

July 12, 1927.

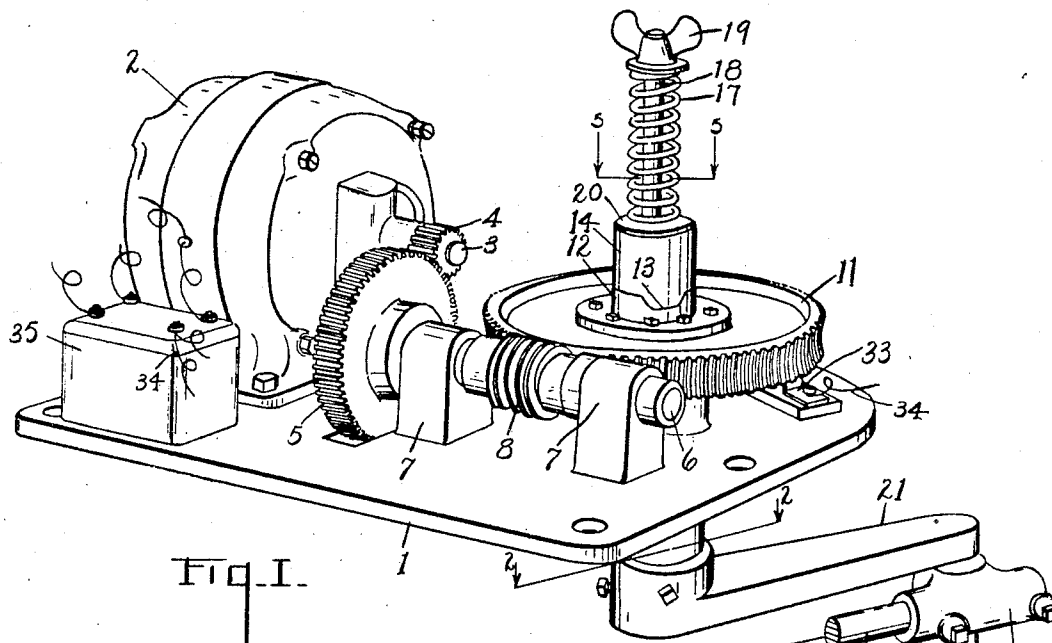
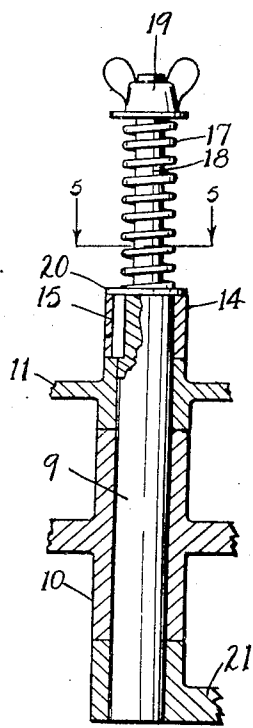
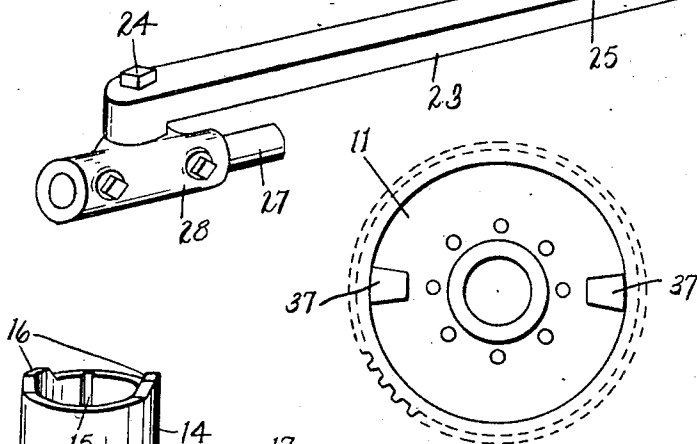
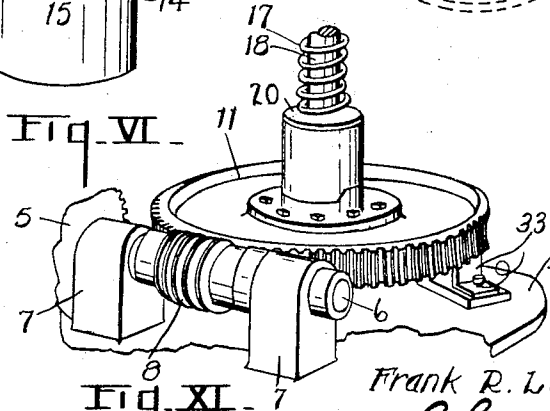
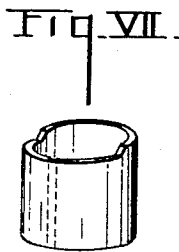
F. R. LEMON

1,635,758

DOOR OPERATING MECHANISM

Filed May 16, 1925

2 Sheets-Sheet 1



INVENTOR
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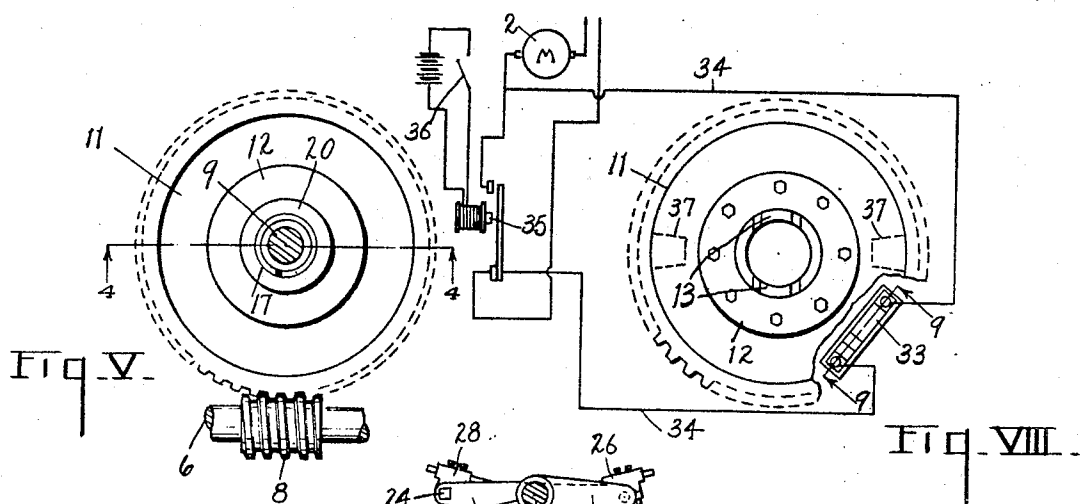
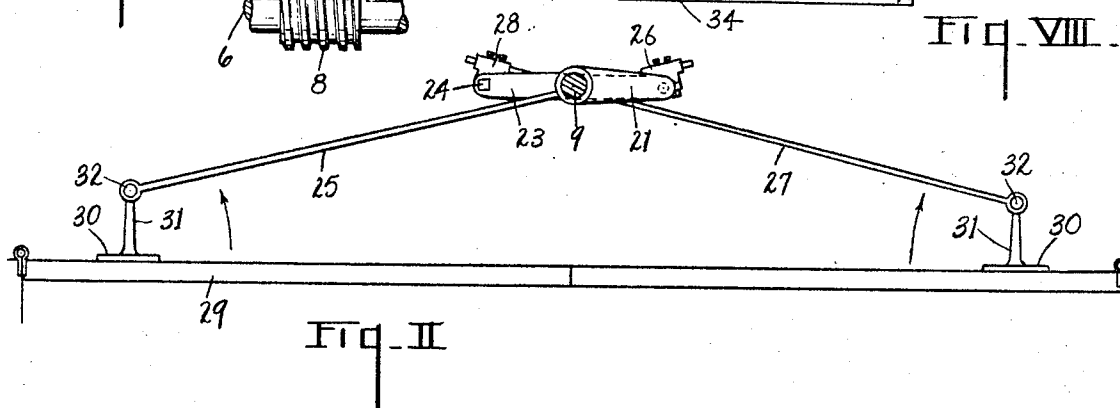
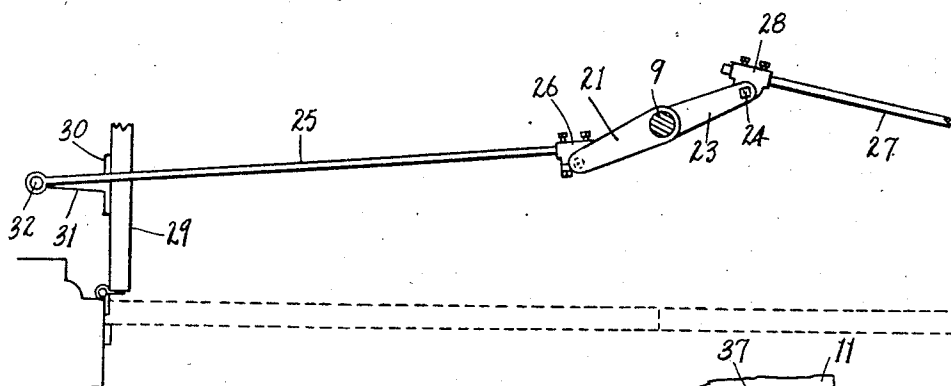
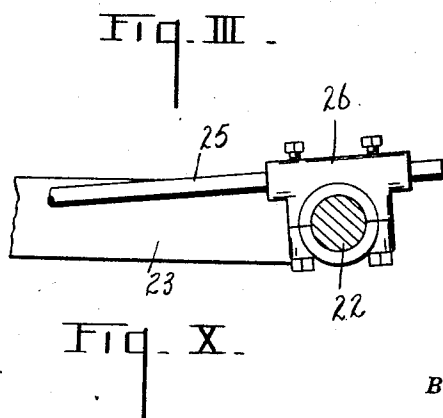
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DOOR OPERATING MECHANISM

Filed May 16, 1925

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

FRANK R. LEMON, OF VICKSBURG, MICHIGAN, ASSIGNOR OF ONE-THIRD TO HENRY B. CRAWFORD AND LULU LEMON CRAWFORD.

DOOR-OPERATING MECHANISM.

Application filed May 16, 1925. Serial No. 30,823.

This invention relates to improvements in door operating mechanisms.

The main object of this invention is to provide an improved door operating mechanism for garage doors and the like which is well adapted for the handling of heavy doors and is at the same time comparatively light and simple in structure.

A further object is to provide an improved door operating mechanism which is very economical in structure and durable in use.

Objects pertaining to details and economies of my invention will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I is a perspective view of my improved door operating mechanism, portions of the door connecting pitmen being omitted.

Fig. II is a horizontal section on a line corresponding to line 2-2 of Fig. I with the pitmen connected to the doors, the doors being conventionally illustrated.

Fig. III is a detail section corresponding to that of Fig. II, the doors being shown in closed position by dotted lines and one of the doors being shown in open position by full lines.

Fig. IV is an enlarged detail view partially in section on a line corresponding to line 4-4 of Fig. V.

Fig. V is a horizontal view partially in horizontal section on a line corresponding to line 5-5 of Fig. IV.

Fig. VI is an inverted perspective view of the driven clutch member for the crank shaft.

Fig. VII is an inverted view of the driven worm gear.

Fig. VIII is a diagrammatic view showing details of the motor control mechanism, the worm gearing being partially broken away.

Fig. IX is a detail section on a line corresponding to line 9-9 of Fig. VIII.

Fig. X is a detail section through one of the crank pins showing the manner of con-

necting the pitmen or door connecting links thereto.

Fig. XI is a fragmentary perspective view showing a modified form of clutch.

Fig. XII is a perspective view of the driven member of the clutch shown in Fig. XI.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts throughout the several views.

Referring to the drawing, I provide a base 1 preferably a casting, at one end of which the motor 2 is mounted. The shaft 3 of the motor is provided with a pinion 4 meshing with a gear 5 on the driving shaft 6. This driving shaft is supported in bearings 7 on the base plate 1.

The shaft has a driving worm 8 disposed between the bearings. The crank shaft 9 is disposed in the vertical bearing 10 of the base plate, the worm gear 11 being rotatably mounted on the shaft and resting upon the upper end of the bearing 10, see Fig. IV. This worm gear is in mesh with the driving worm 8.

On its upper side the gear 11 is provided with a driving clutch member 12 having a pair of recesses 13 therein, the ends of the recess being inclined as shown. The coacting driven clutch member 14 is splined at 15 to the upper end of the crank shaft and has lugs 16 coacting with the recesses 13.

The driven member is held yieldingly in engagement with the driving member of the clutch by means of the coiled spring 17 which is mounted on the supporting spindle 18 projecting from the upper end of the crank shaft 9 and carrying an adjusting nut 19. A washer 20 is arranged between the lower end of the spring and the clutch member 14.

On the lower end of the crank shaft is a double throw crank comprising an arm 21 secured to the shaft and carrying a pin 22 on the lower end of which is an arm 23 which is disposed parallel to the arm 21 and is of such length that the throws of the crank are equal. The connecting rod 25 is connected by the wrist pin coupling 26 to the pin 22 carried by the arm 21 while the connecting rod 27 is connected by the wrist pin coupling 28 to the pin 24 carried by the

crank arm 23. The pitman or link 25 is above the arm 23 while the link 27 is below the same so that the parts do not engage as the crank revolves.

5 The doors indicated at 29 are provided with coupling brackets 30 having arms 31 thereon to which the pitmen are connected by the pivots 32. With the parts thus connected the doors are opened and closed upon
10 a complete revolution of the crank.

I therefore provide means for stopping the motor with the doors opened and also when
15 in their closed position. This in the embodiment illustrated comprises a switch 33 which is connected by the circuits 34 to the electromagnetic control mechanism shown conventionally at 35 and to the motor. The starting switch, of which there may be any number desired, is indicated at 36.

20 By closing the switch 36 the electromagnetic control switch 35 is actuated to start the motor which continues until the stopping switch 33 is engaged by one of the lugs 37 on the under side of the gear 11
25 which breaks the circuit and stops the motor.

I have illustrated and described an embodiment or adaptation which I find very simple and practical. I have not attempted to illustrate certain modifications and adaptations which might be required for different
30 installations as it is believed the disclosure made will enable those skilled in the art to embody or adapt my improvements as may be desired.

35 Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a door operating mechanism, the combination of a base plate, a motor mounted thereon and provided with a shaft having a pinion, a driving shaft mounted on
40 said base plate and provided with a worm and with a gear meshing with said pinion of said motor shaft, a crank shaft disposed vertically through said base plate, a worm gear rotatably mounted on said crank shaft and meshing with said worm on said driving shaft, said worm gear having a driving clutch member on its upper side, a coacting
45 driven clutch member splined to said crank

shaft, a spring for yieldingly holding said driven clutch member in engagement with said driving clutch member, a double throw crank on the lower end of said crank shaft, door connecting pitmen on the throws of
55 said crank, a motor control means comprising a switch member mounted on said base plate below said worm gear, and a pair of switch actuating members on said worm gear disposed to stop the motor with the
60 crank arms in a predetermined position.

2. In a door operating mechanism, the combination of a base plate, a motor mounted thereon and provided with a shaft having a pinion, a driving shaft mounted on
65 said base plate and provided with a worm and with a gear meshing with said pinion of said motor shaft, a crank shaft disposed vertically through said base plate, a worm gear rotatably mounted on said crank shaft and meshing with said worm on said driving shaft, said worm gear having a driving clutch member on its upper side, a coacting driven clutch member splined to said crank
70 shaft, a spring for yieldingly holding said driven clutch member in engagement with said driving clutch member, a double throw crank on the lower end of said crank shaft, and door connecting pitmen on the throws of said crank.
75

3. In a door operating mechanism, the combination of a motor, a driving gear operatively connected to the motor, a crank shaft, a driven gear coacting with said driving gear and rotatably mounted on said crank
85 shaft, a driving clutch connecting said driven gear to said crank shaft, said clutch being adapted to yield when the load on the crank shaft exceeds a predetermined amount, a double throw crank on said crank shaft, door connecting pitmen on the throws of
90 said crank, a motor control means comprising a switch member, and a pair of switch actuating members on said driven gear disposed to stop the motor with the crank
95 arms in a predetermined position.

In witness whereof I have hereunto set my hand.

FRANK R. LEMON.