"WESTINGHOUSE"

TRADE MARK.

REGISTERED

Self-Lapping Driver's Brake Valve

Type "W"

WESTINGHOUSE BRAKE (AUSTRALASIA) PTY. LTD.

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1946

WESTINGHOUSE SELF-LAPPING BRAKE VALVE

TYPE "W"

The WESTINGHOUSE SELF-LAPPING BRAKE VALVE has been developed to enable greater straight air brake efficiency being obtained, and it has the following advantages over earlier brake valves of the rotary or slide valve type :—

1. The service braking force is unaffected by fluctuations of main reservoir pressure between compressor governor settings.

2. Brake cylinder pressure is automatically maintained and brakes cannot release by leakage if air pressure exists in the main reservoirs. This feature is available during normal service applications and also when changing ends with both brake valves in handle-off position.

3. When employed in combination with Type " E " Relay Valves, extremely rapid rates of application and release are available without any inflexibility of operation.

4. The manipulation of the brake valve is simpler than that of older types of valves, and efficient stops are more readily made. A high initial inshot of pressure to the brake cylinder with a graduating off as the stop progresses may be accomplished by the simplest movements of the brake valve handle, and much more effectively than has previously been found practicable.

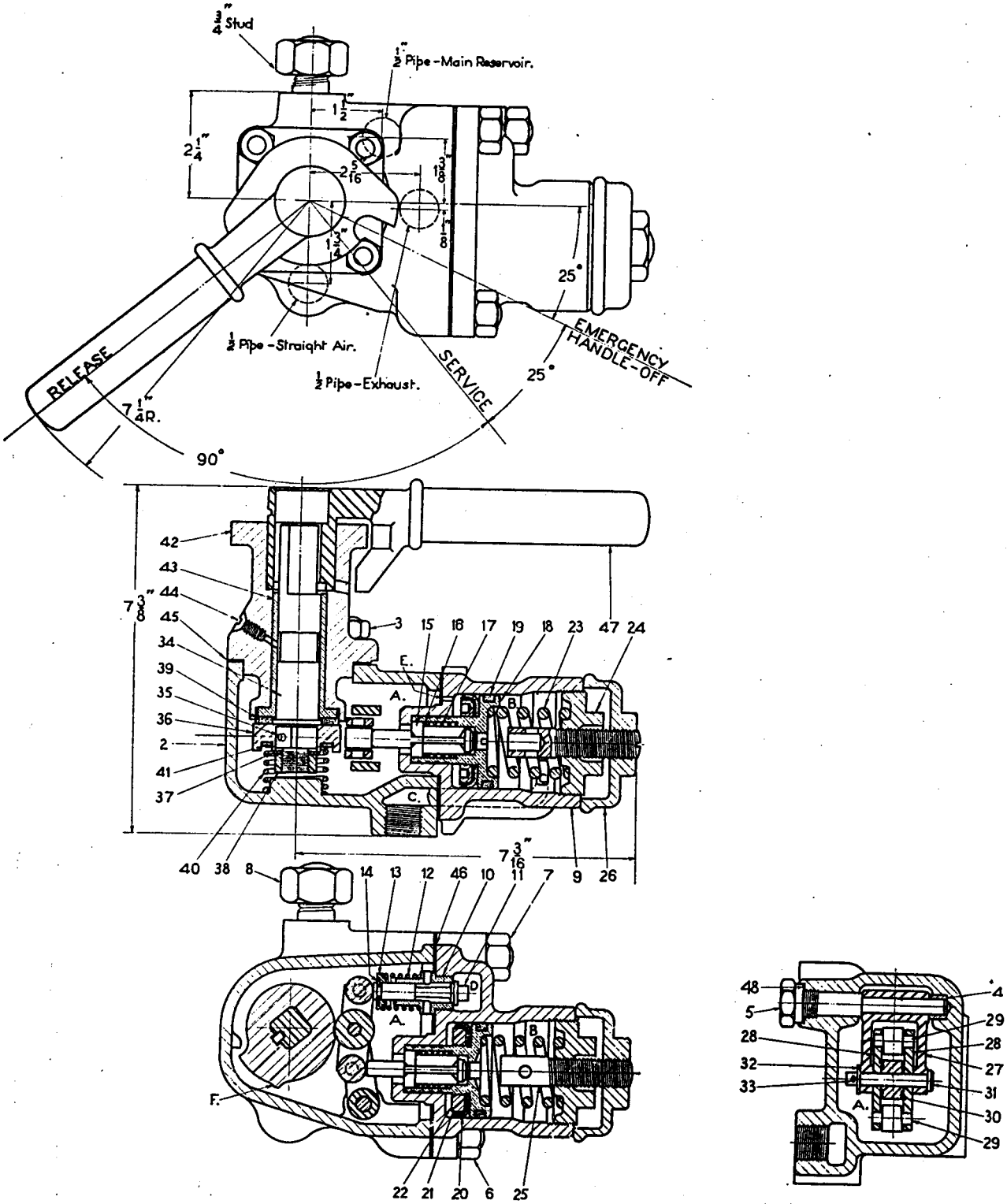
The design of the Type " W " Brake Valve is shown in Figure 1, and the operation is as follows :—

SERVICE APPLICATIONS: When it is desired to make a partial or full service brake application, the brake valve handle is moved from Release towards Service position, the extent of the angular movement depending upon the brake cylinder pressure required. It will be noted that the handle 47 engages the spindle 34, to which is secured the cam 36. It will be observed also that the distance from the face of the cam to the centre of the spindle is least in Release position and gradually increases as it approaches Service position, so that rotary movement of the cam from release to Service position causes it to abut against and move roller 30, to which is attached the rocker arms 28, the complete rocker assembly being anchored by yoke 27 to hinge pin 5. Therefore, as the brake valve handle 47 is moved towards Service position, the cam will first abut against roller 30 and then move outward the rocker arms, one roller of which will bear on the inlet valve 11 and the other on exhaust valve 15. The exhaust valve spring 17 is weak relatively to inlet valve spring 12, and as the roller 30 and the rocker assembly are moved outward by the cam, the rocker arm bears at one end upon inlet valve 11 as a fulcrum, and at the other end will move the exhaust valve 15 on to its seat in the piston 18, closing off communication from the chamber A (in direct communication with the brake cylinder or relay valve) to the atmosphere via chamber B and port C. Further movement of the cam will cause the rocker arm, bearing upon the exhaust valve 15 as a fulcrum, to open inlet valve 11, permitting air to flow from the main reservoir via port D into chamber A, directly in communication with the brake cylinder or relay valve. Air pressure in chamber A has communication with the face of piston 18 via port E, and when the pressure established in chamber A and upon the face of piston 18 is sufficient to overcome the tension of spring 23, the latter will be compressed, the resultant movement of the piston and exhaust valve assembly allowing the rocker arm to rotate around fulcrum pin 31, permitting inlet valve 11 to seat and prevent further admission of air to chamber A from the main reservoir. Should a higher brake cylinder pressure be desired, the brake valve handle will be moved closer to Service position, when the new position of the cam will cause roller 30 to be forced further outward, opening inlet valve 11 as already described and permitting main reservoir pressure to again flow into chamber A. Th inlet valve will remain open until such time as the pressure in chamber A, acting upon piston 18, is again superior to the force exerted by spring 23, when the latter will be further compressed, allowing of a rotative movement of the rocker arms around fulcrum pin 31, as already described, until the inlet valve closes.

MAINTENANCE OF BRAKE CYLINDER PRESSURE AGAINST LEAKAGE: Assuming that pressure in chamber A (brake cylinder or relay valve pressure) is established as already described, and that brake cylinder leakage exists, it will be clear that as the pressure in chamber A falls, the tension of spring 23 will become superior to the opposing force exerted by the piston 18 under the influence of air pressure in chamber A, and the resultant movement will cause the rocker arm assembly to rotate around fulcrum pin 31, thereby opening the inlet valve 11, permitting main reservoir air pressure to flow into chamber A. This flow of air will continue until such time as the pressure acting on piston 18 is superior to the opposing force of spring 23, when the latter will be compressed, permitting the rocker arm to move around fulcrum pin 31 and the inlet valve to close as already described.

RELEASE OF THE BRAKES: When it is desired to partially or entirely release the brakes, the brake valve handle is moved toward Release position. The cam face then recedes from roller 30, when, by the action of spring 17, the exhaust valve 15 is forced away from its seat, permitting air to flow from chamber A (brake cylinder or relay valve pressure) via the exhaust valve seat, chamber B, and port C to atmosphere. When the pressure in chamber A is reduced sufficiently the force exerted by spring 23 becomes superior to the opposing force of piston 18, which will be moved by the spring until the exhaust valve seat in the piston bears upon the exhaust valve, preventing further escape of air from chamber A to atmosphere.

EMERGENCY APPLICATION: (Handle-off position) : To make an emergency application of the brakes the brake valve handle is moved to Emergency position, at which point the cam is of considerably greater diameter, as shown at F. Under the influence of pressure built up in chamber A, the piston 18 will compress the spring 23, as already described but as this movement is limited by adjustable stop pin 25, the piston 18 will be unable to move far enough to allow sufficient rocker arm movement for the inlet valve 11 to close. The inlet valve will remain open, permitting direct access of main reservoir pressure to chamber A and to the brake cylinder or type " E " relay valve.


3/4" Stud
1/2" Pipe - Main Reservoir.
1 1/2"
2 1/4"
2 5/16
1 3/8
1/8
1 3/4"
25°
1/2 Pipe - Straight Air.
1/2 Pipe - Exhaust.
RELEASE
SERVICE
EMERGENCY HANDLE - OFF
7 1/4" R.
90°
7 3/8"
7 3/16"
42
43
44
45
34
39
35
36
2
41
37
40
38
8
3
15
16
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29
28
27
32
31
33
30
22
21
20
6
25
A.
B.
C.
D.
E.
F.

Fig. 1

BRAKE VALVE ADJUSTMENT: **Full Service Pressure Setting:** The full service setting of the brake valve is made by moving the brake valve handle to Service position and turning the adjusting cap 24 until the required brake cylinder pressure is obtained. During this adjustment the stop screw 25 should be screwed back as far as possible, so that it does not abut on piston 18, as this will interfere with the pressure adjustment.

EMERGENCY ADJUSTMENT: Upon completion of the full service adjustment, and with the brake valve handle in Service position, the stop pin 25 should be screwed down until it bears lightly on piston 18, when it should be backed off one half turn. The brake valve handle should then be moved to Emergency position, and the locking cap 26 secured in position.

MAIN RESERVOIR PRESSURE: The cut-in pressure of the compressor governor should be five pounds higher than the full service pressure setting of the brake valve.

MANIPULATION OF THE BRAKE: It is well known that the frictional properties of brake shoes decline at high speeds and increase at low speeds. To obtain the most efficient braking performance it is necessary that the brakes should be applied at the commencement of the stop with the maximum force circumstances permit, and to graduate brake cylinder pressure off as the stop progresses, so that a uniformly high rate of braking is maintained during the stop without liability of wheel sliding or discomfort to passengers. With the Self-lapping Brake Valve this operation can be very readily accomplished, as the pressure developed and maintained in the brake cylinder depends only upon the position of the brake valve handle. In making a brake application, therefore, it is only necessary to move the handle as far as circumstances permit toward Service position at the commencement of the stop, and to move the handle back gradually toward Release position as the stop progresses to maintain a uniform rate of braking. Fanning of the brake valve is detrimental to a good stop and involves a waste of compressed air. An example of a good service stop is shown in fig. 2, which shows the recommended graduating off of brake cylinder pressure and illustrates the uniform rate of deceleration obtained by this method of operation.

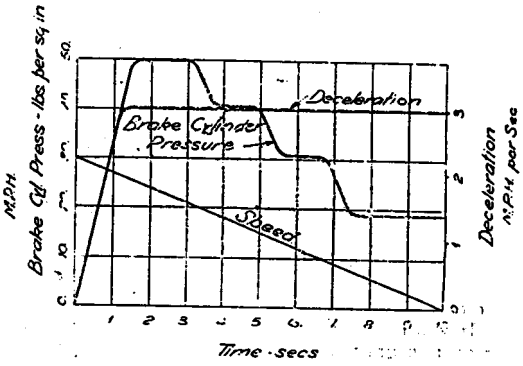

Fig. 2

REPLACEMENT PARTS: Standard and repair size replacement parts are obtainable from Westinghouse Brake (Australasia) Pty. Ltd., and should be ordered by description and piece numbers as shown in Part Catalogue Section 4 List 7.