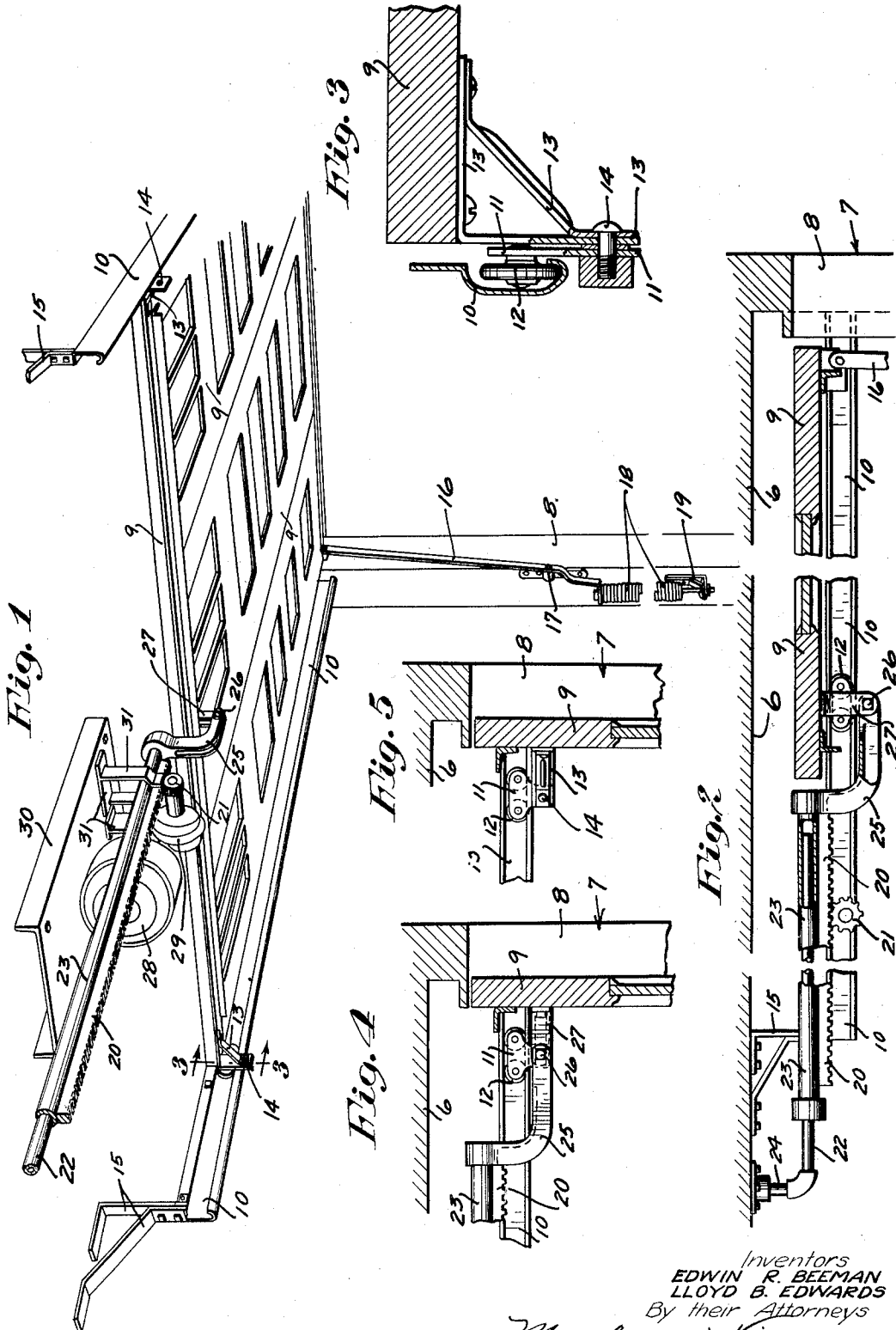


Dec. 19, 1933.

E. R. BEEMAN ET AL
DOOR OPERATING MECHANISM

1,940,485

Filed Dec. 28, 1931



Inventors
EDWIN R. BEEMAN
LLOYD B. EDWARDS
By their Attorneys
Merchant and Kisson

UNITED STATES PATENT OFFICE

1,940,485

DOOR OPERATING MECHANISM

Edwin R. Beeman and Lloyd B. Edwards, Minneapolis, Minn.; said Edwards assignor to said Beeman

Application December 28, 1931
Serial No. 583,427

4 Claims. (Cl. 268—59)

Our present invention has for its object the provision of an extremely simple and highly efficient mechanism for operating doors for garages and the like that are mounted for movement from a closed vertical position to an open overhead horizontal position.

The invention, while intended for general use, is especially well adapted and designed for use in connection with a door mounted to swing bodily about a horizontal axis during its opening and closing movement and where there is very little head room above the opening in the building for the door.

Generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawing, which illustrates the invention, like characters indicate like parts throughout the several views.

Referring to the drawing:

Fig. 1 is a perspective view showing an overhead door in its open position and the improved mechanism for operating the same and further diametrically illustrating one of the door posts at the opening in the building for the door;

Fig. 2 is a fragmentary view principally in section showing the door and its operator, as illustrated in Fig. 1, and further illustrating a portion of the building;

Fig. 3 is a fragmentary detail view with some parts sectioned on the line 3—3 of Fig. 1, on an enlarged scale; and

Figs. 4 and 5 are fragmentary detail views showing the door closed and illustrating the adjacent portions of the door hanger and operator.

Of the parts of the building illustrated, for the purpose of showing the invention applied in working position, it is important to note the ceiling 6, the door opening 7, the door post or frame 8 at one side of said opening and the door 9. The mounting for the door 9 includes a pair of horizontal track rails or ways 10, a pair of hanger brackets 11, a pair of rollers 12, journaled on each hanger bracket 11 and arranged to run in one of the rails 10, and a pair of brackets 13 rigidly secured to the door 9 at the inner face and upper corners thereof and which brackets are secured to the hanger brackets 11 by a pair of axially aligned pivot pins 14 which are parallel to the plane of the door 9 and are spaced, by the brackets 13, inward of said door, see Fig. 5. Both track rails 10 extend longitudinally of the door 9, when open, below the top of the door opening 8 and their front ends are rigidly secured to the building structure and their rear ends are rigidly

secured to a pair of hanger brackets 15 on the ceiling 6.

The door 9, at its lower end portion, is carried during its opening and closing movements and supported, when in an open overhead position, by a pair of arms 16, only one of which is shown, intermediately pivoted to the door posts 8, as indicated at 17. The long ends of the arms 16 are pivoted to the door 9, at its inner face and lower corners, and a pair of coiled upright compression springs 18 are mounted at their lower ends on brackets 19 secured to the door posts 8 and their upper ends are attached to the short ends of said arms.

The parts thus far described are of well-known construction and have been illustrated simply for the purpose of showing the invention applied in working position.

Referring now in detail to the improved door operator, the numeral 20 indicates a long inverted horizontal rack, which extends longitudinally of the door 9, when open, and a driven pinion 21 meshes with said rack. The rack 20 is guided for straight line endwise movement by a shaft 22 and a tubular member 23 telescoped onto said shaft for endwise sliding movement. Said shaft 22, at its rear end, is rigidly secured to the ceiling 6, as indicated at 24 and the tubular member 23 is formed as a part of the back of the rack and extends parallel thereto. If desirable, the shaft 22, at its rear end, may be secured to the rear wall of the building structure instead of the ceiling, as shown.

It is important to note that the shaft 22 and the tubular member 23 are in the plane of the door 9, when open, and said shaft and tubular member, as well as the door 9 when open, are above the tracks 10 and below the top of the door opening 8.

On the front end of the tubular member 23 is rigidly secured an arm 25 which, when the door is open, extends thereunder and its front end is detachably secured by a pivot bolt 26 to a bracket 27 secured to the door 9 at its inner face and at the transverse center thereof. The axes of the pivot pins 14 and the bolt 26 are aligned and the door 9, during its opening and closing movements, swings about these axes without imparting lateral or angular movement to the rack 20, the shaft 22, the tubular member 23 and arm 25. It will thus be seen that there is no pressure produced between the shaft 22 and the tubular member 23 that would tend to cause them to bind and interfere with free

reciprocatory movement of the rack 20 over the pinion 21.

The pinion 21 is driven in either direction to reciprocate the rack 20 and open and close the door 9 from an electric motor 28 by transmission mechanism 29 to said pinion. The motor 28 and transmission mechanism 29 are secured to a channel plate 30 on the ceiling 6 and brackets 31 on said plate. If there is not sufficient head room for suspending the members 28, 29, 30 and 31 from the ceiling 6, the same may be mounted on one of the walls of the building structure or any other suitable place.

From the illustrations in the drawing and the above description, it is evident that the improved door operator may be installed where there is practically no head room whatsoever over the door opening 8, see Fig. 2. Or in other words, the operator does not require any more head room than that required for the door. If necessary to make an installation the arm 25 may be turned up instead of down, as shown, thus bringing the operator below the plane of the door when open or the arm 25 dispensed with and the member 23 directly pivoted to the door. It is also evident that the operating mechanism positively locks the door closed.

If necessary for the successful operation of a relatively wide door two of the operators may be used and attached to the door near the upper corner thereof.

From what has been said, it will be understood that the door operator described is capable of modifications as to details of construction and arrangement within the scope of the invention herein disclosed and claimed.

What we claim is:

1. In a device of the class described, an overhead sliding door, means for guiding the door from a closed vertical position to an open horizontal position, a front member, a rear member, said two members extending longitudinally of the door when open, said rear member, at its rear end, being secured to a relatively fixed support, said front member being mounted on the rear member for free straight line endwise sliding movement, said front member, at its front end, being hingedly attached to the door and supported therefrom, said two members being rearwardly of the door in all of its positions and substantially in the plane thereof when open,

and means for reciprocating the front member to open and close the door.

2. In a device of the class described, an overhead sliding door, means for guiding the door from a closed vertical position to an open horizontal position, a front member, a rear member, said two members extending longitudinally of the door when open, said rear member, at its rear end, being secured to a relatively fixed support, said front member being mounted on the rear member for free straight line endwise sliding movement, said front member having an arm rigidly secured to its front end, said arm being hingedly attached to the door and supporting the respective end of the front member therefrom, and means for reciprocating the front member to open and close the door.

3. In a device of the class described, an overhead sliding door, means for guiding the door from a closed vertical position to an open horizontal position, a tubular member and a shaft telescopically connected and extending longitudinally of the door, when open, said shaft, at its rear end, being secured to a relatively fixed support, said tubular member having an arm rigidly secured to its front end, said arm being hingedly attached to the door and supporting the respective end of the tubular member therefrom, said tubular member and shaft being rearwardly of the door in all of its positions and substantially in the plane thereof when open, and means for reciprocating the tubular member to open and close the door.

4. In a device of the class described, an overhead sliding door, means for guiding the door from a closed vertical position to an open horizontal position and for supporting the same to swing about a horizontal axis during its opening and closing movements, a pair of overhead slidably connected members which extend longitudinally of the door, when opened, one of said members being secured to a relatively fixed support, the other of said members being hingedly attached to the door in substantially axial alignment with said horizontal axis, said two members being rearwardly of the door in all of its positions and substantially in the plane thereof when open, and means for reciprocating the member hingedly attached to the door for opening and closing the door.

EDWIN R. BEEMAN.
LLOYD B. EDWARDS.