

July 6, 1943.

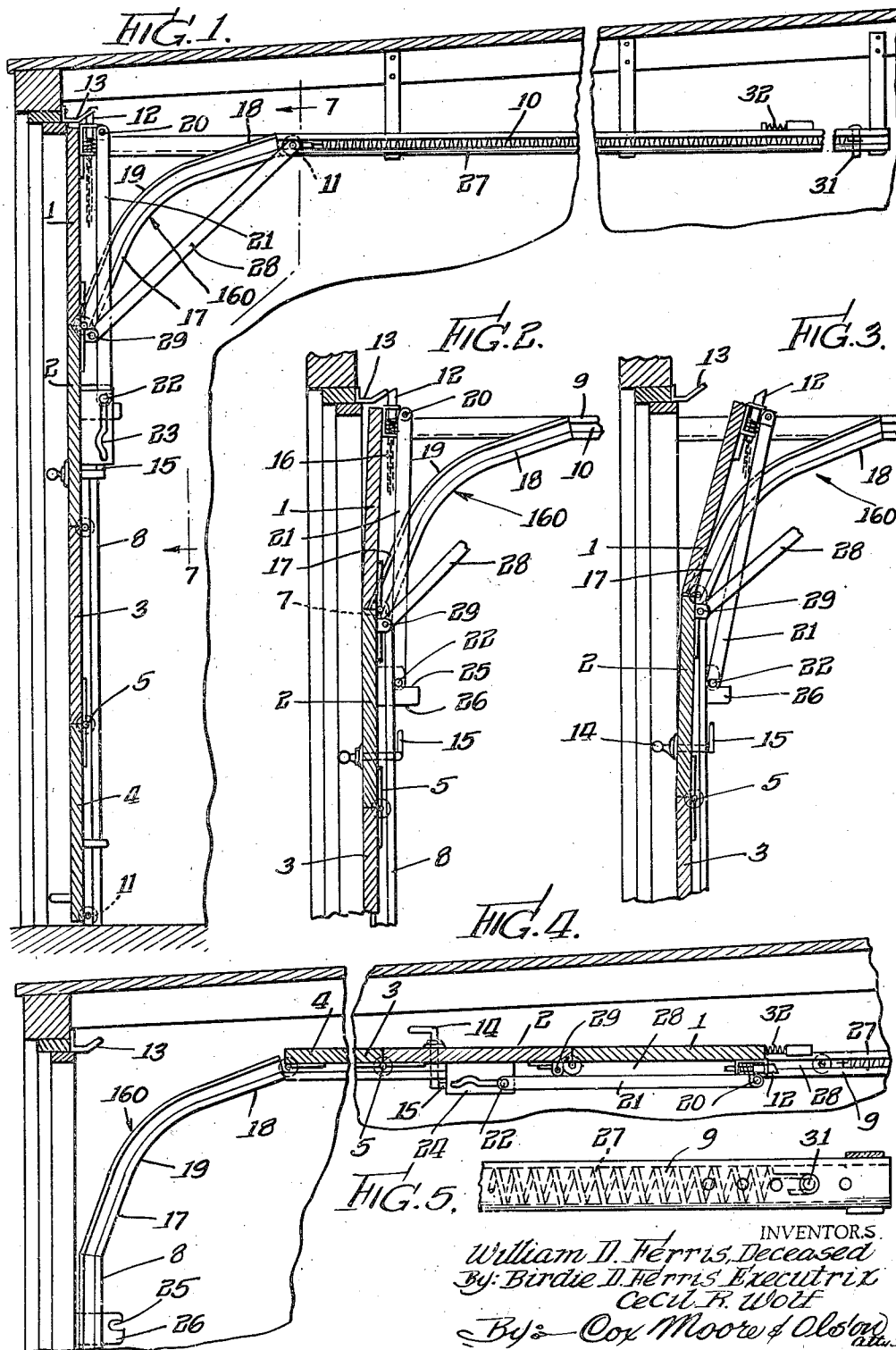
W. D. FERRIS ET AL

2,323,807

GARAGE DOOR

Original Filed Feb. 5, 1941

3 Sheets-Sheet 1



July 6, 1943.

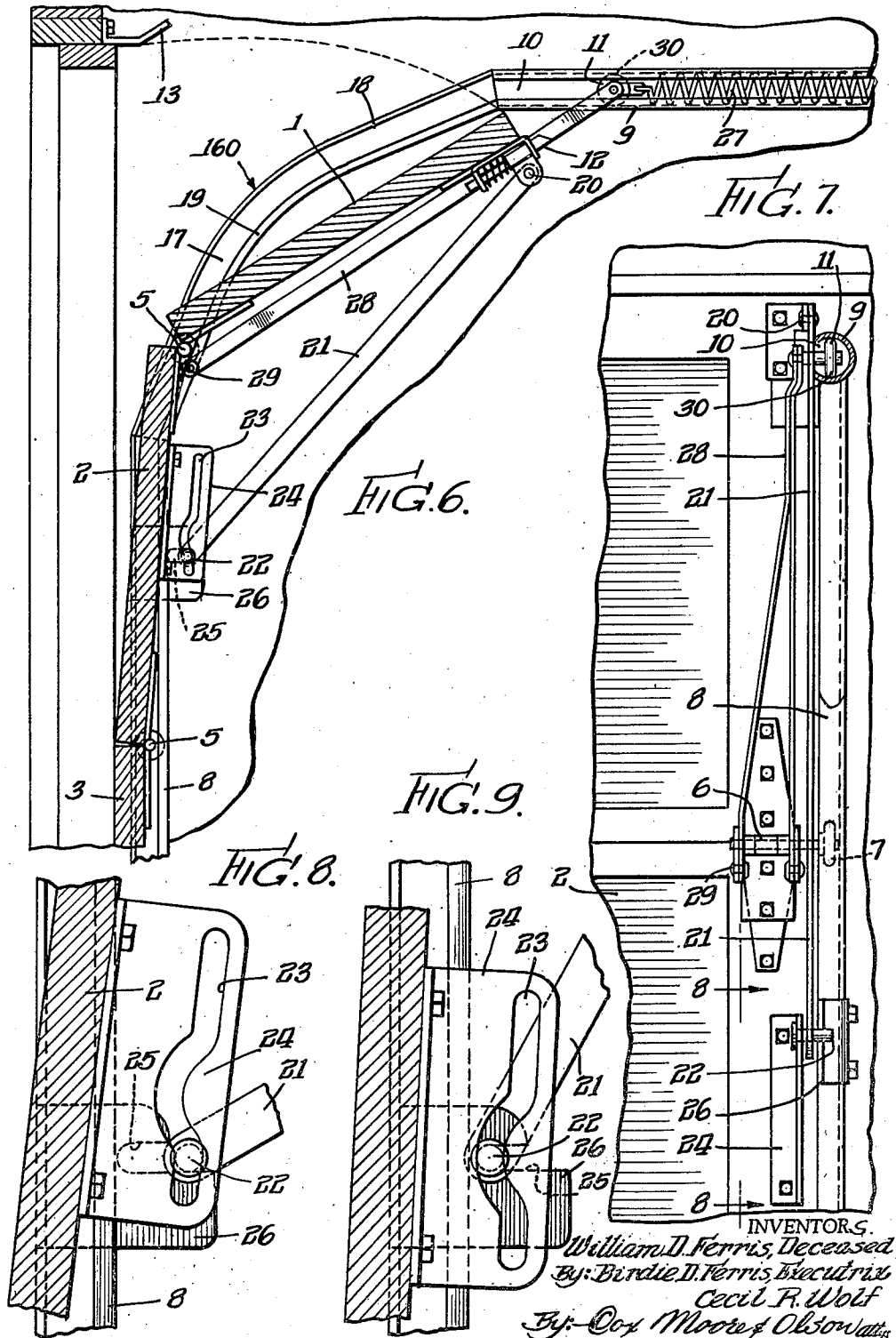
W. D. FERRIS ET AL

2,323,807

GARAGE DOOR

Original Filed Feb. 5, 1941

3 Sheets-Sheet 2



July 6, 1943.

W. D. FERRIS ET AL

2,323,807

GARAGE DOOR

Original Filed Feb. 5, 1941

3 Sheets-Sheet 3

FIG. 10.

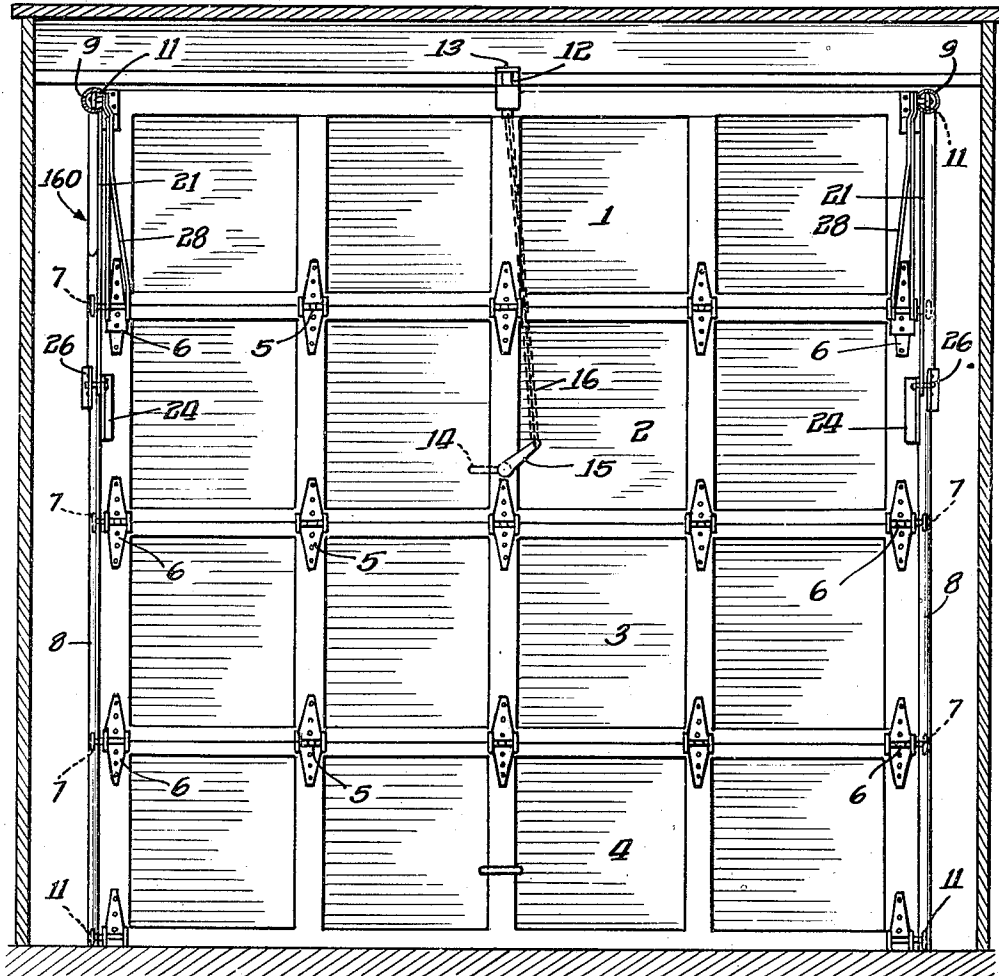


FIG. 11.

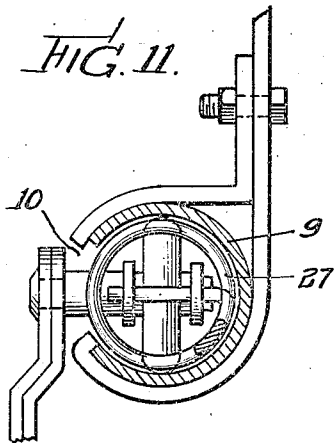
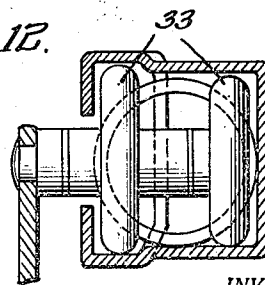


FIG. 12.



INVENTORS.

William D. Ferris, Deceased
By: Birdie D. Ferris, Executrix
Cecil R. Wolf
By: Cox, Moore & Olson attys

UNITED STATES PATENT OFFICE

2,323,807

GARAGE DOOR

William D. Ferris, deceased, late of Sterling, Ill.,
by Birdie D. Ferris, executrix, Sterling, Ill.,
and Cecil R. Wolf, Sterling, Ill., assignors to
Frantz Manufacturing Co., Sterling, Ill., a cor-
poration of Illinois

Original application February 5, 1941, Serial No.
377,498. Divided and this application June 6,
1942, Serial No. 447,335

20 Claims. (Cl. 160—202)

This invention relates to the door opening and closing devices, and more particularly to doors of the garage door type, wherein the doors are composed of horizontal sections horizontally hinged together at their meeting edges and which move upwardly in unison and then horizontally overhead to the open position of the door.

The present invention is a division of copending application, Serial No. 377,498, filed February 5, 1941, and entitled Garage door.

Among the objects of the present invention is to provide a novel and improved construction and arrangement whereby a door of this particular character is more easily operated and is more free from action that would cause jolting or jarring in the opening and closing movements thereof.

Another object of the invention is to provide a novel and improved construction and arrangement of doors formed of horizontally hinged together sections normally in vertical closed position and which, when unlatched, automatically shift to an overhead open position.

Yet another object of the present invention is to provide a door of the foregoing character wherein the power means for opening the door is disposed overhead and is connected by appropriate linkage mechanism to an upper portion of the door and in such a manner that as soon as the door is unlatched it will automatically move from a vertical, closed position to an overhead open position.

Yet another object of the invention resides in providing a hinged door of the foregoing character with power mechanism for automatically opening the door when unlatched to shift it to an open position wherein spring means constitutes the source of power for opening the door, and wherein linkage mechanism interconnects the spring means with the uppermost first and second sections of the hinged sections of the door in association with latching mechanism adapted to cause the automatic inward tilting of the upper section of the door when unlatched and to cause the door sections to be guided along vertically disposed track mechanism into overhead horizontally disposed track mechanism through the intermediary of an interconnecting curvilinear track mechanism.

Another object of the present invention is to provide a door of the foregoing character wherein one of the sections of the door is provided with a latch, and wherein the uppermost section of the door is provided with a pivotally disposed lever carrying at one end thereof a lug adapted to

engage with the latch whereby to lock the upper and next to the upper sections in vertically closed position when the door becomes closed, and conversely, whereby, when the door is unlocked by the operation of an independent door locking mechanism, the door is automatically shifted in a manner to cause the automatic unlatching of the lug of the lever from the latching mechanism and whereby to cause the inward tilting of the upper section of the door and the shifting of the door by means of its rollers along the track mechanism whereby to guide the door to upward overhead open position.

Yet another object of the present invention resides in the peculiar conformation of the cam mechanism associated with the door and the slotted latch whereby to cushion the opening and closing movements of the door under the action of the power spring.

Another object of the present invention is to provide an improved garage door of the horizontally hinged sectional type wherein certain of the door sections carry bearing means adapted to be guided in vertical and horizontal stationary tracks for shifting the door from vertically closed to horizontal open position along said tracks, and wherein spring means is housed normally within the horizontal portion of the track and is connected to one of the door sections by means of a linkage mechanism so as to automatically shift the door upwardly when the door is unlatched, together with means automatically locking and unlocking the same during the upward movement of the door whereby to incline the leading edge of said uppermost door section inwardly in the preliminary upward movement of the door and without the provision of any means interconnecting the leading edge of this door section with the track mechanism.

Another object of the invention is to provide in a garage door of the horizontally hinged type, carrying bearing means adapted to run in vertical and horizontal tracks when swinging from a vertically, closed position to an open horizontal position, a spring in the horizontal track and pivotally connected by means of a link, the front end of the link being provided with bearing means to run in the track and the link being positioned during the preliminary opening movements of the door so as to permit the uppermost door section to be inclined downwardly and rest upon said link, whereby said uppermost door section is guided as the remaining sections of the door are shifted along by their bearing means running in the tracks.

Still another object of the invention is to provide a garage door of the horizontally hinged sectional type adapted to run in vertical and horizontal tracks by means of interengaging bearing means carried by the door, wherein the uppermost door section is free of such bearing means and wherein spring means associated with the horizontal track is connected by means of a link with the next highest door section so as to permit the uppermost door section to swing relatively to said link and track from a vertical position away from said link to an inclined position, having its front edge supported by said link.

A further object of the invention is to provide a garage or other door of the horizontally hinged sectional type carrying bearing means adapted to run along vertical and horizontal interconnected tracks together with the provision of a power spring disposed in the horizontal track and directly connected to the door by means of a rigid link whereby to eliminate the use of flexible cable connections in such type of door.

Another object of the invention is to provide in a garage door, or other door, of the horizontally hinged type carrying bearing means running along vertical and horizontal interconnected track sections and wherein the uppermost door section is automatically shifted from a vertically closed position to an inwardly inclined position during the preliminary door opening movements and wherein a single power spring is used not only to raise the door to horizontal open position but also is utilized in association with other instrumentalities acting on the upper door section to automatically swing it to such inclined position during the preliminary upward movements of the door.

Further objects of the invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings, wherein

Figure 1 is a vertical section of a garage door embodying the principles of the invention, showing the same in its vertical or closed position and showing portions of the garage building also in section.

Figure 2 is a similar view showing the uppermost section of the door unlatched and moving into an inclined position inside the building.

Figure 3 is a similar view showing the uppermost section open to a greater degree.

Figure 4 is a similar view showing the door in its raised and overhead open position.

Figure 5 is a longitudinal section of the tubular track in which each lifting spring is enclosed, showing a portion of the spring thus contained in the track.

Figure 6 is a view similar to Figures 1, 2 and 3, but showing the uppermost section of the door tilted entirely over into its inclined position within the building.

Figure 7 is an inside elevation of the portions shown in Figure 6 of the drawings, being in the nature of an enlarged section line 7-7 in Figure 1 of the drawings.

Figure 8 is an enlarged detail fragmentary view, being in the nature of a section on line 8-8 in Figure 7 of the drawings.

Figure 9 is a similar view, but showing the parts in different positions.

Figure 10 is an inside view or elevation of the complete door, showing portions of the garage building in vertical section.

Figure 11 is a detail cross section, on a larger

scale, of one of the overhead tubular tracks in which the springs are enclosed.

Figure 12 is a view similar to Figure 11, but showing a different form of the invention.

Referring now to the drawings in detail, the door comprises the four sections 1, 2, 3 and 4, which are hinged together by hinges 5 at their horizontal meeting edges. The uppermost hinges 6 have wheels or rollers 7 that travel in the vertical track 8 provided at opposite sides of the doorway, and which wheels or rollers 7 also travel in the substantially horizontal overhead tracks 9. These overhead tracks are preferably cylindrical in formation, as shown in Figure 11, except that each cylindrical track has a longitudinal slot 10 at its inner side. The upper and lower ends of the door are provided with wheels or rollers 11 and also travel in these tracks, being carried by brackets mounted on the door.

The uppermost section 1 of the door is, as above explained, hinged to section 2 of the door so that the upper edge portion of this section 1 is free to swing outwardly in a vertical, closed position, and is likewise free to swing inwardly into an inwardly inclined position, as shown in Figure 6 of the drawings. Preferably, the upper edge of the section 1 is provided with a latch bolt 12 for engagement with a bracket 13 fastened to the top of the doorway so that when the door is closed this uppermost section 1 of the door will automatically be latched in closed position. To unlatch this uppermost section, a handle 14 is swivelled on section 2 of the door, and the inner end portion of this handle is provided with a crank arm 15 which is connected by a chain 16 to the lower end of the latch bolt. In this way, by rotating the handle 14 the latch bolt is disengaged from the bracket or strike piece 13 and the door will then automatically move to substantially horizontal open position.

Between the upper ends of the track sections 8 and the outer ends of the horizontal track sections 9, are track sections 160 that are formed in a special manner, as clearly shown in Figures 1 to 4 of the drawings. Each track section 160 is composed of two straight portions 17 and 18 and an intermediate curved portion 19. The straight portion 18 is preferably of the same length as the straight portion 17 and the ends of these two sections 160, on each side of the doorway, can be welded or otherwise fastened to the ends of the vertical and horizontal tracks. The special form thus provided for the two sections 160, as found by actual experience, ensures a smoother and easier and better motion or movement of the door into its open position, and thereafter in a closed position. The door is shown in its open position in Figure 4 of the drawings where it will be seen that it occupies a horizontal plane, practically at the top of the horizontal tracks. In other words, the action of the wheels or rollers on the door is much improved by the provision of these track sections 160 in the form shown and described, and the action is much better than would be the case if these sections were formed with one curve from end to end of a single radius.

The subject matter of the track construction, including the cooperation of the spring thereof, is claimed in the prior pending application, Serial No. 377,498 aforesaid, and the remaining subject matter is claimed in the present application.

In connection with the track mechanism and the door, means is provided for automatically controlling its opening and closing movements. In addition, means is provided for automatically

bodily shifting the hinged sections of the door from a vertically closed position to an open, substantially horizontal, overhead open position merely by unlatching one of the door sections. For this purpose there is a pivot 20 on each upper corner of the door and each pivot is connected by a link 21 with another pivot 22, which latter pivot moves up and down in a slot 23 in a bracket plate, or cam slot plate 24 fastened to the section 2 of the door. In addition, this pivot 22 of each link 21 moves into and out of a notch 25 in a bracket 26 stationarily mounted on the doorway or on some other suitable anchorage. This notch 25 of each bracket, there being one on each side of the doorway, is longer on its lower edge so that the notch is shorter on its upper edge than at its lower edge. In addition, the slot 23 of each plate 24 is preferably formed with a bulged portion that bulges in the direction toward the door midway between its lower end and the substantially middle portion of the bracket. This bulge, while not essential to the correct operation of the door, is preferred in that it imparts a beneficial cushioning action to the opening and closing of the door. The bulge in the slot 23 positions the pivot 22 at the inner end of the notch 25, as shown in Figure 9, while the straight lower portion of the slot 23 pulls the pivot out of engagement with said notch as shown in Figure 3 whereby the door is ready to move upwardly into its open overhead position. This construction eases the action and prevents the foremost section 1 from closing violently with a jerk or slam when it moves outwardly laterally toward the door frame. When the door is latched the notch 25 of the two plates 26 holds the door rigidly against any upward movement. For automatically opening the door when unlatched, and for pulling the door into its open overhead position, a pair of coil springs are used, one in each of the overhead tracks 9. The ends of these springs 27 are connected by a pair of links 28 with pivots 29 on the door section 2. Each link 29 is made double as it is composed of two bars spread apart at their lower ends and bent together at their upper ends. The upper ends of these links 28 are connected to wheels or rollers 30 that travel in the overhead tracks and which in turn are connected to the springs 27 mounted in the tracks. The innermost ends of these springs may be fastened in place in any suitable manner, as by bolts 31 inserted through the overhead tracks. Thus these springs are always housed inside of said overhead tracks and are never extended therefrom. Hence these springs cannot sag or move up and down, but can only have extension endwise and horizontally within said tracks. The springs are stretched to their full capacity when the door is in its closed position, as shown in Figure 1 of the drawings, but the stretch is practically all out of the springs when the door assumes its overhead open position against the bumper springs 32. In this way there is no jolting, jarring, or violent action when the door reaches its final open position.

In Figure 12 there is a modification showing a different form of overhead track which is substantially practically rectangular in cross section instead of being cylindrical and in which the door has two rollers 33 instead of the one roller as shown in Figure 11 of the drawings. Thus, in any form of the invention the pivots 22 are at the tops of the slots 23 when the door is in closed position, as shown in Figure 1 of the drawings, and the said pivots are at the same ends of the

said slots when the door is in open position, as shown in Figure 4 of the drawings. This is true, of course, regardless of the form of the overhead tracks, for in each case the same control devices are employed for controlling the uppermost section of the door in the opening and closing of the latter.

In the operation of the door, when the latch 12 is released the top door section 1 will immediately move from the position shown in Figure 1 to that shown in Figure 2. The pull of the coil spring 27 accomplishes this movement through the various levers and pivots in the following manner:

The coil spring 27 pulls on the connecting bar 28. The uppermost end of this bar 28 is guided and supported by a wheel 11 operating within the horizontal track 9. The lower end of bar 28 is pivoted on or near the hinged joint 5 and is so constructed as to give the proper support to the wheel 11 and keep the wheel straight in the track. This bar 28 also supports the weight of the top door section when the door is open. Thus the pull of the spring 27 results in an upward thrust on the entire door. The connecting link 21 pivoted at 20 to the upper corner of the top door section 1 has its lower end moving in the slotted bracket 24, which bracket is attached to the door section 2. Anchored in the lower end of the lever 21 is the stud or pivot 22 which is at this point confined in the slot 25 of the stationary bracket 26 mounted on the side of the frame. As the spring urges the door upwardly, the uppermost door section 1 pivots inwardly about the hinged joint 5 because bar 21 and stud 22 are held confined in slot 25. Thus, as a result of this, the top door section is pulled inwardly and downwardly. After it has been pulled inwardly just a little way it is assisted by gravity and continuous until it rests on the bar 28 (see Figure 6). During the time this is taking place the roller 7 is raising and passes from the straight vertical track 8 into the inclined portion 17 of the track 160 carrying the bracket 24 and the slot 23 upwardly along with the door section 2, but the stud 22 is prevented from raising by slot 25, but since the slotted bracket 24 is raised with the section 2, this bracket also moves inwardly somewhat due to the roller 7 being guided upwardly and inwardly on track 160. Bracket 24 cannot raise the stud 22 but it does push the stud outwardly of the slot 25 until the stud is clear of this slot 25. In this position the stud 22 is now free to move on upwardly, together with the entire door, the spring 27 furnishing the power. The purpose of the bulge in the slot 23 is to reduce the sudden jar on the mechanism when the door is being closed and stud 22 strikes the lower edge of the slot 25. The bulge in the slot is not for the purpose of moving the stud 22 in and out of slot 25 in the stationary bracket 26. This latter movement is attained by the movement of the door section 2 as the roller 7, located at the hinged joint between door sections 1 and 2, moves from the vertical track section 8 into the curved section 160. The important fact is that the bracket 26 has the slot 25, the upper edge of which is shorter than the lower. Thus when the door is being closed the stud 22 strikes the lower edge of slot 25 and is thus never permitted to go lower than this point as the door continues downwardly in its closing movement. This stud 22 thus remains stationary with respect to a vertical direction, but necessarily moves horizontally deeper into slot 25, the movement of the door

section 2 being the cause of this horizontal movement. Reversely, on the opening movement of the door, the door causes the outward movement of stud 22 in slot 25, allowing stud 22 to clear the short upper edge of slot 25 in bracket 26.

In closing the door the stud 22 strikes the lower edge of slot 25 when the bottom door section 4 is approximately six inches from the floor. From this point on until the door is entirely closed, the lower edge of slot 25 forces the uppermost door section closed due to the pressure of the slot 25 on the stud 22 in the lower end of the connecting bar 21. It is only during the final closing and the initial opening of the top door section 1 that the mechanism comprising connecting bar 21, stud 22, bracket 24 and slot 25 have their function.

From the foregoing it will be seen that the door starts moving upwardly practically as soon as the upper section thereof is unlatched and that such movement causes the first wheels or rollers on the door to enter the straight portions 17 of the specially formed track sections 160, as indicated in Figures 2 and 3 of the drawings, and this action causes the links 21 to pull the door section 1 into an inclined position because the pivots or studs 22 are at such time still in the notches 25 of the two bracket plates fastened to the door frame. However, as soon as this section 1 reaches the position shown in Figure 6 of the drawings the springs 27 then exert a pull that raises the door to an extent such that the slots 23 move the pivots 22 out of the notches 25 so that the door is then free to move upwardly and into its horizontal overhead open position. One of the functions of the bulges or curves in each slot 23 is to hold the pivots 22 back in the notches 25, as shown in Figure 9 of the drawings, at a moment when it is important that this be done to ensure the proper desired action of the door.

It will thus be seen that in the present construction the single spring 27 is housed within the horizontal track mechanism and is connected directly to the door sections to raise the door, by means of a link mechanism and preferably a rigid link mechanism, which is preferably connected to the next to uppermost door section so as to permit the uppermost door section to swing freely from a vertical closed position to an inwardly inclined position during the preliminary door opening movements so as to permit the remaining sections of the door to move along the track way, and furthermore we have provided this link mechanism interconnecting the secondmost section of the door and the spring with roller means adapted to run in the track and which link means is positioned so as to support and form a stop for the door in its inclined position; and in addition we have provided automatic means operative by the upward movement of the door and thus operative by the single spring 27 in association with instrumentalities cooperating with the uppermost door section and particularly the link 21 for automatically shifting the uppermost door section from the vertical, closed position to an inwardly inclined position during movement of the door so as to pre-position it for upward door travel and this automatic instrumentality is carried out by the use of the stationary latch mechanism 26 in association with the shiftable cam 24, including the cam slot 23.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing illustrative description and it is obvious that numerous changes may be made in the form, construction and arrangement of

the several parts without departing from the spirit or scope of the invention or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a garage door construction in which the door comprises a plurality of horizontal sections hinged together at their horizontal meeting edges, vertical tracks at the sides of the doorway, overhead tracks disposed horizontally, and intermediate track sections connecting the vertical tracks with the horizontally disposed tracks, the uppermost section of the door being free to swing inwardly from a vertical or closed position in the doorway, means on the door engaging said tracks and track sections, links having their upper ends pivoted on the upper edge portion of the uppermost door section, a locking or stud mechanism for the lower ends of said links and stationary means on the sides of the doorway for engaging said studs or locking means to pull the uppermost door section inwardly at the beginning of the operation of the opening movement of the door.

2. In a garage door construction in which the door comprises a plurality of horizontal sections hinged together at their horizontal meeting edges, vertical tracks at the sides of the doorway, overhead tracks disposed horizontally, intermediate track sections connecting the vertical tracks with the horizontally disposed tracks, the uppermost section of the door being free to swing inwardly from its vertical or closed position in the doorway, means on the door engaging said tracks and track sections, links having their upper ends pivoted on the upper edge portion of the uppermost door section, pivots for the lower ends of said links, and stationary means on the sides of the doorway for engaging said pivots to pull the uppermost door section inwardly at the beginning of the operation of opening the door.

3. A structure as specified in claim 2, comprising plates on the door section immediately below the said uppermost section, said plates having slots for engaging said pivots, thereby to control the engagement of said pivots with and their disengagement from said stationary means, in the opening and closing of the door.

4. A structure as specified in claim 2, comprising springs in said overhead tracks connected to pull on the upper edge portion of the door section immediately below said uppermost section, so that the latter is free to swing inwardly and outwardly at its open edge on the hinges between its lower edge and the upper edge of the door section immediately below said uppermost section, said springs being fully enclosed in both the open and closed positions of the door, and being practically free from stretch or tension when the door is in open position.

5. A structure as specified in claim 2, said stationary means comprising bracket plates at opposite sides of the doorway, each bracket plate having an open horizontal notch formed with a longer lower edge than its upper edge.

6. A structure as specified in claim 2, the upper edge portion of the uppermost door section having a latch bolt, means on the top portion of the doorway for engaging said latch bolt, and means controllable from the outside of the door to release said latch bolt when it is desired to open the door.

7. A structure as specified in claim 2, the connections between the springs and the door section immediately below the uppermost door section comprising a pair of bars at each side of the doorway, these bars being bent together at their upper ends at each side of the door, and each pair of bars being spread apart a substantial distance where they are pivoted on the upper portion of the said lower door section.

8. A structure as specified in claim 2, said overhead tracks being hollow in cross section and each provided on its inner side with a slot for means carried on the door.

9. A multi-sectioned overhead door comprising a plurality of hinged door sections, bearing means on each of said sections engageable with a pair of tracks, said tracks being located on opposite sides of the door opening and each having a vertical rail merging inwardly at the top thereof with a horizontal rail substantially normal to said opening, means pivotally connected to the upper portion of the uppermost door section and movable therewith as said door sections move upwardly for tilting the uppermost section of the door inwardly and additional means connected to said doors and bearing in the track sections for causing said door sections to move along the track sections whereby to shift the door from vertically closed position to substantially horizontal overhead open position.

10. A multi-sectioned overhead door comprising a plurality of hinged door sections, bearing means on each of said sections engageable with a pair of tracks, said tracks being located on opposite sides of the door opening and each having a vertical rail merging inwardly at the top thereof with a horizontal rail substantially normal to said opening, a spring for opening the door, a stationary latch, a cam slot carried by an intermediate section of the door, a link pivotally connected to the top of the top section of the door having a lug operative in said cam slot, a second link connecting the spring and that section of the door bearing the cam slot, said cam slot being shaped whereby upon unlatching the door said spring tends to move the door upwardly and causes the cam slot to hold the lug in the stationary latch and thereby cause the inward tilting of the upper section of the door and thereafter upon the further upward movement of the door to release said lug from said stationary latch and to shift the bearing means of the door sections along the vertical and horizontal tracks from a closed position of the door to an open, substantially horizontal position of the door.

11. In a garage door of the type having a plurality of horizontally hinged sections adapted when vertically positioned to be in door closing position, track means having vertical and horizontal portions bearing means disposed substantially at the juncture of the two highest door sections, the upper door section being free of bearing means, said bearing means operating in said tracks, spring means for shifting the door, a link interconnecting the spring means with the door section that is hinged to the upper portion of the next to the highest door section when the door sections are in closed position, a second link pivotally connected to the top of said uppermost door section, a stationary open slotted latch, a lug on the bottom of said second link adapted to enter said slot of the latch and a cam plate carried by the second highest door section and operative on said lug for holding said lug in said

latch slot whereby to shift the upper door section inwardly and away from vertical closed position, said cam means thereafter removing the lug from said latch slot as said door moves upwardly, said spring and linkage mechanism thereafter causing said door sections to travel along said track to shift it overhead to substantially horizontal position.

12. In a garage door construction of the horizontally hinged sectional type, the combination of a stationary doorway having vertical and horizontal interconnected tracks, bearing means on the door sections running in said tracks, the upper portion of the top section of said door being free of said bearing means and tiltable toward and from said stationary track means, spring means mounted at the top of said door frame and having one end anchored, a linkage connected to the opposite end of said spring and to one of the door sections, a second linkage connected to the top of the top door section, and means automatically acting upon said second linkage upon the upward movement of the door for shifting the upper section of the door inwardly and for thereafter causing said door section to travel along said track mechanism.

13. In a garage door having horizontally hinged sections, the combination of a door frame, track means affixed thereto having vertical and horizontal sections and an interconnecting section along which the door is adapted to move, bearing means carried by certain of the door sections adapted to run in said track means, spring means, door impelling means operative by said spring and connected to the door and operable in the track sections along the horizontal track and connected with the door for pulling the door upwardly to open position along said track, and instrumentalities associated with certain of the door sections for shifting the upper door section from closed vertical position to inwardly inclined position upon the preliminary upward movement of the door whereby to preposition said uppermost door section for movement of the door sections upwardly into horizontal overhead position along said track.

14. In a garage or other door construction wherein the door is composed of horizontally hinged sections, a door frame including vertical and horizontal tracks having interconnected track portions, certain of the door sections having bearing means adapted to run in said tracks, power spring means having one end stationarily anchored, the opposite end of the spring means being connected to one of the door sections, and additional means for causing the uppermost door section to swing from a vertical closed position to an inwardly inclined position during the upward movement of the door sections by the spring.

15. In a garage or other door construction wherein the door is composed of horizontally hinged sections, a door frame including vertical and horizontal tracks having interconnected track portions, certain of the door sections having bearing means adapted to run in said tracks, power spring means disposed in the horizontal track, said spring means having one end anchored, another portion of the spring means being connected by means of a link to one of the door sections, the uppermost door section being free to swing from a vertical closed position to an inwardly inclined position during the upward movement of the door sections by the spring, said uppermost door section having an

additional link pivotally connected thereto, and cam means associated with said second link and operative upon movement of said door sections under the impulse of said spring for automatically shifting said uppermost door section relative to a vertically closed position.

16. In a garage or other door construction wherein the door is composed of horizontally hinged sections, a door frame including vertical and horizontal tracks having interconnected track portions, certain of the door sections having bearing means adapted to run in said tracks, power spring means disposed in the horizontal track, said spring means having one end anchored, another portion of the spring means being connected by means of a link to one of the door sections, the uppermost door section being free to swing from a vertical closed position to an inwardly inclined position during the upward movement of the door sections by the spring, said uppermost door section having an additional link pivotally connected thereto, and cam means associated with said second link and operative upon movement of said door sections under the impulse of said spring for automatically shifting said uppermost door section relative to a vertically closed position, said cam means comprising a cam plate fixed on the next to uppermost door section and operatively associated with the lowermost portion of said second link, and stationary latching means adapted to be engaged with and disengaged from the lowermost portion of said second link for cooperating with the upward movement of the door for inwardly shifting the uppermost portion of said door.

17. In a garage or other door of the horizontally hinged sectional type, a door frame having a vertical track and a horizontal overhead track with interconnecting sections, certain of the door sections having bearing means adapted to run along said track sections, a spring housed within the horizontal track and having one end anchored, a rigid link pivotally connected to the opposite end of the spring, a roller on the end of the link connecting with said spring and adapted to run in said track, a second roller disposed at the hinged connection of the uppermost and next to uppermost door sections, said second roller adapted to run in said track, the opposite end of said first link being pivotally connected to the door adjacent said first mentioned hinge connection, a second link pivotally connected to the uppermost edge of said door, said second link carrying at its opposite end a latching stud, a slotted cam plate carried by said next to uppermost door section and adapted to receive the stud on the second link, a stationary latching plate carried by the door frame and having a latching slot therein adapted to receive the latching lug on the second link, said cam plate being shaped to cause the locking engagement of the lug on the second link with said cam slot and its automatic disengagement from said latching slot whereby to cause the automatic inward tilting of the upper section of the door from a closed vertical position during the upward movement of the door.

18. A multiple sectioned overhead door comprising a plurality of hinged door sections, tracks located on opposite sides of the door opening and each having a vertical rail merging inwardly at the top thereof with a horizontal rail substantially normal to said opening, spring means having one end anchored, a carrier movable with the door in all positions of the door, said carrier being pivoted to the door section beneath the uppermost section at one end and having means running in the tracks at its opposite end, the end of said spring opposite the anchorage being connected to said carrier and whereby to pull the door to open position when the door is unlatched, means for automatically shifting the upper door when unlatched comprising mechanism pivotally connected to the upper portion of the door, and stationary means operatively associated with said second mentioned mechanism for causing the automatic shifting of said uppermost door upon movement of the door.

19. A multiple sectioned overhead door comprising a plurality of hinged door sections, a frame, tracks mounted on the frame at the sides of the opening, each track having a vertical rail and at the top a horizontal rail substantially normal to said vertical rail, means adapted to run in the track and bodily movable with the uppermost door section in all positions of said upper door section, a carrier connected to one of the leading door sections of the door and operable in said track, spring means for urging said carrier in a predetermined direction, and means for shifting the uppermost door section upon movement of the door along the track, said means being pivotally connected to the upper portion of the uppermost door section, and actuating means for said last named means for shifting said uppermost door section upon movement of the door sections along the track.

20. In a garage door construction in which the door comprises a plurality of horizontal sections hinged together at their horizontal meeting edges, vertical tracks at the sides of the doorway, overhead tracks disposed horizontally, and intermediate track sections connecting the vertical tracks with the horizontally disposed tracks, the uppermost section of the door being free to swing inwardly from a vertical or closed position in the doorway, means on the door engaging said tracks and track sections, means for automatically bodily shifting the hinged sections of the door from closed to open position comprising elongated mechanism having an upper portion pivoted on the upper edge portion of the uppermost door section, and locking mechanism for a lower portion of said elongated mechanism, and stationary means on the sides of the doorway for engaging said locking mechanism to pull the uppermost door section inwardly at the beginning of the operation of the opening movement of the door.

BIRDIE D. FERRIS.

*Executrix of the Estate of William D. Ferris,
Deceased.*

CECIL R. WOLF.