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DOOR OPERATING MECHANISM

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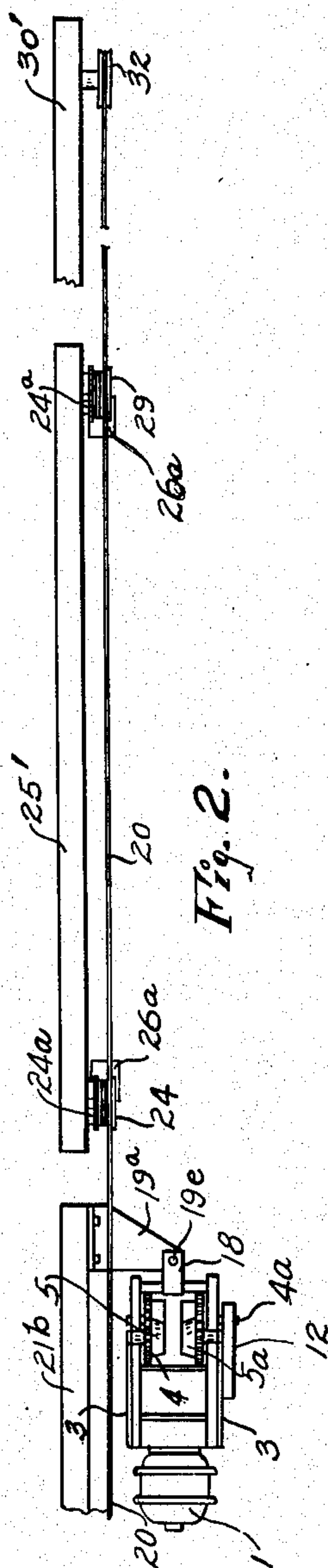


Fig. 2.

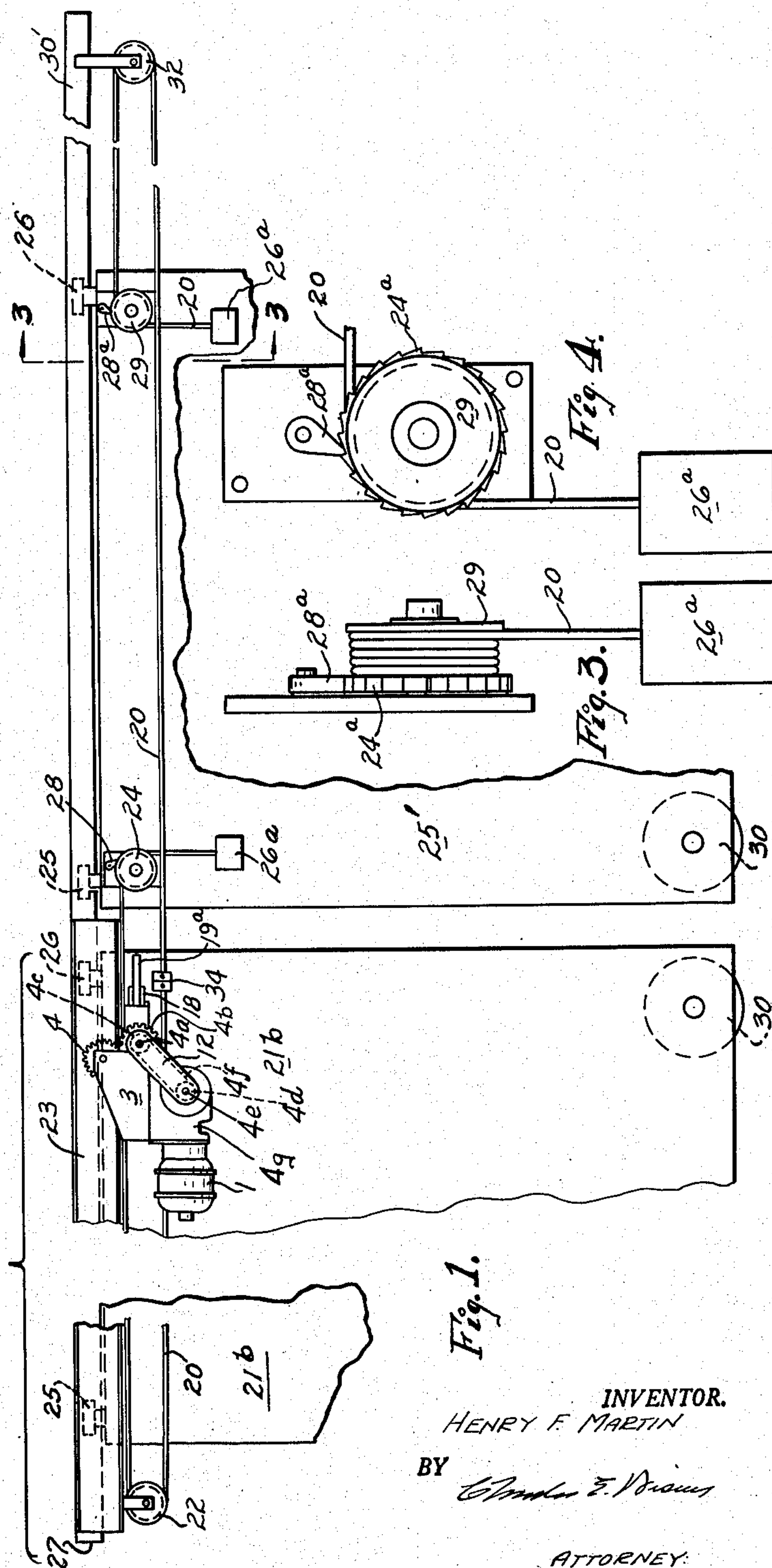


Fig. 1.

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DOOR OPERATING MECHANISM

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730,723. Divided and this application June 24,
1950, Serial No. 170,187

2 Claims. (Cl. 268—49)

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This invention relates to a door operating mechanism the object being to provide a new and improved mechanism which involves an overhead rail and a motor actuated mechanism for moving a door or a series of doors along a rail, the present application being a division of my copending application, Serial No. 730,723, filed February 25, 1947, now Patent No. 2,617,365, relating to Tractors for Use in Transportation of a Load.

This and other features and objects of the invention are hereinafter more fully described and claimed, and the preferred form of the invention is shown in the accompanying drawing in which—

Fig. 1 is a fragmentary elevational view showing my improved arrangement of doors and operating mechanism therefor.

Fig. 2 is a plan view thereof.

Fig. 3 is a section taken on line 3—3 of Fig. 1; and

Fig. 4 is a right end elevational view of Fig. 3.

It will be understood that the above drawing illustrates merely the preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claims hereafter set forth.

The purpose of the invention is to provide an arrangement of a series of doors movable along a trackway by means of a motor from an open to a closed position or vice versa.

There is provided an I beam 23 upon which the motor mounting casing 3 is positioned and supported whereby energization of the motor 1 is adapted to effect reciprocal movements of the door 21b which is joined at its upper end by the bracket 19a to the draw rods 18 which project from the motor mounting 3.

In Figs. 1, 2, 3 and 4 there is illustrated a pair of oppositely movable doors 21b and 25'.

The two doors 21b and 25' have a pair of longitudinally spaced rollers 30 at their lower ends which bear upon the floor or other surface to thereby support said doors for sliding movements thereover.

As shown in Fig. 1 there are provided a pair of rollers 25 and 26 at the upper ends of the doors 21b and 25' which are cooperable between the longitudinally extending L shaped guide flanges 27 and 30', flange 27 being illustrated in Fig. 1.

The motor 1 joined to door 21b is adapted to effect movement to the right or left of the door 21b whereas a pulley and ratchet arrangement is incorporated upon the door 25' for effecting simultaneous opposite movements of said door. It is understood that said motor is connected in an electric circuit not shown in the drawing.

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The motor is of the reversible type whereby the doors may be moved to an open or closed position.

The motor 1 as shown in Fig. 1 is supported by the upright parallel spaced plates or casing 3—3. There is an I beam 23 secured to the ceiling of the enclosed space. Upon the lower flange of the I beam are journaled the rollers 5 and 5a each having a gear 4 which meshes with a gear 4b secured to rotatable shaft 4a, Fig. 1, which is supported between the plates 3 on each side of said I beam.

There is a housing 12 upon the outer face of the motor supporting casing 3 which encloses a sprocket gear 4c secured upon shaft 4a, a similar sprocket gear 4d secured on power take-off shaft 4e and an interconnecting driving sprocket chain 4f. Shaft 4e extends from a suitable power take-off housing 4g which is joined to motor 1 so that the motor drive shaft is operatively connected to said power take-off shaft.

The forward edge of motor supporting casing 3—3 has drawbars 18 joined by a pin 19e to the bracket 19a secured to the forward edge of door 21b as shown in Figs. 1 and 2.

Upon closing the circuit to the electric motor, the latter and casing 3 are caused to travel along the rail 23 thereby moving door element 21b to the left or right.

A pair of pulleys 24 and 29 are journaled upon the inner wall of the door 25' in spaced relation, the pulley 29 including the ratchet wheel 24a shown in Fig. 4 whereas the pulley 24 includes a similar ratchet wheel 24a.

The pawls 28 and 28a are pivotally mounted upon the door 25' for restraining engagement with the respective ratchet wheels of the pulleys 24 and 29, with said pawls being inclined inwardly towards each other as shown in Fig. 1.

The cable 20 has a weight 26a on one end, is wound around pulley 24 and extends to the left of Fig. 1 and over the pulley 22 which is suspended from the I beam 23. The cable continues around the pulley 22 and to the right, across the door 25' and around the pulley 32 which is suspended from a stationary portion 30' of the building structure. The cable continues over the pulley 29, is wound therearound and has secured at its free end the weight 26a.

It will be noted that a portion of the cable 20 is secured to the power operated door 21b by the attaching bracket 34.

In operation movement to the left of the door 21b under control of the motor 1 effects a similar movement to the left of the lower portion of the cable 20. The right end of cable 20 exerts a

thrust to the right of the upper portion of the cable with respect to the pulley 29 which is restrained against rotation by its pawl 28a. Consequently this thrust to the right of said cable in effect draws the door 25' to the right whereas the opposite end of the cable 20 adjacent the door 21b projects around the pulley 22, with the upper portion of said cable moving to the right and winding around pulley 24 at the same time as the weight 26' on the end of said cable causes the same to unwind thereon moving downwardly. Thus a power operated movement of the door 21b to the left effects a similar movement to the right of the door 25' whereby the doors are opened.

To close the doors the motor 1 is energized for rotation in a reverse direction and the door 21b moves to the right towards the closing position.

This movement to the right of door 21b moves the lower portion of the cable 20 to the right, and the left end thereof extending around the pulley 22 exerts a thrust to the left upon the upper portion of said cable which is transmitted to the pulley 24. By virtue of the pawl 28 the said pulley is prevented from rotating with the result that this thrust to the left is transmitted through the pulley to the door 25' moving the same to the left for closing the same. At the same time movement to the right of the door 21b causes the right end of the cable 20 to move around the pulley 32 and under the action of the weight 26a rewinds upon the pulley 29.

When door 21b moves to the left, there will be a thrust to the right of the upper portion of cable 20 which passes over pulley 32, and as the pulley 29 is locked against rotation this thrust will cause a corresponding movement of the door 25'. The cable adjacent door 21b which passes around pulley 22 will move to the right and the slack in said cable will normally be taken up by the movement to the right of the door 25' with the weight 26a taking up any possible slack in the cable.

Pulleys 24 and 29 operate as cable take-up pulleys for keeping the cable taut. The separately operated pawls are intended to prevent rotation of the corresponding ratchet on said take-up pulleys in a direction opposite from the movement caused by the weights 26a.

On the reverse closing movement of door 21b to the right, there will be a thrust to the left of the upper portion of the cable 20 with respect to pulley 24. And as this pulley is retained against rotation, such thrust to the left will close door 25'. The slack in the right end of the cable 20 produced by the closing of door 21b will be taken up generally by the upper portion of the cable 20 adjacent the pulley 20 as door 25' moves to closed position.

Having described my invention reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. In a building structure having a door opening, an upright door with floor engaging rollers for a portion of said opening, and power means for slidably opening and closing said door; a second upright door with floor engaging rollers for the remainder of said opening and aligned with said first door, a series of pulleys on said second door and upon said building structure upon opposite sides of said opening, a cable centrally joined to said first door with intermediate portions thereof extending around the pulleys on said structure and with outer portions thereof wound around the pulleys on said second door, said cable having free ends depending from said second door pulleys, weights upon said free ends, and means on said second door alternately restraining respectively said door pulleys against rotation on opening and closing movements respectively of said power driven door, whereby said doors will simultaneously open and close.

2. In a building structure having a door opening, an upright door with floor engaging rollers for a portion of said opening, and power means for slidably opening and closing said door; a second upright door with floor engaging rollers for the remainder of said opening and aligned with said first door, a pair of spaced cable take-up pulleys on said second door, additional pulleys upon said building structure upon opposite sides of said opening, a cable centrally joined to said first door with intermediate portions thereof extending around the pulleys on said structure and with outer portions thereof wound around the pulleys on said door respectively, said cable having free ends depending from said second door pulleys, weights upon said free ends, ratchet wheels on said door pulleys and rotatable therewith, and pawls inwardly and downwardly inclined towards each other and pivotally mounted upon said second door and alternately cooperable with said ratchet wheels to prevent rotation of one door pulley on opening movements of said first door and to prevent rotation of the other door pulley on closing movements of said first door, whereby said doors will simultaneously open and close.

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