

U.S.G.

INSTRUCTION LEAFLET

No. 2388

MARCH, 1934

(SUPERSEDES MAY, 1930 ISSUE)

FEED VALVE
CODE OF TESTS
AND REPAIR
INSTRUCTIONS

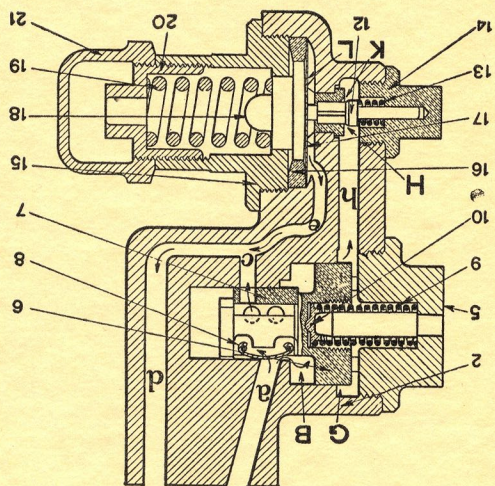
WESTINGHOUSE
AIR BRAKE COMPANY
PITTSBURGH, PA.
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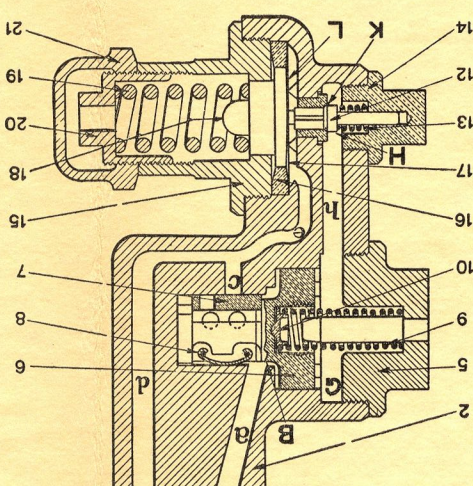
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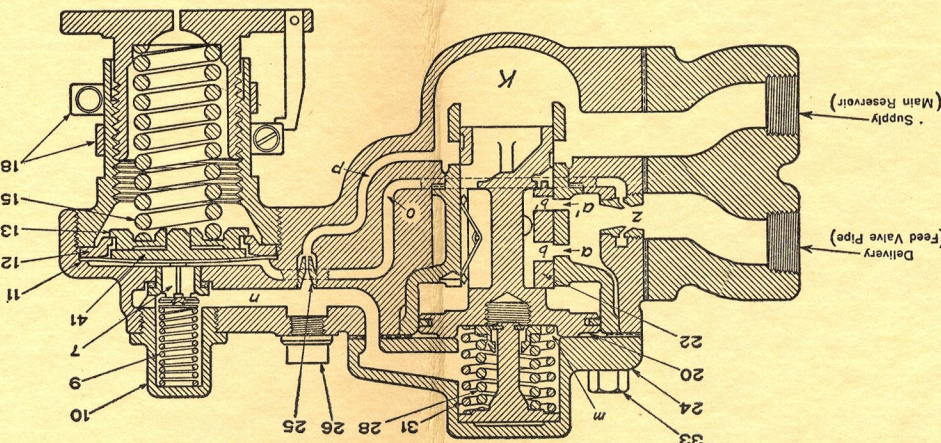
Diagrammatic View of the C-6 Feed Valve
In Open Position



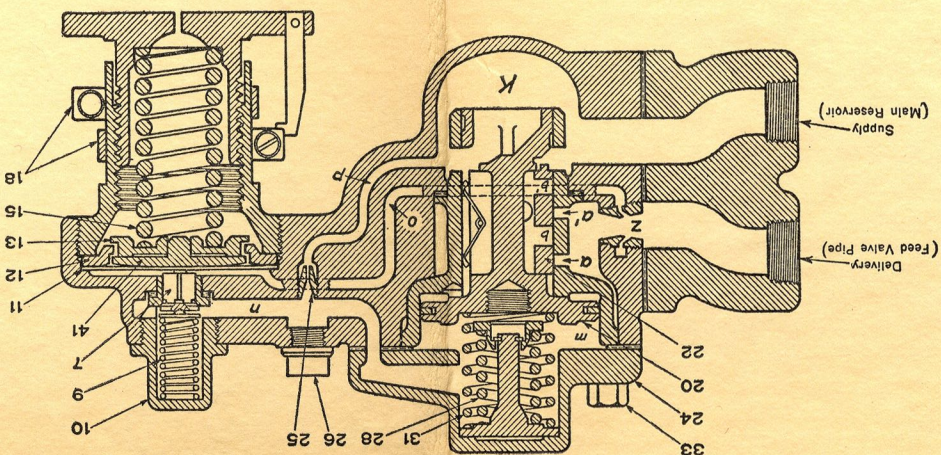
Diagrammatic View of the C-6 Feed Valve
In Closed Position



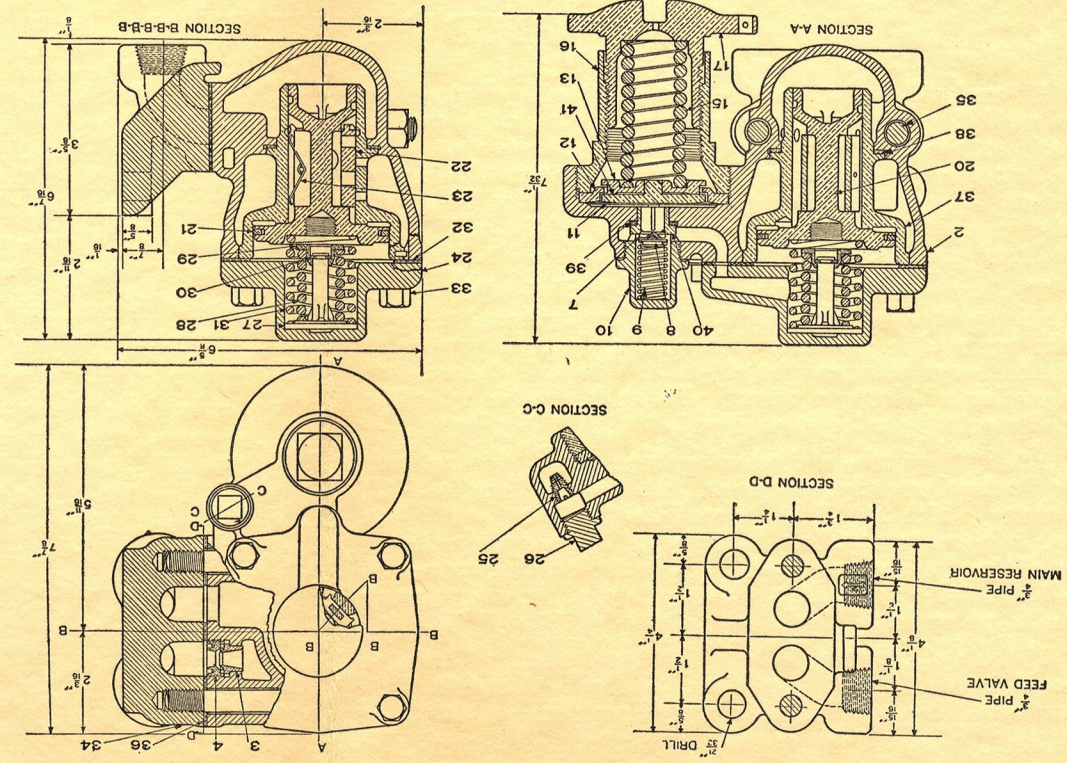
Diagrammatic Views of the M-3-A Feed Valve
Open Position



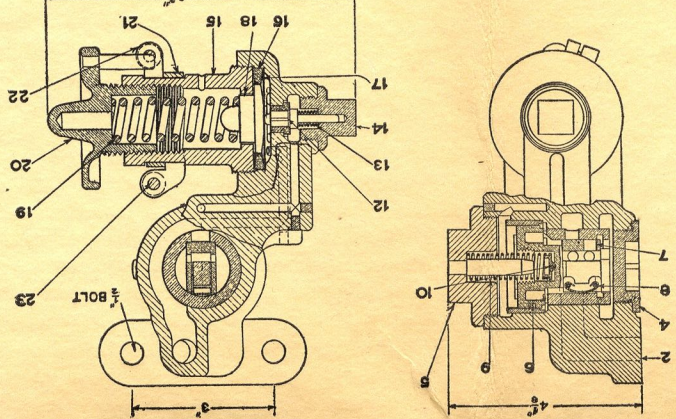
Closed Position



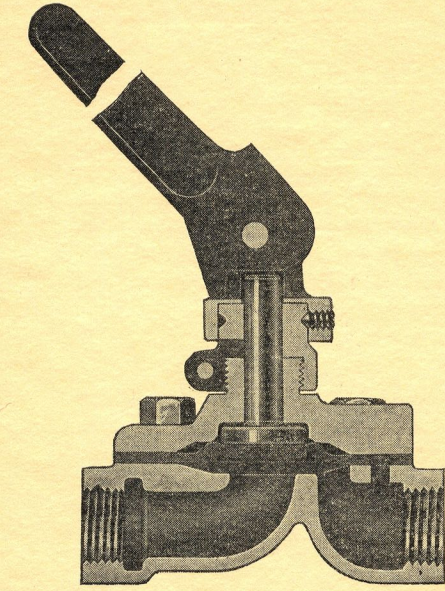
Views of the M-3 Feed Valve from Catalog Assembly Drawing



Views of the B-6 Feed Valve from Assembly Drawing



are: (a) the quick opening lever type handle, the radial position of which is adjustable to any angle, and (b) controlled diaphragm deflection, by means of an adjustment which regulates the amount of travel of the parts transmitting handle movement to the diaphragm.



Sectional View of the 3/4" Quick Opening Diaphragm Cock with Lever Type Handle

To adjust the diaphragm tension (or deflection), loosen the cap screw which serves to clamp the split coupling on the threaded portion of the cover and screw down or back off the coupling to increase or decrease the diaphragm deflection until the force imparted to the diaphragm by the cam portion of the handle (through the medium of plunger and disc) is just sufficient to prevent leakage past the diaphragm with the handle in closed position. The clamping cap screw should be tightened when the desired tension on the diaphragm is obtained. The handle position can then be adjusted to the desired angle by loosening three set screws in the handle fulcrum and rotating handle and fulcrum around the clamped coupling. The three set screws must be re-tightened to hold the handle in place and to permit proper operation of the diaphragm.

WESTINGHOUSE AIR BRAKE COMPANY

Pittsburgh, Pa., U. S. A.

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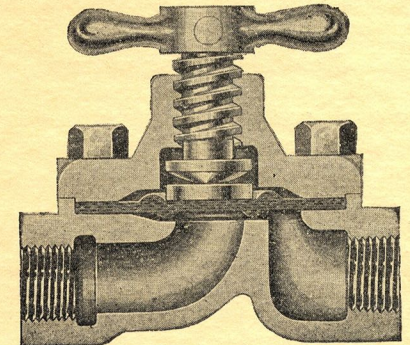
PITTSBURGH, PA.

U. S. A.

Diaphragm Type Cocks

Care should be exercised in operating the diaphragm type cocks in order to realize the benefits to be derived from the use of this improved type cock; that is, eliminating leakage (thereby giving consistent and dependable test results) and obviating the delay and annoyance incident to reseating, lubricating, and replacing cock keys.

When the test rack is not in use, all diaphragm cocks should be open. This practice will prolong the life of the diaphragm by preventing permanent set as the diaphragm is in normal position with the cock open, see illustrations.



Sectional View of the 1/2" Diaphragm Cock with Screw Type Handle

When closing the diaphragm cock with screw type handle, the handle should be turned only until slight resistance is felt. Heavy pressure on the diaphragm is not required to make a seal, and further turning of the handle after the diaphragm seals will result only in injury to the diaphragm.

The distinctive features of the improved diaphragm cock

FEED VALVE REPAIR INSTRUCTIONS AND TEST CODE

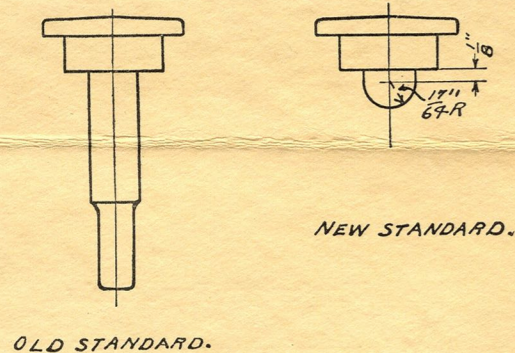
FEED VALVE REPAIRS

Where leakage past the feed valve piston is greater than the regulating valve can care for without being wide open, or nearly so, the feed valve will be either very slow in restoring the last few pounds or will maintain a lower brake pipe pressure with a train having considerable leakage than with either a tight brake pipe volume or a light engine. The detection of this defect is one object of Tests No. 2 and 4.

The larger regulating valve used in B-6 and C-6 feed valves, which the Westinghouse Air Brake Company can apply to older types of feed valves when sent in for repairs, permits of more wear between the piston and its cylinder without interfering with correct operation, than is possible when the small regulating valve is employed.

When the pistons of feed valves sent to the Westinghouse Air Brake Company for repairs can be trued up to 1⁴⁷/₆₄" diameter, which is 1/64" below standard size, the new piston bush is bored to fit this size of piston, thus further utilizing the old piston and providing stock in the bushing to permit its being trued up to fit a new standard piston when heavy repairs are again required.

If the diaphragm spindle is of the old standard form, it should be shortened to conform to the new standard as illustrated, thereby insuring improved performance.



Grinding in a regulating valve lengthens the stem that contacts with the diaphragm. With the valve seated and the ends of a straight edge resting on the diaphragm shoulder in the body against which the diaphragm is clamped, the end of the stem should just touch the straight edge.

Always examine both discs of the diaphragm and replace with new ones any that show cracks or signs of cutting; also see that the narrow shoulder in the body against which the diaphragm is clamped has no sharp edges as these would eventually cut the diaphragm and render the valve inoperative. If the edges are sharp, they should be rounded slightly with a scraper.

The method of determining when supply and regulating valves are tight and the need for avoiding binding of diaphragm spindle are explained in the instructions for testing. A bent inner stem of the small regulating valve, which sometimes results from lack of care in removing the cap nut, can cause leakage.

No oil or grease should be applied to the supply piston. The supply valve should be lubricated sparingly with a good grade of dry graphite. These instructions apply also when cleaning a feed valve. Using oil or grease to improve the fit of a loose piston is useless, as the flow of air past the piston will soon displace it.

The standard piston spring for the B-6 and C-6 feed valves is stronger than those of the earlier valves of this type and the two springs should not be used interchangeably. Always examine this spring for possible wear and corrosion and replace when found imperfect. The piston spring tip prevents the piston spring from rotating the piston and its stem should always be of standard dimensions and in its place. This tip and the cap nut stem limit the port opening and if non-standard may restrict it.

The humming of a feed valve is produced by the vibrations of the regulating spring and may be remedied by grinding off the tapered end of the spring coil at each end of the spring an amount sufficient to obtain 1/16" clearance between the inside of the end of the coil and the next coil to it. All new regulating springs are now so manufactured and may be used as a guide for changing old springs.

Before making alterations in feed valve regulation, a test gage should be employed to ascertain if the gage on the locomotive is in proper adjustment.

In the absence of a new feed valve gasket when needed, do not attempt to use gaskets of other than standard type. The old gasket may be re-used if necessary by providing a good gasket bearing around the port openings. The metal may be thickened at these points by rolling the inner edges of the gasket port openings with any round instrument which will enter the port openings freely.

Feed valves should not be located where they will be subjected to extremes of temperature or where they cannot be reached conveniently for adjustment and replacement. A dirty or worn valve should be replaced by one known to be in good order and properly adjusted rather than attempt cleaning or repairing on the locomotive.

B-6 Feed Valve used where two pressures may be employed should have the stop lugs properly located and secured so that merely turning the handle pin from one stop lug to the other will make the desired change. Where but one pressure will be wanted, the lugs may be secured in position to prevent turning the handle either way.

NOTE: We strongly recommend that all slide valve feed valves requiring repairs affecting the regulating valve bushing, piston and piston bushing, be returned to Wilmerding, Pa., St. Louis, Mo., or Emeryville, Calif., for that purpose on account of the necessity of special processes and facilities. If this repair work is done in railroad shops, however, the feed valves individually should be made to pass the code in every instance before they are returned to service.

CODE OF TESTS

Preliminary Test

After the feed valve has been cleaned or repaired, attach it to the rack before replacing the spring box portion and its parts; then, with all cocks closed, open supply cock, and leave it open during all tests, open cocks 1 and 3 to determine regulating and supply valve leakage. Regulating valve leakage will be shown at the valve stem. Supply valve leakage will be indicated at the small port in the diaphragm chamber. However, as leakage between the feed valve gasket ports will also cause a blow at the diaphragm chamber port, determine that this is not the cause before making repairs to the supply valve.

At the completion of test, coat the valve carefully with soapsuds for casting and cap nut seal leakage, then apply spring box and its parts and test as follows:

The piping diagram of the test rack shows two complete sets of apparatus so that one valve can be vibrating while the other is being tested. Cocks 3, 4, 5 and 11 and bleeder "A" are identical to cocks 7, 8, 9 and 10 and bleeder "B" respectively; in this code reference is made only to the former, but by substituting the latter combinations, the same test will be made on the second apparatus. The second apparatus (shown in dotted lines) is not necessary; it is merely a means of saving time when two feed valves are to be tested simultaneously.

NOTE: When M-type Feed Valves are tested on a standard test rack equipped with the old brackets, the cored ports in the brackets must be drilled to 3/4" drill size and the M Feed Valve tested in inverted position.

Supply reservoir pressure should be 20 lbs. higher than the desired setting of feed valves undergoing test.

No. 1—Vibrating Test

Commence the test with all cocks closed. Bolt the feed valve to the bracket. Open cocks 1, 3 and "A," then tighten regulating nut until valve begins to vibrate rapidly. This will be indicated by intermittent puffs of air from cock "A."

Allow the valve to vibrate for one (1) minute.

At the completion of this test, close cocks 1, 3 and "A."

No. 2—Capacity Test

Commence the test with all cocks closed, open cocks 2, 3 and 5. Set the feed valve to close at 70 lbs. Close cock 2 and with 90 lbs. pressure in the "Operating Reservoir," close cock 5 and open cock 6. Then open cock 5 and note the time required to reduce the pressure from 90 to 40 lbs. This time should not exceed 13 seconds for B-6 and C-6 feed valves, and for B-3 and B-4 feed valves 16 seconds. For M-Feed Valves the time must not exceed 9 seconds and for C-8 Feed Valves, 10 seconds.

No. 3—Supply Valve, Regulating Valve and Casting Leakage Test

Commence test with all cocks closed. Open cocks 2, 3, 4 and 5 and set feed valve at 70 lbs. After charging the small reservoir to 70 lbs., close cock 5. Supply valve and regulating valve leakage will be indicated by a rise in pressure on the small reservoir gage. This leakage should not be greater than 5 lbs. in 20 seconds.

Should the leakage be greater than the amount specified, remove the spring box, diaphragm ring and diaphragm. Soap the regulating valve port for regulating valve leakage and the adjacent port for supply valve leakage. In this way the source of leakage may be distinguished. Reassemble the spring box diaphragm ring and diaphragm.

Soap the entire valve for leakage. If the cap nut joints are not tight, the valve is liable to overcharge, especially when the piston becomes coated with oil or gum.

At the completion of this test, close cock 4.

No. 4—Range Test

Commence the test with cocks 2, 3, 5 and "C" open and feed valve set at 70 lbs. The range (difference between the cutting-in and cutting-out point) should not be greater than 1 1/2 lbs. The valve operation should be snappy, cutting in and out several times in a minute. If the range is greater than 1 1/2 lbs., the supply piston is either too tight or too loose. If the overcharge on the next test is excessive the piston is too tight; otherwise, it is too loose.

At the completion of this test, close cocks 3 and "C."

No. 5—Overcharge Test

Section A—"B" and "C" Type Feed Valves

Commence the test with cocks 2 and 5 open. Open cock 6 and reduce the brake pipe volume reservoir pressure 5 lbs. below the setting of the feed valve. Close cock 6, then open cock 3 quickly and note the overcharge on the brake pipe volume gage. This overcharge must not exceed 2 lbs.

At the completion of this test, set the feed valve to the desired pressure, then close cocks 2, 3 and 5.

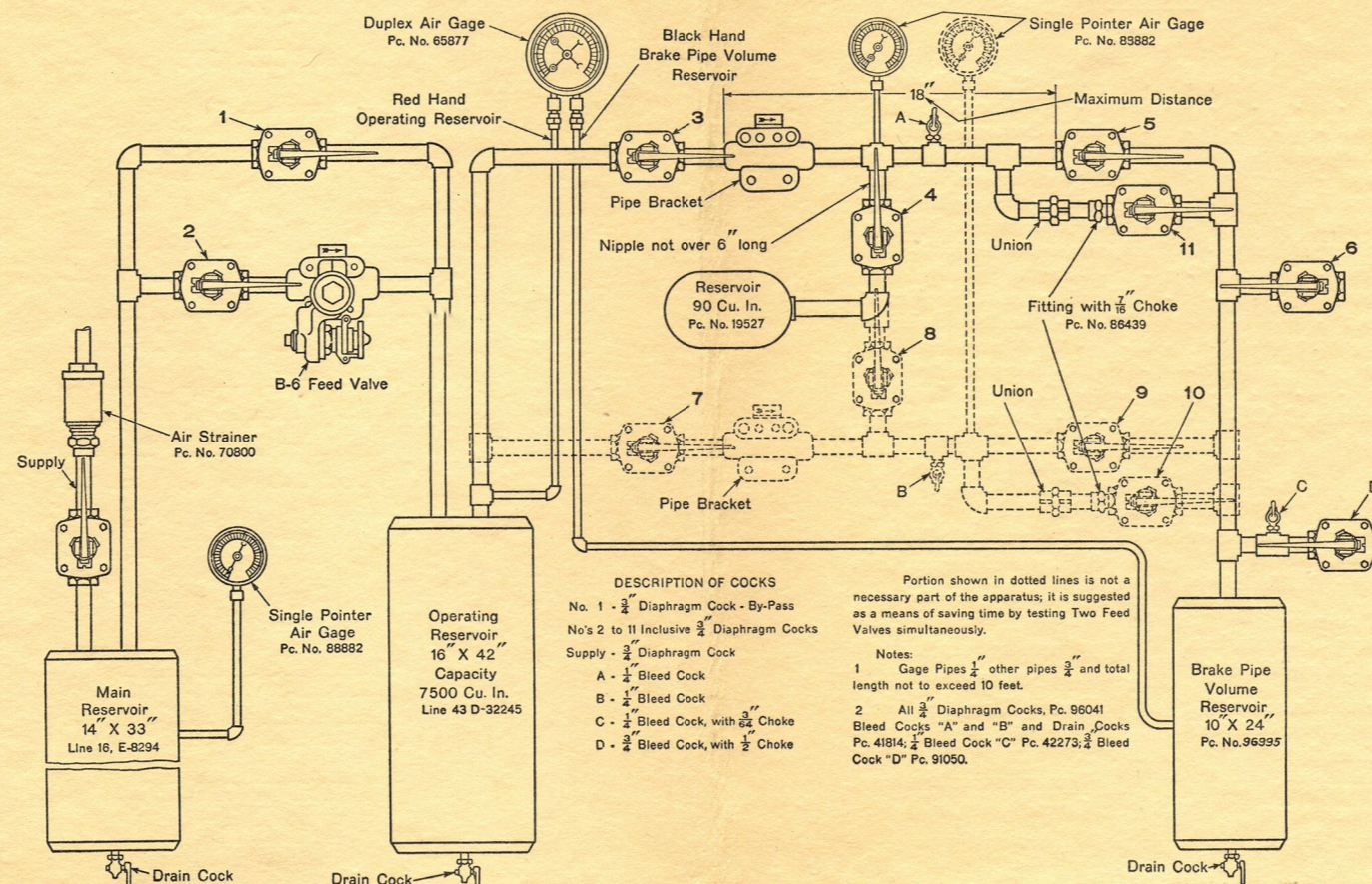
Section B—Type "M" Feed Valves

Commence test with cocks 2 and 3 open, all other numbered cocks closed. Open cock 6, reduce brake pipe volume reservoir pressure five pounds below setting of feed valve, then close cock 6 and open cock 11. Note that the overcharge on the brake pipe volume gage does not exceed two pounds. At completion of the test, open cock 5, charging brake pipe volume reservoir to 70 pounds.

No. 6—Venturi Test of "M" Type of Feed Valves

Commence test with cocks 2, 3, 5 and 11 open, all other cocks closed.

Close cock 5, open Bleed Cock "D." Note that there is not less than 16 lbs. differential between the brake pipe volume and feed valve line pressure. Failing to obtain 16 lbs. may be due to improper choke in cock "D" or to restriction in venturi port.



Diagrammatic View of Piping Arrangement for Testing Types B, C and M Feed Valves

DESCRIPTION OF COCKS
No. 1 - 1/2" Diaphragm Cock - By-Pass
No's 2 to 11 Inclusive 1/2" Diaphragm Cocks
Supply - 1/2" Diaphragm Cock
A - 1/2" Bleed Cock
B - 1/2" Bleed Cock
C - 1/2" Bleed Cock, with 1/8" Choke
D - 1/2" Bleed Cock, with 1/4" Choke

Portion shown in dotted lines is not a necessary part of the apparatus; it is suggested as a means of saving time by testing Two Feed Valves simultaneously.

Notes:
1 Gage Pipes 1/2" other pipes 3/8" and total length not to exceed 10 feet.
2 All 1/2" Diaphragm Cocks, Pc. 96041
Bleed Cocks "A" and "B" and Drain Cocks Pc. 41814; 1/2" Bleed Cock "C" Pc. 42273; 1/2" Bleed Cock "D" Pc. 91050.