

June 18, 1957

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2,795,831

QUICK DISCONNECT BUCKLE

Filed April 27, 1954

2 Sheets-Sheet 1

Fig. 1.

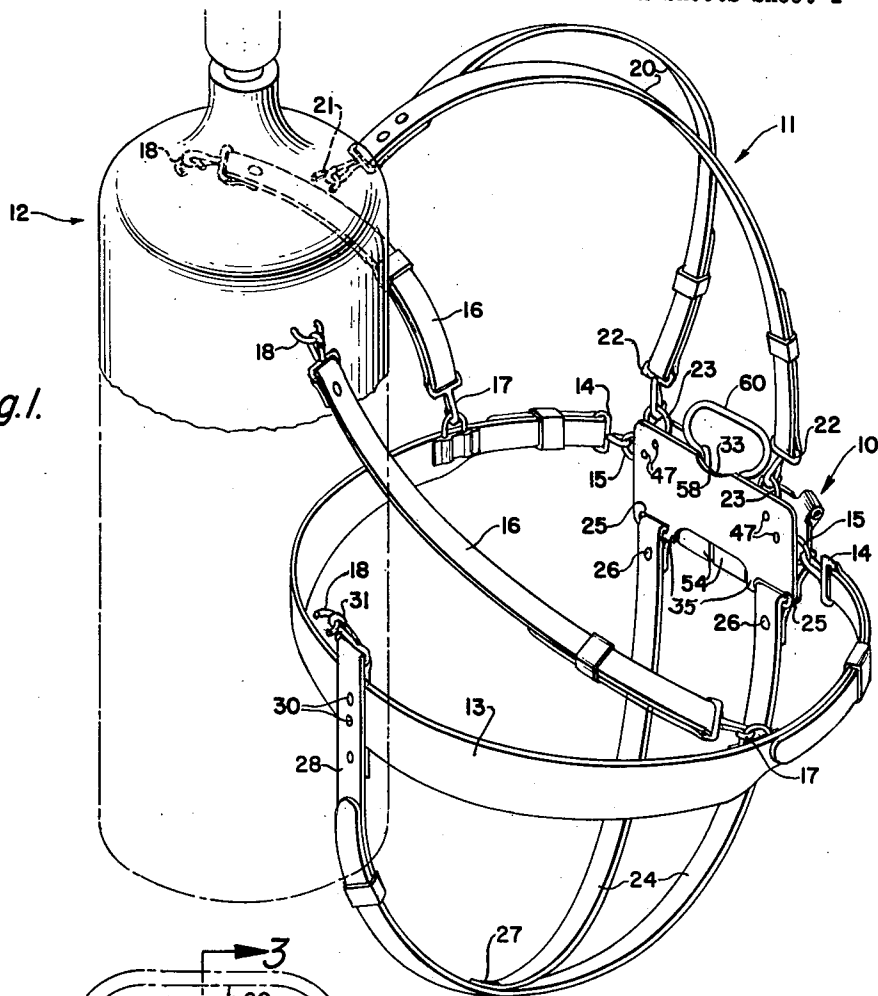
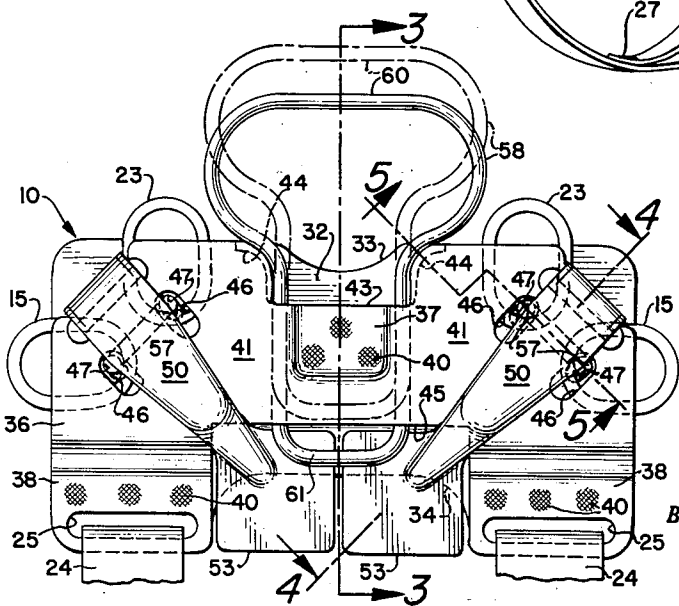


Fig. 2.



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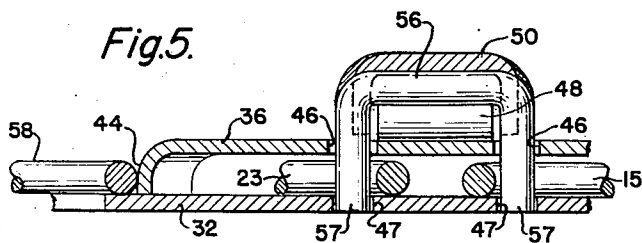
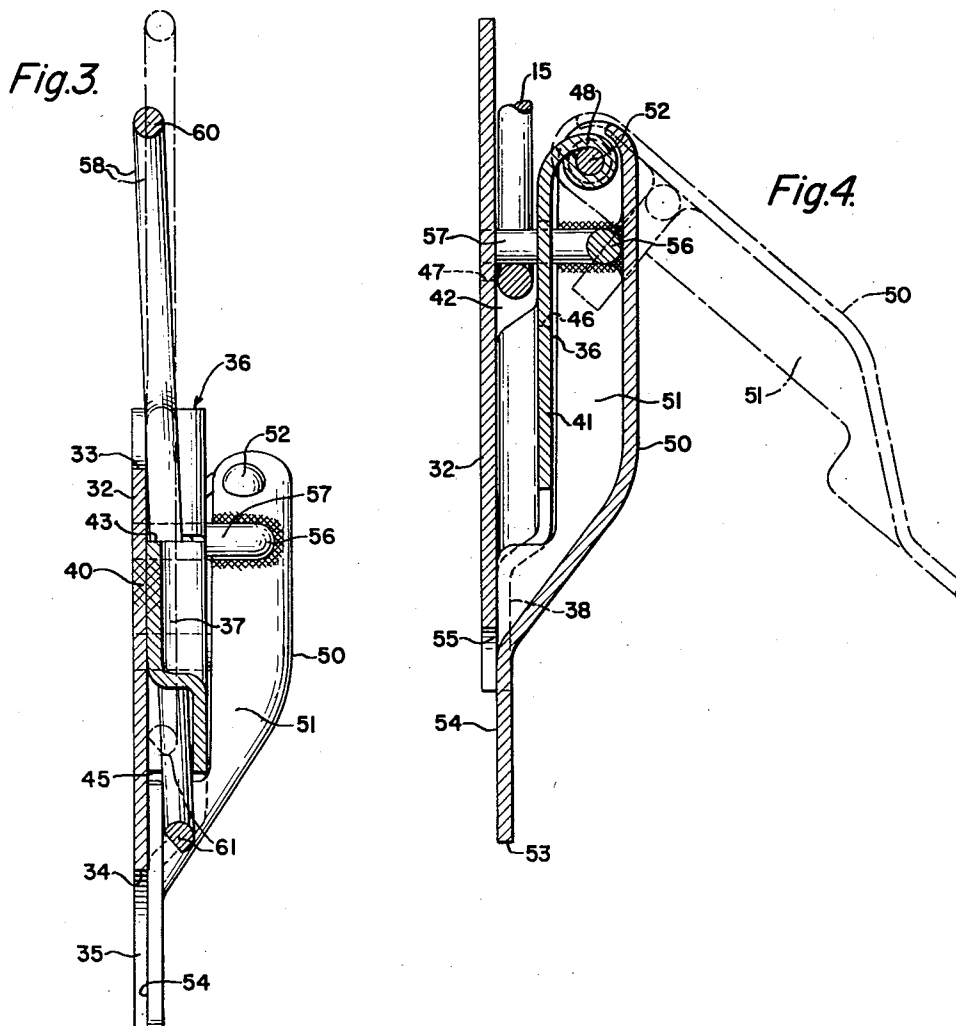
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1

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QUICK DISCONNECT BUCKLE

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7 Claims. (Cl. 24—205.17)

The present invention relates generally to a buckle and relates more specifically to a buckle adapted for use as a quick disconnect fitting in conjunction with a harness or the like.

Heretofore, many attempts have been made toward construction of buckles, similar to that of the present invention, permitting simultaneous release of various portions of a harness and harness fittings. These prior buckles and the harness fittings frequently have involved considerable complex mechanism, numerous parts that were expensive and time-consuming in manufacture, and have lacked an efficient safety means for preventing inadvertent release of the buckle from the harness or the like.

It has been found that, in many instances, for example, in connection with parachute harnesses, back pack harnesses and harnesses used with underwater diving equipment, the need often arises to release a harness from the wearer in such a manner as to drop the apparatus carried by the harness. This action must usually be accomplished as soon as possible, in order to relieve the wearer of excess burden and often enable escape from dangerous situations. Buckles of this type must usually be operable with one hand, must be reliable in operation, light in weight, rugged in construction and relatively simple in design, in order to accomplish the above defined objectives.

When the buckle and harness are used to support heavy loads, it is desirable that means be provided to enable individual removal of each strap of the harness without releasing the mechanism of the buckle in order that the load may be slowly eased from the wearer.

Accordingly, it is one important object of the present invention to provide a quick disconnect buckle that may be used in conjunction with any of a variety of harnesses and wherein means are provided to quickly disengage the buckle from the harness if the need should arise.

Another important object of the present invention is to provide a novel buckle having features enabling its construction from simplified stampings, thereby creating a device of the character described that is efficient in operation, light in weight, and rugged in construction.

A further object of the invention is to provide a novel quick disconnect buckle, for use with a harness or the like, wherein means are provided for simultaneously disengaging the buckle from the harness by a one hand operation, and wherein safety means are provided to prevent inadvertent release of the buckle from the harness.

Other and further important objects of the present invention will become apparent from the disclosures in the following detailed specification, appended claims and accompanying drawings, wherein:

Fig. 1 is a perspective view of a harness showing the quick disconnect buckle of the present invention in use therewith;

Fig. 2 is a front elevational view of the buckle;

Fig. 3 is an enlarged transverse sectional view through

2

the buckle and safety catch means, taken substantially as indicated by the line 3—3, Fig. 2;

Fig. 4 is an enlarged sectional view through one of the levers forming a portion of the present invention, taken substantially as indicated by the line 4—4, Fig. 2; and

Fig. 5 is an enlarged fragmentary sectional view through the pins and aligned openings of the present invention, taken substantially as indicated by the line 5—5, Fig. 2.

Referring to the drawings, and referring primarily to Figs. 1 and 2, the quick disconnect buckle of the present invention is shown as indicated generally at 10. As shown in Fig. 1, the buckle 10 is adapted for use with a suitable harness, indicated generally at 11, which may be attached for supporting any of a variety of loads such as, for example, an air tank 12. The tank 12 may be adapted for use in connection with an underwater breathing device or the like. In this connection, it is to be specifically understood that, while the present invention is shown and will be described in connection with a specific type of harness and load, the buckle of the present invention may be utilized with other types of harnesses and loads without departing from the spirit and scope of the present invention.

The harness 11, as shown by way of example in Fig. 1, includes a waist strap 13 having end fittings 14 which are removably secured to rings or loops 15. A pair of rearwardly extending straps 16 are removably secured to the waist strap 13, as by fittings 17 and are further removably secured to the container 12, as by suitable fittings 18. A pair of shoulder straps 20 extend from a fitting 21, on the tank 12, to end fittings 22 which are removably attached to rings or loops 23. A pair of leg straps 24 are secured in longitudinally extending slots 25 in the lower portion of the buckle 10 and retained therein by suitable rivets 26 or the like. The leg straps 24 are adapted to extend rearwardly through the crotch of the wearer and are joined, as at 27, into a single strap 28 which is, in turn, secured, as by rivets 30, for example, to a central rear area of the waist strap 13. The upper end of the strap 28 is provided with a fitting 31, which may be removably attached to the lowermost fitting 18 of the tank 12.

In accordance with the usual practice, the harness 11 is provided with various adjustable slides and keepers, in order that the lengths of the straps may be altered in accordance with the size of the wearer. Likewise, the various fittings utilized with the harness 11 may be of the snap variety in order that various portions of the harness may be removed as desired.

As shown primarily in Figs. 2—5, the buckle 10 includes a substantially rectangular base plate member 32 that may be made, by stamping or the like, from sheet material. The base plate member 32 includes a semi-circular cutout portion 33 along the upper edge thereof and a transversely extending cutout 34 in the central area of the lower edge thereof. The areas of the base plate member 32, on each side of the cutout 34, define downwardly extending, substantially square tabs 35. A cover plate member 36, having a configuration substantially the same as the base plate member 32, is positioned on the base plate member. This cover plate member may also be made from sheet material as by stamping or the like.

The cover plate member 36 has a central depressed portion 37 and depressed side tab portions 38, which overlie the tabs 35, the depressed portions being secured to the base plate member by spotwelding 40 or the like. The cover plate member 36 is also provided with portions 41 that are disposed in spaced relationship to the base plate member 32 thus to define open-sided slots 42,

Fig. 4, the purpose of which will be hereinafter more fully described. The upper edge of the cover plate member 36 is provided with a substantially rectangular cutout 43 that is somewhat deeper than the cutout 33 in the base plate member. The sides of the cutout 43 are defined by rearwardly bent outwardly curved tabs 44, the rearward edges of which are adapted for engagement with a surface of the back plate member 32, thereby to insure proper spacing of the cover member 36 relative to the back plate member 32. The lower edge of the cover plate member 36 is also provided with a cutout 45 which extends above the lower edge of the back plate member cutout 34 and intermediate the spaced tabs 38. The elongated leg strap openings 25 are disposed through the tabs 35 and 38.

As shown primarily in Figs. 2 and 5, a plurality of aligned openings are formed through the cover plate member 36 and the base plate member 32. These openings overlie the slots 42. The cover plate member 36 is provided with two such pairs of elliptical openings 46 which extend through the cover plate member and are disposed in spaced relationship, and at an angle to the sides of the buckle. The base plate member 32 is provided with elongate openings 47 that are arranged in the base plate member in a manner similar to the arrangement of the openings 46.

The cover plate member 36, adjacent the outer corners thereof and overlying the slots 42, is bent outwardly, as at 48, Fig. 4, to form portions of hinges for a pair of levers 50. The levers 50 have side portions 51 which extend over sides of the bent out portion 48. Hinge pins 52 extend through the portions 48 and the side portions 51, thereby hingedly mounting the levers 50 on the cover plate member 36. With reference primarily to Fig. 2, it is to be noted that the levers 50 extend diagonally downwardly and inwardly over the outer surface of the cover plate member 36 and have their inner lower ends, remote from the hinge point thereof, provided with substantially square finger engaging portions 53. The portions 53 are positioned in side by side relationship within the cutout 45, with rearward surfaces 54 of the finger engaging portions 53 being normally adapted to rest on an outer surface 55 of the base plate member 32.

Each of the levers 50 is provided with a substantially U-shaped pin structure 56, Fig. 5, that may be secured thereto, as by welding or the like. The base or transverse portion of the pin structure 56 serves as a support for the pairs of pins 57, the pins 57 being adapted normally for disposition within the aligned openings 46 and 47.

A safety catch member 58 is slidably disposed between the plate members 32 and 36. The safety catch member may be made from wire-like material or the like which may be joined in order to provide a continuous ring-like release member which is guided for slidable movement by contact with inwardly directed surfaces of the tabs 44 and by outwardly directed side portions of the depression 37. The safety catch member 58 is provided with an upper loop portion 60 that is disposed above the upper edge of the buckle, and a lower catch portion 61 that is adapted for extension beyond the lower edge of the cutout 45 and over the outer surfaces of the finger engaging portions 53. The catch member 58 thereby acts to maintain the finger engaging portions 53, and the surfaces 54 thereof, in contact with the surface 55 of the base plate member 32, and to maintain the pins 57 in the aligned openings 46 and 47. The guided nature of the member 58, relative to the tabs 44 and sides of the depression 37, serves to frictionally retain the member 58 in its various positions until manual movement thereof.

In operation, with the safety catch member moved to the position shown by the dotted lines in Fig. 2, the rings 15 and 23 are normally first inserted into the slots

42 and retained therein by placement of the levers 50 in the position shown in Fig. 2 and insertion of the pins 57 in the aligned openings 46 and 47. The safety catch member 58 is then moved from the dotted line position in Fig. 2 to the solid line position, thereby to lock the levers 50, together with the pins 57, in a position shown in the drawings. The wearer next places the harness in position on the body with the end fittings of the harness 11 being secured to the rings 15 and 23. It is to be noted that the likelihood of losing the rings 15 and 23 is reduced by the present construction due to the fact that the rings are always either attached to the harness fittings or positioned in the buckle about the pins 57.

If an emergency condition should arise wherein the wearer would desire to drop the buckle, harness and load, he need only first pull upwardly on the loop 60 of the safety catch member 48, using the semi-circular cutout 33 as a finger rest or holding the buckle as by the depression 37, thereby moving the catch portion 61 upwardly and out of engagement with the finger engaging portions 53. Alternately, inasmuch as the leg straps 24 act to hold the buckle down, the safety catch 58 may be pulled upwardly without using other portions of the hand or fingers. At least one finger may then be inserted beneath and behind the finger engaging portions 53 thereby to move these portions and the levers 50 about the hinge points in an outward direction toward the position indicated by the dotted lines in Fig. 4. This action serves to remove the pins 57 from the aligned openings 46 and 47 and permits simultaneous release of the rings 15 and 23 from their positions in the slots 42 and about the pins 57. When the rings 15 and 23 are released, the buckle 10, together with the leg straps 24, will drop, while the waist strap 13 and shoulder straps 20 will be free to move backwardly and upwardly respectively, thereby freeing the wearer of the buckle, harness and load.

It is to be noted that the present device is made from components which may be stamped or otherwise suitably formed from sheet material or the like, with the present buckle requiring very little time in assembly, the plate members being first placed together with the safety catch member in place and then spot welded. Thereafter it is only necessary to insert the hinge pins 52 in order to complete final assembly of the device. It is also to be noted that no obstructions exist that might interfere with free movement of the rings 15 and 23 outwardly from the slots 42 when the pins 57 have been removed from the aligned openings 46 and 47, thus to insure positive operation of the device and release of the buckle from the harness.

Having thus described the invention and the present embodiment thereof, it is desired to emphasize the fact that many modifications may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In a quick disconnect buckle adapted for use with a harness, the combination of: a base plate member; a cover plate member mounted on said base plate member, said plate members having portions positioned in spaced relationship to define open sided slots therebetween; a plurality of aligned openings in said plate members at opposite sides of said slots; a pair of levers pivotally mounted on said cover plate member adjacent open ends of said slots; pins carried by each of said levers adjacent the pivotal points of said levers, said pins being adapted for insertion and withdrawal from said openings, portions of said harness being adapted for reception in said slots and retention therein by said pins; and a safety catch slidably disposed between said plate members and adapted for cooperation with ends of said levers remote from said pivot points, thereby to maintain said pins in said openings, said levers being adapted for manual movement, upon release of said safety catch,

5

to withdraw said pins from said openings and release said harness from said buckle.

2. A quick disconnect buckle adapted for use with a harness, said harness having harness attachment fittings, comprising, in combination: a substantially rectangular base plate member; a cover plate member having portions secured to said base plate member and other portions disposed in spaced relationship to said base plate member; a pair of slots defined between said spaced portions of said plate members, said slots having open sides directed outwardly toward upper corners of said plate members; a pair of aligned sets of openings through said plate members; a pair of levers; means for hingedly mounting said levers on said cover member at upper outer corners thereof and adjacent said openings, said levers extending diagonally inwardly and downwardly over said cover plate member; finger engaging portions formed on the ends of said levers remote from said hinge mounting and disposed in side by side relationship, surfaces of said finger engaging portions being adapted to rest on said base plate member; a pair of pins carried by each of said levers, said pins being adapted for insertion in and withdrawal from said openings, said harness fittings being adapted for insertion into said slots and retention therein by said pins; and a safety catch slidably disposed between said plate members and adapted for cooperation with said finger engaging portions to maintain said finger engaging portions in contact with said base plate member and said pins in said aligned openings, said levers being adapted for manual movement, upon release of said safety catch, to remove said pins from said openings and release said harness fittings from said slots.

3. A quick disconnect buckle adapted for use with a harness, said harness having harness attachment fittings, comprising, in combination: a substantially rectangular base plate member; a cover plate member having portions secured to said base plate member and other portions disposed in spaced relationship to said base plate member; a pair of slots defined between said spaced portions of said plate members, said slots having open sides directed outwardly toward upper corners of said plate members; a pair of aligned sets of openings through said plate members; a pair of levers; means for hingedly mounting said levers on said cover member at upper outer corners thereof and adjacent said openings, said levers extending diagonally inwardly and downwardly over said cover plate member; finger engaging portions formed on the ends of said levers remote from said hinge mounting and disposed in side by side relationship, surfaces of said finger engaging portions being adapted to rest on said base plate member; a pair of pins carried by each of said levers, said pins being adapted for insertion in and withdrawal from said openings, said harness fittings being adapted for insertion into said slots and retention therein by said pins; a safety catch slidably disposed between said plate members and adapted for cooperation with said finger engaging portions, thereby to maintain said finger engaging portions in contact with said base plate member, and to maintain said pins in said aligned openings; and a finger engaging loop formed on said safety catch and extending above said buckle, said levers being adapted for manual movement, upon release of said safety catch by movement thereof by said loop, to remove said pins from said openings and release said harness fittings from said slots.

4. A quick disconnect buckle for use with a harness having a crotch section and belt and shoulder sections with apertured end portions, said buckle comprising a body formed for substantially permanent attachment to said crotch section, said body having parts spaced to provide slots to receive the apertured end portions of said belt and shoulder sections, said spaced parts having registering openings; lever means supported for pivotal movement on said body; pin means carried by said lever

6

means for movement into and out of said registering openings upon pivotal movement of said lever means, said pin means extending through the apertured end portions of said belt and shoulder sections when the latter are disposed in said slots; and a catch member guided for sliding movement in said body between a position overlying said lever means to prevent pivotal movement thereof and removal of said pin means from said apertured ends and another position releasing said lever means for such movement.

5. A quick disconnect buckle for use with a harness having a crotch section and belt and shoulder sections with apertured end portions, said buckle comprising a substantially rectangular body formed at the lower portion for substantially permanent attachment to said crotch section, said body having parts spaced to provide slots at the upper corners to receive the apertured end portions of said belt and shoulder sections, said spaced parts having registering openings; lever means supported for swinging movement substantially diagonally across said body, the free ends of said levers being disposed adjacent one another at the lower portion of said body in one position of said levers; pin means carried by said lever means, said pin means being disposed in said registering openings to retain the apertured end portions of said belt and shoulder sections in said slots in the latter position of said lever means; and a catch member guided for substantially vertical movement in said body from a position overlying the free ends of said levers to a position releasing the same.

6. A quick disconnect buckle for use with a harness having a crotch section and belt and shoulder sections with apertured end portions, said buckle comprising a substantially rectangular body formed at the lower portion for substantially permanent attachment to said crotch section, said body having parts spaced to provide slots at the upper corners to receive the apertured end portions of said belt and shoulder sections, said spaced parts having registering openings; a lever disposed for pivotal movement about an axis extending diagonally across each upper corner of said body, said axes being disposed in front of said body, the free ends of said levers being disposed adjacent one another at the central lower portion of said body in a locked position of said levers; pin means carried by said levers, said pin means being disposed in said registering openings to retain the apertured end portions of said belt and shoulder sections in said slots in the locked position of said levers, said pin means extending rearwardly beyond the axes of pivotal movement of said levers and through said slots; and a catch member guided for substantially vertical movement in said body from a position overlying the free ends of said levers when in a locked position to another position removed from said levers.

7. A quick disconnect buckle for use with a harness having a crotch section and belt and shoulder sections with apertured end portions, said buckle comprising a substantially rectangular body with front and rear walls having portions shaped and spaced to provide slots opening to the upper corners, a recess at the central lower portion of the front wall and guide means extending upwardly from said recess, said body also being formed for substantially permanent attachment to said crotch section, the front and rear walls having registering openings in the portions spaced to form said slots; a lever supported for swinging movement about an axis extending diagonally across each upper corner, said axes being spaced forwardly of said front wall; pin means rigidly carried by said levers for movement into and out of said registering openings upon swinging movement of said levers, the free ends of said levers being disposed adjacent one another in said recess when said pin means are positioned in said openings; and a catch member disposed for sliding movement in said guide means from a position overlying the free ends of said levers to pre-

2,795,831

7

vent movement thereof to a position removed from said
levers to permit movement thereof.

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