

Mar. 20, 1923.

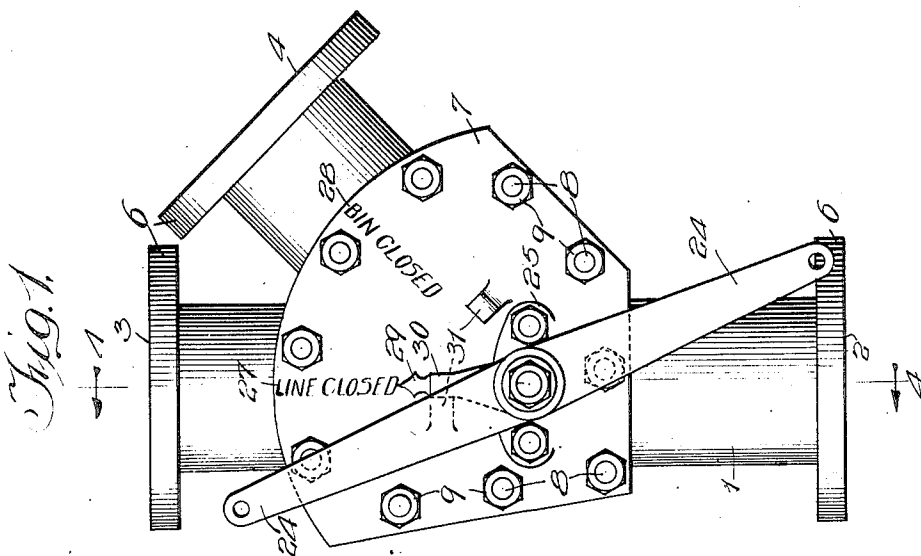
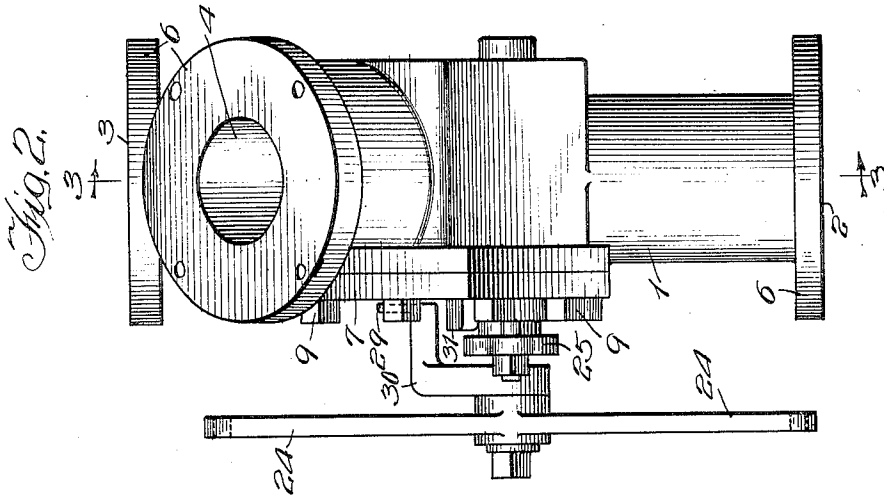
1,448,941.

E. W. POWELL.

SWITCHING VALVE FOR AIR TRANSPORT SYSTEMS.

FILED JAN. 6, 1921.

2 SHEETS—SHEET 1.



Witnesses:
W. F. Kilroy
Harry R. L. White

Inventor:
Edward W. Powell
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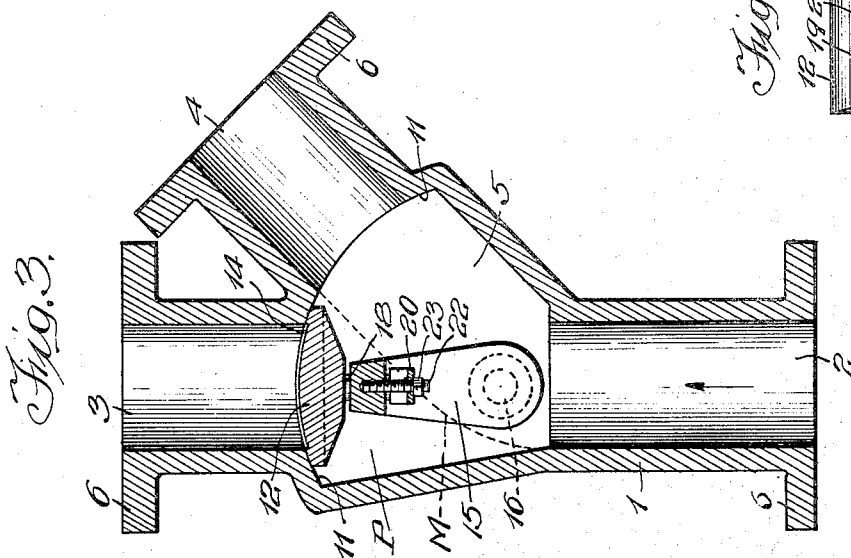
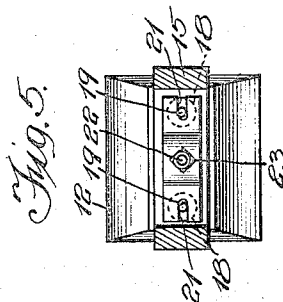
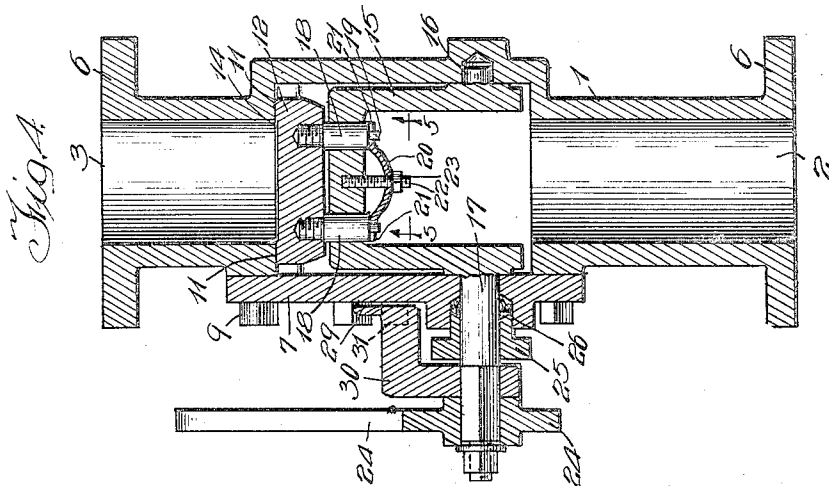
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UNITED STATES PATENT OFFICE.

EDWARD W. POWELL, OF CHICAGO, ILLINOIS.

SWITCHING VALVE FOR AIR TRANSPORT SYSTEMS.

Application filed January 6, 1921. Serial No. 435,431.

To all whom it may concern:

Be it known that I, EDWARD W. POWELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Switching Valve for Air Transport Systems, of which the following is a description.

My invention belongs to that general class of devices known as valves, and relates particularly to an improved switch valve for air transport systems or the like. The invention has among its objects the production of a device of the kind described that is simple, convenient, compact, durable, efficient, inexpensive and satisfactory for use wherever found applicable. The invention has among its further objects the production of a device of the kind described which will operate satisfactorily under all conditions, which may be adjusted as desired, as well as be automatically adjustable and which may be easily and quickly assembled or disassembled, as required. Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claim.

In the drawings, wherein like reference characters indicate like or corresponding parts,

Figure 1 is a side elevation of my improved switching valve;

Fig. 2 is a similar view of another side of the same;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 1; and

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 4.

Referring to the drawings, 1 represents a casing of suitable size, shape and material, which in the construction shown is provided with an inlet 2 and a plurality of outlets 3 and 4, 5 being an intermediate chamber between or connecting the inlet and outlets. I have shown the casing provided with flanges 6 at the inlet and outlets for attachment of the conducting pipes thereto, it being understood, however, that

said pipes (not shown) may be connected to the casing in any suitable manner. In the casing illustrated I have constructed the same with an open side at the chamber 5, which is normally covered by a removable closure plate 7, which when in place constitutes a portion of the casing. The closure or cover plate 7 may be secured in place by the studs 8 and nuts 9, or any equivalent means for the purpose.

I preferably construct the casing with the valve seat 11 at the interior ends of the outlet passages 3 and 4, the casing being preferably enlarged so that the chamber 5 is of a slightly greater size than the inlet opening, the purpose of which will be more fully described hereinafter. Arranged in the casing is a valve member 12, which in the construction shown is formed to cooperate with the valve seat 11, the valve being preferably recessed, as indicated at 14, so that its only bearing face on the valve seat is adjacent its periphery. The valve 12 is mounted on a yoke 15, which is pivotally supported by the studs or shaft parts 16 and 17 from the casing. As most clearly shown in Figs. 3, 4 and 5, the valve 12 is adjustably mounted on the yoke by means of the pins or studs 18, which are carried by the valve and slidably engage with the yoke. As shown, a spring 20, carried by a stud 22, engages the two pins or studs 18, which in the construction shown are preferably provided with the projecting pins or parts 19, which engage in slots 21 at the ends of the spring so that the spring is prevented from turning on its pin 22. Normally, the spring 20, maintains the valve 12 upon its seat 11, it being possible to vary the adjustment as desired by adjusting the nut 23 on the stud 22. However, the valve is itself automatically adjustable on the yoke, and when necessary, it may slightly yield, its movement being opposed by the spring 20.

I have shown the supporting shaft part 17 of the yoke extended to the exterior of the casing. At its outer end I provide an operating lever or arm 24, which is secured on the shaft or part 17, and may be employed in actuating the same. Any equivalent means, however, may be employed for the purpose. I prefer to project the shaft 17 through the cover so that when the cover is removed for inspection, the cover, yoke and valve may be removed as an en-

tirety or unit, or the same may be placed back in the same manner. I also prefer to provide a stuffing box by providing the chamber in the cover plate, as shown, and member 25 arranged to cooperate with the packing 26 of suitable material, so that a tight joint is provided so that air under pressure or other fluid cannot escape and leak out at this point. For convenience in operating, there may be designated on the cover plate, as indicated in Fig. 1 at 27 and 28, indications as to the valve positions, or equivalent words or characters to show or identify the same. In this connection, I provide an indicator 29, which is carried by the part 30, mounted on the shaft 17. Obviously by glancing at the indicator the position of the valve may be readily determined at any time without reference to the operating lever or handle 24, which may be applied as found desirable. If desired, stops 31 may be provided for limiting the travel of the valve so that it is always brought up to the proper position.

In operating the device the material, for example powdered or fine coal, ashes, cinders or whatever is to be transported is forced through the conduits or piping in the direction indicated by the arrow, its passage through the casing being controlled by the valve 12. As the valve is shown in Fig. 3, the same would be discharged through the outlet 4. Obviously, shifting the valve to the opposite position, closing the outlet 4, would permit its discharge through the outlet 3. Assuming the valve 1 in the position as shown in Fig. 3, as material is discharged through, the casing a portion would probably have a tendency to pocket, for example in the space marked P, its line probably being approximately as indicated by the dotted line M. It would pack this space very tightly, the pressure in itself, as well as the air pressure, tending to maintain the valve tightly on its seat. Ordinarily, the valve is only shifted when the air pressure is off. If it is desired to shift the valve to close the outlet 4, the yoke is rocked on its shaft or support, and in this connection it will be noted that regardless of how tightly the material is packed in the pocket P, the yoke and valve will have a tendency to break away the material and will not in any way in this case interfere with the moving of the valve. The same also will be substantially the case when the valve is in the opposite position, in which case the material will of course pocket on the opposite side of the casing. It will be noted that the yoke does not in any way impede or interfere with the passage of material through the casing, as the distance between the sides of the yoke is equal at least to the size of the inlet. This is of importance, as the same does not cause

the device to choke up or interfere with the passage of the material.

With my construction, the valve is air tight on the closed side so that material being transported past the valve will not be discharged through the closed outlet, and also so that the transporting air pressure will not suffer a drop in pressure in passing the valve due to leakage. This is of importance where the material is being transported a long distance and passing a large number of switch valves.

The advantages of the valve construction illustrated may be briefly described as follows: The arm of the valve being made in U-shape, as shown, allows the full, unrestricted area of the pipe with the valve in either position. This is important as a restricted or obstructed opening causes the valve parts to become scored and generally useless in a short period. Heretofore, with valves for this purpose, difficulty has been encountered on account of the fine material which is being transported clogging or jamming the valve, making it difficult, if not impossible, to operate. This necessitates the blowing out of the valve with an auxiliary air line or the dismantling of the valve. With my construction, the same is so designed that in moving the valve in either direction the moving parts recede from any packing material which may remain in the valve, making it impossible to jam the valve. This obviates the necessity of an auxiliary air line and cleaning out of the valve, and obviates the dismantling and removing of the cover at frequent intervals.

With my improved construction the valve seat is cylindrical, the casing seat being concave and the sliding valve portion being convex. The parts are kept in close contact at all times by means of the pins or studs 18, which may slide through the yoke and spring 20. This pressure may be regulated as described. The pressure, however, placed on the parts of the valve by the spring keeps out any material which might tend to work in between the surface while the valve is being operated. When the material is being transported the air pressure in the pipe line acts against the entire surface of the valve, making a close contact and a tight valve. It may be mentioned that with a number of classes of materials it might be desirable to make the slide of pressed steel or other material flexible enough to conform to any irregularity of wear which might occur in the casing when the air pressure was on it. The sliding pins and spring also make an automatic adjustment which wears on the valve seat, making frequent attention unnecessary. The type of valve in its simplicity of construction makes the device very light and compact, thereby reducing the cost con-

siderably, as well as the space required for its installation.

As before mentioned, removing the nuts or bolts holding down the side cover plate 7 permits the removal of the entire valve action or mechanism, thereby making easy inspection or repair work. The removal of all jamming tendency with this construction makes the power necessary to throw the valve nearly constant at all times. This enables the mechanism to be employed by means of which the valve may be thrown from a distance either by hand or other power. This is of considerable advantage in itself because generally air transport lines are placed well overhead and may at times not be readily accessible.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

In a device of the kind described and in combination, a casing adapted to have material forcibly transmitted therethrough, said casing having an inlet at one end and a

pair of outlets at the other end, one of said outlets being in alignment with said inlet and the other of said outlets being at an obtuse angle thereto, and a valve chamber intermediate said inlet and outlets with a bore of larger cross-section than said inlet, a valve in said chamber controlling said outlet openings, a yoke pivotally mounted in said chamber, said yoke having a pair of arms spaced apart a distance substantially equal to the width of said inlet at said chamber, and a cross bar connecting said arms, pins carried by said valve and slidably extended through said cross bar, a spring having elongated slots at its ends to removably receive the ends of said pins, means for adjusting the tension of said spring to vary the pressure of the valve upon its seat, and means for actuating said yoke on its pivotal axis to move said valve so that said valve and yoke will recede from any material that may be jammed between its rear edge and the casing whenever said yoke is actuated in either direction.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses:

EDWARD W. POWELL.

Witnesses:

ROY W. HILL,

BERTHA HARTMANN.