Nov. 19, 1940. D. H. MORGAN 2,222,151

OPERATING MEANS FOR CANOPY DOORS

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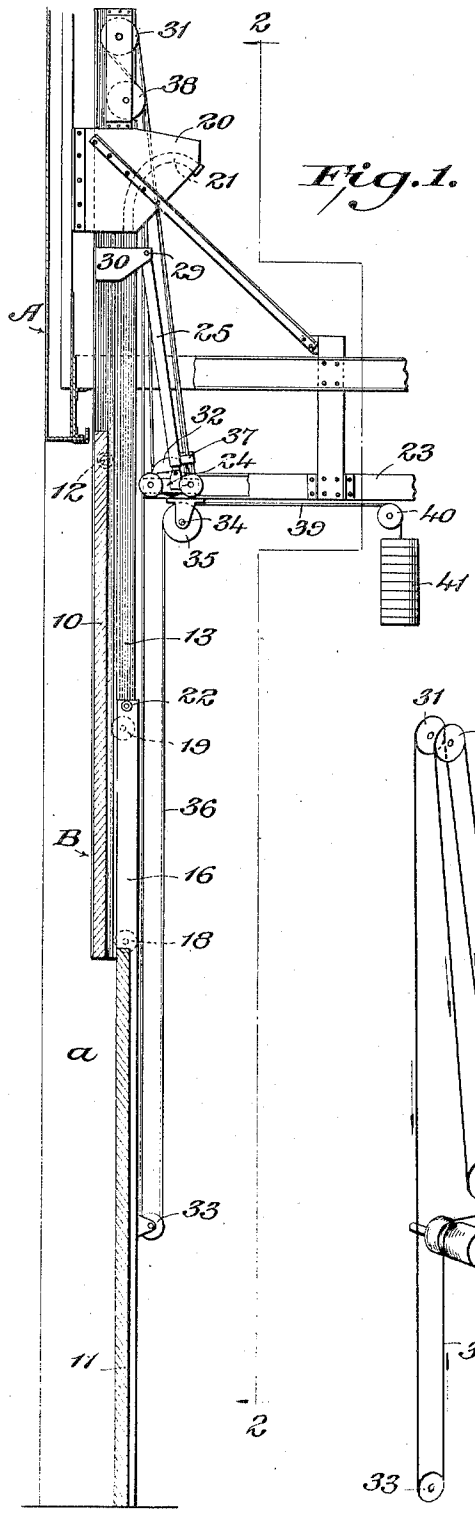

Fig. 1.

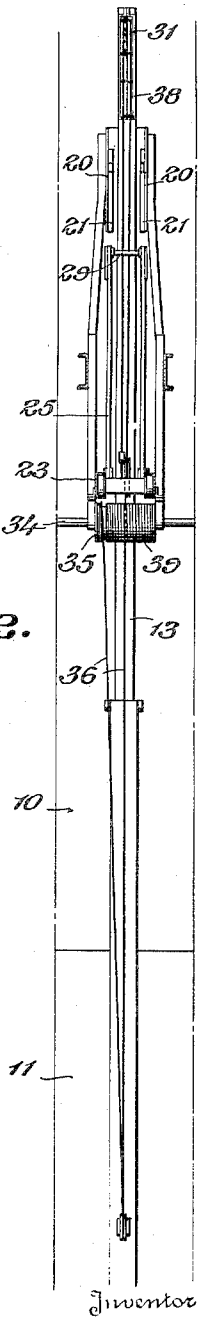

Fig. 2.

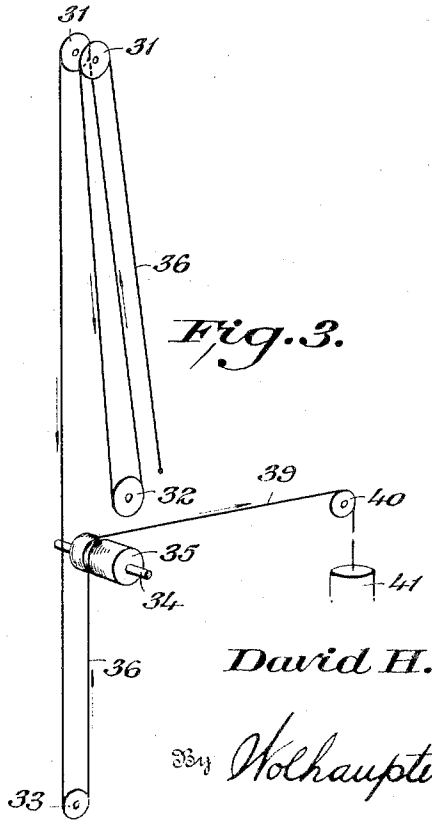

Fig. 3.

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Fig. 6.

Fig. 4.

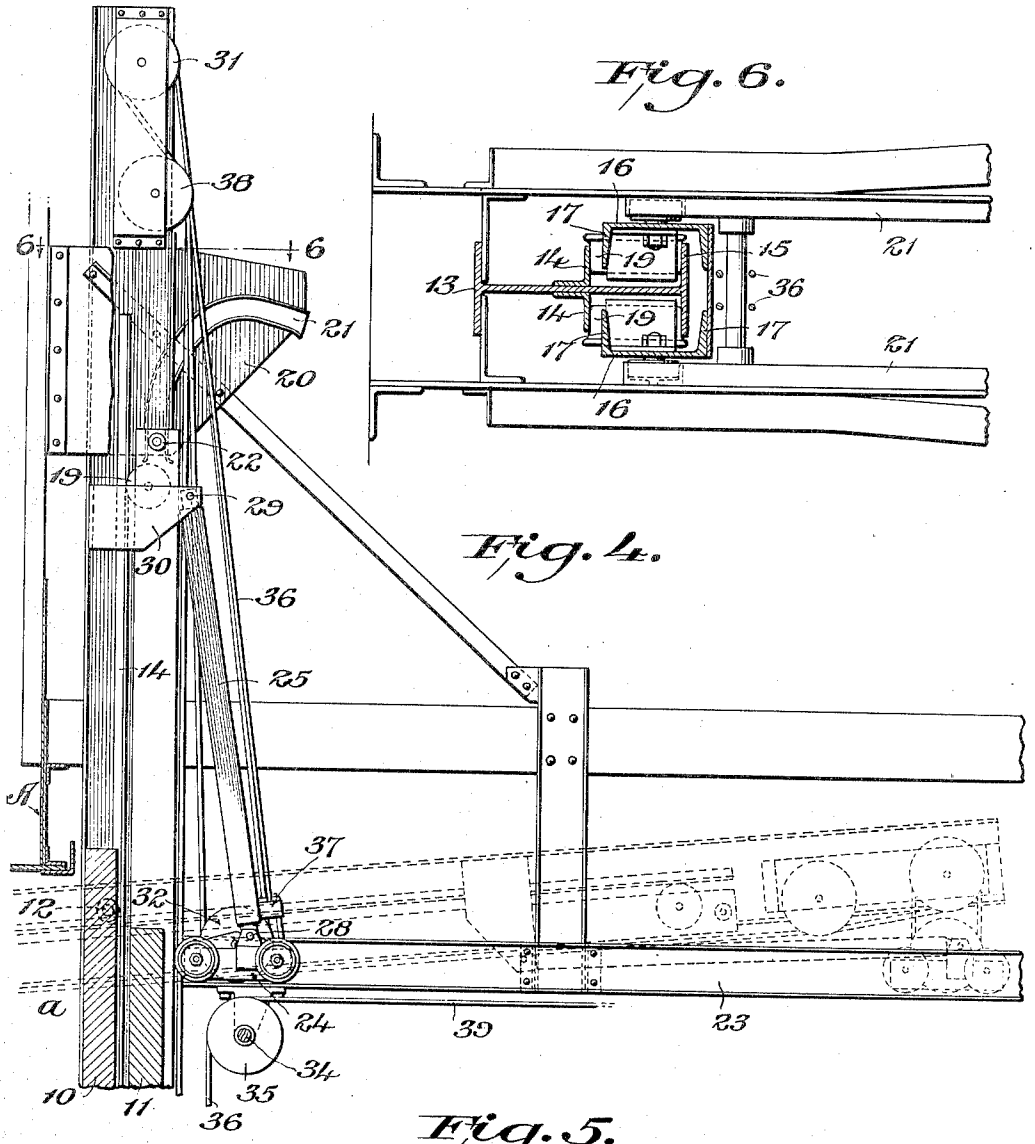
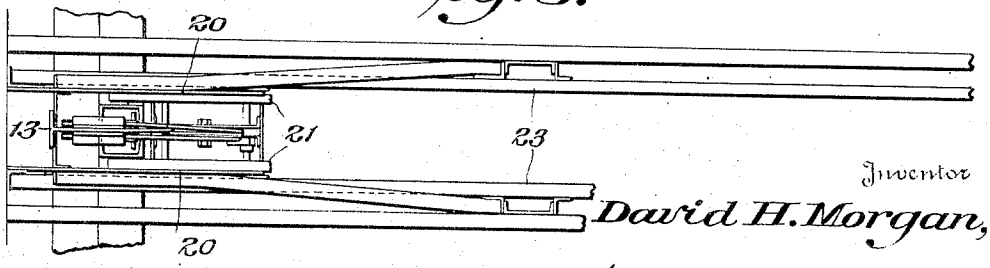


Fig. 5.



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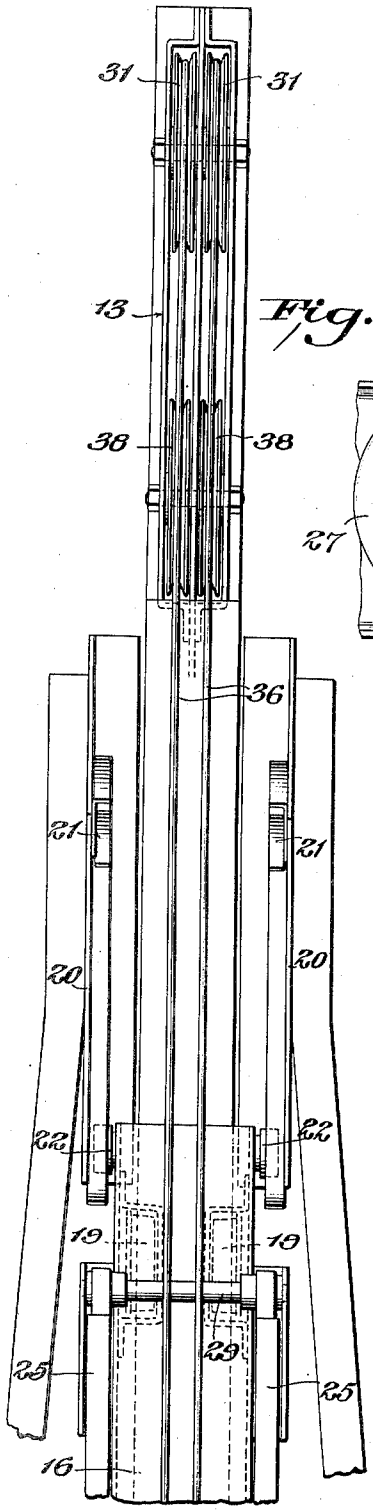


Fig. 7.

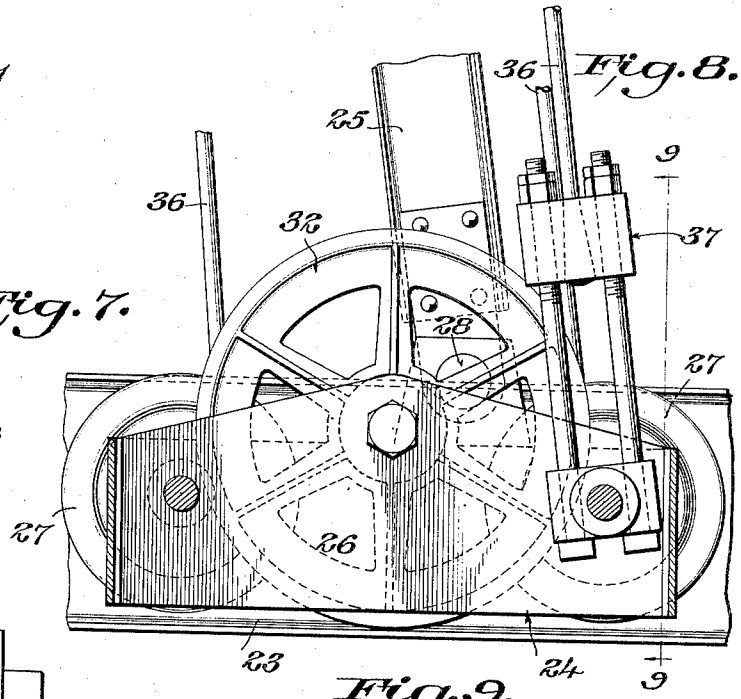
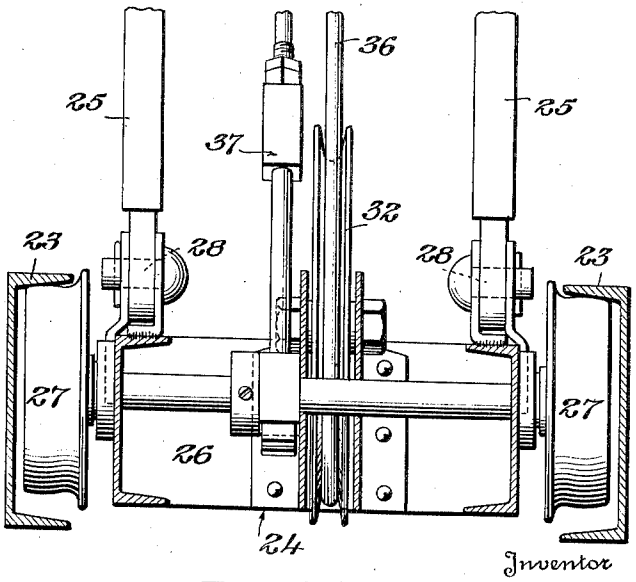


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE

2,222,151

OPERATING MEANS FOR CANOPY DOORS

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Application January 5, 1940, Serial No. 312,621

12 Claims. (Cl. 268—30)

This invention relates to doors, and has particular reference to improvements in so-called "canopy doors"; that is to say, doors of the type which, when open, extend horizontally, or substantially horizontally, forwardly, canopy-like, from a doorway at or near the top thereof.

Such doors commonly are used for controlling the doorways of aircraft hangars, warehouses and the like, and usually they are quite high, wide and heavy, often being composed of two or more independent sections disposed in side to side relationship in instances where the doorway is very wide.

One principal disadvantage of such doors, as heretofore constructed and operated, is that they begin to swing upwardly and outwardly either simultaneously with, or immediately following, initiation of opening movement thereof. The lower part of the door therefore describes a sweeping arc which necessitates that the space immediately in front of the door be maintained unobstructed. This space frequently is very valuable, as for example, in the case of an aircraft hanger, to temporarily accommodate aircraft, or, in the case of a warehouse, to accommodate goods or the like. Moreover, if the door is of material height, the height and width of said space may be considerable. Furthermore, if the door is of material height, it may suffice in many instances to open only the lower part thereof, rather than the entire door, which is advantageous for many reasons, but provision for which has not been embodied in doors of the type mentioned as heretofore constructed and operated.

Accordingly, one special and important object of the present invention is to provide a canopy door embodying a construction and mode of operation whereby the space in front thereof, for a considerable height and closely adjacent thereto, may advantageously be utilized for any desired purpose without interfering with operation of the door, and whereby the lower part of the door may be opened and closed while the upper part thereof remains closed. These purposes are accomplished, generally speaking, by constructing the door of upper and lower leaves, the upper leaf of which is pivoted for swinging movement between a vertically disposed, closed position and a substantially horizontally disposed, open position, and the lower leaf of which is mounted on the upper leaf for vertical sliding movement between raised or open and lowered or closed positions relative thereto, and by providing for substantially fully raising and lowering the lower leaf relative to the upper leaf while the upper leaf remains vertically disposed closing the upper part of the doorway; also, by providing for swinging the upper leaf only when the lower leaf is substantially fully raised relative thereto.

Another disadvantage of prior doors of the type mentioned is that the operating and control means therefor usually have been of such nature as to occupy considerable space behind the door below the top thereof, thereby precluding, or seriously interfering with, the possibility of advantageously utilizing the space behind and adjacent to the door for storage or other purposes.

Accordingly, another special object of the present invention is to provide, for doors of the type mentioned, operating and control means which are disposed substantially entirely above the top of the doorway, or at least high relative thereto, to render the space behind and adjacent to the door, and for a considerable height, available for storage or other purposes.

Another special object of the present invention is to provide an improved operating means for doors of the type mentioned, characterized by being effective to open and close the lower part of the door without disturbing the closed condition of the upper part thereof and, by continuous, smooth operation, first to raise the lower leaf of the door relative to the upper leaf thereof and then to swing the two leaves as a unit to canopy-like, substantially horizontally disposed, open position.

Another object of the present invention is to provide an operating means for doors of the type mentioned which is simple, practical, thoroughly reliable and efficient in operation and which embodies a design whereby practically any desired mechanical advantage may be obtained between a power shaft and the door, thus to enable even the heaviest doors to be operated satisfactorily by only relatively small power.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the accompanying drawings, wherein like characters of reference denote corresponding parts in related views:

Figure 1 is a vertical, transverse section through a door and its operating means constructed in accordance with one practical embodiment of the invention.

Figure 2 is a section on the line 2—2 of Fig. 1.

Figure 3 is a diagrammatic perspective view of the door operating means.

Figure 4 is an enlarged view, similar to Fig. 1, of the upper part of the door, showing, in full lines, the upper leaf vertically disposed and the lower leaf nearly fully raised relative thereto

and, in dotted lines, the lower leaf fully raised relative to the upper leaf and the two leaves swung as a unit to substantially horizontal, open position.

Figure 5 is a top plan view of the structure as shown by full lines in Fig. 4.

Figure 6 is an enlarged detail cross section on the line 6—6 of Fig. 4.

Figure 7 is an enlarged rear elevation of the upper part of the door.

Figure 8 is an enlarged longitudinal section through the trolley comprising part of the door operating and control means; and

Figure 9 is a transverse section on the line 9—9 of Fig. 8.

Referring to the drawings in detail, A designates a part of a building structure having a doorway *a*, and B designates, generally, the present door controlling said doorway *a*.

The door B comprises upper and lower leaves designated as 10 and 11, respectively, which, within the purview of the invention, may be of any suitable or desired specific construction. They accordingly have not been illustrated in detail, but have been indicated conventionally as of panel form.

The upper leaf 10 is pivoted in any suitable manner, as indicated at 12, at or near its top, to the building structure A at or near the top of the doorway *a*, for swinging movement between a vertically disposed, closed position and a substantially horizontally disposed, open position in which it extends, canopy-like, forwardly from the building structure A at the top of the doorway *a*. On the other hand, the lower leaf 11 is mounted in any suitable manner on the upper leaf 10 for vertical sliding movement between raised or open and lowered or closed positions relative thereto. In this latter connection and as illlustrated in the present instance, the upper leaf 10 includes a vertically disposed I-beam 13 having welded or otherwise suitably secured to its web a pair of angle members 14 which, in conjunction with the flanges 15 at the inner side of said I-beam, provide roller trackways. On the other hand, the lower leaf 11 includes a pair of vertically disposed channel members 16 which are located at opposite sides of the I-beam 13 and the flanges 17 of which constitute roller trackways. Near the bottom of the upper leaf 10 the I-beam 13 is provided with rollers 18 which are disposed in the trackways afforded by the flanges 17 of the channel members 16, while near their tops the channel members 16 are provided with rollers 19 which are disposed in the trackways afforded by the angle members 14 and the aforesaid flanges 15 at the inner side of the I-beam 13. Thus, the lower leaf 11 is mounted on the upper leaf 10 for free sliding vertical movement relative thereto.

The upper leaf 10 is of a height to control approximately the upper half of the doorway *a*, and the lower leaf 11 is of a height to control the remaining or lower portion of said doorway. The lower leaf is disposed inwardly relative to the upper leaf to slide behind said upper leaf, and when said lower leaf is lowered its top is disposed only slightly above the bottom of the upper leaf. Accordingly, the channel members 16 extend suitably above the top of the lower leaf so that when the lower leaf is lowered the rollers 18 and 19 are sufficiently spaced apart to firmly support the lower leaf upon the upper leaf.

The I-beam 13 extends above the top of the upper leaf 10 and between a pair of plates 20 suitably fixed to the building structure A above the doorway *a*. On the inner sides of these plates 20 are trackways 21 in the form of channels which are open at their ends and which have their upper portions curved inwardly and their lower portions disposed vertically or substantially vertically. Carried by the channel members 16 at the outer sides thereof near their upper ends are rollers 22 which are disposed in vertical alinement with the lower portions of the trackways 21 when the door leaves 10 and 11 are disposed vertically, and which are designed to enter said trackways when the lower leaf 11 is raised relative to the upper leaf, thereby to cooperate with the inwardly curved upper portions of said trackways to initiate upward and outward swinging movement of the leaves 10 and 11 as a unit. In this connection and as will be observed from the drawings, the trackways 21 are disposed at an elevation such that the rollers 22 cooperate with the inwardly curved upper portions thereof only when the lower leaf is nearly fully raised relative to the upper leaf. Accordingly, the lower leaf may be freely raised and lowered to open and close the lower part of the doorway while the upper leaf remains vertically disposed closing the upper part of the doorway, and since the lower leaf partakes only of vertical movement as long as the upper leaf remains vertically disposed, it follows that obstructions placed closely adjacent to the door do not interfere with opening and closing movements of the lower leaf. Moreover, since swinging movement of the upper leaf is not initiated until the lower leaf is nearly fully raised relative thereto, the bottom of the lower leaf is disposed well above the bottom of the doorway when the two leaves begin to swing as a unit. Consequently, the space in front of the door and closely adjacent thereto to a considerable height may be occupied or obstructed without interfering with complete opening movement of the door, that is, to swinging of the two leaves as a unit to canopy-like position.

Referring now to the operating means for the present door, 23 designates suitable fixed track means disposed horizontally, or substantially horizontally, and extending inwardly relative to the doorway *a* at or near the top thereof, 24 designates a suitable trolley mounted to travel forwardly and rearwardly along said trackway and suitably held against vertical movement relative thereto, and 25 designate links connecting said trolley with the I-beam 13 at a point suitably spaced above the pivot or hinge 12 of the upper leaf 10. In this connection and according to the present specific construction, the track means 23 is comprised by a pair of channel members suitably supported by the building structure, the trolley 24 is comprised by a frame 26 equipped with wheels 27 which ride between the flanges of said channel members 23, and the links 25 are pivoted at their lower ends to said trolley frame 26, as indicated at 28, and at their upper ends are pivoted, as indicated at 29, to bracket arms 30 suitably fixed to the I-beam 13.

Carried by the I-beam 13, at or near the top thereof, is a pair of sheaves 31, 31, while carried by the trolley 24 is a sheave 32 and carried by the lower door leaf 11 is a sheave 33. Moreover, a suitably supported power shaft 34 extends horizontally inwardly of and parallel with respect to the door B adjacent to the top of the doorway *a* and carries a drum 35 to which is secured one end of a cable 36. This cable extends from said drum downwardly beneath the sheave 33, then upwardly over one of the sheaves 31, then

downwardly beneath the trolley-carried sheave 32, then upwardly over the other sheave 31 and then downwardly to the trolley 24 to which it is suitably anchored as indicated at 37. Accordingly, by rotating the drum 35 in a direction to wind the cable 36 thereon, said cable reacts from the trolley 24 first to raise the lower door leaf 11 relative to the upper door leaf 10 and then to swing the two leaves as a unit upwardly and outwardly, following initiation of such swinging movement of said leaves by the cooperation of the rollers 22 on the channel members 16 of the lower leaf 11 with the rearwardly curved upper portions of the trackways 21. The upper leaf does not swing prior to initiation of swinging movement thereof by the cooperation of the rollers 22 with the trackways 21 for two principal reasons; first, because the point of pivotal connection of the links 25 with the I-beam 13 is well inwardly of a vertical plane including the pivotal axis of the upper leaf 10 and because, when the upper leaf is disposed vertically, the trolley 24 is disposed closely adjacent to the door and the links 25 therefor are disposed at only a slight downward and inward inclination so that they act as struts effectively holding the upper part of the I-beam 12 against inward swinging movement and, second, because a lesser force is required to be exerted through the cable 36 to raise the lower leaf 11 than is required to effect swinging movement of the leaves. Accordingly, the operating mechanism illustrated and described provides for raising and controlling lowering of the lower leaf 11 to open and close the lower part of the doorway while the upper leaf 10 is vertically disposed closing the upper part of the doorway and, at the same time, provides for swinging the combined leaves to open position following raising of the lower leaf, all in a smooth continuous operation.

When, during the final portion of the raising movement of the lower leaf 11, the rollers 22 of said lower leaf cooperate with the inwardly curved upper end portions of the roller trackways 21, continued winding of the cable 36 onto the drum 35 results in downward and inward swinging of the portion of the I-beam 13 above the pivot 12 of the upper door leaf and in upward and outward swinging of the two leaves 10 and 11 toward canopy-like position, due to the cooperation of said rollers 22 with the inwardly curved upper portions of the trackways 21 and to the downward and inward pull exerted by the cable 36 from the trolley 24 upon the upper end portion of the I-beam 13.

As the upper end portion of the I-beam 13 swings downwardly and inwardly, the links 25 act to push the trolley 24 inwardly along its track means 23. The links 25 therefore become increasingly divergent downwardly with respect to the said upper end portion of said I-beam, and by the time the rollers 22 leave the upper end portions of the trackways 21 this divergence is so pronounced that the cable 36 exerts primarily a downward pull on the upper end portion of the I-beam 13, with continued downward and inward swinging of the upper portion of the I-beam 13 and consequent inward movement of trolley 24 the effective length of the lever arm constituted by the said upper portion of said I-beam progressively increases. Therefore, with increased resistance of the door to swinging movement, the swing force exerted thereon progressively increases although uniform power is applied to the power shaft 34.

Of course, upon reverse rotation of the drum 35 being permitted, the door gravitates to closed position, the two leaves first swinging to substantially vertical position and the lower leaf 11 then moving downwardly relative to the upper leaf.

Below the sheaves 31, 31 the I-beam 13 carries another pair of sheaves 38, 38 over which the portions of the cable 36 which extend downwardly from the sheaves 31, 31 pass and which serve to position said portions of said cable so that they do not rub or wipe against any part of the door structure.

Preferably, but not necessarily, the drum 35 has attached thereto one end of a second cable 39 which extends from said drum over a sheave or sheaves 40 and which is provided at its other end with a counterweight 41. The cables 36 and 39 are attached to the drum 35 at opposite ends thereof so that when either cable is wound onto said drum the other is unwound therefrom. Accordingly, the door is effectively counterweighted.

The described cable connection between the power shaft 34 and the door affords a mechanical advantage of four. Obviously, however, any other desired mechanical advantage may be obtained simply by increasing or decreasing the number of sheaves 31, 32 and correspondingly increasing or decreasing the number of reaches of the cable 36. In any event it is apparent that the entire operating and control mechanism extends only slightly below the top of the door and therefore does not interfere with utilization of the space adjacent to and behind the door substantially throughout its height, for storage or other purposes.

Of course, it will be understood that one or more mechanisms as described may be associated with any door or any door section, and that in the case of a door embodying two or more sections disposed in side to side relationship, the mechanism, or mechanisms, of each section may be operated by a common power shaft 34. It will further be understood that the mechanism described is not restricted to use with doors embodying two or more leaves, but may readily be adapted to the operation of single leaf doors. Moreover, while only a single structural embodiment of the invention has been illustrated and described, it is desired to point out that the invention may readily be embodied in various other specifically different mechanical structures within its spirit and scope as defined in the appended claims.

I claim:

1. A door including a leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, substantially horizontally disposed track means extending rearwardly with respect to said door leaf near the top thereof, a lever arm extending upwardly from said door leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said door leaf and said link extending at only a slight downward and inward inclination relative to said leaf when the latter is disposed vertically, and means reacting from said trolley to swing said door leaf toward open position.

2. A door including a leaf pivoted for swing-

ing movement between vertical and substantially horizontal closed and open positions, respectively, substantially horizontally disposed track means extending rearwardly with respect to said door leaf near the top thereof, a lever arm extending upwardly from said door leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said door leaf and said link extending at only a slight downward and inward inclination relative to said leaf when the latter is disposed vertically, a sheave on said lever arm, a power shaft, a cable drum on said power shaft, and a cable anchored at one end to said trolley and extending from said trolley over said sheave and then to said drum, whereby rotation of said drum in a direction to wind said cable thereon effects swinging movement of said door leaf toward open position.

3. A door including a leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, substantially horizontally disposed track means extending rearwardly with respect to said door leaf near the top thereof, a lever arm extending upwardly from said door leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said door leaf and said link extending at only a slight downward and inward inclination relative to said leaf when the latter is disposed vertically, a sheave carried by said trolley, a pair of sheaves on said lever arm, a power shaft below the pivot of said door leaf, a cable drum on said power shaft, and a cable anchored at one end to said trolley and extending therefrom over one of said lever-arm sheaves, then beneath said trolley-carried sheave, then over the other lever-arm sheave and then to said drum, whereby rotation of said drum in a direction to wind said cable thereon effects swinging movement of said door leaf toward open position.

4. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, and means reacting from said trolley to raise and to control lowering of said lower leaf relative to said upper leaf and to swing the two leaves as a unit toward substantially horizontally disposed, open position.

5. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, a sheave on said lever arm, a sheave on said lower door leaf, a power shaft, a cable drum on said power shaft, and a cable anchored at one end to said trolley and extending therefrom first over said lever-arm sheave and then downwardly to and beneath said lower door leaf sheave and then to said drum, whereby rotation of said drum in a direction to wind said cable thereon is effective to raise said lower leaf relative to said upper leaf and to swing the two leaves as a unit toward substantially horizontal, open position.

6. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, a sheave on said trolley, a pair of sheaves on said lever arm, a sheave on the lower door leaf, a power shaft, a cable drum on said power shaft, and a cable anchored at one end to said trolley and extending therefrom first over one of said lever-arm sheaves, then beneath said trolley-carried sheave, then over the other of said lever-arm sheaves, then downwardly to and beneath said lower door leaf sheave and then upwardly to said cable drum, whereby rotation of said drum in a direction to wind said cable thereon is effective to raise said lower leaf relative to said upper leaf and to swing the two leaves as a unit toward substantially horizontal, open position.

7. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward

or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, fixed means, means on the lower door leaf cooperating with said fixed means in response to the final portion of raising movement of the lower leaf relative to the upper leaf to initiate swinging movement of the two leaves as a unit toward open position, and means for raising said lower leaf relative to said upper leaf and for thereafter swinging said leaves as a unit to open position.

8. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, fixed cam means, means on the lower leaf cooperating with said fixed cam means in response to the final portion of raising movement of the lower leaf relative to the upper leaf to initiate swinging movement of said leaves as a unit toward open position, and means for raising said lower leaf relative to said upper leaf and for thereafter swinging said leaves as a unit to open position.

9. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, fixed means, means on the lower door leaf cooperating with said fixed means in response to the final portion of raising movement of the lower leaf relative to the upper leaf to initiate swinging movement of the two leaves as a unit toward open position, and means reacting from said trolley for raising said lower leaf relative to said upper leaf and for thereafter swinging said leaves as a unit to open position.

10. A door including a leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, substantially horizontally disposed track means near the top of said leaf, a lever arm extending upwardly from said leaf above the pivot thereof, a trolley movable along said track means and held against upward or downward movement, a link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said door leaf and said link extending at only a slight inclination relative to said leaf when the latter is disposed vertically, and means reacting from said trolley through said lever arm to swing said door leaf toward open position.

11. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable along said track means and held against upward or downward movement, a link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, and means reacting from said trolley through said lever arm to raise and to control lowering of said lower leaf relative to said upper leaf and to swing the two leaves as a unit toward substantially horizontally disposed, open position.

12. A door comprising an upper leaf pivoted for swinging movement between vertical and substantially horizontal closed and open positions, respectively, a lower leaf mounted on said upper leaf for sliding movement between raised and lowered open and closed positions relative thereto, respectively, substantially horizontally disposed track means extending rearwardly from said door near the top of the upper leaf, a lever arm extending upwardly from said upper leaf above the pivot thereof, a trolley movable inwardly and outwardly along said track means and held against upward or downward movement, a rigid link pivotally connected at one end to said trolley and at its other end to said lever arm, said trolley being disposed closely adjacent to said upper leaf and said link extending at only a slight downward and inward inclination from said lever arm to said trolley when the upper door leaf is disposed vertically, fixed means, means on the lower door leaf cooperating with said fixed means in response to the final portion of raising movement of the lower leaf relative to the upper leaf to initiate swinging movement of the two leaves as a unit toward open position, and means reaching from said trolley through said lever arm for raising said lower leaf relative to said upper leaf and for thereafter swinging said leaves as a unit to open position.

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