

Jan. 1, 1924

H. E. ABELE

1,479,440

CONTROL MECHANISM

Filed Nov. 22, 1920

3 Sheets-Sheet 2

Fig. 3.

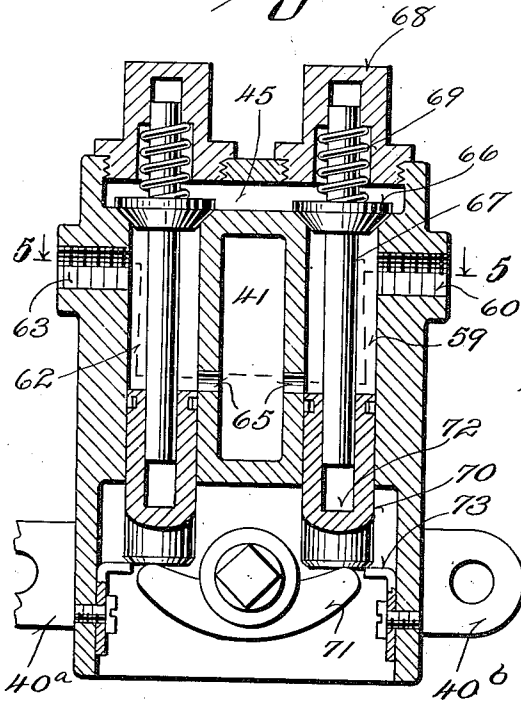


Fig. 4.

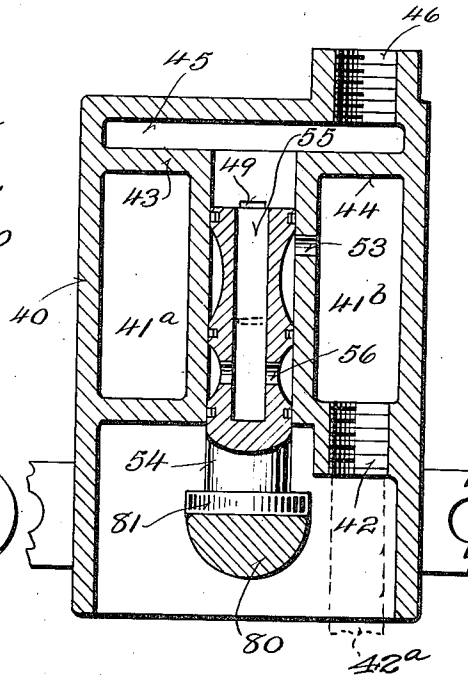
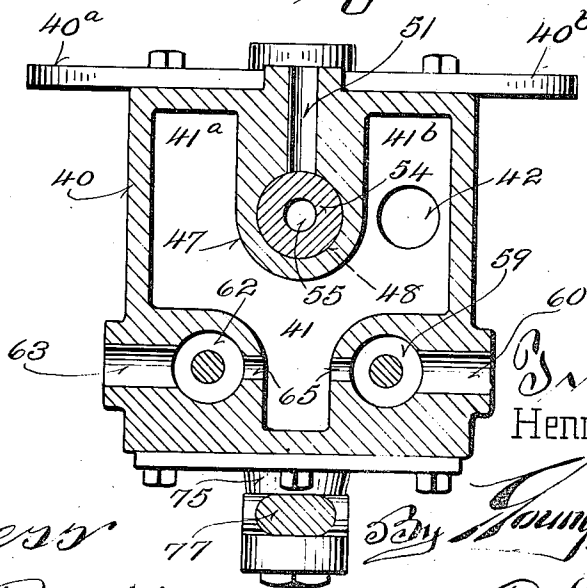


Fig. 5.



Inventor
Henry E. Abele

Witness
J. P. Britt

By Young & Young
Attorneys

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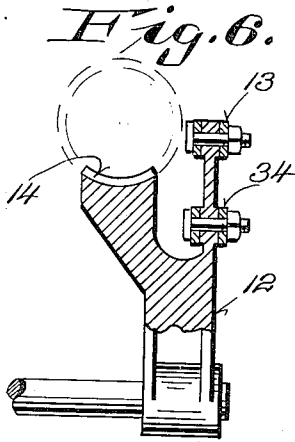


Fig. 7.

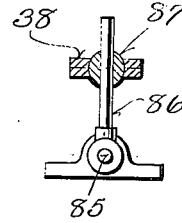


Fig. 8.

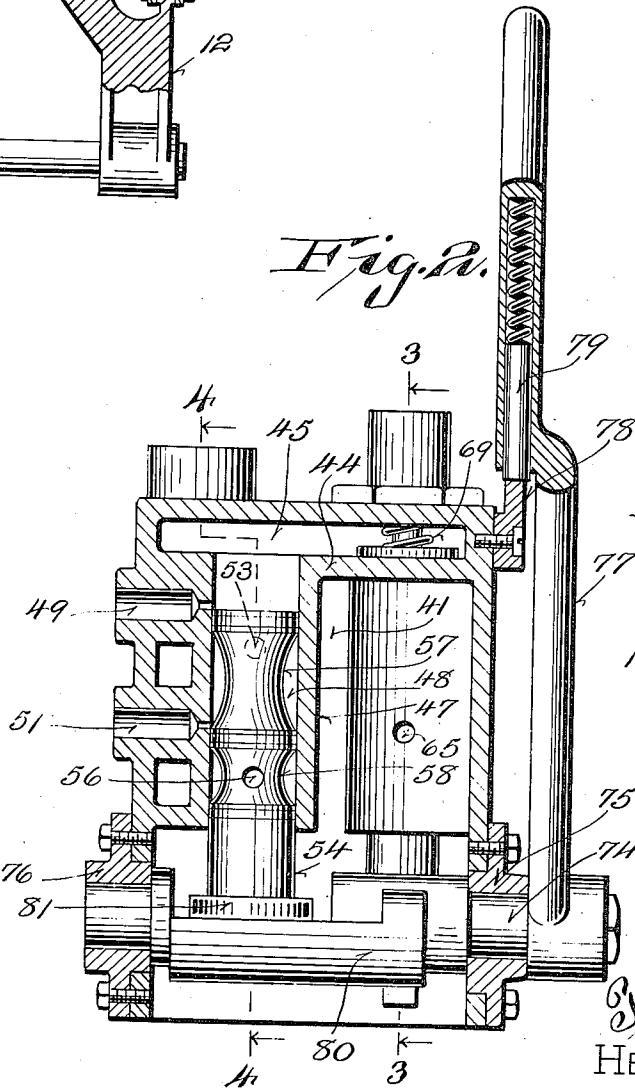
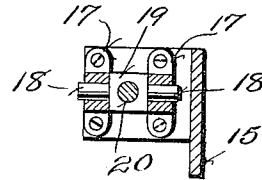


Fig. 8.



Inventor
Henry E. Abele

Witness
J. P. Britt

By Young & Young
Attorneys

UNITED STATES PATENT OFFICE.

HENRY E. ABELE, OF MILWAUKEE, WISCONSIN.

CONTROL MECHANISM.

Application filed November 22, 1920. Serial No. 425,787.

To all whom it may concern:

Be it known that I, HENRY E. ABELE, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Control Mechanism; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 This invention relates to improvements in control mechanism and is more especially adapted for use in connection with the reversing gear of a locomotive. It is obvious, however, that it may also be used on any
15 control mechanism which is or can be actuated by means of an oscillatory or a reciprocating member.

One of the principal objects of my invention is to provide an improved controlling
20 mechanism which may be actuated by fluid pressure.

Another important object of the invention is to provide an improved control mechanism which may be actuated either by fluid
25 pressure or manually.

Other objects and advantages will be apparent from the following description read in connection with the accompanying drawings, in which:

30 Figure 1 is a side elevation of the device with parts shown in section, and parts of a locomotive shown diagrammatically in connection therewith.

Figure 1^a is an illustration of the indicator dial used in connection with my device.

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a vertical sectional view taken
40 on the line 3—3 of Figure 2.

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 3.

45 Figure 6 is a vertical sectional view taken transversely through the reversing lever.

Figure 7 is a detail sectional view taken on the line 7—7 of Figure 1, and

50 Figure 8 is a detail sectional view taken on the line 8—8 of Figure 1.

Similar reference characters refer to like parts throughout the several views.

I have illustrated my device as applied to a locomotive, the frame of which is shown
55 diagrammatically in Figure 1 and designated by the reference character L. To this

frame is attached the supporting bracket 10, to which are attached the bearing members 11. The reversing lever 12 is pivotally mounted in said bearing members and is provided with an arm which is pivotally connected to the reach rod 13. A gear segment 14 is also carried by said lever concentric with its pivot.

A casting 15 is mounted on the locomotive, 65 and is provided with a transverse flange 16, to which are secured bearing members 17. Within these bearing members are journaled the trunnions 18 which carry the bearing block 19 in which is journaled the reduced 70 portion 20 of the longitudinal shaft 21. This longitudinal shaft is provided with a worm 22 which is engageable with the gear segment 14. The opposite end of the shaft 21 is journaled in a block 23 which is slidably mounted in a vertical guide-way 24, which is carried by the casting 15. The reduced portion 20 of the shaft 21 is connected by a universal joint 25 with the telescoping rod 26 which is in turn connected 80 with the rod 27. The rod 27 extends upwardly and rearwardly to the cab where it is provided with a hand wheel 28 by which it may be rotated. The wheel 28 is also provided with a ratchet 29 which is engageable 85 by the pawl 30 to hold it in any position to which it may be adjusted.

The slidable block 23 is connected by a piston rod 32 to the piston head 31 which operates within the cylinder 33 carried by 90 the casting 15. Thus it will be seen that when the piston head 31 is carried upwardly from the position shown in Figure 1, the worm 22 will be disconnected from the reversing lever 12 and the manual operation 95 thus rendered inoperative. The reversing lever 12 may also be rocked by means of the rod 34, which is pivoted at one end thereto. The opposite end of the rod 34 is pivotally connected to the piston rod 35, on the end 100 of which the head 36 is carried. The piston head 36 operates within the cylinder 37 which is attached to the frame of the locomotive.

The rod 35 is provided at the end which is 105 connected with the rod 34 with a bracket 38, which is mounted to slide on the guide 39. The piston heads 36 and 31 are adapted to be reciprocated within the respective cylinders by fluid pressure controlled by means 110 located within the valve box 40, which is attached to the locomotive by the brackets 40^a

and 40^b. Said valve box is provided with the vertical central channel 41 with its two branches 41^a and 41^b. This channel is in communication with the atmosphere through the port 42, which may be provided with the pipe 42^a, extending to a point outside of the locomotive.

The upper side of the channel 41 is separated by the plates 43 and 44 from the channel 45, which is connected by the inlet 46 to a source of fluid pressure. The two branches of the atmospheric channel 41^a and 41^b are separated by the casing 47 which encloses the cylinder 48. Said cylinder may be placed in communication with the upper part of cylinder 33 through the opening 49 and the pipe 50. The cylinder 48 may be placed in communication with the lower end of the cylinder 33 through the opening 51 and the pipe 52. The upper end of the cylinder 48 is also provided with a port 53, opening into the atmospheric channel. Reciprocally mounted within the cylinder 48, is the fluid control member 54 which is provided with the central longitudinal bore 55 and the transverse openings 56, and is circumferentially reduced as shown at 57 and 58.

With the fluid control member 54 in the position shown in Fig. 2, the upper end of cylinder 33 will be in communication through the pipe 50 and opening 49 with the channel 45 which is under pressure. The lower portion of the cylinder 33 will be in communication through the pipe 52 and opening 51 past the reduced portion 57 and through the port 53 with the atmosphere. The piston head 31 will, therefore, be held in the position shown in Figure 1.

When the fluid control member 54 is raised by means hereinafter described, its upper end will pass the opening 49 and shut off the same from the pressure in the channel 45. The opening 49 will then be placed in communication with the atmosphere through the port 53 past the reduced portion 57. At the same time the opening 51 will be cut off from the atmosphere and placed in communication with the pressure in the channel 45 by means of the opening 56 and the bore 55. The piston 31 will then be raised to the upper limit of its movement and the worm 22 disconnected from the gear segment 14.

The valve casing is also provided with a vertical cylindrical cavity 59, which is in communication through the opening 60 and pipe 61 with one end of the cylinder 37. The valve casing is also provided with another vertical cylindrical cavity 62 which is in communication through the opening 63 and pipe 64 with the opposite end of the cylinder 37. Both of said cavities 59 and 62 are provided with ports 65 opening into the atmospheric channel 41. Each of the

cavities 59 and 62 is normally closed at its upper end by the valve 66 mounted on the valve rod 67, which is reciprocally mounted at its upper end in the bearing member 68, said valve being held yieldingly on its seat by the spring 69. The lower end of the valve rod 67 is slidably mounted in the plunger 70. When the plunger is raised by the rock arm 71 it will first cover the port 65. After this port has been covered, the lower end of the recess 72 will strike the lower end of the valve rod 67 raising the valve 66 and admitting fluid pressure from the channel 45 into the cavity 59 and through the opening 60, the pipe 61, into one end of the cylinder, communication of this end of the cylinder having been previously cut off from the atmosphere by the closing of the port 65.

In a similar manner when the member 71 is rocked in the opposite direction, the other end of the cylinder will be cut off from the atmosphere and opened to pressure, the pressure within the cylinder operating to force the plunger 70 downwardly until the pressure fluid is allowed to escape through the port 65 to the atmosphere. The movement of the plunger 70 in the downward direction, is limited by the stop 73 as shown in Figure 3. The rock arm 71 is mounted on the rock shaft 74 which is journaled in the bearings 75 and 76 attached to the walls of the valve casing.

The shaft 74 is rocked by means of the lever 77 which cooperates with the segment 78 which is frictionally engaged by the spring pressed pawl 79. Said rock shaft 74 is also provided with a crank 80 on which is carried a plate 81 which engages the member 54 when said shaft is rocked.

The bracket 38 is connected at its upper end with the spherical bearing member 87 through which projects the arm 86 which is mounted on the lower end of the rod 85, said rod being connected through beveled gears 84 to the rod 83 which is operatively connected to the indicator on the dial 82.

The operation may be briefly summarized as follows:

With the parts in the position shown in Figure 1, both ends of the cylinder 37 are in communication with the atmosphere. The lower end of the cylinder 33 is in communication with the atmosphere and the upper end thereof under pressure. In this position the reversing lever 12 may be freely operated and held securely in any position by means of the hand wheel 28. If it be desired to operate the lever 12 by fluid pressure, the lever 77 is rocked forward or backward according to which way it is desired to swing the lever 12. This movement rocks the shaft 74 and no matter which way it is rocked the first result will be to raise the fluid control member 54. This results

in opening the upper end of cylinder 33 to the atmosphere and opening its lower end to pressure as hereinbefore described. This results in raising one end of the shaft 21 and disconnecting the worm 22 from the gear segment 14, and leaves the lever 12 free to be operated by the piston head 36.

The further movement of the lever 77 and shaft 74 results in raising one of the valves 66 and subjecting one side of the piston 36 to pressure, this end of the cylinder having been previously shut off from communication with the atmosphere by closing the port 65. The position of the lever 12 will be indicated on the dial 82 as will be readily understood.

I have described and illustrated my invention as applied to a locomotive, but it will be understood that the invention is not limited to the precise structure herein shown and described, or to the particular adaptation thereof, but that it covers all equivalents and modifications which may fall within the scope of the appended claims.

I claim as my invention:

1. In combination, a pivoted member, a gear segment thereon concentric with its pivot, a manually operable worm engageable with said gear segment for oscillating said pivoted member, means operable by fluid pressure for disconnecting said worm from said gear segment, means operable by fluid pressure for oscillating said pivoted member, and valves for controlling the admission of fluid pressure to each of said pressure operated means successively.

2. In combination, a pivoted member, a gear segment thereon concentric with its pivot, a manually operable worm engageable with said gear segment for oscillating said pivoted member, means operable by fluid

pressure for disconnecting said worm from said gear segment, means operable by fluid pressure for oscillating said pivoted member, valves for controlling the admission of fluid pressure to each of said pressure operated means successively, and a single oscillatory member for controlling all of said valves.

3. In combination, a pivoted member, a gear segment thereon concentric with its pivot, a manually operable worm engageable with said gear segment for oscillating said pivoted member, means operable by fluid pressure for disconnecting said worm from said gear segment, means operable by fluid pressure for oscillating said pivoted member, valves for controlling the admission of fluid pressure to each of said pressure operated means, and a single oscillatory member for actuating said valves to render both of said fluid pressure means successively operative.

4. In a link operating mechanism the combination of a pivoted member, a gear segment connected thereto and concentric with said pivot, a worm adapted to pivot about one end, manually operable means universally joined to said worm, means operable by fluid pressure for tilting said worm about its pivot to connect and disconnect it with said gear segment, means operable by fluid pressure for oscillating said pivoted member, valves for controlling the admission of fluid pressure successively to each of said pressure operated means, and a single manually operable means for controlling said valves.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

HENRY E. ABELE.