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P. R. SCHREIBER

2,597,824

GARAGE DOOR

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2 SHEETS—SHEET 1

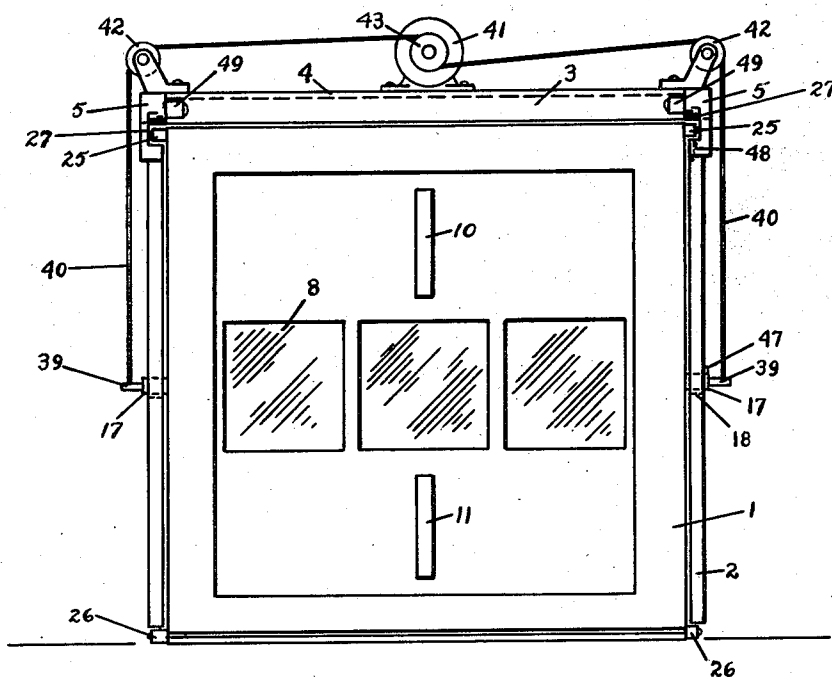


Fig. 1

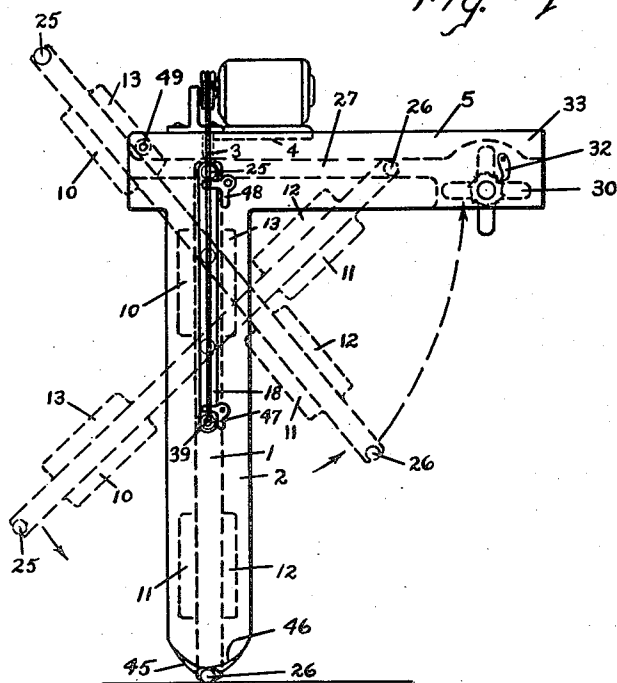


Fig. 2

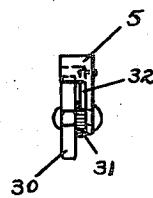


Fig. 3

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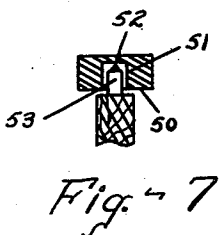
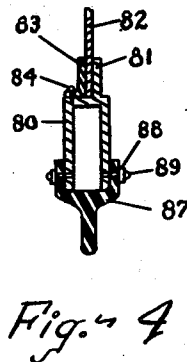
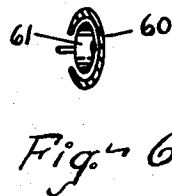
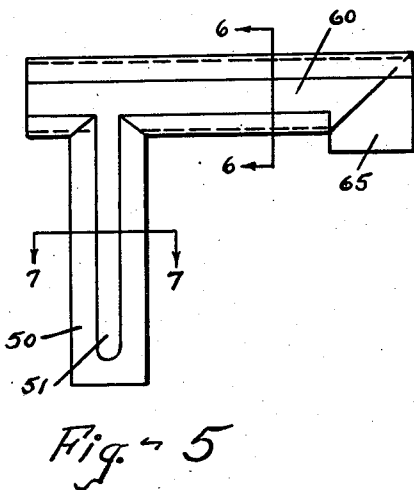
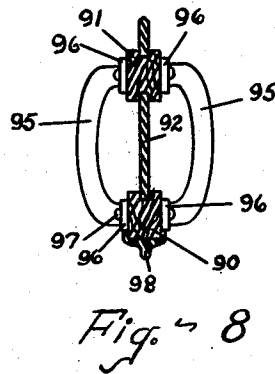
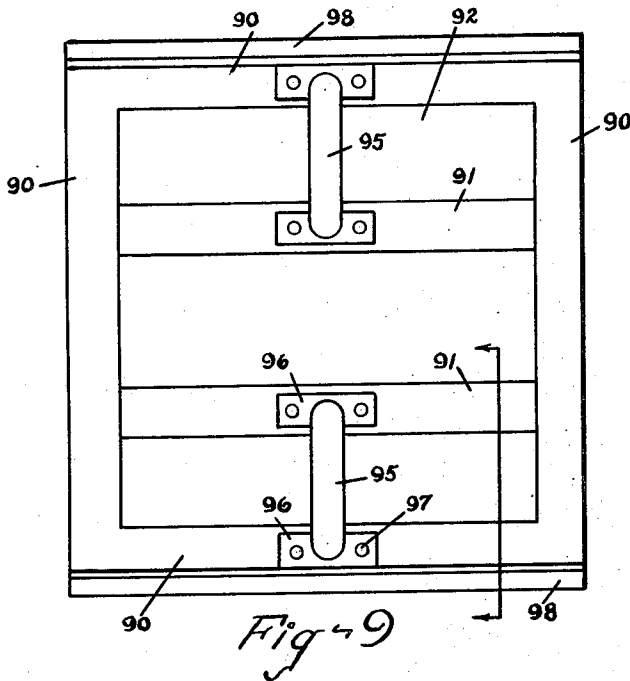
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2 SHEETS—SHEET 2



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GARAGE DOOR

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6 Claims. (Cl. 20—16)

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This invention relates to an improved garage door. The door is designed so that it will open if pushed by the bumper of an automobile. It is, therefore, preferably reversible, i. e., the edge which at times is at the top of the door may at other times be at the bottom, and vice versa. The door is preferably provided with means on the inside and outside, and usually at both the top and bottom of each side, to serve as a bumper to be contacted by the bumper of an automobile when the door is to be opened. The door is preferably arranged so that to open the door its bottom may be pushed either inwardly or outwardly; but in closing, the edge of the door which is outside of the garage will be brought down and never the edge inside of the garage. Thus there is no interference with a car which may be parked in the garage.

The door is suspended from the midpoint at each side. It is substantially symmetrical so that the portion of the door which at one time forms the top of the door at another time forms the bottom. Guide means at the corners of the door cooperate with tracks located at each side of the top of the door and perpendicular to the plane of the door, to guide its movement. At one end of each track, preferably the inner end, there is locking means to prevent the guide means from leaving the track within the garage, although this locking means does not interfere with the entrance of the guide means into the track at this point. The door is preferably provided with an electric motor for raising and lowering it.

The invention will be further described in connection with the accompanying drawings which show more or less schematic means for accomplishing the invention as well as details representing preferred forms of construction.

In the drawings:

Fig. 1 is a view of the door from the outside of the garage;

Fig. 2 is a side view of the door and includes the door jamb;

Fig. 3 is a detail showing one form of one-way locking means;

Fig. 4 is a detail showing one form of weather-sealing construction which may be used at both the top and bottom of the door;

Fig. 5 is a side view of a preferred form of track for guiding the door;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 5; and

Figs. 8 and 9 show a preferred form of bumper attachment.

Fig. 1 of the drawing shows the door 1, the door

jamb 2, and the top 3 across the door. Suitably fastened to the top member is a support 4. There are track means 5 at each side of the top of the door which are perpendicular to the plane of the door. The door comprises glass windows 8 and four bumpers 10, 11, 12 and 13.

At the middle of each side of the door is a cylindrical support 17 which projects laterally therefrom. This support fits into a guide opening 18 which passes through the jamb 2, and although in the drawings this opening 18 is shown as being vertical, it may be inclined and if so will ordinarily incline inwardly and upwardly so that as the door is opened, the major portion of it will be brought into the inside of the building, leaving only a small amount, if any, to project outside the building. At the top and bottom of the door and projecting laterally from each side are the guide rollers 25 and 26 which fit into the track 27 provided in the track means 5 on each side of the door. These tracks are preferably, although not necessarily, horizontal. When one end of the door is up, the rollers 25 are engaged by the track, and when the other end of the door is up, the rollers 26 are so engaged.

At one end of the track, and preferably inside of the door, is the one-way locking means 30. This is preferably a ratchet arrangement which permits the rollers 25 or 26 to enter the track 27 when the bottom of the door is swung up inside of the garage, but prevents these rollers from leaving the track at its inner end and thus prevents the top of the door from swinging down inwardly. Thus, although the door may be opened by pushing the bottom in or out, in closing the door, the outer end will always be swung down regardless of whether this outer end was previously the top or the bottom of the door.

Fig. 3 shows a preferred form of one-way locking means which comprises the four-fingered turning element 30 which is fastened to the ratchet wheel 31 which is engaged by the pawl 32. These are fastened to the means 5 in which the track 27 is formed. Any suitable one-way locking means may be employed.

Projecting from the supports 17 are pins or other means 39 to which the steel cables 40 are fastened. One end of each cable is connected with the motor 41 which is fastened to the support 4. The cables are guided by the pulleys 42. The central pulley 43 onto which the cable is wound as the motor is operated to lift the door, may be a wide pulley onto opposite sides of which the two cables are wound simultaneously. The motor is preferably a small motor such as a $\frac{1}{2}$

to $\frac{1}{2}$ H. P. motor, and may be connected with reduction gearing which, for example, may include a worm gear which locks the pulley 43 so as to prevent the door from lowering of its own weight. It is then necessary to reverse the motor in order to lower the door. The motor is advantageously connected with a time switch, not shown (which may be a thermo-switch), so that after the passage of a short interval of time after lifting the door, during which an automobile is driven into or out of the garage, the motor will automatically reverse and close the door. The reverse movement of the motor may be controlled manually if preferred.

The door may be constructed of wood or metal. Aluminum or magnesium alloy may be preferred. The track means may be of any design. The construction illustrated in Figs. 1-3 is quite schematic, and is intended to illustrate in the simplest manner, the operation of the door.

The operation of the door is best illustrated by reference to Fig. 2. In the closed position the rollers 26 at the bottom of the door register in the notch of the springy sheet metal clip 45 (not shown in Fig. 1) fastened to the bottom 46 of the door jamb. The automobile owner, arriving at the garage, approaches the door from the outside, i. e., from the left, and gently pushes the bumper 11 with the bumper of his car. The door pivots about its central supports 17, and the rollers 25 at the top of the door roll forward in their tracks. This causes the bottom of the door to raise up as it swings inwardly, and the cylindrical supports 17 at the middle of the door raise in the openings 18 and trip the switch 47. The motor then starts operating. It is not necessary to push the door very far with the bumper before starting the motor which completes the opening operation. As the support 17 reaches the top of the track 18 it trips the switch 48, and this stops the motor. If the motor drives through a worm gear, this will hold the door up. If not, other means will be provided.

The reverse movement of the motor is initiated by a time switch or by a manual switch or by any other suitable means. As the door is lowered, the switch 48 is thrown and the motor continues to operate until the switch 47 is thrown. The switches 47 and 48 are designed with suitable current-making and current-breaking mechanisms to accomplish the desired results. Other switch means, located as desired, may be used.

Following the movement of the door, soon after it trips the switch 47, the upper rollers 25 will reach the end of the track 27. The door is evenly balanced, so the upper edge will roll over the rollers 49, past the angular position shown in dotted lines in Fig. 2, and as the middle supports 17 continue to be lifted, the door will flatten out. As it comes to the horizontal position the rollers 26 will turn the locking means 30, and then immediately the switch 48 will be thrown and the door will come to rest.

When the motor is thrown into reverse, the supports 17 will descend in their tracks 18. The inner end of the door can't retrace its steps because the ratchet prevents the rollers 26 from passing down through the locking means. Consequently, it is the outer edge of the door which lowers, and the rollers 26 at the inner end are drawn along the tracks 27. When the closing of the door is completed, the door will be completely reversed: whereas originally the bumpers 11 and 12 and the rollers 26 were at the bottom of the door, they are now at the top.

Although in closing it is always the outer edge of the door which descends, the door may be opened in either direction. If an automobile inside the garage is backed against the inner bumper 12, the bottom of the door will swing out. The upper rollers 25 will follow back along the tracks 27 and this will lift the door off the ground. The switch 47 will be tripped and the motor 41 will start and continue to raise the door by lifting the supports 17. When these supports reach the top of the track they will trip the switch 48 and the door will lie in a horizontal position.

No matter whether the door is raised by pushing its lower part out or in, when the door is opened it lies horizontally. The one-way locking means 30 prevents the inner end from lowering. Therefore, the door is always closed by bringing its outer edge down.

Figs. 5-7 show preferred forms of track means. The door jamb may be formed of two parts and the upper part 50 may come just below the middle of the door. The track 51 need not penetrate the jamb as in Figs. 1 and 2, but may be formed into one face of it, as illustrated in Fig. 7. In that event, the cable 52 will be fastened to the support 53 possibly by simply attaching it with a suitable screw or bolt threaded into the end of the support.

The horizontal track 60 at the top of the door may be of usual sheet metal construction such as shown in section in Fig. 6. In that case, the rollers 61 at the four corners of the door may be of any usual design. The inner end of the track may be cut at an angle, as at 64, and the support 65 for suitable one-way locking means may be welded to it:

If the door is of aluminum or magnesium or other light-weight alloy, the main members may be extruded. The four outside edges of the door may, for example, be channels such as the channel 80 shown in cross-section in Fig. 4. This channel may be extruded with a lip 81 which helps to hold the panel 82, which forms the major portion of the door surface (except for the windows). The panel may be held in place by the angle 83 which is held to the extruded channel by the screw 84. Whatever the construction, it will ordinarily be found advantageous to provide a rubber seal 87 across the top and bottom of the door. This may be vulcanized in place or may be held by strips 88 which extend across the door and are fastened by bolts 89 which are screwed into suitable tapped holes in the channel 80. The rubber portion comprises a lower lip which is flexible and forms a weather-tight seal with the top and bottom of the door opening.

Figs. 8 and 9 illustrate a door of wooden construction. The border 90 and cross bars 91 are of thicker material than the panels 92. The bumpers 95 may be of aluminum tubing which may be welded or otherwise fastened to the plates 96 of which there are four for each two bumpers. These plates are located on opposite sides of the door as illustrated, and the bolts 97 pass through the door and hold the plates in place on opposite sides of it. The top and bottom edges of the door are provided with the flexible weather-sealing blade 98. A similar construction may be used for fastening bumpers to a metal door.

Thus the door is capable of being constructed of different materials and with structural pieces of different design. The bumpers may be wider or narrower and instead of a single bumper at the top and bottom of each side of the door, several bumpers may be employed. Although the

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door has been described more particularly as being used in a garage, it may find other uses as, for example, in a warehouse, etc. Instead of operating by a motor, the door may be lifted by a coiled spring and preferably by making use of the torque of the spring rather than its pull. The spring may be mounted in any convenient manner. If desired a spring may be used for raising the door and a motor may be provided closing the door, although the door may be closed manually.

The invention is not limited to the details of the construction shown, but is defined in the claims which follow.

What I claim is:

1. A door for a garage or the like located inside a door opening, supporting means for the door projecting laterally from the middle of each side edge of the door and pivotally held by means for raising and lowering the door, which latter means is in the opening, a track at each side edge of the door extending from the middle of the door in a generally upward direction to guide said supporting means as the door is raised and lowered, a substantially horizontal track at each upper corner of the opening and perpendicular thereto, means projecting laterally from the four corners of the door adapted to be engaged from time to time by said last mentioned track and guided thereby, one-way locking means at the end of said track farthest from the opening which permits said laterally projecting means to enter this end of the track, but prevents their leaving this end end of the track, and additional guide means outside the door above said last mentioned track adapted to project laterally over the edges of the door and contact its inner surface when the bottom of the door is pushed in and swings the top of the door out around said supporting means when the door is being raised.

2. A door for a garage or the like located inside a door opening, supporting means for the door projecting laterally from the middle of each side edge of the door, a track in each side edge of the opening extending from the middle of the door in a generally upward direction to guide such means, a substantially horizontal track at each upper corner of the opening and perpendicular thereto, means projecting laterally from the four corners of the door adapted to be engaged from time to time by said last mentioned track and guided thereby, one-way locking means at the farthest end of said track from the opening which permits said laterally projecting means to enter this end of the track, additional guide means outside the door above said last mentioned track adapted to project laterally over the edges of the door and contact its inner surface when the bottom of the door is pushed in and swings the top of the door out around said supporting means when the door is being raised, cables attached to said supporting means and means for winding and unwinding the cables to raise and lower the door.

3. In combination with a doorway in a garage or the like, a door with means for pivotally suspending the same at the middle of each side edge thereof, the door being pivotally reversible on said suspending means, guide means projecting laterally from the four corners of the door, a substantially horizontal track at each side edge of the door at the top thereof and perpendicular there-

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to, in which said guide means are adapted to be engaged from time to time, and additional guide means located outside of the door, projecting over the edges of the door and adapted to contact the inner surface of the door when the bottom of the door is pushed in so as to swing the top of the door out around said suspending means.

4. In combination with a doorway in a garage or the like, a door, means for raising and lowering the door pivotally connected with the two side edges of the door, guide means extending outwardly from both sides of the doorway, and means located on the side edges of the door above said pivotal connection which cooperate with the guide means so that the top of the door moves outwardly guided by the guide means when inward pressure is applied to the bottom of the door, and the top of the door moves inwardly guided by the guide means when outward pressure is applied to the bottom of the door.

5. The combination of claim 4 in which the pivotal connection is at the middle of each side of the door, means cooperative with the guide means are located on the edges of the door below said pivotal connection as well as above it, and the guide means and cooperating means are disengageable at a location remote from the doorway on each side of the doorway whereby the door is reversible in the doorway.

6. The combination of claim 4 in which the pivotal connection is at the middle of each side of the door, means cooperative with the guide means are located on the edges of the door below said pivotal connection as well as above it, the guide means and cooperating means are disengageable at a location remote from the doorway on each side of the doorway whereby the door is reversible in the doorway, and locking means is located in the guide means on one side of the doorway only whereby engagement of the cooperating means and guide means on this side of the doorway is prevented, the cooperating means and guide means being engageable on the opposite side of the doorway.

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