S. H. HUNTER.

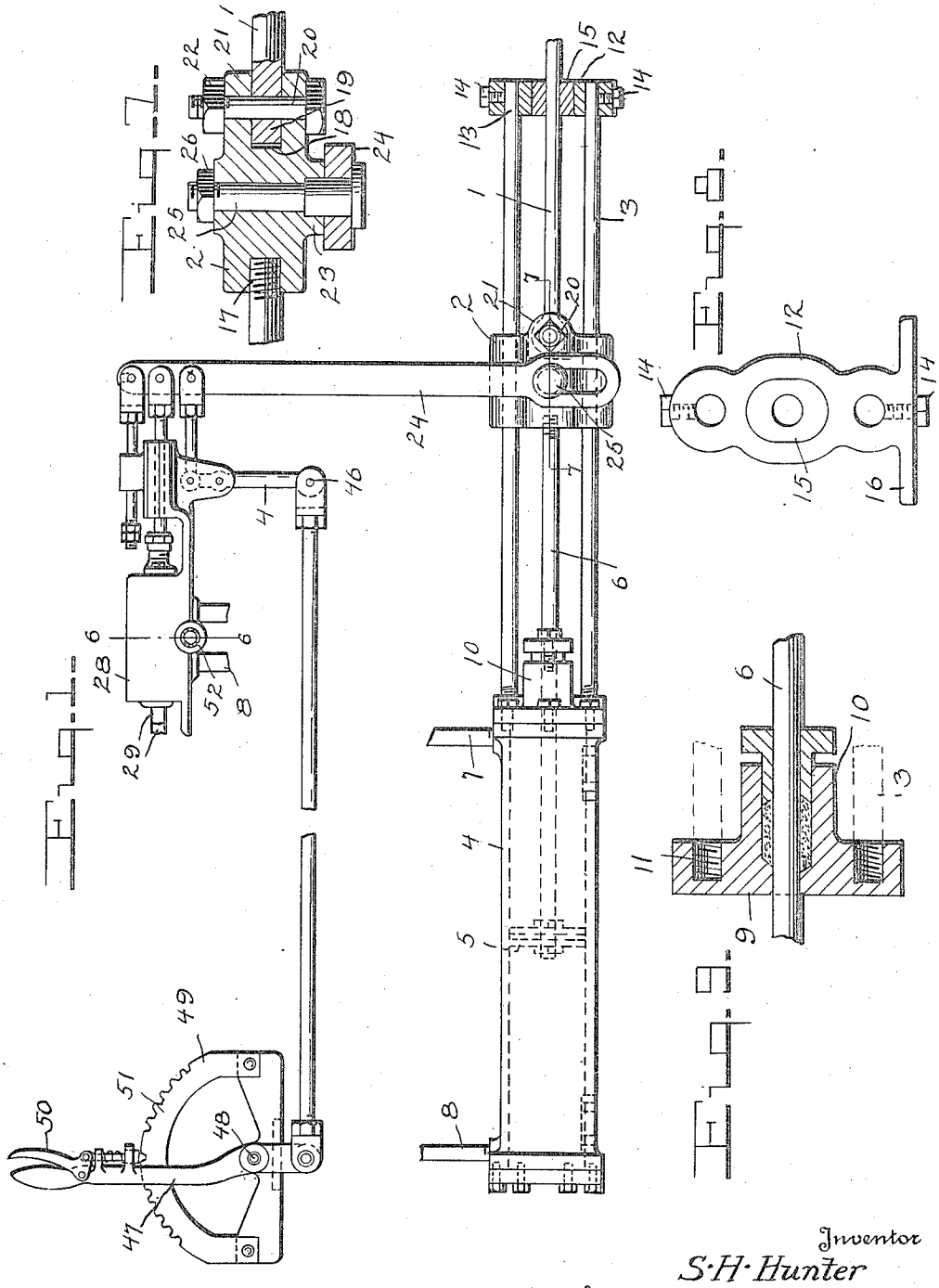
POWER ACTUATED VALVE GEAR OPERATING MECHANISM.

APPLICATION FILED APR. 10, 1915.

1,206,707.

Patented Nov. 28, 1916.

2 SHEETS—SHEET 1.



Witnesses

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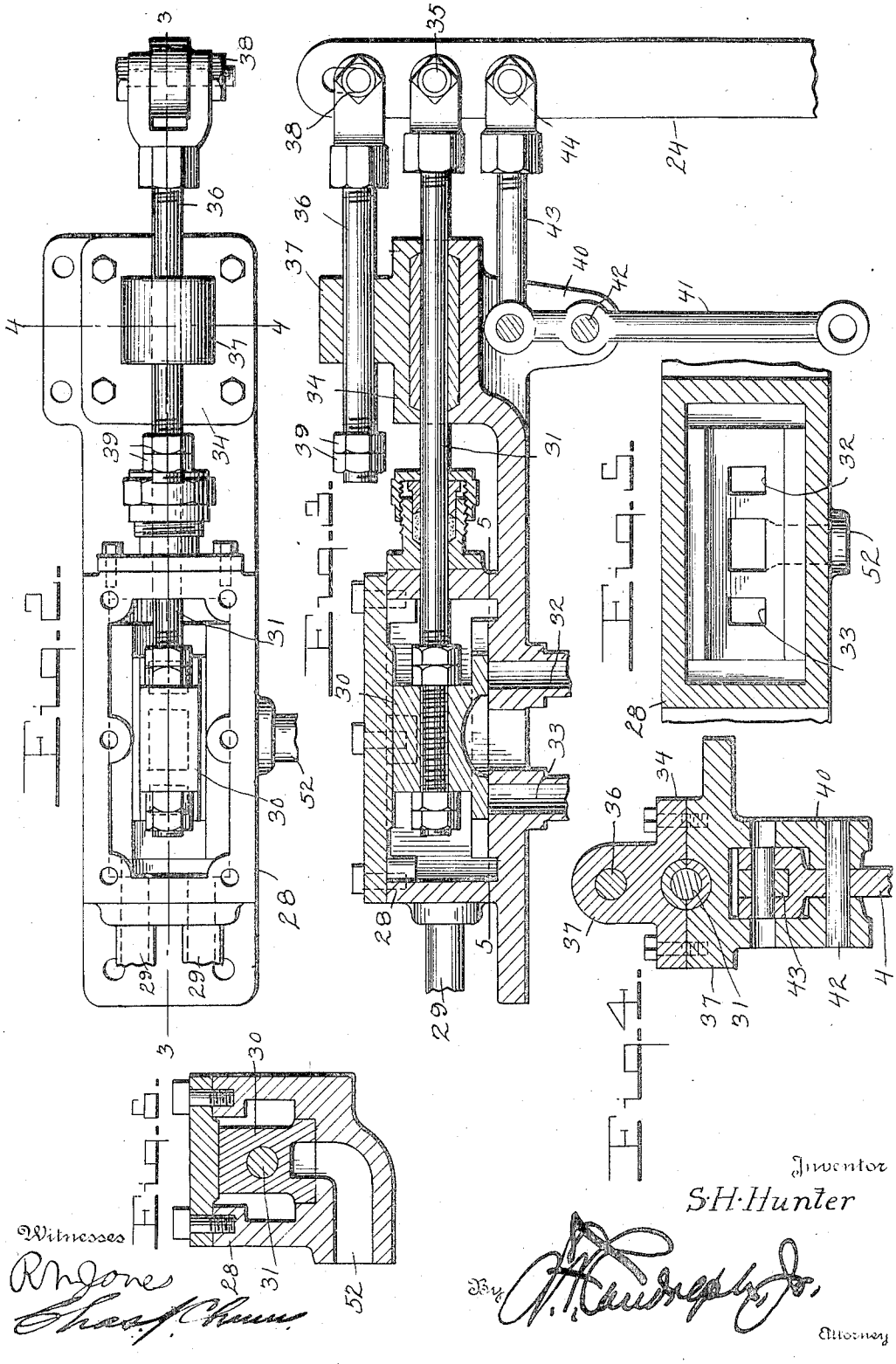
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UNITED STATES PATENT OFFICE.

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POWER-ACTUATED VALVE-GEAR-OPERATING MECHANISM.

1,206,707. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed April 10, 1915. Serial No. 20,490.

To all whom it may concern:

Be it known that I, SMITH H. HUNTER, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Power-Actuated Valve-Gear-Operating Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in valve gears for locomotives and more particularly to power actuated operated means for controlling the valve gear.

The primary object of the invention is to provide means for controlling the valve gear, easily, reliably and quickly, and to this end there is provided a cylinder, piston, piston rod carried by the piston and operatively associated with the reach rod, a valve to control the motive agent for reciprocating the piston and a lever and rod, and rods operatively associated with one another, the piston rod and the valve and arranged so that by oscillating the lever the piston may be moved in either direction to bring about corresponding movement of the reach rod.

An important object of the invention is to provide novel means to support the rods or links which connect the valve stem with the piston rod, said means serving to brace the operating mechanism generally and acting as a stop to limit the movement of the mechanism and insure its proper operation.

Another object is to improve operating means for valve gears so as to render them more practical, simple as to construction, easy to operate and efficient.

The above and additional objects are accomplished by such means as are illustrated in the accompanying drawings, described in the following specification and then more particularly pointed out in the claims.

With reference to the drawings, wherein I have illustrated the preferred embodiment of my invention as it is reduced to practice, and throughout the several views of which similar reference numerals designate corresponding parts. Figure 1 is a side elevation of my improved device, Fig. 2 is a top plan view of the valve showing a portion of the operating means therefor and the top plate of the valve casing removed, Fig. 3 is an enlarged longitudinal sectional view taken on line 3—3 of Fig. 2, Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 2, Fig. 5 is a horizontal sectional view taken on line 5—5 of Fig. 3, Fig. 6 is a vertical sectional view taken on line 6—6 of Fig. 1, Fig. 7 is a detail fragmentary longitudinal sectional view taken on line 7—7 of Fig. 1, Fig. 8 is a detail end elevation of the cross head, and Fig. 9 is a detail sectional view of one of the cylinder heads.

Referring to the drawings by characters of reference, 1 designates the reach rod of reversing locomotive valve gear, not shown, and 2 the slide block or cross head reciprocally mounted upon spaced parallel guide rods 3. The guide rods 3 are carried by and extend outwardly from one end of an elongated cylinder 4.

Reciprocally mounted within the cylinder 4 is a piston 5 carrying the ordinary piston rod 6 which rod 6 extends outwardly through one end of the cylinder 4 and is secured to the cross head or slide block 2 at its outer end. The piston 5 is normally positioned centrally of the ends of the cylinder 4 and is arranged to be moved in either direction from its normal position, by the admission of motive agent upon either side thereof through pipes 7 and 8 which are connected with the ends of the cylinder and communicate therewith. The cylinder head 9 at one end of the cylinder 4 is formed with an apertured boss 10 to receive the piston rod 6 and further provided with screw threaded openings 11 in its outer face, said openings being arranged to receive the screw threaded ends of the guide rods 3. A plate 12 of elongated formation is mounted upon the outer ends of the guide rods 3 and is formed at points adjacent to its ends with guide rod receiving openings 13. Set screws 14 are carried at the ends of the plate 12 and arranged to engage the portions of the guide rods that are disposed within the openings 13 to secure the plate in position. An apertured bearing element 15 is mounted within a central opening in the plate 12 and receives the reach rod 1. Extending from either side of the plate 12 on the lower end thereof are attaching teeth 16 which are to be secured to the locomotive in any suitable manner.

The cross head or slide block 2 is formed in the nature of a casting and provided in one face with a screw threaded piston rod receiving opening 17 in which is turned the

outer end of the piston rod 6 as shown clearly in Fig. 7. A recess 18 is formed in the opposite face of the block 2 and receives an eye 19 formed on the inner end of the reach rod 1.

A bolt 20 is inserted through apertured ears 21 extending from the recessed side of the plate and through the ear 19 to pivotally connect the reach rod with the block. A nut 22 is turned on said bolt and engages said block. Opposed bosses 23 are formed on the other opposed side of the block 2 and inserted through said bosses and the lower end of an operating link 24 is a bolt 25. The bolt 25 is formed with an enlarged portion adjacent to its headed end for the purpose of supporting the link 24 and a nut 26 is turned on the threaded end of said bolt and in engagement with the adjacent boss 23. The lower end of the link 24 is enlarged and in said enlarged portion is formed a longitudinal slot 27 which receives the enlarged portion of the bolt 25.

Located above the cylinder 4 at any suitable point upon the locomotive, not shown, is a valve chest 28 with which is communicated a pair of pipes 29. The pipes 29 are connected with an air and steam source of supply respectively, in order that either air or steam may be utilized to operate the device as will be later more fully described.

Slidably mounted within the valve chest is an ordinary D-valve 30 to which is connected a valve stem 31. This valve 30 is arranged to coöperate with spaced outlet ports 32 and 33 arranged in the ordinary manner relative to the slide valve and which communicate with the pipes 7 and 8, thus connecting the cylinder 4 with the distributing valve therefor. The valve stem 31 is slidably mounted in a supporting bearing 34 which is an extension of the valve casing 28.

The outer end of the stem 31 is pivotally connected in any suitable manner as at 35 to the link 24 at a point intermediate the ends of said link but adjacent to its upper end. A supporting guide and stop rod 36, slidably mounted within bearings 37 carried by the support 34, is disposed in parallel relation to the stem 31. This rod 36 has a pin and slot connection 38 with the upper end of the link 24 and upon its free end carries nuts 39. This rod 36 not only supports the link 24 and acts as a fulcrum therefor but limits the movement of the link, valve stem and coöperating parts. The length of said rod is varied in accordance with the side movement of the valve and coöperating parts. Depending from the supporting flange 34 are spaced ears 40 between which is pivotally mounted intermediate its ends a rocker arm 41. This member 41 is pivoted as at 42 intermediate its ends between and to the ears 40 and at its upper end is pivotally connected with a link 43. The link 43 is in turn pivotally connected with the link 24 as at 44 at a point below the pivotal connection 35. An auxiliary reach rod 45 is pivoted at one end as at 46 to the lower end of the rocker 41 and at its other end to the lower end of an operating lever 47. This lever 47 is pivoted as at 48 intermediate its ends upon a quadrant 49 and is located within the cab of the locomotive, not shown. Lever locking means designated 50 as an entirety is mounted upon the lever and arranged to coöperate with notches 51 in the quadrant. The casing 28 is provided with an exhaust port 52 arranged in the usual manner relative to the D-slide valve 30 and casing.

In operation, to set the valve gear, not shown, forward, the lever 47 is moved from its normally vertical position forwardly causing a pull to be communicated to the rod 45 and the rocker 41 to rock and communicate a push to the link 43. Upon pushing of the link 43 the operating link 34 is moved outwardly, the fulcrum point at this time being the pin and slot connection at the upper end of the link, thus the valve stem 31 is pulled outwardly and the valve moved to open the port 33. Steam or air entering the port 33 is directed to the cylinder 4 through the pipe 8 and the piston 5 is moved forwardly causing the reach rod 1 to be pushed in the same direction and the valve gear, not shown, to be set to provide for the forward motion of the locomotive. As the cross head 2 moves toward the plate 12, the link 24 is moved correspondingly and pulls the valve stem 31 outwardly causing the valve to move into closed position.

To set the valve gear, not shown, in reverse position, the lever 47 is moved as far rearward as possible causing the rod 45 to be pushed forwardly and the link 43 pulled inwardly and effecting an inward swinging movement of the link 24 relative to the connection 38 at the upper end thereof.

The valve stem 31 is thus forced inwardly and the valve 30 unseats the port 32 allowing the air or steam to enter the cylinder 4 through the pipe 7 and supports the piston 5 rearwardly. Upon rearward movement of the piston the slide block or cross head 2 is moved correspondingly and a pull communicated to the reach rod 1. When the cross head 2 moves inwardly the link 24 is swung from the pivotal connection thereof with the link 43 at the point 44 and a pull communicated to the valve stem 31 causing the valve to move into closed position and setting the gear, not shown, in reverse position. It will be seen that the reverse gear, not shown, may be quickly and easily operated by the small lever 47. The guide and stop bar 36 limits the movement of the mechanism and in acting as the fulcrum point for

the link 24 dispenses with the necessity of employing a complicated arrangement of links to effect the desired swinging movement of the link 24 to cut off the valve, or in other words remove it from normal position.

In practice, I have found that the form of my invention, illustrated in the drawings and referred to in the above description, as the preferred embodiment, is the most efficient and practical: yet realizing that the conditions concurrent with the adoption of my device will necessarily vary, I desire to emphasize the fact that various minor changes in details of construction, proportion and arrangement of parts may be resorted to, when required, without sacrificing any of the advantages of my invention, as claimed.

What is claimed is:—

1. The combination of a cylinder, a piston reciprocally mounted within the cylinder and provided with a piston rod, a guide extending from one end of the cylinder, a slide block mounted on the said guide, and connected with the outer end of said piston rod, a valve casing located above the cylinder and the guide, a slide valve operated in the valve casing for controlling the admission and exhaust of fluid pressure to the said cylinder, said slide valve having a stem extending beyond the casing, a link pivotally connected at its lower end to the slide block and extending upwardly therefrom, and pivoted at its upper portion to the valve rod or stem, said link being extended above the valve stem, a slidable rod located above the valve stem and connected at one end with the said link and provided with spaced abutments, a fixed guide receiving the slidable rod and located between the said abutment, a rocker located below the valve stem and pivoted intermediate of its ends, one end being connected with the said link, and a reversing lever connected with the other end of the rocker.

2. The combination of a cylinder, a piston reciprocally mounted within the cylinder and provided with a piston rod, a guide extending from one end of the cylinder, a slide block mounted on the said guide, and connected with the outer end of said piston rod, a valve casing provided with an extension having a bearing spaced from the casing and provided at the top with a guide lug and having a depending support, a valve operating in the casing for controlling the admission and exhaust of fluid pressure to the said cylinder and provided with a stem guided in the said bearing, a link pivoted intermediate of its ends to the stem and connected at its lower end with a slide block, a slidable rod mounted in the guide lug and located above the valve stem and connected at one end with the upper end of the said link, said rod being provided with spaced abutments arranged to engage the guide lug, a rocker pivoted intermediate of its ends to the depending support and connected at its upper end with the said link below the valve stem, a reversing lever and a reach rod connecting the reversing lever with the lower end of the rocker.

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

SMITH H. HUNTER.

Witnesses:
MRS. A. B. HILL,
M. B. PIERCE.