ROYAL CANADIAN AIR FORCE

DESCRIPTION AND MAINTENANCE INSTRUCTIONS

MAGNETIC COMPASSES, AN5766-1, -2, -3, -4

(This EO replaces EO 20-25EB-2 dated 18 Jan 54)

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

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LIST OF RCAF REVISIONS

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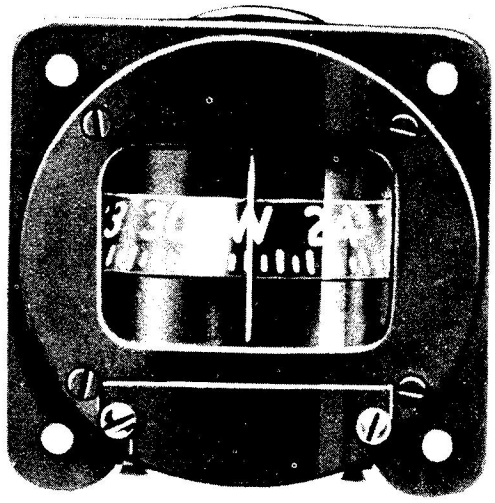


Figure 1 — Front View, Type AN5766-1 or -2, Pilot's Standby Compass

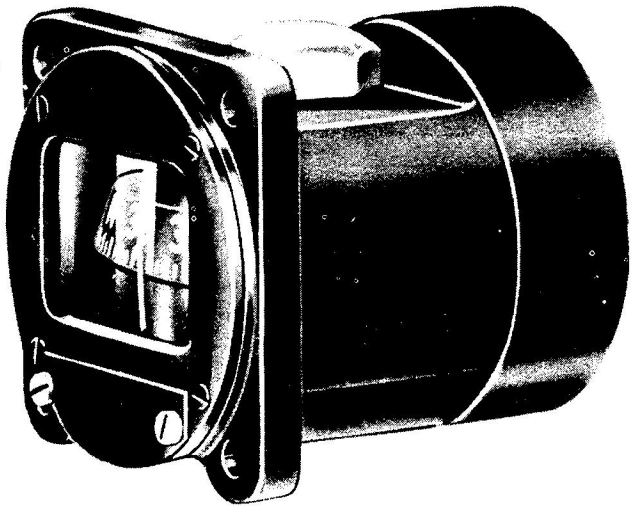


Figure 2 — Three-Quarter View, Type AN5766-1 or -2, Pilot's Standby Compass

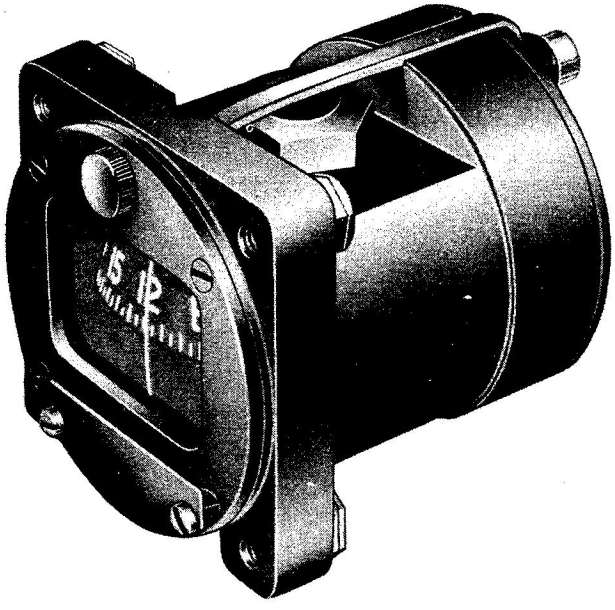


Figure 2a — Three-Quarter View, Type AN5766-4 Pilot's Standby Compass

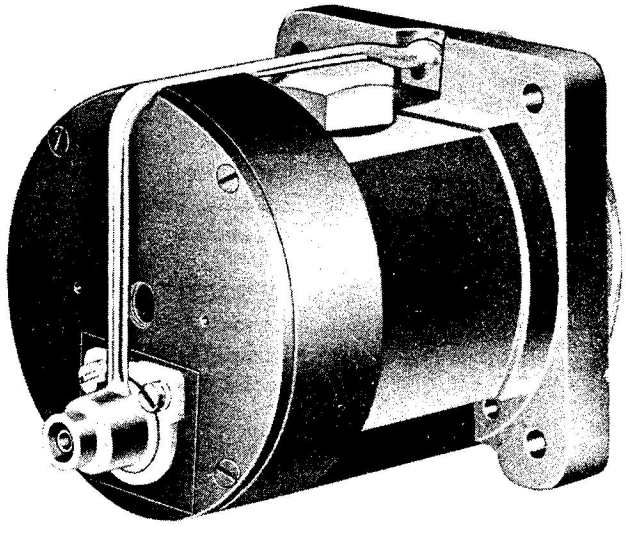


Figure 2b — Three-Quarter Rear View, Type AN5766-3 Pilot's Standby Compass

SECTION I
INTRODUCTION

1. EO 20-25EB-2 is used as the basic Handbook for the instrument involved.

2. This Handbook contains descriptive data on, and instructions for the installation, operation, maintenance, and overhaul of the type AN 5766-1, 2, 3 or 4 Magnetic Compass.

3. The type AN 5766-1, 2, 3 or 4 compass covered by this Handbook, is manufactured by the Airpath Instrument Company, Lambert Field, St. Louis, Missouri.

4. The Handbook contains references to the following Technical Orders in which applicable instructions may be found:

T. O. No.	
05-15-3	Installation, Compass and Swinging of Aircraft C
02-20A	Visual In[DELETED]stems for Airplanes.
00-20A-2	Airp[DELETED]nance Instruction Forms.
00-25-4	[DELETED]aintenance Procedure and [DELETED]aul of Engines.
05-	[DELETED]pection, Maintenance, Storage and Shipment of Instruments.

SECTION II
DESCRIPTION

1. GENERAL DESCRIPTION.—The type AN 5766-1, 2, 3 or 4 compass is intended for use as a standby instrument for the pilot on aircraft equipped with electrical directional instruments. The AN 5766-1, 2, 3 or 4 compass continuously indicates the heading of the aircraft with reference to the earth's magnetic field.

2. DETAILED DESCRIPTION.

a. PRINCIPAL UNITS. (*See figure 3.*) — From the assembly point of view, the AN 5766-1, 2, 3 or 4 magnetic compass consists of the following principal units: the case (8); the bezel (15); the card element (composed of 1, 2, 3, and 4); the jewel post unit (composed of 5, 6, 7, and 14); the lubber line (11); the lens (13); the expansion unit (9); the liquid; and the compensator (12). With the exception of the lubber line, the various units are held together by screws.

(1) CASE. — The case (8) is an aluminum casting filled with damping liquid and contains the card element (1, 2, 3, and 4); the jewel post unit (5, 6, 7, and 14); the lubber line (11) and the expansion unit (9). The case is provided with four mounting ears for panel mounting.

(2) BEZEL.—The bezel (15) is an aluminum plate which secures the lens (13) to the case.

(3) CARD ELEMENT.—The aluminum dial (1) and magnets (2) are attached to a float (3) which contains a pivot (4). The card is graduated into five-degree divisions to represent horizontal angles. The cardinal headings are indicated by N. E. S. and W., while each thirty degrees is indicated by a number corresponding to the angle. The magnets are so arranged that their axes are parallel to each other and to the north-south axis of the card.

(4) JEWEL POST.—The pivot rests in a mounted jewel. The jewel, in order to absorb external vibration, is supported on a spring (6) operating in a polished cylinder inside the jewel post (7).

(5) LUBBER LINE.—Mounted in the case behind the lens (13) is lubber line (11) for reference when reading the compass. The line is as close as practical to the card so as to reduce parallax error. A plane passing through the line and the center of the pivot is parallel to the longitudinal axis of the airplane when the compass is installed.

(6) LENS. — The lens is flat and exposes sixty degrees of the card's graduations.

(7) EXPANSION UNIT. — The expansion unit (9) is fastened to the back of the case by four screws and is open to outside air pressure. Its function is to compensate for the expansion and contraction of the liquid, due to temperature changes.

(8) LIQUID. — The damping liquid which meets the requirements of Specification No. 3-GP-31, is a refined fraction of crude petroleum, free from moisture, acidity, glue, suspended matter or other impurities.

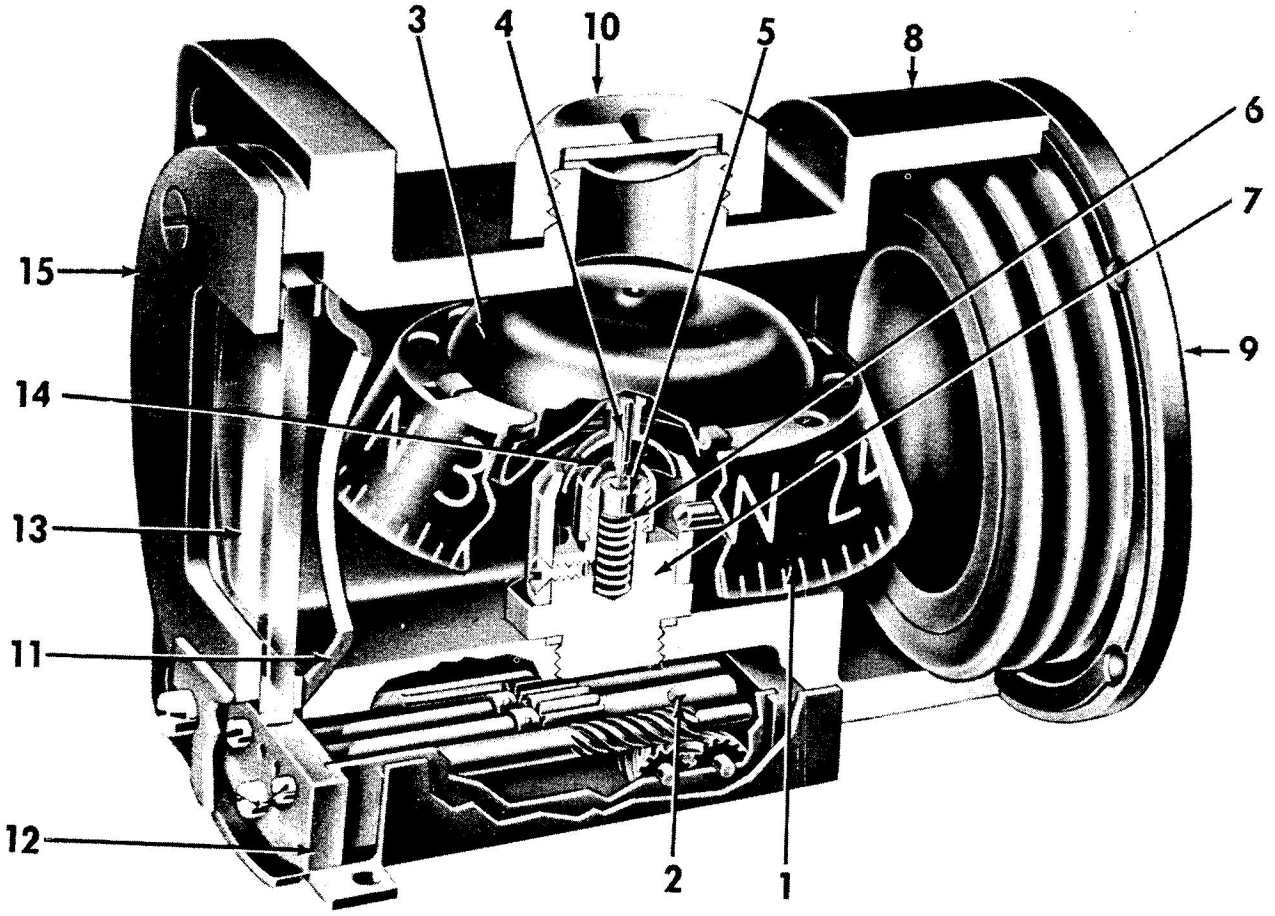


Figure 3 — Cutaway of Typical Pilot's Standby Compass

1 Dial
2 Magnet
3 Float
4 Pivot
5 Jewel
6 Jewel Spring
7 Jewel Post
8 Outer Case
9 Expansion Unit
10 Filler Cap
11 Lubber Line
12 Compensator
13 Lens
14 Jewel Post Cap
15 Bezel

(9) COMPENSATING SYSTEM. — A compensator (12) is enclosed at the bottom of the case by a compensator housing. The compensator, which is removable through the front of the compass, provides a means for magnetically compensating the compass for deviation. It consists of two sets of permanent bar magnets arranged in two vertical planes perpendicular to each other and directly below the center of the card magnets. Each set is adjusted by swinging up the cover plate at the front of the compass and turning the two slotted adjustment screws marked E-W and N-S. The compensator is easily removable from the front of the compass.

(10) COMPASS LIGHTING. - Provision has been made for reading the compass by using self-luminous fluorescent compound, Specification AN-L-1a, on major dial markings and lubber line and fluorescent compound, Specification C-28-96, on minor dial markings.

The AN 5766-1 and AN 5766-2 Compasses are non-lighted while the AN5766-3 and AN 5766-4 Compasses employ 3 volt lighting systems.

TABLE I—LIGHTING CHARACTERISTICS

Type No.	*Description*	*Material used on numerals*
AN5766-1	Non-lighted	Fluoresc[illegible] lum[illegible] D E T E D ...L-L-6770
AN5766-2	Non-lighte[illegible]	...minescent AN-L-1
AN5766-3	D E L	...orescent radioactive luminescent material AN-L-1
	...uted electrically	Fluorescent luminescent material AN-L-1

SECTION III
INSTALLATION

1. LOCATION.

a. Installation of compasses by Service Activities should always be made in the location provided in the airplane unless relocation is found necessary and is authorized in writing by Air Materiel Command Headquarters. Initial installation of compasses is made with special attention given to the airplane designer's Handbook requirements, substantially as follows:

(1) Compasses shall be so installed that a vertical plane passing through the card pivot and lubber's line will be parallel to the longitudinal axis of the airplane, and the card pivot supporting post substantially perpendicular, when the airplane is in flying position.

(2) The compass compensating chamber and adjusting screws shall be easily accessible.

(3) Brackets, required for mounting compasses, shall be made of brass, duralumin, or other nonmagnetic materials. Brass mounting screws, with 6-32 threads together with locknuts.

(4) Special attention shall be given to the prevention of disturbing magnetic fields in the vicinity of the compass, either of a permanent nature (such as may result from the proximity of electrical equipment, radio, armament, or structural members), and also of a varying nature (such as may result from variations in current flow in electrical wiring, or the position of retractable landing gears or kindred equipment).

b. It must be kept in mind that a reasonable amount of permanent magnetism in the vicinity of the compass can be compensated for; but variable magnetic fields having an effect upon the compass are not permissible, as they cannot be compensated for.

c. Figure 4 contains installation dimensions of the type AN 5766-1, 2, 3 or 4 compass.

2. FINAL TESTS. — After an installation has been completed the compass must be swung (compensated) in accordance with the instructions published in EO 20-25-1.

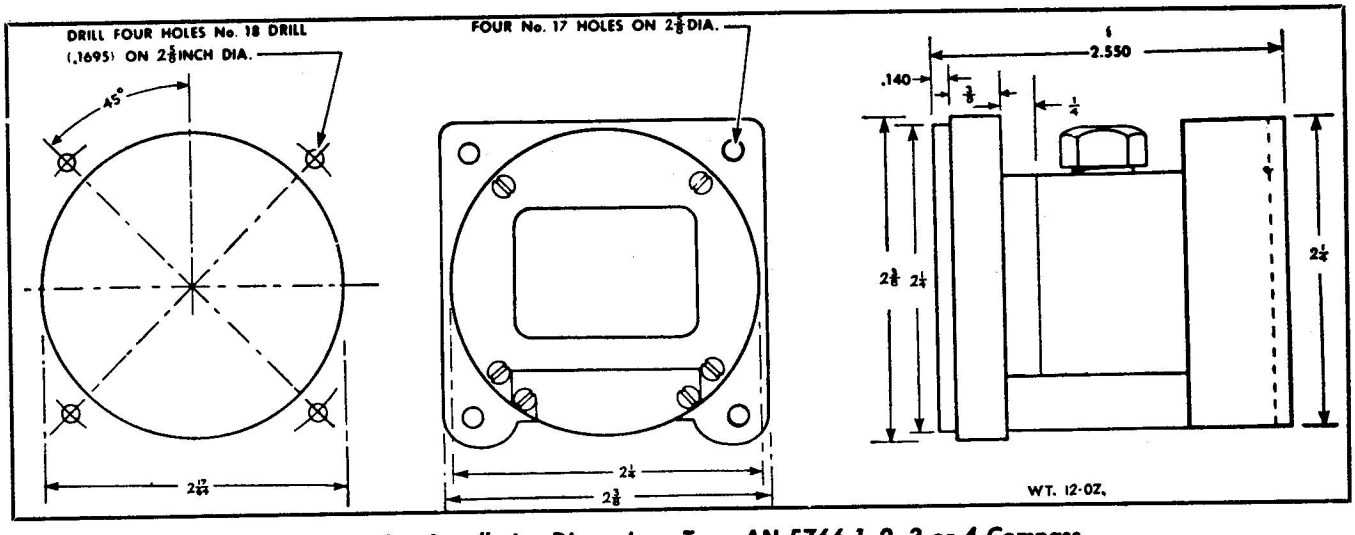


Figure 4 — Installation Dimensions, Type AN 5766-1, 2, 3 or 4 Compass

SECTION IV
OPERATION

1. PRINCIPLES OF OPERATION.

a. The AN 5766-1, 2, 3 or 4 compass depends on the earth's magnetic field for its operation. A pair of magnets attached to the card assembly align with the earth's magnetic field.

b. The card and magnets are attached to a float assembly which in turn pivots on a hardened steel pivot supported by a spring-mounted jewel. The spring absorbs any external vibration.

c. The jewel-mounted card is contained in an air-tight case which is filled with damping liquid. The expansion unit at the rear of the case allows the liquid to expand and contract due to temperature changes. The case is filled with liquid through a filling hole.

d. The indications of the card are read against the lubber line which represents the longitudinal axis of the airplane when the compass has been properly installed. A projection of this line onto the compass card gives the magnetic heading of the aircraft.

e. A compensator is necessary to provide a means of compensating the compass for the effects of local magnetic interference in the aircraft, which causes errors in indication.

2. THEORETICAL OPERATION.

a. The earth is surrounded by magnetic lines of force which have a general north-south direction. These lines, which are horizontal at or near the geographic equator, gradually incline downwards, as the distance from the equator increases, until they become vertical in the vicinity of Hudson Bay in the north, and South Victoria Land in the south. These two areas, wherein the earth's magnetic field is perpendicular to the earth's surface, are known respectively as the "North Magnetic Pole" and the "South Magnetic Pole." Any freely suspended magnet will align itself with the lines joining these two poles. It is the dependable directional uniformity of these lines that make them useful in obtaining horizontal direction. They are, however, subject to local distortion, which must be taken into account when flying cross-country.

b. Since compasses are designed to indicate in a horizontal plane, convenience requires that the earth's field of total strength be resolved into two components: a horizontal component and a vertical component. The horizontal component gives directive force to the compass magnet, while the vertical component causes the card to tilt or dip. The amount of dip varies over the earth's surface.

c. Since the magnetic and geographic poles do not coincide, there are two directions: the magnetic and geographic. The angle between the two meridians is known as "Variation." It is measured from the geographic meridian and is considered positive towards the east, negative towards the west. The variation is different in different localities because of a variety of phenomena; and, consequently, it is always necessary to refer to a variation chart, when setting a compass course, in order to obtain the proper correction. Such charts are plotted from data obtained in extensive magnetic surveys.

3. FACTORS AFFECTING OPERATION.

a. CHARACTERISTICS OF DAMPING LIQUID. — The damping liquid prevents the card assembly from moving too freely. If there were none, the assembly would move continuously.

(1) The damping liquid must be one that is subject to minimum viscosity change with variations in temperature of from minus 65° C. (-85° F.) to plus 70° C. (158° F.). Only with such a liquid can room temperature operating characteristics be maintained within reasonable tolerances at all other temperatures.

(2) Other qualities of the damping liquid prevent discoloration and deterioration of the paint used in the compass.

b. EXPANSION OF LIQUID. — Since compass liquid expands when heated and contracts when cooled, provision is made in the compass for this by using a flexible sylphon-type expansion unit open to outside air pressure.

c. AIR IN THE COMPASS. — Air in the compass bowl destroys the stability of the compass. In compasses having a flexible expansion unit to permit expansion and contraction of the liquid, the air must be completely removed before sealing up the compass. Unless the air is removed, bubbles of it will appear at high altitudes (low pressure) and low temperatures.

d. SWIRL.—When an aircraft is turned, the motion of the compass bowl is imparted to the damping liquid, causing it to swirl. The outer layer of the liquid, which is in contact with the bowl, travels at nearly the same speed; while liquid in the center remains stationary. Since the magnetic element depends upon the damping liquid for stability, it must be affected by the liquid in motion. This is called "swirl effect."

e. FORCES EXERTED ON THE CARD.

(1) The balance of the card assembly is controlled by two forces: the downward pull of its weight and the upward pull of the float. If properly related, these forces hold the assembly in a pendulous state so that it will quickly return to its normal horizontal position when free to do so after being deflected. If the assembly has too long a pendulum, acceleration forces will throw it off balance, resulting in oscillation. Too short a pendulum is affected to a greater degree by magnetic dip.

(2) Magnetic dip may be corrected by the addition of a small weight to balance the card.

Note

A compass balanced at any given latitude will start to dip toward the north as the north magnetic pole is approached, and towards the south as the south magnetic pole is approached.

f. THE FLOAT. — The function of the float is to relieve the pivot and jewel of the wear due to the weight of the card assembly, and to give to it the proper degree of pendulousness. The float, being air filled, presents a greater surface to the liquid; and being at the center of the liquid, reduces the effect of swirl on the assembly.

g. THE CARD.—The card, because it must accommodate the graduations, numerals, and cardinal letters, is large and therefore acts like a flywheel. This motion is overcome by the directive pull of the magnets and the retarding effect of the damping liquid.

4. PERFORMANCE CHARACTERISTICS.

a. PERIOD. — The period of a compass card is measured "time of swing" after artificial deflection, and indicates the ratio of effective pull to the inertia of the card assembly and the retarding effect of the damping liquid. A compass with a short "time of swing" is said to have a "fast period," and a compass with a long "time of swing" a "slow period." The AN 5766-1, 2, 3 or 4 compass is a fast-period compass.

b. OVERSWING. — Overswing is the amount the card will swing past the equilibrium position when it has been deflected artificially and released. The damping liquid serves to reduce the overswing.

c. SWIRL.—Swirl is the movement of the damping liquid caused by turning the compass. (Refer to paragraph 3, *d,* this section.)

5. ERRORS AFFECTING ACCURACY. — The fact that the compass may be in error, due to installation and inherent characteristics, should be realized and these errors taken into account when extremely accurate use of the compass is required. These errors may be divided into three classifications as described below:

a. MECHANICAL. — Mechanical errors are errors in the construction of the mechanism.

(1) CARD ERROR.—The card error is the difference between an indicated and a true reading. With a plane through the lubber line and the center of the jewel stud, parallel to the magnet, the compass should indicate north or south without any compensation being applied. Turning the compass about its vertical axis from the above described position, by reference to an accurate circular scale to each 30-degree heading, the error is overcome by accurately lettering the card and by aligning the directive magnets properly with the north and south indications.

(2) FRICTION ERROR. — The friction error is caused by the condition of the pivot and jewel and is indicated by an irregular movement of the card. The use of a jewel and carefully formed pivot reduces friction to a minimum. The float reduces friction still further by relieving the downward pull of the card assembly.

(3) BALANCE. — The balance of the card is evidenced by its horizontal position. An unbalanced condition tends to increase the errors in compass indication. Correct balance is maintained by the addition of weight to the light side of the card assembly.

(4) LUBBER-LINE POSITIONING.—Error may be caused by the misalignment of the lubber line.

(5) PERIOD. — The time of swing from equal angles either side of the equilibrium position should be the same for both directions. Improperly magnetized magnets or an unbalanced condition of the card may be the cause of unequal periods.

(6) OVERSWING.—The amount the card swings past the equilibrium position should not be too great. Too much overswing denotes weak directional magnets.

(7) DAMPING.—The maximum deflection of the card from its original equilibrium position, after completion of a 360-degree turn in one minute, should not be excessive. The proper selection of the damping liquid and the correct strength of the directive magnets determines this condition.

(8) HEELING. — When the compass is tilted to any position within 20 degrees from its normal upright position on any heading, the card should be perfectly free to revolve on the pivot. The card reading should remain the same, whether the compass is tilted or is in a normal upright position.

b. INSTALLATION. — The compass should be so installed that a plane passing through the lubber line and the center of the jewel stud is parallel to the longitudinal axis of the airplane. This plane should also be parallel to the vertical axis of the aircraft.

c. FUNCTIONAL.—Functional errors are due to the action of the earth's magnetic field on the compass when the airplane is in flight.

(1) A compass card when installed in an airplane acts as a pendulum and, as such, is subject to the com-

bined forces of gravity and acceleration. The effect of gravity is to keep the card in a horizontal plane; while the effect of acceleration is to tilt the card from its normal horizontal position. When the card is tilted, the vertical component of the earth's magnetic field exerts a directive force on the card, tending to deflect the north-south diameter of the card from the magnetic meridian and thereby introduce an error in the indications of the compass.

(2) Owing to its pendulous action during turns, the card assumes a position which is perpendicular to the resultant of the combined forces of gravity and acceleration. The direction of this resultant force is known as the "apparent vertical", and is the direction a plumb bob would assume if installed in an airplane. In correctly banked turns the apparent vertical is perdenticular to the floor. The amount that the apparent vertical differs from the true vertical depends upon the angle of the bank, which in turn depends on the speed of the airplane and the radius of the turn. The amount that the card is deflected from the meridian depends on the angle of bank, the duration of the turn, and the period of the card.

(3) As the airplane makes a complete turn, the vertical component tends to deflect the compass card from the magnetic meridian as follows: from north to east in the direction of the turn; from east to south, opposite to the direction of turn; from west to north, in the direction of the turn. A turn in the opposite direction has the same effect in each quandrant, as given above. The turning error is most pronounced when the airplane turns out of a northerly course This gives rise to the term "Northerly Turning Error."

SECTION V

SERVICE INSPECTION AND MAINTENANCE

1. SERVICE TOOLS REQUIRED.-No special tools are required to service the AN 5766-1, -2, -3 or 4 magnetic compass.

2. SERVICE INSPECTION

(a) The applicable aircraft maintenance schedules (-7 EOs) should be used as the basis for periodic compass inspection however the following instructions may be used as a guide in establishing schedules for aircraft inspection and maintenance.

(1) DAILY INSPECTION.-At each aircraft daily inspection.

a. Check all compasses for broken or loose cover glasses or other visible defects.

b. Clean the compass cover glasses with a clean cloth.

c. Inspect compass visually for discoloration of liquid and for evidence of bubbles.

(2) MINOR INSPECTION.-At each aircraft minor inspection, the compass will be inspected for security of mounting, leakage of liquid, defective lighting system, broken glass, discoloration of liquid, unbalanced card, or any defect which impairs the visibility or might render the compass inoperative.

(3) MAJOR INSPECTION.-All compasses installed on aircraft will be compensated and the readings recorded at each major inspection period in accordance with the instructions contained in EO 20-25-1 and at such other periods as are specified therein.

3. When inspection indicates that any of the following conditions exist, the compass is to be removed from the aircraft and replaced with a serviceable instrument.

(a) Clouded or discolored liquid impairing visibility.

(b) Discoloration or fading of card markings to the extent that the markings are illegible.

(c) Loss of luminosity of the luminous paint to the extent that the markings are illegible with standard cockpit lighting.

(d) Card does not rotate freely and in a horizontal plane when the aircraft is in normal flying position. (Deflect the card by using a small permanent magnet).

(e) Leakage of liquid from the bowl which cannot be stopped by uniform tightening of the bezel screws.

(f) Cracked window glass.

(g) Bowl cracked or mounting frame or lugs broken.

(h) Compass not responsive or erratic in action after proper efforts to compensate.

(j) Lubber line loose or misaligned.

(k) Defective compensating system.

(l) Any major defects not enumerated above which might render the compass inoperative.

4. MAINTENANCE.-Normally, the maintenance work to be accomplished by Units on compasses will consist of the tightening of screws to eliminate leakage of liquid, the compensation of compasses and the replacement of any defective compasses.

5. LUBRICATION.-No lubrication of the compass is required.

6. STORAGE.-Magnetic compasses, including magnets used in the compensation thereof, will not be stored in metal bins or metal cabinets and will be kept at least three feet from any electrical wires not enclosed in conduit. Compasses should not be placed near steam radiators or other sources of heat, as excessive heating will cause expansion of the liquid with resultant leakage.

SECTION VI
DISASSEMBLY, INSPECTION, CLEANING, REPAIR AND REASSEMBLY

1. OVERHAUL TOOLS REQUIRED — A number of special tools and fixtures are recommended as an aid to performing the work described in this section. These are listed, together with all their manufacturing specifications, in section VIII.

2. DISASSEMBLY.

a. DISASSEMBLY OF MECHANISM.

aa. On the AN 5766-3 and -4 lighted compass, remove the light bulb and the screws that hold the wire assembly to the compass. Lift the connector up and exert a steady pull to the rear to remove the wire assembly from the case. (See figures 5a, 5b, and 5c.)

(1) Unscrew the two cover plate screws, taking out the left-hand screw first, and then remove cover plate. (See figure 5.)

(2) Remove compensator by pulling on center screw. If the compensator sticks, back out center screw about one quarter-inch and use as a handle to pull out compensator. (See figure 6.)

(3) Remove compensator housing by unfastening the three flat-head screws. (See figure 7.)

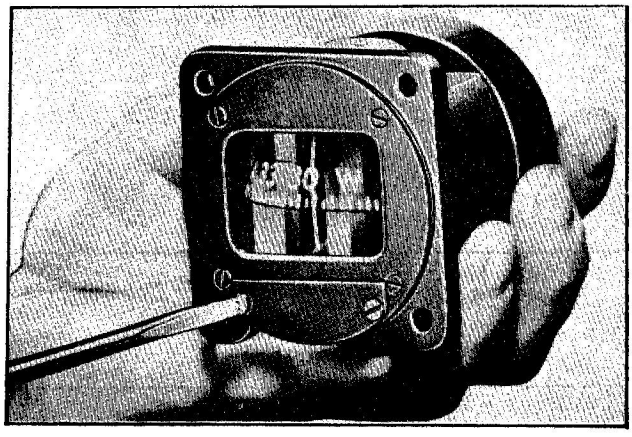


Figure 5 — Remove Cover Plate Screws

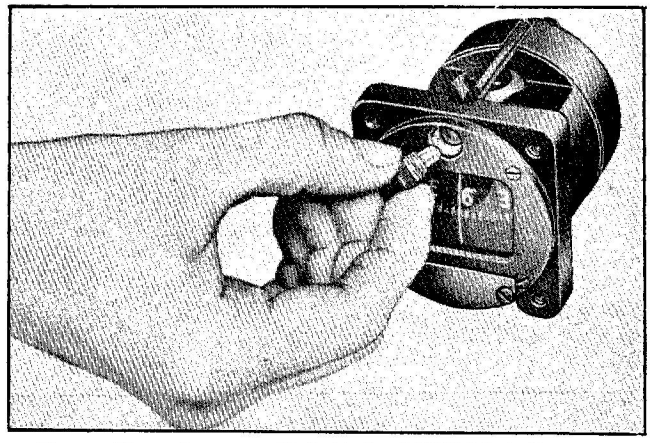


Figure 5b — Remove Light Bulb, AN5766-4 Compass

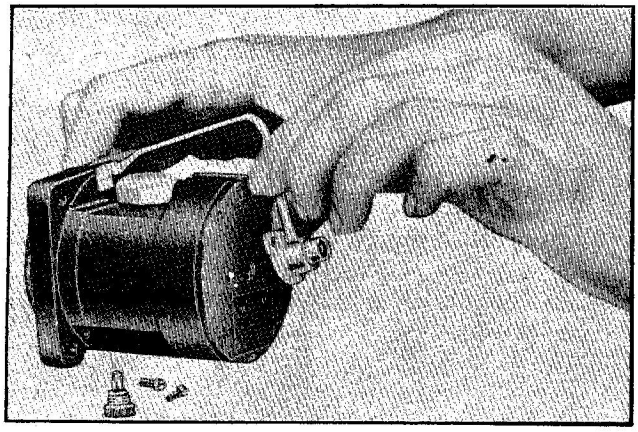


Figure 5a — Remove Light Bulb, AN5766-3 Compass

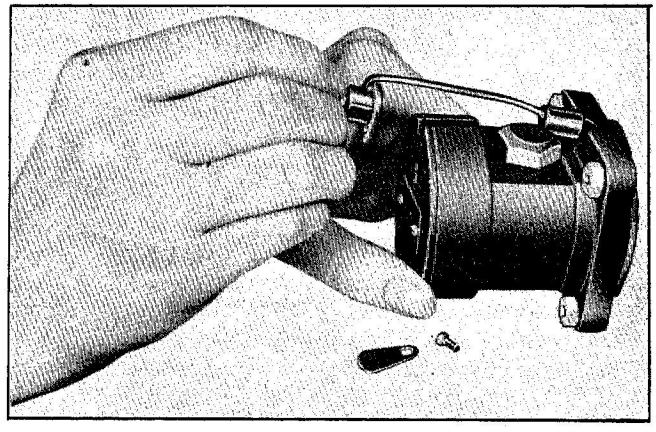


Figure 5c — Remove Light Assembly

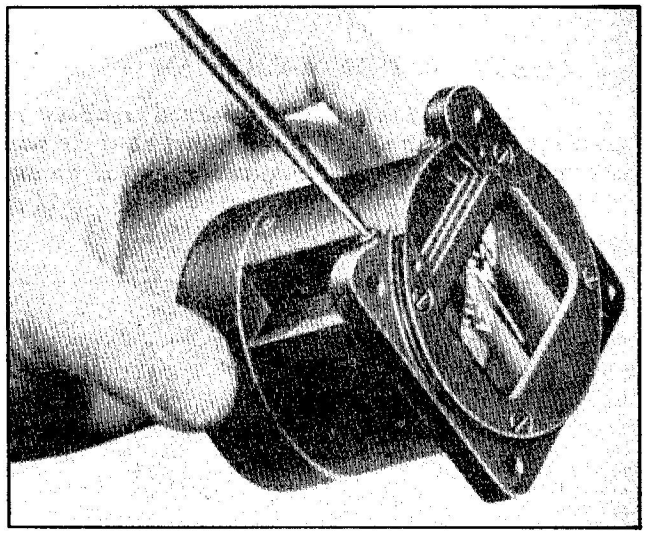


Figure 7 — Remove Compensator Housing

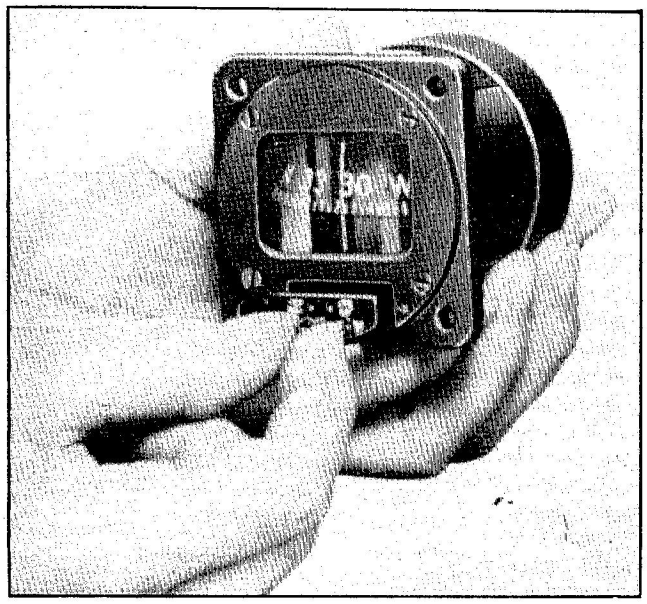


Figure 6 — Remove Compensator

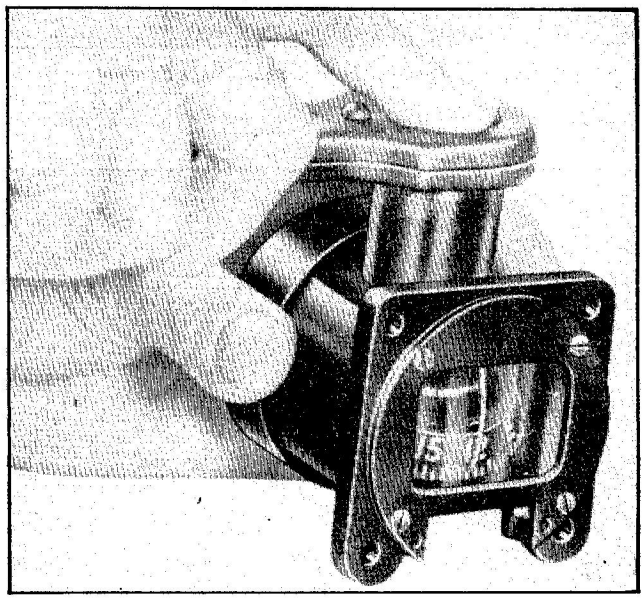


Figure 8 — Remove Filler Cap

(4) Remove hexagon filler cap at top of compass (figure 8) and drain liquid. If the aluminum sealing cup sticks to the top of the filling boss, remove by inserting razor blade, or thin knife blade, between the disc and boss. (See figure 9.) Do not scratch top of boss. A new sealing cup will be necessary. If the cup sticks to the inside of the filler cap, remove with a suitable punch. (See figure 9.) Should the composition gasket inside the filler cap be damaged, remove it and replace.

(5) Remove the four bezel screws. (See figure 10.)

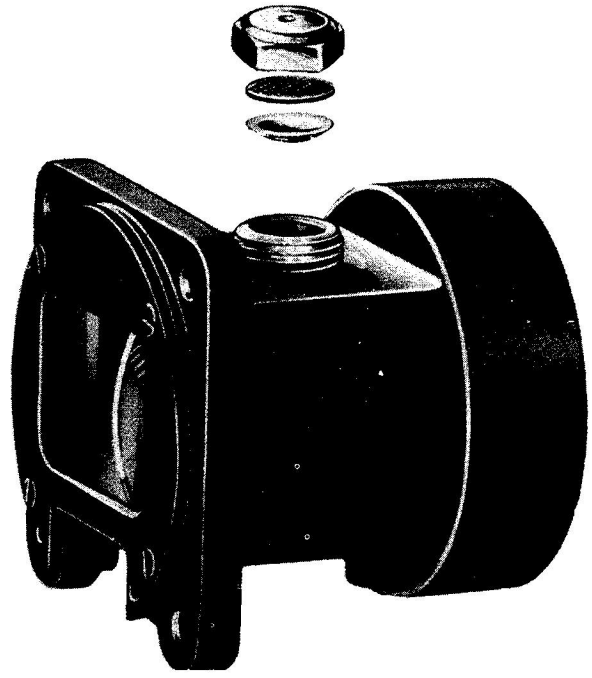


Figure 9 — Dissassembly of Filler Cap

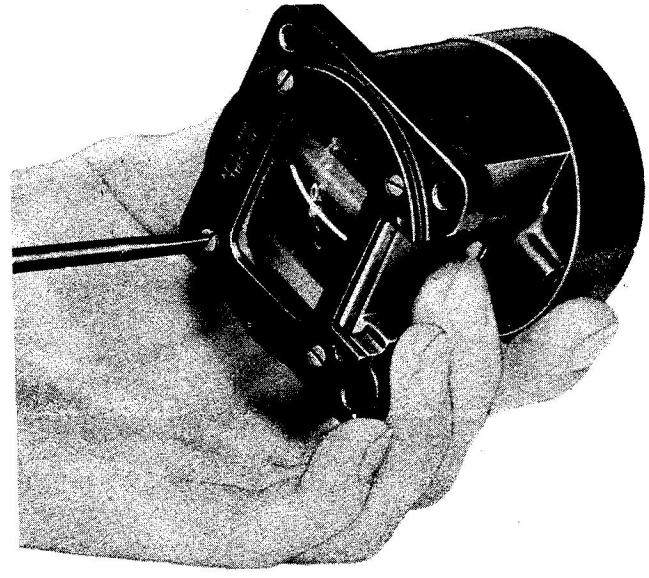


Figure 10 — Remove Bezel Screws

CAUTION

In order to avoid lens breakage, back out each screw about one quarter of a turn at a time, proceeding around the ring evenly in this manner until pressure is released.

(6) Remove bezel and bezel spacer gasket. (See figure 11.)

(7) Remove the lens with a razor blade or knife blade by cutting between the gasket and case. (See figure 12.) be careful not to scratch the lens or let the razor blade or lens hit the card assembly. The gasket will have to be replaced.

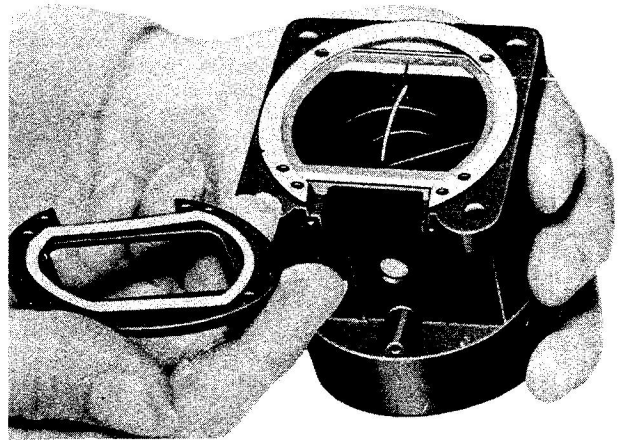


Figure 11 — Remove Face and Bezel Spacer Gasket

Figure 12 — Loosen Lens

(8) Remove the lubber line by prying it out of its recess, alternating on both ends. (See figure 13.) Keep the screwdriver as close as possible to the top and bottom of the inside of case, and pry against the extreme end of the lubber line so as not to bend it.

(9) Remove screws at the rear of compass and, using knife or razor blade, loosen the expansion unit plate. (See figure 14.)

CAUTION

Do not insert the razor blade over one-eighth inch since there is a possibility of piercing the expansion unit bellows.

(10) Lift out expansion unit and gasket. (See figure 15.)

(11) Loosen the jewel post with a 9/16 inch end-wrench (figure 16) and remove the jewel post and card assembly. (See figure 17.) Be extremely careful not to bend the card assembly.

(12) Remove the jewel post gasket as shown (figure 18), in the event it sticks in the case.

(13) Remove the card assembly from the jewel post. (See figure 19.)

b. DISASSEMBLY OF CARD AND JEWEL POST ASSEMBLY.

(1) DISASSEMBLY OF JEWEL POST.

(*a*) Chucking the jewel post cap lightly in a drill press chuck, loosen the cap about one turn.

(*b*) Holding jewel post with jewel cap down, slowly unscrew cap with fingers. Since there is a spring behind the jewel, lift off cap carefully so as not to lose spring or jewel. (See figure 20.)

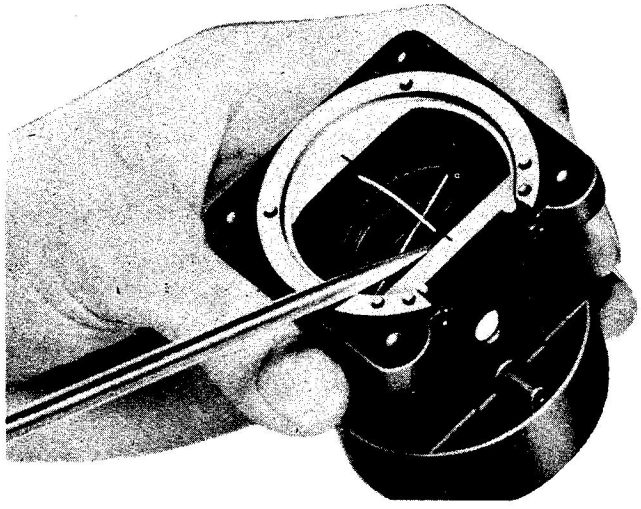


Figure 13 — Loosen Lubber Line

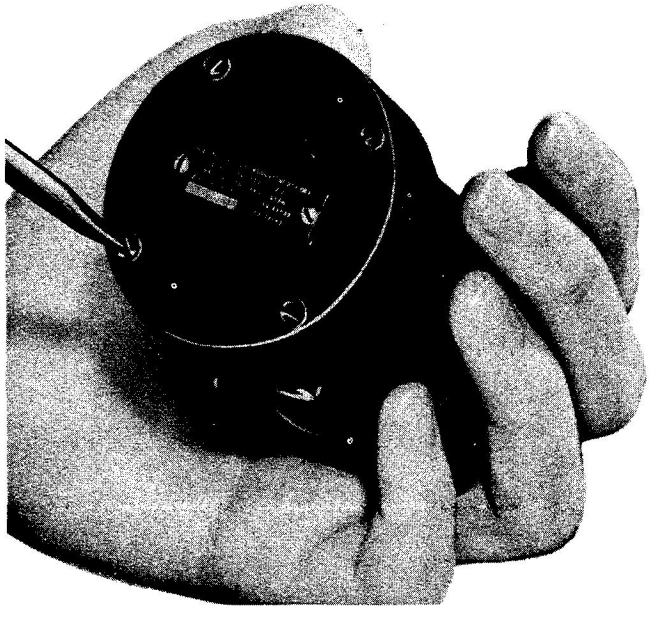


Figure 14 — Loosen Expansion Unit

Figure 15 — Remove Expansion Unit Gasket

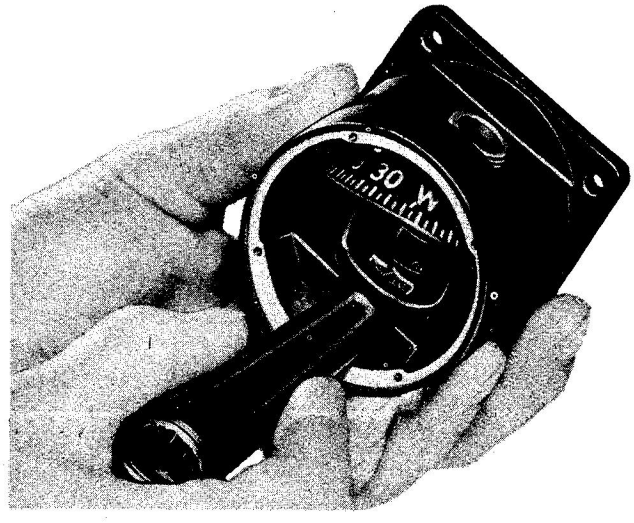


Figure 16 — Loosen Jewel Post

Figure 17 — Remove Jewel Post and Card Assembly

Figure 18 — Remove Jewel Post Gasket

(2) DISASSEMBLY OF CARD ASSEMBLY.

(*a*) REMOVING THE PIVOT.—It is not necessary to remove the pivot for cleaning; however, if it is flattened or chipped, it must be replaced. To remove the pivot use special punch (figure 32) and card assembly fixture (figure 34). Chuck the punch in a drill press and, using it as an arbor press, push out the pivot. (See figure 21.)

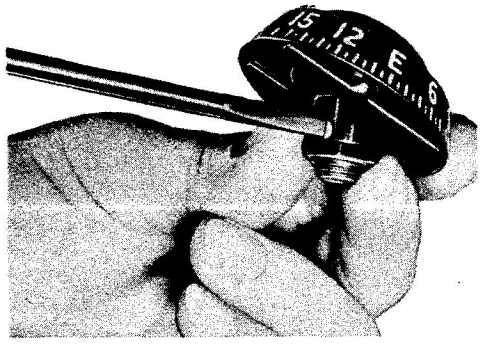


Figure 19 — Remove Card Assembly From Jewel Post

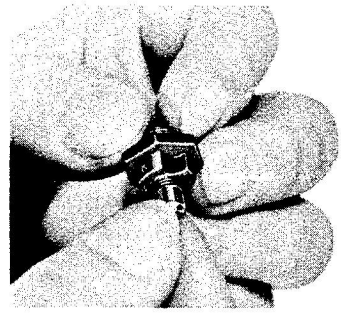


Figure 20 — Unscrew Jewel Post Cap

Figure 21 — Remove Pivot

(*b*) REMOVING THE CARD FROM THE CARD ASSEMBLY. — Unless the float leaks or is damaged, it should not be removed.

1. Place the card on the card-and-float-assembly jig (figure 34). Place the protection cap (figure 33) over the top of the float and, with a pocket knife or other thin-bladed tool, bend back the ears of the float (figure 22), and remove the float. (See figure 23.)

2. Further disassembly of the float is unadvisable.

c. DISASSEMBLY OF THE COMPENSATOR.

(1) Unless the gears will not turn or are dirty, parts are damaged, or magnets need remagnetizing, the disassembly of the compensator should not be necessary.

(2) Remove the two assembly screws (figure 24) and remove all the long shafts.

(3) Spring the frame out slightly and remove the short shafts.

d. DISASSEMBLY OF THE LIGHT.—This is no recommended. If it is found to be faulty, it should b replaced.

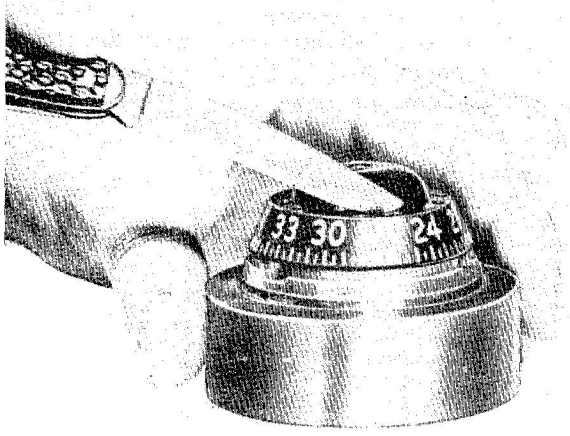


Figure 22 — Turn Back Float Ears

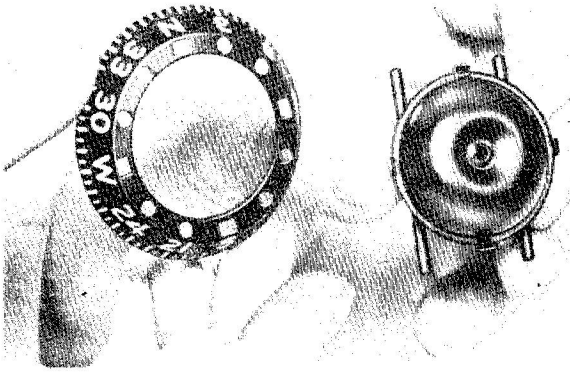


Figure 23 — Remove Float

3. CLEANING, INSPECTION AND REPAIR.

a. CLEANING.

(1) GENERAL. — All compass parts may be cleaned in a good grade benzene. Dry them in a lintless cloth and blow loose dirt off with light air blast. Keep parts under cover until ready for reassembly.

CAUTION

Do not allow fluid to enter the expansion unit as it is extremely hard to remove, thus making it difficult to locate leaks in the unit.

(2) PIVOT. — To clean the pivot while in the float, press it into the end grain of a piece of pegwood which has been dipped in a fine abrasive (such as lavigated alumina mixed with water or jeweler's rouge) and twirl the stick. Clean pivot and pivot cap with benzine, and polish pivot with a piece of pithwood.

(3) JEWEL. — Clean the mounted jewel in benzine and polish with a piece of pithwood.

(4) LENS. — Wash with soap and water, rinse thoroughly to remove all traces of soap and dry with lint-free cloth. Avoid handling to safeguard against smearing.

b. INSPECTION AND REPAIR.

(1) CASE. — Inspect the case for cracks and unpainted surfaces. A cracked case must be rejected Paint all internal surfaces with dull black lacquer.

(2) EXPANSION UNIT. — Remove the specification plate and replace the two specification plate screws in their holes. Place the thumb over the hole in center, without pressing, and place in a jar of soapy water. (See figure 25.) Squeeze gently and hold together for about thirty seconds. Any air bubbles coming from unit under pressure will indicate a leak.

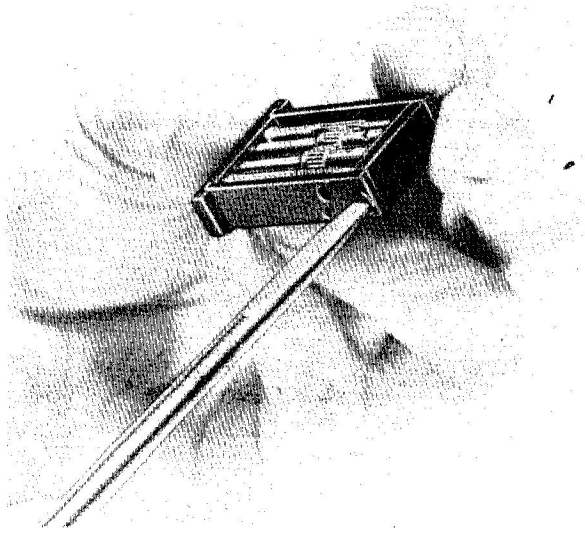


Figure 24 — Remove Compensator Screws

CAUTION

Do not remove the thumb while the expansion unit is immersed in fluid as fluid might be drawn into it.

(*a*) If a leak is found in a joint between the end plate and the sylphon it can be repaired with a soldering iron. It is impractical to try to repair any leaks in the bellows itself. All soldering flux must be removed and the unit carefully cleaned in benzine and dried with a lint-free cloth or blast of air.

(*b*) The entire surface of the expansion unit opposite the mounting plate must be lacquered dull black.

(3) LENS.—Inspect the lens for cracks, chips, scratches, bubbles or foreign matter in the glass which would interfere with the clean undistorted vision of the card and lubber line. If any of these faults are present, replace with a new lens.

(4) JEWEL MOUNT ASSEMBLY.

(*a*) Inspect the jewel for chips or cracks by feeling the surface with a sewing needle. The slightest imperfection is cause for rejection.

(*b*) Inspect the mount for any burrs or scratches that might interfere with it sliding free in the cylinder in the jewel post.

(5) JEWEL POST.—The jewel will drop to the bottom of the cylinder of its own weight if the cylinder is clean and smooth. A reamer (figure 35) is recommended for cleaning the cylinder.

(6) CARD PIVOT.—Inspect the point of the pivot under a magnifier for a smooth tip. The pivot may be removed from the float and replaced.

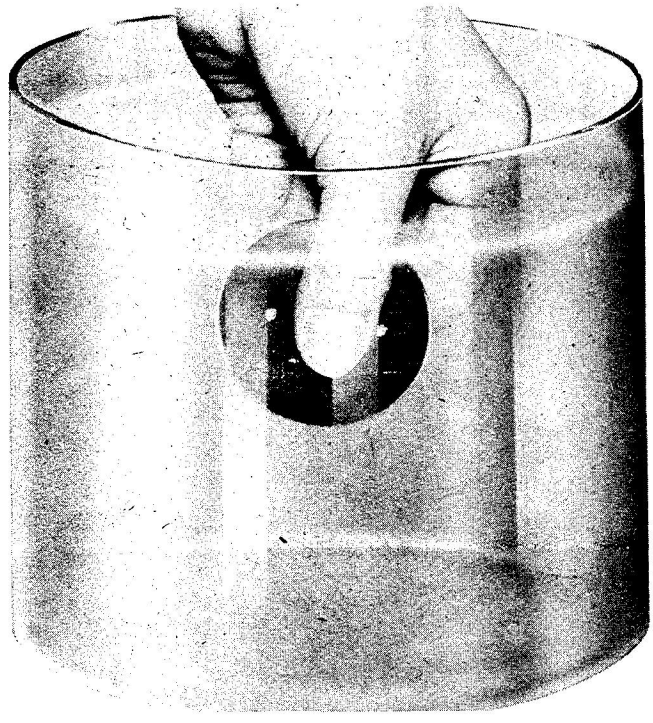


Figure 25 — Test Expansion Unit

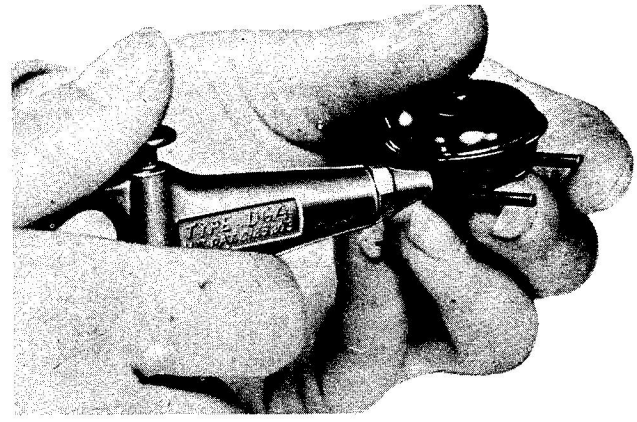


Figure 26 — Repairing Float Leak

(7) CARD SHAPE.—The shape should be both round and flat. The best way to do this is to check it against a jig as shown in figure 33. Put the card on the jig at eye level with the light behind it. The card may be bent with the fingers to straighten it.

(8) FLOAT ASSEMBLY.

(*a*) To test the float for leaks, immerse it in compass fluid in a glass container, under a bell jar. A glass cover will keep the float from rising and, at the same time, any leak may be observed. If no bubbles are observed at a pressure of three inches mercury, the float may be assumed to be free of leaks.

(*b*) If the float does leak, at a soldered joint, fluid will be present inside and the leak will have to be increased in size in order to drain out the fluid. A good way to get the fluid out is shown in figure 26. Punch a very small hole (1, figure 26) and direct air pressure from gun in a line tangent to the circumference of the card at the point of the leak (2). The pressure inside the card will be lowered and the fluid will be drawn out through point (2).

(*c*) Then place the float in an oven of approximately 66° C. (150° F.) until all the fluid has evaporated. Too hot an oven will damage the magnets and melt the solder.

(*d*) Resolder the leak and remove all soldering rosin with benzine. Touch up unpainted spots with dull black lacquer. Bake at 66° C. (150° F.) for two hours.

(9) CARD MAGNETS.—If it is necessary to remagnetize the card magnets they should be remagnetized after assembly to the card.

(*a*) In order to see if the magnets need remagnetizing, place the entire card assembly on a jewel post in a container of compass fluid, and deflect the card 30 degrees from the normal position. When the fluid comes to rest, release the card, starting a stop watch at the same instant. After the card has gone through 25 degrees, stop the stop watch. Repeat the procedure, deflecting the card in the opposite direction. The average of the two times should be between 1.8 and 1.4 seconds.

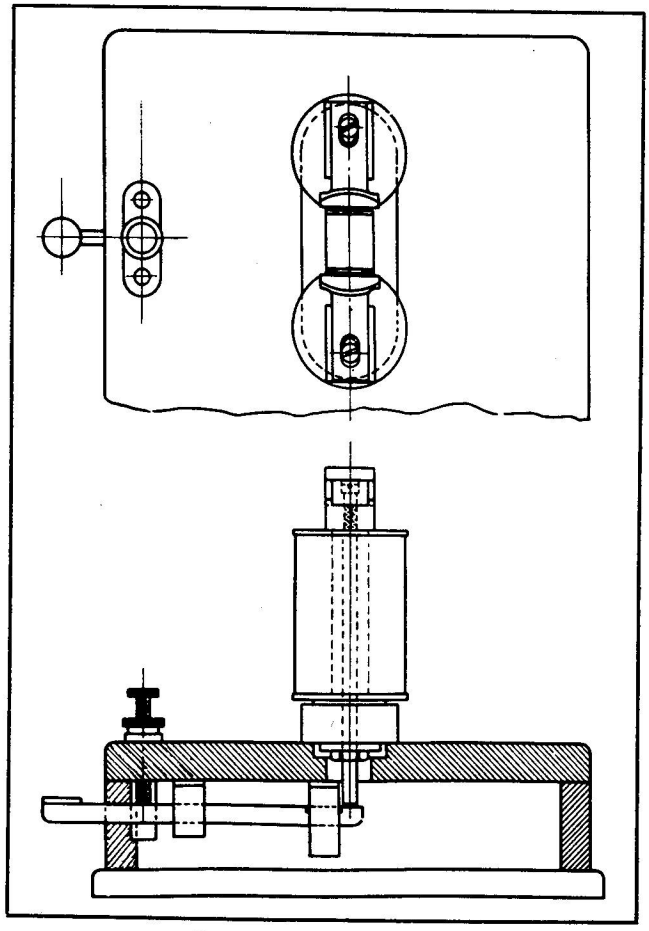


Figure 27 — Magnetizer

(*b*) The magnetizer (figure 27) can be used to remagnetize the card and compensator magnets. Drawing of the magnetizer is shown in figures 36 and 38.

1. To determine the polarity of the magnetizer, hold the card a few inches above pole pieces when the current is on. Like poles will repel and unlike poles will attract.

2. Mount the card assembly on the magnetizer with the north poles of the magnets over the south poles of the magnetizer. Close and open the south poles of the magnetizer. Close and open the switch three or four times; the last time open it slowly. The magnets will be saturated.

(10) COMPENSATOR MAGNETS.—Should it be necessary to remagnetize the compensator magnets, remagnetize them in the shafts. North-seeking poles are painted red.

(*a*) In order to determine whether the compensator magnets need remagnetizing, install the compensator in a compass known to possess proper strength in card magnets. With the compass on north and the compensator on neutral, apply full N-S compensation. This should not be less than 30 degrees nor more than 40 degrees. Repeat the procedure on east. The deflection should be the same. Be sure the compass is not influenced by local attraction.

(*b*) Using the magnetizer (figure 27), but using the pole pieces with the end section (figure 38), adjust the pole pieces to clamp the magnets between them.

(*c*) Remagnetize the compensator magnets by placing the north pole (red dot) of the magnets over the south pole of the magnetizer. Opposite poles attract and like poles repel. Close and open the switch three or four times and open it slowly the last time. The magnets will be saturated.

(11) GASKETS.—Replace both paper and corprene gaskets. Paint the inside corprene gaskets with a good grade of shellac on both sides, and let dry about ten minutes.

4. REASSEMBLY.

a. REASSEMBLY OF THE COMPENSATOR.

(1) Install the short shafts so that the magnets are parallel with each other, but with the poles opposite each other. With the magnets in this position, place the adjustment shaft so that the dot on it appears opposite the dot on the frame. Spring in the frame to hold the shafts in place.

(2) Install the long shafts so that magnets are also parallel and poles opposite, and so that the adjustment-shaft dot lines up with the frame dot.

(3) Place on the back plate and secure it with the two back plate screws.

Note

If gears from another compensator are used, trouble will probably result in trying to place the magnets parallel to each other.

b. REASSEMBLY AND CHECKING OF CARD AND FLOAT ASSEMBLY.

(1) Using a fixture such as illustrated in figure 34, place the float in the fixture recess and the card on

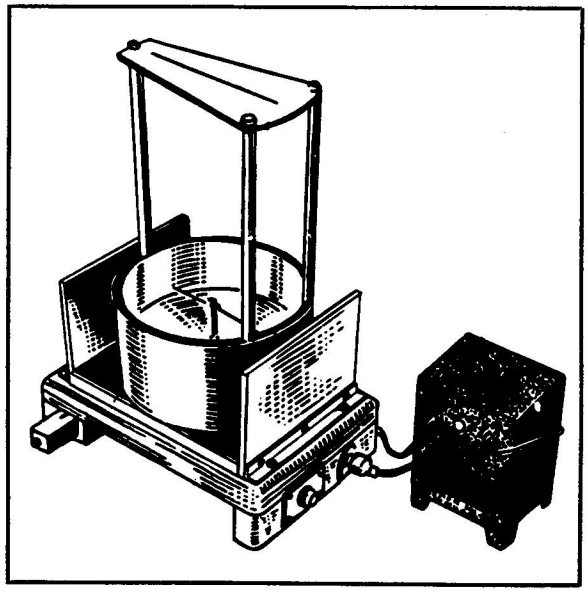


Figure 28 — Field Stand

top of it, so that the ears of the north-seeking poles of the magnet are at the figure S on the card.

(2) Push the float ears through their respective holes in the card and bend them over, being careful to bend straight in toward the center of the float. Guard against bending the float by placing over the float top the float protection cap. (See figure 33.)

(3) For replacing the pivot, use a drill press for an arbor press and press in with a fixture and punch such as shown in figure 32. The bottom of the pivot should be .038 above the bottom edge of the pivot cap.

(4) Check the accuracy of the card assembly in an artificial magnetic field by using an artificial magnetic field stand. (See figures 28, 40 and 41.)

(5) Balance the card by placing it in a balancing stand. (See figure 30.) Be sure that the stand is not located near any disturbing magnetic field.

(*a*) Pour in compass fluid until it barely covers the reference plate of the stand.

(*b*) Level the stand by adjusting the three leveling screws until the level of the liquid is exactly parallel to the reference plate.

(*c*) Now fill the bowl with compass fluid to within approximately one inch of the top.

(*d*) Locate the card assembly on the jewel stud, being certain that no bubbles are trapped under the float and, by placing a small brass weight of the proper size on to the top rim of the card (directly over the high part of the card), balance the card. Note the weight's exact position and, turning the card over, fasten the weight to the underneath side of the rim of the card with aircraft dope.

(*e*) After the dope has dried, replace in the balance stand to see that card has remained level.

(6) After the card is balanced, dry thoroughly, and then very carefully touch up any bare metal places with dull black lacquer.

(7) If the card finish has been impaired, spray the complete assembly, except the pivot, with a thin coat of clear lacquer, and bake for three hours at 82° C. (190° F.). A higher temperature will damage the magnets, melt solder, and damage the radium finish.

c. REAMING OF THE JEWEL POST.

(1) Drop the jewel and mount into the jewel post. With the jewel post vertical the mounted jewel should fall to the bottom of the cylinder of its own weight. If it does not, remove and polish out with the burnisher. (See figure 35.)

(2) Drop in the spring with the "bent end" of the spring to the top. The top of the spring should be .030 inch above the top of the jewel post to obtain the proper tension when compressed.

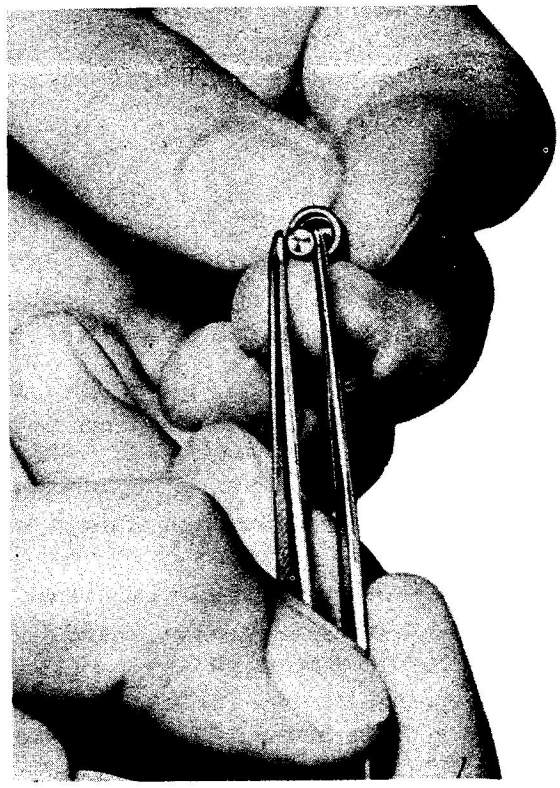


Figure 29 — Replace Jewel in Cap

(3) Place the jewel into the jewel post cap (figure 29) and then screw the cap onto the jewel post, centering the jewel as the cap is screwed on. Be sure the cap fits tightly. The bottom of the cap should come within .030 inch of the shoulder of the jewel post when screwed all the way down.

(4) Test the jewel for "spring" with a sewing needle. It must be absolutely free from sticking in any position.

d. REASSEMBLY OF THE MECHANISM.

(1) Touch up all bare metal spots on inside of case with black lacquer.

(2) Fasten the compensator housing to bottom of case with the three screws provided.

(3) Assemble the card to the jewel post.

(4) Insert a new jewel post gasket in recess in case.

(5) Install jewel post and card assembly being extremely careful not to bend the card. Touch up the jewel post with black lacquer.

(6) Install the lubber line, making sure that it is straight and perpendicular within one degree, and also will not touch the card in any position.

(7) Shellac both sides of the expansion unit gasket and place on rear of case. Line up holes in gasket carefully with those in the case. Allow the gasket to set until it is slightly tacky.

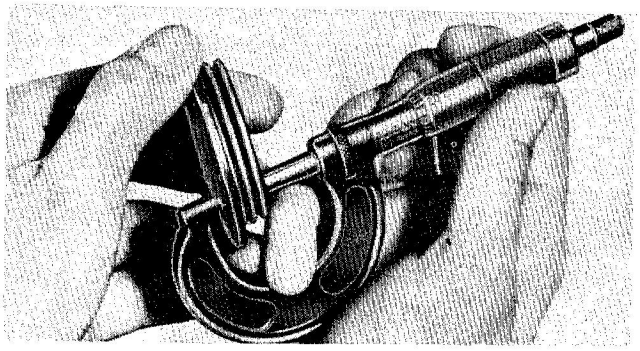


Figure 30 — Set Expansion Unit to Depth

(8) Set expansion unit to proper length (.450 to .470) as shown in figure 30. Place on rear of case and pull down tight with the four screws.

(9) In like manner assemble the corprene bezel gasket, with shellac on both sides, and allow it to become tacky before placing it on the lens.

(10) Clean the lens of all finger marks and install.

(11) Place the front spacer gasket on lens so that it does not overlap the case at any point.

(12) Place the bezel on the spacer gasket and pull down tight with the four screws. If the screws seem to pull down too easily install an additional spacer gasket.

e. REFILLING THE COMPASS.

(1) Allow compass to set at least eight hours, and place in a warm oven of about 48° C. (120° F.). Leave the compass in the oven from 30 to 45 minutes with the filler cap off so that the warm air and vapors may escape. In a moist atmosphere it will be necessary to let the compass dry for at least 16 hours with the filler cap off, but with the filler hole protected against dirt.

(2) Fill the bowl with aircraft compass liquid, Specification 3-GP-31.

(*a*) This liquid must be clean and free from moisture.

(*b*) Fill and drain the compass several times until it is absolutely clean. The filling and draining process washes out dirt particles which might have lodged in the chamber during overhaul. Close the filler hole and swirl the liquid around. Any foreign material remaining in the liquid will then be immediately apparent.

(3) Fill the compass as follows:

(*a*) Place the compass with the filler hole open in a container of clean compass liquid so that it is completely immersed at room temperature.

(*b*) Next place the container including the compass in a vacuum chamber. Evacuate the chamber to the extent of the available suction and allow the compass to remain in this condition for at least one hour.

(4) If the original filler cap is to be used, remove the phosphor bronze cup, flat washer and the (2) two rubber washers. Just before installing cap, install two rubber washers, flat phosphor bronze washer and phosphor bronze sealing cup in cap, convex surface outward.

(5) Increase the pressure to atmospheric value and, while the compass is still immersed in the liquid, replace and tighten down the filler cap.

Note

When putting the filler cap into the liquid, put it in at an angle so that no air will be trapped by it. This method of filling the compass eliminates enough air to prevent the appearance of bubbles at high altitude.

f. FINAL ASSEMBLY.

(1) Dry all compass liquid thoroughly from the outside of the case and inside of the expansion unit. Turn the compass face up and blow air (20 to 30 pounds pressure) through one of the small holes in the back of the expansion unit. This will blow out and evaporate the liquid that collected in the expansion unit.

(2) Place the compass in an oven and heat for 30 minutes at 65° C. (150° F.). Any leaks should be apparent due to pressure from the expanded liquid.

(3) Place the compensator in the housing. The compensator should push easily into the housing but should not be loose.

(4) Now apply a maximum amount of compensation to the compensator for the N-S and E-W heading, and also check the neutral positions of the compensating magnets.

(*a*) Place the compass on a rotatable stand (figure 31) in the earth's magnetic field, and undisturbed by any local magnetic influences. Drawings of the compass stand are shown in figures 42, 43, 44 and 45.

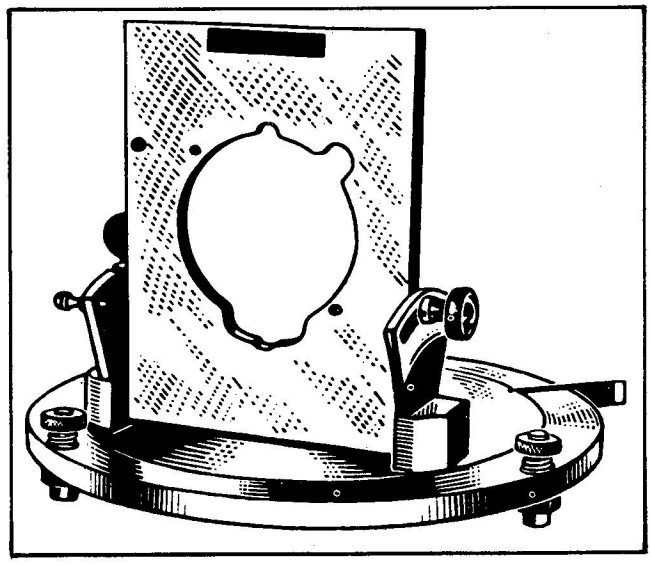


Figure 31 — Compass Turntable

(*b*) With the compensator magnets in a neutral position, that is, when the dots of the compensator adjustment shaft match the dots of the compensator plate, the compass card should align itself with the north and south magnetic meridian within two degrees. If this does not happen, the magnets of the compensator probably are not in exact relationship with the dots and should be corrected by changing the gearing relationship of the magnet gears and pinion.

Note

All adjustments should be made with a non-magnetic screw driver.

(*c*) Set the compensator at neutral and, with the compass on north, apply the maximum compensation, first one direction and then the other, using the N-S set of gears. Tap the compass before taking a reading. A deviation of 30 to 40 degrees should be indicated in each direction. A lesser reading indicates weak compensator magnets and the magnets should be re-magnetized as previously explained.

(*d*) Set all compensator magnets again at neutral and check the deflection on the E-W reading, when the maximum amount of compensation is applied with the E-W compensator gears as described in the above paragraph.

(*e*) After making the above test, reset all compensator magnets on neutral.

(5) If the compass is a model AN 5766-3 or -4 (lighted unit), insert light housing in hole in case from the rear. Pull the assembly down over the rear of the compass until the screw holes are aligned. Insert gasket and screws, and tighten screws firmly. Install light bulb. (See figures 5a and 5b.)

SECTION VII
TEST PROCEDURE

1. METHOD OF INSPECTION AND TESTS.

a. INDIVIDUAL TESTS.—The following tests shall be applied to each completed compass.

(1) CARD ERROR. — The plane through the lubber line and the center of the jewel shall be parallel to the magnetic meridian, when the compass indicates north or south, within one degree. Turning the compass about its vertical axis from the above described position by reference to an accurate circular scale, each 30 degree heading should likewise be accurate within plus or minus one degree. This test shall be made with the compensator removed.

(2) FRICTION ERROR. — After the card has been deflected 5 degrees either way from its position of rest, it shall return to within one degree of the original position without vibration.

(3) LEVELING.—When the compass is in normal upright position, the lubber line shall be within one degree of vertical.

(4) BALANCE. — The card should balance so that the plane of the card is within one degree of the horizontal.

(5) CARD TEST. — (TIME 30 DEGREES TO 5 DEGREES.) In a magnetic field not to exceed .20 gauss, the card shall be magnetically deflected 30 degrees from its equilibrium position, and held in this position long enough for the liquid to come to rest. It shall then be released and the time observed for the card to pass through an angle of 25 degrees towards its equilibrium position. The same procedure shall be repeated in the opposite direction, being extremely careful not to change the position of the compass between observation, as the deflection is to average out any error due to incorrect setting of the compass with reference to the equilibrium position of the card. The average of the two times (right and left deflection) for the card to swing through an angle of 25 degrees shall not exceed 1.8 seconds nor be less than 1.4 seconds.

(6) OVERSWING. — Deflect the card magnetically 30 degrees from its equilibrium position, and hold in this position long enough for the liquid to come to rest. Then release and note the extent of overswing past the equilibrium position. Now deflect in the opposite direction the same amount and note the overswing again. The card shall not overswing its equilibrium position by more than 15 degrees. This test may be combined with the test in the previous paragraph.

(7) DAMPING TEST. — With the compass in the normal upright position on any heading with the fluid at room temperature, swing the compass through 360 degrees of arc in one minute of time. The maximum deflection of the card from its original position after completion of the 360 degree turn in one minute shall not exceed two degrees.

2. ROUTINE TYPE TESTS. — The following tests, in addition to those specified in paragraph 2, shall be applied to not less than five instruments selected at random among each hundred or fraction thereof.

a. HEELING.—The compass card shall be perfectly free to revolve on its pivot when the compass is tilted to any position within 20 degrees of its normal upright position. The card reading shall not differ at any time from the card reading obtained while the compass is in its normal upright position. The readings should be taken at the top of the five degree graduations.

b. COMPENSATION. — With the compass in its normal upright position in a uniform magnetic field not exceeding .20 gauss, place the compass first on north and then on east. When the minimum increment of compensating magnetism is properly introduced for either heading, a deviation of not more than two degrees shall result. Maximum compensation applied on the east-west gears when the compass is on north, or on the north-south gears when the compass is on east, shall not affect the indication of the other headings by more than two degrees. When the entire compensating system is set on zero, no deviation of the card shall result when the compass is set on any HEADING.

3. SPECIAL TYPE TEST.

a. The following test, in addition to those specified in paragraphs 2 and 3, may, when desired, be applied to three or more instruments selected at random from each hundred or fraction thereof.

b. HIGH TEMPERATURE. — The compass shall be subjected to a temperature of 70° C. (158° F.) at a pressure of 30 inches of mercury for a period of two hours. The compass shall then be inspected for any signs of leakage or damage.

c. LIGHTING.—On models AN 5766-3 and -4, connect to a three-volt d-c source to see if bulb lights.

SECTION VIII
SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT

1. SPECIAL TOOLS AND FIXTURES. — Following is a description of the tools, fixtures and test equipment recommended for the disassembly, inspection, cleaning, repair and reassembly of the magnetic compass. Drawings giving dimensions, materials and manufacturing operations to aid in making this equipment are shown.

a. PIVOT PUNCH. — (*See figure 32.*) The pivot punch is designed to remove the pivot without damage to the float. It is slightly under the diameter of the pivot.

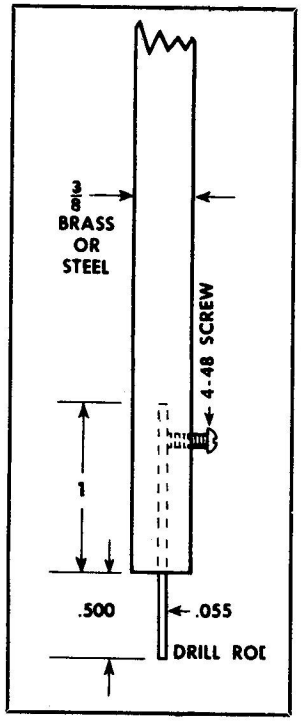


Figure 32 — Pivot Punch

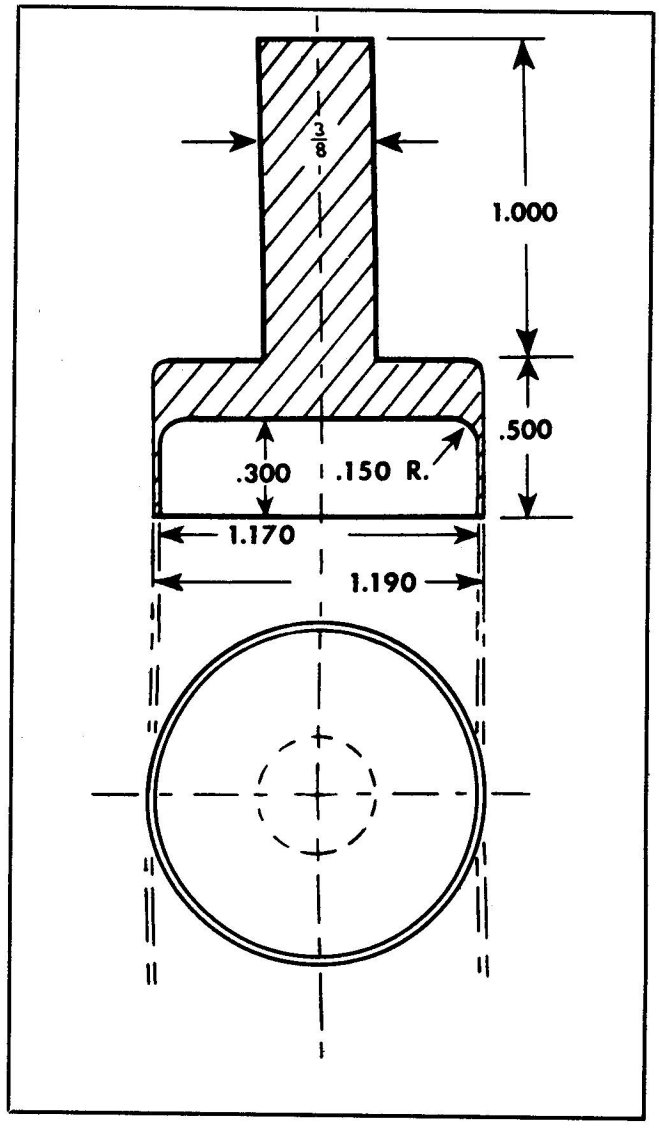


Figure 33 — Float Protection Cap

b. PROTECTION CAP—(*See figure 33.*) The protection cap is used to protect the float against damage while being disassembled and reassembled to the card.

c. CARD AND FLOAT ASSEMBLY FIXTURE.—(*See figure 34.*) The card and float assembly fixture is used to hold the assembly while removing and replacing the pivot, disassembling and reassembling the float to the card and checking the card accuracy and trueness (flatness on bottom).

d. JEWEL CYLINDER BURNISHER.—(*See figure 35.*) The jewel cylinder burnisher is used not to cut, but to polish the cylinder in the jewel post.

e. MAGNETIZER.—(*See figures 36 and 38.*) The magnetizer shown is for magnetizing both the card and compensator magnets of the compass. Two sets of pole pieces are shown for the two sizes of magnets. The brass holder is the correct size to locate the card magnets between the pole pieces. An ejector is provided to aid in removing the magnets after magnetizing.

f. BALANCE STAND.—(*See figure 39.*) The stand shown is used to balance the compass card assembly. A jeweled boss provides the means for mounting the card element. When the bowl is filled with compass liquid, the card assumes its correct position. The level of the float is checked against the compass rose that sets in the bottom of the bowl.

g. ARTIFICIAL FIELD STAND.—(*See figures 40 and 41.*) The artificial field illustrated is for the purpose of checking the position of the card with respect to the directional magnets when they are acted upon by a magnetic force. It similates the magnetic pull of the earth's magnetic field, but is stronger and concentrated in two planes so as to overcome all out-

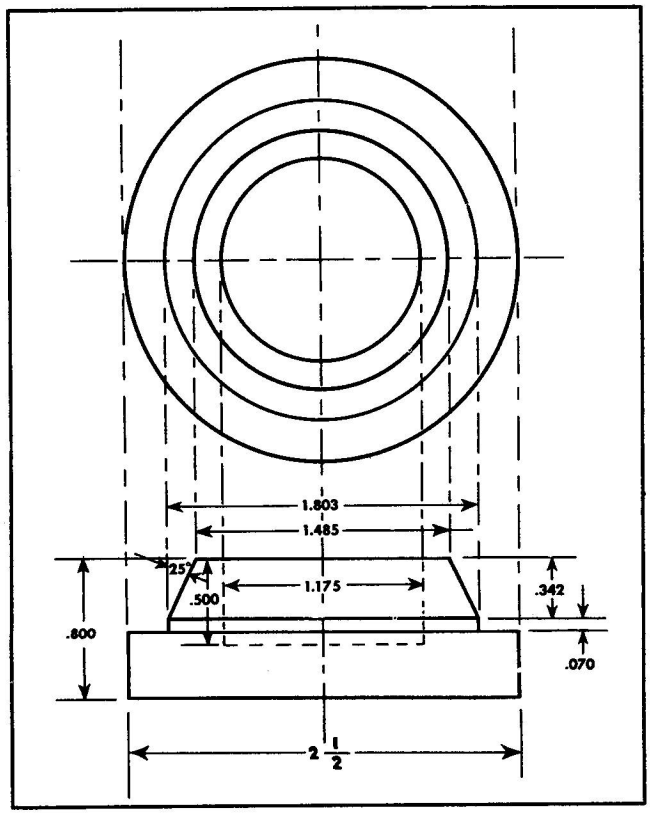


Figure 34 — Card and Float Assembly Jig

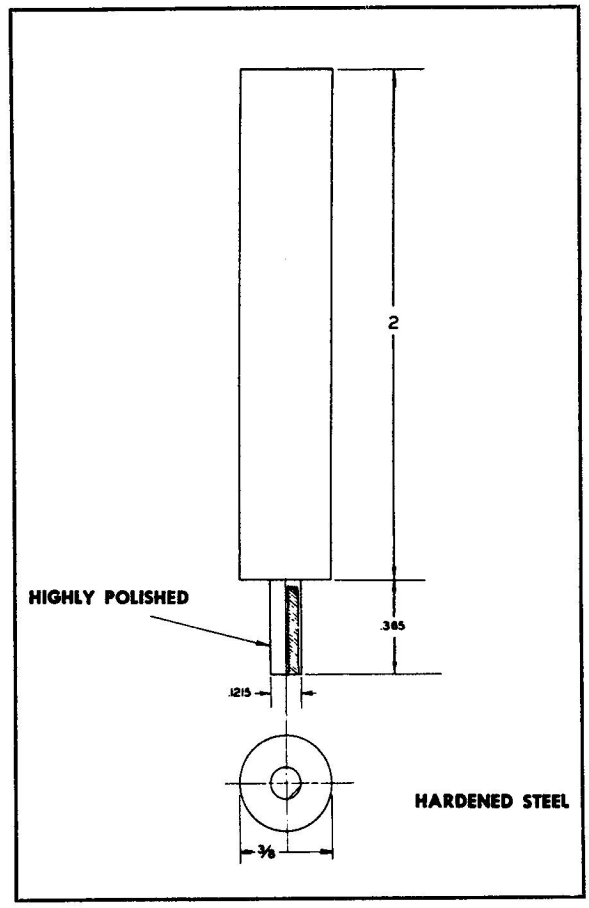


Figure 35 — Jewel Cylinder Burnisher

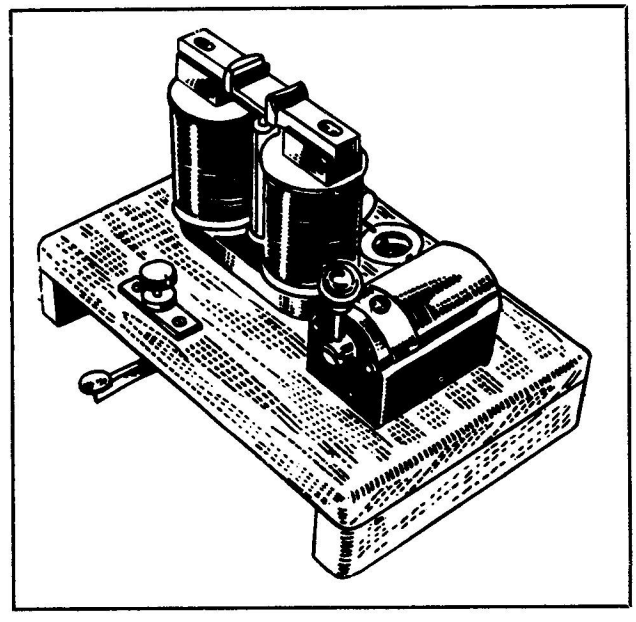


Figure 36 — Magnetizer

side influences. With this force acting on the compass magnets, the card should align itself with cardinal lines engraved inside the test bowl within one degree. Before placing the compass card on the pivot, the action of the artificial field may be checked with the magnetic needle provided. A sight is provided for viewing the needle or card. (To be fabricated locally.) The artificial field consists of an iron stand, the core of which is wound with 380 turns of No. 27 cotton covered enameled copper wire, which amounts to 62.5 ampere turns. Before winding, the core is covered with a sheet of oiled linen, and after being wound the entire coil is protected with cotton tape and then varnished. The current is supplied by a 6-volt battery charger, and amounts to .165 ampere.

b. COMPASS TURNTABLE.—(*See figures 42, 43, 44 and 45.*) Complete details of a compass turntable are illustrated. These incorporate all the fixtures that are desirable in such a turntable.

2. REFERENCES.—Some of these special tools and fixtures are the same as used in EO 20-25CB-2 and EO 20-25EA-2.

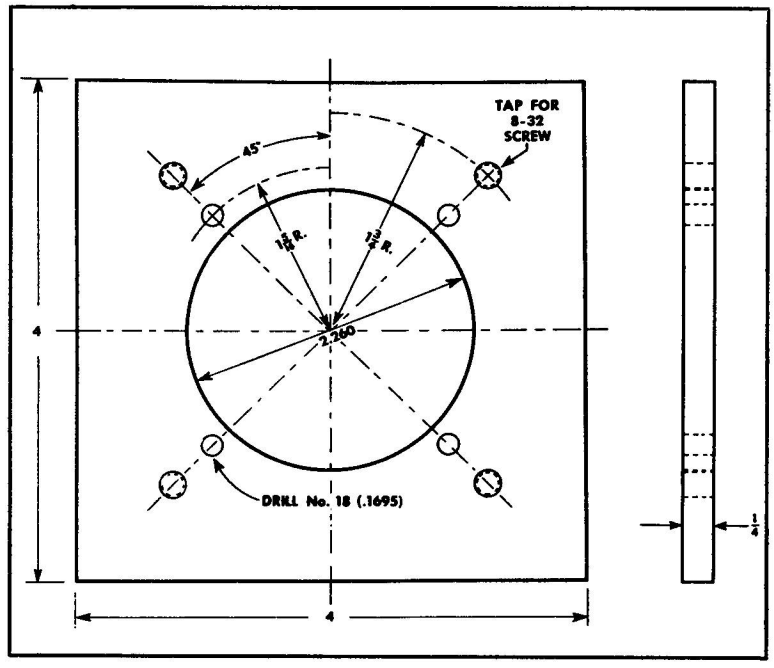


Figure 37 — Adapter for Compass Turntable

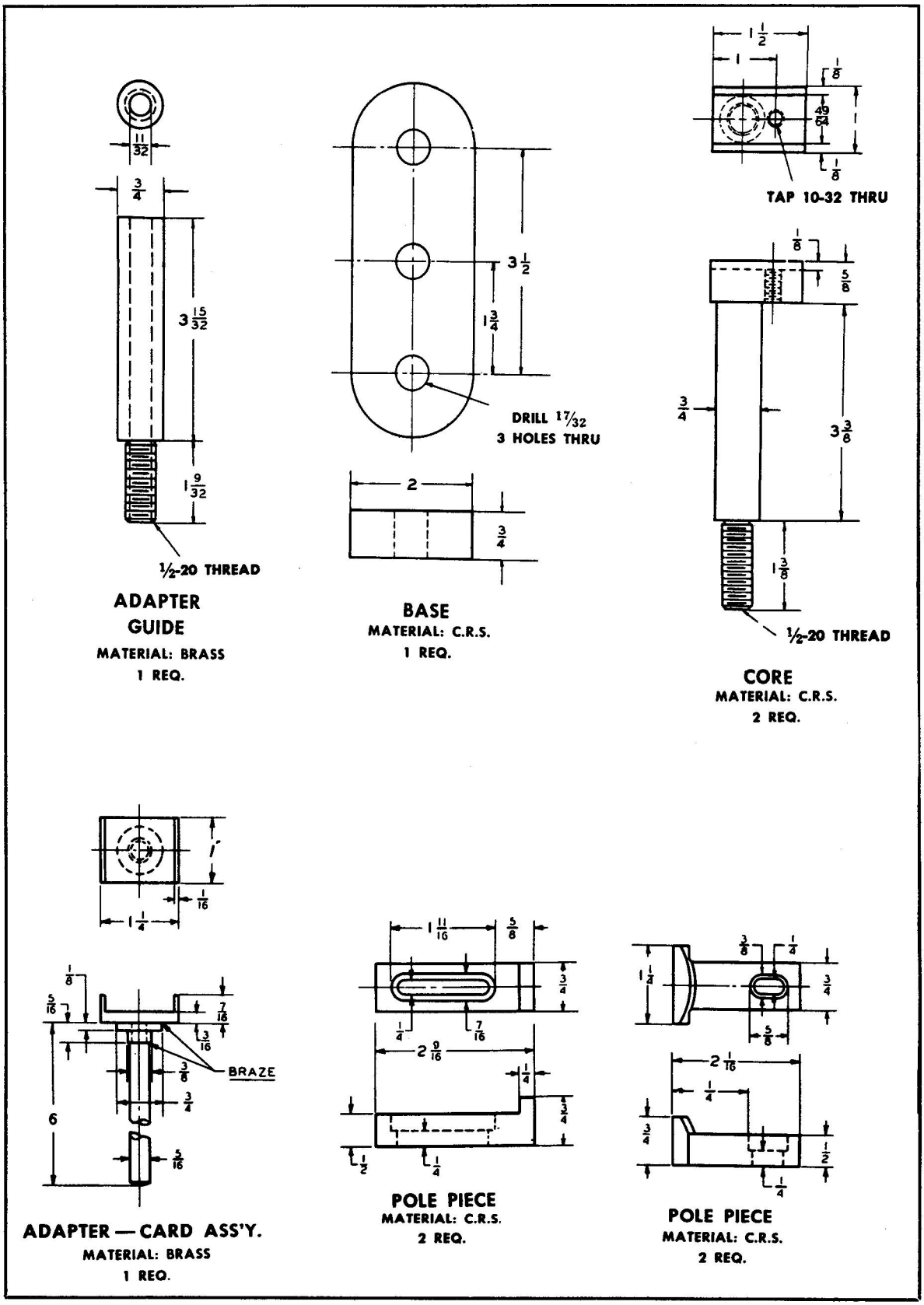
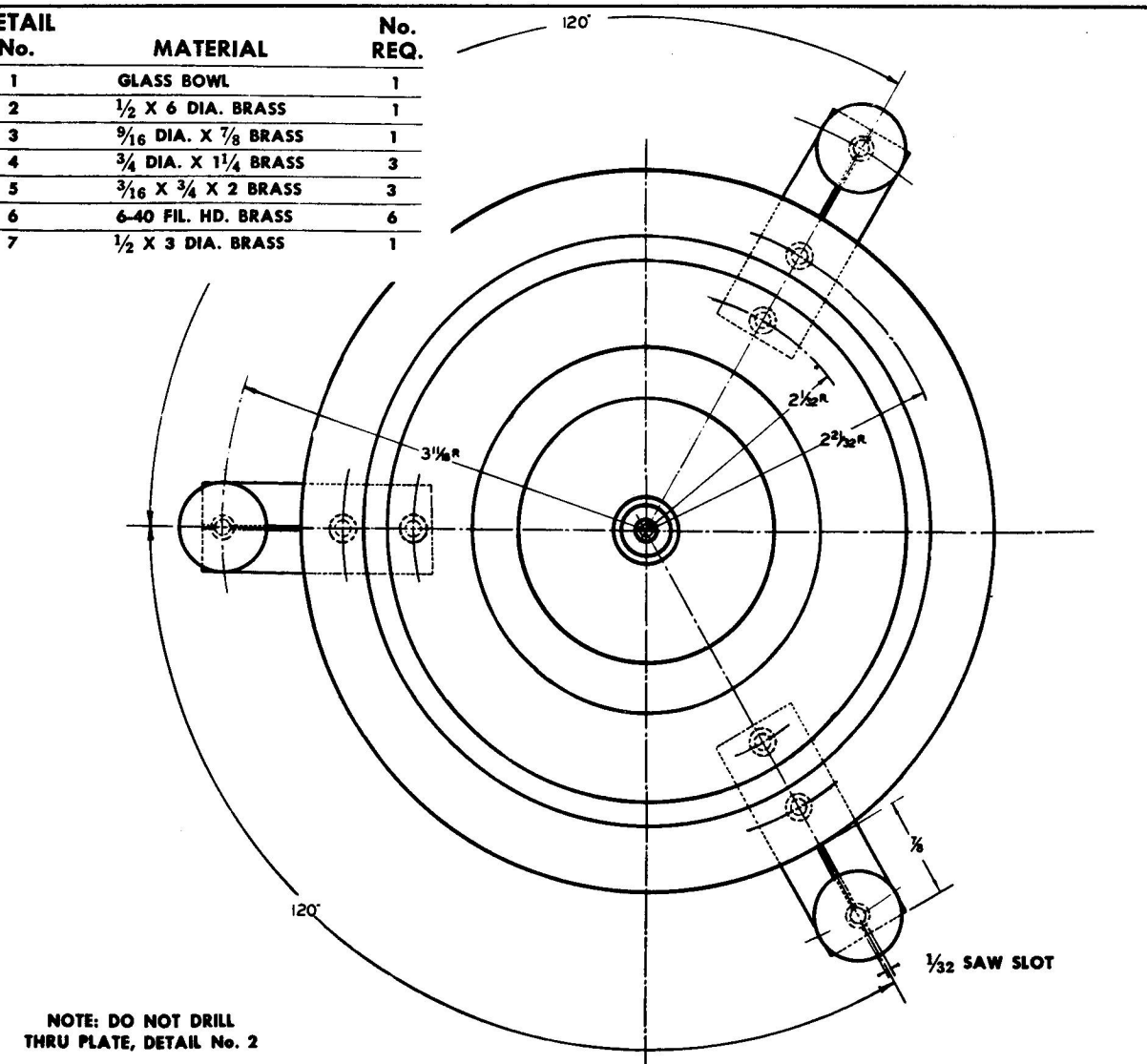


Figure 38 — Details of Magnetizer

DETAIL No.	MATERIAL	No. REQ.
1	GLASS BOWL	1
2	1/2 X 6 DIA. BRASS	1
3	9/16 DIA. X 7/8 BRASS	1
4	3/4 DIA. X 1 1/4 BRASS	3
5	3/16 X 3/4 X 2 BRASS	3
6	6-40 FIL. HD. BRASS	6
7	1/2 X 3 DIA. BRASS	1



NOTE: DO NOT DRILL THRU PLATE, DETAIL No. 2

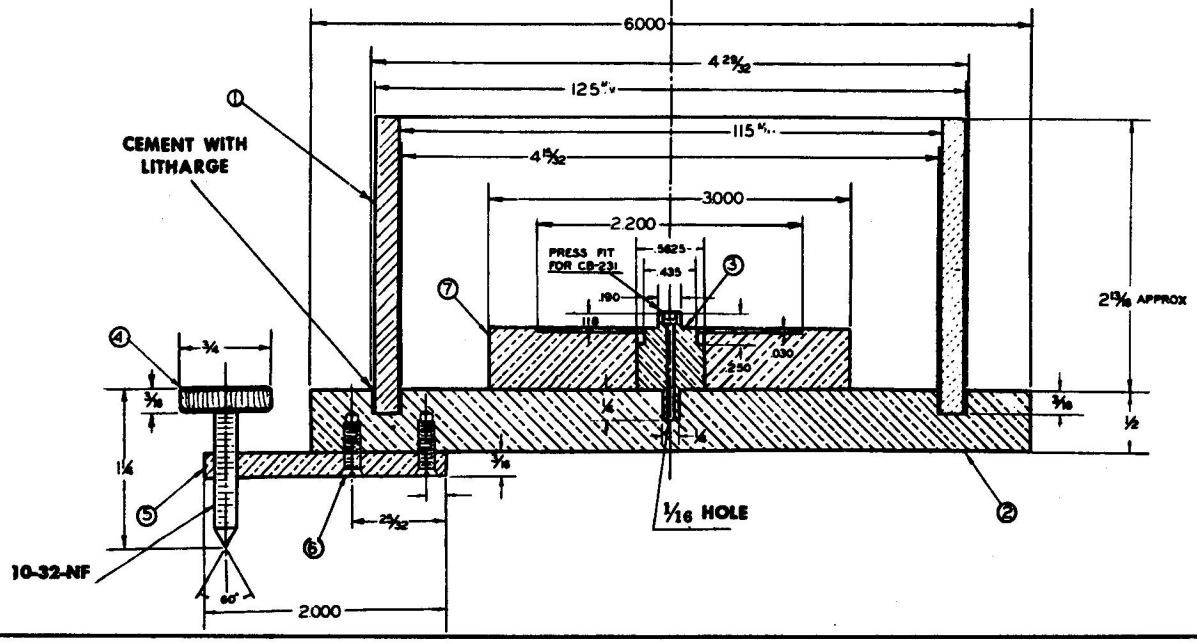


Figure 39 — Balance Stand

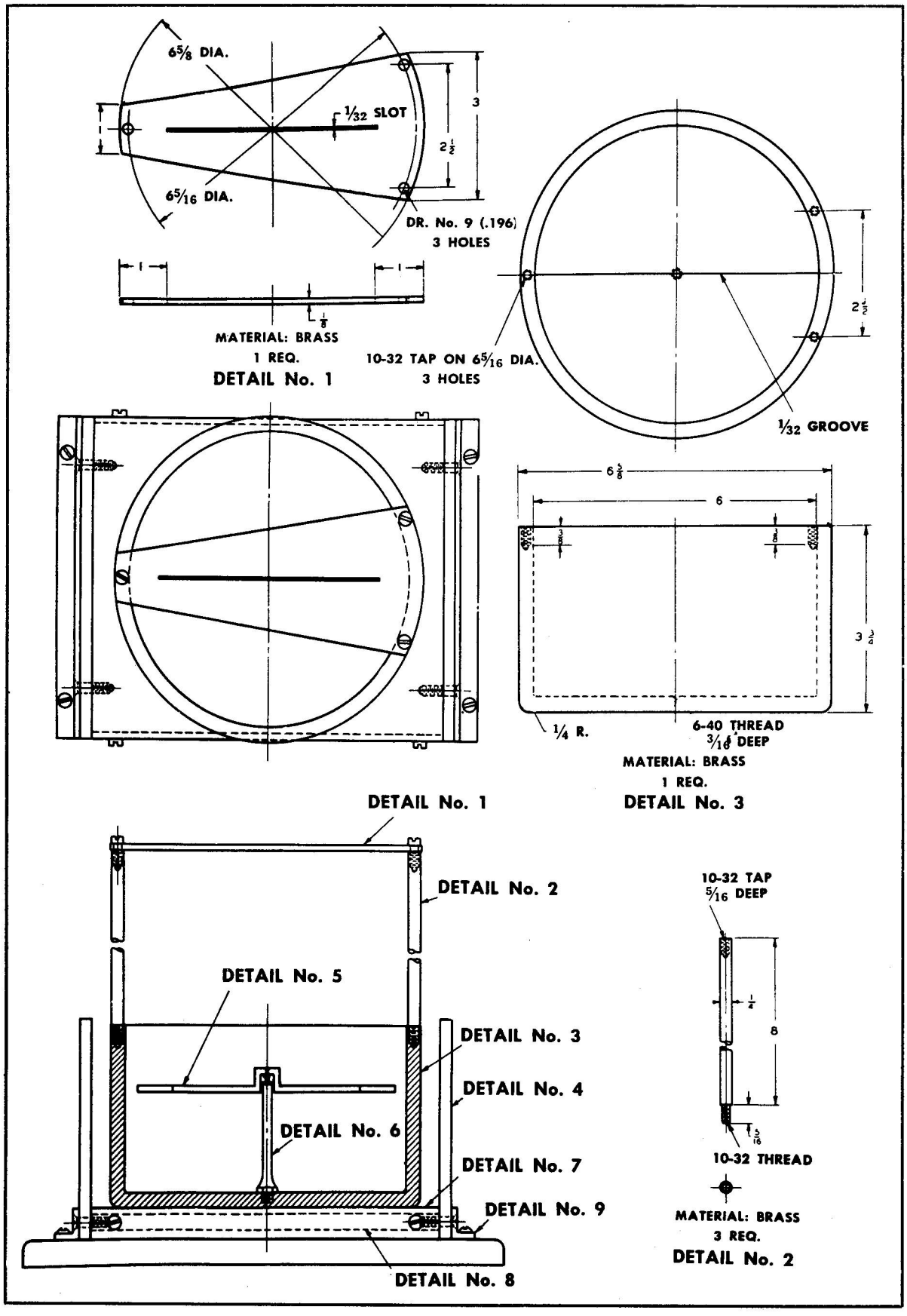


Figure 40 — Artificial Field Stand

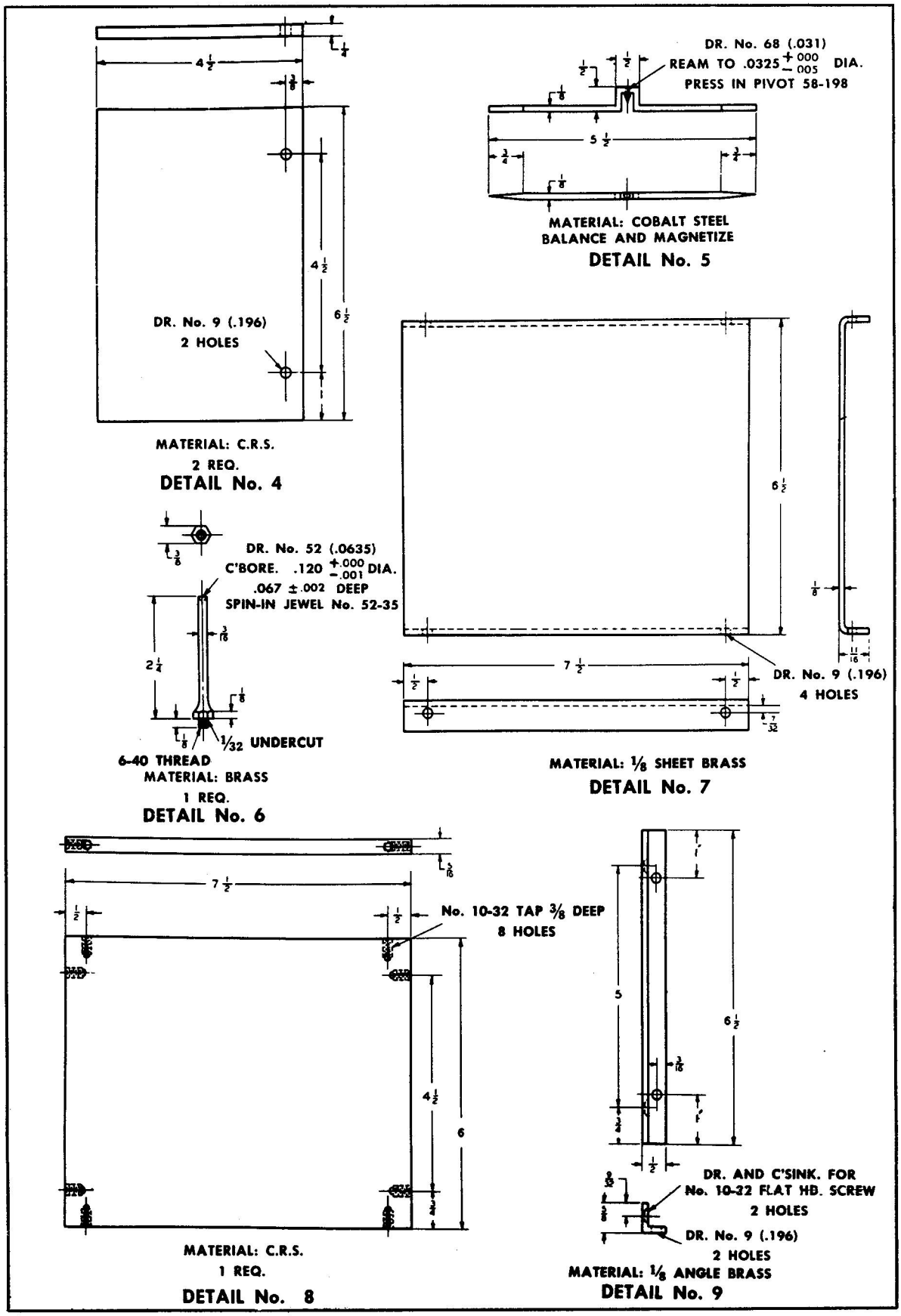
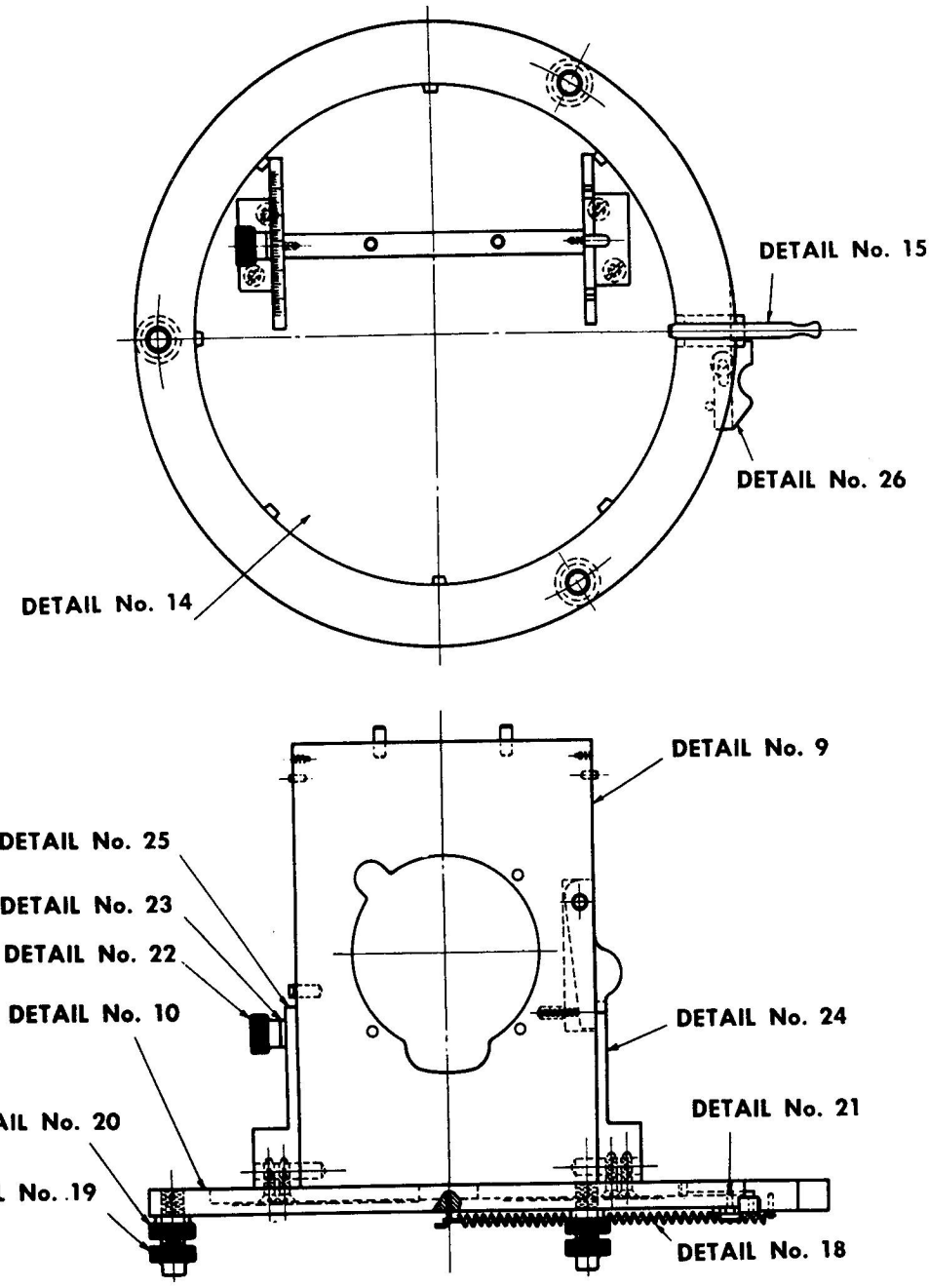


Figure 41 — Artificial Field Stand Details



DETAIL No.	DESCRIPTION	MATERIAL	No. REQ.
1	VERTICAL SUPPORT PLATE	H. H. BRASS	1
2	MOUNTING PLATE LOCATING PIN	H. H. BRASS	2
3	BRACE LOCATING PIN	H. H. BRASS	2
4	FINGER PIN	PHOS. BRONZE	1
5	FINGER	H. H. BRASS	1
6	FINGER SPRING	PHOS. BRONZE SPG. WIRE	1
7	PIVOT PIN	PHOS. BRONZE	2
8	POINTER	H. H. BRASS	1
9	VERTICAL SUPPORT PLATE ASSEMBLY	—	1
10	BASE PLATE ASSEMBLY	—	1
11	SPRING HOOK PIN	H. H. BRASS	1
12	BASE PLATE	H. H. BRASS	1
13	GUIDE PIN	PHOS. BRONZE	1

DETAIL No.	DESCRIPTION	MATERIAL	No. REQ.
14	ROTARY PLATE	H. H. BRASS	1
15	KEY ASSEMBLY	—	1
16	KEY	H. H. BRASS	1
17	SPRING HOOK PIN	H. H. BRASS	1
18	SPRING	PHOS. BRONZE SPG. WIRE	1
19	STUD	H. H. BRASS	3
20	LOCK NUT	H. H. BRASS	3
21	SCREW	H. H. BRASS	1
22	CLAMP SCREW	H. H. BRASS	1
23	WASHER	H. H. BRASS	1
24	NOTCHED QUADRANT	H. H. BRASS	1
25	GRADUATED QUADRANT	H. H. BRASS	1
26	LOCK	—	—

Figure 42 — Compass Turntable

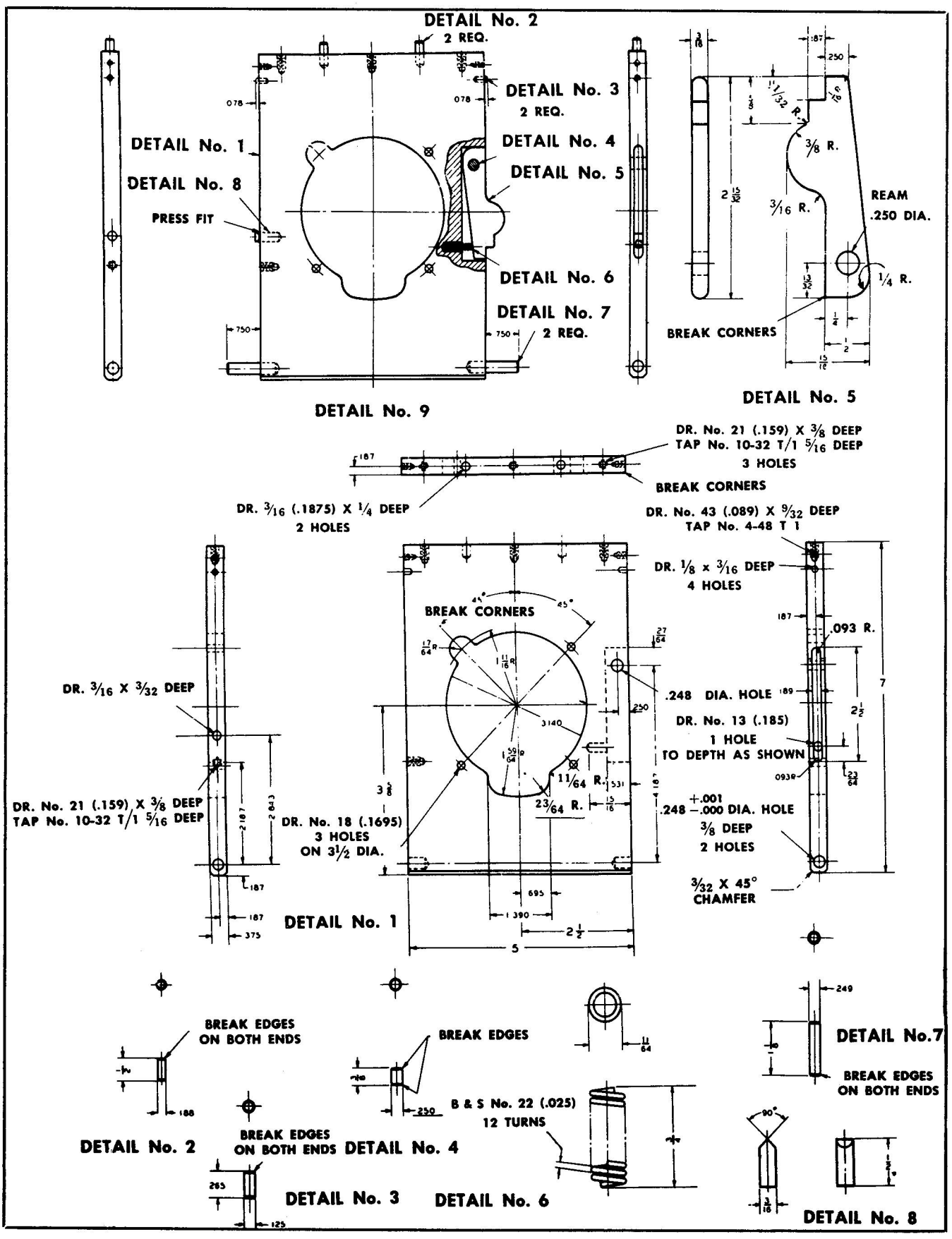


Figure 43 — Compass Turntable Detail

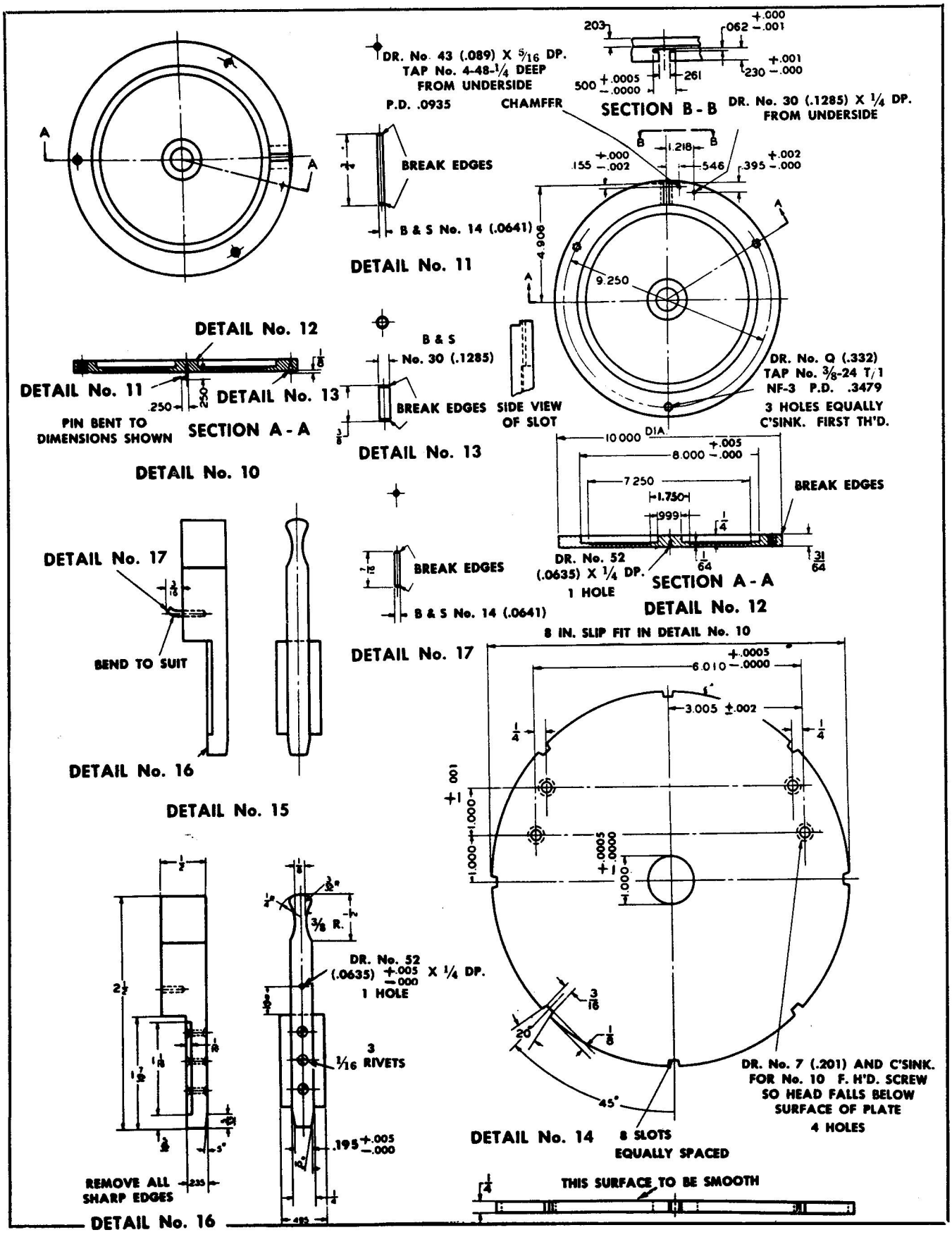


Figure 44 — Compass Turntable Detail

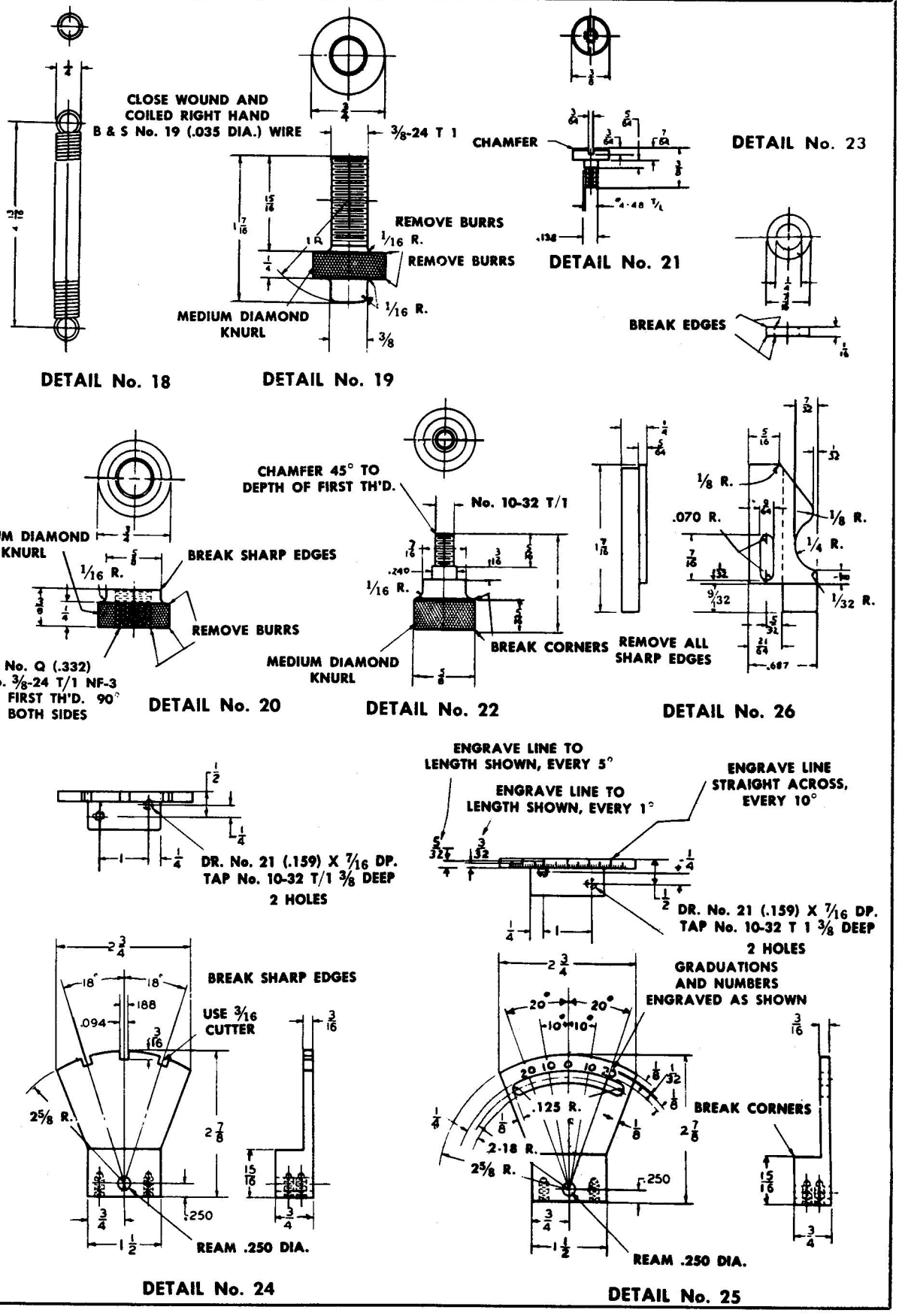


Figure 45 — Compass Turntable Detail

PARTS CATALOG

SECTION IX
INTRODUCTION

1. This Parts Catalog comprises an Illustrated Parts List, and a Group Assembly Parts List. The AN 5766-1, 2, 3 or 4 Pilot's Compass is manufactured by Airpath Instrument Company, St. Louis, Mo.

2. The Group Assembly Parts List, section X, consists of illustrations in exploded form. Detail parts have been assigned index numbers, by which the parts may be identified through reference to correlated figure numbers, index numbers, and nomenclature in the Group Assembly Parts List. This list includes a compilation of major assemblies, and is divided into minor serviceable assemblies and detail parts as they constitute the final assembly. Subassemblies and details are arranged and indented in the order which indicates their relation to the main assembly.

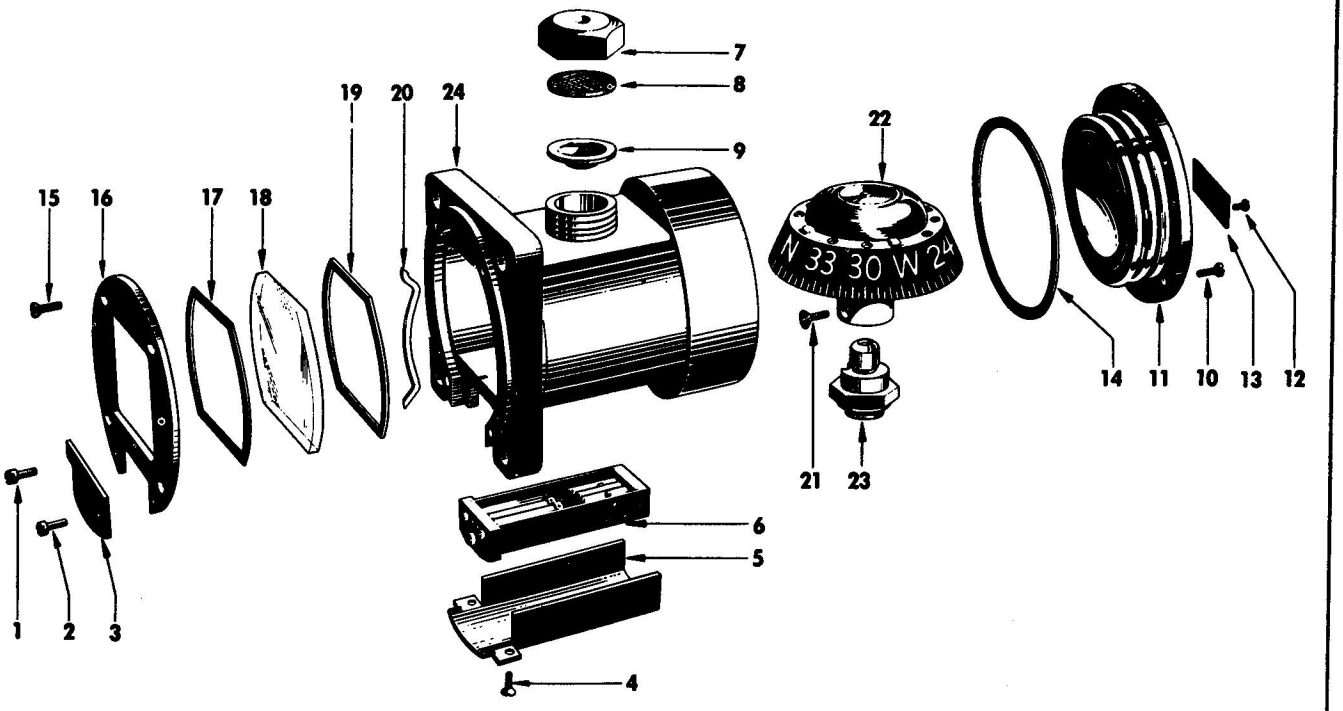


Figure 46 — Complete Instrument Exploded View of AN 5766-1 or 2 non-lighted Models

Figure & Index Number		PART NUMBER	1 2 3 4 5 6 7 NOMENCLATURE	Units Per Assy.
46		CB-2100	Compass Assembly Type AN 5766-1 or 2	1
46	1	448-4-VBX	Screw—Coverplate (left)	1
46	2	CB-633	Screw—Coverplate (right)	1
46	3	CB-920	Coverplate—Compensator	1
46	4	256-2FBX	Screw—Compensator housing	3
46	5	CB21-904	Housing—Compensator	1
46	6	CB21-400	Compensator Assembly (See figure 48 for details)	1
46	7	CB21-709	Cap—Filler	1
46	8	CB21-711	Gasket—Filler cap (2)	2
46	9	CB21-710	Cap—Phosphor Bronze Sealing	1
46	10	CB21-602	Screw—Expansion unit	1
46	11	CB21-100	Expansion Unit	1
46	12	256-2-RBT	Screw—Identification plate	2
46	13	CB21-735	Plate—Identification	1
46	14	CB21-902	Gasket—Expansion unit	1
46	15	CB21-602	Screw—Bezel	4
46	16	CB21-601	Bezel	1
46	17	CB21-915	Gasket—Spacer bezel	1
46	18	CB21-913	Lens—Compass	1
46	19		Gasket—Sealing bezel	1
46	20	CB21-918	Wire—Lubber line	1
46	21	256-2-FBX	Screw—Card retainer	1
46	22	CB21-300	Card Assembly (See figure 47 for details)	1
46	23	CB21-200	Post Assembly - Jewel (See figure 47 for details)	1
46	24	CB21-701	Case	1
46		AN-VV-C551	Liquid—Damping	AR

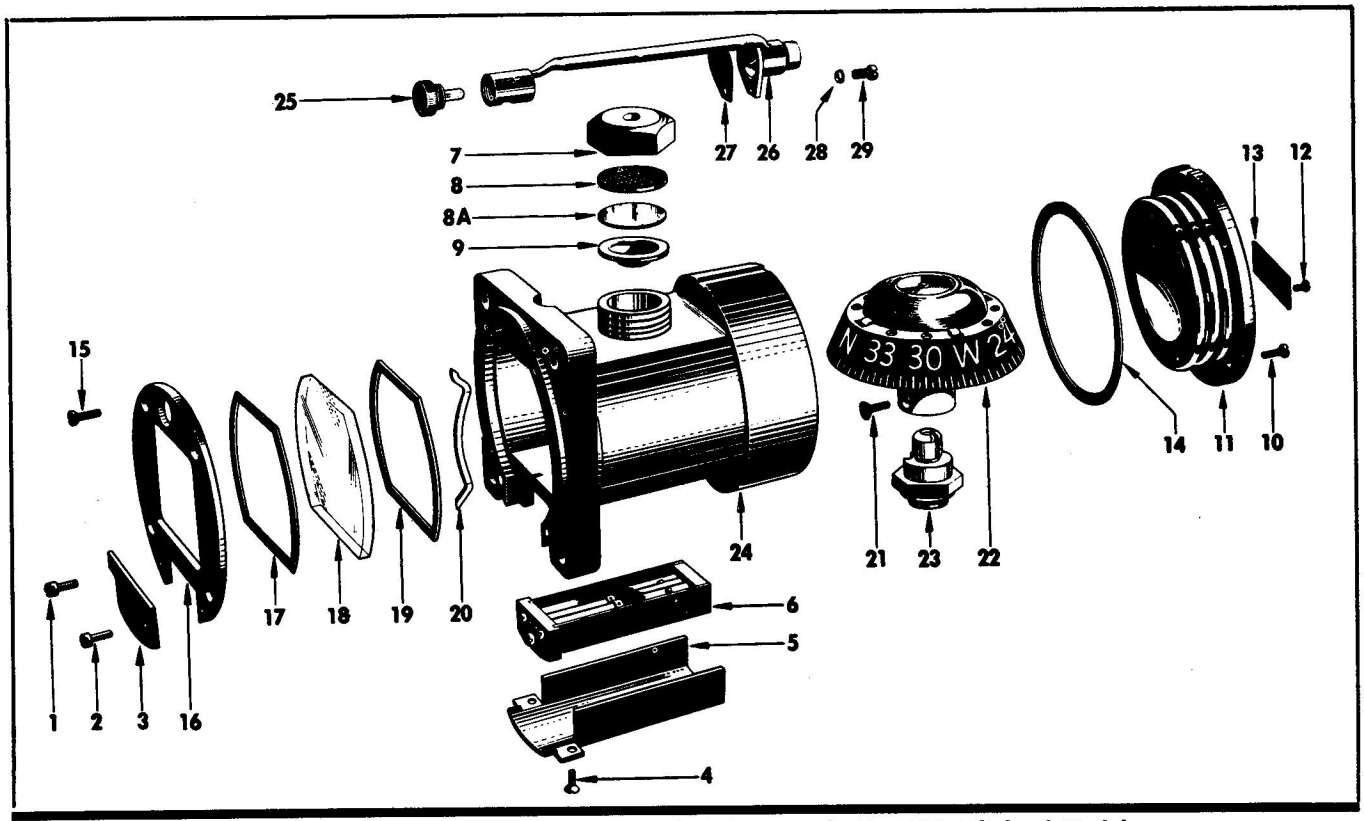


Figure 46a — Complete Instrument Exploded View of AN 5766-4 lighted Model

Figure & Index Number		PART NUMBER	1 2 3 4 5 6 7 NOMENCLATURE	Units Per Assy.
46a		CB-2100	Compass Assembly Type AN 5766-4	1
46a	1	448-4-VBX	Screw—Coverplate (left)	1
46a	2	CB-633	Screw—Coverplate (right)	1
46a	3	CB-920	Coverplate—Compensator	1
46a	4	256-2FBX	Screw—Compensator housing	3
46a	5	CB21-904	Housing—Compensator	1
46a	6	CB21-400	Compensator Assembly (See figure 48 for details)	1
46a	7	CB21-709	Cap—Filler	1
46a	8	CB21-711	Gasket—Filler cap (2)	2
46a	8A	CB21-710A	Disc.	1
46a	9	CB21-710	Cap—Phosphor Bronze Sealing	1
46a	10	CB21-602	Screw—Expansion unit	4
46a	11	CB21-100-AN4	Expansion Unit	1
46a	12	256-2-RBT	Screw—Identification plate	2
46a	13	CB21-735	Plate—Identification	1
46a	14	CB21-902	Gasket—Expansion unit	1
46a	15	CB21-602	Screw—Bezel	4
46a	16	CB21-601-AN4	Bezel	1
46a	17	CB21-915-AN4	Gasket—Spacer bezel	1
46a	18	CB21-913	Lens—Compass	1
46a	19		Gasket—Sealing bezel	1
46a	20	CB21-918	Wire—Lubber line	1
46a	21	256-2-FBX	Screw—Card retainer	1
46a	22	CB21-300	Card Assembly (See figure 47 for details)	1
46a	23	CB21-200	Post Assembly - Jewel (See figure 47 for details)	1
46a	24	CB21-701-AN4	Case	1
46a		AN-VV-C551	Liquid—Damping	AR
46a	25	AN3136	Lamp—Instrument	1
46a	26	CB-21-500A	Light—Assembly	1
46a	27	CB-21-531-C	Insulator—Connector Plate	1
46a	28	CB-531F	Grommet—Insulating	1
46a	29	CB-520-C	Screw—Connector Plate	1

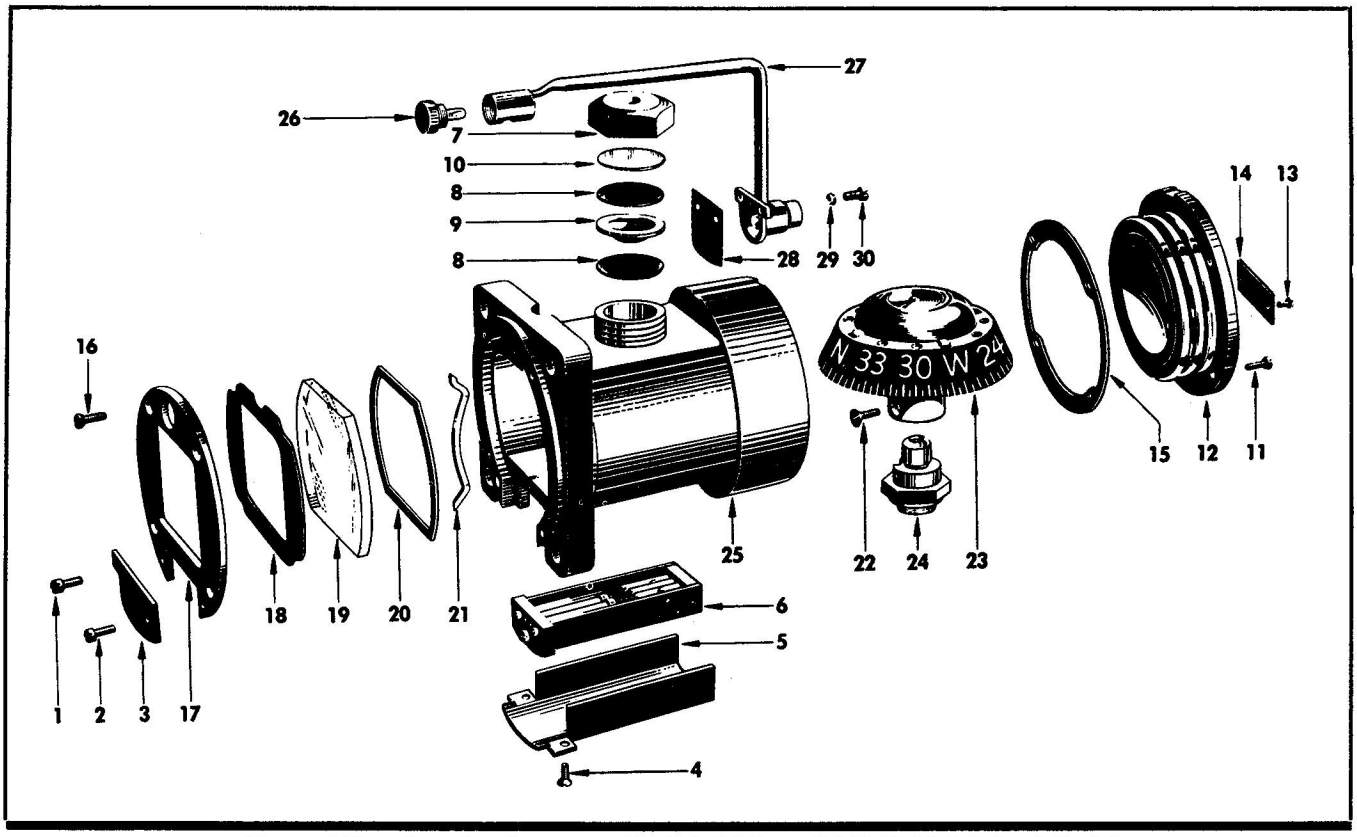


Figure 46b—Complete Instrument Exploded View of AN 5766-3 lighted Model

COMPASS ASSEMBLY

Figure & Index Number	PART NUMBER	1 2 3 4 5 6 7 NOMENCLATURE	Units Per Assy.
46b	CB-2100-M	Compass Assembly—Type AN5766-3	1
46b 1	AN501B4-4	Screw—Machine, fillister head, fine thread	1
46b 2	CB21-633	Screw—Coverplate (right)	1
46b 3	CB21-920	Coverplate—Compensator	1
46b 4	256-2FBX	Screw—Compensator housing	3
46b 5	CB21-904	Housing—Compensator	1
46b 6	CB21-400	Compensator Assembly (See figure 48 for details)	1
46b 7	CB21-709	Cap—Filler	1
46b 8	CB21-711	Gasket—Filler cap	2
46b 9	CB21-720	Washer—Spring, filler cap	1
46b 10	CB21-710A	Disc	1
46b 11	CB21-602	Screw—Expansion unit	4
46b 12	CB21-100M	Unit—Expansion	1
46b 13	256-2RBT	Screw—Identification plate	2
46b 14	CB21-735	Plate—Identification	1
46b 15	CB21-902	Gasket—Expansion unit	1
46b 16	CB21-602	Screw—Bezel	4
46b 17	CB21-601-AN4	Bezel	1
46b 18	CB21-915-AN3	Gasket—Spacer bezel	1
46b 19	CB21-913-AN3	Lens—Compass	1
46b 20	CB21-914	Gasket—Sealing bezel	1
46b 21	CB21-918	Wire—Lubber line	1
46b 22	256-2-FBX	Screw—Card retainer	1
46b 23	CB21-300	Card Assembly (See figure 47 for details)	1
46b 24	CB21-200	Post Assembly—Jewel	1
46b 25	CB21-701-AN4	Case	1
46b 26	AN3136	Lamp—Instrument	1
46b 27	CB21-500M	Light Assembly	1
46b 28	CB21-531M	Insulator—Connector plate	1
46b 29	CB-531F	Grommet—Insulating	1
46b 30	CB-520C	Screw—Connector plate	1

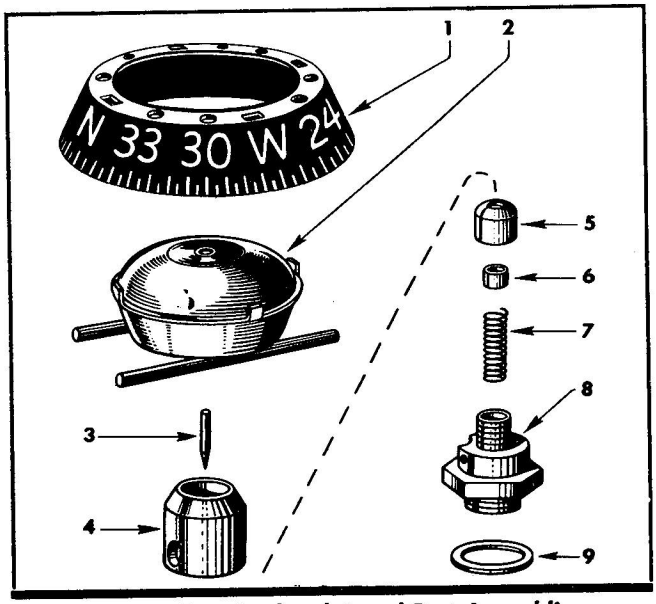


Figure 47 — Card and Jewel Post Assemblies

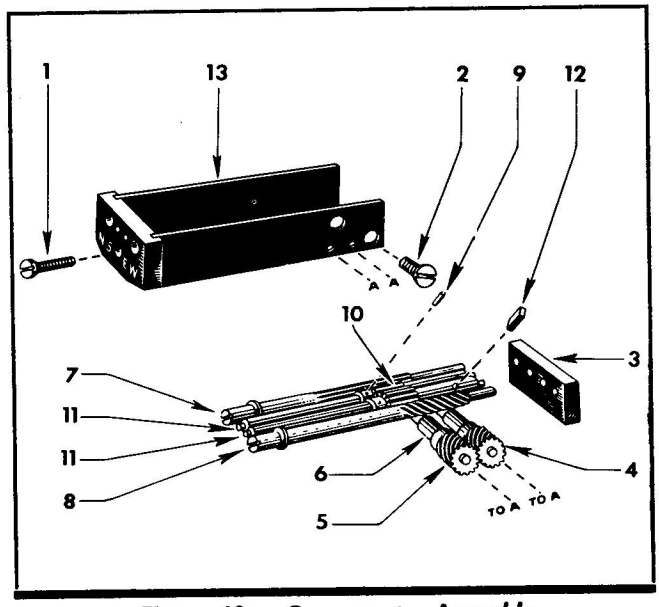


Figure 48 — Compensator Assembly

Figure & Index Number	PART NUMBER	NOMENCLATURE	Units Per Assy
47		Card and Jewel Post Assemblies	
47	CB21-300	Card Assembly	1
		(Refer to figure 46)	
47 1	CB21-303	Dial	1
47 2	CB21-310	Float Assembly	1
47 3	CB21-334	Pivot	1
47 4	CB21-305	Retainer—Card	1
47	CB21-200	Post Assembly - Jewel	1
		(Refer to figure 46)	
47 5	CB-232	Cap—Jewel post	1
47 6	CB-231	Jewel—Mounted	1
47 7	CB-233	Spring—Jewel	1
47 8	CB21-201	Post—Jewel	1
47 9	CB21-202	Washer—Jewel post	1
48	CB21-400	Compensator Assembly	1
		(Refer to figure 46)	
48 1	448-6-VBX	Screw—Compensator withdrawal	1
48 2	256-2-FBX	★ Screw—Assembly	2
48 3	CB21-402	★ Plate—Back	1
48 4	CB21-438	★ Pinion—East-West, left-hand	1
48 5	CB-438A	★ Pinion—East-West, right-hand	1
48 6	CB21-407	★ Shaft—East-West magnet holder	2
48 7	CB21-404	★ Shaft—North-South adjustment	1
48 8	CB21-405	★ Shaft—East-West adjustment	1
48 9	CB-437B	★ Pin—Pinion	2
48 10	CB21-411	★ Pinion—North-South	2
48 11	CB21-406	★ Shaft—North-South magnet holder	2
48 12	CB21-413	★ Magnet—North-South	2
48 12	CB21-414	★ Magnet—East-West	2
48 13	CB21-401-3	★ Frame Assembly	1

★ Non-procurable parts, procure as a complete assembly.