Nov. 23, 1926. 1,608,042

G. R. SMITH

REVERSING GEAR FOR ENGINES

Filed June 24, 1922 2 Sheets-Sheet 1

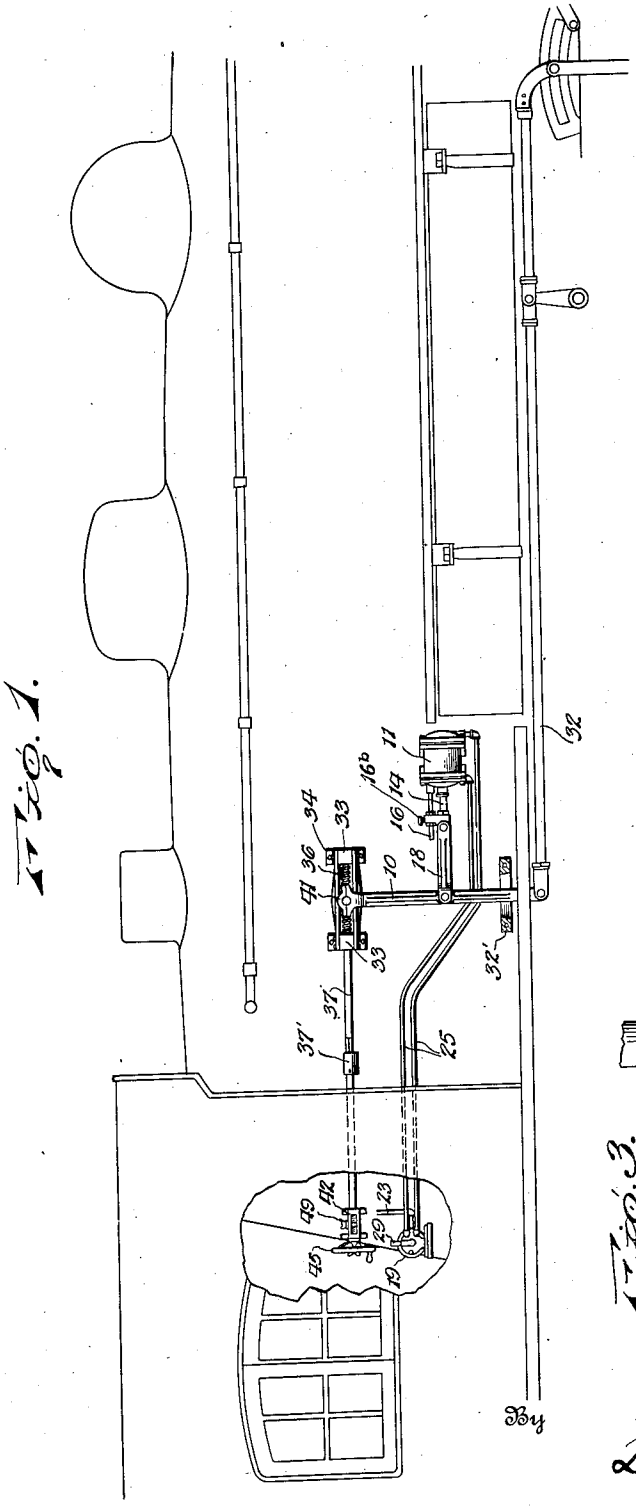


Fig. 1.

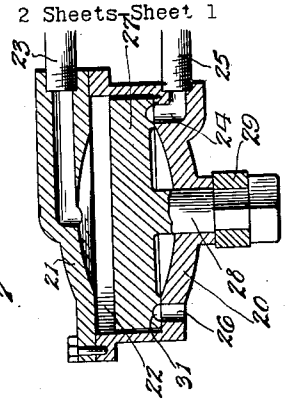


Fig. 4.

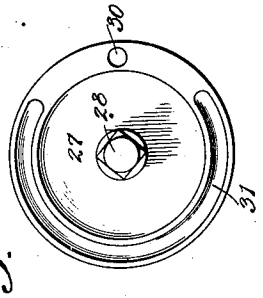


Fig. 5.

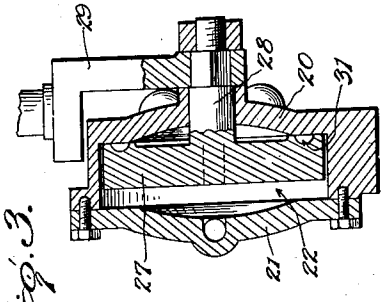


Fig. 3.

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REVERSING GEAR FOR ENGINES

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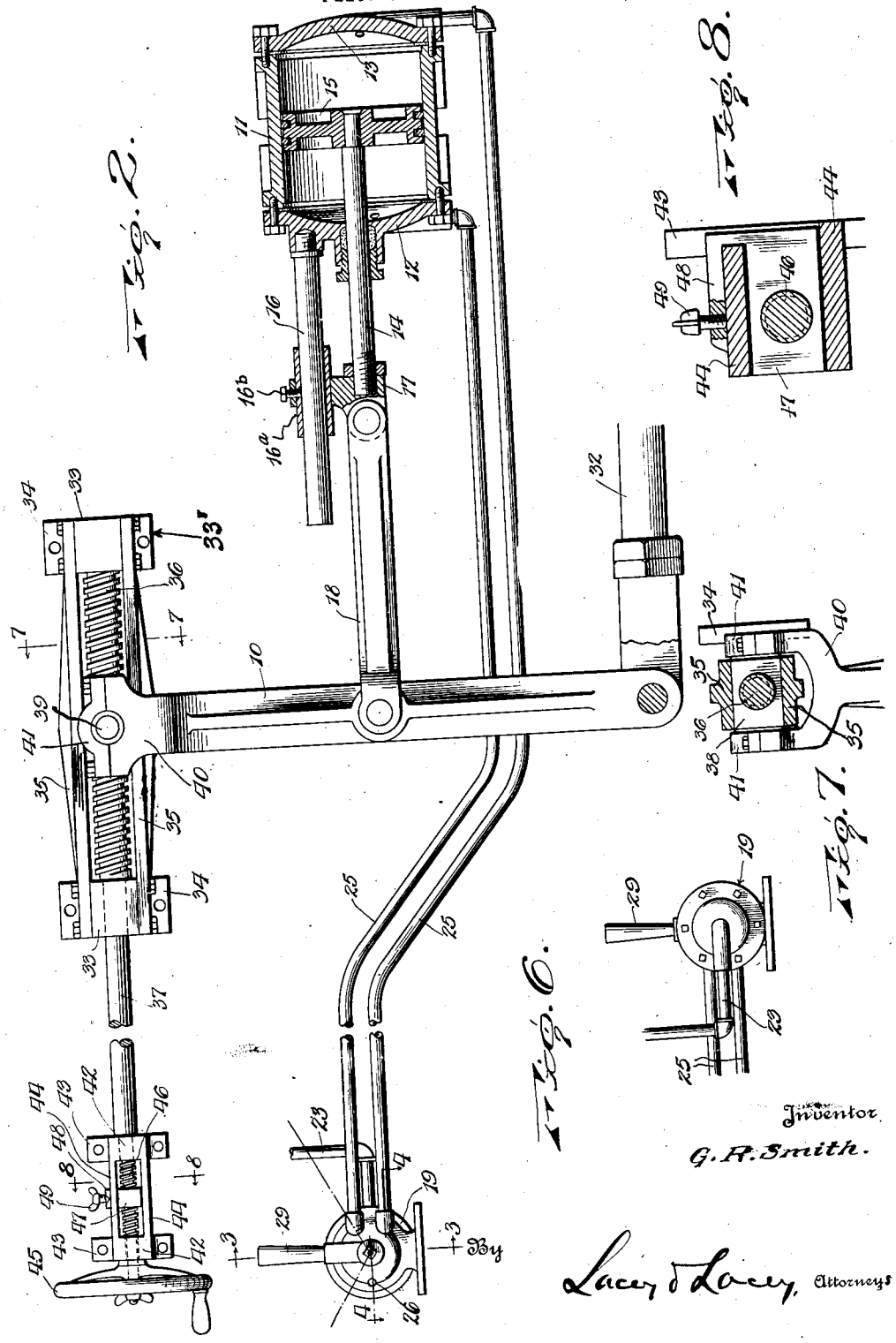


Fig. 2.

Fig. 8.

Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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REVERSING GEAR FOR ENGINES.

Application filed June 24, 1922. Serial No. 570,528.

This invention relates to an improved reversing gear for locomotives or other engines, the invention being especially concerned with that type of gear employing fluid pressure operated means embodied in a cylinder and piston for effecting reversal and also employing a manually operated means embodied in a hand wheel and screw operable independently of the fluid pressure operated means for effecting reversal as well as adjusting the cut-off auxiliary to the action of the first means.

The invention seeks, as one of its principal objects, to provide a gear wherein creeping of the power operated means, usually inherent in the type of gear mentioned, will be eliminated.

The invention has as a further object to provide a gear wherein the cut-off may be accurately adjusted and secured in adjusted position.

Another object of the invention is to provide a gear employing a floating reversing lever and wherein when the power operated means is actuated for adjusting the lever, the lever will rock upon the hand operated means and wherein, when the hand operated means is actuated, the lever will rock upon the power operated means.

And the invention has as a still further object to provide a reverse gear wherein the screw employed for manually adjusting the reversing lever will be mounted exteriorly of the locomotive cab so as to be out of the way of the engineer but wherein an indicator will be provided within the cab for registering the adjustment of the screw and consequently the adjustment of the cut-off for the distribution of steam.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a fragmentary side elevation showing our reversing gear in connection with a locomotive, parts being broken away,

Figure 2 is an enlarged side elevation showing the reversing gear in detail, parts being illustrated in section,

Figure 3 is a sectional view on the line 3—3 of Figure 2, looking in the direction of the arrows, this view showing the valve controlling the power operated means for the gear,

Figure 4 is a sectional view on the line 4—4 of Figure 2, looking in the direction of the arrows,

Figure 5 is a face view of the valve proper,

Figure 6 is a rear elevation of the valve,

Figure 7 is a sectional view on the line 7—7 of Figure 2, looking in the direction of the arrows, and

Figure 8 is a sectional view on the line 8—8 of Figure 2, looking in the direction of the arrows.

In carrying the invention into effect, I employ a floating reversing lever 10 with which is associated power operated means for swinging the lever. This means includes a cylinder 11 closed at its ends by removable heads 12 and 13 and slidable through the head 12 is a piston rod 14 upon the inner end of which is mounted a piston 15 reciprocable within the cylinder. Extending from the head 12 is a guide 16 slidably supporting a sleeve 16^a to which is attached by screw 16^b a cross head 17 engaged with the outer end of the piston rod, and pivotally connected at one end to the cross head is a link 18, the opposite end of which is pivotally connected to the lever 10 at a point substantially midway between the ends thereof. The piston 15 may be operated either by steam or compressed air, as preferred, and controlling the flow of fluid to the cylinder 11 is a valve, indicated as a whole at 19, the valve being, as shown in Figure 1, located within the locomotive cab convenient to the engineer. As best brought out in Figures 3 and 4, said valve includes a casing 20 closed by a back plate 21 defining a fluid chamber 22 within the casing and supplying a motive fluid to said chamber is a pipe 23 connected to said back plate. Formed in the front wall of the casing are ports 24 from which lead pipes 25, one of which is connected to the head 12 of the cylinder 11 to communicate with the cylinder at one end while the other of said pipes is connected to the head 13 of the cylinder to communicate with the cylinder at its opposite end. The front wall of the casing is also provided with an exhaust port 26 and rotatably mounted within the casing is a disc shaped valve 27 from which extends a stem 28 journaled through said wall and equipped with a hand lever 29 operable for rotating the valve. As will be observed, the handle will coact with the front wall of the casing

for holding the valve seated against said wall at its inner side and formed through the margin of the valve is a port 30 adapted to be brought into register with the ports 24 selectively. The valve is also provided, as shown in Figure 5, with a marginal exhaust channel 31 so that when the valve is turned to admit steam from the chamber 22 through the port 30 to either of the ports 24 for admitting fluid to one end or the other of the cylinder 11, as the case may be, the channel 31 will be brought into communication with the other of the ports 24 for releasing steam from the opposite end of the cylinder through said channel and through the exhaust port 26. Thus, the valve may be readily manipulated for controlling the piston 15 and, in this connection, attention is directed to the fact that fluid pressure in the chamber 22 of the valve casing will press the valve against the front wall of the valve casing to prevent leakage around the valve stem. Pivotally secured to the lower end of the lever 10 is a reach rod 32, the opposite end of which is attached, as suggested in Figure 1, to the reversing valve of the locomotive and associated with the lower end of the lever is a slotted plate 32′ for stopping the travel of the lever so as to prevent injury to any of the parts.

In conjunction with the lever 10, I also employ hand operated means for rocking the lever, as will now be described. Fixed to any suitable portion of the locomotive adjacent the upper end of the lever is a cage 33′ comprising end blocks 33 having base flanges 34 through which are engaged bolts or other suitable fastening devices securing the end blocks in position and extending between said blocks are side plates 35. Journaled upon the blocks is a screw 36 upon the forward end of a shaft 37 and threaded upon said screw is, as best shown in Figure 7, a nut 38 slidably fitting between the plates 35. This nut is provided with trunnions 39 and formed on the lever 10 at its upper end is a fork 40 straddling the nut to coact with said trunnions, the fork members being provided with split bearings 41 engaging the trunnions. Thus, the nut will pivotally support the lever at its upper end while, should it become necessary, the lever may be readily detached by removing the caps of the bearings 41. As shown in Figure 1, the shaft 37 extends into the locomotive cab and interposed in the length of said shaft is a joint 37′ to accommodate lineal expansion of the shaft. Mounted upon any suitable portion of the locomotive within the cab is a cage journaling the forward end of the shaft. This cage includes end blocks 42 from which extend base flanges 43 apertured to accommodate bolts or other suitable fastening devices securing the cage in position, and connecting said blocks are side plates 44 which are integral with the blocks. The blocks rotatably receive the shaft 37 therethrough and fixed to the rear end of the shaft is a hand wheel 45 located convenient to the engineer. Between the blocks 42 the shaft is formed with a screw 46 and threaded upon said screw is, as shown in detail in Figure 8, an indicator 47 slidably fitting between the side plates 44. Projecting from the indicator at one end thereof is a pointer 48 overhanging the uppermost of said side plates to cooperate with a suitable scale thereon and threaded through the pointer to engage said side plate is a set screw 49 for locking the indicator against movement along the screw 46 and consequently locking the shaft 37 against rotation.

As will now be understood in view of the preceding description, the valve 19 may be operated to effect shifting of the piston 15 in either one direction or the other and correspondingly rocking the lever 10 upon the nut 38 to effect reversing of the locomotive when the hand wheel 45 may then be turned for rotating the screw 36 and, as will be at once understood, rocking the lever upon the link 18 for adjusting the cut-off and distribution of steam. This adjustment of the cut-off will, of course, be registered by the pointer 48 of the indicator 47 so that the cut-off may be regulated with extreme accuracy when the set screw 49 may then be turned for locking the indicator stationary and accordingly locking the shaft 37 against creeping. Thus, the hand operated means may be employed auxiliary to the power operated means for setting the reversing lever. However, if desired, the hand operated means may be alone employed for rocking the lever upon the link 18 to effect reversal and adjustment of the cut-off. I accordingly provide a reversing gear wherein the hand operated means may be used independently of the power operated means and vice versa, to effect reversal and cut-off of steam, or wherein said means may be used in conjunction with each other. As will be perceived, the present gear is distinguished by the fact that the cage 33′ at the forward end of the shaft 37 is stationary so that neither said cage nor the shaft can partake of any floating movement such as would molest the setting of the cut-off while, however, the reversing lever 10 is mounted to float with the nut 38 and is movable upon the nut as one center and also movable upon the link 18 as another center. Thus, the reversing motion may be set by means of the hand wheel 45 without the necessity of shifting the piston 15.

Having thus described the invention, what is claimed as new is:

1. In a locomotive engine reverse gear in combination with the reach rod and reversing lever pivoted at one end thereto, a fluid

operated mechanism pivoted to the reversing lever intermediate its ends, a manually operable valve mechanism for controlling the supply of motive fluid to the fluid operated mechanism, manually operable means including a screw and cooperating nut, the latter being pivotally and detachably connected to the opposite end of the reversing lever, indicating means actuated by the manually operable means, and locking means associated with the indicating means and movable therewith to secure the said manually operable means in the required adjusted position.

2. In a locomotive engine reverse gear in combination with the reach rod and reversing lever pivoted at one end thereto, a nut pivotally mounted on the reversing lever, a shaft having screwthread connection with said nut and provided with a second screwthread, a nut mounted on the second screwthreaded portion of the shaft, a scale member engaging the last mentioned nut to prevent rotation thereof, an indicator carried by said nut and movable over the scale member, and a lock on the indicator to engage the said scale member and secure the shaft in the desired adjusted position.

In testimony whereof I affix my signature.

GEORGE R. SMITH. [L. S.]