

No. 730,683.

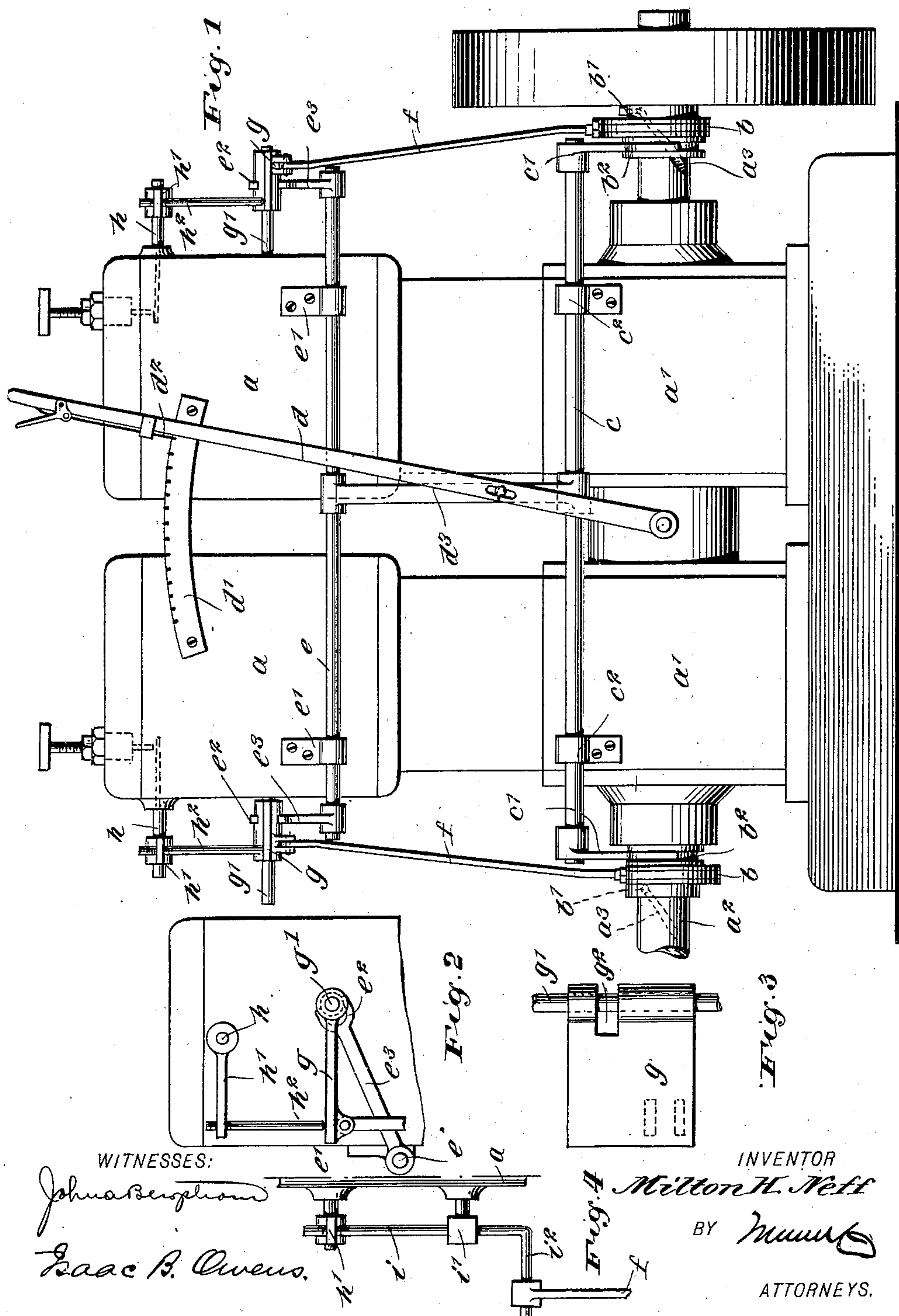
PATENTED JUNE 9, 1903.

M. H. NEFF.  
GAS ENGINE REVERSING GEAR.

APPLICATION FILED OCT. 7, 1902.

NO MODEL.

2 SHEETS--SHEET 1.



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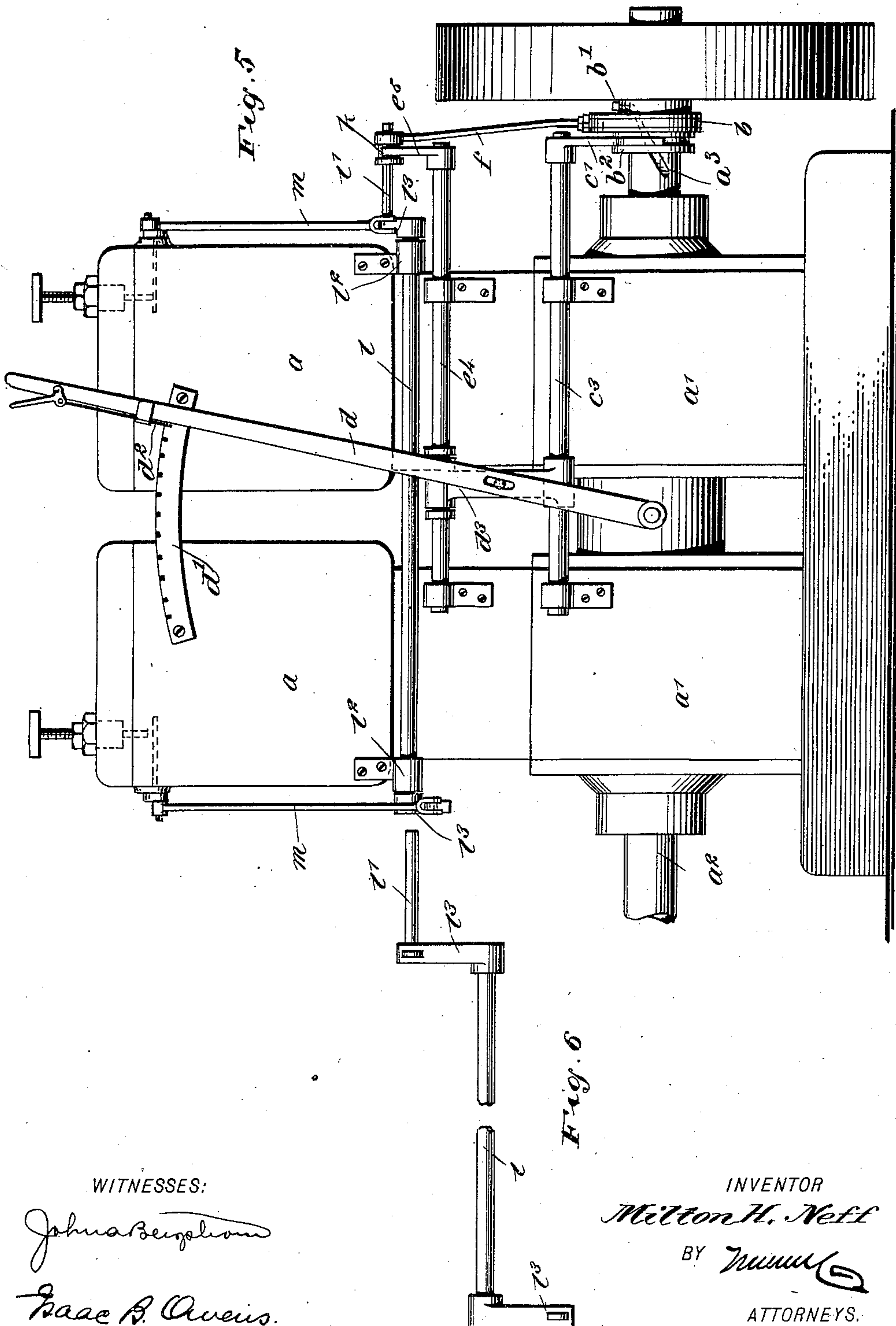
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

MILTON H. NEFF, OF WATERTOWN, NEW YORK.

## GAS-ENGINE REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 730,683, dated June 9, 1903.

Application filed October 7, 1902. Serial No. 126,310. (No model.)

*To all whom it may concern:*

Be it known that I, MILTON H. NEFF, a citizen of the United States, and a resident of Watertown, in the county of Jefferson and State of New York, have invented a new and Improved Gas-Engine Reversing-Gear, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in reversing-gears in which the igniter, being actuated by an eccentric on the engine-shaft, is moved so that its position on the shaft is changed, thus changing the moment of action of the igniter so as to "catch the engine on the turn," and thus reverse its movement.

The invention resides in certain peculiar features of construction and arrangement of parts adapted to a reversing-gear of this class, all of which will be fully described hereinafter.

This specification is an exact description of several forms of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side view of a double-cylinder engine to which my invention is shown as applied. Fig. 2 is an end view showing the parts adjacent to the igniter. Fig. 3 is a plan view of the swinging flattened arm. Fig. 4 is a view of a modified form of the invention. Fig. 5 is a view of a second modification in which only one eccentric is employed, and Fig. 6 is a view of the igniter-operating rock-shaft used with the construction shown in Fig. 5.

$a$  indicates the two engine-cylinders,  $a'$  the crank-cases, and  $a^2$  the engine-shaft, in each end of which is formed a diagonal slot  $a^3$ . Eccentrics  $b$  are mounted, respectively, on the ends of the shaft and have pins  $b'$ , which run in the said diagonal slots  $a^3$ . These eccentrics turn with the shaft and are capable of being moved spirally around the shaft, following the form of the grooves  $a^3$ , thus shifting the relation of the eccentric to the shaft in a manner which will be fully understood from the prior art. Connected to each eccentric is a grooved collar  $b^2$ , and with these

collars forks  $c'$  are loosely engaged. Said forks are fastened on a shaft  $c$ , which is mounted in bearings  $c^2$  and slides in parallelism with the engine-shaft  $a^2$ .

$d$  indicates a hand-lever fulcrumed on the engine-frame and working with a quadrant  $d'$  and pawl  $d^2$ , as shown. This lever  $d$  is connected through the medium of a cross-head  $d^3$  with the shaft  $c$ , said cross-head being also connected with a sliding shaft  $e$ , mounted above the shaft  $c$  in boxes  $e'$  and arranged to slide longitudinally in parallelism with the engine-shaft. By the action of the lever  $d$  the shafts  $c$  and  $e$  are operated simultaneously and are thrown to one or the other side of the engine.

$f$  indicates the eccentric-rods, which are one for each eccentric and which extend upward to and have pivotal connection with the under side of a flattened rocker-arm  $g$ . These arms  $g$  are mounted to rock and also to slide on stub-shafts  $g'$ , projecting from the opposite sides of the engine, and each of said flattened arms is provided with a notch  $g^2$  at its hub, in which are fitted the forked ends  $e^2$  of arms  $e^3$ , fastened, respectively, to the ends of the shaft  $e$ . The sliding movement of the shaft  $e$  will, through the medium of the arms  $e^3$ , impart a like movement to the flattened rocker-arms  $g$ , and thus these arms will be shifted sidewise in unison with the shifting of the eccentrics.

$h$  indicates the shafts, which are rocked to operate the igniters, and said shafts have arms  $h'$  attached thereto, these arms carrying downwardly-projecting pins  $h^2$ , which bear on top of the flattened rocker-arms  $g$ . The parts  $h'$  and  $h^2$  are not adjustable in time with the eccentric; but the adjustment of the eccentric, carrying with it the adjustment of the flattened arms  $g$ , does not prevent the proper action of the eccentric on the rock-shafts  $h$ , owing to the flattened form of the arms  $g$ . The width of these arms is sufficient to keep them always engaged with the arms  $h^2$ , notwithstanding that said arms  $g$  may be shifted sidewise to the same extent that the eccentrics are moved.

In the operation of the invention the parts are adjusted as shown, and assuming that it be desired to reverse the engine the lever  $d$  is thrown so as to change the position of the ec-



centrics *b*. This causes a change in the movement of the arms *g*, and thus the operation of the eccentrics is delayed or accelerated, as may be the case, so as to reverse the movement of the engine, all of which will be fully understood from the prior art.

The modification shown in Fig. 4 consists in providing a sliding pin *i* in place of the pin *h*<sup>2</sup>, this pin *i* being mounted in the guide *i*<sup>1</sup>, attached to the engine-cylinder, and having a laterally and outwardly disposed end *i*<sup>2</sup>, taking the place of the swinging arm *g*. With this end *i*<sup>2</sup> the eccentric-rod *f* is slidably engaged, so that the lateral movement of the eccentric-rod, due to the change of position of the eccentric, does not affect the connection between the parts *f* and *i*. The shaft *e* may or may not be in connection with the aperture of the eccentric-rod *f*. It is preferred, however, to have a sliding connection between this rod *f* and said shaft *e*.

The modification shown in Fig. 5 involves the use of one eccentric merely. In Fig. 5, *a* indicates the engine-cylinders, and *a*<sup>2</sup> the engine-shaft, the same as in Fig. 1. *a*<sup>1</sup> indicates the crank-cases. The single eccentric *b* is mounted on the shaft *a*<sup>2</sup>, the same as in the other form of the invention, and the fork *c*<sup>1</sup> is connected to a sliding shaft *c*<sup>3</sup>, which takes the place of the shaft *c*. This shaft *c*<sup>3</sup> is connected, by the cross-head *d*<sup>3</sup>, with the handle-*d*, the same as before, and *e*<sup>4</sup> indicates a sliding shaft taking the place of the shaft *e*. Said shaft *e*<sup>4</sup> carries a crank *e*<sup>5</sup>, having a forked end engaged with a grooved sleeve *k*, to which is attached the eccentric-rod *f*. Said sleeve *k* slides on the wrist-pin *l*<sup>1</sup> of a rock-shaft *l*, mounted in bearings *l*<sup>2</sup>, attached suitably to the engine. Now it will be seen that by throwing the lever *d* to shift the eccentric through the action of the parts *d*<sup>3</sup>, *c*<sup>3</sup>, and *c*<sup>1</sup> the shaft *e*<sup>4</sup> will also be thrown to shift the sleeve *k* on the wrist-pin *l*<sup>1</sup>, and thus all of the parts *b*, *f*, and *k* are shifted in unison without disturbing the connection of the eccentric with the rock-shaft *l*. The shaft *l* has a crank *l*<sup>3</sup> at each end, one of these cranks being that to which the before-mentioned wrist-pin *l*<sup>1</sup> is attached. (See Fig. 6.) The cranks *l*<sup>3</sup> are respectively connected with the rods *m*, which extend upward and engage with the igniters in the usual or any desired manner.

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

1. The combination with an eccentric shiftable for the purpose specified, of a sliding member in connection with the eccentric to shift it, an eccentric-rod, means for transmitting the movement of the eccentric-rod, such means including a part shiftable in time with the eccentric, a second sliding member

in connection with said part, and means for moving the two sliding members in unison. 65

2. The combination of an eccentric shiftable for the purpose specified, means for transmitting the movement of the eccentric, said means including a part shiftable in unison with the eccentric, and means for shifting the eccentric and said shiftable part simultaneously and in unison. 70

3. The combination of an eccentric shiftable for the purpose specified, means for imparting the movement of the eccentric, said means including a part shiftable in time with the eccentric, two sliding shafts respectively having connection with the eccentric and said shiftable parts, and means for moving the shafts in unison. 80

4. The combination of an eccentric shiftable for the purpose specified, an eccentric-rod, a swinging arm having connection with the eccentric-rod and arranged to be shifted in unison with the eccentric, a member engaged by the arm to be operated therefrom, and means for shifting the eccentric and arm in unison. 85

5. The combination of an eccentric shiftable for the purpose specified, an eccentric-rod, a swinging arm having connection with the eccentric-rod and arranged to be shifted in unison with the eccentric, a member engaged by the arm to be operated therefrom, and means for shifting the eccentric and arm in unison, said arm being flattened transversely so that its shifting movement will not disengage it from the devices operated by the arm. 90

6. The combination of an eccentric shiftable for the purpose specified, an eccentric-rod, a flattened swinging and sliding arm with which the rod is connected, means engaged by the arm to be operated therefrom, a sliding shaft, an arm attached to the sliding shaft and having connection with the said flattened arm, means having connection with the eccentric to move it, and a manually-operative device connected with the sliding shaft and with the said means having connection with the eccentric, to operate said elements in unison. 100

7. The combination of an eccentric shiftable for the purpose specified, an eccentric-rod, a swinging and sliding arm connected to the eccentric-rod and flattened for the purpose specified, and means for shifting the eccentric and sliding the arm in unison. 115

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 120

MILTON H. NEFF.

Witnesses:

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EVERARD BOLTON MARSHALL.