H. P. ROBINSON.

BALANCE SLIDE VALVE.

APPLICATION FILED SEPT. 16, 1913.

1,140,188. Patented May 18, 1915.

Fig. 1.

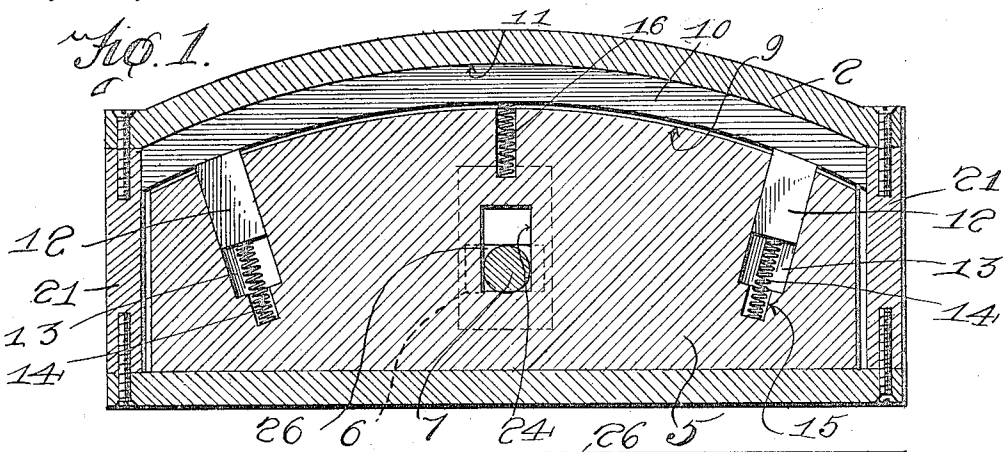


Fig. 2.

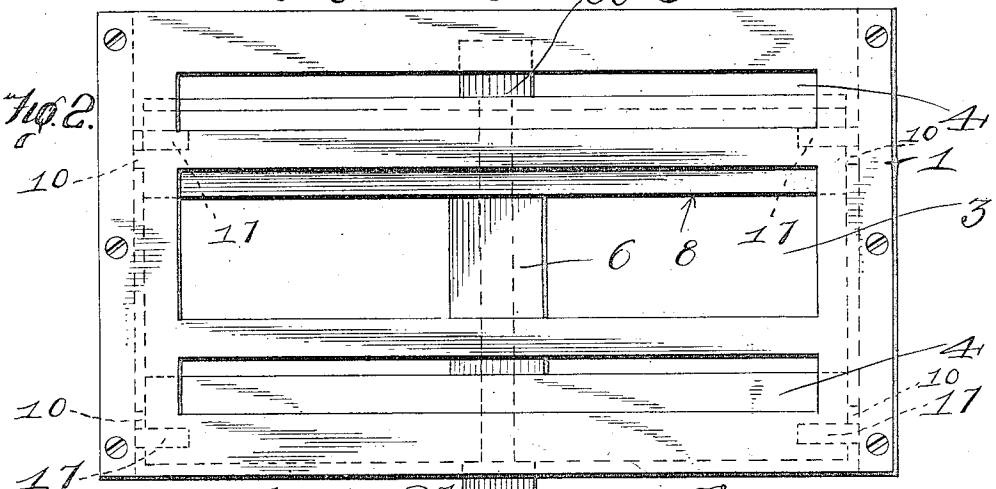


Fig. 3.

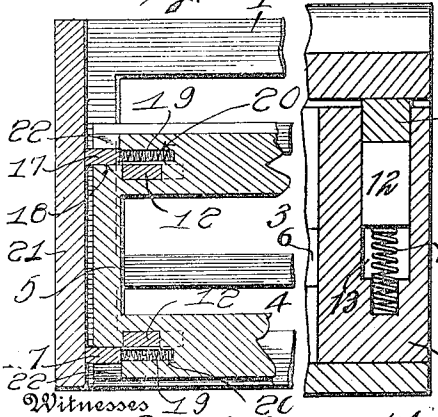


Fig. 8.

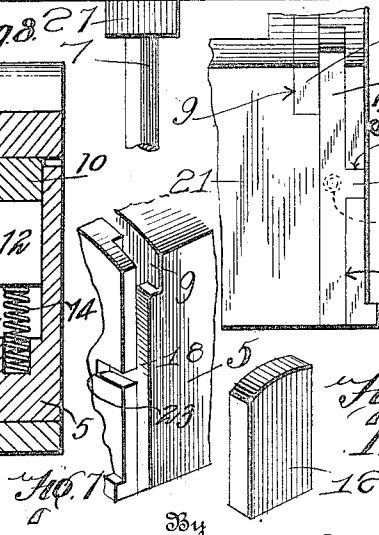


Fig. 4.

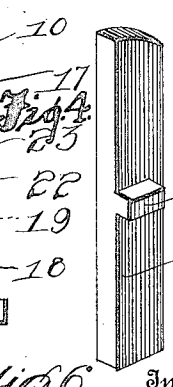


Fig. 5.

Witnesses

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Fig. 7.

Fig. 6.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D.

UNITED STATES PATENT OFFICE.

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BALANCE SLIDE-VALVE.

1,140,188. Specification of Letters Patent. Patented May 18, 1915.

Application filed September 16, 1913. Serial No. 790,091.

To all whom it may concern:

Be it known that I, HERMAN P. ROBINSON, a citizen of the United States of America, residing at Bristol, in the county of Sullivan and State of Tennessee, have invented certain new and useful Improvements in Balance Slide-Valves, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to balance slide valves for locomotives and the like, and has for its object the production of an efficient valve which will be perfectly balanced and will offer the minimum amount of resistance to the valve gear.

Another object of this invention is the production of an efficient slide valve which is provided with an efficient packing strip for giving a large area of contact for the valve, and also greatly increasing the life thereof.

Further objects and advantages of the present invention will be pointed out throughout the following specification and claim.

In the drawings: Figure 1 is a central transverse section through the valve. Fig. 2 is a bottom plan view thereof. Fig. 3 is a horizontal section through the lower portion of one end of the valve. Fig. 4 is a side elevation of a portion of the sliding valve. Fig. 5 is a detail perspective of one of the side packing strips. Fig. 6 is a detail perspective of one of the plunger blocks adapted to engage the upper packing strip carried by the sliding valve. Fig. 7 is a detail perspective view of one corner of the slide valve head. Fig. 8 is a vertical section through the slide valve taken through the pocket thereof and showing the packing strip in cross-section and also the spring pressed plunger which normally urges an outward pressure upon the packing strip.

By referring to the drawings, it will be seen that 1 designates the valve casing which may be formed of any desired shape without departing from the spirit of the invention, the present casing being provided with an arched top 2 as clearly illustrated in Fig. 1. The base of the casing 1 is provided with a central exhaust opening 3 and upon each side of the exhaust opening 3 is positioned an elongated inlet opening 4. These openings 3 and 4 pass entirely across the body 1 from one side to the other so as to produce the greatest amount of area for the steam to act upon the valve. Casing 1 may also be used by placing the lower end of the sides 21 on the valve seat, instead of on the base, thereby producing the same effect.

The main sliding portion of the valve comprises a hollow body 5 having a centrally located bridge portion 6 through which the operating shaft or rod 7 passes. The hollow portion 8 of the head or body 5 will permit the passage of steam therein for allowing the steam to be passed from the inlet to the exhaust openings of the casing 1.

The sliding head 5 is provided upon the top thereof with a plurality of arched grooves 9 into which fit the arched packing strips 10. These packing strips 10 are adapted to fit firmly in engagement with the lower face 11 of the cover plate or top 2 of the casing 1 so as to produce a steam-tight joint and prevent the escape of steam through the casing or body 1. The packing strip 10 is normally held in firm engagement with the lower face 11 of the cover plate 2 by means of the spring-pressed plunger-blocks 12. These plunger-blocks 12 work in the sockets 13 formed in the head 5 and are normally pushed outwardly by means of the coil springs 14, which coil springs have their lower ends mounted in the sockets 15 formed in the head 5 as is clearly illustrated in Fig. 1. A coil spring 16 is also mounted centrally of the head 9 and engages the under surface of the packing strip 10 for also exerting an upward pressure upon the packing strip as clearly illustrated in Fig. 1.

Adjacent each of the upper packing strips 10 and upon each side of the head 5 is placed a vertically-extending packing strip 17, which packing strips fit in the channel portions 18 of the head 5 as is clearly shown in Figs. 3 and 4. Coil springs 19 are positioned within the sockets 20 for normally exerting an outer pressure upon the packing strips 17 so as to hold the packing strips in firm engagement with the sides 21 of the casing or body 1. The vertically-extending strips 17 are provided with integral, laterally-extending lugs 22 which lugs fit in the notched portions 23 formed in the head 5 so as to prevent the vertically-extending strips 17 from having any vertical movement upon the head 5. The springs 19 will exert a lateral pressure upon the strips 17, as is clearly illustrated in Fig. 3.

From the foregoing description, it will

be seen that the packing strips 10 and 17 will constitute a steam tight closure around the edges of the sliding head 5 and will thereby prevent the escape of steam from the head, and owing to the small frictional area of the head upon the casing or housing 1, it will be seen that the pressure of steam will be greatly reduced upon the sliding head 5; and, further, it will be obvious that the head 5 may be very easily moved within the casing 1 owing to the great reduction of frictional pressure upon said head.

The head 5, as previously indicated, is provided with a centrally-located bridge portion 6 through which extends an aperture 24, and within this aperture 24 is placed the valve operating rod or shaft 25. This shaft or rod 25 is provided at one end with a laterally-extending head 26 and spaced from this head 26 is formed an additional head 27, the heads 26 and 27 engaging the opposite sides of the head 5 for firmly holding the operating rod 7 in firm engagement with the head 5. It will be seen that by turning the heads 26 and 27 upwardly so as to fit within the aperture 24, the rod 7 may be easily removed from the aperture 24.

By means of the construction as illustrated and described, it has been found by practical experience that the present device offers from fifty per cent. to sixty per cent. less resistance to the valve gear than the ordinary slide valve now in use. It has further been found that forty per cent. less steam pressure on top of the valve is produced by means of the present device, and that the valve will not blow off of its seat when the exhaust occurs as it strikes the deflection hood instead of the top of the exhaust cavity in the valve, as with the ordinary slide valve in use now. It should be further understood that the present slide valve may be applied to any steam chest now in use without renewing any portion of the steam chest.

In view of the fact that the frictional area of the face of the valve has been reduced twelve per cent., the area exposed to the boiler pressure has been reduced approximately forty per cent., and, further, by constructing locomotives and the like, this valve may be constructed as an inside admission slide valve.

It should be understood that the packing strips above described are expanded by means of the spiral springs previously indicated and also by the steam pressure, while the engine is in operation. It will be seen that the hood 2 of the casing 1 is curved on the same radius as the upper face of the valve and packing, and is held in place in any desired manner. The circulation of the steam within the chest is free over the top of the casing so that there will be an equal pressure of steam upon both sides of the valve at all times.

What is claimed is:—

A valve comprising a casing, a sliding head positioned therein, said head provided with a plurality of channel portions upon the upper face thereof, packing strips positioned therein, means for normally exerting an outward pressure thereon, said head provided with vertically-extending grooves upon the side portions thereof adjacent said first mentioned packing strips, vertically extending packing strips positioned within said vertically-extending grooves, said head provided with notched portions adjacent said vertically-extending grooves, a vertically-extending strip positioned within each vertically-extending groove, each vertically-extending packing strip provided with a laterally-extending rib portion fitting in said notches of said head, and spring means engaging said vertically-extending packing strips for normally exerting a lateral pressure thereon.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

HERMAN P. ROBINSON.

Witnesses:
D. T. McKee,
T. M. Hobson.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."