Nov. 9, 1948. J. THOMAS 2,453,554

OVERHEAD DOOR GUIDING AND LATCHING MECHANISM

Filed May 11, 1945 2 Sheets-Sheet 1

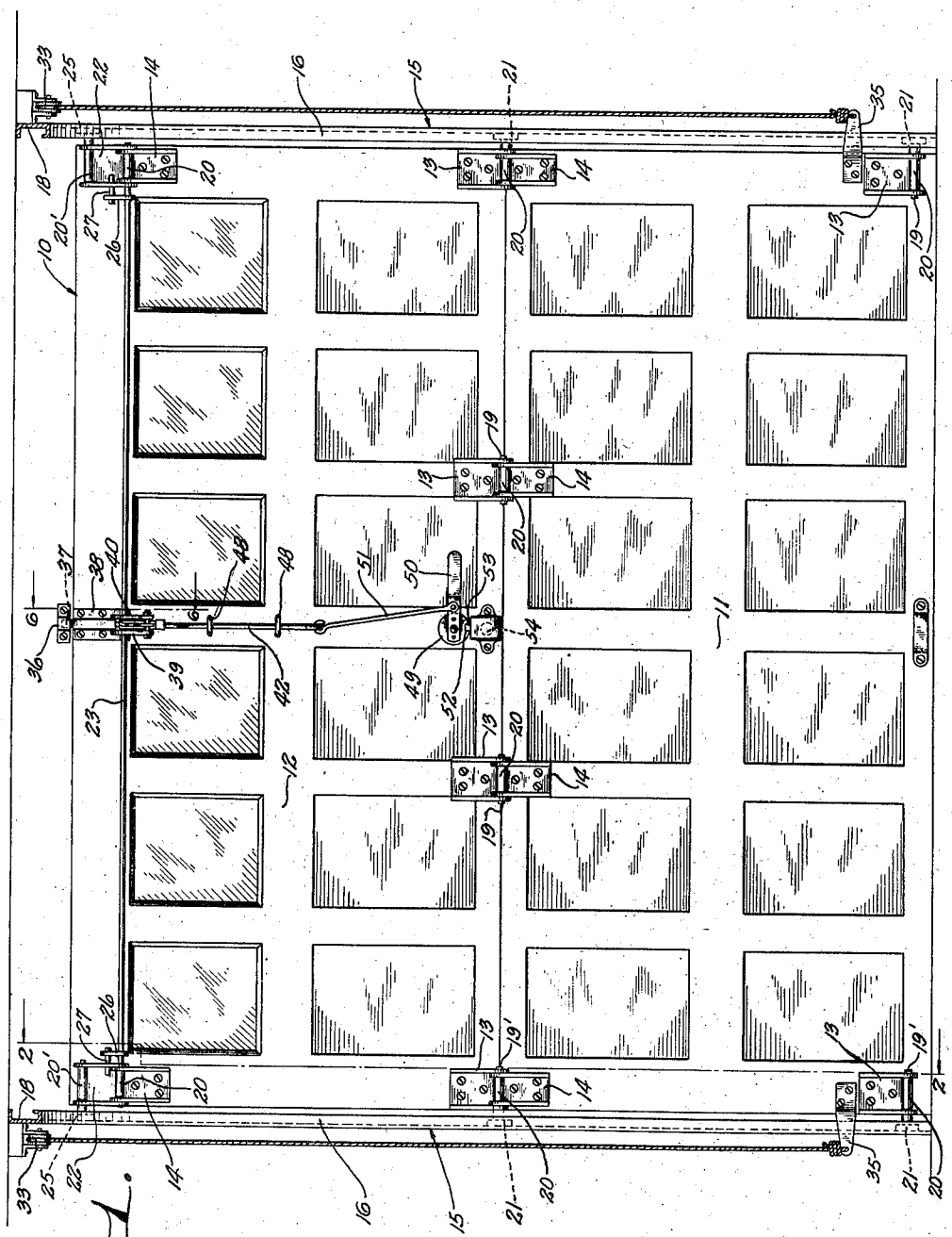


Fig. 1.

INVENTOR.
John Thomas,
BY Morsell & Morsell
ATTORNEYS.

Nov. 9, 1948. J. THOMAS 2,453,554

OVERHEAD DOOR GUIDING AND LATCHING MECHANISM

Filed May 11, 1945 2 Sheets-Sheet 2

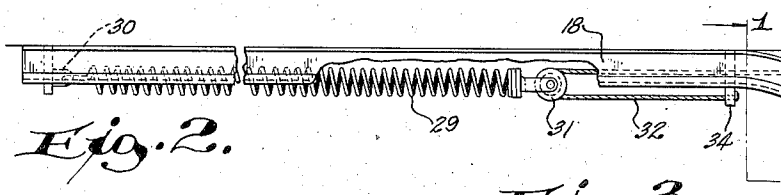


Fig. 2.

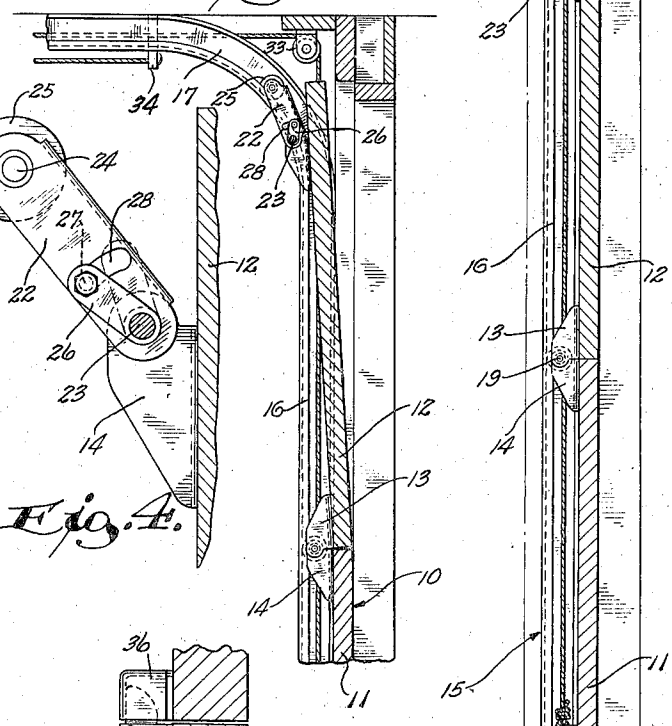


Fig. 3.

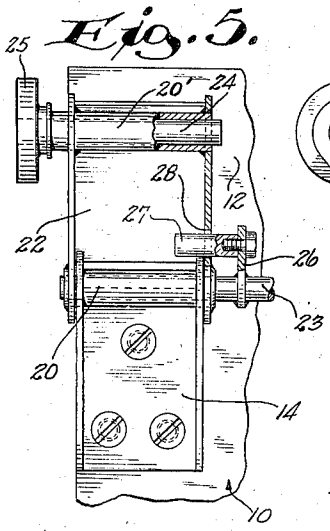


Fig. 5.

Fig. 4.

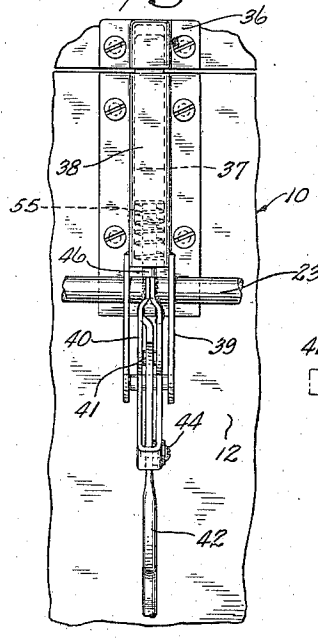


Fig. 7.

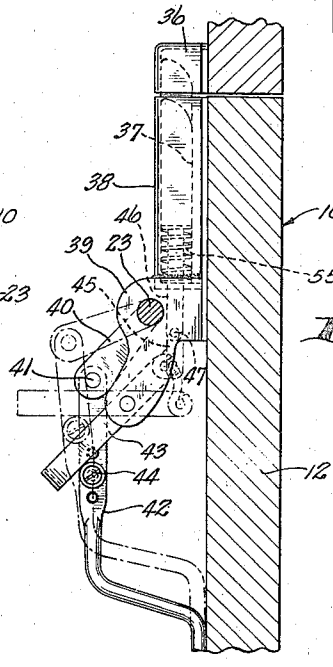


Fig. 6.

INVENTOR.
John Thomas,
BY Morsell & Morsell
ATTORNEYS.

Patented Nov. 9, 1948

2,453,554

UNITED STATES PATENT OFFICE

2,453,554

OVERHEAD DOOR GUIDING AND LATCHING MECHANISM

John Thomas, Milwaukee, Wis.

Application May 11, 1945, Serial No. 593,136

11 Claims. (Cl. 160—201)

1

This invention relates to improvements in overhead door guiding and latching mechanisms.

The overhead door of the present invention is of the type which includes superimposed and foldably connected sections arranged relative to the tracks or guiding means in a manner so that the rollers, carried by the top section of the door, are on hingedly mounted supports which may project outwardly or collapse relative to said door section, whereby, for the elevation of the door to overhead position, a path utilizing but a minimum of head room is required. In doors of the type under consideration, due to the low elevation of the overhead portion of the guiding tracks for the door, the top section of the door may break or fold inwardly before initiation of movement of the entire door, with the result that special separate means must be provided for controlling swinging movement of the top section of the door and for latching said top section when the entire door is closed.

With the foregoing in mind, it is, therefore, a primary object of the present invention to provide, in connection with an overhead door of the type mentioned, unitary and jointly operated means for simultaneously controlling swinging movement of the top section of the door and for controlling latch mechanism associated therewith.

A further object of the invention is to provide, in a plural-section overhead door, a latching mechanism which simultaneously and jointly latches the upper section of the door against inward swinging movement, and latches the entire door against vertical movement.

A further object of the invention is to provide, in an overhead door guiding and latching mechanism, hinge sections of simple formation made according to a single pattern and adapted for use individually or in pairs in various arrangements on the door.

A further object of the invention is to provide, in a multi-section overhead door, a simple mechanism traversing the upper section of the door and controllable from an intermediate point on the door for latching the door and for operating the roller-carrying supports for the top section of the door.

A further object of the invention is to provide, in a multi-section overhead door, simple and inexpensive door section controlling and latching mechanism which is easy to install, which is adjustable to compensate for the variations in door widths, and which is easy to operate.

2

A further object of the invention is to provide an overhead door guiding and latching mechanism of a very simple and inexpensive construction, which is strong and durable, which is simple and efficient in operation, and which is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved overhead door guiding and latching mechanism, and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a rear or inner elevational view of the improved overhead door in its closed position and showing the guiding and latching mechanism applied thereto, portions of the supporting structure being shown in section, said view being taken on line 1—1 of Fig. 2;

Fig. 2 is an enlarged detail sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary detail vertical sectional view only with the latching mechanism released and the roller supports of the top section of the door swung to position to permit the inward breaking of the top section of the door prior to initiation of movement of the door to its overhead position;

Fig. 4 is an enlarged fragmentary detail sectional view showing a portion of the upper section of the door and the roller-carrying support hingedly associated therewith;

Fig. 5 is a similar view at right angles to the showing in Fig. 4 with parts broken away and in section;

Fig. 6 is an enlarged fragmentary detail sectional view taken on line 6—6 of Fig. 1; and

Fig. 7 is a fragmentary detail sectional view of the showing in Fig. 6 taken at right angles thereto.

Referring now more particularly to the drawings, the complete sectional overhead door 10 is illustrated as having two sections 11 and 12, but in actual practice the door may include any desired number of illustrated sections. The sections 11

and 12 are hinged together in superimposed relation by hinges which comprise complementary plate members 13 and 14, which will be dealt with more fully hereinafter. For the purpose of guiding the door to and from its overhead position there is provided adjacent each side of the door a metal track 15 of channeled formation and comprising an upright section 16, a curved section 17 and an overhead horizontal section 18.

For foldably connecting the superimposed door sections 11 and 12, sets of spaced complementary hinge plates 13 and 14 are utilized, as previously mentioned. The hinge plates are of very simple construction and adapt themselves to different usages and installations. For the hinged connection of the door sections each hinge is composed of a section 13 and a complementary section 14, the latter being narrower than the section 13 so as to fit within the flanged sides thereof, as shown. A hinge plate or section 13 is screwed or otherwise secured to one section of the door and the complementary hinge plate or section 14 is screwed or otherwise secured to the other section of the door, with the adjacent portions of the hinge sections telescoping and said telescoping portions being provided with registering apertures through which a pintle 19 is extended, the pintle being enclosed in a sleeve 20 welded or otherwise secured within an end portion of one of the hinge sections, as the section 14. As for the hinge members, which are adjacent the side margins of the door, the pintles 19' are relatively long and the outer ends of the same carry rollers 21 to ride in the tracks 15. On the lower face portions of the door section 11, adjacent the side margins thereof, plates 13 may be secured carrying sleeves 20 which have journalled therein the pintles 19' carrying lower track engaging rollers 21 on their outer ends. The roller-carrying pintles 19' are longitudinally shiftable in their sleeves 20, and this permits the rollers 21 to be brought into accurate registration with the tracks 15, when the door is installed, irrespective of slight inaccuracies in the positions of the hinges or in the door section width.

The improved mechanism for guiding the door to and from its overhead position is of importance in the present invention. The upper, inner corner face portions of the top section 12 of the door have screwed thereto plates 14 similar to those previously described in connection with the hinges, only positioned with their sleeve portions 20 uppermost. As the construction of the upper roller-carrying elements on each side of the door are identical, only one will be described in detail. In telescopic relation with the sleeve-carrying portion of an upper plate 14 is a bracket plate 22 having flanged sides. A bracket plate 22 is hingedly connected to an upper anchored plate 14 by an elongated rod 23 which extends through the sleeve 20 and through apertures in the overlapping flanged portions of the complementary plate members 14 and 22. The rod 23 traverses the inner face of the upper portion of the door section 12 and at its opposite extremity it enters and forms a pintle for the hinge connection of the opposite roller-carrying bracket 22 with its fixed plate 14.

A bracket plate 22, in its swingable association with a fixed plate 14, is shown in detail in Figs. 4 and 5. Within a sleeve 20' in the free end of the plate 22 is revolubly mounted a shaft 24 carrying an upper track roller 25 at its outer end. Said shaft is axially adjustable in its sleeve for adjustments and installation alinement. Fast on the elongated horizontal rod 23 adjacent an inner face portion of the bracket plate 22 is a crank 26 having on its free end an inwardly projecting stud 27 extending into an arcuate slot 28 in an inner side flange of the bracket plate 22. Obviously, when oscillatory movement is imparted to the elongated rod 23, through means hereinafter to be described, swinging movement will be imparted to the crank 26 to oscillate the stud 27 in the bracket plate slot 28. The slot provides for a certain degree of lost motion before the stud 27 contacts end portions of the slot to thereby swing the roller-carrying bracket plate 22.

Mounted on the building supporting structure adjacent each horizontal track section 18 is a counter-balancing spring 29 (see Fig. 2). One end of a spring is anchored, as at 30, while the other end of a spring carries a sheave 31 about which is extended an elongated cable 32, a portion of the cable also being engaged by another sheave 33, suspended from the supporting structure at some distance from the sheave 31. One end of the cable 32 is anchored, as at 34, while the other end of the cable, passing downwardly from the sheave 33, is anchored on a bracket 35 projecting laterally from a lower inner face portion of the lowermost door section 11.

Mounted on the inner surface of a wall or support over the door opening and intermediate the side edges thereof is a latch socket plate 36 adapted to be entered by a spring-urged latch bolt 37 vertically reciprocatably mounted in a bracket plate 38, secured to a face portion of the door section 12 adjacent its upper margin and in vertical alinement with the socket plate 36. Integral with and depending from the bracket plate 38 is a bifurcated bearing bracket 39 in which an intermediate portion of the horizontal rod 23 is journalled. The inner eyed extremity of a bifurcated lever 40 is secured to the rod 23 and the outer end portions of said lever 40 have pivotally connected therebetween, as at 41, the upper extremity of the angled end of a vertically reciprocatable operating link 42.

There is intermediately pivotally mounted between depending ear portions of the bifurcated bracket 39 a yoke-like lever 43 which encloses the upwardly extending flattened portion of the link 42 and is adapted to be contacted by a protuberance 44 adjustably mounted in said portion of the link 42. The inner end portion of the yoke-like lever 43 is pivotally connected to the hooked extremity of a link 45, which is also pivotally connected with a shank 46 depending from the latch bolt 37, as at 47.

The vertical link 42 is vertically reciprocatably mounted on an inner face portion of the door section 12 by means of staples or guides 48. On the inner face of the door section 12 intermediate the side edges thereof and adjacent its hingedly connected lower margin is a revolubly mounted plate 49 having affixed thereto the inner end of an operating handle 50. The lower end portion of a connection 51 is pivotally mounted on the handle 50 and the upper end portion of said connection 51 is in hooked engagement with the depending lower extremity of the link 42. Thus, a movement of the handle 50 is effective to partially revolve the plate 49 and to also raise or lower the jointed linkages 51—42 to impart, through the mechanism previously described and illustrated in Figs. 6 and 7, movement to the latch bolt 37 and simultaneous oscillatory movement to the elongated horizontal rod 23 which, through the arrangement of Figs. 4 and 5, swings the upper

roller-carrying supporting plates **22**. In actual practice, a similar handle member **50** may be provided on the outer face of the door and connected with the plate **49** in order to operate the latching mechanism and door section swinging mechanism from exterior of the building.

It will be noted that the circular plate **49** is formed with a notch **52** which, when the mechanism is locked, is engaged by a lock plunger **53**. Projection and retraction of the lock plunger **53** is effected in the conventional manner by a key inserted into a lock cylinder **54**, and upon movement of the lock tumblers thereby, the lock plunger **53** is actuated whereby the handle **50** and associated mechanism is free to be moved, or is locked against movement, as the case may be.

In the operation of the overhead door incorporating the improved guiding and latching mechanism, let it be assumed that the door is in its closed and latched condition illustrated in Figs. 1, 2 and 6. If it is desired to unlatch the door prior to manually shifting it to its overhead open position, the lock is first manipulated to release the lock plunger **53** from the disc recess **52**. Thereupon, the handle **50** is raised or turned in a counterclockwise direction relative to Fig. 1. Through the jointed linkage **51—42**, which is thereby shifted upwardly, the lever **43** is turned in a clockwise direction relative to Fig. 6 to thereby lower the latch bolt **37** and to withdraw it from the latch socket **36** against the tension of the coiled spring **55**. Simultaneously the upward shifting of the jointed linkage **51—42** will operate to raise the lever arm **40** to thereby turn the elongated horizontal rod **23** in a clockwise direction relative to Fig. 6. The outer ends of said rod carry the levers **26** and said levers are shifted from the position of Fig. 2 to the position of Fig. 3 with their studs **27** riding in the bracket slots **28**. The position of Fig. 3 is attained approximately simultaneously with the release of the latch bolt and wedging pressure against the inner face of the upper door section **12** is released so that said door section, because of its weight and mounting, swings or breaks inwardly slightly to the position of Fig. 3, with a slight shift of the bracket-carrying rollers **22** relative to the curved portions of the track **17**. Thereafter, the door may be manually pushed to its horizontal overhead open position, such movement being accomplished with little effort due to the spring and cable arrangement which counterbalances the door. Also, the various rollers **21** and **25** ride freely in the tracks.

The door is closed in a reverse manner and when the position of Fig. 3 is attained, then the handle **50** is swung downwardly to shift the jointed linkage **51—42** downwardly and the rod **23** turns in a direction to kick the levers **26** from the position of Fig. 3 to the position of Fig. 2, wherein the levers and brackets **22** then exert a wedging or pushing action against the slightly open upper portion of the upper door section to cause it to assume the completely closed position of Fig. 2, whereupon expansion of the spring **55** will cause the latch bolt **37** to snap into the latch socket **36**. It will thus be seen that the improved mechanism is effective through a single manual manipulation to simultaneously and jointly operate the latch bolt and to dispose the upper roller-carrying brackets **22** in a manner to exert a pushing force against the upper section of the door, or to release such pushing force to permit the door section to break inwardly, as the case may be.

The door mechanism is susceptible of easy mounting to permit installation of the door regardless of slight inaccuracies or differences in door widths. The roll shafts **19'** are axially shiftable in their hinge or bracket sleeves to properly aline them with the side tracks. Likewise, the lever-carrying studs **27** are of sufficient length to engage in the bracket slots **28** regardless of slight inaccuracies in the positioning of said brackets. The latch mechanism not only latches the upper section of the overhead door in its vertical position to prevent undesired inward breaking thereof, but also latches the entire door against vertical movement. When the overhead door is in its closed position, the upper hinged section **12** of the door is automatically retained in a correct closed condition without any special manipulating means therefor. When the door is to be opened simultaneously with the release of the door latch, the upper door section automatically breaks inwardly slightly and the mounting brackets for the upper rollers compensatingly vary their proximity to the plane of the door section during movements, with the result that when the door is in its raised overhead position, said roller-carrying brackets collapse adjacent the face of the door to occupy very little space, and this is of considerable advantage in minimizing the overhead required for the door. The improved overhead door guiding and latching mechanism is furthermore of simple and novel construction and is well adapted for the purposes described.

What is claimed as the invention is:

1. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of the door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door, independent bearing units hingedly mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, and means engaging said bearing units and extending to a position on the door remote therefrom for manually controlling relative rocking movement between the top section of the door and said bearing units.

2. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of said door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door to engage said tracks, independent bearing units hingedly mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, a latch bolt movably mounted on the top section of the door adjacent its free margin for latching said door section in vertical closed position, and common means for controlling said latch bolt and for effecting relative rocking movements between said bearing units and the top section of the door.

3. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of said door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door to engage said tracks, a rock shaft movably mounted on and traversing the upper section of the door, independent bearing units mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, said rock

shaft forming a common pintle for hinged movements of said bearing unit, lost motion connections between said rock shaft and said bearing units for effecting relative rocking and wedging movements between said bearing units and the top section of the door, and means extending from said rock shaft to a remote operating point on the door for moving said rock shaft.

4. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of said door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door to engage said tracks, a rock shaft movably mounted on and traversing the upper section of the door, independent bearing units mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, said rock shaft forming a common pintle for hinged movements of said bearing units, lost motion connections between said rock shaft and said bearing units for effecting relative rocking and wedging movements between said bearing units and the top section of the door, a latch bolt movably mounted on the top section of the door adjacent its free margin for latching said door section in vertical closed position, and common means for moving said rock shaft and for operating said latch bolt.

5. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of said door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door to engage said tracks, a rock shaft movably mounted on and traversing the upper section of the door, independent bearing units mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, said rock shaft forming a common pintle for hinged movements of said bearing unit, lost motion connections between said rock shaft and said bearing units for effecting relative rocking and wedging movements between said bearing units and the top section of the door, a latch bolt movably mounted on the top section of the door adjacent its free margin for latching said door section in vertical closed position, and common means extending from a lower portion of said door to the rock shaft and to the latch bolt for simultaneously manually operating the same.

6. An overhead door, comprising a pair of superimposed, hingedly connected sections, tracks mounted adjacent both side edges of said door to guide the door from a vertical to a horizontal position, guide rollers carried by the lower section of the door to engage said tracks, a rock shaft movably mounted on and traversing the upper section of the door, independent bearing units mounted upon the upper corner portions of the top section of the door and carrying on their free ends rollers to engage said tracks, said rock shaft forming a common pintle for hinged movements of said bearing units, lost motion connections between said rock shaft and said bearing units for effecting relative rocking and wedging movements between said bearing units and the top section of the door, a latch bolt movably mounted on the top section of the door adjacent its free margin for latching said door section in vertical closed position, a handle movably mounted on the door remote from the latch bolt and bearing units, and an elongated jointed linkage extending from the handle to the rock shaft and latch bolt for simultaneously operating both of the latter upon movements of the handle.

7. A bearing assembly mounted upon the uppermost section of an overhead door, comprising a pair of hinge brackets mounted on opposite corner face portions of the door section, an elongated rock shaft movably mounted on said door section and extending between said hinge brackets to swingably engage said brackets and to form a common pintle for the same, said brackets projecting shiftably inwardly of the plane of said door section face, anti-friction devices carried by the outer ends of said hinge brackets and projecting laterally therefrom, a connection attached to an intermediate portion of said rock shaft, and an operating member movably mounted on a section of said door and engaging said connection.

8. A bearing assembly mounted upon the uppermost section of an overhead door, comprising a pair of hinge brackets mounted on opposite corner face portions of the door section, an elongated rock shaft movably mounted on said door section and extending between said hinge brackets to swingably engage said brackets and to form a common pintle for the same, said brackets projecting shiftably inwardly of the plane of said door section face, anti-friction devices carried by the outer ends of said hinge brackets and projecting laterally therefrom, a latch bolt reciprocatably mounted on said uppermost section of the door adjacent its upper margin and intermediate the hinge brackets, a connection attached to an intermediate portion of said rock shaft to oscillate it and to said bolt to reciprocate it, and an operating handle movably mounted on a section of the door remote from the bolt and brackets and operatively engaging said connection.

9. Control means for an overhead door of the type which includes a pair of sections hinged together in superimposed relation to fit in a door frame with tracks adjacent the sides of the door frame curving rearwardly therefrom, comprising hinged brackets on opposite upper corner face portions of the uppermost section of the door carrying anti-friction members to ride in said tracks, means for causing relative swinging movement as between said hinged brackets and said door section, a latch on the uppermost foldable door section to jointly latch said section against independent swinging movement and the entire door against sliding movement on the tracks, and manual control means mounted on a remote portion of the door for jointly controlling relative swinging movement of said hinged brackets and operation of said latch.

10. Control means for an overhead door of the type which includes a pair of sections hinged together in superimposed relation to fit in a door frame with tracks adjacent the sides of the door frame curving rearwardly therefrom, comprising hinged brackets on opposite upper corner face portions of the uppermost section of the door carrying anti-friction members to ride in said tracks, means for causing relative swinging movement as between said hinged brackets and said door section, a latch on the uppermost foldable door section to jointly latch said section against independent swinging movement and the entire door against sliding movement on the tracks, manual control means mounted on a remote portion of the door for jointly controlling relative swinging movement of said hinged brackets and operation of said latch, and means for locking said control means against operation.

11. An overhead door, comprising door sections, tracks mounted adjacent both side edges of the door to guide the door from a vertical to a horizontal position, guide rollers carried by a lower portion of the door, independent bearing units hingedly mounted upon the upper corner portions of the top of the door and carrying on their free ends rollers to engage said tracks, and means engaging said bearing units and extending to a position on the door remote therefrom for manually controlling relative rocking movement between the top portion of the door and said bearing units.

JOHN THOMAS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,983,856	Johnson	Dec. 11, 1934
2,032,951	Pixley	Mar. 3, 1936
2,041,221	Brunst	May 19, 1936
2,082,774	Basile	June 8, 1937
2,091,299	Bagley	Aug. 31, 1937