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REVERSING GEAR MECHANISM.

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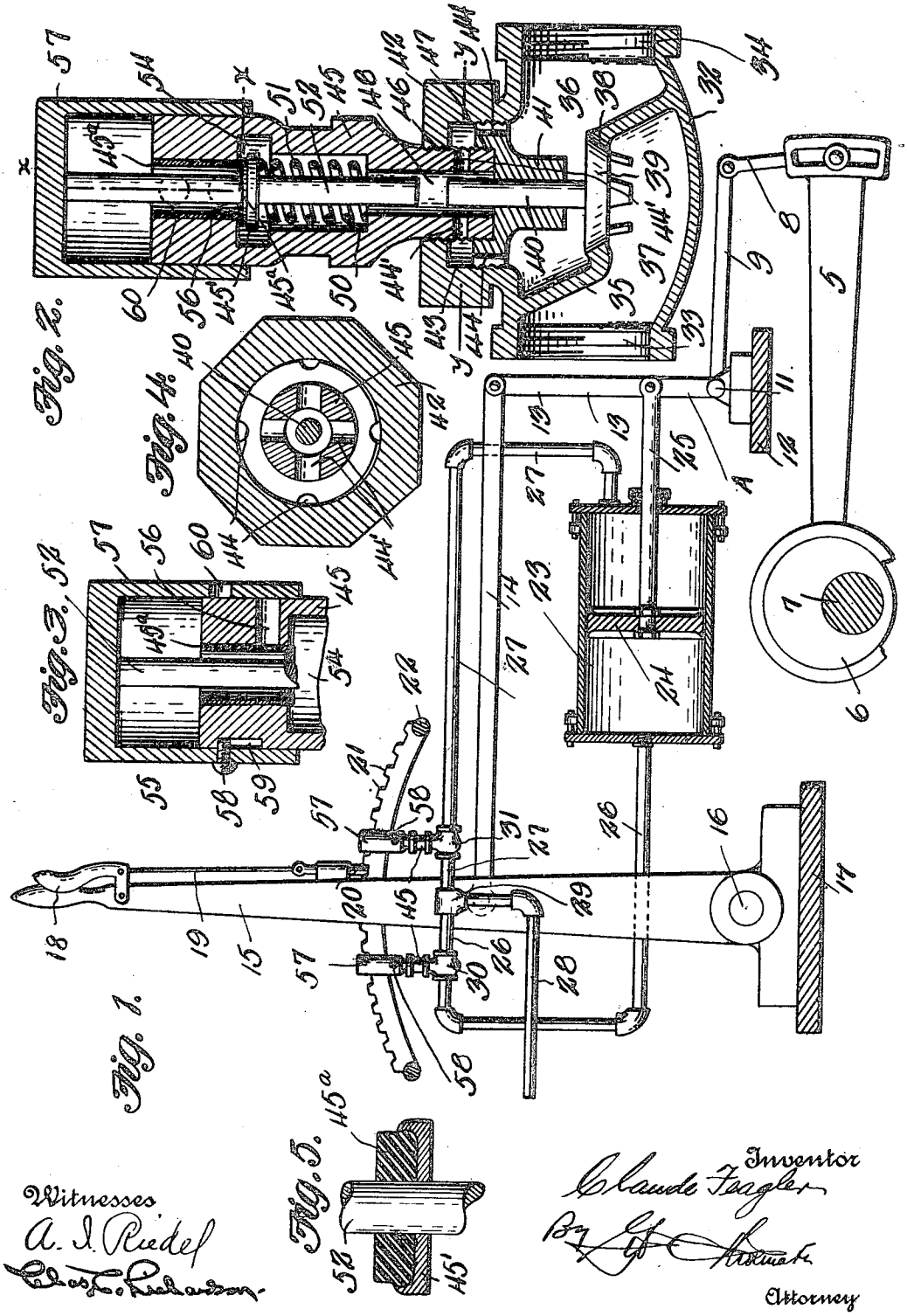


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.

Witnesses

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REVERSING-GEAR MECHANISM.

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Application filed May 4, 1914. Serial No. 836,203.

To all whom it may concern:

Be it known that I, CLAUDE FEAGLER, a citizen of the United States, residing at Garrett, in the State of Indiana, have invented certain new and useful Improvements in Reversing-Gear Mechanism, of which the following is a specification.

This invention relates to reversing gear mechanisms.

One object of the invention is to provide a reversing gear mechanism embodying a cylinder and a source of pressure supply communicating with opposite ends of the cylinder to balance the cylinder piston with means arranged in the line of pressure supply to cut off the supply from one end of the cylinder and simultaneously vent or permit exhausting the pressure from that end of the cylinder so as to permit a free and easy reverse of the mechanism.

Another object of the invention resides in the provision of a mechanism to assist the engineer and enable him to easily and readily effect the required reversal of the engine with comparatively slight exertion or force.

Another object resides in the provision of a mechanism of the character stated embodying among other characteristics a cylinder provided with a piston and also a valve mechanism for controlling the reverse mechanism, the valve mechanism including a gravity operating member to cut off the pressure and located preferably remote from the cylinder and which may be locked against unseating when it is desired to relieve one end of the cylinder of pressure and the locking of which upon its seat opens that particular end of the cylinder to the atmosphere.

A still further object is to provide a reversing gear mechanism embodying a cylinder and a source of pressure supply communicating with opposite ends of the cylinder to normally balance the cylinder piston, with means arranged in the line of pressure supply for separately cutting off the supply from the respective ends of the cylinder and also provide for escape or exhaust of the pressure from the respective ends of the cylinder so as to permit a free and easy reverse of the mechanism.

With the above and other objects in view, this invention resides in the novel features of constructions, formations, combinations and arrangements of parts to be hereinafter more fully described, claimed and illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of my invention with parts thereof shown in section, Fig. 2 is a vertical longitudinal sectional view taken through one of the operating valves, Fig. 3 is a transverse sectional view taken through the upper end of said valve on the line *x*—*x* of Fig. 2, Fig. 4 is a horizontal sectional view taken through said valve on the line *y*—*y* of Fig. 2, and Fig. 5 is a fragmentary sectional view of the auxiliary sealing valve.

Referring now more particularly to the accompanying drawing, the numeral 5 designates the reversing link of a locomotive or the like, adapted to actuate the reversing shaft 7, through the medium of the cam 6. This reversing link 5 is connected by means of the link hanger 8, to the lower horizontal arm 9 of a bell crank lever A, fulcrumed, as at 11, to a convenient portion of the frame shown at 12. The vertical arm 12 of this bell crank lever A has pivoted to its upper end, a reach rod 14, by means of which it is operatively connected to a hand lever 15, as shown. This lever 15 is pivoted at 16 to a convenient portion of the frame shown at 17. The lever 15 is equipped with a hand grip 18 designed to operate, through the assistance of the rod 19 and the dog 20, which engages between the teeth 21 of the segment 22, for the purpose of locking said lever 15 in its various adjusted positions, against undesired movement.

The reversing cylinder is shown at 23 and has operating therein, a piston head 24, which is connected by means of the piston rod 25 to the before-mentioned upper arm 13 of the bell crank A. Air or the like under pressure is supplied to the cylinder 23 upon opposite sides of the piston head 24 preferably through the branch pipes 26 and 27 which are connected to the main supply pipe 28 through the coupling 29. The supply of air, or its equivalent, to the opposite ends of the cylinder 23 may be governed in any suitable manner, one manner for convenience being shown by the twin valves 30 and 31 which are preferably identical in formation. As these twin valves are preferably alike a detailed description of one is sufficient to give a full understanding of the same. To this end, the said valves 30 and 31 each consist preferably of a valve casing 32, provided with inlet and outlet openings 33 and

34 (see Fig. 2) threaded to receive the pipes 26 and 27 as the occasion may be. This valve casing 32 is preferably provided with a partition 35 dividing the same into upper and lower compartments 36 and 37, respectively, which communicate through the horizontal valve seat 38 formed in this partition 35. A gravity valve 39 engages the valve seat 38 with its stem 40 slidably engaged in the spider 41, which is preferably threaded in the upper extension 42 of the casing 32. The upper end of this extension 42, above the spider 41 is preferably provided with a compartment 43 which is in communication with the upper compartment 36 through the said spider 41. A tubular extension 45 is connected, preferably by thread 46 to the upper end of the aforesaid extension 42 of the valve casing and at its inner end may extend through the compartment 43 with its extreme inner end preferably having screw threaded fit at 47 in a central recess formed in the spider 41. This arrangement not only rigidly supports the tubular extension 45 against displacement, but also further insures securing the spider 41, against any undesired movement. A cap 57 is disposed to slide loosely on the outer end of the extension 45. This cap provides a means for operating the reversing mechanism and is so arranged and disposed that it may be convenient to the operator, preferably by the operator's foot. This cap may be termed a "foot operating element". Upon inward movement or depression it is designed to slide on the outer end of the extension 45 and slide or shift inwardly the valve stem 52 against the tension of the spring 51 engaging at one end the internal shoulder 50 of the extension 45 and at its opposite end the auxiliary valve 53. When thus shifted the inner end of the stem 52 engages the outer end of the aforesaid valve stem 40 and by holding the foot operated element in inward or depressed position the valve 39 may be held on its seat against movement incident to pressure or otherwise. The auxiliary valve 53 is preferably located in a chamber 54 of the extension 45 and includes a socket member 45′ and a rubber gasket 45^a adapted to bear tightly against the seat formed by the inner projecting end of the brass or other tubular sleeve 45^b fitted tightly in any suitable manner in the outer end of the bore of the extension 45. The gasket may be fitted tightly to the auxiliary valve in any suitable manner one way being to direct the edges of the socket member 45′ inwardly into the edges of the gasket, as shown in Fig. 5. The auxiliary valve 45′ prevents the pressure from seeping or leaking out between the cap 57 and the tubular extension 45 but air within the cap may escape upon depression of the same from between the side walls of the cap and said extension because of the loose slidable connection of the cap with the tubular extension. A lateral port 56 extends from the reduced bore of the extension 45 and sleeve 45^a through the outer side of said extension to the atmosphere, but is normally closed by the aforesaid slidable foot-operated element 57 which is limited in its sliding movement upon said extension 45 by the projection 58 which engages in a slot 59 formed in said tubular extension 45. The foot operated element 57 is provided with a port 60, designed to register with the port 56 when the operated element 57 is depressed against the tension of the spring 51.

The operation of the device is as follows:—The air under pressure or its equivalent, passes through the feed pipe 28 and the branch pipes 26 and 27 to the opposite ends of the cylinder 23, raising the valves 39, until the pressure upon the opposite sides of the piston 23 is equalized which will force the piston 24 to a central position within the cylinder 23 thereby balancing the piston as clearly shown in Fig. 1. This will obviously force the lever 15 to the upright position shown in Fig. 1, through the assistance of the link 14, it being understood that it is first necessary to release the pawl 20 from its engagement with the teeth of the segment 22, so that proper movement of the lever 15 will be permitted. When the pressure within the opposite ends of the cylinder is equalized with that of its source of supply, the valves 39 will drop into engagement with their valve seats 38. When it is desired to reverse the locomotive, one of the caps or elements 57 is pressed downwardly by the foot of the engineer or otherwise, until the stem 52 contacts with the outer end of the valve stem 40, which holds the desired valve 39 against any upward movement, and at the same time the engineer releases the dog 20 from the segment 22 by means of the hand grip 18. Simultaneously with the contact of the two stems 40 and 52, the ports 56 and 60 will be brought into alinement, which permits air pressure at the desired end of the cylinder 23, to escape through the corresponding compartment 36, passages 44 and ports 44′, the last mentioned ports providing a communication between the compartment 43 and the bore 48 of the tubular extension 45, and out through the alined ports 56 and 60. As the pressure is reduced in one end of the cylinder 23, the piston 24 will move in that direction and obviously the unlocked gravity valve 39 will be raised by air pressure or the like which will then pass into the cylinder 23 at the proper end, until pressure therein is again equalized, and the last mentioned gravity valve will drop and again engage its seat. Obviously the movement of the piston 24 will throw the bell crank lever 10, which, through the

medium of the link 5, will operate the reversing shaft 7 in the desired manner.

From the foregoing, it will be manifest that a reverse mechanism for locomotives or other engines is provided which is simple and economical and which will positively fulfil all the necessary requirements of such a device. It should be understood in this connection that various minor changes in the specific details of construction can be resorted to within the scope of the appended claims, without departing from or sacrificing any of the advantages of the invention.

Having thus clearly described my invention, what I claim as new and desire to protect by Letters Patent is:—

1. In a reversing gear mechanism, a cylinder, a piston operable in the cylinder, a source of pressure supply communicating with opposite ends of the cylinder and including pressure actuated valve mechanisms, and means yieldably mounted over the valve mechanisms for depression separately to cut-off the pressure supply from one end of the cylinder and simultaneously exhaust the pressure from that end of the cylinder through said valve mechanism.

2. In a reversing gear mechanism, a cylinder, a piston operable in the cylinder, a source of pressure supply communicating with opposite ends of the cylinder, including pressure actuated valve mechanisms and normally communicating with the interior of said cylinder, and foot operating means connected to the valve mechanisms for depression separately to lock the same and cut-off the pressure supply from the respective ends of the cylinder, said foot operating means locking the respective valves upon depression and providing a passage from the interior of the valve mechanisms to the atmosphere.

3. In a valve gear mechanism, a cylinder, a source of fluid pressure supply including branches which communicate with opposite ends of the cylinder, a valve casing in each branch and normally in communication with the opposite ends of said cylinder, a pressure actuated valve in each valve casing, means to hold each valve normally on its seat and means to permit exhausting the pressure from the corresponding end of the cylinder through one of the valve mechanisms during reversing operation without opening the respective valve.

4. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of pressure supply communicating with opposite ends of the cylinder, valve mechanisms in the line of the pressure supply, each valve mechanism including a valve casing and a pressure actuated valve therein, a tubular extension on each valve casing communicating with the latter, the stem of each valve projecting into the respective tubular extension, each extension having an internal valve seat, a valve stem slidable in each extension and arranged in alinement with the stem of the respective pressure actuated valve in the valve casing, a valve on each second mentioned stem held normally in engagement with the respective internal valve seat of the corresponding extension, and a cap slidable on each extension, and having an outlet to register with the outlet of the respective extension upon depression of the corresponding cap the depression of which locks the respective pressure actuated valve on its seat to permit the reversing operation.

5. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of pressure supply communicating with opposite ends of the cylinder, a valve casing in the line of the source of supply, a pressure actuated valve, and means slidable exteriorly of the valve casing to exhaust through said casing, and means carried by the slidable means for engagement with the valve to cut-off the supply to one end of the cylinder and to simultaneously permit exhaust of pressure from that end of the cylinder.

6. In a reversing gear mechanism, a cylinder, a piston in said cylinder, a source of pressure supply communicating with opposite ends of the cylinder, separate pressure valves in the line of pressure supply, and depressible means to hold the valves seated and permit of escape of pressure from opposite ends of the cylinder alternately.

7. In an apparatus such as described, a valve casing, a pressure actuated valve therein, and a single means for locking the valve in closed position and releasing pressure through said valve casing when the valve is closed.

8. In an apparatus such as described, a valve casing, a pressure actuated valve disposed within said casing and means for simultaneously locking said valve and permitting of a discharge of pressure through said valve casing when said valve is closed.

9. In an apparatus such as described, the combinations with a reversing mechanism for locomotives or the like, a valve casing, a gravity valve in said casing, means for locking said valve against movement, an exhaust valve for said casing, and means whereby the exhaust valve may be operated and the gravity valve simultaneously locked.

10. In an apparatus such as described, in combination with the reverse mechanism of a locomotive or the like, of a cylinder operatively connected thereto, a valve casing having inlet and outlet openings, a partition disposed between said openings, said partition having a valve seat formed therein, a gravity valve engaging said valve set, a tubular extension extending from said valve casing, said tubular extension having a bore therein, said bore being in communication

with the valve casing, and open to the atmosphere, means for controlling said communication to open to the atmosphere, and means carried by this last mentioned means for simultaneously locking and unlocking the gravity valve upon opening and closing said communications.

11. In a device of the character described, the combination with a reversing mechanism for locomotives or the like, of a valve casing having inlet and outlet openings, a gravity valve controlling communication between said openings, said valve casing having a communication with the atmosphere, and means for simultaneously controlling said communication and locking said gravity valve.

12. In an apparatus such as described, in combination with a reversing mechanism for locomotives or the like, a casing having inlet and outlet openings formed therein, a gravity valve controlling the communication between said openings, a tubular extension carried by said valve casing and in communication therewith, an element slidable upon said tubular extension, a stem slidable in said extension for engaging said valve, said tubular extension and slidable element being provided with ports, said ports registering simultaneously upon engagement of the stem with the gravity valve to lock the latter, and means for normally retaining said stem in spaced relation from the gravity valve and the ports out of registration.

13. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, means including bodily movable valves to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder while the respective valves are held closed.

14. In an apparatus such as described, a source of pressure supply, a cylinder having its opposite ends in communication with said pressure supply, a valve casing in the line of pressure supply, oppositely operating valves within said valve casing, and depressible means within said valve casing for unseating one valve and allowing an exhaust from one end of the cylinder, and engaging the other valve for locking it upon its seat, and means for automatically closing the first mentioned valve.

15. In an apparatus such as described, an actuating cylinder, a source of pressure supply connecting the opposite ends of said cylinder, valve casings in the line of pressure supply, gravity valves located in said valve casings and means engaging the gravity valves for locking the same upon their seats, and simultaneously exhausting the pressure from the ends of said cylinder.

16. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, and means including gravity valves and operable to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder while the respective gravity valves are held closed.

17. In a reversing gear mechanism, a cylinder, a source of pressure supply communicating with opposite ends of the cylinder, a piston operable in the cylinder, and means including pairs of valves, one valve of each pair operating by gravity, said means being operable to cut off the pressure supply from one end of the cylinder and simultaneously exhaust the pressure from that end.

18. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, and means to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder, said means including gravitating valves.

19. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, means to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder, said means including gravitating valves, and also including normally closed valves arranged to co-act with said gravitating valves to lock the latter on their seats when said normally closed valves are shifted to open position.

20. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, means to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder including pairs of valves, the valves of each pair being normally closed.

21. In a reversing gear mechanism, a cylinder, a piston in the cylinder, a source of fluid pressure supply communicating with opposite ends of the cylinder, means to control the supply of fluid to opposite ends of the cylinder and to vent the ends of the cylinder, said means including pairs of valves, one valve of each pair being locked upon actuation of the companion valve to open the latter.

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

CLAUDE FEAGLER.

Witnesses:
H. W. MOUNTZ,
J. D. BRINKERHOFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."