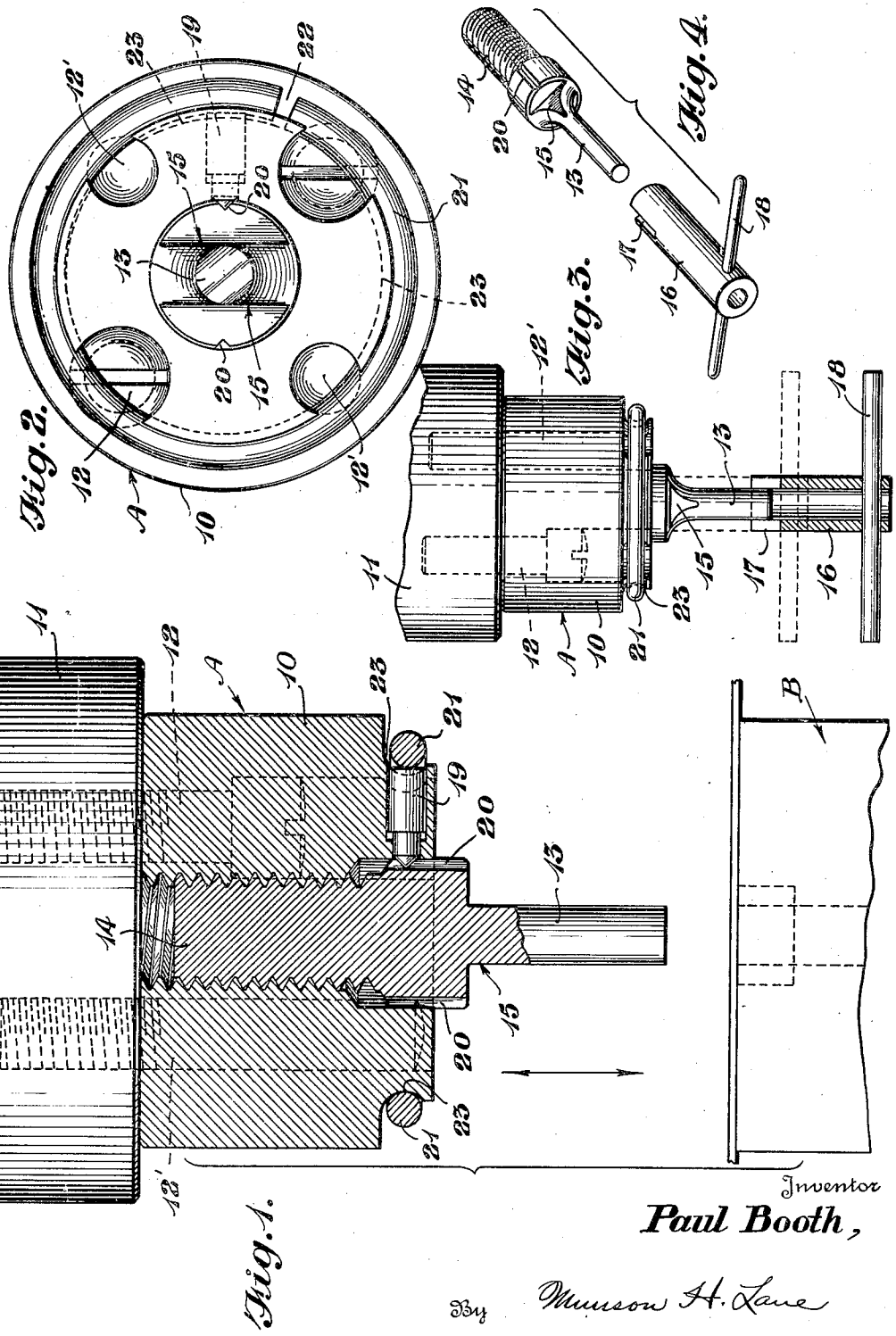
Sept. 5, 1939. P. BOOTH 2,172,272

PUNCH AND RETAINER ASSEMBLY

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Inventor
Paul Booth,
By Munson H. Lane
Attorney

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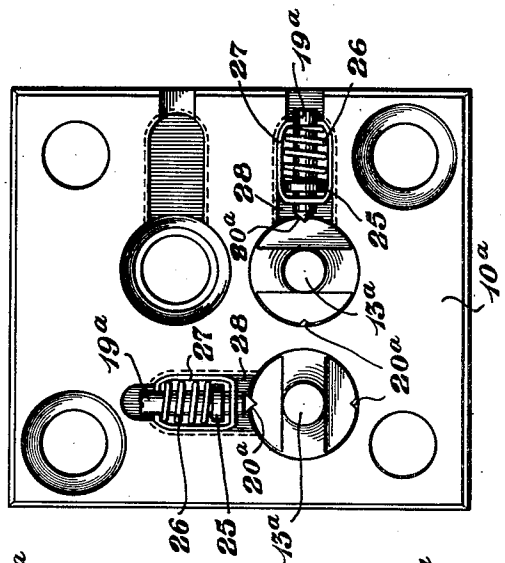


Fig. 6.

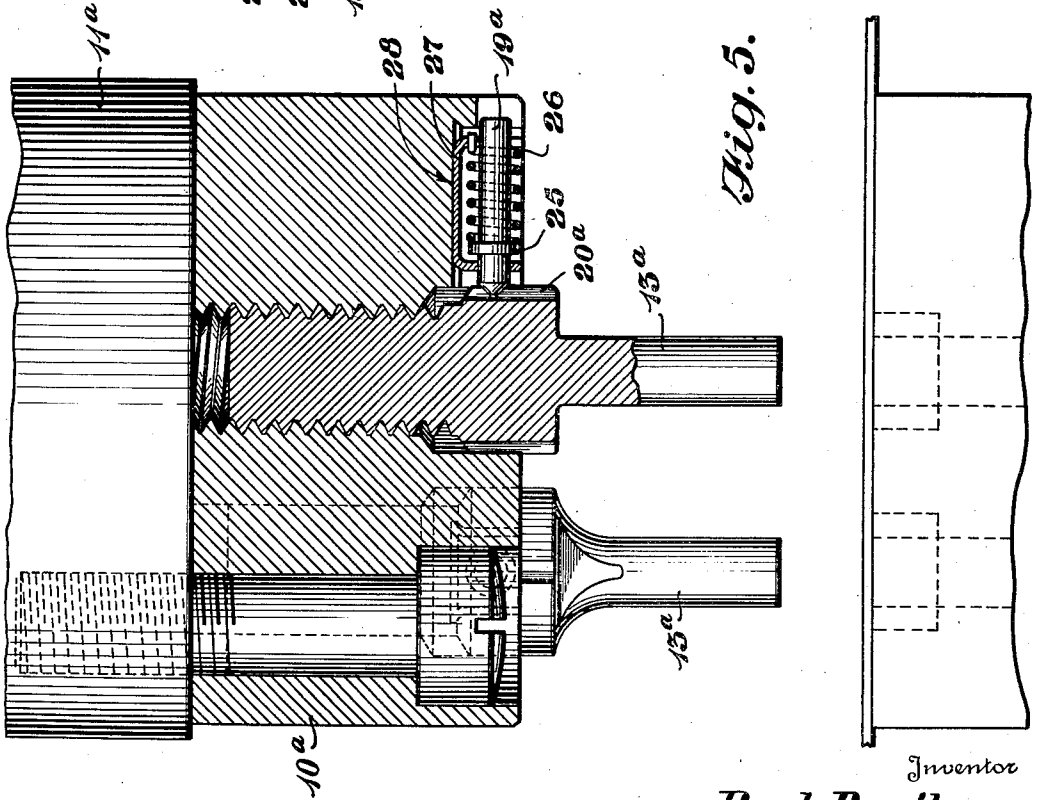


Fig. 5.

Inventor

Paul Booth

By Munson H. Lane

Attorney

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PUNCH AND RETAINER ASSEMBLY

Paul Booth, Indianapolis, Ind.

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3 Claims. (Cl. 164—124)

The invention relates to improvements in punch presses, such as are commonly used in the manufacture of automobile, refrigerator and electrical equipment, and more particularly to an improved punch and retainer assembly for said punch presses.

In present day presses the punch is generally held in place solely by use of spring pressed balls or pins. This arrangement is objectionable as in the operation of piercing a metal sheet an enormous amount of power is required both to force the punch through the metal and to retract it after the punching operation is completed.

It is also important to provide for adjustment of the punch so that the desired length of punch may be employed depending on the work being done.

Among the objects of my invention are to provide for ready replacement and adjustment of the punch while at the same time insuring strength and rigidity in the punch assembly.

These objects are accomplished according to the present invention by threadedly mounting the punch in the retainer body and retaining the punch in any desired adjusted position by means of a spring pressed pin or the like which serves to prevent rotation of the punch.

The invention will be more readily understood by reference to the accompanying drawings wherein are set forth by way of illustration preferred embodiments of the inventive thought.

In the drawings:

Fig. 1 is a transverse vertical section, partly in elevation, showing the punch block and its cooperating die.

Fig. 2 is a bottom plan view of the punch and retainer assembly.

Fig. 3 is a side elevation of the punch and retainer assembly on a smaller scale than in Figs. 1 and 2 and showing a key member employed for adjusting the punch.

Fig. 4 is a perspective view of the punch member and the key for adjusting the same.

Fig. 5 is a view similar to Fig. 1 but showing a modification wherein a plurality of punches are employed in a single punch block or retainer.

Fig. 6 is a bottom plan view of the same.

In the drawings A denotes generally the reciprocating punch member and B the corresponding die member of a punch press which is intended for punching heavy metal sheets and the like.

The punching member A includes a punch retainer or punch block 10 which is adapted to be detachably secured to a punch ram 11 of any standard press by means of suitable screws or the like 12—12 and 12'—12' passing vertically through holes in the punch block into threaded apertures in the punch ram.

According to my invention the punch proper 13 is provided with a threaded shank 14, which fits into corresponding threads within an aperture in the retainer or punch block 10. As shown the complementary threads of the shank and socket respectively are heavy and very strong and are adapted to bear the entire strain incident to the punching and withdrawal movements of the punch in the operation of piercing a metal sheet. The punch may be adjusted to any desired position depending on the work to be done.

To facilitate such adjustment the punch is flattened as indicated at 15 to permit it to be engaged by a suitable key which is in the form of a socket 16 adapted to fit over the punch 13, and at its extremity is cut away as at 17 so as to fit the flatened portion 15 at the junction of the punch 13 with its shank 14. A suitable handle 18 provides sufficient leverage to easily turn the punch to the desired position.

After the punch is adjusted it is held against accidental rotation by suitable means 19, shown as in the form of a pin, one end of which fits into an axially extending keyway 20, two of which are formed in the shank 14 of the punch at angles of 180° apart just above the flattened portion 15. The pin is urged inwardly by suitable means herein shown as a resilient ring-like member 21, formed of spring steel, with its ends approaching each other at 22. The member 21 fits in a groove 23 formed at the lower end of the retainer head 10. It will be noted that very accurate adjustment of the punch is possible within the limits of the vertical slot 20. On each turn of the key through an angle of 180° the end of spring pressed pin or plunger 19 will snap into one of the slots 20, with a clicking sound. Any number of slots 20 may be provided, and the pitch of the screw threads in the shank 14 may be varied as desired, thereby determining the fineness of adjustment.

Figs. 5 and 6 show another embodiment of the invention wherein a number of punches 13a are mounted in the head 10a in a manner similar to that described in the first embodiment of the invention. Each punch is held in position within the retainer by means of a pin or the like 19a, provided with a shoulder 25 against which a spring 26 presses to urge the pin into its keyway 20a. The pin 19a and spring 26 are carried by a

retainer member 27 which is mounted in a cut-away portion 28 formed in the lower face of the punch block 10a.

It will be noted that according to the herein disclosed embodiments of my invention the punch block or retainer does not have to be removed from the press to permit removal or adjustment of the punch or punches, which are readily accessible from below the block for such purposes. It will be further noted that the threaded shank is an integral part of the punch, and permits metal to be pierced with the punch adjusted to any length, the punch being stripped out of the pierced sheet by the reverse action on the threads.

The punch assembly is strong and rigid in construction permitting it to be used for heavy duty metal work as distinguished from light work such as paper punching for example.

The entire device is novel and distinguishes from devices in common use in many ways among which may be mentioned the following:

(1) The method of retaining the punch in the retainer is by means of threads, this allows for ready length adjustment, which is desirable in the use of dies. The desired punch length can be obtained by screwing the punch in or out. The spring holds a cone shaped pin in a notch on the punch. This keeps the punch in line with other than round dies. The spring and pin also keeps the punch in a set position as to length.

(2) In an operation of piercing sheet metal an enormous amount of strength is required to pull the punch out of the sheet metal after it has been forced through the metal by the power of the punch press. The threads accomplish this, as the retainer is as strong pulling out as pushing through. Present day devices are objectionable as the balls or pins used to keep the punches in place split or break from the operation of stripping the punch out of the sheet metal.

(3) The flattened punch point allows a special wrench to actually screw the punch out of the retainer. Present day devices depend on a ball or pin being pushed to a new position and then pliers applied to pull the punch out. But due to the broken or marred balls, pins, rust, or oily parts, it is often impossible to remove the punches or button dies without taking the whole die apart. (Small holes are usually required.)

(4) The punch and retainer set consists of four parts, namely, retainer body, punch, pin and spring. Present day devices usually have in addition a backing plate. This backing plate is not needed with the screw type retainer set. Due to this assembly requiring 4 parts it is cheaper to make than the five part type now used.

I claim:

1. For use in a punching machine of the reciprocating type, a punch block adapted to be secured to a reciprocable press ram, a punch provided with a threaded shank adjustably mounted in the punch block, the lower portion of the punch shank being provided with a vertical keyway, and the lower portion of the punch block being provided with an annular groove, a passageway connecting the groove and said keyway, a pin mounted in said passage, and an annular spring member mounted in said groove and serving to force the head of said pin into said keyway to lock the punch against accidental rotation.

2. For use in a punching machine of the reciprocating type, a punch block adapted to be secured to the reciprocable press ram, a plurality of punches having threaded shanks adjustably mounted in said block, each having a keyway and a spring pressed pin for engagement with said keyway to hold its respective punch in adjusted position.

3. For use in a punching machine of the reciprocating type, a punch block adapted to be secured to the reciprocable press ram, having a threaded socket, a punch having an integral threaded shank adjustably mounted in said socket, an axial keyway formed in the punch member just below the threaded portion, and a spring pressed plunger slidably mounted in said punch block and having one end engageable in said keyway to prevent accidental rotation.

PAUL BOOTH.