TRANE AIR CONDITIONING

# SERVICE BULLETIN

THE TRANE COMPANY - LA CROSSE, WISCONSIN

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DATE 2/6/76

PRODUCT RECIP. COMP.

SERV. MAN. SECT.

PAGE 1-6

T. GUTHRIE

**SUBJECT:** MODEL E COMPRESSOR, MECHANICAL FAILURES

INTRODUCTION:

A possibility of a lubrication failure or scramble could occur in the Model E compressor if a discharge valve does not properly seat. Causes of this problem and proper corrective procedure are outlined in this bulletin.

DISCUSSION:

Three separate conditions involving improper discharge valve seating, with resultant lubrication problems, have been observed within the compressor. Any one or all of these conditions in combination can cause an apparent lubrication failure.

1. Discharge Valve Hang-up

   The reason for discharge valve hang-up is attributed to an incorrect or excessive chamfer on the valve operating counterbore. (See Figure 1). The chamfer should be approximately .005 to 0.010 inches deep. With this dimension the chamfer will appear as a very slight bevel.

   If the chamfer is cut too deep, the discharge valve can move out of its operating counterbore and be caught between the discharge cage and suction valve plate, if the cage also lifts off the suction valve plate.

   If a discharge valve is displaced as described above and allowed to stay open, a constant back pressure (discharge pressure) is exerted on the piston of that cylinder. Design lubrication considerations for wrist-pin and large end rod bearings dictate that there be alternate loading on the journals. Alternate loading allows oil to reach the top and bottom of the bearings as the crankshaft rotates. A constant downward pressure on the top of the piston prevents sufficient oil from reaching the top half of the bearings causing a lubrication failure and eventual mechanical scramble.

2. Improper Cylinder Head Spring Position

   Improper spring positioning can occur when using either style cylinder head spring (three coil turns vs three and 1/2 turns) and positioning the start of the spring on a supporting rib on the discharge cage assembly as shown in Figure 5.

   Improper spring position can allow movement (tilting) of the discharge cage assembly, resulting in excessive noise, probable discharge valve seating problems, and potential mechanical failures.

3. Short Cylinder Head Springs

   The cylinder head spring was changed in 1972 from three to three and one half total coils as shown in Figure 2 and 3. The wire material was also

changed to increase the maximum allowable stress in the spring.

Reinstallation of a short spring during overhaul may allow the discharge cage assembly to lift during normal operation because of insufficient spring compression. The cage movement coupled with the possibility of the discharge valve moving sideways from its normal position will prevent the valve from seating thus allowing continuous hot gas leakage to the top of the piston. When this occurs, alternate loading of the bearings is interrupted which can cause an eventual compressor failure.

CORRECTIVE ACTION:

If the old style cylinder head spring (see Figure 2) is being reused for overhaul, check to see that the spring has not taken a set. Place the spring on a flat surface and lay a straight edge on the top of the spring. Rotate the spring 360° to determine the minimum free length. Minimum free length for a reusable head spring is 2.47 inches.

When reinstalling either style spring it is possible to improperly position the spring as described in Section 2 above. Be sure the start of the spring, when placed on the cage assembly, is located as shown in Figure 4.

Check the chamfer on each of the discharge valve cage assemblies prior to installation. The chamfer should be cut at approximately .005 to .010 of an inch. A simple test may be used to determine whether or not the cage is usable. The valve should be depressed as far as possible on one side and then pushed sideways to see if the valve can be pushed out of its normal counterbore. Any cage found in which the valve may be displaced should not be used when rebuilding a compressor.

PRODUCTION CHANGES:

All production stock has been inspected and reworked as necessary. In addition, Manufacturing is looking into a procedure to eliminate the chamfer operation.

This Service Bulletin applies to:

Hermetic Reciprocating Compressor
Open Reciprocating Compressor
Water Cooled Cold Generator
Air Cooled Cold Generator
Split System Condensing Units (RA and RAUA)
Reciprocating Compressor Chillers
Commercial Self Contained Air Conditioners
Single Zone Rooftop Units
Multizone Rooftop Units

and will appear on the following Microfiche:

Cold Generators
Compressor, Reciprocating
Rooftops
Self Contained, Commercial
Split System Condensing Units

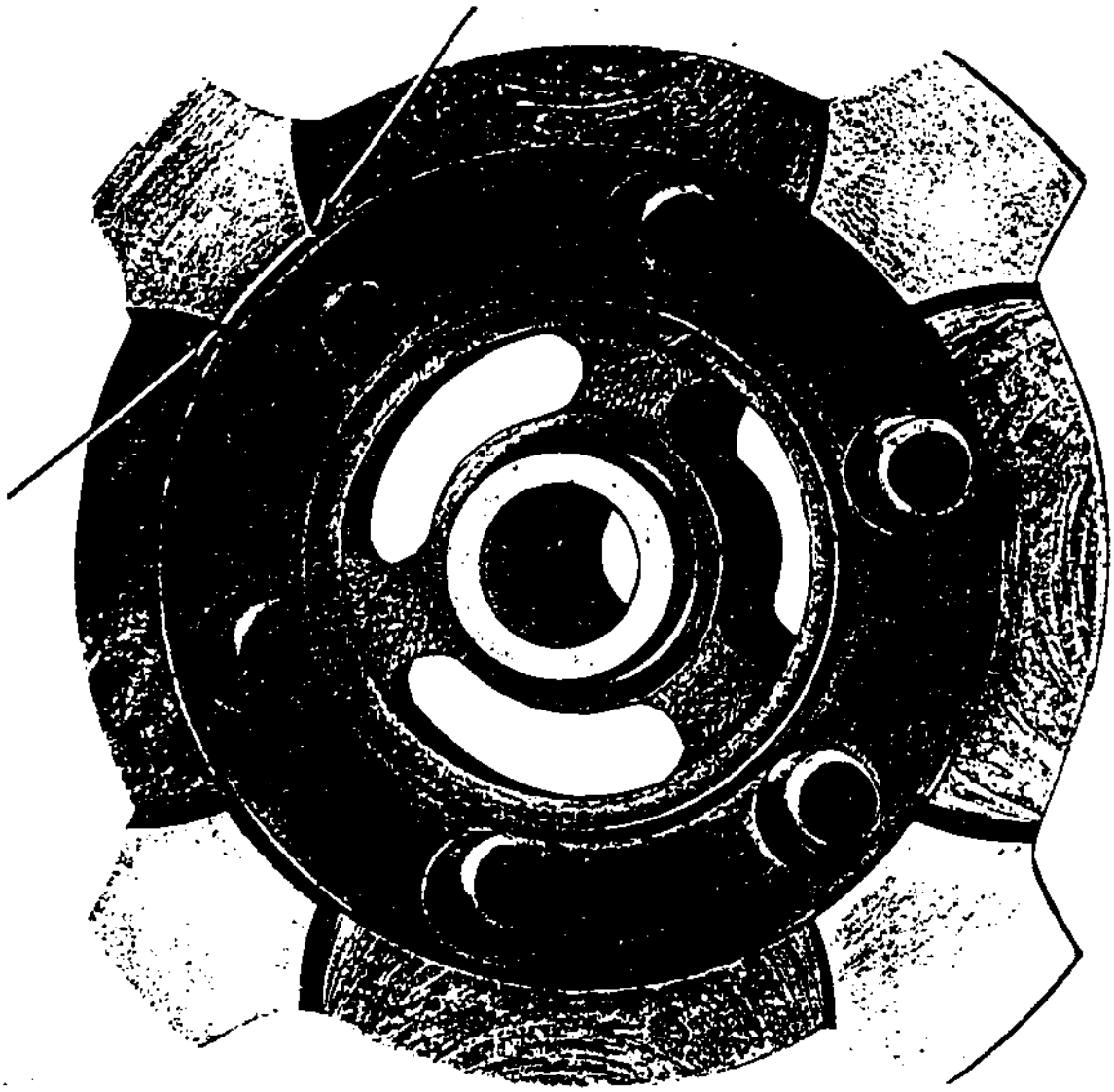

FIGURE 1

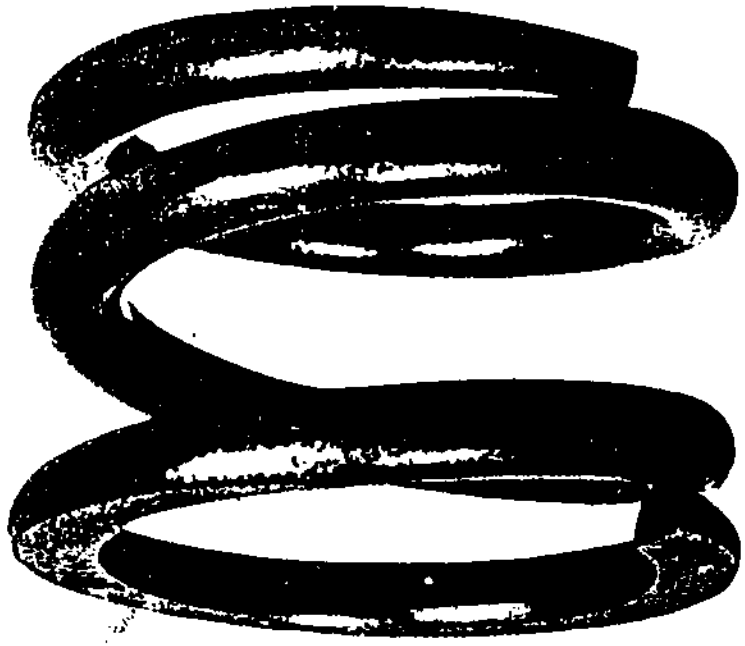

FIGURE 2 - Old 3 Coil

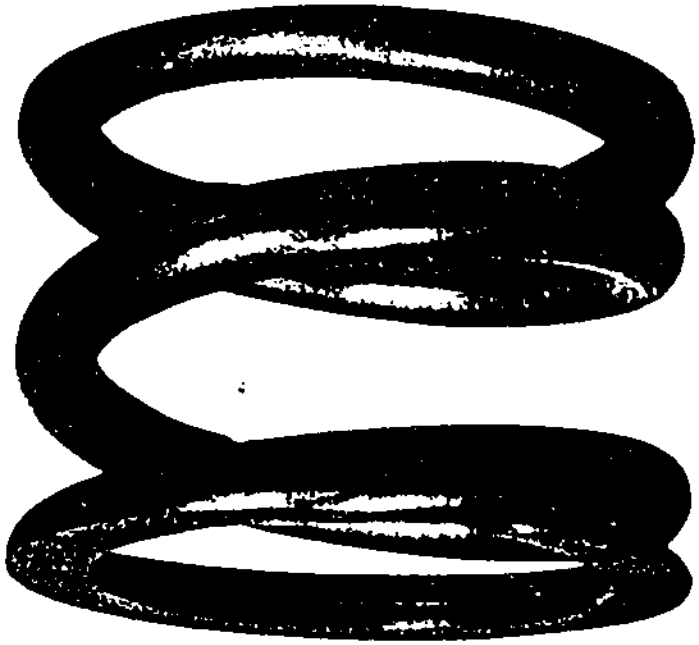

FIGURE 3 - New 3½ Coil

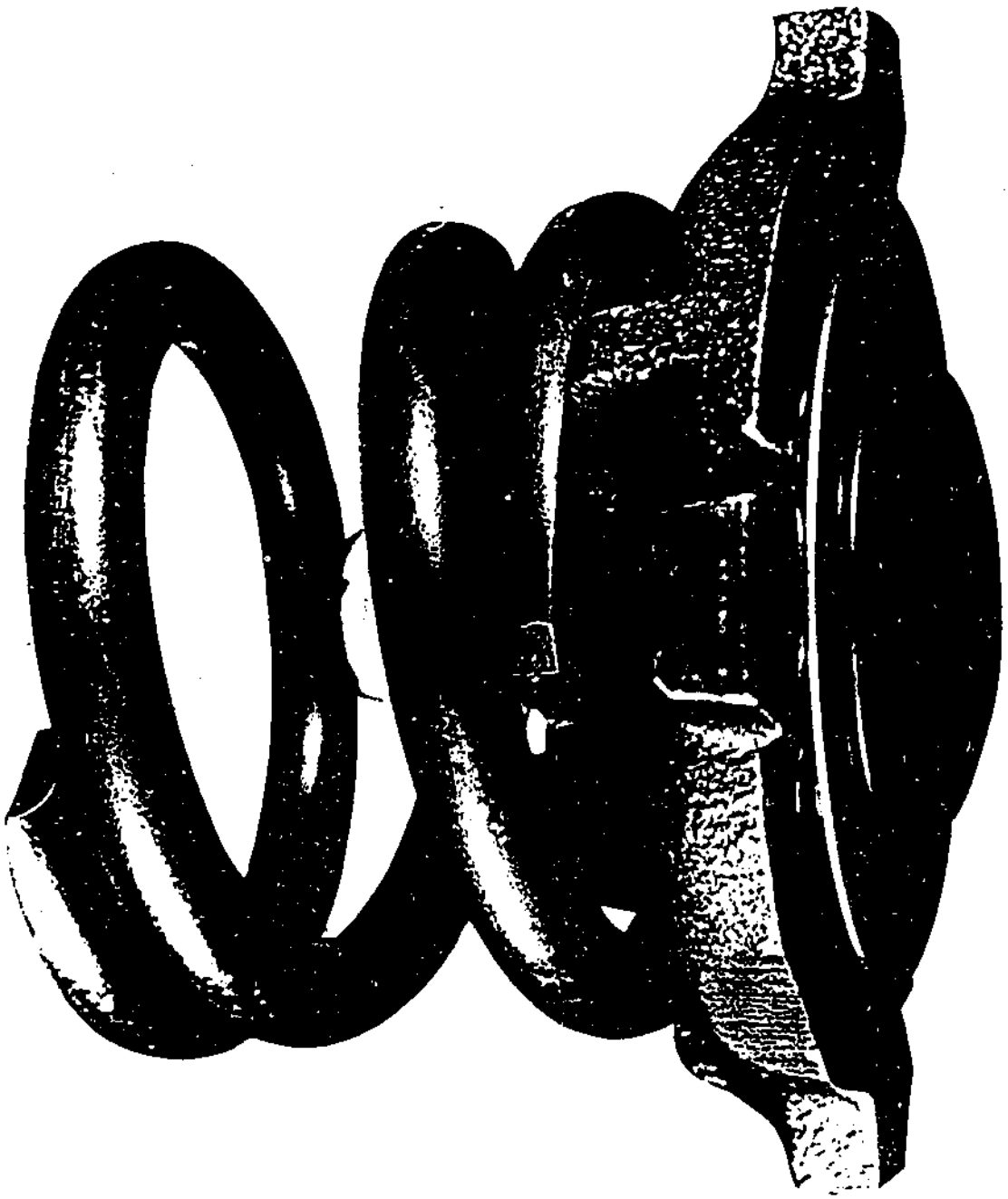

FIGURE 4 - Cylinder Spring Installed Correctly

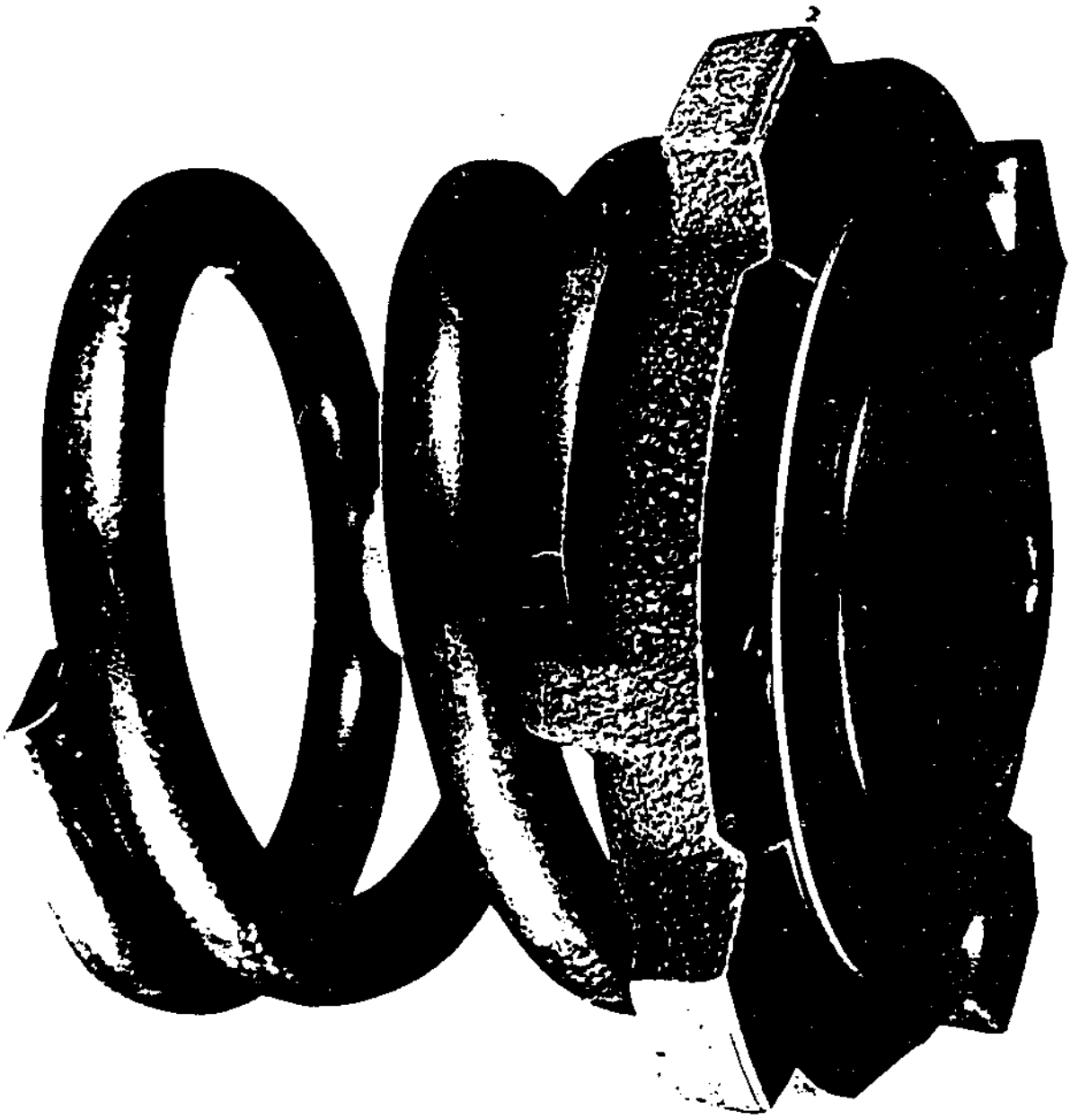

FIGURE 5 - Cylinder [illegible]ing Installed Incorrectly