Jan. 5, 1943. A. J. KRAUS 2,307,281

APERTURING PUNCH

Filed Oct. 14, 1942

Fig. 1

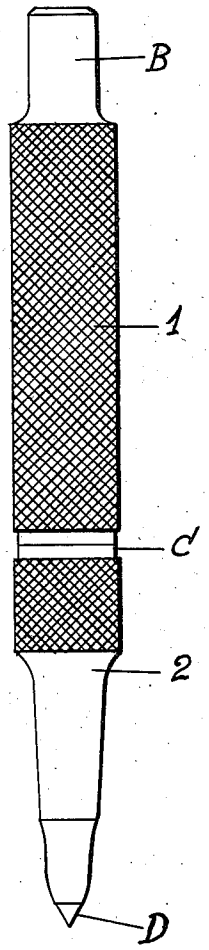


Fig. 2

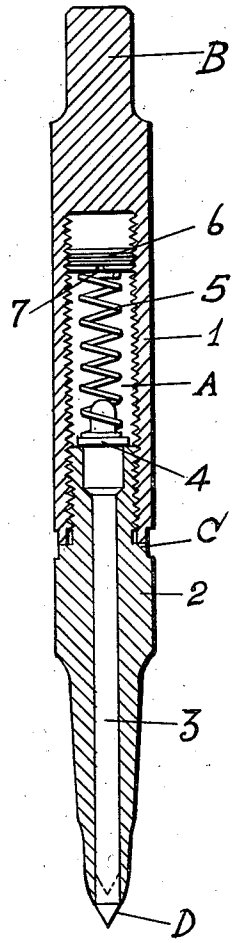


Fig. 3

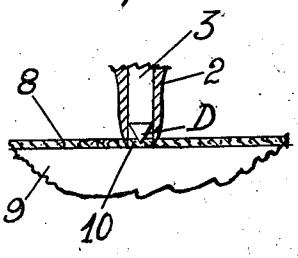
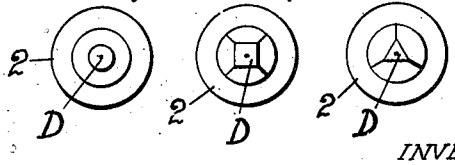


Fig. 4 Fig. 5 Fig. 6



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APERTURING PUNCH

Alfred J. Kraus, Wichita, Kans.

Application October 14, 1942, Serial No. 462,030

1 Claim. (Cl. 164—119)

My invention relates to an aperturing punch, and has for its principal object a plunger as centering means for an aperture and to eject the core of the aperture from the punch.

A further object of this invention is to provide a spring to tension an outward thrust for a plunger.

A still further object of this invention is to provide an internally threaded barrel for a spring, a head of a pointed plunger and a threaded stud, the spring seating between the stud and head of the plunger, whereby the tension of the spring may be varied by screwing the stud toward and from the head of the plunger.

A still further object of this invention is to provide two members for the barrel of the aperturing punch that are threadedly connected in axial alignment as accessible means to the spring and stud, said members each being knurled externally as a convenient means to unscrew and tighten their jointed connections, and furthermore to avoid slipping movement of the aperturing punch should the same be operated by stroke of the hand gripping the tool to aperture leather or other substance miscellaneously.

A still further object of this invention is that the lower removable portion of the aperturing punch is interchangeable to vary the form and size of the apertures and likewise the diameter of the pointed plunger, and also the plunger may conform to the polygonal form of the punch or remain cylindrical to engage smoothly in the straight wall portions of the adopted form for an aperture; furthermore the upper section of the barrel has at its upper extremity an extension to receive the stroke of a hammer, or the like, to execute an aperture through a thickness of material.

These and other objects will hereinafter be more fully explained, reference being had to the accompanying drawing forming a part of this specification, and in which like characters will apply to like parts in the different views:

Referring to the drawing:

Fig. 1 is a side elevation of the aperturing punch.

Fig. 2 is a longitudinal sectional view through the punch diametrically taken through the structure, except the spring, stud and plunger that are shown in elevation.

Fig. 3 is a fragmentary view of the lower extremity of the punch, illustrating its action upon a sheet of material and showing the position of the point of the plunger at the time of cutting the core from the aperture.

Fig. 4 is a view of the aperturing end of the punch, while Figs. 5 and 6 are modified forms for the apertures.

Referring to the invention in detail, it will be seen that the shaft of the punch body consists of upper and lower portions 1 and 2, respectively, and each being externally knurled as shown in Fig. 1. The upper portion is bored axially as at A and internally threaded as shown in Fig. 2, there being also provided on the outer end of said portion a smooth cylindrical extension B axial with the punch body to function as a head to receive the stroke of a hammer, or the like to punch an aperture.

The lower portion is reduced in diameter for a portion of its length downward from its upper extremity and being threaded to engage with the internal threads of portion 1, so that the end of last said portion will firmly seat on a shoulder C formed on portion 2 as above stated whereby the force of impact will be impinged at the shoulder instead of upon the threads to avoid mutilation thereof.

It will be seen that portion 2 is axially bored therethrough to receive a plunger 3, slidable therein, the plunger being increased in diameter a spaced distance downward from its upper end, and having a flange 4 on which a coil spring 5 will seat while a portion of its convolutions will engage around the upper end of the plunger to maintain an axial position of the spring on the plunger, the other end of the spring seating on a threaded stud 6 that engages with the said internal threads of member 1, said stud having an eye 7 to receive a screw driver for adjustment of the spring by moving the stud longitudinally toward and from the spring whereby a desired tension for the plunger is had. The other end of said plunger is conically pointed as at D as means to center the punch where the apertures are to be made, and furthermore to eject the core of an aperture when the punch is raised from its point of execution, the ejection being accomplished by the spring and the said spring being of sufficient length and resilience to permit movement of the point inward of its bore as shown by dotted lines in Fig. 2, the position of which is governed by the thickness of the element being punched, another example of which is illustrated in Fig. 3, in which instance, a sheet of leather 8 or other material seated on a suitable bearing 9 is punched, the point of the plunger receding inward according to the thickness of the sheet, but free to automatically

eject forcing the core 10 outward at the instant of raising the punch.

It will now be seen that a series of apertures may be laid out in spaced relation along a sheet of material by centering the apertures in a suitable manner, in such case the point of the plunger protruding as shown in Fig. 2 is easily centered for each aperture and maintained during the pending stroke.

It will also be seen that the outer extremity of the portion 2 is drawn to a cutting edge as clearly shown in Figs. 2 and 3, in which instance the aperture is circular as shown in Fig. 4, but may be modified as shown in Figs. 5 and 6 as the case may require. In the instance of the latter named modifications the lower end portion of the plunger may be formed to coincide with that shown in said figures, or it may be formed tubular to engage with a smooth running fit between the straight sides of these or other polygonal apertures optionally, and at all times the point of the plunger is a centering means for the aperture, and the spring tension as ejecting means for the core thus formed.

These and other modifications may be employed as lie within the scope of the appended claim.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:

In an aperturing punch, as an article of manufacture, a punch body comprised of upper and lower portions, each of which is knurled externally for a portion of its length, the upper portion having a cylindrical head to receive a stroke thereon, and said portion being bored axially from one end to near its cylindrical head, and being internally threaded the entire length of the bore, a stud threadedly engaging in the bore, said stud having an eye to receive a screw driver to turn the stud to raise and lower the stud in the bore, the lower portion of the body being axially bored therethrough, one end being reduced and threaded to engage in the bore of the upper portion for snug engagement of its open end with the shoulder while the major length of the other portion is tapered and sharpened at its lower extremity to function as a punch for aperturing sheets of material, a plunger to slidably engage in the bore of the lower portion, said plunger having a head on its upper end to seat on the upper end of its respective portion of the body and slidably engaging in the bore of the upper portion, the lower end of the plunger being conically pointed and protruding from the sharpened end of the lower body portion, a spring positioned in the threaded bore of the upper body portion to seat on the threaded stud and head of the plunger to normally extend its conical point and permit the same to recede at the time of aperturing a sheet of substance and the conical point being ejected by the spring to discharge a core from the punch as cut from the aperture.

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