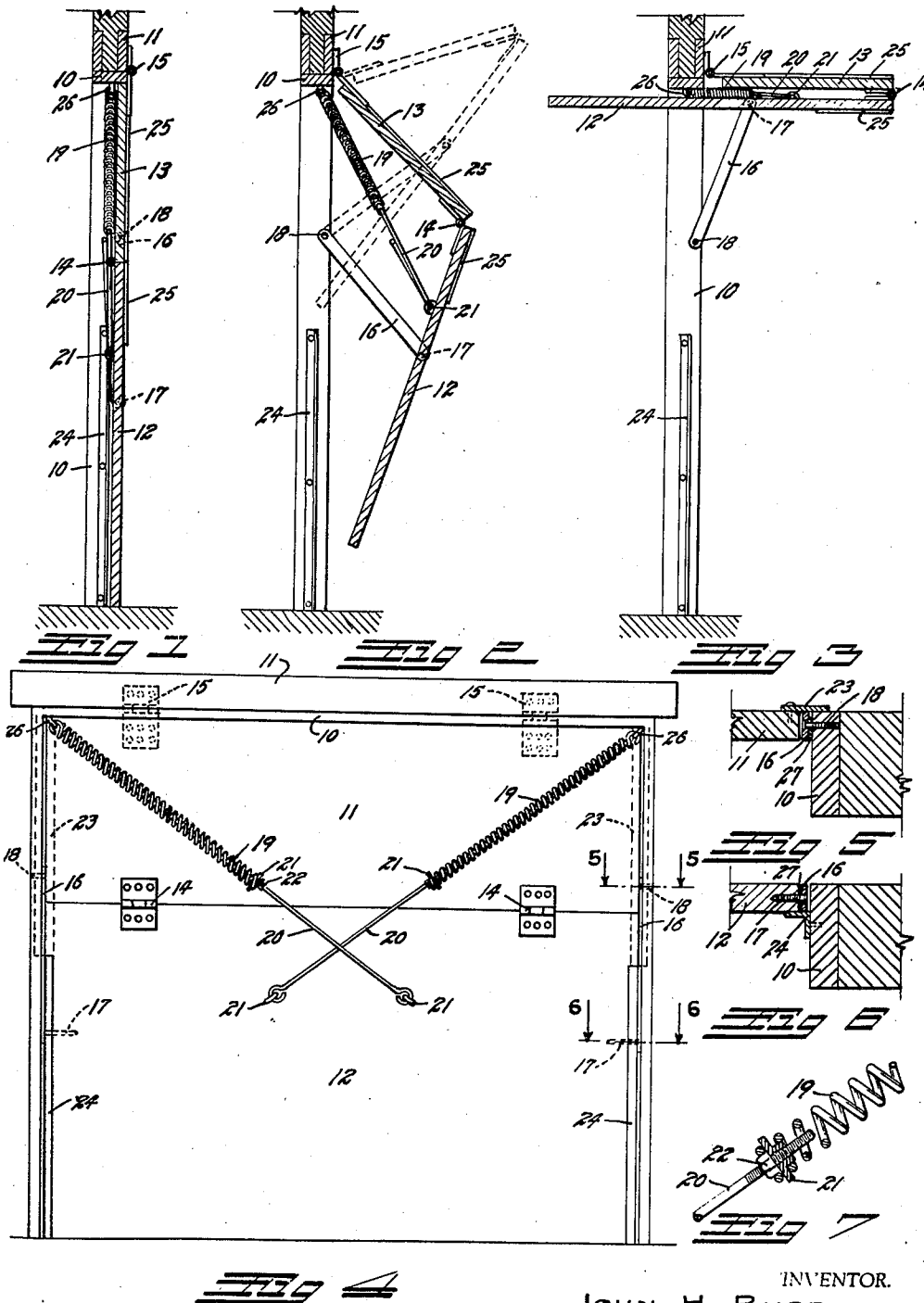


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OVERHEAD DOOR

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OVERHEAD DOOR

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This invention relates to an overhead door, and has for its principal object the provision of a simple and highly efficient overhead door mechanism in which all tracks, rollers, guides, etc. will be eliminated, and in which it will not be necessary for the user to do any lifting whatsoever.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a vertical section through the improved door, illustrating it in the closed position;

Fig. 2 is a similar section illustrating intermediate positions of the door;

Fig. 3 is a similar section illustrating the door in the fully open position;

Fig. 4 is an inside face view of the improved door;

Figs. 5 and 6 are enlarged sections through the edge of the door, taken on the lines 5-5, and 6-6, Fig. 4, respectively; and

Fig. 7 is a detail view illustrating a method of connecting the springs and pull rods of the improved door.

In the drawing, a typical door frame is indicated at 10 with its lintel at 11.

The improved door is formed in two sections, a relatively wide lower section 12 and a relatively narrow upper section 13. The two sections are horizontally hinged together on their inner faces by means of suitable hinges 14, and are suspended from the top of the door frame 10 or from the lintel 11, upon suitable suspension hinges 15 which are placed on the outside face of the door and secured to the upper edge of the upper door section 13.

A link bar 16 is hinged at its lower extremity at each side of the lower section 12 upon suitable lower pivot bolts 17. The upper extremities of the link bars 16 are hinged to the sides of the door frame 10 upon suitable upper pivot bolts 18.

Tension springs 19 extend inwardly and downwardly from suitable attachments at the upper corners of the frame 10 on the inside face of the door. These springs terminate in pull rods 20 which are hingedly connected to the lower section 12 of the door upon suitable eye-bolts 21 or

in any other desired manner. It will be noted that the pull rods cross each other on the vertical center line of the door, that is, the attachment point of the right hand spring is on the left of the lower section, while the attachment point of the left hand spring is on the right of the section.

The springs may be attached to the pull rods 20 in any desired manner, but it is so desired to attach them so that an adjustment of the tension therein can be made to cause both springs to pull equally so as to offset the thrust of each other in a lateral direction to prevent binding or cramping of the door. One of the methods of attachment is illustrated in Fig. 7, wherein the rods 20 are threaded into a spring plate 21 which engages the lower turn of the spring. A lock nut 22 locks the spring plate in any desired position on the rod. Any suitable stop means will be employed for stopping the door in its closed position.

To seal the door at the sides to prevent the entrance of drafts, an angle stop member 22 is positioned inside the door frame 10 at each side thereof so as to contact the inside face of the lower portion of the lower section 12. An overlapping strip 34 is secured to the side edges of the upper section 13, and the upper portion of the lower section 12, so that, when the door is closed, the overlapping strip will cover the space between the door and its frame, as shown in Fig. 5. The angle stop member 22 will perform a similar function for the lower section of the door, as shown in Fig. 6.

When the door is in the closed position, (Fig. 1) the springs 19 will be exerting their greatest tension. In this position, however, the links 16 are past their dead centers, that is, the springs are acting on the inside of the upper pivot bolts 18, so the door is naturally held in the position of Fig. 1. To open the door, it is only necessary for the operator to push the upper portion of the lower section 12 straight outwardly. This carries the springs to the outside of the upper pivot bolts 18 where they can now exert an upward action on the door. This upward action causes the links 16 to rotate outwardly and upwardly, as shown in Fig. 2, until the coaction of the links 16 and the upper section 13 causes the lower section 12 to swing to a horizontal overhead position, as shown in Fig. 3.

At this time, the foreshortened springs are exerting very little tension. However, they are supporting practically no weight and are only acting to hold the upper extremities of the links 16 inwardly to the position of Fig. 3. When in the latter position, the weight of the door sections

on the outside of the frame is greater than the weight on the inside thereof, so that the natural tendency is to maintain the horizontal position with the links acting as a fulcrum.

To close the door, it is only necessary to give a short pull downwardly on the lower edge of the lower section 12. This quickly swings all of the weight of the entire assembly to the outside of the frame 10 so that it will descend under the cushioning action of the springs 16 to the position of Fig. 1.

When properly balanced, a very slight outward push causes the door to automatically move to the position of Fig. 3, and a very slight downward pull causes the door to return to the position of Fig. 1.

The position of the lower pivot bolts 17 is very important. If these bolts were placed further down on the lower section, the links 16 would swing to a more vertical position in Fig. 3, causing the excess weight on the outside of the frame to tend to swing the two portions 11 and 12 downward when open. As illustrated, any tendency of the double outside door portion of Fig. 3 to move downward is offset by an upward reaction against the top of the door frame. Therefore, the proportionate spacing of the elements is essential.

It has been found that the most efficient proportions for this door are: to have the upper portion 11 slightly in excess of one-half the width of the lower portion 12; to have the distance between the top of the lower portion 12 and the bolts 17 slightly less than one-half the width of the portion 12; to have the length of the links 16 slightly less than one-half the width of the portion 12; and to have the attachment bolts 21 positioned closer to the upper edge of the lower section 12 than the pivot bolts 17 so that slight lifting action is obtained in the open position of Fig. 3. Any proportional arrangement other than the above destroys the efficiency of the door.

It is desired to call attention to the fact that there are no slides, guides, or tracks employed in the improved door; that most of the operating space required is on the outside of the door, where it will not interfere with the interior storage; and that the lower edge of the door does not move inwardly until it has reached a position above the half-way point so it will not strike an automobile or other equipment in closely spaced relation to the door.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on

the side of said frame; and at its other extremity on the side edge of the lower door section.

2. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame; and at its other extremity on the side edge of the lower door section, the hinge point between said links and said door frame being positioned above the horizontal center line of the lower door section.

3. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame; and at its other extremity on the side edge of the lower door section, the hinge point of said links to the door being positioned above the horizontal center line of the lower door section.

4. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame; and at its other extremity on the side edge of the lower door section, the hinge point between said links and said door frame being positioned above the horizontal center line of the lower door section, the hinge point of the lower extremities of said links being positioned above the horizontal center line of the lower door section.

5. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame, and at its other extremity on the side edge of the lower door section, there being two of said spring means extending inwardly from adjacent the upper corners of said frame and crossing each other at the center of the door before reaching

their attachment points on the lower door section.

6. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame, and at its other extremity on the side edge of the lower door section, there being two of said spring means extending inwardly from adjacent the upper corners of said frame and crossing each other at the center of the door before reaching their lower attachment points on the lower door section, the lower attachment points of said spring means being above the horizontal center line of the lower door section.

7. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; tension spring means extending from the top of said frame downwardly on the inner face of said door to a

hinged connection on the inner face of the lower door section; a hinged link at each side of said door, each of said links being pivoted at one extremity on the side of said frame; and at its other extremity on the side edge of the lower door section, the vertical width of the upper door section exceeding one-half the vertical width of the lower door section.

8. The combination with a door frame of an upper door section; hinges suspending the upper section from the top of the frame on the exterior face thereof; a lower door section; hinges suspending the lower door section from the upper door section, said hinges being positioned on the interior face of said door; a tension spring secured at each upper corner of said door frame on the interior side of said door; a pull rod extending from the lower extremity of each spring, the pull rods crossing each other at the center of said door; and hinged attachment means for said rods positioned on the inner face of the lower door section above the horizontal center line thereof; a hinged link at each side of said door; first pivot means pivoting each link by an end thereof to the side of said door frame at a point forwardly of the upper attachment points of said springs and above the lower door section; second pivot means attaching the other extremities of said links at the side edges of said lower door section at points above the horizontal center line of said lower door section.

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