This invention relates to nail holders and particularly to that type constituting a hand tool adapted to hold a nail inserted therein while the nail is being driven by hammer blows on the holder.

The invention contemplates the provision of a relatively inexpensive nail holder and nail driving punch combined, in which a sleeve on the punch part or handle is urged by a spring to rotate in the proper direction to effectively hold the head and to form a recess in the groove or notch against any tendency of the nail to move out of proper alignment or to twist or rise out of, or to otherwise leave, the notch in which it is held.

The invention further contemplates the provision of a nail holder adapted to hold various sizes and types of relatively small nails during the major part of the driving operation, to release the nail after it has been driven a major part of the way in and to act as a driving punch to complete the nail driving operation.

The invention is particularly useful to aid unskilled persons to drive nails of the smaller sizes straight, to protect the fingers from injury by the hammer, and for use in constricted spaces as in corners and places which fingers cannot reach or find difficulty in reaching to hold a small nail.

The various objects of the invention will be clear from the description which follows and from the drawings, in which:

Fig. 1 is an elevational view, partly in section and foreshortened, of the combined nail holder and punch, showing a nail held thereby ready to be driven.

Fig. 2 is an end elevational view thereof, showing the pressure-applying cam arm of the sleeve urging the shank of a small nail into one of the notches of the holder, the arrow indicating the direction in which the sleeve is urged to rotate.

Fig. 3 is a similar view of the holder, showing the sleeve rotated in the direction of the arrow to release the nail.

Fig. 4 is a vertical sectional view of the holder taken on the line 4--4 of Fig. 1.

Fig. 5 is an elevational view, partly broken away, of the sleeve.

Fig. 6 is an elevational view of the end of the punch showing in dash-dot lines, nails of different sizes and types inserted into the nail-holding recesses and showing also the nail-driving surface and the punch end surface.

Fig. 7 is a fragmentary side elevational view thereof.

Fig. 8 is a fragmentary top plan view thereof.

In the practical embodiment of the invention shown by way of example, the holder comprises three main parts, namely, the punch and handle 10, the sleeve 11 and the coil spring 12. One end portion of the punch serves as a handle 13 and is intended to be struck manually on its end surface 14 by a hammer to drive the nail 15 held at the other mutilated end 16. A transverse slot 17 is made partway through the punch near the mutilated segmental end 16 and sufficiently deep to form a recess for the reception of the head of the largest nail to be driven. The flat wall 18 of the slot is a partial end surface of the punch and constitutes the main nail driving surface which engages the head of the nail and exerts pressure thereon to drive it when the handle is struck.

The mutilated end portion 16 of the punch between the slot 17 and the end punching surface 19 is shaped to provide suitable recesses or notches for holding the shanks of nails of different sizes and types. As shown the end part of the punch forming the nail-holding portion 16 is mutilated or cut away to form a substantially triangular segment. One side 21 of the segment is preferably flat to serve as a stop as will later be explained, and the other side 22 is serrated to provide the triangular notches 23 and 24 of different recesses in the respective nail shanks of various nails. The bottoms of both notches are above the horizontal center line of the punch as viewed in Figs. 2, 3 and 6 to permit the nail head to rest in the slot while clearing the bottom thereof. The shank of the nail rests against the sides of the notch and projects forwardly by the width of the notch enough to be driven for the major part of its length, the shank also projecting upwardly above the top of the surface 22.

To hold the nail firmly in place while the major part of the driving operation is performed, the spring-pressed sleeve 11 is mounted for oscillation or limited rotation on and embraces a cylindrical portion of the punch and is held thereon against relative longitudinal movement by the pin 25 fixed in the punch and projecting outwardly into the circumferential slot 26 extending part way around the sleeve. The sleeve is reduced in diameter at its inner end portion 27 which rides on the shoulder 28 of a collar as 29 fixed to the punch by the pin 30. The torsion spring 12 between the punch and the inner surface of the reduced portion of the sleeve is anchored at one end 32 in the sleeve and at its other end 33 is anchored in the collar 29, whereby the sleeve is urged by said spring in the nail-holding direction of the arrow of Fig. 2.

As best seen in Figs. 2, 3 and 5, the nail-holding end portion of the sleeve 11 is cut away from the remainder of the sleeve as by the groove 34 to expose the open top of the punch slot 17, but beyond said slot, a suitable vise-like cam arm 35 having a free end portion, is bent from the material cut away from the sleeve, in a direction to press upon and properly hold the shank of the nail in the selected notch 23 or 24. Said arm 35 overhangs the serrated side 22 of the punch segment, being normally urged by the spring 31 into contact with that side of the segment forming the tops of the notches.

The cam arm being in a neutral position, is in the position of a chord of the circles forming the cross section of the sleeve, and the arm being above or beyond the center of the sleeve, it is removed from the tops of the notches to expose the notches when the sleeve is rotated in the clockwise direction of the arrow of Fig. 3 into the position shown in that figure against the section of the spring 31. In its fully retracted position, the arm engages and is stopped by the side 21 of the serrated segment, but retracting rotation of the sleeve may be stopped instead by the end of the sleeve slot 26 and the pin 25, if desired. When released, the sleeve is automatically rotated in the counterclockwise direction of the arrow of Fig. 2 to close the arm upon the shank of a nail in either notch and projecting above the top of the notch. However, the nail-holding function of the arm is independent of the spring 31 as will soon be pointed out.
To insert the nail into position, with the sleeve in the position shown in Fig. 3, the nail head is placed in the punch slot 17 and the shank in the selected notch 23 or 24 depending on the diameter of the shank. On the release of the sleeve, the spring 31 rotates the sleeve to carry the arm 35 forcibly against the outstanding nail shank. The nail and tool may now be handled as a unit with one hand to bring the point of the nail to any otherwise inaccessible point where the nail is to be driven. Hammer blows upon the punch end 14 causes the driving surface 18 of the punch to engage the head of the nail and to drive it.

It will be noted that owing to the tendency of the sleeve 11 to rotate in a counter clockwise direction into the locking position thereof, and since movement of the sleeve is limited to rotation about its axis, any force tending to twist the nail out of its proper straight position, or to lift it, has such a small component in a clockwise direction, that even a considerable force would not cause dislocating movement of the arm or loosen the vise-like grip upon the nail of the arm 35 independently of the spring. The coil spring 31 and the cooperating sides of the notches 23 or 24 help to resist such dislocating movement of the sleeve. It will further be noted that any tendency of the nail to move sideways under the hammer blows upon the punch is effectively resisted by the tapered sides of the notch and the relatively long and secure grip of said sides on the nail, since an appreciable portion of the length of the nail near the head is in pressed contact with the sides of the notch.

After the nail has been driven in the manner which will now be clear and as far as it will go, it is readily released by manually rotating the sleeve to the position of Fig. 3, permitting the withdrawal of the tool from the nail.

The operation of driving the nail all the way in is then performed by placing the slightly projecting flat extreme end surface 19 of the punch against the nail head and using the hammer at the other end 14 of the punch.

It will now be seen that the tool can readily be operated by unskilled persons with full protection of the fingers and at places where relatively small nails could not otherwise be driven while held in the fingers, that the tool is simple, rugged, inexpensive and durable, while holding the nail with great firmness during the driving operation owing to the eccentric disposition of the holding parts, and that the various objects of the invention have been adequately attained.

While a certain specific form of the invention has herein been shown and described, various obvious changes may be made therein without departing from the spirit of the invention defined by the appended claims.

We claim:

1. A nail holder comprising an elongated member having a cylindrical end portion terminating in a mutilated notched segment, and a spring-pressed sleeve open at an end thereof and mounted coaxially on and rotatable on said end portion and having an arm extending in the position of a chord of the sleeve cross section across the open end of the sleeve and urged toward the notch of the segment to lock upon the shank of a nail arranged in the notch against movement in the notch, and means for limiting movement of the sleeve to circumferential movement around the axis of said end portion and thereby rendering the sleeve incapable of being dislocated by the nail in the notch.

2. The nail holder of claim 1, the means for limiting the movement of the sleeve comprising a pin projecting from the end portion, the sleeve having a circumferential slot extending part way around and through the sleeve and receiving the pin.

3. A combined nail holder and punch comprising punch provided with a mutilated substantially triangular segmental end portion having a partly cylindrical surface and two side surfaces, one of the side surfaces having a nail receiving notch therein and the other side surface being substantially flat, a hollow open-ended sleeve rotatably mounted on the punch and having a projecting end portion arranged around and guided by the segmental end portion of the punch, the remainder of said end portion of the sleeve carrying an integral arm extending transversely in a non-radial direction across the open end of the sleeve and having a free end portion thereof adapted to engage and press upon the shank of the nail in the notch and means constraining the arm to move only in a plane substantially perpendicular to the axis of the sleeve.

4. A combined nail holder and punch having a cylindrical part and a mutilated end portion adjacent the cylindrical part and extending therebetween, the mutilated portion having a nail-receiving notch therein, a manually movable sleeve mounted coaxially on and embracing the cylindrical part and extending part way around the mutilated portion, means restricting movement of the sleeve to circumferential movement in both directions around the cylindrical part, and means carried by the sleeve and movable therewith into positions to cover and to uncover the open part of the notch and thereby to lock a nail in the notch, the last mentioned means comprising a member arranged in the position of a chord of the circles constituting the cross section of the sleeve.

5. The nail holder and punch of claim 4, the mutilated portion being essentially triangular in cross section and having a flat face serving as a stop to engage the member at the end of the notch-uncovering movement of the sleeve and the member.

6. A nail holder comprising a sleeve open at both ends, means passing through the sleeve for movably supporting the sleeve, means restricting the sleeve movement to circumferential movement only, said supporting means and the sleeve having a common axis, said supporting means having a longitudinal notch therein for the reception of part of a nail, and nail-locking means normally immovable by the nail in the notch for locking the nail in said notch comprising a member carried by the sleeve and extending transversely across the open end of the sleeve and across the notch in the operative position thereof, the member being at all times in radial spaced relation to the axis of the sleeve, said member being movable only in a plane substantially perpendicular to the axis of the sleeve.

7. The nail holder of claim 6, the member having a free end and constituting a bent end portion of the sleeve, there being a groove part way around and through the material of the sleeve separating the member from the remainder of the sleeve, and a coil spring interposed between the sleeve and the means for supporting the sleeve, said spring urging the member toward the nail-locking position thereof.

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