

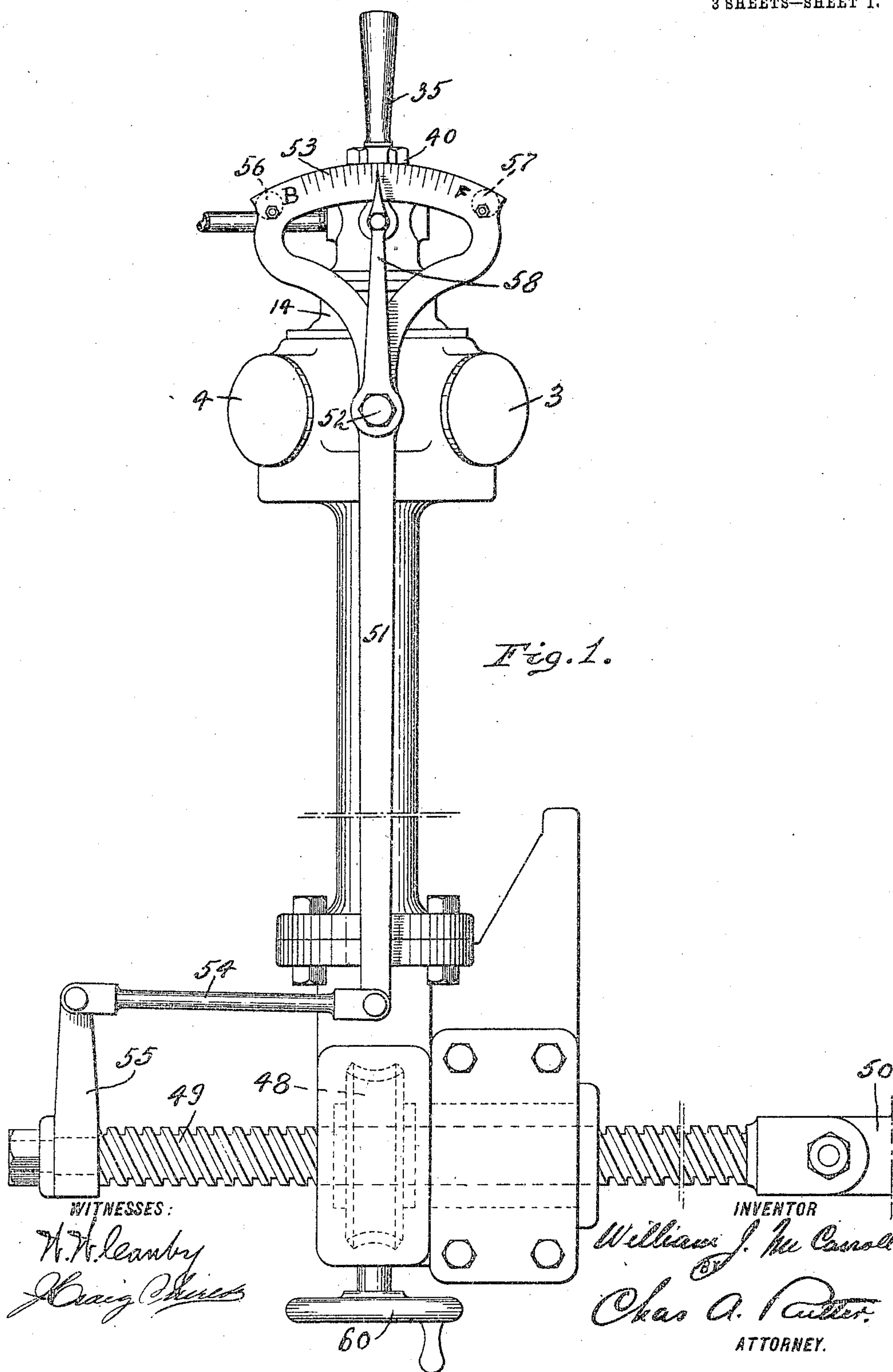
No. 790,968.

PATENTED MAY 30, 1905.

W. J. McCARROLL.  
REVERSING GEAR.

APPLICATION FILED JULY 25, 1904.

3 SHEETS—SHEET 1.



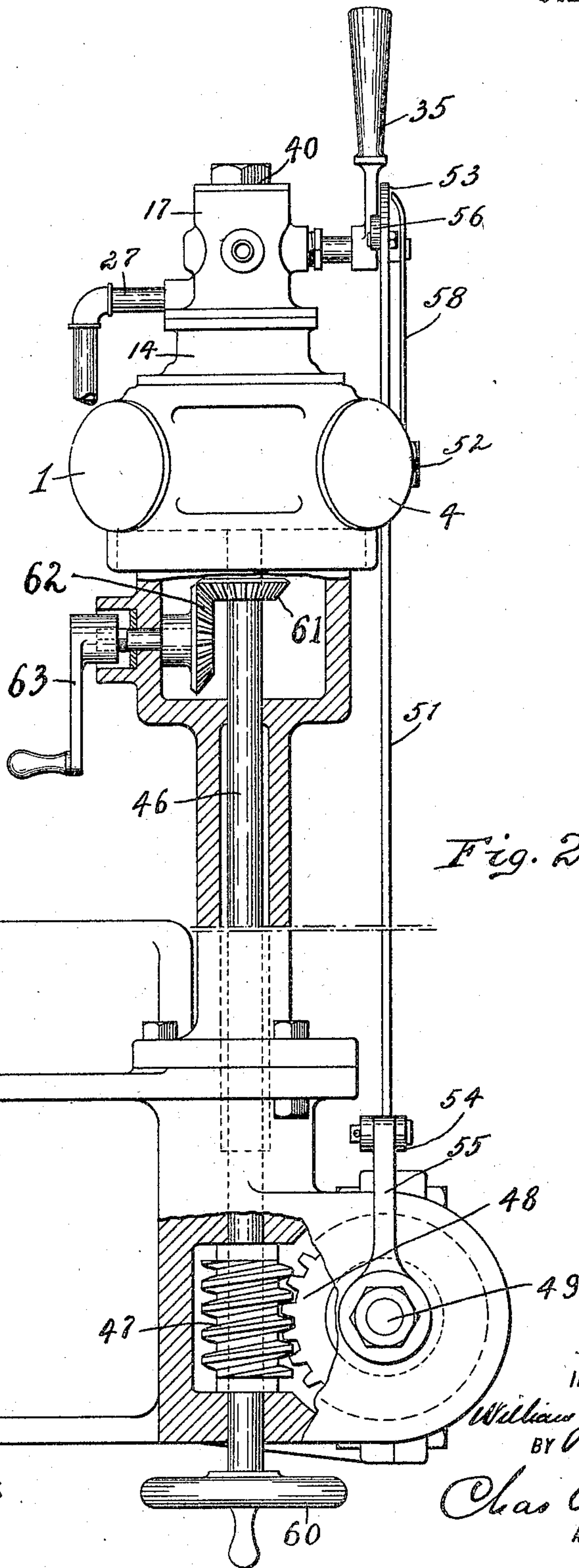
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3 SHEETS—SHEET 2.



WITNESSES:

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Craig Currier

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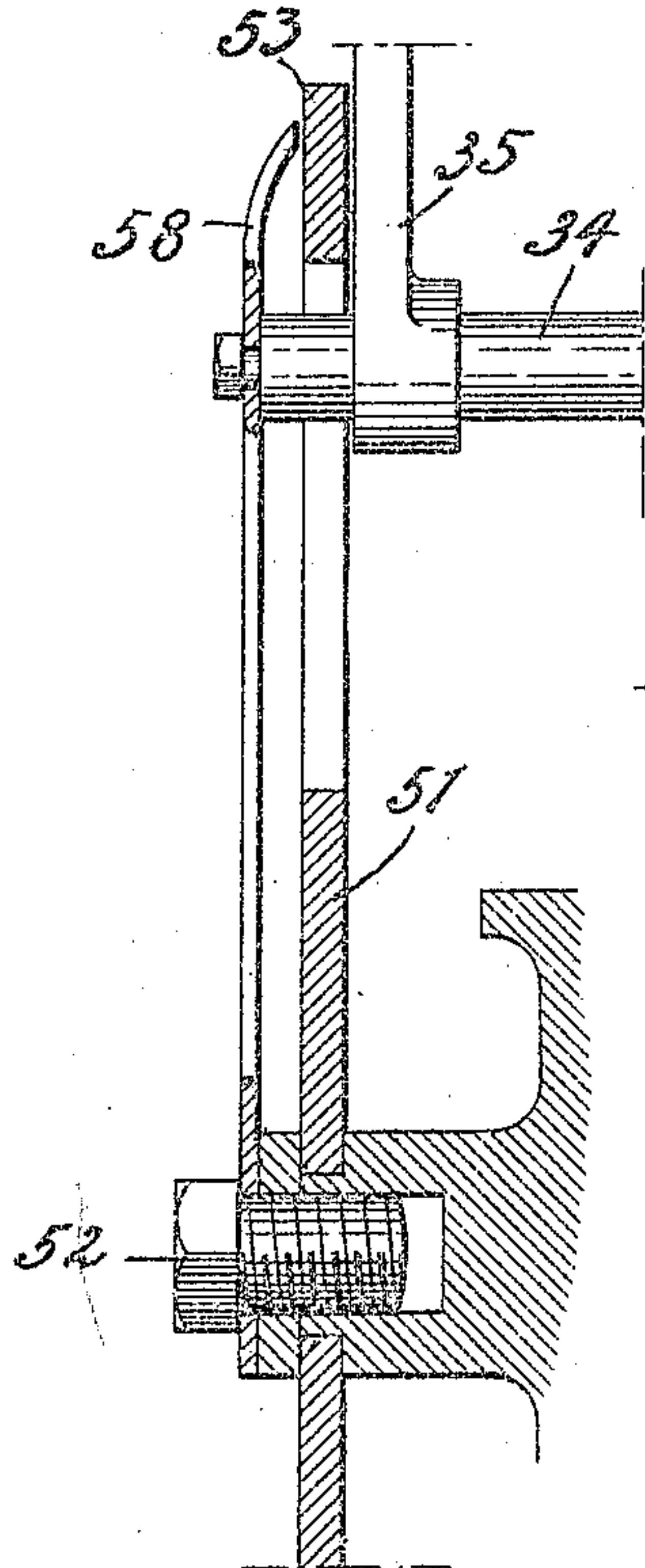
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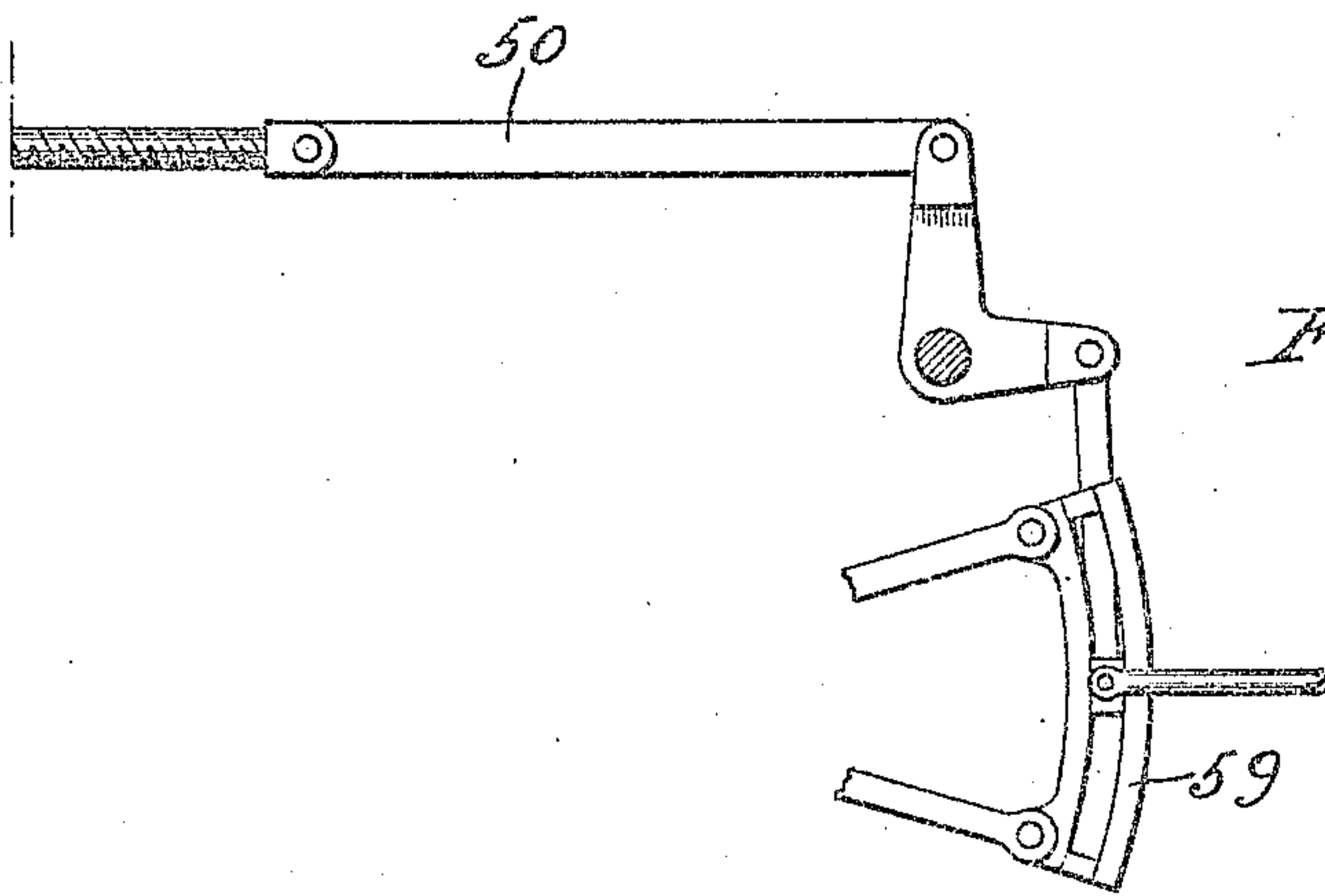
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3 SHEETS—SHEET 3.



*Fig. 3.*



*Fig. 4.*

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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TO BURNHAM, WILLIAMS & CO., OF PHILADELPHIA, PENNSYLVANIA,  
A FIRM.

## REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 790,968, dated May 30, 1905.

Application filed July 25, 1904. Serial No. 217,940.

*To all whom it may concern:*

Be it known that I, WILLIAM J. MCCARROLL, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Reversing-Gears, of which the following is a specification.

My invention relates to improvements in reversing-engines, and is adapted more particularly for operating the link of a link-motion reversing-engine, although I do not desire to confine myself to this application of the apparatus, as it may with suitable modifications be used to operate a steering-gear for vessels or any device requiring a reverse motion.

In the accompanying drawings, forming part of this specification, and in which similar numerals of reference indicate similar parts throughout the several views, Figure 1 is a side elevation of my reversing-engine and screw driven thereby; Fig. 2, a front elevation, partly in section, of Fig. 1; Fig. 3, a side elevation, partly in section, of the pointer, the arm 51, with arc 53, the throttle-valve lever, &c.; Fig. 4, a side elevation of a link, reach-rod, and connection between these parts.

1 2 3 4, Figs. 1 and 2, are the cylinders of a four-cylinder engine, the cylinders being arranged in opposed pairs, one pair being at right angles to the other.

46, Fig. 2, is a stem driven by the pistons of the cylinders 1 2 3 4, which carries a worm 47, which gears with a worm-wheel 48, which is threaded through the center to receive a screw 49, which is connected, if the gear is to be used in a locomotive, with the reach-rod 50, which is connected with the reversing-link in the usual manner. A revolution of the stem 46 will cause the worm 47 to drive the worm-wheel 48, which will cause the screw 49 to travel in or out as the stem is driven forward or backward.

51 is an arm pivotally supported at 52, the upper end of which carries an arc 53, which is graduated, as shown. The lower end of the arm 51 is secured by a link 54 to an arm 55, rigidly connected to screw 49. 56 57 are stops carried by arc 53, which are adapted to en-

gage the operating-lever 35, as presently described. For purposes of adjustment the stops 56 57 are preferably eccentric in form, so that they may be set to engage the operating-lever sooner or later, as may be desired.

58 is a pointer rigidly carried by the pivot 52, which carries arm 51, for instance, which indicates in connection with the graduations on the arc 53 the position of the screw 49, and hence the position of the reversing-link.

In the drawings the apparatus is shown set in a neutral position—that is, supposing it to be connected to a link-motion, the link 59, Fig. 4, is set so that the locomotive-engine valve is closed off.

If it be desired to set the link for a forward movement, the lever 35 is pulled over toward "F" on the arc 53, or toward the right. This opens valve 26 and causes the pistons 5 6 to revolve the rod 46, which through worm 47 will drive worm-wheel 48, which will drive the screw 49 to the right, lifting the link and causing a forward movement of the locomotive. By reversing the lever 35 a reverse motion of the several parts takes place and the link is dropped, causing a reversal of the locomotive-engine valve-gears and of the engine.

The operating-lever 35 may be thrown and held by hand until the indicator or pointer 58 and the graduations on arc 53 show the locomotive-link to be in any desired position, when the lever 35 is thrown by hand to its vertical position, closing off the valve 26 and stopping the movement of the pistons 5 6 and parts actuated by them. If, however, a full movement forward or backward of the locomotive is desired, the lever 35 is thrown completely over, causing the pin 37 to engage one of the notches 44 45 in the stop 39. This will cause the slide-valve 26 to be held open and the reversing-engine to operate until the screw 49 has been almost completely drawn to one side or the other by the interiorly-threaded worm-wheel 48 and the locomotive-engine link completely raised or completely lowered. When this has been done, the arm 51 has been so far rocked that one of the stops 56 57, Figs. 1 and 2, will strike against the operating-lever 35.



The jar caused by this engagement will throw the pin 37 out of the notch 44 45 that it is in engagement with and the spring 41 forcing the stop 39 down, when the incline 42 or 43  
 5 will guide the pin 37 back to its vertical position and cause its lower end to move the slide-valve 26 to close off the supply of actuating fluid to the cylinders 1 2 3 4.

I desire to lay particular stress upon the  
 10 screw 49, the interiorly-threaded worm-wheel 48, and the worm 47, all of which insure a locking device which cannot be rattled loose when the reversing-link is set at any position.

It may sometimes be necessary to operate  
 15 the device by hand. To provide for this, I may place upon the stem 46 a hand wheel or crank 60, by means of which this stem and the worm 47 may be turned, or the stem 46 may carry a bevel-gear 61, Fig. 2, which would  
 20 gear with a bevel-gear 62, the shaft of which would be driven by a crank 63 in order to rotate the stem. The crank 63 would be so placed as to be operated from the cab of a locomotive, and as it would only be used in  
 25 the absence of a sufficient pressure of the actuating fluid to drive the motor which is connected to the stem 46 it is made detachable from the shaft of the gear 62.

In this application I have confined my claims

to the valve-gear link mechanism. The reversing-engine for operating this mechanism will form the subject of a separate application.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a reversing-gear, in combination, a reversing-engine, a stem driven by said engine, a worm on said stem, an internally-threaded worm-wheel driven by said worm, a screw passing through and driven by said worm-wheel adapted to be connected to a link, a pivoted arm carrying at one end a graduated arc and at the other connected to said screw, and stops carried by said arm adapted to engage and close the throttle-valve of said reversing-engine at a predetermined position of said screw. 35 40 45

2. The combination with a reversing-engine, a link-motion, and means operated by said engine for raising or lowering the link, of a pivoted arm carrying at one end a graduated scale and being at the other end attached to the link-operating means, and a stationary pointer for indicating in connection with said scale the position of said link. 50

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Witnesses:

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