Feb. 1, 1944. W. L. GARBERDING 2,340,805

FINGER STOP

Filed June 13, 1942

Fig. 1.

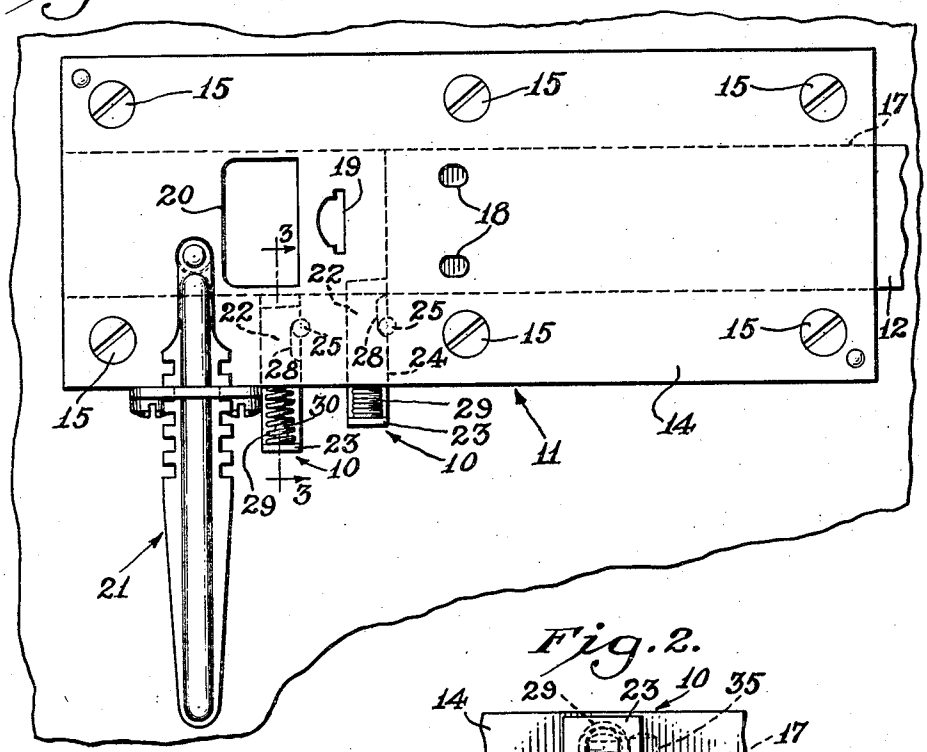


Fig. 2.

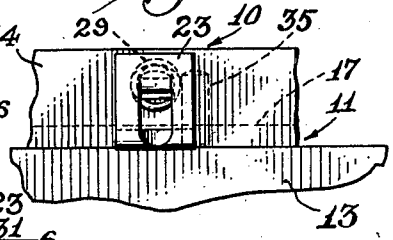


Fig. 3.

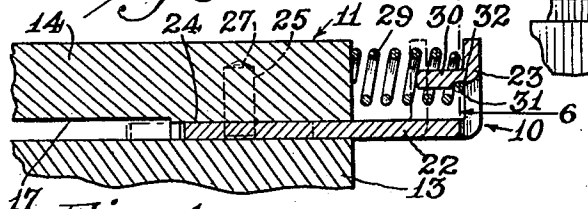


Fig. 4.

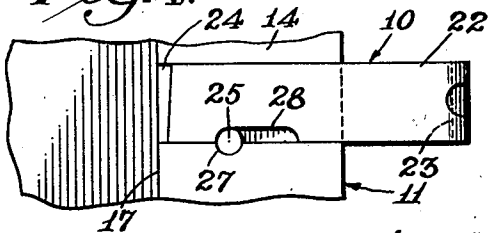


Fig. 5.

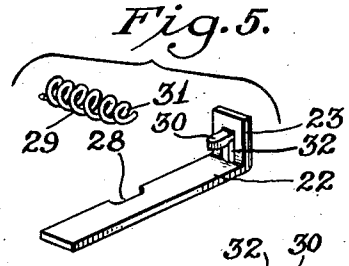


Fig. 6.

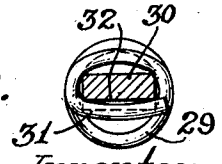


Fig. 7.

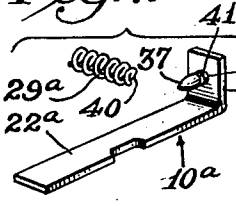
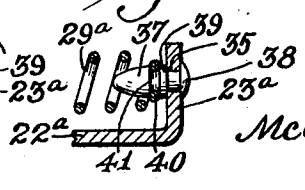


Fig. 8.



Inventor
Waldo L. Garberding
BY
McCaleb, Wendt & Dickinson
Attorneys.

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UNITED STATES PATENT OFFICE

2,340,805

FINGER STOP

Waldo L. Garberding, Chicago, Ill.

Application June 13, 1942, Serial No. 446,978

5 Claims. (Cl. 164—59)

My invention relates to improvements in die stops, and more particularly concerns novel features in the construction of finger stops such as are frequently used with progressive or gang dies.

Finger stops are used for properly gauging the extent of advance of the leading end portion of a stock strip for the performance thereon of certain preliminary operations in a progressive die before such end portion reaches the blanking-out position in the die. As many finger stops are customarily used with a die assembly as there are successive preliminary operations to which the material must be subjected before blanking out.

In prior practice finger stops have been individually hand made specially for each job, requiring costly milling, machining and fitting operations. Another disadvantage of prior finger stops has been the need for separate handling and the liability of loss of the small unattached return springs before the stop is assembled for use with the die, and also when the die is disassociated from the die assembly, as when the stripper plate is removed for die repairs or other purposes. In these circumstances, the little return springs jump out of the respective specially drilled locating bores, provided therefor in the edges of the associated stripper plates and often are lost or crushed and destroyed by being stepped upon or by having a heavy object laid thereon.

These and other shortcomings and disadvantages of the prior art are avoided by my improved finger stop, which, in addition to being adapted to be supplied in standardized form and sizes for general use where finger stops are required, is also equipped to retain the return spring in permanent unitary association therewith.

Another object of the invention is to provide a finger stop that is adapted to be installed more quickly and easily than prior stops of this type.

A further object is to provide a novel arrangement of the return spring structure in a finger stop.

Still another object is to provide a finger stop which can be made by high speed quantity production methods from relatively simple and inexpensive material and sold at low cost, and requires but a bare minimum of simple parts.

Other objects and advantages of my invention will appear more fully from the following description and from the accompanying sheet of drawings, in which similar characters of reference indicate similar parts throughout the several views.

In the drawing:

Figure 1 is a top plan view of the stripper plate portion of a progressive die utilizing a pair of my finger stops;

Fig. 2 is a front elevational view on a larger scale of one of the finger stops shown in Fig. 1;

Fig. 3 is a vertical sectional view, on an enlarged scale, taken along substantially the line 3—3 of Fig. 1;

Fig. 4 is a bottom plan view of the finger stop and the immediately adjacent portions of the associated stripper plate;

Fig. 5 is a perspective assembly view of the finger stop;

Fig. 6 is a vertical sectional detail view taken in the plane of line 6—6 of Fig. 3;

Fig. 7 is a perspective assembly view of a slightly modified form of the finger stop; and

Fig. 8 is a fragmentary longitudinal sectional view, on an enlarged scale, showing the details of the spring anchorage for the modified form.

By way of practical example, I have shown in Fig. 1 a pair of finger stops 10, embodying the features of my invention, installed in a progressive die structure 11 only the lower portion of which has been illustrated, and in more or less conventionalized fashion. The finger stops 10 are arranged to be operated successively to gauge progressively advanced positions of the leading end of a stock strip 12 upon which preliminary punching operations are to be performed before it reaches the blanking punch station in the die.

The die structure 11 comprises a die block 13 upon which is mounted a stripper plate 14 secured in place by means of screws 15. A longitudinal channel 17 in the lower face of the stripper plate 14 provides a guideway through which the stock strip 12 is advanced through the die to a succession of preliminary punch openings 18, 19 and finally blanking punch opening 20, which openings register with respective die holes in the die block 13.

As shown, the first of the finger stops 10 in the series is in stopping position to gauge the leading end of the strip 12 for the first preliminary punching at the punch openings 18. Upon release of the first finger stop 10, the strip may be advanced into engagement with the second of the finger stops 10 at the succeeding opening 19 for the second preliminary punching operation. Thereafter the end of the strip 12 is advanced into engagement with an automatic die stop 21 which from there on takes over all further stopping control over the strip for incremental advance during operation of the die. The automatic die stop 21 may, as shown, be of the type

disclosed in my copending application Serial No. 428,568, filed January 28, 1942.

Having now more particular reference to Figs. 2 to 6, inclusive, the body of my improved finger stop 10 is adapted to be made by a simple combination die stamping process from an appropriate gauge of sheet metal stock and comprises an elongated, relatively narrow flat shank or stop leg 22 and a relatively short integral presser head or thumb flange 23 extending right angularly from the rear end of the stop leg. In practice, a popular small size of the finger stop has been made from $\frac{1}{16}$'' dead soft cold rolled sheet steel about $\frac{5}{16}$'' wide and having the stop leg 22 initially about 1¾'' long and the thumb flange 23 about ⅜'' long. In a larger and heavier standard size of the stop, ⅛'' material has been used with the stop leg 22 initially two inches long and the head flange 23 about ⅜'' long. After the body of the stop has been formed, it is hardened for ruggedly withstanding long and vigorous usage.

In use, the stop end of the leg 22 is ground down to the proper length and shape required for any particular installation, and is received for longitudinal sliding movement within a guide channel 24 milled in the lower face of the stripper plate 14 and extending transversely from the outer edge of the stripper plate to the strip channel 17. Then the stop end of the leg 22 is adapted to be projected from a position within the guide channel 24 short of the stop channel 17, as shown in full line in Fig. 3, to a position as shown in dot-dash outline where it projects into the path of the advancing end of the stock strip 12.

Within the channel 24, the stop leg 22 is, of course, confined against lateral displacement in either a vertical or horizontal direction by the walls of the channel and the upper face of the underlying die block 13.

Longitudinal outward displacement or retraction of the stop leg 22 beyond a predetermined range of longitudinal sliding movement is prevented by a limit pin 25 which is driven into a downwardly opening bore 27 in the stripper plate 14. The pin 25 is set with its diameter coincident with one of the side walls of the channel 24 so that approximately one-half of the cross section of the pin is received within a longitudinal clearance cut-out or notch 28 formed in the side of the stop leg 22.

In assembling the stop 10 with the stripper 14, the stop finger 22 is placed within the guide channel 24 after the limit pin 25 has been driven in place but before the stripper is secured in place on the die block 13. After the stripper has been fastened down, the stop pin 25 retains the finger stop against being pulled out of place while the clearance notch 28 permits the desired range of free sliding stopping operation thereof.

Automatic retraction of the stop from the stopping position shown in dot-dash outline to the full outline position shown in Fig. 3, is effected by resilient means such as a small coiled compression spring 29 which bears at one end against the inner face of the presser head 23 and at its other end against the adjacent edge of the stripper plate 14. The arrangement is preferably such that the spring 29 maintains a slight pressure even in the fully retracted position of the stop so as to avoid loosening and rattling. By pressing a finger against the outer face of the presser head 23, compression of the spring 29 is effected and the stop leg 22 is moved to stopping position. Instantly, upon release of finger pressure upon the head 23, the spring 29 snaps the stop back into the retracted position.

According to the present invention, the return spring 29 forms a unitary part of the finger stop 10 so that the finger stop unit can be handled prior to installation or upon removal from the installation without separation of the spring. To this end, the presser head 23 is equipped with an anchorage for the adjacent end of the return spring 29, in this instance comprising an integral inwardly struck supporting and anchoring finger 30 which is of relatively small cross section so as to be received within the adjacent end coils of the spring.

In order to secure the return spring 29 against unintentional withdrawal from the finger 30, the adjacent flexible end turn or loop of the spring is ensmalled as indicated at 31 so as to grip the tongue 30 snugly adjacent its base and gain a secure hold within a transverse anchoring channel 32 formed across the base of the tongue for this purpose. In this instance, the channel 32 is pressed in the base of the tongue by the forming die in which the stop body is formed. The resilient interconnection effected by the ensmalled end-loop 31 within the channel 32, thoroughly resists ordinary pulling force on the spring 29 which might tend to dislodge the same unintentionally from the finger 30 but permits the spring to be removed by forcing the end loop to yield and leave the channel, if necessary.

Assembly of the flexible end loop 31 upon the supporting finger 30 may be effected by initially expanding the end loop to a greater diameter than the finger, bringing the end loop and the finger into relatively assembled relation and allowing the end loop to contract into embracing relation to the finger and within the anchoring channel 32.

On the other hand, assembly may be accomplished by relatively sliding the end loop 31 and the supporting finger 30 axially into interengagement. Accordingly, the supporting finger 30 is formed of generally taper-pointed shape as shown so as to be initially projectible without resistance into the end loop for locating the parts for assembly. Then the assembly may be completed by forcing the parts axially together whereby the tapered finger 30 gradually expands the end loop 31 until it embraces the base of the finger and snaps into the anchoring groove 32. It will thus be apparent that assembly of the parts is a simple and expeditious process. The end of the spring 31 is entirely separated by the thickness of the presser head flange 23 from the outer finger-engageable face of the flange, thus guarding the operator's finger against any possibility of injury by any sharp edge or burr that may be present on the end of the spring wire.

A slightly different form of anchorage for the return spring may be provided as shown in Figs. 6 and 7, wherein the finger stop 10^a may be in all other respects substantially the same as the finger stop 10 already described, with a one-piece body including a stop leg 22^a, a right-angular presser head flange 23^a, and a coiled compressible return spring 29^a. Instead of having a struck-out anchoring tongue, however, the presser flange 23^a is formed with an aperture 35 for relatively snugly receiving the reduced diameter shank of a separately formed supporting and anchoring pin 37. Permanent attachment of the pin 37 is effected by upsetting the outer end of its reduced shank rivet fashion to form a securing head 38

which opposes a shoulder 39 at the base of the main body of the pin to clamp the interposed portion of the presser head flange 23a therebetween. The pin 37 is preferably of generally conical, taper-pointed shape to fit within the adjacent end coils of the spring 29a and slidably receive and expand during assembly of the parts a smaller diameter annular resilient end loop 40. Assembly is completed by the snapping of the end loop 40 into an annular peripheral anchoring groove 41 formed in the base portion of the pin 37 forwardly spaced from the shoulder 39. In this way the return spring 29a is firmly anchored to the body of the finger stop 10a but can readily be released by expanding the end loop 40 and withdrawing it from the supporting finger 37, if necessary.

From the foregoing it will be apparent that my invention provides a finger stop adapted to be supplied in a minimum number of standard sizes to meet all requirements and completely avoids the need for making individual finger stops. In practice, this effects savings up to two-and-a-half man hours of labor formerly required in milling and shaping a finger stop. All that the die maker need do for installation of my improved die stop, is to provide the slide channel for the stop leg and drill the limit pin hole in the stripper plate. Then, he drives the limit pin in place, and, if necessary, grinds the end of the stop leg down the proper length and shape, and places the finger stop in operative position ready for use. Since the return spring of the finger stop is a substantially permanent part of the stop unit, there is no need for drilling a spring-retaining hole in the edge of the stripper as has been the general practice heretofore. The unitary construction of the stop also eliminates the need for separate handling of the return spring as an incident either to installation or to dismounting of the finger stop. Furthermore, my finger stop is susceptible of being manufactured at unusually low cost by simple quantity production methods. This taken together with the large amount of hand labor saved in making and installing the stop, effects a very substantial reduction in die making cost where my improved finger stop is used.

While the invention is susceptible of various modifications, and alternative constructions, I have shown in the drawing, and have herein described in detail certain preferred embodiments, but it is to be understood that I do not thereby intend to limit the invention to the specific forms disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the following claims.

I claim:

1. In a finger stop for use in conjunction with the stripper plate of a die assembly to afford manual control over the passage of a strip of material through the die, a body comprising an elongated flat sheet metal stop leg having a stop edge on one side, an integral presser flange bent up from and extending perpendicularly rigid relative to one end of said leg, said leg being adapted to be mounted within a channel in the stripper plate extending right angularly into the material channel thereof and opening through one side of the plate whereby said stop edge can be interposed in the path of and engage the end of an advancing strip of material when the stop leg is projected inwardly by pressure applied to said presser flange, a finger projecting inwardly from approximately the center of the inner face of said presser flange parallel with and over the center line of said stop leg, and an elongated compression spring telescoped about and supported by said finger and extending substantially therebeyond for engagement with the side of the stripper plate to maintain the stop normally in a retracted condition wherein the end of the stop leg and the stop edge are withdrawn from the material channel, the end of the compression spring adjacent said presser flange being engaged to hold the spring assembled with the finger.

2. In combination in a finger stop, an elongated sheet metal body comprising a stop leg substantially wider than thick and having a stop edge on one side, the width of the stop leg being such as to enable the leg to withstand substantial force directed against said stop edge without causing distortion of the leg, one end portion of the body being bent into right angular relation to the stop leg and providing a digitally engageable presser flange for manipulation of the stop, said presser flange having an elongated integral finger struck out from a point along the bend joint between the leg and flange up to about the middle of the flange, the finger extending inwardly in spaced parallel relation to the leg, and a coiled compression-type retraction spring telescoped about and supported by said finger and extending a substantial distance beyond the end of the finger, said finger having a groove across the base thereof and said spring having an end loop portion engaged within said groove to retain the spring against separation from the finger.

3. In combination with the stripper structure of a die assembly, a finger stop having a flat sheet metal stop leg and a thumb element at the outer end of the leg, the stripper structure having a longitudinal stock channel and a shallow lower face guide slot for the stop leg extending from one edge inwardly to the stock channel, a fixed limit pin projecting into said guide slot, the stop leg being formed with an elongated longitudinal edge notch to afford working clearance for said pin, and a return spring interposed between said thumb element and the adjacent edge of the stripper structure for normally urging the stop into inactive position to the limit permitted by interengagement of said pin and an end of the clearance notch.

4. A combination as defined in claim 3 in which the thumb element is an integral right-angularly bent flange on the stop leg and the spring is anchored to such flange.

5. A combination as set forth in claim 3 in which the return spring is fastened at one end to the thumb element and at its other end freely abuts the adjacent flat outer edge of the stripper structure.

WALDO L. GARBERDING.