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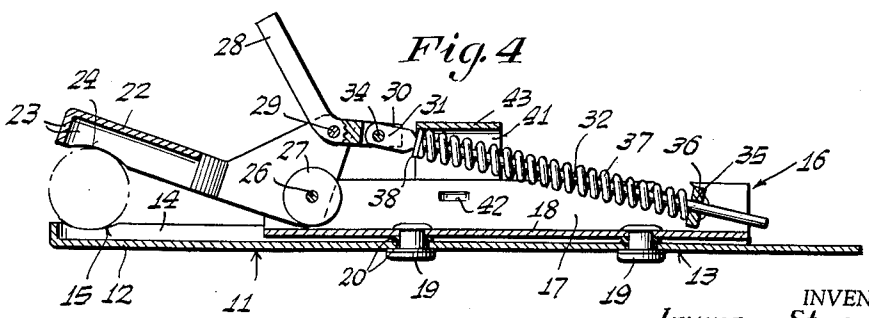
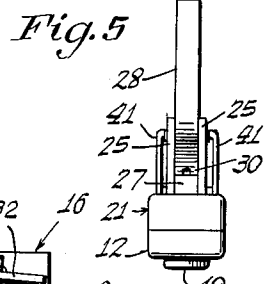
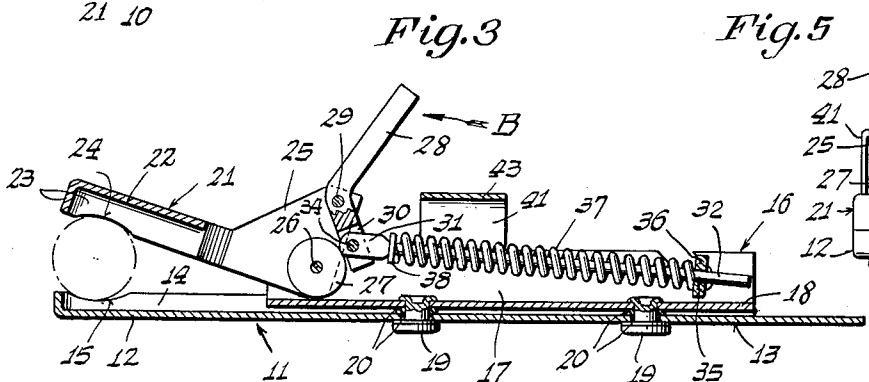
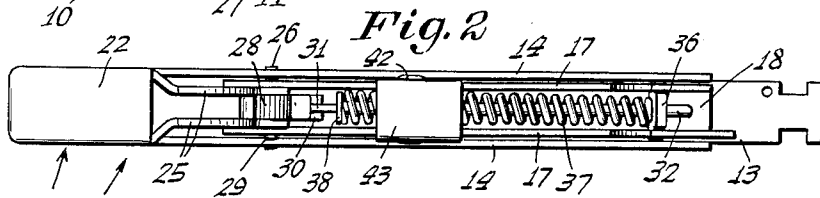
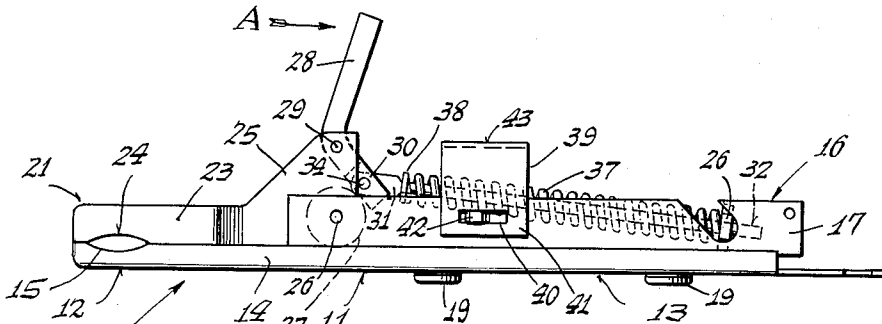
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3,028,577

LOCKABLE JAW CLAMP

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Fig. 1



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3,028,577

**LOCKABLE JAW CLAMP**

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This invention relates to a clamping device and more specifically to a jaw type clamp.

An object of this invention is to provide a novel clamping device having a fixed jaw and a jaw movable relative thereto which is normally biased to the closed position, and having means for positively locking the jaws in either the inoperative closed position or in any relative, operative open position thereof.

Another object is to provide a novel operating means operatively associated with the movable jaw of the instant device whereby actuation of the operating means in one direction moves the jaws to an operative clamping position and actuation of the operating means in the opposite direction positively locks the jaws in any of the relative operative positions thereof.

Still another object of this invention is to provide means for adjusting the spread, the jaws and the locking force acting thereon when in an operative locked position.

The foregoing objects and advantages are attained by a clamping device comprising a fixed jaw, a movable jaw and means for pivotally connecting the fixed and movable jaw for relative movement therebetween. According to this invention an operating lever is fulcrumed intermediate the ends thereof to the movable jaw about a point spaced from the pivot connecting the jaws, the arrangement being such that in an unlocked position one end of the lever is adapted to engage a bearing member rotatively disposed on the pivot connecting the jaws. A resilient means having one end anchored to an extended portion of the fixed jaw and having its other end pivotally connected to the end portion of the lever for normally urging the lever into engagement with the bearing member and the jaws to closed position. The arrangement is such that a force exerted on the lever in one direction will rotate the lever and movable jaw in fixed relative relationship therewith about the pivot connection of the jaws to spread the same, and a force exerted in the opposite direction on the lever will rotate the lever relative to the movable jaw and about its own fulcrum to positively lock the jaws in any position thereof.

A feature of this invention resides in the provision that the fixed and movable jaw may be electrically insulated one from the other for rendering the clamping means readily adaptable for use as a releasable electrical connector.

Another feature resides in the provision of means for adjusting the limit of spread of the jaws.

Other features and advantages will be readily apparent when considered in view of the drawings and specification in which:

FIG. 1 is a side elevation view of the improved clamp in accordance with this invention.

FIG. 2 is a top plan view of the clamp.

FIG. 3 is a sectional view illustrating the clamp in an operative unlocked position.

FIG. 4 is a sectional view similar to that of FIG. 3 illustrating the same in an operative locked position.

FIG. 5 is a front end view of the clamp in the normally closed position.

Referring to the drawings, the clamp 10 of the present invention includes a base means 11 having a fixed jaw portion 12 and an extended portion 13 formed integral therewith. As shown, the base means 11 is provided with a continuous vertical flange 14 which extends along the front and the major portion of the sides thereof, the side

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flange portions against the tip end of the jaw portion 12 being cut-down to provide a gripping edge 15. Connected to the extended portion 13 of the base is a frame member 16. While the frame may be formed as an integral portion of the base 11, it is herein illustrated a separate member comprising a channel shaped structure having spaced leg portions 17 connected by a central web portion 18. As shown the web portion 18 is connected to the base 11 by a pair of fastening means 19, such as rivets or the like. In order that the instant clamp may be utilized as an electrical connector the frame 16 may be electrically insulated from the base 11 by means of insulating washers 20 as shown.

Pivotally connected to the front end of the frame 16 is a movable jaw 21. As shown the movable jaw comprises a top 22 having a depending flange 23 extending along the front and sides thereof. The side flanges like those of the fixed jaws are also provided with a gripping edge 24. As illustrated the respective flanges 14 and 23 of the fixed and movable jaws are arranged to engage one another in the closed position.

Constituting an integral part of the movable jaw is an enlarged bifurcate or yoke portion 25. As shown the yoke 25 of the movable jaw is connected to the upright legs of the frame member 16 by a pivot pin 26. According to this invention an abutment in the form of a roller bearing or bushing 27 is rotatively disposed on the pin 26.

Connected to the movable jaw 21 is an operating lever 28. In accordance with this invention the lever 28 is angled, as shown, and is fulcrumed at its apex portion to the jaw 21 by a pivot pin 29, at a point spaced from the pivot 26 of the jaws. As seen in FIGS. 3 and 4, the lower end 30 of the lever is bifurcated and receives therebetween a flattened end portion 31 of a rod 32 which is pivotally connected to said lever by pin 34. The other end of the rod is extended through an aperture 35 in an anchor plate 36 transversely fixed between the leg portions 17 of the frame. In order to normally urge the bifurcated lever end portion into engagement with the roller bearing 27 and the jaws to normally closed position, as seen in FIG. 1, a spring means 37 is disposed about the rod and maintained under compression by the anchor plate 36 and a washer 38. With the construction described it will be noted that although the clamp may constitute a general purpose clamp, it is likewise applicable for use as a terminal connector for electrical hookups, as for example, to eliminate contact resistance when using the Kelvin principle of resistance measurement. This is rendered feasible because of the insulating washers 20 and the wiring connection made to the rear of the base and frame 11 and 16 respectively. Therefore, this construction provides for separate current and separate voltage connections so that in measuring resistance the low-current voltage connections may be independent of connections required to carry high current.

The operation of the clamp is as follows:

With the clamp in the normally closed position as shown in FIG. 1, a force applied to the operating lever in the direction indicated by arrow A will cause the lever, the roller bearing 27, and the movable jaw 21 to rotate clockwise, as viewed in FIGS. 1 and 3, in fixed relative position with respect to one another about the pivot pin 26 to spread the jaws open for gripping an article therebetween. In order to lock the jaws on the article, another force is applied on the lever in the opposite direction as indicated by arrow B, in FIG. 3, to rotate the lever about its own fulcrum 29 and relative to movable jaw to a position shown in FIG. 4. In doing so the pivot 34 connecting the rod 32 to the lever end 30 is moved through the dead center position of an imaginary line extending between the fulcrum 29 of the lever and the anchor point

35 of the rod. Thus, a toggle effect is produced and positive locking of the jaws is provided. With this arrangement the jaws may be also locked in the closed position.

In order to effect an adjustment to limit the spread of the jaws 12 and 21 and to limit the movement of pivot 34 through the dead center position, a means in the form of a slide 39 is provided. As shown, the slide comprises an inverted U shape member having longitudinally extending slots 40 in the leg portion 41 thereof for receiving a protuberance 42 projecting laterally of the frame 16 by which the member 39 is slidably connected to the frame 16. The top 43 of the slide comprises a stop limiting the rotation of lever 28 when actuated clockwise to open the movable jaw and also, as shown in FIG. 4, limiting the movement of pivot 34 through dead center position when the lever is moved in the opposite direction for locking the jaws. It will be noted that the maximum spread between jaws is attained when the slide is located at its most rearwardly disposed position and the minimum spread is had by sliding the slide to its most forwardly disposed position. Likewise the distance which the pivot 34 moves beyond dead center may likewise be adjusted, thereby making adjustable the amount of locking force acting on the jaws of the clamp.

Although the invention herein has been described in detail, it will be understood that the description is intended to be illustrative rather than restrictive and that many features thereof may be used to advantage without using them in conjunction with other features. The structural details set forth are susceptible to modification and change without departing from the spirit of this invention, or the scope of the appended claims.

I claim:

1. A clamp comprising a fixed jaw, a movable jaw pivotally connected to the fixed jaw, actuating means for rocking said movable jaw relative to said fixed jaw to effect a spread and a closure of said jaws, said actuating means comprising a lever pivotally connected to the movable jaw for individual movement relative thereto, an abutment on said movable jaw disposed for engagement by said lever and providing a connection between said movable jaw and lever for effecting the rocking movement of the movable jaw by the lever, resilient means pivotally connected to said lever for urging said lever into engagement with said abutment, and said resilient means actuable by a movement of said lever independently of said abutment for applying a force to said movable jaw to hold it when in closed position or when in any operative position to which it is moved.

2. A clamp according to claim 1, including means for adjusting the extent of the spread of said jaws and the amount of the holding force applied to said movable jaw.

3. A clamp comprising a base means including a fixed jaw, a movable jaw, means pivotally connecting said movable jaw to said base means, an abutment carried by said movable jaw, an operating lever for actuating said movable jaw, said lever being fulcrumed intermediate the ends thereof to said movable jaw about a point spaced from the abutment and also the pivot of said jaw, resilient means having one end thereof anchored to said base means and having its other end pivotally connected adjacent an end portion of said lever for normally urging said end portion of said lever into engagement with said abutment to maintain said movable jaw in a biased normally closed position with respect to said fixed jaw whereby actuation of said lever in one direction while engaged with the abutment opens said jaws for gripping an article, and abutment means on said fixed jaw, said movable jaw, lever and abutment means being arranged whereby the abutment means prevents opening movement of the movable jaw when the lever is actuated in the opposite direction, the resilient means holding the lever away from the abutment on the movable jaw.

4. A clamp comprising a base means including a fixed jaw portion, a movable jaw, means pivotally connecting said movable jaw to said base means, a turnable bushing carried by said pivotal connection, an operating lever for actuating said movable jaw, said lever being fulcrumed intermediate the ends thereof to said movable jaw about a point spaced from the pivotal connection of said jaw, resilient means having one end thereof anchored to said base means and having its other end pivotally connected adjacent an end portion of said lever said latter pivot connection being normally disposed between and out of alignment of the pivot of said jaws and the fulcrum of said lever, said resilient means normally urging said end portion of said lever into engagement with said bushing to maintain said movable jaw in a biased normally closed position with respect to said fixed jaw whereby actuation of said lever in one direction while engaged with the bushing causes said end portion of said lever to turn the bushing and fulcrum about the same to open said jaws and actuation of said lever in the opposite direction causes said end portion and the pivot between said lever and resilient means to move away from said bushing and through a dead center-line position extending between the fulcrum of said lever and the anchor point of said resilient means, and abutment means on said fixed jaw, said movable jaw, lever and abutment means being arranged whereby the abutment means prevents opening movement of the movable jaw when the lever is actuated in the opposite direction, the resilient means holding the lever away from the bushing to lock said jaws in any relative open or closed operative position thereof.

5. A clamp comprising a base means including a fixed jaw having an extended portion and a frame connected to said extended portion, a movable jaw, means pivotally connecting said movable jaw to said frame, a turnable bushing carried by said pivotal connection, an operating lever for actuating said movable jaw, said lever being fulcrumed intermediate the ends thereof to said movable jaw about a point spaced from the pivotal connection of said fixed jaw, resilient means having one end thereof anchored to said frame and having its other end pivotally connected adjacent an end portion of said lever for normally urging said end portion of said lever into engagement with said bushing for maintaining said movable jaw in a biased normally closed position with respect to said fixed jaw whereby actuation of said lever in one direction while engaged with the bushing opens said jaws, and abutment means on said frame arranged to limit movement of said resilient means whereby actuation of said lever in the opposite direction disengages it from the bushing and moves said resilient means into engagement with said abutment means to lock said jaws in any relative open or closed operative position thereof.

6. The invention as defined in claim 5 wherein said frame is electrically insulated from said base means.

7. A clamp comprising a base means including a fixed jaw, a movable jaw having a bifurcated end portion, pivot means connecting said bifurcated end portion of said movable jaw to said base means, a roller bearing disposed between the said bifurcated end portions and said pivot means, an operating lever for actuating said movable jaw, said lever being fulcrumed intermediate the ends thereof to and between said bifurcated portion of said movable jaw about a point spaced from the roller bearing and the pivot of said jaw, resilient means having one end thereof anchored to said base means and having its other end pivotally connected adjacent an end portion of said lever for normally urging said end portion of said lever into engagement with said bearing member to maintain said movable jaw in a biased normally closed position with respect to said fixed jaw whereby actuation of said lever in one direction which maintains said engagement opens said jaws, an abutment means on said fixed jaw, said movable jaw, lever and abutment means

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being arranged whereby the abutment means prevents opening movement of the movable jaw when the lever is actuated in the opposite direction and disengaged from the roller bearing, the resilient means thereafter acting to hold the lever away from the roller bearing and apply a force thereon acting to hold the jaws in any relative open or closed operative position thereof.

8. A clamp comprising a base means including a fixed jaw, a movable jaw, means pivotally connecting said movable jaw to said base means, a turnable bushing carried by said pivotal connection, an angled member forming an operating lever for actuating said movable jaw, said lever being fulcrumed at its apex to said movable jaw about a point spaced from the pivotal connection of said jaws, biasing means comprising an apertured anchor plate secured to said base means, a rod having one end thereof extending through said apertured plate and having its other end pivotally connected adjacent an end portion of said lever and a compression spring disposed on said rod for normally urging said end portion of said lever into engagement with said bushing to maintain said movable jaw in a biased normally closed position with respect to said fixed jaw whereby actuation of said lever in one direction which maintains said engagement opens said jaws, and abutment means on said fixed jaw, said movable jaw, lever and abutment means being arranged whereby the abutment means prevents opening movement of the movable jaw when the lever is actuated in the opposite direction, the resilient means holding the lever away from said bushing and applying a force acting on said lever to hold the jaws in any relative open and closed operative position thereof.

9. A clamp comprising a base means including a fixed jaw having an extended portion and a frame connected to said extended portion, a movable jaw having a bifurcated end portion, means pivotally connecting said bifurcated end portion of said movable jaw to said base means, a

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roller bearing disposed between said bifurcated portion and said pivot means, an angled operating lever for actuating said movable jaw, said lever being fulcrumed at its apex to and between said bifurcated end portion of said movable jaw about a point spaced from the roller bearing and the pivot of said jaw, biasing means including an apertured anchor plate secured to said base means, a rod having one end thereof extending through the aperture of said anchor plate and having its other end pivotally connected adjacent an end portion of said lever and a compression spring disposed on said rod for normally urging said end portion of said lever into camming engagement with said roller bearing to maintain said movable jaw in a normal biased closed position with respect to said fixed jaw whereby actuation of said lever in one direction which maintains said engagement causes said end portion thereof to turn the said roller bearing and fulcrum about the same to open said jaws, and abutment means on said frame, said movable jaw, lever and abutment means being arranged whereby actuation of said lever in the opposite direction moves the said end portion thereof and the pivotal connection between the end portion of said lever and row away from said roller bearing and beyond the dead center line position extending between the fulcrum of said lever and anchor point of said rod to lock said jaws in any relative open or closed operative position thereof.

10. The invention as defined in claim 9 including an adjustable slide connected to said frame to limit the movement of said lever beyond said dead center position.

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