

No. 665,460.

Patented Jan. 8, 1931.

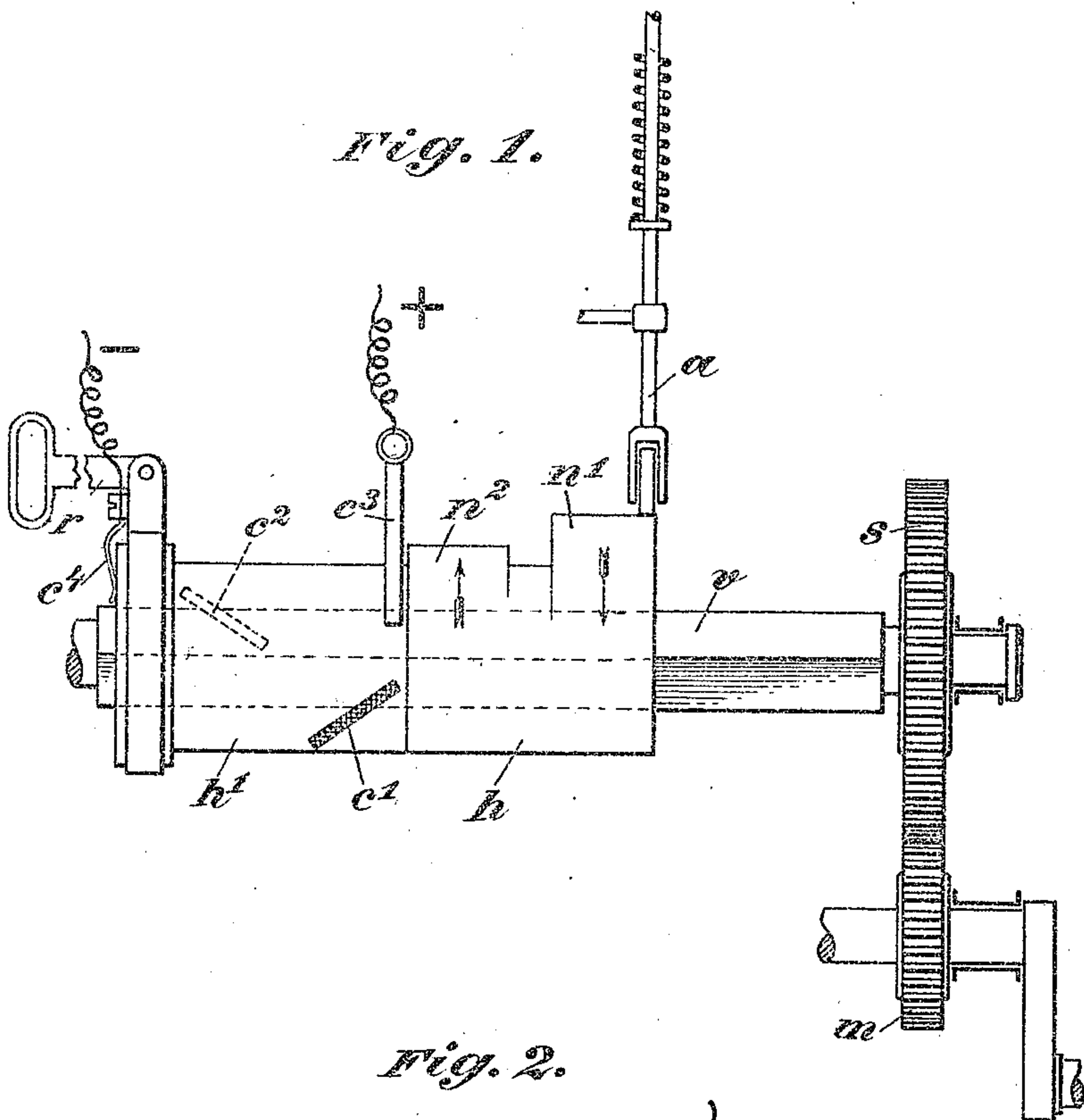
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## REVERSING GEAR FOR EXPLOSIVE ENGINES.

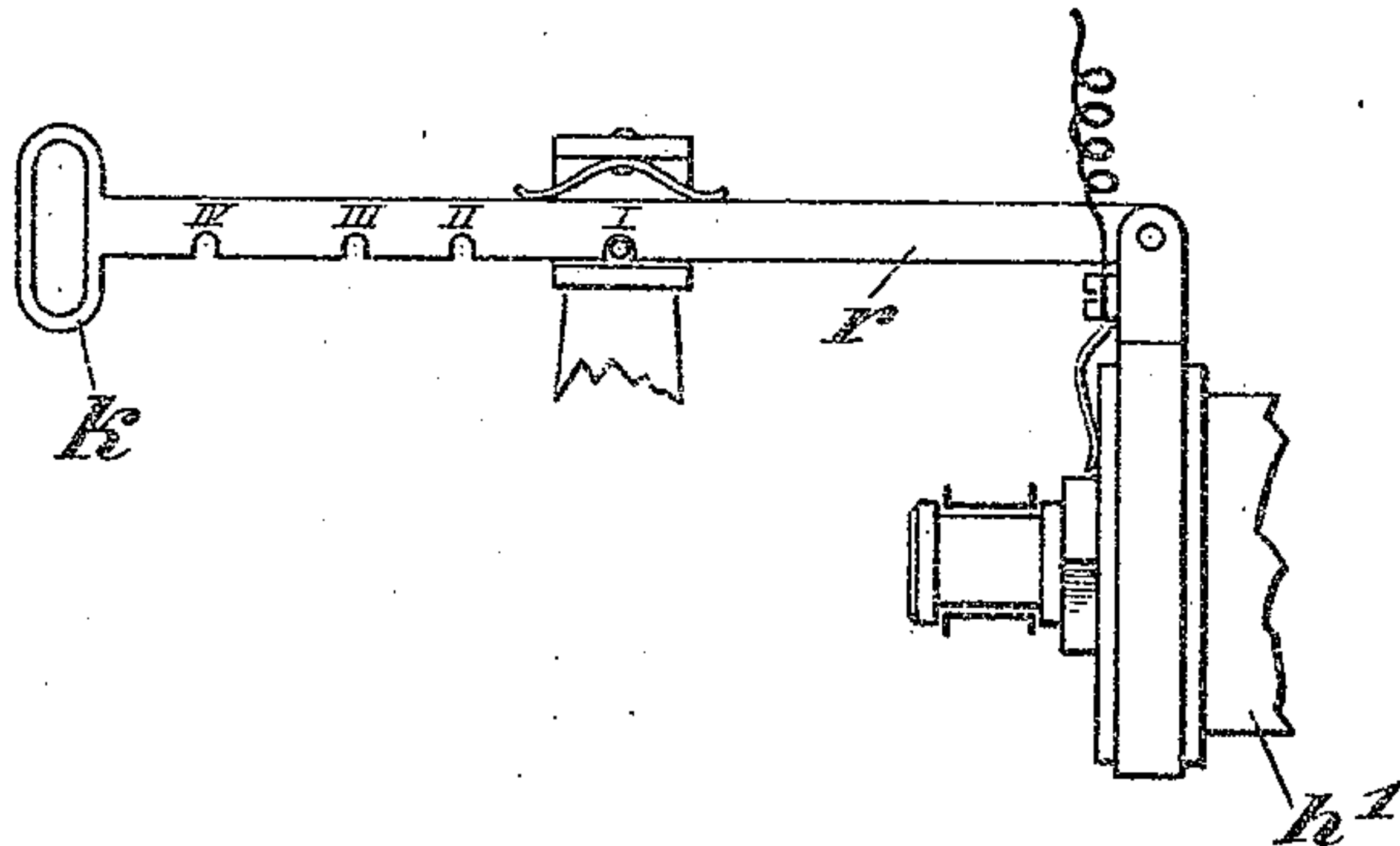
(Application filed Aug. 30, 1900.)

(No Model.)

*Fig. 1.*



*Fig. 2.*



Witnesses  
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# UNITED STATES PATENT OFFICE.

ROBERT RITTER VON PALLER, OF NUREMBERG, GERMANY.

## REVERSING-GEAR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 665,460, dated January 8, 1901.

Application filed August 30, 1900. Serial No. 28,592. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT RITTER VON PALLER, a subject of the Emperor of Austria-Hungary, residing at 5 Gellertstrasse, Nuremberg, in the German Empire, have invented certain new and useful Improvements in Reversing-Gear of Internal Combustion or Explosion Motors, of which the following is a full, clear, and exact description.

10 This invention relates to the reversing-gear of an internal combustion or explosion motor in which the ignition of the explosive mixture is effected by an electric spark or by means of electricity.

15 The reversing-gear to which this invention is especially applicable consists of the well-known device of a rotatable and longitudinally-movable sleeve furnished with two cams.

20 According to the present improvements the early or late ignition is effected by a device which is operated by the same lever or handle by means of which the motor is caused to move forward or backward.

25 The ignition device consists of two contacts arranged upon the double cam-sleeve and sloping in opposite directions relatively to the axis of the sleeve. During the rotation of the sleeve one or other of the sloping contacts comes against another contact and closes the circuit, thus effecting ignition.

30 The drawings herewith illustrate the improved devices.

35 Figure 1 illustrates the general arrangement of the devices in elevation. Fig. 2 is a similar view of the starting and reversing handle or lever.

40 The shaft *v* of the reversing-gear is driven from the main shaft by means of the pinion *m* and the wheel *s*, the pinion and wheel being respectively of the proportions one to two. The shaft *v* is square or non-circular in section, and upon it is mounted the sleeve *h h'*, the eye or bore of which is similarly shaped. The sleeve is thus free to slide along the shaft, but is at the same time bound to rotate with it.

45 *r* is a rod provided with a handle *k*, by means of which the sleeve may be moved to start or reverse the motor.

50 *n'* and *n''* are the two cams upon the sleeve,

either of which is adapted to come into gear with and operate the valve device *a*, according to the position of the handle *k*. This reversing device is well known.

55 These improvements consist in the electrical devices by means of which the time of ignition is altered to correspond with the positions of the cams and the direction of rotation. An extension *h'* of the sleeve *h* is formed with two contacts *c'* *c''*, either of which, according to the position of the sleeve, may come into contact with and complete an electrical circuit through a third contact *c'''*. Upon the position of the sleeve then will depend whether the motor moves backward or forward as one or other of the cams operates the valve-gear, and ignition will take place at the desired time, according to which contact, *c'* or *c''*, makes contact with *c'''*.

60 *c''* indicates the sliding or rubbing connection, by means of which the sleeve and its contacts are placed in the circuit.

65 By means of the handle *k*, the motion of which is transferred to the rod by any suitable means, the motor will move forward in the position II, and late ignition will take place, while early ignition will take place in position I. The motor will move backward with late ignition in position III and with early ignition in position IV.

70 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a reversing-gear for internal combustion or explosion motors, the combination 75 with a valve device and a stationary electric contact, of a rotatable shaft, a sleeve longitudinally movable thereon and provided with two cams, either one of which may be brought into engagement with the valve device by the longitudinal movement of the sleeve, two electric contacts on said sleeve, one or the other of which can be engaged with the stationary contact, and a rubbing-contact engaging permanently with said sleeve.

80 2. In a reversing-gear for internal combustion or explosion motors, the combination with a valve device and a stationary electric contact, of a rotatable shaft, a sleeve longitudinally movable thereon and provided with two cams, either one of which may be brought into engagement with the valve device by the 85 90 95 100

longitudinal movement of the sleeve, two electric contacts arranged obliquely on opposite sides of the sleeve, one or the other of which can be brought in line with the stationary contact upon the movement of the sleeve, and a rubbing-contact engaging permanently with said sleeve.

In witness whereof I subscribe my signature in presence of two witnesses.

ROBERT RITTER VON PALLER.

Witnesses:

OSCAR BOCK,

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