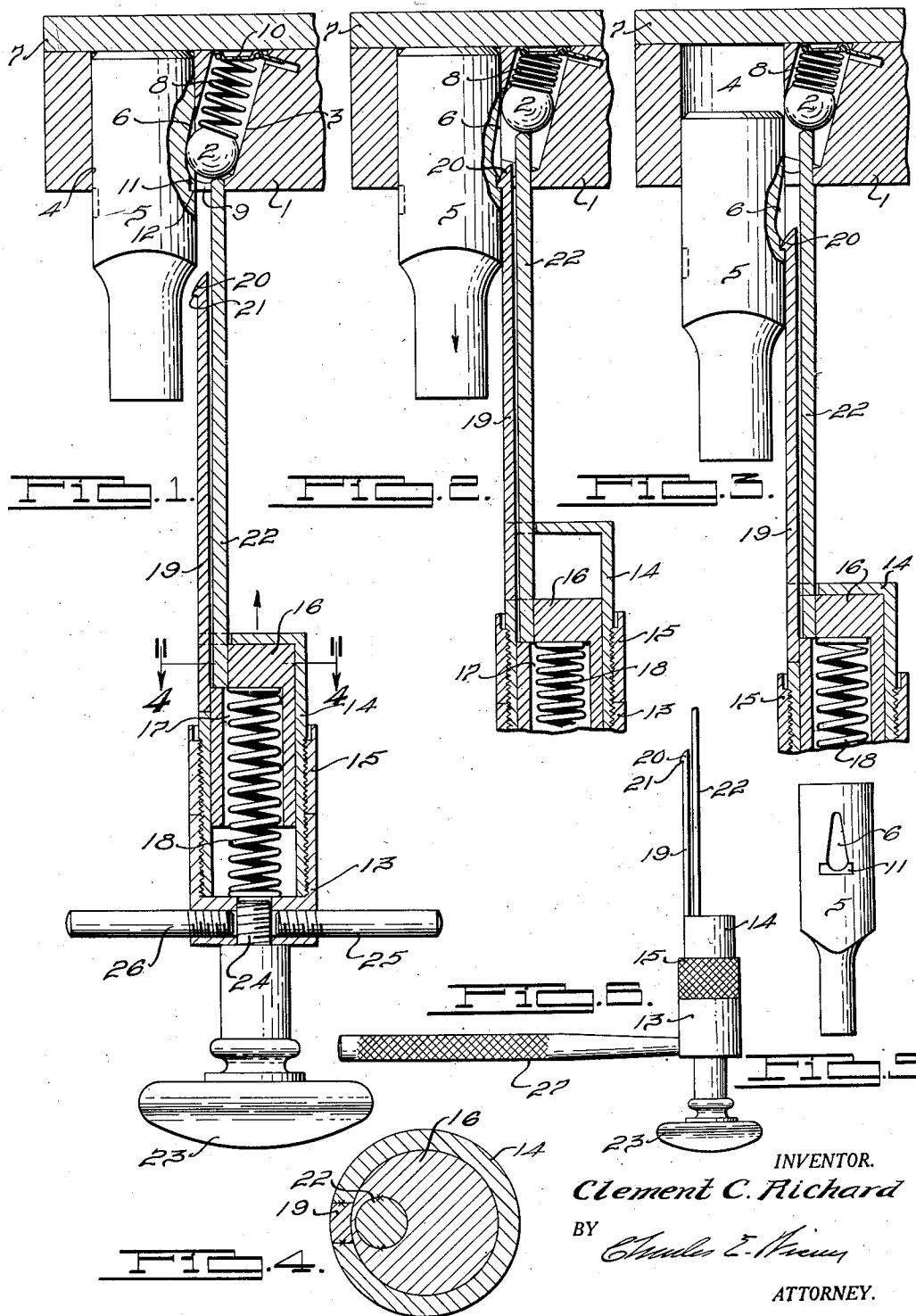


Sept. 17, 1940.

C. C. RICHARD  
PUNCH REMOVING DEVICE

Filed Dec. 13, 1937

2,215,015



INVENTOR.  
*Clement C. Richard*  
BY *Charles E. Krum*  
ATTORNEY.

## UNITED STATES PATENT OFFICE

2,215,015

## PUNCH REMOVING DEVICE

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

Application December 13, 1937, Serial No. 179,530

4 Claims. (Cl. 81—3)

This invention relates to a device for removing punches, dies and the like from locked position in the retainers, the object of the invention being to provide a means having a part adapted to hold the lock element in retracted position while another part is movable to withdraw the punch.

The device is operable with various forms of retainers having an automatic means for locking the punch or die in position as for instance in the U. S. patent to O. K. and C. C. Richard, No. 1,621,811 of March 22, 1927, or the U. S. patent to C. C. Richard, No. 1,974,217, issued February 10, 1935, or other forms of lock device in which it is required to force the lock element out of locking position against a spring tension to release the punch or die to withdrawal movement.

It is also an object and feature of the invention to provide a device having a punch carrying element which, upon insertion into the retainer block against the lock element, engages a notch provided therefor on the tool whereby, on release of pressure by the operator, the tool is automatically withdrawn.

It is further an object and feature of the invention to provide a spring-projected lock releasing pin carried by a housing in which there is a fixed tool engaging pin, the spring projecting the lock releasing pin being of greater tension than the spring forcing the lock element to locked position, providing a structure that upon release of hand pressure, the tool engaging pin will move to withdraw the punch before the lock element is released to movement by its spring.

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

Fig. 1 is a longitudinal section of a punch retainer and lock and of the withdrawal device in position at the time of insertion of the removing pin.

Fig. 2 is a similar section showing the position of the parts at the completion of the insertion of the release pin to a point of engagement with the notch therefor in the punch shank.

Fig. 3 is a similar section showing the relative movement of the punch removing pin and the lock retracting pin as the punch is removed.

Fig. 4 is an enlarged section taken on line 4—4 of Fig. 1.

Fig. 5 is a side elevation of the punch or die shank showing the lock recess and notch for the release pin.

Fig. 6 shows a form of device having a handle at one side for manipulation thereof.

In punch and die retainers, a spring-pressed lock element is provided to engage in a notch of the punch or die positioned in an aperture in a retainer body. This retainer and lock element, as above stated, may be of various forms. In the form here shown, the retainer body is indicated at 1 and a ball lock element at 2, the ball being insertible in an aperture 3 lying at an angle to the aperture 4 for the shank of the punch 5 and opening thereinto near the face of the retainer as shown.

The punch has a notch 6 in its wall into which the ball seats when the punch is inserted to engagement with the backing plate 7. This notch 6 is inclined to the longitudinal axis of the punch and the ball assumes a wedging relation therewith normally preventing withdrawal of the punch. The ball is projected to locking position by a spring 8 and there is a slot 9 opening from the punch aperture 4 into the bottom of the ball aperture 3. There is also a means for retaining the spring in position in the retainer block, here shown as a disk like element 10.

Heretofore, it has been the practice to insert a pin into an aperture opening to the bottom of the ball recess whereby the ball could be retracted from position and the punch withdrawn by hand. Punches are usually supported in the head of a press and dies on the base or table or the punch set may contain several punches as a group in a block having a series of apertures therefor and each of which is provided with a lock element such for instance as the ball 2. This retainer block or any form of retainer such for instance as a single retainer here shown may require the punch to be withdrawn when not in association with the press. It is the purpose of this invention to provide means for ready, practically automatic, withdrawal of a punch or die from a retainer block and for this purpose, I provide the punch not only with the notch for the lock element, such for instance as the notch 6, but I also provide a notch 11 opening from the bottom edge thereof as shown clearly in Fig. 5 and this notch forms a shoulder 12 at a right angle to the axis of the punch as will be understood from Fig. 1. The punch is shown in normal locked position in Fig. 1 and the punch removing tool is there shown at the beginning of the releasing operation.

In the preferred construction, the tool has a body consisting of an open ended cylindrical shell 13 interiorly threaded to receive the open end of an elongated, externally threaded, shell 14. On this shell 14 is a knurled locking nut 15. The member 14 is open ended and a cylindrical body 16 is insertible therein, this body having a recess 17 to receive one end of a coiled compression spring 18, the opposite end of which seats on the inner face of the end of the outer shell 13. It is to be noted that the shell 14 is firmly seated in the member 13 being held from longitudinal movement relative thereto. However, the body 16 is reciprocable in the interior of the shell 14. To the shell 14 is fixedly secured an elongated rod like stem or pin 19 having an end formed with a point and a curved face 20 providing a hook portion 21. There is also a rod 22 fixedly attached to the spring-pressed body 16 which extends through an aperture provided therefor in the head of the shell 14 as will be understood from Fig. 1.

A handhold is also provided comprising a knob 23 having a stem provided with a threaded extension 24 for securing the same to the head of the shell 13 and there are also transversely extending companion pins 25 and 26 threaded in the head 13, the purpose of which is to provide a grip for two fingers of the hand of the operator with the knob 23 resting in the palm of the hand. The tool, when thus grasped, may be positioned with the rod or pin 22 extending through the slot like aperture 9 in the face of the retainer to engagement with the punch locking element or ball 2 as here shown.

When the ball is thus engaged, the pin, by application of pressure, first retracts the ball 2 to the position shown in Fig. 2 collapsing its spring 8 and then the spring 18 is compressed causing the point of the hooked pin 19 to pass into the slot 9 of the retainer block and to snap into engagement with the ledge 12 of the notch 11 in the punch shank. The pin 19 is of spring metal and spaced a slight distance from the stiff pin or rod 22 thus permitting the same to pass through the slot 9 whereupon the hook end of the pin 19 moves into the notch 11. The tension of the spring 18 is greater than that of the spring 8 which, as heretofore stated, tends to force the ball to its locking position but the difference in the length of the rod like elements 19 and 22, when in normal position shown in Fig. 1, requires that the spring 18 be compressed in order to move the hook end of the member 19 into the punch recess 11. Thus, when the parts are in the position shown in Fig. 2 with the hook end of the member 19 in place, a release of the pressure by the hand of the operator will first permit movement of the member 19 and shell 14 in respect to the member 16. This is the desired arrangement of the parts as it is necessary to insure holding the ball or equivalent lock element in retracted position until the recess 6 for the lock element is out of position to be engaged by the ball. Thus, on the partial release of pressure by the hand of the operator, the member 19 will move relative to the member 22 withdrawing the punch from its aperture as shown in Fig. 3. This movement of the device from the position of Fig. 1 to that of Fig. 3 is very rapid appearing as a single act of the operator. Thus it becomes a very simple matter to withdraw the punch from its locked position in the retainer block.

It is frequently the case that punch points or punches break and require the shank to be re-

moved and a new punch introduced. In introduction of the punch to place in the retainer, the ball or similar lock element is automatically moved out of place by the end of the punch and as the punch end engages the backing plate 7, the ball normally moves to locking position. Thus any punch is readily withdrawn to introduce a new punch in replacement of a broken one or a punch of a different form may be introduced as may be required for a different operation.

It is oftentimes necessary to reach in beneath the head of a press for instance to a position in which the operator cannot grasp the device by the pins 25 or 26. For this purpose of introduction of rods 19 and 22 into a retainer which is not accessible with the hand of the operator on the knob 23, I provide a side handle 27 insertible in one of the threaded apertures for the pins 25 or 26. This will enable an operator to move the tool conveniently from a distance to one side thereof rather than from directly at the end. The structure in Fig. 5 is otherwise entirely similar to that shown in Fig. 1, the elements being the same.

The above description has referred more particularly to punches or punch shanks but die members cooperative with such punches are removable from similar retainers in the same manner by the tool here shown and in fact any device that is locked in a similar manner in a block may, if the block is apertured in the manner hereinbefore described, be removed by use of my improved tool here shown in the preferred form.

It is believed from the foregoing description that the various objects of the invention are attained by the punch removing device here shown; that the structure is simple and comparatively inexpensive in character, and that the device may be used with the various spring-pressed lock elements commonly known in the punch and die retaining art.

Having thus briefly 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 device for the purpose and function described comprising a hollow body, a handle at one end thereof, an elongated pin fixed to the body and extending therefrom, said pin having a hooked end, an element slidable in the body, a spring for moving the same in one direction, an elongated pin attached to the said slidable member and extending to a distance beyond the hook end of the first pin, said longer pin providing a lock retracting element and the hooked pin providing a punch engaging element.

2. A device for the purpose and function described, comprising an externally threaded cylindrical body element open at one end, a handhold at the opposite end thereof, a second cylindrical open ended hollow shell externally threaded for association therewith, a lock nut on said second shell to hold the same in fixed relation with the said body, a pin having a hook end in fixed relation with the said second shell and extending therefrom at one edge parallel with the longitudinal axis thereof, a cylindrical member slidable in the said second shell, a spring tending to force the same to the bottom of the said second shell, and a second pin extending through the bottom of the said shell and fixed to the sliding member, the second pin being closely adjacent to and parallel with the hooked pin and, when in pro-

jected position, having its outer end at a distance beyond the hooked end of the first pin.

3. A device for the purpose of removing a punch or the like from its aperture in a retainer in which it is held by a spring-pressed ball engaging a notch therein, said retainer having an opening through its face and the punch having a notch comprising a device having a pin like part provided with a hooked end, a second pin like part lying closely adjacent to and parallel therewith and normally having an end extending to a distance beyond the hooked end of the first pin like part for introduction through said retainer opening, said pin like parts being relatively movable in parallel relation, a spring for moving the longer pin like part with respect to the pin like part having the hooked end, a hand hold for moving the pin like parts to position with the longer of said pin like parts retracting the ball and compressing the spring in the retainer and the hooked end of the other pin like part engaging the notch of the punch.

4. A device for the purpose of removing a punch or the like from its aperture in a retainer in which it is held by a spring pressed lock element engaging a notch provided in the punch, said retainer

having a recess for the lock element open at its lower end to the punch aperture, and a slot opening through the face of the retainer and extending from the punch aperture to the recess for the lock element, comprising a holder, a resilient pin like element having one end fixed to the holder and extending therefrom and terminating in a hook end, a pin like element carried by the holder in a relatively movable relation, a spring carried by the holder for projecting the movable pin like element with its end at a distance beyond the hook end of said fixed pin like element, the structure providing a means whereby, as the movable pin like element is inserted into the retainer through the slot, the lock element is moved from locked relation with the punch permitting the hook end of the fixed pin like element to enter the slot and engage the notch in the punch and, as the punch is withdrawn from its aperture by said fixed pin like element, the lock element is held in retracted position by the relatively movable pin like element until the notch in the punch is moved from its position for cooperation therewith.

CLEMENT C. RICHARD. 25