Aug. 15, 1933. C. T. BRADSHAW 1,922,614

PUNCH

Filed Oct. 8, 1931

Fig. 1.

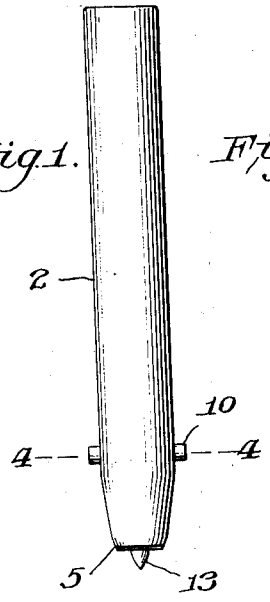


Fig. 2.

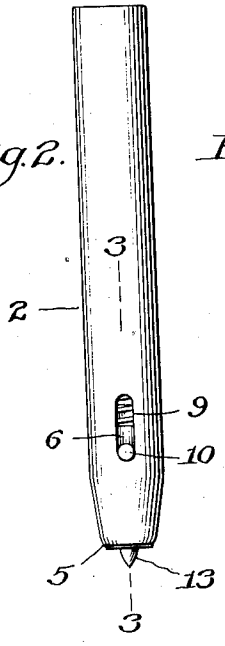


Fig. 3.

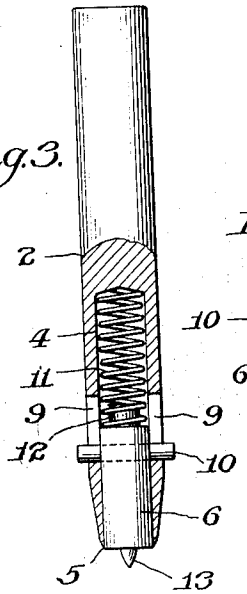


Fig. 4.

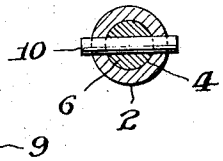


Fig. 5.

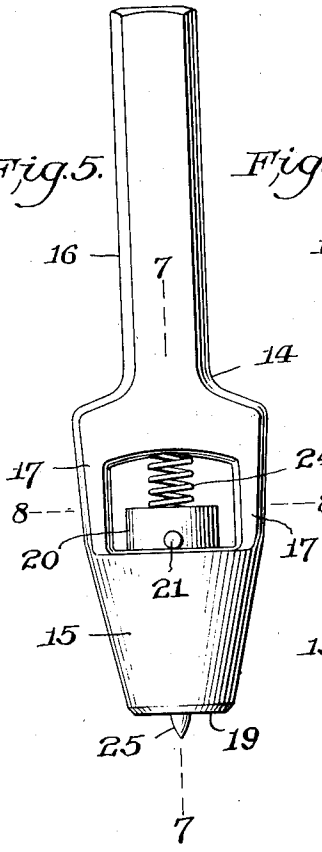


Fig. 6.

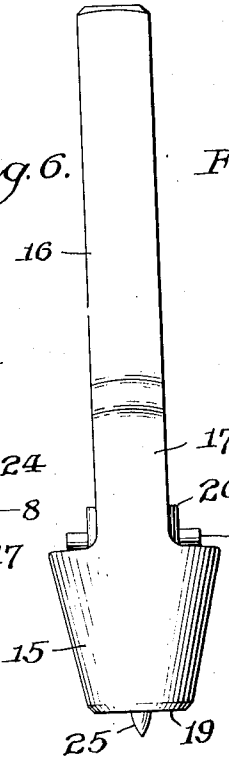


Fig. 7.

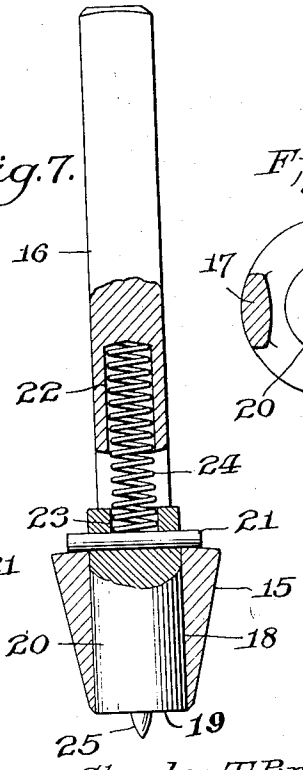
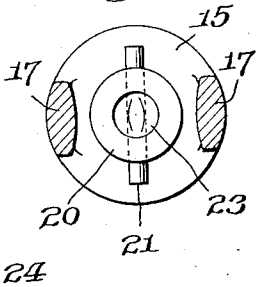


Fig. 8.



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PUNCH

Charles T. Bradshaw, Philadelphia, Pa.

Application October 8, 1931. Serial No. 567,742

2 Claims. (Cl. 164—124)

This invention relates to improvements in manually operated punches for punching holes in sheet material of various kinds.

The object of the invention is to provide a punch of novel, inexpensive and efficient construction having means whereby the punchings may be easily and automatically ejected from within the cutting die, and having means whereby the punch may be quickly and accurately centered upon the work or material to be acted upon thereby.

The invention resides in the elements of the punch and the combinations of them hereinafter described and claimed.

In the accompanying drawing, illustrating the invention,

Figure 1 is a side view of a punch showing one form of embodiment of the invention.

Figure 2 is a side view thereof as seen at right angles to Fig. 1.

Figure 3 is a longitudinal section of the punch, on line 3—3 of Fig. 2.

Figure 4 is a transverse section, on line 4—4 of Fig. 1.

Figure 5 is a side view of another form of embodiment of the invention.

Figure 6 is a side view of the punch shown in Fig. 5, as seen at right angles thereto.

Figure 7 is a longitudinal section of the punch, on line 7—7 of Fig. 5.

Figure 8 is a transverse section, on line 8—8 of Fig. 5, omitting the spring.

Referring to Figs. 1 to 4, inclusive, 2 designates the body member of the punch which in this instance is in the form of a cylindrical bar somewhat tapered at one end portion, as illustrated.

The tapered end portion of the member or bar 2 has an axial bore 4 therein which extends a considerable distance into the member, and the tapered end of the member is provided with an annular cutting edge 5 which surrounds the open end of the bore 4 and constitutes the cutting die of the punch. The opposite end of the member or bar 2 is adapted to receive hammer blows to drive the cutting die of the punch through the material to be cut or punched in the usual manner when the punch is in service.

A cylindrical plunger 6 is slidably fitted within the outer end portion of the bore 4 so as to be longitudinally movable therein, and, in the normal position of the plunger, as shown in the drawing, the lower or outer end surface thereof is at the plane of the cutting edge 5 of the punch or substantially so.

Side walls of the body member 2 on opposite sides of the bore 4 therein are provided with oppositely-arranged, longitudinally-extending, parallel slots 9 which open into the bore and extend through the walls of the member to the exterior thereof.

The inner end portion of the plunger 6 carries a pin 10 which extends transversely through the same and has its end portions extending outwardly from the respective sides of the plunger and into the slots 9. The pin 10 and the walls of the slots 9 serve to limit the extent of the longitudinal movement of the plunger 6 within the bore 4, and the end walls of the slots 9 nearest the cutting edge 5 prevent downward or outward movement of the plunger 6 beyond its normal position.

A helical spring 11 is housed within the bore 4 and exerts pressure against the inner end wall of the bore and the inner end of the plunger 6 and holds the plunger yieldingly in its normal position from which it may be moved inwardly against the action of the spring 11 and to which it will be automatically returned by the spring when inward pressure against the plunger is removed.

The inner end of the plunger 6 is provided with a centrally arranged projection 12 which extends into the adjacent end of the spring 11 and holds it in a central position with relation to the plunger for the proper operation of the spring and plunger and for the prevention of undue friction between the helices of the spring and the annular wall of the bore 4.

The lower or outer end of the plunger 6 is provided with a pointed centering pin 13 which projects downwardly or outwardly from the center of the outer end surface of the plunger in axial alinement with the plunger and the cutting die, as clearly shown in the drawing.

It will now be understood that when the punch is in service the cutting die may be easily and quickly centered over the hole to be cut in the material to be acted upon by placing the point of the centering pin 13 upon or near a suitable dot or mark upon the material. It will be understood also that when a hole is punched in the material, the pin 13 and plunger 6 will be moved inwardly against the pressure of the spring 11 which, when the punch is removed from the material, will move the plunger outwardly to its normal position and thus automatically eject the punching from the cutting die.

If the spring 11 should fail to return the plunger to normal position after one or more punching operations, and one or more punchings

should become clogged within the cutting die, due to the character of the material being acted upon, the plunger 6 may be readily forced back to normal position to eject the clogged punchings by the aid of a hammer or other tool or instrument applied to one or both of the outer end portions of the pin 10 which are extended outwardly beyond the slots 9 for this purpose.

Another purpose of projecting the end portions of the pin 10 outwardly from within the slots 9 is that they prevent the cylindrical body of the punch from rolling away when it is laid upon a work bench or table which is not perfectly level, before or after punching operations.

Referring now to Figs. 5 to 8, inclusive, and the form of embodiment of the invention therein illustrated, the body member 14 of the punch comprises a head 15 forming one end portion thereof, a handle 16 forming the opposite end portion thereof and being spaced from and in axial alinement with the head 15, and spaced arms 17 connecting the head 15 and handle 16 and extending laterally from the handle and longitudinally from the head, as illustrated in the drawing.

The head 15 is made tapered and has an axial bore 18 extending therethrough and it is provided with an annular cutting edge 19 which surrounds the lower or outer end of the bore 18 and forms the cutting die of the punch. The outer or upper end of the handle 16 is adapted to receive hammer blows to drive the cutting die through the material to be punched.

A cylndrical plunger 20 is slidably fitted within the bore 18 of the head 15 and it is longitudinally movable therein. In the normal position of the plunger 20, as shown in the drawing, the lower or outer end surface thereof is at the plane of the cutting edge 19 or substantially so.

The upper or inner end portion of the plunger 20 extends into the space between the head 15 and the handle 16 and it is provided with a pin 21 which extends transversely therethrough and has its end portions extending outwardly from the respective sides thereof and is adapted to engage the inner or upper end of the head 15 and prevent outward or downward movement of the plunger beyond its normal position.

The inner or lower end portion of the handle 16 is provided with a bore 22 in axial alinement with and of less diameter than the bore 18 in the head 15, and the inner or upper end portion of the plunger 20 is provided with a bore 23 having a diameter substantially the same as the diameter of the handle bore 22 and in alinement therewith.

A helical spring 24 extends between the handle 16 and the plunger 20 and has its respective end portions housed within the bores 22 and 23. The spring 24 exerts pressure against the handle 16 and against the plunger 20 and holds the plunger yieldingly in its normal position and from which it may be moved or pressed inwardly against the action of the spring.

The lower or outer end of the plunger 20 is provided with a pointed centering pin 25 which projects downwardly or outwardly from the center of the outer surface of the plunger.

The functions and operations of the plunger 20, spring 24 and centering pin 25, are the same as the functions and operations of the plunger 6, spring 11 and centering pin 13, previously described.

I claim as my invention:

1. A punch comprising a body member having a head forming one end portion thereof and a handle spaced from the head in axial alinement therewith and forming the opposite end portion of the member and connected to the head by spaced arms which extend longitudinally from the head and laterally from the handle, said head having an axial bore extending therethrough and a cutting edge surrounding the outer end thereof, a plunger slidable in the bore and extending into the space between the head and the handle and having an outer end surface in the region of the plane of the cutting edge in the normal position of the plunger, a pin penetrating the plunger and projecting outwardly therefrom within said space and adapted to engage the inner end of said head and prevent outward movement of the plunger beyond its normal position, said handle having a bore therein opening into said space and in axial alinement with and of less diameter than the bore in the head, said plunger having a bore in the inner end portion thereof of substantially the diameter of the bore in the handle and alined therewith, a helical spring having its end portions extending into the bores in the handle and the plunger and acting against the plunger to yieldingly hold it in its normal position, and a pointed centering pin projecting from the center of said end surface.

2. A punch comprising a body member having a head forming one end portion thereof and a handle spaced from the head in axial alinement therewith and forming the opposite end portion of the member and connected to the head by spaced arms which extend longitudinally from the head and laterally from the handle, said head having an axial bore extending therethrough and a cutting edge surrounding the outer end thereof, a plunger slidable in the bore and extending into the space between the head and the handle and having an outer surface in the region of the plane of the cutting edge in the normal position of the plunger and carrying a part projecting laterally therefrom within said space and adapted to engage the inner end of said head and prevent outward movement of the plunger beyond its normal position, said handle having a bore therein opening into said space and in axial alinement with and of less diameter than the bore in the head, said plunger having a bore in the inner end portion thereof of substantially the diameter of the bore in the handle and alined therewith, a helical spring having its end portions extending into the bores in the handle and the plunger and acting against the plunger to yieldingly hold it in its normal position, and a pointed centering pin projecting from the center of said surface.

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