Dec. 10, 1957 H. V. HOLMAN 2,815,778

STRAIGHT BEAM ADJUSTABLE JAW CLAMP

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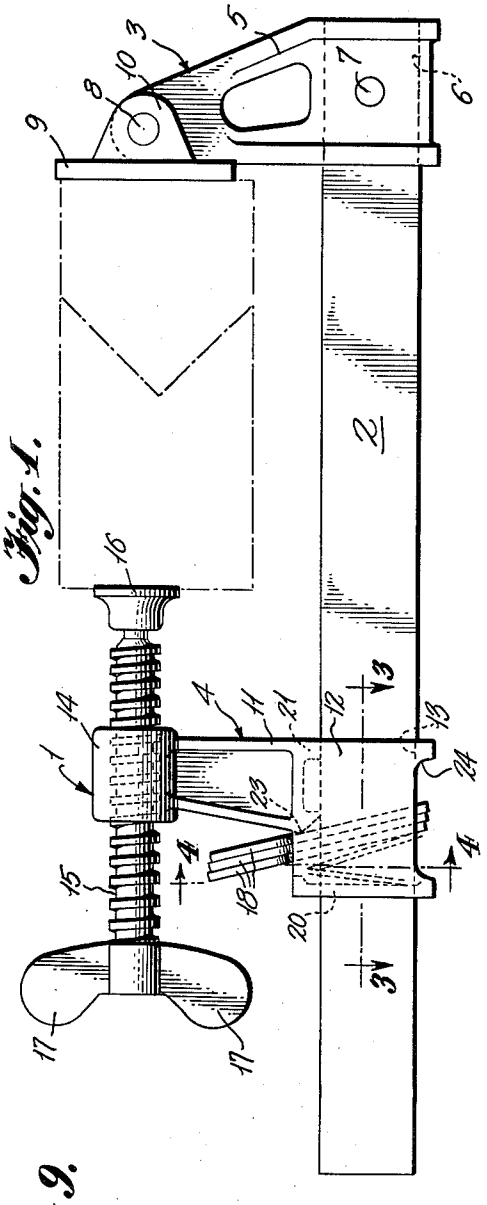

Fig. 1.

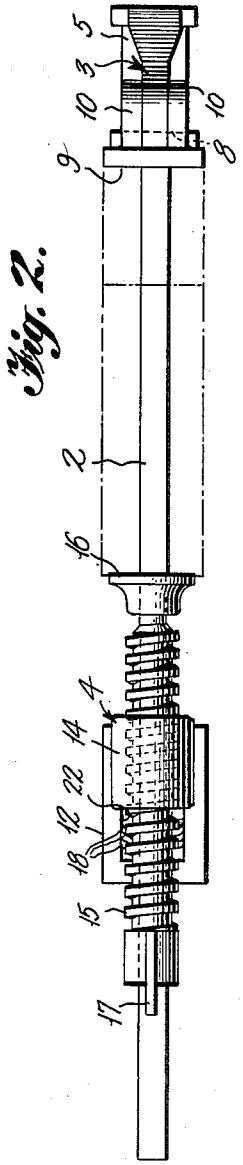

Fig. 2.

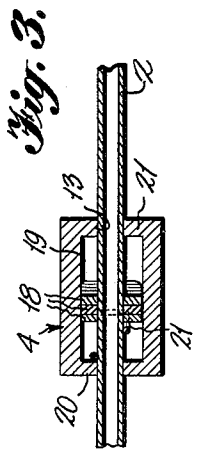

Fig. 3.

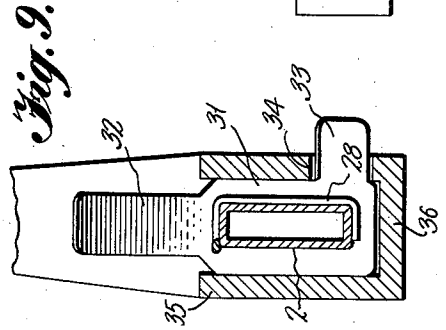

Fig. 9.

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Fig. 4.

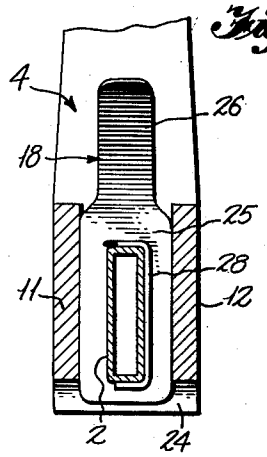


Fig. 5.

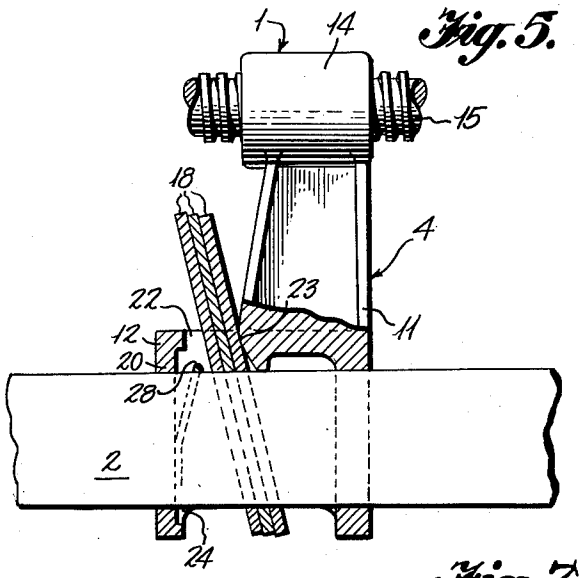


Fig. 6.

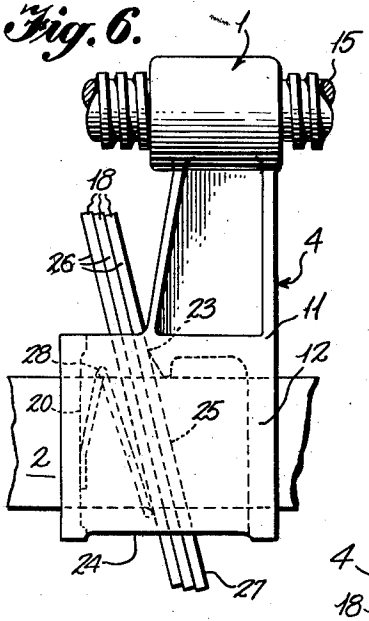


Fig. 7.

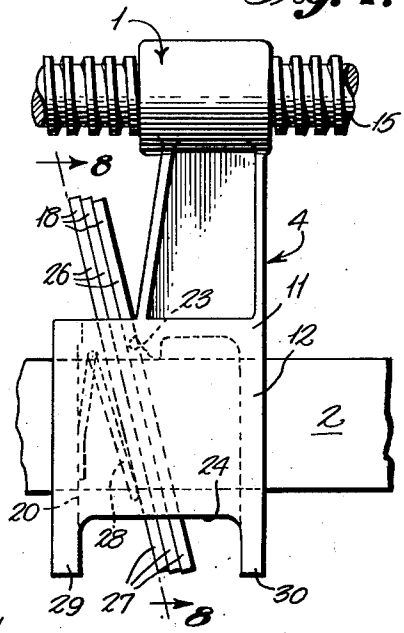
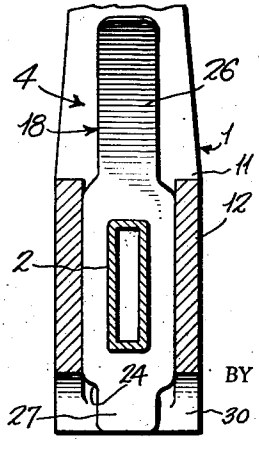


Fig. 8.



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STRAIGHT BEAM ADJUSTABLE JAW CLAMP

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Application February 23, 1954, Serial No. 411,995

1 Claim. (Cl. 144—303)

This invention relates to clamps of the portable or semi-portable types in which one of the jaws is fixed and the other slidable to and from a rough adjustment position. The structure is an improvement over that disclosed in my prior Patents 1,783,713, dated December 2, 1930, and 2,221,325, dated November 12, 1940.

Each of the above-mentioned patents discloses a clamp consisting of a bar having a fixed jaw and a movable jaw mounted thereon. The movable jaw is slidable on the bar and held in positions of adjustment by means of canted keys or disks which bite into the bar and prevent reverse movement. In the earlier of the two patents, the disks were at such angle that they had to be pressed forward to release, yet the jaw must be moved in an opposite direction to release position. After the clamp had been under severe pressure it was impossible at times to release the disks due to the fact that they had actually bitten into the material of the bar. In the later patent, the locking keys are canted in the reverse direction to correct this defect, but use of this design revealed other defects in design and operation.

The object of the present invention is to provide a clamp of the nature disclosed in the mentioned patents which will have improved operating characteristics and be readily releasable regardless of the pressure exerted during clamping action.

A more specific object of the invention is to provide a clamp of this nature in which the clamping keys are releasable by pressure applied to either end of the keys, or by pressure upon both ends simultaneously.

A still further object is the provision of such a device in which the adjustable jaw may be moved forward toward clamping position or backward by pressure upon the locking keys in the direction in which the jaw is to be moved to eliminate the necessity for the counter-pressures required to move the jaws of former clamps in one direction.

Other objects of the invention will become apparent from the following description of practical embodiments thereof when taken in conjunction with the drawings which accompany, and form part of, this specification.

In the drawings:

Figure 1 is a side view of a clamp embodying the principles of the present invention;

Figure 2 is a top plan view of the clamp shown in Figure 1;

Figure 3 is a horizontal section through the bar and movable jaw slide, and is taken on the line 3—3 of Figure 1;

Figure 4 is a vertical section through the bar and jaw slide showing the locking keys, and is taken on the line 4—4 of Figure 1;

Figure 5 is a fragmentary view of the bar and sliding jaw with portions of the jaw slide broken away;

Figure 6 is a partial side view of a modified form of clamp;

Figure 7 is a view similar to Figure 6 showing a further modified form;

Figure 8 is a vertical section taken on the line 8—8 of Figure 7; and

Figure 9 is a vertical section through the bar and movable jaw slide showing a further modified structure.

In general, the invention comprises a clamp of the type indicated in which the canted locking keys are free to move bodily as well as tiltably, within the jaw slide, and provision is made for access to the keys for tilting from either end.

Referring to the drawings in detail, there is shown a clamp 1 which comprises a bar 2 having a jaw 3 fixed to one end and a jaw 4 mounted for sliding movement along the bar.

The fixed jaw consists of a casting 5 which has an enlarged boss at its lower end. The boss is provided with a through opening 6 of the same cross section as the bar to receive the end of the bar. A pin 7 passes through openings in the boss and the bar to securely fasten the casting to the bar. The upper end of the casting is drilled to receive a pivot pin 8 for securing the jaw plate 9 to the casting. The plate 9 is provided with a pair of spaced rearwardly extending ears 10 which are also drilled to receive the pivot pin 8. This permits the jaw plate a certain amount of pivotal movement, so that it may find its seat flush upon the surface of the work to be held in the clamp.

The movable jaw consists of a casting 11 which at its lower end has an enlarged portion 12 which has an opening 13 through it to slidably receive the bar 2. The enlarged portion forms a slide to movably carry the jaw on the bar. The upper end of the casting is formed into a boss 14 which is bored and threaded to receive an adjusting screw 15 which carries the jaw plate 16. Plate 16 is swivelly mounted upon the end of the adjusting screw 15, and the opposite end of the screw is provided with wing portions 17 by means of which the screw can be turned, to tighten or loosen the plate 16 with respect to the work.

Slide 12 of the movable jaw is provided with a plurality of keys 18 which lock upon the bar 2 to hold the movable jaw in positions of adjustment along the bar. The keys are shown as relatively thin, elongated members, each having an opening of substantially the same width as the bar but slightly longer than the depth dimension of the bar. In other words, the openings in the keys are of such size that the keys are freely slidable along the bar when the keys are positioned at right angles to the bar. When the keys are canted, however, the edges of the openings will bite into the bar to prevent movement of the keys along the bar. The slide 12 has its central portion cored out to form a chamber 19 to receive the keys. The chamber extends the major portion of the length of the slide, leaving end walls 20 and 21, which contain the openings 13, for bearing engagement with the bar 2. The slide is open at the top for an appreciable distance adjacent the end wall 20, as at 22, to permit the keys to project through so that they may be engaged by the fingers of the operator for manipulation in adjusting the clamp. Opening 22 is considerably longer than the combined thickness of the keys so that the keys may have bodily movement lengthwise of the opening. The edge of the opening remote from end wall 20 is rounded to form a fulcrum 23 for the keys and the adjacent portions of the casting above and below the rounded section are inclined away from the wall 20. The entire lower portion of the slide between the end walls is cut away, as at 24, and the lower part of the side walls is also cut away so that an access opening is provided at the bottom to enable the operator to reach the lower portion of the keys to move them to release position.

In Figures 1 through 5 of the drawing the keys are shown as having a rectangular body portion 25 and up-

wardly extending finger pieces **26** which are of less width than the body portion . The finger pieces extend through the upper opening **22** in the slide and a considerable distance above the top of the slide. In Figures 6, 7 and 8 the keys are shown as having bottom finger pieces **27** also, which extend through the lower opening **24** in the slide. In all of the forms a spring **28** is shown coiled around bar **2** within the chamber **19** of the slide having one end bearing against the end wall **20** and its opposite end bearing against the lower portion of the body of the outermost key **18** so as to urge the lower portions of the keys rearwardly to cant them upon the bar. The upper portions of the keys will be resting against the fulcrum and, therefore, held against rearward movement.

In Figures 7 and 8, of the drawing a slightly modified form of slide is shown in which the end walls **20** and **21** are provided with downwardly projecting legs **29** and **30** of such length as to extend below the bottoms of the lower finger pieces **27** of the keys to form supports upon which the clamp may rest when it is being used upon a work bench. By having the legs longer than the downwardly projecting portions of the keys the lower finger pieces may be reached and moved without contacting the work bench.

Figure 9 shows a further modification in which the keys **31** are also adapted to be tilted by pressure exerted upon finger pieces at opposite ends of the keys. In this form the top finger piece **32** extends vertically above the keys as in the former modifications. The lower finger piece **33** extends laterally from the bottom of the key and projects through a slot **34** formed in the side of the slide **35**. In this case the bottom of the slide will be closed, as shown at **36**. This construction will permit the key to be released from the bottom but it is unnecessary to have the slide positioned above the work bench or other support on which the clamp is positioned.

It will be noted that the clamp of the present invention incorporates the best features of the two patents mentioned above, while eliminating the defects of each. The keys are arranged so that their upper ends are inclined away from the work in the same position shown in the earlier of the two mentioned patents. This provides a better grip upon the bar as the leading biting edges at the tops of the keys are positioned closer to the jaw proper. The difficulty of releasing the keys is eliminated as the keys may be tilted from either end or from both ends simultaneously. With the keys inclined, as shown, much less force is required to release them if that force is applied at the bottom than is the case where the keys must be tilted about their fulcrum by pressure upon the top finger pieces. By releasing the keys with pressure upon the bottoms the releasing pressure is in the direction in which the jaw must move to release the work. Thus it is not necessary to exert the counter pressures formerly required. As the top and bottom openings in the slide are of considerable length

the keys are free to move bodily and, therefore, may assume a position in which they will slide freely upon the bar. When it is desired to move the jaw into clamping position pressure may be exerted upon the tops of the keys and as this pressure is in the direction in which the jaw must move, it will be sufficient to cause the jaw to move to adjusted position. If the clamp is put under considerable pressure and the keys bite deeply into the bar, they can be released by moving their ends in opposite directions by means of the top and bottom finger pieces. As soon as the keys are released, pressure upon the bottom finger pieces alone will be sufficient to hold them in released position and to move the jaw away from the work.

While in the above practical embodiments of the invention have been described and shown, it will be understood that the specific details of construction illustrated are merely by way of example and that these may be changed within the scope of the appended claim.

What is claimed is:

In a clamp of the type having a bar and a pair of opposed work-engaging jaws mounted on the bar, a housing slidable upon the bar forming the mounting for one of said jaws, a plurality of locking keys in surface engagement wtih one another within said housing, said keys being apertured for sliding movement on said bar, a fulcruming abutment in the housing to one side of the bar for engagement with an end key of said plurality, spring means within said housing and about the bar in engagement with the other end key of said plurality to cant said plurality of keys about the abutment to bind on the bar, an opening in said housing adjacent the abutment and an opening opposite thereto, the end key of said plurality adjacent the spring having a projection extending through the opening in the housing adjacent the abutment to an exposed readily accessible position beyond the housing to provide a finger-piece for releasing said keys when pressure is exerted in one direction, and the other end key of said plurality having a projection extending through the other opening in said housing to an exposed readily accessible position beyond the housing to provide a finger-piece at the other end of said plurality for releasing said keys when pressure is exerted in the opposite direction, whereby said keys may be released by pressure upon one of the key projections in the direction it is desired to move the housing and jaw.

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