O. C. JOHNSON.

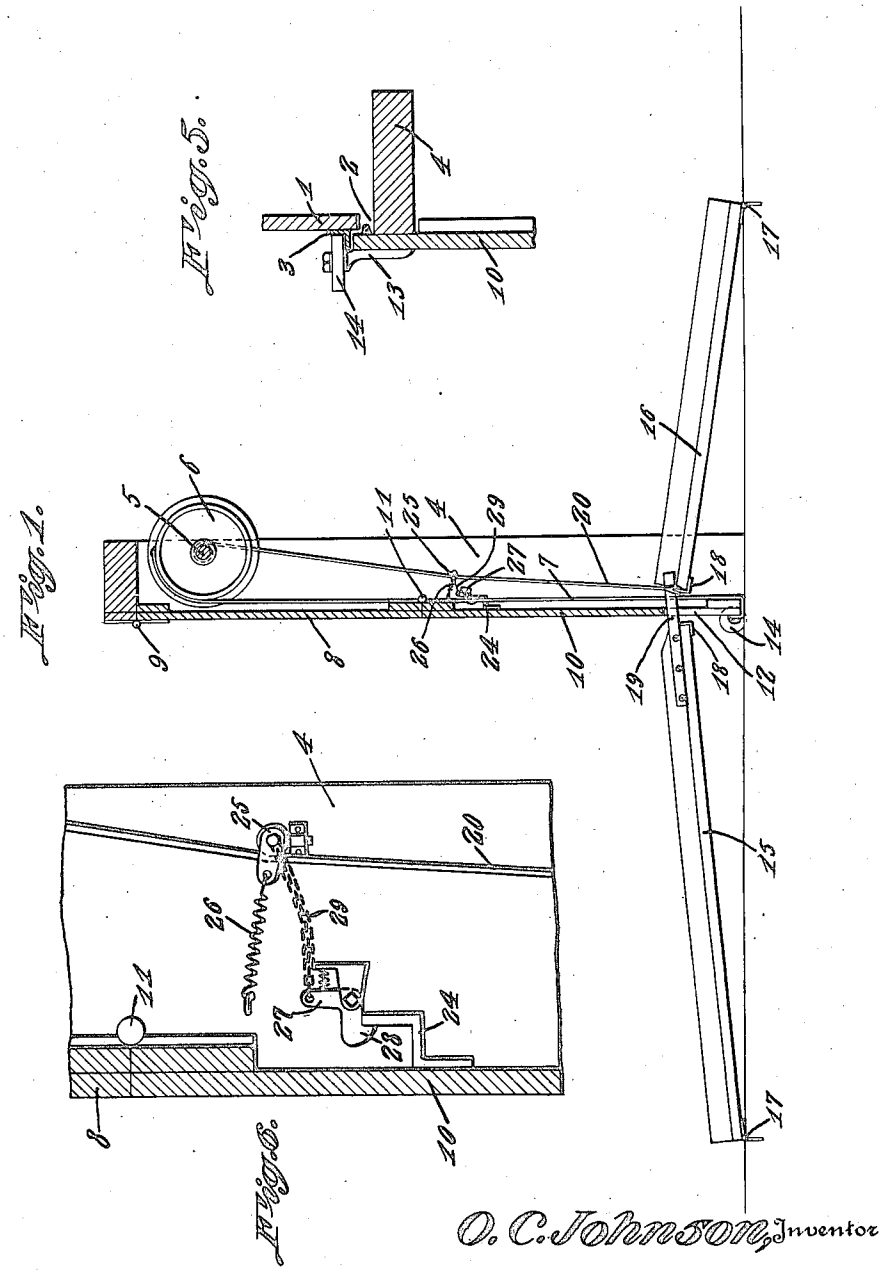
DOOR.

APPLICATION FILED SEPT. 14, 1920.

1,412,871.

Patented Apr. 18, 1922.

3 SHEETS—SHEET 1.



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By Cashow & Co.

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3 SHEETS—SHEET 2.

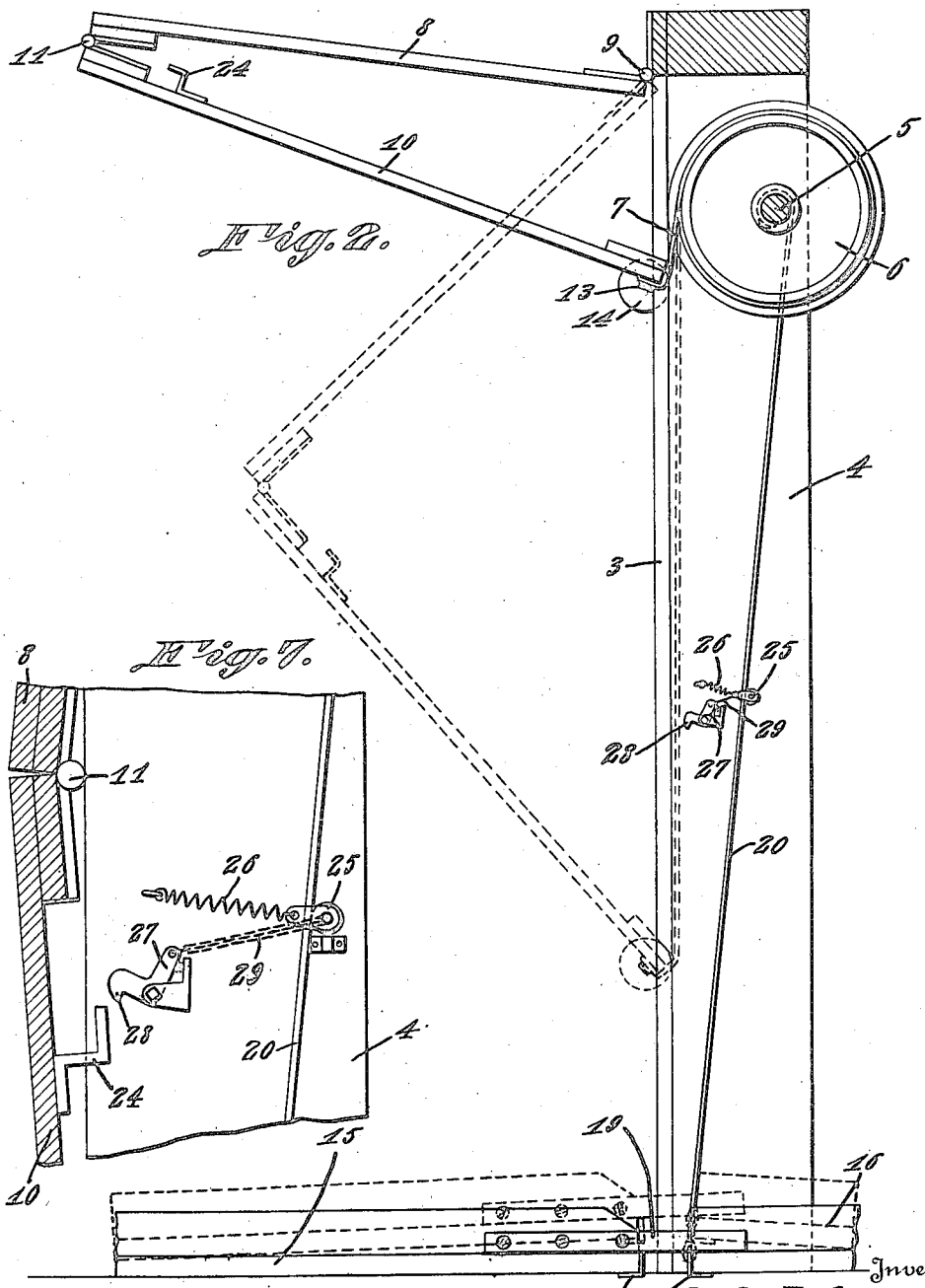


Fig. 2.

Fig. 7.

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3 SHEETS—SHEET 3.

Fig. 4.

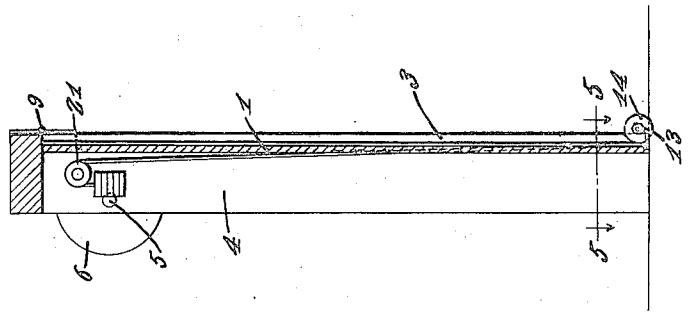
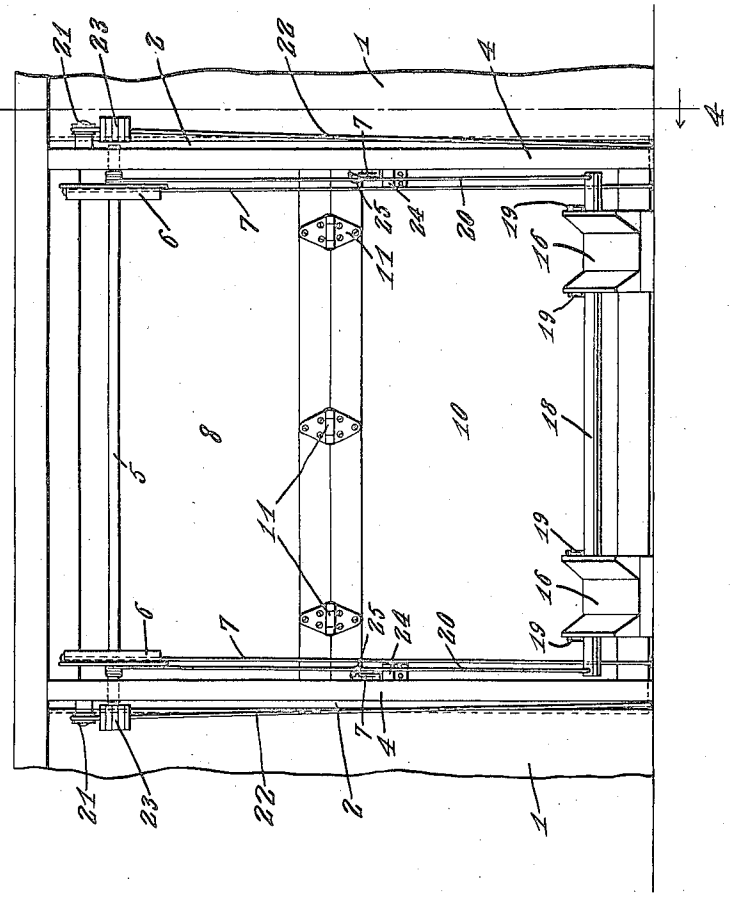


Fig. 5.



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UNITED STATES PATENT OFFICE.

ORVILLE C. JOHNSON, OF AURORA, ILLINOIS.

DOOR.

1,412,871. Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed September 14, 1920. Serial No. 410,132.

To all whom it may concern:

Be it known that I, ORVILLE C. JOHNSON, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a new and useful Door, of which the following is a specification.

This invention relates to doors particularly designed for use in connection with garages although it is to be understood that the same can be used with other structures if found desirable.

One of the objects of the invention is to provide a sectional door suspended from above the door opening and which is adapted to fold and swing upwardly when moved to open position, thus to allow a vehicle to pass under the raised and folded door and through the opening.

A further object is to provide door operating means adapted to be shifted by a vehicle approaching the door from either direction, the movement of said means serving to impart a gradual folding and upward movement to the door so that it will be lifted out of the path of the vehicle and allow it to pass through the door opening after which the door will close automatically.

A further object is to have the sections of the door so proportioned that, when the door is folded, it will be elevated the maximum distance, and will not swing out against the machine during the opening operation.

A still further object is to provide efficient means for locking the door in closed position, said means being shifted by the door operating mechanism so as to unlock the door just prior to its elevation by said mechanism.

Another object is to provide a door which will indicate whether or not it is locked when closed.

A still further object is to provide a door which can be installed readily on structures already in use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that, within the scope of what is claimed, changes in the precise embodiment of the invention shown can be made without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a vertical transverse section through the door and showing its operating and locking means in elevation.

Figure 2 is an enlarged section through the door structure and showing the door completely opened, one of the intermediate positions of the door during the opening operation being indicated by dotted lines.

Figure 3 is an inner elevation of the door and its operating means.

Figure 4 is a section on line 4—4, Figure 3.

Figure 5 is a section on line 5—5, Figure 4.

Figure 6 is a detail view of the locking device, in holding position.

Figure 7 is a similar view showing the door unlocked.

Referring to the figures by characters of reference 1 designates a wall of a structure having an opening 2 therein. Secured to the outer surface of the wall 1 and close to the opening 2 are angle strips 3 constituting guide rails. Uprights 4 are arranged close to but spaced from the sides of the opening 2 and extend from the floor upwardly to points above the door opening. In the upper portions of these uprights is journaled a shaft 5 to which are secured wheels 6 located near the uprights 4. To each of these wheels is secured the upper end of a cable 7 or other flexible device the lower end of which is attached to the lower edge of the door. This door is formed of an upper section 8 hingedly connected as at 9 to the upper wall of the door opening and a lower section 10 hingedly connected, as at 11, to the lower edge of the section 8. The section 10 has slots 12 extending upwardly thereinto from its lower edge and as will be apparent by referring to the drawings the length from top to bottom of the lower section 10 is greater than that of the upper section 8.

The door is provided, adjacent its lower edge with laterally extending brackets 13 on each of which is mounted a small wheel or roller 14. These wheels or rollers are adapted to engage the guide rails 3, thereby to facilitate the up and down movement of the door during the operation thereof.

The door operating means includes a pair of inclined rails 15 hingedly connected to

the floor beyond one side of the door and another pair of inclined rails 16 hingedly connected to the floor at the other side of the door, the hinge connections having been indicated at 17. The rails of each pair are connected at their inner or normally raised ends by cross strips 18 and the rails of the two pair are disposed with these cross strips at opposite sides of the door as shown especially in Figure 1. Tongues 19 extend from the rails 15 through the slots 12 and bear on the rails 16. Thus when the rails 15 are depressed the tongues 19 necessarily depress the rails 16 and, when the rails 16 are elevated they will elevate the tongues 19 and the rails 15.

Cables 20 or other flexible devices are connected to the ends of the cross strip 18 connected to the rails 16 and extend upwardly to the shaft 5. These cables are wrapped about those portions of the shaft between the wheels 6 and the uprights 4 and in a direction opposite to that in which the cables 7 are extended over the wheels 6.

Guide sheaves 21 are mounted on the uprights 4 near their upper ends and beyond the ends of the shaft 5 and supported by each of these sheaves is a cable 22 or other flexible element the upper end of which has counterbalancing weights 23 connected thereto while the lower end extends through the door opening between the wall 1 and the upright 4 and is attached to the lower end of the door section 10.

The lower section 10 of the door has a bracket 24 secured to its inner face near the upper end thereof and close to each side of the door. Each of the cables 20 passes through a pulley block 25 and a coiled spring 26 connects the block to the adjacent upright 4. A bell crank lever 27 having a head 28 at one end constituting a lock, is pivotally mounted on each of the uprights 4 and the pulley block 25 and is connected to said block by a link 29 or the like. Under ordinary conditions the spring 26 pulls upon the block 25 which, in turn, thrusts through the link 29 against the bell crank lever 27 so as to hold the head 28 in the path of the bracket 24. Obviously, therefore, when the door is closed the brackets 24 will be engaged by the heads 28 of the latches and the door sections thus held in alignment and fastened against outward and upward movement.

When an automobile or other vehicle of sufficient weight to depress the rails 15 or 16 approaches the door it will ride upon the adjacent pair of rails and force them downwardly out of the position shown in Figure 1 and to the full line position shown in Figure 2. This will cause the cables 20, which are normally held at an angle by the springs 26, to straighten out so as to pull against the springs 26 and, through the links 29, upon the bell crank levers 27 which will thus be disengaged from the brackets 24.

Continued downward movement will result in the cable 20 unwinding from and rotating the shaft 5 while, at the same time, the wheels 6 will wind the cables 7 thereon and cause the door to fold upwardly as indicated by dotted lines in Figure 2. During this folding action the wheels or rollers 14 will travel along the guide rails 3. As the lower section of the door is longer than the upper section it will be apparent that the two door sections can be raised to the maximum elevation as indicated by full lines in Figure 2, the lower section, when brought close to the wheels 6, acting as a brace for supporting the upper section in elevated position. As long as the required weight is upon either pair of rails the door will be held in raised position but as soon as the vehicle passes off of the rails the parts will gravitate to their normal position, the door moving downwardly to set position. This movement of the door will cause the brackets 24 to snap into engagement with the heads 28 of the bell crank levers 27 but if the door should not descend fast enough to cause its two sections 8 and 10 to move into alignment, the door would remain unfastened and the hingedly connected ends of the two sections 8 and 10 would project forward slightly, thus indicating clearly that the door is not locked.

It is to be understood that the weights 23 can be varied so as to allow the rails 15 and 16 to be depressed only by vehicles of more than a predetermined weight. One or more persons standing on the rails would not weigh enough to depress them and open the door but a vehicle of the proper weight to be used in connection with the door, when driven onto the rails, will cause them to move downwardly and thus actuate the door.

What is claimed is:

1. The combination with a vertically movable sectional door, of opposed depressible approach members interconnected at the bottom of the lower of said sections, a shaft at the top of the door, wheels mounted on either end of the shaft, flexible elements wound upon said shaft and connected to the depressible members, and other flexible elements attached to said wheels and to the lower edge of said lower door section for raising said sectional door.

2. The combination with a vertically movable sectional door, of opposed depressible approach members interconnected at the bottom of the lower of said sections, a shaft at the top of the door, wheels mounted at either end of the shaft, flexible elements wound upon the shaft and connected to the depressible members, and other flexible elements attached to said wheels and extending under the lower edge of the lower door section and

attached to said section for raising said sectional door.

3. The combination with a structure having a door opening, of upper and lower hingedly connected door sections within the opening, a hinge connection between the upper section and the top of the door opening, vehicle supporting rails at opposite sides of the door and movable downwardly, means extending through the door for connecting the rails, a shaft adjacent the upper portion of the opening, wheels thereon, flexible connections between the wheels and the lower portion of the lower door section, flexible connections between the shaft and the rails, said last named connections being wound upon the shaft, a latch, a sheave movably engaged by the flexible connection of the shaft, yielding means for holding the latch normally in a predetermined position, a connection between the latch and sheave, and means on the lower door section for engagement by the latch when the door is closed.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ORVILLE C. JOHNSON.

Witnesses:
W. C. ESTEE,
W. G. NICHOLSON.