E. J. G. PHILLIPS.

MEANS FOR SUPPORTING SLIDING DOORS.

APPLICATION FILED JULY 23, 1915.

1,188,482. Patented June 27, 1916.

2 SHEETS—SHEET 1.

Fig. 1

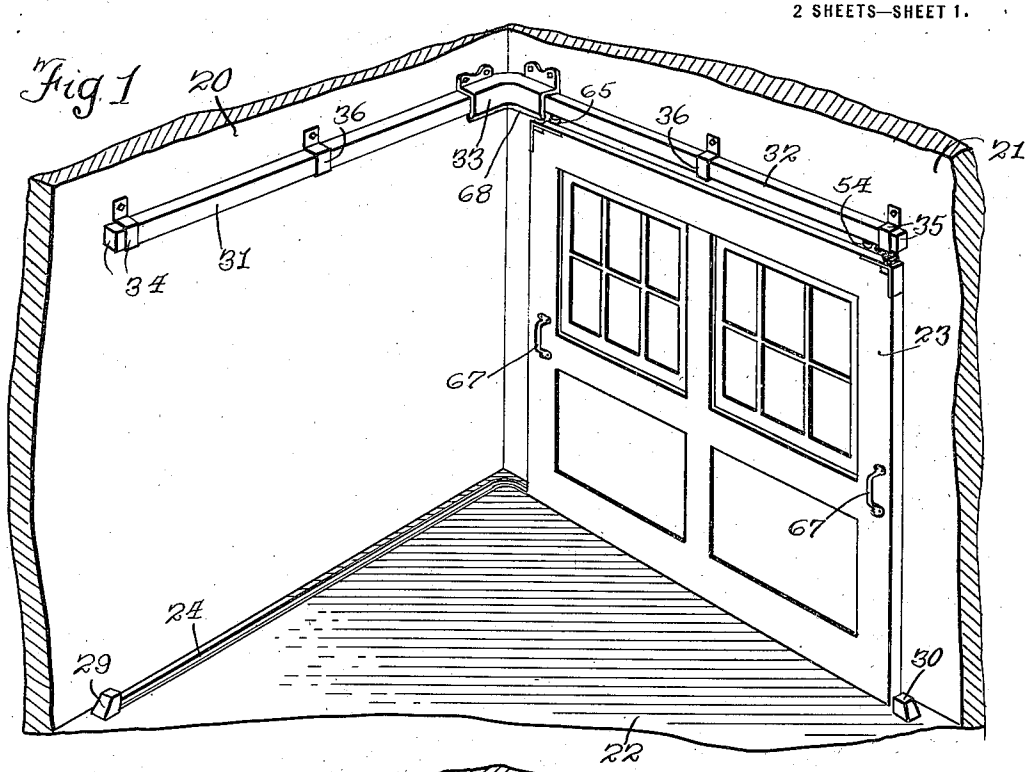
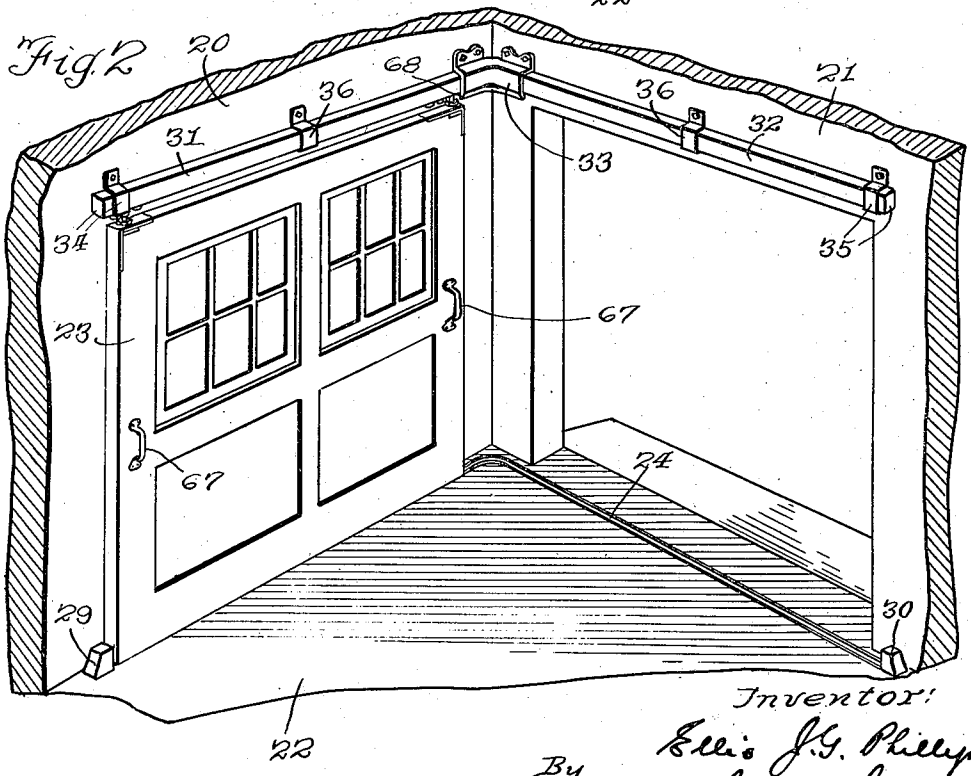


Fig. 2



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Fig. 3

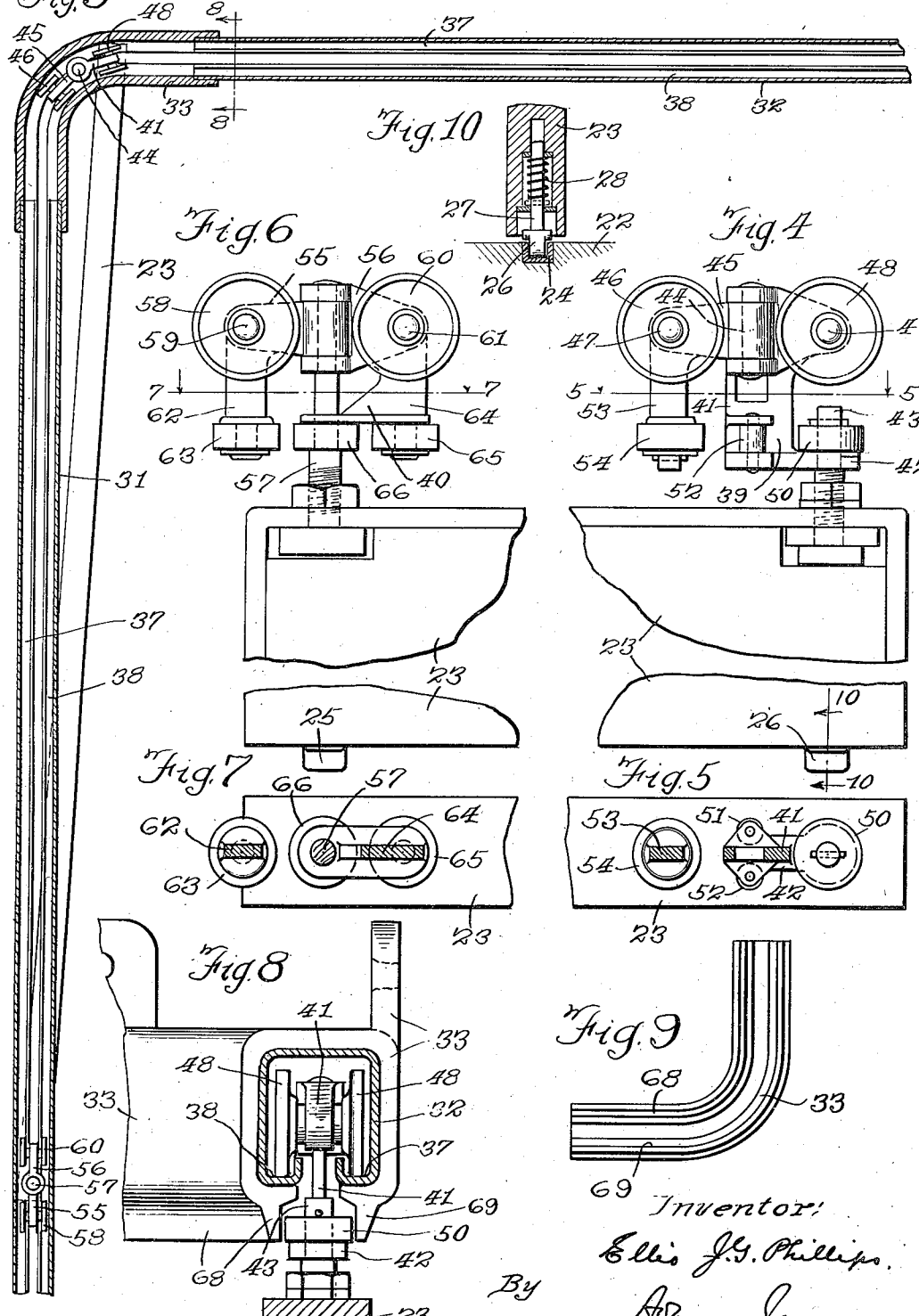


Fig. 10

Fig. 6

Fig. 4

Fig. 7

Fig. 5

Fig. 8

Fig. 9

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UNITED STATES PATENT OFFICE.

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MEANS FOR SUPPORTING SLIDING DOORS.

1,188,482. Specification of Letters Patent. Patented June 27, 1916.

Application filed July 23, 1915. Serial No. 41,509.

To all whom it may concern:

Be it known that I, ELLIS J. G. PHILLIPS, a citizen of the United States, and a resident of Aurora, in the county of Kane, State of Illinois, have invented certain new and useful Improvements in Means for Supporting Sliding Doors, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to means for supporting sliding doors and particularly to means for supporting a door so as to enable it to slide from position closing an opening in one wall of a building, such as a garage, into position along the adjacent side of the building at right angles to the wall containing the doorway.

It is one of the objects of my invention to provide supporting means of this type such that the door is adapted not only to be moved from its position along one wall to a position along the adjacent wall at right angles thereto, but also to be moved into position along such wall at the desired distance from the corner.

It is another object of my invention to provide suitable guiding means in connection with the supporting hangers such that the door shall move easily and smoothly from position along one wall into position along the adjacent wall about a curved track of comparatively small radius.

It is another object of my invention to improve devices of this type in sundry details hereinafter pointed out.

The preferred means by which I have accomplished my several objects are illustrated in the accompanying drawings and are hereinafter specifically described.

That which I believe to be new and desire to cover by this application is set forth in the claims.

In the drawings:—Figure 1 is a view showing a corner of a building equipped with a door embodying my improved supporting means; Fig. 2 is a view similar to Fig. 1, but showing the door in its opened position; Fig. 3 is a horizontal section through the supporting track showing the position of one of the hangers as it moves about the curved track by which the two straight sections of track are joined; Fig. 4 is an enlarged detail showing the construction of the carriage mounted upon the right-hand side of the door in Fig. 1, and showing also the corresponding guide at the bottom of the door; Fig. 5 is a horizontal section taken on line 5—5 of Fig. 4; Fig. 6 is an enlarged detail showing the form of carriage and bottom guide at the left-hand side of the door in Fig. 1; Fig. 7 is a horizontal section taken on line 7—7 of Fig. 6; Fig. 8 is an enlarged detail being a section taken on line 8—8 of Fig. 3; Fig. 9 is a bottom view of the curved track section by which the two straight sections of track are operatively connected; and Fig. 10 is an enlarged detail showing the manner of mounting the guides at the lower edge of the door, being substantially a section taken on line 10—10 of Fig. 4.

Referring to the several figures of the drawings in which corresponding parts are indicated by the same reference characters, 20—21 indicate two adjacent side walls and 22 indicates the floor of a building, the wall 21 being provided with a doorway therein adapted to be closed by a door 23 as shown in Fig. 1. As shown in Figs. 1, 2 and 10, the floor 22 is provided with a guide 24 extending along the sides 20—21. As best shown in Figs. 4 and 6 the lower corners of the door 23 are provided with slide-blocks 25—26 similar in construction adapted to slide freely along the guide 24 which is in the form of a channel as best shown in Fig. 10. Each of the slide-blocks 25—26 comprises a shank 27 extending upward into the door, a spring 28 being provided adapted to hold the slide-block yieldingly down in proper engagement with the guide. At the ends of the guide 24 are located suitable stop-blocks 29—30 adapted to limit the movement of the door 23. In the construction shown, the guide-blocks 25—26 are elongated and are accordingly mounted so as to turn relative to the door for following the guide 24.

The upper supporting means for the door comprises straight track sections 31—32 joined at their adjacent ends by a circular track section 33 which also serves as a bracket for supporting the adjacent ends of such straight track sections. The outer ends of the sections 31—32 are supported by brackets 34—35, which, in the construction shown, are in the form of caps adapted to close the ends of the sections 31—32. Intermediate brackets 36 of any suitable type assist in supporting the track sections. As

best shown in Fig. 8, each of the track sections 31—32 is in the form of a channel with its edges turned inward so as to provide two runways 37—38 properly spaced apart.

As is best shown in Figs. 4 and 6, the upper corners of the door 23 are provided with carriages 39—40, pivotally mounted upon vertical axes upon the door, the axes of the carriages 39—40 being in vertical alinement with the guides 25—26 as shown in Figs. 4 and 6. Inasmuch as the curvature of the guide 24 corresponds to that of the curved track section 32, the door is permitted free and easy movement as is hereinafter described.

The carriage 39 comprises a bracket 41 provided with a horizontally-extending arm 42 by which the bracket is pivotally mounted upon a pin 43 extending upward from the door 23. Pivotally mounted upon a vertical pivot pin 44 carried by the bracket 41 is an arm 45. Supporting wheels or rollers 46 are revolubly mounted upon the end of the arm 45 by means of a pin 47. Supporting wheels or rollers 48 are journaled by means of a pin 49 upon the bracket 41 directly above the pivot pin 43. Mounted upon the pivot pin 43 below the rollers 48 is a guide roller 50; upon opposite sides of the bracket 41 below the pivot pin 44 are mounted two guide rollers 51—52; and upon the lower end of an arm 53 depending from the arm 45 is revolubly mounted a guide roller 54.

The carriage 40 is similar in a general way to the carriage 39, but differs therefrom by reason of being centrally pivoted upon the door in lieu of being pivoted upon one end. In the construction shown in Fig. 6, which illustrates the carriage 40, two arms 55—56 are pivotally mounted upon a pivot pin 57 extending upward from the door 23. The arm 55 is provided with two supporting wheels or rollers 58 mounted thereon by means of a pin 59, and the arm 56 is provided with two supporting wheels or rollers 60 mounted thereon by means of a pin 61. The horizontally-extending arm 55 is provided at its outer end with a downward-extending arm 62 having revolubly mounted upon its lower end a guide roller 63; the arm 56 is likewise provided with a downwardly-extending arm 64 which has revolubly mounted upon it a guide roller 65; and a third guide roller 66 is revolubly mounted upon the pivot pin 57 below a horizontally-extending portion of the arm 64.

As will be seen by an inspection of Figs. 4 and 6, the two supporting rollers at each end of each of the carriages 39—40 are pivotally connected with the two supporting rollers at the opposite end of that carriage. Each two supporting rollers have a guide roller positioned directly below them, and each carriage as a whole is mounted upon a vertical axis upon the door. The carriage 40 is of the type preferably used for a single door adapted to close an entire doorway. When two doors are to be used the adjacent edges of the two doors will preferably be provided with carriages of the type of carriage 39.

With the door in the position shown in Fig. 1, when it is desired to move the door to the position shown in Fig. 2, the door is grasped by a handle 67 of any suitable type and moved bodily to the left in Fig. 1. When the guide roller 63 comes in contact with flanges 68—69 serving as guides and extending downward from the bracket 33, the arm 55 will be turned upon the pivot pin 57 so as to cause the supporting rollers 58 to turn properly and easily for following the curvature of the tracks provided by the said bracket 33. As the rollers 60 approach the curved portion of the track the guide rollers 65 and 66 serve to make their movement about the curve smooth and easy. The engagement between the various guide rollers and the flanges 68—69 is best illustrated in Fig. 8 where the roller 50 of the carriage 39 is shown in position between such flanges. As will be readily understood, when the carriage 39 in turn comes into engagement with the curved portion of the track, the guide rollers 50, 51, 52 and 54 serve to guide the supporting wheels about the curve in whichever direction the carriage may be moving.

So far as I am aware I am the first in the art to provide means for supporting a sliding door comprising in effect a caster wheel and means for controlling the turning of the caster wheel upon its vertical pivot, and I therefore wish to claim this feature broadly. While I prefer to use a form of carriage comprising two sets of supporting wheels, it will be understood that I do not restrict myself to this particular form of structure except as hereinafter specifically claimed.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The combination of a door, a curved track for supporting the door, an arm pivotally connected at one end with said door, a supporting wheel journaled on a horizontal axis on said arm adapted to engage said track, and a guide curved to correspond to the curvature of said track adapted independently of the supporting wheel to swing said arm laterally upon its pivot to an angular position relative to the door into substantially a tangential position relative to that portion of the track with which the supporting wheel is in engagement.

2. The combination of a door, a curved track for supporting the door, an arm pivotally connected at one end with said door, a supporting wheel journaled on a hori-

zontal axis on said arm adapted to engage said track, and a guide curved to correspond to the curvature of said track adapted to have an effective bearing on said arm at its pivotal mounting and also at a point at one side thereof for swinging the arm laterally upon its pivot to an angular position relative to the door into substantially a tangential position relative to that portion of the track with which the supporting wheel is in engagement.

3. A door hanger comprising in combination an arm, means for pivotally supporting a door upon a vertical axis therefrom, a supporting wheel journaled upon a horizontal axis on said arm, a roller journaled on the axis upon which said arm is pivotally connected with said door, and a second guide roller journaled upon said arm on a vertical axis at one side of said first-named guide roller.

4. A door hanger comprising in combination an arm, means for pivotally supporting a door upon a vertical axis therefrom, a supporting wheel journaled upon a horizontal axis on said arm, a guide roller journaled upon said arm on the axis upon which said arm is pivotally connected with said door, and a second guide roller journaled upon said arm on a vertical axis directly below the horizontal axis of said supporting wheel.

5. A door hanger comprising a pair of wheels pivotally connected together to swing angular relatively to each other, means for suspending a door therefrom, and guides connected with said wheels respectively for turning either of said wheels to an angular position relatively to the other wheel.

6. A door hanger comprising two arms pivotally connected together, supporting wheels journaled on said arms respectively, means for suspending a door from said arms, and guide rollers carried by said arms respectively.

7. A door hanger comprising two arms, a pin pivotally connecting said two arms together, supporting wheels journaled on said arms respectively, means for suspending a door from said pivot pin, and guide rollers journaled on said arms at opposite sides of said pin.

8. A door hanger comprising two arms, a pin pivotally connecting said two arms together, supporting wheels journaled on said arms respectively, means for suspending a door from said pivot pin, a guide roller journaled on said pin, and other guide rollers journaled on said arms at opposite sides of the pin.

9. The combination of a door, a curved track for supporting the door, a caster-wheel mounted on said door and adapted to swivel about a vertical axis thereon, and means comprising a guide carried by said caster-wheel at a point in vertical alinement with the said caster-wheel for turning the caster-wheel on its vertical axis to follow the curvature of the track.

10. The combination of a door, a curved track for supporting the door, a carriage mounted on said door, comprising an arm pivotally mounted on a vertical axis relative to said door, and a pair of supporting wheels journaled on said arm at one side of the vertical axis thereof, a guide roller mounted on said arm, and means acting on said roller serving to turn said wheels to follow said curved track.

11. The combination of a door, a curved track for supporting the door, a carriage mounted on said door, comprising an arm pivotally mounted on a vertical axis relative to said door, and a pair of supporting wheels journaled on said arm at one side of the vertical axis thereof, and means carried by said track acting on said arm as said door travels along the track serving to turn the wheels to follow the curvature of the track freely and easily.

12. The combination of a door, a curved track for supporting the door, a carriage mounted on said door, comprising an arm pivotally mounted on a vertical axis relative to said door, and a pair of supporting wheels journaled on said arm at one side of the vertical axis thereof, a guide roller mounted on said arm, and a flange carried by said track adapted to be engaged by said guide roller for turning said wheels to follow said curved track.

13. The combination of a door, a curved track for supporting the door, an arm mounted upon a vertical axis upon said door, a supporting wheel journaled on a horizontal axis on said arm adapted to engage said track, a guide roller journaled upon the vertical axis upon which said arm is mounted, a second guide roller journaled upon a vertical axis on said arm at one side of said first-named guide roller, and a guide curved to correspond to the curvature of said track adapted to engage said guide rollers as the supporting wheel moves along the track for swinging said arm laterally upon its pivotal axis to an angular position relative to the door.

14. In a means for supporting a sliding door, the combination of a bracket, means for pivotally connecting said bracket with said door on a vertical axis thereon, a supporting wheel journaled upon a horizontal axis upon said bracket, and a guide roller journaled upon the vertical axis upon which said bracket is mounted relative to said door.

15. In a means for supporting a sliding door, the combination of a bracket, means for pivotally connecting said bracket with

said door on a vertical axis thereon, a supporting wheel journaled upon a horizontal axis upon said bracket, a guide roller journaled upon the vertical axis upon which said bracket is mounted upon said door, and a second guide roller journaled upon a vertical axis upon said bracket at one side of the said vertical axis upon which said bracket is mounted upon said door.

16. In a means for supporting a sliding door, the combination of a bracket, means for pivotally connecting said bracket with said door on a vertical axis thereon, a supporting wheel journaled upon a horizontal axis upon said bracket, an arm pivotally mounted on a vertical axis upon said bracket, a second supporting wheel journaled upon a horizontal axis on said arm, and a guide roller journaled upon said arm in vertical alinement with said second supporting wheel.

17. In a means for supporting a sliding door, the combination of a bracket, means for pivotally connecting said bracket with said door on a vertical axis thereon, a supporting wheel journaled upon a horizontal axis upon said bracket, an arm pivotally mounted on a vertical axis upon said bracket, a second supporting wheel journaled upon a horizontal axis upon said arm, a guide roller journaled upon said arm in vertical alinement with said second supporting wheel, and a second guide roller journaled upon said bracket at one side of the vertical axis upon which said bracket is mounted upon said door.

18. In a means for supporting a sliding door, the combination of a bracket, means for pivotally connecting said bracket with said door on a vertical axis thereon, a supporting wheel journaled upon a horizontal axis upon said bracket, an arm pivotally mounted on a vertical axis upon said bracket, a second supporting wheel journaled upon a horizontal axis upon said arm, a guide roller journaled upon said arm in vertical alinement with said second supporting wheel, a second guide roller journaled upon said bracket at one side of the vertical axis upon which said bracket is mounted upon said door, and a third guide roller journaled upon the vertical axis upon which said bracket is mounted upon said door.

19. In a means for supporting a sliding door, a carriage comprising in combination an arm pivotally mounted on a vertical axis relative to the door, a pair of supporting wheels journaled upon a horizontal axis thereon, and a guide roller journaled upon the vertical axis thereon.

20. In a means for supporting a sliding door, a carriage comprising in combination an arm pivotally mounted on a vertical axis relative to the door, a pair of supporting wheels journaled upon a horizontal axis thereon, and a guide roller journaled upon a vertical axis on said arm below the supporting wheels journaled thereon.

21. In a means for supporting a sliding door, a carriage comprising in combination an arm pivotally mounted on a vertical axis relative to the door, a pair of supporting wheels journaled upon a horizontal axis thereon, a second arm depending from the outer end of said first-named arm, and a guide roller journaled upon a vertical axis on said second arm.

ELLIS J. G. PHILLIPS.