

(No Model.)

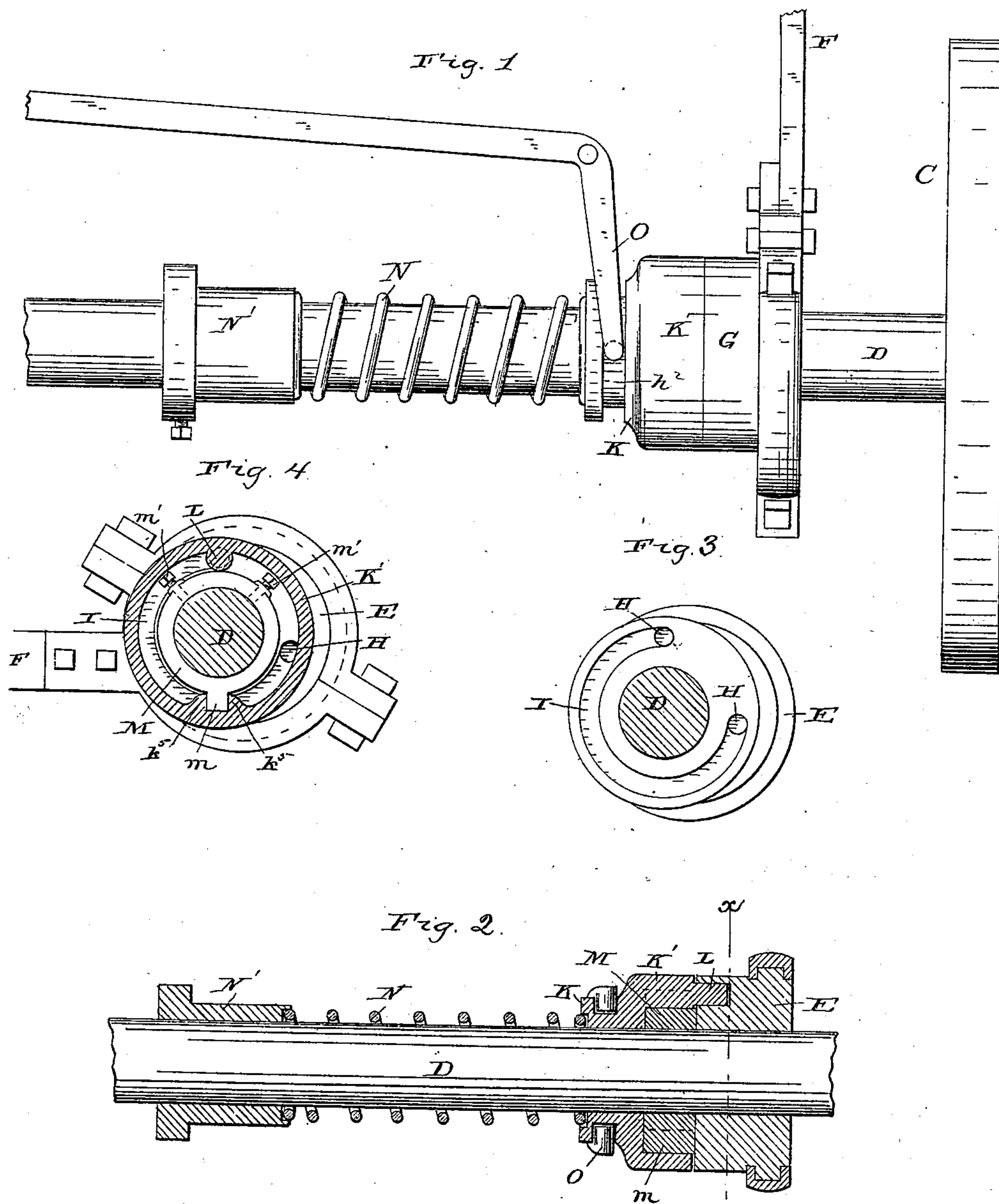
2 Sheets—Sheet 1.

W. A. CLARKE.

REVERSING GEAR FOR STEAM ENGINES.

No. 272,648.

Patented Feb. 20, 1883.



Witnesses:

W. A. Low -
J. S. Barker.

Inventor:

Millard A. Clarke
by Doubleday & Bliss

atty.

(No Model.)

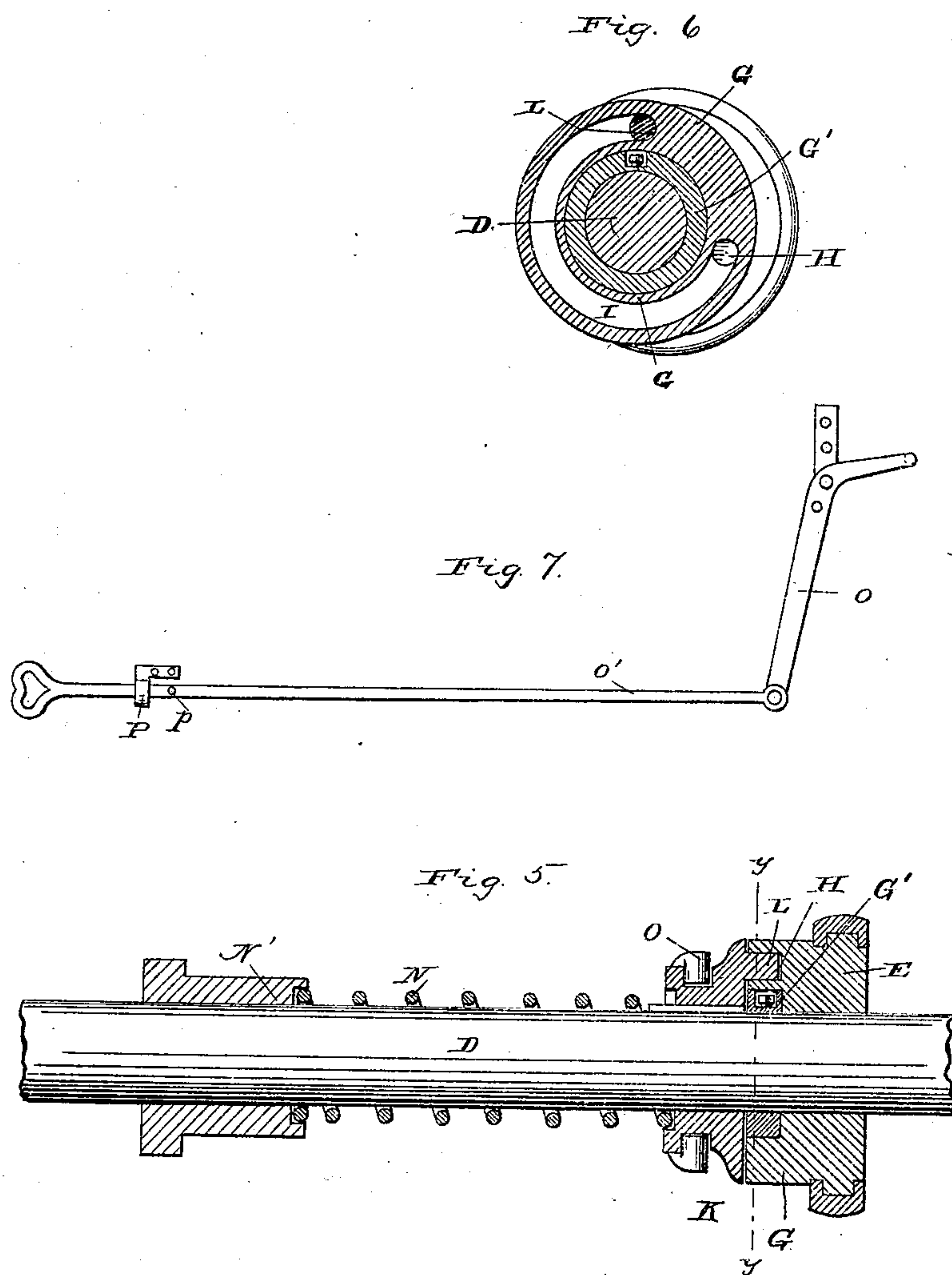
2 Sheets—Sheet 2.

W. A. CLARKE.

REVERSING GEAR FOR STEAM ENGINES.

No. 272,648.

Patented Feb. 20, 1883.



witnesses:

H. M. Loe
J. S. Barker

Inventor,

Millard A. Clarke
by Doubleday & Bliss

UNITED STATES PATENT OFFICE.

WILLARD A. CLARKE, OF STILLWATER, MINNESOTA.

REVERSING-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 272,648, dated February 20, 1883.

Application filed January 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLARD A. CLARKE, a citizen of the United States, residing at Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful Improvements in Reversing-Gear for Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a top plan view of a sufficient portion of an engine to illustrate the method of applying my invention thereto. Fig. 2 is a sectional view of the clutch mechanism, the shaft being shown in side elevation. Fig. 3 is a face view of the eccentric and governor fully detached. Fig. 4 is a transverse section on the line *xx*, Fig. 2. Fig. 5 is a longitudinal section of a slightly-modified form. Fig. 6 is a transverse section on the line *yy*, Fig. 5; and Fig. 7 is a view of the shifting-lever.

The invention relates to improvements in the device for reversing an engine or reversing the direction of the main engine-shaft.

It relates more especially to improvements in reversing-gear of the class having sockets in the face of the eccentric, or in the face of a hub or collar carried by the eccentric, with which sockets alternately a pin engages, the pin being connected with the shaft by means of a sliding collar which carries it, and which is connected to said shaft.

Heretofore it has been customary to have the face of the eccentric in which are made the sockets for receiving the pin smooth, except at the point where the said sockets are sunk; or where a projecting hub, collar, or pulley has been formed or attached to the eccentric to receive these sockets the face of said hub or collar has been made smooth.

Much difficulty is experienced in practice in using a device of the character last described, from the fact that repeated trials are often necessary before an engagement is effected when reversing. This difficulty I have succeeded in overcoming in the manner which will be hereinafter set forth. Again, it has been customary in making reversing-gear of the character to which this invention appertains to form an enlarged socket in the fixed collar and place therein a pin and coiled spring for the purpose of operating the pin. This, also, has

been a matter of much trouble, as the spring is situated eccentrically relatively to the main shaft, and therefore the sliding collar (which also must be moved by the spring) has not been affected as advantageously as is desirable and necessary. Another part of the present invention relates to the overcoming of this difficulty.

The devices to be specifically described may be combined with an engine of any preferred kind.

As shown, there is a crank-wheel, C, upon the main engine-shaft D.

E is the eccentric mounted on the main engine-shaft and related to the valve in any suitable way, and connected therewith by the rod F. The eccentric is loose upon the shaft, and with it is formed, or to it is attached, the governor-pulley G. In this part G are formed sockets, recesses, or thimbles H, which are adapted to receive and engage with a pin, to be described. The sockets are equidistant from the shaft and a suitable number of degrees apart.

I represents a groove or slot cut in the face of the pulley concentric with the shaft, and extending from one of the sockets H to the other. Preferably this slot is about three-quarters of an inch wide and half an inch deep. Instead of forming these in the governor-pulley, they may be formed directly in the face of the eccentric itself, or in the face of a hub, collar, or plate carried by the eccentric. Immediately adjacent to this governor-pulley, flange, hub, or collar G there is arranged a sliding cup-shaped part, consisting of a collar or hub portion, K, and a flange part, K'. It carries a pin, L, which is rigid relatively to the hub or collar, and projects from it toward the eccentric, to be adapted to engage with one or the other of the sockets or recesses H. The sliding part K K' is keyed to the shaft either by an ordinary spline or feather, as shown in Fig. 5, or by means of an expanded disk or hub, as at M, Figs. 2 and 3. In the latter case the part M is provided with a spline or feather, *m*, and with set-screws *m'*, by means of which it can be fastened in any proper position.

N represents a coiled spring around the shaft, one end of which bears against a fixed collar or equivalent device at N', the other end

bearing against the sliding part K K'. The spring constantly tends to force the part K K' toward the eccentric, and therefore to force the pin L into one or the other of the sockets H.

5 A spring of the character shown is much more effective and much surer in its operations than are those above alluded to, mounted eccentrically relatively to the shaft in a comparatively small socket in a fixed hub or collar, and arranged to bear against the connecting-pin. Especially is this the case when the pin has been connected with the sliding collar loosely, as has generally been the custom in mechanisms of this sort.

15 O represents a forked shipping-lever, the arms of which engage with the sliding part K K' by means of a groove, h^2 , therein. In an engine having a steam-dome above the boiler the lever O is bent, and is pivotally connected to a sliding hand-lever, O'. The latter is mounted in one or more bearings, as at P, and is provided with a pin or stop, p , so situated that when a pull is exerted upon the lever O' the sliding part K K' shall not be drawn too far away from the eccentric. The part K K' should not be drawn so far as to withdraw the end of the pin from the groove or slot I, and therefore said groove can be utilized to insure that the pin shall instantly engage with the next socket or recess.

30 In operation, when it is desired to reverse the engine by means of the mechanism described, it is done by pulling upon the lever O', which, through the shipping-lever, draws the pin out from the socket H with which it is engaged, and after it is withdrawn the eccentric is held stationary by the friction of the valve upon its seat, and the shaft, together with the sliding part K K' and its pin L, continue to revolve until the latter reaches the next socket, which it is caused to enter by reason of the tension of the spring N. This results in a reversing of the engine, as will be readily understood. The groove I overcomes the difficulty heretofore experienced with devices of this sort—namely, the failing of the pin to engage with the next socket at the proper time. When the groove is used it is practically impossible for the pin to pass beyond said socket. In the construction shown in Figs. 2 and 3 the part K' has preferably inwardly-projecting flanges or ribs h^5 , engaging with the rib m , these parts operating to hold the sliding part properly in position relatively to the shaft. As said above, these parts, how-

ever, may be dispensed with without departing entirely from my invention. Thus in Figs. 5 and 6 there is shown a sliding part, K K', engaging directly with the eccentric or governor-pulley, the latter being preferably provided with a groove or annular recess, in which is fitted a collar, e , to hold the eccentric in proper place on the shaft.

I prefer to form the sliding part K K' and connect it to the shaft as shown in Figs. 2 and 3. This arrangement makes a more comely appearance, covers up entirely the screws m' , which are otherwise liable to catch the governor-belt should it run off its pulley, and also shortens the parts, which is a great advantage. It is also preferable to a connection by feather or key, which it is necessary to fit and adjust with great nicety in order to set the valve in its proper position.

I do not claim any of the features which I have shown and described except those specifically set forth in the following claims, reserving the right to claim other patentable matters to which I may be entitled in another application heretofore filed, of which this is a division.

What I claim is—

1. The combination of the following elements: the engine-shaft, the eccentric loose thereon, the sockets or recesses carried by the eccentric, the groove between the sockets or recesses, the sliding pin or projection, and means for preventing said pin or projection from escaping from the groove when it is withdrawn from the sockets or recesses, substantially as set forth.

2. The combination, with the eccentric provided with sockets or means for engaging with a pin, of a sliding part having the flange K' and the pin, and means within said flange for holding the part upon the shaft, substantially as set forth.

3. The combination, with the eccentric provided with sockets or means for engaging with a pin, of the sliding cup-shaped part having the flange K', provided with a guide upon its inner side, the adjustable ring or disk secured to the shaft within the flange, and provided with a tongue fitted in the way or guide upon the flange K', substantially as set forth.

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

WILLARD A. CLARKE.

Witnesses:

R. A. FOYLE,
POWELL MACY.