W. J. MACKLE.

PUNCH.

APPLICATION FILED JULY 6, 1915.

1,166,613.

Patented Jan. 4, 1916.

Fig. 1.

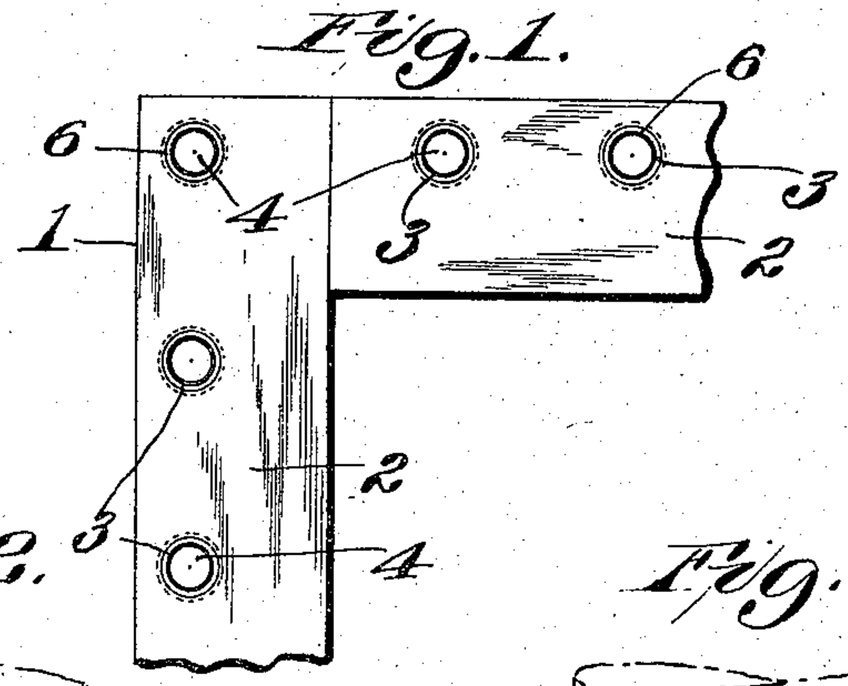


Fig. 2.

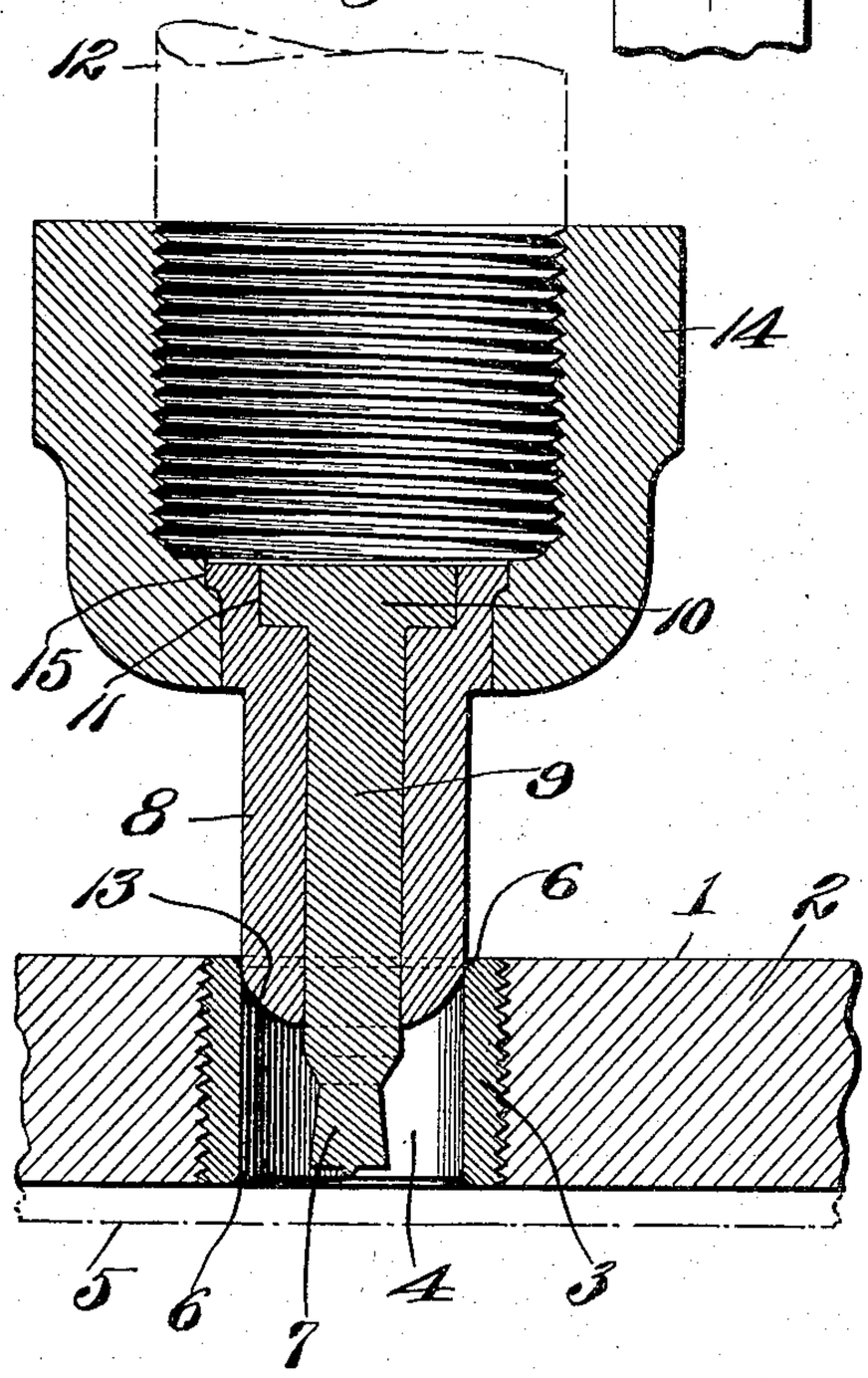
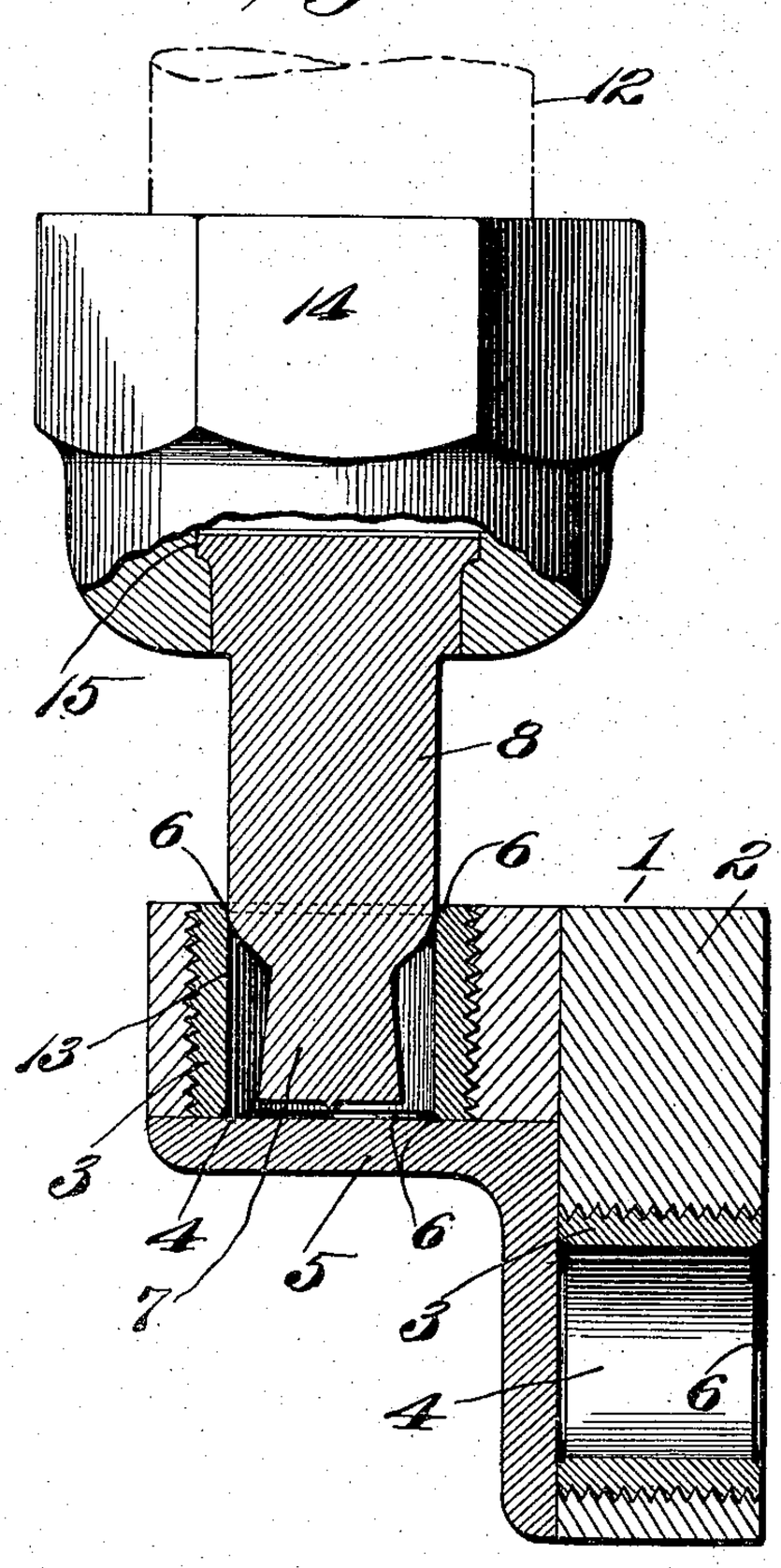


Fig. 3.



Inventor:
William J. Mackle,
by Hugh K. Wagner,
His Atty.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM J. MACKLE, OF ST. LOUIS, MISSOURI.

PUNCH.

1,166,613. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed July 6, 1915. Serial No. 38,048.

To all whom it may concern:

Be it known that I, WILLIAM J. MACKLE, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Punches, of which the following is a specification.

This invention relates to punches, and has for its object to provide a punch of simple and cheap construction and improved means for securing the punch to a punch stock.

Another object of the present invention is to provide a punch constructed with a view to economy in the use of material by providing a hollow body-portion adapted as a common holder for removably holding therein punch-points of different sizes adapted to punch holes of different sizes.

An advantage of the present invention is that it provides a punch adapted to be firmly secured to a punch stock and whereby a great saving in time is made in performing work in this, that the preliminary center punching is eliminated and in this that the delay and the tedious work of setting a punch in position to center in a center punch-mark is avoided.

Further, this invention consists in the construction and arrangement of parts more particularly described in the specification and set forth in the claims.

In the accompanying drawings forming part of this specification wherein like numbers of reference denote like parts wherever they occur, Figure 1 is fragmentary plan view of a templet embodying the present invention, showing the removable bushings in place to form the lined templet-holes; Fig. 2 is a vertical sectional view showing a punch of the present invention consisting of a hollow body-portion and a removable punch-point held thereby, and means of attaching the punch to the plunger of the punching-machine, and, also, showing a vertical sectional view of a bushing-lined templet-hole associated with the punch to illustrate the method of the present invention; and Fig. 3 is a view partly in side elevation and partly in vertical section showing a solid punch-body and punch of the present invention in association with a templet embodying this invention adapted for punching holes in angle-iron.

A templet 1 may have its body-portion 2 constructed of wood with suitable sized holes therein each adapted to receive a hollow cylindrical bushing 3, open at both ends, which bushing may be of metal. The outer side of said bushing may be screw-threaded, as best seen in Figs. 2 and 3, and adapted to engage the correspondingly screw-threaded walls of said holes so that said bushing may be readily inserted into position in said holes and removed therefrom, each bushing screwed into position shown in the drawings being adapted to form the templet-holes 4 of a templet embodying the present invention. By this construction, bushings 3 may be removed from one templet and used on another templet, it being, of course, understood that each templet may be provided with only one templet-hole 4, or with a plurality of templet-holes spaced apart as desired and arranged to form any desired design adapted to the position of the holes to be punched therethrough in the metal 5 or the like upon which the templet is placed. The edges about the open ends of said bushings may be counter-bored to form substantially a bevel or slope 6 flaring outwardly from the inner wall of each bushing so that the entrance or mouth of each templet-hole may be slightly larger than the templet-hole proper, said bevel or slope being adapted as a guiding means, as hereinafter more particularly described, for the purpose of this invention.

Punch-point 7 may be of any ordinary construction and is provided with a shoulder-bearing portion 8 of a substantially greater diameter than that of said punch-point, and said portion 8 may be formed integrally with said punch-point, as shown in Fig. 3, or may be a separate hollow member, as shown in Fig. 2. The form of punch-bit with the shoulder-bearing portion formed integrally with the point, as shown in Fig. 3, is more particularly for use with a punch-bit and a point adapted to punch large-sized holes, such, for instance, as holes having a diameter of five-eighths ($\frac{5}{8}$) of an inch or greater, where a punch-bit of great strength of solid metal is desirable.

The form of punch-bit illustrated in Fig. 2, is especially well adapted for the construction of a punch-bit with a point adapted to punch smaller holes, such, for instance, as holes having a diameter of less than five-eighths ($\frac{5}{8}$) of an inch, the construction of said punch-bit with a punch-point 7 separately made from the shouldered

member 8 may be, as shown in said Fig. 2, a hollow member 8 of substantially greater external diameter than punch-point 7, the hollow portion of said hollow member being adapted to receive therethrough the upwardly extending elongated portion 9 of said punch-point, said elongated portion being provided with a terminal head 10 adapted to seat in an appropriate recess 11 therefor borne by the upper end of the hollow portion of said hollow member adjacent the plunger 12 of the punching machine.

The shoulder-bearing member 8, which is shown as a hollow member separable from punch-point 7 in Fig. 2, and which is shown as solid and integrally formed with punch-point 7 in Fig. 3, is in each case of a substantially greater diameter than said punch-point, the diameter of said member 8 being adapted to permit said member to fit slidably in the opening formed by the vertical wall of said templet-hole 4. Shoulder 13 is preferably formed on an incline or curve sloping from the outer wall of said member 8 to the outer wall of punch-point 7, as shown in the drawings, the cutting end of punch-point 7 being adapted to be spaced a suitable distance away from shoulder 13.

Either punch-bit just described may be removably attached to plunger 12 of a punching machine by means of internally screw-threaded hollow member 14, which member may be open at both ends and may be adapted to be screwed in place upon the screw-threaded end of said plunger, the punch-bit being inserted into said hollow member, before said member is screwed in position, with the enlarged head 15 of member 8 seated in an appropriate recess formed in the inner wall of the hollow portion of said hollow member 14, so that when said hollow member 14 is screwed home upon plunger 12, punch-point 7 and shoulder-bearing member 8 forming the punch-bit of this invention will be securely held in punching position upon said plunger.

It is, of course, understood that in the construction of the punch-bit shown in Fig. 2, the extension 9 of punch-points 7 of different sizes may be of one size and diameter, adapted to the size and diameter of the hollow portion of hollow member 8, so that said hollow member will serve as a common holder for each of the punch-points 7 of different sizes. Thus a great saving in metal is made in the construction of a punch-bit of the form shown in Fig. 2, as one shouldered member 8 will serve as a removable holder for each one of a set of punch-points of many different sizes, any punch-point 7 of a set being readily removable from or inserted in place in said shouldered member by slipping said punch-point into and out of the position shown in Fig. 2, the operation of attaching the punch-bit to plunger 12 and removing same therefrom being accomplished by means of hollow member 14. The solid form of punch bit shown in Fig. 3 is, also, attached to plunger 12 by means of hollow member 14, as shown in the drawings.

In operation, the punch-bit, whether that shown in Fig. 2 or that shown in Fig. 3, having been attached to plunger 12, as shown in the drawings, and a templet 1 having been placed in position with reference to a metal sheet 5 or the like, Fig. 2, or a piece of angle-iron 5, and fastened in place if found necessary, Fig. 3, to mark the position of the holes desired to be punched, plunger 12 is caused to function to cause punch-point 7 to enter a templet-hole 4, shoulder 13 of member 8 being adapted to bear slidably upon the beveled or sloped edge 6 of the mouth of said templet-hole until the vertical outside of member 8 slides against the adjacent vertical wall of templet-hole 4, so that as said punch-point reaches the metal 5 or the like to be punched, said punch-point will center accurately in the center of the hole desired to be punched. By this method of operation in connection with a punch-bit and a templet embodying the present invention, the preliminary center-punching of the hole desired to be punched is avoided, and an entirely blank metal sheet, bar, channel, angle-iron, or piece of structural metal of any configuration or the like may be punched directly through said templet by a punching machine equipped with a punch-bit of this invention with less care and labor on the part of the operator than in the old way of marking with a center punch and then laboriously setting the perforating punch in adjusted position to center upon said center punch-mark. Thus, by means of the present invention, a great saving in time and labor is achieved and less skill upon the part of the workman is required, with the result that the punching is quickly done with great accuracy as to locating the punch-holes in the desired position. Moreover, because of the comparatively large size of the templet-hole 4, as compared to the size of the punch-point 7, which templet-hole is adapted to the size of the substantially large shouldered member 8, the operator can readily cause said punch-point to enter said templet-hole and he will not need to enter said hole with said punch-point centrally, for when shoulder 13 strikes bevel 6 of said templet-hole, said shoulder coöperating with said bevel will automatically adjust punch-point 7 in central position, so that when the vertical wall of member 8 enters into said templet-hole and slidably engages the vertical wall of said templet-hole as said punch-point reaches the metal to be punched,

said punch-point will be automatically adjusted to aline axially with the center of the hole to be punched. Thus, it will be seen that the punch-bit of this invention operated in connection with the templet associated therewith is self-centering, and the advantage in operation is, that punching is greatly facilitated because it requires a negligible amount of effort on the part of the operator to cause this self-centering punch-point to enter the templet-hole of such substantial size as compared to the tedious labor of centering a punch-point upon the very small mark of a center punch.

The punch-bit and templet and the method of punching provided by the present invention, also, has the advantage of avoiding the distortion as to the spacing between punch-holes that is often the result of punching by punch-bits of ordinary construction in the old way, particularly in the case of certain pieces of material, such, for instance, as in the case of sheet iron, brass, and the like. By said old method and means in punching a series of spaced holes along the length of a bar, for instance, the location of said holes is first marked by means of a center punch-mark or the like by the use of a templet of the ordinary construction and then the holes are punched at said marks by means of a perforating punch, and as a result it will be found that there is a tendency to cause the bar to stretch perceptibly, so that when the pattern of the templet or the like is superimposed upon the bar after punching same, the templet-holes and the punched-holes will not register with each other throughout. By the method of the present invention with a punch-bit and templet of this invention, this unsatisfactory and inaccurate result is avoided, as the punching does not follow markings previously made upon the metal to be punched, but follows the holes of the templet as each hole is successively presented to the punch-point, and, therefore, any stretching of material that may occur will be in advance of the punching process, so that the pattern or set of holes punched will when completed exactly correspond to and register with corresponding holes in the templet, and the distortion of spaces between holes will be avoided, thus providing accurate punched pieces that can be readily assembled with similarly punched companion pieces and attached together by means of bolts or the like through companion holes accurately placed relative to each other to achieve the desired result to facilitate construction work.

As hereinabove suggested, the punch-bit and templet of this invention and the method of punching therewith herein described, may be applied in punching structural metal or the like of any design, size, shape, or of any cross-sectional configuration. It is, of course, understood that the punch-point 7 of the punch-bit of the present invention may be shaped to punch holes of any desired shape or design other than circular, such, for instance, as oval, elliptical, polygonal, shapes combining the geometrical forms mentioned, or any other desired shapes.

Various changes in the construction and arrangement of parts may be made and in the method of operation without departing from the nature and spirit of the present invention.

I claim:

1. The combination with a punch stock and threaded coupling nut, a hollow shank secured at one end to the punch stock by said nut and terminating at the outer end in an inward taper, a solid punch comprising an elongated body portion, a head, and a perforating end, said body portion extending continuously throughout the hollow shank while said head is adapted to abut the punch stock, whereby a rigid structure is provided without joints between the said nut and the punching end portion of the punch.

2. The combination with a punch stock and threaded coupling nut, a hollow elongated shank secured at one end to said stock by said nut, a recess in said secured end of the shank, a solid punch comprising an elongated body portion, a head and a punching end, said body portion extending continuously throughout the hollow shank while its head is firmly seated in said recess and held therein by said nut against the said stock, whereby a rigid structure is provided without transverse joints between the said nut and the work end portion of the punch.

In testimony whereof I hereunto affix my signature.

WILLIAM J. MACKLE.