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B.R. 932 (1945) (RESTRICTED)

HANDBOOK

ON

AMMUNITION

1945

Admiralty, S.W.1 Naval Ordnance Department

LIST OF CHAPTERS

- I. GENERAL REMARKS ON EXPLOSIVE
- II. PROPELLANTS.
- III. HIGH EXPLOSIVE
- IV. GUNPOWDER AND PYRO ECHNIC COMPOSITIONS.
- V. CHAP & WA GH S.
- VI. CART. DC & FOR B.L. GUNS.
- VI CARTRIL ES FOR Q.F. GUNS AND AIRCRAFT CATAPULTS,
- VIII. UBEC VENT.
- 1X PRIMERS
 - X. BLANK CARTRIDGES.
- XI. PROJECTILES.
- XII. SHELL FUZES AND GAINES.
- XIII. SMALL ARMS AMMUNITION.
- XIV. S.A.A. (contd.)-1-INCH AIMIN & RIV & AN. 22 INCH.
- XV. S.A.A. (conid.)-20-M S.A. AM. INITION.
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 - XIX. PYROT CHNICS.
 - XX, LINE CARRYING ROCKETS AND LINE-THROWING GUNS.
 - XXI, AIRCRAFT BOMBS AND COMPONENTS.
- XXII. AMMUNITION PACKAGES,
- XXIII. AMMUNITION EMBARKATION AND SUPPLY.
- XXIV. MAGAZINES AND SHELL ROOMS.
- XXV. WEATHER DECK MAGAZINES AND LO YERS
- XXVI. TARGETS AMMUNITION

SPECIAL NOTE

Owing to the War ending, certain stores described in "Ns Handbook have been withdrawn from service.

They have not, however, been deleted from this Edb in because it is felt that their use during the War 1939-1945 should be on record. Also t would we meant reprinting, as the book was ready for the binders before the corrections could a made.

A list of stores under this category appended, and it will be supplemented by "P" Series A.F.O. amendments as required,

A aratus A.I

Bon, sdm , Cartridges and Charges.

Cartridges, Aircraft, Catapault.

Cartridges for Holman Projector.

Charges, Bombardment.

Cordite A.S.N.

Fuze No. 125.

Fuze No. 402.

Fuze Time and Percussion, No. 93.

Holman Projector.

P.A.C.

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Projectiles-Par Shot,

Projectiles-Shravel St. 11.

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Tracer	2010		++.4	444	***	***	110	***	+44	+++	519
S.A.P. Tracer	757	77.7			6.5	****	10151	0.00	04906	4.4+	521
Incendiary	***	***		400		555	277	232	727	***	522
Proof		- 45.	***			22		***	***	***	523
Blank	***	**						+++	***	***	524
Drill	***	4.00	(eve	***	999	***		***	***	***	525
Dummy	1110	**	***	***	***	***	40.0	***	***	***	526
Observing		***	199	***	0.64	***	***	***	989	999	527
Rifle Grenade Bal	1100	***	3505	1000	***	***	***	3.56	27.5	1111	1000
Rifle Grenade Cor	dite	-117	355	333	***	***	755	tette	***	137	529
	5	Section	2 Rev	olver :	and P	istol At	nnuni	tion			
General	***	***	+++	***	+++		***	***	335	20	530
Pistol, Revolver, No. 1			2555	***	0.00	4997	110	4.4	(489)	***	500
Pistol, Revolver, No. 2	2, 0.380)-inch	***	2255	****	Kee.	400	***		3444	536
Pistol, 0.455-inch	***	***	***	***	0.555	525	W-T	227	17.	255	537
	Secti	ion 3—	Americ	an Sm	all A	s Am	ımı 'ti	on			
General Remarks	***	155	***	***	***		10.0	200	35.00	444	539
Table of American Car	tridges	, Calibr	es and	Col	Mark	gs.	12	111	222	784	541
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			RIFI	EC	RTR	LOGE	S				
Aiming Rifle Cartridge	S	(644)	***	700		7-200-05		***	444	***	550
1-inch Electric, M		***	5000	111	100	144	466	2220	444	***	551
1-inch Percussion,			5999	2000	7999	X+3	44.0	***	440	***	552
Miniature Rifle Cartrid		and other	1000	1000	2007	n siste	Section.	0.0007	672531	1000	KO COR
0.22-inch Cartridge										***	553

CHAP	TER	XV-	S.A.A	. (con	tinued)	20 1	M.M. C	ART	RIDGI	S	Para,
General Remarks	***	250	1111	1777		***	***		***		560
			Sec	ction	1—Oerlil	con					
British Oerlikon	***	222	222	***	5707	***	***	+++	+++	***	561
Fuzes Nos. 254 an	d 258	010	***	***	***		4.60	***	***	***	561
Charge	***		***	***	100	**	***	***	***	++4	561
Shell filling	***	***	+++	***	200		***	444		***	561
Markings and mea		identif	ication	900	9.9	***	***	7893	***	200	562
Types of Ammuni	tion	***	***	933	.0.	***	***	****	22.0	***	562
Frojectile, Practic		(8400)			3555	***	***	335	22.2	27.7	563
Frojectile, Practic			:222	755	127	757	***	***	***		564
Shell, H.E., Incen			I.)	-	-		444	110	***	***	565
Shell, H.E., Incer		ra	(H.E./L	./ .)	***	414	400	***	+++	***	566
Shell, Semi-A. ou	ır-Pier	ng/x	1 /1 V	A.P.	H.E./I.)	***	***	***	1600	***	567
Shell, H.E. (H.)		***	4+1		***	+++	***	***	***	444	568
Shell H.E., Trace	H.E	./T.).	1.696		***	352	8.650	***	***	2111	569
Cartri e, Drill, M	la s l	and I	11	3400	488.0	tet	***	****	11.1	222	570
Clearing "harge	***	***	7.57			707.0	***	***	***	***	572
A. vican le kor	n	440	***	***				***	***		573
7 pes Anmuni	tion, f	illings	and cold	our m	arkings	200	4.65	***		44	574
			Se	ction	2 Hispa	ano					
General Remarks	****	***	+++				111	***	*	***	577
Markings and mea	ns of i	dentif	ication			***	444	***		5944	578
Types of Ammuni			+++	+++		***	***	***	300	***	579
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Action	***	7.0	***	***			5776		1000	1000	-
O. L. Dealest Plans			Sect	tion 2			-				598
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Main component p						777	100	***	***		600
Tail, propelling	***	111	444	144	***	***	***	***	2444		600
Fins	***	444	***	***	+14	***	444	***			601
Flare Head	+++	***	***	(0.01	+++	140	***		.***	***	002
Action	0.11	/C	(tales)	411	***	***	***	7.2	5111	***	603
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Action	2000	***	255	111	***	2.00	445	***	**	***	001
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Rocket	117	355	2000		222	***	14.	***	3777		606
Main Container	***	***	1.00		155		***	***		***	607
Main Cable	***	+++	0+4	**	122	1.	***	0.00	+++	1990	608
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Action	400	F11	Dees	***	443	200	111	+++	0.4.4	(00)	610
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Main Container	1000	377	199	994	444	***				100	615
A address											616

	The state of the s												Para
	Mark IA	140)	***	***	600	444	*+*	***		644	***	441	617
	Mark II	100	***	1013	7.17	***	***	155		140	110	99.57	618
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	Mark II	***	2.22		***	****	2016		***	***		***	625
									3381290				
				CIL	A DOTT	n v	177	cors	T 17.17.1	ê			
	227 6/2 5/2			CH	APTE	KA	V-11	GREI	NADES	E.			
		***	+++			++-	++=	***	***	***		***	630
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	Marking	144		***	9+1		***	***	***	***	100		639
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	Discha ver N		Mark I			***	444		***			200	641
	rtridg S.		303-inc					***					642
•									***	***	1444		643
	Packing		***	***	244	***	***	***	***	***		**	
	Thening		***	***	***	1916		***	444	444	****	8.	645
	1 (525) 2010 12010 1201	2000										elesciests	
	CHAPTE	RX	VIII-	HOL	MAN	PRO	DJECT	FORS	B.L.	4-IN	CI N	IORT.	RS
	Projectile, Illumit	atin	g. No. 1	Ĺ	444					- U.S			650
				1111		1115	255.00		+40	***	1977	490	652
	Projectile, Illumin		No S		218	***	1550		38.50	100	7.	(855)	
	Holman Cartridge				***	144			356		***	1	653
	Bomb, 10-lb., Un		ton Mo	1 W.	ale T	144	1	444	***	4440	***	+++	654
		uerwa	iter No	. 1, ma	IK I, W	Attn	is ch	A	3.54	***	400	4.00	655
	Action		***	***	4.44	***	***	***	900	303	***	***	656
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	Action	·	****	+++;	100	444	****	***	737	399	444	444	658
	Bomb, B.L., H.E.	4-ir	ich M	Ta. 10	Ib., 4	arl	***	***	***	220	1986	***	659
	Action		***	***		111	+++	+++	TATE:	27.7	27.5	2.00	660
			- (IAP	TER	XIX	-PVI	ROTE	CHNIC	.5			
	Classification			11111		TOTAL TO	S. STESTER						-
		**			***	***	***	***	4.64	***	***	444	(57()
	Signalling and Na	120 (2000)											1200000
	Rocket, Signi				1000	***	1486	***	***	***	***	-9:	671
	Rocket, Signa				***	255	0.00	*++	***	***		-	674
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	Portfire		2000	0645	441			1.00					692
	Ouick Match.			95.00		100	***	1000	1	****	***	900	693
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	Friction Tube		444	4**	4400	144	1880	444	***	***	222	2.1	695
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reworks' Boxes, Ge	eneral re	marks	ttt	100	***	225		0.773	1777	
Night Signal Box		273	572	***	440	++0	***	+++	***	***
Sea Boat Box	+++			2.2	12.1		110	***	***	
Boat's Magazines	+++	***	115	222	14.00	430	90	***	***	24.5
Gig's Magazine		***	K+1.	***	***	0.00	*1.1	***	***	***
Steam Boats	***	400	***	×++	***		100	1.11	0.00	
			*****				CTTTO	ec 13		ATT
CHAP	FER X	(X—I	INE	ROW	R AN		CKE	rs an	(D) L1	NE
ne carrying Rockets					1		1111	111	340	110
cket, Line carrying			7.	***		***	444	***	444	
Instructions for u			***	1.02	7920	5444	***	***	141	144
cket, Line carrying		y 1-		200	4	100		See	***	***
ne-throwing Guns		4.175	1117	100	***	(858	3777	444	K430	222
ne-thrower, Sha ide	r Cos		354					207	244	500
le, M.L.E. (0.30)				311	***	255	***	***		
The state of the s	1 HOUSE			1000	255					
CH	PTE	R XX				BOM	BS Al	ND T	HEIR	
			(COMP	ONE	NTS				
influ ci de	sign	474	***	***		***	***	+++	***	
der stem	114	***	100	***	***	***	1.525			
s for H.E. Bomb	s	488	***	222	***	***	***	***	***	1
ls for H.E. Boml	bs	***	***	777	**		***		***	**
Tail Pistols	***	***	***	***	***		***			
Nose Pistols	. ***	449	***	***	***	4.7		1100	- 1	440
Arrangements	of fuzes	and p	istols	400	1.00		***	69.9	5 444	300
ators for H.E. I		***	***	+++	(7)		1.444	4.0	0.00	300
Detonator—Burs	ter	+++-	***	100			**>	5.00	***	200
Tails	9900	***	200		+++	(244		***	325	311
of Bombs.						THE PERSON NAMED IN				
A.P. and A.P.	***	***	***	***	***	444	0.64	***	***	400
eneral Purpose	(G.P.)						444	14	***	4.
ledium Capacity			1	1	2846	0.4.3	200	400	200	944
inti-Submaria	- 11 3-2	44	400	44 1	760	444	1000	***	***	(4)44
nti-Pers el	**+		6	344	***		0.00	4)(1)(+++	999
ncencary	200	+30	300	0+0	400	200		***	***	1449
ractice	9440	***	434	328	0.844	***	1999	***	***	***
rill	***	211	411		111	111		175		
ngs	+++	***		***		***			1	44
	CHAN	enters.	VV	T 43	DATE	TTTTC	N1 TV I	CIZAC	120	
	CHAP	TER						CKAC	LS	
Se	ction 2	Pack				Rema		al m	unition	
drical Cases							ii tileti			
2.12	****	***	1515	250	483	140	220	100		***
л И	***		josy	2.1	***	111	100	7//		3
i.F	***	***	***	444		***		***		
ngular Cases	***	252	655	-	4.4				00000	
	***	44.60	24066			***	***	**	997	4.4
	111			1415	444	(4.0)		+3.5	364	4.4
	111	411	***		(41)	140	111	tet.	det	***
R.J. and R.H.		***	***	200	1999	***	***	1720	4.44	255
f., W., S., R., ar		3.11	***		***	975	555	27.5	***	**
of Keys	att.	277	577	***	****	***	***	***	***	**
for Q.F. Amm		***	***	***	***	144	144	***	***	**
dge Boxes—	214	***	****	***		244	***	***	444	**
. 23, Mark II	+++	0.00	***	0.00	***	1000	***	***	***	***
185				The state of the s						

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4 mee	3+	Cartridge, Q.F. 4.7-inch, Separate Cartridge, Q.F.					10.7	***	***	151
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Conta	- 11		nen	****	244	12.0	1777		222	189
ote	r v	The Tubes Vent						i.		#5340.0
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11 2	5		xterna	i.	722	***	***	275	34	324
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	" D.A. No. 44 Mark X v			+4,4	+++=	340	****	+++	
	" ", No. 118 Mark II	4.60	+10	1449	200	11.0	***	444	358
	,, No. 230 Mark V		311	115	+++	911	***	1270	359
17.		•	49	(185)	5555	200	***	+++	365
	., No. 246 Mark I		***	17:3	***	1,777	***	***	370
	" No. 255 Mark I	- 1	ET	33	+47	111	222	444	375
	Time and Percussion, No. 93 Mari			1444	***		***	110	448
,, 18,				3432	+4.6	9.73	***	110	383
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1	40 1 AT 10 M. A. L. T		***	9+4	***	444	***	+++	458
	- 1 T T T T T T T T T T T T T T T T T T		***	+++	***	464	***	***	463
20.			411		****	900	444		441
							4		
Chr .e.	Small Arms Ammunition.					1112.4		50,00	515
sale 21.			***	***	17.5		557.	***	
. 22.	Revolver, Pistol and Machine Car	bine .	Ammu	mition	491	***	***		530
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GLOSSARY

The definitions given are intended to apply to the ter v in the sense in which they are used in this book,

Annulus: In small arms ammunition, the varnishe ving beta in the percussion cap and the base of the cartridge.

Blast: The outward pressure the air a used by its displacement at the point of the explosion or detonation.

Cannelure: A grow, espec illy circular bove formed round a bullet or projectile near its base,

Copacity: When sed in action to the or bombs, the amount of explosive filling stated as a percentage of the total weight the shell or bomb.

Centrifus force: To vadial force acting on a body travelling in a curve, owing to the tendency of the body a continue tracling in a straight line.

house: A neither of closing the neck of a bag containing explosive in powder form by drawing it to love it is everal pleats and then tying it round with silk thread.

cong: a method of securing a projectile in its case consisting in pressing the wouth of the case into a cannelure on the projectile.

Comping: A method of closing the month of a cartridge case with a series of sm \(\frac{1}{2} \) folds, e.g. as a means of retaining the charge in unbulleted blank cartridges,

Danger Zone: The space round the point where an explosi or deto. Son occurs thin which damage may be caused. It may be divided into two distinct are: :—

 The Blast Zone—in which persons or male it may e damaged the expansion of gases of that explosion or detonation.

(ii) The Fragment Zone—in which person or material magnetic damaged by fragments produced by an explosion or detonation. The fragment of consist of portions of the walls of the shell or other container or may be formed by material so in motion by the explosion.

Drift: The deviation of a projectile whe right from the plane of departure due to its clockwise rotation.

Endothermic: (of a chemic 's supounds. Abording heat on its formation; lead azide is an example of such a compound.

Erosion: The a r mechan any provinced on metals with which they come into contact by :-

(i) The mecha sal fricts a of the solid products of an explosion.

(ii) The scrubbin, action of the hot gases.

The alternate heating and cooling, e.g., of the hore, by causing surface disintegration ceters the erosive effect.

Fragmentation: The breaking up of the container of an explosive; the more vision is smaller and more numerous are the fragments produced.

Hygroscopic: Tending to absorb moisture from the air; ammonium no te is o examp. Luch a substance.

Indenting: Process of pressing the metal of a cartridge case into a cannelure a shell or bullet at several separate points on the circumference.

Inertia: The property by which matter continues in a law frest of while motion in a straight line, except in so far as the state is changed by cornal face.

Muzzle Velocity: The velocity of a proble relative the mounting at the moment it leaves the muzzle; sometimes called "Initial velocity."

Necking: The operation of reducing the diameter of the mouth of a cartridge case from chamber diameter to projectile diameter, resulting in the formation of the conventional "bottle-shaped" cartridge. The operation may also be used to fix a bullet in its case, with or without an additional operation such as indenting.

O.F.M.: Obsolete for future manufacture.

Penetration: Holing of armour caused by shell burst on or near its surface.

Perforation: Passage of shell through armour in a fit condition to burst on the far side.

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the shell by the rifling of the gun. If heavy vibration is experienced the setting of pre-set fuzes may alter. If pre-setting is essential the setting of such fuzes is to be checked at frequent intervals, and in any case after heavy vibration has occurred.

- 404. The tensioning of the time rings of combustion time fuzes may alter owing to varying climatic conditions:—
 - (i) With normally tensioned fuzes, the tensioning may become either greater or less.
 - (ii) With clamped fuzes the tensioning may decase so that the time ring can be turned by normal application of fuze setting the life fuzes are fired with comparatively loose time rings there will probably be irregular sults or premature bursts.
- 405. Where the tensioning is less than the undard landown in the next paragraph, the fuzes may be retensioned on board as described below.

The standard of tensioning to be spaintained is

- (i) Fuzes as in para 404 (i).— We time sex on ring should require a firm pressure to set when using the hand fuze a ting ey. It should not be possible to turn the time setting in with the finger at I thumb.
- (ii) Fp. as in tra. 04 (ii) With clamped fuzes it should not be possible to turn the tild setting ag wis smable pressure using the hand fuze setting key.

Instructions for reasing lension of fuzes, para. 404 (i):—

406. (i) Ease bat the two small set screws near the top a full turn each.

- Fit the key provided (key No. 133 for fuzes Nos. 198 and 400 or key No. 141 for fuzes No. (1).
- (iii) sold the shell or fuze firmly and screw down the top of the fuze
- (a) Test the tension in accordance with the standard laid down and adjus. I necessary.
- (v) Screw up the set screws.
- (vi) Set fuze to "safe" or setting ordered.
- (vii) Replace the waterproofing composition R.D.11

Instructions for damping fuzes, para. 404 (ii) :-

407. Similar action is taken when clamping from to hat laid do n for increasing the tension, except that the fuze must be set to the correct of the best valuation hard down.

407A. Occasional checks on the tensions of the combination of the combination of the combination of the carrying out inspections. It is not the policy of the tensioning of unclamped fuzes which are apparently stiff, as the stiffness may be due to due to

Fuze Setting.

408. The amount of the powder that ourned is regulated by the angle through which the bottom ring is boned. Granuscus on the body of the fuze to enable this angle to be read off and an account of the inequality of the movable ring, or vice versa. The graduations on the body are a grary dissions chosen to obtain the requisite degree of fineness of setting; they do not necessarily a resent a nutes, degrees of arc or seconds of time.

409. Fuze scales a published to indicate the times of flight corresponding to the various strings. The movement of the bottom time ring may be (i) by hand, using the suitable setting key, (ii) by a hand setter; (iii) by a fuze setting machine. Slots are formed in, or study project from, ring to enable it to be turned.

For hand setting with a key the position of the slots or study is of little important, as the rug is revolved until the graduation required appears opposite the arrow.

With some types of hand setter or fuze setting machine the position of the dots or study must be accurate and care must be taken to avoid damaging or disperting them. On no account should they be used for any purpose other than setting the ring with the approved ken setter or machine.

Escape Holes.

410. In all Time fuzes (except No. 185) haust channels or escape time holes through which the gases generated escape nere. These escape holes are closed by escape hole discs. An efficier essenti prevent direct access of burning gas at high pressure from the gun (which would ature by flash over) and also to prevent e a pro moisture reaching the composition during stor Pren tures are occasionally experienced in subcalibre guns with No. 124 fuzes, when flash from umber gases enters the escape holes after the discs have blown off but before the projectile is clear of ie parent gun,

Fuze, Time, No. 125. Plate 19.

411. This fuze is for use with 2-pdr. to 6-pdr. common nose fuzed shell and has superseded No. 124; it is smaller than but similar in design and action to No. 198.

The flash channel between the detonator and the top ring is filled with mealed powder. This gives a slight delay in the lighting up of the top ring and is intended as a guarantee against the shell bursting in the parent gun when used in sub-calibre guns.

The bottom ring has ratchet teeth around its periphery to engage the automatic fuze setter. No cover is fitted.

The design and components of the fuze are shown in the illustration.

Safety Arrangements.

- 412. The fuze embodies the following safety and ments:-
 - (i) The detonator is carried in a per twhich it eld clear of the striker needle by a stirrup spring housed inside the sleeve.
 - (ii) Accidental ignition of the detonato will not quite the magazine while the fuze is set "SAFE," as the form the less in the rules are blanked in this position.

Before Firing.

413. The fuze is any training the ottom ring until the setting mark is in line with the required graduation on the approxime.

Action-On Firing.

4). The inertia of the detonator pellet causes it to set back on to the needle which pierces the detonate. The results flash passes through the flash hole and ignites the composition in the top ring.

Acc -Du vy aght,

As The ruze powder in the top ring burns round until it ignites the powder of let in the channel adding to the bottom ring. The fuze powder composition in the bottom ring is a cited and burns util it ignites the powder pellet at the head of the channel leading to the magazine. Escape holes be drilled in the time rings at the position where the train of powder is a numerical. Each hole is filled with a perforated powder pellet and closed by a brass disc, which is blown but and allows the gases to escape as the powder burns.

Action-On Burst.

416. The flash passes along the channel and some powder if the magazine. The flash from the magazine passes through the weakened portion in the entre of the closing plug and ignites the exploder.

Fuze, Time, No. 198. Plate 19.

417. This igniferous time fuze, of 2-inch gas to and is tensioned.

The fixed upper time in a graduated 0 . 2. The movable lower time ring is engraved with the setting mark.

As an A Juze No. 18 as be largely superseded by Nos. 206, 207 and 211 fuzes.

- 418. The for is for the with:
 - (i) 12-p . to 8-i .ch H.E. shell.
 - (ii) 12-pd to 4-inch Star shell (except 4-inch Mark XVI).
 - (iii) 4-inch to 5.25-inch Smoke shell B.E.
 - (iv) 5.25-inch and 6-inch Chemical B.E. shell.
 - (v) 4-inch, 4.7-inch and 5.25-inch Target Smoke shell.
 - (vi) 12-pdr. to 8-inch H.A. Practice projectiles.
 - (vii) 12-pdr. Falling Target shell,

The design and components of the fuze are shown in the Ulustration,

The screwed watertight cover must be removed before fit og fuze to sh V; the cover may then be temporarily replaced.

Safety Arrangements.

- 419. The fuze embodies the follow a safety arr genents -
 - (i) The detonator in its holder is opt clear of the needle by a spring.
 - (ii) Accidental ignition of the detor or will not ignite the magazine while the fuze is set "SAFE" as the flash holes in the rings are blanked.

Before Firing.

420. The cover is unscrewed and removed. The fuze is set by turning the bottom ring until its setting mark is in line with the required graduation on the top ring.

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Action-On Firing.

421. The inertia of the detonator holder causes it to set back on to the needle which then pierces the detonator. The resulting flash passes through two flash holes and ignites the fuze powder in the top ring.

Action-During Flight.

422. The fuze powder in the top ring burns round until it ignites the powder pellet in the channel leading to the bottom ring. The fuze powder in the bottom ring is ignited and burns until it ignites the powder pellet at the head of the channel leading to be magazine. Escape holes are drilled in the time rings at the position where the train of powder's contented. Each hole is filled with a perforated powder pellet and closed by a brass disc which it down out to allows the gases to escape as the powder burns.

Action-On Burst.

423. Flash passes along to channel of ignites the pewder in the magazine. The flash from the magazine passes through the violence on in the centre of the closing plug and ignites the exploder or detonates the gain passes (tted).

The No. 198 as similar to 3. 198 accept that part of the screw thread which holds the fuze in the nose of the shill has been removed. The cutaway of the thread allows the fuze to blow out easily. No. 198c fuzes are the sin certain H.A. Practice projectiles and these are stencilled appropriately.

Fuze, T. e, No. 400.

424. Was is a cort burning fuze for use with :-

- (r -pdr. to 16-inch H.E. shell (with a gaine).
- 4-inch and below (except 3.7-inch) Shrapnel shell.
- (iii) 12-pdr. to 8-inch H.A. Practice projectiles.

The body of the fuze and the safety arrangements are similar to the of No. 18, Mark II (Flate 19). Two additional flash channels are bored from the central space r and the spring to the too time ring. The top time ring is empty, and flash from the decision for passes so high to the bottom ring which is filled with S.R.304 fuze powder.

The total time of burning of the fuze is 9 seconds. To distingula the fuze from the No. 198, its lower ring is coloured with blue lacquer.

Fuze, Time, No. 402. Plate 19.

425. This fuze is for use with Shrapnel she only in 12-pdr, H.A. and H.A./L.A., 3-inch 20-cwt, and 4-inch (Mark XIX) guns in D.X.M.S., Fast liners and Oilers. The fuze must not be used with H.E. shell. The design and components of the fuze are shown in the illustration. The time of burning is fixed so that the shell it is loded at 500 yard, range and no fuze-setting is required.

Safety Arranger as.

426. The connator have r is held away from the striker needle by the spring.

Action-On Firing

427. The detons or holder sets back against the spring and the needle pierces the detonator.

Adion-During Flight.

428. The flash from the detonator passes through the flash channel and ignite the delay opposition which causes a certain delay before igniting the powder pellet and

TIME, MECHANICAL

429. The mechanism of this type of fuze is designed to rea at a predex uned rate after the fuze is armed. As the rate is little affected by the rotational velocity of the propertie in which it is fired, the time of running or time of burst is practically constant in an type of gun. The design is capable of being used in nearly all equipments, provided the those of flight is known, even though the range table does not include a scale for the actual free. The meanurical interfaces in supply are Nos. 206, 207, 211 and 215; they differ only slight, in design.

Fuze Setting.

429a. Time Mechanical fuzes are intended be set primarily by mechanical fuze setters, and the graduations provide a secondary means of settin by eye with a hand key.

The body or base piece is graduated externally from 00 to 21½. The lowest setting at which these fuzes will function is 007; with fuzes fitted with the muzzle safety bridge piece settings less than this will give blinds.

Fuzes are set by rotating the dome in a clockwise direction viewed from the point of the fuze.

430. The fuzes are issued set "safe" and must be in this condition before using the mechanical setter. If a fuze is disturbed from the "safe" setting, it must be carefully reset "safe" before it is set by a mechanical setter. Small reverse settings to adjust over-set fuzes may be made, but main setting must be in a clockwise direction only. Fuzes are not compromised by setting and may be reset a number of times if required. If heavy vibration is experienced, the setting of pre-set fuzes may alter. If pre-setting is essential the setting of such fuzes is to be checked at frequent intervals, and in any case after heavy vibration has occurred.

Although the most satisfactory setting is probably that do to by the mechanical fuze setter, good setting to the graduations by hand key is possible if care a versised. These graduations also form a rough check for the mechanical setter. Particular calcular value when setting with a hand key. The key is marked with an arrow to indicate in which direction a rotate.

It is important to ensure that the fuze is still set " . 'e " after 'e removal of the cover, especially when it has once been set.

431. The safety arrangements e similar a those in vercussion D.A. fuzes, and differ fundamentally from Combustion Time fues as no de natoris struck on firing the gun.

432.

given to the use of time mechanical fuzes for bombardment, as this 433. Consideration would simplify drill, and apply of fuzes to ships taking part in assaults. Trials have shown that mechanical fuze will function on impact, but at small angles of descent under easy ditions a ti obably be a high proportion of blinds. The shell burst is caused by the soft gro there will or on , thus firing the detonator of the luze or gaine, and this train of action CITE read and mu han when a direct action fuze is employed, whereas rapid initiati nent shell.

4. Whenever possible, direct action fuzes should be used for bombarding, but who the guns that a being used for bombardment must also be at immediate readiness to represent time in chanical fuzes is acceptable unless a large proportion of the target is soft grand.

For fuzing and unfuzing shell, (see paras. 487 and 488).

Fuze, Time, No. 206.

435. This fuze is for use with :-

- (i) 4-inch to 8-inch H.E. shell (with No.) or N 10 gaine).
- (ii) 4-5-inch to 5.25-inch Star shell,
- (iii) 5.25-inch and below Targe Smoke shell.
- (iv) 4-inch to 8-inch 1. Practic projectiles.

Some difficulty may be explained on recording fuzes supplied in the cylinders No. 202. Should this occur and the fact cover become accretion from the fuze, the fuze itself must be unscrewed from the cylinder to means of the aze fixing key.

The mechanism is a nilar to at of the No. 211 fuze (Plate 20).

On impact with thin 'eel plating fuze No. 206 with a No. 9 gains will also detonate the shell. At short ranges the gains a conator will be actuated by the crushing in of the fuze body, even if the fuzes are set "SAFE": at longer ranges or at oblique impact it is desirable that fuzes a set to burst well beyond the target.

For instructions for fuzing and unfuzing shell, see para. 487.

Safety Arrangements.

436. The fuze embodies the following safety arrangements -

- shaped foot (i) The striker is kept away from the detonator hich rests on a by a ca pillar. Should any fault in the mechanism the fo come the pillar before the fuze is rotated, further movemen of the etonator is arrested becomes locked. Subby the centrifugal safety catch enga fuze fired in this condition sequent rotation of the fuze free the will be blind.
- (ii) During flight, the centrifugal safety cash open and does not interfere with the striker which is released after the passage of the "SET" time.
- (iii) The clockwork mechanism cannot be started when the fuze is set "SAFE," as the trigger safety catch prevents the trigger from setting back and freeing the hand. As long as the fuze is set "SAFE" the trigger safety catch is retained under the trigger by a stud which projects from the inside of the dome.

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(iv) No. 206 Mark II fuzes have been introduced into the service and have a device consisting of a bridge piece which prevents the hand of the clockwork mechanism from rising until the mechanism of the fuze has run approximately one second. This prevents premature bursts occurring just inside the muzzle of the gun.

Before Loading.

437. The watertight cap is unscrewed and removed the dome is set to the required fuze length. This operation shears the dome shearing pin and allows the trigger safety catch to come out from underneath the trigger.

Action-On Firing.

- 438. (i) The locking ring sets back, shearing the small evets by which it is held, and its bottom edge is cut into it. The scking pins of the base piece. As the locking ring is keyed to the dome any arther the ring of the same relative to the base piece is prevented.
 - (ii) The trigger say back and trees are hand thus allowing the mechanism to start. The har reverses uti-clockwee, and the hand spring continues to force it against the idenside. The hand to ...
 - (iii) The real on of the projectile causes the centrifugal safety catch to swing out clear of the cam on the striker.

Action- uring Flight and on Burst.

439. We load revolves until it comes in line with the gate in the hand race. The hand spring for the hand through the gate and the end of the striker lever is released. The allows the striker turn so that its foot drops off the pillar. The striker spring forces the calk down so that its point pierces the detonator. Flash from the detonator ignites the powded in the mazine.

Fuze, Time, No. 207.

440. This fuze is for use with the same shell as No 100 hs, and also with 4-inch, Mark XVI, and 4.5-inch to 5.25-inch Star shell, and 4.5-inch and 4-inch Chapital B.E.

The fuze was introduced as a strengthened form of to. 206, but is nowbeing superseded by No. 211 for H.E. shell.

The Safety Arrangements and action we identical to use of No. 206. The Mark III design is fitted with a bridge piece, which prevents to hand of the clockwork mechanism from rising until the mechanism of the fuze has run approximately use second. This prevents premature bursts occurring just inside the muzzle of the gun

Fuze, Time, No. 211. 20.

441. The face can be used with

- inch to 8 .ch H.E. shell.
- (ii) 5 5-inch a below Target Smoke shell.

This is a detecting fuze embodying a gaine; it is superseding No. 206 fuze in all H.A. equipments in which the embination of No. 206 fuze and No. 10 gaine is approved.

The design and components are shown in Plate 20. The mechanism is how of lower in the body than the No. 206 fuze to improve the strength of the fuze and its ability to resist streams on firing.

For instructions for fuzing and unfuzing shell see para. 487 and 489

Safety Arrangements.

442. The fuze embodies the following safety arrangements:-

- a cam-shap (i) The striker is kept away from the d tonator foot which rests on a allov ome off the pillar before pillar. Should any fault in the mech ds the detonator is arrested the fuze is rotated, further n veme t and becomes locked. Subseby the centrifugal safety h which ill not fre a fuze fired in this condition would quent rotation of the be blind.
- (ii) During flight the centrifugal vety cath opens and does not interfere with the striker, which is released after the passes of the "set" time.
- (iii) The centrifugally operated shutter blanks off the passage between the detonator and the magazine. A detent holds the shutter in the "SAFE" position.
- (iv) The bridge piece prevents the hand of the clockwork mechanism from rising until the mechanism of the fuze has run for approximately one second. This prevents premature bursts occurring inside the muzzle of the gun.

Before Loading.

443. The watertight cap is unscrewed and removed. The fuze is set by turning the dome to the required fuze setting; this operation shears the dome shearing pin.

Action-On Firing.

444. There are two series of actions, namely, those caused by set-back (which occur simultaneously) and those caused by the rotation of the projectile.

In the first series :-

- (i) The locking weights set back and force the ocking pins into the space between the dome and the body, thus prevent g any fineer relative movement between them.
- (ii) The trigger sets back and frees the and, thus llowing the mechanism to start. The hand revolves anti-clockwise and the hand space continues to force it against the underside of the hand.
- (iii) The detent sets lack agains its spring and frees the shutter.

In the second series

- (i) The carriful state wings clear, allowing a free passage for the foot on the state when a drop of one pillar.
- (ii) The composition could be completed and locks itself back under the shoulder of the detent hole.
- (iii) As the utter is no longer held by the detent it slides over against the pressure of the shutter a long into the armed position.

co. -Dur. v FV a and on Burst.

A country of the hand revolves until it comes into line with the gate in the hand race of the hand spring as a the hand through the gate and the end of the striker lever is released. This arows the striker turn so that its foot drops off the pillar. The striker spring forces the wiker down and its point process the detonator. Flash from the detonator ignites the C.E. in the stemm I channel to the shutter and the magazine is detonated.

Fuze, Time, No. 215.

446. This fuze is for use with 4.5-inch to 5.25-inch St shell.

The safety arrangements and action are similar those of No. 207 Mark III fuze, with a longer time of running. (Maximum of 80 seconds.)

CH. XII SECTIO 4.—TIME AND PERCUSSION FUZES

447. These confirmed time times and a percussion mechanism which works on the inertial principle.

The fuze wilk unction impact before the time mechanism is due to function or if the time mechanism fails to unction arrectly. These fuzes are obsolescent.

The safety arran ments are detailed in the description of the No. 93 fuze.

Fuze, Time, Percussion, No. 93, Mark I. Plate 17.

448. This fuze is for use with 6-inch to 15-inch Shrapnel shell. It is a clamping fun and its des n and components are shown in the illustration.

Safety Arrangements.

449. The fuze embodies the following safety arrangements:-

Time Portion.—(i) The time pellet carrying the deto tor is preve ed from falling on the needle by a stirrup spring and a fety pin.

(ii) While the fuze is set to S. VE, acc ental duition of the detonator will not ignite the magazine so the fit because are blanked.

Percussion Portion.—The percuss of detonators prevental from moving forward on to the percussion needle by a steel but insposed be seen the top of the pellet and the top of the recess in the body of the fuze. It is an retained by the stirrup spring taking under the brass ferrule.

Before Loading.

450. The safety pin is removed. The cap is eased back (right-hand screw), the bottom ring is set to the fuze setting ordered and the cap screwed down again. No attempt should be made to replace the safety pin once it has been removed, and if not required for immediate use, the fuze must be removed from the shell and thrown overboard.

CH. XII-SECTION 5.

Action-On Firing.

451. Time Portion.—The inertia of the time pellet causes it to set back through the stirrup spring on to the time needle. Flash from the detonator ignites the fuze powder in the top ring and the powder burns as in the No. 198 fuze.

Percussion Portion.—The inertia of the ferrule causes it to set back, straightening out the arms of the stirrup spring and exposing the hole in the body in line with the steel ball. Centrifugal force causes the ball to fly out into as hole. The fuze is now armed, the percussion pellet being held back only by the spring.

Action-On Burst or Impact.

452. When the fuze powder has burnt the flas basses dow into and ignites the fuze magazine. If the shell strikes an object before the time portion has functored, the percussion detonator pellet will set forward on to the percussion medie; this is a ginite the detonator, and the resulting flash will pass into and ignite the fur magazine.

453

CH. XII-SECTION 5.-DRILL FUZES

Drill, P cussion, Dir t Action, Fuzes.

454. v. 45P and v. 230 are in service. They are converted service fuzes with all explosives significant grange cents removed, or solid plugs shaped to represent service fuzes.

rill A Fues.

455. These consist of converted service fuzes with all explosives and ignitio arrangements moved, or of specially manufactured plugs contoured to represent service uzes. The can be used for fuze setting drill. Fuzes, drill, time, No. 206, Mark II, No. 207 and No. 11, Mark II, are provided with removable rings which can be replaced when worn.

Marking of Drill Fuzes :-

- 456. (i) All fuze bodies are black.
 - (ii) The caps of 45P drill fuzes are red
 - (iii) The portions of time fuzes on such the rao tions ar engraved are left bright.
 - (iv) The word "DRILL" is stamps on the a.

ANY FUZE WHICH IS A T BLACK, OR WHICH DOES NOT HAVE THE WORD "DRILL" STAMPED UPON IT SHOULD A TREATED AS LIVE.

CH. XII—SECTION 6.—GAINES

457. Gaines at used we igniferous fuzes (and occasionally with detonating fuzes) to produce detonation of the sh I filling and are fitted in the shell directly below the fuze. They are actuated by pressure from the explosion of the fuze magazine and initiate the detonation wave which is conveyed through the exploder to the shell filling.

Gaines are fitted in all H.E. shell with 2-inch fuze holes, except shell for 3.7-in howitzer of shell using fuze No. 211. Gaines are also used in some Target Smoke and special Bon ardment shift the letter Z after a Mark indicates that a Lead Azide Detonator is fitted.

Gaine, No. 10. Plate 19,

458. This gaine is for use with :-

- (i) 3-inch to 8-inch, 14-inch, 15-inch (B.N.F.) and I inch H.E. sh
- (ii) 5.25-inch and below Target Smoke she

The design and components of the gaine are sho in ho be illa value.

Safety Arrangements.

459. This gaine embodies the following afety are ngements:-

- (i) The detonator is not in line with the nee e before firing. Should the needle be forced back by any cause its point will take in a hole in the shutter. The shutter is held in its safety position by a spring and detent.
- (ii) Accidental ignition of the detonator will not fire the magazine as the detonator is not in line with the fire channel. Should the detonator fire accidentally, the gases generated will pass down into the vent hole.
- (iii) During flight, the needle is kept clear of the detonator by the needle disc.

Action-On Firing.

460. The detent sets back against its spring and frees the shutter which moves, under the influence of centrifugal force, until the detonator is in the centre line of the gaine between the needle and the fire channel.

Action-On Burst.

461. The gases produced by the ignition of the map one of the fuze force the needle of the gaine back on to the detonator. The detonator disrupts a starts the chain of detonation which passes through the C.E. in the fire channel into the mags one of the gaine.

Gaine, No. 9.

462. This gaine is similar to No. 10, except that it is confident in lead free material, and therefore can be used in shell fille in its high explore containing Picric Acid.

Gaine, No. 11. Plate 19.

463. This gaine is for us with :-

- (i) 12 ar. 12 vt. ad 3-inch I.E. shell.
- (ii) 4 inch, 4 inch, 5 inch, 6-inch (Mark XXIII guns) and 8-inch Chemical Bursting

e design and components are shown in the illustration.

Safety A. angement.

64. As conditionally operated shutter blanks off the channel between the dechator and the fire a new the magazine.

Action-On Firing.

465. Centrifugal force causes the shutter to swing over against the passure of a spring. The stemmed channel in the shutter is thus brought into line with the detonato and fire cannel of the magazine.

Action-On Burst.

466. The gases produced by the ignition of the fuze tragazine can the detonator of the gains to disrupt. The chain of detonation passes through the "LE to the shut or and the fire channel into the magazine of the gains,

CH. XII-CCTION 1 -DETONATORS FOR FUZES AND GAINES

467. A "try" detoutor type when on initiation will transmit a wave of detonation to the high explosionalling of a few or when.

The term betonator has been used rather loosely and it became customary to refer to caps filled with an ignit rous corposition as detonators.

Both true detor tors and igniferous composition filled detonators are fitted in fuzes used in Naval Service, and to avoid confusion true detonators will be referred to as "Disruptive" despression in the igniferous composition filled detonators as "Igniferous" detonators.

The greatest care is taken to ensure that detonators are correctly made, that fly are clean and that no loose fulminate or igniferous composition is on the exterior. In some of recautions is possible that over-sensitive detonators may sometimes be passed into the great and it is therefore of the utmost importance that detonators or fuzes containing detonators should be the containing detonators.

468. Fulminate of mercury and igniferous compositions re liable to teriorate and to become unserviceable with time; the rate of deterioration of igniferon composition is very much less than that of pure fulminate.

No age limit is placed on the life of detonators filed, the ignitions of apositions or on composite detonators filled with igniferous composition and lead wide. Wife to be a years is placed on detonators of pure fulminate. The speed of deteriors on is increased with the temperature of storage.

DISRUPTIVE DETONATORS

469. Disruptive detonators are fitted in Perussion D.A., and Time No. 211 fuzes and in all gaines. The container is of copper and the filling contest of (i) a top layer of "A" mixture and a bottom layer of lead azide, or (ii) a charge of pure fulminate of mercury.

Detonators filled in the first manner have the letter "Z" suffixed to their nomenclature.

Disruptive detonators are initiated by a direct blow from a sharp hard needle which causes a molecular disruption and a wave of detonation is propagated to the fuze magazine.

CH. XII-SECTION 7.

470. The several types of disruptive detonator used are :-4-grain detonator (filled fulminate of No. 18 f No. 18 fuze mercury) now superseded for current filling by the 5-grain "Z" No. 18P fuze No. 19A fuze No. 45P fuze (Marks II, VII/II, VII****/II XI/II4-grain detonator (filled C.E. and lead 11 gaine (Mark IIZY) azide) 5-grain detonator (filled fulminate of fuze (all marks up to and including mercury) now superseded for current filling by the 5-grain " Z No. 451 ze (Marks VIII, VIII**, X) o. 8 ga e (all marks up to and including Mark IV) 5-grain " Z " detonator . 44 fuze (all marks above Mark X) sition " A " and lead No. 45P fuze (Marks VII****Z/II, VIII**Z, XZ, XIZ/II) No. 117 fuze No. 118 fuze No. 230 fuze No. 230P fuze No. 240 fuze No. 241 and 248 fuze No. 360 fuze No. 360 C fuze No. 211 fuze, No. 720 fuze No. 8 gaine (all marks ab No. 9 and 10 gaine No. 11 gaine (Mark I) No. 720 fuze (magazine 5-grain detonator (filled A.S.A.) tonator alternative 5-grain 6-grain detonator (filled C.E. and lead No. 2 s II and azide) No. fuze (M 10-grain detonator (filled fulminate of gaine (bot deto ator and gaine are mercury)
2.8-grain " Z " detonator (filled compatition " A " and lead azide) cent)

IGNIFEROUS DETONATORS

471. Igniferous detonators ignite powder by sh and their usual function is to ignite the powder filling of a fuze mag

These detonators filling according to their service :-

(A) De ors for percussion part cf Time and Percussion fuzes and Nos. 246 fuze entirely with A mixture. This type of filling is also used in . 206 a 207.

tatic No. I

- (B) Special onator for Time and the time part of Time and Percussion fuzes, filled ly half and half with B mixture and a powder pellet. approxim
- 472. A and B compositions are mixtures of the following substances:-

		A MIXTURE	B MIXTURE
Fulminate of Mercury	2.22	6 parts by weight	11 per cert of eig
Chlorate of potash	***	6 parts by weight.	52.5 pc cent. by weig
Antimony sulphide	***	4 parts by weight.	36.5 per ent. 1 weight.

Igniferous Detonators, Filled "A" Mixture.

473. These detonators are made in three sizes-3, and 1.7 e designed to be struck b

by a needle on the top and		fitted in the follo by (tzes:-
3-grain detonator		All media and large is perconn fuzes.
		No. 202 fuze Time succhanical fuze.
2-grain detonator		Fuze, per ssion, b. e, Hotchkiss.
1.7-grain detonator	***	No. 81 fuze (Time and percussion fuzes—percussion arrange- No. 93 fuze ment):
		No. 243 fuze No. 246 fuze With larger hole in the detonator.
		No. 720 fuze With larger hole in the detonator for percussion arrangement.

Igniferous Detonators, Filled "B" Mixture and Powder.

474. This type of detonator is used in the time arrangement in Time, Time and Percussion and fuze No. 720, Marks I to III. These detonators are more squarely shaped than the plain igniferous detonators and are designed to be struck by a needle on the bottom,

The detonators fitted to the different types of Time fuzz differ slightly in filling and construction, but are all made on the above lines.

As an example, the weights of explosive filling edetonator for fuze No. 198 are :-

1.1 grains detonating composition " P "

1.41 grains of gunpowder.

CH XII-SEC ION 8.-MISCELLANEOUS

Failures and Accounts wan Fuzes.

47 "Blinds" "Prematures" may occur with any type of fuze. They may also occur through fault in the bell or its filling quite apart from the misbehaviour of the fuze.

With procession mechanisms a blind usually indicates that the main detonator of the fuze has least to firm. With time mechanisms it may mean that (1) the detonator of the ignition arrangement as hard to proceed on, or (2) the time rings have failed to ignite, or (3) the time ring naving ignited, we describe that the same in all cases—the fuze does not function.

Blinds in fuzes may be due to any one of a large number of causes or ven to a submation of causes which it is impossible to determine without investigation. One of the non-tech cal reasons may be the failure to remove the safety pin or/and safety cap.

The term "premature" applied to a fuze indicates the some attion of the uze has functioned some than was intended, with the result that the shell filing is explored prematurely.

476. By reason of the Safety Arrangemen action of the fuze detonator prematur will not always result in the premature exp ell. In zes, however, where there is nothing to prevent the flash from the deton gazine the premature action of the detonator will result in the immediate of the fuze A premature ignition of a fuze detonator may result in a shell bursting when gun is fired and before the shell has had time to reach the muzzle. A similar accid may occur ing to a defective shell or filling.

It is important when sporting pematures to ske great care to ensure that full particulars of the shell, the fuze and the energy use in the an are reported to the Admiralty; this will enable the matter to be fully invenigant and look assistion being thrown on the fuze or on the shell when the other is region respons legions, as ident,

Premate as fuzes many or due to a large number of causes, and it is impossible without thorough investigation to a sermine a cause of any one accidental explosion.

Firing through Muzz Covers.

477. Base fuzed shell are not liable to premature if fired through a muzzle cover, e. n if the ver is coated with ice. Nose fuzed shell may premature if fired through a muzzle cover and if the not they will probably be blind.

478. For Guns, 2-pdr. to 12-pdr. inclusive.—When muzzle covers of any acture a incluse, who ser or not they are likely to be coated with ice, the first round fired should be a provice part or a base fuzed shell.

479. For Guns, 3-inch and above:-

- (i) When circumstances are such that throughout the vhole period uring which the guns are likely to remain loaded, formation iable to cur, all shell, whether base fuzed or with direct action ell) or time fuzes, may be fired through muzzle covers nditio ble to keep covers in place, The exceptions to the al e fuzes 5P. Shell fuzed with these fuzes are not to be fired through , and w en they are in use and it is necessary to keep covers in place, the first round ist be a ractice projectile or a base fuzed shell.
- (ii) When ice is liable to form, base food shell and K device shell may still be fired through the covers, but shell fuzed D.A. those fitted with time fuzes should not be fired. A practice projectile (or a base fuzed shell, according to circumstances) should be the first round fired.

Note.—Cartridge, Q.F. 40 mm. Practice (weighted and plugged shell) must be used for 40 mm. Bolors guns and not Cartridges Q.F. 40 mm. Projectile Practice (fuzed and filled S.R.274).

CH. XII-SECTION 9.

Care of Fuzes.

480. Instructions for the care of fuzes supplied separately in tin cylinders are set out in the N.M. & E.R.s.

Should the watertightness of fuzes supplied in their component shell be compromised in any wav (e.g., by removing the pin or by setting of a time ring) that fuze, if not immediately fired, should be regarded as unfit for service, and the complete round returned to a Naval Armament Depot at the earliest opportunity.

Metal Fuze Covers.

481. Metal fuze covers have proved superio to rubber overs.

Metal covers are not to be removed until absolutly necess, y, due regard being paid to operational and weather conditions.

In the event of fuze fail cs the rowine report Form No. S.1148(j)) is to state the period of time between the removal of me fuze coverand sking, together with any remarks as to weather conditions, etc., to which say have been exposed before and during that period, and which may be helpful in other many be cause.

Kit Plasters.

48. Kit plaster form a method of waterproofing and a means of protection for fuzes of shell in ready we racks in a bosed positions. Instructions for use are contained in N.M. & E.R.

The pasters consist essentially of a conical canvas cap soaked in kit composition and placed over the non-order of fuzed shell. They can be readily removed by the beckets without the use of a key other astrument. Kit plasters are supplied for No. 44 fuzes.

483. The method to be used when fitting a plaster is :-

- (i) Remove any grease from the nose of the fuze.
- (ii) Heat the composition in an ordinary gluepot. It should remain at full here for about 15 minutes before it is used.
- (iii) Men handling the plasters should rub a littl mineral gross over their hands to prevent the composition adhering.
- (iv) Place a paper cover (supplied with the last of over the lose of the fuze to prevent the composition adhering to the lose.
- (v) Dip the plaster into the composition and keep it there for one minute, so that it may be well saturated.
- (vi) Lift the plaster from he composition and allow it to cool until the composition is no longer runner.
- (vii) Two men a pulk such the bod of two loops and pull the plaster quickly over the nor of the self, seek out. The seams should then be pressed down with a suitable to of wood.
- (viii) Fh. lly, dip to nose of shell 4.7-inch and below into the hot composition till the composition in just covers the junction between the bottom of the plaster and the shell. With shell a over 4.7-inch, apply a coat of composition with a brush. Scrape off any composition which runs down on to the body of the shell when it is stood on it.
- (ix) To facilitate removal of the plaster, a becket of spun yarn should be ve throug all four loops of the plaster. A tug on this becket will pull all four loops at acc.

CH. XII—SECTION 9.—FUZING AND UNFUZING S ALL

GENERAL.

484. Regulations concerning the safety precaution to be a served while fuzing and unfuzing shell are set out in N.M.E.R.

Shell 6-pdr, and below and all shell for comaring are solico azed.

As a wartime measure H.E. shell 5 which and be writted with Fuzes No. 206 or No. 207 are supplied fuzed.

In ships other than D.E.M.S., Fast Liner and Audliary Vessels, H.E. shell for use with Time Combustion fuzes are supplied plugged, with gar is in position (if fitted). Certain H.E. shell for use with Percussion, D.A., Fuzes, are also issued plugged.

For D.E.M.S., Fast Liners and Auxiliary Vessels, shell below 6-inch are supplied fuzed; 6-inch shell are issued plugged and are fuzed on board with assistance from Naval Armament Supply personnel.

All components that screw into the base of a shell (i.e., base fuzes, tracers) have left-hand screw-threads. Nose fuzes have right-hand screw-threads.

INSTRUCTIONS TO FUZE-GENERAL.

- 485. (i) Ease the "grub" or fixing screw in the nose of the shell right back to ensure that it clears the threads of the plug. The screw recess will be found full of luting.
 - (ii) Unscrew the plug from the fuze hole and remove the plug and washer. Washers which are sometimes fitted round the head of a No. 8 gaine should not be removed. If the plug cannot be unscrewed with the service fuze key, the shell is to be landed at the first opportunity at a Naval Armament. For.
 - (iii) Wipe the threads of the fuze hole to asset hat no explosive is left on them.
 - (iv) Coat the threads of the fuze with Mark V ting, taking care that no luting is applied to the bottom of the fuze. Plac a fillet or tark VI luting or R.D. 1205A under the washer. No lubricant other than a rek V luting is to be used; it is to be applied with a new brush. Mark VI luting is taken and should be applied with a wooden spatula.
 - (v) See that the grace is screed home. With a No. 8 gaine this is done by feeling with the fingers that the head of the gaine is below the surrounding washer (care being taken that the press to plate of the gaine is not touched); with other gaines it is done by feeling that the paine itself is not loose. If the gaine is not screwed home the shell is to be returned to Navy Armament Depot.
 - (vi) Fit vash a to the fuzes as follows :-

No 44 and 45P-no washers.

Percusion, D.A., Time, Time and Percussion—a copper asbestos washer unless a washer was already been fitted.

- (i) Ansert the fuze and screw home, using no more force than can be applied by hand with the service fuze key. The washer must be kept central a that no part of it protrudes beyond the side.
 - Fuzes fitting G.S. fuze holes (i.e., Nos. 44 and 45P fuz ed in by their are set caps, which are slotted across or provided with a squa recess in ne top. The with a sevonet joint. le, to screw the fuze cap turns the fuze by the body pins, on to which the cap with a It is not always possible, because of the the G.S. om of the recess in far enough in for the underside of the on the b is to be accepted; a fillet of nder he head of the fuze. It the nose bush and a slight protrusio of the fu in the shell Mark VI luting is applied in the is essential with fuzes have ght safety cap and tightening wn water plug (e.g., No. 45P fuzes nat the should be in the screwed down position when the fuze i
 - (c) Fuzes fitting 2-inch holes are sewed in by the body. The fitting key takes into a groove or hole with body. You, in Time fuzes with watertight covers the cover must be removed before screw with the fuze.
 - (d) Time a horizontal Percussion fuzes must be set SAFE before they are inserted.
- (viii) So ew the gub secondruly nome. Fill up its recess with luting, Mark VI.
 - A steet the aid of the fuze from damp. This is applicable only to No. 44 and earlier maks of No. 45P, which have no watertight cap and have not already been water-product in disor.

The pacedure is :-

- (a) Untie the knot in the becket of the safety pin. The becket is a se through the crown of the safety cap. No. 44 fuzes, Marks X and later, do n have a be et.
- (b) Remove the securing pin or pins. In No. 44 fuzes, W. K. Alane later, this also removes the safety pin.
- (c) Remove the safety cap carefully so as to avoid any trait on the becket of the safety pin.
- (d) Examine the Pettman cement over the head of the fuze to see that it is sound and in good condition; if it is not included condition the luting may work down into the fuze and saturate the detonate leaves who is are one in good condition should be returned to a Naval Argament Deposit.
- (e) Coat the top portion who fuze w thank luting, placing a thick layer over the head of the fuze. Daupplying sting to the head of a No. 44 fuze care must be taken to avoid depressar, the needle disc as this will fire the detonator.
- (f) Reeve the becket of the safe pin through the crown of the safety cap.
- (g) Replace the safety cap.
- (h) Replace the securing pin or pins and open out the split ends. In fuzes No. 44, Mark X and later, replace the safety pin; if any difficulty is encountered in so doing the fuze should be removed and returned to a Naval Armament Depot unless it is likely to be fired in the near future.

CH. XII-SECTION 9.

- Re-knot the becket of the safety pin.
 - Note.—In future manufacture the luting may be applied to the head of the fuze at the fuze-filling factory. No further waterproofing on board will be necessary with these fuzes.
- (x) With D.A. fuzes stencil the word "FUZED" on the shell with the special vermilion paint.

INSTRUCTIONS TO UNFUZE-GENERAL.

486. Unfuzing shell is carried out by reversing the operators just described :-

- (i) Ease the grub screw right back.
- (ii) Unscrew the fuze with the service fuze by (using to more force than can be applied by hand). If the fuze the total be removed by this means, the fuzed shell must be returned to a Naval A nament lepot at the irst opportunity.
- (iii) Examine the fuze to see that n part of it remains in the shell. It a portion remains in the shell are shell is to be hadded with care, kept in the horizontal position and lowered a cross if a sleep water. The remainder of the fuze should be handled with care are thrown overses of a care. In no circumstances should any attempt be made to remain a proton of a fuze remaining in a shell on board H.M. Ships.
- (v) Insert this aug, with leather washer under the flange, and follow a procedure similar to that in (vi), (iv) and (vii) of para. 485. The threads of the plug must be wiped clean refore applying the luting. Screw up the grub screw and fill its recess with luting wrk VI. Care is to be taken that the correct type of plug is placed in the shell.
- (v) Set arough the word "FUZED" with vermilion paint.
- (2) Seplace the fuze in a tin cylinder and seal it.

TIM MECHANICAL FUZES AND FUZE NO. 230.

487. Shell supplied fuzed with No. 206, 207 or 211 fuzes may also be used with Fuze to. 230 over Gaine No. 9 or 10 and vice versa. When a No. 211 fuze is fit of on board in face of any other fuze and gaine, the "G.9" or "G.10" marking on the shell shall be used or based out and if a No. 211 fuze is being replaced by other fuze and gaine, the "A.9" or "10" as applicable, should be added by steneil to denote the presence of a gaine.

To Fuze with Fuze No. 211,

488. Ease the grub screw fully back and r (with leather washer) by means of re that the components of the exploder system Key No. 48, Mark I, or a suitable screw driver, taki components are in place a "gauge," depth of bould be applied to the shell cavity, using the that all t are not spilled from the shell. To en cavity, filled H.E. shell, No. 7 supplie The gaug longer end of the gauge which The bottom of the gauge will rest, without narked ge should be just clear of the nose of the shell. If nose of the shell on both sides the shell should be pressure, on the explode r in t the gauge, without ue pre re-plugged and ent Depot at the first opportunity. ed to a l

If the gapting a correct siew in the fuze (which has a copper asbestos washer secured to it) using Key No. 89, Mark III (Suedule of keys, page 131). Screw the grub screw firmly home and fill the recess with lutin Mark I.

To Fuze with Fuze No. 230 over Gaine No. 9 or 10.

489. Ease the grub screw fully back and remove the plug No. 20 (with leather wa er) or fuz No. 211, taking care that the components of the exploder system are not spilled fro ell. Gauge the cavity with gauge No. 7 as described above for No. 211. Insert gaine N means o Key No. 69, Mark II. The gaine, when screwed down, need not make me the seating in the shell, but should give firm compression to the exploder not to be used. Apply gauge No. 7 to the fuze hole using the end marked after insertion of gaine. The flange should make metal-to-metal contact with the nose of the ell. If gauging is correct, insert Fuze No. 230, using Key No. 121, Mark I (taking car that the cop asbestos washer, which is provided with the fuze, is in place). Screw the ll the recess with alv home crew luting, Mark VI.

To Remove Fuze No. 230 and Gaine No. 9

490. Ease the grub screw fully back and unseew Fuze to, 230 (with the C. & A. washer) and unscrew the gaine, using the same implements as a use for sing described above. No undue force should be used. The shell can then be fuzed with tuze No. 211 or plugged with Plug No. 20; the precautions and gauging as set out in para. 488 being a served.

FUZES IN 14-INCH, 15-INCH AND 16-INCH, H.E. SHELL. Fig. 5.

491. These shell, when prepared for time fuzes, are marked with the word "TIME" in two places on the nose. If 15-inch H.E. shell have zinc alloy caps in place, the caps should be removed and left off after fuzing. The approved luting is Mark VII or VIIm.

To remove Time Combustion Fuzes in 14-inch and 16-inch H.E. Shell and Fuze with Fuze No. 118.

- 492. (a) Slack back the fixing screw.
 - (b) Remove the time fuze with key No. 89 and replace in its tape-banded cylinder.
 - (c) Remove the gaine No. 9 or 10 with key No 69 and place similarly in its cylinder.
 - (d) Insert exploder, 3 oz. C.E. pellet, with lifting band.
 - (t) Using gauge No. 9 test the depth of cavity and if correct, insert two tracing cloth discs on top of the exploder. Gauge No. 9 is a Not Go "gauge, and when used, the bottom of the gauge will rest, without press of on the exploder, 3 oz. C.E. pellet, in the cavity and the flange should be just clear of a nose of the shell. Should the cavity be of incorrect depth, the shell must be return to the nearest Naval Armament Depot.
 - (f) Insert fuze No. 118 with copper sbestos a ther under flange with Keys No. 113 or No. 121, using luting where and a described a the Diagram.
 - (g) Tighten the fixing sore and cover with luting as called for on the Diagram.
 - (h) At this stage 'e stencillis of the wor." Time "in two places should be Carred through but not oblift ated, in one r the 'it may be known that this shell can be explodered to take a size a 'd time fuz.

To remove Fr. No. 118 in 14 sch ar 16-inch H.E. Shell and Fuze with a Time Combustion Fuze.

- 493. (a) So k book the fixing screw.
 - (b) Ren we the fuze No. 118 with Keys No. 113 or No. 121 and replace in its tape-banded cylin.
 - Remov the two tracing cloth discs and lift out the exploder, 3 oz. C.E. pellet, using a made of brass wire. In order to ensure that all components are place and suite for receiving a slight compression upon the insertion of No. 9 gaine, a gauge, depth of cavity filled H.E. shell No. 7, is supplied. Apply this using the longer end of the gauge marked "Not Go." The to the shell cavity of the gauge will rest, without pressure, on the explodering unit in the cav and th lange should be just clear of the nose of the shell. If the gauge, without lue pre e touches the nose of the shell on both sides, the shell should be replugged and cturned to n Armament Depot at the first opportunity.
 - (d) If the gauging is correct insert gaine No. or 10 w. Key No.
 - (e) Apply gauge No. 7 to the fuze hole, using the end man of " after insertion of gaine," The flange should make metal to the clock of the shell. If incorrect, the shell should be returned saugged with alug fuzz sole 2-inch No. 11 to the nearest Naval Armament Depot. On so according to the shell should be inserted.
 - (f) If the depth is correct insert vs. to. 400, placing a copper-asbestos washer under the flange, or fuze N 401, which as a copper-asbestos washer secured to it, with Key No. 89, using lutin where and described on the Diagram.
 - (g) Tighten to fixing so, w and cover with luting as called for on the Diagram,
 - (h) The word The should be stencilled on the shell.

To remove theme Compatible 1 win 15-inch H.E., B.N.F. Shell and Fuze with Fuze No. 360.

- 494 (a) tack back he fixing screw.
 - (b) R sove the time fuze with key No. 89 and replace in its tape-banded cylinder.
 - (c) Ren ve the gaine No. 9 or 10 with key No. 69 and place similarly in its cylinder.
 - (d) Remove the two tracing cloth discs, lift out the exploder, 26 dram C.F. together with the three glazeboard discs placed at the underside between the cellet an diffing band, using a hook made of brass wire.
 - (e) Insert exploder, 5-oz. T.N.T. pellet, with lifting band, follows by two tracing cloth discs.
 - (f) Using gauge No. 9 test the depth of cavity. Gauge No. 1 is a "OT Good age, and when used the bottom of the gauge will rest, without less of on the tracing cloth discs in the cavity and the flange should be just clear of no rol shell. Should the cavity be of incorrect depth, the shell should be return 1 to the near Naval Armament Depot.
 - (g) Insert fuze No. 360 with a copper water under the flange with keys No. 113 or No. 121, using luting sparingly on the thread last calso on the conver-asbestos washer to make an effective scal. At this star fuze to, such our live the safety cap removed and the watertight cover in place.

Note.—In the event of the shell long required for use against targets which the common pointed shell were a signed to ttack, a special steel nose plug will be supplied to replace the No. 360 fuze.

- (h) Tighten the fixing screw and co r with luting.
- (4) Assemble the zinc alloy cap, using luting sparingly on the thread and also on the flange.
- (k) At this stage the stencilling of the word "TIME" in two places on the head should be barred through but not obliterated, in order that it may be known that this shell can be explodered to take a gaine and time fuze.

CH. XII-SECTION 9.

To remove Fuze No. 360 in 15-inch H.E., B.N.F. Shell and Fuze with Time Combustion Fuze.

- 495. (a) Remove zinc alloy cap.
 - (b) Slack back fixing screw.
 - (c) Remove fuze No. 360 with keys, No. 113 or No. 121, and replace in its tape-banded cylinder.
 - (d) Remove the two tracing cloth discs and lift out the exploder, 5 oz. T.N.T. pellet, using a hook made of brass wire.
 - (e) Insert exploder, 26 dr. C.B. pellet, with the greeboard discs between the lifting band and bottom of the exploder and follow by the injection of two tracing cloth discs. To ensure that all components are in place and suitable for receiving a slight compression upon the insertion of No. 9 or 10 gaine, a rauge depends cavity filled H.E. shell No. 7 is supplied.

Apply the gauge to one sell cavity, wing the longer end of the gauge marked "NOT GO." The become of the gauge will est, without pressure, on the explodering unit in the cavity, and the flange would be just clear of the end of the nose of the shell. If the gauge of bout indue pressure touches the nose of the shell on both sides, the shell should be realized and retuned to an Armament Depot at the first opportunity.

- (f) If the gaging is rrect, sare saine No. 9 or 10 with key No. 69.
- (g) Apply gate, No. 7 to the fuze hole, using the end marked "GO after insertion of the gaine." The dange should make metal-to-metal contact with the nose of the shell. If accorrect, the shell should be returned plugged with plug fuze hole, 2-inch No. 11, to be nearest No. 1 Armament Depot. On no account should plug fuze hole, 2-inch, No. 10 be inserted.
 - If the opth is correct, insert fuze No. 400, placing a copper-asbestos washer over flange, fuze No. 401 which has a copper asbestos washer secured to it, using Year sparingly on the threads and also on the copper-asbestos washer to make an exective seal.

Note.—On no account should an attempt be made to replace winc alloy up on a shell that has time fuze in place.

- (j) Tighten the fixing screw and cover with luting.
- (k) The word "TIME" should be re-stencilled on the snell.

H.E. SHELL WITH A UNIVERSAL CAVITY 4-INCH TO 1 INCH.

495a. Shell fitted with a standard size of univers one his averity have been recently introduced to permit an exchange of fuzing arrangements to be carried at a Soard.

A list of shell so fitted with the appropriate luzes of their expoder units are set out in the Addendum to this Handbook. These shell will have a letter "U" stencilled on opposite sides of the head as a means of identification.

Shell which have tracer fitted are not to be fitted with Fuzes Marks 56 and 60. When Fuzes Marks 56 or 60 are being fitted VITING ast not be used on the threads of fuze, fuze hole, screw, or screw hole; these most

- (1) be with a clean of uti
 - and
- (2) be dry a fore inser on of the fuze and grub screw.

Luting is to be used on on the inderside of the copper-asbestos jointing washer under the fuze and for filling the recess over be grub screw when the screw is home.

Fuzes together with their appropriate exploder units are packed in metal cylinders and are ready for insertion into the shell cavity. A lifting band is fitted to the exploder unit and nables is to be lifted as a whole. It must be used when the exploder unit is withdrawn from or inserted in the shell or cylinder.

To Exchange Fuzing Arrangements.

and ga Ease the grub screw felly back, unserew and remove the plug or fuz applicable) from the shell. Withdraw the exploder unit from the shell. The ngements should then be placed in the appropriate metal cylinder, which should be identification purposes and closed. When placing a gaine in its cylinder, which is the place of the control of the cylinder narked suit ly with a label for er care mus taken to ensure pter with that the plastic washer of the cylinder is positioned below plastic a gaine intruding. n the gaine must be The gaine must be screwed into the adapter and the shou flush with the top face of the washer when the contact. This ensures r permit play between the that the gaine will not exert any undue pr on the bottom of the gaine and the exploder unit

Remove the fuze, or fuze and gaine required and the exploder unit and the packing from the cylinder. Insert the exploder unit into the empty wity of the shell, felt end first, followed by two tracing cloth discs. When a gaine is being fitted is must be screwed home on to its seating with Key No. 69, Mark II, to ensure the correct compression of the exploder unit. Check this by applying Gauge No. 7 to the fuze hoe, using the end marked "GO" after insertion of gaine. The flange of the gauge should make metal-to-metal contact with the nose of the shell. Screw the fuze home with its appropriate key and screw the grub screw firmly home.

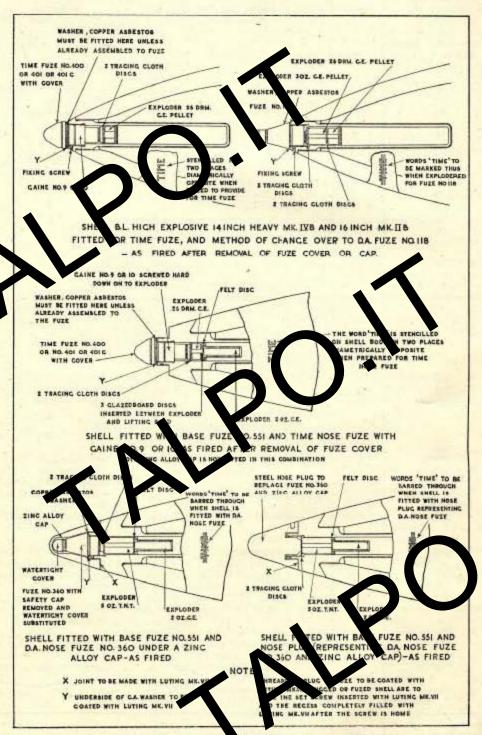


FIG. 5,-FUZES IN 14-IN 15-IN., AND 16-IN. SHELL.

FUZES AND GAINES IN USE IN THE NAVAL SERVICE

TYPE AND SERVICE NO. OF FUZE	PARA.	PLATE NO.	PROJECTILES IN WHICH USED	GUN	REMARKS
Percussion, Direct Action.					
19A	-	-	H.E.	3-pdr. and 6-pdr.	O.F.M.
45P	348	16	H.B.	12-pdr. to 6-inch	For anti-ship use against thin plates
44	353	16	H.E.	3-pdr. to	For bombardment
117	-		Smoke Sheh Imoke Sheh	6-inch 6-inch	1
			(A.Q.)	6-inch	Or Fuze No. 118
1.0	B A		without a Gaine	Mark XII	
118			H.E. Shell with- out Gaine	3.7-i n c h, 14-i n c h	
				to 16-inch	
			Chemical Bursting without a Gaine	6-inch, Mark XII	
230	359	16	H.E. Shell with Gaine	8-inch and below	
	-	=	Target Smoke Chemical Bursting	4.7-inch	
	-		with Gaine No. 11	4.5-inch to 8-inch,	
			The Manual Fee Back	except 6-	
9000			HE DAR	Xx	
360C	364	-	H.E., B.N.F. (without Gain	15-inc	
240 241	365	17	HP	2-pdrV. 2-pd L.V.	O.F.M. Supersedes Nos. 131 and
57.1	303	1		o-pdr. and	240
			" K levice Pro-	6-pdr. 6-inch and	O.F.M.
243			jectile H.E.	8-inch 2-pdr. H.V.	
246	0	17	H	2-pdr. H.V.	Superseding No. 243
248	3		K" device Pro- jectiles	6-inch to 16-inch	Modified No. 241 to allow use with reduced charges as well as full charges
- 251	374	-	H.E.	40 mm. Bo-	Superseded by No. 255
				fors (British)	
252	375		Incendiary	20 mm. Hispano	British and Annican manu cture O.F.
253	577	-	H.E. and H.E./I.	20 mm.	Pitish and Amer an
254	561	20	H.E., H.E./I. and	Hispay 20 mm.	m un un
			H,E,/I,T,	Oerlikon 20 mm.	
255	375	17	H.E.	Hispano mm.	opersedes No. 251
258	56x	-	H.F./I. an	20 m	British manufacture
259	100		E.,	Oer on	only
aud	378			Bofors	
Percussion, Base, Hotchkiss	383	18	Steel Well.	3-pdr. and	
			C.P. Shell	6-pdr. 2-pdr.	
Percussion, Base, Small	No.		S.A.P.	2-pdr.	

TYPE AND SERVICE NO. OF FUZE	PARA.	PLATE NO.	PROJECTHES IN WHICH USED	GUN	REMARKS
Percussion, Base, Medium.					
12	1000	-	C.P. Shell		
12F	-	=	C.P. Shell	12-pdr. to 4.7-inch	Lead-free metal. Weak ened creep spring
12F.R.		-	C.P. Shell		canad steep spring
12W.F. 12F	=	1	C.P. Shell S.A.P.	4.7-inch	Lead-free metal. For
Special				and below	use under base cover plates. Weakened creep spring
500	1	-	S.A.	12-pdr. to	Supersedes No. 12F
501	387 (5)	18	A.P.	5.25-inch 12-pdr. to	Special Supersedes No. 500
200		1	O.A.D.	5.25-inch	17.1
502	30 (ii)		S.A.P.	4.5-inch, 4.7-inch (62 lb.) and 5.25-	Weakened creep spring
				inch	
	387 (iii)	-	C.P. H.E., B.N.F.	}15-inch	Weaker Arreep spring
Perce sion, Base,	1				
Large, 15C	-		C.P.C. filled pow-	6-instand	
15			der C.P.C. filled pow-	6-inch an	
	- 7		der	above	OL LOSS
15 without delay			C.P.C. fill Por-	i-inch	Obsolescent
16D	-		A.P.C. C.P.C.; C.P.B. cited shellite	6-is and above	
158	100	===	C.P.C. filled C.N.T. A.P.C. filled	15-inch	1
			C.N.T	14-inch,	10 50 7007 10007
				15-inch and	Supersedes No. 16D
158A	-		A.P.C. filled	16-inch	
159	, t (ii)		c.P.C. filled T.N.T.	15-inch	Supersedes Nos. 158
			A.P.C. filled	8-inch and	and 158A
345		1	T.N.T. or shellite S.A.P.C. filled	above 8-inch	5
			T.N.T.	Total Control of the	Secondes (o. 16D)
345A	-	-	S.A.P.C. filled shellite	8-inch	
346	391 (iii)	=	S.A.P.C. filled T.N.T. or shellite	8-inch	uperse is Nos. 5 to and
479	125	-	C.P.B.C.; C.P.C.	6-xh	
			or S.A.P. filled T.N.T.	+	2 1 17 100
479A		-	C.P.B.C.; C.F.	G-inch	Spersedes No. 16D
		1	or S. P. fill I		La sur sur
480	391 (i)	18	or S. P. fille	6-inch	Superseding Nos. 479 and 479A
No.			T.N.T. shellite		
Time, Combustion			(manufacture)	- To an	Towns of the last
80/44	244	-	H.E. (16 lb.)	3-inch 20 cwt.	Obsolescent
124	-	-	C.N.F.	2-pdr.	O.F.M.
				122	

TYPE AND SERVICE NO. OF FUZE	PARA,	PLATE NO.	PROJECTILES IN WHICH USED	GUN	REMARKS T
Γime, Combustion—					
contd. 125	411	19	C.N.F.	2-pdr., 3- pdr. and 6-pdr.	Supersedes No. 124 Mean Time set full 16. seconds
185	13 -0	-	Targe Smoke (12½ xx.)	3-inch 20 cwt.	Obsolescent
198	417	19	H.E. wi gaine	12-pdr. to 8-inch	Mean Time set full 4 seconds
	777		Star Shell	4-inch and below	
			Soke hell B.E.	4-inch to 5.25-inch	- 275
			nemical B.E.	5.25-inch and 6-inch	
			Target Smoke with gaine	4-inch, 4.7- inch and	1
700 0 20			H.A. Practice Pro-	5.25-inch 12-pdr. to	
			jectiles Falling Target	8 inch 12-pdr.	
400	7	Treats	Shell H.E. Shell with	12-pdr. to	Mean Twe set full 9,
400	424		gaine Shrapnel Shell	16-inch 4-inch and	seconds
			Sittaphet Shea	below (ex-	
	.5		H.A. Practice P	inch, 12-pdr. to	
401		100	jectiles H.F. oen wr	8-inch 12-pdr. 3-	Mean Time set full-
401			g de	inch 4- inch, 14-	Mark I, 16.7 seconds Mark II, 17.55 second
				inch, 15- inch and	Mark 11, 17.50 second
			Shrappel shell	16-inch 4-inch and	2
			Shirapper shen	below (ex- cept 3.7-	Obsolescent, Bein
			Target Smoke Shell	inch) 5,25-inch	used as a temporar measure for project
		-	with gaine H.A. Practice Pro-	and below 12-pdr.	tiles mentioned
	2		jectiles Falling Targe:	8-inch 4-inch	
			Shell	Marks V and XVI,	
	100			4.5-inch and 5.25	
402	425	19	Shrapnel Shell	inch 4-inch an	Intended to function a
	4-3	19	*	below (ex-	300 yards range
				(th)	
lime, Mechanical.	435	_	H F with g ne	Vinch 40	Maximum time of run
			Star Shell	4.5-inch to	ning—43 seconds
			Targa Smoke	5.25-inch 5.25-inch	
			Shell H.A. Practice Pro-	and below 4-inch to	
		B7=	jectiles	8-inch	

TYPE AND		l'a			
SERVICE NO.	PARA.	PLATE NO.	PROJECTILES IN WHICH USED	GUN	REMARKS
Or Form		2000	Which Copp		
Time, Mechanical—			3.		
207	440		Star Shel	4-inch to 8- inch inch Yark XVI, 4-vinch to 5.25-inch	Maximum time of run- ning—43 seconds
			Targe Smole Shell H & Practice Projectiles	4.5-inch and 4.7-inch 5.25-inch and below 4-inch to 8- inch	
211	X	20	H.E. without a gaine Target Smoke Shell without a gaine	4-inch to 8- inch 5.25-inch and below	Combined Fuze and Gaine Maximum time of run- ning—43 seconds
1	446		Star Shell	4.5-inch, 5.25-inch (in Cruisers and above)	Maximum the of run- ning to seconds
Time and Percussion 80 93	448	17	Shrapnel Shell Shrapnel Shell	3.7 inch inch 15-inch	
Gaines					(250) (A - 200) (A
No. 2	TE.	275	Target nicke (12½)	uch	Obsolescent
No. 8	-		H.E. Target Smear	3-inch to 8- inch 4-inch and 4.7-inch	Used in conjunction with No. 230 or Time Fuzes
No. 9	462		E	3-inch to 8-inch. 14-inch, 15-inch (B.N.F.) and 16-inch	Superseding No. 8. Can be used with shell fill- ings containing Pieric Acid
ST 01			Target Smoke Shell	5.25-inch and below	
No. 10	458	19	H.E.	3-inch to 8-inch. 14-inch, 15-inch (B.N.F.)	Superseding N. 8. Canot be use with shelf fillings containing Picture 10.
			Target Smoke Shell	and 16-inch 5.25-inch an below	V
Nc. 11	463	19	H.E.	12-p ; and	
			Chemical Burst ig Shell	3-inc 4.5-inc 8-inc (except	
				6-inch Mark XII)	

CHAPTER XIII

SMALL ARMS AMMUNITION

SECTION 1.—GENERAL KEMARKS

505. Small Arms Ammunition is used with rifles, mayine guns, machine carbines, sub-machine guns, revolvers and pistols.

The term "Small Arms Cartridges" include the compute round—cartridge case, percussion cap, propellant charge and bullet.

All Small Arms cartridges, ath the veception of the Cartridge, Aiming Rifle 1-inch Electric, are fired by percussion, and the resulting flast ignites the propellant charge.

Ammunition of Belijsh cosign for rifes, machine guns and machine carbines of the calibres 0.303-inch, 7.92-mp. 3-ma. 0. inch (Vick is and Browning), and 0.55-inch is dealt with in Sections 1 and 2 of this Charter. Ar number of it is design for revolvers and pistols of the calibres 0.455-inch and 0.380-inch is deal, with in Section 3, and American Small Arms ammunition in supply, other than Orglikon, in Section 4.

An unition wire special features is described for -20-mm, guns in Chapter XIV; for 1-inch Aiming N is and 0.22-n by Miniature Rifle in Chapter XV; and for rifles fitted with Grenade Discharger Chapter VIII.

AF" SE ASE.

506. Cases (except Drill and Dummy) are of solid drawn brass. The design is a similar lines at that of the Q.F. case for a gun, except that a Cap Chamber and Anvilore recess, in the base it stead of a primer. Two fire holes are drilled through the bottom of this reco. The cap is tapered from base to shoulder and has a bottle-neck near the mouth to secure the bullet.

507. There are two types of case :-

- (i) Rimmed.—A rim or flange is formed round he base to a sition the cartridge and assist its extraction. All 0.303-inch cartridges at rimmed.
- (ii) Rimless.—A groove is cut round arth was a assist exerction. The case is positioned by its shoulder seating on the "lead" or ion and agreed end of the chamber. All rifle and machine gun cartridge exercises. 0.303-inch are rimless.

The copper or brass percussic cap is party alled with Cap Composition. It is pressed into the cap chamber, with the composition hard against the Anvil, and is secured by stabbing or ringing. It must fit tightly all round so that here can be a escape of gas between the cap and the case on firing. Varnish is applied to seen the up and the case to make the joint water and gas tight.

A beeswax produce may be folled whether cannelure of the bullet to render the ammunition watertight. As atternative only accomponent method is to varnish the neck of the case internally or the bullet of an ally before asserting it in the case.

PROPELLANT CH RGE.

508. This is pack I in the cartridge case.

The chief propellants are :-

- (i) Cordite M.D.T.
- (ii) Neonite.—The neonites are nitrocellulose powders, usually to for of graphers flakes, composed of gelatinised nitrocellulose with diplocylamin as abiliser and coated with a moderant.

With a cordite charge a glazed board or strawboard disc is inserted to be the bullet and the charge. Its function is to control the gases at the moment of discharge, let un barrel wear and thus increase the accuracy of the flight of the bullet.

THE BULLET.

509. This has a cylindrical body, are available to have record base (except Tracer, which have open bases). It is composite at a has an enclope, a core and/or a filling. Bullets may be reinforced by the addition of one or two sleets, between the envelope and the core or filling.

Envelopes are of :-

- (i) Cupro-nickel (silver colour);
- (ii) Gilding metal (copper colour);
- (iii) Soft steel, coated with one of these substances externally and/or internally. Ductile materials are used so that on engaging the rifling there is neither too much strain on the bullet nor undue wear on the rifling.

The features of the core and/or filling vary with the type of cartridge.

Normally, one or two cannelures are cut in the body of the bullet near the base, and the bullet is secured in the cartridge case by indenting and/or coning the case into the cannelure.

- 510. A bullet differs from a projectile or shell in that having no driving band it is made to engage the rifling of the rifle or gun by :—
 - (i) "Set up" (i.e., expansion of the base of the bullet).
 - (ii) Being slightly larger in diameter than the stee of the rifle or gun,

The trajectory or line of flight of a bullet is induced by gravity and air resistance, and the extent of the resistance depends on such factors as angle of devation, muzzle velocity, rotation, weight, shape, etc.

The weight and muzzle velocity of bullets of the various types of cartridge of the same calibre vary, and when mixed types are fired from a belong magazine the bullets will not follow the same line of flight. To ensure accurate using with mored types of cartridges, modern cartridges are "matched" so that at a given range as bullets with each the same point or target. Matching is effected by adjusting the weight or shape in the bullets or the quantity of the propellant charge.

MARKINGS AND MEANS OF MENTIFY ATION. Plate 21.

- 511. Types of artriges may be identified by :-
 - (i) The cour of the varnished ring or annulus. Some types of cartridge have the tips of the lets coloured in addition, and the colour of the tip thus provides the means of identification and NOT the colour of the annulus.
 - Each ypc of cartridge except Ball has a code letter stamped on the love of the case ording the mark numeral.
 - The mark numeral is stamped on the base of the case.

512. Code.

NO.	CARTRIDGES	LETTER	COLOUN OF ANNULUS
1	Ball	1	Purp
2	Practice		Purp
3	Armour-Piercing (A.P.)	W	Great
4	Semi-Armour-Piercing (S.A.P.)	F	reen
5	Tracer	G	Red
5	Incendiary	В	Blue
7	Proof	0	Yellow
8	Blank or Buisted Blan	Ĺ	Nil
9	Drill	D	Nil
10	Decemy	U	Nil
11	serving	0	Black
11 12 13	A dosive	R	Black
13	Greade Discarger	H	Colourless
14	Smo Genera or Discharger	E	Colourless
15	Self di troying	Y	According to rules set out below

513. Incendiary cartridges and special tracer for use by aircraft have the tip of the but coloured as a means of identification:—.

Short range day tracer White Short range night tracer Grey Incendiary Blue

A colour-varnished annulus of the appropriate code colour is so used,

Where a cartridge possesses more than one characteristic (e.g., S.A.P. vacer) and therefore comes under two or more serial numbers, all the relevance code letters will be used. The sequence of the code letters and the colour of the annulus is governed to the forwire, order of precedence;—

Thus, S.A.P. tracer, serial Nos. 4 and a man ode letter FG in this order, and the annulus colour is green, since F precedes G.

If the propellant is other than cordite, a N er is stamped on the cartridge case to denote the nature of the propellant :—

- T Black Powder.
- Z Nitro-cellulose or Ballistite.

 514. The following particulars are stamped on the base of a cartridge case:—
 - (i) The manufacturer's initials or trade mark

CH XIII-SECTION 2.

- (ii) Year of manufacture (usually only the last two figures).
- (iii) The distinguishing letter or letters denoting the type of cartridge.
- (iv) The mark numeral of the cartridge followed, where necessary, by the letter denoting the nature of the propellant.

CH. XIII—SECTION 2.—TYPES CY CARTRIDGE. Plate 21.

515. The cartridge case, percussion cap and propelly t described in Section r are typical for Small Arms ammunition of British design for rife machine carbines and sub-machine guns.

The present types of cartridge and

Ball, Armour-Piercing (A.P. Semi-Amour-Pierch (S.A.P.), Tracer, S.A.P. Tracer, Incendiary, Proof, Blank, Drill, Dummy are Observing

The components for typ of cartridg are similar in its various calibres, differing only in size or amount.

Cartridge, S.A. Ball Div. 21.

516 No Code Le er. Annulus Colour-Purple.

The a tridge is sur-lied for all calibres except 0.5-inch Browning for use against personnel.

The birt envelope is of cupro-nickel, gilding metal, or steel coated with cupro-nickel or gilding etc. Its one journal antimony with an aluminium, plastic or fibre tip, or mild sto with a lead time of tip. One tip may be adjusted to the correct weight for the required balliness and balances to silet we ensure accuracy in flight. The 9-mm. bullet has no tip.

Note:—American 0.5-inch Browning is in supply. Cartridges for Vicker and Browning 0.50-inch machine guns are not interchangeable; they differ in length a 4 other oversions.

Cartridge, S.A. Armour-Piercing. Plate 21.

517. Code letter W. Annulus Colour-Green.

Cartridges are in supply in the following calibres :-

7.92-mm. 0.303-inch, 0.5-inch (Vickers), and 1.5. inch

The bullet is specially reinforced to attent armou plate. It becam envelope of cupro-nickel, gilding metal, or steel coated with cupro-nickel, or giving metal, a sleeve of lead antimony and a core of hard steel. The perforating power of the rate is dependent on the striking energy of the core and the angle at which it strike the plate. It impact with armour plate the core will perforate and the envelope and sleeve will flatter out and support the point of the core during the first instant of penetration, acting as a descicant transist its passage through the plate.

Cartridge, S.A. See Armou Pier

518. Cod Lo or F. A dius Colour-Green,

The cartridge is a supply only for the 0.5-inch Vickers machine gun. It is similar to A.P., except that the core of its bleet is of mild steel.

Cartridge, S.A. Tracer. Plate 21.

519. Code Letter G. Annulus Colour-Red.

Cartridges are in supply in the following calibres:-

7.92-mm., 0.303-inch, 0.5-inch (Browning) and 0.55-inch.

Tracers are sometimes referred to as "Ball Tracer" to distinguish to un free S.A.P. Tracer.

This type of cartridge enables the line of flight of the bullet to be observed to assist in correction of a.m.

The bullet consists of an envelope, a core, a filling The envel e is of cupro-nickel, a wash gilding metal or steel coated with cupro-nickel or gildin sists of a front section of lead antimony and a rear section is a solid ming and tracer compoawn sitions are filled into the rear section and it washer with a central hole. se is se On firing, the heat from the propellant nites the tracer compositions which burn ning an with a bright light and allows the flight ullet to e observed.

Dark ignition tracers with a trace which is at evides until the projectile is some distance from the muzzle of the gun are in supply for certain or ibres.

The object of this type of tracer is to minimize blinding at night and to prevent the gunlayer being confused by the trace just outside the muzzle. To some extent they also avoid disclosing the position of the gun.

520. The tracer bullet is of lighter weight than Ball or A.P. and, by reason of the burning away of the tracer composition, its weight decreases during flight. In consequence and as a result of the

effect produced by the burning tracer composition being forced out of the rear of the bullet, the trajectories of tracer bullets differ from those of other bullets. Tracer cartridges are matched-up with other types of cartridge, but they are naturally less destructive than Ball or A.P., and are liable to foul the barrel. This latter disability is overcome by mixing the various types of cartridge in the belts and magazines. The length of trace (i.e., time of burning) is regulated by adjusting the tracer composition.

Cartridge, S.A. Semi-Armour-Piercing Tracer.

521. Code Letter FG. Annulus Colour-G.

This cartridge is in supply only for the 5-inch W ters machine gun. It is similar to Tracer, except that the front section of the core of the left is of all steel.

Cartridge, S.A. Incendiary. Pl

522. Code Letter B. A nulus Co or-Blue.

Cartridges are in supply in the following chibres :-

7.92-mm., 0.30 mm 0. inch (Vick s and Browning).

The cartrice is use aprinciply to stack aircraft. The sensitivity and incendiary effect of the bullet is such that it is a perforate the skin of an aircraft without ignition and penetrate its self-scaling tank and the set the petrol.

I bullet cons is of an envelope, sleeves, base discs and a filling of Incendiary composition.

The early marks 0.303-inch were filled with white phosphorus; these are now obsolescent,

Carridge, A roof.

oz Code Letter Q. Annulus Colour—Yellow.

Cartridges are in supply in the following calibres:-

7.92-mm., 0.303-inch, 9-mm., 0.5-inch (Vickers) and 0.55-inch.

This is a Ball cartridge with an increased propellant charge which give higher passure. It is used for proving guns.

Cartridge, S.A. Blank.

524. Code Letter L. Annulus Colour-Nil

The cartridge is special to 0.303-inch colore. It as a bullet of I its main purpose is to make a loud report.

The propellant charge consists of 10 graphs and cardite Mark I Size 20, or 15 grains of nitrocellulose. A strawboard wad is fixed above the large in the neck of the case which is closed by necking and crimping.

Cases manufactured to other these of cartriage may be used for Blank and markings other than the correct ones may be lock? for example, a rejected Ball case may be used and the Ball mark numeral remain.

Cartridge ...A. Orill. Pl 21

525. Code I ter D. Annulus Colour-Nil.

Cartridges are in s ply in the following calibres:-

7.92-mm., 0.303 ach, 9-mm., 0.5-inch (Vickers), and 0.55-inch.

These cartridges are used for training purposes; they may also be included at the end a belts of cartridges for machine guns to remind the gun's crew to reload. The origin type of case is chromium-plate with three vertical grooves which are painted red. There is no problem or percussion cap. The recess forming the cap chamber is painted red and or tempy.

Since the commencement of hostilities another type of case has been introduced. Case is an ordinary brass service case with four holes bored in the side and the reast straining the cap chamber is left empty.

Cartridge, S.A. Dummy.

526. Code Letter U. Annulus Colour-Nil.

Cartridges are in supply in the following calib s :-

7.92-mm., 0.303-inch, 9-mm., 0.5 (Vickers), 4 0.55-xch

The cartridge is used by inspecting of ers and depots and is not in supply to ships. It is similar to Drill, but has a plain case; the best is of ailding metal. The weight and balance of the cartridge are the same as those of Ball.

Cartridge, S.A. Observing.

527. Code Letter O. Annulus Colour-Black,

The cartridge is in supply only for 0.303-inch calibre. The bullet makes a small puff of smoke on impact. The cartridge is used for training purposes to assist in observation of firing.

CH. XIII-SECTION 3.

The cupro-nickel envelope has a hole bored in the nose which is closed with a plug of fusible metal. Phosphorus and powdered aluminium are filled into the envelope which has a lead core. The base is soldered. (The tips of the bullets are varnished black.) This cartridge is obsolescent.

Cartridge, S.A. Rifle Grenade, Ballistite, Mark IZ.

528. Code Letter H. Annulus-colourless. The front half of case is black.

These cartridges are used with (1) Rifles fitted with Dichargers, and (2) Bombs, B.L. H.E., 4-inch, Mortar 10 lb, Mark I. They are blank cartridges of a charge of approximately 30 grains of ballistite. Ballistite is a mixture of soluble nitrocal so and nitroglycerine, and is rather more powerful than cordite; it is mostly used as a sporting power. The mouth of the case is closed with a glazed board cup and is not crimped.

Note.—These cartridges must NOT be used w \(\begin{align*} (1) a relided grenade, e.g., Rifle M.L.E., as the ignition of the ballistite is much too rapid and a ogerous pressures would be produced; NOR with (2) Smoke Float, B.L. 4-inch works. Marks II at \(\begin{align*} III. \)

Cartridge, S.A. Rifle Grenade, 303-inch. Crdite.

529. Code Letter ... nu s-colourles. The case is black all over.

These cartridge are used with (1) By as M.L.E. (line throwing), and (2) Smoke Floats, B.L. 4-inch Mortar, Mark II are AII. They are blank cartridges with approximately 43 grains of Cordite M.D. The mouth of the case is closed with a glazel board cup and is not crimped.

Note: These cartrilles must NOT be used with (1) Rifles fitted with a discharger as the propellant does not burn rap thy enough to ensure complete ignition; NOR with (2) Bomb, B.L. H.E. & Morta 10 lb., Mark I.

CH. XIII—SECTION 3.—REVOLVER AND PISTOL AMMUNITY

Plate 22.

CF FRAL

530. Each of the many designs of Revolver and Pistol requires special cumunition but the variations are, in the main, minor ones. The cartridges are comparity and have as same main parts as the rifle cartridge. The case may be rimmed, rimless or chairmass and have one or more fire holes. The method of ignition is the same as for the rifle carridge.

531. The types of cartridge are :-

Ball, Proof, Blank and Drill.

The markings and method of identification (except Processes as same as the corresponding type of rifle cartridge.

The ammunition described may be considere spical of the present supply.

PISTOL, REVOLVER, No. 1, 0.455-in

Cartridge, S.A., Ball.

532, No Code Mater, unul Colou Purple.

The solid 2 can brass contributed and has a cap chamber and anvil recessed in the base. Two fire hole are villed through the bottom of the recess. The brass or copper cap is filled with cap composition and secured by riging. The charge is cordite or nitrocellulose.

The bullet has a voro-nickel envelope and a lead antimony core. The cannelure is filled with beeswax mixture and a v bullet is secured by rolling the mouth of the case; it may be further secured by indenting the case into the cannelure.

Cartridge, S.A., Proof.

533, Code Letter Q. Annulus Colour—Yellow. The case is a reddish coper

The case and cap are the same as for Ball. The charge of cordite a mitrocell lose clouded to give a pressure of 7 tons.

The bullet is of lead antimony and has three cannelures. It is secured cloning the mouth of the case and rolling the case into the top cannelure.

Cartridge, S.A., Blank.

534. Code Letter L. Annulus Colour-Nil

The case and cap are the same as for 'an.

The charge consists of approximately a mains of growwder. Two felt wads are placed above the charge and the mouth of the case is crim, if to retail the wads and the charge.

Cartridge, S.A., Drill.

535. Code Letter D. Annulus Colour-Nil.

The white metal or brass case is rimmed and has three vertical grooves painted red. The cap chamber recess is filled with a red fibre pad secured by three stabs.

The bullet is of lead antimony and has three cannelures. It is secured by coning the mouth of the case and rolling the case into the top cannelure PISTOL, REVOLVER, No. 2. 0.380-inch. Cartridge, S.A., Ball.

536. No Code Letter. Annulus Colour—Purple.

The case is rimmed with the base of the rim bevelled off. The bullet has a cupro-nickel origiding metal envelope and a lead antimony core. It has two cannelures, the lower being filled with beeswax mixture. The bullet is secured by coning the mouth of the case into the upper cannelure and rolling the case into the lower one.

Cartridges, S.A., Proof and Drill are similar to esponding types in 0.455-inch calibre.

Cartridge, S.A., Blank has a charge of approximally 5.5-grains of gunpowder which is covered by a felt wad.

PISTOL, 0.455-inch.

Cartridge, S.A., Ball.

537. No Code Letter. onulus Cour-Purple

Ammunition of this call re is simila to that for the Pistol Revolver No. 1 with the following variations:—

The case it semi-rim as (it is a groove cut round its base above the rim) and has three fire holes.

The bullet has copper nickel plated envelope with a lead antimony core. It has one cannelure and is ocured by coing the mouth of the case into the cannelure.

538 Cartridges, S.A., Proof, Blank and Drill, differ from Pistol Revolver No. I ammunition in the cos are mi-rimless and (except Drill) have three fire holes.

CH. XIII-SECTION 4.-AMERICAN SMALL ARMS AMM AT ON

539. Small Arms Ammunition of American design and manufacture in supply for what may a considered essentially American calibres of Small Arms, namely, iffe and fachine Gun 0.30-inch; Thomson Sub-Machine gun, and Smith and Wesson revolver 0. Sinch; and Browning Machine gun 0.5-inch. Ammunition is also in supply for the carbine.

Cartridges are similar to British ammunition excer :-

- (i) Cases are of the rimless type. The anvil is separate u t and a fitted in the percussion cap (termed " primer ") before the case inserted in a the case. Rifle and Machine gun cartridges have one fire the case.
- (ii) The propellant charge is nitr ellulor powder.
- (iii) The bullet envelope (termed "o.ket") is of gilding metal and is copper coloured. The base of the bullet may be by t-tailed or flat (except Tracer which is open). The bullet is secured in the case by couping the mouth of the case into the cannelure or where the transport can fure (e.g., 0.45-inch) by coning.
- (iv) Markings a discuss of Application:—The means of identification is by varnish colour arking the tip and the ackets. The American code of colours is the same as the citish code with the exception of A.P., which may be either black or green. The cour-varnished annulus indicates that waterproof varnish has been applied. The code letter statem is not used.

540. The base of the cartridge may be stamped with the initials of the manufacturer, year of manufacture and callere, but there is no uniform standard. British manufactured at the sign for American calibres has the tips of the jackets coloured and base markings in addition

Small Arms cartridges of American calibres will not lead into British weapons of approximately the same calibre. For example, the base of the 0.30-inch cartridge (rimless) canally than that if a 0.303-inch cartridge (rimmed) but the diameter of its case is larger are as too light a 0.303-inch rile, gun or links belt. Similarly, 0.5-inch Vickers and Browning cartridges are not in a sharp gable as they differ in length and in other dimensions as stated above.

541.

TABLE OF AMERICAN C RTRIDGES

CARTRIDGES	CALIBIA	COLOUR OF TIP
Ball A.P. Tracer Tracer with dark ignition Tracer (short range day) Incendiary Dummy (Drill) A.P./Incendiary	0.30-inch 0.5-inch 0.30-io.a an 0.5-inch 0.30-io.a an 0.5-inch 0.30-inch and 0.5-inch 0.30-inch 0.30-inch and 0.5-inch 0.30-inch, 0.45-inch and 0.5-inch 0.5-inch	Nil Black or green Red Orange White Blue Nil Silver

CHAPTER XIV

S.A.A.(cont.)— 1-INCH AIMING RIFLE AND MINIATURE RIFLE CARTRIDGES

1-INCH AIMING RIFLE CARTRIDGES. Plate 22.

550. The 1-inch Aiming Rifle Cartridge comes within a definition of Small Arms Ammunition, but it differs from type by having a primer, electric or per ssion, instead of the usual percussion cap. It is supplied in bulk, 96 rounds in a box, A. A., G.S., 4.

Cartridge, Aiming Rifle, 1-inch Electric Mark II.

551. The cartridge comprise a cartridg case, prime, charge and bullet,

The solid drawn brass case i rimmed but is without the usual pronounced bottle-neck to receive and secure the bullet. The equated internally with the exception of the threads of the primer hole and that portion which supposes the bullet. The base of the case is marked with the manufacturer's initials or trade many the letter N, as a mark numeral of the cartridge.

The brass primer perises a body and magazine in a single unit. It is screwed into the primer hole and the joint is more tight with a fibre washer. A brass contact pin, insulated from the body by ebonite tashes, is fifth at the base. One end of the bridge wire is soldered to the point of the country to at the other to the body. The recess is filled with guncotton dust so as to surround the we have the country of the primer by the primer beginning to the primer before the primer by the primer beginning to t

forming electric current is passed from the contact pin. The bridge wire go no and the guncot in dust and the magazines are in turn ignited. The resulting flash ignited the cord is charge.

he charge consists of about 160 grains of cordite, Mark I, size 3.

The lead-antimony alloy bullet weighs approximately 10-32s. Its two canneres are nod with beeswax mixture. The rear end of the bullet is reduced in diverged a coppe cup is pressed on firmly and turned in on the bullet.

Cartridge, Aiming Rifle, 1-inch Percussion, Mark III

552. The cartridge is similar to Electric, Ma. 11, b. is sted with percussion primer.

On firing, flash from the cap ignores the maga we and the resulting flash ignites the propellant charge. Gun pressure is prevented from blowing barn by the soft copper cap sealing in the body.

MINIATURE RIFLE CARTI DO

0.22-inch Ammur' an.

553. The said dature of minunition of this calibre is "Cartridge, Rim Fire, 0.22-inch, Mark I," and the present Serve type of cartridge is known as "Non-Rusting."

The term "Rim-Pe" denotes a cartridge without a percussion cap. The fold of the rim of the case is hollow and is chared with cap composition.

Cartridges are supplied in cardboard boxes of 100; 100 boxes are packed in a quarte at.L. ca

The cartridge comprises the case, charge and bullet.

The case is of copper zinc alloy, solid drawn.

The charge is usually black powder. Cordite, neonite or other nitrocell use por lers way, however, be used according to the particular manufacturer's practice.

The bullet is made of soft lead. It is rounded at the head and has three she cannel ures, usually lubricated with beeswax mixture. It is secured in the case by cooling, necking a crimping.

554-559.

CHAPTER XV

S.A.A. (cont.)-20 mm. CARTRIDGES

SECTION 1-GF RAL

560. 20 mm. ammunition is in supply for :-

- (i) Oerlikon and Polsten guns.
- (ii) The Hispano gun.

Oerlikon and Hispano ammunition and not intercongeable. The base of the Oerlikon case is of less diameter than its body, thereas the timensions of the base and body of the Hispano case are almost identical.

The cartridges for an explanate similar components and comprise—case, percussion cap, propellant charge and shell or rope sile.

The cases are a cless and their brass percussion caps are secured by ringing.

The steel shell a catted with a copper driving band and, except Semi-Armour-Piercing which are closed with steel in a plugs, a percussion D.A. fuze is screwed in. A cannelure is cut below the driving band and the she for projectile is secured in the case by indenting.

Practice rojectil's are not fitted with a fuze,

SECTION 2-OERLIKON

B ITISH OERLIKON. Plate 23.

561. The designs and components of typical ammunition are shown in the Justration

The fuze fitted is No. 254 or No. 258. Each is a Percussion of Action for chaving no moving parts; the crushing of the fuze on impact actuates the domator. It action raises the fuze will-perforate the skin of an aircraft without functioning, but a will operation impact with wing spars, petrol tanks or other heavy structures. At very short ranges the fuze till function on impact with the skin of an aircraft. The No. 258 is the more a satisfactory and is in supply for H.E./I and H.E./I/T for Naval Service.

The propellant charge is nitro-cellulose, flass or o' pped tube.

The shell filling is C.E. or T.N.T. C.E. is obstace for future manufacture.

The outside of the shell below to driving bat is varnished to render the joint between shell and case watertight.

All future Oerlikon tra r v British panyl cure will have Dark Ignition. (See para, 519.)

Markings and a ms of Ide if arion

562. The type of ammulation are identified by the colour marking on the shell or projectile. The fuze can be identified:— 5, 254 is painted the same colour as the shell. No. 258 is not painted except for a blue spot in the tose.

The Lot Number of the shell or projectile, the contractor's initials and, if applicable, the letters D.I. (indicating dark ignition tracer) are stamped on the side of the shell or projectile. Projectiles for Drill (except Drill, Marks I and II) have no stamped markings.

The base of the cartridge case is stamped as follows:-

- (i) Initials or trade mark of the manufacturer of the case.
- (ii) Oe. (i.s., Oerlikon).
- (iii) The letter "Z" (denoting neonite filling).
- (iv) Year of manufacture of case, e.g., '44.

Note.—Oerlikon ammunition of "new" British manufacture will be stamp with details of the lot number and type of ammunition on the cartridge consists in fact of the base groove. It will be shown thus:—

S. H.E./I C.

These details should be quoted in all regards alling with refective ammunition.

Types of Ammunition. Plate 23.

562 (a) The present types of ammunition and se colour markings are :-

 Practice
 ...
 Lead Grey.

 Practice Tracer
 ...
 Light Green.

 H.E. Incendiary
 ...
 Signal Red.

 H.E. Incendiary Tracer
 ...
 Bright Green.

CH. XV-SECTION 2.

S.A.P./H.E./I. ... Red with white tip. H.E. Buff. H.E. Tracer Light Blue. Lead Grey with red band round the body. Proof 644 Drill, Mark I Black with DRILL in White Letters. 4.00 *** Drill, Mark II ... Wood, unwinted.

Projectile, Practice. Colour-Lead Grey.

563. The steel projectile is hollowed to make the weigh correct and the nose is pointed to give the required ballistics; the base is closed with a well disc.

Projectile, Practice Tracer. Colour Green.

564. The projectile is similated by Prace v., but for a purpose of ballistic matching the nose is less pointed. The body is partly filled with pacer composition. On firing, heat from the propellant gases guites the tracer post in which bins for approximately 3½ seconds.

Shell, H.E., Inceno ry. (H ../I). —Signal Red.

565. The filling a cases an increment of Incendiary composition with T.N.T. superimposed and press l.in; a waxy lasting cloth disc separates the T.N.T. filling from the incendiary composition.

On impact, the fuze ectonates the T.N.T. filling and the detonation ignites the incendiary com-

X includes a concendiary composition results in an extremely high temperature of detonation, at this exercise decrease for igniting petrol.

Sh I, H.E., Incendiary, Tracer. (H.E./I./T.) Colour-Bright Green,

A 566. The shell is open at both ends and is divided into two compartment. The following compartment is filled with an increment of Incendiary composition with T.N.T. super sposed and pressed in; a waxed lasting cloth separates the T.N.T. from the ignorance composition. The rear compartment is filled with tracer composition. A thin brass cloud disc is cover the tracer composition and is retained in position by a steel washer which is secural into the line of the shell.

On firing, heat from the propellant gases may be cutre of the losing disc and ignites the tracer composition which burns for approximately $3\frac{\pi}{4}$ shows. On it pact, the fuze detonates the T.N.T. filling and the detonation ignites the Landian composition.

Shell, Semi-Armour-Piercing/H.E./L (S.A.P./H.A. (.) Colour-Red with White tip.

567. This shell is similar to the a E./I but a a conator is superimposed on the filling and the head of the shell is closed which steel rive plug. The shell is detonated on impact with armour plate or heavy metal structure and the spendary of aposition is ignited.

Shell, H.E. (W. .. Colour-

568. The shell similar v the H.E./I except for the illing, which is entirely high explosive. This type of ammunity in is no obsolescent.

Shell, H.E. Tracer (H.E./T.) Colour-Light Blue.

569. The shell is similar to the H.E./I./T except for the filling, which is entirely 1 sh explosive. This type of ammunition is now obsolescent.

Cartridge, Drill, Mark I. Colour-Black with DRILL in White,

570. This cartridge and CARTRIDGE, DRILL, MARK II (described w) are supplied for magazine loading practice and must not be loaded into the gun. The projects is of cast iron.

The base of the case is stamped :-

- (i) Oc.
- (ii) Letter "D" (denoting "Drill") and II (denoting M. V. Naval).
- (iii) Date of filling barred out.

The cap is removed and a red annul a is plinted.

Cartridge, Drill, Mark II. No colour marking.

571. The hardwood cartridge is stamped :-

- (i) Oc.
- (ii) Letter " D " and H N.
- (iii) Contractor's initials or recognised trade mark
- (iv) Year of manufacture, e.g., '44

Clearing Charge.

572. The clearing charge comprises a shortened service cartridge case with a full charge. The propellant is retained by a glazed board cup.

A one-round magazine is supplied to facilitate the use of clearing charges,

The magazine is suitable for any mark of gun.

AMERICAN OERLIKON. Plate 23.

573. H.E., H.E./I and H.E./T ammunition of Amer an design and manufacture are in supply. The case and shell are similar to those of Britis design.

The fuze, No. 26, is a Percussion, D.A. fuze which is a adaptation of the British No. 254 and functions in a similar manner. The propellant charges graph a tubular neonite. The high explosive filling is either C.E. or Pentolite.

574. The types of ammu tion and be filling as distinguished by the colour marking on the shell.

The base of the stayped :-

- (i) Conractor's nith or tra mark.
- (ii) Ye of p Aufacture
- (iii) 20 m -Mark II.

575 The following particulars are marked on the side of the case in indelible blue ink :-

- (i) Initials of filler
- Number in 1-inch letters.

576. Se present types of ammunition in supply, their filling and colour ark as are :-

H.E.	442			5	C.E	****			White.
H.E.	***	***	500	***	Pentolite	***		***	1
H.E.T.	***				C.E		_440		L ht Grey
H.E.T.	***	***	***		Pentolite		**		Dar Blue.
H.E.I.	***	1775	***	***	C.E		***	200	Red.

SECTION 3-HISPANO

577. A typical roun shown, or comparison with Oerlikon, in the illustration. (Plate 23.)

The fuze fitted is N 2. A n diff. Oerlikon fuze, No. 254 Mark IV, is approved as an alternative.

The proper of the charge outro-conclude powder. The high explosive filling is C.E.

Markings and mean of Identification,

578. The types ammunition are identified by the colour markings on the shell are jectiles. The base of the case is stamped:—

- (i) Manufacturer's initials or trade mark.
- (ii) Year of manufacture.
- (iii) 20 mm.

H.E.I. ...

The colour of the annulus is purple for all types of ammunity exect Durany, which is uncoloured.

The markings stamped on the side of the shell are :-

- (i) Lot Number and last two figures of the year of h
- (ii) Filling contractor's initials or trade m
- (iii) Mark of complete round and the of propella

Types of Ammunition.

579. The present types of ammunition is apply and the colour markings on the shell or projectiles are:—

Ball		2888	***	5,592	11864	100	100	Black or blued.
Tracer	12.55			1.555	1991	***	000000	Black with T in Red, or red band.
A.P./T. (Day)	1000	***	100	100	777	W	Black body, white tip and white

CH. XV-SECTION 3.

A.P./T. (Night) Black body, white tip and green band. H.E.I.—Top half of body Buff. Lower half of body Red. Nose of fuze Green or Red. A.P. ... 444 Black with white tip. S.A.P. Incendiary ... Red with white tip. Dummy Black or blued.

Note,-No red band is painted on shell to denote that the are filled.

H.E. and Incendiary are obsolescent,

The above ammunition is similar to the correst ading Breash types of Oerlikon ammunition described earlier in this Chapter, or open a following:

Cartridge, S.A., Ball. Colour-ack or blu

580. The project is hope and a mean closing disc in the base prevents the entry of gases into the projectile.

Cartridge, S.A., Armon Ciercing (A.P.). Colour-Black with White tip.

581. To ammunitio is for use against armoured fighting vehicles and armour protection in

The roject to saich has no filling, is of armour-piercing steel and its pointed by a fitted with a north or each cap. The length of the cartridge is the same as Ball, and the cap mition can be used all types of magazine and in belts. Later marks are without a cap and have other an inertifility or a spigoted base plug.

Cartridge, S.A., Armour-Piercing Tracer (A.P./T.). Colour—Black body, white tip and white or green band above the driving band.

581A. The projectile is of armour-piercing steel and is acapped. Here are alternative fillings for Day and Night tracers.

Cartridge, S.A., Semi-Armour-Piercing Incend by (S.A. /I). Now Red with White tip.

582. This ammunition has been developed in a gnition of aircraft petrol tanks protected by armour plate.

The shell is an H.E. shell body had with ince diary composition, or alternatively, filled with incendiary composition and classing a de mater superamposed. The head is closed with a steel nose plug.

On impact with amour later way, netal structure the shell breaks up and the incendiary composition is in set. The property of the property of

Cartridge, S.A., Dum v. Cole r-Black or blued.

583. The cartridge amprises a standard case with three holes drilled in the side about three inches from the base, a wooden distance piece, and a "ball" projectile secured by swearing of rolling.

584-589.

CHAPTER XVI

ROCKET-PROJECTED DEVICES

SECTION I-PROPERILES

ROCKETS "U" (UNROTATING).

590. These projectiles consist of a cordite a ket or 74. Propelling, with a shell screwed into the head. They are launched from the rails of a projector estead of being fired from the conventional gun, and are not rotated. Unlike the ammunition of a gun, the charge forms an integral part of the projectile and travels with a man at until con med.

591. The original nomency are was hoket, Unrotating, Projectile (U.P.), but with the extension of the use of rocket projection this was changed to Rocket "U" (U denoting Unrotating).

Some of the advantage as disadvant ges of rocket projection of shell are :-

Advantag

- (i) The a saty of the shell of a Rocket "U" is greater than that of a shell of similar calibre yed from a rifled gun.
- i) Lower as deration obviates the necessity for strength against pressure and set-back.
- Projectors are light and simple.
- (iv) sence of "deck thrust" on launching.
- Absence of gun wear.
- (vi) Ease and rapidity of manufacture as a complete unit, i.e., pojector as projectile or other device.

Disadvantages.

- (i) Less accuracy.
- (ii) Lower average and striking velocity.
- (iii) Slower loading.

Lack of accuracy is partly compensated by using but the projet ors which fire salvoes varying up to 20 rounds, and thus it need not be a disdvant to as a second effect is obtained.

Rockets, "U," 2-inch. Plate 24.

592. The 2-inch rocket "U" is a anti-aircra device.

Only one type of she is "ted to "ese reacts, namely, the H.E. shell,

The main corn ments of a round are all. Propelling, Tail Fins, Shell and Fuze. These parts are supplied separately for assemble, on and are assembled in the following order:—

- (a) The Fins to Tail, Propelling.
- (ii) Shell o Tail, opelling.
- (iii) Fuze r Shell,

Dismantling is done in the reverse order.

593. The Tail, Propelling, is a welded steel tube with a shell ring secured into the head by steels. Below the shell ring the Head Obturator, a cupped disc of thin shell steel, seals the lead end of he Tail, Propelling, against leakage of gases. The venturi (nozzle) is welded to be over end of he Tail, Propelling. The bag of silica gel in the venturi is for desiconing purposes. The beginn obturator prevents any leakage of gas past the venturi. The charge of write LO, is case and at the head; it rests in the tube and is supported at the tail by a grid. A magnitude of composition igniter incorporating an electric puffer is fitted in the castellation of the charge.

Electric leads from the igniter pass through the annuls of the con te to four brass contacts near the tail orifice. The contacts (two positive and two legative) are wired so that proper contact is made with the knife-edges of the mounting presentive of the higher at which the round is loaded.

The tail orifice is sealed by a tinned one closing a recurrence in position by R.D. Cement No. 1. The Tail, Propelling, will not self-project. In there should be accidental ignition of the cordite with a round in an unassembled state, the Head acturator which is without the support of the base of a shell) will blow out and the products of commission was escape from both ends of the tube.

594. Tail Fins (4), of steel plate, are inserts into slots in the tube; they are driven back by means of a wooden hammer and latched in position.

595. The Shell is of the High Explosive type filled with 9-ozs. of T.N.T. It is screw-threaded near the base to screw into the shell ring of the Tail, Propelling. On firing, the shell gives support to the Head Obturator.

CH. XVI-SECTION 2.

596. The Fuze, No. 720, is a wind vane arming, direct action type which arms at a distance of approximately 75 feet from the projector. The self-destruction device operates at a short range of 4,500 feet (4½ seconds); no shutter is incorporated. An internal and an external detent prevent the wind vane rotating until the round is fired. The external detent is visible and houses into a slot cut into the skirt of the wind vane cap. On firing, acceleration causes both detents to set back.

The wind vanes of the fuze are then free to rotate; approximately five complete turns of the wind vane in an anti-clockwise direction (looked at from the nose) will put the fuze into a direct action functioning condition at the same time releasing the time state, and the fuze will detonate 4½ seconds later. Additional safety is provided by a safety split provided is passed through the skirt of the wind vane cap and fuze body. The safety pin prevents that of the wind vane cap in either direction and must be removed before loading. The pin a secured a position by means of wire which takes round the body of the fuze and is sealed with a lad seal.

The fuze is not watertight and must be protected from the wather by applications of Grease No. 0, in accordance with the instructions

Action.

597. The rocket is launched by electric current initiating the electric puffer. The magnesium composition igniter are the coracte charged elignited. The pressure of gas set up by the burning condite disperses though the ventoriand a ovides the impetus to the rocket. The condite burns for approximately .8 should, doing when a cried the rocket is accelerating.

SECTION 2—ILLUMINANTS

2-inch Ro set Flare. 2 ste 24.

598. The Rocket Flare is launched from a special Projector which is attached to a gunshield, at a constion 1302 at it is set to burst at 5,000 yards at an approximate height of 2000 feet; the re-burst for the seconds.

the handbook, B.R.924 Handbook for the 2-inch Rocket Flare, should be consulted for general in nections, maintenance and detail.

599. The round is supplied for assembly on board and comprises the following main arts—Tail, Propelling, Flare Head and Fins (4).

The order of assembly is :-

(i) Fins to Tail, Propelling.

(ii) Flare Head to Tail, Propelling.

600. The Tail, Propelling, is similar to the can, to ling, of a t-inch Rocket "U," except that the Head Obturator is not perforated. "To fine arolder cal to to see of the Rocket "U."

601. The Flare Head Container is a tinned o cannelures near the base. canister, containing the illuminating flare candl a parachute assembly attached, is inserted in The Ballistic Cap fi the Container. on the forw end of the Container, to which it is secured with adhesive tape. The Base Socket is cured into other end of the Container by indenting the cannelures; it contains the rmal E ctor which crews into the shell ring of the Tail, Propelling. The Thermal Ejector consiwith a septum of accurately machined thickness in the centre.

The lower of a piece is acknown Fuze (primary delay) cut to burn approximately 22 seconds makes intimate contact with a grains of L.D.N.R. (lead-dinitro-resorcinate) which is stemmed into the septum recess. The upper and of the Bickford's Fuze projects into the magazine which contains approximately 40 grains of G.22 gunpowder (primary ejection charge). A short piece of Bickford's Fuze (secondary delay) cut to burn for 3 seconds projects from the base end of the canister: the lower end is in close proximity to the primary ejection charge, and the upper end projects in a magazine containing 40 grains of G.12 gunpowder (secondary ejection charge).

Action.

602. On launching the rocket, heat from the cordite propellant is transmitted process the Heat Obturator and thin septum of the Thermal Ejector and ignites the L.D., R., which, in the intest the lower end of the Bickford's Fuze (primary delay). After 9, 18 or 22 hours (depending on the mark used) the primary ejection charge is ignited, and the canicer is ejected from the container in a forward direction.

The Bickford's Fuze (secondary delay) is initiated com the pri ary ejection charge. Three seconds later the secondary ejection charge is gnites the candle and and ejects the parachute, cable and candle in a forw d dire The parachute opens when ejected from the canister and the ligh candle mid-air. The purpose of the secondary delay is to allow the velocity canister speed at which it is safe to eject the flare and the parachute assembly without ak-up.

Rocket, Illuminating, 9-lbs. (Snowflake).

603. This store is an illuminant and is used in locating enemy submarines.

The cylindrical 2-inch Powder-filled steel rocket is similar to Apparatus A.D. Type D; in addition, it is fitted with tail fins (4). The Parachule Head contains a parachute with a star and igniting arrangements. The rocket is launched from a Projector Type A or B of Apparatus A.D. Type D, using the appropriate 60 grain cartridge.

Action.

604. When the rocket reaches the vertex of its flight, about 1,500 feet or more, the burster is ignited by the burning rocket composition. Its action ignites the star and expels the parachute and lighted star from the rocket head. The parachute opens out and the burning star is suspended from it; the star burns for about 60 seconds.

SECTION 3-APPARATUS, AIR DEFENCE (A.A.D.)

Apparatus A.D., Type D. Plate 25.

(Parachute and Cable-P.A.C.)

605. This device suspends a cable from a prachute at the the firing ship. The cable is rendered lethal on the impact of an attacking aircraft, and a craft must either keep at a height which precludes accurate bombing or change course.

The Handbook should be contains for general extructions, maintenance and detail,

The Mark III/N consists of the following main component parts—Rocket with Parachute Head, Main Container, Main Cable at Lower Parichut Assembly. The assembled ammunition is termed "Apparatus A.D. Type D." (Abbreviation P.A.C.).

606. The Ro ch steel rocket with a tin parachute head attached. A unpowder burster are packed in the parachute head. The 38-inch diameter hed to the parachute head fits over the outside of the muzzle of the projector painted canvas cove water into the barrel. Two stirrups and a bridle are attached to the rocket; and pre nts access feet of cable which is covered with asbestos at the rocket end and fitted with the brid as about fi for shackli to the Main Cable. Before securing the rocket tail to the Main Container is removed and the top loop of the K.B. Cable is secured by its a short portion of the wire tail is coiled down into the Main C o as to hip the rocket tail, and it is retained in place until it is ged by the pull

607. The Main Container is a cylindrical iron box which has two descentric ampartments. The outer compartment contains the Main Cable and the inner contains the Low Parachia Assembly. The lid is detachable. The Main Container is lashed to the deck.

608. The Main Cable consists of 400 feet of K.B. ID ye with loop at each end and a swivel on each loop. One swivel is attached to the wire tail of the rocket by le and the other to the Lower Parachute Assembly.

609. The Lower Parachute Assembly company a 18-14 diameter parachute and a small trail parachute. The larger parachute is packed a canvas and codled and the small trail parachute is attached.

Action.

610. The 60-grain gunpowder tridge ejec he rocket from the Projector and also ignites the at of approximately 550 feet, the burning rocket rocket composition. When reaches a he the rock harge in the parachute head and the upper parachute composition ignites and ex the g powder is ejected. At this sembly will be approximately 150 feet above the sea, age. at the trail parachute will be open. The lower parachute will st the lower parac impact of an aircraft with the cable. On impact the trail parachute the lower parachute which opens and renders the cable "lethal." remains in dle until pulls the ri d releas

Apparatus, A.D. Ty J. Pate 25.

611. The objects of means of operation of this device are similar to those of the A.A.D. Type D. Type J Mark I ejects a 600 ft. 2½ ton cable.

The Handbook B.R.293/44, Handbook for the Apparatus Type J, should be consided for general instructions, maintenance and detail.

The Apparatus is supplied in three main component parts, (i) the Taile Top line (ii) the Hold Canister and Thermal Fuze, and (iii) the Main Container.

The round is assembled on issue to ships. The fully assembled bund including the Tail, Propelling) is "Apparatus A.D. Type J." The Apparatus is launched it as a "Projector A.A.D. Type J."

612. The Tail, Propelling, is similar to the Tail Propellin, of a 2-inch Rocket "U," except that:—

- (i) The head obturator is not perfor ted.
- (ii) There are no fins or fin slot
- (iii) A short stirrup is welder to it exterior if the base of the tube.
- (iv) The venturi is closed with a wined plant closing disc. The flexible rubber pigtail containing the firing leads is passe through the closing disc; contact study are omitted.

613. The Head Canister and Thermal Fuse.—The Head Canister is of tinned plate and contains a 62-inch parachute; it is made integral with the cast iror ejector cup by soldering. The lower circumference of the Head Canister rests inside the ejector cup on a piston or diaphragm. The base of the ejector cup is screwed into the shell ring of the Tail, Propelling. Provision is made in its base for the Thermal Fuse which is a separate unit.

1

capacity of approximately 25 per cent. The blast effect is greater than with S.A.P., but the main damage is caused by fragmentation. A pistol and detonator is inserted in either the nose or the tail of the bomb. A nose pistol must function before it is broken or crushed by impact, and for this reason an instantaneous detonator is fitted with it. This arrangement reduces the crater effect. When a delay is required the suitable detonator should be used along with a tail pistol.

Medium Capacity Bombs. Example, 500-lbs. M.C. Plate 32,

734. These bombs have a greater capacity than 6 bombs, and consequently have an increased blast effect and produce smaller fragments. Their and detonator arrangements are similar to those of G.P. bombs.

Anti-Submarine Bombs. Example, 100-lbs. A

735. These are special-purpose hombs as their ame impa es, but they may be suitable for other targets if a greater blast effect bombs is required. Depending on type, either iven by G. nay be em a nose fuze or a tail pistol ar detonate oved

Anti-Personnel Born

736. These 40-lbs. designed to give a large number of small fragments i.P. b. suitable for this purpose; it is fitted with a nose pistol and her respects is similar to the larger G.P. bombs. A parachute attachment on detonation. detonator only, fitted.

ncendia Bombs.

alling of these bombs is incendiary. In the 25-lb. Incendiary omb at the tail end. Other types have a nose fuze,

ACTICE BOMBS. Plate 32.

738. These are small bombs (about 10-lbs.). They have a cast-iron oulded nose ewed to a container filled with either a smoke composition for day practic flare coma flash position for night practice. Night practice bombs are supp d. Day ctice bombs may be supplied without the smoke filling, which is issued separa omb is fill locally before use. The pistol is built into the bomb, and on impact the strik shears a and fires a detonator-burster.

Drill Bombs.

739. Any of the above types of bomb al and drill purposes and differ only from service bombs in that their filling

Markings on Aircraft Bombs.

740. Stencil markings on the b give the llowing information :-

- Nomenclat d mas
- weigh
- ere filled
- Number
- and place of last examination.
- number of method of filling of Bomb (where applicable).

741. Colour markings are used as follows:-

- (i) H.E. bombs are coloured green (earlier bombs were yellow).
- (11) A red band near the nose indicates that the bomb is filled.
- (iii) A white ring adjacent to the red identifies an S.A.P. bon
- (iv) Two white rings, one either side of the red, denotes A.P.
- (v) A plain green band denotes a T.N.T. filling-"T.N.T." is st
- d on or near the band. (vi) A criss-crossed green band, with a fraction be . denotes amatol filling of high grade.
- (vii) A plain green band, with a numeral nd a ow, denotes an amatol filling of low grade.
- (viii) Incendiary bombs are pain dull re
- (ix) Practice bombs are pair ; two en bands denote a smoke composition filling and two black bands a flash co sition.
- (x) Drill bombs are painted black v a yellow band.

Note.-The new system of colour marking, co mon to all Services, to denote the explosive filling will be found in B.R. 1202.

CHAPTER XXII

AMMUNITION PACKAGES

SECTION 1.—GENER & REMARKS

745. For the purpose of this chapter Ammedition Paceages are grouped as follows:-

- Packages stowed on board with a ir ammultion (e.g., Cases for cartridges, B.L.; Q.F. Cartridge and Ammunition boards).
- (2) Packages for the to the ship).

The weight, dimensions are contents of the various packages are included in "Notes on Naval Guns and Armament Stores."

- 746. Packages of tan ig amunition must be handled with great care, and the instructions in the N.M. & E.Rs arefully seemed. Roy a usage of packages may result in :—
 - (i) Dange to the contents. This may cause missfires, hang-fires or prematures.
 - (ii) Loss of ar-tightness. This will cause a loss of efficiency.
 - Jammin of lids of cases. This will cause loss of time and possibly a reduction in the rate of it in action.
- 47. An supplying packages must not be raised or lowered quickly. Ample time should be allowed, imballing an existence and a supplying an existence of the package catches or jams in such a way count sumage may be cused to it or its handles the package should be set aside and carefully exactined; if there is damage of suspicion of damage, the package must be returned to an Armament Dent for test.

Care must be taken to prevent water getting into packages, particularly packages of fuminiumsilicon or galvanised iron; filled packages should not be exposed to heavy rain

Packages are rendered weather-tight and air-tight V, the us of luting, symatine rings or rubber rings.

Luting is a thick paste which does not dry easily as it is acced between metal surfaces or in channels to form an air-tight joint. It is also used to render me I or tin med cases and cartridge and ammunition boxes water-tight. If possible, uting sholld a several sed at intervals of six months to test its efficiency; lids of packages are not to be proved specially for this purpose.

Dermatine is a rubber composition; when young of dermatine is pressed into the groove around the lid or opening of certain cases of forms an antight seating for a flange.

748. The sealing develop of packages must be examined on embarkation and packages with broken tapes or seals are to be sturned to the saval Armament Depot with a report of the circumstances. When remaining field are units a packages those with broken seals are to be kept separate and the Arman and Depot it could.

CH. XXII—SECTION 2.—PACKAGES STOWED ON BOARD WITH THE AMMUNITION

CASES.

749. Cartridges, B.L., are packed in cylindrical or rectangular flash cost use of aluminism alloy, steel or brass. The cases are stowed to permit easy access, i.e. or that the covernts can be withdrawn without moving the case in its stowage. The abbreviated non-aclature fenotes a mape, e.g., "C.E."—Cylindrical "E," "R.N."—Rectangular "N." Cases are sportly sealed by affixing two station monogram labels over the joint of lid and body some cases have sealing labels fixed over the ends of tapes. "C.E.," first supplies of "C.F." and "N." cases have their own individual sealing arrangements.

Cases and certain cartridge and ammunition box is weire my discussion open and close them. The keys vary in shape according to the type of lid; they are sugardating in a convenient position in the magazine. A list of keys is set out a waragraph of with distrations in the Schedule of Keys on page 131.

CASES, POWDER, CYLINDRICAL. Plate 34

750. Fractional charges for B.L. 14-inch, which and 16-inch guns are packed in cylindrical cases with the ignitered end of the Cartridge, B.L. towards the lid. The cases are of sheet brass or steel, jointed with rivets or welded and strengthened by circular bands. The lid is secured by feathers or lugs taking under recesses in the rim of the case; it is rendered air-tight by a rubber or dermatine ring. The bottom of the case is strengthened. Cylindrical cases should never be rolled along the deck.

" C.E." Case. Plate 34.

751. This case holds three 1/6 charges for a B.L. 16-inch gun. The case is of brass and strong end rings improve the flashtightness. It has three handles. Cardboard liners provide further anti-flash protection and facilitate the withdrawal of cartridges. (To assist withdrawal the lifting band of the second cartridge is attached to that of the third.) The lid is secured by a locking ring whose six lugs drop into grooves in the end ring. A screwed ring revolves inside the locking ring.

Sealing is effected by two lead alloy seals each passing through a hole in the end ring of the case. The head of the seal bears the monogram of the closing station; the other end is riveted into a countersunk recess in the end ring and impressed of the monogram of the station. The air testing plug is covered with a small brass disc bearing the monogram of the closing station and is soldered in position.

752. To open.-Ship the "Key, Case, Mag ine, No. over the bar running diametrically direction until the lugs in the locking ring are across the screwed ring and turn anti-clocky in line with the slots in the er nove the lid. If the locking ring is not moved e case. top, the ca when the spring catch is in coct with i ch should be withdrawn and rotation continued until it is again in contact w its stop, en a urther attempt to move the locking ring should be vithdraw v made. If the lid is en the lugs on the locking ring are in line with the slots in the end ring se" should be used to prise the lid and free the dermatine ring from the jo

753. To close. When the spring catch anti-clockwise to its stop. Insert the lid into the end ring of the case, ship the rey and turn in a clockwise direction until the locking ring reaches the limit of its trave. Withdraw the spring catch and continue the rotation until the lid is hard down. The pring catch should be depressed again if more than one revolution is needed to close the case.

" M Case. de 34.

754. his case holds two \(\frac{1}{2}\) charges for a B.L. 15-inch gun. The case is handle of copper wire covered with leather; later Marks have a metal had or steel and has engthened end igs improve the flashtightness; cardboard liners provide further antin and facilit, but were crew in the te the withdrawal of cartridges. Cases were originally designed with a at each converted by having one end permanently closed; this end is painted blue The set end ring at the lid end can be screwed home to prevent ling off d g transport. hostilities, all the screw is removed before opening the case and must be a dily acco ble; durii. screws should be removed. There are two small holes is the case ar one the lid and the sealing label is secured by tapes.

755. To open.—Remove the set screw of fitted. See the "cey, Case, Powder, Cylindrical "L' and 'M' No. 4 or 5 or 'M' No. 6" (a supplie) and seem an anti-clockwise direction until the lugs on the locking ring are visible in the lock of at the end ring of the case. Remove the lid. If Key No. 6 is supplied the lid can be lifted clear with it. A lever is provided to assist opening.

756. To close.—Place the lid is the mouth on the case so that the lugs on the locking ring enter the inclined grooves in the use. Turn the lid is a clockwise direction using the Key provided. Undue force should not be used but an aircraft it at is essential. The lid is prevented from turning by screwing home at set sow.

" C.F." C.se. Vate 34.

757. This case holds the ½ charges for a B.L. 14-inch gun. The case is of brass or steel with a solid bottom. It he only one handle. First supplies have a brass body with strengthening bands; modern cases have accumferential corrugations. All "C.F." cases have two location bands to engage the wriggle bars of the magazine stowage. The case is sealed by affixing the fine matter aution monogram sealing labels on opposite sides over the junction of lid and end ring.

758. To open.—Remove the locking pin by pulling the toggle. Ship the "Key Case, Magaine, No. 4" and turn the locking ring in an anti-clockwise direction. When the locking ring are visible in the slots in the end ring of the case, the lid with the locking ring a lack will be held on the key by the two spring catches and can be withdrawn from the call.

759. To close.—The lines on the locking ring and the pposite before the lid is d should b g ring into the slots in s of the loc shipped on the case. Ship the key on the lid and insert the l the end ring of the case. Make sure that the slot for e the holes in the end he locki pin is oppo ring when the lid is fitted. Turn the locking ring lockwi direct until the lid is secured. Before unshipping the key make sure that the n one or other of the holes lockin Unship the key and insert in the end ring and, if necessary, adjust osition lit pin the locking pin, open out the ends so that the pin is held in position. Stick a piece of adhesive tape over the keep tl toggle in position.

RECTANGULAR CASES. Plate 34.

760. Charges for B.L. guns 8-inch and below and Charges, Aircraft, Catapult, are supplied in rectangular cases of aluminium alloy or sheet brass, corrugated or indented to give strength. The ends are solid and are secured to the body by various means. Wood linings are fitted in some old type cases to prevent irregular fittings in the ends of the cases injuring the cartridges. Wood or cardboard packing pieces in the shape of stools, cylinders, etc., may be supplied for convenience of

CH, XXII.—SECTION 2.

packing and unstowing or for ensuring firm stowage. Packing pieces of cardboard are covered with a preservative, usually bakelite varnish. Wooden packing pieces are mildrew proofed.

The opening for the lid may be in the centre of or in a corner of one end. Cases are stowed to permit easy access, i.e., so that the contents can be withdrawn without moving the case in its stowage.

" R.M." Case. Plate 34.

761. This case holds five \(\frac{1}{2}\) or ten \(\frac{1}{2}\) charges for the B.L.S-inch gun. It is of aluminium alloy and brass with riveted joints. The lid, which lifts in one pion, comprises two parts, namely, the lid proper and the locking handle (a star shaped piece of methods were ends take in inclined recesses round the lid opening). The two bronze handles are on the top of the case.

762. To open.—Ship the Key, Case, Magazin Vo. 3, an urn the locking ring in an anti-clockwise direction until the lugs on the locking ring are free of the grows in the body. Remove the lid.

763. To close.—Insert the lide of wolve the leving handle in a clockwise direction, using the key, until the lid is felt to be and down

"R.N." Case. Plate 24

764. This cas wolds has a ridges poked in cardboard containers for B.L. 6-inch, Mark XXIII guns. It is of an inium aloy which ends are welded to the body. The two metal handles are recessed in the top. The locking device is a brass cover plate or locking ring with four lugs.

76 To open.—, up the Key, Case, Magazine, No. 2, and turn the locking ring in an anti-clockwise direction until the lugi on the locking ring are free of the grooves in the body. Remove the lid.

766. A close.—Insert the lid. Revolve the locking ring until the lugs are home in the grooves to be top at the cost. Insert the key and turn clockwise until the lid is hard down.

La." C. (Cartridges for 8-inch guns).

R.H." Case (Cartridges for 6-inch, Marks XXII and XXII* guns.) F & 34.

767. The locking arrangements of these cases are similar.

To open.—Ship the Key, Case, Magazine, No. 1, and turn the locking rin in an anti-clockwise direction until the lugs on the locking ring are free of the groves in the body. I move the lid.

768. To close.—Insert the lid. Ship the key and turn in a clock se direction; the lugs on the locking ring must be carried home to the ends of the greater was in the up of the case. When home, the label recesses on top of the case and on the locking up all be approximately in line. The turning movement must be continued until the lid k gelt to b hard way.

"T," "W" (Plate 34) "S," "P" and "C" ases.

769. These cases hold cartridg for B.L. 4.7 th, 4.7-inch or 6-inch guns. The cases are similar and are typical of the older cases still to the service. The corrugated brass sides are riveted to flanges on the top and bottom. It wild is occurred by a locking ring and is operated by a key. (See paragraph 772). The case are wolld with onen monogram scaling labels.

771. To close.—Thip the lid and locking ring so that the arrows on the locking ring and on the body of the case are posite. Insert the lugs of the locking ring into the grooves in the body. Ship the key and turn the locking ring in a clockwise direction until the lid is home in the

7	72.					LIST (OF KEY	vs	
Key,	Case,	Powder,	Rectangular	No.	5	***	***		" W " Case.
19	34	**	*	No.	ł	***	***		{"R"II-III
"	**		,,	No. 3	3	110	***	1	"S "As IV-V, "T" vrks V-VI. "W" I vrks HI-IV,
**	**	10	**	No. 2	2	798		58.00	" T " Mark IV. " O' Mark V.
Key,	Case,	Powder,	Cylindrical,	M. No	. 6	A		8	Committee 1.
		ii.		L. & M		. 5		2	L" Marks III, III*, IV & VI.
	**	**	**	L. & M		4			do.
10-	10	n		L. No.		***		244	"L" Mark I.
	-11		- 11	L. No.	1	-	***		"L" Mark I.
Key,	Case,	Magazine	No. 4	***	+++		1444	1144	" C.F." Cases,
	**	22	No. 3	+++-	7.77	***		CARE	" R.M." Cases.
- 11	30	**	No. 2	***	444	***	***	***	" R.N." and Catapult Cases.
	31	200	No. 1	***	***	111	***	***	" C.E."" " R.H." and " R.J."
11	**		No. 1 Spec	cial	***	***	***	***	do.

BOXES FOR Q.F. AMMUNITION.

773. Boxes for Q.F. separate loading cartridge cases are called "Cartridge Boxes," and boxes for Q.F. fixed ammunition are called "Ammunition Boxes." The boxes are rectangular and are of wood, aluminium alloy or steel. They have various methods of locking. These and other boxes are marked with a code letter to identify the contents; the number after the code letter denotes the series in the class. The code of letters is as follows:—

P.	***************************************	Projectiles
C.	. *************************************	Q.I. cart. ge cases and Q.F. fixed ammunition.
В	***************************************	ombs and occessories.
G.	***************************************	G nades and coessories.
H	***************************************	Sm. Arms At munition (A.S.A.).
M.		Misce neous,
T.		Tubes, vent.

The letter and a number are granded or agrav d on each end of the box.

CARTRIDGE B LES.

774. All carrie we's sees (except C.185) are of teak or other hardwood and are lined with tinned copperar tinned plant. Strengthening bands are fitted as necessary. The handles are of galvanised iron, at I wire rope a grummets with leather or canvas grips. The lid of the older type of box is secured to a locking plane which engages four metal bolts; the plate has an eccentric action and is secured to a rectar plant key. The modern box lid is fastened by catch levers which are held down by a light print of a hasp secured with a turn buckle. Lids are rendered watertight by filling liting into a secest around the top of the lining.

x, Cartridge, C.23 Mark II. Plate 35.

775. This box holds six cartridges for Q.F. 4-inch, Marks V-V** guns. It is of hard you and has a metal lining. It is fitted with two wire handles. The lid is secured by four otch level, which are held down by split pins.

Box, Cartridge, C.185. Plate 35.

776. This box holds four cartridges for Q 4.5 arch ans. It is of galvanised steel and its lid screws down on to a rubber or dermatine just. The two was handles are at the sides. Three steel diaphragms retain the cartridges in place at a sto (which has over the bases of the cartridges) prevents lengthwise movement. Tape is three to through the handle and round the centre pin of the lifting plate and knotted. A tien scaling late it is affixed over the knot and the ends of the tape.

777. To open.—Turn the hand in the centre of the lid anti-clockwise and remove the lid. Remove the cartridge stop supposers of the wing nut in the centre; use Key, Box, Cartridge, No. 2, if necessary. Withdraw to carridges top one box.

778. To closs.—Insert he sax artidges in the box and assemble the cartridge stop on the centre spinds. Sighten up as wing nut, using Key No. 2. Assemble the lid and tighten up on the handle in a clock size director.

AMMUNITION BOXI

779. All Ammunition boxes (except C.190) are of teak or hardwood and are lines with med copper or tinned plate. The handles are of steel or wire rope with leather grips. The hids are see led by catch levers held in place by split pins.

Ammunition Box C.163. (Plate 35). C.163C, C.273.

780. Each of these boxes holds two rounds of Q.F. 4.7-inch ammunit v. They are of hardwood. The lid is secured by two hinges and is fastened by catch leaves held downly split pins. A frame with diaphragms and suitable packing pieces is fitted inside to prevent in vement of the rounds. Instructions for replacing fired cartridge cases are on the inside of the lid on the box. C.163C and C.273 boxes differ from C.163 only in that they are says in over to a commodate rounds fitted with No. 211 fuze. The C.163C box is a converted C.63.

Ammunition Box C.190. Plate 35.

781. This box holds 30 rounds for Q.F. 1 vdr., Ma. VIII and XIV guns if packed in bulk (the rounds stowing heads and tails) or 28 rounds a ted in 100 articulated belts. The belted rounds will only stow properly in one way, i.e., the way in a lich they are packed on issue. If unloaded and not used they must be stowed in the same way or the box will be strained on closing. The box is of galvanised steel. The lid is the complete top of the box, and it hinges on and is fastened by two hasps. The loaded box should be kept upright as otherwise the weight of the ammunition may break the internal watertight scal.

Linen monogram sealing labels are affixed over the hasps.

CH. XXII.—SECTION 2.

Ammunition Boxes C.216 and C.219.

782. Ammunition Q.F. 40 mm: (Bofors) is packed in boxes C.216 and C.219. Each is a rectangular steel box with a hinged lid which is fastened by two spring clips. A piece of tarred string is passed through the loop of each clip, knotted on each side, passed through a hole in the stud and secured.

The C.216 box holds 24 rounds in 6 chargers. The C.219 box holds 24 rounds, each in a cardboard container.

CASES, POWDER, METAL OR TIN-LINED.

783. These packages are used for small comb tible stor and for boat work. They are of wood and are lined with tinned copper or tinned plate. It lids of the older cases are secured by two screw bolts which are withdrawn by a special key. Lids the later parks are secured by a brass catch which engages into a slot in the side of the case. The ware three sizes of metal and tin lined cases—Whole, Half and Quarter. The floowing was of ammunition may be contained in these cases:—

Whole Case :- C.118 (Plate 35) and C.122.

7,680 comes O.D. Linch rifle blank.
Co rounds 1,7-88, B.L. o Q.F. blank.
Lyroup 4-inch Q.S. blank charges.
96 conds 3,7-inch Q.F. blank charges.

Half Case -C.119 (Pla 35) and C.123.

3,400 rounds 0.303-inch rifle, blank.

Founds 3-pdr. Q.F., blank, charges 11-oz.

37 rounds 6-pdr. Q.F., blank, charges 15-oz.

30 rounds 12-pdr., 12-cwt, blank charges.

20 rounds 6-pdr. Q.F., blank cartridges.

25 rounds 3-pdr. Q.F., blank cartridges.

30 rounds 3-inch H.A., blank charges or 4-inch blank reduces charges.

5 belts Maxim, filled.

168 rounds cartridges, signal, 14-inch.

306 rounds cartridges, signal, 1-inch.

Quarter Case: - C.121 (Plate 35) and C.124.

1,200 rounds 0.303-inch rifle, 11, for b ts.

840 rounds 0.303-inch rifle, by

1,450 rounds 0.303 ch rifle, bla

10,000 rounds 0,22-inc R.F.

66 roun cartridge signal, 11-inca.

120 rounce ca. sidges, small meh

cround carte as so o fuze.

SMALL ARMS A. JUNITIO BOXES (A.S.A.).

784. Small Arms Ammunison is provided in various types of wooden boxes which have a tinned plate lining or tinned attended to the containers. The lining is liable to deteriorate, and the oldest ammunition in the ship must be use. First. Linings of all boxes passed up for firing practice should be true out and examined. If a lining is defective boxes of the same date are to be examined and a necess we the ammunition is to be exchanged at the first opportunity. Exposure to damp the cause of serviceability of the ammunition, but where there is marked corrosion, the can which a should be returned at an early opportunity.

The following may be considered typical of A.S.A. boxes generally.

Box A.S.A. G.S., H.4. Plate 35.

to the box ith whipcord and is 785. This is a "Whole "A.S.A. box. The sliding li is attac tached the split pin lies in a fastened with a split pin. The short length of twisted wir he wire behind the seal; groove and the seal label is superimposed. A le the end of the wire is secured to the lid and abel : fore the box can be opened. Galvanised iron wire handles with leath nd. The lining is of tinned plate are fitt with a rip off soldered lid; if the box is cannot made watertight again except by soldering

786. The following ammunition may be consened in this type of box :-

270 rounds 0.5-inch M.G. ammunation in cartons.

96 rounds 1-inch A.R.

840 rounds cartridges, S.A., ball, 0.303-inch in chargers.

850 rounds cartridges, S.A., ball, 0.303-inch in bandoliers

1,000 rounds cartridges, S.A., ball, 0.303-inch, in cartons.

A.S.A. Box, Half, Naval, H.3. Plate 35.

787. This is a "Half" A.S.A. box. It is smaller but of similar construction to the "Whole" A.S.A. box. It has a galvanised iron wire handle at one end. The lid is secured with a brass split pin which has a T-shaped handle attached. To open—withdraw the split pin, slide back the lid and tear off the cover of the lining.

788. The following ammunition may be contained in this type of box :-

828 rounds 0.455-inch revolver.

360 rounds 0.303-inch, ball, in c

500 rounds 0.303-inch, ball, for un, in cartons.

480 rounds 0.303-inch, ball, r Lewis in cartons.

500 rounds 0.303-inch, rifle,

350 rounds 0.303-inch, ball, in doliers

500 rounds

Box Ammunition, S.A., H.2 Plate 3

789. This box of oxes, each of which holds 100 rounds of 0.5-inch cartridges e tin-plate in an articulated vanised iron wire handles; it is closed with two hasps. as two g

Box A.S.A.

790. This is al box for 20 mm. British Oerlikon ammunition and it holds 306 rounds in cking pieces. It has a screw-on lid. The lining is of zinc or tinned plate with th suitable oldered lid

two types of American manufactured box for American ma ctured Oerlikon One type, a wooden box similar to Box A.S.A. H.33, holds 300 t The other type, x somewhat similar to C.216, holds 180 rounds.

inting of Packages.

792. All packages for gun ammunition, fireworks, torpedo, mining an oth charge explosive d a STONE colour. components, except those specified in paragraphs 793 and v, are pai

793. Packages painted the following colours contain own:

GREEN Target smoke at nunition.

GREEN (stain) A.S.A. elted, or in artons or Signal cartridges.

BROWN ...

BROWN (stain)

RED Blan mmunition.

nsport, detonator and explosive. RED Cases,

BLACK ummy ammunition.

YELLOW Bomb

GREY lachrymatory, and generators.

794. The ot painted externally or internally apart from special markings

nade of aluminium-silicon alloy. agazine.

d, pac

ectile.

Packages of galvanised steel.

The following packages are not painted internally :-

Cases, powder, cylindrical, and rectangular.

Cases, cordite,

Cases made of galvanised steel.

Special Markings on Packages.

795. The following markings will be found:-

TWO RED BANDS

DARK BLUE BANDS

PRACTICE (BRIGHT) YELLOW BAY

TWO LIGHT BLUE BANDS H.V.

WHITE CROSS

GREEN BAR BLACK OR WHITE " ZIG ZAG"

containing plosives except those ackago

plosive Naval armament g drill and dummy ammunition

target smoke ammunition boxes.

s, cartridge, aircraft, catapult.

Packages for Q.F. 2-pdr. High Velocity Ammuni-

Packages containing a full charge of Flashless cordite (not Star shell charges).

Packages containing American Propellant.

Packages containing H.E. (Radar) Shell.

CH, XXII.-SECTION 3.

796. To assist rapid identification of the TYPE of projectile contained, all packages for FIXED AMMUNITION are marked with a coloured bar; the bar is painted on the centre cross batten of the lid or on the side bearing the label and on packages for 4-inch and under, where practicable, at an angle to an edge. The colours are as follows:—

Other Markings.

797. Containers, filled with exposives, wich are renoved from packages during use and handling in H.M. ships will have the word. Explosive containers for cartridges, B.L., and Charges, Aircraft, Catapult are painted with the read and will have an N.13 label.

Wooden packages of new many stage or fireworks will be fireproofed and the letters "F.P." cut or branded on each epit

One and of "M" has is painted blue to indicate that this end is permanently closed, as stated above.

My lags on S.A. Beyes.

790 Small of ammunition in chargers is packed in brown-stained boxes; comunition in builder are used or belts is packed in green-stained boxes.

s definite indication of the type of ammunition packed and its Mark car only be a tained from the ibels; for classification labels are printed in the following distinctive cours;—

Group VI (except blank) ... Green on white ground.

Blank ... Red on blue ground.

Group IX... Blue on white ground.

Group XII ... Brown on white ground.

Drill or dummy ... Black on grise ground.

Incendiary ammunition. Red or cowhite ground.

799. Each type of small arms cartridge up to and including 5.5 ch is identified by a symbol. The symbol is printed on the label in the proper rock colour and is overprinted in black with the code letter and, where necessary, the letter indice ag the nature of the propellant. The symbols are displayed on large distinguishing bels, one of each side of the box. The labels also contain the following information:—

The number of rom

Nomenclatur

Method packing.

Date and spection ark (for new type boxes).

A small distinguitying labers also affixed at each end of the box. On these are printed the symbol and (except ball and so all) the characteristic name, i.e., tracer, armour-piercing, etc.

800. To facilitate it stification in the dark of 0.303-inch charger packed ammunities of 0.303-in, ammunition packed in other than the normal method (e.g., ball and tracer belt a togeth raised metal letters are affixed to the end of A.S.A. boxes so packed.

The identification letters will be :-

CC ... charger packed.

X ... any other unusual packing.

This will be additional to the method at present in force for identifying a praction in the dark

Belt packed-A "V" shaped wood piece at each end.

Carton packed-One batten at each end.

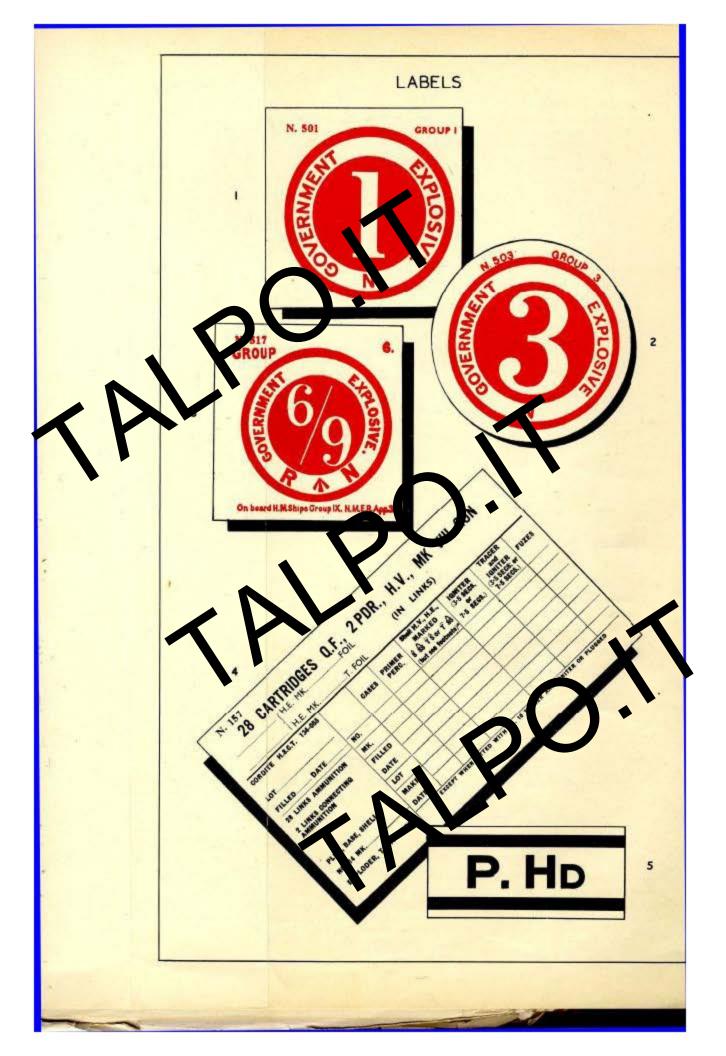
Bandolier packed-No battens at end.

CH. XXII—SECTION 3.—PACKALES OR THE TRANSPORT OF AMMUNITION (WHICH ARE NOT 5 OWED N THE SHIP)

BOX, AMMUNITION, Q.F., 4-INCH, MARK XVI CUNS.

Ammunition Box C.222. Plate 35.

801. This box holds two rounds of 4-inch, Mark XVI* fixed ammunition. It is of steel and consists of two halves in which cradles to support the rounds are secured. It is jointed longitudinally and the joint is made by a rubber gasket. The package is secured by three wing nuts, the centre nut being drilled and sealed by a wire seal. The wire is threaded through the hole in the small bracket



and the wing nut and the ends of the wire are sealed with a lead disc which is impressed with the Station Monogram of the Naval Armament Depot which sealed the package. Two wooden packing pieces are fitted, one at each end of the box. The packing pieces ensure that the tapes of cartridge clips are not caught in the joint of the box and the clips pulled off. Packing pieces must always be kept in place during handling and transport and the tape tucked down before closing the package.

To Open.

802. To prevent damage to the packing pieces the pack e should be opened as follows:-

Slack back and remove the three wing nuts. Key, box, a munition, No. 3, should be used if necessary. Remove the lid by lifting both handles sim staneously. lifting one handle only will split the packing pieces. Remove the packing pieces and the ounds at their replace the packing pieces in the box.

To Close.

802a. Flace the rounds in the crade. Fit the tacking pieces in place, making sure that the tapes on the clips are well tucked of an Win be lid of the box and screw down evenly on each wing nut. Key, Box, Ammunition, A. 3, she lid to used as necessary.

Ammunition Box C.290.

803. This box olds two roughs of Q.F. 4-inch, Mark XVI*, fixed ammunition. It is of steel, and is of similar shape to the C.222, which it supersedes.

The I is the old and is secured by four bolts; these are tightened or released by a "high ed," or trace the spanner.

Co tainer, Immunition, Q.F., 4.5-inch Gun. C.217. Plate 35.

44. This container holds one round of 4.5-inch fixed ammunition. It is of a led pape and its lid is occured by a webbing harness and quick release buckle; see it is eyelets an provided in the buckle and securing straps. The container is sealed by a wire through the left the eye its and secured by a lead disc.

Containers, Cartridge, Q.F., 5.25-inch Gun, C.227.

4.7-inch Mark XI Gun, C.228.

4.5-inch Gun, C.279.

805. These containers each hold one convidge of Q. separate ammunition. They are of rolled paper and are similar in design to the container C.217.

CH. LAII— CTION 4.—LABELS,

806. All packages contoning Government explosives have a Station label or lead seal and a combined Group and Government Explosive label. Usually they have also a Contents label affixed to them.

Station Label. Diagram 5.

807. This white linen label has two parallel black stripes with the Station accounts between them. Two of these labels are placed on each package by the packing a repair indicate where the package was sealed. The labels are affixed to cover the joint between the lat and the body, over a hasp or the knot of the sealing tapes; so long as both labels a contact the contents may be accepted as correct.

Group and Government Explosive Label. Diagrams 1, 2 an

808. The size of packages used for the public of veyants of calosiants limited by the Board of Trade, but the limitations do not apply to profiges containing Government Ammunition Stores. These packages have Group and Government explosives of the Group number specified in N.A. & E.R.. The Group number is in the centre of the label.

Sometimes Group Stowage ashore and afloat are not identical, and in this event a Composite label is affixed. (Diagram). The explosive is classified for general purposes under the Group number which forms the numerator and for the special purpose of stowage in H.M. Ships under the Group number which forms the denominator.

Contents Label. Diagram 4.

809. A Contents Label is affixed to Q.F. Cartridge and Ammunition boxes and to most packages containing stores filled with explosive giving full particulars of the contents. It is put in the most convenient place for reading, stowage asbore and affoat being taken into consideration.

CHAPTER XXIII

AMMUNITION EMBARKATION AND SUPPLY

EMBARKATION OF AMMUNITION.

815. Ammunition is as a rule embarked from lie ers but in certain conditions embarkation may be carried out with the ship alongside a jetty.

Embarkation involves :-

- (1) Lifting the ammunition on board and
- (2) Striking it down to magazines and bell room.

Hoisting inboard is usual by a ammunitie derrick or a general service derrick. Aircraft cranes are also used for holology in the smaller packages. In small ships, shell may be embarked through side scuttles and packages embarked a rough wooden chutes.

Hoisting Inboard

816. Arrange cents or hoisting inboard include :-

- (i) Scre grabs for shell above 6-inch calibre.
- (ii) Scale-wards for shell of 6-inch calibre and under and for Q.F. ammunition in containers. Scale boards are wooden trays slung from the four corners by wire ropes led to a central ring. Various sizes are used according to the maximum bad which can be be detected by the derrick or crane.
- (ii) Special slings of various kinds for cordite cases and for the large by es.
- (iv) Steel cargo nets for the smaller packages.

(v) Webbing straps or two-legged slings for pom-pom and simila boxes.

After the ammunition has been placed on deck it is struck down a line of atches to be magazines or shell rooms. An additional operation may be necessary assample, box VQ.F. ammunition to be stowed in bottle racks must first be unboxed.

Main armament ammunition for capital ships requires special transponents for striking down. Shell or cordite cases are lowered inboard and condition of a transpoling trolley or on a "perambulator" which is wheeled along the deck to the embaning batch. The perambulator is placed over the open hatch and the shell or the cordite can lifted by a handle of the perambulator is removed and the shell or the cordite case is struck down.

817. Arrangements for strik g down inc de :-

- (i) Screw grabs for hora utal handlin of 15-inch shell in older battleships.
- (ii) Six-legged a es for a inch condite cases in older battleships.
- (iii) Copylined lings and so the grabs for main armament shell and cordite in Nelson, beaney and are sea feships.
- / h chanical dless chain or wire hoists in reverse and operated by hand.
- (v) Va. us type of slings, bags or strops for other ammunition rounds or boxes.
- (vi) Carrie, hand, for 4.7-inch shell.
- (vii) "Cruel" or carriers, ammunition, quadruple, and quadruple shell bars (vii) a. 828).
- (viii) Carriers, ammunition, single or double. (See para 826.)

818. Typical ammunitioning arrangements, e.g., for a modern cruiser of the iji Class, as as follows:—

Six-inch shell are hoisted inboard by ammunition derricks and fuck do in hology of whip and power bollard through a run of hatches direct to shell room. Con te can a are hoisted inboard and struck down in slings in a similar manner.

Fixed ammunition for the 4-inch guns is hoisted in by the 'craft crane and struck down by means of the endless chain hoists (made reversible for this purpose) is in cruets brough hatches by whip and power bollard.

Boxes of pom-pom and small arms amprecition are he sed in the ammunition derrick and struck down by power or hand-operated comps through the characteristic to the magazines.

AMMUNITION SUPPLY.

819. The supply route from magazine or cell room to the gun is usually broken and transport is in one or more stages in a horizontal or vertice direction.

Means of horizontal transport include :-

Trolleys or barrows.

Overhead rails fitted with travelling grabs which may be moved by hand or by power. Conveyors, hand or power operated.

Hand-through scuttles.

Means of vertical transport include :-

Hand-ups and Vaughan chutes, i.e., steeply inclined chutes passing through the decks up which the ammunition is pushed by hand. For 4.5 inch fixed ammunition power operated hand-ups are used.

Whips. Ammunition may be hoisted through one or more decks either by hand or by means of an electric bollard.

Hoists forming part of the gun mounting.

Endless wire hoists.

Endless chain hoists,

Endless whips.

820. In capital ships overhead rails are need in the hell rooms for conveying main armament shell from the bins to the hoist in hydraulically operated trabs. Special facilities are also provided for conveying cordite charges to the scuttle. In King George V and Nelson classes inclined chutes with shaped wooden rollers are atted, and in Queen a sabeth and Royal Sovereign classes special trolleys carry four charges.

821. Ammunities or Qu7, guns 4-inh, and 4.5-inch, and for 4.7-inch guns other than those in turrets is supplied direct roughly magnine to the deck below the gun or to a compartment on the gun deck. The bounds at transport from the top of the hoist by way of "hand-ups" and "shell chutes" to the gundar, and into the ready-use lockers,

b. ?. In small s ps where ammunition has only a short journey to the gun deck, an endless whip is fitted which extend from the deck of the magazine to the deck head at the top of the hoist. The whip has we hooks arranged so that one travels up when the other is on its way down; two rounds are time in the pointed using either bags or single carriers.

Objectity in arranging a rapid supply of ammunition to close-rap armament may arise

- (i) Inconvenient location of the magazines in relation to the guns. It allocating space such items as main machinery and main and secondary a nament amunition take precedence.
- (ii) The necessity for stowing more than one to a smunition the same magazine,
- (iii) Ammunition being packed in boxes. Pikes must a hoisted stigly by whip (usually worked by an electric bollard).

To overcome this delay a proportion of amm with his stown unboxed in Ready-Use Lockers and in boxes in Ready-Use Magazines and or Magazine Lockers, Paras, 867 and 868.]

824. Alternative supply arrangements was according to the ship and to the restrictions imposed by considerations of weight and means of operation. In large ships, where the primary method of supply is by power, the secondary supply arrangements are through a line of hatches using a single whip with bags or carried hoisted to a bollard roist (where possible) or by hand. In small ships the secondary supply arrangements are oven the main route of supply for pom-pom and other ammunition for close range, capons.

AMMUNITION SUPPLY PPLIANCES.

825. Various opliands and devices are used for the supply and safe transport of ammunition from magazines and shell rooms to gun positions. A list of the principal devices is set out below with brief remarks on the purpose for which they are used. The appliances used to supply a mounted in turrets are not included as detailed descriptions of these are given in the various gun a unting handbooks.

APPLIANCE	DESCRIPTION	PURPOSE FOR WHICH USED
Power operated: Dredger hoist Chain hoists (E.C. hoists) and Endless wire hoists Motor bollard hoist (double or single drum)	Horizontally placed buckets attached to motor-driven endless chains Ammunition hoisted vertically by "heads" attached to motor-driven endless chains Single whip with— (i) Shell or cartridge ags (ii) Carriers, ammunition, a gle, double and quantuple (iii) Carriers, shell, bad, and carriers, shell, puadrate	Hoisting B.L. 6-inch shell and cordite (in Clarkson's cases) Hoisting Q.F. fixed ammunition, Q.F. cartridges (separate), Q.F. 4.7-inch shell Various, including the following: B.L. and Q.F. shell and cartridges Q.F. fixed ammunition Q.F. 2-pdr. and S.A. ammunition in boxes
Mechanical hand-up	(iv) sings or boxed an unition) Chief with moor-driven sprocket weel and bell. Angle of chute 45° a, rox.	Supplying Q.F. 4.5-inch fixed ammu- nition
Mechanical coveyor	orize tal choos with motor-driven	For transporting Q.F. 4-inch or 4.5- inch ammunition
Hand operated :— Hand up chutes	Chute with cam and handworked wire haul up, fitted between decks. Angle of chute 45° approx.	Supplying Q.F. 4.7-inch shell to gun positions. Not considered prac- ticable for a weight heavier than 62 lbs.
Desconvyor	Chute, generally portable, fitted at a convenient inclination determined by the maximum supply height and minimum delivery height per- missible	For supplying a such ammunition to gun casenates a positions where a fixed thechanical conveyor would be unstable
Ammunition hand- up	Chute fitted between decks. Round are pushed up by hand, Any of chute 45° (approx.)	Supplying Q. 4-inch fixed ammu- lition suitally for deck heights of
Vaughan chute	Chute and hand worked alley. Angle of chute 45° c.pp (x.)	Sup ying 2.F. fixed ammunition. In some cases the chute has been capted for use in hoisting Q.F. 2-pdr, ammunition in boxes
Endless whip	Whip with a carrier to be end and a balance weight at the other codless who with hoos attached,	Höisting Q.F. 4-inch or 4.5-inch fixed ammunition from a lower to an upper magazine Suitable for hoisting shell and cart
	A Shear at 1 and bottom of hor Miam of sheave, 7 inches)	ridges in bags or a round of Q.F. fixed ammunition in a carrier, am- munition, single
Hand- proforms	int-up or hanging platforms, sually fitted with back rest and ody belt for the safety of the operator in a seaway	For positions where owing to estricted space it would not possible to fit a chute hand-up
Hand-down	Sloping chute with spring buffer at the lower end	For supplying amore to from an upper to a lower ragazine shell-room
Miller's flaps	Hinged half plates or gratings (flaps) fitted with return springs. Usually a toggle or lead ball on the whip opens the flaps; when the ammunition which is being hoisted by passed through, the springs clost the flaps. Arrangements are made for pinning the flaps in the open position	Fitted in a sum on trunks where there is a possible of roughs falling own the bunk sum accooking. They are not fitted where Q.F. cartries of fuzed shell are hoisted unless physician is made to prevent the flaps uning into contact with and damaging, the ammunition
Hand-through sup- ply scuttles	Shuttered operags in alk-location of through the amount on is passed and placed on a tra (where fitted) on the receiving sice.	Fixed where necessary through bulk- heads of shelters and deck houses to gun positions in destroyers and sloops. Used also in some magazines where a bulkhead divides the magazines into two separate compartments

Note—(i) Where exposed to the weather, coamings and watertight covers are fitted to the openings in the deck through which chutes are worked. The covers should be so fitted that they can be placed in position, if required, while the chute is rigged.

(ii) In general, the chutes are portable and suitable stowage is to be provided for them when unrigged.

CARRIERS, AMMUNITION AND SHELL.

Carriers, Ammunition.

826. The designs in general service hold the following quantities of ammunition:-

Single type-One round of fixed ammunition.

Double types-Two rounds of fixed ammunition.

Quadruple types-(i) Four rounds of fixed ammunion.

- (ii) Four Q.F. cartridges.
- (iii) Two Q.F. cartridges and a projectiles.

The quadruple type is commonly known as a ammunion "cruet." The double and quadruple types have fittings for guide and hoisting wires at arranger cuts for retaining the ammunition. The cartridges rest on rubber pads.

827. There are three design of quat uple carries for fixed ammunition and cartridges :-

- (i) The "all-round" type: Rounds are loaded into and removed from either side. This design carnet conveniently brused where space is restricted on one or two sides and is there to be a preseded.
- (ii) The one-we "ty, Donds are loaded into and unloaded from one side only.
- (iii) The "transfer of the state of the s

The golde wires of (1) and (iii) may be so arranged that the carrier in transit revolves through an de up too maximum of 90° in order that the rounds may be unloaded where required if restriction some will not possible the orthodox arrangement. The double and quadruple carriers are hoisted a paramount and the hoist is usually trunked up.

Criers, Shell.

828. Two designs of carriers have been introduced into the service :-

- (1) Carriers, Shell, Hand, Steel, for Q.F., 4.7-inch and Q.F., 4.5-inch (sparate leading) guns. The carrier consists of a tapered steel ring with the handle; the handle is secured to the ring by a handle clip. The carrier is used in place of a bag is strop for hooking to the hoist whip or to a Carrier, Shell, Qua fruple. What the exception of ships fitted with endless chain hoists the carriers on the shell in lowage, thus avoiding the use of rope grommets.
- (2) Carriers, Shell, Quadruple, Q.1 4.7-inc, Mars. X*, XII and XII* guns.

The carrier consists of a cross with an eyebolt for lifting, fitted with guide tubes at each end; on the order side are four hooks for hoisting projectiles in Carriers, Shell, Hand. The carrier is poisted on go de wires by a whip and bollard and the hoist is usually true of up.

Bands, Lifting, P. .., 6-inc. Problems.

829. The any similar trearriers, shell, Hand. They are supplied to ships mounting B.L., 6-inch, Mark XXIII guns except to se fitted with sliding shell stowage) for removing projectiles from the upper tiers of the well bay

830-834.

CH. XXVI.

883. The functioning of the fuze magazine ignites the powder burster and cordite ejection charge, and in turn the rocket tail, cordite and target flare are ignited.

The target flare is ejected under action of the pressure plate; the split supports, driven to the rear, shear the threads securing the fabricated tail which falls away, as do the split supports.

The burning target flare speeds towards the firing ship, the radar aerial being extended under action of the springs.

ROCKET GLIDER TARGET

884. The target is a model glider with a way span of 5 inches, and is used on a shore range. It was originally designed for firing practice with hompson ub-machine guns.

885. The equipment consists A Model older with a rocket motor, and (2) a special launching catapult.

The fuselage, wings, tailpline and fins of the clider are covered by a strong outer skin of special material; its tailplane sount with hinged to that it can be adjusted for trim. The rocket metor, fitted in the understate of the hielage, consists of a rocket tube, adapter and striker sub-assembly venturi, percussion cap and a consistency age.

The catapult of states the following action :-

- (1) The rot of motor is initiated by its firing mechanism.
- Impetus om the elastic cords launches the glider. Once launched, the means of sustained propulsion is provided by the rocket motor.

RP 3. 2-I. CH. ROCKET, TARGET

886. This rocket provides a moving target whose speed is from 250 to 400 knot. The range is a proximately 5,000 yards. The means of launching the rocket are:—

- (1) On board ship.—From a Modified projector, which has a heavy woden cross as a base.
- (2) On shore.—From an Unmodified projector, when is scured by pressing the feet and spade into the ground.

The Target Handbook should be referred to for general instructions, maintenance and detail.

887. A round consists of the following part — poelling wit, Target Head and Fins (4). The order of assembly is:—

- (1) Fins to Propelling Unit.
- (2) Target Head to Prop ling Unit.

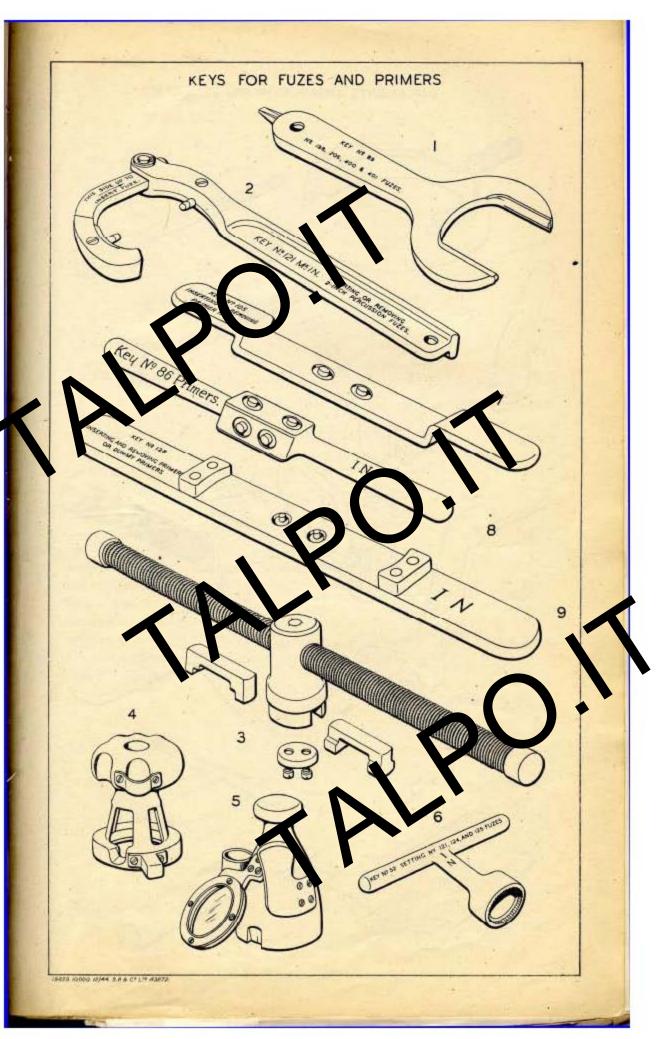
Dismantling is done the review order.

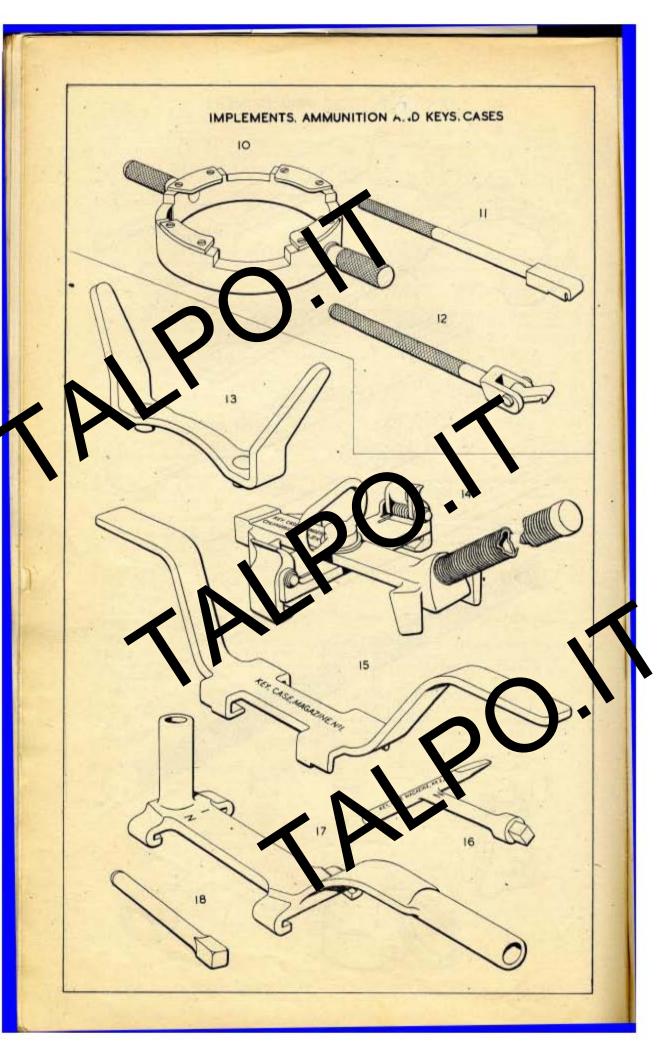
THE PROPELLING DWC is a starter 2-inch Rocket U. The tube is 24-inches in diameter and 204-inches is single.

THE TO SET HEAD and body, obe with a weight and a ballistic cap attached to the forward end and a socker ontaining he detonator and the igniter at the rear end. Two candles, each with a priming composite care consined in the body. There are four vent holes in the casing for each candle and for protection to holes are covered by lassolastic strips.

888. After launching, the pressure of gas developed by the cordite in the rock opposes a reversible diaphragm and striker, and the detonator is exploded. This ignites priming composions and in turn the candles are ignited. (A burster ensures the satisfactory ignition of the primary composition.) The candles burn simultaneously, the lassolastic strips are burn of at the gases id flames escape through the vent holes. The flaming rocket travels at a high procity of the and of its structure.

ROCKET TARGET, PRACTICE, 11b. See Para. 689.





SCHEDU

Key No. 89 Key No. 121

Key Key 1

key No. 128

Key, cases, powder, rectangular, No. 3,

Key, cases, powder, cylindrical,

Key, case, magazine, No

Key, case, magazine

Key, case, magazine

Drift, 5.25-inch, Mark

Index No. SHEET 2 10 Ring, inserting and removing lid, 5.25-in., Mark I 11 Tool, rectifying mouths of Cartridge Cases, Q.F. 5 12 Tool, opening tangs of cartridge cases, Q.F. 5.25-in 13

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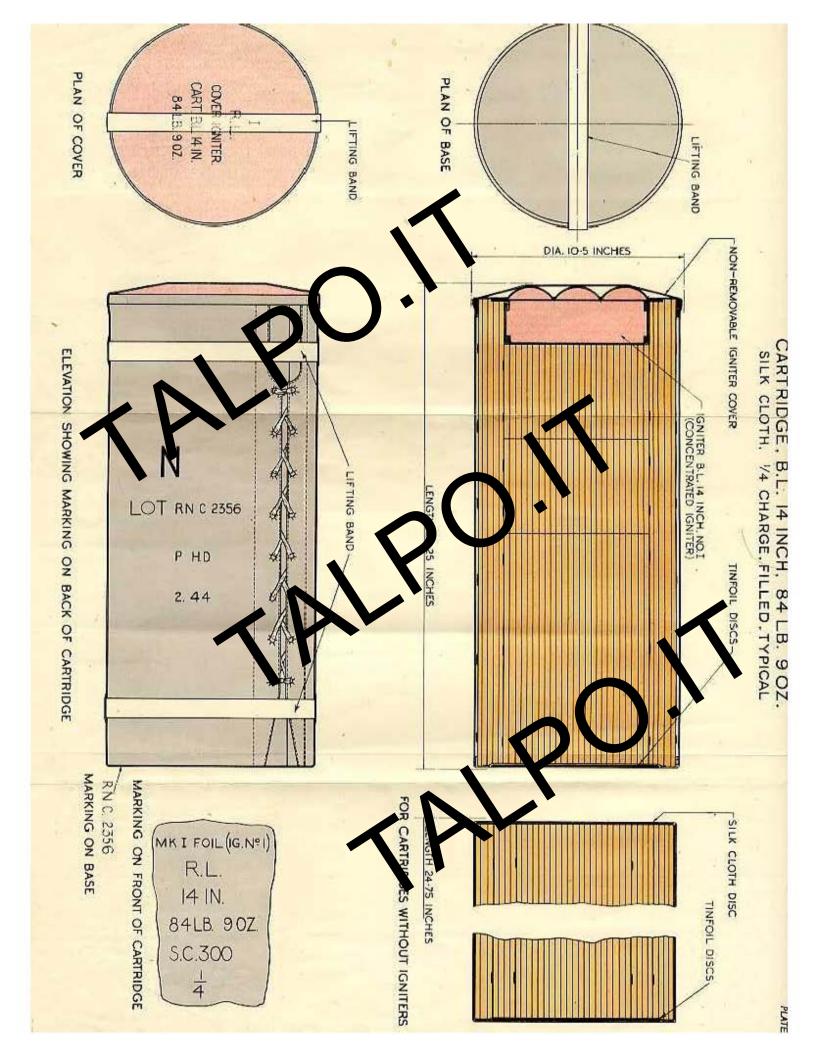
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	110000			1	Para.	Bomb's Aircraft, Components	729
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C.163	***		222		780	Anti-Personnel	736
C.190	***	***	111	111	781	A.S	738
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C.2	0+1	4447	721	111	801	M.C	734
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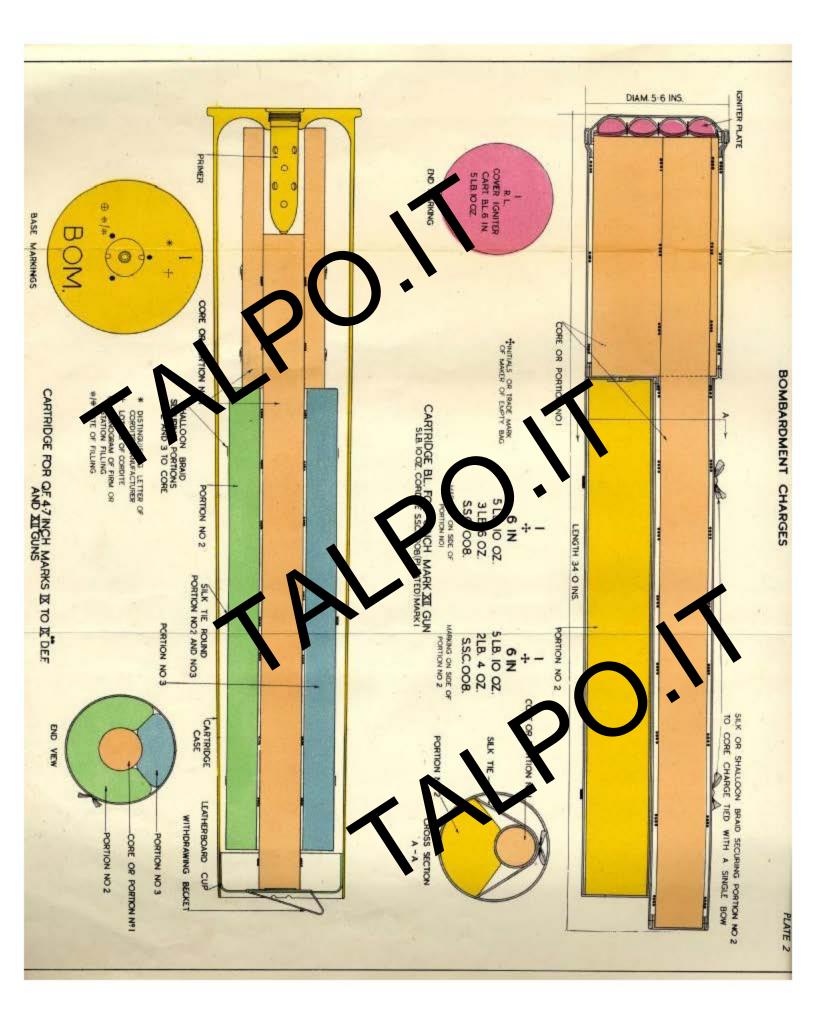
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ominal		***	0++	+>+0	***	106	Explosive	444	245	***		260
A usted		110	***	0.00		107	Explosion	244	***	***	*11	12
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Oerlikon	111		1111	***	***	572						
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Combustion	See of a	***	4.44	week.	446	2	The second second		-			
Composition, Explo		E.)	1000	200	100	200	Falling Target Sh	144	464	100	200	875
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ridge Boxes	30000	***	***	***		809	Boas agazine	(deep)	***		1277	703
Copal varnish	111	355	211	201		4	Gig's Magazine	0.14	1111	***	1444	703
Cordite, Main featur Lot, Definition		***		1444	***	20	Night Signal Box	999	+++	FF1	199	701
Sizes	W.	***	1	(44)	- 111	7 %	Sea Boat Box	1444	444	+++	411	702
Flashless and N	ion-bli	ling		***	170		Steam Boat Box Fixed Charge Weight		111	***	411	704 108
Definition		Br. S.	charge			31	Flame, Float, Delay, Mic.	T	***	377	***	679
A.S.N	444	-				37	Flare, Signal		990	***		677
H.S.C./K./7	100	0.0		200	111	38	Flashless and Non-Blindi	g Prope	Hants	222	200	30
N. Type	949				111	35	Flashless Charge, Definiti		***	401	444	31
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Full Flash	227		+**	2777	227	21	Flooding Arrangements	in Maga	zines	and	Shell	
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S.C./T		***	1045	0.14	1116	23	Fractional Charges	CHY	++1		222	115
S.S.C	17.5	***		144	***	22	Fragment Zone	200		111	444	12
S.U	***	***	***	***	***	24	Fragmentation, Definition Friction Tubes	43/2/3		***	1	12 697
W	200	22		-	1	28	Full Charge	499	1	200		130
W.M	1000	***	0.00	***	111	29	Full Flash Propellants			223		21
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C.P.C. Shell		***	***	***	***	286	Fuze Powders		+++	511	***	399
Containers	844	***	2000	544	***	142	Fuze(s), Shell	+++	***		×	335
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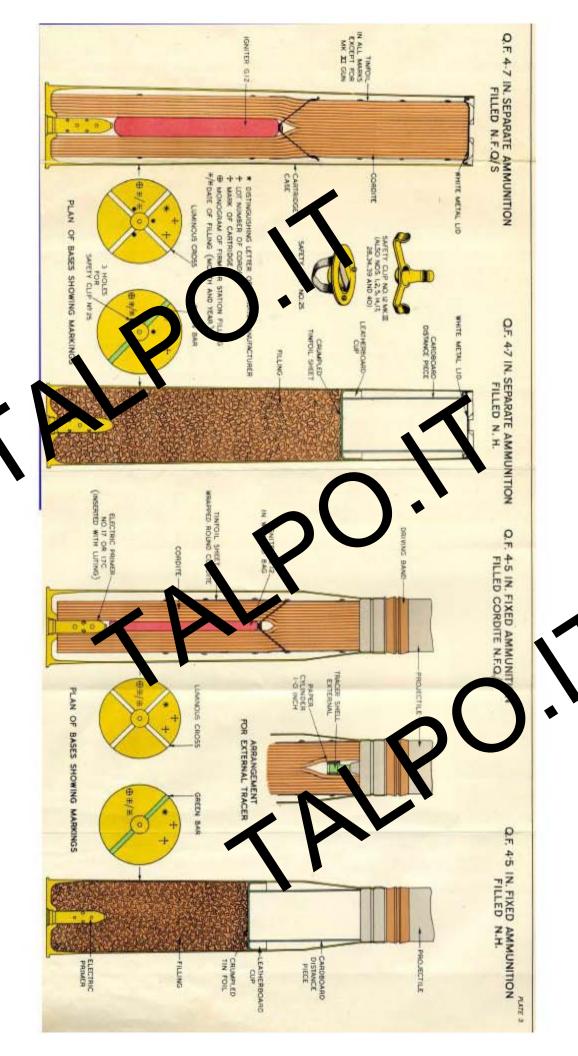
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Hand Conveyor		310	100	1	94		853
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Hand Conveyor S25 Venting S25 Markings on i S25 Markings on i S25 Markings on i S25 Markings on i S25	н			A		Stowage	856
Hand-Down		* ***	****				859 841
Handing Rooms	Hand-Down			-			041
Drenching System in				244	-		231
Venting of, in Capital Ships							245
Venting of, in Cruisers			177.94		845	Boxes, A.S.A	798
Hand-operated Ammunicos Supply Arrangements	Venting of, in Cruisers	***	111		1000000		740 128
Hand-up Chutes					45/54	The Art of the control of the call their leaders	539
Hand-up Platforms See	Hand-through Supply Scuttle				cor	PERMITTE	511
	Hand-up Platforms				825	, 20 m.m. Hispano	578
		5)	- +++-	111	289	+ + + Oerilkon	562

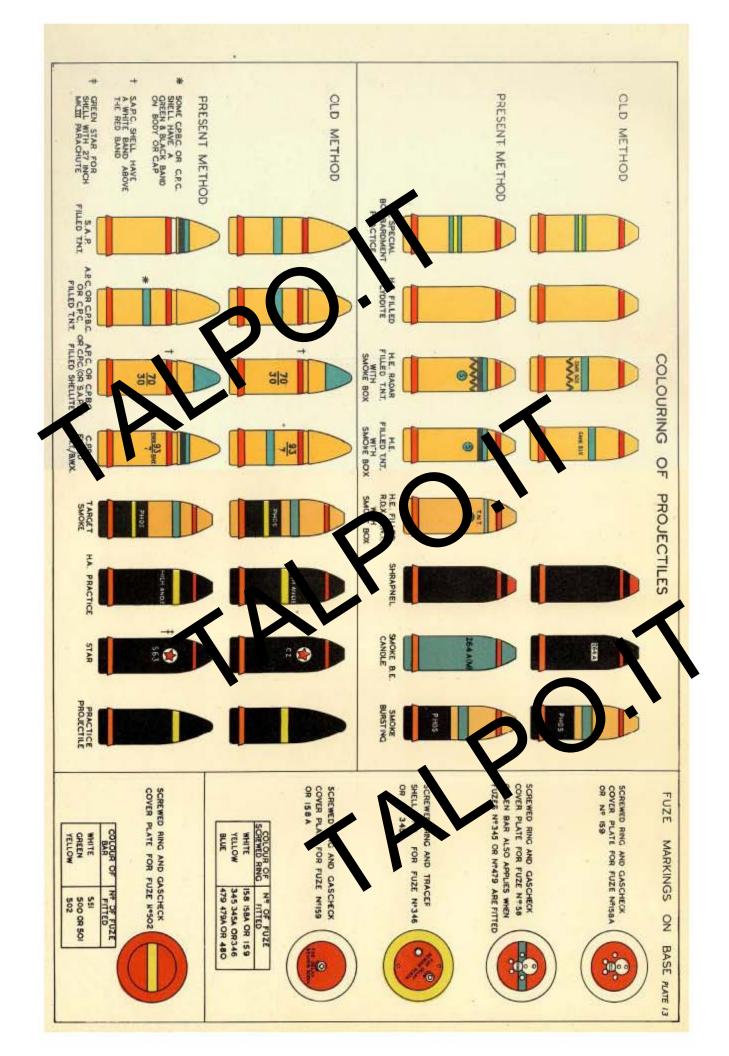
Markings on -cont. 339	2874. 259 259 259 279 279 279 279 279 270 270 270 270 270 270 270 270 270 270
Fuzes	272 279 303 313 250 307 267 270 259 875 485 289 52(a) 263 264 265 266 266 266 273 310
Igniters	279 303 313 259 267 270 259 875 485 289 52(a) 263 264 265 266 266 273 310
Lids of Q.F. Cartridges 188	303 313 250 267 270 259 875 485 289 52(a) 263 264 265 265 266 266 273 310
Packages, Ammunition 792	250 307 267 270 259 875 485 289 52(a) 263 264 265 266 266 273 310
Primers 228	307 267 270 259 875 485 289 52(a) 263 264 265 266 266 273 310
O.F. Cartridges	267 270 259 875 485 289 52(a) 263 264 265 266 266 266 273 310
Q.F. Blank Cartridges	270 259 875 485 289 52(a) 263 264 265 266 266 273 310
Tubes, V.S. 221 M.C. Aircraft, Bombs 734 Mechanised Conveyor 825 Hand-up. 80 Metal Covers for fuzes 481 Miller's flaps 825 Mill	259 875 485 289 52(a) 263 264 265 266 266 273 310
M.C. Aircraft, Bombs	875 485 289 52(a) 263 264 265 266 266 273 310
Mechanised Conveyor S25	485 289 52(a) 263 264 265 266 266 266 273 310
Mercury Fulminate	289 52(a) 263 264 265 265 266 266 273 310
Metal Covers for fuzes	52(a) 263 264 265 265 266 266 273 310
Miller's flaps	263 264 265 265 266 266 273 310
Mills' Bomb 630 T.N.T./B.W.X.	264 265 265 266 266 273 310
Mineral Jelly	265 266 266 273 310
Motor Bollard 825	266 266 273 310
N.C.T. Propellant	266 273 310
N	273 310
N.C.T. Propellant N.H. Propellant Night Squal Box Nitroceli hese Powders Nitroceli hese Powders Nitroglycene Nitroglycene Nomenclature for describing shape of projectile head Nemenclature for describing shape of projectile head Nitrocell head Nit	310
N.C.T. Propellant N.H. Propellant Night Saval Box Nitroceit as e Powders Nitroglyceit e Nitroglyceit	
N.H. Propellant	924
Nitrocellos se Powders	
Nitrocellos se Powders	257
Mitroglyck e 85 minal Webt Charge 106 Piercing Shell	306A
minal W bt Charge 106 Piercan Sheri	271 281
No. District. 111 111 111 111 111 111 111 111 111 1	282
12 Page 11 11 11 11 11 11 11 11 11 11 11 11 11	288
Value ver covers 126 C.P.C	286
C.P.B.C	287
S.A.P	285 284
serving, Cartridge S.A 527 S.A.P.C Practice Projectiles	304
Octilikon Ammunition (see also Cartridges, S.A.) 560 Proof Projectiles or Sho	306
American 573 Shell supplied fuzed	484
Clearing Charges 572 plugged	484
Drill, Mks. I and II 570 Shomel Shex	300
H.E. Shell	298 299A
H.E./I/T Shell 568 S Shell with a D.J dze	291
H.E.T Shell 2-nds	296
Markings on and means of identification . 562 Tary Shin Pactice	305
Practice projectiles 563 Target	302
Practice Tracer Projectiles 4 Unfuzing Shell Propellants Propellants	486
Types of 562. Flashless and Non-blinding	30
Full Flash	21
Initiation of	- 11
American	39
P.A.C. (see also Approximate A. Typ. 2) ool5 Protecting tubes Packages, Ammunican 745 Protective Doors for Magazines	141 838
Packages, Ammunitation of the Protective Doors for Magazines	852
Boxes S.A 784 Pyrotechnic Compositions	95
Cartridge Box 774 Pyrotechnics	670
Case, Powder, Condrical 750 Candle, Smoke, White, Mk. I	687
Me or Tin Lined 783 Cartridge, Signal, 1 and 11-inch	699
", Rec. gular 760 Fireworks' Boxes Labels for 806 Flame, Float, Delay, Mk. I	679
Labels for 806 Flame, Float, Delay, Mk. I	677
Transport Packages 801 Initiators for	201
P.E.T.N Work of the Projectiles, filluminating Nos. 1 and 2 55	
Pentolite 80 Rocket, Flare, 2-inch	98
Percussion Fuzes (see also Fuzes) 345 Rocket, Illumination 9 lbs. non-tel Picrates 72 Rocket, 1 lb. May estum Str	681
Picrates 72 Rocket, 1 lb. Maj ssum Str Picric Acid (see Lyddite) 72 Signal, 1 i. Red Aren	674
Pieric Powder 68	671
Piercing Shell (see Projectiles) 281 "Target, Prace v, 1 lb	689
	All Printers
Pistol, Aircraft, Bomb 723 Smoke addes	-688
Pistol, Aircraft, Bomb 723 Revolver No. 1 Cartridge, S.A 532	685
Fistol, Aircraft, Bomb 723 -Smoke andles 532 532 532	150
Pistol, Aircraft, Bomb	150 39
Pistol, Aircraft, Bomb	150 39 7, 240
Pistol Aircraft, Bomb	150 39 7, 240 238
Pistol, Aircraft, Bomb	150 39 7, 240 238 172
Pistol, Aircraft, Bomb	150 39 7, 240 238 172 154
Pistol Aircraft, Bomb	150 39 7, 240 238 172 154 182 308
Pistol, Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152
Pistol Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152 155
Pistol Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152 155 159
Pistol, Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152 155 159 188
Pistol Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152 155 159 188 186 187
Pistol, Aircraft, Bomb	150 39 7, 240 238 172 154 182 308 152 155 159 188 186 187

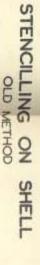
221		7		-1	Dara.	2 2 200				F	ara.
Q.F. Cartridges—cont.					****	Stations Labels	+++	110	440	***	807
Safety Clips Separate	-944	111	100	***	166	Submarine Smoke Candles	***	1111		***	94
Special Gunnery Sci	hool Char	med .	100	75	181	Sulphurless Gunpowder Super Charges	77	11.0	***	***	133
Star Shell	Acc.	Bea			171	Cuput CountyCont	444		200	332	500
Tinfoil in	***	14.	400	***	157		Т				
Quick Match	444	***	110	***	693		1				
	1723					Table of :— Fractional Charges, Re	deced	Chanse	e Louis	are	139
	R					1920 total Charges, No.	auceu.	ter.	***	***	491
R.D.X					79	High Explosives		***	***		85
R.D.X./B.W.X	- 110	144	Charles 1		266	Pistols, Aircraft, Bomb	165	***	***	***	724
R.D.X./T.N.T.	4141	(6)	100	2	66(a)	Taik Aircraft, Bombs Targe Ship Practice Project Target make Shell	162	110	***	+++	730
Ready Use Lockers and		***	444	***	48	Targe Ship Practice Project	tiles	140	***	110	305
Reduced Charge firings	110	900	66.0	1	î	Target noke Shell	444	110	***	***	3072 869
Reduced Charges for B.I	mins	111	****		131	Tear Off a ses	111			***	125
Table of Approved		111	1111		139	AND THE RESERVE AND THE PARTY OF THE PARTY O		440	***		68
Reduced Charges for Q.1		A	San	140	169	me and Percussion Fuzes	(see a	so Fuz	es)		447
Instructions to conv		ich Ca	rtridg	40	170	Time Combustion Fuzes (se	e also	Fuzes)	***	+++	397
Removable Igniter Cove	rs	***			1	Time Compositions (Fuze F			***	101	399
Revolver and Pistol Ca	75,		717		530	Time Mechanical Fuzes (see		277.6	157 0	***	429
Return Tubes for Cooks Rifle Grenades	on a		109.45	***	840 641	Tinfoil in Cartridges, B.L.		***	***	***	119
Rifle Grenades Cartridges, S. 0.3	03 h.	2		44.0	Ott	in Q.F. Cartridges	***	01007	***	***	74
Ballistite a		111	1111		528	Beeswax	200	1	***	76	264
Cordite, Mk	NAME OF TAXABLE PARTY.	771	2775		529	Block. Method of			***	***	263
Riffe M.E. Line-Thro Rim-Fit Cartridge, S.A	ing	100	444	+++	715	Crystals	***		***	***	70
Rim-Fit Cartridge, S.A.	0.22-inc	h, Mk.	1	+++	553	Poured. Method of	filling		***	26	2(a)
Rocket F. e, 2-inch	No. of Consumer	dieles	614	114	598	Tracer, Cartridges, S.A.	***	0.04	***	211	519
Illa ination I	Stor		ken	++4	603	Tracer(s), Shell	211	111	111	***	322
1 lb. Versium	n	***	***	+++	681 674	No. 1, Mk. VI No. 2, Mk. VI	W)	4	***	***	326
Signal	46	5			671	No. 8 and No. 9		4.	***	***	328
Target Prac	ctice, 11b.	100	122	110	689	No. 13			***	7	325
Glider Target.	101		444		884	No. 16	***		THE I	444	327
2-inch Target. B		114	148	444	886	Tracers and Igniters, Shell		044	***	141	329
., Target parachut		555	872	+++	689	No. 7		***	+	***	332
" U " 2-inch		100	222	++4	590	No. 14	tion .	7	and the said	***	333
Lockers for	-(41)	199	100	200	592 869	Transver racs es (see Pac Tube Criction	KH	Anun	mition)	***	697
Rolling Stowage	144	111	1000	***	856	Tube Greetion	***	+14	***	100	230
ronning Drowings	111				.000	Tub Cardboard F tectin					141
	S					abe Vent		444	***	***	205
S.A.P. Aircraft Bombs	2			4	732	L 4	***	dia.			219
Cartridge, S.A.	77.7	127	777	K	518	Max	***		466	***	221
Shell	11	***	***		285	Means of Identification	1	***	***	***	207
S.A.P.C. Shell	244		411	444	4	4-inch	***		124	+++	215
S.A.P. Tracer Cartridge,		ers.		***	4	,5-inch	100		+++	***	210
Schermuly Line-Carryin	g Rocket,		1271	257	71	1-inch Packing	227	***	***	***	222
		2 lb.		190	710	Stowage	100				222
V		6 lb.		24	24						
Instructions for se Shell (see also Practiles			84.5		711 250						
Fillings and of				735	262		U				
Shell Fuzz, see a o Fuz	COLUMN ST	P33			335	Unfuzing Shell, General I	nstruc	tions			480
Shell Rooms. Fl. ling			+44		849	Fuzed with No. 211	and .			***	48.
,, ., Stovere	040		144	***	858,	., ., No. 230 ar	d Gair	ne No.			490
	ing		***	+++	861	14 and 16-inch H.E. ft	ized w			us-	70000
Shellite	160	***	444	1+1	77			T	ion	-	492
Method of filling wi	444	127	***	***	265	15-inch H.E. fuzed wi	th Ties	m. 5	bustion	7.	493 494
Shrapnel Shell	***	***	***	1	300		77.0		oustion.	18	495
Silk Cloth for Cartridge		1111	144		120	Universal Cavity	1		***	-	1954
Signal Compositions	444	***	444	1.	98						
Signal Cartridges	***		***		675		37	1			
Slow Match	1000	W7.10	VIII -	21	694		V				
Small Arms Ammunition			CONTRACTOR OF THE PARTY.	.A.)	505	Vaughan Chute		1.000	***		825
Smoke Compositions Calcium Phosphide	***	***	100	211	99	Ventilati Magazines		1		144	859
Carbon Tetrachlorio		sitions	3.7	***	99	,, Shell Rooms	**	***	210	***	861
Fumyl					99	Venting gazines and I	ndin	g Root	ms	***	841
Hexachloroethane (ons	493	+++	99						
White Phosphorus	911	****	200	277	99		W				
Smoke Float, B.L., 4-in				11	657	IXV	100				-
Lockers for		***	1444	94.	869	reli	217.0	ASS.	***	122	158
Smoke Grenades. Lock Smoke Shell, B.E.		***		1	869 298	Vather Deck Magazines a			***	***	865
Smoke Shell, B.E., with		Fuze		1	298	Experimental Explosi			148	111	866
Smoke Shell with a D.A		114	122		79A	Miscellaneous Explosiv Ready-use Lockers an			177	***	869
Special Gunnery School	Charges:	for B.L	guns		38	Managara					867
и и	Q.F. Car	tridges	444	***		Weather deck Magazines				***	870
Spraying Arrangements	. Magazin	es	***		853	17-20-00-00-00-00-00-00-00-00-00-00-00-00-	11875	E-87.7	900834	1275	STREET,
Star Shell (see also Proje		996	***	111	291		7				
Philippine The P		444	111	***	296 132		Z				
OF	. Cartrid	res	22	***	171	Zone, Danger	0000	- 22	141		12
10 11 11 12.0	- Contracts	a our	123			The state of the s	227				7

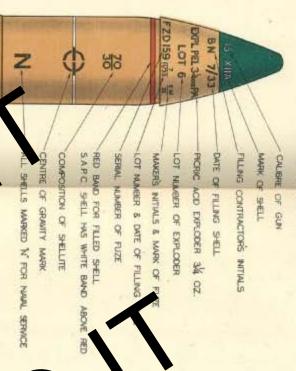




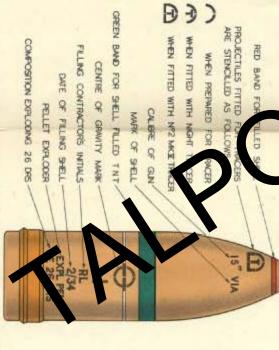








APC CACOR CARC FILED SHELL



TYPICAL NOSE FUZED SHELL

PRESENT METHOD

EXPL PEL 3 AFZDI59 BN 7/43 LOT 6 -DATE OF FILLING SHELL PICRIC ACID EXPLODER 3% OZ FILLING CONTRACTORS INITIALS MARK OF SHELL RED BAN ALL SHEL CENTRE OF CALIBRE OF GUN CER MARKING SHOWING SERIAL NUMBER NAME OF TRACER HUMBER OF EXPLODER NUMBER & DATE OF FILLING FUZE S INITIALS & MARK OF FUZE NUMBER OF FUZE FILLED SHELL IL HAVE A WHITE BAND OR NAVAL SERVICE ITTED WITH LIVE TRACER

PIC CRC & CRBC FILED SHELL

RED BAND FOR FILLED SHELL

PARECTILES FITTED FOR TRACERS
ARE STENCILLED AS FOLLOWS:

WHEN PREPARED FOR TRACER
WHEN FITTED WITH TRACER
WHEN FITTED WITH TRACER
WANK OF TRACER
CALIBRE OF GUN
CALIBRE OF GEN
CALIBRE OF SHELL
CENTRE OF GRANTY MARK
FILLING CONTRACTORS INTIALS
DATE OF FILLING SHELL
EXPLOSER
COMPOSITION EXPLODING 28 DRS
CE 26 DRS
CE 26 DRS

TYPICAL NOSE FUZED SHELL

IGNITER SHELL NºI MARK I

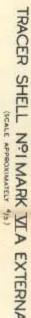
STIRRUP SPRING

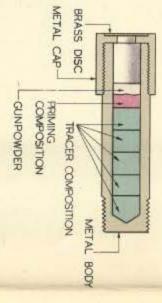
ANVIL

CAP HOLDER

STEEL

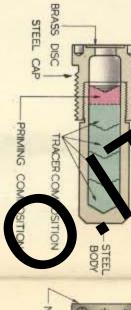
DELAY COMPOSITION







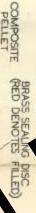
E APPROXIMATELY (3) Nº 2 MARK VA INTERNAL





TRACER SHEL

(SCALE APPROX





STEEL BODY

COMPOSITION

STEEL CLOSING

TING RECESSES

OPPER NON-DELAY

* CONTRACTOR'S INITIALS OR RECOGNISED TRADE MARK

The Date of Manufacture Month and Year

The Date of Filling Month and Year

Monogram of Filling Station

A FILLED LOT NUMBER

PAINTED RED AFTER FILLING FLAT BASE TRACER

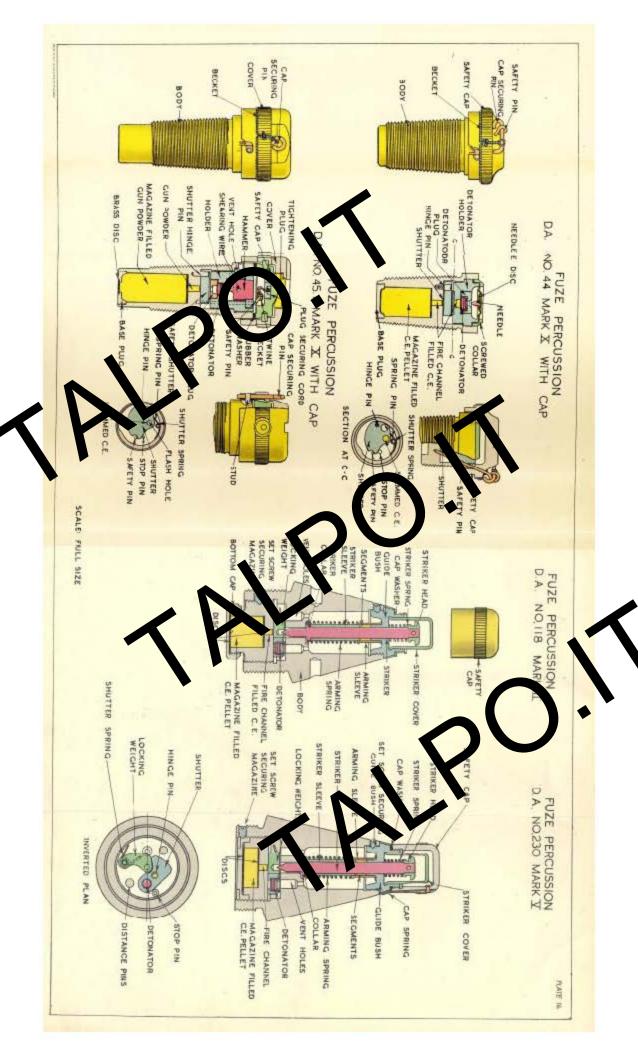
R SHEL

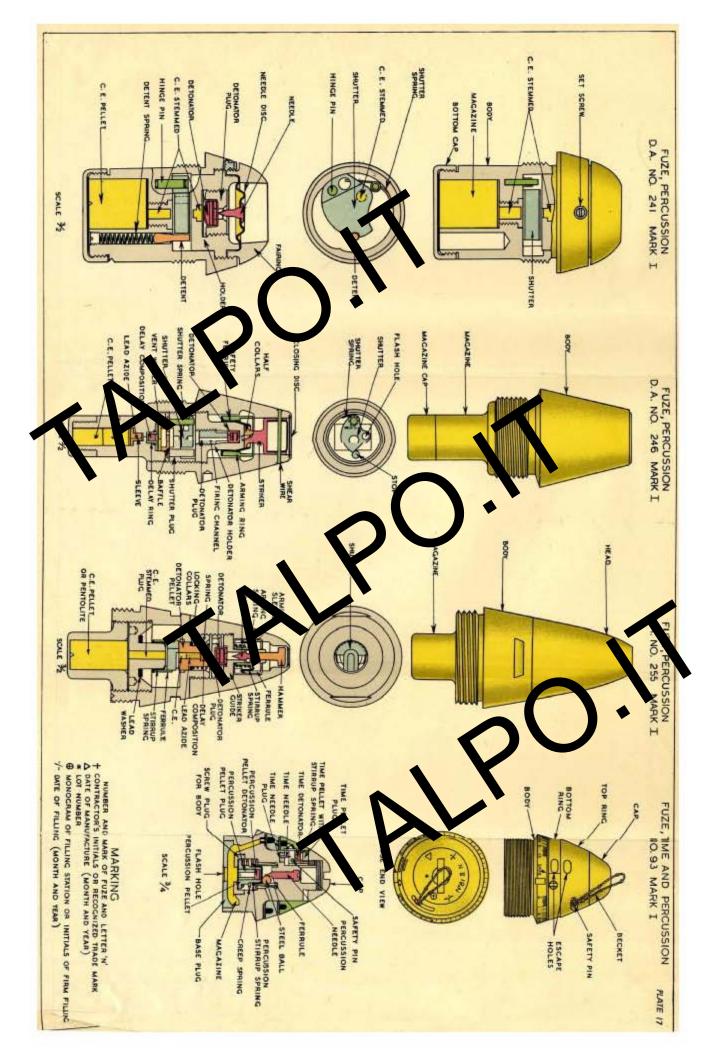
PRIMING

GUNFOWDER

CAP ANVIL STIRRUP SPRIN GUNPOWDER ANVE GUNPOWDER PAPER DISC GL AZEDBOARD WASHERS SCREWED

COMPOSIT





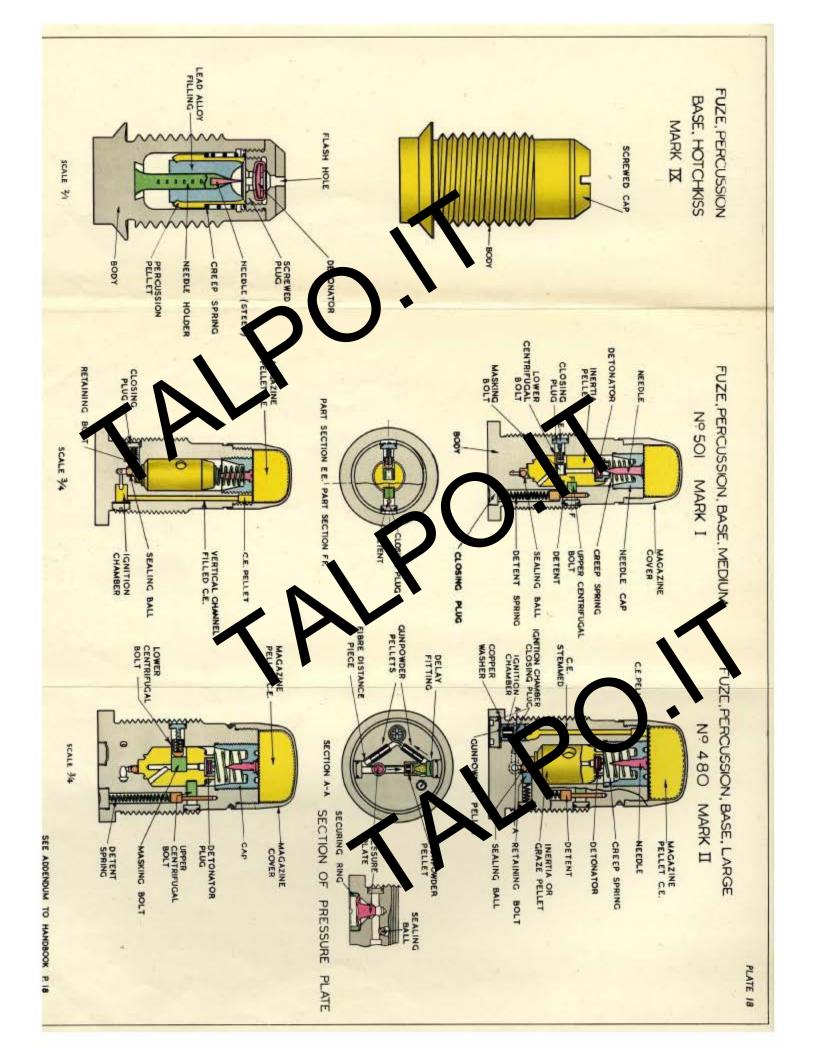


PLATE 19



GUNPOWDER MAGAZINE

NEEDLE PLUG

SLEEVE

BOTTOM RING

TOP RING

- MEALED POWDER

SCREW, SECURING CAP

POWDER PELLETS

DETONATOR

BOTTOM RING WASHER

PELLET-

DETONATOR HOLDER SECURING PIN STIRRUP SPRING ESCAPE HOLE DISC-ESCAPE HOLE DISC SETTING MARK FUZE, TIM 98 MARK II MARK

BOTTOM RING PELLET-SET SCREWS FOR CAP

BODY PELLET

BASE PLUG

MAGAZINE

NEEDLE

FILLING HOLE PLUG

SCALE 3/4

SPRING

CONTRACT REGISTERE

CLOSING

DETONAL

TIME, O2 MARK I



GUNPOWDER MAGAZINE

PLUG

DELAY HOLE PLUC

PLUG, FLASH HOLE-

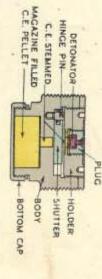
WASHER

FLASH CHANNEL-

METAL COVER

+0+D MONOGRAM OF FILLING STATIO YEAR) LOT NUMBER DATE OF MA ING STATION

GAINE NO. II. MARK II XX



SCALE 3/4

