June 22, 1943. R. D. ROBERTSON 2,322,471

QUICK ACTING CLAMP

Filed Nov. 4, 1940

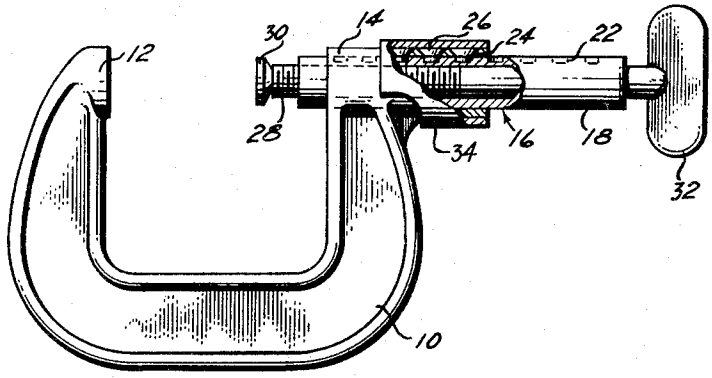


Fig. 1

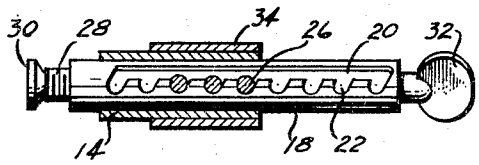


Fig. 2

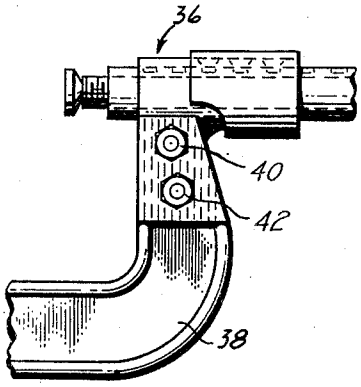


Fig. 5

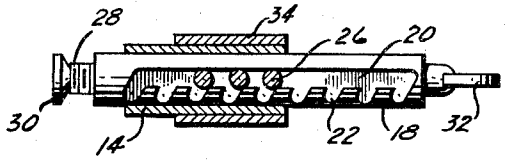


Fig. 3

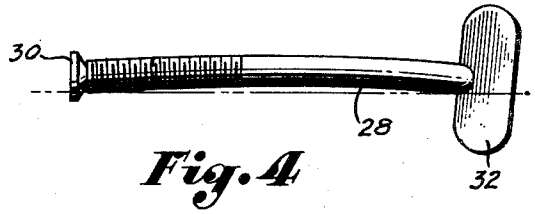


Fig. 4

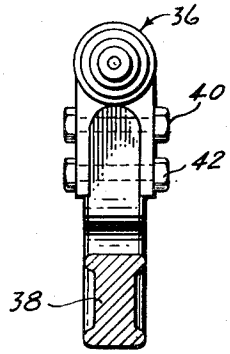


Fig. 6

ROBERT D. ROBERTSON
INVENTOR.

BY J. Edwin Coates
ATTORNEY.

Patented June 22, 1943 2,322,471

UNITED STATES PATENT OFFICE

2,322,471

QUICK ACTING CLAMP

Robert D. Robertson, Santa Monica, Calif.

Application November 4, 1940, Serial No. 364,260

2 Claims. (Cl. 144—305)

My invention relates to a clamping tool of a type readily suitable for quick adjustment through a relatively wide range of movement, the range being limited only by the size of the clamp.

In various types of work where articles are being fabricated, wide use is made of clamping devices to hold various parts together preparatory to the installation of final fastening means. In order to meet production requirements, high speed fabrication is necessary and for that reason any feasible time saving device is in great demand.

The most commonly used clamping device today is the conventional C clamp having a stationary jaw formed, usually, as a part of the clamp body and a movable jaw having a long threaded shank to afford the necessary adjustment in dimension between the clamp jaws. Often, in production work it is desirable to move a clamp from a position in which the jaws are relatively widely separated to a position in which the jaws are relatively close together, or vice versa. When such an instance occurs it is necessary to tediously screw the threaded shank through quite a long range of movement, a time consuming operation.

To decrease this time consumption I have devised a clamping device in which the threaded shank is retained for fine and tight adjustment but wide ranges of movement are accomplished through a sliding action of a cylinder or the like by which the threaded shaft is carried. Thus, with the device of my invention any long range adjustment is made with a quick push or pull on the movable jaw followed by a slight rotative movement to complete the clamping operation. Such a quick adjustment is the primary object of my invention.

Another object of my invention is to provide a clamping device having a safe and secure locking arrangement on the movable jaw.

Another object is to provide a clamping mechanism in which the parts subject to wear or breakage are easily replaceable.

A still further object is to provide a clamping device of easy operation, embodying simplicity in construction which permits low cost manufacture.

Other objects will become apparent after reading the following description and studying the drawing, in which

Figure 1 is an elevational view of a conventional C type clamp in which my invention has been embodied, the invention residing in the construction and arrangement of the movable jaw, a portion of which is shown in cross section at the right end of the body member.

Figure 2 is a plan view of the portion of the clamp embodying the invention, the bearing for the movable jaw and a retaining sleeve being shown in cross section, and the movable jaw being placed in a non-sliding or locked position.

Figure 3 is a view similar to that of Figure 2 with the movable jaw being shown in sliding or unlocked position.

Figure 4 is a view of a screw shaft having a handle on one end thereof, forming a part of the movable jaw, the shaft being longitudinally arcuate to a slight degree. The curvature of the shaft as shown is exaggerated for clarity.

Figure 5 is a view similar to Figure 1 and showing a suggested method of attaching the movable jaw to a clamping body; and

Figure 6 is an end view of the arrangement shown in Figure 5.

With reference now to the drawing, a C type clamp body member is shown at 10 having a stationary jaw 12 fixed thereto on one leg of the C. A bearing member 14 is formed on the other leg of the C and serves to carry a movable jaw assembly 16. The movable jaw assembly includes a cylinder 18 slidable in the bearing. A longitudinal groove 20, shown in Figure 2, is formed in the cylinder and projecting therefrom, at a slight angle, are a plurality of pockets 22, these pockets having their openings slanting toward the right end of the cylinder.

The bearing 14, in addition to carrying the cylinder 18, is provided with a plurality of small bores or openings 24 suitable to accommodate the insertion of a plurality of pins 26 shown in the illustration to be countersunk rivets of the 100 degree type. The diameter of these pins is of a size sufficient to be accommodated snugly in the pockets 22, and the groove 20 is of a width slightly greater than the pin diameters so that the pins may slide freely therein.

A screw shaft 28 is threaded through the cylinder 18 and the left end of this shaft is provided with a swivelling button 30 adapted to cooperate with the stationary jaw 12 in clamping an article therebetween. At the right end of the screw shaft a handle is affixed to permit turning the shaft. The shaft is constructed so as to be longitudinally arcuate as shown in Figure 4, the arc being shown greatly exaggerated for clarity.

The object in bowing the shaft 28 is to afford a slight binding relation between the shaft and the cylinder when the shaft is threaded thereinto, without the necessity for resorting to an expensive split sleeve construction or the like.

Figure 2 shows the cylinder 18 rotated in the bearing 14 so that the pins 26 are nested in the pockets 22, thus locking the cylinder against translational movement with respect to the bearing.

In Figure 3 the cylinder has been rotated so as to free the pins from the pockets 22 and to move them into the groove 20 so that the cylinder may slide with respect to the bearing 14.

A sleeve 34 is placed over the bearing 14 in a press fit for the purpose of holding the pins 26 in the bearing to the extent that they will protrude into the groove 20 or pockets 22 of the cylinder 18 depending upon the disposition of the cylinder with respect thereto. This sleeve is easily removable so that the pins 26 may be replaced in the event of excessive wear or breakage.

As previously stated, there is a binding relation between the screw shaft 28 and the cylinder 18. This binding relation is sufficient to cause the cylinder 18 to rotate with the shaft 28 when the latter is turned by the handle 32. However, as soon as the cylinder has rotated sufficiently for the pins 26 to engage the pockets 22, the cylinder will be held against further rotation and the shaft may then be rotated with respect thereto.

The above discussion has concerned a clockwise rotation of the shaft and cylinder. Assuming now that the pins 26 are in the cylinder pockets, it is evident that a counter-clockwise movement of the shaft 28 will again pick up the cylinder by reason of the binding relation and move the pockets away from the pins so that the pins are carried into the groove 20.

In operation, when it is desired to clamp an article between the stationary and movable jaws the stationary jaw is placed at one side of the article to be clamped and by means of the handle 32 the entire movable jaw assembly is moved toward the other side of the article to be clamped, the pins 26 riding in the groove 20, thus permitting a quick sliding action. As the button 30 of the movable jaw comes into light engagement with the article to be clamped the handle 32 is twisted clockwise. The first portion of the twisting movement will move the pockets 22 into engagement with the pins 26 whereupon the cylinder will be locked and further rotation of the handle 32 will cause the threaded shaft to move relative to the cylinder into a tight and gripping engagement with the article to be clamped thus holding the latter securely between the stationary jaw 12 and the button 30 of the movable jaw assembly 16.

When it is desired to release the clamp, the handle 32 is rotated counterclockwise and the first portion of this rotation will unscrew the shaft 28 from its tight engagement with the clamped article and the shaft will then pick up the cylinder 18 and rotate same so as to free the pins from the pockets and move them into the groove 20 so that the entire movable jaw assembly 16 may be pulled toward the right, thus making it ready for re-clamping on another article of any size which may be accommodated by the body member 10.

In the clamp just described the movable jaw assembly is carried in a bearing which is an integral part of the clamp body member 10. A suggested modification of this arrangement is shown in Figures 5 and 6 wherein the entire movable jaw assembly and bearing for carrying same is an independent unit indicated at 36. This unit is fitted to a clamp body 38 in a tongue and groove arrangement and bolted thereto at 40 and 42.

This latter arrangement is suggested for the reason that after continued usage of a clamp, particularly of the C type, it is not unusual for the body to become deformed or damaged. Therefore, it may be desirable to replace the body portion which is the most inexpensive part of the entire device.

Any type of connecting joint may be used between the movable jaw and bearing assembly and the clamp body and the particular joint shown is meant to be merely a suggested arrangement.

While I have herein shown and described my invention in its present preferred embodiment it will be apparent to those skilled in the art after studying the specification and drawing that many modifications may be made therein without departing from the scope thereof. Accordingly, I do not wish to be limited other than by the scope of the appended claims.

I claim:

1. In a clamp: a body member; a stationary jaw fixed to said body member; a bearing carried by said body member opposite said stationary jaw; an internally threaded cylinder rotatably carried by said bearing member having a longitudinally extending groove in the outer surface thereof and having pockets in spaced relation along one side of said groove and inclined forwardly away therefrom, at least one through opening being formed in said bearing; a detent carried by said bearing in said opening, said detent being adapted to slide in said cylinder groove in one position of said cylinder and to engage one of said pockets when said cylinder has been rotated to another position; a sleeve slidable over said bearing and opening to hold said detent therein; a bowed and threaded shaft in said cylinder, the bowing of the shaft affording a slight binding relation between said shaft and cylinder, whereby rotation of said shaft in one direction will turn the cylinder to position the detent in one of its pockets and rotation of said shaft in the opposite direction will position the detent in said groove; means to adjust said bowed and threaded shaft relative to said cylinder when said cylinder is locked by engagement of said detent with one of said pockets, and a jaw carried by said shaft at its inner end.

2. In a clamp: a body; a stationary jaw carried by the body; a guide stationarily carried by the body having guide surfaces directed toward said stationary jaw; an inwardly projecting detent carried by said guide; means preventing outward movement of said detent; an internally threaded sleeve slidable in said guide and oscillatable with respect thereto, said sleeve being formed with an outwardly open sided longitudinally extending groove therein and with pockets in spaced relation along one side of and communicating with said groove and inclined forwardly away therefrom; said detent being adapted to slide in said groove in a first position of said sleeve and to engage one of said pockets when said sleeve has been oscillated to a second position; an externally threaded manually rotatable and bowed shank having threaded engagement with said internally threaded sleeve, the bowing of the shank affording a slight binding relation between said shank and sleeve whereby rotation of said shank will turn the sleeve from one to the other of said first and second positions according to the direction of rotation and further rotation will give the shank a screw thread movement in the sleeve; and a jaw carried by the inner end of said shank.

ROBERT D. ROBERTSON.