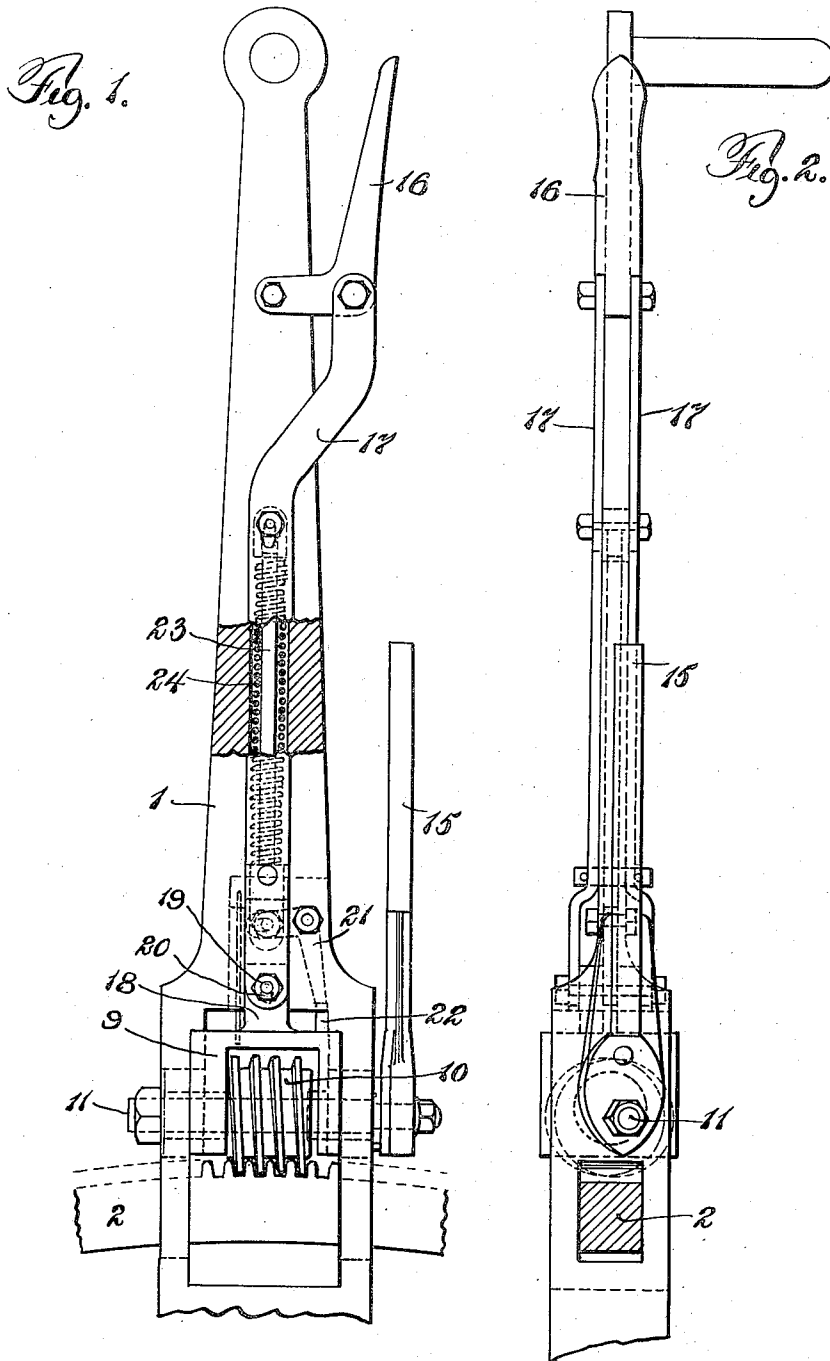


W. C. A. HENRY.
OPERATING LEVER.
APPLICATION FILED JULY 28, 1909.

954,515.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.



WITNESSES
Harvey L. Lechner
Archibald Martin

INVENTOR
W. C. A. Henry
by atty
Paul Symonds

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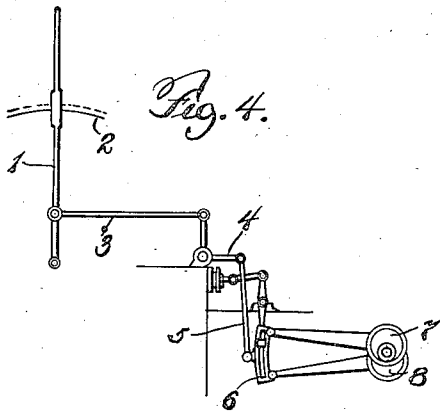
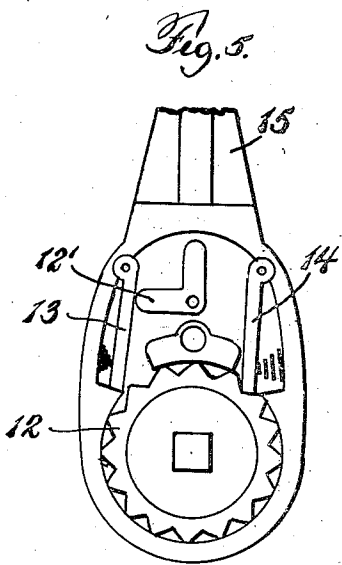
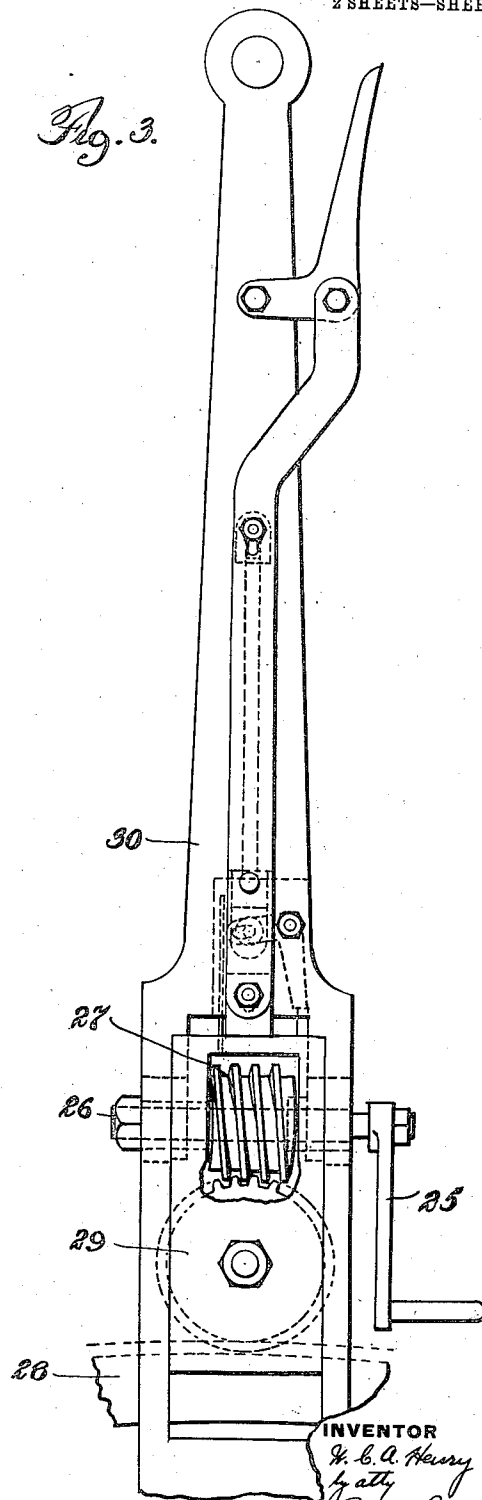


Fig. 3.



WITNESSES
Harry L. Lechner
Archworth Martin

INVENTOR
W. C. A. Henry
By atty
Paul Synnott

UNITED STATES PATENT OFFICE.

WILLIAM C. A. HENRY, OF COLUMBUS, OHIO.

OPERATING-LEVER.

954,515.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed July 28, 1909. Serial No. 510,133.

To all whom it may concern:

Be it known that I, WILLIAM C. A. HENRY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Operating-Levers, of which the following is a specification.

The invention relates to operating levers, and particularly to what are known as reversing levers for use in connection with various types of valve gear employed with engines. The invention has for its principal objects; the provision of an operating or reversing lever, as it is ordinarily termed, of improved construction, adapted to be operated directly manually, or indirectly by means of gearing which renders the actuation more easy; the provision of an improved combined hand and gear operated reverse lever wherein the gear employed is utilized as the catch member when the lever is operated directly by hand, and the provision of a lever of the character specified, wherein the gear used as a catch is securely and positively maintained in operative position by a holding latch, and wherein the latch is moved to unlocked position and the gear carried out of operative position successively by the gripping of the handle by the operator.

Certain embodiments of the invention are illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the operating or reverse lever;

Figure 2 is an edge elevation of the lever;

Figure 3 is a side elevation of a slightly modified form of lever;

Figure 4 is a diagrammatic side elevation illustrating the application of the lever to the operation of the ordinary Stephenson link gear, and

Figure 5 is a detail side elevation of the reversible ratchet which is employed in connection with the lever of Figures 1 and 2.

The invention is illustrated in Figure 4 as applied to the operation of the Stephenson link motion commonly used for adjusting and reversing the position of the valve employed on a locomotive, but it will be understood that the lever is of general application and may be used in connection with other types of engines, and other link motions aside from the Stephenson, the construction being obviously just as applicable to

the Walschaert link motion very commonly employed, and in fact to any relation which calls for a combined hand and power operated lever. With the link motions as now employed upon locomotives, it is a matter of considerable difficulty to operate the reversing lever, and the object of this invention is to eliminate such difficulty by applying a gear connection for moving the lever. Such a connection necessarily increases the time required to move the lever, and in order that the lever may be operated rapidly in case of emergency, the device is so arranged that the gearing may be thrown out and the lever operated directly in the usual way, by merely turning the handle. The details of construction will be understood from the drawing in connection with the detailed description hereinafter.

Referring to the diagrammatic illustration of Figure 4, to indicate one manner in which the lever may be employed, 1 is the handle, 2 is the sector over which the handle moves, 3 is the connecting rod extending from the handle to the bell-crank lever 4, 5 is a second connecting rod extending from the end of the bell-crank lever 4 to the reversing sector 6, and 7 and 8 are the eccentrics which govern the valves of the locomotive, the position of which eccentric is governed from the sector 6, by the connecting arms shown, such general construction being old and well known in the art.

Referring now to the construction of the lever as shown in Figures 1 and 2, it will be seen that the handle 1 is slotted above the sector 2 and carries in such slotted portion a block 9, which block 9 carries the worm gear 10 mounted upon the shaft 11. The shaft 11 is provided with a ratchet wheel 12 at one end (Fig. 5), which ratchet is rotated from the pawls 13 and 14 actuated from the handle 15, the operating lever 12' being provided whereby either pawl may be held out of engagement with the ratchet wheel depending upon which direction it is desired to rotate the shaft 11. As indicated in Figure 2, the shaft 11 with the worm 10 is set slightly at an angle with respect to the sector 2 so that the teeth of the sector may be cut straight across instead of at an angle, thus rendering the construction somewhat cheaper. As indicated in Figure 1, the worm is in engagement with the teeth of the sector, but when desired this worm may be withdrawn from engagement with the

teeth in order to permit the handle to be moved without operating the handle 15, and this is accomplished from the gripping member or handle 16 at the upper end of the handle 1, which member 16 is pivoted to the handle 1 and connected to the block 9 which carries the worm, by means of the two side bars 17, 17, (Figure 2). The block 9 is provided with a pair of upstanding lugs 18, which lugs carry a bolt 19. The bolt 19 engages longitudinal slots in the side bars 17, 17, in order that the side bars may have a slight amount of lost motion with respect to the block 9, the purpose of which lost motion is to permit the side bars to operate a catch to release the block 9 before such block is moved upward. The catch comprises a bell-crank lever 21 pivoted in the handle 1 at its middle portion, and having its lower end in engagement with a lug 22 on the block 9, and its other end pivoted to the side bars 17, 17. It will be seen from the foregoing that when the gripping member 16 is grasped and pressed inward, the side bars 17, 17 move upward, first disengaging the catch 21 from the lug 22 and then moving the block 9 with its worm upward out of engagement with the teeth on the sector 2, after which the lever 1 may be freely moved in either direction. The handle 1 is slotted intermediate the bars 17, 17, as indicated in Figure 1, and in this slotted portion a guide bar 23 is mounted surrounded by a spring 24, which spring is normally under compression and tends to hold the side bars 17, 17 in their lowermost position, and the catch 21 in the position shown in Figure 1, so that as soon as the gripping member 16 is released the catch 21 returns to the position indicated in Figure 1. It will be seen from the foregoing that the handle 1 may be moved along the sector 2 either by actuating the ratchet handle 15 backward and forward, or that in case of emergency, when it is desired to move the handle rapidly without the use of the ratchet handle 15, the upper end of the handle 1 may be gripped by the operator in the usual manner, thus swinging the catch 21 and lifting the block 9, and the handle then swung quickly along the sector, until the desired position is reached. It is obvious that any form of ratchet other than that shown in Figure 5 might be used if desired.

The form of device shown in Figure 3 may be operated by means of a crank 25 instead of a ratchet handle, the shaft 26 which carries the worm 27 being a sufficient distance above the sector 28 to permit the use of a crank instead of a ratchet. The additional space between the shaft 26 and the sector 28 is secured by the use of a worm wheel 29 mounted in the handle 30, intermediate the worm 27 and the sector 28. In other respects the construction of the lever

and operating mechanism is precisely the same as that of the device shown in Figures 1 and 2 and described heretofore in detail.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:-

1. In combination in an operating lever, a pivoted handle, a rack bar, gearing on the handle cooperating with the rack bar whereby the handle may be moved along the rack bar, means for moving the gearing into and out of engagement with the rack, and positive locking means for maintaining the gearing in engagement with the rack.

2. In combination in an operating lever, a pivoted handle, a rack bar, gearing on the handle mounted for bodily movement into and out of engagement with the rack bar, positive locking means for maintaining the gearing in engagement with the rack, and a common means for operating the locking means and moving the gearing into and out of engagement with the rack bar.

3. The combination with a pivoted operating handle, a fixed rack bar mounted adjacent thereto, of a worm mounted on the handle for reciprocation and adapted to engage the teeth of the rack bar, positive locking means for maintaining the worm in engagement with the rack bar, and pawl and ratchet mechanism for operating the worm.

4. In combination in an operating lever, a pivoted handle, a rack bar, means for moving the handle along the rack bar including a movable worm, means for moving the worm into and out of a driving connection with the rack bar, and positive locking means for maintaining the worm in driving position.

5. In combination in an operating lever, a pivoted handle, a rack bar, means for moving the handle along the rack bar including a movable worm, means for moving the worm into and out of a driving connection with the rack bar, positive means for maintaining the worm in driving position, and a common means for operating the locking means and moving the worm out of driving position.

6. The combination with a pivoted operating handle and a toothed sector adjacent thereto, of a worm mounted on the handle for reciprocation and adapted to engage the teeth of the sector, means for rotating the worm, a latch for holding the worm in engagement with the sector, a gripping member on the handle, and connections from such member to the latch and worm whereby the actuation of the member moves the latch to unlocked position and carries the worm out of engagement with the sector.

7. The combination with a pivoted operating handle and a toothed sector adjacent thereto, of a worm mounted on the handle

for reciprocation and adapted to engage the
teeth of the sector, means for rotating the
worm, a spring-held latch for holding the
worm in engagement with the sector, a grip-
5 ping member on the handle, a lost motion
connection from the member to the worm
and a connection from the lever to the latch
whereby the actuation of the member first
moves the latch to unlocked position and

then carries the worm out of engagement 10
with the sector.

In testimony whereof I have hereunto
signed my name in the presence of the two
subscribed witnesses.

WILLIAM C. A. HENRY.

Witnesses:

J. A. DILDINE,
GEO. W. DAVIDSON.