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Commercial Division
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SERVICE BULLETIN

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SUBJECT:
17DA CONOFLOW GUIDE VANE ACTUATOR AND POSITIONER

PURPOSE

To advise how to properly check and adjust the Conoflow guide vane actuator and positioner used in 17DA compressors to control the inlet guide vane assembly.

MACHINES AFFECTED

17DA compressors

BACKGROUND

All vane motors on 17DA machines should be checked according to the procedures contained in this bulletin.

PROCEDURE

The following procedure is recommended to properly check and adjust the subject actuator and positioner.

The main air regulator (6), Figure 4, must be set at 80 psig and the cushion air regulator (3), Figure 4, set at 30-40 psig to insure rapid closing of the guide vanes at shutdown. A schematic of the air flow is shown on Figure 4.

To check if the Conoflow actuator mechanical stops are adjusted properly:

1. The machine must be in a shutdown condition.

2. The guide vane solenoid (1), Figure 4, must be supplied with a 110 volt power supply. Normally at shutdown the solenoid is de-energized so a separate power source must be applied to close the solenoid during this adjustment. A simple cord with a 110 volt wall plug can be utilized with an extension cord.

3. Place the auto-manual station in the manual position.

The operation of the Conoflow actuator must be such that the actuator mechanical stops (both open (17) and closed(15)), Figure 2, are reached before the internal (guide vane assembly) stops are seated.

4. Remove the clevis pin (19), Figure 1.

5. Push the guide vanes closed by turning the guide vane lever (21), Figure 1. Use a large crescent wrench if unable to move the guide vane lever by hand.

   Decrease the manual air station loading regulator until the actuator rod (18), Figure 2, comes to rest on its closed stop (15), Figure 2. This stop is an external spacer ring (4) mounted just above the yoke (5), Figure 4.

   Early machines may not have this spacer. The closed mechanical stop will then be the piston (16) inside the vane motor, Figure 2.

6. With the vane lever (21), Figure 1, indicating closed and the actuator rod (18) in its closed (upmost) position, line up the idler link (20), Figure 1, with the yoke (5), Figure 1. If the holes do not line up the closed stop must be adjusted. See Page 3 for this adjustment.

7. Manually push the vanes in their full open position by using the guide vane lever (21).

8. Increase the manual loading regulator pressure until the Conoflow actuator rod (18), Figure 1, comes to rest at its downmost position (vanes open).

9. Again try to line up the holes in the idler link (20) with the yoke (5). If they do not line up the open stop must be adjusted. See Page 3 for this adjustment.

To check if the vane motor stroke is matched to the guide vane stroke:

1. The machine must be in a shutdown condition.

2. The guide vane solenoid must be supplied with a 110 volt power supply.

3. Place the auto-manual station in the manual position. Make sure the station is supplied with air at 20 psi.

4. Increase the manual loading regulator pressure slowly. The actuator rod (18), Figure 1, must just begin to move at 3 psig and be fully extended at 15 psig.

   The action of the actuator rod must be checked after the stops, both open (17), Figure 2, and closed (4), Figure 4, have been checked and if necessary adjusted. Use the procedure of adjusting the Conoflow vane motor stroke with the stroke of the guide vanes.

To adjust the mechanical stops (Conoflow actuator):

1. With the clevis pin (19), Figure 1, removed, increase the manual loading regulator pressure until the actuator rod (18), Figure 1, moves downward and the vane motor piston (16) comes to rest on its internal stop (17), Figure 2.

2. Open the vanes by pushing the guide vane lever (21), Figure 1, until the vanes come to rest on their internal stop.

3. Back off this stop 1/16" towards the closed position.

4. Loosen the locknut (if present) on the yoke and screw the yoke (5), Figure 1, (up or down) until the hole in the yoke and the hole in the idler line (20), figure 1, line up and the clevis pin (14), Figure 1, can be inserted. This fixes the vanes open mechanical stop.

5. Decrease the manual air station regulator pressure until the vanes close completely. Measure the distance from the top of the yoke (5) to the spot faced surface on the vane motor mounting bracket (27), Figure 4. Add 1/32 to this measurement and grind a stop (4), Figure 4, to suit. Be sure to mark the position of the yoke before removal to insert the stop. This fixes the closed stop.

To adjust vane motor stroke:

The mechanical stops have now been adjusted. The stroke of the vane motor must now be matched with the stroke of the guide vanes. The instrument air signal must just start to open the vanes at 3 psig and be just resting on the open stop at 15 psig. Use the following procedure:

1. With the solenoid still energized open the manual air station loading regulator valve until the vanes are closed completely.

2. Remove the dust cap (11), Figure 2, from the top of the positioner.

3. Set the manual air station loading regulator to 3 psig.

4. The vane actuator rod (18), Figure 2, should just begin to move. If it does not, turn the zero adjust coupling (10), Figure 2, clockwise until the actuator rod just starts to move open. This sets the proper starting point.

5. If the shaft moves before 3 psig is reached, turn the zero adjust coupling (10), Figure 2, counterclockwise several turns and proceed as in step 4.

6. After the positioner is set so the shaft just starts to move open at 3 psig, continue to increase the manual air station loading regulator valve until the gauge reads 15 psig. Note at which point the vanes come to their full open position. If the vanes have fully opened before 15 psig is reached, the range spring assembly (Figure 3) must be adjusted. If the vanes have not fully opened and 15 psig has been attained, the range spring assembly will also have to be adjusted. Use the procedure under adjusting the range spring assembly.

If the vanes reach their full open position at the same time the gauge reads 15 psig the strokes are matched and no further adjustment is necessary.

To adjust the range spring assembly:

Normally the vanes will reach their full open position before the full air signal of 15 psig is reached. Use the following procedure to match the strokes. Refer to Figure 2.

1. Turn off the air supply and remove the necessary tubing, etc. Bleed the air from the cylinder and capacity tank.

2. Remove the spirolox ring (12), Figure 2.

3. Remove the headplate (9), Figure 2, which is held in place by O-ring (8), Figure 2.

4. Remove Allen set screw (13), Figure 2.

5. Remove spring rod nut (14), Figure 2.

6. Remove positioner body by removing the six capscrews (7), Figure 2. This will expose the range spring assembly, Figure 3.

7. Measure the distance from the top of the spring rod (24), Figure 3, to the top of the actuator housing (26), Figure 3, distance "A". Record this dimension.

The stroke of the Conoflow motor is changed by changing the number of inactive spring coils (coils above the spring clip (23) in the range spring assembly, Figure 3.) The larger the number of inactive coils the shorter the stroke of the actuator rod per pound of air signal. This means that the instrument air signal span of the motor will be increased and matched with the stroke of the guide vanes as the number of inactive coils are increased. It will be a trial and error method and may be time consuming (up to four hours).

To change the span, turn the range spring clip (23), Figure 3, to allow about four more inactive coils. Readjust the spring rod (24), Figure 3, using the two nuts (25), Figure 3, to maintain the dimension "A" previously measured. This will be a trial. Reassemble the range spring assembly positioner, and connect the necessary tubing.

8. Reset the zero adjust (10) to start to open at 3 psig.

9. Using the 3 psig starting point, screw in the manual air station loading regulator until either the vanes completely open against mechanical stop or 15 psig is reached. If the mechanical stop is reached before 15 psig, try again. From this trial we find out whether or not to try again and how many coils to keep inactive.

   Generally, four (4) more inactive coils will increase the span by (1 to 1-1/2 psig).

After the necessary adjustments have been made, the assembly should work as follows:

At 3 psig the actuator rod (18), Figure 2, should just start to move. The rod should continue to travel downwards until 15 psig is reached. At that point the vanes should be fully open and just touching the open stop, (17), Figure 2.

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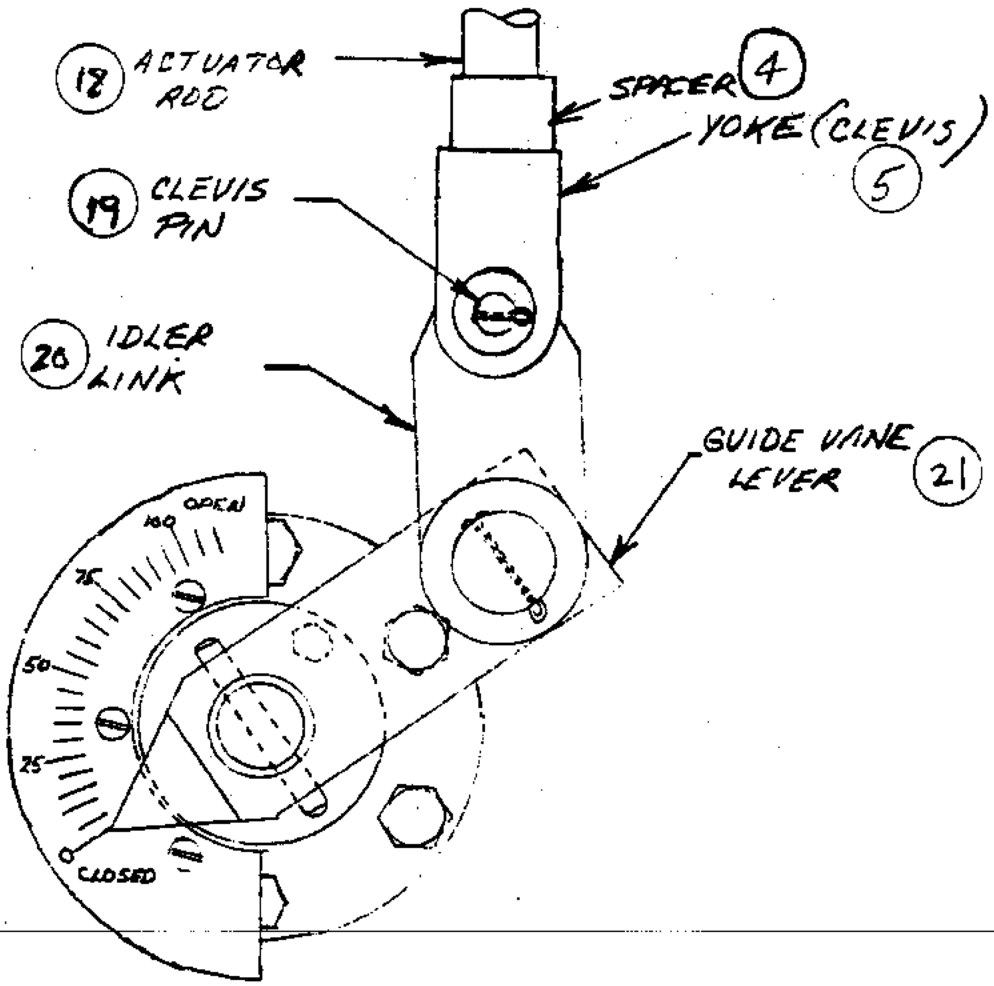

FIGURE 1

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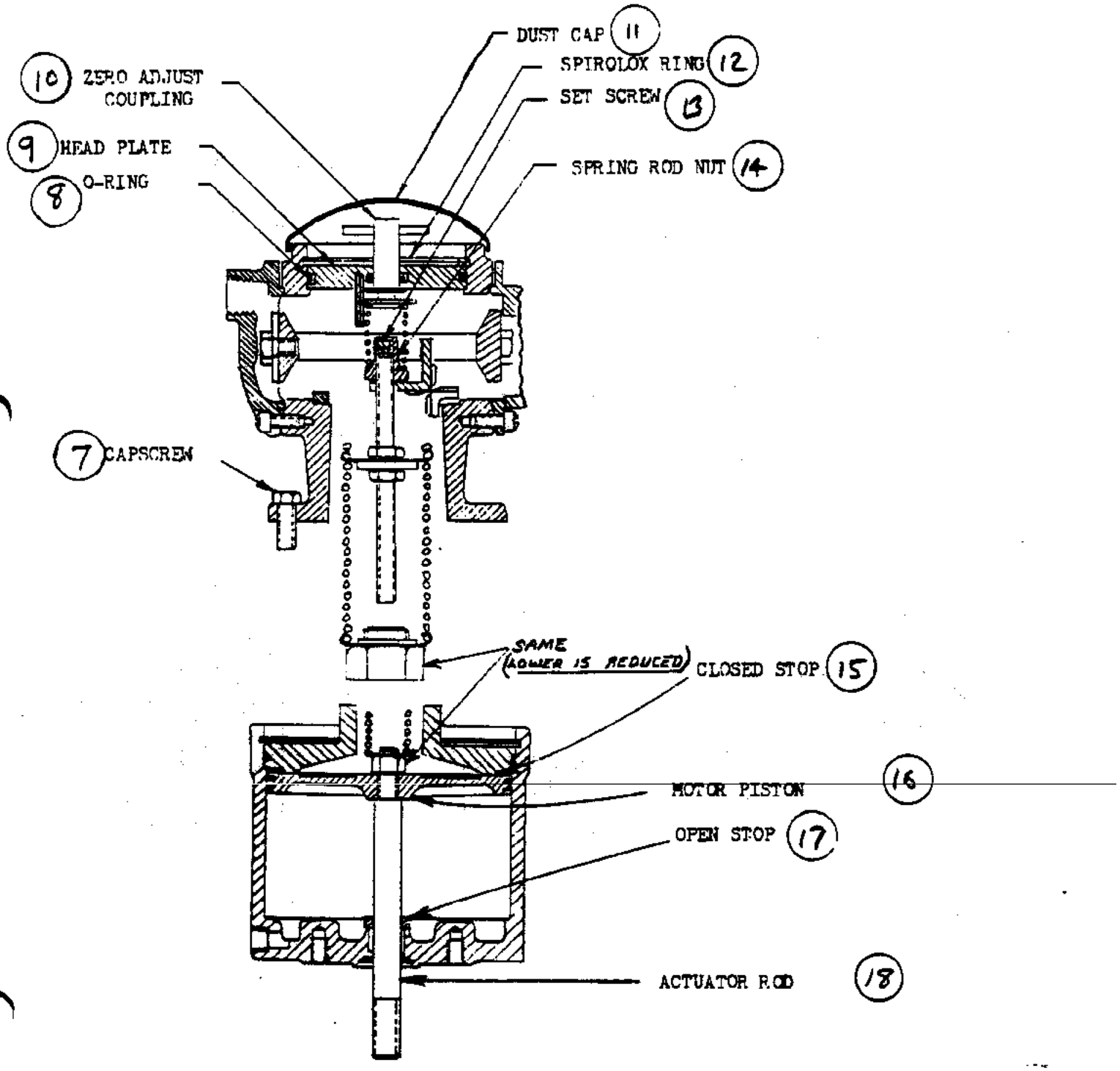
POSITIONER



ACTUATOR

R-5190A

FIGURE 2

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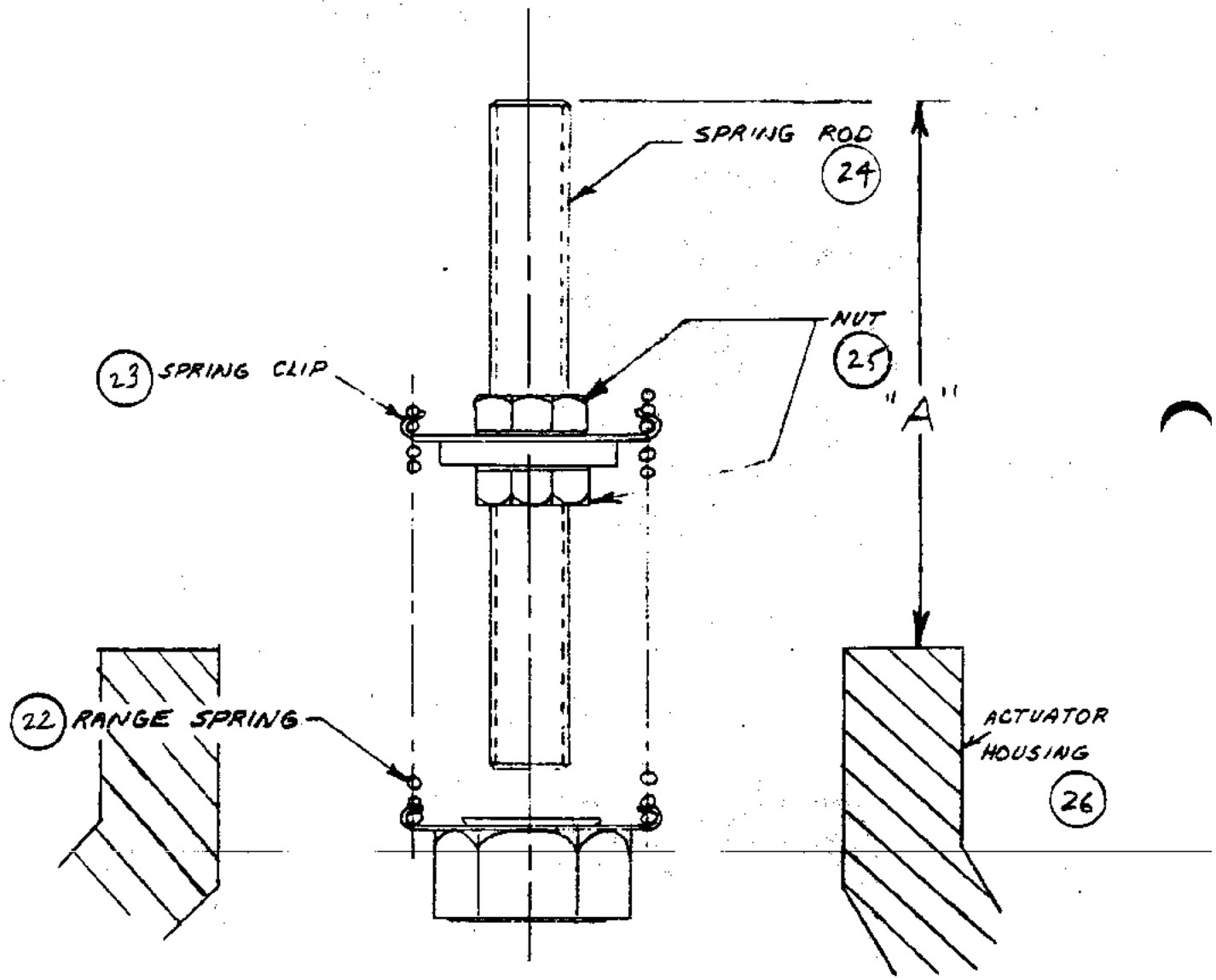

FIGURE 3

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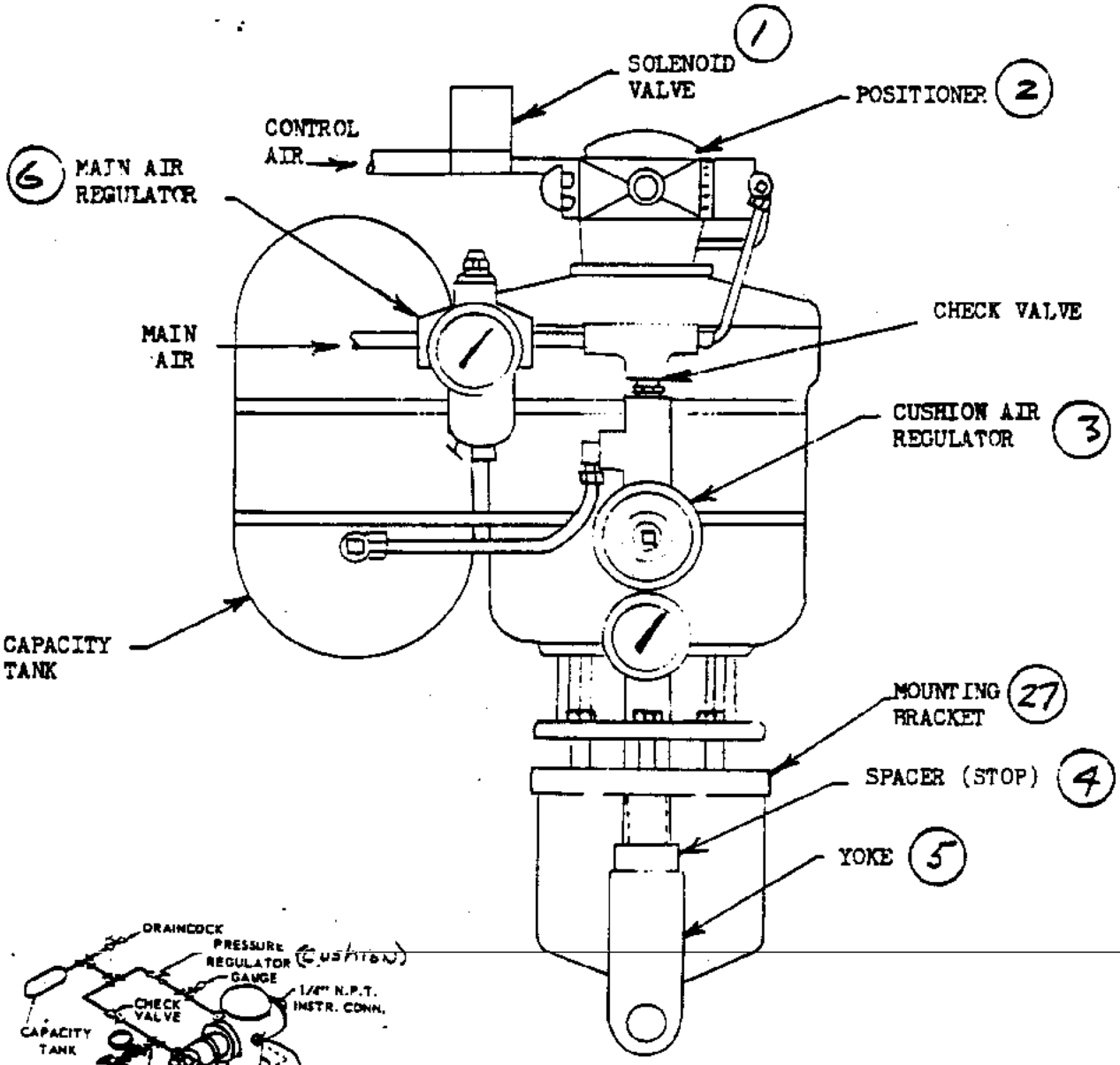

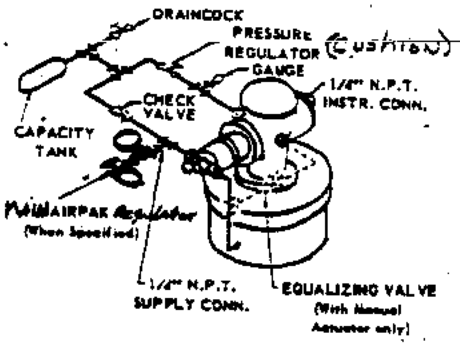

SCHEMATIC OF AIR FLOW

FIGURE 4