April 17, 1962 J. N. SAXTON 3,029,512

PERCUSSIVE TYPE PUNCH

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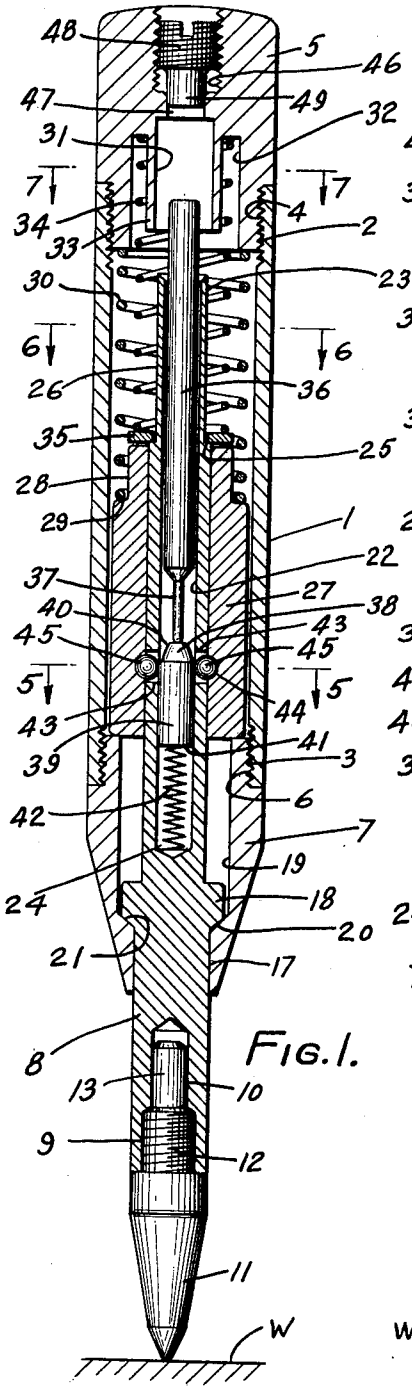


FIG. 1.

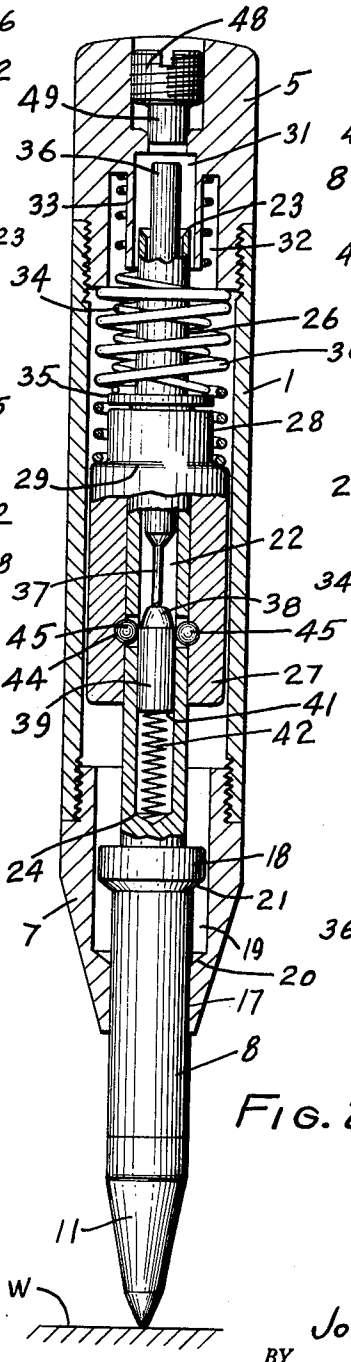


FIG. 2.

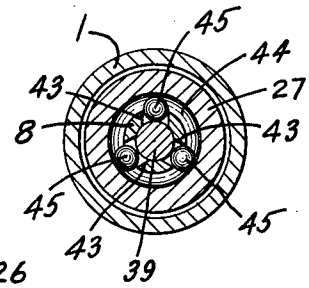


FIG. 5.

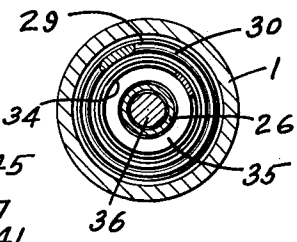


FIG. 6.

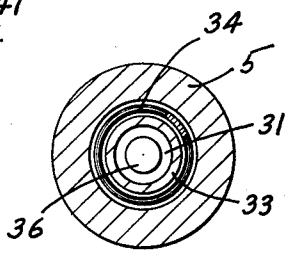


FIG. 7.

INVENTOR,
JOHN N. SAXTON;
BY
Calvin Brown,
ATTORNEY

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FIG. 3.

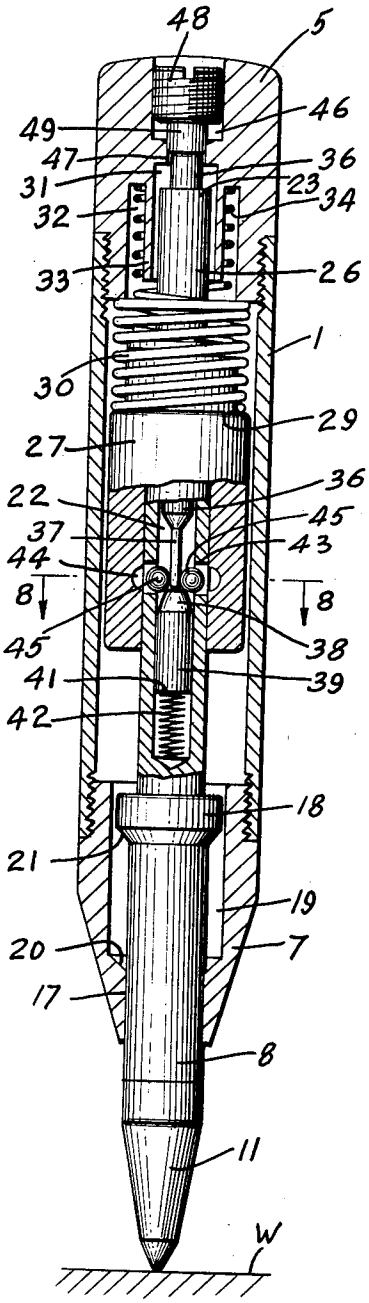


FIG. 4.

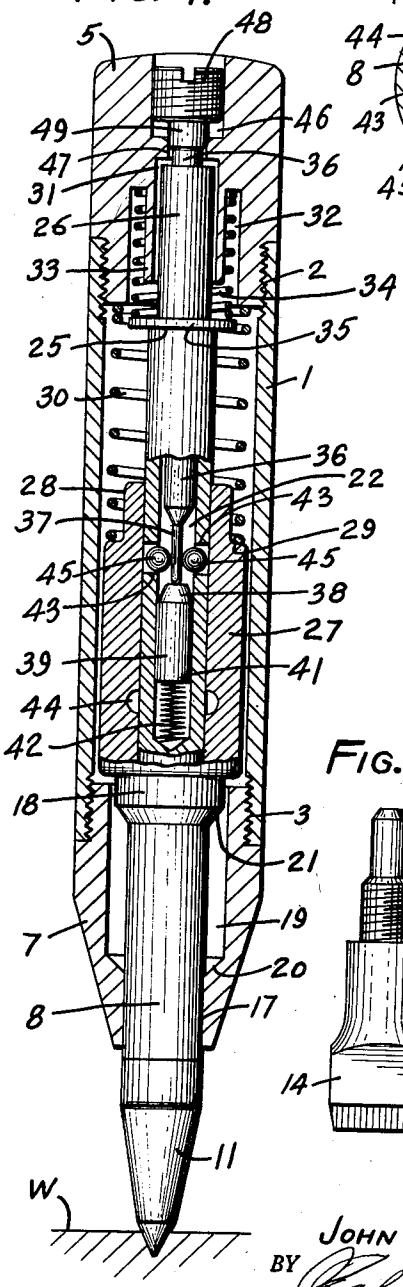
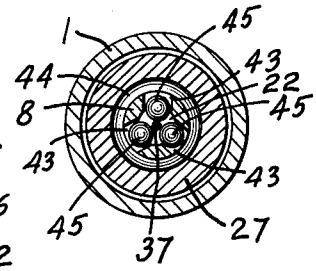


FIG. 8.



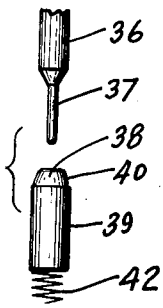
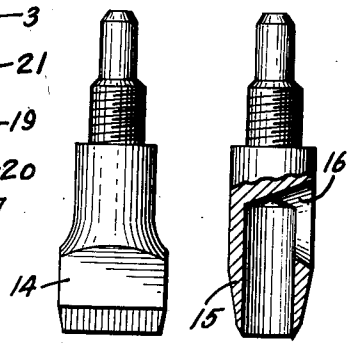


FIG. 9.

FIG. 10. FIG. 11.



INVENTOR,
JOHN N. SAXTON,
BY
ATTORNEY

United States Patent Office 3,029,512 Patented Apr. 17, 1962

3,029,512

PERCUSSIVE TYPE PUNCH

John N. Saxton, 4207 N. Harlan St., Baldwin Park, Calif.

Filed Apr. 4, 1960, Ser. No. 19,669
1 Claim. (Cl. 30—367)

The present invention relates to punches generally and specifically to a percussive type of punch. Punches are used for various purposes and the present invention has for an object a type of punch wherein the point may be pressed against work, the punch releasing at a given pressure to deliver a percussive blow against the point.

The particular punch is useful for various purposes such as an insert tool, a chiseling tool and the making of indentations. The punch is particularly adaptable for layout work and for the locating of points on the layout.

A further object is the provision of a punch which is efficient in operation, of few parts, inexpensive in cost of manufacture, and generally superior to punches of the character stated now known to the inventor.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, and association and relative arrangement of parts, members and features, all as shown in certain embodiments in the accompanying drawings, described generally and more particularly pointed out in the claims.

In the drawings:

FIGURE 1 is a vertical, sectional view of the punch as an entirety;

FIGURE 2 is a view similar to that of FIGURE 1, being in vertical section with certain parts shown in fragment, and in moved position;

FIGURE 3 is a vertical section similar to that of FIGURE 2, certain parts being in further moved position from that of FIGURE 2;

FIGURE 4 is a vertical, sectional view, partly in fragment showing parts in moved position from that of FIGURE 3;

FIGURE 5 is a sectional view on the line 5—5 of FIGURE 1;

FIGURE 6 is a sectional view on the line 6—6 of FIGURE 1;

FIGURE 7 is a sectional view on the line 7—7 of FIGURE 1;

FIGURE 8 is a sectional view on the line 8—8 of FIGURE 3;

FIGURE 9 is a detached, fragmentary view of certain parts of the invention;

FIGURE 10 is an elevation of a chisel point which may be used in the practice of the invention; and

FIGURE 11 is a fragmentary sectional view of a point for punching holes in work.

Referring now to the drawings, and specifically to FIGURE 1, the punch includes a tubular casing part 1 internally screw threaded at its ends 2 and 3, the threads 2 engaging the threads 4 of a cap or head 5 while the threads 3 engage threads 6 of a stem retainer 7. This construction provides a housing or casing for the mechanism of the punch. This mechanism includes a stem or rod 8 axially bored inwardly from one end thereof and screw threaded at 9 with a counterbore 10 for the receiving of a point 11 which point has a screw threaded shank 12 for engagement with the threads 9 and with an unthreaded reduced diameter shank 13 for reception in the bore 10. I may substitute for the point 11 the chisel device 14 of FIGURE 10, or the hole forming device 15 of FIGURE 11 provided with a side opening 16 through which severed slugs are directed. Both of the devices shown in FIGURES 10 and 11 are provided with threaded shanks and reduced diameter unthreaded portions for fitting within the threaded portion 9 of the stem or rod 8 and likewise within the bore 10. Other forms of devices may be incorporated and used with the stem or rod 8. The stem or rod 8 is passed through a bore 17 in the lower end of the stem retainer 7, and the stem or rod 8 within the stem retainer is provided with an anvil 18. The anvil has a diameter closely approximating the diameter of an enlarged bore 19 in the stem retainer. Extending between the bores 17 and 19 is a conical wall 20 and the anvil 18 has a lower wall 21 which is conical so as to rest, when in one position on the wall 20. The stem or rod 8 is axially bored at 22 the bore extending from the upper end 23 to a zone 24, the bore terminating above the anvil 18. Further, the wall thickness of the stem or rod 8 for the area which includes the bore 22 varies from the lower end of the bore at zone 24 to an annular shoulder 25 whereupon the external diameter is reduced, as shown at 26 to the end 23 where the bore commences. Adapted to surround the stem 8 and specifically that portion included between the anvil and the shoulder 25, is a hammer 27 of annular form. This hammer is externally reduced in diameter at 28 to form an annular shoulder at 29. Interposed between the end of the cap or bead 5 and the annular shoulder at 29 of the hammer, is a coil spring 30, this spring is termed the pressure spring as it is adapted to move the hammer against the anvil when the hammer is released. The blow of the hammer against the anvil is sudden, sharp, and strikes the anvil with considerable force as hereinafter set forth.

The cap or head 5 is provided with an axial bore 31 and an annular bore 32 thus providing between bores 31 and 32 an annular wall 33. What I term a restoring coil spring 34 has an end portion received in the bore 32 and surrounds the annular wall 33 with the opposite end of the spring 34 resting upon a washer 35 which washer engages the annular shoulder 25. Thus spring 34 does not act upon the hammer but does bear against the stem or rod 8.

Adapted for movement within the bore 22 of the stem or rod is a releasing rod 36. This rod has an uniform diameter and in the position shown for the rod in FIGURE 1, the rod extends within the bore 31 of the cap or head 5. The lower end of rod 36 is provided with a reduced diameter stem 37. The end of stem 37 is adapted to rest upon or engage the end 38 of a plunger release 39. The upper end of said plunger release is of conical form, as shown at 40, to provide a cam portion. Between the lower end of the bore 22, to wit: zone 24, and an end 41 of the plunger release 39 is a coil spring 42 which constantly urges the plunger release to the position shown in FIGURE 1. As stated, this plunger release is of cylindrical form and fits closely within the bore 22. The rod or stem 8 is provided with one or more, in the present instance three, equidistantly spaced apart transverse bores 43 and in alignment with each bore 43, for the position shown for the parts of FIGURE 1, the hammer is formed with sockets 44 adapted to house in part balls 45. In this position, as shown in FIGURE 5, substantially one-half of each ball detent is within a socket 44 while the other half thereof is within a bore 43. The plunger release in the position shown has its cylindrical wall surface engaging the detents to hold the detents within the sockets 44, which may be merged into a single annular groove, as in FIG. 5.

The cap or head 5 is formed with an axial screw threaded bore 46 opening inwardly from the top surface of said cap or head which communicates with a reduced diameter unthreaded counterbore 47. A screw threaded member 48 engages the threads 46 and said member has a shank 49 for passage through the counterbore 47. The end of the shank 49 is for adjusting the axial movement of the release rod 36 thereby governing the striking force of the hammer against the anvil.

The operation, uses and advantages of my invention are as follows:

What I term the normal position for the punch is the position of the punch parts as shown in FIGURE 1, and wherein the conical bottom surface of the anvil is resting against the complementary conical surface **20** of the stem retainer. The spring **42** has moved the plunger release **39** to a position where the ball detents **45** are held within the sockets **44** in the hammer. The point **11** is engaging the surface of work marked W. The operator grasps the casing, the palm of the hand engaging the top of the cap or head **5** and pushes downwardly. Such action holds the stem or rod **8** against movement and as the hammer **27** is locked to the stem or rod **8** by the ball detents **45**, the pressure spring **30** is compressed to a certain extent and the restoring spring **34** is compressed between the washer **35** and the cap or head **5**. As the casing is moved downwardly from the position of FIGURE 2 to the position shown in FIGURE 3, the upper end of the releasing rod **36** is engaged by the shank **49**, as shown in FIGURE 3 and as the casing is moved further downwardly, the pressure spring **30** is further compressed. The plunger release **39** is moved downwardly by engagement therewith of the reduced diameter stem **37** of the rod **36**. When this occurs, the ball detents are released from the sockets **44** in the hammer and moved inwardly of the bores **43** to release the hammer for striking engagement with the anvil as shown in FIGURE 4. The pressure spring causes the hammer to engage the anvil very suddenly and with considerable force with the result that the point **11** will indent the work W. Upon releasing pressure against the head or cap **5** of the casing as an entirety, the restoring spring **34** which is compressed in FIGURE 4 will move the casing **1** upwardly, and in so doing the parts will again assume the position shown in FIGURE 1 with the ball detents received in part within the sockets **44** of the hammer.

As previously mentioned, I may substitute other devices for the point **11** as shown on FIGURES 10 and 11 which is illustrative of certain applications of the punch. The cam surfaced upper end **40** of the plunger releases moves upwardly under pressure from spring **42** to again cam the ball detents from the position of FIGURE 4 to that of FIGURE 1, and such camming action forces the ball detents into the sockets **44**. If it is desired to regulate the striking pressure exerted by the hammer on the anvil, this may be done by adjusting the member **48** by moving it downwardly and thereby limiting the movement of the releasing rod **36**. Obviously, a longer stroke or movement of the releasing rod will allow greater compression of the pressure spring with resultant greater pressure exerted against the hammer.

I claim:

A percussion punch of the type employing a cylindrical casing having slidable therein a spring pressed hammer for striking, when the casing is manually moved a chosen distance in its working stroke, an anvil having a hollow stem on one side and a penetrating tool on the other side, said casing having an annular shoulder normally holding the hammer spaced from the anvil, which shoulder is moved toward the tool when the casing is moved less than said chosen distance, and further movement of the casing toward the tool lowers the casing shoulder below the top of the anvil and simultaneously operates a release mechanism to free the hammer from the anvil stem to which it is temporarily secured, the casing having a contact member engaging the release mechanism as the casing is moved toward the tool: characterized by the contact member being adjustable from outside the casing, the hammer having axially through it a central bore in which is an internal socket groove normal to the axis of the casing, the anvil stem having a plurality of transverse bores, and the release mechanism comprising a release rod slidable within the hollow stem, a spring urging the anvil and its stem downwardly to normal position, said release rod being circular in transverse cross-section with a lower cylindrical section of lesser diameter, a release member slidable in the hollow stem, spring urging the release member upwardly into contact with the reduced lower end of the release rod, said release member having a camming surface at its upper end, a plurality of balls held at least partially within the transverse bores at all times, said balls being free of the internal socket groove in the hammer when in contact with said reduced end of the release rod and moved outward by said camming surface of the release member to engage the internal socket groove of the hammer and be so held by said release member, thereby to lock the hammer to the holow stem, manual movement of the casing to said chosen distance causing the adjustable contact member of the casing to engage the top of the release rod, thereby moving said release rod and the release member toward the tool, thus freeing the balls from the groove in the hammer, the diameter of the lower end of the release rod being sufficiently small to readily accommodate the balls and the lower end of the rod within the hollow of the anvil stem.

References Cited in the file of this patent

UNITED STATES PATENTS

2,455,270	Ravella	Nov. 30, 1948
2,787,178	Maxim	Apr. 2, 1957

FOREIGN PATENTS

51,164	Sweden	May 11, 1920