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Instruction Pamphlet No. T 5007

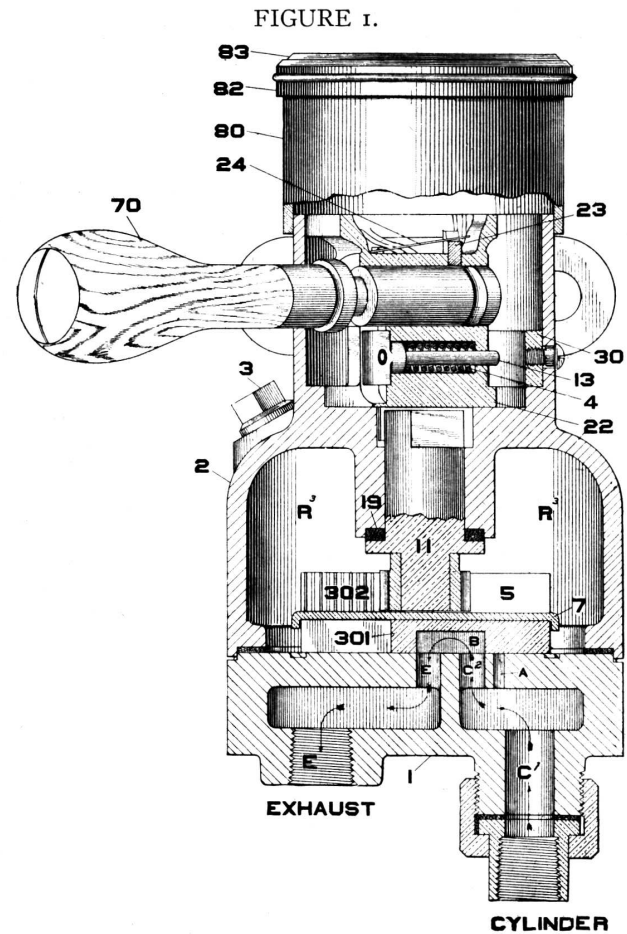
Operating Valves

for

Straight Air Brake Equipments

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O. V. J. OPERATIVE VALVE.
View showing Slide Valve.

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The Operating Valve—O. V. J.

The O. V. G. and O. V. J. Operating Valves are similar in construction, but have the position of their ports reversed, and consequently the movement of the handle of the O. V. G. is from release at the extreme right to emergency application at the extreme left, whereas with the O. V. J. the same movement occurs in the opposite direction. Otherwise their operation is identical.

Before describing the construction of the operating valves, a few words concerning the terms employed may be of advantage.

SLOW SERVICE APPLICATION—A gradual application of the brake, such as is usual in slowing up, preventing acceleration on grades, or making slow stops; it is made by admitting air pressure to the brake cylinder slowly through a small port; an ultimate pressure considerably less than the maximum is sufficient.

QUICK SERVICE APPLICATION—For a smooth and rapid stop, essential to the making of a fast schedule time. By opening the large port for an instant and then covering same, a high pressure in the brake cylinder is quickly attained, after which the pressure is gradually reduced as the speed decreases, thus making a smooth stop in the shortest distance practicable.

EMERGENCY APPLICATION—One in which the full braking power is applied almost instantaneously, for the purpose of avoiding collisions, saving lives, etc., obtained by fully opening the emergency port, thereby letting full reservoir pressure into the brake cylinder in the shortest possible time. The rail should always be sanded while making emergency stops to avoid possibility of sliding wheels and thereby making a poor stop.

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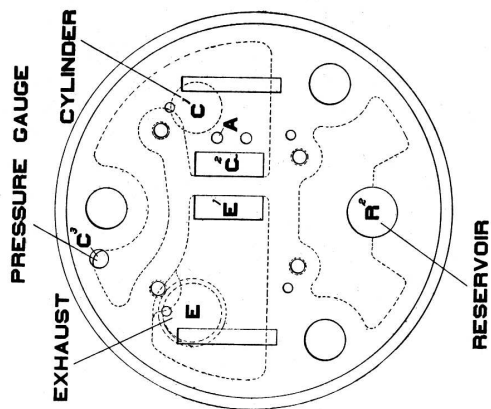


Fig. 3.

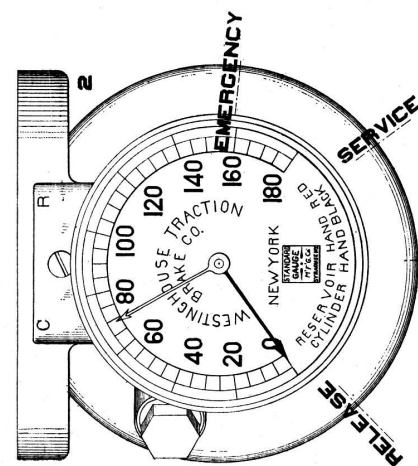


Fig. 2.

O. V. J. OPERATING VALVE.
Top View and Seat.

There are four positions of the O. V. J. valve (see Fig. 2, and small figures on pages 7 and 8).

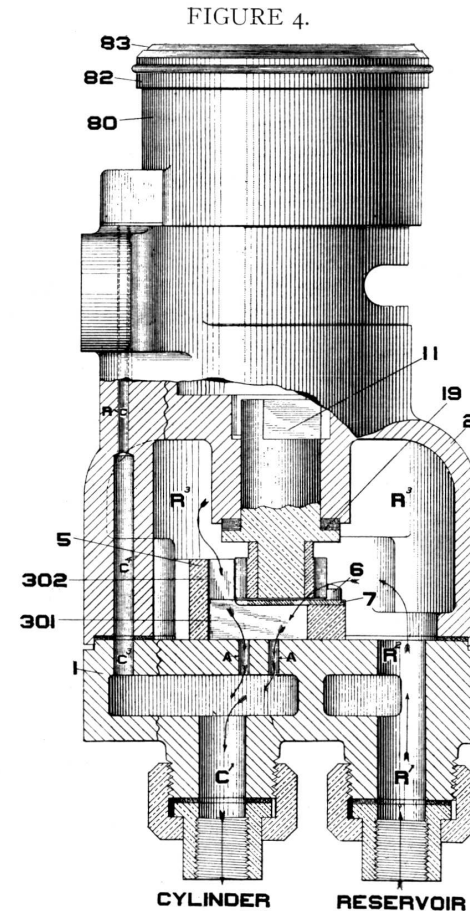
RELEASE—When the handle is at the extreme left, (the slide valve at the extreme right) and the cylinder and exhaust ports are connected, consequently atmospheric pressure only is in the cylinder, and the brakes are released.

LAP—When the handle is about 45 degrees from release position and the ports leading to brake cylinder are closed, consequently the pressure conditions in the brake cylinder remain what they were previous to the moving of the handle to this position.

SLOW SERVICE APPLICATION—With the handle about 90 degrees from release, exhaust port closed, and the small port open to brake cylinder.

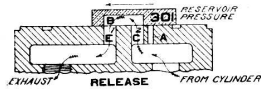
EMERGENCY APPLICATION—With the handle at extreme right and both small and large ports wide open, exhaust port closed, brakes on with full power.

The **Operating Valve, Form O. V. J.**, shown in Figs. 1, 2, 3 and 4, consists of a head and body 2, cast in one piece. On the top of the head is a double gauge 80, of which the red hand indicates the reservoir pressure and the black one the pressure in the cylinder. The gauge is protected by heavy plate glass 83, secured in place by means of the ring 82, screwed on the gauge case. In the head, directly below the gauge, is a socket 22. Into this socket fits the removable handle 70, which swings through an arc of about 130 degrees when turning from release position at the extreme left to emergency at the right. The head is provided with a suitable slot to permit of this movement, but the handle may be withdrawn when the valve is in one position only, namely, "Lap." When withdrawn the latch 23 is dropped by

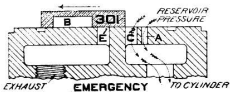


O. V. J. OPERATING VALVE.
View Showing Reservoir Cavity.

the spring 24 into suitable holes in the head, thus locking the socket in lap position until the handle is again inserted, when the latch is raised enough to disengage it again from the head. Just below the hole in the socket for the handle, is a smaller one, parallel to it, holding a spring actuated bolt 13, which, when the valve is operated, passes over suitable notches, thereby indicating the various positions of the valve. Engaging with the socket on its under side is a stem 11, provided with a pinion which engages with a rack 302 forming a part of the slide valve 301, so that when the handle is moved, the valve slides from side to side between suitable guides 5 and 6. The turned down ends of the spring plate 7 are not meant to serve as a stop for the travel of the valve, but simply as an indicator of the proper position of the valve when assembling. The handle must always be stopped by the ends of the slot and not by the valve striking the ends of the plate 7. The base 1 of the valve is provided with

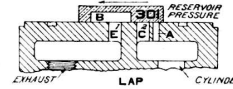


two rectangular ports (Fig. 3), the exhaust E to the left and the brake cylinder C to the right; when the handle is in release position at the extreme left these two ports are connected by means of the cavity B in the underside of valve, and the brake is fully released. The the right of the large brake cylinder port is a small one A leading to the same cavity, which is uncovered first as the handle is moved to the position for a service application of the brake. A



further movement of the handle to the right uncovers the large port C also and the valve is in the position for an emergency ap-

plication. Returning the handle to the left until the two cylinder ports are covered by the blank portion of the slide

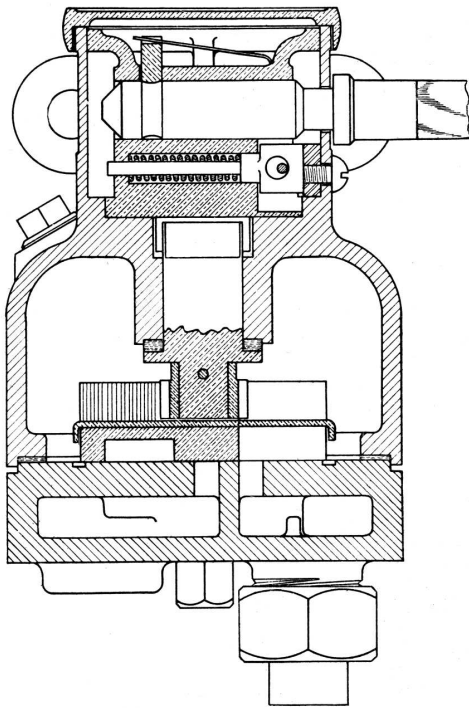


valve, puts it in the position of lap. The valve body 2 forms a chamber R^s in constant communication with the reservoir by means of the 1/2" union connection on under side of base, at the right, Fig. 4. In the body of the valve are passages R and C, C' and C'', which connect the reservoir chamber and the cylinder cavity in the base, to their respective gauges.

The Form O. V. P. Operating Valve.

The O. V. P. Operating Valve, Fig. 5, opposite page, is a modified form of the O. V. J. Valve, in which the air gauge is eliminated. It is for use in cases where it seems advisable to use a separate Air Gauge, mounted on the front wall of the vestibule, and connected to the piping system so as to show the brake cylinder and reservoir pressures. The operation of this valve is identical with the other, and the construction is very similar, but somewhat simplified by the absence of the gauge. That part of the O. V. J. Valve above the handle-socket cavity is entirely done away with, and is replaced by a brass plate which fits over the top of the casing as shown in Fig. 5.

FIGURE 5.



OPERATING VALVE, O. V. P.

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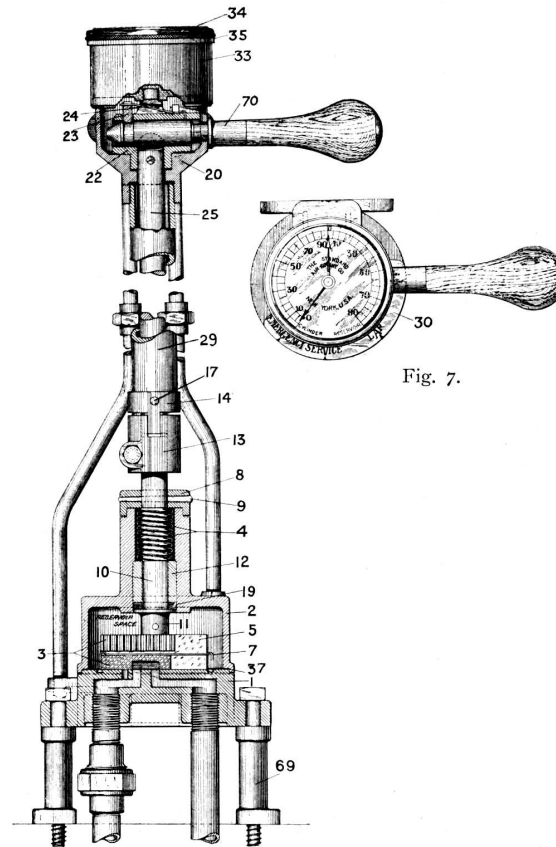


Fig. 7.

FIGURE 6.

OPERATING VALVE, O. V. T.

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The Operating Valve, O. V. T.

The Operating Valve, Form O. V. T., shown in section in Fig. 6, and top view in Fig. 7, on the opposite page, is very similar to the form O. V. G., but has the valve part placed upon the floor of the platform with the operating head directly above it at the level of the motorman's hand. On the top of the head 20 is a duplex gauge 33, similar to that just described in the form O. V. J. The red hand of the gauge indicates reservoir pressure, and the black one train-pipe pressure. The construction of the gauge is exactly the same, it being protected by plate glass 34, secured in place by ring 35. The removable handle 70 engages in the socket 22, and swings through an arc of about 130° from release position at the extreme *right* to emergency position at the *left*. The handle may be inserted and withdrawn when in lap position only. The latch 23 actuated by spring 24 locks the socket in lap position when the handle is removed.

By means of a vertical shaft 25, enclosed in a pipe casing 29, and provided with flexible coupling 13 and 14, the socket in the head is connected to the stem 10 of the valve. The pinion 11 is secured to this stem and engages with a rack cut upon slide valve 3. The movement of the handle forces the slide valve from side to side between suitable guides in exactly the same manner as in the Form O. V. J.

The base 1 of the valve is provided with two rectangular ports similar to those shown in Fig. 3, but the release is to the right and the brake cylinder to the left. When the handle is in release position at the extreme right, these two are connected by means of the cavity in the underside of the slide valve, and the brake

is fully released. To the left of the large brake cylinder port is the small circular one leading to the same cavity, which is uncovered first as the handle is moved to the left from release position, and when it is fully opened the valve is in position for full service application of the brakes. A further movement of the handle to the left uncovers the large port also and the valve is in position for an emergency application. Returning the handle to the right until the two cylinder ports are covered by the blank portion of the slide valve, puts it in lap position when all ports are blanked. A further movement of the handle to the extreme right brings the valve to the position of release, as described above.

The flange 30 (see Fig. 7) attached to the head just below the slot for the handle is plainly marked for the positions of the handle corresponding to the different positions of the valve. The valve cover 2 forms a chamber, which is in constant communication with the reservoir. Near the cylinder connection, at the side of the base, is a lug having a $\frac{1}{8}$ " pipe-tapped hole leading to the cylinder cavity. This is piped to the hole in the head marked C, which leads to the black-hand gauge. The other $\frac{1}{8}$ " pipe-tapped hole in the head, marked R, is connected to the hole in the cover 2, which communicates to the cavity having reservoir pressure, thus bringing same to the red-hand gauge. A third hole, in this cover, is for the purpose of oiling the valve, which should be done regularly.

Instructions for Installation.

THE OPERATING VALVE O. V. J., should be secured to the vestibule framing or dash rail by means of a bracket and the lugs provided on the back of the valve for the purpose. It should be so located between the controller and the hand brake that the motorman may conveniently rest his hand on the handle when in "lap" or release positions, and be able to turn it through its entire range of movement without striking either the controller or brake staff. The gauge should be in full view of the motorman and not obscured by any part of the controller. The under side of the valve has three openings, two of which are provided with unions for $\frac{1}{2}$ " standard iron pipe. Connect the one in front to the reservoir pipe and the one in the rear (nearest to the side carrying the supporting lugs) to the train pipe, as shown in Fig. 2, Instruction Pamphlet No. T. 5001. The third opening, which has no union, is the exhaust, and should be connected to the Exhaust Muffler beneath the platform. If it is desirable to place a cock in the reservoir pipe so as to remove the operating valves without discharging the air pressure, one may be put in the branch pipe connecting the reservoir to the reservoir pipe; or two may be used, one in the reservoir pipe just below each operating valve, preferably inside the vestibule, but so placed that there will be no danger of its being closed by a broom when cleaning the car.

To install the OPERATING VALVE, FORM O. V. T., after finding proper location where the handle will be convenient for the motorman, and the platform sills will not interfere with the piping, bore three 1" holes through the floor to correspond with the tapped holes in the base as described on page 11, keeping, if possible, the cylinder

and exhaust openings in line across the car and toward the dash board. Connect the cylinder and reservoir outlets to their respective pipe lines by means of the unions supplied with the valve; the distance pieces 69, (Fig 6) support the valve at the proper height from the floor to admit of ready access to the unions. It will, however, be necessary to remove the distance pieces to get at the unions, and to take up the valve. By means of a short pipe, connect the muffler to the exhaust outlet, and fasten the base to the floor by means of two $\frac{3}{8}$ " lag screws $5\frac{1}{2}$ " to 6" long. By means of an angle piece of $\frac{1}{4}$ " plate, secure the Operating Head to the dash rail or vestibule wall so that the staff is vertical, and be sure there is $\frac{1}{8}$ " clearance between the end of the rod 25 and the top of the valve stem 10; while this is being done, the female clutch 13 should be loose on the valve stem. Then take hold of the spring cap 8 and turn the stem to the right gently until the valve 3 strikes the bent-over end of spring 7, which indicates the extreme travel in that direction; then return the stem $\frac{1}{16}$ " (measured on the circumference of the spring cap) and with handle at extreme right, slip female coupling 13 up to within $\frac{1}{8}$ " as far as it will go on male coupling 14 and clamp it securely on the valve stem by means of the cap screw. If, on turning the handle to the left, it will not go to the end of slot in the head, the valve is striking against the other end of spring 7, which shows that the stem was turned back more than the $\frac{1}{16}$ " called for above and it should be reset. Make gauge connections with the $\frac{1}{8}$ " pipe and unions as described on page 12.

Inspection and Maintenance.

The Operating Valve should be oiled regularly, eight or ten drops are sufficient. Should a leak develop inside the O. V. J. form near the handle socket, detach the body from the base and take out and soften the packing leather 19, Fig. 1. When replacing the body slide the valve to the extreme left, and with the handle at its extreme right, drop the body into place; before tightening the cap screws see that the handle swings readily the entire length of its slot. If the piping is properly cleaned so there is no grit to cut the seat, the valve will remain tight indefinitely.

If the O. V. T. form is used, note that the positions of the valve conform to those of the handle, as marked on the flange on the head; the handle should always move freely from one end of the slot to the other. In the event of the brake failing to operate, first look at the gauge to see if the pressure is still maintained in the reservoir; if the pressure is all right the trouble must be in the operating valve, or beyond; then try the brakes from the other end of the car; if they work all right the trouble is in the first operating valve tried: possibly the clutch has slipped.

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