July 21, 1936. E. L. SIBLEY 2,048,170

EYELETING OR RIVETING IMPLEMENT

Filed July 20, 1933

Fig. 1.

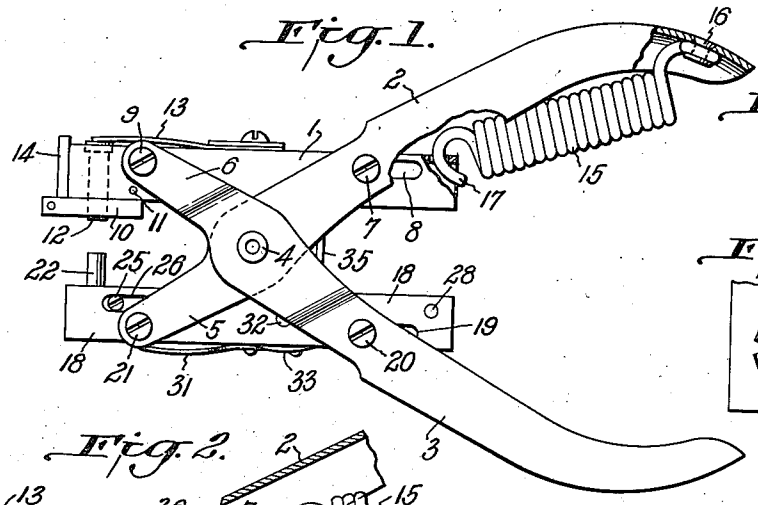


Fig. 7.

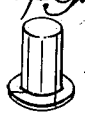


Fig. 8.

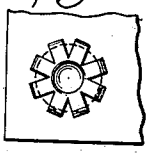


Fig. 2.

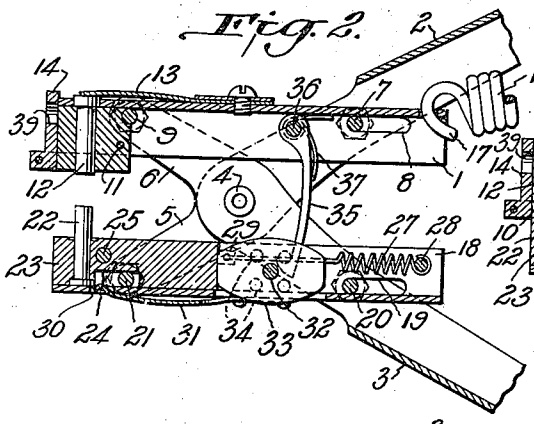


Fig. 3.

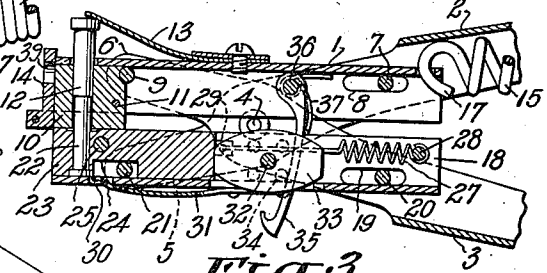


Fig. 4.

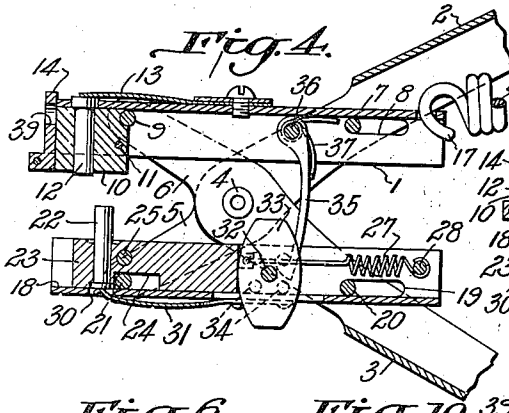


Fig. 5.

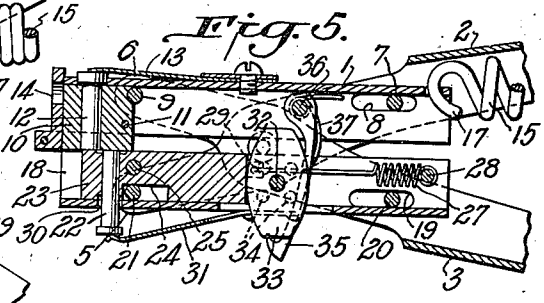


Fig. 6.

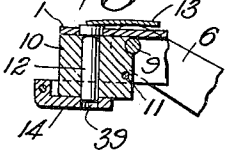


Fig. 10.



Fig. 9.

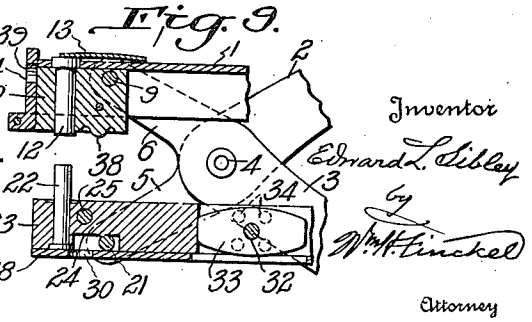


Fig. 11.



Inventor

Edward L. Sibley

by

Wm. H. Hincken

Attorney

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EYELETING OR RIVETING IMPLEMENT

Edward L. Sibley, Bennington, Vt., assignor to Edw. L. Sibley Mfg. Co., Inc., Bennington, Vt., a corporation of Vermont

Application July 20, 1933, Serial No. 681,377

20 Claims. (Cl. 218—19)

The object of this invention is to provide an implement of the plier type by means of which a variety of eyelets or rivets may be set, and in some instances re-formed or reverted into substantially their original shape for further use, and in some instances converted into double open-end type for ribboning and other purposes, and in some instances removed by sufficiently turning the same inside out.

Illustrating the use of the invention, two types of eyelets are shown, first, one having one end closed and the other open and provided with a circumscribing laterally projecting flange, the barrel or shank of the eyelet being longitudinally partible between the two ends so as to collapse in setting and thereby form a laterally extending head in substantial parallelism with the said flange in order to grip opposite sides of an article on which the eyelet is set, examples of which are shown in patents to E. L. Sibley, No. 358,225, dated February 22, 1887 and to the undersigned No. 1,469,757, dated October 2, 1923, No. 1,611,288, dated December 21, 1926, and No. 1,615,048, dated January 18, 1927, and, second, the ordinary eyelet which is open at both ends. The invention, however, is not limited to any specific type of structure of the eyelet or rivet, excepting as hereinafter claimed.

The invention consists of an implement or tool having pivotally connected crossed handles carrying in always parallel relation a punch and a die with automatic means for aligning these parts for the purpose of setting the eyelet or rivet, for removing it, for converting it into a ribbon-receiving fastener, and for reverting or redeeming it for the addition of more parts to be fastened, as I will proceed now more particularly to set forth and finally claim.

In the accompanying drawing illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation of the implement in normal open position with one handle partly broken out. Fig. 2 is a longitudinal section with the handles partly broken away, the position of parts being the same as in Fig. 1. Fig. 3 is a longitudinal section, the handles being partly broken away and the punch and die elements being closed as in the punching act. Fig. 4 is a longitudinal section with the punch elements shifted and in locked position so as to operate against the upsetting anvil when the jaws are closed to set the eyelet. Fig. 5 shows the parts of Fig. 4 in upsetting position. Fig. 6 is a detail illustrating a movable die placed in operative position when it is desired to redeem a set eyelet for the addition of more parts to be fastened. Fig. 7 is a perspective view of one form of eyelet or rivet which the implement is designed to set, and Fig. 8 is a top plan view of the eyelet or rivet of Fig. 7 set. Fig. 9 is a fragmentary longitudinal section of a modified form of upsetting anvil to adapt the implement or tool for setting ordinary commercial open-end eyelets such as shown in elevation in Fig. 10 and in cross section in Fig. 11, the latter view showing the eyelet set.

While the invention is illustrated in a form of a hand-operated implement or tool, it may be incorporated, with any necessary changes, in a power or other press or machine.

The die member includes a part 1 which is mounted in a handle member 2 at one end and a handle member 3 at the other end. These handle members are crossed and pivotally connected at 4 and provided beyond such pivots with jaws 5 and 6, respectively.

The die member 1 is in the form of a channel, and this channel is connected at its rear to the handle 2 by a bolt 7 sliding in slots 8 and secured in the handle, so as to permit the opening and closing movements of the handles, and it is pivotally connected at its forward end to jaw 6 by a bolt 9 crossing from side to side of the channel in such way as to permit the jaw 6 to turn thereon as the handles are opened and closed. In the forward end of this channel is mounted the die proper 10 which fills the inside of the channel at the forward end and is held stationary therein by a rivet 11 headed up in the side walls of the channel. 12 is a pin mounted to slide longitudinally in a through hole in the die proper and held therein by means of a spring 13 attached to the channel.

The die proper or anvil 10 may have pivoted to it a movable die 14 capable of being turned out of position as shown in Figs. 1 to 5 and 9, when not needed for use and to be turned into useful position as indicated in Fig. 6, when needed, as will presently appear.

A retractile spring 15 is secured at one end 16 within the handle 2 and at its other end 17 it is connected with the rear portion of the channel of the die member, so that the effect of the spring is to separate or open the jaws of the implement or tool.

The punch includes a channel member 18 provided with slots 19 on opposite sides through which slots extends a bolt 20 near the rear of the channel, said bolt being secured in the handle 3. Near the front of the channel this punch mem-

ber is supported by a bolt 21 passed transversely through the jaws 5 of the handle 2. The punch 22 is mounted in a block 23 having a longitudinal sliding motion in the channel 18 and provided with a by-pass cut 24 to overlie the bolt 21. The block is retained in the channel and also guided in its motion by a screw or pin 25 carried by said block, and the head of the screw pin travels in a slot 26 in an adjacent wall of the channel. This block 23 is normally drawn rearwardly within the channel by means of a spring 27 anchored at one end 28 to the channel and at the other end 29 to the block 23, so that in normal open position the punch 22 rests upon the bottom of the channel and is thus supported in operative position. A slot 30 is provided in the bottom of the channel to expose a portion of the head of the punch 22 and this head rests upon a flat spring 31 to aid in keeping said punch normally projected.

In the channel 18 is mounted on a shaft 32 a plane elliptical cam 33 having truncated ends and provided with a series of equidistant pins, extrusions or other projections 34 extending parallel to the cam axis from one side thereof. This cam is arranged so as to have its peripheral surfaces turned into engagement with the block 23 to permit the movement of said block into and out of position and also to hold it in given position. The parts 34 are successively engaged by a hook or pawl 35 which is suspended from a pin 36 mounted in the channel of the die member 1, and this hook is normally impelled toward the parts 34 in the cam by means of a spring 37, coiled around the pin 36 and having one end abutting against the channel member 1 and the other end lying upon the back of the hook. The cooperative arrangement of the hook or pawl 35 and the elliptical cam 33 may be so modified, if desired, that the hook or pawl instead of engaging pins 34 or other offstanding parts carried by the cam may engage in holes or depressions in the cam for imparting movement thereto as the hook or pawl returns to its original position. Such a modification may readily be made by twisting the shank of the hook or pawl in such manner that the operative hook-like end of same will lie in substantial parallelism with the axis of its pivot 36 to thus readily engage such holes or depressions provided in the cam.

By reason of the functions of the cam 33, it is herein sometimes called a buffer cam.

When the implement is in the position shown in Figs. 1 and 2, an eyelet or rivet, such as shown in Fig. 7, is placed on the punch 22 and the article to be fastened is placed between the eyelet and the die. It will be observed that the punch 22 and the pin 12 in this position are in alignment, so that when the handles are moved toward each other, the punch 22 and its supported eyelet are moved toward the die 10 and the eyelet is forced through the article to be fastened, the pin 12 being moved upwardly against tension of its spring 13, and then pressure on the handles being relaxed, the cam is moved from a position shown in Fig. 2 to the position shown in Fig. 4, the spring 27 then pulling the block 23 and its punch member 22 into a position out of alignment with the pin 12 and into a position opposite the portion 10 of the die, and then moving the handles toward each other again the eyelet is forced into contact with the portion 10 and collapsed, as indicated in Fig. 8, the collapsed head being on the top side of the article to be fastened opposite to the flange, and the eyelet thereby set. As the punch carries the eyelet towards the upsetting anvil and the eyelet is set, the spring 31 under pressure from the closing jaws yields so as to permit the punch to descend in the block, see Fig. 5, thus releasing the set eyelet, and immediately thereafter upon releasing pressure on the handles the punch is reset to the position shown in Figs. 1 and 2, ready to receive another eyelet.

As indicated in Figs. 2 and 3, the movement of the block 23 outwardly shifts the support of the punch 22 to the bottom of the channel so as to hold the punch solid against the pressure used in setting the eyelet. After the eyelet has been forced into the article on which it is to be set and the pressure on the handles is relaxed the parts are moved into the positions shown in Figs. 4 and 5 and the punch is thus moved opposite the slot 30 and put under the tension of the spring 31 so that the punch may recede (see Fig. 5) as said eyelet is upset against anvil 10 and permit the removal of the article containing the set eyelet and then forwarded to the position shown in Figs. 1, 2, and 3 ready for use for the insertion of another eyelet.

In these motions the hook 35 engages successively with the pins 34 or other described parts of the cam so as to cause the cam to permit the sliding movement of block 23 and alternately to hold such block in fixed position for the time being.

The channel members 1 and 18 are mounted in the handles in parallel relation and themselves have no motion independent of the handles; their functions primarily being to carry or support the punch and die.

As thus far described, the mechanism is useful for operation upon headed eyelets or rivets; in other words, on eyelets or rivets having one end closed, as shown in Figs. 7 and 8. For operation on commercial eyelets open at both ends, as shown in Figs. 10 and 11, the die member may have a teat 38, Fig. 9, in the form of a small inverted dome of slightly larger diameter than the inside diameter of the commercial eyelet and adapted to turn or curl over the leading end to effect a setting of the eyelet, as indicated in Fig. 11.

In setting a headed eyelet (Fig. 7) the eyelet is placed upon the punch 22, when the tool or implement is in the position indicated in Figs. 1 and 2 with the punch opposite the pin 12. Then the article to be fastened, as, for example, a number of sheets of paper, is laid over the head of the eyelet and the handles closed down, so that the punch and its supported eyelet will be driven through the article, see Fig. 3; then the handles are released and the hook 35 on its consequent upward motion engages one of the cam parts 34 and turns the cam from the block locking position, Figs. 2 and 3, into the block releasing position, Fig. 4, and then said block retreats and brings its punch from beneath the pin 12 to beneath the part 10, Fig. 5, by which motion the eyelet and the article through which the eyelet has been driven are in position for another closing of the jaws, with the result that the barrel or shank of the eyelet or rivet is collapsed and the fastening consummated. During this period of heading up the eyelet the cam 33 has been turned broadside against the block 23, as in Fig. 5, and the block held in stationary position and in readiness to be released upon relaxing the pressure upon the handles.

If it be desired to cut an opening in the head

of the set rivet for purposes of ribboning together the parts of the article, the implement or tool when again in the position shown in Fig. 1 may be given a further pressure which will operate to cut a hole in the head.

If for any reason, as for adding other parts to be riveted, it be desired to restore the shank or barrel to substantially its original shape, this can be accomplished by turning the movable die 14 into the position shown in Fig. 6 with the hole 39 therein registering with the through hole in the anvil block, and then placing invertedly the article with the set eyelet between the die and punch with the punch registering with the hole 39 and the through hole in the anvil block, and then by closing the jaws the shank or barrel of the rivet will be restored to its elongated position, and then the additional article or articles be applied and the same eyelet be used, and clinched in the same way as a fresh eyelet, onto the thus increased thickness of the article. This operation is herein referred to as redeeming the eyelet.

Details of construction may be varied within the principle of the invention and the scope of the claims following.

Furthermore, while certain of the claims herein specify an eyeleting implement of plier type, it is to be understood that the invention is not limited to a plier type but includes an implement or machine of any available or preferred type.

What I claim is:—

1. An eyeleting or riveting implement, provided with a die and a punch, said die and said punch being arranged in parallel relation and provided with operating means including a sliding block carrying the punch and an intermittently rotated buffer cam cooperating with said sliding block whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set.

2. An eyeleting or riveting implement, provided with a die and a punch, said die and said punch being arranged in parallel relation and provided with operating means including a sliding spring-retracted block carrying the punch and an intermittently rotated buffer cam cooperating with said sliding block, whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, said cooperating buffer cam acting to hold hold the block and punch in the respective positions for inserting the eyelet or rivet and for upsetting it.

3. An eyeleting or riveting implement, provided with a die, a shiftable punch, a sliding block in which said punch is mounted, said die and said punch being arranged in parallel relation and provided with operating means including a buffer cam having a step-by-step motion, whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet and article may be carried into a position to be set.

4. An eyeleting or riveting implement, provided with a die and a shiftable punch, said die and said punch being arranged in parallel relation and provided with operating means whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet and article may be carried into a position to be set, and a buffer cam cooperating with the punch member to hold it in the positions for inserting the eyelet and for upsetting it.

5. An eyeleting or riveting implement, provided with a die and a punch carried by a shiftable member, said die and said punch being arranged in parallel relation and provided with operating means whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, and a buffer cam cooperating with said shiftable member to hold the punch in positions for inserting the eyelet or rivet and for upsetting it, said shiftable member being blocked from movement by the buffer cam, and a cam actuating device.

6. An eyeleting or riveting implement, of plier type, provided with a die and a shiftable punch, said die and said punch being arranged in parallel relation and provided with operating means whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, parallel separate carriers for the said die and punch, handles applied to such carriers to move them toward and from each other in parallel relation, and means operable in response to movement of said handles for moving the punch into and out of alignment with the die.

7. An eyeleting or riveting implement, of plier type having handle levers, and provided with a die and a shiftable punch, said die having a movable pin and said punch being adapted to be held rigidly, a carrier for the die and a carrier for the punch, and means operative in response to movement of said handle levers to effect a movement of the punch into alignment with the pin in the die and other means responsive to actuation of said punch-moving means to withdraw said punch from such alignment.

8. An eyeleting or riveting implement, of plier type, provided with a die and a shiftable punch, a pair of pivotally connected crossed handles, carriers mounted on said handles so as to move in parallelism, a longitudinally movable pin in the die, means acting normally to project said pin, said die having an anvil portion next to its pin, a sliding block in which the punch is mounted, means to permit the punch member to yield when brought into contact with said anvil portion, means for effecting the sliding movement of the punch, and actuating means for automatically moving said last-mentioned means in response to movement of said handles.

9. An eyeleting or riveting implement, of plier type, provided with a die and a movable punch, a pair of pivotally connecting crossed handles, carriers mounted on said handles so as to move in parallelism, a longitudinally movable pin in the die, means acting normally to project said pin, said die having an anvil portion next to its pin, a sliding block in which the punch is mounted, and means to permit the punch member to yield when brought into contact with said anvil portion of the die, means for effecting the sliding movement of the punch block, and actuating means for moving said last-mentioned means, said slide effecting means including a cam mounted to rotate in the punch carrier, and means mounted in the die carrier and projecting into the path of movement of the cam to actuate said cam step by step.

10. An eyeleting or riveting implement, of plier type, provided with a die and a movable punch, a pair of pivotally connected crossed handles, carriers mounted on said handles so as to move in parallelism, a longitudinally movable pin in the

die, means acting normally to project said pin, said die having an anvil portion next to its pin, a sliding block in which the punch is mounted, means to permit the punch to yield when brought into contact with said anvil portion, means for effecting the sliding movement of the punch with its block, and actuating means for moving said last-mentioned means, said slide effecting means including a cam mounted to rotate in the punch carried, means mounted in the die carrier and projecting into the path of movement of the cam to actuate said cam step by step, and a spring anchored in the punch carrier at one end and attached to the sliding block at the other end to keep the sliding block in operative relation to the cam.

11. In an eyeleting or riveting implement, two relatively movable members, a die carried by one of said members, and a shiftable punch carried by the other of said members, said die comprising a bore, and said die and punch being provided with operating means whereby by one motion an eyelet or rivet may be punched through an article, and by another movement the eyelet or rivet and article may be carried into position to be set, and an auxiliary die element provided with a bore complemental to the bore of said die and movable into register with said die to increase the length of the bore thereof.

12. In an eyeleting or riveting implement, two relatively movable members, a die carried by one of said members, a shiftable element carried by the other member and provided with a punch, said die and said punch being movable with said members in parallel relation and provided with operating means whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, and a buffer cam cooperating with the shiftable element to hold it in the positions for inserting the eyelet or rivet and for upsetting it, the shiftable element being blocked from longitudinal movement by the buffer cam during the insertion of the rivet or eyelet, said buffer cam being provided with a series of stops, and an automatic cam actuating device operable in response to relative movement of said movable members and including a hook to engage said stops.

13. An eyeleting or riveting implement, of plier type, provided with a die and a punch carried by a shiftable member, said die and said punch being arranged in parallel relation and provided with operating means whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, and a buffer cam cooperating with the punch member to hold it in the positions for inserting the eyelet or rivet and for upsetting it, the shiftable member being blocked from longitudinal movement by the buffer cam during the insertion of the rivet or eyelet, said buffer cam being provided with a series of laterally projecting pins, and an automatic cam-actuating device including a spring-pressed hook to engage said pins and turn the cam step by step.

14. An eyeleting or riveting implement, of plier type having handle levers, and provided with a combined die and anvil and a shiftable punch, said punch being provided with automatic operating means responsive to movement of said handle levers, whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, and a teat on the said anvil for use in setting open-ended eyelets or rivets.

15. An eyeleting or riveting implement, of plier type having handle levers, and provided with a die and a shiftable punch, said die and said punch being arranged in parallel relation and said punch provided with automatic operating means responsive to movement of said handle levers, whereby by one motion an eyelet or rivet may be punched through an article and by another motion the eyelet or rivet and article may be carried into a position to be set, said punch being spring-mounted and adapted to move away from the die as the eyelet or rivet is set.

16. In an eyeleting or riveting device, two pivotally joined relatively movable lever parts, one of said parts carrying a die and an anvil, and the other part carrying a shiftable punch, and means carried by one of said parts and responsive to relative movement of said parts for shifting said punch so that the latter may cooperate with said die and with said anvil successively.

17. In an eyeleting or riveting device, two pivotally jointed relatively movable lever parts, one of said parts carrying a die and an anvil, and the other part being provided with a shiftable element carrying a punch, and means responsive to relative movement of said parts and including a cam carried by one of said parts and cooperating with said shiftable element for shifting said element and with it said punch so that the latter may cooperate with said die and with said anvil successively.

18. In an eyeleting or riveting device, two relatively movable parts, one of said parts carrying a die and an anvil, and the other part being provided with a shiftable element carrying a punch, means for imparting relative movement to said relatively movable parts, and means for shifting said element and with it said punch so that the latter may cooperate with said die and with said anvil successively, said means responsive to such relative movement and including a cam carried by one of said parts and cooperating with said shiftable element and a cam-operating member carried by the other of said parts.

19. In an eyeleting or riveting device, two relatively movable parts, one of said parts carrying a die and an anvil, and the other part being provided with a shiftable element carrying a punch, means for imparting relative movement to said relatively movable parts, and means for shifting said element and with it said punch so that the latter may cooperate with said die and with said anvil successively, said means responsive to such relative movement and including a cam carried by one of said parts and cooperating with said shiftable element, a spring connected with said shiftable element and normally holding same in engagement with said cam, and a cam-operating member carried by the other of said parts.

20. In an eyeleting or riveting device, two pivotally joined relatively movable lever parts, one of said parts carrying die and anvil means, and the other part carrying a punch for cooperation with said die and anvil means, and means carried by one of said parts and responsive to relative movement of said parts for causing relative shifting of said die and anvil means and said punch, whereby said punch may cooperate with said die and with said anvil successively.

EDWARD L. SIBLEY.

CERTIFICATE OF CORRECTION.

Patent No. 2,048,170. July 21, 1936.

EDWARD L. SIBLEY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 8, after "screw" insert or; page 3, second column, line 55, claim 9, for "connecting" read connected; page 4, first column, line 10, claim 10, for "carried" read carrier; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of October, A. D. 1936.

Leslie Frazer

(Seal) Acting Commissioner of Patents.