

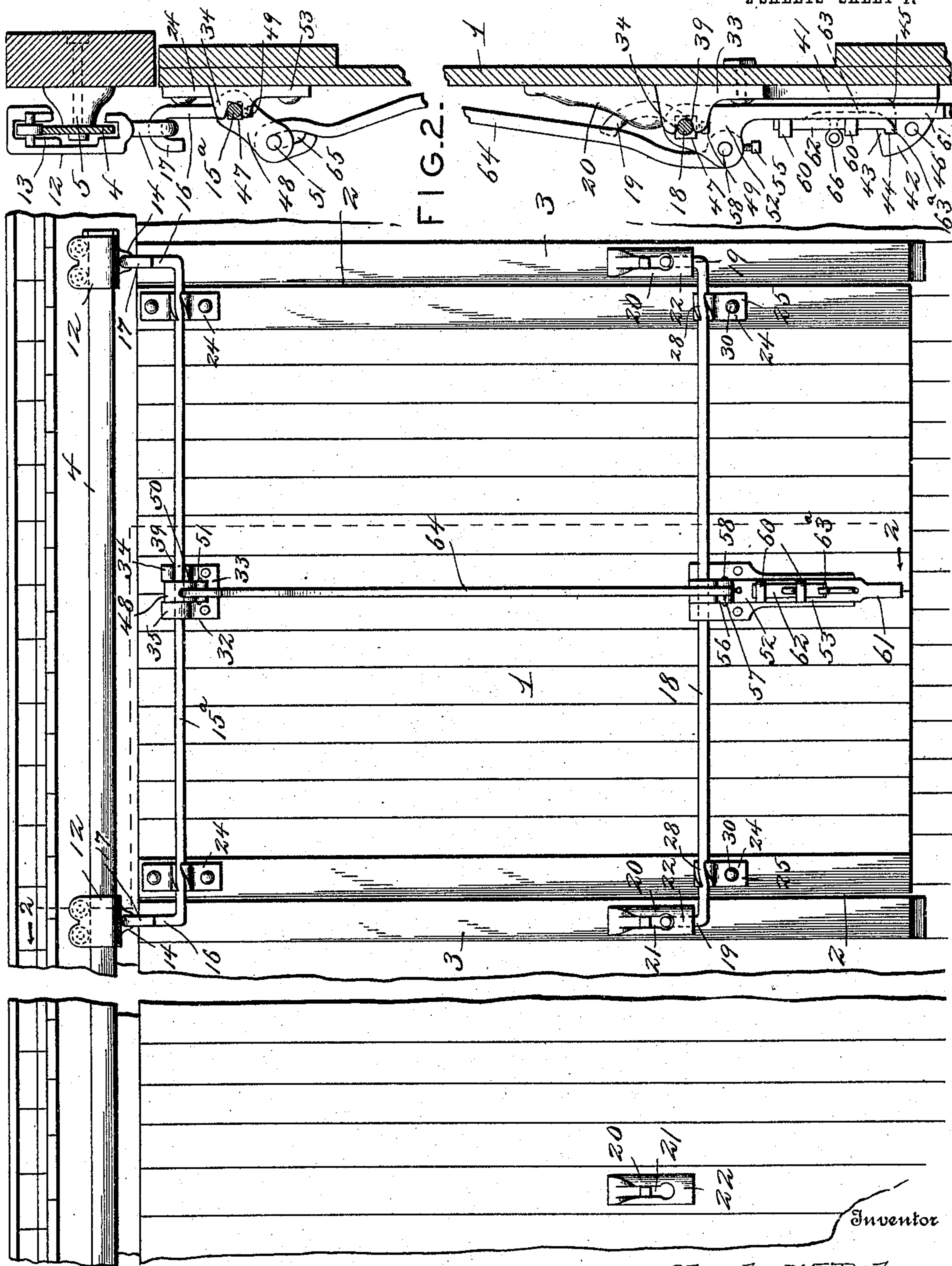
No. 782,641.

PATENTED FEB. 14, 1905.

C. W. BITNER.  
LOCKING DEVICE FOR DOORS.

APPLICATION FILED JUNE 24, 1903.

2 SHEETS—SHEET 1.



Witnesses

Harry L. Amer.  
Chas. S. Hoyer.

FIG. 1.

By

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2 SHEETS—SHEET 2.

FIG. 3.

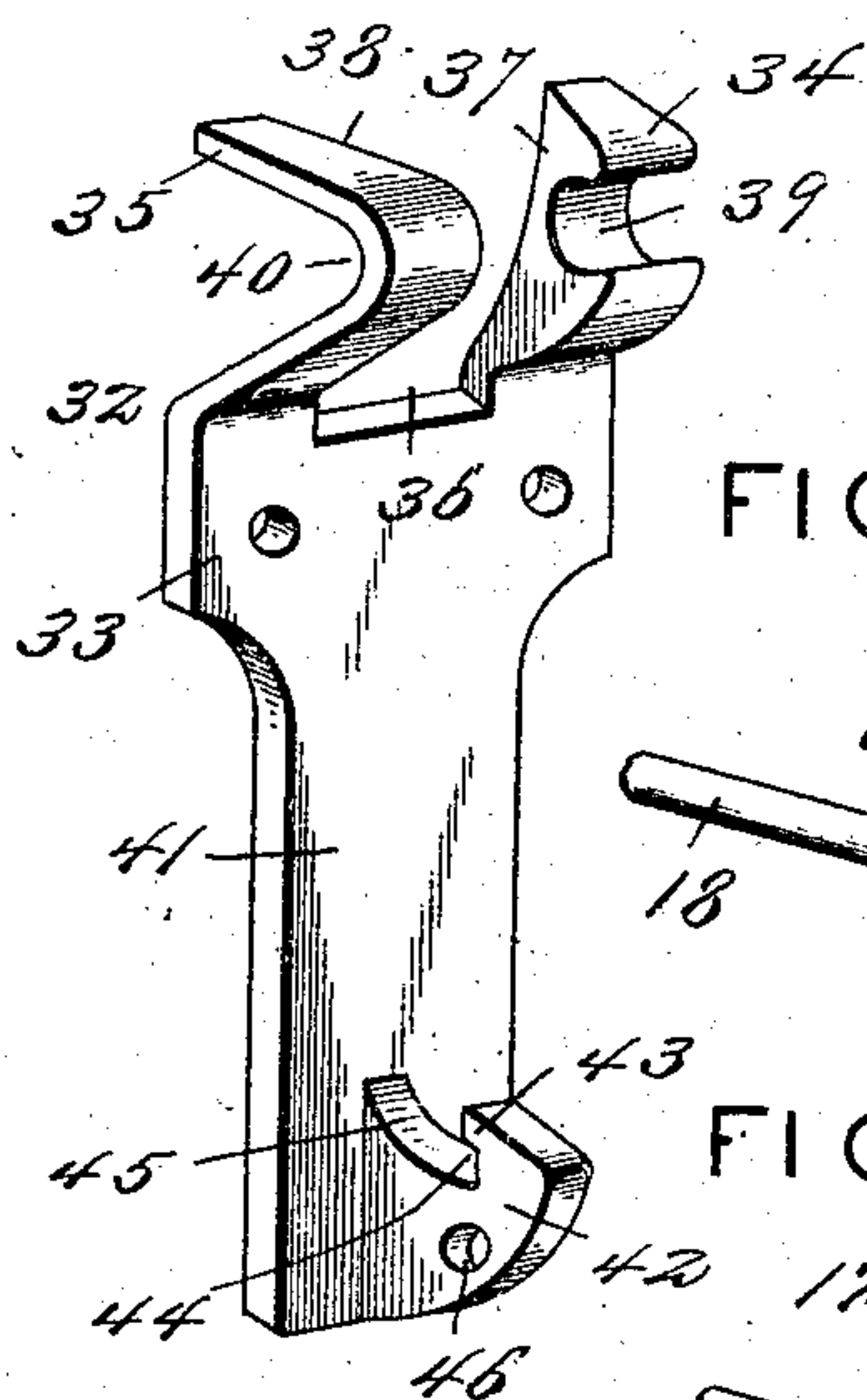


FIG. 4.

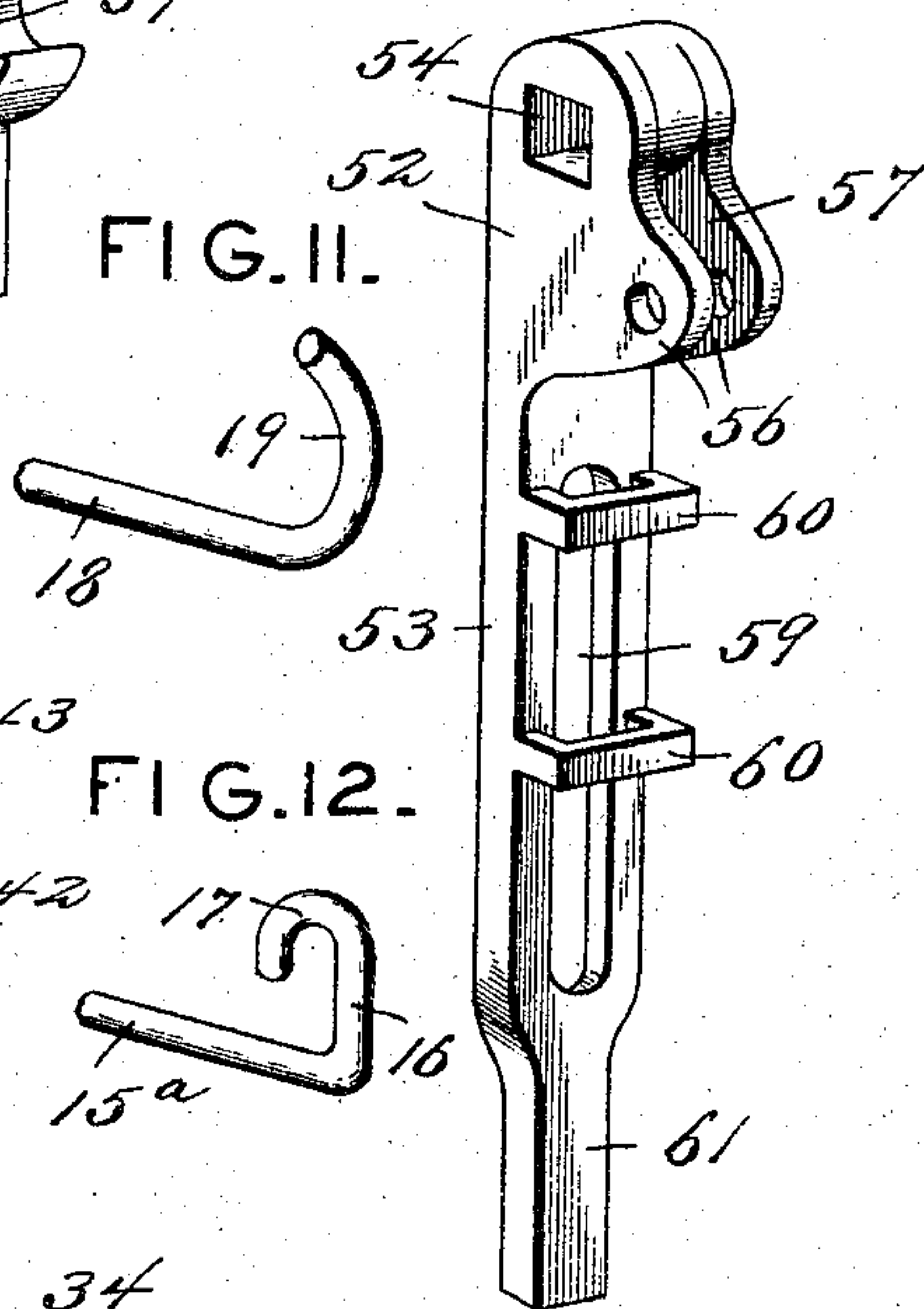


FIG. 5.

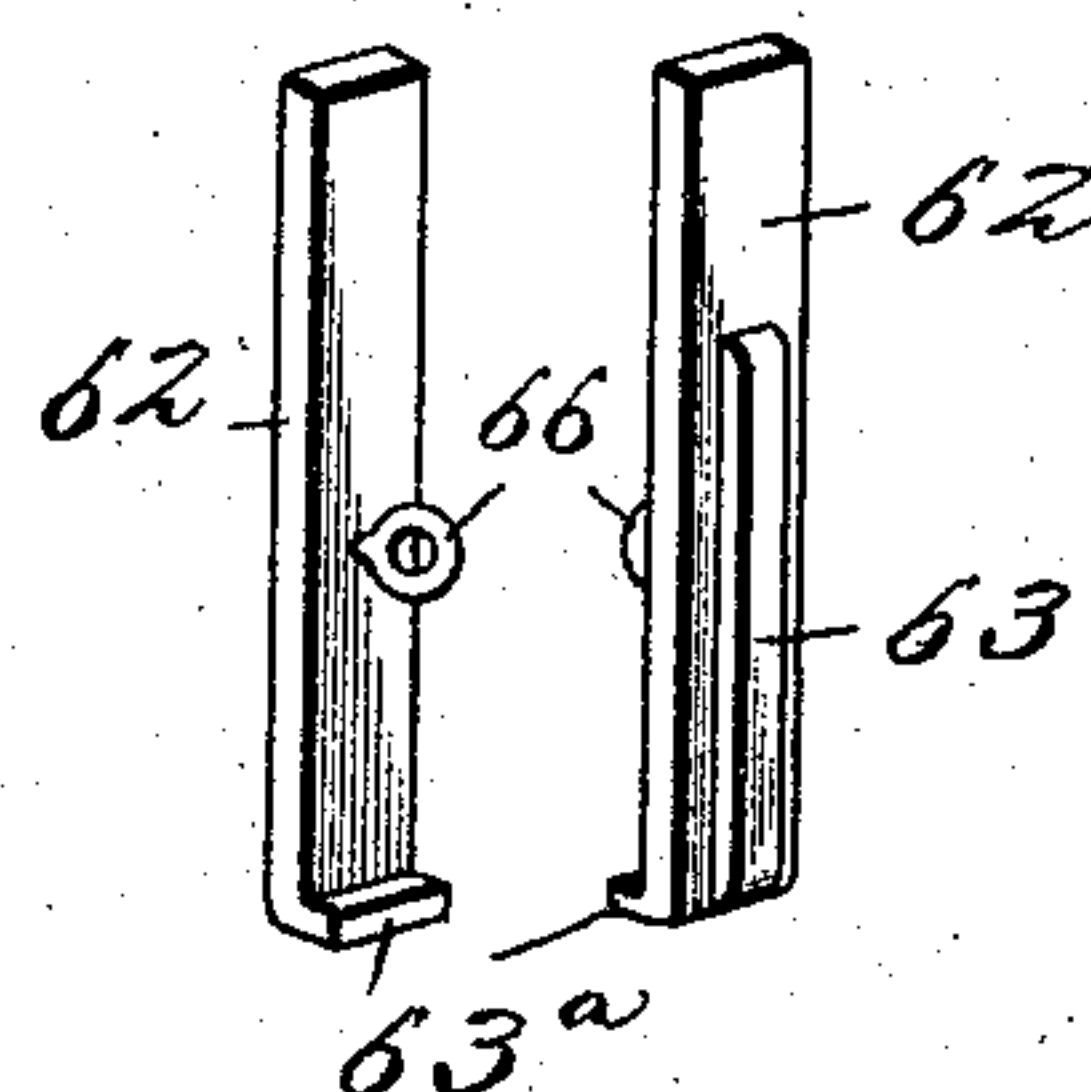


FIG. 11.

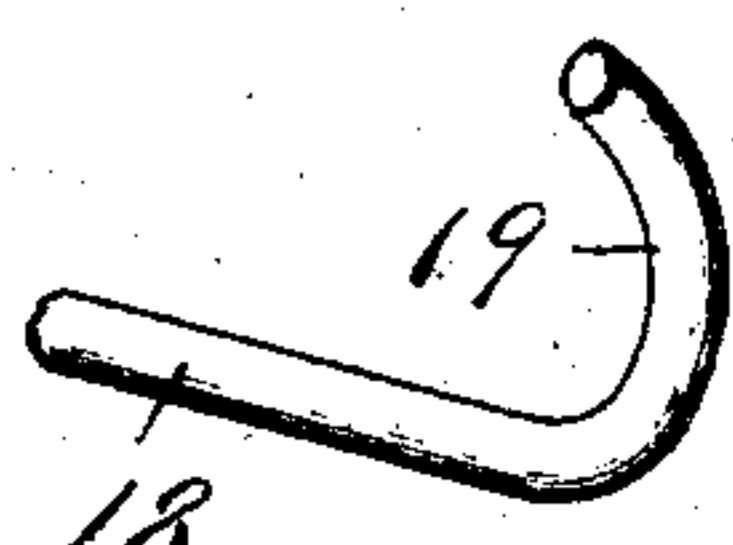


FIG. 12.

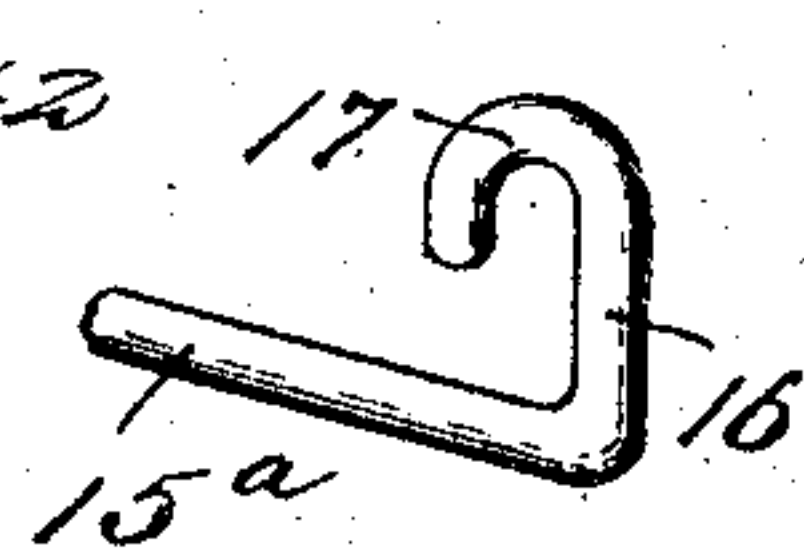


FIG. 6.

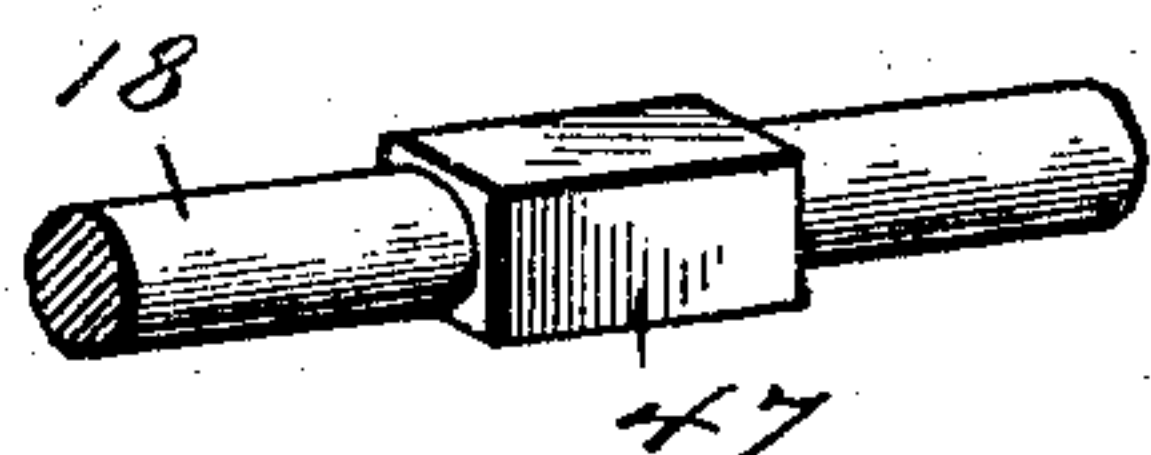


FIG. 7.

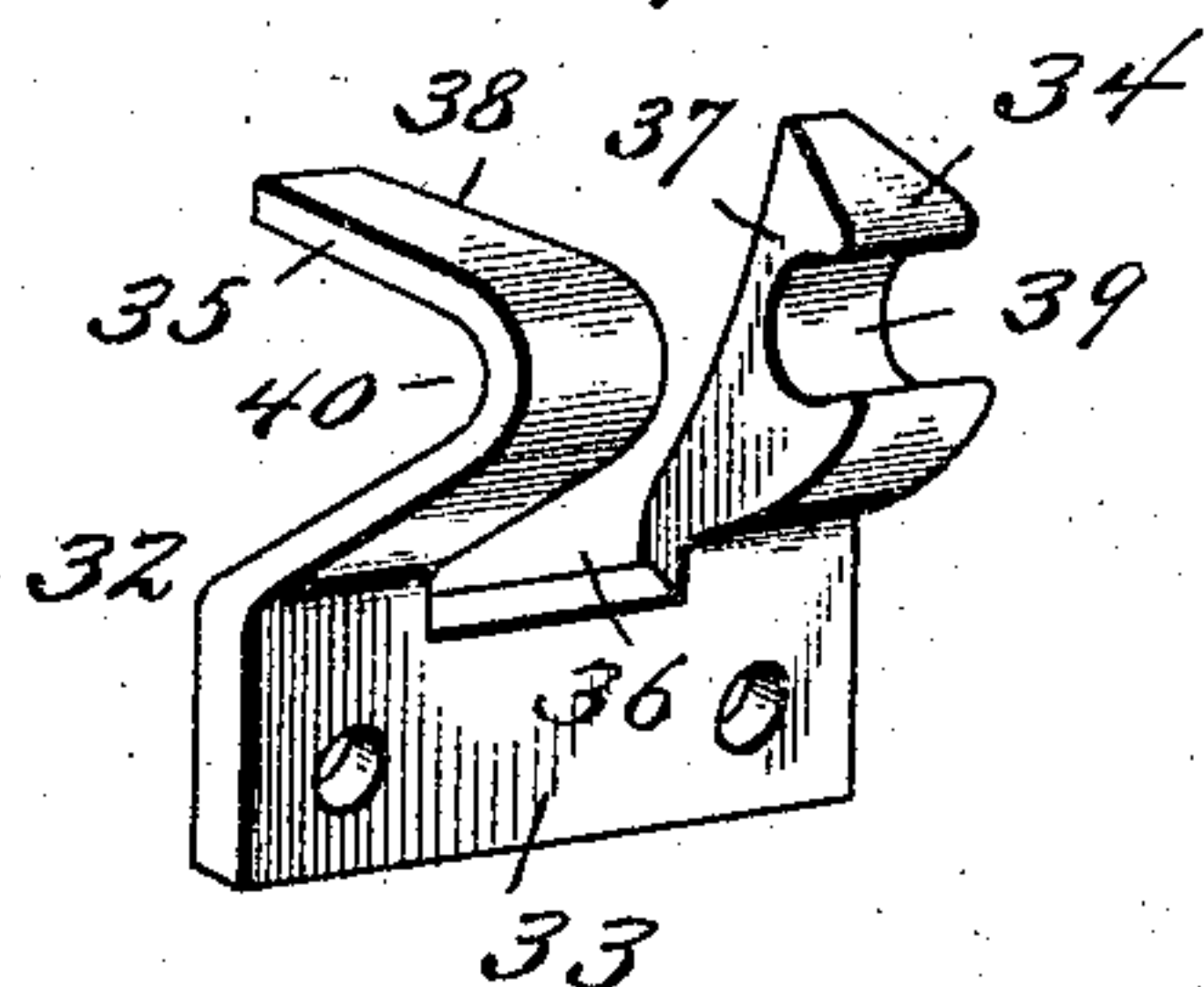


FIG. 14.

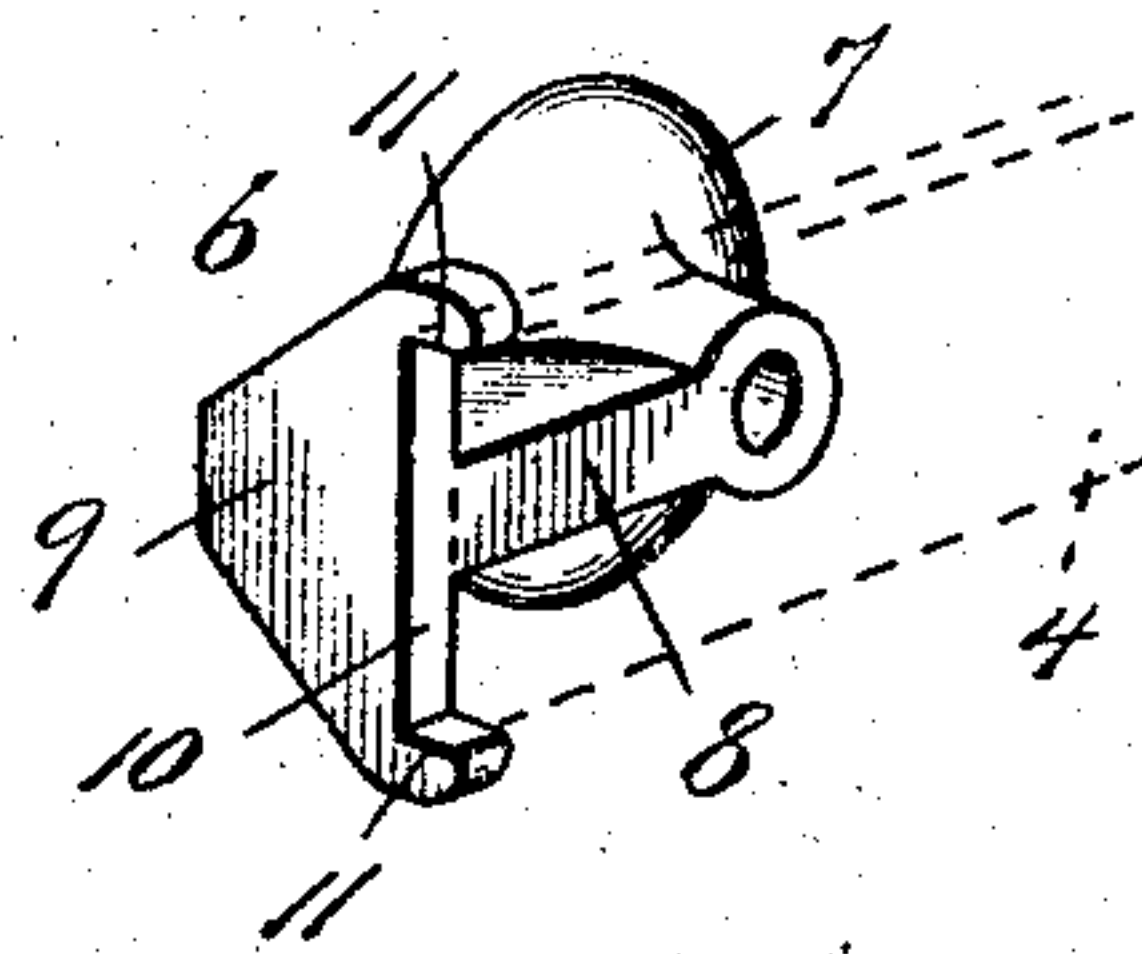


FIG. 13.

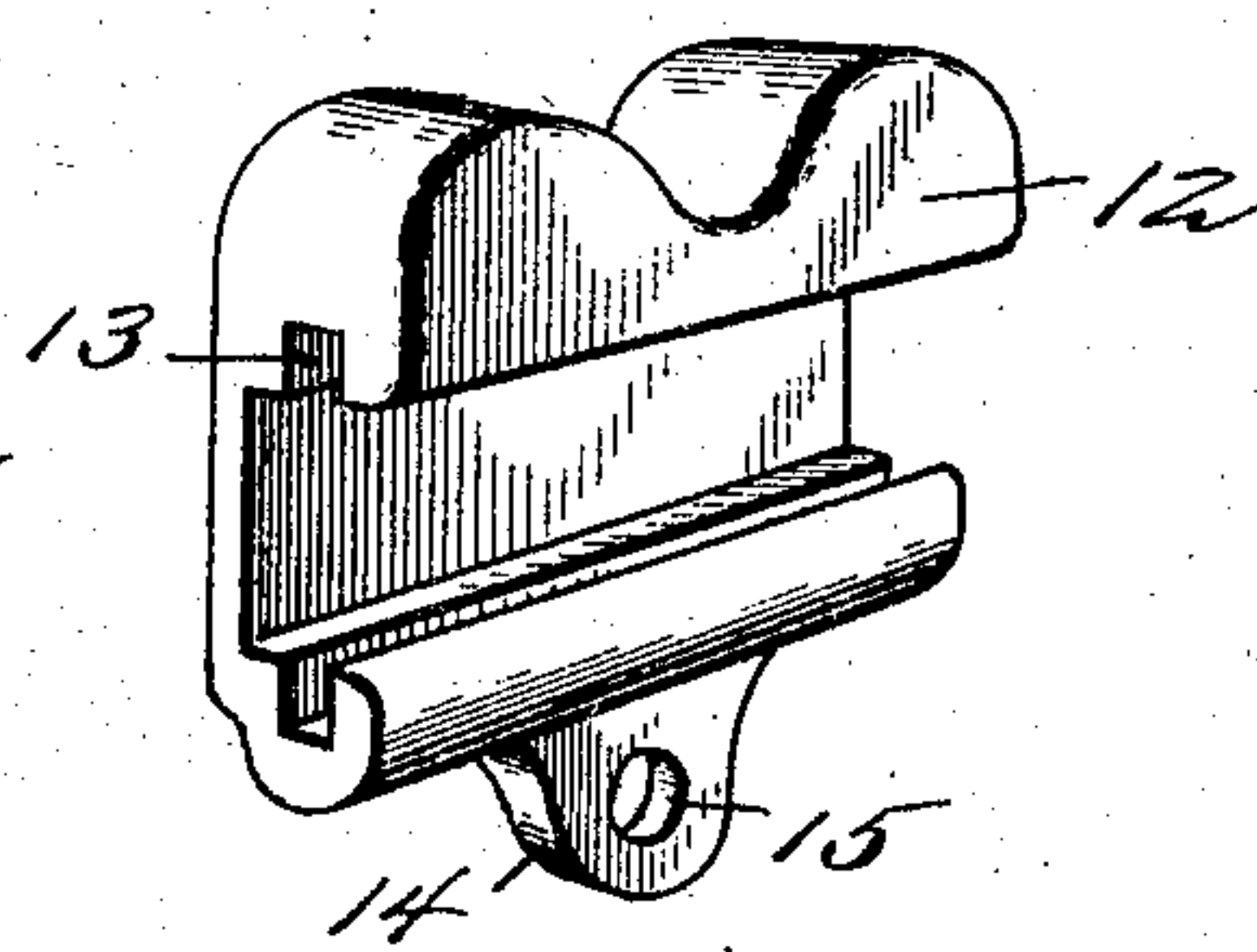


FIG. 10.

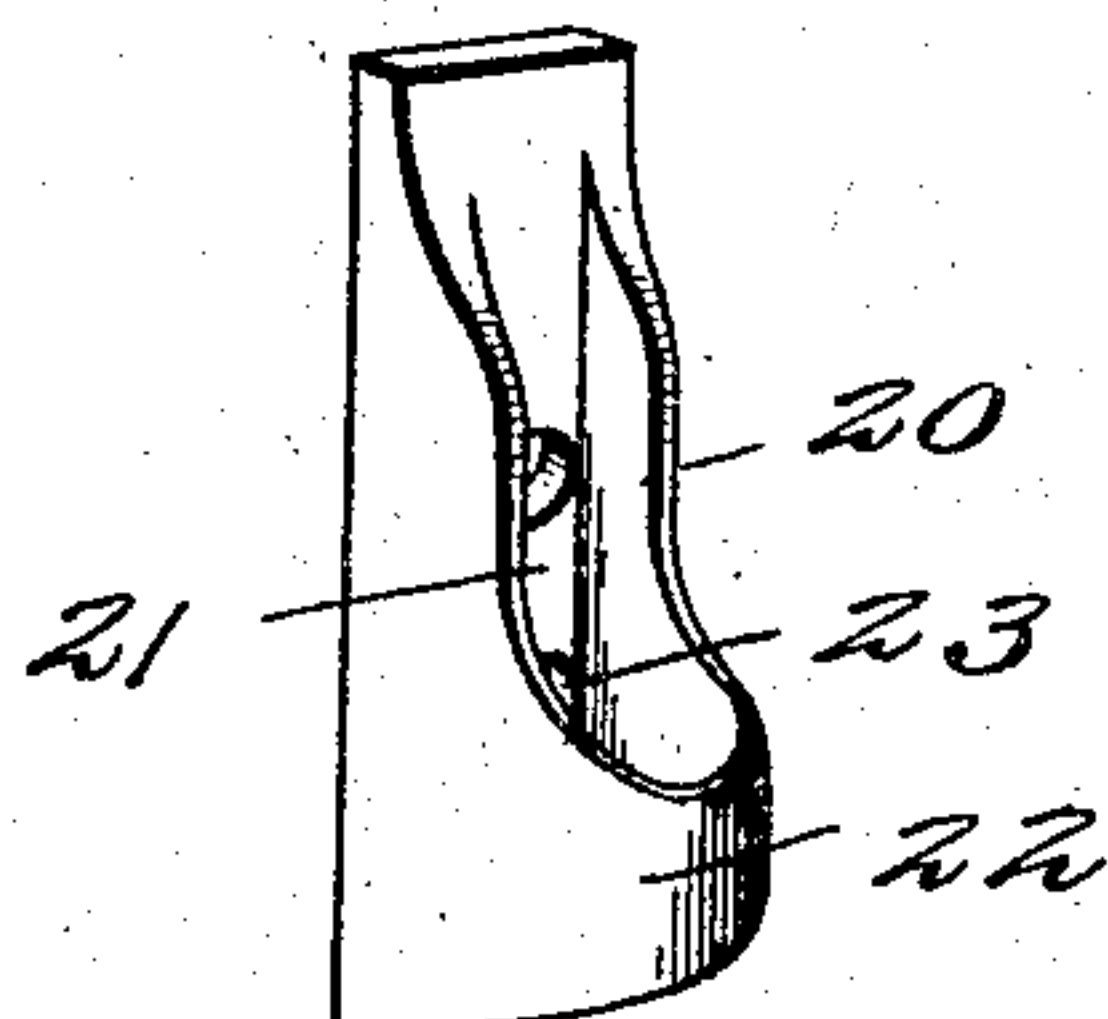


FIG. 9.

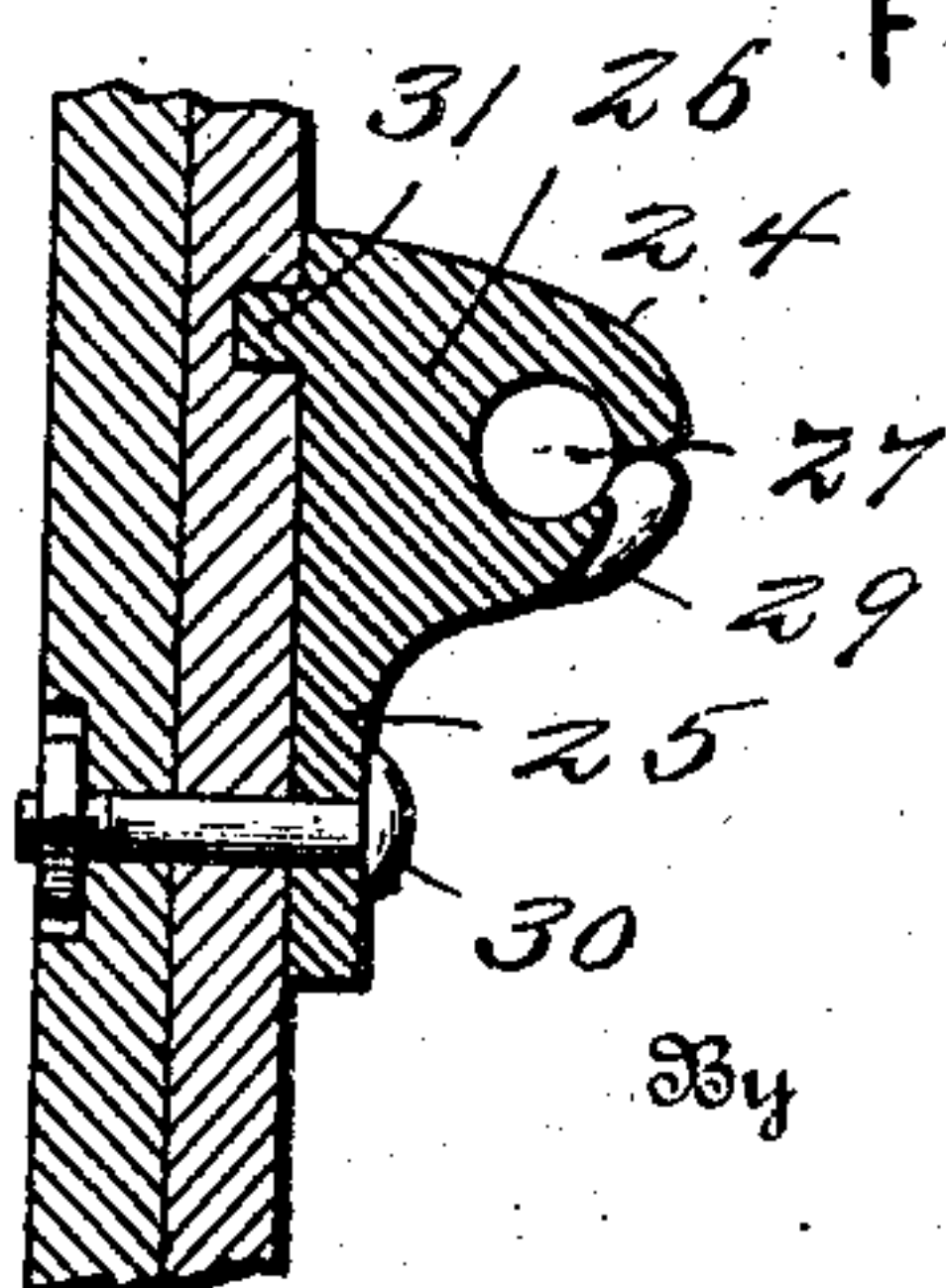
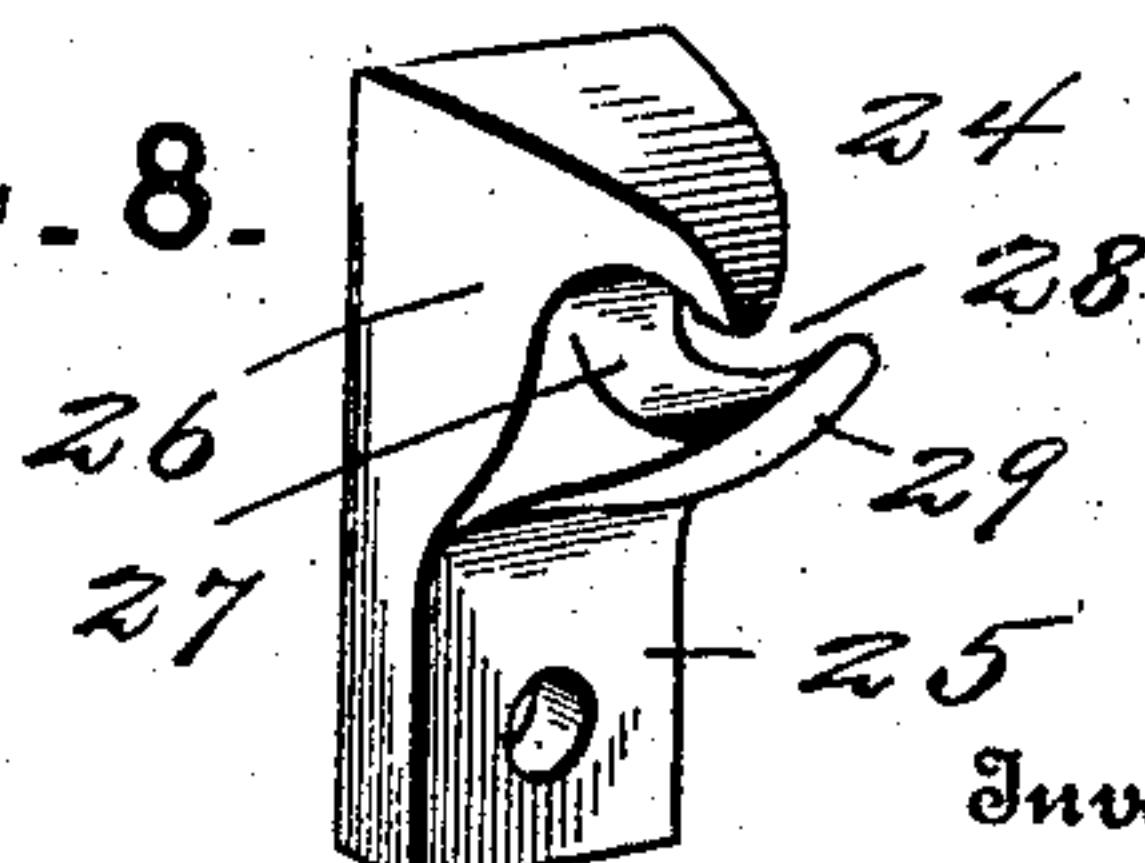


FIG. 8.



Witnesses

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## UNITED STATES PATENT OFFICE.

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CAR EQUIPMENT COMPANY, OF TERRE HAUTE, INDIANA.

## LOCKING DEVICE FOR DOORS.

SPECIFICATION forming part of Letters Patent No. 782,641, dated February 14, 1905.

Application filed June 24, 1903. Serial No. 162,952.

*To all whom it may concern:*

Be it known that I, CHARLES W. BITNER, a citizen of the United States of America, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented new and useful Improvements in Locking Devices for Doors, of which the following is a specification.

This invention relates to fasteners for doors of that class which are hung from and movable on a track and operative toward and away from a door opening through the medium of hangers freely movable on the track.

The improved door-fastener is intended for application to all doors of the class specified which are used on barns, storage-houses, or other inclosures, but especially designed for application to a car-door to assist in forming tight joints to prevent the entrance there-through of sparks or dust and overcome any tendency toward injury to the contents of the car, as well as provide a reliable fastening or securement of the door to resist nefarious attempts to effect an entrance into a car without breaking the seal.

The improved fastening embodies parts so constructed that they may be easily applied and assembled, the number of parts being reduced to a minimum without in the least detracting from the strength of the entire fastening organization and materially lessening the cost of application.

The improved fastener includes means operating in conjunction with special hangers whereby the door may be quickly and easily separated from or attached to the hangers, such operation being pursued after the parts of the fastener coöperating with the hangers have been applied and secured to the door.

The invention also contemplates the provision of a novel form of terminal stop in connection with the track for engagement with the adjacent hanger to limit the movement of the door in accordance with a predetermined arrangement.

The invention also consists in the general details of construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation

of a portion of a car shown equipped with a door and having the improved fastener applied thereto. Fig. 2 is a vertical transverse section on the line 2 2, Fig. 1. Fig. 3 is a detail perspective view of the lower central shaft-bearing and catch element. Fig. 4 is a detail perspective view of the clasp. Fig. 5 shows detail perspective views, in reverse positions, of the sliding bolt mounted in the clasp. Fig. 6 is a detail perspective view of the central portion of the lower rock-shaft. Fig. 7 is a detail perspective view of the upper bearing for the center of the upper rock-shaft. Fig. 8 is a detail perspective view of one of the terminal bearings for either shaft. Fig. 9 is a detail sectional view showing the manner of securing the shaft terminal bearings to the door. Fig. 10 is a detail perspective view of one of the sockets or keepers for the terminals of the lower rock-shaft. Fig. 11 is a detail perspective view of one terminal of the lower rock-shaft. Fig. 12 is a detail perspective view of the one terminal of the upper rock-shaft. Fig. 13 is a detail perspective view of one of the hangers looking toward the rear side thereof. Fig. 14 is a detail perspective view of one of the terminal stops for the track.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

As before indicated, the improved fastener is adapted to be applied to any hanging or suspended door to which it may be applicable, and though the accompanying drawings show it on a car-door a limitation in application is not intended to be suggested.

The present form of door coöperates with a suitable door-opening in the side of a car, the said door being what is known as an "outside" door and closable snugly between opposite end strips, which are secured on the side of the car adjacent to opposite side walls of the door-opening. The improved fastener is operative in such manner as will be hereinafter explained to closely force the door between the strips when the fastener is in locked condition; but when the latter is opened sufficient play or movement of the door is



permitted to swing outwardly beyond the outer surfaces of the strips 3 to clear the door-opening.

At a suitable elevation above the top of the door-opening a track 4 is secured against the car side and held outwardly by an intermediate frusto-conical space-block 5, (see Fig. 2,) and by end stops 6, (shown in detail by Fig. 14,) each of the stops embodying in its structure a frusto-conical space-block 7, having an integral longitudinally-extending web 8, terminating in a head 9, having a slot 10 in its outer edge to receive the end of the track-rail 4. The outer edge of the web 8 is flush with the outer terminal of the space-block 7 and the vertical wall of the slot 10, so that the end of the track 4 will have a flat bearing, and at the ends of the slot 10 are stop projections 11, which embrace the upper and lower edges of the track, as shown by dotted lines, Fig. 14. A pair of hangers 12 is mounted on the track 4, and each hanger has a groove 13 extending longitudinally therethrough and open at the rear of the hanger, as shown by Fig. 13, to reduce the friction and also to permit such hanger to ride over the web 8 and outer reduced extremity of the space-block 7 of the terminal stop 6, the vertical extent of the opening in the rear of the hanger being such as to permit the latter to move over either end stop. The outer ends of the respective hangers contact with the projections 11, and the sliding movement of the door is thus limited. The end stops 6, constructed as set forth, also reinforce the track organization at the opposite terminals, and by having the hangers move thereover the extent of the track is minimized within the required distance for the movement of the door to arrive at a fully opened or closed position of the latter. The intermediate space-block 5 also has its outer extremity reduced to permit the hangers to freely pass thereover, and in assembling the track, intermediate space-block, and end stops a single fastening device is passed through each stop and the track and the intermediate block and the track. The hangers will also be supplied with suitable antifrictional rollers in the upper portion thereof, as shown by Fig. 2, the said rollers being loosely held in the hangers and engage the upper end of the track. Depending from the lower edge of each hanger is a lug 14, having an opening 15 therethrough to provide an eye extending longitudinally of said lower edge of the hanger, so that connecting devices for the door may be assembled therein by a movement in planes at right angles to the hangers or in a direction transversely of the lower edges of said hangers.

On the upper extremity of the outer side of the door 1 a rock-shaft 15<sup>a</sup> is applied and has terminal right-angular crank-arms 16 projecting upwardly therefrom and continued into forwardly-extending hooks 17, which have

their terminals overhanging a part of the said arms. The hooks 17 loosely engage the eyes depending from the hangers and are adapted to be inserted in said eyes or drawn from the latter in hanging or detaching the door without requiring a disassociation of any part of the track organization and hangers or the fasteners, thereby permitting the full application of the track and hangers without affecting any part of the mechanism secured to the door and cooperating therewith to effect an attachment of the door to the hanger or a separation of the door from the latter. By having the hooks 17 loosely engage the eyes on the lower edges of the hangers the door can be swung outwardly and inwardly in the opening and closing movements thereof, and the crank-arms, as will be presently explained, are actuated by their rock-shaft 15<sup>a</sup> to press the door inwardly between the strips 3 during the locking operation and also to move the door outwardly when the fastener is released, such opposed movements and operations of the crank-arms resulting from reverse movements of the crank-shaft 15. On the lower portion of the outer side of the door 1 is a second rock-shaft 18, which is connected to the upper shaft 15<sup>a</sup> for simultaneous operation of both shafts, and the lower shaft 18 is formed with inwardly-directed curved crank-arms 19, having their terminals projected outwardly, the arms 19 being in planes at right angles to the shaft 18 and movable into and through sockets or keepers 20, secured on the strips 3. Each socket or keeper 20 has a slot 21 in its outer side communicating with a lower opening extending through the bottom thereof and covered by a cross-web 22, the material being removed or cut away at a point directly in rear of the web 22, as at 23, (see Fig. 10,) to allow the crank-arm 19 to have unobstructed movement inwardly through and outwardly from the lower extremity of the socket. Each rock-shaft is held in terminal bearings 24, (clearly shown by Figs. 8 and 9,) and each bearing is provided with a depending securing-shank 25 and an upper boss 26, having an opening 27 extending transversely thereacross, with a spiral inlet-slot 28 for convenience in applying the boss to the shaft and without requiring the latter to be longitudinally inserted therethrough, thus permitting the crank-arms on the opposite ends of the shaft to be formed prior to the application thereof to the terminal bearings. In applying either shaft to the bearings the latter are turned at an angle until the spiral slot 28 is in line with the shaft, when the bearings may be readily pushed over the shaft, and after it is turned in vertical position and secured it will be seen that accidental disengagement of each shaft from its terminal bearings will be obstructed by the overhanging reversely-arranged projections 29, forming the walls 4 or guarding the slots 28. One fastening bolt or screw 30 is all that is neces-



sary to secure each bearing 24 to the door, as the latter has an upper rearwardly-projecting central lug 31, which extends into a seat formed to receive the same in the door, as shown by Fig. 9.

The center bearing 32 for the upper rock-shaft 15<sup>a</sup> is shown by Fig. 7 and comprises a depending securing member 33, with an upstanding bearing-lug 34 at one end and an inwardly-projecting arm 35 at the opposite end, the lug and arm being separated by an intervening slot 36 and having their inner opposing edges 37 and 38 divergently beveled to form a clearance to permit the said upper rock-shaft 15<sup>a</sup> to be disposed in the center bearing 32 without requiring said shaft to be inserted endwise through the bearing, thereby facilitating the application of the shaft to the door. Extending transversely over the intermediate portion of the lug 34 is an outwardly-opening slot 39 in longitudinal alinement with the bend or bow 40 of the arm 35, the said lug and arm engaging opposite portions of the shaft when the center bearing is attached to the door. In applying this center bearing to the upper rock-shaft it is turned at an angle similar to the terminal bearings heretofore described, and after application it is held in firm applied position by two screw-bolts extending through openings formed in the member 33. The number of the screw-bolts used may be varied, however, and the shape of the securing member 33 may be modified without affecting the operation of the entire bearing. The edges 37 and 38 of the center bearing-plate 32 are divergently beveled in order to permit the center bearing 32 to be fitted easily around the shaft without decreasing materially the strength of the bearing. It is only necessary that the slot 36 be as wide as the diameter 15<sup>a</sup> at the point opposite the outwardly-opening slot 39, and below said slot 39 the slot 36 may be narrowed to increase the strength of the bearing.

The lower shaft 18 also has a center bearing in all respects similar to that just described and to which reference-numerals designating like parts have been applied. This lower center bearing is clearly shown in detail by Fig. 3, and in addition to the features heretofore described in connection with the upper center bearing and common to both bearings the lower center bearing has an elongated depending shank 41, continuous with the securing member 33 and provided with an outwardly-projecting hooked catch 42, with the hook member 43 projecting upwardly and formed with a shoulder or offset 44 in its inner edge above a curved guide edge 45, which extends downwardly to the lower terminal of the rear edge of said hook member. The catch 42 is also formed with an opening 46 for the reception of the seal-wire; but in some instances where the fastener is applied to doors other than those used on cars the open-

ing 46 may be omitted and any other well-known locking attachment employed in connection therewith. This lower center bearing is applied to its shaft 18 in a manner similar to the upper center bearing to the shaft 15<sup>a</sup> and attached to the door in vertical position, as shown.

Each of the shafts 15<sup>a</sup> and 18 has a central angular enlargement or boss 47, which is disposed between the lug 34 and arm 35, said enlargement or boss being an integral part of the shaft and avoiding the necessity of securing a separate piece or element to the shaft to arrive at the result sought, and thus materially lessen the cost of manufacture. Each of the shafts may be primarily a bar angular in cross-section and dressed down or forged to a circumferential form, except at the center, to preserve the enlargement or boss 47 and the crank-arms at the ends given the shape as set forth by bending or other machines now in use and without requiring any particular mechanism to produce the shaft complete. This is a further material saving in the cost of manufacture of the fastening. The center bearings having the lugs 34 and arms 35 arranged, as set forth, with intervening slots between the lugs and arms, are provided to permit the central enlargements or bosses 47 to be disposed between the lugs or arms by turning the said center bearings at a proper angle, and thus avoiding the necessity of moving the shaft longitudinally through the center bearings and having the bosses or enlargements 47 as separate pieces requiring an after attachment.

On the enlargement or boss 47 of the upper shaft 15<sup>a</sup> a coupling 48 is secured and has an opening therethrough corresponding in angular contour to that of the cross-sectional contour of the said boss or enlargement, and to prevent the coupling 48 from working loose on the boss or enlargement by wear a set-screw 49 is inserted therethrough and impinges against a portion of said boss or enlargement 47. The opposite end of the coupling is formed with a slot 50, and extending thereacross and held by the coupling is a pin 51.

The enlargement or boss 37 of the lower shaft 18 is engaged by the head 52 of a latch 53, said head having an opening 54 therethrough corresponding in contour to that of the cross-sectional contour of the enlargement or boss, the said head being prevented from working loose on the enlargement or boss by a set-screw 49 inserted through the head and terminally bearing on the said enlargement. Below the head 52 the latch has a pair of outstanding ears 56, with a slot 57 therebetween, across which extends a pin 58. In the body of the latch 53 a longitudinal slot 59 is formed, and over a portion of the latter guides 60 are disposed and spaced apart from each other, said guides having openings there-



through which are greater in width than the width of the slot 59. The lower end of the latch is reduced to form a grip or handle 61, and the catch 42 at the lower end of the center bearing for the shaft 18 is adapted to be projected through the lower extremity of the slot 59. A bolt or slide 62 is held in the guides 60 and has a rear rib 63 projecting longitudinally over a portion of the same to enter the slot 59 and render the movement of the said bolt or slide positive within the guide and also strengthen or reinforce the bolt or slide sufficiently to withstand ordinary wear and tear and obstruct any tendency of the same to break or become bent, particularly at its lower extremity. The lower end of the bolt or slide 62 is formed with an outstanding nose or catch-lip 63<sup>a</sup>, which is adapted to ride over the upper edge of the catch 42 and gravitate behind the hook 43, where it will be forced into engagement with the offset or shoulder 44 to prevent accidental disengagement of the bolt or slide. The tension on the latch when closed, derived from a source which will be more fully hereinafter explained, exerts an outward pressure or pull thereon and maintains the lower terminal of the bolt or slide 62 in engagement with the hook 43 and prevents the lip 63 from drawing away from the offset or shoulder 44. In overcoming this tension on the latch in opening the door it is necessary to press backwardly on the lower end thereof far enough to allow the lip 63 to be disengaged from the offset or shoulder 44, when the bolt or slide may be drawn upwardly and permit the latch to be pulled outwardly and clear the catch 42. When the latch is secured over the catch, a seal may be applied, and the wire of said seal is threaded through the opening 46 of the catch 42 and secured in the usual manner. It will be understood that any preferred form of seal may be employed, and, as before indicated, when the door is used for covering openings other than those formed in cars a padlock or analogous device may be applied to the catch 42 for securing the latch closed over said catch.

Between the coupling 48 and the ears 56 the connecting bar or rod 64 is interposed, said bar being bent adjacent to its terminal to compensate for the operation and actuation of the parts with which it connects. The lower end of this connecting bar or rod is pivotally held between the ears 56 by the pin 58 passing through said ears, a screw 55 passing through the lower end of the connecting rod or bar 64 and bearing against the pivot-pin 58, moving in the ears 56. In other words, the pivot-pin moves in the ears, but is held immovable in the lower end of the connecting rod or bar 64 to obtain a positive operation and to have the said lower end of the connecting rod or bar remain fixed on the pin 58 to cause responsive actuation of the upper

shaft 15<sup>a</sup> the moment the latch 53 is operated without the least lost motion. The upper end of said connecting bar or rod is formed with an elongated eye or slot 65 to permit said connecting-rod to have a certain amount of longitudinal movement in relation to the coupling 48 in the opening and closing movements of the fastener and door, but to insure a simultaneous operation of both rock-shafts at intervals.

It will be seen that the latch 53 serves as a controlling-lever, for by its operation the movement of both rock-shafts is governed and the engagement or disengagement of the crank-arms at the ends of the lower rock-shaft in relation to the sockets or keepers, as well as the movement of the crank-arms of the shaft 15<sup>a</sup> in the eyes 14 of the hangers. When the controlling lever or latch 53 is free to be opened, the slide or bolt is elevated after first pressing backwardly on the lower end of said lever, the said slide or bolt being provided with a finger piece or eye 66 at an intermediate point to facilitate the disengagement thereof from the catch 42. The lever or latch being free is drawn outwardly, and immediately the rock-shaft 18 is turned in a rearward direction, and the curved terminal crank-arms thereof gradually move downwardly through the sockets or keepers on the strips 3, and the lower portion of the door 1 moves outwardly, this latter operation being due to the release of the curved crank-arms at the end of the shaft 18 from a binding engagement in relation to the socket. The upper rock-shaft 15<sup>a</sup> does not start to move until the lower terminal of the slot 65 in the upper end of the connecting rod or bar 64 strikes the pin or fulcrum means 51, held in the outer end of the coupling 48; but as soon as the lower terminal or end wall of the said slot 65 engages the pin 51 the upper rock-shaft 15 is turned in a rearward direction, and simultaneously the door 1 is elevated to assist in a complete clearance of the curved crank-terminals of the shaft 18 from the sockets 20 and simultaneously throw the doors as an entirety outwardly far enough to disengage it from the strips 3. The movement of the upper rock-shaft 15<sup>a</sup> is limited and does not have as great a rotation as the lower shaft, for a purpose which has been just explained and also to dispose the center of gravity of the door and part carried thereby directly under and in line with the centers of the hangers to ease the movement of the latter on the track and avoid sidewise or irregular position thereof and unequal wear on the rollers disposed in the hangers. After the door has been released it is slightly pulled outward to clear the socket 20 on the strip over which it is desired the door shall move, and when the door is completely opened a portion of one edge thereof assumes such a position as to engage the outer edge of the strip 3, over



which it has moved, and will be obstructed from any tendency toward an accidental closing movement. As a further means of locking the door open the one crank-arm of the lower shaft will be operated through the medium of the controlling lever or latch 53 to engage the socket 20 nearest thereto, and when said lower rock-shaft is operated to cause its crank-arm to engage the socket the upper rock-shaft 15<sup>a</sup> will be similarly actuated after a certain length of time or interval of downward movement of the connecting rod or bar 64 and push the door closely inward against the car side, thereby preventing the door from swinging or having loose movement, especially after the controlling lever or latch is caused to engage the catch 42. As an additional safeguard in locking the door in open position, it is proposed to secure a socket 20 at a proper point on the side of the car so that both crank-arms of the lower rock-shaft 18 may be engaged. In closing the door it is drawn over the opening between the strips 3, and the controlling lever or latch 53 is moved downwardly to cause the crank-arms at the ends of the shaft 18 to engage the sockets 20 on the said strips 3 and at a proper time move the upper rock-shaft 15<sup>a</sup> inwardly and cause its crank-arms to come forward through the eyes 14 of the hangers 12 and simultaneously press the door inwardly between the strips and form tight joints around the same which will obstruct the entrance of sparks or dust into the car-body. After the controlling lever or latch 53 is locked down over the catch 42 any attempts to irregularly or nefariously pry the door open from the lower end to gain access to the car without breaking the seal will be successfully resisted, and the contents of the car will thus be preserved against theft.

All the parts of the fastener or locking device except the rock-shafts and connecting-rod will be formed by casting from suitable metal, and in view of the similarity of construction of their several parts their cost of manufacture will be reduced to a minimum. Furthermore, the several parts of the improved locking device are light in their structure and will not materially add to the weight of the door, and it will be understood in various applications the proportions and dimensions of the several parts may be varied at will to compensate for corresponding increase or decrease in the dimensions of the door on which the locking device is used. Furthermore, jamming or sticking of the door will be overcome by the operation of the fastener or locking device set forth, no matter what pressure may be brought to bear against the inner side of the door. The tension exerted on the controlling-lever and having the tendency to throw the latter outwardly is produced through the connecting bar or rod 64 when said rod is drawn downwardly.

Having thus fully described the invention, 65 what is claimed as new is—

1. In a device of the class set forth, the combination with a door, of means for slidably suspending the door, rotatable elements extending across the door and having crank-terminals, the terminals of the upper elements loosely and separably engaging a part of the suspending means, socket devices to receive the terminals of the lower element, a controlling-lever attached to the lower element and adapted to be locked closed in depending position, bearing means on the door for the rotatable elements having oblique slots therein to permit application thereof to the elements intermediate of the ends of the latter and without requiring endwise insertion of the elements through said means, and a connection between the center of the elements whereby the latter may be simultaneously operated by the lever. 70 75 80

2. In a device of the class set forth, the combination with a track, of a door slidably suspended therefrom, bearings on the door having diagonally-arranged slots leading to the bores thereof, and locking mechanism for the door including rotatable elements having angular terminals, the said elements being held in the bearings. 85 90

3. In a device of the class set forth, the combination with a suspended door, of locking mechanism therefor including center bearings, each of which has an upstanding lug, with an outwardly-opening slot, and a rearwardly-directed arm, a space being formed between the lug and arm, rotatable elements held in said center bearings, and locking means for operating the said elements to secure the door in either a closed or an open position. 95 100

4. In a device of the class set forth, the combination with a suspended door, of rock-shafts extending transversely thereacross and having terminal crank-arms and intermediate angular enlargements, end and center bearings on the door for the rock-shafts provided with openings which permit application thereof to the said shafts at points intermediate of the ends of the latter, the angular enlargements being disposed in the center bearings when the latter are applied, a controlling-lever secured to one of the rock-shafts and adapted to be locked in closed position, a connection between the said lever and the angular enlargement of the other shaft, sockets and suspending devices for the door for loose engagement by the crank-arms of the shafts. 105 110 115

5. In a device of the class set forth, the combination with a suspended door, of locking means therefor consisting of rock-shafts connected for simultaneous operation and having terminal cranks, bearings for the said shafts, sockets for engagement with the cranks of one shaft, the center bearing for one shaft having a lower catch with an upper offset, a controlling-lever attached to the lower shaft 120 125



to move over the said catch of the one bearing, and a slide carried by the controlling-lever and provided with a lower projection to engage the said offset of the catch.

- 5 6. In a device of the class set forth, the combination with a suspended door, of locking means therefor consisting of rock-shafts connected for simultaneous operation and having terminal cranks, a part of which are adapted  
10 to engage holding devices to suspend the door, sockets for engagement with the cranks of the remaining shaft, a center bearing for the

lower shaft having a catch, a controlling-lever attached to said lower shaft and movable over the catch, and a slide carried by the controlling-lever and having a lower end to lock in engagement with the catch. 15

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. BITNER.

Witnesses:

JOHN F. BYRNE,  
JESSIE A. KING.