

March 6, 1951

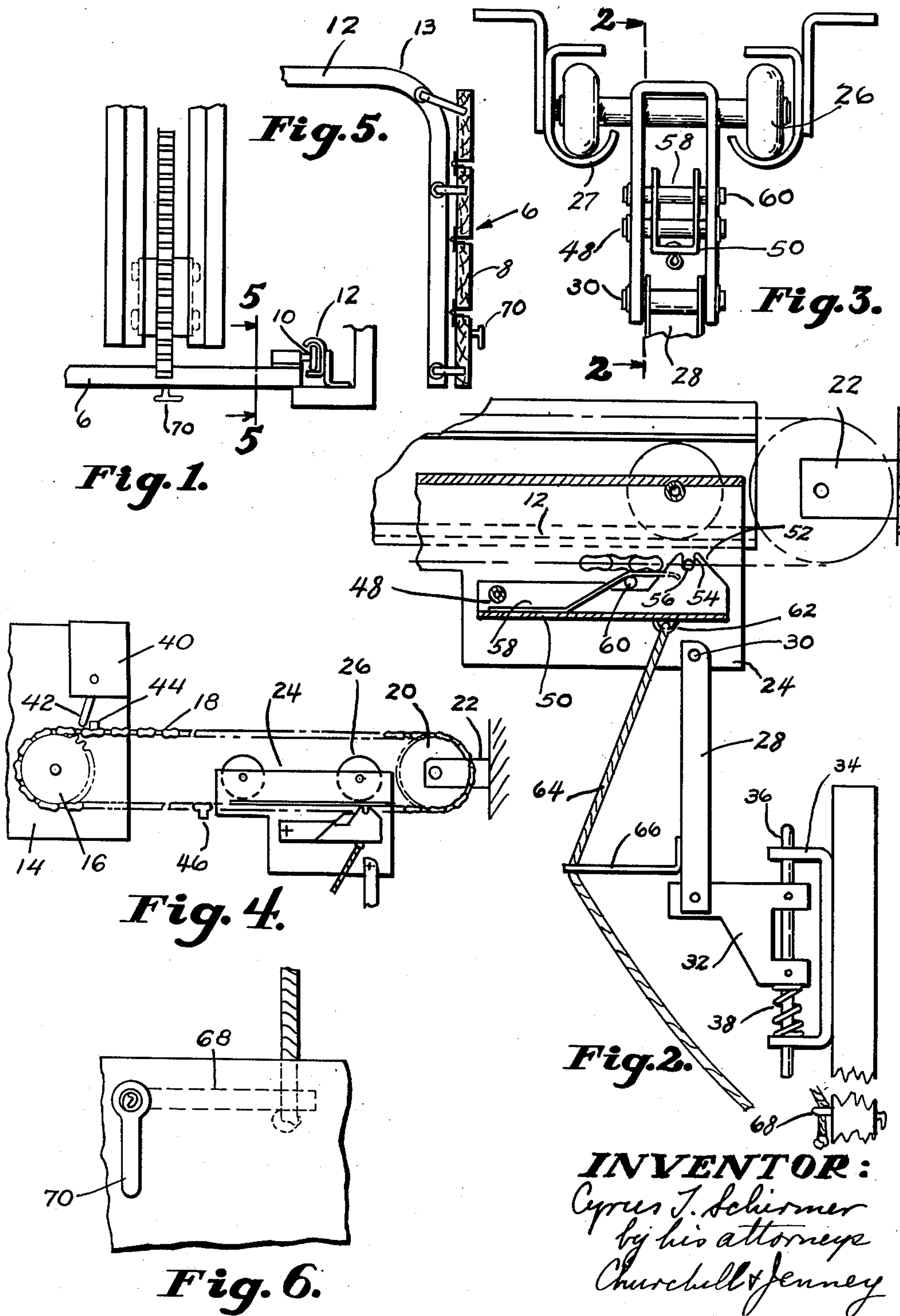
C. T. SCHIRMER

2,544,239

GARAGE DOOR OPERATING DEVICE

Filed Aug. 27, 1945

2 Sheets-Sheet 1



INVENTOR:
Cyrus T. Schirmer
by his attorneys
Churchill & Jenney

March 6, 1951

C. T. SCHIRMER

2,544,239

GARAGE DOOR OPERATING DEVICE

Filed Aug. 27, 1945

2 Sheets-Sheet 2

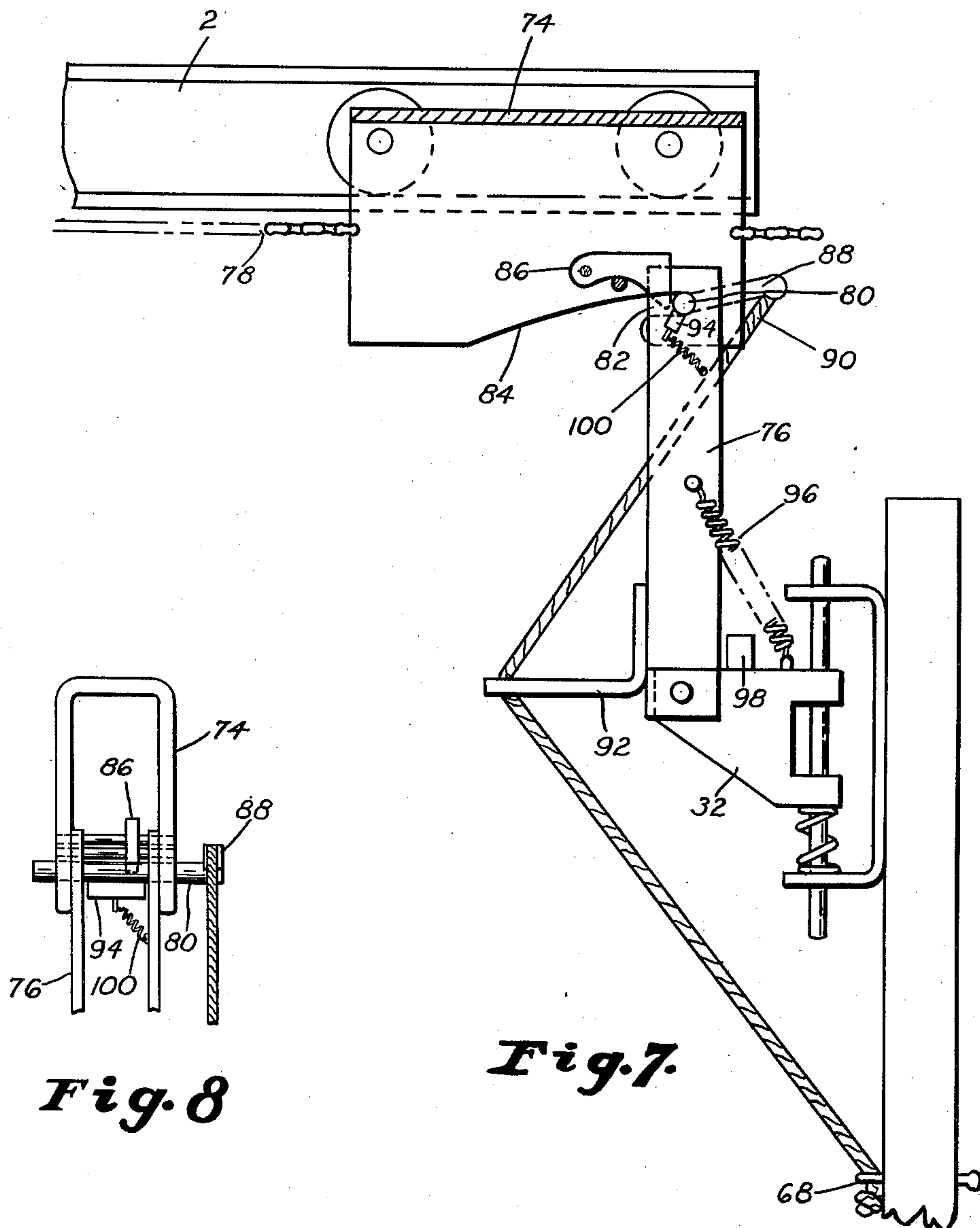


Fig. 8

Fig. 7

INVENTOR:
Cyrus T. Schirmer
by his attorneys
Churchill & Jenney

UNITED STATES PATENT OFFICE

2,544,239

GARAGE DOOR OPERATING DEVICE

Cyrus T. Schirmer, Wayland, Mass., assignor, by
mesne assignments, to National Pneumatic Co.,
Inc., a corporation of Delaware

Application August 27, 1945, Serial No. 612,921

17 Claims. (Cl. 268—58)

1

The present invention relates to garage door operating devices, and more particularly to means used in connection with power operating mechanism, to permit manual opening and closing of the door if the power mechanism becomes disabled.

The principal object of the present invention is therefore to provide means for placing the door under manual control, while preserving adequate security under all conditions.

In the accompanying drawings Fig. 1 is a plan view of a garage with a power driven overhead type door; Fig. 2 is a detail sectional elevation of the door operating mechanism on line 2—2 of Fig. 3; Fig. 3 is an end elevation of the carriage shown in Fig. 2; Fig. 4 is a diagram illustrating the chain connections for operating the door; Fig. 5 is a diagrammatic sectional elevation on line 5—5 of Fig. 1, showing the jointed door and tracks therefor; Fig. 6 is a detail view of a part of the release mechanism; Fig. 7 is an elevation of a modified form of mechanism, and Fig. 8 is an end view of the carriage.

The invention is applied to power operated garage door mechanism which may be of conventional type and which will first be briefly described. As shown in Figs. 1 and 5 the door 6 of the overhead type consists of a number of horizontal hinged sections 8. The door is provided with rollers 10 riding in tracks 12 at the sides of the door, the tracks being curved as indicated at 13 to permit the door being opened in overhead position. The power operating mechanism is preferably arranged centrally of the door and comprises a motor enclosed in the casing 14 which is preferably suspended from the garage ceiling at point in the rear of the door. The motor drives a sprocket 16 through a suitable clutch and reduction gearing. A chain 18 rides between the sprocket 16 and a sprocket 20 mounted in a bracket 22 at the front of the garage above the door. A carriage 24 having wheels 26 rides on tracks 27. The carriage is connected to the door by means of a link 28 pivoted at 30 to the carriage at its lower end to a bracket 32 which is connected with the upper section of the door. As shown in Fig. 2, this connection comprises a U bracket 34 secured to the door and carrying a sliding rod 36 to which the bracket 32 is secured. A spring 38 between one arm of the U bracket 34 and the bottom of the bracket 32 provides a yielding connection to allow for proper closure of the door against the sill at the limit of the closing movement. As shown in Fig. 2, the link 28 is in vertical position when

2

the door is closed and it is, therefore, impossible to open the door by lifting it manually. This means affords security against access by unauthorized persons. When the door is to be opened by the power mechanism the carriage is drawn to the left, thereby first rocking the link 28 about the pivot 32 and then drawing it in a general horizontal direction to pull the door up into its overhead or open position. A limit switch 40 having a movable arm 42 engaged by dogs 44 and 46 on the chain determines the limits of movement of the door.

The parts thus far described are of standard construction. The motor may be operated by any suitable means such as a key control switch or any device under the driver's control. However, the operating mechanism is preferably that described in the co-pending application of Schirmer and Knobel Serial No. 612,924, filed August 27, 1945 (now Patent #2,450,021), which utilizes a photo-electric control to open or close the door by blinking the headlights of the automobile a certain number of times. In any case when the system is arranged for power operation the limit switch 40 embodies a reversing control whereby selective operation of the motor for either the opening or closing movement is determined by the position into which the switch arm 42 has been moved by one of the dogs.

Owing to the connection between the motor and sprocket and also to the vertical link connection 28, the mechanism thus far described renders it practically impossible to operate the door if the power supply is cut off or if the electrical system is disabled for any cause. According to the present invention, the chain 18 is detachably connected to the carriage in such a way that the connection may be released and the door may be opened manually. To this end the carriage is constructed as shown in Figs. 2 and 3. The carriage 24 comprises a U-shaped member depending from the axles of the wheels 26. Pivoted within the carriage on a pin 48 is a member 50 having upstanding ears 52 with slots 54 to receive a pin 56 carried at one point on the chain 18. A leaf spring 58 secured to the floor of the member 50 is arched over a pin 60 which extends across the carriage. The spring urges the member 50 upward and normally holds it in engagement with a pin 56 extending outwardly from one of the chain links. Under normal conditions, in which reliance is placed in power mechanism for operating the door, this connection acts as if the chain were permanently connected with the carriage.

3

The bottom of the member 50 is provided with an eye 62 to which is attached a cable 64. By pulling downwardly on the cable the member 50 is released from the chain. If the garage is provided with an access door separate from the door 6 the cable 64 may be allowed to hang from the member 50 at a convenient height to be reached by the driver. It is only necessary to pull down on the cable and then draw it rearwardly to pull the link 28 away from its vertical position. The door may then be opened by hand.

If the door 6 is the only means of access to the garage, means are provided whereby the cable may be operated to disconnect the member 50 and also to rock the link 28 away from its vertical position. To this end, the cable passes through an opening in an arm 66 attached near the bottom of the link 28 and extending rearwardly therefrom. From that point the cable passes downwardly to a pivoted arm 68 located at a convenient place in one of the door sections. The arm 68 is provided with an outside handle 70, preferably key controlled. The driver, finding himself unable to open the door because of disablement of the power mechanism, will unlock the handle 70 and turn it in a direction to pull downwardly on the cable. This downward pull first releases the pivoted member 50 from the chain 18. Movement of the member 50 is limited by engagement of its floor on the pivot pin 30 of the link 28. Further motion of the cable 64 applies a component of force to the carriage toward the rear of the garage, that is, toward the left as viewed in Fig. 2. This force is sufficient to move the carriage along the track to break the link 28 away from its vertical position. The door may then be lifted by hand to gain access to the garage.

The door may be opened and closed manually until such time as the power mechanism is repaired. After repair the parts are reengaged by simply starting the power drive. It will be observed that the ears 52 are provided with long inclined surfaces so that the pin 54 will ride on one or the other of these surfaces and snap into proper position on the first power movement of the mechanism.

It will be seen that under normal power-operating conditions, the cable simply rides inactively with the carriage and door, and in no way interferes with the power operation of the door.

A modified form of mechanism is shown in Fig. 7. The tracks 27 are as in Fig. 2 and the carriage 74 is mounted for motion on the track in the same manner as the carriage 24 of the previously described construction. The bracket 32 and its mode of connection to the door are also as previously described.

A link 76 which forms the connection between the carriage and the bracket 32 is pivoted to the bracket and is releasably connected to the carriage in a manner to be presently described. The chain 78 may be directly connected to the carriage. Since the release mechanism operates by disconnecting the link from the carriage, any other suitable type of drive, such as a screw, may be substituted for the chain. The link is provided at its upper end with a pin 80 which is normally seated in slots 82 in the carriage wall. The walls of the carriage are cut away as indicated at 84 on an arc whose center is at the pivot of the link 76 on the bracket 32 when the door is closed. A latch dog 86 pivoted within the carriage normally holds the link in engagement with the carriage.

4

Thus, as shown in Fig. 7, the face of the dog abuts against the pin 80.

The pin 80 is free to turn in the link 76 and is provided at one end with an arm 88 to which is attached the cable 90. The cable passes through an arm 92 extending rearwardly from the link 76 near the bottom. The cable is also connected to the arm 68 on the door handle as in the construction previously described.

The pin 80 is provided with a latch-lifting member 94 which operates on clockwise rotation of the pin 80 to lift the dog 86.

A spring 96 is connected between the link 76 and the bracket 32 and tends to hold the link 76 in proper position with respect to the bracket when the link is released from the carriage. A block 98 on the bracket prevents the link from being pulled too far in a clockwise direction by the spring. A spring 100 connected between the lifting member 94 and the link 76 normally holds the member 94 in non-lifting position relative to the dog 86.

Under normal power operating conditions the link 76 remains connected with the carriage; hence the system operates in exactly the same manner as that shown in Fig. 2. When it becomes necessary to open the door manually, a pull on the cable rotates the arm 88 and the lifting member 94 to lift the latch dog 86 above the pin 80. A further pull on the cable rocks link 76 out of the slot 82 against the tension of the spring 96. When the link has been rocked outwardly far enough to clear the cut away portion 84 of the carriage walls, the door may be opened manually. The carriage remains at its forward position. Upon manual closing of the door, it will be observed that the spring 96 will snap the pin into locking position, thereby preventing the door being opened by unauthorized persons. It is necessary, therefore, to apply a pull on the cable each time the door is to be opened.

Having thus described the invention, I claim:

1. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a connection between the carriage and door, a connection between the chain and carriage comprising a movable clutch member on the carriage, a complementary clutch member on the chain to be engaged thereby, spring means normally holding said clutch members in engagement, and manual means for disengaging said members.

2. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, said link being in door-locking position when the door is closed, the combination of a movable clutch member on the carriage, a complementary clutch member on the chain to be normally engaged thereby, and manual means for disengaging said clutch members, said means having provision for moving said link to non-locking position to permit manual operation of the door.

3. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, said link being in door-locking position when the door is closed, the combination of a movable clutch member on the carriage, a complementary clutch member on the chain to be normally engaged thereby, and a cable connected to the movable clutch member to disengage it from the chain.

4. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, said

5

link being vertical when the door is closed, the combination of a movable clutch member on the carriage, a complementary clutch member on the chain to be normally engaged thereby, and a cable connected to the movable clutch member to disengage it from the chain, the said carriage being also shiftable by the cable to cause movement of the link to non-vertical position to permit manual operation of the door.

5. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, said link being vertical when the door is closed, the combination of a movable clutch member on the carriage, a complementary clutch member on the chain to be normally engaged thereby, and a cable connected to the movable clutch member to disengage it from the chain, and an arm extending rearwardly from the link, the cable passing through said arm in a direction to draw the carriage rearwardly after disengagement of the carriage and chain.

6. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, said link being vertical when the door is closed, the combination of a movable clutch member on the carriage, a complementary clutch member on the chain to be normally engaged thereby, and a cable connected to the movable clutch member to disengage it from the chain, an arm extending rearwardly from the link, and means mounted on the door to pull on the cable, the cable passing through the arm in a direction to cause rearward movement of the carriage and movement of the link to non-vertical position after disengagement of the movable member from the chain.

7. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, the link being in vertical position when the door is closed to prevent opening of the door, the combination of a pivoted member on the carriage having a pin-engaging slot, a pin on the chain to be normally received in the slot, and means attached to the pivoted member to swing said pivoted member about its pivotal mounting and thereby withdraw it from the pin, said means further serving to swing said link out of its vertical position and thereby unlock the door.

8. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, the link being in vertical position when the door is closed to prevent opening of the door, the combination of a pivoted clutch member on the carriage having a pin-engaging slot, a pin on the chain to be normally received in the slot, a cable attached at one end to the pivoted member, a lock-controlled arm to which the other end of the cable is connected, said arm being mounted on the door, and means acting upon a pull on the cable to draw the carriage rearwardly and thereby move the link from its vertical position.

9. In power operating mechanism for overhead doors having a chain, a carriage moved thereby, and a link to connect the carriage and door, the link being in vertical position when the door is closed to prevent opening of the door, the combination of a pivoted clutch member on the carriage having a pin-engaging slot, a pin on the chain to be normally received in the slot, a cable attached at one end to the pivoted mem-

6

ber, a lock-controlled arm to which the other end of the cable is connected, said arm being mounted on the door, an arm extending rearwardly from the link, the arm having an opening through which the cable passes to apply a tilting force to the link, to remove it from locking position upon a pull on the cable.

10. In power operating mechanism for overhead doors having a carriage and power driving means for the carriage, a link to connect the carriage and door, a releasable connection between the link and carriage, and manual means including an element pivotally mounted on the door and projecting exteriorly of said door for releasing said connection.

11. In power operating mechanism for overhead doors having a carriage and power driving means for the carriage, a link to connect the carriage and door, the link being in door-locking position when the door is closed, a pin at one end of the link to engage the carriage, latch means normally holding the pin in engagement with the carriage, and manual means to operate the latch to disconnect the link from the carriage and to rock the link to non-locking position to permit manual operation of the door.

12. In power operating mechanism for overhead doors having a carriage and power driving means for the carriage, a link to connect the carriage and door, the link being in door-locking position when the door is closed, a pin at one end of the link to engage the carriage, latch means normally holding the pin in engagement with the carriage, and a cable connected with the pin and operable to release the latch and to rock the link to non-locking position to permit manual operation of the door.

13. In power operating mechanism for overhead doors having a carriage and power driving means for the carriage, a link to connect the carriage and door, the link being in door-locking position when the door is closed, a pin at one end of the link to engage the carriage, latch means normally holding the pin in engagement with the carriage, and a cable connected with the pin and operable to release the latch and to rock the link to non-locking position to permit manual operation of the door, and a lock-controlled handle accessible from the outside of the door, the cable being connected with said handle.

14. In power operating mechanism for overhead doors having a carriage and power driving means for the carriage, a link to connect the carriage and door, the link being in door-locking position when the door is closed, a pin at one end of the link to engage the carriage, latch means normally holding the pin in engagement with the carriage, said means including a pivoted dog on the carriage, the pin having a lifting member to release the dog from engagement with the pin, a cable connected with the pin to rotate the pin, and means operated by the cable to rock the link to non-locking position.

15. In power operating mechanism for overhead doors, having a link movable with the door and power driving means for the link said power driving means including a driving motor, the link having a pivotal connection with the door and being in vertical door-locking position when the door is closed, the combination of a releasable connection between the driving motor and the link, and manually operated means including an element pivotally mounted on the door and projecting exteriorly of said door for releasing said connection and for turning the link

7

into a non-locking position to permit manual opening and closing of the door.

16. In power operating mechanism for overhead doors, having a link movable with the door and power driving means for the link said power driving means including a driving motor, the link having a pivotal connection with the door and being in vertical door-locking position when the door is closed, the combination of a releasable connection between the driving motor and the link, and a manually operated cable for releasing said connection and for turning the link into a non-locking position to permit manual opening and closing of the door.

17. In power operating mechanism for overhead doors, having a link movable with the door and power driving means for the link said power driving means including a driving motor, the link having a pivotal connection with the door and being in vertical door-locking position when the door is closed, the combination of a releasable connection between the driving motor and the link, and manually operated means for re-

8

leasing said connection and for turning the link into a non-locking position to permit manual opening and closing of the door, and a lock controlled device accessible from the outside of the door to operate said manual means.

CYRUS T. SCHIRMER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,324,587	Elliott	Dec. 9, 1919
1,519,749	Ainsworth	Dec. 16, 1924
1,544,542	Ainsworth	July 7, 1925
1,778,360	Gorman	Oct. 14, 1930
1,916,652	Beeman et al.	July 4, 1933
1,962,475	Blodgett	June 12, 1934
2,218,505	Chambers	Oct. 22, 1940
2,221,039	Babcock	Nov. 12, 1940
2,401,082	Konter	May 28, 1946
2,430,729	Negri	Nov. 11, 1947