May 30, 1939. C. C. RICHARD 2,160,676

COMBINED PUNCH AND STRIPPER

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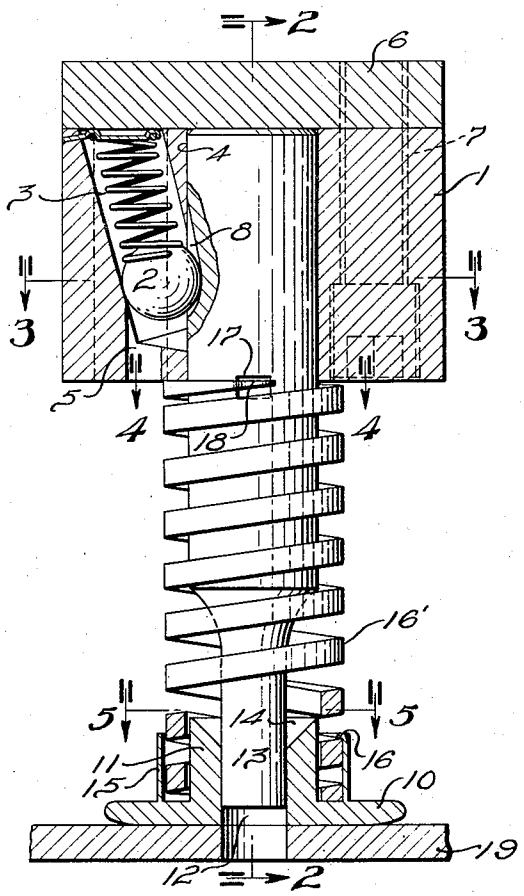

Fig. 1.

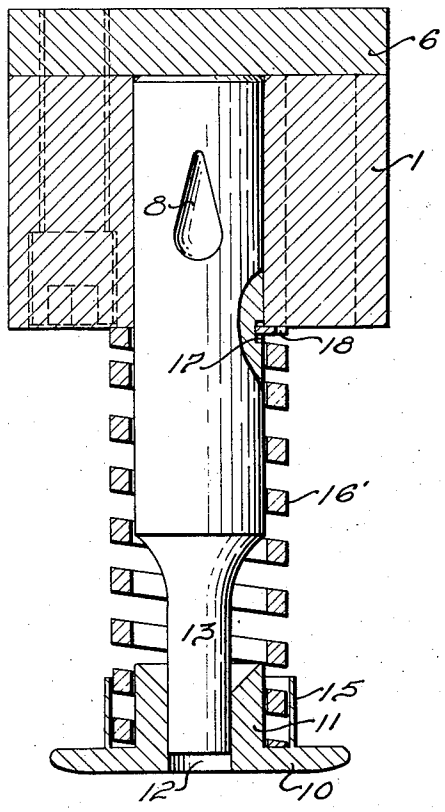

Fig. 2.

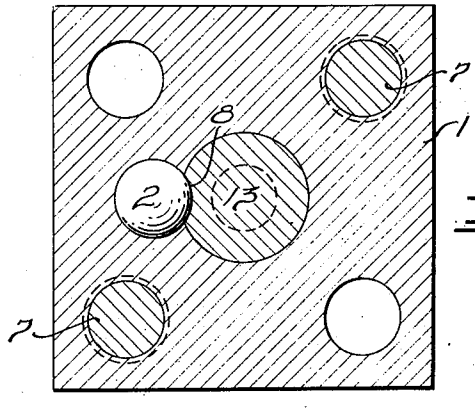

Fig. 3.

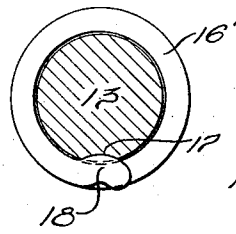

Fig. 4.

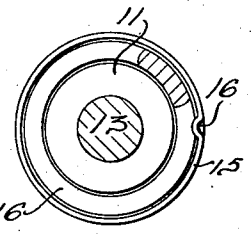

Fig. 5.

INVENTOR.
Clement C. Richard.
BY
Charles E. Fraser
ATTORNEY.

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2,160,676

COMBINED PUNCH AND STRIPPER

Clement C. Richard, Bloomfield Hills, Mich., assignor to Allied Products Corporation, Detroit, Mich., a corporation of Michigan

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7 Claims. (Cl. 164—110)

This invention relates to a punch and companion stripper, the object being to provide a punch which carries its own stripper plate or button so that in a group of punches for instance, instead of having an apertured plate common to the group and supported by the head of the press with which the punch set is associated, each punch carries its own stripper and thus the punches may be readily removed from the retainer without disturbing the remainder and avoids necessity of removal of the heretofore cumbersome stripper plate common to several punches.

It is further an object and feature of the invention to provide a combined punch and stripper in which the spring and stripper plate or button are supported by the body of the punch and removable as a unitary structure with the punch from its retainer.

It is further an object and feature of the invention to provide a combined punch and companion stripper including a spring element for projecting the stripper carried by the punch and independently engageable with the face of the retainer in which the punch is held, the arrangement being such that movement of the punch due to wear does not affect the seating of the stripper against the retainer face.

It is further an object and feature of the invention to provide a retainer in which the punch is automatically locked in position in the retainer body, the punch having a recess in its shank and the lock comprising a spring-pressed ball or the equivalent feeding into the recess and automatically taking up wear as the punch head and backing plate become worn with which is associated a coiled spring encircling the punch and a stripper button riding on the punch point and secured to the outer end of the spring, the punch shank having a notch to receive an inbent portion of the opposite end of the spring, the notch being of greater width longitudinally of the punch than the portion of the spring positioned therein providing for longitudinal displacement of the punch without displacement of the spring end from the notch through its pressure engagement with the face of the retainer.

These various objects and novel features of the invention are hereinafter more fully described and claimed, and the preferred form of construction of a unitary punch and stripper element embodying my invention is shown in the accompanying drawing in which—

Fig. 1 is a longitudinal section of a punch and stripper embodying my invention.

Fig. 2 is a similar section taken on line 2—2 of Fig. 1.

Fig. 3 is a section taken through the retainer body and lock element on line 3—3 of Fig. 1.

Fig. 4 is a section taken through the punch on line 4—4 of Fig. 1 showing the notch and indented spring seated therein.

Fig. 5 is a section taken on line 5—5 of Fig. 1 further illustrating the manner of attachment of the stripper plate or button to the spring.

It has been common heretofore, as above stated, to provide a stripper plate having apertures for the several punches of a group, which latter is spring-supported relative to the head of the press and mounted independently of the punches. Such previous construction becomes cumbersome in use due to the fact that if a punch is broken the stripper plate must of necessity be dismounted in order to remove the shank of a broken punch.

The punch retainer of this present invention which is indicated at 1, is of the same general character as shown in United States Patent No. 1,621,811 of March 22, 1927, issued to O. K. Richard and C. C. Richard. In this present case a ball 2 is used riding in an angularly disposed aperture 3 in the retainer body which aperture opens into the aperture 4 for the punch shank. There is also an aperture 5 from the bottom of the ball recess through the face of the retainer. This is provided to permit an instrument to be inserted to engagement with the ball to retract the same to thereby permit ready withdrawal of the punch.

There is provided the usual backing plate 6 to which the retainer body is secured as by screws inserted through the apertures in the retainer and backing plate to secure the punch head to the head of the press (not here shown). It will be noted that the shank of the punch has an inclined recess 8 as in the former patent mentioned, and the relationship of the lock and the recess 8 here shown is of the same character and for the same purpose as in the said United States patent.

I have thus described the retainer, the locking element, and the operation thereof for the reason that it is with such a structure that my punch and stripper unit is particularly useful. Punches frequently have to be withdrawn and new punches set in place but, by my improved construction and arrangement of the stripper and its spring as hereinafter described, the punch and stripper are as readily manipulated as the punch alone, no extra labor being involved on the part of the operator and avoiding not only

the cost but the loss of time incident to the assembly or removal of the prior forms of stripper plates with the punch head every time it became necessary to remove a punch from the head.

The stripper consists of what I will term a "button" 10 which may be of circular form having a hub 11 with an opening 12 therein for the punch point 13. This aperture 12 has a coned end portion 14 permitting the button to be readily set onto the end of the punch. Peripherally of the hub 11 is an outer cylindrical shell 15 spaced from the hub and of a length sufficient to receive at least a pair of turns of the coiled helical spring 16'. The peripheral edge of the shell 15 has an indented portion 16 which enables the button to be threaded onto the spring with the indentation engaging the upper face of a second turn of the spring as indicated in Fig. 1. When the button is turned sufficiently tightly, compression of the first coil relative to the second coil of the spring is produced which holds the button in place by tension. Other means may be provided for attaching the button to the spring but the above described means is of simple character and in the case of damage to a button permits its ready removal and substitution of a new one.

The face of the punch shank is provided with a notch 17 of arcuate form as will be understood from Fig. 4 and the end of the spring is inbent at 18 to enter this arcuate notch 17. The width of the notch longitudinally of the punch is greater than the width of the indented spring end. Thus the said spring end and in fact the spring itself may be freely moved longitudinally of the punch to the extent permitted by the width of the notch.

When the punch is seated in its retainer, the notch 17 has an upper edge within the recess for the punch shank in the retainer and thus permits the spring end to seat against the face of the retainer as will be readily understood from Fig. 2. The pressure of compression of the spring caused by the punch pasing through a plate 19 for instance as shown in Fig. 1 will be received by the face of the retainer and is not taken by the punch. Normally the spring is of such length that the stripper plate 10 has its lower face below the tip of the punch and thus, upon the punch entering the plate 19 the spring 16' is compressed and upon withdrawal of the punch in the formed aperture of the plate, the button will be projected to strip the work 19 from the punch end. The operation of the stripper is entirely automatic once the punch has been set in the retainer and the punch simply carries the stripper and its spring and supports the stripper property in relation to the punch yet in the case of breakage is readily removable from the punch.

When the punch, stripper and its spring are in assembled relation, the punch and stripper may be handled as a unit for insertion or removal from the retainer thus permitting the ready change of punches and ready removal of a broken punch and insertion of a new punch in its place due to the retainer construction as well as the unitary punch and stripper structure.

It is to be noted that the punch is held from rotation by the lock ball or element 2 as the notch 8 in the punch shank for the ball is of arcuate form fitting the ball as shown in Fig. 3 to thereby hold the same from rotation.

The retainer block is here shown as carrying only a single punch but the block may be provided with several punch apertures and punch locking elements of the character here shown and as is my common practice. The invention is not restricted however to the specific form of retainer shown as other forms constructed to permit ready insertion or removal of the punches may be utilized.

It is believed evident from the foregoing description, that the various objects and features of the invention are attained by the construction described; that a new facility in the handling of punches and stripper plates is provided by providing a punch and stripper unit wherein the punch carries its own stripper and thus providing a mode of use in insertion or removal from retainers carried by the punch head which is of particular benefit where several punches are used in a group.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is:

1. A combined punch and stripper comprising a punch having a shank and a point, a stripper plate apertured to receive the point and reciprocable thereon, and a helical spring encircling the punch and having one end attached to the plate and the other end to the punch shank, in a manner to permit the said end to limitedly move longitudinally of the shank.

2. A combined punch and stripper comprising a punch having a point and a shank, a stripper plate apertured to receive the punch point, a helical spring encircling the punch shank and secured to the stripper plate, the punch shank having an arcuate notch and the end coil of the spring having an arcuate inturned portion engageable in the notch to hold the stripper plate in normal position to a point beyond the punch shank.

3. A combined punch and stripper for association with a retainer, comprising a punch having a point and shank, a stripper plate reciprocable on the punch point, and a helical spring encircling the punch and secured to the stripper plate at one end, the opposite end being secured to the punch shank by a lost motion connection whereby on insertion of the punch shank in the retainer therefor the spring end may continuously seat against the retainer face as the punch through wear feeds into the retainer.

4. A combined punch and stripper unit comprising a punch having a shank and a point, a stripper plate having a hub apertured to receive the point, a helical coiled spring, the stripper plate having a cylindrical shell spaced from the hub providing a recess for the spring end, said shell having a part thereof engageable between the turns of the coil permitting the punch to be turned onto the coil to at least a second turn to thereby compress the end turn and retain the stripper plate thereon by tension, the other end of the spring being attached to the punch body.

5. A combined punch and stripper manipulatable as a unit for insertion in a retainer having an opening through one face thereof, and releasable means for automatically locking the punch therein comprising a punch having a point and a shank, the shank having a part cooperating with the locking means on insertion in the retainer, a stripper plate reciprocably mounted on the punch point, and a helical spring having one end attached to the stripper plate and the other end supported by the punch shank, the said support on the shank permitting a limited longi-

tudinal movement of the spring on the punch whereby as the stripper plate engages the work and compresses the spring, the pressure is taken by the face of the retainer.

6. A unitary punch and stripper assembly for association with a retainer body having an aperture to receive the shank of a punch comprising a punch having a shank insertible in the said aperture, a notch in the face of the shank, the end of the notch toward the shank end being positioned below the face of the retainer when the shank is inserted therein, a helical spring into which the punch shank is inserted, the end of the spring seating in the notch in a manner to slide longitudinally of the punch within the limits of the notch, and a stripper button carried by the opposite end of the spring, said button being apertured to receive the punch point, the connection between the spring and the punch shank compensating for wear on the end of the punch permitting the same to feed into the retainer.

7. In combination, a retainer having an aperture for a punch shank, a releasable lock element for holding the punch in place, a punch having a shank insertible in the aperture and formed for cooperative relation with the lock, a stripper comprising a plate reciprocable on the punch point, said plate having a cylindrical recess and a spring having one end engageable in the recess and attached to the plate and the other end attached to the punch shank, the arrangement providing for removal of the punch and stripper as a unit from the retainer by release of the lock.

CLEMENT C. RICHARD.