June 21, 1932. H. W. CRANE 1,863,922

MOTOR REVERSING SWITCH FOR DOOR OPENERS

Original Filed June 8, 1928 2 Sheets-Sheet 1

Fig. 1.

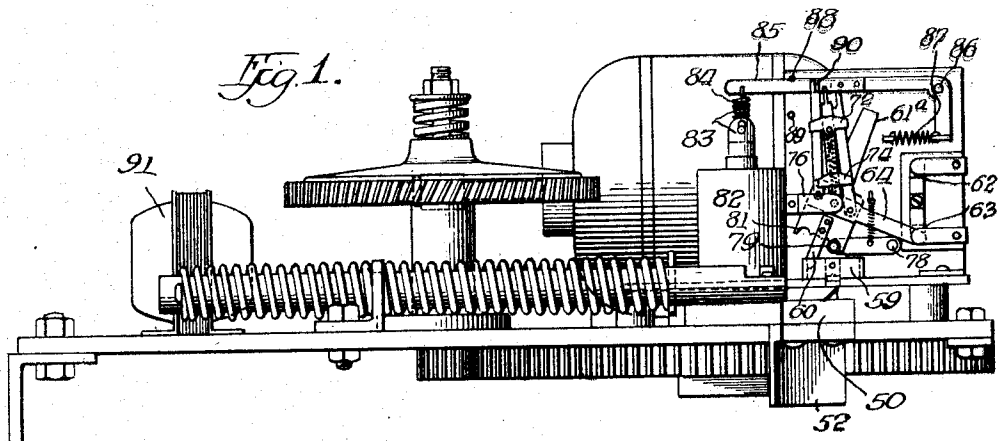
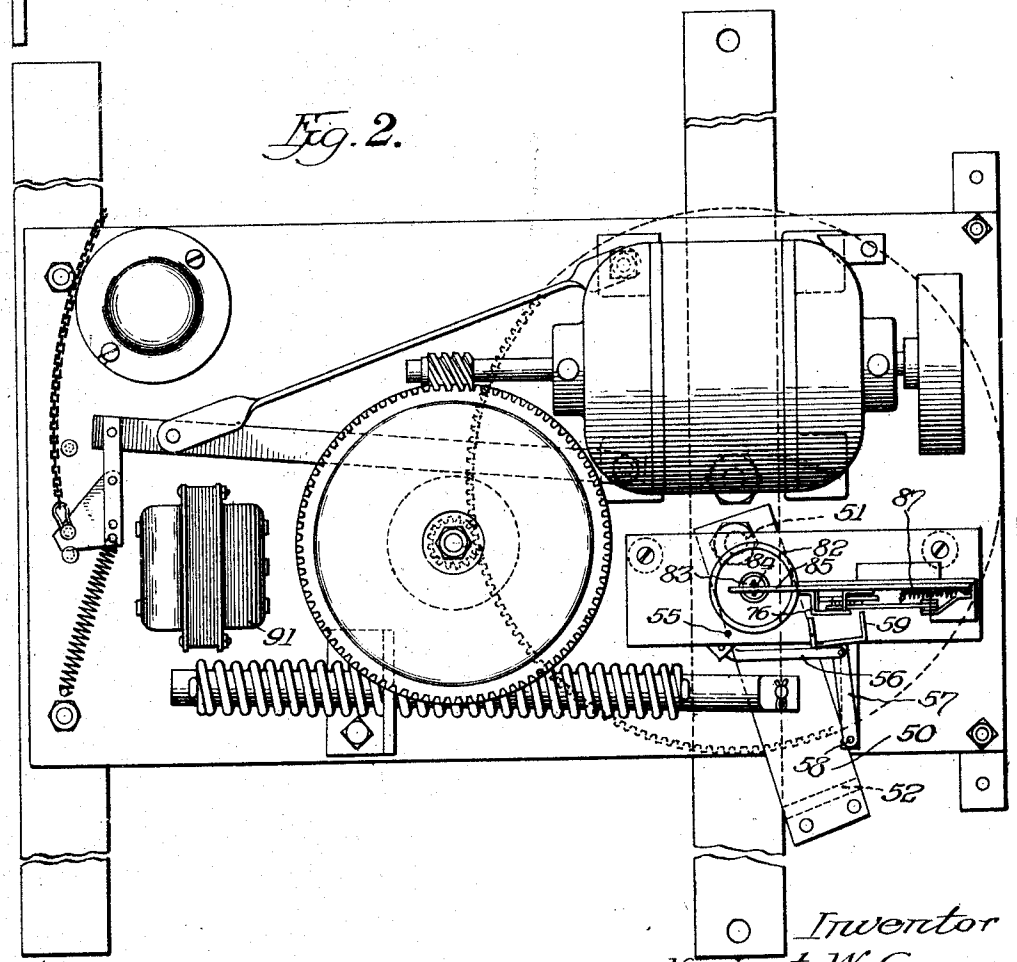


Fig. 2.



Witness:
R. C. Dorion

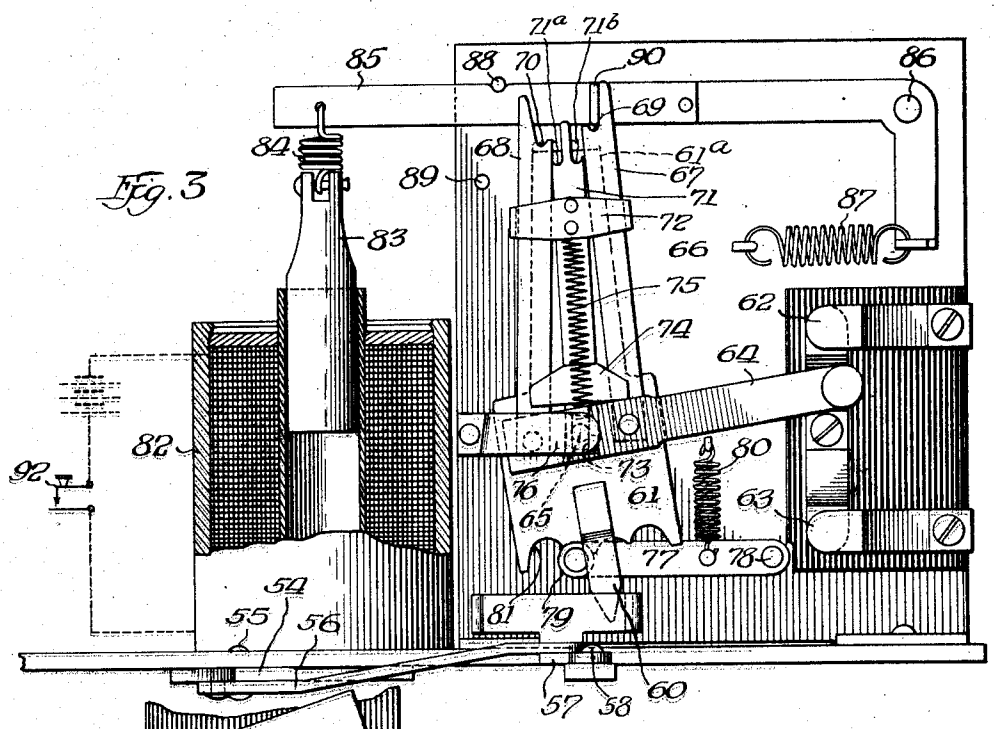
Inventor
Herbert W. Crane
By Murray & Murray Attys.

June 21, 1932. H. W. CRANE 1,863,922

MOTOR REVERSING SWITCH FOR DOOR OPENERS

Original Filed June 8, 1928 2 Sheets-Sheet 2

Fig. 3



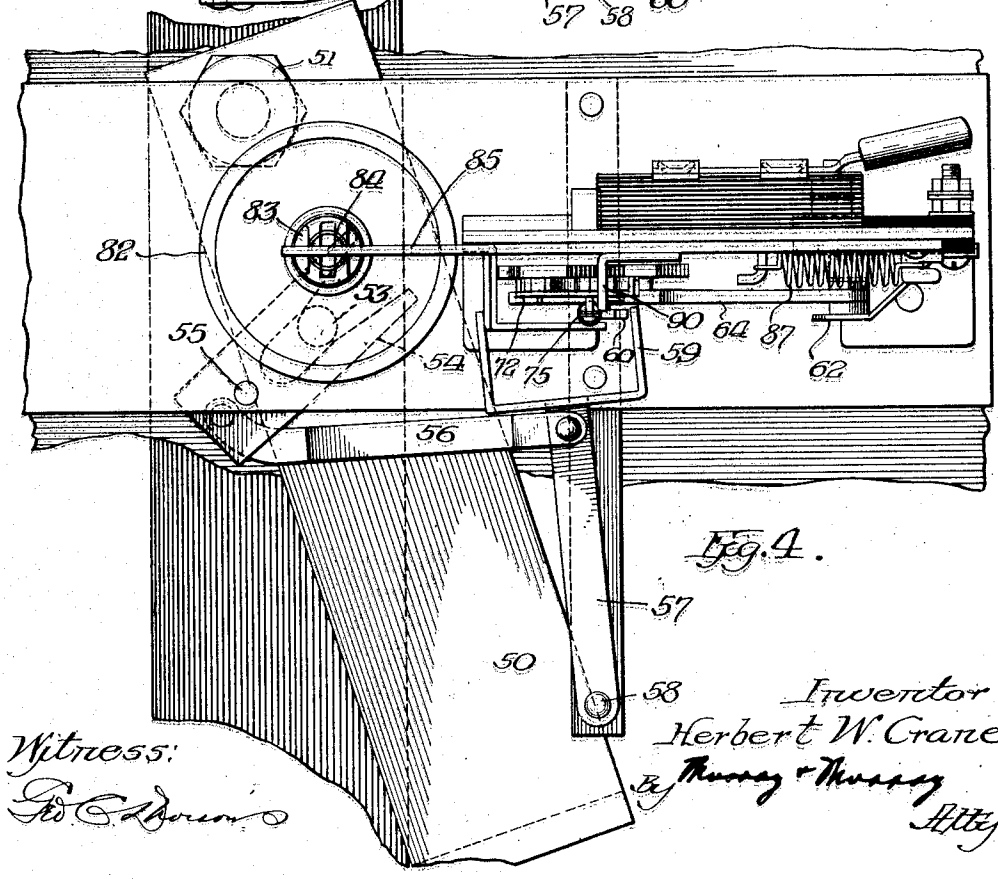


Fig. 4.

Witness:

Inventor
Herbert W. Crane
By Murray & Murray
Attys

Patented June 21, 1932 1,863,922

UNITED STATES PATENT OFFICE

HERBERT W. CRANE, OF OAK PARK, ILLINOIS

MOTOR REVERSING SWITCH FOR DOOR OPENERS

Application filed June 8, 1928, Serial No. 283,864. Renewed November 4, 1931.

My invention relates to devices for eletrically operating doors and particularly to a novel mechanism of extreme simplicity designed as an improvement on the construction of my prior Patent 1,290,718 of January 7, 1919.

An object of my invention is to provide, in connection with a reversing motor, simple mechanism adapted to effect the reversal of operation of the motor, together with means connected to the motor for actuating the doors with a minimum of complications.

The device will be more readily understood by reference to the accompanying drawings, in which—

Fig. 1 is a side view thereof;

Fig. 2 is a plan view;

Fig. 3 is an enlarged elevation of the reversing switch; and

Fig. 4 is a plan view thereof.

The motor switch which will now be described is actuated by an arm 50 when the doors reach their limits of movement; the actuation being through the instrumentality of a pin 53 fixed to the arm 50 that engages a yoke pivoted at 55 to a fixed abutment. A link 56 connects the opposite end of the yoke to a rocker arm 57 pivoted at 58 and having a yoke 59 at its free end. The two arms of the yoke are adapted to contact a projecting finger 60 from the switch operating rocker 61.

The switch includes two pair of contacts 62, 63 and a switch arm 64 adapted to oscillate between said pairs of contacts. The switch arm is rigid with the rocker 61 that is pivoted at 65 to a vertical plate 66.

Pivoted to the rocker on opposite sides of its pivot 65 are actuating fingers 67, 68 having notches 69, 70 in their upper ends. A central finger 71 carries a band 72 that surrounds the fingers 67, 68 and retains them in operative relation. This finger is provided with two notches 71—*a*—71—*b* on opposite sides of its upper end. The lower end of the finger 71 is provided with a slot 73 that passes over the pivot 65 of the rocker. A transverse projection 74 on the middle finger lies in the plate of the switch arm 64, the extremities of the projection on opposite sides of the center of oscillation of the switch arm being adapted to contact the switch arm on one or the other of its sides according to the position of the switch arm. A spring 75 extends between the band 72 and a fixed pin carried by the holding clip 76 and tends to move the middle finger downwardly. An arm 77 is pivoted at 78 to the plate 66 and carries a roller 79 on its free end. A spring 80 connected at one end to the plate 66 and at the other end to the arm tends to pull the roller 79 into one of the four notches 81 in the bottom edge of the rocker.

A solenoid 82 is mounted on the base, its core 83 being connected by a stiff coil spring 84 to an arm 85. The arm is pivoted at 86 to the plate 66 and a spring 87 tends to hold the arm in a position shown in Fig. 3. The arm oscillates between stops 88, 89 on plate 66 and carries a projection 90 positioned above the notches 69, 70, 71—*a*, 71—*b* in the fingers.

As the solenoid is intended to be operated by low voltage current a transformer is indicated at 91 in the drawings. A circuit closer is indicated at 92.

The operation is as follows:

Assuming the parts in the position shown in the drawings, upon actuation of the circuit closer 92 the solenoid core will be moved downward, thus oscillating the arm 85. The projection 90 of the arm in engagement with the notch 69 in the finger 67 will force said finger downwardly, thus moving the rocker 61 about its pivot and consequently moving the switch arm 64 into position to close the pair of contacts 63. Upon release of the solenoid core the arm 85 will return to its upward position and the projection 90 thereon will lie above the notch 71—*b* in the finger 71. At that point the projection 74 on the finger 71 will bear on the rear overhanging portion of the switch arm 64 and upon the next actuation of the solenoid and downward movement of the projection 90 will engage with the notch 71—*b* in the finger 71 and oscillate the switch arm to break the contact 63. However, the projection 61—*a* on the rocker will in its return to a vertical position contact with the projection 90 and

prevent any overthrow, the motion of the switch arm being merely sufficient to break contact with the pair of contacts 63. However, upon the return of the solenoid arm to its upward position, the middle finger 71 will be so far depressed that the projection 90 may pass over the top of the finger 71 in position to engage the notch 70 in the finger 68 in preparation for a reversal of the motor. The steps of reversing are identical with those already described. Thus it will be seen that the motor may be stopped, started and reversed by duplicate movements of the solenoid arm. The notches 81 in the bottom of the rocker serve merely to insure a snap motion of the parts.

When the switch is to be actuated automatically by the motion of the door, the yoke 59 will contact the projections 60 and throw the switch arm out of its contact engagement, in position ready for the next solenoid actuation which will effect a reversal of the motor.

While it is not so illustrated it will be understood that a suitable housing will be provided covering the entire mechanism above the base plate thereby avoiding the entrance of dust and moisture.

The extreme simplicity of the mechanism insures continuous and repeated operation through a long period and may be advantageously employed wherever a cheap and efficient door operating mechanism is required. Except for breakage of parts, misoperation is impossible.

Modifications in the form and arrangement may be made without departure from the spirit of my invention.

I claim:

1. A switch for reversing the motor of a door opener, consisting of two pairs of contacts, a contact arm adapted to oscillate between said pairs of contacts, a rocker to which said arm is fixed, three actuating fingers operatively connected to said rocker and arranged at right angles to said arm, two of said fingers being pivoted to the arm, one on each side of its center of oscillation, the third finger between said fingers, a projection on said third finger adapted to contact said arm alternately on opposite sides of its center of oscillation, and an actuating arm having a projection adapted to successively engage each of said three fingers.

2. A switch for reversing the motor of a door opener, comprising, in combination, two pairs of contacts, a contact arm adapted to oscillate between said pairs of contacts, a rocker to which said arm is fixed, rocker-actuating fingers pivoted to said arm one on each side of its center of oscillation, a third finger parallel to said fingers and between the same, a lateral projection on said third finger adapted to contact said arm alternately on opposite sides of its center of oscillation, and an actuating arm adapted by duplicate motions to successively contact and exert a thrust on each of said three fingers.

3. In combination, two pairs of contacts, a switch arm mounted for oscillation between said pairs of contacts, a rocker on which said arm is mounted, two fingers pivoted to said rocker, one on each side of its center of oscillation, said fingers having notches in their free ends, a third finger mounted between said first mentioned fingers and having a transverse projection parallel to the switch arm and adapted to alternately contact said switch arm on opposite sides of its center of oscillation, said third finger having a notch in its free end, an arm, and a solenoid for actuating the same, said arm being adapted in duplicate motions to successively contact notches in the free ends of the three fingers.

4. In combination, two pairs of contacts, a switch arm mounted for oscillation between said pairs of contacts, a rocker on which said arm is mounted, two fingers pivoted to said rocker, one on each side of its center of oscillation, said fingers having notches in their free ends, a third finger mounted between said first mentioned fingers and having a transverse projection parallel to the switch arm and adapted to alternately contact said switch arm on opposite sides of its center of oscillation, said third finger having a notch in its free end, an arm, a solenoid for actuating the same, said arm being adapted in duplicate motions to successively contact notches in the free ends of the three fingers, and means actuated by the motor-operated element for disconnecting the switch arm from either pair of contacts.

5. In combination, two pairs of contacts, a switch arm adapted to oscillate between said pairs of contacts, a pivoted rocker to which said arm is rigidly connected, fingers pivoted to said rockers one on either side of its center of oscillation and projecting at right angles to the switch arm, a third finger mounted for reciprocation relative to the pivot of the rocker and having a transverse member adapted to alternately contact said switch arm on opposite sides of its center of oscillation, the free ends of said three fingers being arranged in adjacent relation, a solenoid and arm operated thereby and means on said arm and said fingers adapting said arm by a duplicte motion to successively contact said three fingers and effect reciprocation thereof with consequent oscillation of said switch arm.

6. A switch for reversing the motor of a door opener, comprising, in combination, two pairs of contacts, a contact arm adapted to oscillate between said pairs of contacts, a rocker to which said arm is fixed, rocker-actuating fingers pivoted to said arm one on each side of its center of oscillation, a third finger parallel to said fingers and between the same, means associated with said third finger

adapted by a thrust of the finger to act on said arm to move the same out of engagement with either of said pairs of contacts, and an actuating arm adapted by duplicate motions to successively contact and exert a thrust on each of said three fingers.

7. In door opener mechanism, in combination, two pairs of electrical contacts, a switch arm adapted to move between and successively engage said pairs of contacts, means for pivoting said arm to a support, three thrust members associated with said arm, one at the pivotal center and one on each side of said pivotal center, means on the center thrust member for engaging said arm to move the same out of contact with either of said pair of contacts, an actuating arm having a fixed arc of movement and adapted to successively engage and exert a thrust on each of said three thrust members.

8. In door opener mechanism, in combination, two pairs of electrical contacts, a switch arm adapted to move between and successively engage said pairs of contacts, means for pivoting said arm to a support, three thrust members associated with said arm, one at the pivotal center and one on each side of said pivotal center, means on the center thrust member for engaging said arm to move the same out of contact with either of said pair of contacts, an actuating arm having a fixed arc of movement and adapted to successively engage and exert a thrust on each of said three thrust members, and additional means acting only to move said contact arm out of engagement with either pair of contacts when a limit of movement can be reached.

In testimony whereof I have affixed my signature.

HERBERT W. CRANE.