Nov. 20, 1928. 1,692,398

G. E. WEAVER ET AL

VISE

Filed Jan. 2, 1926

Fig. 1.

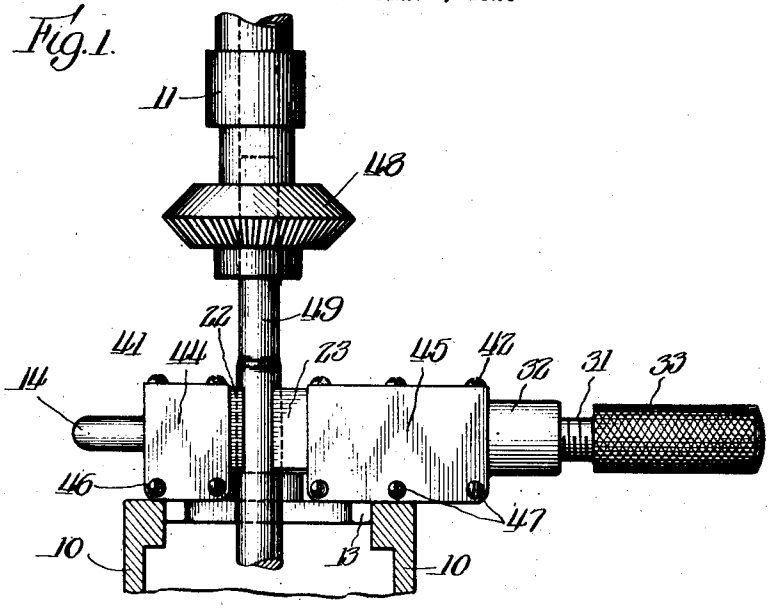


Fig. 2.

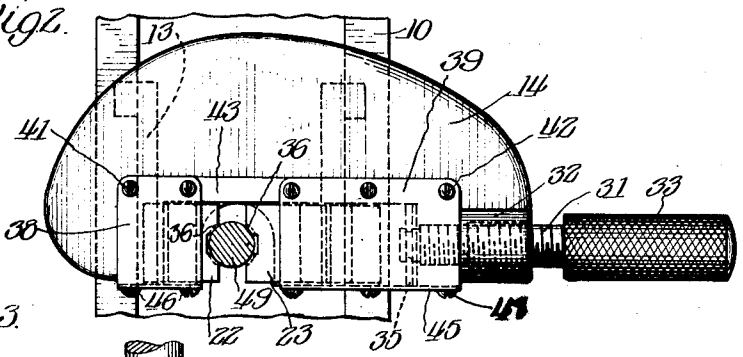
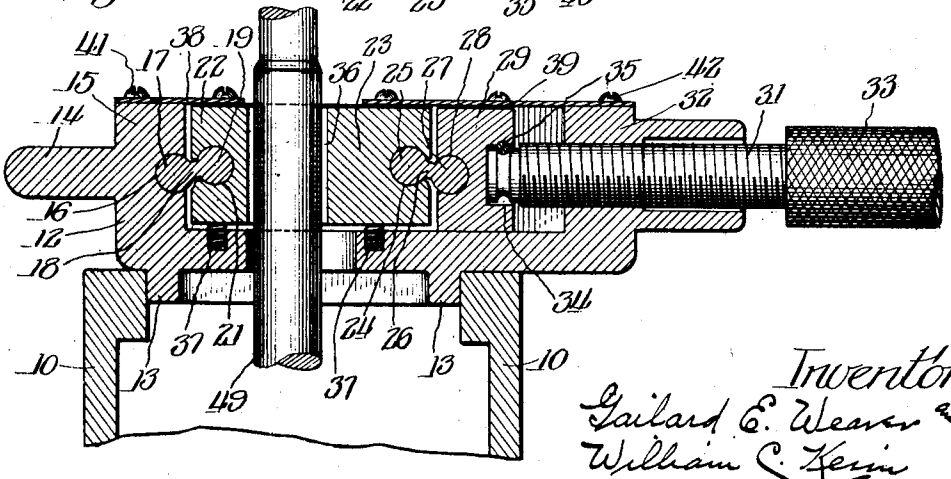


Fig. 3.



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Patented Nov. 20, 1928. 1,692,398

UNITED STATES PATENT OFFICE.

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VISE.

Application filed January 2, 1926. Serial No. 78,776.

Our invention concerns vises or holding appliances, its main object being the provision of a construction of this type having distinct structural and functional advantages relating more particularly to simplicity in design and effectiveness in operation.

The new vise is adapted to be used more especially for holding a vertically-disposed body, such as a shaft, although its use is not limited in this respect.

When employed during application of a gear to a shaft the vise grips the latter near the end which receives the gear and holds it firmly and securely while the gear is being forced thereon by a press or plunger of any appropriate form.

To permit those trained in this art to have a full and complete understanding of the invention and its various advantages, in the accompanying drawing forming a part of this specification, and throughout the several views of which like reference characters have been used to designate the same parts, a present desirable and preferred embodiment of the invention has been illustrated in detail.

In this drawing:

Figure 1 is an elevation of the new vise resting on suitable bolster-plates shown in section, the vise being indicated as gripping a shaft during the application of a gear thereto by a power piston or plunger;

Figure 2 is a plan view of the new vise showing the gripped shaft in section; and

Figure 3 is a vertical, central, longitudinal section through the vise indicating its gripping action on a shaft illustrated fragmentarily.

By reference to the plurality of views of this drawing, it will be perceived that the novel vise or improved gripping appliance is adapted to be used by resting it on the bolster sideplates 10, 10 of a press, not otherwise illustrated, except that its forcing plunger or piston 11 is partly shown.

In order to maintain such vise in correct and proper position on the spaced or separated bolster-plates, its main body 12 has a depending rib 13, the opposite sections or portions of which are spaced apart the proper amount to be correctly received between the bolster-plates, whereby the vise cannot accidentally be displaced or shifted laterally.

To strengthen the appliance, such main member 12 has a substantial outstanding rib 14 of the general shape and form depicted in Figure 2, whereby the vise, as a whole, is well able to withstand the severe strains to which it is subjected in ordinary use.

One upstanding wall 15 of the vise on its inner face and below the center of such face is supplied with a more or less complete cylindrical bearing 16 opening into or communicating directly with the center cavity or space of the appliance.

Such bearing accommodates and rockingly receives one cylindrical end 17 of a short link 18 having its opposite cylindrical end 19 rockingly mounted in a similar bearing 21 in the outer face of a vise jaw or block 22, such bearing 21 being at a higher elevation than the companion bearing 16, whereby the link assumes an upwardly inwardly-inclined position, as clearly shown in Figure 3.

The opposite companion or complementary jaw or block 23 of the vise is similar to, but reversed with relation to, the element 22, having its bearing 24 receiving the rounded terminal part 25 of a like link 26, the opposite end 27 of which is mounted in a corresponding bearing 28 in an adjustable block 29.

The two links 18 and 26 are oppositely inclined as is fully presented in Figure 3.

Member 29 may be adjusted toward and from the wall 15 by means of a screw 31, extended through a threaded bearing in the upright wall 32 of the vise, and equipped at its outer end with a knurled handle 33 by which it may be readily and easily turned to effect the adjustment, and having its inner, annularly-grooved end mounted for turning in, and held against retraction or withdrawal from, a bearing 34 in the outer face of the movable or adjustable block 29, a cross-pin 35 in the groove of the screw and located in a hole in the block retaining the parts in assembled relation as will be readily understood.

The inner complementary faces of the movable jaws 22 and 23 are provided with serrated or roughened, shallow, V-shaped grooves 36, 36 to enable such members to engage and firmly and effectively grasp and clamp the body to be held even though it may be round in shape.

In order to hold the companion jaws normally in elevated position, coiled springs 37, 37 are mounted in recesses or cavities in the vise with their top ends pressing upwardly against the under faces of the jaws.

To limit the ascent of the jaws and to act

as protecting means for the appliance, we employ cover plates 38, 39 fastened to the top of the vise by screws 41 and 42, the plate 38 having a downward extension 44 covering a portion of the side of the device and fastened in place by screws 46, the other or companion plate 39 having a similar depending extension 45 maintained in position by screws 47.

Assuming that it is desired to apply a differential gear 48 to a drive shaft 49 of an automobile, the latter is placed in upright position in the recesses of the expanded, elevated jaws and the gear is properly located for application to the shaft.

The downward pressure of the plunger or piston 11 on the gear is transmitted more or less to the shaft and the slight downward movement of the latter is carried to the engaging jaws which swing downwardly a small amount thereby very firmly and securely holding the shaft against further descent, it being obvious that the greater the pressure applied to the shaft, the greater the holding action of the jaws which operate somewhat as a very powerful toggle.

The construction is such that the links of the hinged or rocking jaws cannot become aligned with one another and their jaws locked together even though such jaws may descend sufficiently to contact with the part of the main body just below them which acts as an abutment or limiting stop for the descent of the jaws.

It will be noted that this device grips or grasps the shaft at a position near where the gear is applied and not at a remote location, it being apparent that the grasping or clamping action of the jaws on the shaft may tend to mar the latter somewhat, but since it is not customary to finish or machine such a shaft except those parts accommodated by the bearings, no injury occurs.

In view of the fact that the more or less circular ends of the links are so arranged with their companion parts that lines drawn through the centers of such circles will not become parallel or in register when the jaws are forced down as far as they will go, it is impossible to lock the jaws against free opening action which occurs as soon as the load or pressure is removed by reason of the automatic expansion of the underlying springs which force the jaws upwardly to release the clamped article.

As has been fully illustrated, the links are pivoted to the jaws slightly nearer the bottoms of the jaws than their tops in order to provide uniform gripping pressure throughout the vertical lengths of the jaws.

It will be readily appreciated that considerable friction may exist between the links and the jaws and between the links and the stationary and adjustable blocks and when the pressure is applied downwardly on the jaws, there is a tendency for their top portions to close in faster on the work than their bottom sections. This would cause the jaws to grip harder at the top than at the bottom were this tendency not overcome by arranging the links somewhat below center so that the gripping action will be uniform throughout their lengths.

An understanding of the construction and mode of operation of the improved vise of this character will indicate that while it is simple in structure, and hence relatively inexpensive to manufacture, it is effective in performing its required functions without likelihood of becoming injured in ordinary service.

Nor is it possible to have the movable parts of the appliance become set or locked, the device readily and comparatively easily freeing the held body when such action is required.

Those skilled in this art will readily understand that the invention is not limited and restricted to the precise and exact details presented since these may be modified within comparatively wide limits without departure from the heart and essence of the invention and without the sacrifice of any of its substantial benefits and advantages, the scope of the invention being defined by the appended claims.

We claim:

1. In a vise, the combination of a substantially C-shaped support open at one side, a jaw movable at substantially right-angles to the plane of the C to engage one side of the body to be clamped by the vise, a link connecting said jaw to said support, a second jaw movable at substantially right-angles to the plane of the C to engage the opposite side of said body, a block adjustable on said support toward and from said first jaw, and a link connecting said second jaw to said block, whereby movements of the jaws with the body cause their increased clamping action on the latter due to the rocking of said links, said jaws registering with the opening at the side of said support.

2. In a vise, the combination of a substantially C-shaped support open at one side, a jaw movable at substantially right-angles to the plane of the C to engage one side of the body to be clamped by the vise, a link connecting said jaw to said suport, a second jaw movable at substantially right angles to the plane of the C to engage the opposite side of said body, a block adjustable on said support toward and from said first jaw, a link connecting said second jaw to said block, whereby movements of the jaws with the body cause their increased clamping action on the latter due to the rocking of said links, said jaws registering with the opening at the side of said support, and means tending to rock said jaws automatically to open position.

3. In a vise, the combination of a substantially C-shaped support, a jaw movable at

substantially right-angles to the plane of the C adapted to engage a side of the body to be clamped and to travel therewith, a second jaw movable at substantially right-angles to the plane of the C to engage the opposite side of said body, a block adjustable toward and from said first jaw, an inclined link connecting said second jaw to said block and of itself alone causing said second jaw to approach or recede from said first jaw as the former is moved, and a stop to prevent said link from assuming a non-inclined position with reference to said support and hence preventing such jaw from becoming locked on the body engaged thereby.

4. In a vise, the combination of a substantially C-shaped support, a block adjustable on said support, a pair of jaws movable at substantially right-angles to the plane of the C adapted to engage opposite sides of and to travel with the body to be clamped by the vise, oppositely-inclined links connecting said jaws respectively to said support and block and of themselves alone causing said jaws to approach or recede from one another as the jaws are moved, and means to prevent said links from assuming aligned positions.

5. In a vise, the combination of a substantially C-shaped support, a pair of jaws movable at substantially right-angles to the plane of the C adapted to engage opposite sides of and to travel with the body to be clamped thereby, and a pair of oppositely inclined links connecting said jaws to said support and of themselves alone causing said jaws to approach or recede from one another as they are moved relatively to said support, the pivotal connections of said links with said jaws being lower than the centers of the latter to secure a more uniform clamping action of the jaws on the body.

6. In a vise, the combination of a substantially C-shaped support, a jaw movable at substantially right-angles to the plane of the C adapted to engage a side of and to travel with the body to be clamped by the vise, a second jaw movable at substantially right-angles to the plane of the C adapted to engage the opposite side of and to travel with the body to be clamped by the vise, and an inclined link connecting said second jaw to said support and of itself alone causing said second jaw to approach or recede from said first jaw when said second jaw is moved to rock said link, the pivotal connection of said link with said jaw being lower than the center of the latter to secure a more uniform clamping action of the jaw on the body.

7. In a vise, the combination of a substantially C-shaped support, a pair of jaws movable at substantially right-angles to the plane of the C adapted to engage the opposite sides of and to travel with the body to be clamped by the vise, oppositely-inclined links connecting said jaws to said support and of themselves alone causing said jaws to aproach or recede from one another as they are moved relatively to said support, means to prevent said links from assuming aligned positions hence preventing the jaws from becoming locked on said body, the pivotal connections of said links with said jaws being lower than the centers of the latter to secure a more uniform clamping action of the jaws on the body, and means tending to move said jaws automatically to open position.

8. In a vise, the combination of a substantially C-shaped support open at one side, a jaw movable at substantially right angles to the plane of the C to engage one side of the body to be clamped by the vise, an inclined link connecting said jaw to said support, a second jaw movable at substantially right-angles to the plane of the C to engage the opposite side of said body, a block adjustable on said support toward and from said first jaw, an inclined link connecting said second jaw to said block, whereby movements of the jaws with the body cause their increased clamping action on the latter due to the rocking of said links, said jaws registering with the opening at the side of said support, means to prevent said links from assuming aligned positions hence preventing the jaws from becoming locked on said body, the pivotal connections of said links with said jaws being lower than the centers of the latter to secure a more uniform clamping action of the jaws on the body, and means tending to move said jaws automatically to open position.

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