May 28, 1940. D. A. BENNER 2,202,513

PORTABLE PUNCH

Filed Nov. 4, 1939

Fig. 1.

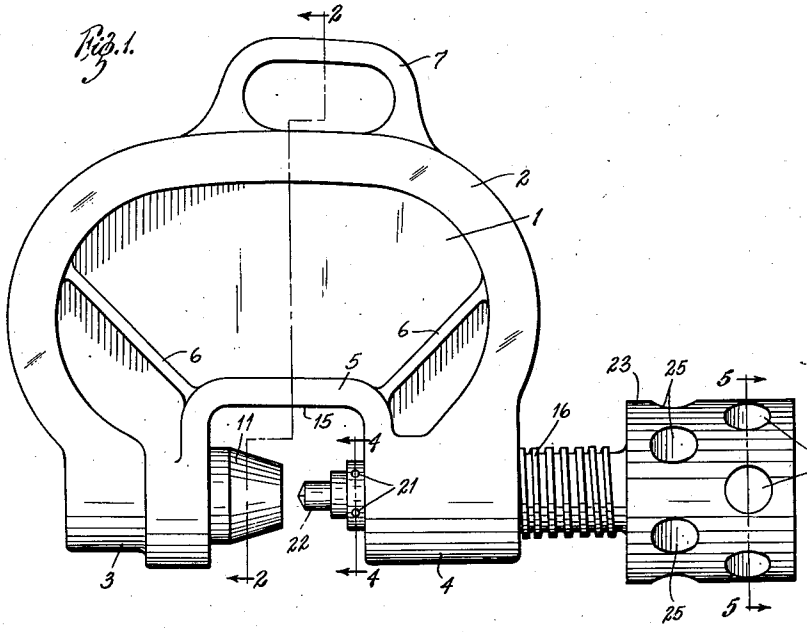


Fig. 2.

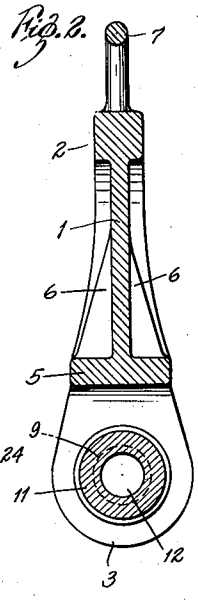


Fig. 3.

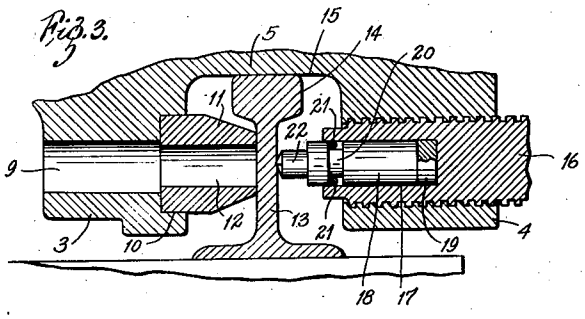


Fig. 4.

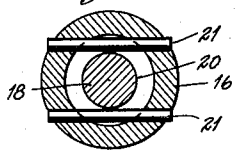


Fig. 5.

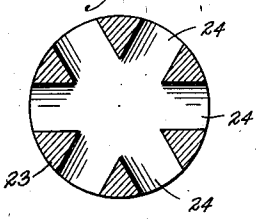
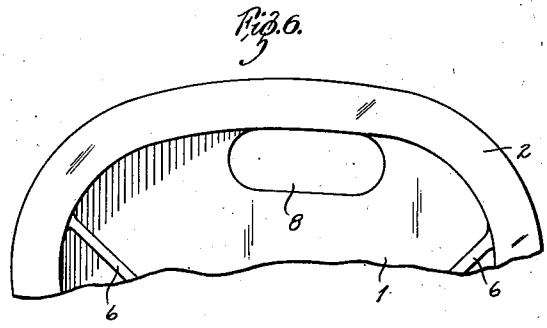


Fig. 6.



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UNITED STATES PATENT OFFICE

2,202,513

PORTABLE PUNCH

Dale A. Benner, Alton, Ill.

Application November 4, 1939, Serial No. 302,815

6 Claims. (Cl. 164—101)

This invention relates to portable punches; and has special reference to devices adapted for use in punching holes through the webs of rails, metallic elements of other shapes, etc., where high compressive forces are required in the punching operations.

Objects of the invention are to provide a punch comprising a strong metallic frame embodying novel features of form to attain lightness of weight and generally of C-shape having a removable and replaceable die attached to the inner side of one of the arms of the frame, and a punch shaft screwed through the opposite arm of the frame having means for supporting removable, replaceable and interchangeable punches at its inner end in axial alinement with any selected die attached to the opposite arm of the frame; and to provide a head rigid or integral with the outer end of said shaft having series of diametrical holes with the holes of each series intersecting and adapted to receive the end of a turning bar or lever in various radial positions whereby the punch shaft may be turned through small angles or degrees of rotation and the turning bar or lever adjusted in most desirable positions to facilitate operation of the punch shaft.

Another object of the invention is to provide an improved portable punch comprising a metallic C-frame including a plate portion constituting the body of the frame and provided with opposite integral outer marginal reinforcing flanges terminating at opposite axially alined bearing portions, integral laterally projecting curved flanges along its inner margin terminating at the inner ends of said supporting portions one of which is formed to receive and support removable, replaceable and interchangeable dies and the other of which is internally threaded for supporting engagement with a rotary screw punch shaft, and opposite reinforcing flanges formed on said plate in a novel relationship to said outer and inner marginal flanges and said supporting portions to cooperate therewith and resist stresses and strains to which the frame is subjected when in use.

Another object of the invention is to provide an improved punch comprising a threaded punch shaft mounted for rotation and longitudinal movements in a supporting frame and having a cylindrical head rigid with its outer end and formed with series of diametrical holes arranged in alternating relationship and adapted to receive the end bar whereby the shaft may be turned slight distances by removal and replacement of the bar in the respective holes of the series of holes.

Other objects will appear from the following description, reference being made to the annexed drawing, in which—

Fig. 1 is a side elevation of my improved portable punch.

Fig. 2 is a cross-sectional view approximately on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view showing the cooperative relationship of the die, the punch shaft, and the punch.

Fig. 4 is a cross-sectional view of the punch shaft and punch approximately on the line 4—4 of Fig. 1.

Fig. 5 is a cross-sectional view of the cylindrical head on the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary view showing a modification in the frame structure to provide a handle.

The metallic frame is generally of C-shape, and comprises a plate portion 1 constituting the body of the frame and provided with opposite integral outer marginal reinforcing flanges 2 terminating at opposite axially alined portions 3 and 4, and also having along its inner margin opposite laterally projecting curved flanges 5 terminating at and merging with the inner ends of said portions 3 and 4, and a plurality of opposite reinforcing flanges 6 connecting the flanges 2 and 5 and separated from the portions 3 and 4. The flanges 6 diverge from the flanges 5 toward the flanges 2 at opposite sides of the plate 1 and cooperate with said flanges and with the enlarged portions 3 and 4 to resist stresses and strains to which the frame is subjected when in use. The frame formed in this manner is easily portable and possesses a maximum degree of strength without the use of an excessive amount of material. An open handle 7 may be formed integral with the flanges 2, as shown in Figs 1 and 2, or a handle may be provided by forming a hand receiving hole 8 through the plate 1, as shown in Fig. 6. In this latter arrangement, the hole 8 is formed at the inner side of the flanges 2 so that said flanges constitute the handle.

The supporting portion 3 is formed with a hole 9 and with an enlarged socket or recess 10 in its inner side coaxial with the hole 9 and adapted to receive and support removable, replaceable and interchangeable dies, such as the die 11, which is formed with a bore 12 therethrough. The bore 12 is coaxial with the recess and of smaller diameter than the hole 9 in order to

facilitate discharge of the waste or punched plugs through said hole 9. When any selected die 11 is secured in the recess 10, the bore 12 through the die is in axial continuation of and alinement with the waste receiving hole 9 through the supporting portion 3. The hole 9 is larger than the bore 12 so that the waste portions will pass freely therethrough and therefrom. Any selected die 11 mounted in the device projects inwardly beyond the supporting portion 3, so that the web 13 of a rail may be seated against the end of the die 11 with its head 14 contacting the edge 15 of the plate 1 and flanges 5 to facilitate proper location of the rail or other article to be punched.

The opposite supporting portion 4 has a threaded hole therethrough in axial alinement with the hole 9 and die 11, and a punch shaft 16 is screwed into and through said hole. The shaft 16 is thereby supported for longitudinal movements toward and from the die 11. Said shaft is formed with a bore or well 17 at its inner end into which the body 18 of a punch extends into abutting engagement with a bronze thrust bearing disc 19 seated at the bottom of said bore or well 17. The punch body 18 is formed with a circumferential groove 20. After the punch body is placed in the bore or well 17, one or more pins 21 are forced into holes through the shaft 1 within the groove 20 in a manner to prevent removal or displacement of the punch and to permit the punch to rotate freely about its axis. A punch 22 is formed on the outer end of the body 18 in axial alinement with the bore 12 through any die 11 that is attached to the supporting portion 3.

A cylindrical head 23 is rigidly attached to the outer end of the shaft 16 and is formed with series of diametrical holes 24 and 25, the holes of each series intersecting each other (Fig. 5). The holes 24 are disalined from the holes 25 and are formed in different circumferential locations along the head 23, making the holes 24 in alternating or staggered relationship with respect to the holes 25, as may be understood by reference to Fig. 1 of the drawing. Thus, the series of holes are displaced at relatively small angles about the periphery of the head so that the shaft 16 may be turned through a small angle of rotation by a turning bar engaged in and removed successively from the holes of the different series of holes.

These holes 24 and 25 are designed and intended to receive one end of a lever or bar by which the shaft 16 may be rotated to force the punch 22 into and through the web 13 of a rail or an analogous element. The holes 24 are displaced only a short distance circumferentially from the holes 25, and vice versa, to facilitate engagement of the turning bar or lever therein for imparting slight turning movements to the shaft 16, as may be required.

It should now be apparent that this invention attains all of its intended objects and purposes efficiently and satisfactorily. The device is of very strong and unyielding construction, of comparatively light weight, is designed to support removable, replaceable and interchangeable dies, and complementary removable, replaceable and interchangeable punches. To remove a punch, it is only necessary to remove the pins 21, move the shaft 16 outwardly far enough, and then withdraw the punch from the bore or well 17. A new punch may be applied and the pins 21 replaced, after which the device may be again operated with the same or any interchanged die 11.

I claim:

1. In a portable punch, a metallic frame substantially of C-shape and comprising a relatively thin body having oppositely extended flanges along its inner and outer margins, an enlarged die supporting portion integral with one end of said body and having a hole therethrough and a recess in its side coaxial with said hole, a die attached to and opening through said supporting portion and having a bore therethrough of less diameter than and opening into said hole, an enlarged punch supporting portion integral with the other end of said body and having a threaded hole therethrough, a longitudinally movable punch device screwed in said threaded hole for cooperation with said die, means for operating said punch, and outwardly diverging flanges integral with opposite sides of said body and having their inner ends merging with said inner marginal flanges adjacent to said supporting portions and their outer ends merging with said outer marginal flanges.

2. In a portable punch, a metallic frame of approximately C-shape and comprising a relatively thin body having end portions of reduced width and having oppositely extended flanges along its outer and inner margins, enlarged axially alined die supporting and punch supporting portions integral with the reduced width end portions of said body and with said flanges, outwardly diverging flanges integral with opposite sides of said reduced width end portions of said body and having their inner ends merging with said inner marginal flanges adjacent to said supporting portions and their outer edges merging with said outer marginal flanges at greater distances from said supporting portions than their inner ends, and a handle integral with and extending outwardly beyond said body and said outer marginal flanges.

3. In a portable punch having a metallic frame of approximately C-shape and having enlarged axially alined die and punch supporting portions integral with its ends and having a hole through said die supporting portion, a die attached to said die supporting portion and having a bore of less diameter than and opening into said hole, a shaft screwed through said punch supporting portion for movement toward and from said die, a punch attached to the inner end of said shaft for extension into and withdrawal from said bore through said die, and an enlarged head attached to the outer end of said shaft and provided with series of approximately radial holes adapted to receive an end of an operating bar or lever whereby said shaft may be rotated.

4. In a portable punch having a metallic frame of approximately inflexible C-shape, enlarged axially alined die and punch supporting portions integral with the ends of said frame, a socket in said die supporting portion for detachably receiving and holding interchangeable dies having bores of different sizes therethrough, and a die detachably secured to said die supporting portion and having a bore opening through said die supporting portion; a shaft screwed through said punch supporting portion for longitudinal movement toward and from said die, means for attaching a punch to the inner end of said shaft for cooperation with said die, and an enlarged head attached to the outer end of said shaft and having a series of approximately radial holes to receive an end of an operating bar or lever to rotate said shaft.

5. In a portable punch having a metallic frame

of approximately C-shape, axially alined die and punch supporting portions integral with the ends of said frame, oppositely extended reinforcing flanges integral with and extending throughout the length of the margins of said frame between said supporting portions, and means for detachably supporting a die in connection with said die supporting portion; a shaft screwed through said punch supporting portion for movement toward and from said die, means for rotatively attaching a punch to the inner end of said shaft for cooperation with said die, and an enlarged head attached to the outer end of said shaft and provided with series of approximately radial holes adapted to receive an end of an operating bar or lever to rotate said shaft, the holes of said respective series being longitudinally disalined along said head.

6. In a portable punch having a unitary and rigid metallic frame of approximately C-shape, axially alined die and punch supporting portions integral with the ends of said frame, and a die attached to said die supporting portion; a shaft screwed through said punch supporting portion for movement toward and from said die and having a concentric bore in its inner end, a punch extending into said bore and projecting beyond the inner end of said shaft toward said die and having a circumferential groove within said bore, a thrust bearing element in said bore for the inner end of said punch, and removable pins extending through said shaft and engaging in said groove preventing detachment of said punch from said shaft and leaving said punch freely rotative with respect to said shaft.

DALE A. BENNER.

CERTIFICATE OF CORRECTION.

Patent No. 2,202,513. May 28, 1940.

DALE A. BENNER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 8, after the word "its" insert --inner--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of April, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)