April 14, 1953 J. BROWNE 2,634,475

QUICK-RELEASE SCREW CLAMP

Original Filed Feb. 28, 1946

Fig. 1.

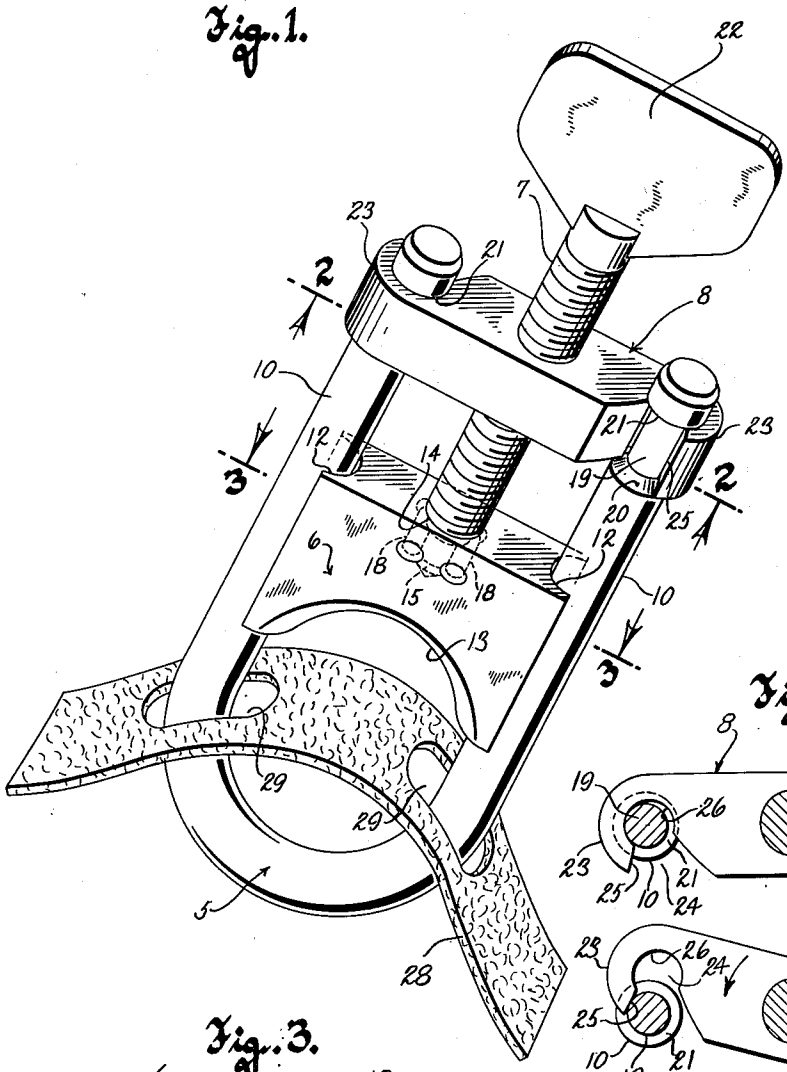


Fig. 2.

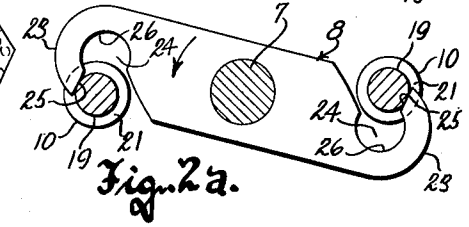
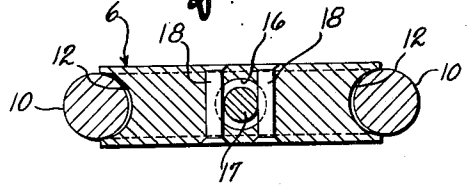


Fig. 2a.

Fig. 3.



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QUICK-RELEASE SCREW CLAMP

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Original application February 28, 1946, Serial No. 650,916. Divided and this application July 20, 1951, Serial No. 237,757

1 Claim. (Cl. 24—135)

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This invention relates to clamps and has more particular reference to quickly releasable clamps. Clamps of this type have a wide variety of uses but are particularly well suited for use with diving dress such as shown and described in my copending application Serial No. 650,916 filed February 28, 1946, now Patent No. 2,569,451 and of which this application is a division.

In the aforesaid copending application entry into the diving dress is effected through a relatively large opening in the back. The back of the shirt portion surrounding the large opening therein has considerable fullness, and after the diver is inside the suit the fullness is bunched or folded together upon itself and conveniently closed with a fluid tight seal by the clamp of this invention.

It is the general purpose of the invention to provide a clamp having fixed and movable jaws brought into clamping engagement by means of a screw but which may be quickly separated to release the same from their clamping positions without actuation of the clamping screw.

More specifically it is an object of this invention to provide a clamp wherein the fixed jaw comprises the bight of a U-shaped bail while the movable jaw comprises a pressure block received between the legs of the bail and constrained thereby to sliding motion toward the fixed jaw upon actuation of a screw connected with the pressure block and threaded into a latch bar having a quickly releasable connection with the legs of the bail by which it is releasably locked thereto.

Another object of this invention resides in the provision of cam type hooks on the latch bar formed by notches opening to the opposite side edges of the bar and in which reduced portions of the legs of the bail are receivable, the hooks camming the legs of the bail toward one another during engagement of the hooks with the reduced portions of the legs of the bail so that the legs of the bail must likewise be flexed together before disengagement of the latch bar from the legs of the bail can be effected. In this way, the resiliency of the legs of the bail is used to hold the latch bar in position on the clamp to facilitate its application to the article to be clamped.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that

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such changes in the precise embodiment of the hereinafter disclosed invention may be made as come within the scope of the claim.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof and in which:

Figure 1 is a perspective view of the clamp of this invention;

Figure 2 is a cross sectional view taken through Figure 1 along the plane of the line 2—2;

Figure 2a is a view similar to Figure 2 but showing the manner in which the legs of the clamp are momentarily cammed together by the act of engaging the latch bar with the same; and

Figure 3 is a cross sectional view taken through Figure 1 along the plane of the line 3—3.

Referring now more particularly to the accompanying drawing in which like numerals designate like parts throughout the several views, the clamp of this invention comprises generally fixed and movable jaws 5 and 6, respectively, a screw 7 for propelling the movable jaw toward the fixed jaw, and a latch bar 8 in which the screw is threaded, for quickly releasing the movable jaw.

The fixed jaw 5 preferably comprises the bight of a U-shaped bail, and extends transversely across and rigidly joins the legs 10 of the bail to hold the same in opposite spaced apart substantially parallel relationship. While the U-shaped bail is preferably, although not necessarily, bent up from round bar stock of substantial thickness to insure rigidity of the bight or fixed jaw 5, it is nevertheless important that the legs 10 have a length such as to enable them to be flexed slightly toward one another for a purpose to be hereinafter more fully described.

The movable jaw or pressure block 6 is in the nature of a crosshead slidably confined between the legs 10 by means of tongue and groove connections which in the present case are readily provided by grooves 12 in the opposite side edges of the block to receive the inner cylindrical surfaces of the legs 10 of the bail, with a slight amount of clearance between the inner sides of the legs and the bottoms of the grooves. At its bottom the block is preferably made concave as indicated at 13, although it may have any desired shape to suit the type of article to be clamped between it and the stationary jaw 5.

The pressure applying screw 7 is joined to the

movable jaw 6 by a connection precluding axial motion of the jaw relative to the screw but permitting the screw to rotate freely with respect to the jaw. For this purpose the screw has its end portion turned down to provide an annular shoulder 14 to engage the flat top surface of the block and a spool shaped extremity 15 rotatably received in a bore 16 opening to the top of the block medially between the grooved side edges of the block. The neck 17 provided by the groove in the spool shaped extremity of the screw is received between a pair of parallel crosspins 18 fixed in the block 6. Hence, the pins 18 preclude axial separation of the pressure screw 7 from the movable jaw 6 without restricting free rotation of the screw in the bore 16 of the jaw.

At locations spaced inwardly a short distance from their extremities, the legs 10 of the bail are notched or turned down as at 19 to provide opposing inner and outer shoulders 20 and 21 at the ends of the turned down portion 19, between which the opposite ends of the latch bar are received to hold the same against motion lengthwise of the legs of the clamp. While not essential, the inner shoulder 20 preferably is chamfered slightly as indicated in Figure 1.

The latch bar 8 is threaded onto the pressure screw 7, which passes through the mid portion of the bar. Hence, when the ends of the latch bar are engaged between the shoulders 20 and 21 on the outer ends of the legs 10 of the clamp, the screw is in effect connected to the legs of the clamp, and when turned by its handle 22, clockwise with a right hand thread on the screw as seen in Figure 1, the screw propels the movable jaw 6 toward the stationary jaw 5. Clamping reaction of the movable jaw, of course, is carried back to the outer shoulders 21 on the legs of the clamp, through the screw and the latch bar.

One of the features of the clamp of this invention, however, resides in the readily releasable connection provided between the ends of the latch bar and the legs of the clamp at their turned down portions 19. Part of this connection is provided by the engagement of the shoulders 20 and 21 at the ends of the reduced portion 19 with the opposite faces of the bar to preclude motion thereof lengthwise of the legs 10. It is also important, however, that this readily releasable connection provide assurance against accidental movement of the ends of the bar out of the spaces between the shoulders 20 and 21.

For this purpose, the bar is provided with hooks 23 on its opposite ends, formed by notches 24 opening laterally to the opposite side edges of the bar. These hooks are so shaped and spaced radially from the axis of the screw 7 that they must be snapped over the reduced portions 19 on the legs 10 during clockwise rotation of the bar 8 upon the screw, with the movable jaw 6, of course, properly engaged between the legs 10. Accordingly, the outer extremities of the hooks 23 are curved back slightly toward the screw 7 and have cam surfaces 25 thereon to engage the outer surfaces of the reduced portions 19 as the ends of the latch bar are simultaneously swung into the spaces between the shoulders 20 and 21. These cam surfaces flex the legs slightly toward one another and then allow the legs to spring apart into the bottoms 26 of the notches 24 where they yieldingly hold the latch bar against rotation (counterclockwise in Figure 1) in the direction to unhook its ends from the legs 10 of the clamp.

Thus, when the latch bar is in its operative position in which its opposite ends are hooked around the reduced portions 19 on the legs of the bail, between the shoulders 20 and 21 defined thereby, the reduced portions 19 are disaligned from the exits of the apertures 26 provided by the notches 24 with the result that the latch bar cannot be accidentally swung out of its operative position. Release of the latch bar, of course may be readily accomplished by grasping the outer end portions of the legs of the bight and pressing them toward one another, such flexure of the legs being possible by reason of the clearance between them and the opposite grooved sides of the movable jaw 6 between the legs.

The clamp of this invention can be very quickly released from any article clamped thereby merely by swinging the latch bar in a counterclockwise direction, while pressure is exerted on the legs of the bail to align the turned down portions 19 with the exits from the apertures 26. With the latch bar unhooked from the legs of the U-shaped bail the movable jaw 6 may be slid away from the stationary jaw 5, and in fact removed completely from the legs of the bight as long as the legs are of uniform diameter or no greater at their outer extremities than along the areas thereof normally embracing the movable jaw.

It is noteworthy that the notches 24 in the latch bar open to those side edges thereof which require clockwise rotation of the bar on the pressure screw 7 for engagement on the hooked ends of the latch bar around the turned down portions 19 of the legs of the bail. With this disposition of the notches, the clockwise rotation of the pressure screw to propel the jaw 6 toward the stationary jaw 5 tends to hold the latch bar properly engaged around the turned down portions 19.

Wherever there is danger of injuring the article or other means clamped between the jaws 5 and 6, it is desirable to employ some means for protecting the clamped means or material. This is especially true for use of the clamp of this invention with diving suits to close the entrance opening to the suits, and where the waterproof material from which the suit is made may be damaged or cut if it is contacted directly by both the stationary and movable jaws of the clamp. To preclude such damage a leather strap 28 having apertures 29 therein to receive the legs of the U-shaped bail may be interposed between the stationary and movable jaws as illustrated in Figure 1.

From the foregoing description taken together with the accompanying drawing it will be readily apparent to those skilled in the art that this invention provides a strong clamping device which may be quickly applied to or released from the material or other means to be clamped.

What I claim as my invention is:

A quickly releasable clamp comprising: a U-shaped bail having straight substantially parallel legs resiliently flexible toward one another; a pressure block having elongated substantially parallel grooves in two opposite side edges thereof substantially conforming in shape to the inner sides of the legs of the bail and in which the inner sides of the legs of the bail are received to constrain the pressure block to translatory sliding movement along the length of the legs and provide a detachable connection between the bail and the block by which the block may be readily slid off of and onto the legs of the bail; said legs having reduced neck portions near their outer

ends providing spaced opposing shoulders on each leg; a crosspiece; a hook on each end of the crosspiece to hook around the reduced neck portions of the legs, said hooks defining a pair of notches having their mouths opening laterally to opposite marginal edges of the crosspiece, and the notches having their inner portions offset away from one another with respect to their mouths, so that upon rotation of the crosspiece about an axis parallel to and midway between the legs the legs are cammed toward one another as their reduced portions enter the mouths of the notches, whereby the legs must be flexed together upon engagement and disengagement of the crosspiece with the legs, and said crosspiece having a thickness so as to be freely received between said opposing shoulders on each of the legs when the reduced neck portions thereof are engaged in the notches of the crosspiece; a screw threaded in a hole in the crosspiece with its axis parallel to and medially between the legs when the crosspiece is in engaged position upon the reduced neck portions of the legs; and a freely rotatable but non-longitudinally movable connection between the screw and the pressure block by which the latter may be propelled toward the bight of the U-shaped bail upon rotation of the screw in one direction in said crosspiece.

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