Mar. 3, 1925. 1,528,298

H. MANIFOLD

GARAGE DOOR

Filed Sept. 15, 1923 3 Sheets-Sheet 1

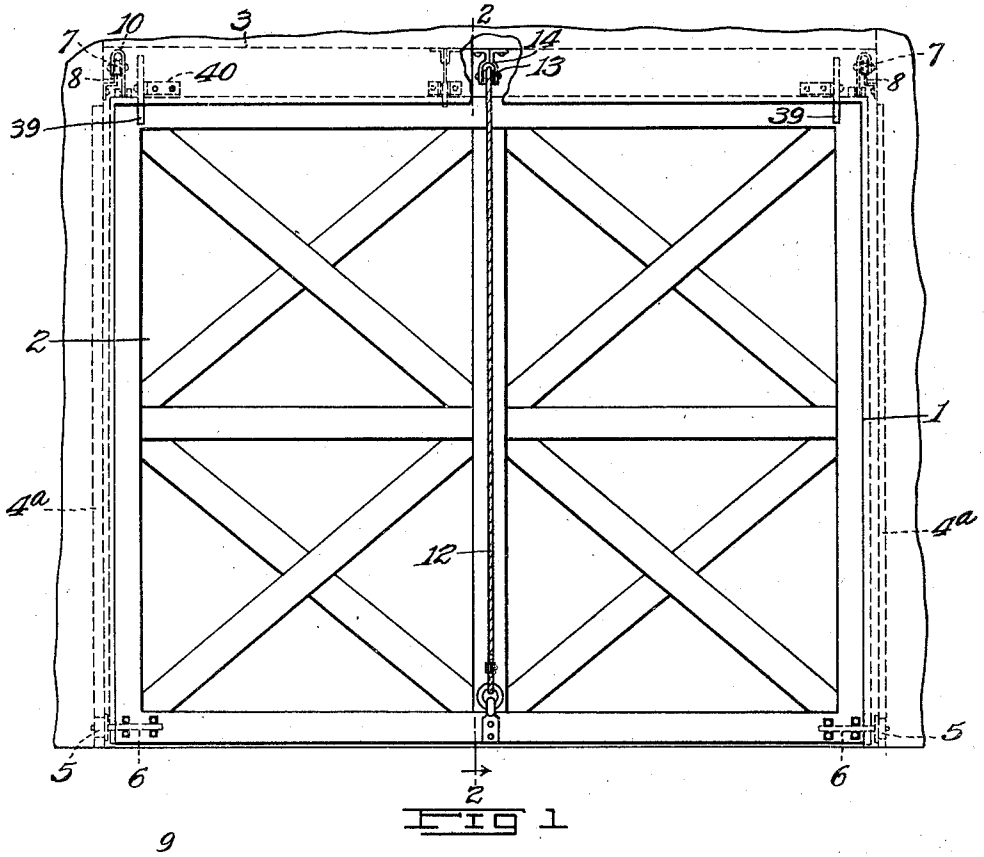


FIG 1

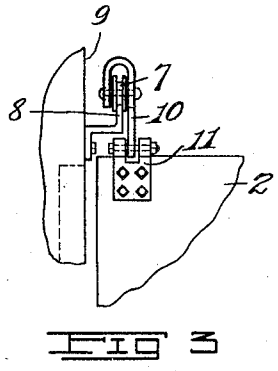


FIG 3

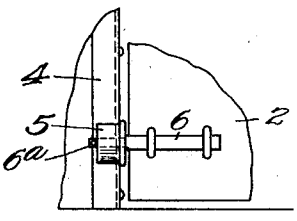


FIG 4

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H. MANIFOLD

GARAGE DOOR

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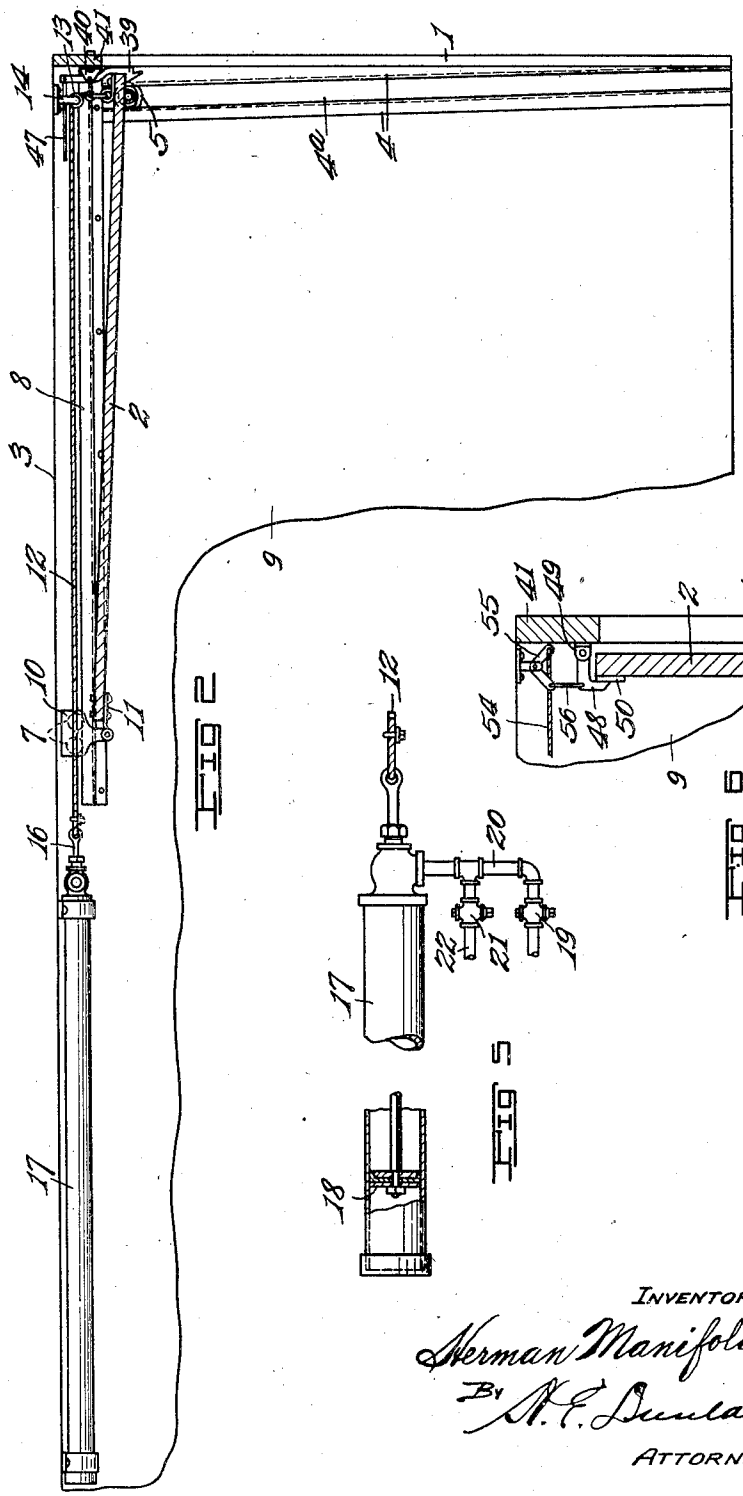


FIG 2

FIG 6

FIG 5

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H. MANIFOLD

GARAGE DOOR

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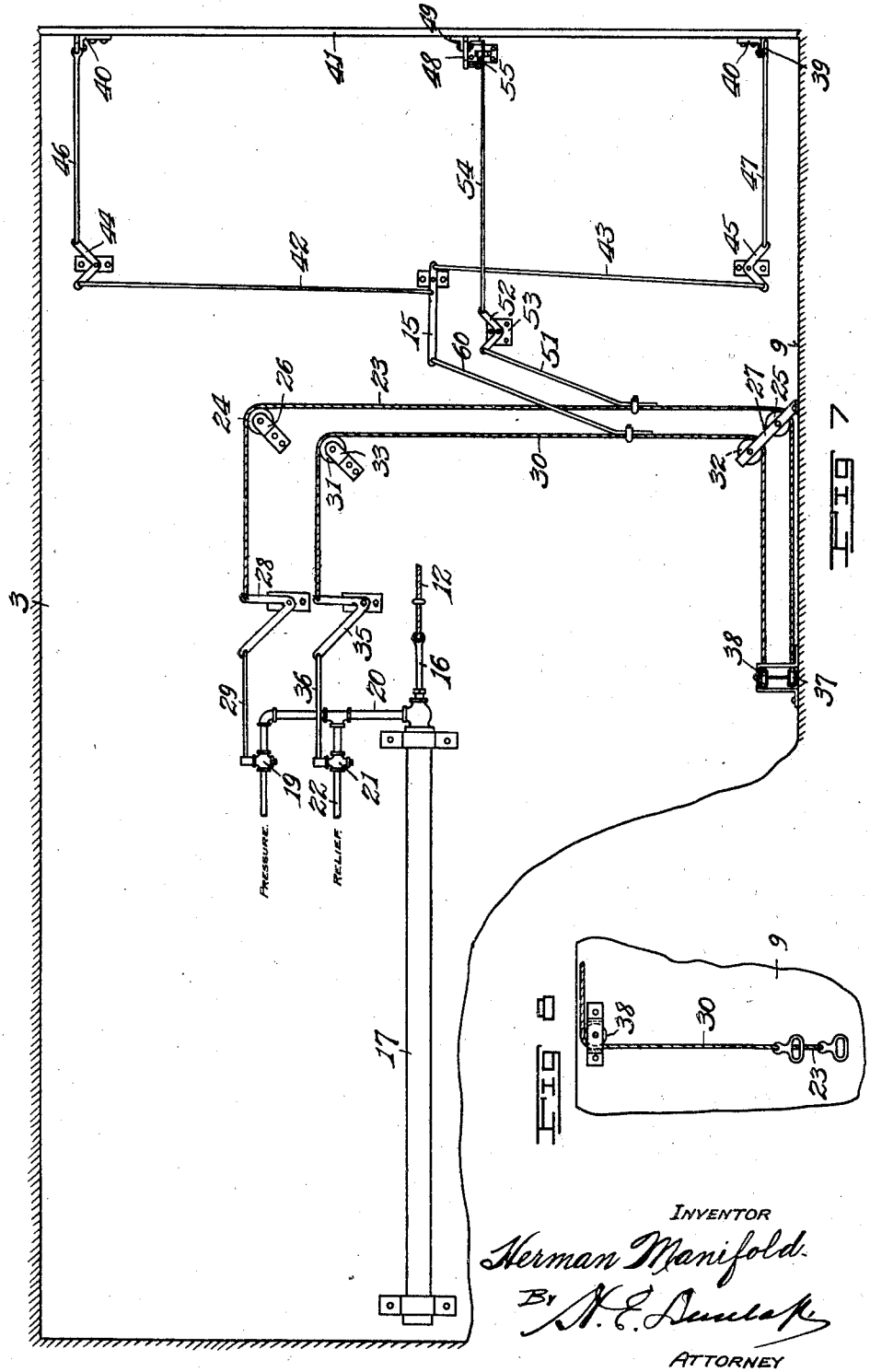


FIG 7

FIG 8

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Patented Mar. 3, 1925. 1,528,298

UNITED STATES PATENT OFFICE.

HERMAN MANIFOLD, OF DILLONVALE, OHIO.

GARAGE DOOR.

Application filed September 15, 1923. Serial No. 662,834.

To all whom it may concern:

Be it known that I, HERMAN MANIFOLD, a citizen of the United States of America, and resident of Dillonvale, county of Jefferson, and State of Ohio, have invented certain new and useful Improvements in Garage Doors, of which the following is a specification.

This invention relates broadly to doors, and more specifically to a door for garages, factories, and the like, and mechanism for opening and closing such doors.

The primary object of the invention is to provide a door, designed primarily for garages, having associated therewith novel and conveniently operated mechanism whereby it may be opened and closed.

With this and other important objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of my garage door and door-operating mechanism, applied;

Figure 2 is a section on line 2—2, Fig. 1, showing the door in its elevated, open position and illustrating parts of the operating mechanism;

Figure 3 is an enlarged fragmentary detail view, in rear elevation, of a door carrier or trolley and the trackway therefor;

Figure 4 is a similar view of a guide roller or carrier for the lower edge portion of the door;

Figure 5 is an enlarged view, partly in side elevation and partly in longitudinal section of the power cylinder;

Figure 6 is a detail section of an upper portion of the door disposed in closed position and showing, in side elevation, the latch mechanism by which unauthorized opening of the door is prevented;

Figure 7 is a ceiling view showing in plan the door opening and closing mechanism; and

Figure 8 is a side elevation of the hand controls.

Referring to said drawings, 1 indicates generally a doorway opening provided in a building, as a public garage, 2 the door for closing said doorway, and 3 the ceiling of the building inside said doorway and over the runway which leads inward from said doorway.

Located at each of the opposite sides of the doorway 1 are substantially upright parallel members 4 which are spaced apart to provide a guideway 4^a for a roller 5 carried by the adjacent lateral edge portion of the door near the bottom edge of the latter. Said roller is preferably mounted upon the laterally projecting spindle 6^a of a rod or bar 6 which is rigidly attached in a horizontal position on the lower portion of the door, as shown.

The door is suspended by wheels or trolleys 7 which are disposed for travel upon trackways 8 that are mounted horizontally in suitable position, as upon the opposite side walls 9 which define the runway. Each of said trolleys is journaled in a bracket-like support or hanger 10 which has pivot-like connection with a bracket 11 fixed upon the upper edge portion of the door.

A cable 12 has its outer end attached to the lower portion of the door, preferably on the outer face of the latter, and said cable thence extends vertically over a pulley wheel 13 carried by a supporting bracket 14 located in a suitable position, as upon the ceiling 3, which overhangs the runway at a point adjacent to the top of the doorway 1. Said cable thence extends inward and has its opposite end connected to the outer end of a piston rod 16 which projects from an end of a power cylinder 17. Said cylinder, which may employ therein either steam or compressed air for actuating the piston 18 by which said rod 16 is carried, is suitably mounted, as on the ceiling 3, and is made of dimensions suitable for performing its function of drawing said cable 12 inward throughout the distance necessary to effect complete elevation of the door from the closed position shown in Fig. 1 to the elevated open position shown in Fig. 2.

The actuating pressure, whether air or steam, is admitted to the outer end of the cylinder 17 by opening a valve 19 provided in a pressure line 20 which opens into said end and said pressure actuates advance travel of the piston, which in lowered position of the door occupies a position at or adjacent to said outer end of the cylinder, and thus, through the cable 12, effects elevation of the door. In opening, the trolleys 7 carrying the door travel inward upon the trackways 8 and the rollers 5 travel upward in the guideways 4^a. A relief valve 21 located in a suitable position, as in a pipe

22 which branches from the line 20 at a point between the cylinder and the inlet valve 19, is opened to release the pressure in the cylinder when it is desired that the door be lowered into closing relation to the doorway. As said pressure is gradually released, the door descends by gravity to its closing position.

The valves 19 and 21 are preferably of self-closing types and consequently remain closed except when manually held open. A cable 23 passed over or about suitably arranged pulleys, as 24 and 25 carried by brackets 26 and 27 mounted on the ceiling 3 and the wall 9, is attached at one end to one arm of a bell-crank lever 28. The opposite arm of said lever is connected, as by a rod 29, to the valve 19 in such manner that a pull applied to said rod effects opening of said valve. In like manner a cable 30, passed about suitably arranged pulleys 31 and 32 carried by brackets 33 and 27, is attached to one arm of a bell-crank lever 35 having its opposite end operatively connected, as by a rod 36, to the valve 21. The outer ends of said cables 23 and 30 depend over pulleys 37 and 38, respectively, in positions in which they may be conveniently grasped by hand for exerting valve-opening force therethrough, as indicated in Fig. 8.

A latch-like member 39 is mounted on a bracket 40 mounted in a suitable position adjacent to opposite sides of the top of the door, as on a cross-bar or beam 41, for automatically assuming underlying supporting relation to the bottom edge portion of the door when the latter occupies its fully elevated position, as shown in Fig. 2. To provide for withdrawal of said supporting members or latches 39 simultaneously with the opening of the relief valve 21, thereby to release and permit the descent of the door to closing position, suitable mechanism is provided intermediate said latches and the cable 30. As herein shown, said mechanism comprises a rod 60 attached to one end of said cable 30, a lever 15 pivoted on the ceiling 3, rods 42 and 43 extending laterally in opposite directions from said lever and attached to the latter on opposite sides of the pivot thereof. The outer ends of said rods 42 and 43 are connected, as through bell cranks 44 and 45 and rods 46 and 47, respectively, with the opposite latches 39 in such manner that tractive force applied to the cable 30 for effecting opening of the relief valve 21 acts simultaneously through the thereto attached rods and levers to swing said latches to door-releasing positions.

A latch mechanism normally prevents elevation of the door from its lowered position. Said latch mechanism consists of a hook 48 pivoted upon a bracket 49 mounted upon the beam 41 intermediate the ends of the latter in such position that it overlies the upper edge of the door with its downward bill portion seated against the inner face of the door, or against a plate 50 mounted on said face. Said hook is connected by suitable intermediate mechanism to the cable 23 in such manner that it is elevated to door-disengaging position simultaneously with the opening of the pressure inlet valve 19, said mechanism, as herein shown for illustrative purposes, comprising a rod 51 attached at one end to said cable 23 and at its opposite end to an arm of a bell crank lever 52 which is pivoted on a bracket 53 mounted on the ceiling. A rod or cable 54 connects the opposite arm of said bell crank 52 to an end of a second bell-crank lever 55 which overhangs the hook and which has its opposite end attached by an intermediate link 56 to the free end of said hook. As is obvious, force applied to the cable 23 for opening valve 19 acts through the intermediate mechanism to retract the hook 48 to a position permitting unobstructed elevation of the door.

While I have herein shown and described certain specific mechanisms intermediate the valve opening cables and the doors supporting latches and the door-retaining hook, it will be understood that these are intended merely as illustrative of operative mechanisms and that I do not contemplate limiting myself thereto.

What is claimed is—

1. The combination with a wall of a building having a doorway therein, of a door for closing said door-way, trolleys attached to the upper part of said door in supporting relation to the latter, horizontal inwardly extending trackways for said trolleys, substantially upright guideways at opposite sides of said doorway, rollers carried by the lower portion of said door disposed for travel in said guideways, a pulley supported over said doorway, a cable attached to the lower part of said door and passing over said pulley, a fluid-pressure cylinder having a piston and piston rod, said piston rod being connected to said cable, manually shiftable means for introducing pressure into said cylinder for actuating movement of said rod whereby tractive force is exerted through said cable for producing travel of said door to an elevated substantially horizontal doorway opening position, a latch normally engaged with and preventing elevation of said door, and means intermediate said latch and said manually-shiftable means whereby actuation of the latter also effects withdrawal of said latch from operative position.

2. The combination with a wall of a building having a doorway therein, of a door for closing said doorway, trolleys attached to the upper part of said door in supporting relation to the latter, horizontal

inwardly extending trackways for said trolleys, substantially upright guideways at opposite sides of said doorway, rollers carried by the lower portion of said door disposed for travel in said guideways, a pulley supported over said doorway, a cable attached to the lower part of said door and passing over said pulley, a fluid-pressure cylinder having a piston and piston rod, said piston rod being connected to said cable, manually shiftable means for introducing pressure into said cylinder for actuating movement of said rod whereby tractive force is exerted through said cable for producing travel of said door to an elevated substantially horizontal doorway opening position, means for releasing the actuating pressure to allow the door to gravitate to doorway closing position, devices engageable with the bottom portion of the door when the latter assumes its fully elevated position whereby it is supported against lowering movement, and means intermediate said devices and the pressure releasing means whereby actuation of the latter also effects movement of said devices to inoperative positions.

3. The combination with a wall of a building having a doorway therein, of a door for closing said doorway, trolleys attached to the upper part of said door in supporting relation to the latter, horizontal inwardly extending trackways for said trolleys, substantially upright guideways at opposite sides of said doorway, rollers carried by the lower portion of said door disposed for travel in said guideways, a pulley supported over said doorway, a cable attached to the lower part of said door and passing over said pulley, a fluid-pressure cylinder having a piston and piston rod, said piston rod being connected to said cable, manually shiftable means for introducing pressure into said cylinder for actuating movement of said rod whereby tractive force is exerted through said cable for producing travel of said door to an elevated substantially horizontal doorway opening position, a latch normally engaged with and preventing elevation of said door, means intermediate said latch and said manually-shiftable means whereby actuation of the latter also effects withdrawal of said latch from operative position, devices engageable with the bottom portion of the door when the latter assumes its fully elevated position whereby it is supported against lowering movement, and means intermediate said devices and the pressure releasing means whereby actuation of the latter also effects movement of said devices to inoperative positions.

In testimony whereof, I affix my signature in presence of two subscribing witnesses.

HERMAN MANIFOLD.

Witnesses:
HECTOR B. GERARD,
CORA HOOPER.