

April 8, 1930.

E. L. SCHELLENS
POWER AMPLIFYING MACHINE

1,753,870

Filed Aug. 31, 1925

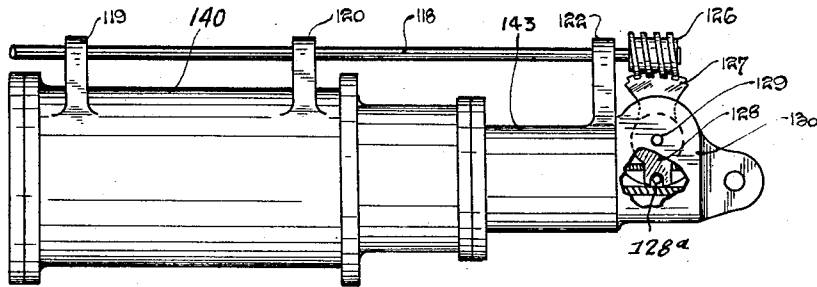


Fig. 1.

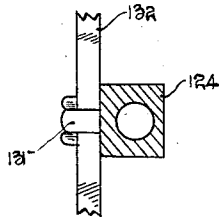


Fig. 3.

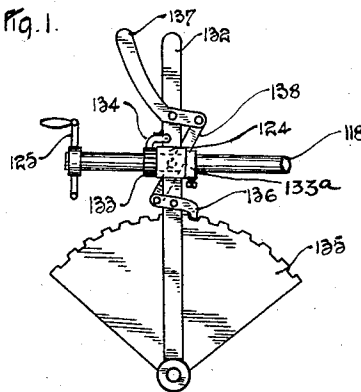


Fig. 2.

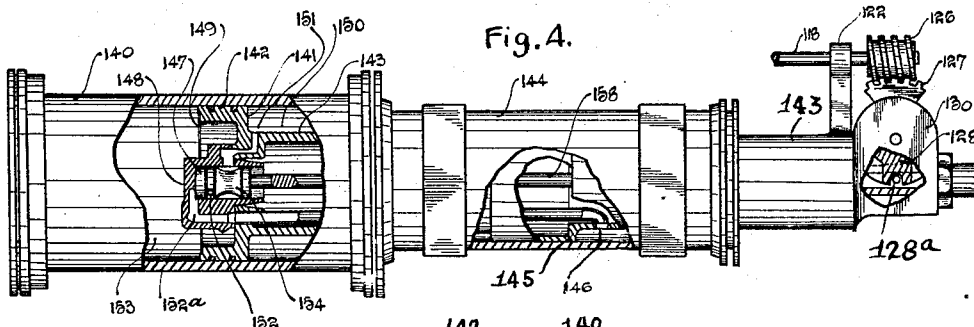
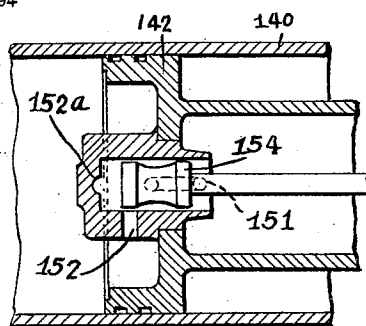


Fig. 4.

Fig. 5.



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POWER-AMPLIFYING MACHINE

Original application filed December 15, 1924, Serial No. 756,160. Divided and this application filed
August 31, 1925. Serial No. 53,623.

The invention relates to a power amplifying machine, as described in the present specification and illustrated in the accompanying drawings that form part of the same.

5 The invention consists essentially of the novel features of construction pointed out broadly and specifically in the claims for novelty following a description containing an explanation in detail of an acceptable
10 form of the invention.

The objects of the invention are to simplify the operation of the valve mechanism in reverse gears where the pressure fluid is transferred from a constant to a variable pressure
15 chamber and automatically readjusts itself; to insure accuracy in the operation by the use of positive actuating elements, such as threaded rotary shafts; to furnish another means of using the screw type of gear originally disclosed in Letters Patent of the United States,
20 December 4th, 1923, filed November 5th, 1919, No. 1,476,470; and generally to provide an efficient, inexpensive and reliable reverse gear.

25 In the drawings, Figure 1 is a side elevation of the cylinder showing the operating gear and broken away to disclose the connection to the valve.

Figure 2 is a view showing the manually
30 operated parts with the locking latch mechanism.

Figure 3 is a detail of the shaft mounting.

Figure 4 is a longitudinal sectional view of the cylinder disclosing the valve and oper-
35 ating gear connections.

Figure 5 is a partial horizontal sectional view of the cylinder and piston showing the operating valve and certain of its ports.

Like numerals of reference indicate corresponding parts in the various figures.

Referring to the drawings, the bearing brackets 119 and 120 extend from the cylinder 140 and the bearing bracket 122 extends from the piston 143 and the rod 118 is slide-
45 able in said brackets and extends therefrom

through the bearing 124 carrying at one end thereof the operating handle 125 and at the other end the worm 126. The worm 126 contacts with the segmental gear 127 forming part of the rocker arm 128 which rocks on
50 the pivot 129 in the bracket 130, the latter forming an extension from the piston 143. The rocker arm is slotted at its other end to engage the valve stem as hereinafter more fully explained.

The block 124 is secured by the pivot 131 to the lever 132. The lever 132 carries a pawl 134 which engages a ratchet 133 secured to the shaft 118 adjacent one side of the block 124. A collar 133^a is secured to the shaft 118 ad-
60 jacent the other side of the block 124 and cooperates with the ratchet to prevent the shaft from sliding through the block. The handle 125 is provided for rotating the rod 118 and such rotation is accompanied by the
35 rotation of the worm 126 and this turns the segmental gear 127 and rocks the arm 128, thereby drawing on the valve stem and valve. This worm gear actuating means for the controlling valve is only used for relatively fine
70 or accurate adjustments of the reversing mechanism.

For quicker operations the lever 132 is used and this lever is pivoted at the lower end of the quadrant 135 and carries the pivoted
75 latch 136 operated by the pivoted handle 137 through the link 138. It has been explained that the block 124 carrying the rod 118 is pivotally secured to the lever 132, therefore when the lever is moved it carries the rod
30 with it and consequently the rocker arm as the teeth of the worm are in engagement with the segmental gear on the said rocker arm.

The lever 132 is used in all operations where a quick or relatively large adjustment
35 of the gear is required and the worm gear is used where finer adjustments, than those afforded by the notches on the quadrant, are required.

The cylinder 140 contains the piston 141, 40

which is reciprocated therein, by the operating fluid, such as steam or air.

The piston 141 comprises a head 142 and a tubular trunk 143 which extends through and projects from the reduced portion 144 of the cylinder 140. An enlarged portion 145 is provided on the piston trunk, such portion working in the extension 144 of the cylinder. Thus the annular chamber 150 around the trunk is closed at one end by the piston head and at the other end by the portion 145.

The controlling valve 154 works in a chamber 157 provided in the piston head 142. A port 152^a leading to the atmosphere through the passage 146 communicates with the left hand end of the valve chamber 157. A port 151 leads from the chamber 150 to the valve chamber at a point adjacent the annular passage around the valve body, such passage being of width sufficient to remain in communication with the port 151 in any operative position of the valve 154. A third port 152 communicates with the valve chamber and the chamber 153 in the cylinder between the piston head and the head of said cylinder. The port 152 enters the valve chamber at a point which will provide communication with the port 151 through the annular passage around the valve body when the valve is moved to the left, and with the exhaust port 152^a when the valve is moved to the right. When the valve is in central position all the ports to the valve chamber are closed.

It will be obvious, from inspection of Fig. 4 that the piston is of a differential type and that it has a greater effective area for the fluid pressure to act on from the left side than from the right, and it follows, therefore, that, if the pressures on each side of the piston are equal, the piston will move to the right.

The valve 154 has a stem 158 extending back through the piston trunk which is provided with a pin 128^a engaged by the forked lower end of the rocker member 128.

The chamber 150 is constantly supplied with the operating fluid from some suitable source such as the boiler of the locomotive or an air pump.

The operation of the gear will be obvious from the following:

Assuming, now, that the pressures on each side of the piston head are so balanced as to retain the piston stationary and it is desired to move the piston to the right, either the hand wheel 125 is turned or the lever 132 is advanced to move the top of the rocker 128 to the right. This moves the valve 154 to the left placing the ports 151 and 152 in communication with each other through the annular passage around the valve body. Fluid will now pass from the chamber 150 to the chamber 153 until the pressure in the latter chamber is increased sufficiently to move the piston to the right. Since the rocker pivot

is carried by the piston and the segmental gear 127 engages the worm 126 the upper end of the rocker is maintained stationary and the valve will be moved to the right with relation to the piston and will close the port 152.

When it is desired to move the piston to the left, the rocker is moved to move the valve to the right. This places the port 152 in communication with the port 152^a leading to the atmosphere through the passage 146. Fluid will now be exhausted from the chamber 153 until the pressure in said chamber is reduced sufficiently to allow the pressure in the chamber 150 to move the piston to the left. This movement also acts to close the port 152.

If, during a movement of the piston, the piston moves far enough to cause the valve to move across and beyond the port 152, such port will communicate either with the atmosphere or the chamber 150, depending on the direction of movement, and will thus automatically balance the pressures again, returning the valve to the neutral position and closing the port 152.

No specific claim is made herein to the operation of the valve or to a rocker actuated valve as these features form the subject matter of my copending application Serial No. 756,160, filed December 15, 1924, of which this application is a division, the claims herein being limited to the dual manual control for the valve.

What I claim is:—

1. Means for manually operating the control valve of a fluid operated power reverse gear comprising a valve actuating member, a shaft carrying a worm meshing with said actuating member together with means for imparting a longitudinal motion to said shaft and means for imparting a rotary motion to said shaft to effect adjustments of said actuating member.
2. In apparatus of the character described including a control valve, the combination of a valve actuating member having a segment of a worm wheel formed thereon and a shaft for actuating said segment mounted for rotary movement and carrying a worm meshing with said segment.
3. Apparatus of the character described including a control valve, means for manually actuating said valve including a shaft, means for moving said shaft longitudinally to effect relatively coarse adjustments of said valve and means for rotating said shaft to effect relatively fine adjustments of said valve together with releasable means for locking said shaft as against longitudinal and rotary motion.
4. Apparatus of the character described including a control valve, means for manually actuating said valve including a shaft, means for moving said shaft longitudinally to effect relatively coarse adjustment of said valve, and means for locking said shaft

against longitudinal movement and for rotating said shaft to effect relatively fine adjustments of said valve.

5. Apparatus of the character described including a control valve, means for manually actuating said valve including a shaft, means for moving said shaft longitudinally to effect relatively coarse adjustments of said valve and means for rotating said shaft in fixed position longitudinally to effect relatively fine adjustments of said valve.

Signed at Montreal, Canada, this 28th day of July, 1925.

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