

R E S T R I C T E D

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SUBJECT: 38 cm Rocket Projector on Tiger I Chassis

Observations by: Capt. R. E. Howehl and Sgt. B. C. Washer, Ord. Tech. Intell.
Team No. 9.

1. GENERAL:

A 38 cm (15 inches) rocket projector mounted on a modified Tiger I Chassis has been examined in the Ninth U. S. Army area. Although the German nomenclature for this equipment is not known, it may be the vehicle referred to in German documents as the "Panzer Sturm Mörser Tiger".

The vehicle on which the rocket projector is mounted is a modified version of the Tiger I Chassis, with a rectangular superstructure replacing the turret.

The rocket projector is radically different in design and construction from any weapon previously examined. The propellant gases are deflected between the tube and liner by an unusual obturator, and escape through a perforated ring at the muzzle. The splined projectile fired by the projector is approximately five feet long and weighs 726 pounds. An unconfirmed report states that the range of the rocker is 6000 meters (6552 yards). The same source reports that the vehicle has a crew of seven, including a tank commander, a forward observer and five men to operate the vehicle and rocket projector.

2. CHASSIS:

a. The suspension, power train, engine and hull are those of the Pz.Kpfw. Tiger, Model E (Tiger I). The normal superstructure and turret of the tank have been replaced by a heavy rectangular superstructure of the type used on the "Panzerjäger" self-propelled guns. The superstructure is made of rolled armor plates and is of welded construction with the side plates interlocked with the front and rear plates. A heavy strip of armor is used to reinforce the joint between the front plate and glacis plate on the outside (Appendix "A", Photos 1 and 2).

A ball-mounted machine gun, MG34, is set into the front plate on the right side.

b. Armor thickness and angles of the superstructure:

	Thickness	Angle to vertical
Front plate	150 mm (5.9 in.)	45°
Projector Mantlet (average)	69 mm (2.4 in.)	Rounded
Projector shield (average)	150 mm (5.9 in.)	Rounded
Side plates	80 mm (3.2 in.)	20°
Rear plate	80 mm (3.2 in.)	10°
Top plate	40 mm (1.6 in.)	Horizontal

c. Dimensions of the superstructure:

Front plate	
Width at base	126 inches
Width at top	101 inches
Height (base to top)	73 inches
Side plates:	
Length at base	128 inches
Length at top	86-1/2 inches
Height (base to top)	38-5/8 inches
Overall height from ground (excluding loading crane)	9 ft 3 in.
Overall height (including loading crane)	11 ft. 4 in.

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d. Ports and hatches: A rectangular loading hatch, 62 inches long and 19 inches wide, is located in the center rear of the top plate. It is closed by two doors, one forward and one to the rear. The rear door can be opened independently of the forward one and mounts a smoke projector, which has 360° traverse, in the center (Appendix A, Photo 1). The door is spring balanced and is hinged at the rear to open outward. A loading crane is mounted on the right rear corner of the superstructure (Appendix A, Photo 2).

A circular hatch, 19 inches in diameter, is provided in the superstructure rear plate.

A pistol port, closed by a conical plug, is located at the front of each side plate.

A ventilator for the fighting compartment is mounted at the right front of the top plate.

e. Vision. The driver is provided with a double periscope mounted in the superstructure front plate (Appendix A, Photos 1 and 2). An opening directly above the driver's periscope permits the use of sighting equipment for the rocket projector. This opening can be closed off on the inside by means of an armor plate moved vertically by a rack and pinion arrangement.

A periscope with 360° traverse is mounted at the rear of the superstructure top plate.

3. ROCKET PROJECTOR:

The rocket projector is mounted in the front plate of the superstructure and is offset to the right of center.

a. The tube

The tube consists of a tubular casting and a spaced, rifled liner. The liner is a steel tube of 1/2 inch wall thickness which is held in place at the rear by four steel blocks and by a perforated ring at the muzzle end (Appendix A, Photo 1). This ring has thirty-one equally spaced holes around its face. The holes are 13/16 inches in diameter. (Appendix A, Photo 1).

The liner has nine grooves with right hand twist, with one turn in 17.6 calibers. At the extreme rear of the liner, the grooves widen to aid in positioning splines near the base of the projectile. The length of the liner is 74-1/4 inches.

A 2-5/16 inch thick horizontal sliding plate, opening from left to right, functions as a breech block. It is opened and closed by means of a rack and pinion (Appendix A, Photo 3).

A metal obturator fits into a circular recess in the front face of the breech plate. The obturator consists of a thin "L" shaped outer ring, a heavier "L" shaped inner ring and a spacer ring (Appendix A, Photo 4). The inside diameter of the assembled obturator is 15-15/32 inches, the outside diameter is 17-29/32 inches. The thickness of the obturator, without the spacer, is 0.8 inches.

The side and face of the outer ring "A", are very thin (0.033 inches) with a 3/8 inch fillet in the inside angle. The side bears against the side of the recess in the breech plate; and the face bears against the rear face of the tube when the breech is closed (Appendix A, Figure A).

The inner ring, "B", is 0.15 inches thick on the face, 0.185 inches thick on the side, with a 9/16 inch radius fillet (Appendix A, Photo 4). The side of the inner ring is bored with 80 radial ports, each 1/2 inch in diameter. (Appendix A, Photo 4). Since the "L" sections are opposite, the inner and outer rings, when assembled, form a chamber opening into the tube through the eighty radial ports.

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When the projectile is fired, the propellant gases pass through the ports to the chamber between the inner and outer rings, and force the face of the outer ring against the rear face of the tube, and the side of the outer ring against the recess in the breech plate, thereby obtaining the gas seal. (Appendix A, Figure A).

The spacer ring, "C", is positioned at the bottom of the breech plate in order to position the face of the outer ring against the rear face of the tube. (Appendix A, Figure A). Both diameters of the rear face of the spacer ring are bevelled. The thickness of the spacer ring is 0.123 inches. Extra spacer rings were found in the breech spare parts box. The thicknesses of these rings are 0.116, 0.118, 0.125, and two rings of 0.128 inches.

A continuous-pull type firing mechanism is contained in the rear face of the breech plate (Appendix A, Photo 3).

A mantlet forms an integral part of the tube and affords protection for the joint of the tube and mount (Appendix A, Photos 1 and 2).

Four projecting lugs are located near the muzzle end of the tube. The lugs at the top and bottom of the tube are square; the lugs on each side of the tube are cylindrical. (Appendix A, Photos 1 and 2). The purpose of these lugs may be either for attachment of a tube extension or for use when removing or installing the projector.

4. THE MOUNT:

The mount consists of a large cast bracket extending through the front plate of the superstructure and welded to the inside. The inside of the bracket conforms to the spherical casting which acts as a cradle. The cradle is mounted to the bracket by horizontal trunnions. The tube is mounted in the spherical cradle by vertical trunnions (Appendix A, Photo 2). In elevation, the cradle and tube elevate together; during traverse, the tube pivots in the cradle - the cradle remaining stationary.

a. Elevation.

Elevation is from 0° to approximately 85°, and provides the only means of regulating the range of the projectile. The elevating mechanism consists of a worm, wormwheel, and an arc and pinion on the left side of the projector and is operated by a handwheel. The elevating arc is bolted to a bracket which projects from the rear of the spherical cradle.

The projector and cradle are extremely well balanced and can be elevated with ease, with or without a projectile in the tube.

b. Traverse

Traverse is approximately 20° (10° right and left of center). For greater shifts in traverse, it is necessary to move the vehicle.

The traversing mechanism consists of a handwheel, worm and wormwheel, and a pinion and rack. The rack is bolted to the top of the rear bracket, and the other components are bolted to the top of the tube. (Appendix A, Photo 3). A traverse indicator is graduated from 0 to 200 mils (10°) to the right and left.

c. Sight Bracket

The sight bracket is bolted to the front plate of the superstructure and is linked to the left trunnion. No range drum or scale was found in the vehicle examined. The azimuth indicator has a micrometer drum which is graduated from 0 to 100 mils and a hundred-mil scale graduated to 2 on each side of the 0 line.

5. LOADING ARRANGEMENTS:

An ammunition loading tray is supported by tubular supports which fold into the floor when not in use. The tray is fitted with six rollers to assist in the manual loading of the projectiles. (Appendix A, Photo 3).

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A hand-operated winch on overhead rails is fitted to the roof of the superstructure. The rails run the entire width of the superstructure. The winch is used to place the projectiles in the storage racks and to carry the projectiles from the racks to the loading tray.

6. AMMUNITION STORAGE:

Ammunition racks are provided within the vehicle for twelve projectiles. One projectile may also be carried in the projector tube. Six racks are on each side of the fighting compartment.

7. OPERATION:

The projectiles are placed on the loading tray by means of the winch and are then loaded by hand with the projector at 0° elevation. A plunger, fitted to the inside of the tube at the rear end, drops behind the projectile to prevent it from slipping back from its firing position, 5 inches in front of the breech plate, when the tube is elevated.

As the breech plate is closed, the camming groove of a bracket, screwed to the top of the breech plate, cams a lock over the plunger. (Appendix A, Photo 3).

The firing mechanism is then slid upward in a bracket which is screwed to the rear face of the breech plate (Appendix A, Photo 3) and an igniter is inserted into the igniter holder in the breech plate.

The firing mechanism is then slid down into the firing position and the projector is layed for elevation and azimuth.

When the lanyard is pulled, the flame from the igniter flashes across a gap to the igniting primer of the projectile. The propellant gases pass through the rear opening between the tube and liner, through the space between the tube and liner, and out through 31holes of the perforated ring at the muzzle end.

8. PROJECTILE:

a. The projectile consists of a three-piece steel body: the nose, which contains the explosive charge and makes up approximately 60% of the total weight of the projectile; the tail, which contains the propellant charge; and the base plate (Appendix A, Photo 5). The sections are screwed together and are held in place by two locking screws.

- (1) The nose section is 37-11/16 inches long. It contains a fuze well into which a point-detonating fuze fits. The fuze is constructed of aluminium and is armed by the rotation of the projectile.
- (2) The tail section is 18-7/16 inches long, and is slotted near the base plate to hold the nine rotating splines which fit into the grooves of the tube liner (Appendix A, Photo 6). The splines are 1.57 inches long, 0.39 inches wide, and 0.39 inches high.
- (3) The base plate has a thickness of 15/16 inches and contains thirty-two venturis which are bored at an angle to assist in the rotation of the rocket projectile. The venturis are 0.79 inches in diameter. (Appendix A, Photo 6).

b. Color and Markings. The projectile is painted dark green and has a 13/16 inch wide white band painted around it at the center of gravity.

On each side of the nose section the following words were stencilled in white:

Achtung !
Feuchtigkeitsempfindlich
vor Regen und Nässe
zu schützen

Warning !
Sensitive to humidity
Protect from rain
and dampness

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A more detailed report on the projectile is being prepared.

9. DATA:

a. Modified Tiger I Chassis

1.	Overall length	248 in.
2.	Overall width	147 in.
3.	Overall height (with loading crane)	136 in.
4.	Overall height (without " ")	111 in.
5.	Width of track	28-1/2 in.
6.	Pitch of track	5-1/8 in.
7.	Track links	95
8.	Pitch diameter	32 in.
9.	Drive sprocket teeth	20

b. Rocket projector

1.	Caliber	38 cm (15 in.)
2.	Length of tube (overall)	81-1/8 in.
3.	Length of liner	74-1/4 in.
4.	Thickness of liner	1/2 in.
5.	Number of grooves	9
6.	Depth of grooves	0.2 in.
7.	Width of grooves	0.4 in.
8.	Width of grooves at rear	1.06 in.
9.	Twist of grooves	Right hand, one turn in 17.6 calibers
10.	Space between liner and tube	1-1/2 in.
11.	Breech plate	Horizontal sliding
12.	Firing mechanism	Continuous-pull
13.	Traverse	20°
14.	Elevation (approx.)	0° to 85°
15.	Markings on breech plate	R5 bwo

c. Projectile

1.	Overall length	60 in.
2.	Weight	726 lbs.
3.	Length of nose section	37-11/16 in.
4.	Length of tail section	18-7/16 in.
5.	Thickness of base plate	15/16 in.
6.	Markings on nose section	13 E (near fuze well) 346.5 (center of section) III 1.9.4.4. (near base of section)
7.	Markings on tail section	569 (near top of section)
8.	Fuze	Point-detonating.

For the Chief Ordnance Officer:


H. N. TOFTOY,
Col., Ord. Dept.,
Assistant.

Incl.:

Appendix "A" - Photos 1 thru 6
Figure A.

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Photo 1.

Front view of equipment with projector at 0° elevation. Note gun mantlet and perforated ring which positions liner at muzzle end of tube and permits the escape of propellant gases. The mounting for the commander's periscope can be seen in front of the loading hatch door, which is shown opened.



Photo 2.

Front view of equipment with projector at maximum elevation. Note the end of the traversing trunnion in the spherical cradle, the cast bracket which supports the cradle and projector, and the lugs at the muzzle end of the tube. The loading crane and armor around the ventilator outlet can be seen at upper left.

Appendix "A"

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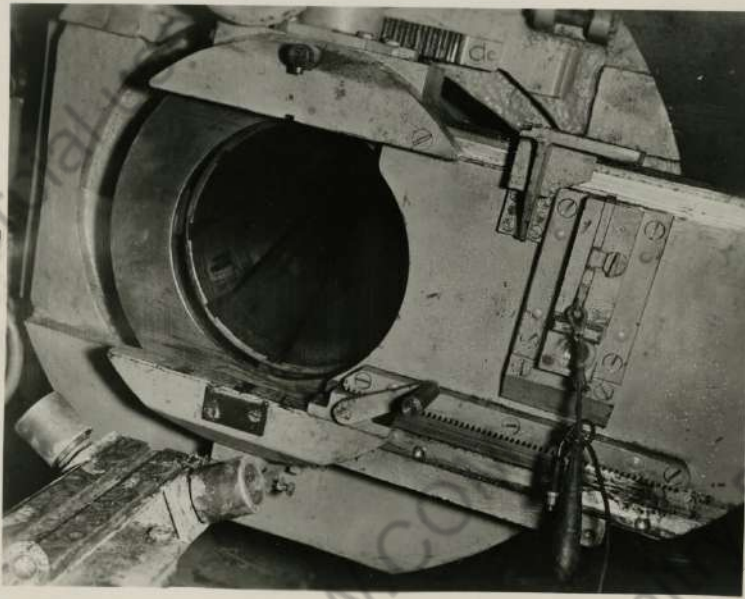


Photo 3.

View of rear of tube and breech plate showing breech mechanism, firing mechanism, traversing rack and part of traversing wormwheel and pinion housing. Note space between liner and tube, tamping bracket screwed to breech plate at left of firing mechanism and a section of the loading tray at lower left.



Photo 4.

View of obturator showing "A" - outer ring, "B" - perforated inner ring and "C" - spacer ring. Note fillets on inner and outer rings and ports bored through inner ring.

Appendix "A"

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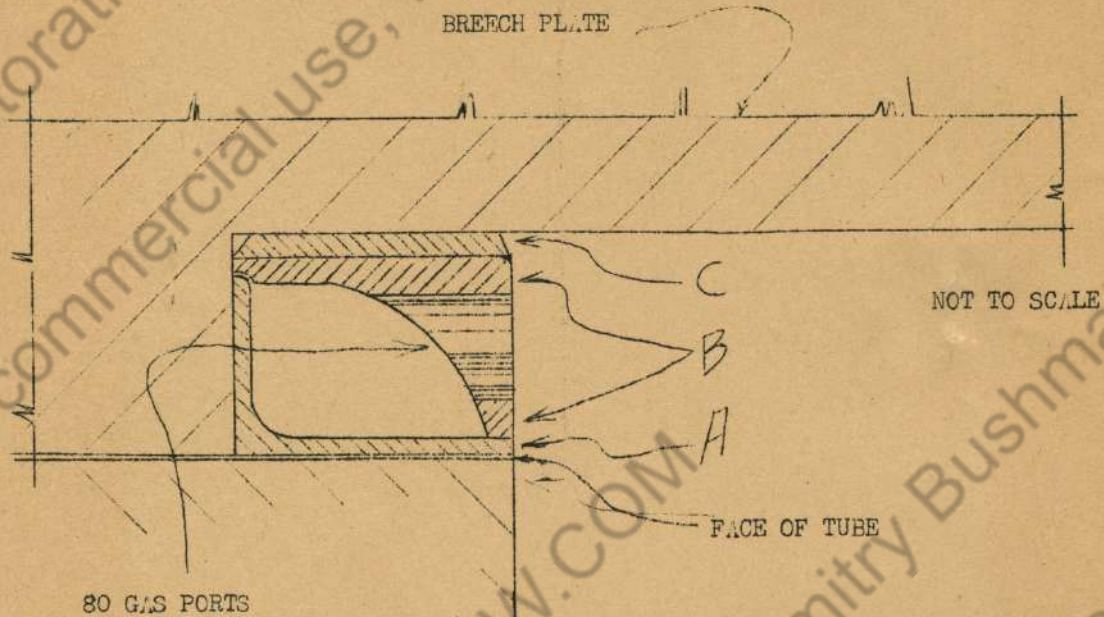


Figure A.

Schematic diagram of assembled obturator. Propellant gases pass through eighty ports of inner ring "E" to chamber between inner ring and outer ring "A", forcing side of outer ring against recess in breech plate and face of outer ring against rear face of tube.



Photo 5.

Overall view of rocket projectile. Finger points to joint of nose and tail sections.

Appendix "A".

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Photo 6.

View of base of projectile. Note igniter element, venturis around base plate and rotating splines at base of tail section.

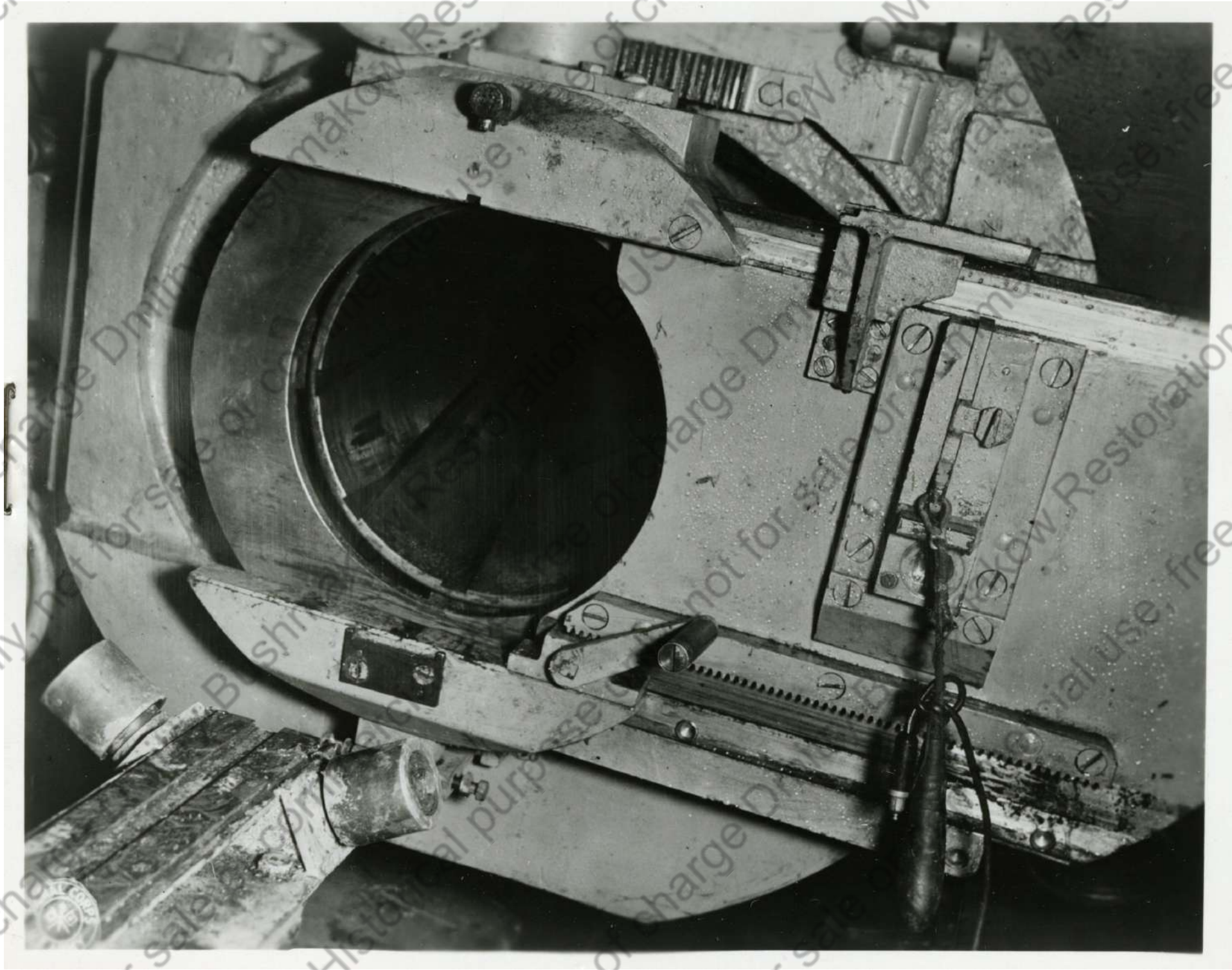
Appendix "A"

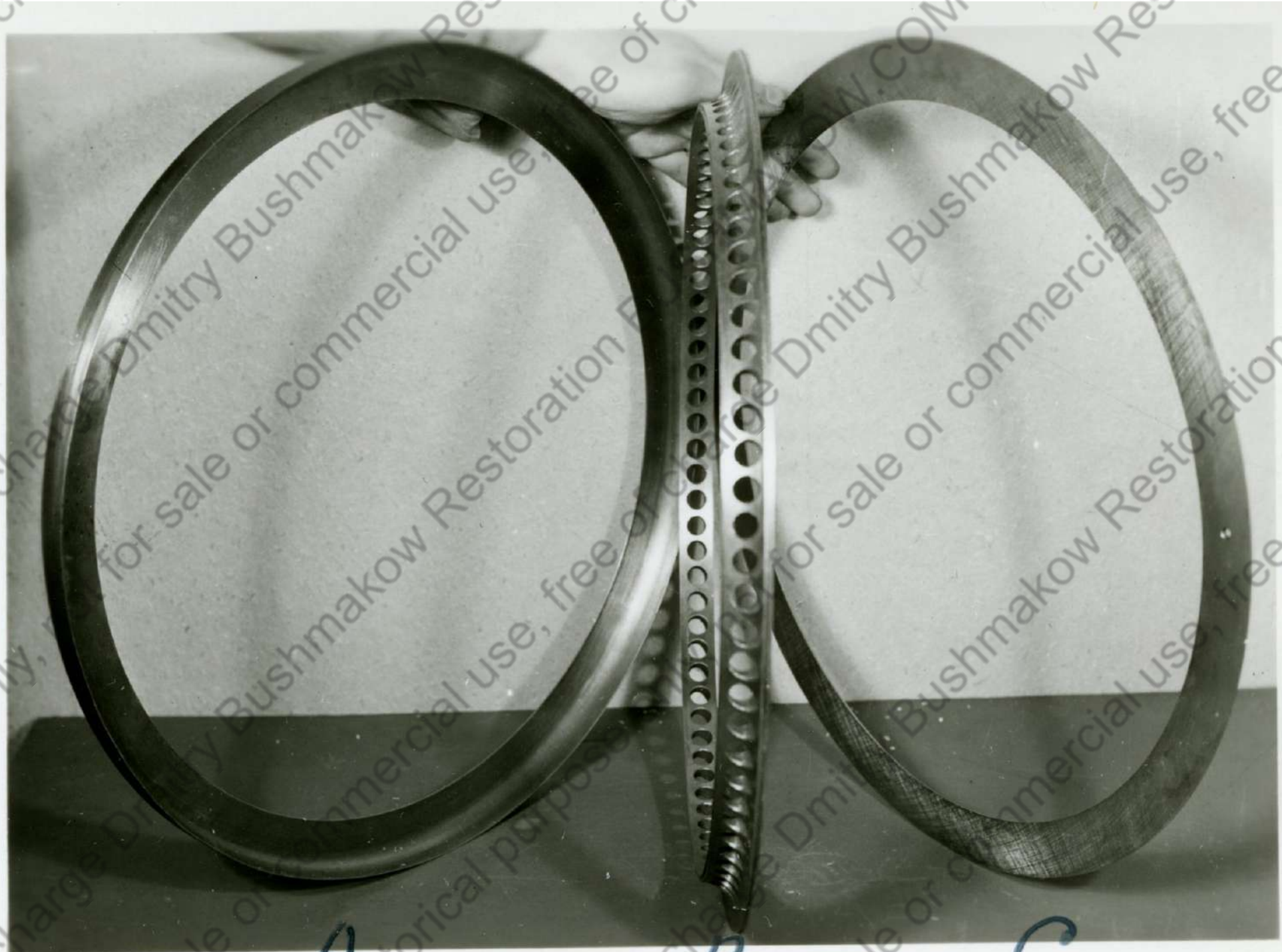
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R E S T R I C T E D









A

B

C



