

REPORT NO. B-2041

DATE 16 April 1943

SUBJECT

Test on Horns, Types H-8 and H-9

by

FR-2041

J. S. Bryant

NAVAL RESEARCH LABORATORY

BELLEVUE, D. C.

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16 April 1943

NRL Report No. B-2041

NAVY DEPARTMENT

Report of Test

on

Horns, Types H-8 and H-9

Submitted by

Federal Electric Company
Chicago, Illinois

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D. C.

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of 1 and 27 March 1943.

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BuShips (5)

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RECOMMENDATIONS

(a) That the subject horns be considered SATISFACTORY for Naval use subject to correction of the deficiencies noted under "Conclusions" and a satisfactory Laboratory inspection test.

(b) That the subject horns be considered SATISFACTORY from the standpoint of high impact shock resistance.

DESCRIPTION OF MATERIAL

4. The subject horns, submitted by Federal Electric Company, Inc., Chicago, Illinois, as Navy Types H-8 and H-9, are designed to operate from a supply of 115 volts, direct potential and 115 volts, 60 cycles, respectively. They are identical in design except for the windings of the motors.

5. The motor is housed in a malleable iron case, provided with two mounting lugs drilled for 1/2-inch mounting screws, and two bosses drilled for 3/4-inch (IPS) terminal tubes. The case is finished with gray paint applied over zinc chromate paint.

6. The steel diaphragm is located between two flat rubber gaskets clamped by eight No. 12-24 round headed steel machine screws passing through the malleable iron front cover and threading into the housing. A 5/16-inch slotted steel adjusting screw, provided with a steel locknut, is located in the rear of the housing. The terminal box, cast integral with the housing, is provided with a malleable iron cover. A flat rubber gasket is clamped by six No. 8-32 fillister headed steel machine screws passing through the cover and threaded into the terminal box.

7. The motor is of the series type. It is secured by two round headed steel machine screws, threaded into the enclosing housing. It is provided with sleeve bearings, lubricated by wick oilers which are accessible after removal of the terminal box cover.

8. The acoustical analyses of the horns are given by Plate 1. Further details in the design and construction of the samples are shown by photographs, Plates 2 and 3, and drawings, references (e) and (f).

METHOD OF TEST

9. The sample horns, following tests to determine their electrical and acoustical characteristics at rated voltage, were subjected to further tests in the following order:

- (a) Inclination
- (b) Endurance and temperature rise
- (c) Sound pressure output
- (d) Shock
- (e) Vibration
- (f) Dielectric
- (g) Insulation resistance
- (h) Watertight
- (i) Salt spray

10. Following a careful examination of the samples to determine compliance with the specification requirements, pertaining to design, quality of workmanship and materials, and any defects resulting from the tests, the type H-8 horn was subjected to the HI shock test when mounted as shown by photograph, Plate 4. The type H-9 horn was not subjected to this test due to failure under the dielectric test.

RESULTS OF TEST

11. The test results obtained were as follows:

RESULTS OF TEST (Cont'd)

Requirements

	<u>Test Values</u>	
	<u>Type H-8</u>	<u>Type H-9</u>
Voltage: Para. E-1.	Tested at 115 volts direct potential.	Tested at 115 volts, 60 cycles.
Amperes: Not specified.	0.56 ampere.	0.68 ampere.
Watts: Para. E-1.	Complied. 64.4(VA).	Complied. 68 watts.
Sound pressure output: Para. E-1.	Complied. 105 db.	Complied. 99 db.
Pitch of note: Para. E-1.	Complied. See Plate 1.	Complied. See Plate 1.
Inclination: Para. D-11h.	Complied.	Complied.
Endurance: Para. F-2m(1).	*Sixteen adjustments were necessary due to excessive wearing of diaphragm button and ratchet, pieces 14 and 18.	*Sixteen adjustments were necessary due to excessive wearing of diaphragm button and ratchet, pieces 14 and 18.
Temperature rise: Para. F-2m(4).	Complied. 52.5° C. above 60° C. ambient temperature.	Complied. 48.8° C. above 60° C. ambient temperature.
Retest of sound pressure output: Para. F-2n.	Complied. 103 db.	Complied. 99 db.
Shock test: Para. F-2g.	Complied.	Complied.
Vibration test: Para. F-2h.	Complied.	Complied.
Dielectric: Para. D-4a.	Complied.	*Broke down at armature. (Sample was disassembled and cleaned before test).
Insulation resistance: Para. D-4b.	Greater than 200 meg-ohms by 1000 volt Megger.	*Zero.
Watertight: Para. D-12e.	Complied.	Complied.
Salt spray: Para. F-2p.	Not conducted due to similarity of samples..	Satisfactory.
Weight: Para. E-1.	Complied. 14 pounds.	Complied. 14 pounds.

RESULTS OF TEST (Cont'd)

<u>Requirements</u>	<u>Test Values</u>	
	<u>Type H-8</u>	<u>Type H-9</u>
Nameplate: Para. D-13c.	*Brass,	*Brass.
Protection of exterior surfaces: Para. C-5d.	Complied.	Complied.
Wiring: Para. D-6a.	Complied.	Complied.
Coil windings: Para. D-6b.	*"Formex" insulation used.	*"Formex" insulation used.
Protective covering for coils: Para. D-9a.	Complied.	Complied.
Waterproofing of coils: Para. D-9e.	Complied.	Complied.
Magnetic circuits: Para. D-9c.	Complied.	Complied.
Terminal block: Para. D-10a.	Complied.	Complied.
Supply leads: Para. D-10c.	Complied.	Complied.
Terminal wiring: Para. D-11d.	Complied.	Complied.
Springs: Para. Para. D-11d.	Complied.	Complied.
Mounting lugs: Para. D-11i.	*Designed for 2 point mounting.	*Designed for 2 point mounting.
Agreement with test plans: Para. H-3b.	Complied.	Complied.

*Denotes failure to comply with the specification.

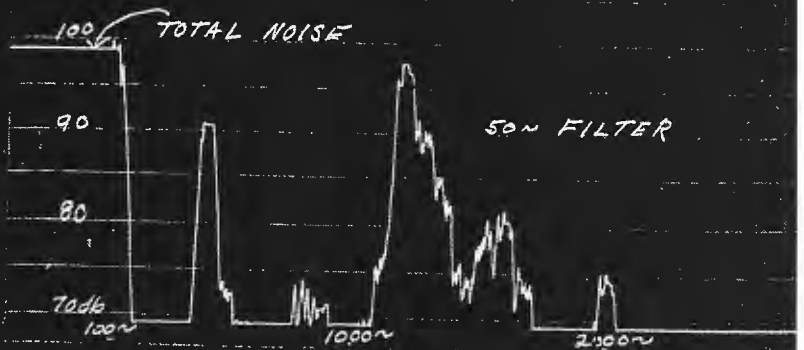
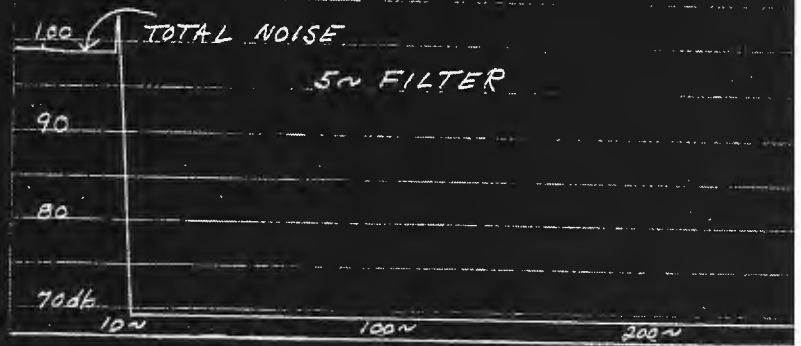
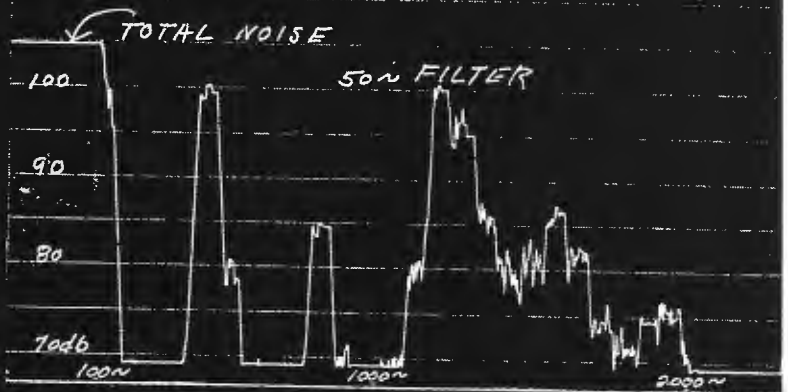
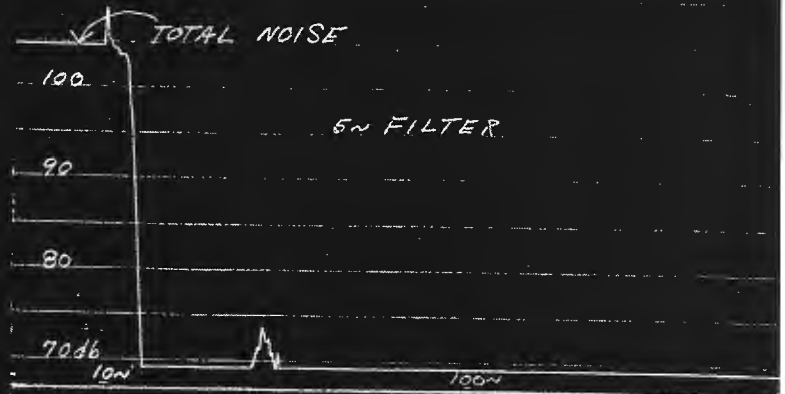
12. The HI shock test resulted in no apparent damage to the type H-8 horn and the sample operated satisfactorily throughout this test.

CONCLUSIONS

13. The subject horns complied with specification, reference (b), except in the following particulars:

- (1) Sixteen adjustments were necessary on each sample due to excessive wear of diaphragm button, pc. 14, and ratchet, pc. 18.
- (2) The armature of the type H-9 failed under the dielectric test and its insulation resistance was zero following the test.
- (3) The nameplate of each sample was of brass in lieu of a less critical material.
- (4) "Formex" insulation was used in the coil windings in lieu of silk or cotton covered enameled copper wire.
- (5) The samples were designed for two in lieu of three point bulkhead mounting.

14. The results of the HI shock test indicate that the strength of the samples is adequate to withstand high impact shock.



FEDERAL ELECTRIC
TYPE H-8 HORN
REPORT NO. B-2041

200~ 300~ 400~ 500~

TYPE H-8

2000~ 3000~ 4000~ 5000~ 6000~

TYPE H-9

200~ 300~ 400~ 500~ 600~ 700~

TYPE H-9

TER

200~ 3000~ 4000~ 5000~ 6000~

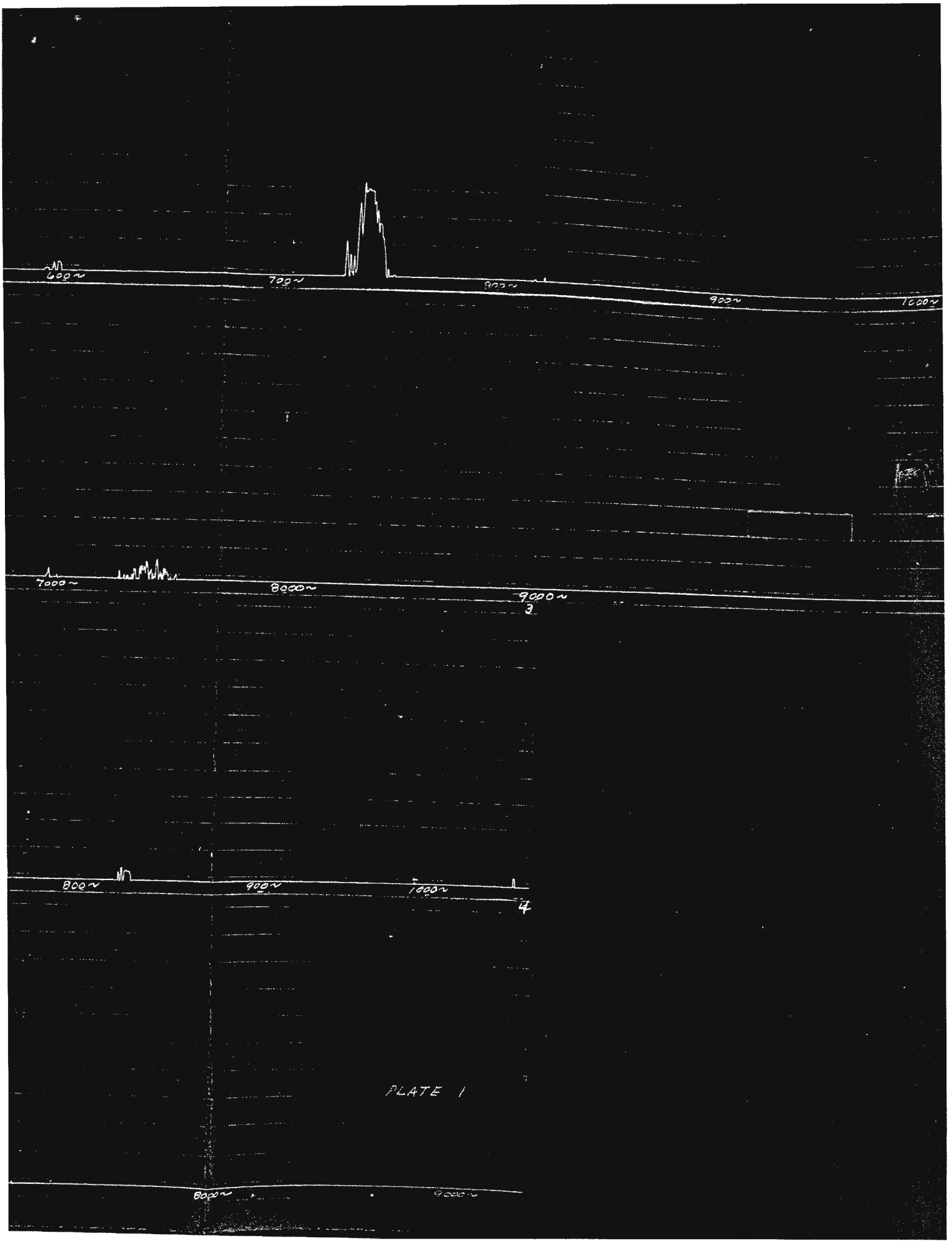


PLATE 1

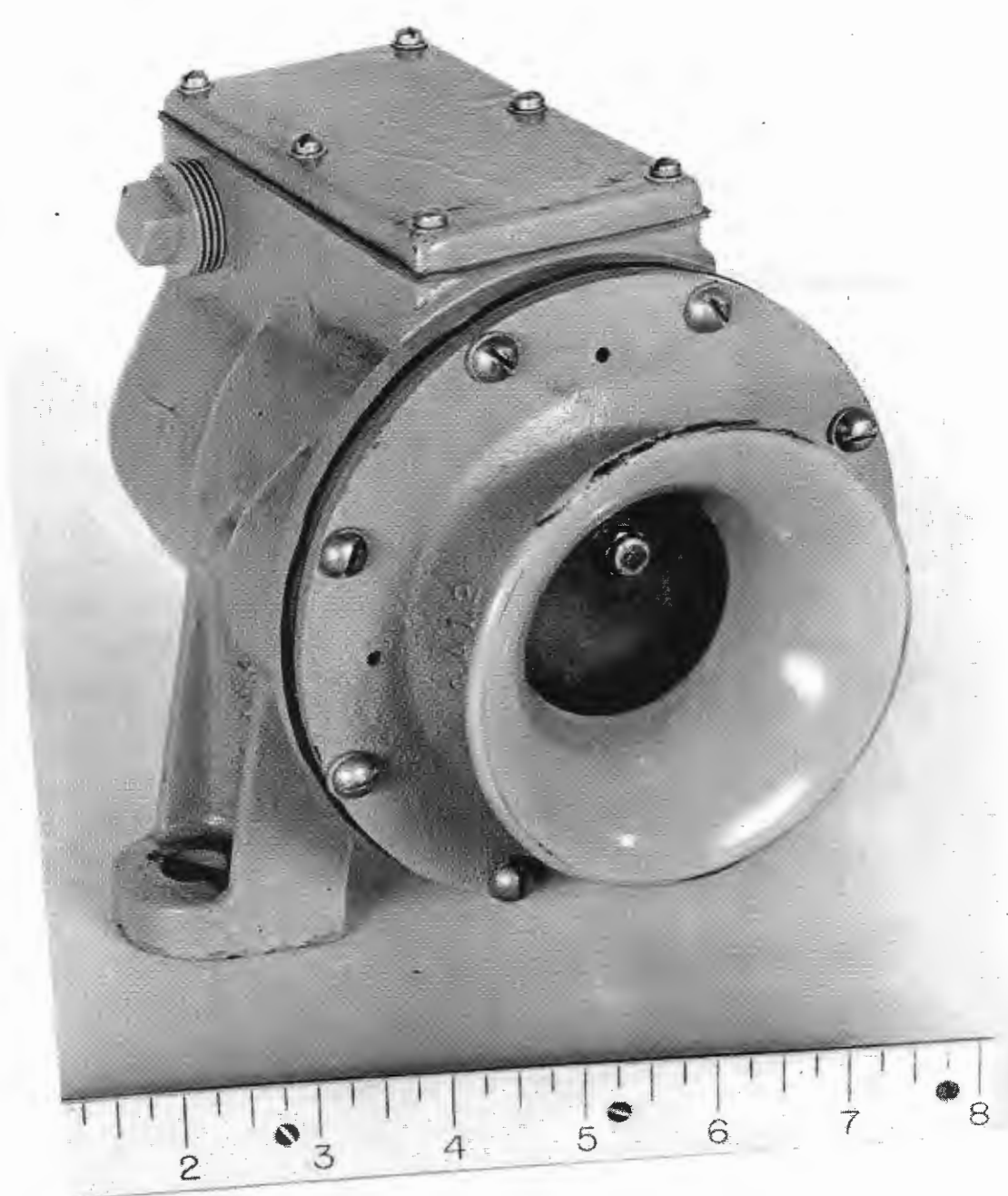


PLATE 2

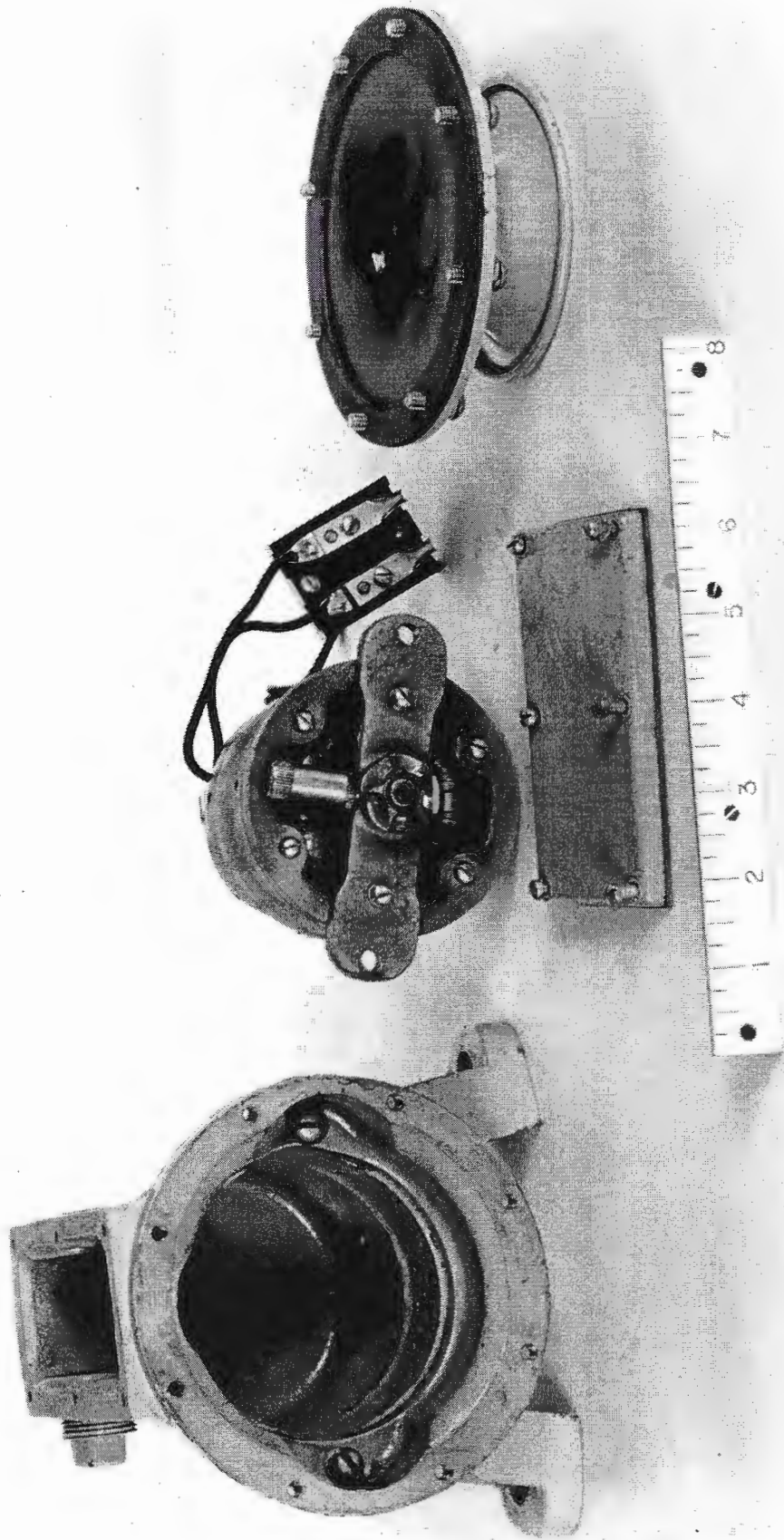


PLATE 3

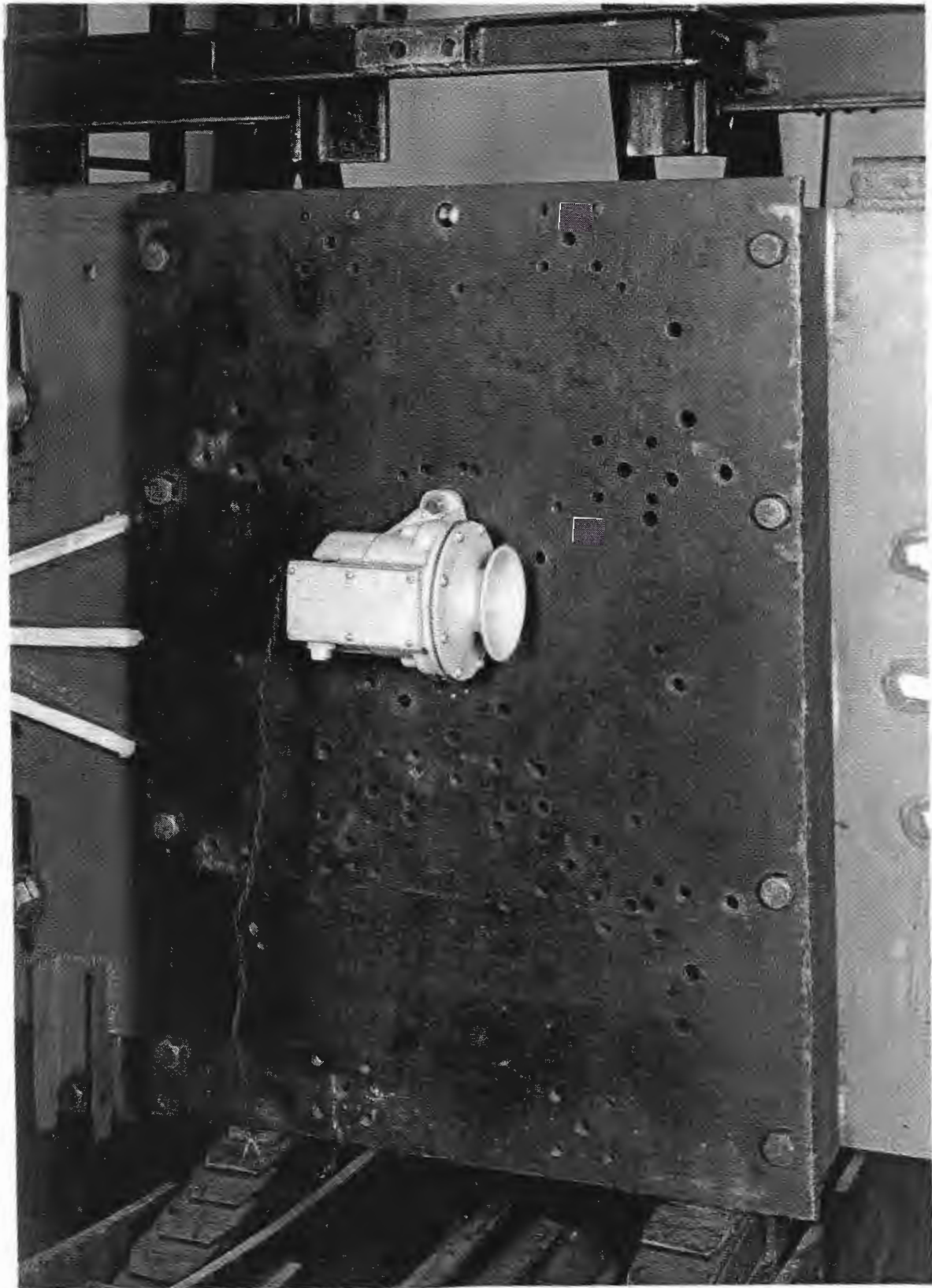


PLATE 4