March 26, 1935. C. G. JOHNSON ET AL 1,995,773

DOOR CONSTRUCTION

Filed Oct. 6, 1931 2 Sheets-Sheet 1

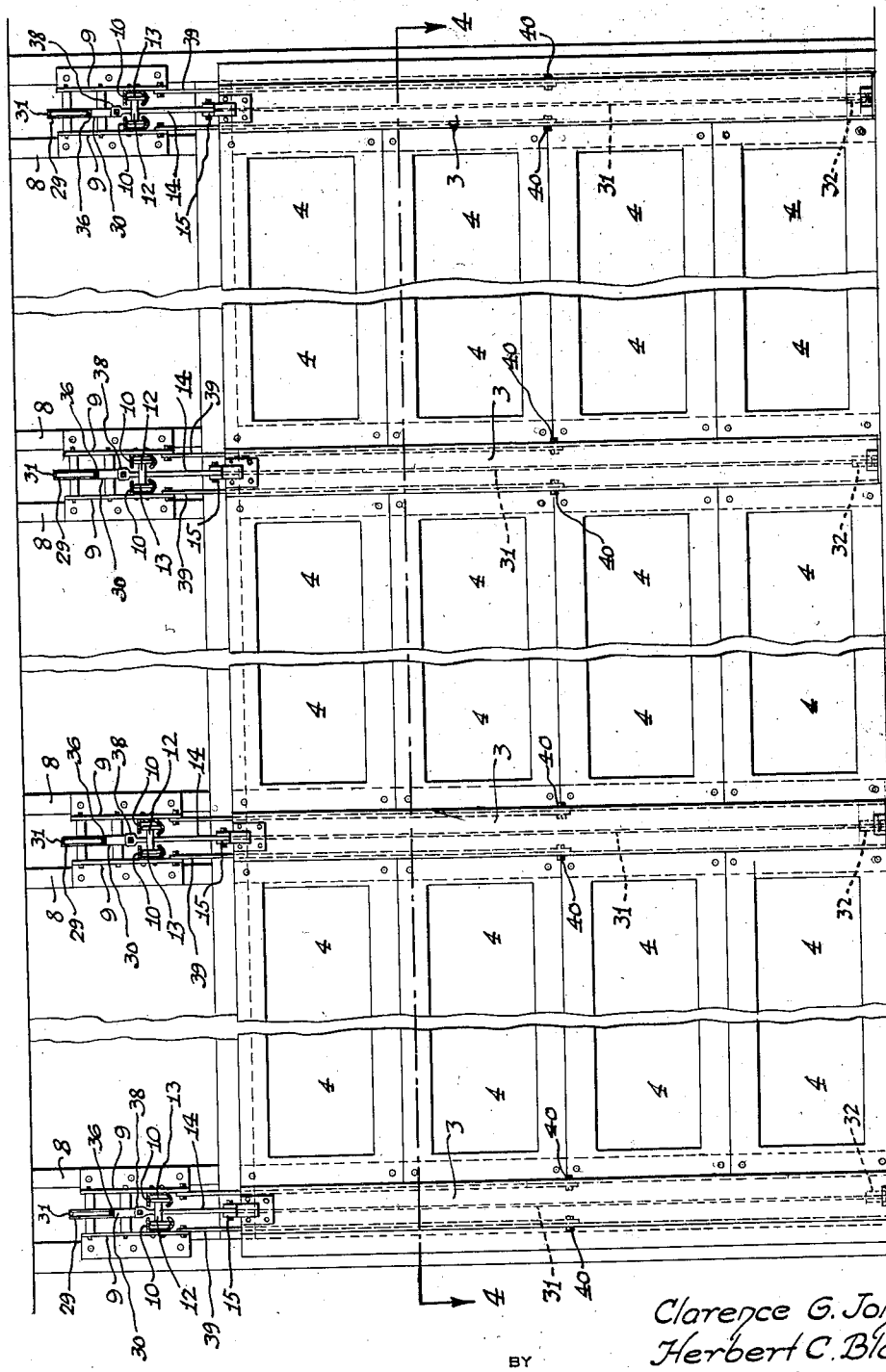


Fig. 1.

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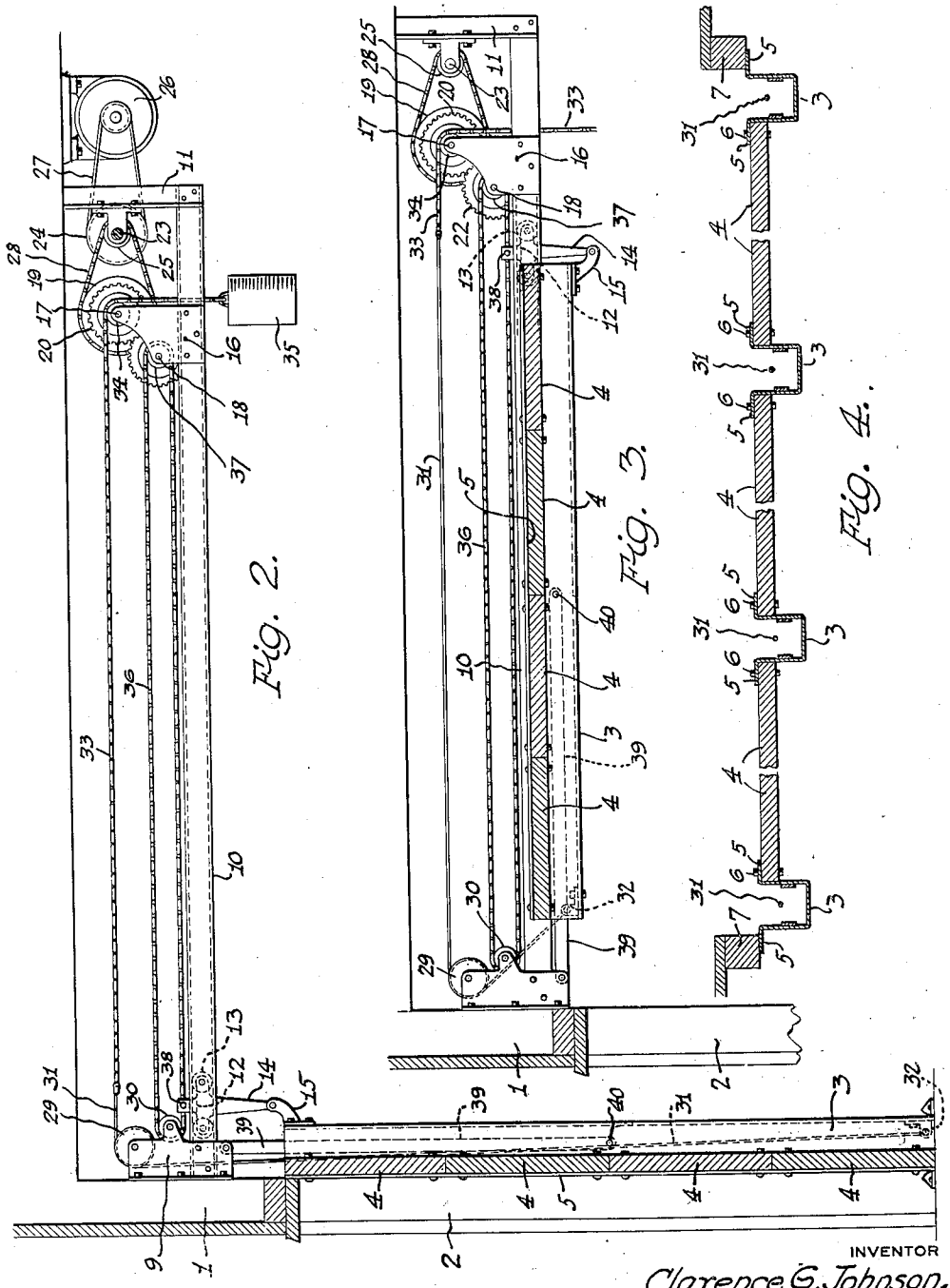


Fig. 2.

Fig. 3.

Fig. 4.

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Patented Mar. 26, 1935

1,995,773

UNITED STATES PATENT OFFICE

1,995,773

DOOR CONSTRUCTION

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Application October 6, 1931, Serial No. 567,242

12 Claims. (Cl. 20—19)

The present invention pertains to a novel door construction wherein there is provided a door opening of such width as to permit at least two motor vehicles to pass therethrough abreast of each other.

The principal object of the invention is to provide a rigid door for such an opening together with means, preferably power actuated, for opening the door by moving it from a vertical to a horizontal upward position, and vice versa. The device of the invention is distinguished by the fact that it does not consist of separately operable door sections and that the door requires no guide rails at the sides of the door opening.

Another characteristic of the invention is that the door is made up of door units of standard width secured to intermediate posts. Over the door opening are mounted tracks which extend inwardly of the structure and the upper ends of the posts are pivotally attached to carriages which ride on the tracks. A suitable means is provided for propelling the carriages on the tracks, and the same means also operates on cables connected to the lower edge of the door for a lifting pull thereon. The door, in moving from closed to open position and vice versa, is guided by means of links pivotally attached thereto and also pivoted to the structure immediately over the door opening, in such a manner that the vertical center of the door travels in a true arc.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings in which—

Figure 1 is an elevation of the door construction at the inner side thereof, showing the structure in section;

Fig. 2 is a sectional view taken transversely of the door opening and showing the door in closed position;

Fig. 3 is a similar section showing the door in raised or open position, and

Fig. 4 is a section on the line 4—4 of Figure 1.

Reference to these views will now be had by use of like characters which are employed to designate corresponding parts throughout.

In the several figures is shown a structure 1 formed with a door opening 2 of a large width to permit several motor vehicles to pass therethrough abreast of each other. The door for closing the opening consists of spaced vertical posts 3 of channel construction having door units between adjacent posts. Each door unit is built of superimposed standard panels 4, the ends of which are secured to outward flanges 5 of the posts 3 by means of bolts 6. The end posts however abut against jambs 7 at the sides of the opening but are not secured thereto.

Above the upper end of each post, a pair of spaced studs 8 is comprised in the building structure, and vertical angle brackets 9 are secured to these studs. From the space between each pair of brackets extends a track comprising a pair of horizontal rails 10 which have their forward ends secured to the brackets. The rails extend inwardly of the structure and have their rear ends supported by any suitable means such as hangers 11.

Each track supports a carriage 12 having rollers 13 riding in the rails. An arm 14 extends downwardly from each carriage and is pivotally attached to an ear 15 secured to the upper end of the corresponding post 3.

To the rear ends of the tracks are secured brackets 16 in each of which are journalled shafts 17 and 18. The shafts 17 carry sprocket wheels 19 and smaller gears 20 while the shafts 18 carry sprocket wheels 21 and larger gears 22 meshing with the gears 20. One such unit is provided for each track. A line shaft 23 is suitably journalled in parallel relation to the shafts 17 and 18 and carries a pulley 24 and sprocket wheels 25 in line with the sprocket wheel 19. An electric motor 26 is suitably supported adjacent the shaft 23 and is connected to the pulley 24 by a belt 27. The sprockets 25 are geared to the respective sprockets 19 by chains 28. Thus, the shafts 17 and 18 are turned when the motor is in operation.

Each pair of brackets 9 supports a pulley 29 and a sprocket wheel 30. Cables 31 are secured to brackets 32 at the lower ends of the posts 3, are passed over the pulleys 29 and then continued as sprocket chains 33 passed over respectively aligned sprocket wheels 34 on the shafts 17. Counterweights 35 are carried by the free or depending ends of the chains 33. An endless sprocket chain 36 is passed over each sprocket wheel 30 and an aligned sprocket wheel 37 on the corresponding shaft 18. The chains 36 are secured at 38 to the respective carriages 12. Finally, links 39 have their upper ends pivotally attached to the brackets 9 and their lower ends pivotally attached as at 40 to the sides of the members 3, substantially at the vertical midpoints thereof. As shown in Figure 1, there are two such links for each post.

In the operation of the device, assuming that the parts are in the positions shown in Figures 1 and 2, the door is raised by operating the motor 26 in counter-clockwise direction or the di-

rection which draws the chains 33 and cables 29. The lower edge of the door is thereby raised by the cables 31, while the upper edge is drawn inwardly by the movement of the carriages 12 which are secured to the chains 36. At the same time, the points 40 swing inwardly in arcs with the links 39 as radii. Finally, the door assumes the position shown in Figure 3 where it lies horizontally along the tracks, the upper edge being supported by the carriages 12 and the lower edge by the cables 29.

It may be now seen that the invention provides a door for an unusually wide opening, the door being built of standard units and sections and operated by means of a single power device. In closing the door, the motor 26 is obviously operated in the reverse direction of that previously described. The counterweights 35 relieve the motor, and in some cases the motor may be replaced by a hand operated mechanism such as differential pulleys.

Although a specific embodiment of the invention has been illustrated and described, it will be apparent that various alterations in the details of construction may be made without departing from the scope of the invention as indicated by the appended claims.

What we claim is:—

1. In a building structure providing a door opening, a door adapted to close said opening, said door being disposed inwardly of said structure and overlapping the vertical and horizontal edges of the structure defining said opening, said door being formed with vertically extending grooves in the outside face thereof, said grooves being arranged with one adjacent to each vertical edge of said door and at least one disposed at a point spaced inwardly from said vertical edges, cables disposed within said grooves and having their lower ends attached to said door adjacent to the lower edge thereof, means for moving and guiding the upper edge of said door inwardly of said structure, means for simultaneously raising said cables in all of said grooves and for actuating said moving and guiding means, and means for guiding the movement of the lower edge of said door during actuation of said cables and said moving and guiding means.

2. In a building structure providing a door opening, a door adapted to close said opening, said door being disposed inwardly of said structure and overlapping the vertical and horizontal edges of the structure defining said opening, said door being formed with vertically extending grooves in the outside face thereof, said grooves being arranged with one adjacent to each vertical edge of said door and at least one disposed at a point spaced inwardly from said vertical edges, cables disposed within said grooves and having their lower ends attached to said door adjacent to the lower edge thereof, means for moving and guiding the upper edge of said door inwardly of said structure, one of said means being attached to said door at points adjacent to the upper end of each groove, means for simultaneously raising said cables in all of said grooves and for actuating said moving and guiding means, and means for guiding the movement of the lower edge of said door during actuation of said cables and said moving and guiding means.

3. In a building structure providing a door opening, a door adapted to close said opening, said door being disposed inwardly of said structure and overlapping the vertical and horizontal edges of the structure defining said opening, said door being formed with vertically extending grooves in the outside face thereof, said grooves being arranged with one adjacent to each vertical edge of said door and at least one disposed at a point spaced inwardly from said vertical edges, cables disposed within said grooves and having their lower ends attached to said door adjacent to the lower edge thereof, means for moving and guiding the upper edge of said door inwardly of said structure, means for simultaneously raising said cables in all of said grooves and for actuating said moving and guiding means, and means mounted in each of said grooves for guiding the movement of the lower edge of said door during actuation of said cables and said moving and guiding means.

4. In a building structure providing a door opening, a door adapted to close said opening, said door being disposed inwardly of said structure and overlapping the vertical and horizontal edges of the structure defining said opening, said door being formed with vertically extending grooves in the outside face thereof, said grooves being arranged with one adjacent to each vertical edge of said door and at least one disposed at a point spaced inwardly from said vertical edges, cables disposed within said grooves and having their lower ends attached to said door adjacent to the lower edge thereof, means for moving and guiding the upper edge of said door inwardly of said structure, one of said means being attached to said door at points adjacent to the upper end of each groove, means for simultaneously raising said cables in all of said grooves and for actuating said moving and guiding means, and means mounted in each of said grooves for guiding the movement of the lower edge of said door during actuation of said cables and said moving and guiding means.

5. In a building structure providing a door opening, a door adapted to close said opening, said door being disposed inwardly of said structure and overlapping the vertical and horizontal edges of the structure defining said opening, said door being formed with vertically extending grooves in the outside face thereof, said grooves being arranged with one adjacent to each vertical edge of said door and at least one disposed at a point spaced inwardly from said vertical edges, cables disposed within said grooves and having their lower ends attached to said door adjacent to the lower edge thereof, means for moving and guiding the upper edge of said door inwardly of said structure, means for simultaneously raising said cables in all of said grooves and for actuating said moving and guiding means, and a link disposed in each of said grooves with one end of each link pivotally attached to the side wall of its respective groove and its other end pivotally attached to the door structure above said opening.

6. In a building structure providing a door opening, a door adapted to close said opening, said door comprising a plurality of panels, channel shaped posts secured to the vertical edges of said panels to rigidly unite abutting panels and to overlap the vertical edges of the structure defining said opening respectively, said channel shaped posts being disposed with the troughs therein forming vertically extending grooves in the outside face of said door, cables disposed within said grooves with their lower ends attached to said posts adjacent to the lower ends

thereof, means attached to the upper end of each post for moving and guiding the upper end of said door inwardly relative to said opening, means for simultaneously raising said cables and for actuating said moving and guiding means, and means for guiding the movement of the lower edge of said door during actuation of said last named means.

7. In a building structure providing a door opening, a door adapted to close said opening, said door comprising a plurality of panels, channel shaped posts secured to the vertical edges of said panels to rigidly unite abutting panels and to overlap the vertical edges of the structure defining said opening respectively, said channel shaped posts being disposed with the troughs therein forming vertically extending grooves in the outside face of said door, cables disposed within said grooves with their lower ends attached to said posts adjacent to the lower ends thereof, means attached to the upper end of each post for moving and guiding the upper end of said door inwardly relative to said opening, means for simultaneously raising said cables and for actuating said moving and guiding means, and means received in the groove formed by each post, for guiding the movement of the lower edge of said door during actuation of said last named means.

8. In a building structure providing a door opening, a door adapted to close said opening, said door comprising a plurality of panels, channel shaped posts secured to the vertical edges of said panels to rigidly unite abutting panels and to overlap the vertical edges of the structure defining said opening respectively said channel shaped posts being disposed with the troughs therein forming vertically extending grooves in the outside face of said door, cables disposed within said grooves with their lower ends attached to said posts adjacent to the lower ends thereof, means attached to the upper end of each post for moving and guiding the upper end of said door inwardly relative to said opening, means for simultaneously raising said cables and for actuating said moving and guiding means, and a link disposed in the groove formed by each post, each of said links having its lower end pivotally attached to its respective post and its other end pivotally attached to the building structure above said door opening.

9. In a building structure providing a door opening, a door for closing said opening, said door having a vertically extending groove in the outside face thereof and spaced inwardly from the vertical side edges thereof, a cable disposed in said groove, means attached to said door at the upper edge thereof adjacent to said groove for moving and guiding the upper edge of said door inwardly, means for simultaneously raising said cable and for actuating said moving and guiding means, and means in said groove for guiding the lower edge of said door during movement of the upper edge.

10. In a building structure providing a door opening, a door for closing said opening, said door having a vertically extending groove in the outside face thereof and spaced inwardly from the vertical side edges thereof, a cable disposed in said groove, means attached to said door at the upper edge thereof adjacent to said groove for moving and guiding the upper edge of said door inwardly, means for simultaneously raising said cable and for actuating said moving and guiding means, and a link disposed within said groove and having its lower end pivotally attached to said door and its upper end pivotally attached to said building structure.

11. In a building structure providing a door opening, a door for closing said opening, said door comprising a plurality of panels, a channel shaped post rigidly uniting vertical abutting edges of said panels, said channel shaped post being disposed so that the trough therein forms a vertically extending groove in the outside face of the door, a cable disposed in said groove and having its lower end connected to said post adjacent to the lower end thereof, means attached to the upper end of said post for moving and guiding said door inwardly from said opening, means for simultaneously raising said cable and for actuating said guiding and moving means, and means disposed within said groove for guiding the lower end of said door during inward movement of the upper end.

12. In a building structure providing a door opening, a door for closing said opening, said door comprising a plurality of panels, a channel shaped post rigidly uniting vertical abutting edges of said panels, said channel shaped post being disposed so that the trough therein forms a vertically extending groove in the outside face of the door, a cable disposed in said groove and having its lower end connected to said post adjacent to the lower end thereof, means attached to the upper end of said post for moving and guiding said door inwardly from said opening, means for simultaneously raising said cable and for actuating said guiding and moving means, and a link disposed within said groove and having its lower end attached to said post and its upper end attached to said door structure.

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