T. A. HEDENDAHL.

FLUID PRESSURE CONTROLLED REVERSING GEAR.

APPLICATION FILED FEB. 24, 1916.

1,232,797.

Patented July 10, 1917.

2 SHEETS—SHEET 1.

Fig. 2.

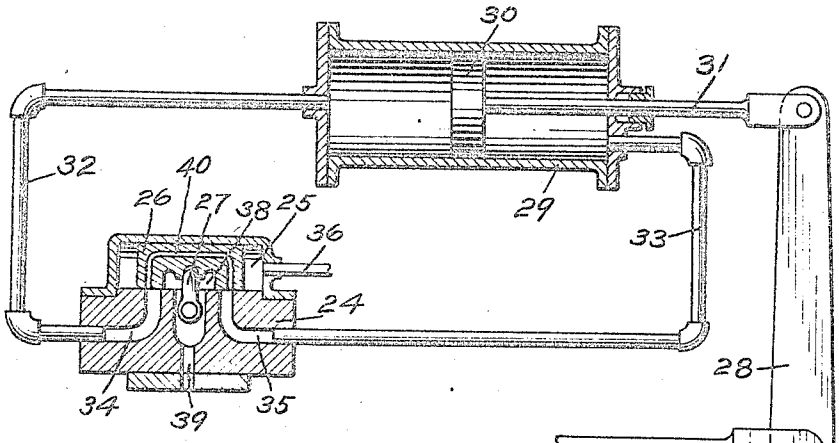
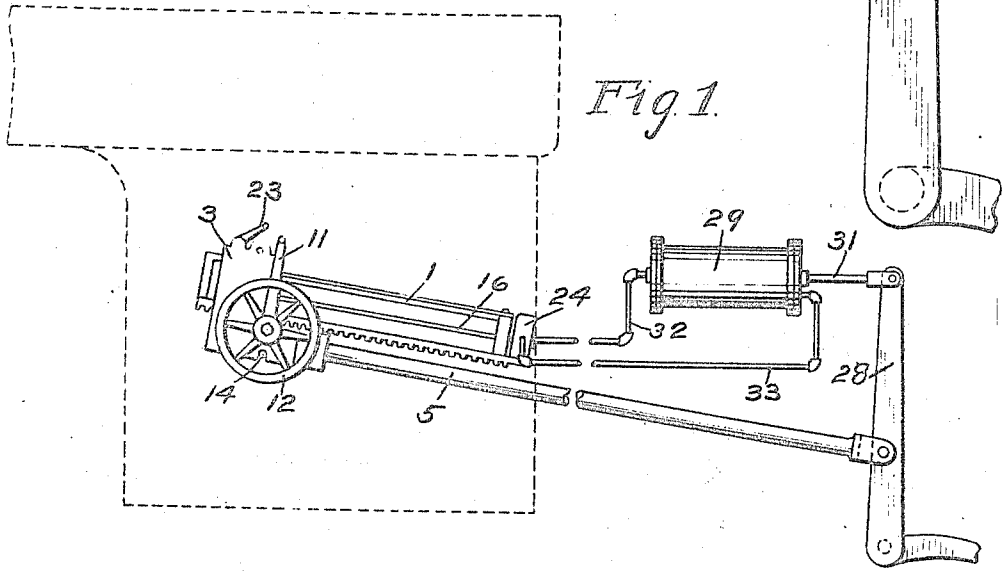


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

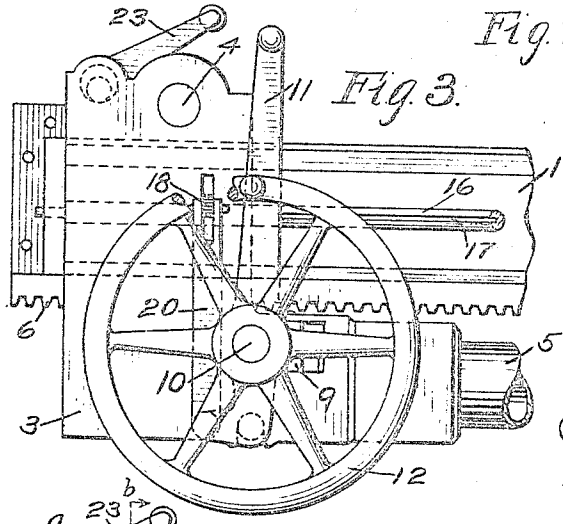


Fig. 7.

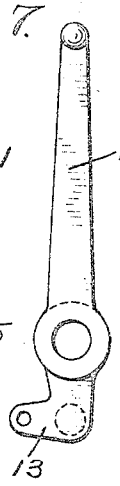


Fig. 8.

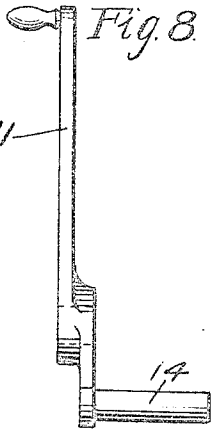
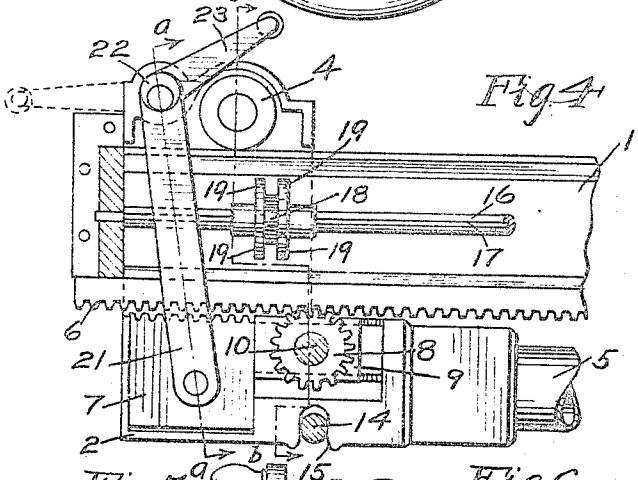


Fig. 4.



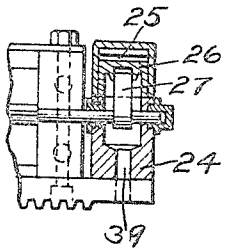


Fig. 5.

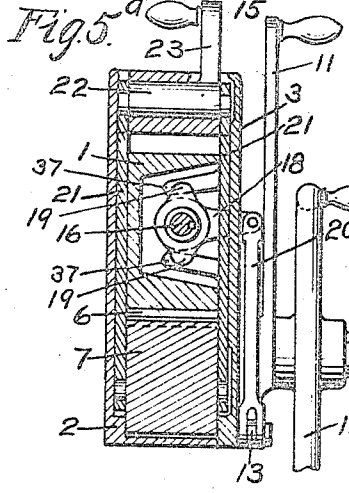
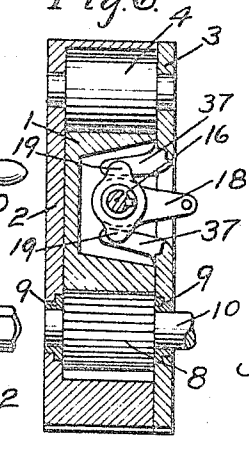


Fig. 6.



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UNITED STATES PATENT OFFICE.

THEODORE A. HEDENDAHL, OF DENVER, COLORADO.

FLUID-PRESSURE-CONTROLLED REVERSING-GEAR.

1,232,797. Specification of Letters Patent. Patented July 10, 1917.

Application filed February 24, 1916. Serial No. 80,173.

To all whom it may concern:

Be it known that I, THEODORE A. HEDENDAHL, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Fluid-Pressure-Controlled Reversing-Gear, of which the following is a specification.

This invention relates to fluid pressure operated means for controlling the reversing gear of a locomotive, and the principal object of the invention is to provide an improved mechanism of the above character adapted to locomotives where the available space is limited.

Other objects and advantages will appear in the following more detailed description of the invention.

In the accompanying drawings, Figure 1 is a fore-shortened elevational view of a reversing gear controlling mechanism embodying my invention; Fig. 2 a sectional view of the operating cylinder and valve mechanism thereof; Fig. 3 an enlarged elevational view of the lever operated mechanism; Fig. 4 a broken longitudinal section of the cab portion of the reversing gear controlling mechanism; Fig. 5 a transverse section on the line *a*—*a* of Fig. 4; Fig. 6 a similar section on the line *b*—*b* of Fig. 4; Fig. 7 a detail face view of the main operating lever; and Fig. 8 a side view thereof.

According to the construction illustrated in the drawings, a section of channel beam 1 is mounted on the boiler in the locomotive cab and carries a movable housing 2 which surrounds the beam 1 and has a cover plate 3 for permitting the assembly of the parts and the application of the housing to the beam.

A roller 4, mounted in bearings in the housing and cover plate, rides on the upper face of the channel beam 1 and supports the housing, and reach rod 5 is arranged below the beam and is secured to said housing.

The under face of the channel beam is provided with rack teeth 6 for engagement with teeth of a latch block 7 mounted within the housing and adjacent to the latch block is a pinion 8 also having its teeth adapted to engage the teeth 6 on the channel beam. The pinion 8 is supported by movable bearings 9 adapted to slide longitudinally on guide bearings provided in the housing and cover plate and is fixed to a pin 10 on which an operating lever 11 is loosely mounted and to which a hand wheel 12 is secured.

Lever 11 has a downwardly extending rocker arm 13 carrying a pin 14 which is fulcrumed in a slot 15 provided in the housing 2.

Mounted within the cavity of the channel beam is a longitudinally extending shaft 16 having a key-way 17 and a lever element 18 is slidably mounted on the shaft and is provided with a key for engaging in the key-way 17.

The cover plate 3 has fingers 37 extending into the channel beam cavity and on opposite sides of said fingers are projections 19 forming part of the lever element 18, so that longitudinal movement of the housing is transmitted to the lever element which is connected by a link 20 to the rocker arm 13.

The latch block 7 is connected by links 21, on opposite sides of the channel beam, to an eccentric shaft 22 having an operating handle 23.

At the outer end of the channel beam 1 there is mounted a valve casing 24 having a valve chamber 25 containing a slide valve 26 and the valve is adapted to be operated by the shaft 16 which is connected to the valve by means of a short lever 27.

Adjacent to the link lifting lever 28 is a cylinder 29 containing a piston 30 connected to said lever by a piston rod 31 and the cylinder chambers at opposite sides of the piston are connected by the respective pipes 32 and 33 to ports 34 and 35 leading to the seat of slide valve 26.

In operation, fluid under pressure being supplied to valve chamber 25 through a pipe 36 connected to a suitable source of fluid pressure supply, if it is desired to shift the reversing gear to the right, the lever 23 is first moved to the position shown in full lines in Fig. 4 of the drawings, so as to rotate the eccentric shaft 22 and cause the latch block 7 to disengage from the rack teeth 6. The lever 11 is then shifted to the right, turning the rocker arm 13, so as to partially rotate the shaft 16 through the operation of the link 20 and the lever 18. The slide valve 26 is then moved so as to uncover port 34 and thus admit fluid under pressure to the cylinder chamber at the left of piston 30, the cylinder chamber at the

right of piston 30 being connected to the atmosphere through a cavity 38 in the slide valve which then connects port 35 with exhaust port 39.

The lever 28 is thereupon operated by the movement of the piston 30 to shift the reversing gear.

Since pinion 8 is mounted in longitudinally movable bearings, and the lever 11 is loosely mounted on pin 10 when the lever 11 is operated, the pinion is rolled along the rack teeth 6 and does not interfere with the action of the lever.

When the lever 28 is shifted to the right by the piston 30, the reach rod 5 is also moved to the right and being connected to the housing 2 it pulls the same to the right and there is sufficient friction between the teeth of the pinion and the rack to cause a reverse movement of the lever 11 to normal position and a corresponding movement of the slide valve 26 back to the lap position, shown in Fig. 2 of the drawings. In this position, it will be noted that a by-pass port 40 connects ports 34 and 35 so that the opposing fluid pressures in the cylinder chambers on opposite sides of the piston 30 are quickly balanced and further movement of the piston and the lever 28 is prevented.

When the reversing gear has been shifted to the desired position, the lever 23 is shifted to the position shown in dotted lines in Fig. 4 and the latch block 7 thus operated to engage the rack teeth 6 so as to lock the parts in their adjusted positions.

If it is desired to effect the movement of the reversing gear in the opposite direction, the lever 11 is moved to the left and the slide valve 26 operated to open the port 35 so as to admit fluid under pressure to the cylinder chamber at the right of piston 30.

If it is desired to move the reversing gear by hand or more slowly, or if the fluid pressure happens to be insufficient, the hand wheel 12 is provided by which the reach rod may be actuated directly through the rotation of the pinion 8 in engagement with the rack teeth 6. This is considered a very desirable feature, since there are times when there might be no fluid pressure or the pressure may not be sufficient to fully insure the proper operation.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a locomotive reversing gear, a cylinder, and a piston therein adapted to be actuated by fluid under pressure for controlling the reversing gear, of a valve for controlling the admission and exhaust of fluid to and from said cylinder, a shaft for operating said valve, a guide member having bearings for said shaft, a housing inclosing and movable longitudinally on said member, and a lever mechanism carried by the housing for operating said shaft.

2. The combination with a locomotive reversing gear, a cylinder, and a piston therein adapted to be actuated by fluid under pressure for controlling the reversing gear, of a valve for controlling the admission and exhaust of fluid to and from said cylinder, a shaft for actuating said valve, a channeled guide member having bearings for mounting said shaft within the channel, a housing inclosing and adapted to move longitudinally on said member, a reach rod connecting said housing to the reversing gear, and a lever mechanism carried by said housing and operated manually for rotating said shaft to open the valve and operated upon movement of the reach rod for rotating said shaft to close the valve.

3. In a reversing gear operating mechanism, the combination with a valve for controlling fluid under pressure for operating the reversing gear, of a shaft for operating said valve, a housing inclosing and mounted to slide longitudinally thereon, a bearing pin, a manually operated lever mechanism fulcrumed on said pin for rotating said shaft, a reach rod connecting the reversing gear with said housing, a hand wheel secured to said bearing pin, and means operated by said hand wheel for mechanically shifting the reversing gear through the reach rod.

4. In a reversing gear operating mechanism, the combination with a valve for controlling fluid under pressure for operating the reversing gear, of a guide member having rack teeth, a housing mounted to slide longitudinally on said member, a pinion mounted in said housing for engaging the rack teeth, a reach rod connecting the reversing gear with the housing, a bearing pin extending from said pinion, a hand wheel secured to said pin for operating said pinion to shift the reach rod, and a manually operated lever mechanism fulcrumed on said bearing pin for operating said valve.

5. In a reversing gear operating mechanism, the combination with a valve for controlling the fluid under pressure for operating said gear, of a guide member provided with a rack, a housing mounted to move longitudinally on said member, a reach rod connecting said housing with the reversing gear, a manually operated lever mechanism carried by the housing and operatively associated with said valve, a pinion connected to said lever mechanism and mounted in longitudinally movable bearings, and a hand wheel for operating said pinion.

6. In a reversing gear operating mechanism, the combination with a valve for controlling the fluid under pressure for operating said gear, of a guide member provided with a rack, a housing inclosing and

mounted to move longitudinally on said member, a reach rod connecting said housing with the reversing gear, a manually operated lever mechanism carried by the housing and operatively connected to said valve, means for permitting movement of the lever mechanism relative to the housing for effecting the opening of said valve, said lever mechanism being shifted in the opposite direction upon movement of the reach rod for closing said valve.

In testimony whereof I have hereunto set my hand.

THEODORE A. HEDENDAHL.