

Sept. 20, 1960

B. W. GROSSMAN

2,953,051

PERFORATING IMPLEMENT WITH STRIPPER SLEEVE RETAINING MEANS

Filed Sept. 20, 1956

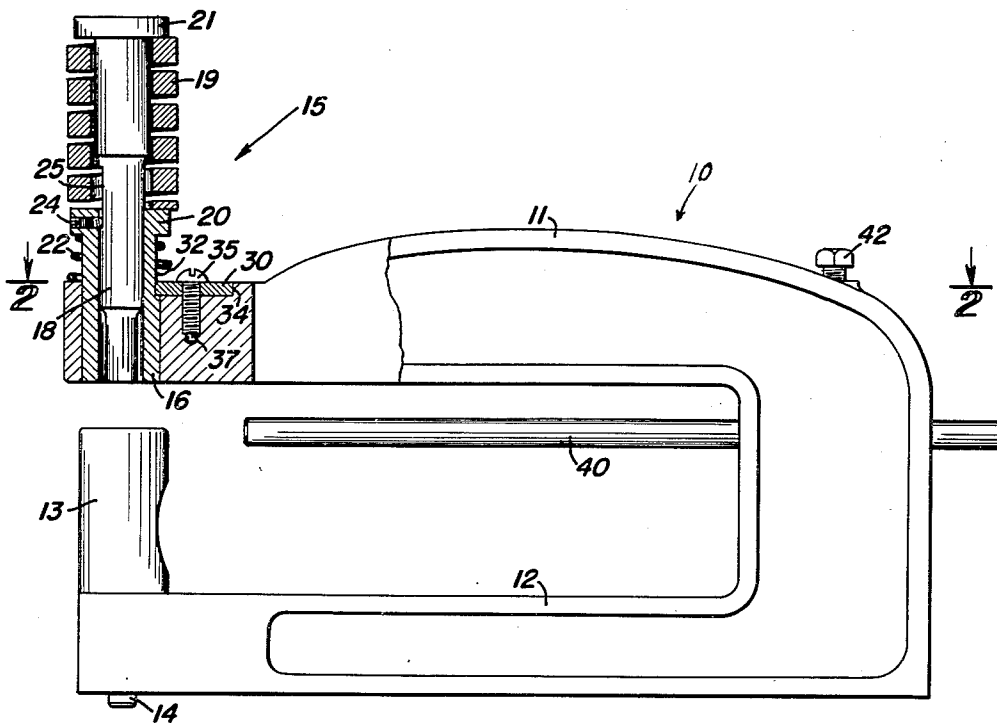


FIG. 1.

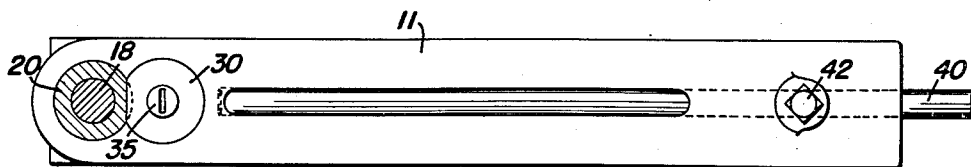


FIG. 2.

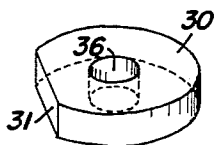


FIG. 3.

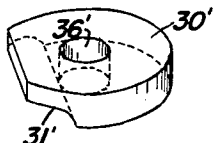


FIG. 4.

INVENTOR

BERT W. GROSSMAN

BY

[Signature]

ATTORNEY

1

2,953,051

PERFORATING IMPLEMENT WITH STRIPPER SLEEVE RETAINING MEANS

Bert W. Grossman, Erie County, N.Y., assignor to George F. Wales, Kenmore, N.Y.

Filed Sept. 20, 1956, Ser. No. 610,993

1 Claim. (Cl. 83—140)

The present invention relates to perforating apparatus and more particularly to self-contained perforating implements.

The conventional self-contained perforating implement comprises a C-frame in the lower arm of which is mounted a die, and in the upper arm of which is mounted a punch-stripper assembly. The punch-stripper assembly conventionally comprises a combined stripper and guide-sleeve which is reciprocable in the upper arm of the C-frame and in which the punch is reciprocable. A coil spring is interposed between the punch and the sleeve, in which energy is stored during the perforation of the work, which energy is released upon relief of the punching pressure to strip the punch from the work. Another spring is interposed between the sleeve and the upper arm of the C-frame to restore the punch-stripper assembly to original position upon completion of the punching operation; and a retainer clip is secured to the C-frame to limit the return movement of the stripper or guide-sleeve to prevent the sleeve from being thrown out of the C-frame on this return movement. A dull punch tends to jam in the work, and will let go suddenly under the stripping force. Since a set screw or the like is provided to limit the upward stripping movement of the punch in the sleeve, the accelerated stripping movement of the punch will be transmitted to the sleeve. Unless some means is provided, therefore, to limit the upward movement of the sleeve it may be ejected from the holder by the suddenly-applied stripping force as the punch lets go of the work. If the sleeve should be ejected from the holder, its ejection might not be noticed by the operator, and it might wedge into such a position as to damage the press, or the work, or a perforating implement on the next down-stroke (working stroke) of the ram of the press. In any event, if the sleeve is ejected from the holder and not noticed, that means that a hole will not be punched in the work on the next down-stroke of the ram. This will mean a spoiled piece of work, or require a repeat punching operation. A stop or retainer clip for the sleeve is, therefore, a very important part for a practical self-contained perforating implement.

Heretofore, the retaining clip has been made of a rectangular block of hardened steel and has been secured in a correspondingly rectangular shaped slot in the upper arm of the C-frame to engage at its free end in a flat or groove in the stripper or guide sleeve. To provide the required slot in the upper arm of the C-frame has meant an end-milling operation.

The primary object of the present invention is to provide a retainer clip which will be less expensive than the retainer clips heretofore used, and in which the recess in the upper arm of the C-frame for the retainer clip can be formed by a counter-boring operation instead of requiring an end-milling operation.

Another object of the invention is to provide a retainer clip which will be stronger than previous retainer clips.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claim.

2

In the drawing:

Fig. 1 is a part side elevation, part section of a perforating unit made according to one embodiment of this invention;

Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a perspective view of one form of retainer clip made according to the present invention; and

Fig. 4 is a perspective view of a modified form of clip.

Referring now to the drawing by numerals of reference, 10 denotes the C-frame of a perforating implement provided with a retainer clip made according to the present invention. The C-frame has an upper arm 11 and a lower arm 12. One type of conventional pedestal die 13 is secured to the lower arm of the C-frame; and the lower arm has a pilot pin 14 for positioning the perforating implement on a templet on the bed of a punch press.

Reciprocably mounted in the upper arm 11 of the C-frame in axial alignment with the die 13 is a punch-stripper assembly 15 comprising a combined stripper and guide-sleeve 16 which is reciprocable in the upper arm of the C-frame, the punch 18 which is reciprocable in the sleeve 16, and the coil stripper spring 19, which is interposed between the enlarged head 20 of the sleeve 16, and the enlarged head 21 of the punch. This punch-stripper assembly is normally held in the upper position shown in Fig. 1 by a coil spring 22 which is interposed between sleeve head 20 and the upper arm 11 of the C-frame. Spring 22 acts to return the punch stripper assembly to its upper position after completion of the perforating operation. A set-screw 24, which is threaded into the sleeve head 20 and which engages in a flat or groove 25 in the punch, serves to limit reciprocating movement of the punch in the sleeve 16.

In a perforating operation, when the ram of the punch press descends, it strikes the head 21 of the punch forcing the punch and the stripper sleeve downwardly, compressing the lifter spring 22. When the bottom face of the sleeve 16 engages the metal sheet or other workpiece which is to be perforated, its motion is stopped, but the downward motion of the punch continues, to perforate the workpiece. During the perforating operation the spring 19 is compressed. As the ram of the press ascends, the spring 19 expands again to strip the punch from the work. Thereafter, as the ram continues to ascend, the lifter spring 22 expands to return the sleeve 16 and the parts carried thereby to their initial positions.

To prevent the stripper-sleeve and the punch assembly from being ejected or thrown out of the C-frame by the expanding lifter spring, the retainer clip 30 is provided.

According to the present invention this retainer clip is made by stamping out a clip which is cylindrical around most of its periphery but which has a flatted slide 31. The flat part of the clip engages in a flat or groove 32 formed in one side of sleeve 16. The flat or groove 32 forms shoulders on the sleeve 16 at opposite ends of the flat or groove which are engaged by the clip 30, thereby to limit the upward movement of the sleeve in arm 11, to prevent the punch-stripper assembly, including the sleeve, from being ejected from the C-frame. The retainer clip also serves the purpose of preventing the punch-stripper assembly from falling out of the perforating implement should the perforating implement be turned upside down when it is being transported.

The clip itself is seated in a recess 34 formed in the upper arm of the C-frame by counterboring the upper arm of the C-frame. The recess 34 overlaps the bore in upper arm 11 in which sleeve 16 reciprocates; hence, counterboring of recess 34 is easy. The clip is held in this recess by a screw 35 which passes through a hole

3

36 in the clip and threads into a tapped hole 37 in the upper arm of the C-frame.

40 denotes a conventional locating pin or gauge bar which acts to limit the distance to which the sheet metal or other stock, that is to be perforated, can be fed between the punch and the die, thereby to determine the distance from the inner edge of the sheet at which the hole is punched in the sheet. This locating pin or gauge bar is mounted in an opening in the upright portion of the C-frame and is secured in conventional manner in any adjusted position by a set-screw 42 which threads into the upper arm of the C-frame and which engages the locating pin or gauge bar.

In Fig. 4 there is illustrated a somewhat modified form 30' of retainer clip which is partially milled away on its lower surface, as denoted at 31', to provide a lip for engagement in flat or groove 32 of the guide sleeve 16.

The big advantage of the retainer clip of the present invention over prior types of retainer clips is in the simplicity of the operation required to make the recess 34 in the holder for the clip. With the type of retainer clip employed by the present invention, this recess can be counterbored, whereas heretofore an end-milling operation has been required to provide a recess in the upper arm of the C-frame for the retaining clip.

While the invention has been described in connection with different embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as fall within the scope of the invention or the limits of the appended claim.

Having thus described my invention, what I claim is:
In a perforating implement having a C-frame with

4

an upper stationary arm and a lower stationary arm, a stripper sleeve reciprocable in a bore in said upper arm, a punch reciprocable in said stripper sleeve, spring means interposed between said punch and said sleeve to strip the punch from the work upon completion of a perforating operation, and second spring means interposed between said sleeve and said upper arm for constantly urging the sleeve and the punch mounted therein to inoperative position, the improvement in combination therewith of an arcuate recess which opens upwardly from the upper surface of said upper arm, said recess joining said bore, said sleeve having a slabbed-off flat groove extending for a part of its axial length and terminating intermediate its ends and confronting said recess, a retaining member in said recess, and a single screw for securing said retaining member therein, said retaining member having a flat surface at one edge substantially coplanar with said groove to permit limited axial movement of said stripper sleeve in said bore, to preclude angular movement of said stripper sleeve in said bore, and to prevent ejection of said sleeve from said upper arm, said retaining member having a cross-sectional configuration in a plane perpendicular to the direction of punch reciprocation, a major part of which configuration includes an arcuate periphery fitting closely in said recess.

References Cited in the file of this patent

UNITED STATES PATENTS

645,264	King	Mar. 13, 1900
2,364,011	Wales	Nov. 28, 1944
2,427,409	Kirsch	Sept. 16, 1947
2,650,663	Wales	Sept. 1, 1953
2,685,928	Bergh	Aug. 10, 1954
2,744,577	Paxhia et al.	May 8, 1956