

W. C. POST.
 REVERSING VALVE MECHANISM.
 APPLICATION FILED APR. 5, 1910.

1,000,193.

Patented Aug. 8, 1911.

Fig. 1 -

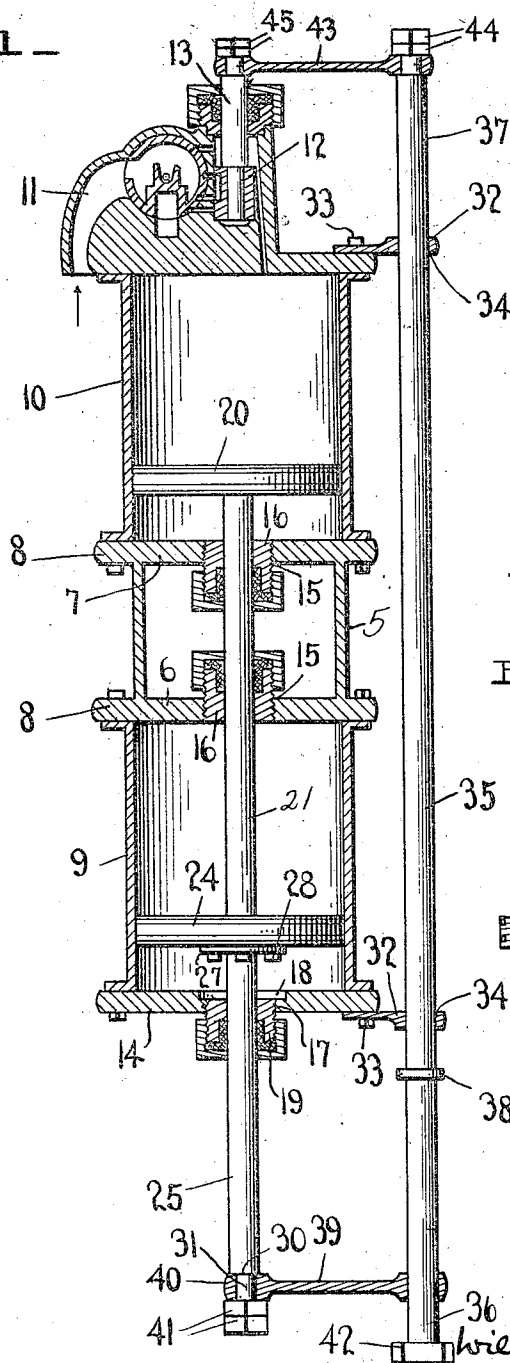
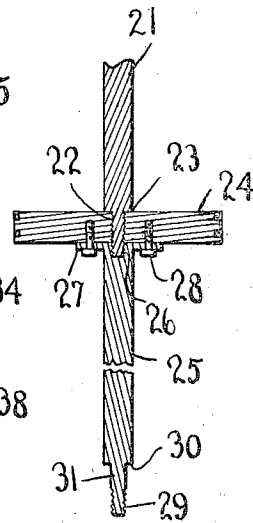


Fig. 2 -



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REVERSING-VALVE MECHANISM.

1,000,193.

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Application filed April 5, 1910. Serial No. 553,603.

To all whom it may concern:

Be it known that I, WILLIAM C. POST, citizen of the United States, residing at Estherville, in the county of Emmet and State of Iowa, have invented certain new and useful Improvements in Reversing-Valve Mechanism, of which the following is a specification.

This invention relates to an improvement in pumps, and more especially to that type of pumps known as the "Westinghouse" or "New York" pump.

In the above named type of pumps, the mechanism controlling the reverse valve is arranged within the steam cylinder and is controlled by a needle carried by the piston rod. As is well known, whenever any part of this valve actuating mechanism becomes broken or otherwise impaired, it necessitates the taking off of the entire valve structure in order to get at the said mechanism. Furthermore, in this general construction, all the mechanism being incased, it is obvious that whenever the pump fails to work, there is no means by which the trouble may be readily ascertained. Furthermore, in this construction the piston in the pumping chamber is connected to the piston rod in such a manner that as the said piston reciprocates, it will also revolve to a certain degree. As a result of this revolving action, the connection between the piston and the rod becomes loosened, consequently causing the said piston to get out of working order.

The principal object of this invention is to change the valve actuating mechanism from the interior to the exterior, so that the working of the same may be readily observed, or should the same become out of order, it can be repaired with despatch and without the necessity of removing the said valve mechanism.

Another object of the invention is to provide an improved piston rod connection, whereby both the pistons of the air and steam cylinders will be prevented from any rotary movement during their reciprocatory action.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended; it being understood that various changes in the size and minor details of construction within the scope of

the claims, may be resorted to without departing from or sacrificing any of the advantages of the invention.

In the drawing:—Figure 1 is a central longitudinal sectional view of the ordinary "Westinghouse" pump, showing my valve actuating mechanism applied thereto. Fig. 2 is a detail sectional view of the piston rod and pistons, showing the connections by the same.

Like reference numerals designate corresponding parts in all the figures of the drawing.

Referring to the drawing, the invention comprises a cylindrical casing 5 having opposed heads 6 and 7, the peripheries 8—8 of which extend beyond the wall of the said casing. Arranged on either side of the casing and extending longitudinally are opposed cylinders 9 and 10 respectively, the former being the air cylinder and the latter the steam cylinder. Secured to the outer end of the said steam cylinder 10 is a reversing valve 11, the mechanism of which is of the well known "Westinghouse" construction, and needs no description. A reciprocating valve 12, having a valve stem 13, is arranged therein to control the said steam cylinder. This valve stem projects outwardly from the extreme end thereof and reciprocates longitudinally with respect to the said cylinders. Secured to the outer end of the air cylinder 9, is a head 14 of ordinary construction. Alined openings 15—15 are formed in the opposed heads of the casing 5, and arranged within the said openings are packing glands 16—16, of any preferred construction. The opening 17 is formed in the said head 14 and in alinement with the openings 15—15. The inner face of this head is counter-bored, as indicated by reference numeral 18, for a purpose hereinafter described, and arranged within the said opening is a packing gland 19 of any suitable construction. A piston 20 of any suitable construction is arranged within the steam cylinder 10 and is secured to one end of a piston rod 21, said rod passing through the glands 16—16 of the casing 5 and terminating within the air cylinder 9. The latter end of the said rod is reduced and threaded as shown by reference numeral 22, thereby forming a shoulder 23—23. A piston 24 is threaded onto the said reduced end and against the said shoulder 23, the extreme end of the said rod projecting beyond

the said piston. A second piston rod section 25 is counter-bored, as shown by 26 and is internally threaded and adapted to be threaded onto the end of the reduced portion of the said piston rod 21. The end of this piston rod section is provided at its end with an integral flange 27, and said flange is connected to the piston 24 by means of set screws 28 or other suitable fastening means. This section 25 extends through and beyond the packing gland 19 in the head 14 of the air cylinder 9. The extreme end of the piston rod section 25 is reduced, as shown at 29 to form a shoulder 30 and a bearing 31. Projecting from the head 14 and the opposed head or valve mechanism 11, are alined supporting guide brackets 32—32. These members are secured to the said heads by set screws 33—33 or any other suitable fastening means, and are provided with alined openings 34—34, through which a valve rod 35 is arranged. One end 36 of the valve rod is arranged substantially parallel with the reduced end 29 of the piston rod 25 and the other end 37 is likewise opposite the outer end of the valve stem 13. A tappet 38 is suitably arranged on the said valve rod 35 at a point between the end 36 and the adjacent bracket 32. A tappet arm 39 has one end 40 connected to the bearing 31 of the reduced end 29 of the valve rod section and is secured in place by nuts 41. The other end of the said arm 39 is perforated to receive the valve rod 35. The end 36 of the valve rod 35 is provided with a nut 42 or other suitable means. An arm 43 is connected to the valve stem 13 and to the other end 37 of the valve rod 35 and is positively held in place by means of nuts 44 and 45 respectively.

From the foregoing, it will be observed that when steam is admitted into the steam cylinder 10 above the piston 20 or that side adjacent the valve 11, the said pistons will be forced outwardly. In this movement the piston 24 compresses the air as will be readily understood by those skilled in the art. As the pistons reach their lowermost positions, less the travel of valve 12, tappet arm 39 contacts with the nut 42 of the valve rod 35 carrying it to the end of piston stroke, and causes the said rod through the arm 43 to actuate the valve stem 13 and valve 12, and thereby reverse the valve 11. Steam will then be admitted on the other side of the piston 20 and will cause the said piston to return. As this piston reaches its furthestmost position, less the travel of valve 12, the tappet arm 39 contacts with the tappet 38 of the valve rod 35, carrying it to end of piston stroke and through the arm 43 actuates the valve stem 13 and valve 12, and again reverses the valve 11. This operation is, of course, repeated as long as desired.

It will be observed that by securing the flange 27 of the valve rod section 25 to the piston 24, the said piston is held rigid and consequently is prevented from any rotary movement which would tend to loosen its connection. It will furthermore be observed that should the interior of the pump be in need of repair, it will only be necessary to remove the head 14. This may be done very quickly and without the necessity of sending the engine to the roundhouse as is now done whenever a pump becomes out of order.

What I claim is:—

1. In an air pump for locomotives, the combination with opposed cylinders, of a reversing valve and a reciprocable valve operating stem arranged on one end of one of the cylinders, pistons respectively arranged within each of the cylinders and connected by a piston rod, one end of the piston rod projecting beyond the end of the cylinder opposite the reversing valve and its stem, a valve rod movably supported by the cylinders and arranged in parallel with the said piston rod, an arm connecting the valve rod and the valve stem, and means connecting the piston rod and the valve rod for moving the latter and thereby actuating the valve stem upon movement of the said pistons in either direction.

2. In an air pump for locomotives, the combination with opposed cylinders, of a reversing valve and a reciprocable valve operating stem arranged on one end of one of the cylinders, pistons respectively arranged within each of the cylinders and connected by a piston rod, one end of the piston rod projecting beyond the end of the cylinder opposite the reversing valve and its stem, perforated brackets exteriorly secured to the cylinders, a valve rod movably arranged within the perforations, and provided with a tappet and nut, an arm connecting the valve rod and the valve stem, and means connecting the piston rod and the valve rod for alternately engaging the tappet and the nut for actuating the valve stem upon movement of the said piston in either direction.

3. In an air pump for locomotives, the combination with opposed cylinders, of a reversing valve and a reciprocable valve operating stem arranged on one end of one of the cylinders, a piston rod projecting into both cylinders and provided with a piston on the end thereof adjacent the reversing valve and its stem and the other end reduced to form a shoulder, a piston secured on the last mentioned end against the shoulder, a second piston rod section projecting through and beyond the end of the cylinder opposite the reversing valve and its stem, said rod section having one end bored to fit the reduced end of the piston rod, a flange integral with the end of the said rod section,

means connecting the flange and the piston for preventing any rotary movement thereof, and means external of the cylinders connecting the rod section and the valve stem for actuating the latter upon movement of the pistons in either direction.

4. In an air pump for locomotives, the combination with opposed cylinders, of a reversing valve and a reciprocable valve operating stem arranged on one end of one of the cylinders, a piston rod projecting into both cylinders and provided with a piston on the end thereof adjacent the reversing valve and its stem and the other end reduced to form a shoulder, a piston secured on the last mentioned end against the shoulder, a second piston rod section projecting through and beyond the end of the cylinder opposite the valve mechanism, said rod section having one end bored to fit the reduced end of the piston rod, a flange integral with the end of the said rod section, means connecting the flange and the piston for preventing any rotary movement thereof, a valve rod movably supported by the cylinders and arranged in parallel with the said piston rod and piston rod section, an arm connecting the valve rod and valve stem, and means connecting the piston rod and the valve rod for moving the rod and thereby actuating the valve stem upon movement of the said pistons in their direction.

5. In an air pump for locomotives, the combination with opposed cylinders, of a reversing valve and a reciprocable valve operating stem arranged on one end of one of the cylinders, a piston rod projecting into both cylinders and provided with a piston on the end thereof adjacent the reversing valve and its stem and the other end reduced to form a shoulder, a piston secured on the last mentioned end against the shoulder, a second piston rod section projecting through and beyond the end of the cylinder opposite the valve mechanism, said rod section having one end bored to fit the reduced end of the piston rod, a flange integral with the end of the said rod section, means connecting the flange and the piston for preventing any rotary movement thereof, perforated brackets exteriorly secured to the cylinders, a valve rod movably arranged within the

perforations and provided with a tappet and nut, an arm connecting the valve rod and the valve stem, and means connecting the piston rod and the valve rod for alternately engaging the tappet and the nut for engaging the valve stem upon movement of the said pistons in either direction.

6. In an air pump for locomotives, the combination with a pair of axially alined cylinders, of a piston in each of said cylinders, a piston rod to which said pistons are connected and which projects from one end of one of said cylinders to the exterior thereof, a bodily removable head closing the opposite end of the other of said cylinders, a reversing valve and a reciprocable reversing valve operating stem located in said removable head and removable therewith and tappet connections between said valve stem and the projecting end of said piston rod for actuating said reversing valve.

7. In an air pump for locomotives, the combination with a pair of axially alined cylinders, a piston in each of said cylinders, a piston rod connecting said pistons, of an extension to said piston rod extending centrally through the head of one of said cylinders, a reversing valve and its reciprocable operating stem mounted centrally on the opposite end of the other of said cylinders, and an operating connection between said extension and said reversing valve stem.

8. In a device of the character described, the combination with a pair of axially alined cylinders of a piston in each of said cylinders, a piston rod to which said pistons are connected and which projects from one end of one of said cylinders to the exterior thereof, a bodily removable head closing the opposite end of the other of said cylinders, a reversing valve mechanism located in said removable head and removable therewith and tappet connections between said valve mechanism and the projecting end of said piston rod for actuating said valve.

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

WILLIAM C. POST.

Witnesses:-

J. A. MARTIN,

WILLIAM K. HILL.