Dec. 16, 1930. E. A. LARSSON 1,785,268

VALVE AND SWITCH OPERATING MEANS

Filed May 16, 1927

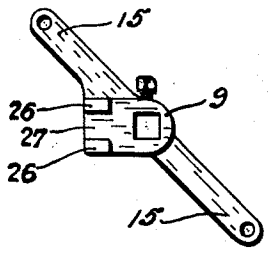


FIG. 1.

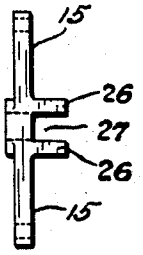


FIG. 2.



FIG. 3.

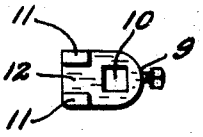


FIG. 5.



FIG. 4.

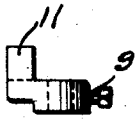


FIG. 6.

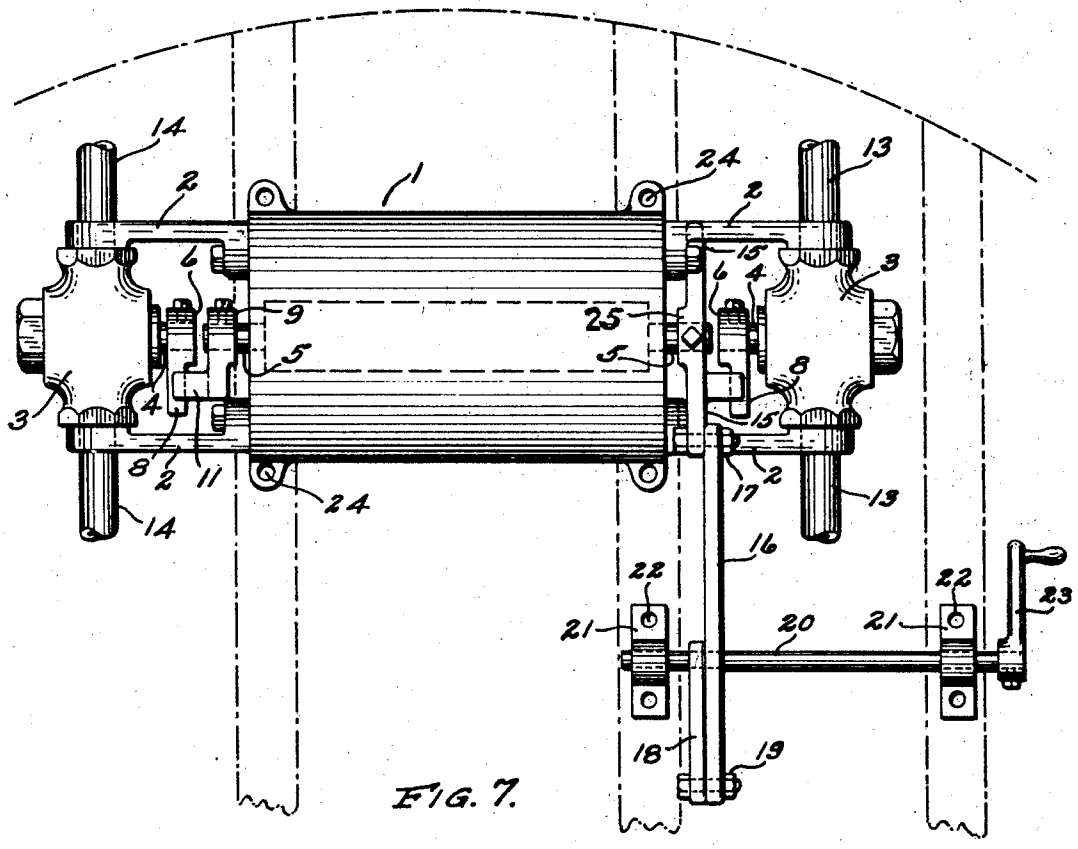


FIG. 7.

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Patented Dec. 16, 1930

1,785,268

UNITED STATES PATENT OFFICE

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VALVE AND SWITCH OPERATING MEANS

Application filed May 16, 1927. Serial No. 191,707.

My invention relates to the simultaneous or substantially simultaneous operation of an electric switch of the drum type to control circuits upon electric cars and valves to control the supply of air used on cars, and my invention relates more particularly to the method of connecting the switch and the valves for simultaneous operation so as to permit the easy operation of the valves and switch, although they may not be in perfect alinement, hence preventing binding or resistance to rotation.

One of the principal objects of my invention is to provide means to control the operation of the valves and switch and at the same time make use of standard or stock valves and stock switches and which may be assembled without the necessity of considerable time and labor expended in exactly alining the axes of the rotating parts and without the necessity of providing means for holding the rotating parts in perfect alinement. Such alinement would be expensive, especially where the valves are made by one manufacturer and the switches by another manufacturer and then brought together and wherein neither manufacturer has taken particular pains as to certain dimensions of the valves and switches, which, under ordinary circumstances exact dimensions would not be required.

Another object of my invention is to flexibly connect the valves and switches to prevent binding and reduce resistance to rotation of the parts.

Another object of my invention is to provide means for rotating such flexibly connected units from the side of the car.

Another object of my invention is to use all the standard parts possible as regularly furnished without the necessity of making up any additional parts other than are absolutely necessary.

My invention resides in the new and novel construction, combination and relation of the various parts herein fully described and shown in the accompanying drawing.

In the drawing:

Fig. 1 is a side view of what I will term the switch operating member for the reason that it is mounted upon the switch shaft and operates the same at will of the car operator.

Fig. 2 is an edge view of Fig. 1.

Fig. 3 is a side view of what I will term the valve operating member because it is mounted upon the valve stem and operates the same.

Fig. 4 is a side or edge view of Fig. 3.

Fig. 5 is a face view of what I will term the switch member, as it is merely mounted upon the switch shaft, but does not tend to operate the switch.

Fig. 6 is a side or edge view of Fig. 5.

Fig. 7 is a bottom view of my invention as mounted upon the beams or sills of a car platform, which are shown in dotted lines.

As already stated, it is my desire to provide a combination of the switch and valves so mounted that they will operate in unison at the will of the car operator. Such operation can be brought about manually or through pneumatic means, as later explained. In this class of device the switch is usually provided by the manufacturer of the electric couplers, as the switch controls the circuits leading to the electric couplers and the valves are, as a rule, supplied by the manufacturer of the air brake system and are standard with him for use under most any condition, therefore, it will be seen that there is no particular attention paid by either as to the necessary requirements for placing the operating stems or shafts in perfect alinement and maintain them in such alinement, and to do so would be quite expensive and probably the most perfect way of bringing about such a condition would be to mount the valves and the switch rigidly upon the same shaft and then providing means for holding the valve bodies in a fixed relation with respect to the switch so that stresses which may be applied to the valves through the displacement upon the pipes will be avoided.

In the preferred embodiment of my invention I provide the switch 1 which is not of any particular construction, but is shown preferably of the drum type, and to the ends of the switch I mount the brackets 2, allowing a space between the inner faces of the brackets 2 sufficient to take in the valves 3,

without regard to the distance between the inner faces of the brackets 2 and the length of the valves, neither do I pay any attention to the distance between the axis of the valve stem 4 and each of the faces of the valve to see that such distance is the same in each case, but I find that taking the standard valve the distance between the axis of the stem 4 and the faces of the valve, while it may vary, is sufficiently close so that I can, as a rule, place the brackets a certain distance apart, which allows for some clearance and variation, and find that the stem 4 will aline with the shaft 5 upon the switch sufficiently close for my purpose. In order to compensate for such non-alinement of the axes of the valve stem and switch shaft as may exist, and also possible relative movement of the valve with respect to the switch, I connect the switch shaft and the valve stem for substantially simultaneous operation by means of elements which will prevent any binding action or increased resistance to rotation of the switch and valve, and this is brought about by permitting a transverse relative movement of the said elements.

Upon the valve stem I mount the member 6, which has a hole 7 therein to fit over the valve stem 4 and a projecting part 8 which engages with the member 9 mounted on the shaft 5 of the switch. The member 9 is provided with a passage 10 to receive the end of the shaft 5 and is also provided with two laterally spaced lugs 11, forming therebetween the channel 12. The projecting member 8 is positioned in the channel 12 and is engaged by the lugs 11 whenever the member 9 is rotated in either direction, and the member 6 is therefore compelled to rotate in unison with the member 9, but is simultaneously free to move relative to the member 9 in a transverse direction with respect to the axes of the switch and valve.

In Fig. 7 I have shown two valves in combination with the switch 1 and two valves are usually used on the brake systems of the present day. One valve may control what is known as the reservoir line or main air supply line and the other valve may control the brake line, which in turn controls the operation of the brakes, in that whenever the motorman permits the air to exhaust from the brake line or whenever the air escapes, as in the parting of cars, the brakes will automatically set. As shown in the drawing, both valves are alike and the pipes 13 and 14 leading therefrom may constitute a part of the reservoir line and the brake line respectively.

The members 6 and 9, so far as I have explained, are the same for operating the two valves, but I have shown provision for manually operating the switch and valves from the side of the car by a modified form 25 of the member 9, the member 25 is provided with the arms 15. The two arms 15 can be employed if desired, or only the one arm. To one of the arms 15 is pivotally secured a lever 16 by means of the fastening 17. To the opposite end of the lever 16 is pivotally secured an arm 18 by means of the fastening device 19. The arm 18 is rigidly secured to the shaft 20 which is rotatably mounted in the bearings 21 which may be secured to the under-framing of the car by means of bolts inserted in the holes 22. At the outer end of the shaft 21 is fixedly secured the operating handle 23. The switch is secured to the car body by means of bolts in the holes 24. The member 25 is provided with spaced lugs 26 forming the channel 27 to receive the lug 8 of the member 6.

In assembling the parts I arrange the valve or valves so that they will be open when the switch is closed and vice versa thereby preventing the flow of current when the flow of air is prevented.

By operating the handle 23 motion is transmitted to the arm 15 and from there to the shaft 5 and simultaneously to the members 6, which in turn operate the valves 3.

In place of the manual operation shown, the member 16 can have substituted therefor an air cylinder and piston, the end of the piston being connected to the arm 15 such that when air is admitted to the cylinder the arm 15 will be moved forward or back as desired. This simple piston and air cylinder construction is well known to those skilled in the art.

It will be readily understood that with the construction described the alinement of the valves and switches will not be necessary, and that there will be no binding or resistance to rotation of the valves and switches relative to each other, therefore, a strain upon the parts is avoided and the operator is sure to open and close the switches and valves to their full extent, which might not be the case if the valves and switches resisted movement.

There are modifications, of course, which may be made in the disclosure shown and described herein which will be apparent to those skilled in the art, but I wish to be limited only by my claims.

I claim:

1. Electric and air control mechanism comprising a pair of valves spaced apart to control separate air lines, a drum type switch interposed between the valves and rotatable about a separate axle, but the axes of the switch and valves being in substantial alinement, an arm secured to each valve and projecting at right angles to the axis thereof to transmit motion to the valves, an arm secured to each end of the axle of the switch drum and projecting at right angles to the axle, spaced members projecting laterally from one pair of said arms, engaging with the other pair of said arms between said spaced members to cause said pairs of arms to rotate

in unison and means on one of said arms to transmit motion alternately in two directions to the said arm to rotate the valves and drum switch in unison.

2. An article of manufacture comprising a frame, a rotatable switch mounted thereon, means projecting from the frame longitudinally of the switch to support a valve, the axis of rotation of the valve and switch being in substantial alinement, a member on the valve to rotate the same, a member on the switch to rotate the same, means on one of the members to interlock with the other member to cause simultaneous rotation and permit relative transverse movement of the members while rotating and means to transmit motion to one of the members at will.

3. Electric and air controlled mechanism comprising a frame, a rotatable switch to control electric circuits mounted thereon and a rotatable valve to control air line circuits connected thereto and mounted on the same frame with substantially alined but disconnected axes, and means secured to the valve and switch and interconnected to compel simultaneous operation of the said means and valve and switch and permit the axes of the valve and switch to shift out of axial alinement without binding.

In testimony whereof I affix my signature.

ERNST A. LARSSON.