Feb. 23, 1954 A. P. BERNARD 2,670,044

PRESS FOR FORMING PELLETS

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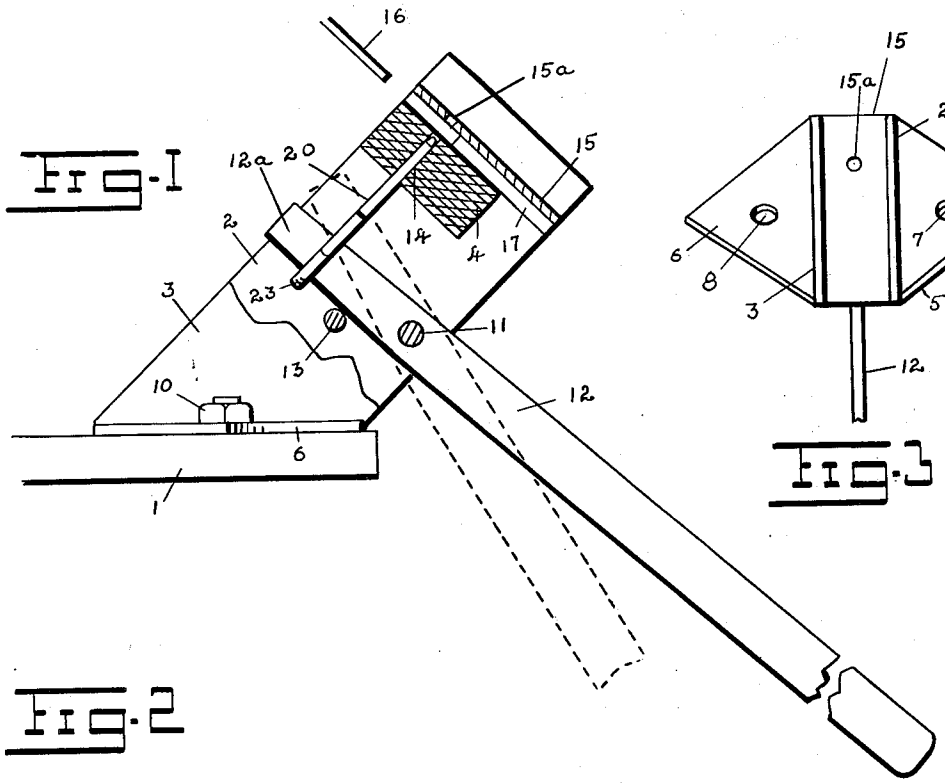


Fig. 1

Fig. 2

Fig. 3

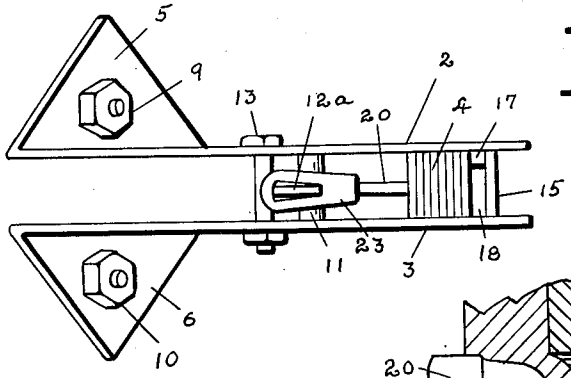
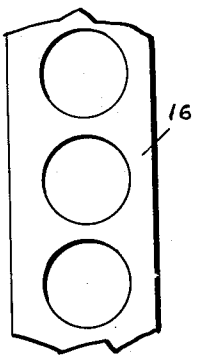


Fig. 4



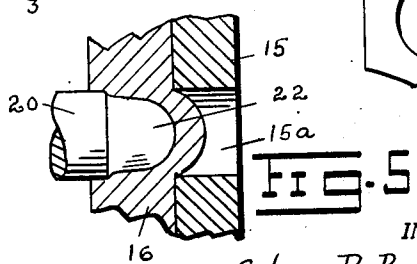


Fig. 5

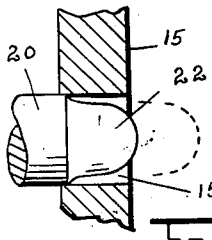


Fig. 6

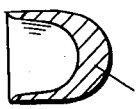


Fig. 7

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PRESS FOR FORMING PELLETS

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Application May 23, 1950, Serial No. 163,740

1 Claim. (Cl. 164—96)

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Air guns and air pistols are in common use. They shoot a projectile with compressed air or gas of other sorts under pressure. Such guns or pistols use round shots or pellets of various designs. Such shots or pellets are usually made of lead or lead composition.

The object of this invention is to provide a punch press that will punch lead pellets from a strip of sheet lead and do it accurately and rapidly and economically.

Another object of the invention is to provide a punch press that will form a pellet that has a heavy head and a light weight hollow tail, the tail being cylindrical on the outside and tapered on the inside.

Another object of the invention is to provide a press that will form a well balanced pellet that can be made to spin on its long axis when shot from an air gun with a rifled barrel.

Another object of the invention is to provide a punch press in which the punch is moved upward on a slant through guides.

Another object of the invention is to provide a punch press that has parallel guide plates suitably spaced apart with a hole through the plates at right angles thereto through which the punch can operate on the strip of lead that is fed between the plates.

Another object of the invention is to provide a press in which the punch will eject the pellet formed thereby from the outermost plate which is placed on an incline so that the pellet can roll therefrom by gravity.

Another object of the invention is to operate the punch by a lever mounted on a pivot which is placed in the frame of the press below the guide plates and below the lead plate on which the punch is to operate so that a downward movement on the end of the lever or handle will cause the punch to operate upward through the guide plates and through the lead plate.

These and other objects of the invention will be illustrated in the drawings, described in the specification and pointed out in the claim at the end thereof.

Fig. 1 is a side elevation of a bench and the press mounted thereon, the plate on one side of the press being partly broken away to show the parts between the plates.

Fig. 2 is a top plan view of the press shown in Fig. 1, the press being tilted so that the long upper straight edge of the top of the press is shown horizontal instead of being shown at an inclination of 45° from the horizontal.

Fig. 3 is an elevation of the press when viewed from the right hand end of Fig. 2.

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Fig. 4 is an enlarged view of the strip of lead showing enlarged round holes therein which would be formed in the strip in punching the pellets therefrom.

Fig. 5 is an enlarged sectional view of a portion of Fig. 1 showing the punch in the position, which it takes when it forces the pellet out of the lead strip.

Fig. 6 is an enlarged sectional view of a portion of the top plate of the press with the die shown in full line position and in dotted line position in the plate.

Fig. 7 is an enlarged sectional view of the pellet after it has been formed and ejected from the press.

In the drawings like reference numerals indicate like parts.

In the drawings reference numeral 1 indicates a horizontal bench on which the press is mounted. The press comprises two side plates 2 and 3 which are parallel to each other and are spaced apart by the block 4 formed of laminated plates suitably held together and joined to the parallel plates 2 and 3. At the bottom of each plate is a flange turned at right angles therefrom; the flange 5 forming part of the plate 2 and the flange 6 forming part of the plate 3. These flanges rest on the bench 1. Each of these flanges has a hole 7 and 8 therein through which pass the bolts 9 and 10 which hold them on the bench.

In a transverse section on Fig. 3, the plates 2 and 3 would appear to extend upright from the flanges 5 and 6. The plates 2 and 3 preferably slant edgewise to one side from the flanges 5 and 6 and from the table or bench on which the flanges rest. This slant is by a considerable angle, preferably by an angle of about 45°. The block 4 and the plate 15 are parallel to each other and are fastened between the upright parallel plates 2 and 3 and space the plates 2 and 3 apart and hold the plates together. The block 4 and the plate 15 and plates 2 and 3 enclose a rectangular guide space between them, which guide space is inclined downwardly to the right by an angle of about 45° as appears in Fig. 1. This is for a purpose that will presently be described.

Mounted on the pivot 11 is a lever or handle 12 which lever can be moved up and down. A bolt 13 is provided which limits the downward movement of the short end of the lever and prevents the punch 20 from getting out of engagement with the hole 14 in the block 4. Suitably spaced apart from the block 4 is the plate 15. The block 4 and the plate 15 operate as guides for the strip of lead 16 which is fed between the

block and the plate, preferably from above from the left side as shown in Fig. 1, although it can be fed from below on the right if desired.

The hole 14 in the block 4 and the hole 15a in the plate 15 act as guides for the punch.

The strip of lead that is fed through the press is a little wider than is needed for the formation of the pellets, but need not be as wide as the space between the plates 2 and 3. For the purpose of limiting the space between the plates, I provide a block 17 for taking up part of the space, leaving a guide space 18 that is somewhat wider than the strip of lead that is to be fed through it. The strip of lead that is fed through this space 18 will preferably have two parallel edges, one of which is held against the block 17. As the pellets are punched out, the strip of lead is distorted and is made somewhat wider and the space 18 must be wide enough to give suitable clearance so that it will not become jammed as it is fed through the press.

The punch comprises the stem 20, the upper end 22 of which is shaped to form the inside of the pellet 21 shown in Fig. 7. The process of forming the pellets is illustrated in Fig. 5. This stem 20 has a block 23 on the lower end of it. The block has an elongated eye therein in which loosely engages the reduced end 12a of the lever 12; so that as the long end of the lever 12 is pushed down at the right in Fig. 1 the left hand end of the lever and the punch is moved upward to punch and form the pellet.

With the strip of lead 16 in position between the block 4 and the plate 15, the right hand end of the lever 12 is pushed down and this pushes the punch 22 up. The punch presses or cuts a disc of lead out of the strip and pushes it through the opening 15a in the plate 15 and in so doing forms a pellet with a thick rounded head and a tapered cup shaped tail that is more or less cylindrical on the outside and tapered on the inside as shown in Fig. 7. As the punch goes through the plate 15 with the pellet it stretches the lead to form the tail of the pellet and pushes the pellet beyond the plate. When the punch is withdrawn, the pellet drops off of the punch or the inclined plate 15 strips it from the punch and the pellet rolls down off the inclined plate and out of the road. This cup shaped tail of the pellet catches the compressed gas that pushes it through the barrel of the gun and it is thin enough so that it is believed to stretch slightly and make a close fit with the barrel.

I have found that the plate 15 should preferably be made of so-called stainless steel because that kind of steel is hard and tough and the edge of the hole through which the pellet is formed stands out sharp and clean and resists wear very nicely. It is not necessary to use case hardened steel for this purpose, although it can be used if desired.

I have also found by the use of this press that I can form pellets at the rate of from forty to fifty a minute and for the purpose of a particular gun I use, I form the pellets from a strip of lead having a thickness of about .13" or thereabouts. The pellets have a diameter of .218" or thereabouts, such pellets being suitable for a .22 calibre rifled air gun and that such pellets can be depended upon for accurate shooting without leading up the gun. The head of the punch, the diameter of the holes in the block and the plate are made to give this result.

These pellets weigh about fifty to the troy ounce.

I have also found that traces of the rifling grooves are formed on the pellets as they travel through the gun, showing that these pellets spin on their long axis after they leave the gun. The pellets form the basis for a divisional application Serial No. 298,813, filed July 14, 1952.

I claim:

A punch press for use in forming air gun projectile pellets, comprising a punch having a cylindrical shank and a nose portion of reduced diameter and slightly tapered terminating in a substantially semi-spherical head, said nose portion having a fillet at its juncture with the shank, a guideway across which said punch can operate, comprising spaced parallel upper and lower plates, said upper plate having a round hole therein perpendicular to said guideway through which said punch may be projected whereby a soft metal pellet can be formed and ejected, said hole having a diameter slightly greater than the head of said punch, and being of the same diameter as the shank and having a sharp circular shearing edge, the lower plate having a guide aperture of the diameter of said shank and being aligned with the first-named hole, and of an axial length greater than the length of the punch nose portion, the spacing between said plates, the diameter of said shank, and the length of said nose portion being approximately the same dimension, the head of the punch and the hole in the plate being adapted to form and shear from sheet soft metal stock of a thickness somewhat less than the spacing between the plates, a pellet with a rounded head and a cup-shaped hollow skirt cylindrical on the outside.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
Re. 10,710	North	Apr. 6, 1886
10,681	McKenna	Mar. 21, 1854
34,844	Naylor	Apr. 1, 1862
43,102	Custer	June 14, 1864
490,007	Williams et al.	June 17, 1893
790,905	Laing	May 30, 1905
910,063	Holmgren	Jan. 19, 1909
996,338	Hindinger	June 27, 1911
1,200,593	Currie	Oct. 10, 1916
1,458,417	Johnson	June 13, 1923
2,414,863	Foster	Jan. 28, 1947

FOREIGN PATENTS

Number	Country	Date
1,208	Great Britain	1854