

A. A. ARNOLD.
PUNCHING MACHINE.
APPLICATION FILED JUNE 28, 1912.

1,052,431.

Patented Feb. 4, 1913.

Fig. 1.

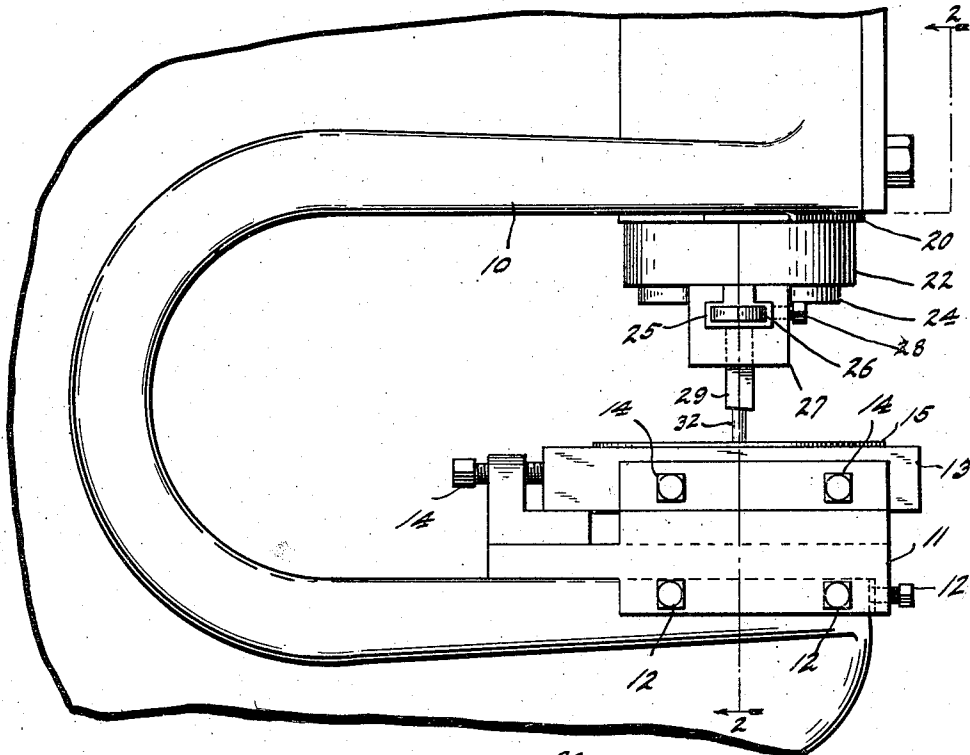


Fig. 2.

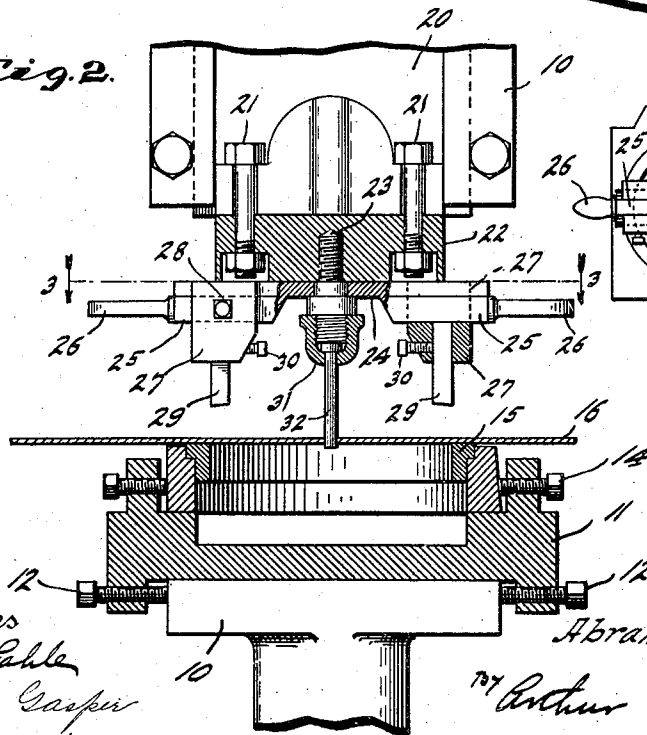
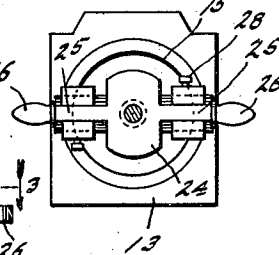


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

ABRAHAM A. ARNOLD, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO HIMSELF AND CHARLES P. GREENEN, A COPARTNERSHIP.

PUNCHING-MACHINE.

1,052,431.

Specification of Letters Patent.

Patented Feb. 4, 1913.

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To all whom it may concern:

Be it known that I, ABRAHAM A. ARNOLD, a citizen of the United States, at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Punching-Machine, of which the following is a specification.

It is the object of my invention to provide a punching machine which is capable of punching holes of large size with a requirement of no more power and with no greater strain on the machine than are usual in punching holes of but a small fraction of such size.

In accomplishing this result, I provide a machine which punches the hole piece-meal by a shearing action, a series of shearing strokes being used to make the complete hole. The shearing tool is mounted so that it may be moved, conveniently by hand, to follow the contour of the desired hole, as by being mounted on a turn table on the reciprocating plunger of the punching machine.

In the accompanying drawing, which illustrates my invention, Figure 1 is a side elevation of the head of a punching machine embodying my invention; Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 is a section on a reduced scale on the line 3—3 of Fig. 2.

The head 10 of the punching machine is conveniently of the usual reinforced horse-shoe shape. On the lower side of the head 10 is mounted a removable block 11, which may be adjusted and clamped in place by screws 12. A die block 13 may be mounted on the block 11, being adjustable and clamped in place by screws 14. The die block 13 is rabbeted on its upper inner edge to receive a die ring 15, the cutting edge, here the upper inner surface, of which conforms to the size and shape of the desired hole to be punched in the sheet metal plate 16. The block 11 is conveniently open in front, to allow the easy removal of the punchings.

A plunger 20 is vertically reciprocable in the overhanging part of the head 10, in the usual manner. Clamped by bolts 21 to the lower end of the plunger 20 is a heavy plate 22, in the center of the lower side of which is fitted a screw 23 shouldered to form a sturdy pivot for a turn table 24. This turn table has projecting arms 25, here shown as two in number to produce a balanced thrust,

provided at their ends with handles 26, and slidably mounted on the arms 25 are knife blocks 27 which may be clamped in desired position on the arms 25, and thus at a desired eccentricity from the pivot screw 23, by bolts 28. Knives 29 fit in holes in the under sides of the knife blocks 27, being clamped in place by bolts 30. A cap 31 is removably screwed on to the lower end of the screw 23, and holds a guide pin 32 the lower end of which, when the machine is in operation, never rises beyond the top surface of the ring 15.

In using my machine, a guide hole of suitable size is first punched in the metal plate 16 in which the desired hole is to be punched, and the guide pin 32 is projected through such hole and then clamped in place against the lower end of the screw 23 by means of the cap 31. The plunger 20 is now started to reciprocate. As the plunger descends, the knives 29 cooperate with the inner or cutting edge of the ring 15 to shear through the sheet metal plate 16. As the plunger rises, the operator, grasping one of the handles 26, turns the turn table 24 slightly so that when the plunger next descends the knives 29 will shear through the plate 16 at a different place. The amount of turning is preferably just sufficient so that each succeeding shear touches or slightly overlaps the preceding one. The complete opening to be punched is completed when the turn table 24 has been turned through 180°. This operation is quite rapid, and requires but a small amount of power and does not put great strain on the head 10 of the punching machine. To vary the size of the hole punched, the knives 29 are adjusted inward or outward, and a die ring 15 of different size is substituted.

What I claim as new is:

1. A punching machine, comprising a reciprocating plunger, a turn table rotatably mounted on said plunger, and a knife eccentrically mounted on said turn table, said knife being adjustable toward and from the center, in combination with a die with different parts of which said knife cooperates successively.

2. A punching machine comprising a head, a reciprocating plunger mounted in said head, a knife carried by said plunger and adjustable relatively thereto in a plane transverse to the movement of the plunger, and a die carried by and normally fixed

relatively to said head and cooperating with said knife in its various positions to form a shear.

3. A punching machine comprising a head, a reciprocating plunger mounted in said head, a knife carried by said plunger and adjustable relatively thereto in a plane transverse to the movement of the plunger, a die carried by said head and cooperating with said knife in its various positions to form a shear, and a removable guide pin carried by said plunger and when in place projecting at all times during the operation of the machine below the shearing surface of said die.

4. A punching machine comprising a reciprocating plunger, a turn table rotatably mounted on said plunger, a knife eccentrically mounted on said turn table and adjustable toward and from the center thereof, a die toward and from which said plunger moves and with different parts of which said knife cooperates successively, and a removable guide pin mounted on said plunger and when in place during the operation of the machine projecting at all times beyond the surface of the die which cooperates with said knife.

5. A punching machine, comprising a reciprocating plunger, a turn table rotatably mounted on said plunger, and a knife eccentrically mounted on said turn table, in combination with a die with different parts of which said knife cooperates successively.

6. A punching machine comprising a head, a plunger reciprocably mounted in said head, a knife carried by said plunger and movable relatively thereto in a plane transverse to the line of movement of the plunger, a die carried by and normally fixed relatively to said head and cooperating with said plunger in the various positions of the latter to form a shear, and means for adjusting said die relatively to said head.

7. A punching machine comprising a

head, a die mounted in said head and having a cutting edge of substantially the size and shape of the hole desired to be punched, a plunger reciprocably mounted in said head, and a knife of comparatively small size relative to the hole to be punched, said knife being mounted on said plunger and movable relatively to the die in a plane transverse to the movement of the plunger to follow the contour of the desired hole.

8. A punching machine, comprising a reciprocating plunger, a knife carried by said plunger, and a work-supporting die toward and from which said plunger is movable, said die and knife being relatively movable in a plane transverse to the direction of reciprocation of the plunger to make the knife cooperate with different parts of the die successively.

9. A punching machine, comprising a head, a reciprocating plunger mounted in the head, a knife carried by said plunger, a die carried by said head and cooperating with said knife to form a shear, said die and said knife being relatively movable in a plane transverse to the movement of the plunger about an axis substantially parallel to the movement of the plunger.

10. A punching machine, comprising a reciprocating plunger, a knife mounted on said plunger, a die with which said knife cooperates, said knife and die being relatively movable to make the knife cooperate with different parts of the die successively, and a turn table on which one of said parts is mounted so that such relative movement may be obtained.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this twenty-fifth day of June, A. D. one thousand nine hundred and twelve.

ABRAHAM A. ARNOLD. [L. S.]

Witnesses:

MAPLE MYERS,
G. B. SCHLEY.