June 15, 1943. J. A. BALCAR 2,322,107

CLAMPING MEANS

Filed Jan. 16, 1941

Fig. 1

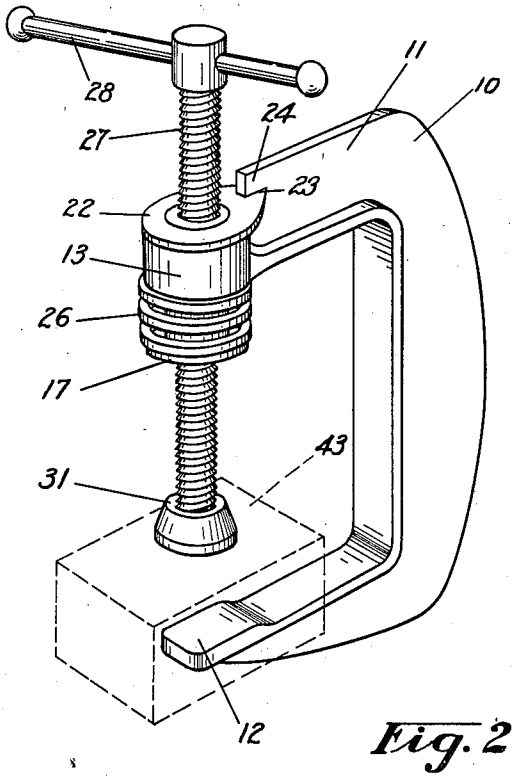


Fig. 2

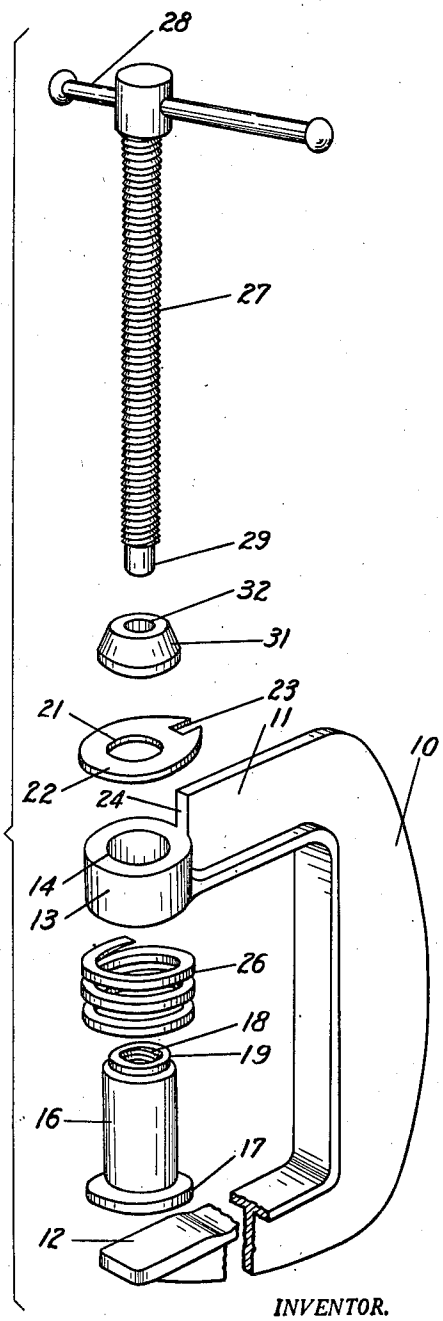


Fig. 3

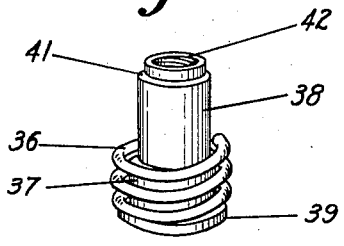


Fig. 4

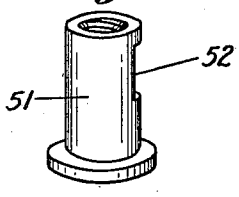
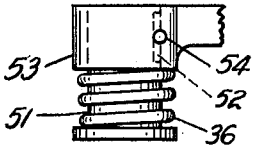


Fig. 5



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CLAMPING MEANS

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3 Claims. (Cl. 144—304)

This invention relates to a clamping means and has particular relation to a resilient clamping means or pressure relieving means for preventing overloading or springing of the clamp.

I have observed that the C clamps and like clamping devices, are relatively short lived and, upon making an analysis of the main reasons for the short life of these devices, I have found that one main misuse of the clamp results in two major types of failures of the device as an operative structure. The misuse referred to is applying too great a pressure to the screw to cause the screw to exert a greater pressure than the device is designed to take care of in use. This may result in either or both of two things; springing of the body of the clamp so that the jaws are no longer in alignment and its usefulness is practically destroyed, or excessive wear on the threads of the screw and the threaded portion of the clamp.

Furthermore, when a plurality of clamps of the type known to the art are employed for clamping a piece of work, tightening of one clamp may so relieve the pressure on neighboring clamps that they may fall off the work.

I have devised means for overcoming these difficulties and for preventing inadvertent overloading of the clamp.

It is, therefore, among the objects of my invention to provide means for preventing overloading of a clamping device.

Another object of my invention is to provide means for maintaining some appreciable pressure on the work by a clamp, even if other means cause the work to be drawn together where the clamp is applied.

Another object of my invention is to provide a resilient clamping means.

Still another object of my invention is to provide a clamping device in which the parts may be replaced.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specifications, wherein are disclosed several exemplary embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawing:

Figure 1 is a view in perspective of a preferred embodiment of my invention as it appears in an assembled condition.

Figure 2 is a view in perspective in exploded relation of the clamping device shown in Figure 1.

Figure 3 is a view in perspective of a modified form of the threaded collar-nut and spring of the device shown in Figure 1.

Figure 4 is a view in perspective of another modification of the collar-nut element of the device shown in Figures 1 and 2, and

Figure 5 is a fragmentary view in side elevation of the collar-nut and spring of Figure 4 and the stirrup portion of a clamp modified to engage this form of collar-nut and spring.

Referring now to the drawing:

The preferred device here illustrated includes the main body member or yoke of a clamping means of substantially the usual form, as indicated at 10. The leg of the yoke member or stirrup 11 opposite to the anvil 12 is provided with a collar 13, the axis of the inner bore 14 of which passes substantially through the center of the anvil 12.

A substantially cylindrical collar-nut 16 is provided, adapted to slide within the bore 14 of collar 13 and to have a close fit therewith. The nut 16 has an enlarged washer-like flange 17 at its lower end to bear against the spring 26. The cylindrical nut 16 is drilled through its longitudinal axis and is threaded, as indicated at 18. The upper end of the nut 16 is grooved, as indicated at 19, so that when the nut is assembled within the collar 13, the flange portion 19 may be engaged with the central bore 21 of a guide or nut retainer washer 22. This nut retainer rests on top of the collar member and is provided with a notch 23 which is received on the flange 24 of the body or yoke 10. The nut 16 is secured to the nut retainer 22 as by welding or the like. The slot 23 and the flange 24 permit the up and down movement of the nut retainer 22 but prevent its rotation and thus prevent the rotation of the nut 16.

In assembling the nut 16 within the collar 13, a spring 26 is placed on the barrel of the nut 16 between the collar 13 and the flange 17. Thus the spring is so positioned as to meet and absorb the thrust of the nut caused by tightening down of the screw 27 of the clamping means. The screw 27 is of usual construction and is provided with a slidable handle 28 and is relieved at the lower end, as indicated at 29, to receive the pad 31 in accordance with the usual practice. The pad 31 is drilled, as indicated at 32, to receive the relieved portion 29 of screw 27, all in accordance with the usual practice.

In the device illustrated in Figures 1 and 2 the spring 26 is preferably square, as illustrated, so that if relatively heavy pressure is applied to the nut 16 by excessive tightening of the screw 27, the spring 26 will bottom to carry the pressure directly to the clamp 10.

In another embodiment of the invention illustrated in Figure 3, I utilize a conventional round spring 36 and provide an extra shoulder 37 on the nut 38 which will strike against the collar 13 if excessive pressure is applied to the screw. The washer-like flange 39 serves substantially the same purpose as the flange 17 of the device shown in Figure 1 for carrying the pressure of the spring 37, but does not carry the excess pressure when excessive pressure is applied to the screw 27. The cylindrical nut 38 is provided with a shoulder, as indicated at 41, and is threaded as indicated at 42 in the same manner as the nut 16.

It is apparent that with the structure here shown, the springs 26 and 36 will become compressed to a greater and lesser extent in proportion to the load imposed by the screw 27, and that the operator of the clamping device may readily observe how much pressure is being applied by the clamp. The screw is resiliently biased against the work 43 being clamped, and if any change in dimension occurs, as for instance during drying of laminated strips of glued lumber, the spring 26 will cause the pad 31 to follow up and maintain pressure on the work 43. The operator, merely by observing the spring 26, need never exceed a certain pre-selected operating pressure of the screw. Yet under exceptional conditions where the maximum clamping force is desired, he may apply full pressure to the screw, causing the spring 26 to bottom and thus transferring the force acting on the nut 16 directly to the collar 13 of clamp 10. The nut 16 is readily replaceable and the screw 27 may be readily replaced if necessary so that the clamp may be used indefinitely.

In a modified form of the nut, collar and spring illustrated in Figures 4 and 5, I utilize substantially the same clamping structure but the nut 51 is provided with a flattened portion 52. The collar 53 has an opening transversely therethrough and a pin 54 is inserted in the opening, the opening being so positioned that the pin passes through the notch provided by the flattened portion 52 and prevents the nut from turning.

It is apparent that my pressure relieving means will greatly prolong the life of clamping devices and will provide for more accurate control of the clamping pressure, as well as provide resilent clamping force such that a plurality of clamps may be used without one or more clamps losing their clamping effect and dropping off.

Although I have described several specific embodiments of my invention, it is apparent that modifications thereof may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. In a clamp, a yoke having an anvil on one arm thereof, a nut slidable in an opening in the other arm of the yoke, means including a flattened portion of the nut and a pin in the yoke for preventing rotation of the nut but permitting longitudinal movement thereof, resilient means for biasing the nut toward the anvil of the clamp, and a screw, threaded through the nut, for applying pressure to the work.

2. In a clamp, a yoke, a nut slidably received in an opening extending through one arm of the yoke, a shoulder on the nut, a resilient means bearing against the shoulder and against the arm of the yoke for biasing the nut toward an anvil on the other arm of the yoke, a screw threaded through the nut, a flattened portion on said nut, and a pin extending through the arm of said yoke adjacent said flattened portion for preventing rotation of said nut relative to said yoke.

3. In a clamp, a yoke, a nut slidably received in an opening in one arm of the yoke, a flattened recess of less length than the nut disposed in the side thereof, a pin in the yoke adjacent to the said flattened recess for preventing rotation of the nut but permitting longitudinal movement thereof, resilient means for biasing the nut towards the other arm of the yoke, and a screw threaded through the nut for supplying pressure to the work.

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