

UNITED STATES PATENT OFFICE.

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IMPROVED VISE.

Specification forming part of Letters Patent No. 82,073, dated September 15, 1868.

To all whom it may concern:

Be it known that we, THOMAS L. BAYLIES and EDWIN CRAWLEY, of the city of Richmond, and State of Indiana, have invented a new and useful Automatic Combination of Screws for Vises, &c.; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view; Fig. 2, a longitudinal vertical section, and Fig. 3 a detached view of automatic devices.

The same letters in the different figures relate to corresponding parts of the invention.

Our invention relates to a combination of screws having threads of different inclination or pitch, and the necessary appurtenances thereto, whereby a combination of the same operation that rapidly adjusts the jaws of a vise (or the corresponding movable portion of any press) also applies the pressure with greatly-increased power. Thus both operations are performed with one hand by a continuous movement of the same device.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

In the accompanying example our invention is illustrated by its application to a vise.

With reference to the drawings, D is a bed-plate, and A and B are jaws, the former being stationary on plate D, and the latter movable. C is a box-slide passing through a correspondingly rectangular opening in jaw A, to which box or slide jaw B is connected, and by which it is supported or maintained in its proper position with jaw A.

F represents a screw-bolt located within box C, on each end of which are the screws *f* and *g*, having threads of different inclination, the former being a right and the latter a left-handed screw. The rabbit-screw *f* engages with nut K, the latter being secured by screw I, or in any convenient manner, by which it is held firmly in the position shown on base D. G is a sleeve inserted through an orifice in jaw B, and is provided with a flange, *m*, resting against the surface of jaw B, where it is secured by a right-angular plate, *e*, the latter being secured by a screw, *t*, to the under surface of said jaw. E is a hollow screw, pro-

vided with threads both inside and out, the inside being a female screw for screw *g*, and the outside a male screw suited to a female screw in sleeve G. This combination of screws is left-handed and differential. In this example the threads of female screw G and male screw E are three to the inch, and the male screw *g* and female screw *f* are four to the inch.

The sleeve G is provided with slots *b* and *b'* of sufficient breadth to admit the pins *c* and *c'* from shaft F, by which the latter is prevented from turning, excepting in conjunction with said sleeve. *a* is a lever inserted through an orifice in the boss end of screw E, for turning the latter and operating the vise. The flange *m* of sleeve G is provided with ratchet-teeth, that operate in conjunction with pawl J during a certain movement of the mechanism. The pawl J is pivoted on screw *h*. H is a pendent trigger, pivoted at *k* to the pawl J, by which the latter is held above the ratchet when the shoulder of screw E is close against the flange *m*. *d* is a spring for the purpose of producing friction between sleeve G and screw E, and is secured inside of sleeve G (in a suitable recess near its end) in any convenient manner.

The operation of the mechanism is as follows: For adjusting the jaw B, the screw E is turned by means of lever *a*, in the ordinary manner of operating a single screw, the friction of spring *d* being sufficient to carry sleeve G with screw E when no greater resistance is offered than occurs in adjusting the jaw.

The sleeve G, when turned, carries with it the bolt F by reason of the pins *c* and *c'* in the slots *b* and *b'*. Thus, in adjusting the jaw, the rabbit-screw *f* only is involved.

In the operation of clamping the article to be held, the pressure is produced by continuing to turn lever *a* (and with it screw E) to the right. The first resistance offered to the jaw overcomes the effective action of friction-spring *d*, thus stopping sleeve G, and consequently screw *f*, in which case the turning of screw E causes the latter to recede at the rate of an inch to four revolutions with relation to screw *g*. The separation of screw E and sleeve G being greater by one-third, the latter is consequently advanced one-third of an inch to each inch traversed by the receding screw E. The jaw B being carried with sleeve G, thus

produces a pressure equal to what would be obtained by a screw having twelve threads to the inch. When, by turning screw E in applying the pressure, the boss of said screw is withdrawn (or run out) from the jaw, the trigger H drops between the shoulder of said boss and flange *m*, and thus allows pawl J to fall and engage with the ratchet-teeth on flange *m*, thereby preventing sleeve G from turning to the left, and thus locking the adjusting-screw *f*. The outer edge of the bottom of trigger H is beveled. Thus, when screw E is turned to the left, for the purpose of releasing the article under pressure and withdrawing the jaw, the pressure of the shoulder of screw E, when it comes in contact with said trigger, lifts the latter, by which pawl J is raised and disengaged from the teeth of flange *m*. Screw E being returned to its former position, with the shoulder against flange *m*, is then prevented from further turning, except in conjunction with sleeve G, and consequently screw *f*. The jaw is thus rapidly withdrawn.

The slots *b* and *b'* in sleeve G have length sufficient to admit of all necessary motion of said sleeve longitudinally on shaft F, which is equal to the yielding of the article under pressure.

Some modification of the arrangement of screws may be easily effected, and yet operate in connection with the same automatic devices, one of which changes may be accomplished (the differential combination being dispensed with) by removing screw *g* and boring the remainder of the screw-bolt F, the screw E in that case being made solid, with a continuation of a smooth shaft extending through the bore of screw-bolt F, and projecting sufficiently beyond to admit of its being secured there in some manner that will prevent its being withdrawn, and yet allow it to

turn in screw-bolt F. Thus, when no power is applied more than is sufficient to adjust the jaw, the friction of spring *d* is sufficient to rotate sleeve G in conjunction with screw-bolt F, by which rabbit-screw *f* is operated for the purpose of adjustment.

When resistance occurs from the pressure, screw *f* ceases to operate, and screw E is turned, as in the accompanying example, the jaw being thus advanced by the single screw E, according to the pitch of its threads.

Thus the automatic advantages are obtained with a more simplified mechanism, and a corresponding loss of power.

Having thus fully described our said invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of the devices operating automatically, by which the action is changed from the adjusting to the compressing screw or screws by a continuous turning of lever *a* in one direction, and the action of the screws is reversed by a continuous turning of said lever in the opposite direction, substantially as set forth.

2. The combination of the pins *c* and *c'* and slots *b* and *b'* with the sleeve G and screws F and E, substantially in the manner described, and for the purpose set forth.

3. The pawl J and trigger H, in combination with screw E, adjusting-screw *f*, and sleeve G, the latter being provided with a ratchet, as specified, and all operating substantially as described, and for the purpose set forth.

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Witnesses:

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