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D. L. MARTYN

1,652,033

PISTON HEAD

Filed May 23, 1925

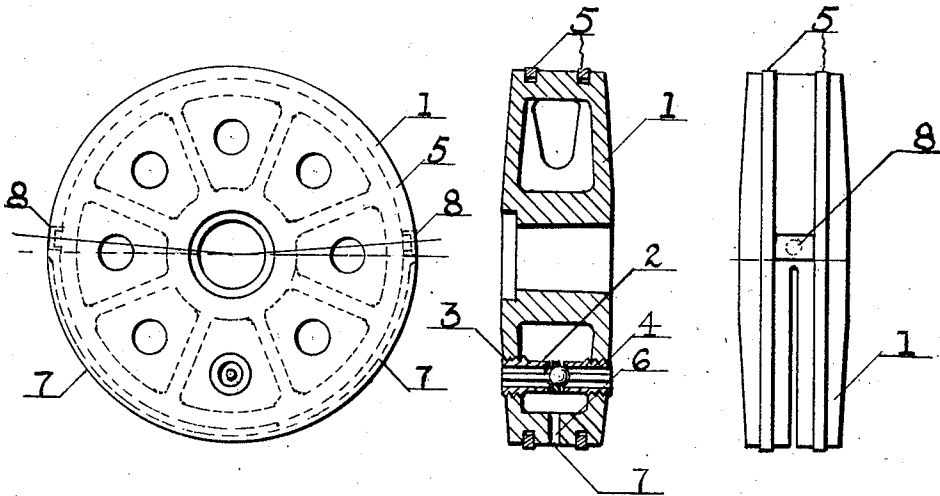


FIG 3

FIG 1

FIG 2

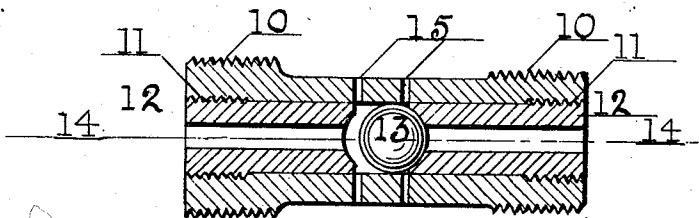


FIG 4

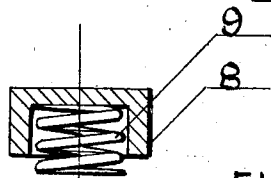
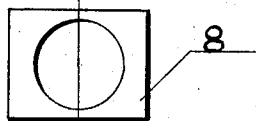


FIG 5



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PISTON HEAD.

Application filed May 23, 1925. Serial No. 32,411.

This invention relates to piston heads of horizontal engines and in particular steam locomotives and has for its object the reduction of friction by the automatic balancing of the piston head and rod.

Further objects will appear as the following specific description is read in connection with the accompanying drawings, which form a part of this specification, and in which:—

Figure 1 is a sectional view of an ordinary locomotive piston head with my improvements shown in part.

Figure 2 is a side elevation.

Figure 3 is a plan.

Figure 4 is a sectional view of my automatic balancer.

Figure 5 shows a tongue piece with spring.

Referring more particularly to the drawings, Figure 1, illustrates a piston head of a type in general use in locomotive practice and showing my balancer 2.

This balancer 2, has one fundamental object, namely to reduce friction, which is accomplished by the action of steam thru it, to automatically raise the piston head slightly off the bottom of cylinder and thus cause the head to "float" on a film of steam.

The piston head 1, is drilled and tapped at both ends 3 and 4 so that the balancer 2 may be screwed into place.

Packing rings 5 are fitted to the piston head by the methods in general use.

The head 1 has a suitable hole 6 drilled in it, at the bottom which communicates with a groove 7, cut approximately half way round the periphery of the head.

Between the packing rings at suitable heights are inserted two tongue pieces or sliding abutments 8.

These tongue pieces or abutments are used to prevent neutralization of the steam pressure.

In order that they will be effective they are fitted with a spiral spring 9 Figure 5.

They are made a close fit and yet free to work in and out, so that the springs will at all times keep them close to the cylinder walls and so prevent steam getting from the top to the bottom or vice versa.

The hole 6 and the segmental groove 7 form a steam passage way from the inside of head to practically half way round the head up to the tongue pieces 8.

When packing rings 5 are in place and steam is admitted into the head 1, the steam is confined between the rings 5 and the tongue pieces 8, this places a film of steam between the piston head and the cylinder walls.

The effect is to raise the head 1 and further, when steam is put into the cylinder the pressure on the rings 5 is balanced by its action, that is to say, the steam being on both sides of the rings 5, whatever spring or tension they have is allowed to work unrestrained.

Referring to Figure 4 which I call the balancer 2, it is made of hard metal, the outside piece 10, is threaded at both ends and for convenience in assembling they are of different diameters.

This piece 10 is bored out its entire length and has a thread 11, cut internally at each end.

Into it are screwed two special plugs 12, having a concave end, of the same radius as the ball 13 also having a hole 14 thru them which forms a steam passage.

One plug is permanently screwed in then the ball 13 is put in which is free to roll back and forth.

The other plug 12 is then put in place and screwed up to about one eighth of an inch from the ball 13, this therefore permits the ball 13 a movement of one eighth of an inch between the concave seats at the ends of plugs 12.

The travel of the ball 13 may be adjusted by turning plugs 12.

To allow steam to pass from the cylinder into the piston head I there may be one hole at the top of piece 10 or a number of small holes 15 pitched diametrically as shown in Figure 4 may be used.

In my improvements the inside of piston head becomes a receiver or dome, which is an important feature, because when engines are linked up or working at a high rate of expansion, the steam in this container is used until commencement of another stroke, producing the same effect as increased clearance.

And further in engines using superheated steam the piston being kept uniformly hot prevents carbon deposit.

While I have shown a preferred method of applying my invention I do not desire to be limited to the exact form which I have here

indicated as I am aware I am entitled to such changes or variations as fall within the scope of the appended claims.

The action of steam upon a piston head when fitted with my improvements is as follows:—

When steam is admitted into the cylinder it goes thru the hole 14, blows ball 13 back against a concave seat, the steam then passes thru the small holes 15 into the piston head cavities.

When the piston head is nearly full it enters groove 7 thru the hole 6, then being confined between the packing rings 5 and the tongue pieces 8 it slightly raises the piston head and piston rod to the top of cylinder.

Upon the return stroke this action is repeated.

There is no exhaust except what steam escapes the packing rings or by worn condition or faulty workmanship.

The lifting pressure is calculated by the difference in projected area between the surfaces confined inside the packing rings and the tongue pieces.

The projected area at top must always be less than the bottom, the amount being regulated by the weight of piston head and by the working pressure of the boiler.

Having thus described my invention I claim:—

1. The combination with a horizontal cylinder, of a piston head reciprocable therein, said head having a transverse bore there-through, a single double acting check valve loosely mounted in said bore, removable valve seats mounted in the opposite ends of said bore, a transverse passage leading from the interior of said bore to the periphery of the

head, laterally spaced apart resilient packing rings set in the periphery of the piston head and defining an annular channel around the piston head, the aforesaid transverse passage opening into a segmental groove in said channel, said groove extending to about the vertical center, abutments mounted in said channel above said center and adjacent the upper ends of the segmental groove.

2. In a piston for horizontal cylinders, a hollow piston head, a cylindrical balancing chamber extending transversely through said head, said chamber comprising a tubular sleeve threaded into the opposite faces of the piston head, lateral perforations in said sleeve adjacent the center thereof, a ball check valve loosely mounted in said sleeve, hollow valve seats adjustably mounted in the opposite ends of the sleeve, spaced apart resilient packing rings mounted in the periphery of the piston head, a vertical passage from the interior of the piston head, a segmental groove in the lower half circumference of the head between and parallel with the said packing rings, the said vertical passage opening into said segmental groove and yielding tongues or abutments mounted in the space between the packing rings above the ends of the segmental groove at diametrically opposite points of the circumference of the piston, and at least above the vertical center of the head, all as and for the purposes specified.

Signed at Vancouver, Clarke County, State of Washington, this 18 day of May, 1925.

DAVID L. MARTYN.