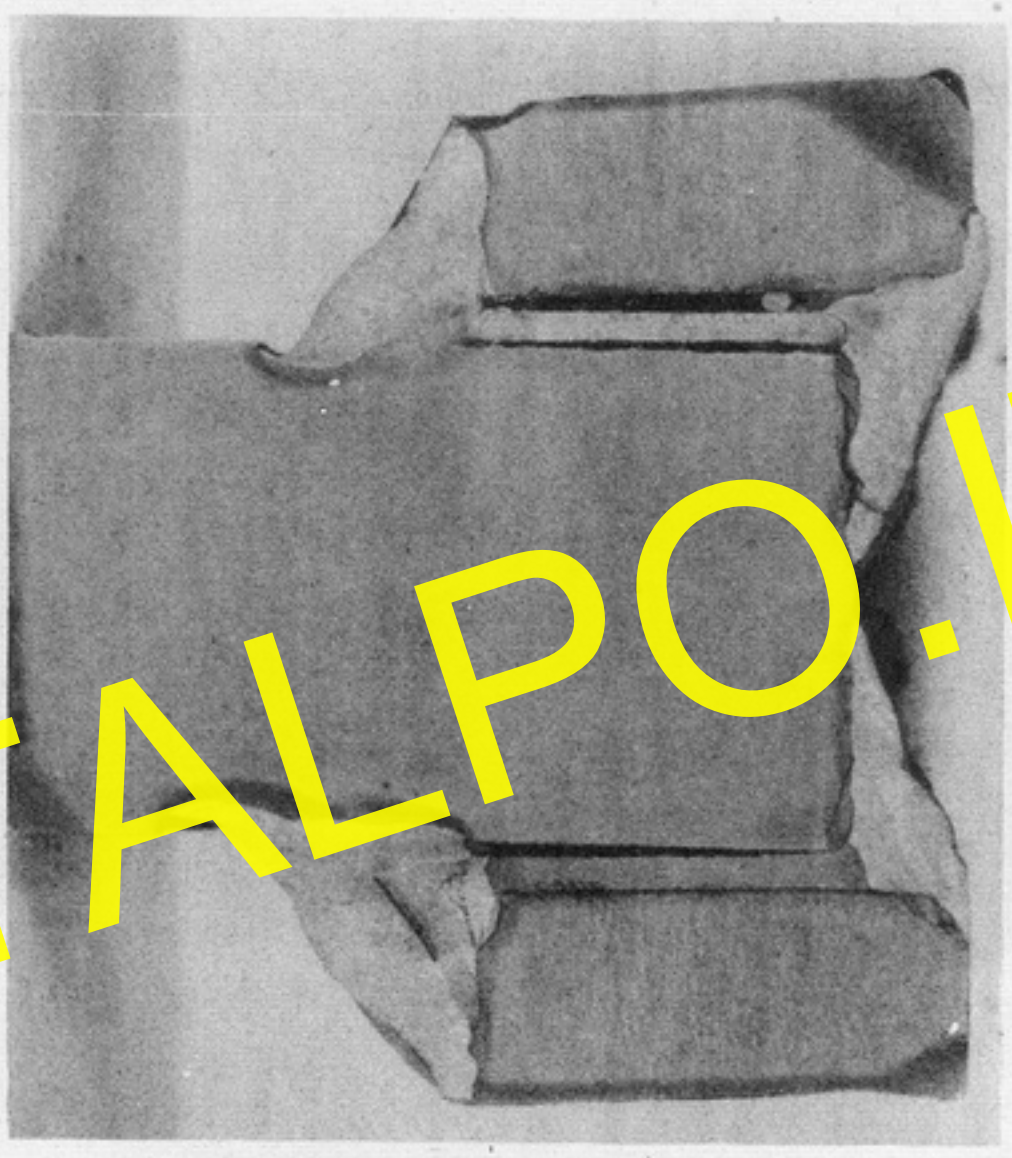
FIG.30

D.H.H.V. TIGER II.
Packs inserted in notch interlock
with rough tack welding.

FIG.31

F. KRUPP. TIGER II. Hull No. 462.
Nose interlock joint before inserting
packs. Note unequal gaps.



PANTHER No. 3040

Rear plate to side plate plug joint.

Transverse Section

Note gaps between packs and plates, and additional unauthorised packing shims.

Longitudinal Section

FIG.32

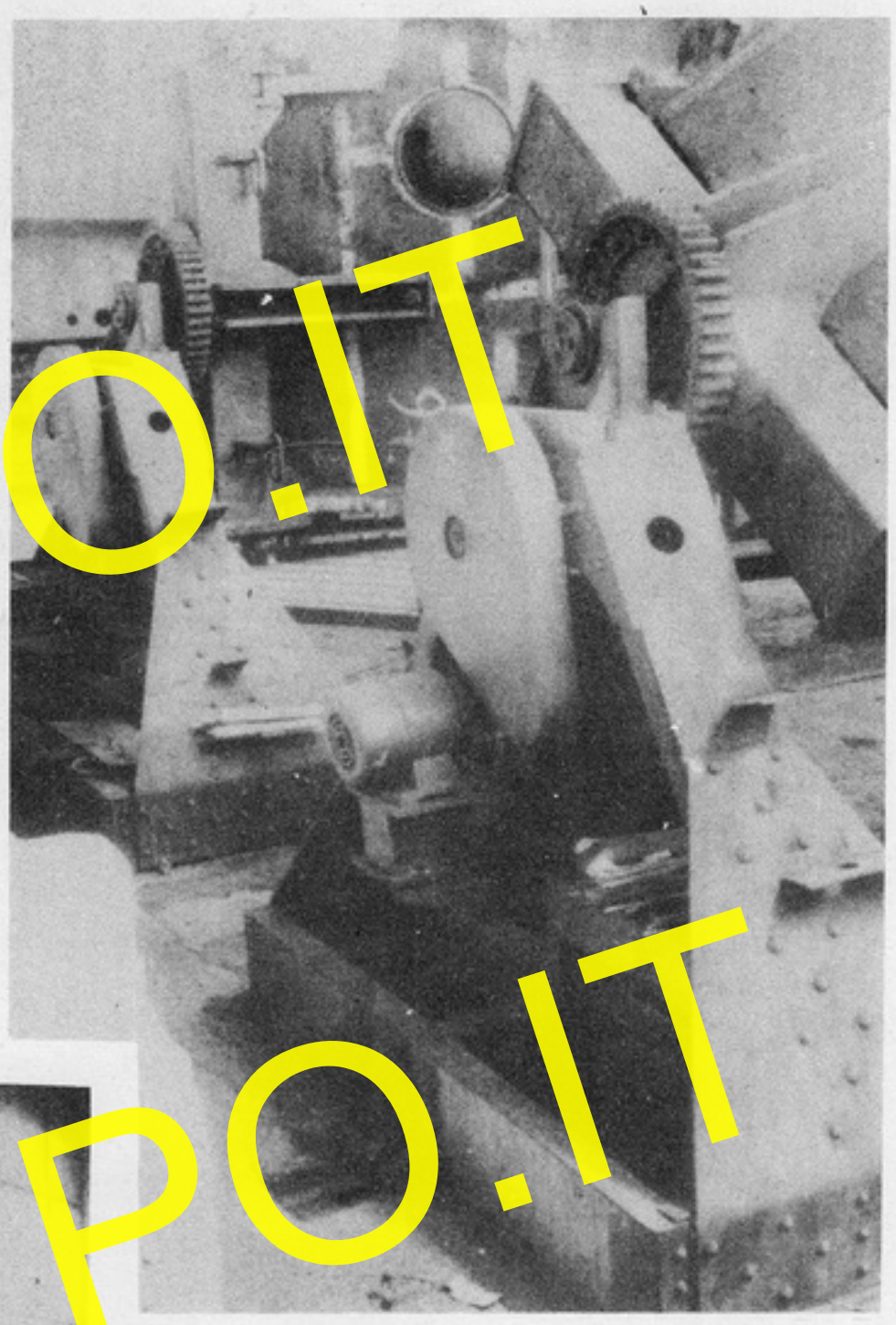


FIG.33

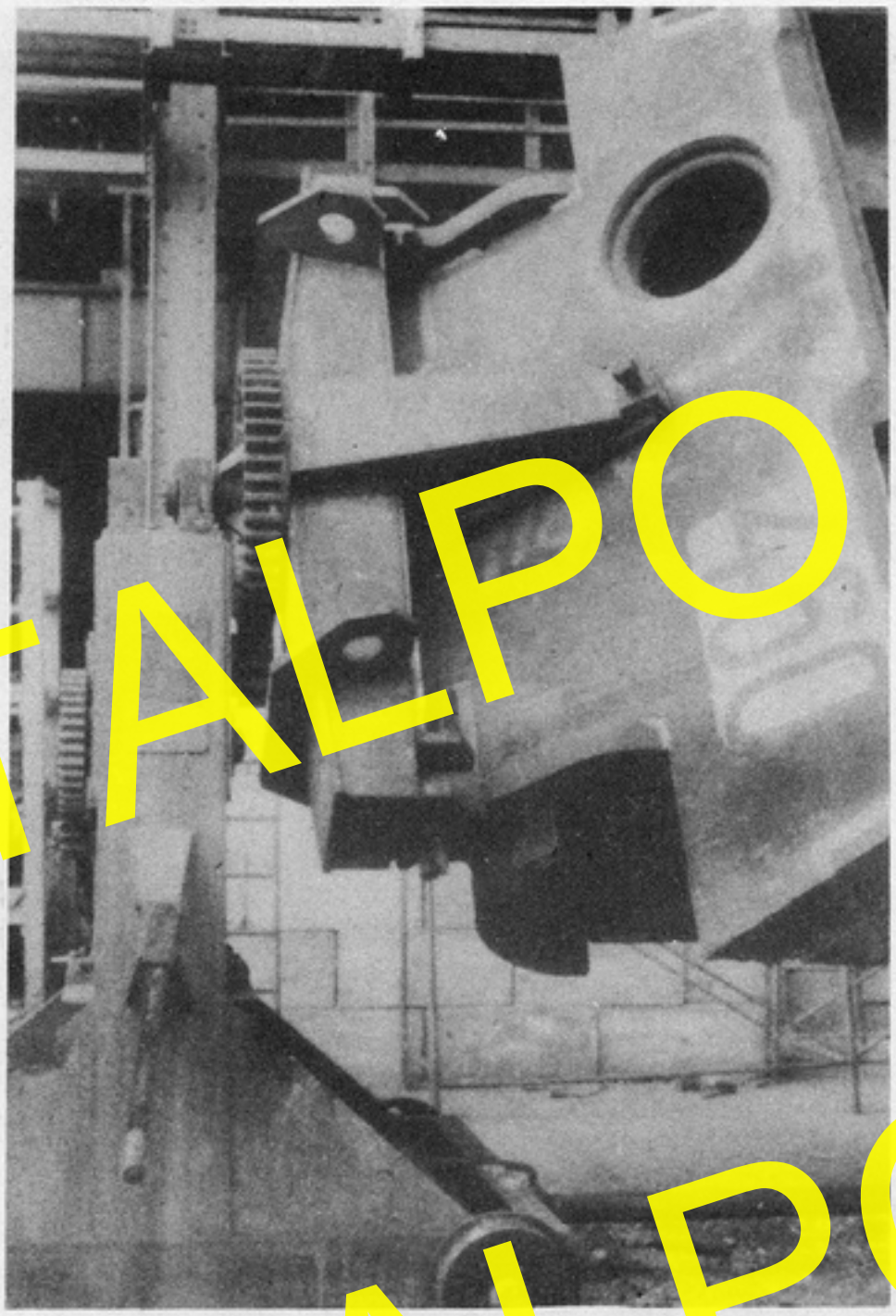
D.H.H.V. TIGER II.

Manipulator front and power driven end.

FIG.34

D.H.H.V. TIGER II.

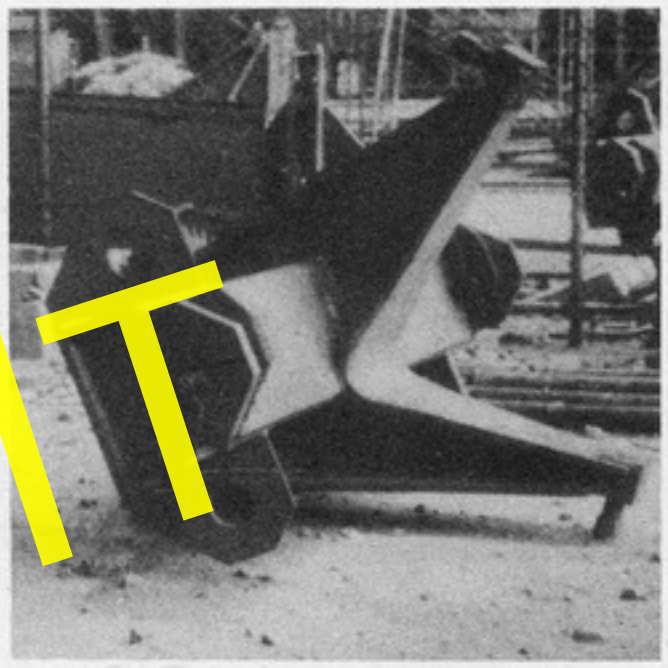
Manipulator rear and free end.



F. KRUPP. TIGER II.

Manipulator rear
end bracket.

FIGS.



FIGS. 35, 36

Manipulator front
end bracket.

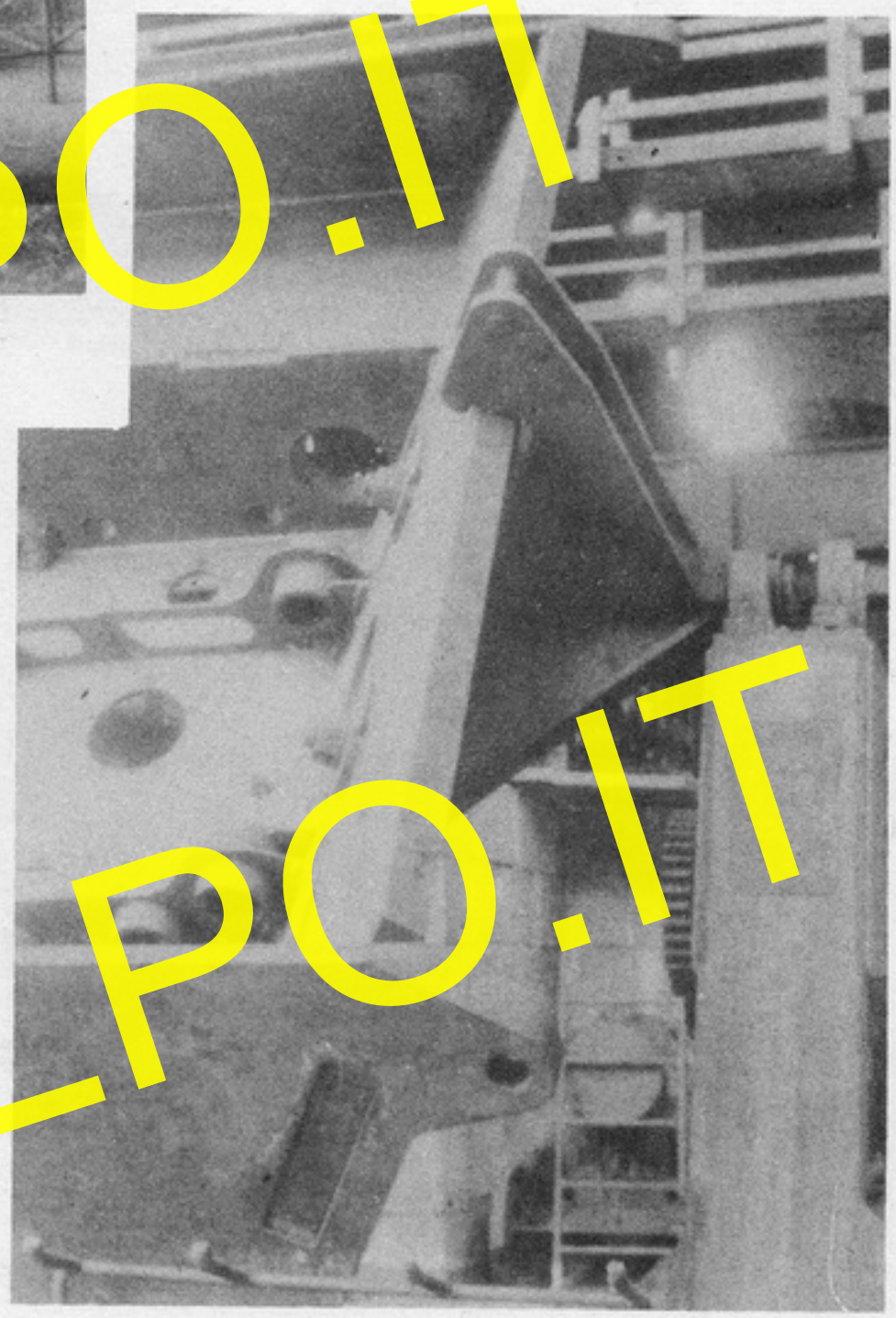
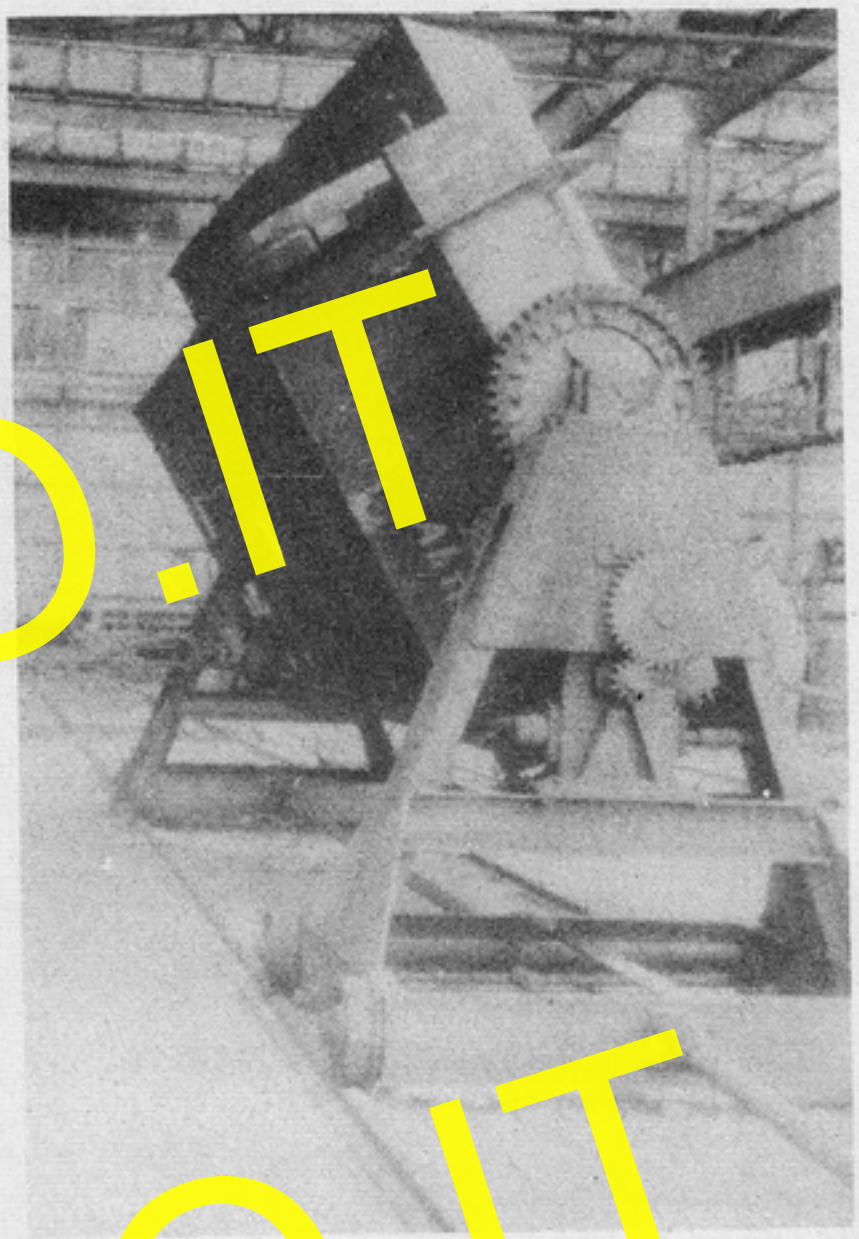


FIG.39

F. KRUPP. TIGER II.

Manipulator
on tracks
showing
connecting links.



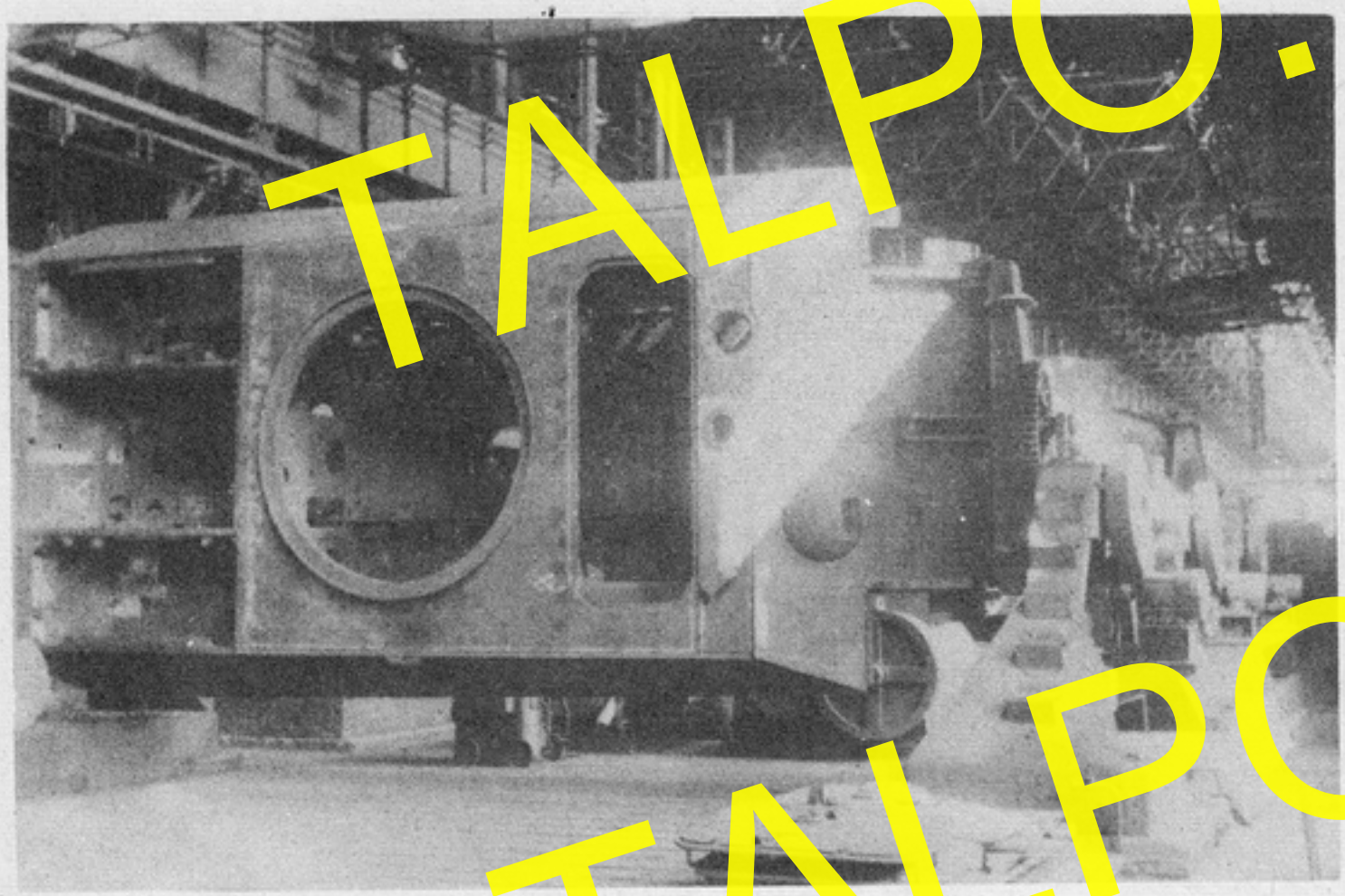


FIG.40

D.H.H.V. PANTHER IG in static manipulator.

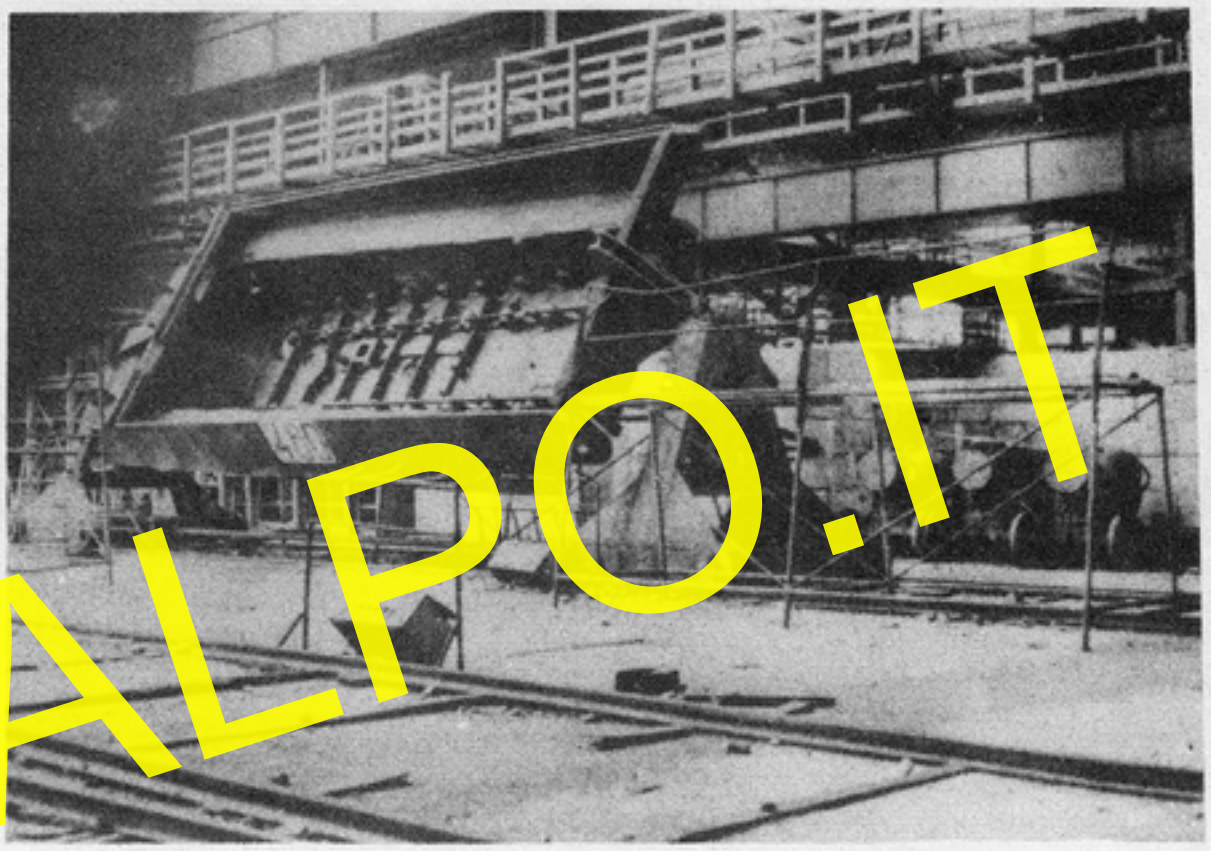


FIG.41

F. KRUPP. TIGER II.
Manipulator and welders' platform.
Welding plant shown in background.

FIG.42

F. KRUPP. TIGER II.
Upper front plates finish gas cut.

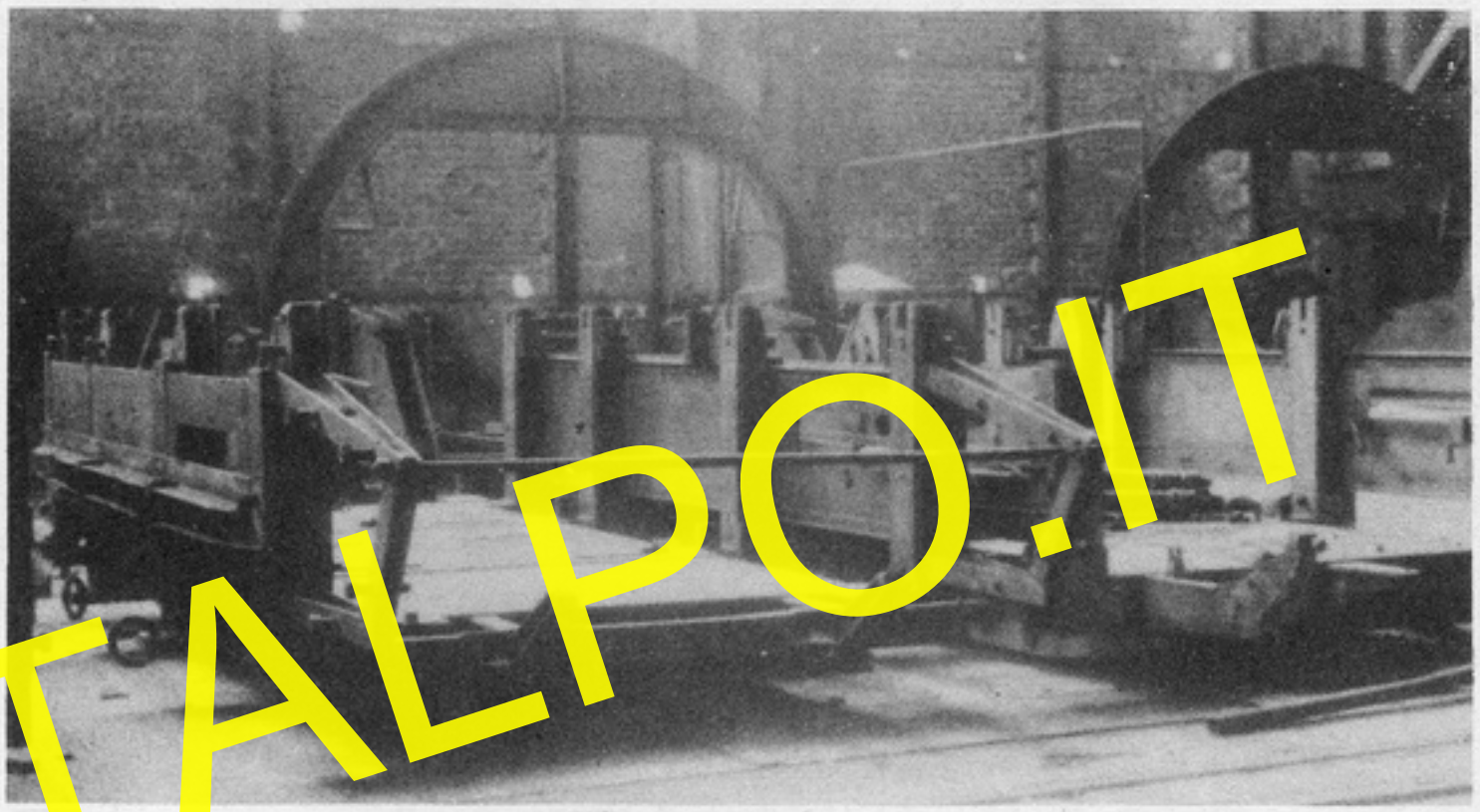


FIG.43

F. KRUPP. PZ.KW.IV. Lower hull jigs.

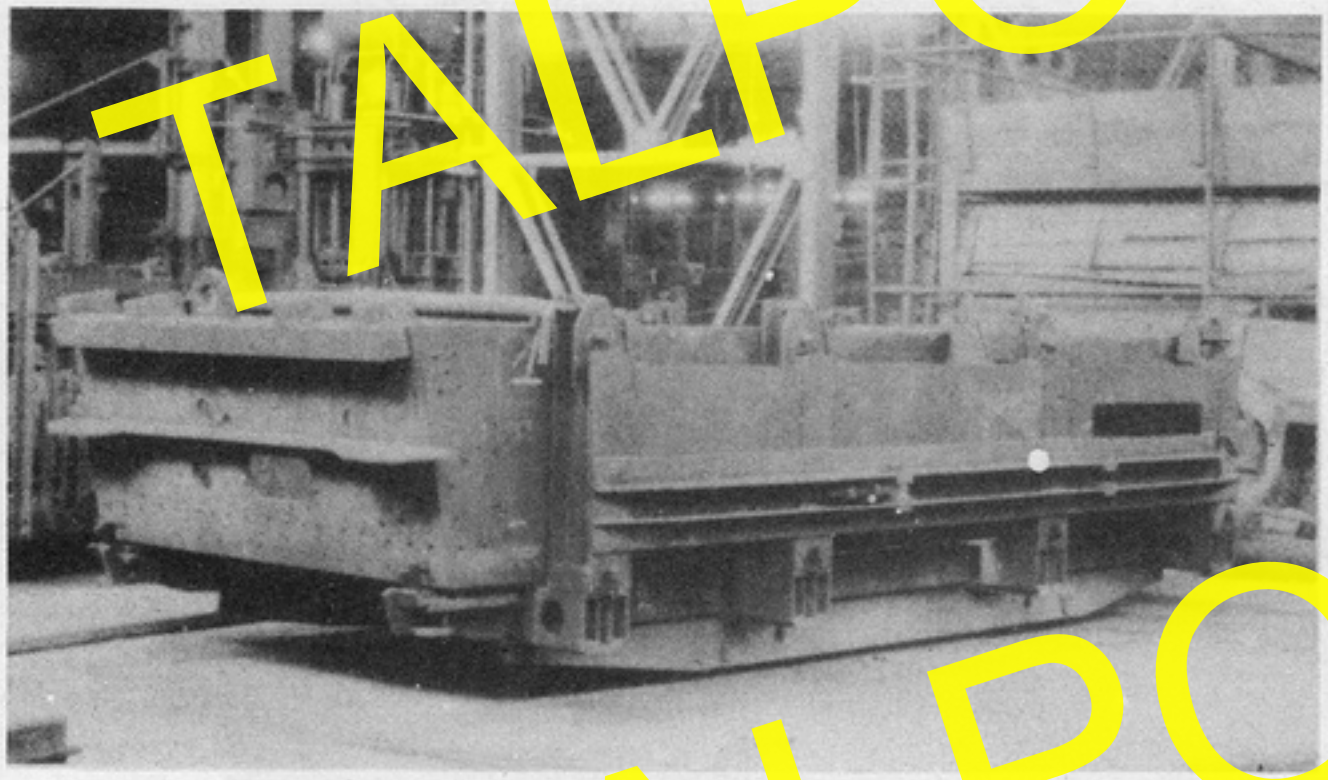


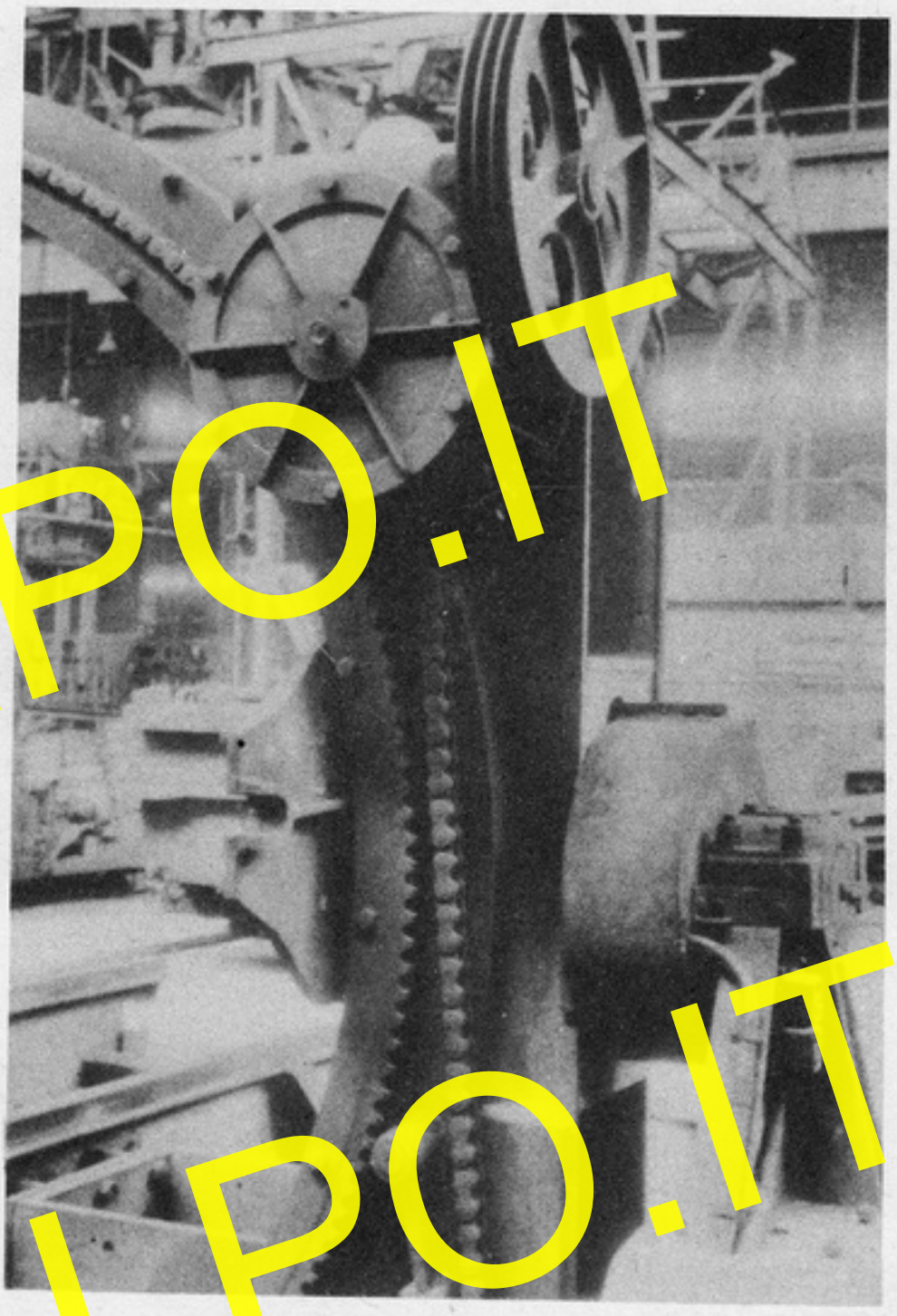
FIG.44

PZ.KW.IV. Lower hull in jig.

FIG. 45

F. KRUPP
PZ.KW.IV
Manipulator

Tilting ring
type.



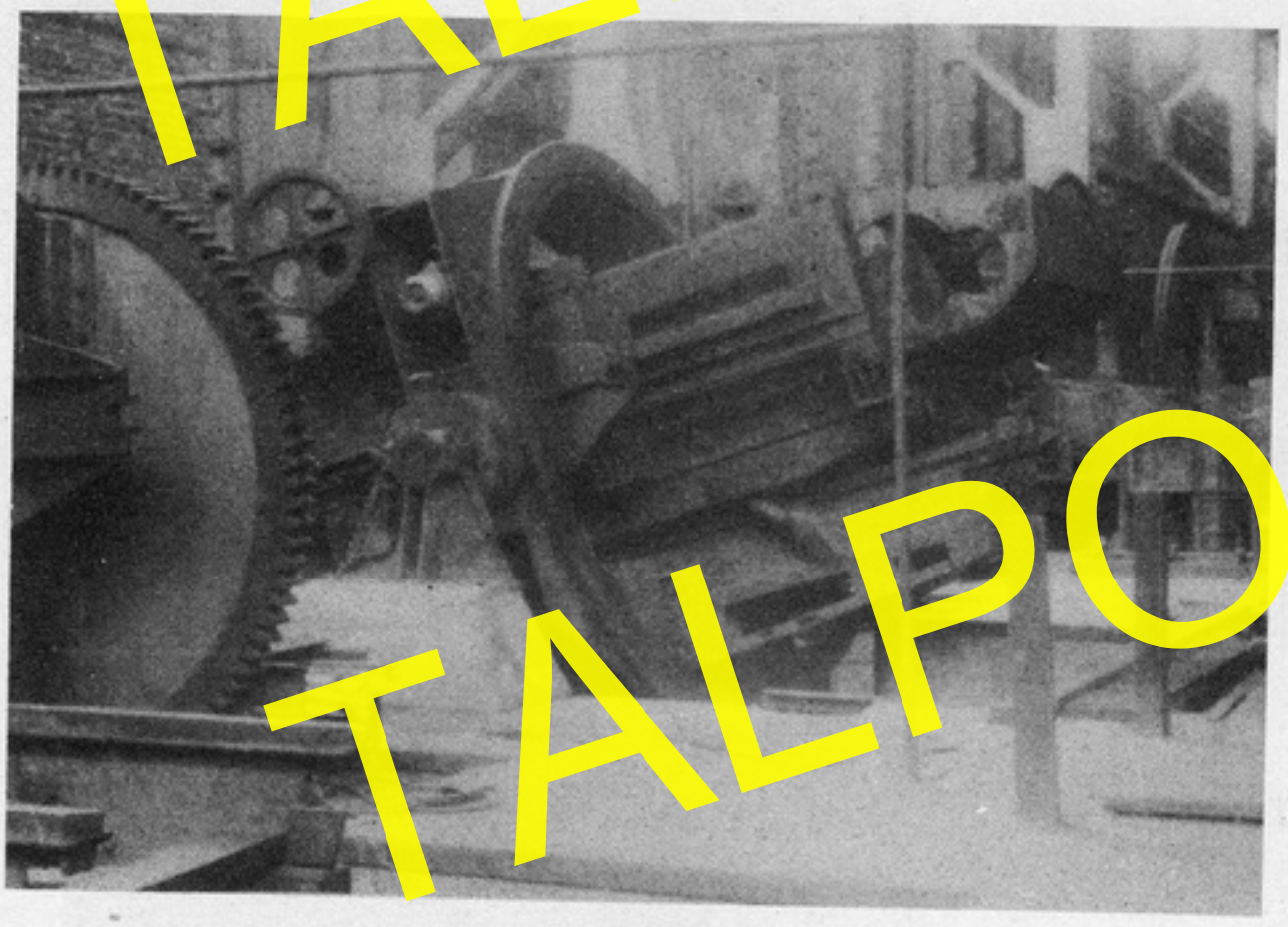


FIG. 46

F. KRUPP. PZ.KW.IV. Loaded tilting ring manipulator

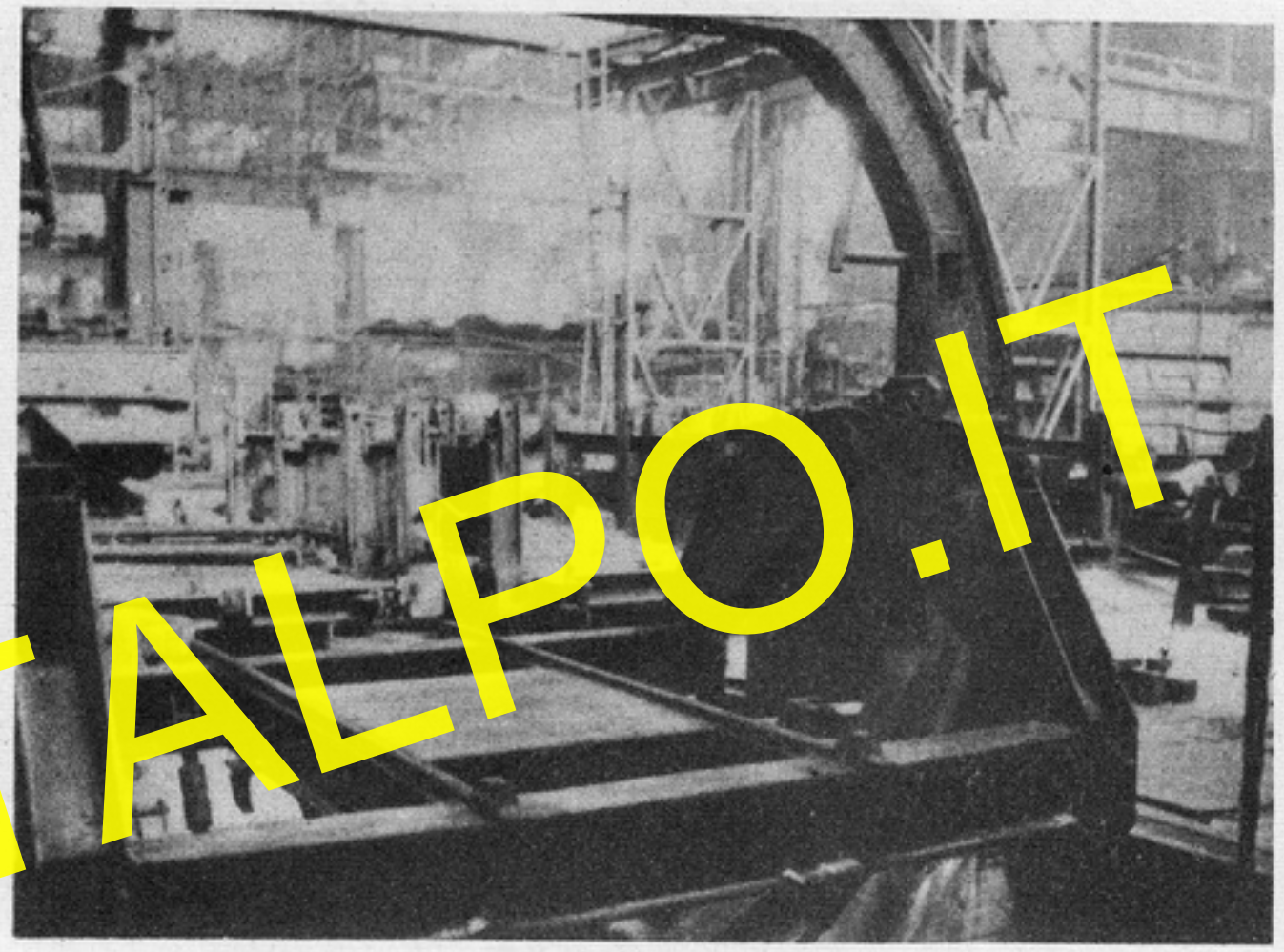


FIG. 47

F. KRUPP. PZ.KW.IV.

Tilting cradle manipulator.

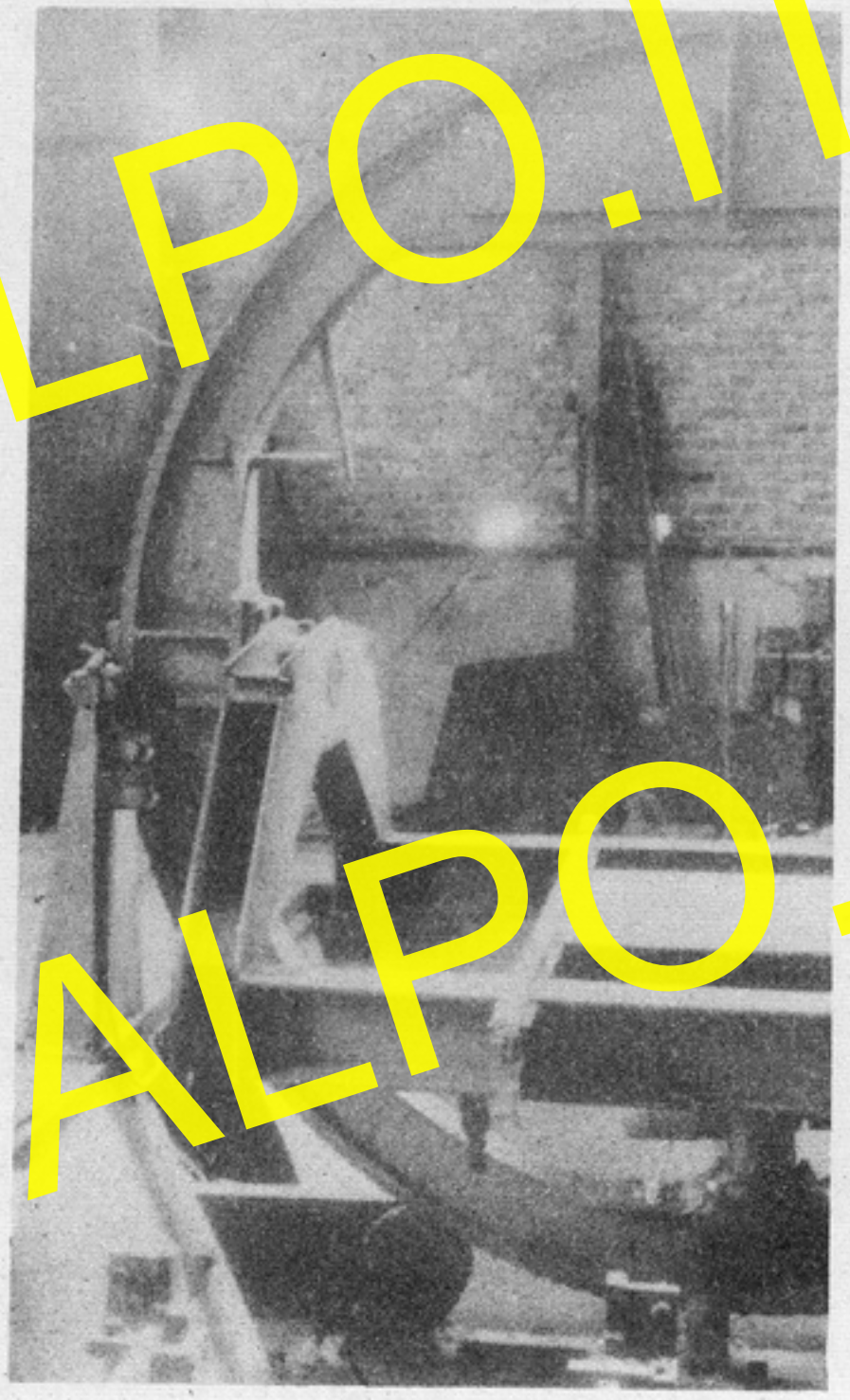


FIG. 48

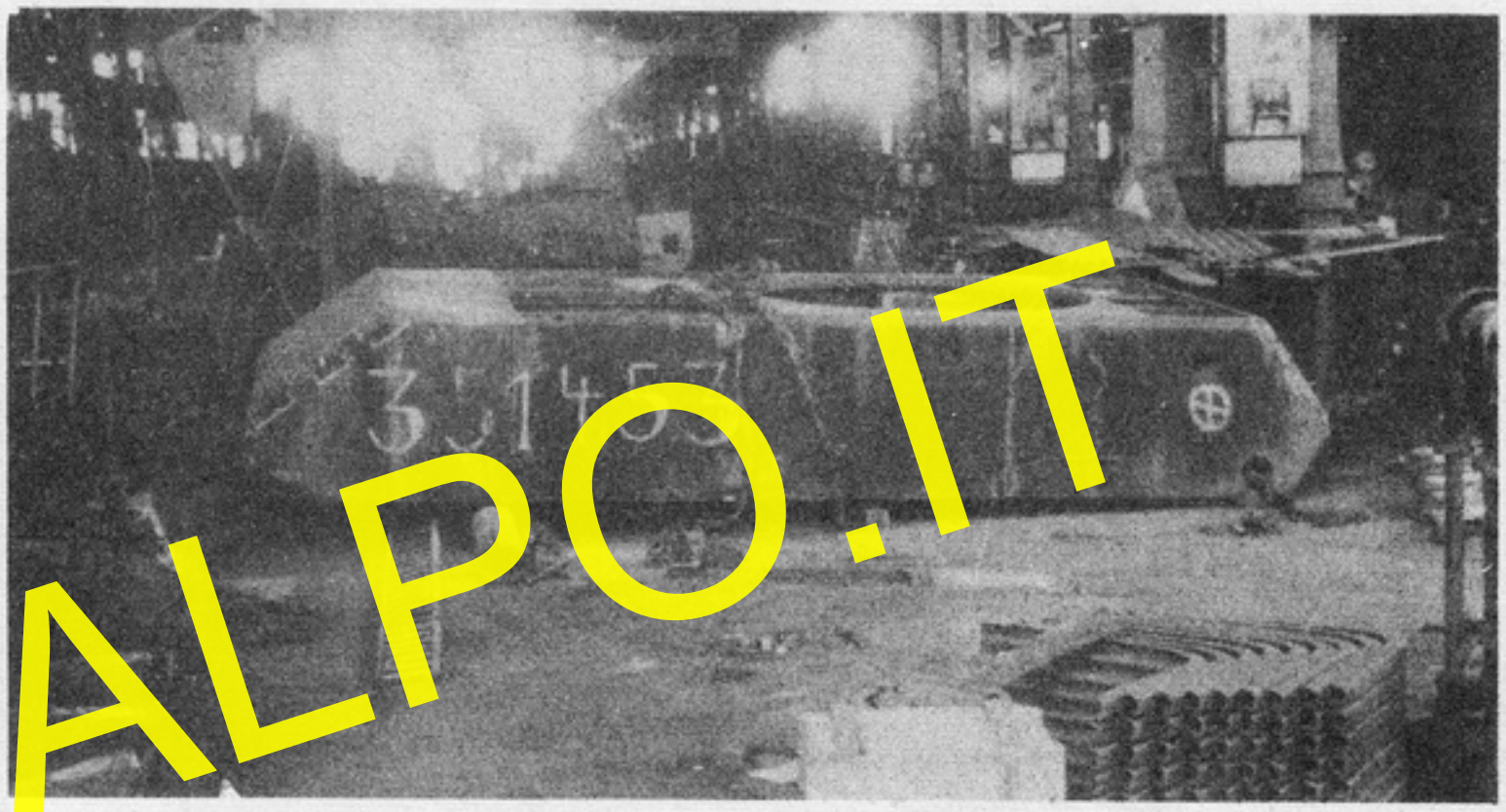


FIG. 49

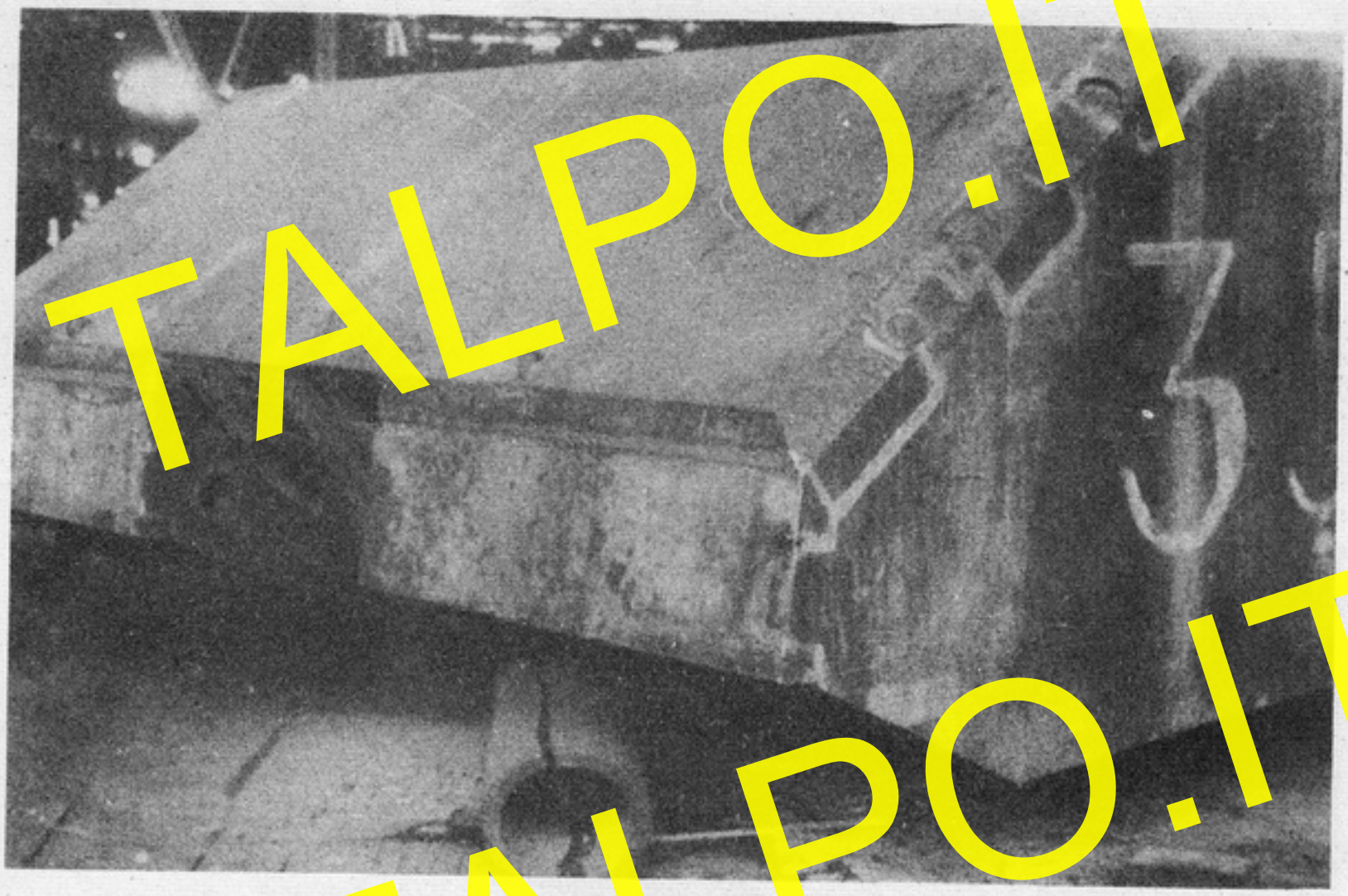


FIG. 50

F. KRUPP. MAUS HULL

Dimensions:-

FIGS. 51, 52

F. KRUPP. MAUS TURRET

Dimensions:-

27 ft. long
10 ft. 6 ins. wide
4 ft. 2 ins. high

Front plate 8½"
Side plates 8"
Roof plate 2½"
Floor plate 3"
Dowels 18" x 3" dia.

APPENDIX "A" - Translation of German Secret Tentative Specification for Design and Fabrication of Armor Parts

Secret (German Classification) TL 21/9017

Tentative Specification

for the Design and Fabrication

of Armor Parts

Issue Date: 21 May 1942
Latest Revision Date: 10 August 1942

Specifications and Standards to be observed:

HgN 113 29: Permissible Variation of Dimensions without Specified Tolerances.

German Army High Command
Ordnance Department
(I.A. Fichtner)

Appendix "A" TL 21/9017

Secret (German Classification)

A. Surface Quality and Finishing Tolerances

1. Surface Quality

The surfaces of the armor parts which may be flame cut autogenously are marked with a special surface mark on the drawings

▽ spanlose Bearbeitung (z.B. autogenes Trennen) zulässig.
Translation: Chipless machining (i.e. flame cutting) permissible.

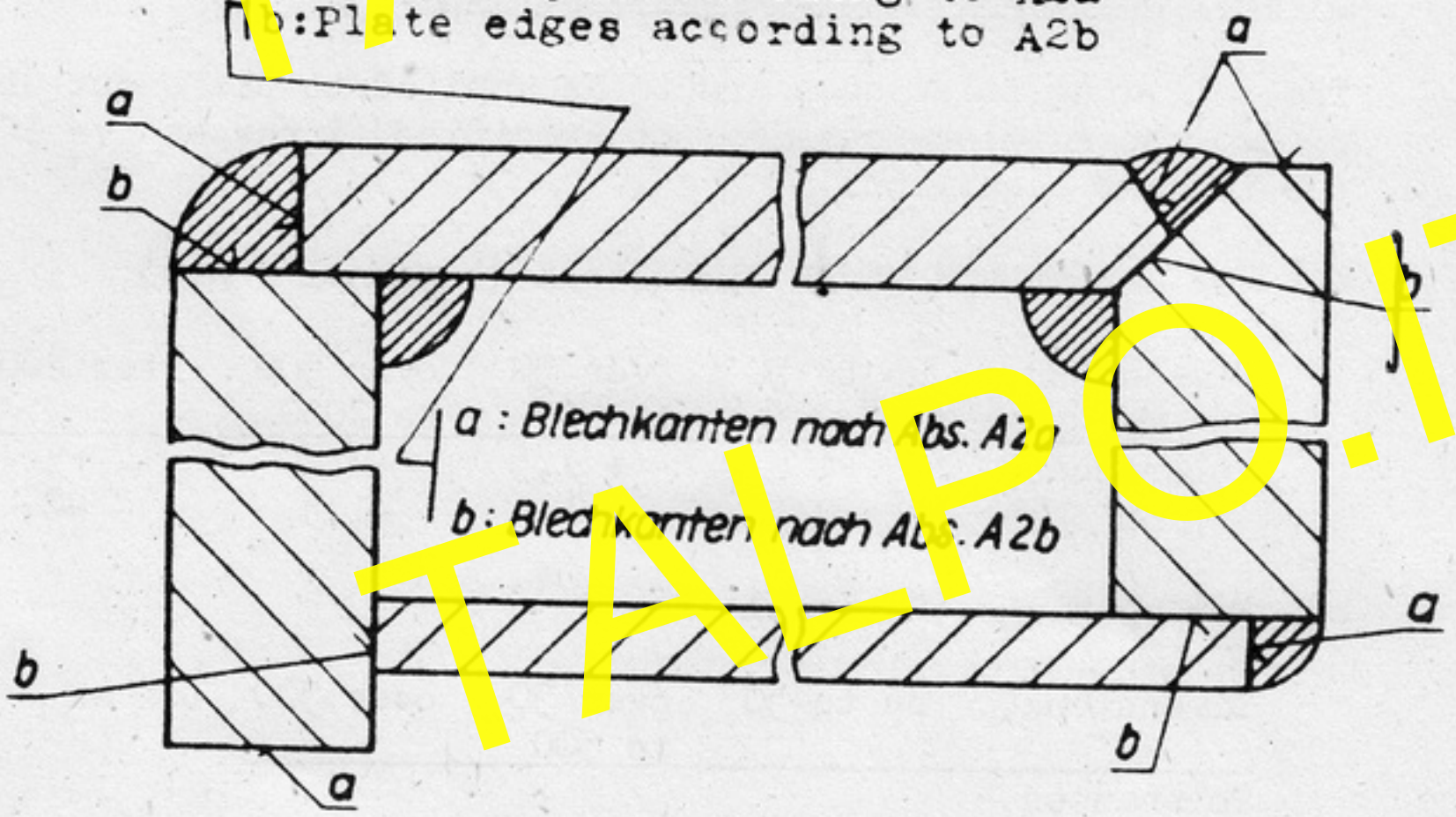
The smoothness of the surfaces which have been treated autogenously is to comply with the definition of DIN 140 ▽ for surface quality.

2. Irregularities due to Flame Cutting

a. Irregularities of every size on sheet edges which remain exposed and also those which serve to form the welding groove, should be removed only when the danger of crack formation during heat treatment exists. (See locations "a" in illustration).

They can generally be removed by grinding.

a: Plate edges according to A2a
b: Plate edges according to A2b



b. In the case of plate edges which are intended for welded connections (i.e. other parts in contact with them) (surface b), the irregularities do not have to be ground, provided they do not exceed the following table and do not constitute a danger of cracking during heat treatment:

Plate thickness mm	up to 15	up to 30	up to 50	over 50
Depth of irregularity mm	2	3	4	8
Width of irregularity mm	5	7	9	11
One irregularity for following length of cut mm	300	300	200	200

If the irregularities might lead to cracks during heat treatment, they must be removed by grinding.

If the irregulatities occur in greater number the plate edge should be machined over the damaged length, providing that the tolerances for construction permit it. Should the tolerances for construction not permit it, a layer of weld metal should be deposited on the damaged edge. (See section B).

Irregularities on sheet edges of any length which occur (in one area) but in larger numbers within one length of 100mm have to be ground out and repaired by a layer of weld metal.

3. Dimensional Tolerances for Flame Cutting.

The following tolerances are to be applied to flame cut dimensions (whose tolerances are not specified) irrespective of changes due to heat treatment..

a. For length and width dimensions (external sizes)

Dimensions, mm	up to 50	over 50 to 500	over 500 to 2000	over 2000
Tolerances, mm	+1 -0,5	+1.5 -1	+2 -1.5	+3 -2

b. For openings (internal sizes)

Dimensions, mm	up to 50	over 50 to 500	over 500
Tolerances, mm	+1	+2	+3

The manufacturer has to observe these tolerances for dimensions of parts to be assembled together, in such a way, that even if the nominal dimensions have to be altered, the assembly according to A5 and A6 is still possible.

4. Tolerances due to heat treatment.

a. Changes of dimensions

Besides the variations permitted for flame cutting (according to section A3) and for machining (according to HgN 113 29, section A1), additional variations occur due to heat treatment (quenching and tempering or surface hardening) on armor parts which have been machined before heat treatment.

For such variations, standard tolerances can not be established at this time because local assembly conditions for armor vary so widely.

The manufacturers should set their own tolerances for machining before heat treatment so that if possible dimensions without specified tolerances will not vary more than 1-1/2 times the tolerances according to HgN 113 29 section A1. This corresponds roughly to 14 to 15 ISA quality.

Neither the tolerances according to paragraph A3 nor according to HgN 113 29 paragraph A1 apply to the finished parts.

b. Distortion of sheets after surface hardening.

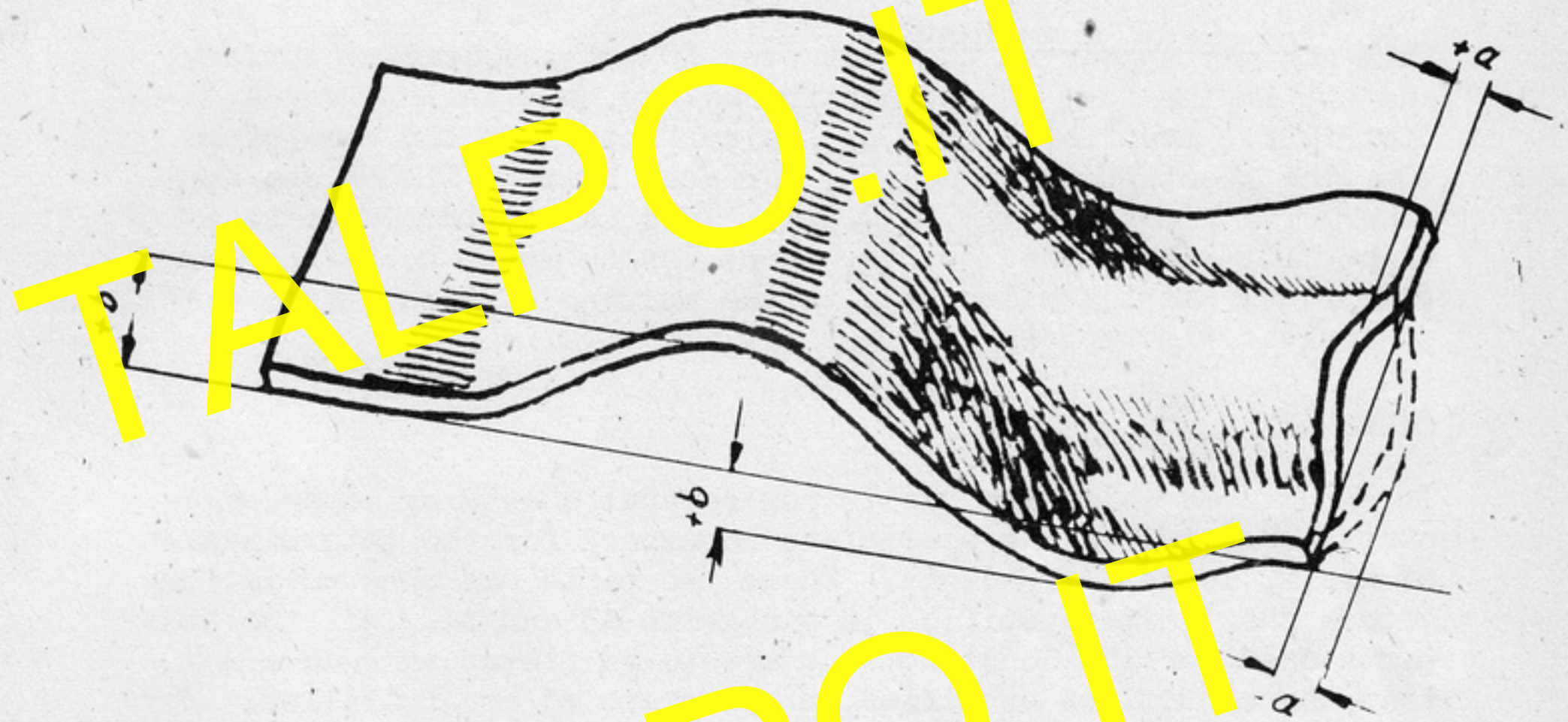
After surface hardening and straightening of armor sheets, the lateral deformation (see picture, dimension "a") perpendicular to the longitudinal axis may amount to 5% of the sheet width. The longitudinal deformation (see picture, dimension "b") in the longitudinal direction, may amount to 1% of the sheet length, however not more than 5mm.

Measured in one area, the lateral and longitudinal deformation together, must not be greater than the greatest permissible single deformation.

The deformations can occur as + or - unevennesses within the permissible sizes (see picture). In sheets where all four sides are almost equal, by length, we understand the direction in which the sheet was fed into the hardening installation.

(1) Example: After surface hardening, a sheet whose length is 5360mm and width 860mm may show a permissible longitudinal deformation of 5mm and a lateral deformation of 4.3mm. Measured in one area, the lateral and longitudinal deformations together must not exceed 5mm.

(2) Example: After surface hardening, a sheet whose length is 1000mm and width 300mm, may show a permissible longitudinal deformation of 1mm and a lateral deformation of 1.5mm. Measured in one area, the lateral and longitudinal deformations together must not exceed 1.5mm.



c. Distortion of sheets after quenching and tempering.

After heat treating and straightening of armor sheets, the lateral and longitudinal deformations measured in one area may amount to 1% of the sum of the length and width of the sheet, however not more than 5mm.

(1) Example: After tempering, a sheet 860mm wide and 5260mm long, may show a permissible longitudinal and lateral deformation of 5mm.

(2) Example: After tempering, a sheet 1500mm wide and 1800mm long, may show a permissible lateral and longitudinal deformation of 3.3mm.

5. Sizes of gaps.

When sheets with distortions according to A4b and A4c are being prepared for welding, the flatness of the bearing surfaces on the welding edges must be such, that the gaps formed are not greater than those shown in the following table:

Width of gap up to	Joints of sheets
1 mm	up to 15 mm thick
2 mm	up to 50 mm thick
3 mm	over 50 mm thick

This gap may appear at the most over 50% of the bearing surface, and not in the form of one continuous gap, but in long waves distributed over the length of the surfaces. On the remaining 50%, the sheet edges or bearing surfaces have to lie on one another with a maximum gap of 0.5mm. This is considered to be a tight fit. In notched joints, sheet length means notch length. This requirement applies only to the welding of such joints with austenitic electrodes.

6. Assembly

In structures which are built from several sheets or other armor parts, only two of the sheets are necessary for the determination of width, length, or height. These two parts can show deviations within the limits specified in paragraph A3 and A4. All the other parts used for the construction, are to be fitted in such a way that the conditions specified in paragraph A5 are fulfilled. For example, the front and back plate determine the width of a tank hull, while the front floor and rear floor plates have to be fitted.

7. Fits

As a rule only fits of the 12. ISA quality, or rougher should be employed for armor plate and armor castings. Finer qualities may be employed only in very exceptional circumstances.

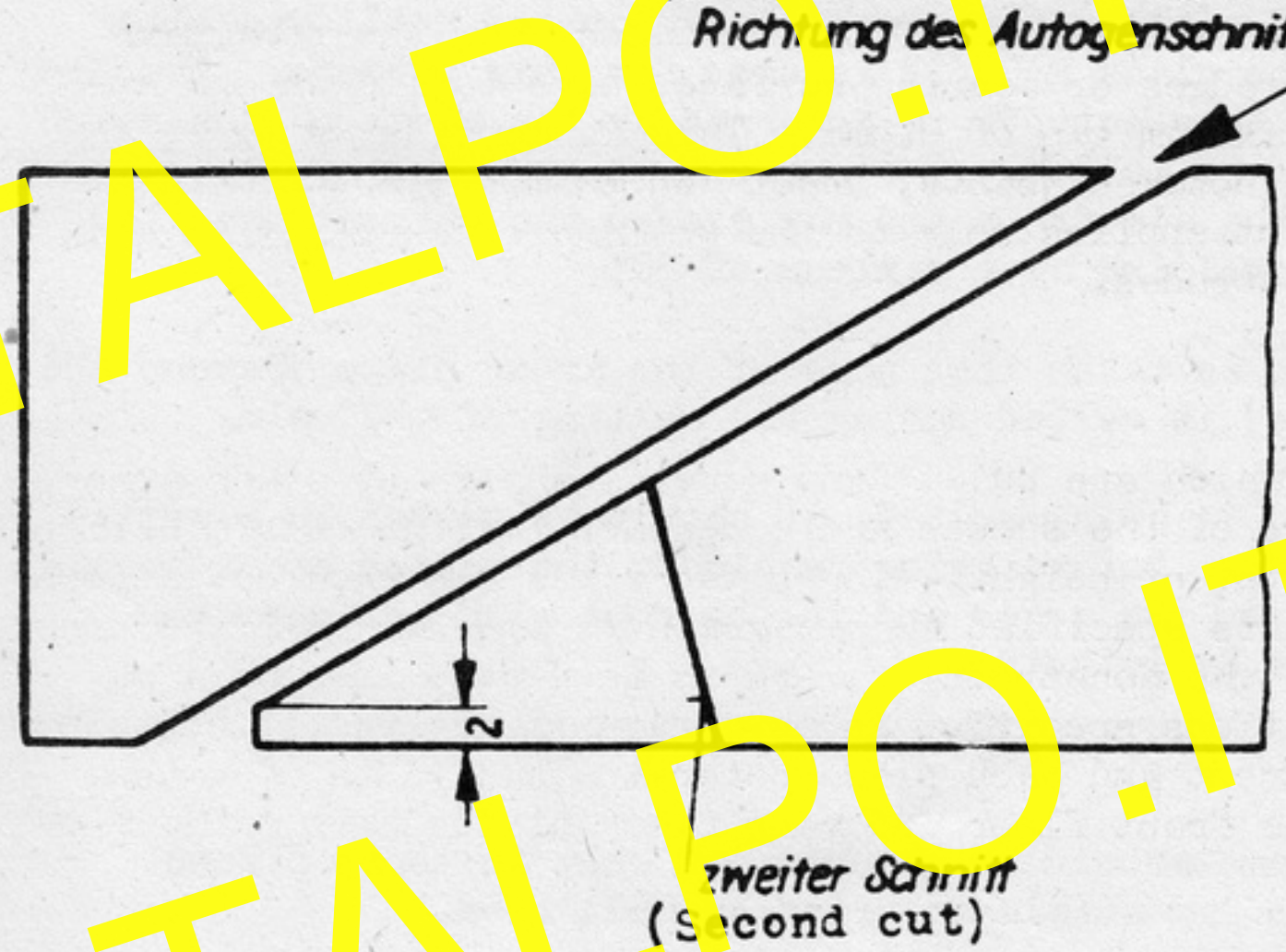
8. Tolerances for distances between bolt holes and rivet holes.

The distances between bolt holes, rivet holes, etc. are to have tolerances corresponding to the difference between the diameter of the hole, according to DIN 69, and the diameter of the bolt shank, if assembly with the corresponding dimensional mating part is to be guaranteed. Care is required that the tolerance is not less than the base tolerance of the 13. ISA quality and, if necessary, the next larger hole, according to DIN 69, has to be used. The difference obtained in this way is to be halved and added as a + or - tolerance to the dimension of the distance.

B. Rules for Design and Fabrication.

1. Flame cutting .

When sheet edges are being flame cut at an angle less than 90°, the sharp edge has to be ground down to a flat of at least 2mm to remove the roughness from the flame cutting. This edge may also be removed by a second flame cutting operation.



2. Repair of cracks.

If any cracks appear during or after the welding of the seams, they have to be repaired. The following three ways can be used:

a) Grinding
b) Melting
c) Chipping

the removal of cracked seams by flame cutting is not permitted.

The method of repair should be agreed in advance between the welding engineer of the firm and the Army Inspector in order to avoid the reporting of each crack before it can be repaired. In spite of this approval, inspection of the repair as part of the general process inspection is required.

a. Grinding.

If by grinding out the whole seam, a cavity larger than 1.5