HAND LOADING PRESS FOR FIELD USE OR THE LIKE

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ABSTRACT

A ram element is slidable on parallel rods, which at one end are secured to a die holder into which standard rifle and pistol dies are threaded along an axis parallel to and midway between the rods. At their other end, the rods are secured to a base to which hand operated levers are pivotally mounted. Sliding movement of the ram is effected through links connected between it and the levers. The links are arranged so that of the force components applied to the ram from the levers, all but those directed parallel to the axis of the die holder are balanced out. The ram is adapted to releasably hold seats for cartridge cases of different sizes, and has a central opening through which a primer cap passes upon being ejected from a spent case by a die decapping pin as the ram forces it into the die held in the die holder.

4 Claims, 6 Drawing Figures
HAND LOADING PRESS FOR FIELD USE OR THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates to presses for use in reloading cartridge cases.

2. Description of the Prior Art
On an extended hunting trip, it is desirable to be able to re-size and reload spent cartridge cases of various sizes, as for pistols and rifles requiring cartridges of different calibers and lengths. Occasionally, one may wish to reform and shorten the neck of a case before reloading. All such operations are readily performed with a heavy and bulky press mounted on a workbench. Such bench presses are adapted to accept standard dies of different sizes for the required operations, and to exert the tremendous forces needed for such operations. However, they are impractical for field use.

In the past, attempts have been made to devise hand tools for such purposes. However, in such tools as heretofore known, each tool has an integral die for use in reloading cases of one size. Thus, one needs a number of such tools in order to perform the desired operations on cases of different sizes. Additionally, such hand tools in use inherently set up forces lateral to the axis of the die and casing. For some operations, the work required to overcome such lateral forces requires power of the type that can only be exerted by a bench press. Accordingly, previously known hand tools are impractical for the desired purposes.

SUMMARY OF THE INVENTION
This invention embraces a hand tool having a ram element slideable on parallel rods to one end of which is fixed holder to accommodate a plurality of standard dies, the other ends of the rods being secured to a base to which a pair of hand operable levers are pivoted, and link means coupling the levers and ram element and operable to balance out and nullify all force components on the ram element except those parallel to the direction of movement thereof.

BRIEF DESCRIPTION OF THE DRAWING
FIG. 1 is a side elevation view of the tool with the hand levers in closed position;
FIG. 2 is a side elevation view of the tool with the hand levers moved to open position, and showing a spent rifle case mounted on the ram, and a die secured in the die holder;
FIG. 3 is a bottom view of the tool of FIG. 2, to aid in explaining the operation of the links for balancing out lateral force components exerted thereby on the ram as the hand levers are closed to force the case into the die;
FIG. 4 is an enlarged, fragmentary side elevation view showing the ram and die holder juxtaposed when the hand levers are closed, wherein the case has been forced into the die and the decapping pin on the die has forced the primer out of the case;
FIG. 5 is a top plan view of a case holder or seat that is removably held by the ram; and
FIG. 6 is a top plan view of the ram.

DESCRIPTION OF PREFERRED EMBODIMENT
Referring to FIGS. 1, 2 and 6, a ram element is shown as a block 10 that is slideable on a pair of spaced parallel rods 12, 14, such ram being provided with parallel openings 16, 18 dimensioned for smooth sliding fit on the rods. At their lower ends as viewed in FIGS. 1 and 2, the rods 12, 14 are secured to a base 20. In the example shown, the base 20 is a block having parallel openings to receive the lower ends of the rods 12, 14. The lower ends of the rods are threaded, and upper nut elements 22 are threaded onto the rods, which are then passed through the block and secured thereto by lower nut elements 24.

The upper ends of the rods 12, 14 are threaded in tapped openings in a die holder block 28, such die holder having an enlarged threaded opening 30 of the diameter required for threaded engagement with the externally threaded bodies of standard pistol and rifle dies. The axis of the opening 30 is centered between the rods 12, 14. In assembly, the rods are threaded into the die holder; the ram 10 is slidably positioned on the rods; the upper nuts 22 are threaded onto the rods; the rods are passed through the block 20; and the nuts 24 are threaded onto the ends of the rods. The nuts 22 are suitably adjusted to insure the desired parallelism of the rods when the nuts 24 are tightened so as to fasten the rods and bracket rigidly together.

Referring to FIGS. 1–3, hand operable levers 34, 36 are shown pivotally mounted on the ends of pins 37, 38 extending through the block 20. In the example shown, the levers are formed with outer hand grip portions provided by solid blocks 40, to the opposite surfaces of which are secured rigid plates 42, 44. As shown, the plates 42, 44 are parallel, and are spaced apart the width of the block 20. Each pair of plates 42, 44 is positioned with their inner ends astride the block 20, and pins 37, 38 are passed through aligned openings of the plates and the block. The pins have heads that abut one plate, and nuts 46 are threaded on the other ends of the pins. Pins 37, 38 are outboard of the rods 12, 14, and their axes are in a plane that is at right angles to the rods, and equally spaced from the axis of the opening 30 in the die holder.

The ram 10 is adapted to be moved along the rods 12, 14 by action of the levers 34, 36, through means adapted to balance out lateral force components on the ram. In the arrangement shown, this is accomplished through respective pairs of links 50, 52, and 54, 56 connected between the ram and the levers. As shown, the links 50, 52 at one end straddle the lever 34 and are pivotally mounted on the ends of a pin 58 extending through the lever plates and the links 50, 52. At their upper ends, the links 50, 52 are pivotally mounted on the ends of a pin 60 that extends through the links and the ram 10. In similar fashion, the lower ends of the links 54, 56 are pivotally mounted on the ends of a pin 62 extending through the links and the lever 36, and their upper ends are pivotally mounted on the ends of a pin 64 extending through the links and the ram. The axes of the pins 60, 62 are inboard of the rods 12, 14, are equally spaced from the axis of the die holder opening 30, and are also in a plane at right angles to the rods.

With this arrangement, the levers abut the ends of the ram 10 when fully closed. Accordingly, the fully closed positions of the levers determine the uppermost position of the ram.

The ram 10 is adapted to releasably support a casing seat or holder 70. As best seen in FIGS. 3 and 4–6, an inverted T-shaped groove 72 is formed in one face of
the ram and its upper surface. From such face, the groove has parallel sides which terminate in a semicircular closed end (FIG. 6) that is coaxial with an opening 74 through the ram. The opening 74 is of a diameter larger than that of a spent primer cap to be ejected from a case. The upper portion of the seat 70 is shaped as a standard shell holder having a C-shaped groove 76 with an overhanging lip so that the head of a spent case 80 can be positioned with its rim 82 captured therein (FIG. 4).

Such shell holders are provided in different sizes to sl tidably receive and capture the heads of cases of different sizes. However, the dimensions of the lower portions of all such holders are identical, so that each has the same sliding and mating engagement with the slot 72 in the ram. Further, the ram is provided with a lateral tapped opening 84 through which a rod 86 is threaded. The outer end of the rod 86 is shaped so that it can be turned, as by an Allen wrench or miniature screwdriver, until its inner end engages the lower surface of the flange on the lower portion of the holder. In this manner, the holder is locked in place with its opening coaxial with the opening 74 in the ram.

With the holder 70 thus positioned, the levers 34, 36 are raised to locate the ram in its uppermost position. Then a die 90 is secured in the die holder 28. The die is a standard die having a threaded body or housing 92 that is inserted into the die holder via a knurled upper end portion 94 of the body. Such body is threaded into the die holder until its lower end projects below it and is in near touching engagement with the holder 70. A locknut 96 on the body is turned against the upper end of the die holder 28 so as to lock the die body in place. Then the primer remover and expander die, indicated at 98, is adjustably positioned with its decapping pin extending into the upper portion of the seat 70. For such adjustment, an element 102 having a knurled end is threaded into the body 92. Such element 102 is also internally threaded to matingly receive the upper portion of the die 98. The knurled end of the element 102 is turned against the upper end of the body. A locknut 104 on the die 98 is backed off from the element 102 until the die 98 is turned to the desired position, after which the locknut 104 is tightened against the upper end of the element 102 to secure the die 98 in place.

Since the die 90 is a standard die, the arrangement and operation of the parts above described will be understood to have been given for the purpose of aiding in describing the operation of the tool of the invention. After the desired adjustments have been made, the hand levers 34, 36 are opened, and a spent case 80 is fitted into the upper portion of the seat 70. It will be understood that the usual precaution is taken of coating the exterior of the case with a suitable lubricant. The case is re-sized and decapped by forcing it up into the die 90. This is accomplished, of course, by forcing the hand levers 34, 36 to the closed positions (FIG. 4).

In this connection, a substantial portion of the case length is moved into the die body 92 before pressure for resizing is applied. At such point, the hand levers 34, 36 are substantially less than 45° from the vertical and the links pairs 50, 52 and 54, 56 are even closer to the vertical. The final closing action to the positions shown in FIG. 4 is effected by placing the heels of the hands against the hand grip portions of the levers to force them toward each other. Since the upper ends of the links are inboard of the parallel rods 12, 14, it will be seen that the force components of greatest magnitude exerted on the ram are parallel to the rods.

Still further in this connection, it should be noted that each link of each pair also exerts a force on the ram tending to move it towards the opposite parallel rod. However, the forces thus exerted by the pairs of links are equal and opposite and are thereby balanced out. Still further, the links acting on the same face of the ram exert a turning force thereon. However, an equal and opposite turning force is exerted by the links on the other face of the ram. Accordingly, the hand loading press of my invention insures that the forces exerted on the hand levers are converted into forces on the links that are solely parallel to the rods. Through the mechanical advantage obtained by the placement of the link elements as shown and described, the tremendous forces needed for re-sizing a rifle or pistol case are readily applied.

When the ram is thus forced to its upper position, the case is re-sized. Simultaneously, the decapping pin forces the spent primer out of the case and causes it to pass through the holder 70 and the ram. Then the levers are opened to pull the re-sized case out of the die. As will now be understood, such movement of the levers is also effected with lateral and turning forces canceled out, and the links exert pulling forces on the ram parallel to the rods to facilitate easy removal of the case from the die body.

In fact, my tool permits one to exert the forces necessary to shorten the neck of a case, and thereby reform it, e.g., to reform a 30-06 case in a 308 die. This means that the longer case must be reform ed so that it is approximately one-half inch shorter, so that its neck is the same distance closer to its primer end. As will be known, to do this requires tremendous power, and is an operation that has not been considered feasible for any but a bench press. However, such operations are readily performed with a hand loading press in accordance with my invention.

Further, the tool with which all such above described operations are readily carried out is small and of light weight. In one example, the tool has hand levers each formed of a pair of steel plates approximately 8.6-in. long, 0.625-in. wide, and 0.125-in. thick, such plates being secured at one end to an aluminum block 3.0-in. long, 0.625-in. wide, and 0.50-in. thick. The links in such example are 4.3-in. long, 0.5-in. wide, and 0.125-in. thick, with 3/16-in. holes spaced 3.8-in. apart. On the hand levers, the links are pivotally mounted on pins 58, 62 that are spaced 1.8-in. from the pins 36, 38 on which the levers are pivotally mounted on the block 20. The pins on which the upper ends of the links are mounted are spaced apart approximately 0.624-in. The rods 12, 14 are 0.312-in. drill rods that are 7.8-in. long. The die holder is 1.863-in. long, and 1.0-in. thick. The ram is 1.82-in. long, 0.875-in. high, and 0.75-in. thick. The ram and die holder are both made of hardened steel. The total weight of such tool is approximately 2 pounds.

I claim:
1. In combination:
   a holder element for releasably holding a die, said holder element having a through opening in which the die is received;
   a pair of parallel rods, a base element said rods at one end being secured to said die holder element, the axis of said through opening being parallel to and
centered between said rods, said rods at their other end being secured to said base element;

a ram element having parallel openings through which said rods extend,
said ram element being slidable on said rods,
said ram element having a center line on the axis of said through opening;
a pair of hand levers pivotally mounted on the ends of said base element;
and respective link means connecting each hand lever to said ram element,
each link means being pivotally connected both to the associated hand lever and to said ram element,
said link means being arranged so that of the forces transmitted thereby from the hand levers to said ram element, the force components lateral to said parallel rods are equal and opposite.

2. The combination of claim 1, wherein a pair of spaced parallel pins extend through said ram element, the axes of said pins being in a plane that is perpendicular to said parallel rods, each link means comprising a pair of links mounted on the ends of a respective one of said pins.

3. The combination of claim 2, wherein said pins are located between said parallel rods.

4. The combination of claim 1, including a seat element for releasably holding the head end of a case to be forced into a die held by said die holder element; and means in said ram element for releasably securing said seat element thereto on the center line thereof.