

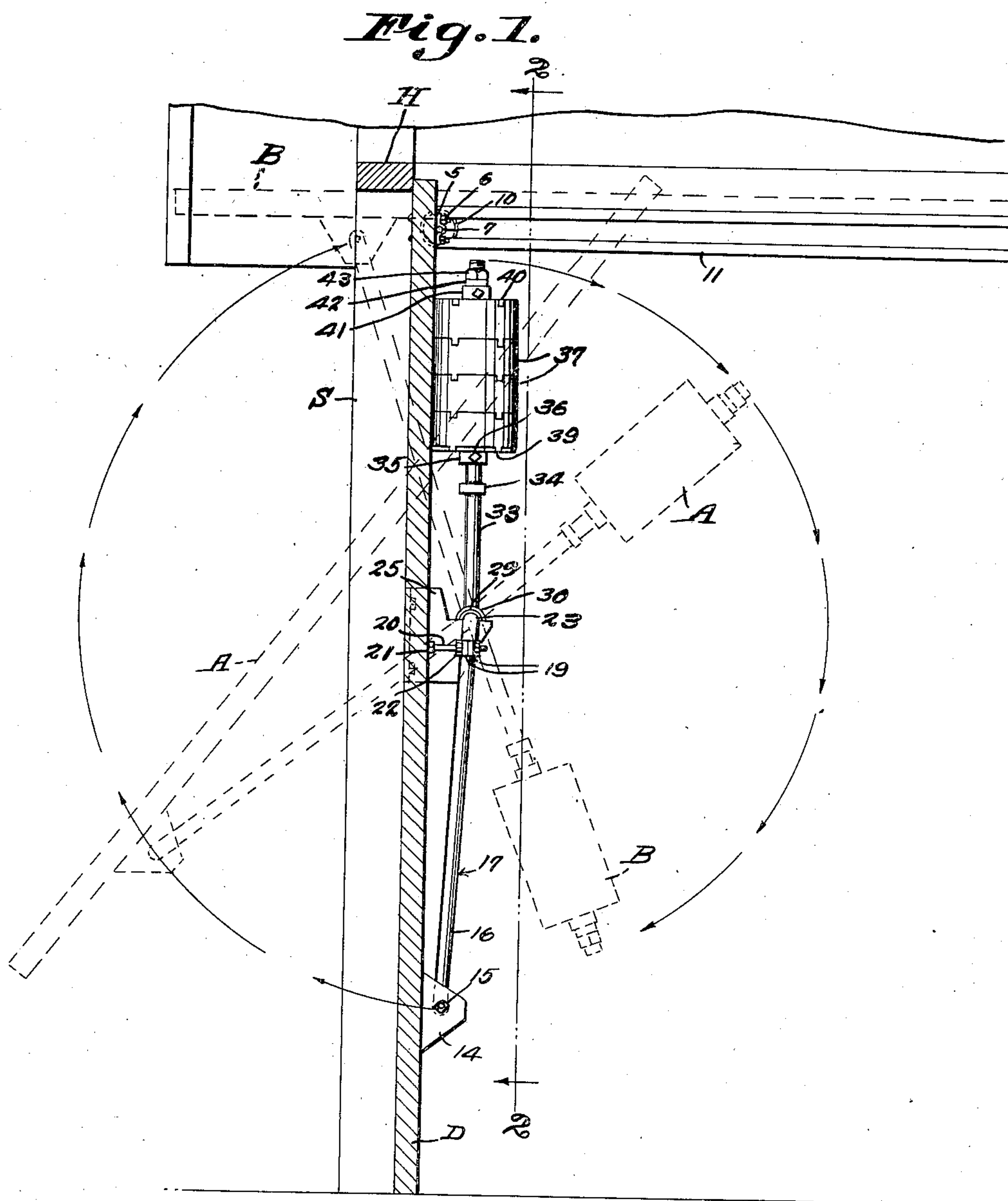
Oct. 25, 1949.

W. A. CALDWELL
GARAGE DOOR HARDWARE

2,485,860

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2 Sheets-Sheet 1



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Fig. 2.

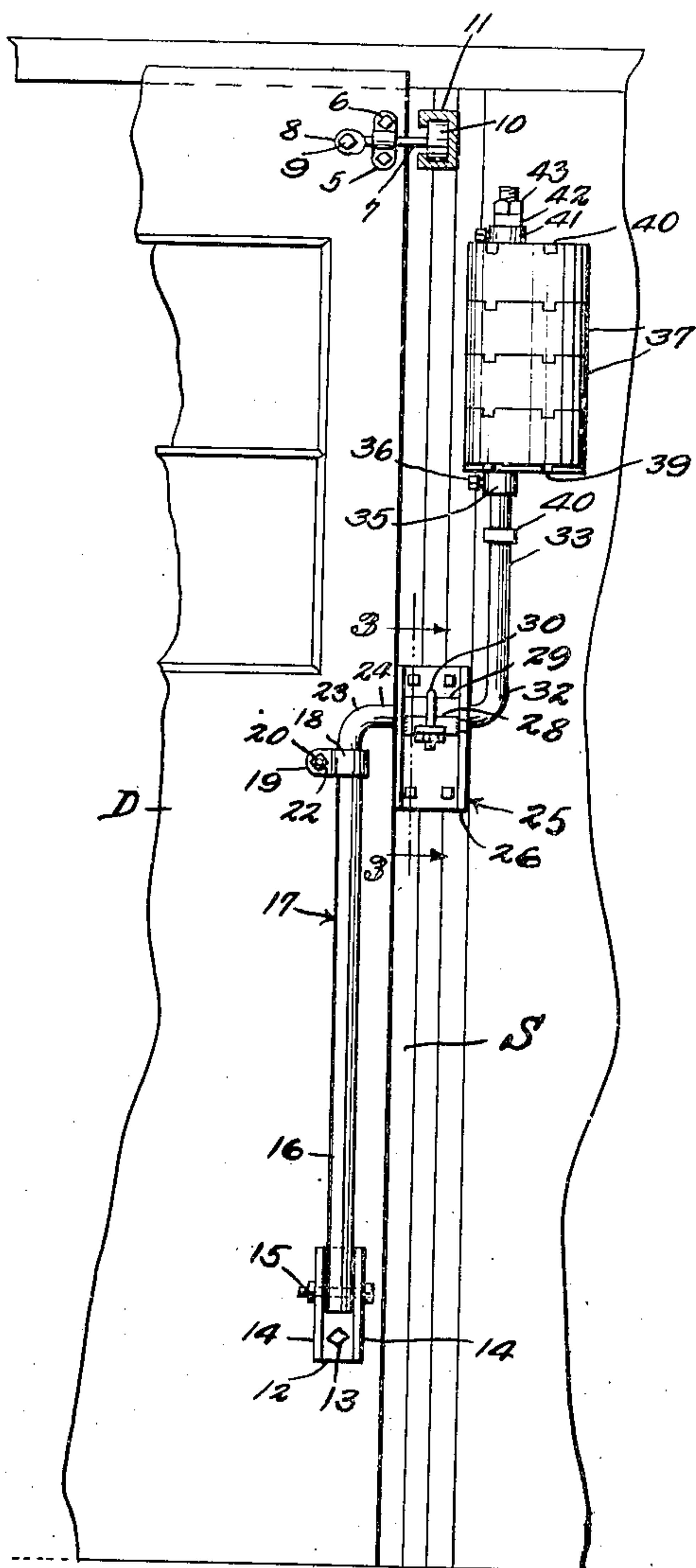


Fig. 3.

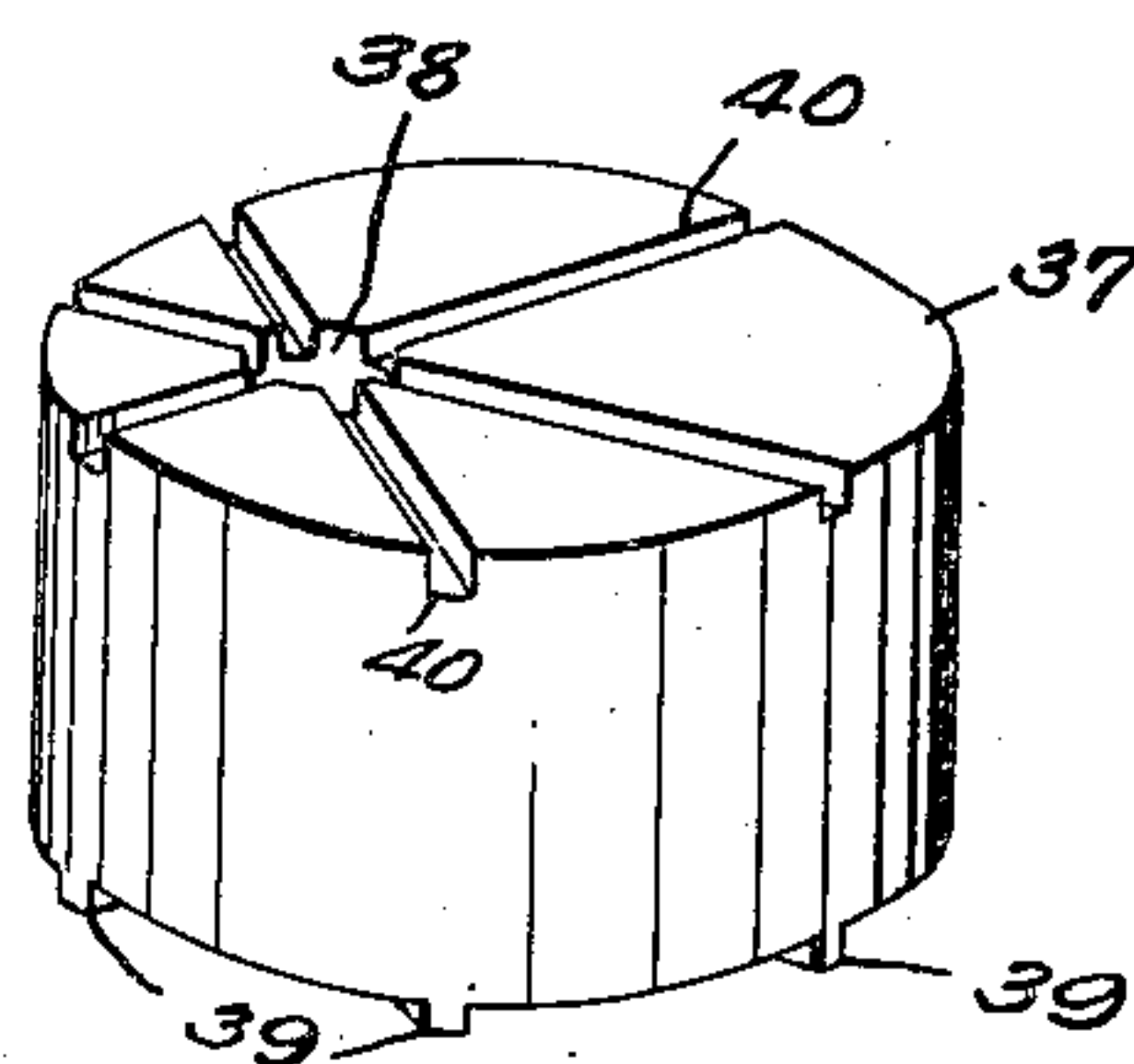
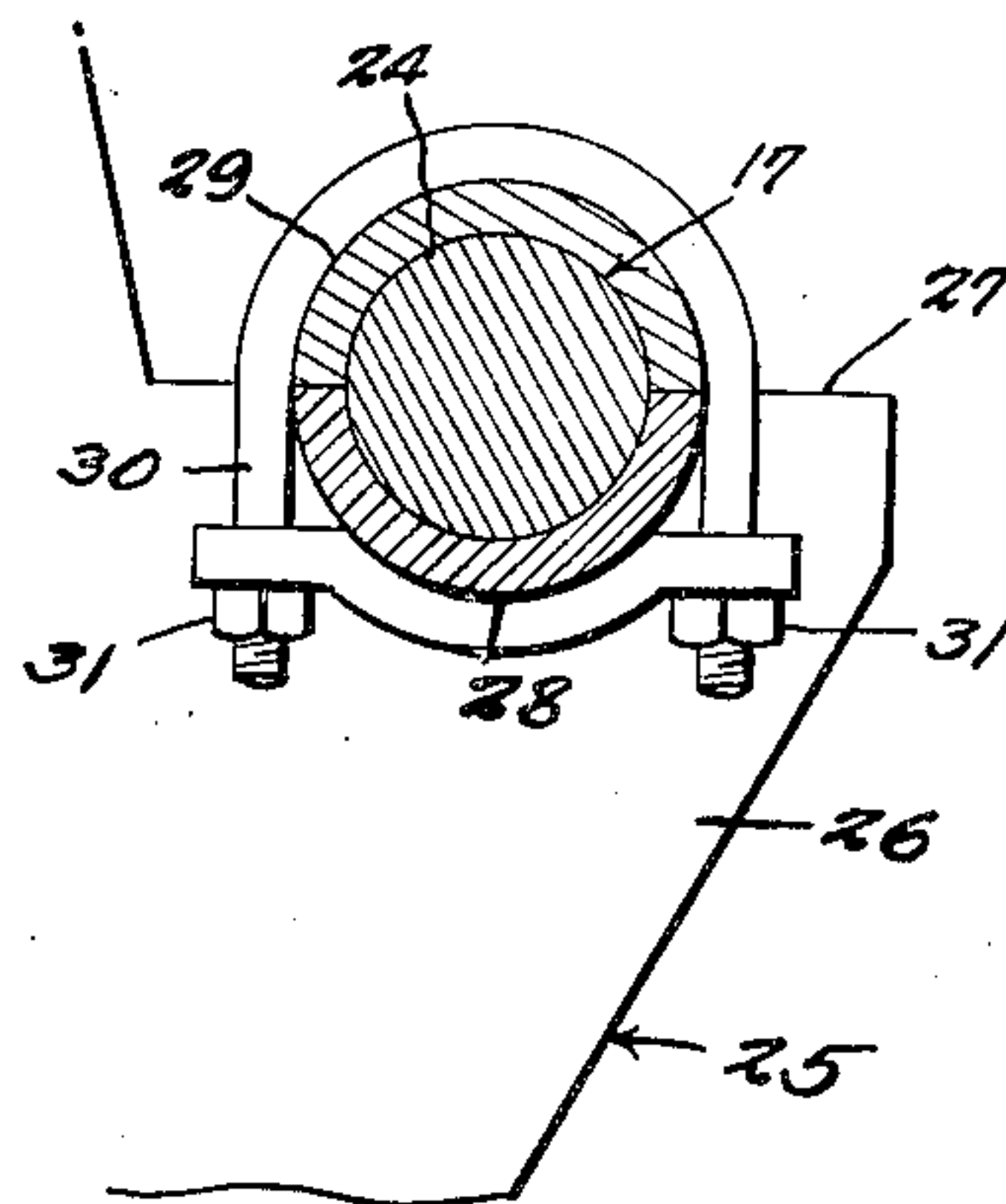


Fig. 4.

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GARAGE DOOR HARDWARE

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1 Claim. (Cl. 20—19)

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This invention relates to garage door hardware, and more particularly, has reference to hardware of the type used in connection with the opening and closing of a garage door of the overhead swinging type.

The primary object of the invention is to provide an improved and novel construction of a means for opening and closing a door of the type described, that will not require the overhead clearance needed in the operation of many doors of this type, is actuated with unusual facility and ease, and provides ready access to doors and the like disposed in the side walls of the garage, my device requiring a minimum of space whether in normal position, or when being operated to open and close the door.

A further important object of the invention is to provide means constituting a wind brace, which when adjustably mounted in connection with the door actuating means, serves to retain the door in closed position, despite pressure exerted against the outer surface thereof by a strong wind, said wind brace being so designed and mounted as to hold the door more tightly against its jamb as the pressure of the wind increases. It is well known in the art, in this connection, that one of the disadvantages of garage door hardware embodying the use of weights counterbalancing the overhead swinging door is that the required adjustment of the weights to provide a proper counterbalance for the door when it is in closed position while serving to retain the door in closed position under normal conditions, cannot take into account the exertion of pressure against the outer surface of the door by a strong wind.

A further important object of the invention is to provide, in connection with my garage door hardware, a particular formation of weights of novel design, whereby such weights can be readily adjusted longitudinally or transversely of the shaft on which they are mounted, in such a way as to increase to an unusual extent the possibility of varying the distribution of weight relative to the door.

Still another important object of the invention is to provide a construction of the type described which, while being in the nature of a far more versatile and efficiently operating door opening and closing means than heretofore known in the art, is yet adapted to be constructed with a minimum of parts and expense, the hardware nevertheless being extremely durable and easy of operation.

With the foregoing and other objects in view

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which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings

Figure 1 is a vertical section through a garage door taken adjacent a door opening and closing means constructed in accordance with the invention, disposed at one side of the door.

Figure 2 is an elevational view, showing fragmentarily one side of the door, the device constituting the invention being shown in elevation, said view being taken on line 2—2 of Figure 1.

Figure 3 is a detail view, taken on line 3—3 of Figure 2.

Figure 4 is a perspective view of one of the weights embodied in the invention.

Referring to the drawings in detail, the reference character D designates a garage door of the overhead swinging type, said door additionally being of the single panel type, as distinguished from a door constructed of separate hinged panels. The head jamb engaging the top of the door is designated by the reference character H, and the side jamb by the character S. These are all of conventional construction, the door D in the present invention being adapted when in normal position to be disposed in a vertical plane, with the top of its front or outer surface being engaged by the rear side of the head jamb H, as particularly shown in Figure 1.

A strap 5 is connected by bolts 6 or the like to the inner surface of the door D, adjacent the upper corner thereof. An axle 7 is retained by strap 5, and preferably at one end is flattened as at 8, and connected to the door by a bolt 9 or other suitable fastening means. The axle 7 is projected beyond the side edge of the door, and carries on its projecting end a wheel 10, that is rotatable on the axle, and is carried in track 11, that is suitably mounted to extend along the side wall of the garage in a plane parallel therewith.

At this point, it is desirable to point out that while the drawings and this specification will be confined to a description of the device used along one side of the door, it is to be understood that an identical arrangement is provided on the other side (not shown) of the door.

Spaced from the bottom of door D, and mounted adjacent the side edge thereof is a lower bracket 12, which is connected to the inner surface of the

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door by bolts 13 or other suitable fastening means. This is formed with parallel rearwardly extended sides 14, formed with opposed openings for the reception of a bolt 15, the bolt 15 constituting a pivot pin. The end of the lower portion 16 of a shaft 17 is pivotally connected to bracket 12 by means of the bolt 15. Referring particularly to Figure 1, the lower portion 16 of the shaft 17 is extended upwardly from its lower end at a slight rearward angle relative to the door D in a line parallel, however, to the side edge of the door (Figure 2). Adjacent the upper end of the lower portion 16 a clamp 18 having ears 19 is mounted thereon, and a relatively elongated bolt 20 is threaded through registering threaded openings in the ears. As shown clearly in Figure 1, the head 21 of bolt 20 is positioned in engagement with the inner surface of the door D, and nuts 22 are used to lock clamp 18 to the lower portion 16.

As will be obvious from the construction described, the distance of head 21 from the upper end of the lower shaft portion is readily adjusted by threading of the bolt 20 relative to clamp 18. Thus, the head 21 may be positioned in tight engagement with the inner surface of door D. It is further to be noted that this clamp and its adjustable bolt 20 is positioned slightly above the center point of the door, when considering the height thereof. As will be explained in detail hereinafter, this construction constitutes a wind brace, when used in cooperation with the door opening and closing means.

Above clamp 18 the shaft 17 is formed with a right-angled bend 23, whereby to provide an intermediate shaft portion 24 disposed perpendicularly to the lower shaft portion 16 and to the side edge of the door. The intermediate shaft portion 24 is pivotally carried on a bracket generally designated by the reference character 25, and having rearwardly projecting parallel sides 26. This is fixedly connected by any suitable fastening means to the side jamb S.

The intermediate shaft portion 24 rests in opposed semi-circular recesses formed in the upper edges 27 of the sides 26. Additionally, a depressingly and transversely curved seat or socket 28 is welded or otherwise rigidly connected at its ends to the sides 26, and extends therebetween, shaft portion 24 resting therein. This construction is particularly shown in Figure 3, and over the shaft portion 24 is positioned a cap 29, that is adjustably clamped to the shaft portion 24 and to the seat 28 by means of a U-clamp 30, having nuts 31 on its ends. This construction provides a pivotal bearing for rotation of the intermediate shaft portion 24, it being understood that U-clamp 30 may be adjustably tightened or loosened to permit the exact freedom of rotation of the shaft portion 24 desired.

At the other end of the intermediate shaft portion 24, the shaft 17 is formed with right-angled bend 32, and from this bend is upwardly extended an upper shaft portion 33, disposed in a plane parallel to the side edge of the door, and when in normal position being additionally parallel to the plane of the inner or outer surfaces of the door. The upper shaft portion 33 is preferably shorter in length than the lower shaft portion 16, and intermediate its ends, is provided with collar 34, which is rigidly connected thereto, as by a weld or the like.

On the upper shaft portion 33, and preferably slightly above the collar 34, is mounted a collar 35, that is connectible at any desired point longitudinally of the shaft portion, and tightly held

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thereto, by a set screw 36. This adjustable collar 35 serves as a lower retaining member for a plurality of weights 37. These are each provided, as shown in Figure 4, with a shaft-receiving longitudinal bore 38 that is disposed eccentrically relative to the axis of the weight. These are additionally provided on one end with a plurality of ribs 39 extended radially from the opening 38 to the periphery of the weight. At the other end, each weight 37 is formed with a plurality of grooves 40 that are also radially extended from the bore 38. The ribs 39 and grooves 40 are of corresponding formation and arrangement, and thus it is seen that each weight may be fitted into each adjacent weight, its rib 39 being received in the groove 40 of the adjacent weight.

Constituting an upper retaining member for the weights 37 is adjustable collar 41 of like construction with collar 35 this also being adjustable longitudinally of the upper shaft portion 33 and tightly connectible thereto. Preferably, on the shaft portion 33 above collar 41 is provided a washer 42, and threadable on the upper end of the shaft portion is a lock nut 43.

As a result of the provision of the adjustable collars 35 and 41, the weights 37 may be adjustably connected to the shaft portion 33 at the desired point longitudinally thereof. Additionally, the provision of weights formed as described permits a distribution of weight transversely relative to the upper shaft portion, since the weights may be swung around the shaft to a desired position before being tightly connected by means of the adjustable collars. This transverse distribution of the weight at any desired point is provided by reason of the provision of the eccentrically disposed bores 38.

Although obviously the collars 35 and 41, after having been adjusted longitudinally so as to mount the weights at the desired point, may be tightly connected to the shaft portion 33 for the purpose of retaining the weights thereon, the collar 34 and the lock nut 43 are provided as safety devices, for the purpose of checking slipping of the weights in either direction, during operation of the device.

In operation of the device, it is first necessary to effect the proper adjustment of the weights 37 relative to the door D. Longitudinal and transverse adjustment thereof is accordingly effected, and, of course, both types of adjustment may be used if desired. It is understood in this connection that the formation of the weights in separate sections as shown permits the addition of more weights, which is particularly desirable in the event of an unusually heavy door D. The adjustment to be effected should be such that the door will overbalance the weights to a very slight degree when closed with the weights slightly overbalancing the door when it is open. In the first event, it is obviously desirable that the door in closed position overbalance the weights sufficiently to remain normally tight against the head jamb H. It is further desirable that the weights, when the door is open, overbalance the door sufficiently to prevent the door from closing without the exertion of manual power. In this connection, in a construction as provided, the fine adjustment of weights permitted readily achieves these aims, and yet permits the door to be opened or closed with a minimum of exertion of manual power. It should be further noted that the mounting of the intermediate shaft portion 24 in its bearing may be adjustably tightened or loosened as desired, and this adjustable mounting

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serves additionally to cooperate with the adjustment of the weights.

Referring now to Figure 1, the door D is there illustrated in its normal or closed position in full lines, and in dotted lines, in an intermediate and a final or raised position, these being respectively designated by the reference characters A and B. The arrows at the left of Figure 1 show the arcuate path taken by the lower pivot point of the door, when moving from closed to open position, while the arrows at the right of Figure 1 designate the arcuate path taken by the upper or free end of the upper shaft portion 33.

The door is opened either by exerting a slight manual pressure against the inner surface thereof below the center point, or by exerting a pull upon the door or upon the upper shaft portion 33, above the center point. Only a slight pressure is required, and as soon as the initial momentum is given the door, the slight overbalance of the door relative to the weights when in closed position is eliminated, and the weights 37, counterbalancing the door, swing in the arcuate path shown until the door is in fully raised position. When the door is in fully raised position as designated by dotted lines B, the weights slightly overbalance the door and retain it in such position. To lower the door, it is only necessary to reverse the procedure, and as soon as the overbalance of the weights is eliminated, the door, under the momentum initially begun by the exertion of a slight manual pressure, swings to a fully closed position.

In this connection, importance is attached to the wind brace constituted by clamp 18 in cooperation with bolt 20. When the door is in closed position, with the parts of the device in the normal position shown in full lines in Figure 1, the pressure of the bolt head 21 against the inner surface of the door, being positioned above the center point, serves to retain the door in tightly closed position relative to the head jamb H. Should a

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pressure be exerted on the outer surface of the door, as by wind, that portion of the door below the bolt 20, being greater in area than the area defined by the portion of the door above bolt 20, will receive the greatest pressure, comparatively speaking, from the wind. The head 21, in the meantime, is pressed tightly against the upper portion of the door. Since the bolt 21 is positioned above the center point of the door, and is tightened against the inner surface thereof, increase in wind pressure only serves to hold the upper edge of the door more tightly against the door jamb.

In this way, it is possible to dispense with separate latch means, hooks, or the like, which must be separately operated in securing the door.

What is claimed is:

The combination with a track-mounted garage door of the overhead swinging type mountable against head and side jambs, of opposed door-supporting shafts pivotally connected to the door at their lower ends, bearing brackets on the side jambs, the shafts being pivotally connected to said brackets intermediate the ends of the shafts, a plurality of interfitting weights on the upper portions of the shafts, said weights having eccentrically disposed shaft-receiving bores, whereby to adjustably distribute weight transversely of the shafts, and means for mounting the weights in positions of longitudinal adjustment relative to the shafts.

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

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