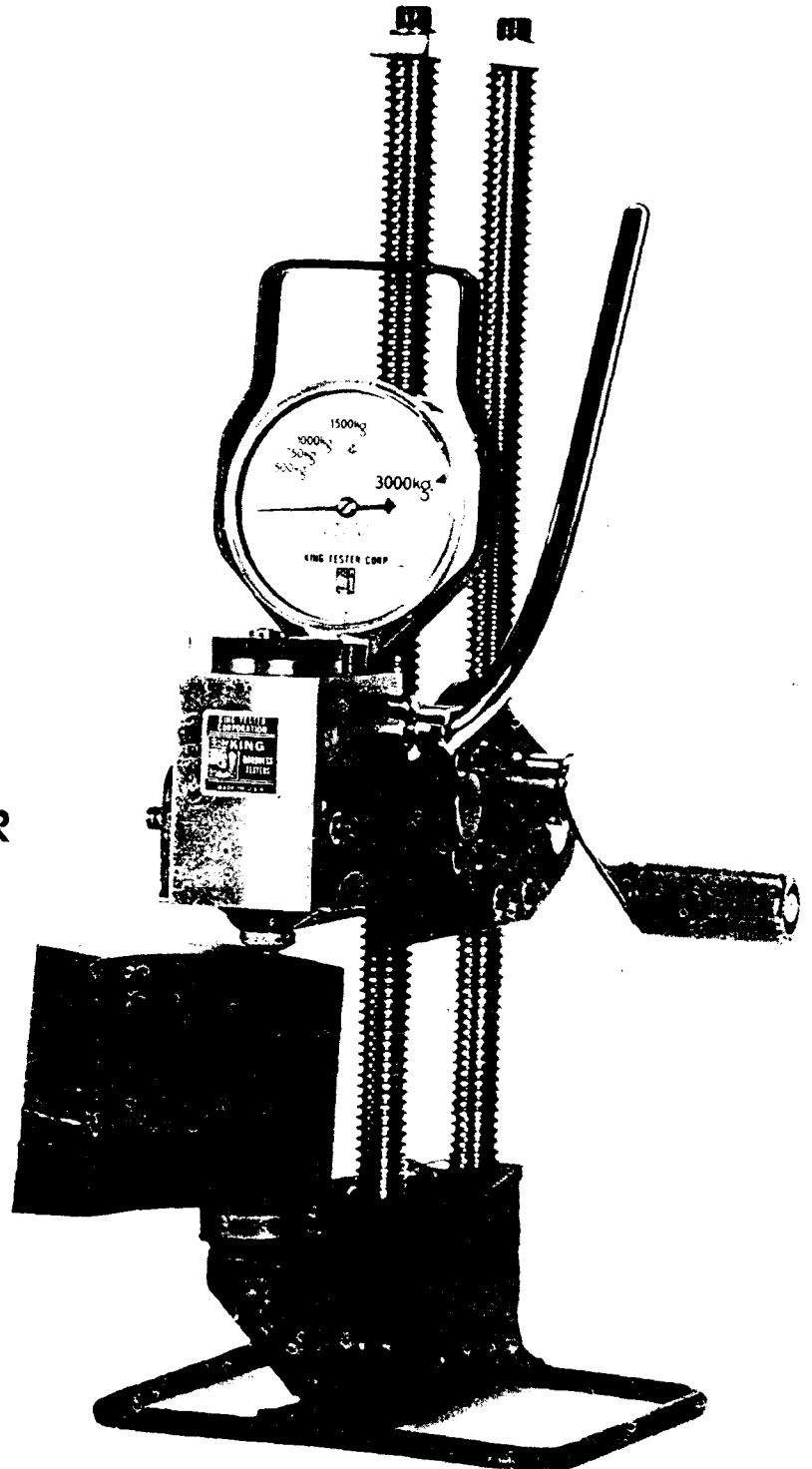


MAINTENANCE MANUAL

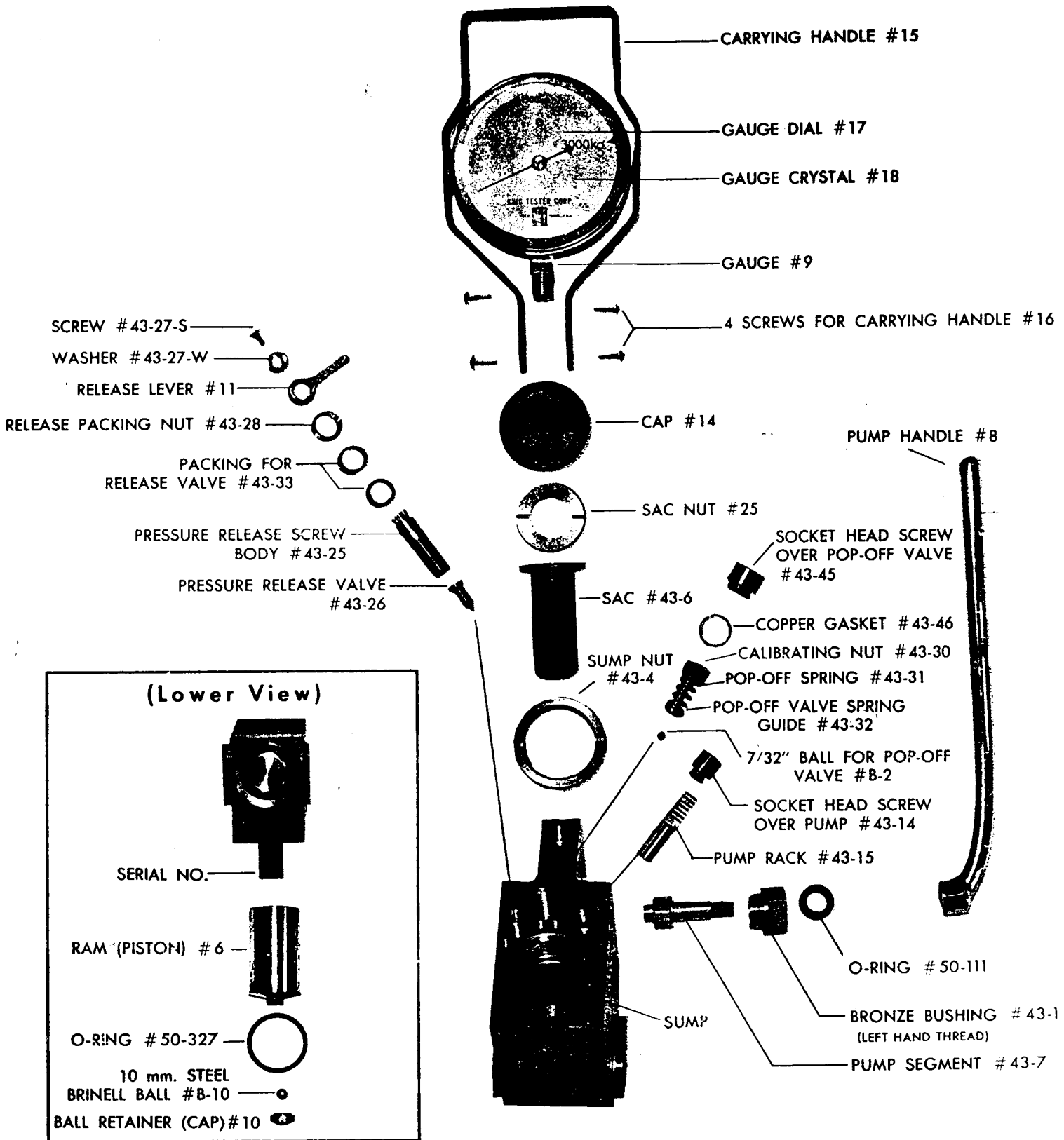
THE KING PORTABLE BRINELL HARDNESS TESTER



KING

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PARTS DIAGRAM FOR KING TEST HEAD (Upper View)



DIRECTIONS FOR CHANGING HYDRAULIC OIL IN TEST HEAD

Hydraulic oil in Test Head should be changed after several months of continuous use. The need for oil change will show up when difficulty is experienced in pumping full 3000 kilogram load. It is important to use correct type and viscosity. Mobile oil BB is best, but if unobtainable use SAE50 (Saybolt 965 Secs. at 100°F.), preferably with a paraffin base. Do not use a detergent oil. To change oil, remove the Test Head from the Base and drain the oil. See instructions on page 4. After draining oil, replace Test Head on Base.

Place a small piece of metal on anvil to protect 10 mm. ball, and crank carriage down until ball is seated firmly. Close pressure release valve #11, Reference: Drawing Page 3.

Fill sump with oil so that it fully covers holes at the top of sump. Keeping the holes covered with oil, pump Test Head until full load is reached several times. Open pressure release valve #11 and allow pressure to fall.

Close valve and pump again. Repeated pumping until after the full load is reached and then releasing the load will cause air to be forced out of the system.

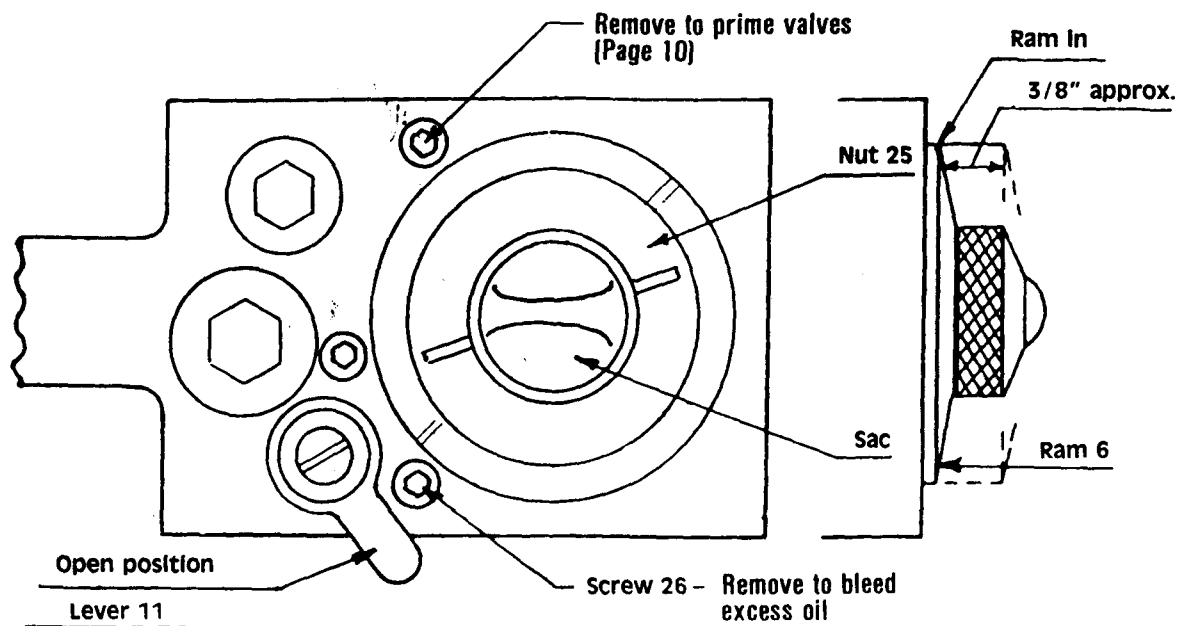
Repeat this operation until no more air bubbles appear on the surface of the oil in the sump. If dark oil comes out, drain Test Head and fill with fresh oil. Repeat previous operations to exhaust air.

The remaining air in system can be exhausted as follows: Raise carriage about 3/8". Close valve and pump full load, keeping sump full of oil. Open valve and lower carriage until ram is forced all the way in. Repeat until no more bubbles appear.

Before replacing sac, raise carriage and pump ram #6 down about 3/8", keeping the sump full of oil. Replace sac, making sure that there is no air pocketed under the sac, and replace sac nut. Tighten sac nut so that it provides an airtight seal. While tightening nut, make sure sac does not turn. Use the flat wrench #SW-1 and pliers to tighten the nut.

Open pressure release valve #11 and crank carriage down until ram #6 is all the way in. If there is too much oil in the system, the sac will bulge out through the hole in sac nut #25. If this occurs, bleed excess oil by loosening headless set screw #26 (in front of pressure release lever). Allow just sufficient oil to escape so that sac will bulge firmly beneath sac nut.

Tighten set screw. Clean outside parts of Test Head with cleaning fluid to remove excess oil. Replace Cap #14.



DIRECTIONS FOR CALIBRATING KING BRINELL TEST HEAD

The King Portable Brinell should be calibrated to pop off at 3000 kgs. This 3000 kg. load is governed by a spring #43-32 under the socket head screw #43-45. Correct procedure for calibrating Test Head is as follows:

Do not remove Test Head from Base, but crank the carriage up so that 10 mm. ball is clear.

Close pressure release valve and pump the ram #6 down about 1/4".

Remove the socket head cap screw #43-45. Note the slotted head screw underneath when cap screw is removed. Turn this screw about 1/16th turn, clockwise to increase the load, or counterclockwise to decrease the load. Pour in a little oil and replace copper gasket and cap screw, making sure no air is trapped underneath.

Using a Standard Brinell test bar, make three or four tests to check the calibration. Be certain that ram is pushed in all the way before making any tests. If the required calibration has not been obtained, repeat the above operation, turning the screw a little each time.

If these adjustments cause the pointer of the gauge to go further than the 3000 kilogram mark on the dial, or if the pointer no longer comes to rest at zero, pointer must be adjusted. Remove the gauge crystal from the gauge, hold pointer with one hand near the center so that it will not bend, insert screwdriver in the slot in center of the pointer. Pointer can be adjusted by turning screwdriver either to right or left. When pointer is in correct position, replace the glass crystal.

INSTRUCTIONS FOR REPAIR OF KING BRINELL TEST HEAD

The Test Head may be removed from the Base or Carriage by first removing the two socket head cap screws, one on each side of the Test Head, which hold Head to side plates. Use Allen wrench to remove these screws, and slide Head out.

When placing Test Head in machinist's vise for repair, use care to grip Head only as directed by instructions which follow. Use only sufficient pressure to hold Test Head firmly. When servicing Test Head, do not loosen sump nut #43-4 and do not remove any headless set screws unless otherwise directed by instructions.

TO DRAIN OIL FROM TEST HEAD

Remove Test Head from Base.

Place Test Head in vise (see Illustration #1).

Place release valve lever #11 in open position.

Remove hardened cap #14. This can usually be unscrewed by hand.

Remove sac nut #25. Use flat wrench #SW-1 and pliers for leverage.

Remove rubber sac #43-6.

Remove Test Head from vise.

Turn Test Head upside down over any container and empty dirty oil. Allow to drain.

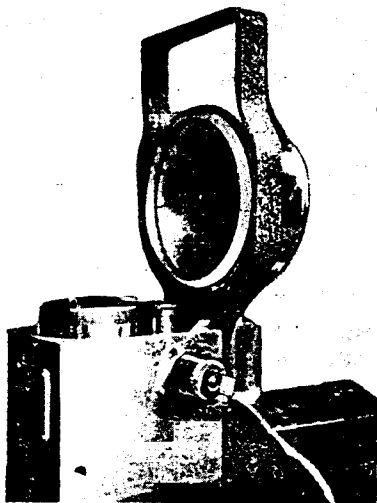


ILLUSTRATION #1

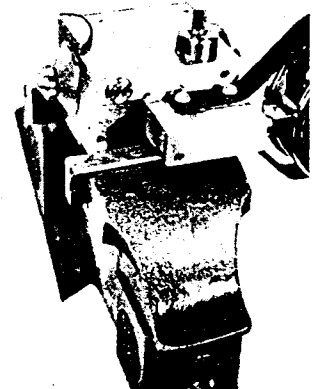


ILLUSTRATION #2

TO REPLACE RELEASE VALVE PACKING

Insert Test Head in vise as per Illustration #1.

Make certain that Pressure Release Valve is in full open position.

Remove Screw #43-27S; Washer #43-27W; Pressure Release Lever #11. Pry lever off gently with screwdriver.

Do not unscrew Pressure Release Screw Body #43-25 unless it is necessary to replace Pressure Release Valve #43-26.

Packing for Release Valve consists of two leather washers. These washers are not subject to excessive wear, and they are sometimes difficult to remove. Removal of these washers is not recommended unless replacement is considered necessary. Replacement is essential when washers are well worn, oil soaked, spongy, and/or oil leakage is apparent.

Washers are most easily removed with the aid of a small pointed or hooked tool. When properly done, each washer should come out in one piece. Be certain to remove all remnants of leather.

If necessary to replace pressure release valve #43-26, it may be done most conveniently at this time.

After removing old packing, insert new packing #43-33 (two leather washers) over Pressure Release Valve Body.

Tamp washers down with tool #R-1 and hammer.

Replace packing nut #43-28 using wrench #SNW-2. Screw down firmly, but use hand pressure only.

Replace pressure release lever #11. Place in position so that lever can be turned to full closed position without lever touching carrying handle #15. Tap lever on with hammer.

Replace washer and screw.

TO REPLACE PUMP RACK AND/OR PUMP SEGMENT

It is recommended that Pump Segment be replaced when square end which holds pump handle becomes excessively worn.

It is necessary to replace Pump Rack when broken or damaged. A broken pump rack will be evident when pump handle can be turned more than the normal arc.

Remove oil from Test Head, if not already drained.

Insert Test Head in vise (see Illustration #1).

Remove Socket Head Screw over Pump #43-14. Use Allen wrench.

Use extreme care when removing this socket cap screw.

Change position of Test Head in vise (see Illustration #2).

Remove bronze bushing #43-10 with 7/8" open end wrench. CAUTION: bronze bushing has left hand thread; turn clockwise to remove.

Lift out pump segment #43-7.

Work out broken or damaged pump rack #43-15. Use care not to scratch or damage 3/8" bore when removing rack.

Make sure holes are free of dirt and chips. Removal of dirt can be accomplished easily if Test Head is taken from vise and washed out with spirits or cleaning fluid, then allowed to drain. Reinsert in vise.

Insert new pump rack #43-15. Fit must be snug and without side play; but rack must move freely back and forth. Any burrs that prevent this smooth action should be removed.

Insert pump segment #43-7. Be certain that rack is at extreme bottom position of movement before inserting segment. Teeth of rack and segment must mesh properly. When properly inserted, segment can be revolved approximately 90 degrees, and all teeth of both rack and segment are used in the arc of travel.

Replace bronze bushing #43-10 with 7/8" open end wrench. Apply firm pressure, but do not overtighten. Pump segment should turn snugly, but smoothly, and without end play, when pump handle is used.

Change position of Test Head in vise. (see Illustration #1).

Pour oil in 3/8" bore above pump rack.

Replace socket head cap screw over pump #43-14. Tighten firmly.

INSTRUCTIONS FOR REPLACING O-RINGS ON TEST HEAD

To replace O-ring Packing in Bronze Bushing, remove pump handle and remove bronze bushing. Note: this bronze bushing has a left-hand thread. After removing bronze bushing, pick out old O-ring and insert new Buna-N O-ring Ring No. 50-111 and reassemble Test Head.

To replace O-ring packing for Ram (piston), pump piston down as far as it will go. Open release valve and remove Test Head from Base. Place Test Head in vise and pull ram completely out of Test Head. Remove O-ring from recess within bore or cylinder of Test Head. Replace with Buna-N O-ring No. 50-327. Replace Ram (piston) carefully. Follow instructions in Service Manual for changing oil and removing air from Test Head.

ADDITIONAL SERVICE INSTRUCTIONS

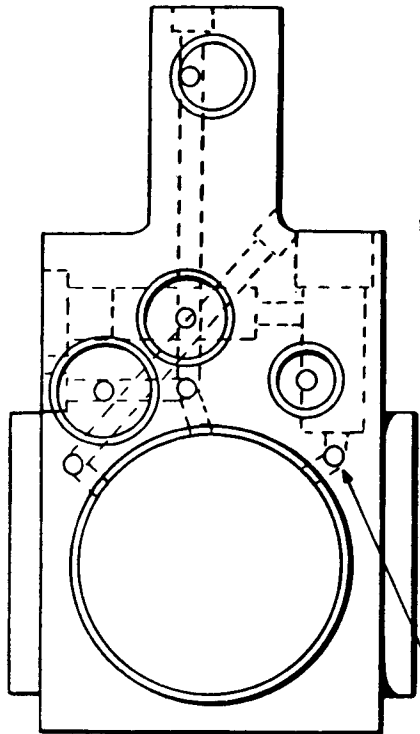
VALVE ADJUSTMENT

Please refer to parts diagram on page 8, opposite. On King Test Heads with Serial #S-1 or later, the valve system consists of unitary high pressure and low pressure valves which ordinarily need no attention. The low pressure valve is located at lower right rear of Test Head and the high pressure valve is located on left side of Test Head, just behind ear. Both valves are spring activated ball check valves and can be exposed by removing flat head screws at these two locations.

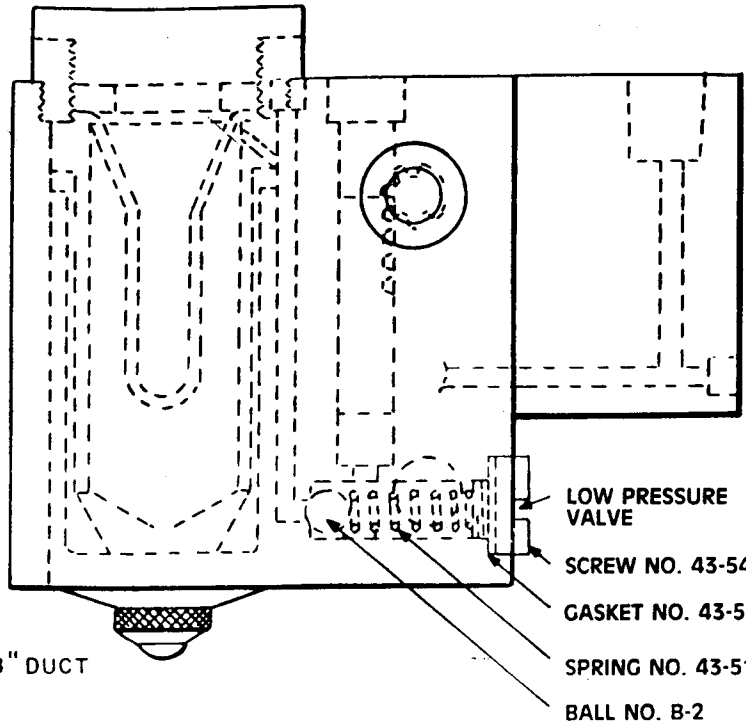
It is not recommended that these valves be exposed at any time unless absolutely necessary. If at any time air is present in the hydraulic system, these valves may become temporarily airlocked. When changing oil, use the customary precautions as outlined on page 2 to remove all air. Should airlock develop, the following procedure is helpful: Pump ram down approximately 5/16" and force back in again as far as it will go. If airlock remains, pump ram down 5/16", remove screw, spring and ball from low pressure valve and allow oil to flow. Refill valve chamber with SAE-50 oil and replace parts. Repeat with high pressure valve if necessary.

On rare occasions, due to improper servicing, valves may fail to operate because of dirt getting between ball and ball seat. Valves may be cleaned by removing both springs and both balls and flushing cleaning fluid through valve passages. Valves can be reseated by tapping 7/32" ball in place with a concave punch and a few light hammer blows. After cleaning, fill chambers with SAE-50 oil and replace balls, springs and screws. Should valves then fail to operate because of airlock, priming may be necessary and the following procedure is recommended:

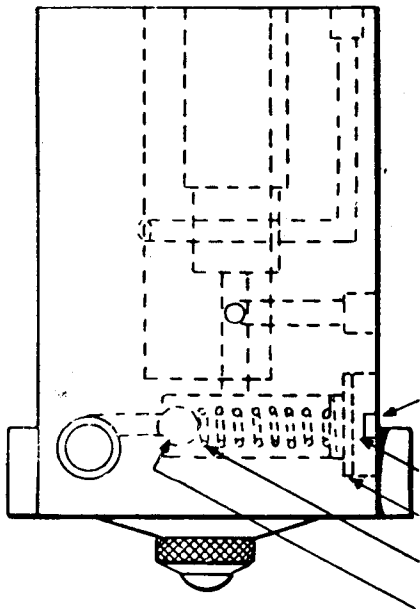
1. Remove pop-off valve assembly. (See parts diagram on page 1.)
2. Remove Sac and fill Sump with SAE-50 oil.
3. Remove 1/4" hollow set screw on top of Test Head at extreme right.
4. Insert a 1/8" diameter shaft into duct and pump up and down slowly. Allow oil to enter this duct from sump after each upward stroke. Pumping will force oil through valves and break airlock.
5. After proper valve action is established, replace all parts and calibrate (page 3).



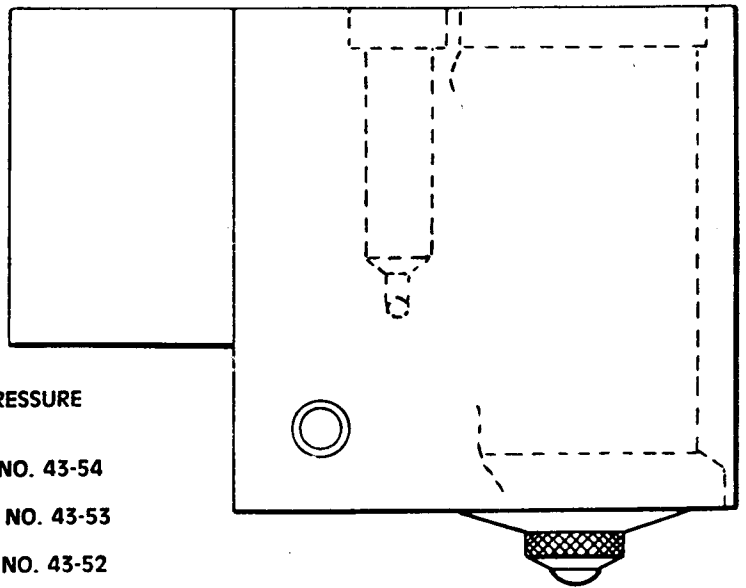
TOP VIEW



RIGHT SIDE VIEW



REAR VIEW



LEFT SIDE VIEW

TO REPLACE GAUGE

It is unnecessary to drain oil when replacing gauge.

Insert Test Head in vise (see Illustration #1).

Remove four screws #16.

Remove carrying handle #15.

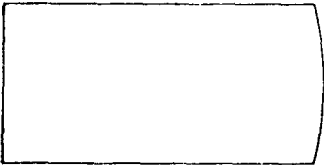

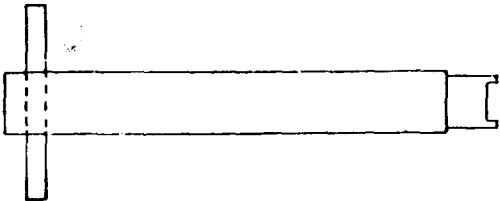
Unscrew Gauge, using open end wrench, and discard old Gauge.

Fill gauge hole in Test Head with oil.

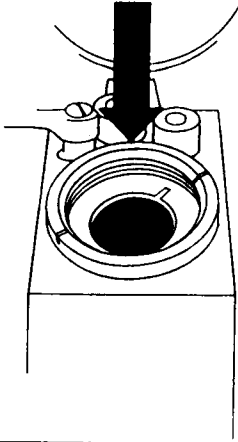
Screw on new Gauge with open end wrench. Tighten firmly but do not use excessive pressure. Gauge should face to the front on Standard Model Tester. Do not attempt to engage all threads on gauge connection unless necessary to make an oiltight joint.

Attach carrying handle with four screws.

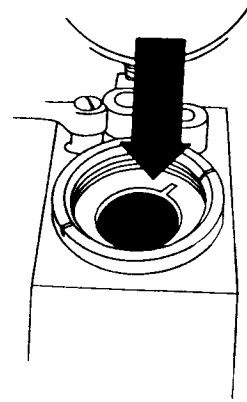
SPECIAL TOOLS TO REPAIR KING BRINELL TEST HEAD

	CATALOG NUMBER	DESCRIPTION
	SW-1	FLAT WRENCH TO TURN SAC NUT
	R-1	TOOL TO INSERT RELEASE VALVE PACKING
	SNW-2	WRENCH TO TURN RELEASE VALVE PACKING NUT

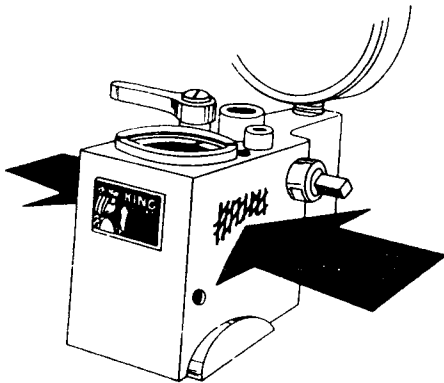
DON'T
tamper with
the sump nut.



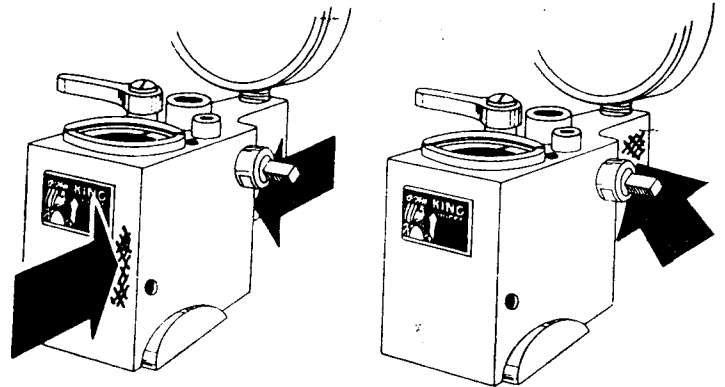
DO
remove only
the sac nut
to add oil.



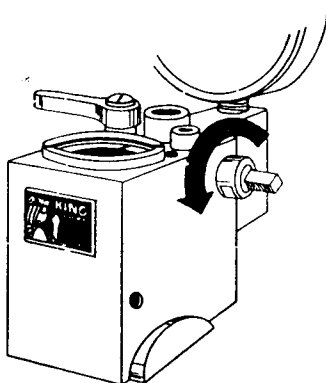
DON'T
clamp the block
by its sides.



DO
hold as shown in
the manual.



DON'T
undo the bronze
pump bushing
counter clockwise.



DO
unscrew the bushing
clockwise, it has left
hand thread.

