May 1, 1928. 1,668,304

E. DE H. CALDWELL

LOCOMOTIVE POWER REVERSE GEAR

Filed Jan. 27, 1926 2 Sheets-Sheet 1

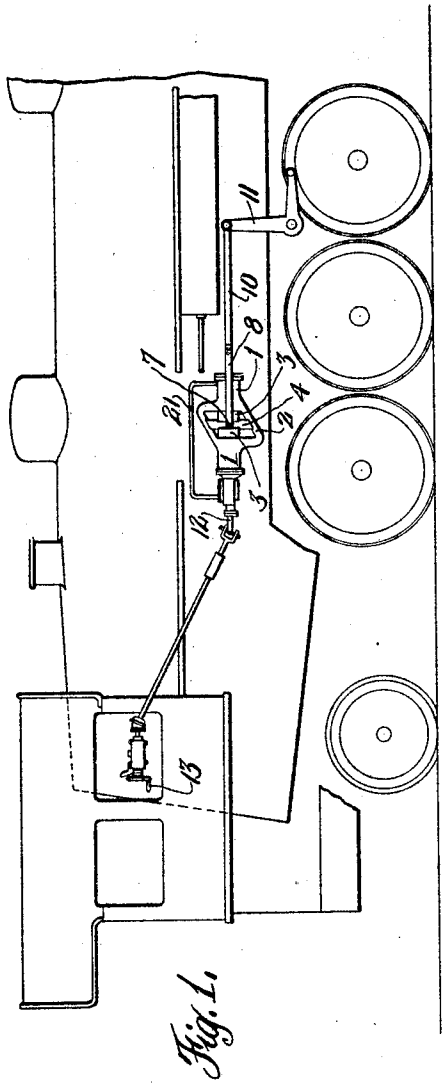


Fig. 1.

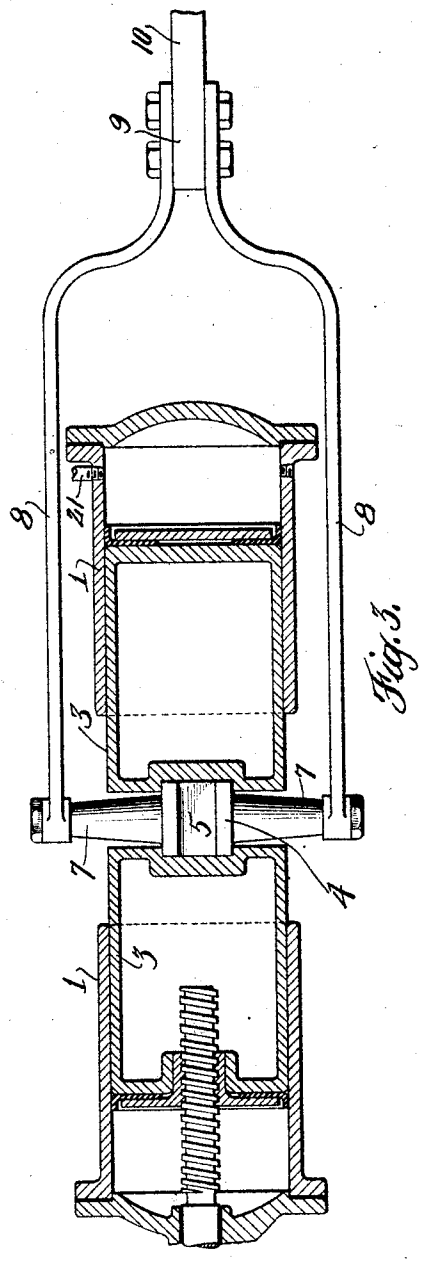


Fig. 2.

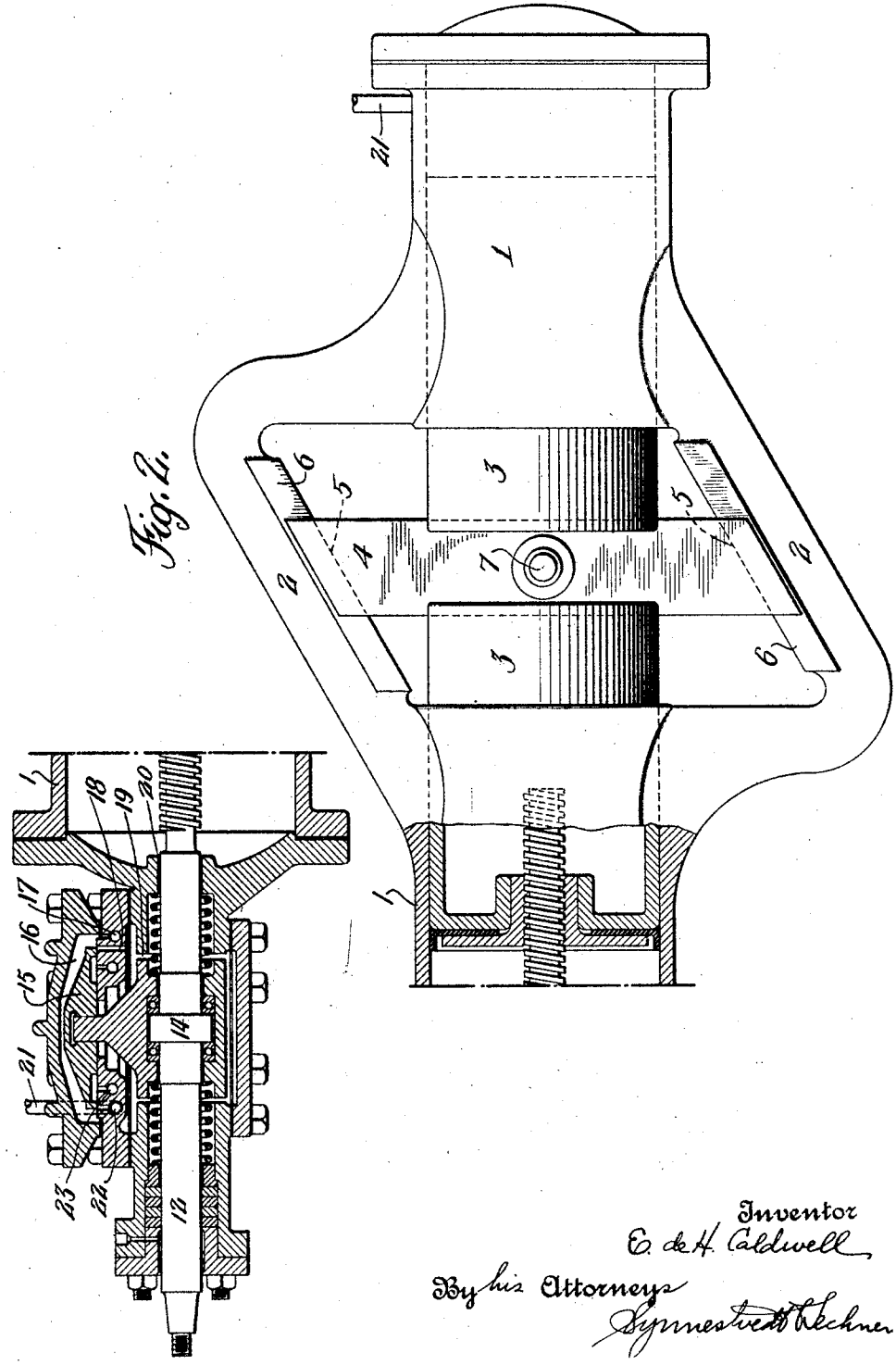
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UNITED STATES PATENT OFFICE.

EDWIN DE H. CALDWELL, OF FREDONIA, NEW YORK, ASSIGNOR TO FRANKLIN RAILWAY SUPPLY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

LOCOMOTIVE POWER REVERSE GEAR.

Application filed January 27, 1926. Serial No. 84,074.

The invention relates to locomotive power reverse gears and has for its principal object the provision of an improved type of such apparatus which can be locked in any desired position of adjustment.

It is also an object of the invention to provide means for permitting the most minute adjustment with entire accuracy and freedom from the possibility of subsequent displacement. I further provide an apparatus of the character described which can be very materially reduced in overall length thereby making it easier of application.

In general I aim to simplify as well as to improve and make more efficient power reverse gears of the character described.

In connection with the locking feature it is an object of my invention to provide for the locking and the unlocking of the gear simply by actuating the hand wheel or other device used to control it. I furthermore provide a device which can be readily operated entirely by hand should the fluid pressure power fail for some reason or other.

The foregoing together with such other objects as are incident to my invention or may appear hereinafter I attain by means of a construction which is illustrated in preferred form in the accompanying drawings, wherein

Fig. 1 is a diagrammatic side elevation of the rear portion of a locomotive showing my improved power reverse gear applied thereto;

Fig. 2 is an enlarged side elevation partly in section illustrating the details of my improved power reverse gear; and

Fig. 3 is a longitudinal horizontal section showing the principal parts of my improved reverse gear.

When referring to the drawings it should be noted that Fig. 2 is in two portions one above the other which arrangement was adopted in order to make the illustration of the parts as large as conveniently possible.

The essential parts of my improved reverse gear are the alined cylinders 1, yoked together by means of the inclined guides 2. The cylinders contain opposed pistons 3 subject at the outer ends to the fluid pressure within the cylinders 1.

Engaged or gripped between the adjacent ends of the cylinders 3 is the locking member 4 suitably recessed at its upper and lower ends 5. The recesses 5 engage suitable trackways 6 on the inner faces of the connecting guideways 2.

Substantially at its central portion the member 4 is provided with outwardly projecting arms 7, one on each side. Twin reach rods 8 are connected at the ends of the arms 7. The outer ends of the reach rods are bent together and joined in any desirable manner at the point 9 to the reach rod 10 which runs forward to the usual valve link 11. Valve adjustments are made thru the medium of the pistons 3 and the reach rods 8 and 10.

Ordinarily substantially equal pressure exists in the cylinders at the outer ends of the pistons 3. It will therefore be seen that the locking member 4 is gripped between the adjacent ends of the pistons 3 and no movement of the pistons can take place except in so far as the member 4 slides across their ends and along the trackways 6. Even though slight leakage might occur at one end or the other the device would still maintain its adjustment because the frictional grip of the pistons 3 upon the member 4 is sufficient to prevent said member from sliding across the pistons either in one direction or the other. It is only when the pressure is practically relieved on one side or the other that any movement can take place.

The valve mechanism for controlling the admission and exhaust of fluid pressure to the outer ends of the pistons 3 is well illustrated and described in copending application of Montague H. Roberts, Serial No. 41,597 assigned to the same company to which the present application is assigned and since it forms no part of my present invention only a very brief analysis of it will be appended.

A valve operating rod 12 under the control of the hand wheel 13 in the cab is screw threaded into the left hand end of the left piston 3. Thru the medium of the collar 14 on the rod 12 the valve 15 is actuated in one direction or the other depending upon the direction of rotation of the hand wheel 13. Fluid pressure, preferably air, is admitted to the valve chest 16 thru the inlet 17 and when the valve moves to the left this pressure is admitted to the left piston 3 thru the port

18 and passageways 19 and 20. At the same time pressure is exhausted from the right-hand piston 3 thru the pipe 21 and passageways 22 and 23.

After an adjustment takes place if the hand wheel is no longer rotated the pistons 3, thru the medium of the stem 12, move the valve 15 back to its neutral position which holds the air on both ends of the pistons 3, thereby locking the device in the manner already described. When traveling in the other direction exactly the reverse operations take place.

It will be noticed that the inlet passages 18 and 22 each have a slight negative lap so that in a neutral position of the valve 15 there will always be pressure at the ends of the pistons 3.

It will be seen that the device is exceedingly simple and the locking feature is highly efficient enabling the most minute valve adjustments to be accurately maintained at all times which, as is well known in this art, is an extremely important matter from the standpoint of safety in engine operation. In former reverse gears it has often been possible for sufficient leakage to take place so that the engineer did not know exactly where his valves were and on not infrequent occasions they were thrown into the reverse direction from that in which the locomotive was traveling with enormously damaging results to the cylinder and saddle structure of the locomotive.

It might be noted that my device is in the nature of an automatic friction lock.

I claim:—

1. Fluid pressure power means comprising in combination, a pair of opposed pistons reciprocable in the same direction, a member between their opposed ends slidable transversely thereof, guide means for said member inclined with respect to the direction of piston reciprocation, and means for applying or relieving pressure to the opposite ends of said pistons.

2. In a power reverse gear the combination of a pair of opposed pistons, reciprocable in the same direction, subject to pressure on the outer ends, a member between the adjacent ends movable across them, and guide means for said member inclined with respect to the direction of piston travel.

3. A power reverse gear comprising in combination, a pair of opposed pistons, reciprocable in the same direction, subject to pressure on the outer ends, a member between the adjacent ends movable across them, guide means for said member inclined with respect to the direction of piston travel, a reach rod connected to said member, and means for reducing the pressure on a piston end in order to cause movement toward said end, said member moving with the pistons to actuate the reach rod while simultaneously sliding across them under the influence of the inclined guides.

4. In a power reverse gear the combination of a pair of spaced coaxial cylinders, a member inclined with respect to the axis of said cylinders for connecting them together, a piston reciprocable in each cylinder, and a locking pin gripped between the adjacent ends of the pistons but movable transversely thereof under the influence of the inclined connecting member.

5. In a power reverse gear the combination of a pair of opposed pistons, reciprocable in the same direction, subject to substantially equal pressure on the outer ends, a member movable transversely of the pistons but normally gripped between their inner ends under the influence of the pressure, means engaging said member to prevent piston movement, and means for reducing the pressure on a piston to permit transverse movement of said member and longitudinal movement of the pistons.

6. In a power reverse gear the combination of a pair of opposed pistons, reciprocable in the same direction, subject to substantially equal pressure on the outer ends, a member movable transversely of the pistons but normally gripped between their inner ends under the influence of the pressure and means engaging said member to prevent piston movement except upon unbalanced pressure conditions on the pistons.

In testimony whereof, I have hereunto signed my name.

EDWIN DE H. CALDWELL.