Dec. 21, 1948. A. A. ARCHAMBAULT 2,456,613

QUICKLY ADJUSTABLE CLAMPING VISE

Filed July 13, 1945

FIG. 1.

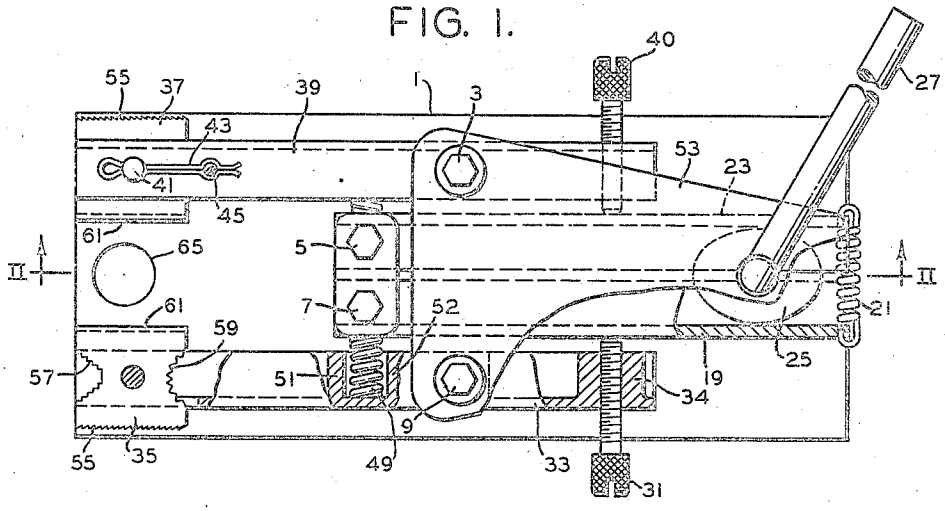
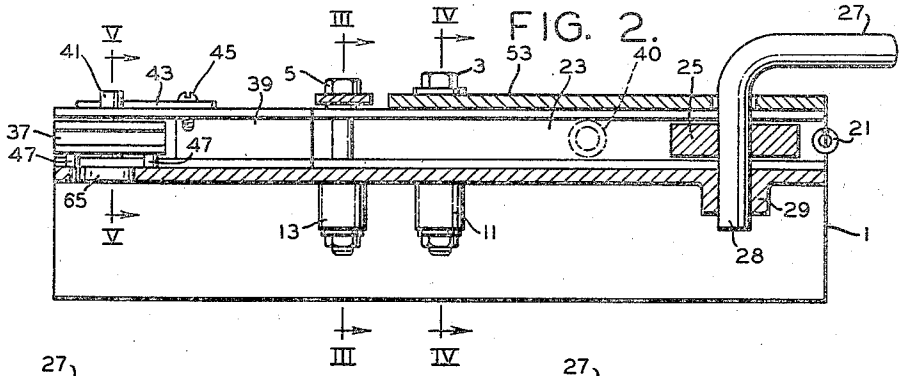


FIG. 2.



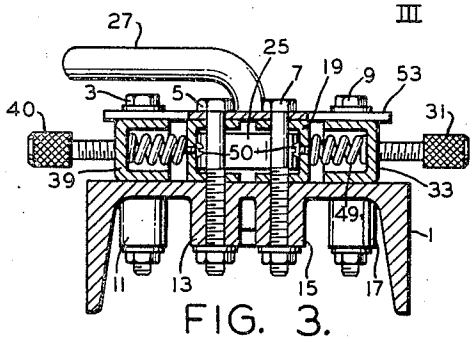


FIG. 3.

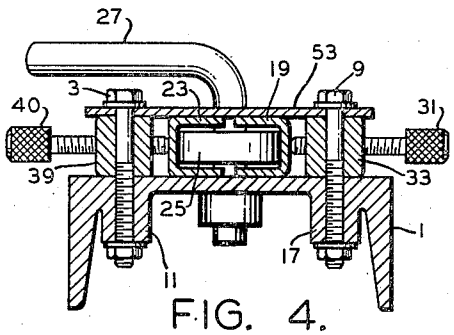


FIG. 4.

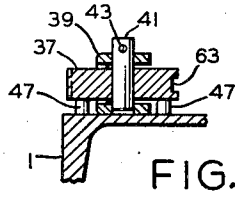


FIG. 5.

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QUICKLY ADJUSTABLE CLAMPING VISE

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3 Claims. (Cl. 81—25)

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This invention relates to vises and is illustrated herein as embodied in a quick operating and easily adjustable vise which is of particular value in performing repeated tasks.

Many types of vises have been developed. The typical vise is heavy and cumbersome and operates slowly and, although satisfactory for general shop use, is unsatisfactory for use in tasks wherein the same operation is performed repeatedly. On the other hand, there are vises which have been developed which will repeat precisely the same movement time after time automatically. Such vises generally are costly and are useful only for performing the single specialized task for which they are designed.

None of the conventional vises are satisfactory for drilling lugs of the type used to finish the ends of electrical cables. It is not unusual to have a number of identical lugs all of which have to be drilled in a similar manner. For this purpose a conventional adjustable vise is unsatisfactory because of its slow operation. On the other hand, a typical non-adjustable vise of specialized type cannot economically be employed when lugs of varying sizes and a number of each size are to be drilled.

Therfore, it is an object of this invention to provide an inexpensive vise suitable for performing a repeated specialized task which vise can be adjusted quickly and easily to perform other repeated specialized tasks.

Accordingly, this invention provides, in a vise having a base and a pair of jaws carried by members which are operated by a pair of levers mounted on the base, a means for adjusting the members with respect to the levers whereby the distance between the jaws may be varied, and means for swinging the levers to operate the members and open and close the jaws. As illustrated, a cam is disposed between the levers and operates to force them apart and against the aforementioned members to operate the jaws. Screws associated with the members bear on the levers and are adjustable to give a proper distance between the jaws, before the vise is operated, for any size of workpiece within the capacity of the vise. When the cam is turned, the jaws are caused to grasp a piece of work, and the cam locks the jaws in position thereon. Regardless of the size of the work, as long as it is within the limits of the vise structure, the jaws are operated with a constant throw in response to the same turning movement of the cam.

As another feature of this invention, means is provided for holding the levers yieldingly against

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the cam whereby the jaws are opened when the cam is released. As shown, a series of springs associated with the levers and members not only hold the levers against the cam but also hold the members in their extended positions relative to the levers.

With the above and other objects and features in view, the invention will now be described with reference to the accompanying drawings which illustrate a preferred embodiment of the invention and will be pointed out in the claims.

Fig. 1 is a plan view of a vise constructed in accordance with this invention, part of the cover and of the levers being cut away to show details of the operating mechanism.

Fig. 2 is a sectional view, the section being taken along the line II—II of Fig. 1.

Figs. 3 and 4 are sectional views, the sections being taken along the lines III—III and IV—IV, respectively, in Fig. 2.

Fig. 5 is a fragmentary sectional view of one of the jaws, the section being taken along the lines V—V in Fig. 2.

As illustrated, the vise includes a base 1 of U-shaped cross-section, as shown in Fig. 3, which supports the working mechanism of the vise.

Four openings are drilled through the base 1 to carry four bolts 3, 5, 7, and 9 which form pivots about which parts of the vise mechanism swing. Reinforcing collars 11, 13, 15, and 17 are welded or otherwise firmly fixed to the lower side of the base surrounding the shank of each bolt to form rigid supports for the bolts.

The mechanism of the vise includes two sets of levers and connections, each of which sets operates one of the jaws. In Fig. 1, one set of levers and connections is below the section line II—II. The other set is above the section line and contains, in mirror image, similar parts. Therefore, only the set of levers and connections below the section line II—II will be described in detail.

A rigid lever 19 is pivoted about its left-hand end on the bolt 7. A spring 21 is attached to the right-hand end of the lever 19 and to the right-hand end of a similar lever 23 which is associated with the upper half of the vise and swings about the bolts 5 and this spring tends to pull the right-hand ends of the levers together.

The levers 19 and 23 are U-shaped in cross-section, as shown in Fig. 4, the open parts of the U's facing each other. A cam 25 fits inside the U-shaped levers 19 and 23 and acts to force the right-hand ends of the levers apart when turned with a cam-operating handle 27, as clearly shown in Fig. 1. The lower portion 28 (Fig.

2) of the cam-operating handle 27 fits through an opening in the base 1 and into a collar 29 (Fig. 2) which is welded or otherwise firmly attached to the lower side of the base to form a bearing in which the cam-operating handle turns.

An adjusting screw 31 (Fig. 1) bears on the lower side of the lever 19 and is threaded to the right-hand end of a member 33 which swings as a lever about the bolt 9 which bolt passes through the lever 33 near the mid-portion thereof. The lever 33 is U-shaped in cross-section as shown in Fig. 3 and the portion thereof through which the screw 31 is inserted is built up, as shown at 34, to take the strain which is developed when the vise is used.

A jaw 35 is attached to the left-hand end of the lever 33. The jaw 35 is constructed to form a bite in which work is held with another jaw 37 associated with a lever 39 in the upper half of the vise.

The distance between the jaws is adjusted by turning the screw 31 and a similar screw 40 associated with the lever 39. The screws bear on the levers 19 and 23 to vary the clearance between these levers and the levers 33 and 39, thus adjusting the distance between the jaws.

Each jaw is held in place on its lever by a pin which passes through the jaw and through the left-hand end of the lever. In the drawings, this construction is best shown in conjunction with the jaw 37 in the upper half of the vise (Figs. 1 and 5) and the lever 39 associated therewith. A pin 41 passes through openings drilled through the left-hand end of the lever 39 and through the jaw 37. A cotter pin 43 passes through the upper part of the pin 41 (Fig. 2) and around a screw 45, attached to the top of the lever 39 to hold the pin 41 in place on the lever 39.

The jaw rotates a small amount about the pin 41. Four short pins 47 (Figs. 2 and 5), one of which extends downward from each corner of the jaw 37, fit around the lever 39 and, while allowing the jaw to rock slightly in place to accommodate work regardless of the angularity of the members 33 and 39, prevent the jaw 37 from turning about the pin 41.

One end of a spring 49 (Fig. 1) bears against the lever 33 and holds the lever and the jaw 35 away from the center of the vise. The other end of the spring bears against the lever 19 (Fig. 3) and is held in place by a screw 50 attached to the lever 19. The spring 49 is held in place against the lever 33 by a partition 51 (Fig. 1) and by a portion 52 of the lever 33 which is built up to take the strain developed therein by the bolt 9 when the vise is in use.

A cover 53, held in place by the bolts 3 and 9, protects the cam 25 and prevents foreign matter getting on the operating faces.

When the vise is to be used, a piece of work to be held by it is placed between the jaws 35 and 37. Then, the adjusting screws 31 and 40 are turned until the jaws are only slightly further apart than the width of the work. Then the handle 27 is turned a quarter turn to operate the cam 25 and close the jaws upon the work. When properly adjusted, the cam acts to lock the jaws in place upon the work when given a quarter turn. Thus, the operation of the vise is quick and easy and does not require the use of great strength by the operator. When work is to be removed from the vise, the handle 27 is returned to an inoperative position and the springs force the jaws away from the work. When once the screws 31 and 40 have been adjusted to accommodate a

piece of work of a given size, no further adjustment is necessary to accommodate other pieces of work of the same size. However, when one set of pieces of a given size is completed, the vise can be adjusted readily to accommodate pieces of a different size by turning the screws 31 and 40. However, regardless of the size of the piece of work held by the jaws and the distance between them, the throw of the jaws during a turn of the handle 27 is a constant amount as long as the size of the work is within the limits set by the structure of the vise.

Each jaw has four interchangeable faces as shown in Fig. 1. As illustrated, the jaw 35 includes a roughened straight face 55, two irregular roughened faces 57 and 59, and a slotted face 61. The cross-section of a slotted face in the jaw 37 is shown at 63 in Fig. 5. The slotted faces are particularly useful for drilling electrical lugs or other flat plate material in which an opening must be bored between two parallel sides. An opening 65 (Fig. 1) through the base between the jaws 35 and 37 permits the use of a drill with the vise.

Many minor changes can be made in the design of the vise without departing from the spirit of the invention. For example, jaws having faces different from those shown can be used.

The illustrated vise has been described with reference to the drilling of lugs used to finish electrical cables. However, it is very flexible, and varied other uses will be apparent to one skilled in the art.

The invention described herein may be manufactured and used by or for the Government of the United States of America for Government purposes without the payment of any royalty thereon or therfor.

Having described the invention what is claimed as novel and desired to be protected by Letters Patent of the United States is:

1. An adjustable vise comprising a base, a pair of jaws, means for operating said jaws toward and away from each other comprising a pair of levers disposed substantially parallel to each other and pivoted at one end to said base, a cam disposed between said levers for swinging said levers in opposite directions when said cam is rotated, a tension spring connected between the unpivoted ends of said levers whereby said levers are maintained in contact with said cam, a pair of members on which said jaws are mounted, said members being pivotally mounted on said base and disposed substantially parallel to and oppositely of said levers, said members being operated by said levers to open and close said jaws, means for continuous adjustment of the angular relation of said members with respect to said levers, and a pair of springs adapted to maintain said members in engagement with said levers through said last mentioned means.

2. An adjustable vise comprising a base, a pair of jaws, means for operating said jaws toward and away from each other to engage a work piece there between comprising, a pair of levers disposed adjacent and substantially parallel to each other and each pivoted substantially at one end point thereof to said base, a cam disposed between said levers for swinging said levers in opposite directions when said cam is rotated, a tension spring connected between the unpivoted ends of said levers whereby said levers are maintained in contact with said cam, a pair of members each supporting one of said jaws at one end thereof, said members being disposed substan-

tially parallel to and oppositely of said levers, said members being pivoted to said base between the pivot points of said levers and said cam, but nearer said pivot points, continuously adjustable screws extending through said members at the ends thereof opposite said jaws and engaging said levers, and a pair of compression springs affixed to said levers and positioned for engagement with said members at points between said jaws and the pivot points of said members, whereby said screws are maintained in contact with said levers.

3. An adjustable vise comprising, a base, a pair of jaws, means for operating said jaws toward and away from each other comprising, a pair of levers disposed substantially parallel to each other and pivoted to said base, spreading means disposed between said levers for swinging said levers in opposite directions, resilient means connected between the unpivoted ends of said levers for maintaining said levers in contact with said spreading means, a pair of members on which said jaws are mounted, said members being pivotally mounted on said base and disposed substantially parallel to and oppositely of said levers, said members being operated by said levers to

open and close said jaws, means for continuous adjustment of the angular relation of said members with respect to said levers, and springs maintaining said members in engagement with said levers through said last-mentioned means.

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