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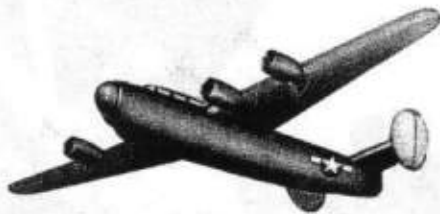
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Introduction

1. This Handbook covers the Operation, Service, and Maintenance of the 42-foot AAF Rescue Boat, Design 221-D. The text and illustrations were prepared from data obtained on boats numbered P-151 and P-152, built by Chris-Craft Corporation, Algonac, Michigan, and in operation at Eglin Field, Florida.

2. Because of successive alterations of plans, changes made at various yards for local reasons, and authorized modifications after the boats have been in operation, not all the data in this Handbook will apply to every 42-foot boat of this design. For this reason, it is important that operating personnel become familiar with wiring, piping, and equipment installed on individual boats, and compare the actual installations with the text and diagrams.





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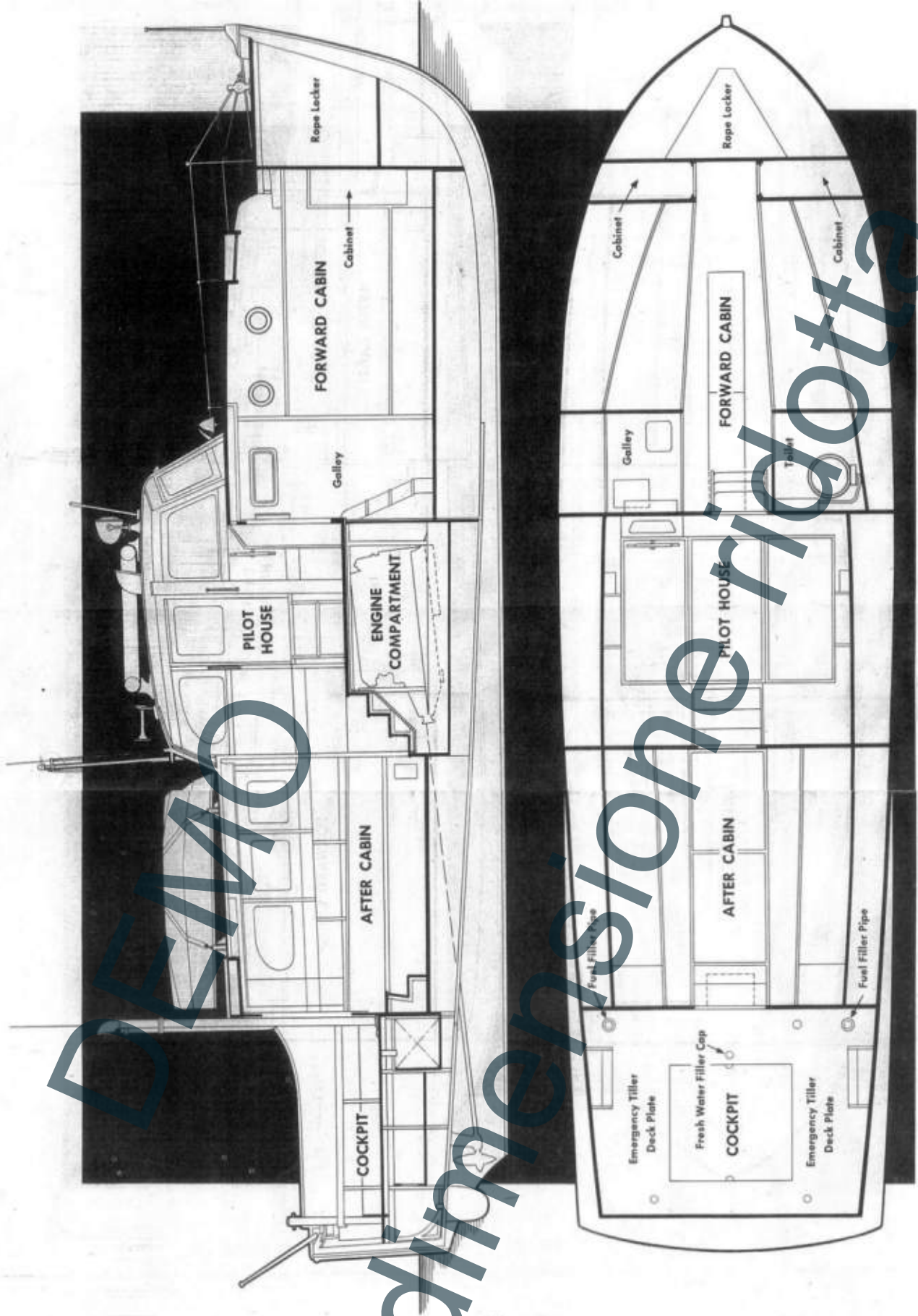


Figure 1—Outboard Profile and Plan
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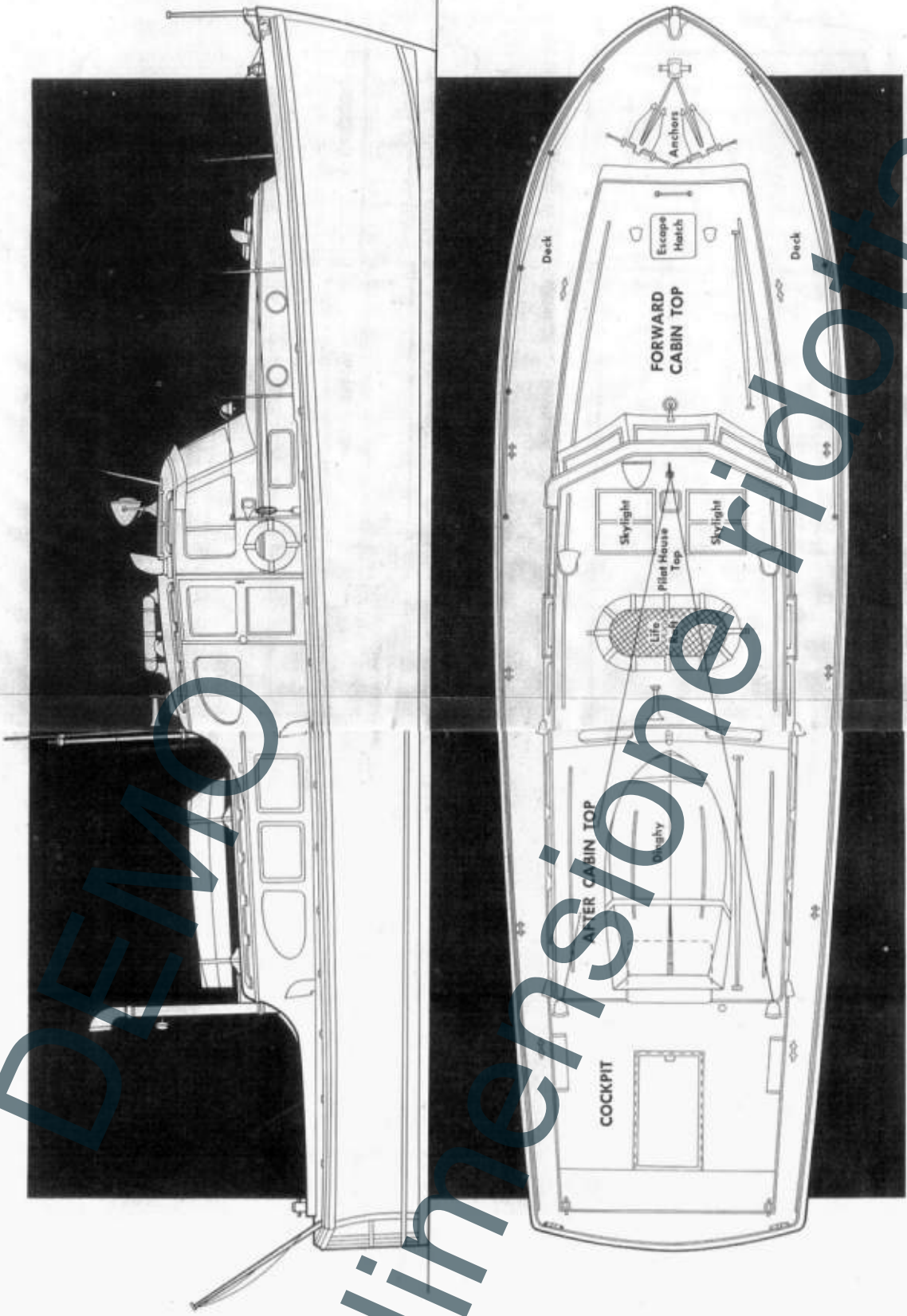


Figure 2—Inboard Profile and Plan

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SECTION I

Description

1. GENERAL INFORMATION.

a. TYPE.—The 42-foot AAF Rescue Boat (*figures 1 and 2*), Design 221-D, is a twin-screw self-propelled gasoline motor boat of vee bottom construction. It is intended to serve as a harbor patrol boat. The forward cabin is fitted with four portlights and two watertight windows, two bunks with removable cushions and stowage space below, two lockers against the forward bulkhead, an enclosed toilet space against the after bulkhead containing a water closet and medicine cabinet, and the galley space containing a one-burner alcohol pressure stove, sink, and stowage shelves. The pilothouse aft of the forward cabin is equipped with the steering gear, engine controls, compass, folding seats, and one cabinet for the ship's log. Two skylights are in the pilothouse top. In the pilothouse floor are removable hatches for access to the engine compartment below. The after cabin or dispensary is fitted with two bunks with removable cushions, stowage space below the bunks for litters, stowage space for life preservers between the bunks and the hull, and two cabinets against the after bulkhead for the radio equipment. The cockpit is of the self-bailing type with a hatch leading to the space below, which contains the fuel and water tanks. The cockpit is fitted with a hinged seat at the stern.

b. DIMENSIONS.

Length over-all	42 ft 4 in.
Length on waterline	40 ft 8 in.
Draft, forward maximum	2 ft 9 in.
Draft, aft: mean	2 ft 0 in.
Beam	11 ft 8½ in.
Freeboard bow	5 ft 7½ in.
Freeboard stern	3 ft 6 in.

c. DISPLACEMENT.

Full load displacement.....11.2 tons

d. TANK CAPACITIES.

Fuel gasoline capacity.....280 gallons
Fresh water capacity.....50 gallons

e. RANGE AND SPEED.

Range, at cruising speed.....187 statute miles
Running hours at full power.....7.5
Speed, loaded.....23.09 miles per hour
Cruising speed (engine speed
1500 to 1800 rpm).....15 to 18 miles per hour

2. DECK FITTINGS AND DECK HARDWARE.

a. On the forward deck are two 30-pound anchors stowed in wood chocks. (*See figure 3.*) The anchor lines are two 40-fathom lengths of 3-inch Manila rope, spliced over thimbles and fitted to shackles at each end. The ropes are fastened to the anchors and pass through deck pipes and pipe caps (*figures 4 and 5*), to the rope locker below (*figure 6*), where they are fastened to ring bolts. In the forward bulwarks are two bow chocks (*figure 3*). The four 10½-inch mooring cleats (*figure 7*) and six 6-inch cleats (*figure 8*) for fenders are bolted through the deck to blocks below. Between the anchors on the forward deck is the riding bit. (*See figure 3.*) Two stern chocks (*figure 9*) are on the after deck. Two wood bitts (*figure 9*) are located in the after corners of the cockpit. Four 2½-inch Manila decklines are each 10 fathoms in length with one end loop-spliced and the other end served. The six netted rope fenders are of the double-ended rope loop type.

b. The deck railing stanchions (*figure 3*) are forged galvanized steel or cast bronze about 30 inches high above the galvanized deck sockets, which are bolted to the deck and footrail. The wire rope rails pass through the two eyes in each stanchion and are fastened to the turnbuckles and deck attachments. There are wood handrails on the cabin tops.

c. A mahogany, spruce, or fir mast is on the after side of the pilothouse. The mast socket is cast bronze or gal-

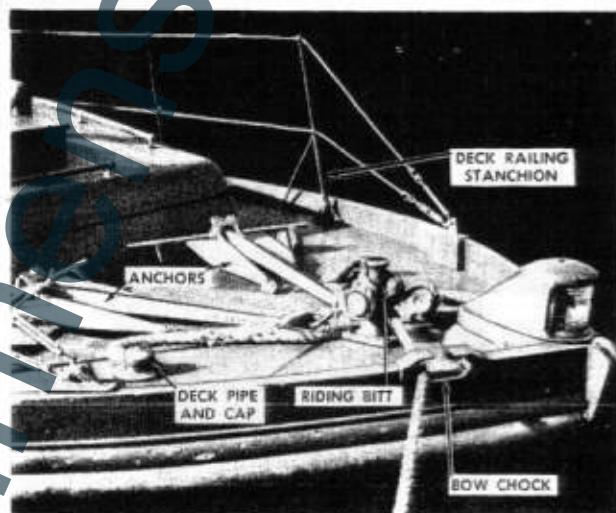


Figure 3—Anchor Stowage



Figure 4—Cap in Place on Deck Pipe

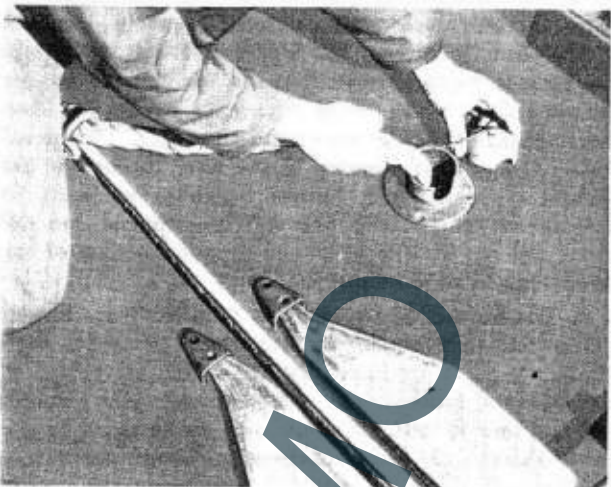


Figure 5—Deck Pipe with Cap Removed

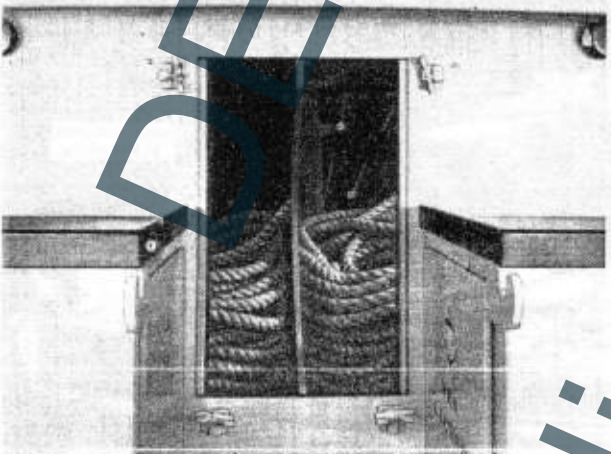


Figure 6—View of Anchor Rope Locker from Forward Cabin

vanized steel fastened with bolts. The mast is equipped with an anchor or blinker light and a watertight deck receptacle. The white cotton halyards are secured by galvanized steel cleats. The mahogany jack staff is fitted with a truck and halyard. The mahogany ensign staff aft is fitted into a flush flag pole socket.

d. One 6-foot and one 8-foot boat hook with galvanized iron ball tips and ash or mahogany poles are stowed in wood chocks on the forward and after cabin tops. (See figure 10.)

3. LIFE-SAVING EQUIPMENT.

a. One balsa wood, canvas-covered life raft (figure 11), five-person capacity, having two spruce paddles, is secured in wood chocks with eye straps and lashings on the pilohouse top.

b. A dinghy of plywood (figure 12) is secured in wood chocks with eye straps and lashings on the after cabin top.



Figure 7—Mooring Cleat

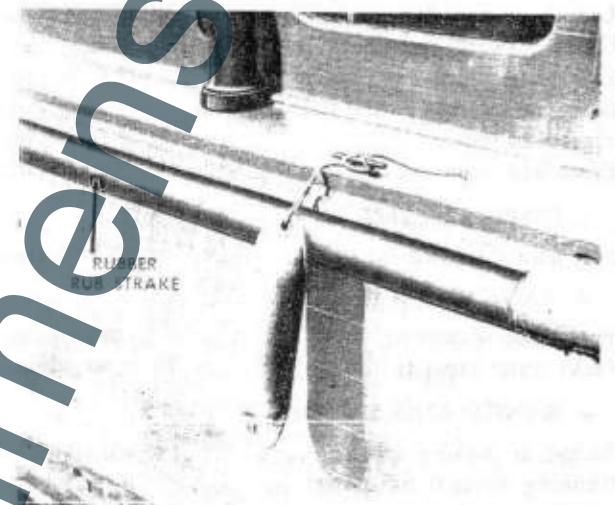


Figure 8—Cleat with Fender Made Fast

(7) Keep lines and fenders stowed neatly when not in use. Make sure they are dry before stowing them in the closed lockers. Air and dry stowed lines once a week.

(8) Air life jackets in the sun once a week.

(9) Keep the galley and equipment scrupulously clean. Do not leave food exposed.

(10) Clean toilets as often as necessary.

c. AT SEA.

(1) All loose deck gear should be stowed away or lashed in place.

(2) Keep the canvas covers installed on such items as the searchlight when the use of such equipment is not anticipated during the trip.

(3) Fasten the after cabin doors to prevent them from swinging and close all hatches to exclude salt spray while under way.

d. AFTER MOORING.

(1) Wash down the decks and all exterior surfaces with fresh water to remove salt water deposits. Use a hose, if possible, and mop the decks dry and clean.

(2) Wash interior surfaces which have been wet by salt water. Use a piece of chamois and fresh water.

(3) Wash windows with fresh water and a chamois.

(4) Dry all lines and fenders thoroughly before stowing them.

(5) Polish all brass.

3. NINETY-DAY INSPECTION IN DRY-DOCK.

a. GENERAL.—The boat must be dry-docked and the bottom inspected, cleaned, and painted every 3 months, except when it is used in fresh water, in which case a period of 4 months is possible.

b. HAULING.—The following methods of hauling may be used:

(1) Where conventional ways are used and a boat cradle is available, the cradle should be used to place the boat on the ways for hauling. If a cradle is not available, suitable keel chocks should be set up on the runway at the bulkheads to guarantee an even distribution of weight on the keel. Suitable blocks (*figure 51*) should be arranged on the ways to accommodate a portion of the weight of the boat. All such blocks should be nailed down, to keep them from fouling the wheels when the boat is placed in the water. Use jacks to support the stern. (*See figures 52 and 53.*) Take care that the weight is equally distributed at all bearing points. Do not let the propellers, struts, rudders, or any other underwater projections carry any weight while the boat is out of the water.

(2) If a crane is the only means available for removing the boat from the water, sling the cradle on the crane and then lower the cradle into the water deep enough that the boat may be placed on it without

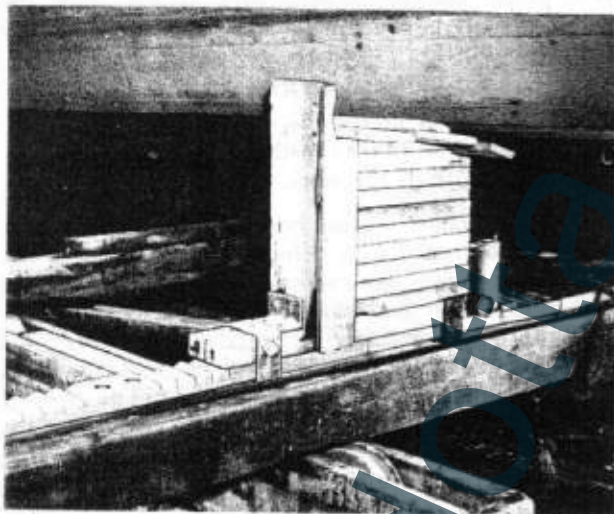


Figure 51—Blocks Supporting Bottom of Boat

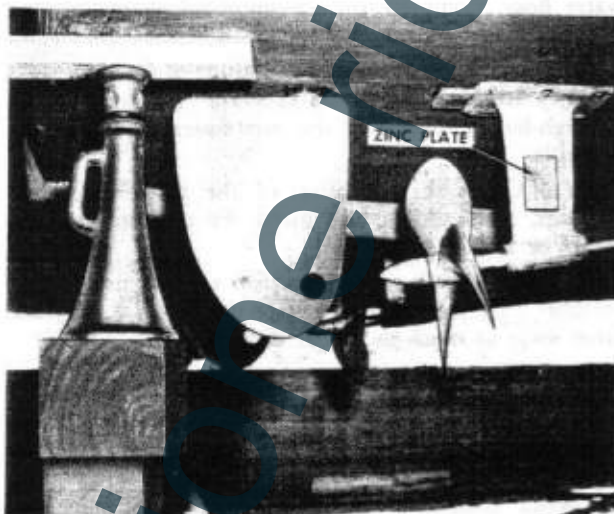


Figure 52—Jack Supporting Stern

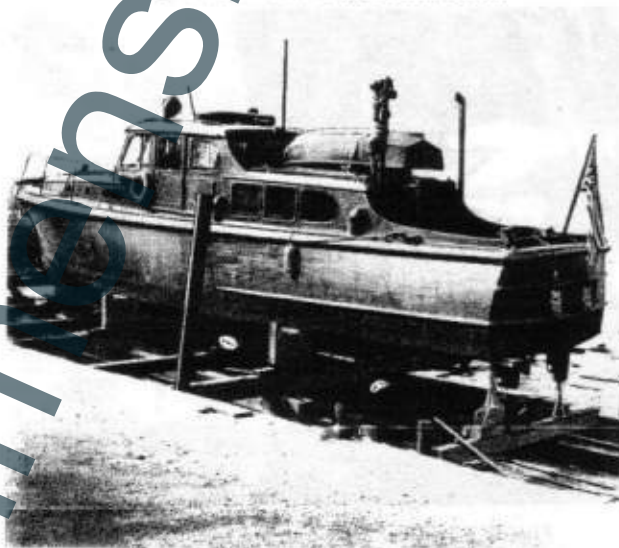


Figure 53—Boat on the Ways

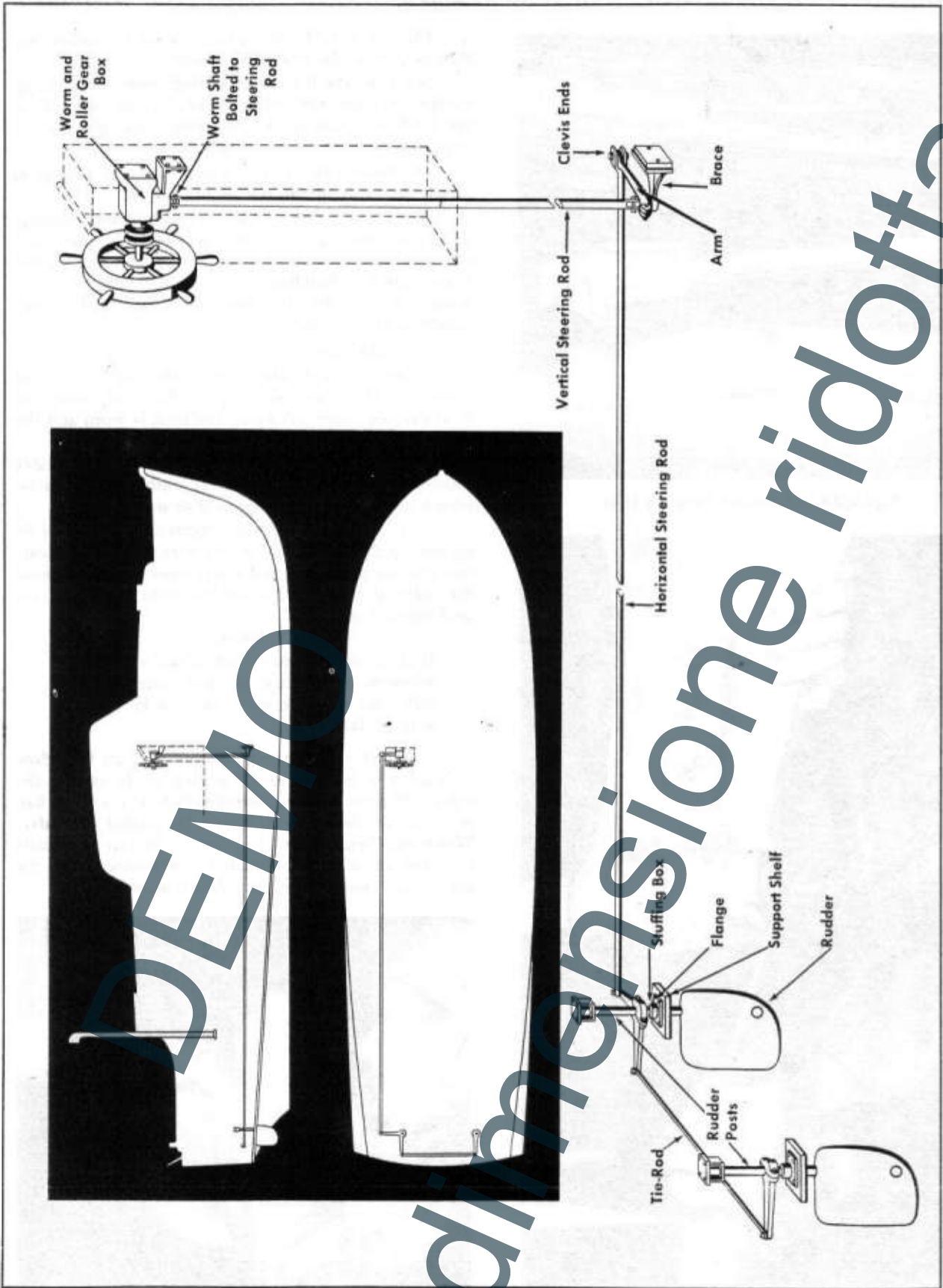


Figure 77—Link-Rod Steering Gear System

SECTION IV

Steering Gear

1. DESCRIPTION.

The steering gear is arranged to operate both port and starboard rudders at the same time. They may be operated by an automobile-type steering gear with link rods, or by a cable, with a sprocket wheel and chain.

a. LINK-ROD TYPE.

(1) MAIN ASSEMBLY.

(a) This type is controlled by an automobile-type worm and roller gear, located behind the steering wheel panel, joined to the steering wheel shaft. A vertical pipe sleeve is keyed and bolted to the worm shaft, and to a short shaft extending upward from a horizontal brace attached at the bottom to the engine compartment forward bulkhead. (See figure 77.) At this point an arm joins the vertical pipe to a horizontal rod which runs along the port side to the rudders.

(b) At each end of the sleeve where it fits over a shaft is a keyway and key. A bolt running through both sleeve and shaft holds the key in place. One of the keys is fitted smaller to allow for a little play in the steering wheel, thus reducing stiffness in operation.

(2) RUDDER ASSEMBLY.—The rudders are connected by a tie-rod with clevis ends. An arm from the rudder post connects with the clevises. (See figure 77.) The rudders are carried by a flange bolted to a support shelf. Combined with the flange is a stuffing box packed with $\frac{3}{8}$ -inch flax packing.

b. CABLE TYPE.

(1) MAIN ASSEMBLY.—The cable type steering gear consists of a sprocket wheel on the steering wheel shaft with a chain fitting over the teeth. Clamped to each end of the chain is a $\frac{1}{4}$ -inch cable. (See figure 78.) The cable runs over a double sheave pulley, under the sprocket wheel, one line going to the port and the other to the starboard side. (See figure 79.) Pulleys support the cable fore and aft on both port and starboard sides. The two lines are fastened to their respective rudder quadrants. (See figure 78.)

(2) RUDDER ASSEMBLY.—The rudders are joined by a tie-rod connecting on the rudder quadrants. Each rudder is carried by a flange bolted to the rudder support shelf. Combined with the flange is a stuffing box and packing nut.

c. EMERGENCY TILLER.—Both types of steering gears are provided with an emergency tiller for steering the boat from the after cockpit. It consists of an arm

and four-cornered adapter which fits over the rudder post. It can be used on either the port or the starboard rudder.

2. OPERATION.

a. NORMAL.

(1) LINK-ROD TYPE.—Four full turns of the wheel are required to turn the rudders from hardover to hardover. For easier operation, a certain amount of play is left in the wheel; however, the wheel should take hold at not more than a half turn. To locate the rudders amidships, turn the wheel hardover, then make two turns in the opposite direction.

(2) CABLE TYPE.—Two and one-half turns are required to turn the rudders from hardover to hardover.

b. EMERGENCY.—If the steering gear fails, use the emergency tiller. Access is made by removing the plate over the rudder on the after cockpit floor. Use as follows:

(1) Remove the plate, either port or starboard. (See figure 80.) Use the special key to unscrew the plate.

(2) Insert the emergency tiller and connect it to the rudder post. (See figure 81.)

3. SERVICE AND INSPECTION.

a. GENERAL.—Every 50 hours check the steering gear for wear, misalignment, and binding or looseness.

b. WORM GEAR.—Except for periodic lubrication, further servicing of the worm gear is seldom required. Lubricate with SAE-50 lubrication oil (in cold weather SAE-30) through the oil filler hole in the gear housing at least every 100 hours. Oil the shaft from the worm gear through an oil filler hole in the shaft.

CAUTION

Do not use graphite or heavy solidified oil in the worm gear.

a. LINK RODS.

(1) The most frequent servicing required on the link-rod steering gear is replacing the bolts at the following locations:

(a) Two bolts on the vertical steering rod. These bolts should be checked to make sure that they have not become loosened enough to permit the keys to fall out.

(b) Two tie-rod bolts.

(c) Steering rod bolt joining the steering rod to each rudder barrel arm.

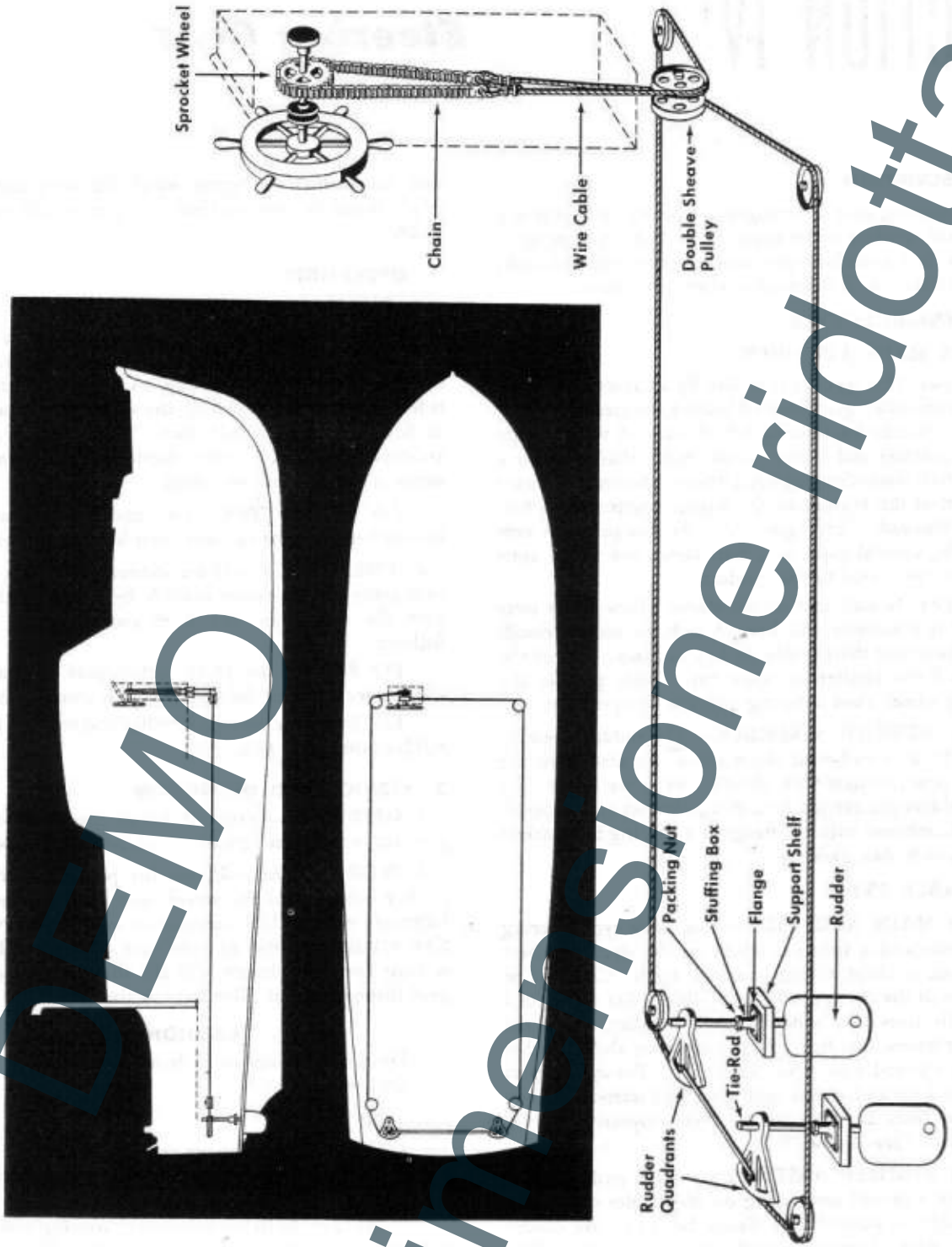


Figure 78—Cable Type Steering System

(2) Grease all connections with a thin cup grease.

d. SPROCKET WHEEL.—The set screw which holds the sprocket wheel key in place on the cable type steering gear may easily become loosened by vibration, permitting the key to fall out. This should be examined from time to time. If considerable trouble requires frequent adjusting, it may be remedied by one of the following changes:

(1) Use a longer setscrew with a locking nut.

(2) Replace the original setscrew with a squarehead screw, the head of which has been drilled to permit safety wiring.

(3) Drill a 1/4-inch hole through the shaft and both sides of the sprocket wheel. Insert a bolt through the sprocket wheel and shaft, tighten the nut, and peen the bolt end to prevent the nut from working loose.

e. WIRE CABLE.

(1) TAKE-UP.—When the steering wheel begins to show play, the wire cable needs tightening. Take-up is made by adjusting the clamps which fasten the cable to the chain.

(2) Grease the wire cable with a rag, running it along the entire length of the cable. Use a rust-preventive grease, Specification No. AN-C-52 or Graphite Grease, Specification No. VV-G-671.

f. STUFFING BOXES.—Adjustment of the stuffing boxes for watertightness is made by tightening the packing nut and the lock nut. When it becomes necessary to use considerable pressure to tighten the lock nut, repack the stuffing boxes. Repack with 3/8-inch flax packing. Be sure that the packing is not too tight for easy rotation of the rudders.



Figure 80—Removing Plate Over Rudder

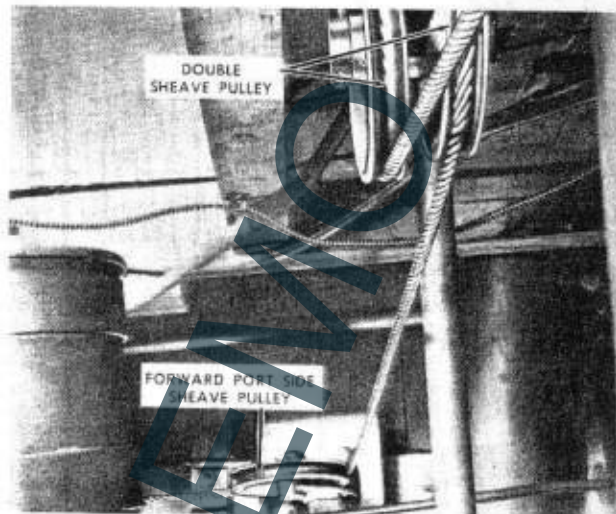


Figure 79—Sheave Pulleys Supporting Wire Cable



Figure 81—Operating Emergency Tiller

4. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
WHEEL DOES NOT TAKE HOLD	Bolt in steering rod loose or broken. Key lost from sprocket wheel.	Tighten or replace. See paragraph 3.d., this section.
CONTROLS STIFF	Rudder stuffing boxes packed too tightly. Cable taken up too tightly.	Loosen or repack. (See paragraph 3.f., this section.) Loosen clamps and let out.

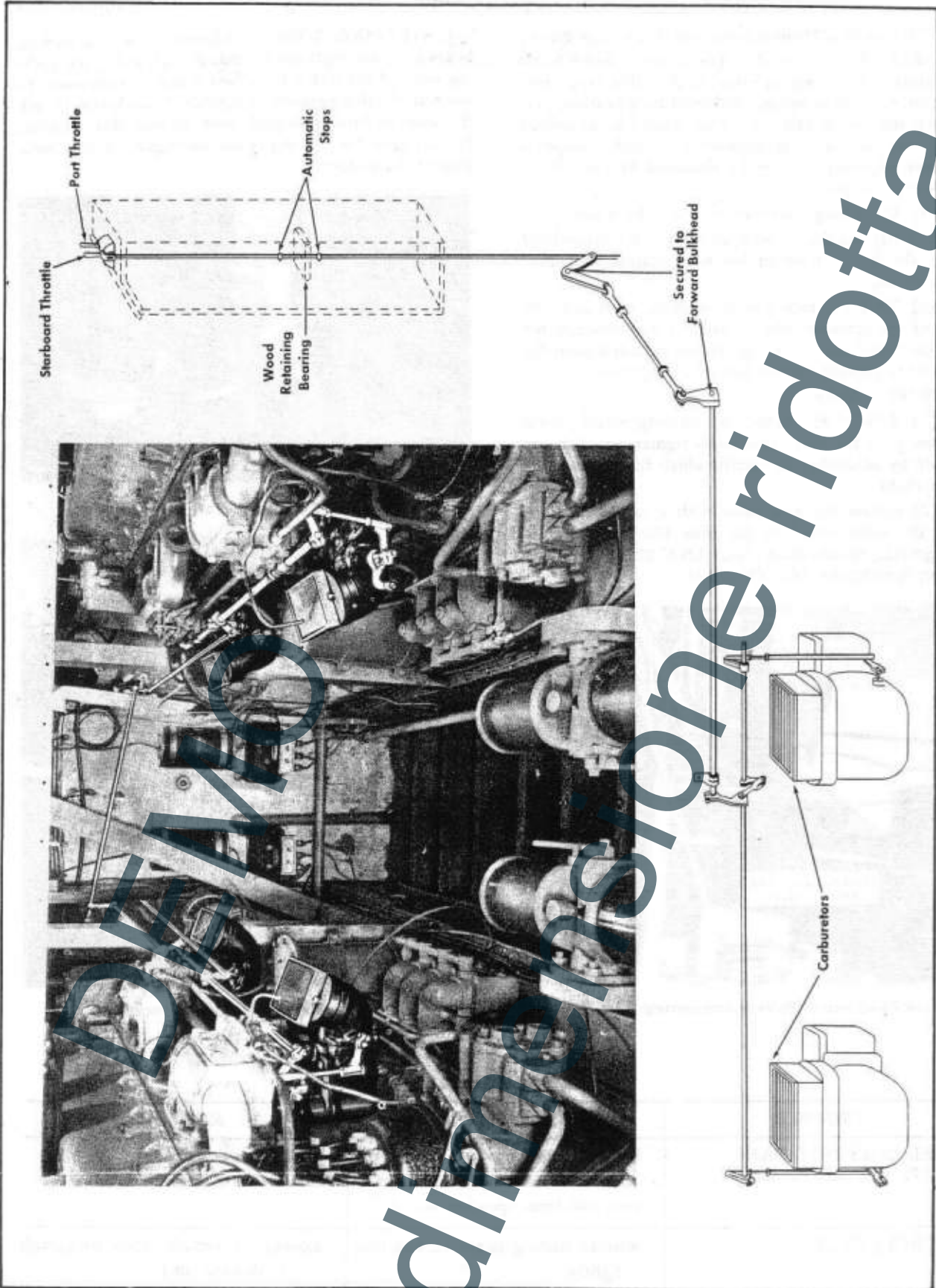


Figure 82—Starboard Throttle System

Shaft Log—Through-hull fitting which accommodates the propeller shaft.

Sheer—Term used to designate the upward curvature or sweep of the deck of the vessel toward the bow and stern.

Slings—Gear made of wire rope and close-linked chain for handling boats at booms or cranes.

Spliced—The joining of the ends of lines to make one continuous line by tucking strands under without knotting.

Sprocket wheel—A wheel with tooth-like projections shaped to engage with the links of a chain.

Stanchion—Vertical post supporting the cable rail.

Starboard—Right-hand side of the boat looking forward.

Stem—The upright timber in the forward part of the boat joined to the keel by the knee.

Stern—After part of the boat.

Stowed—Stored.

Strake—A continuous line of planks from bow to stern.

Stringer—A longitudinal timber or stiffener inside the hull. Depending on their location, stringers are known as bilge stringers, side stringers, hole stringers, etc.

Strut—A bracket support between two parts or a metal brace used as a support on construction.

Stuffing Box—A gland containing packing to prevent leakage of water.

Superstructure—Any cabins, deck houses, etc. built above deck.

Transom—The planking across the stern.

Tiller—A lever for turning the rudder of a boat.

Topsides—Side planking of a boat between the waterline and deck or rail.

Thermostat—An automatic temperature-control mechanism.

Transceiver—Combined radio receiver and transmitter.

Whip Antenna—A flexible antenna shaped like a buggy whip.

