

July 20, 1937.

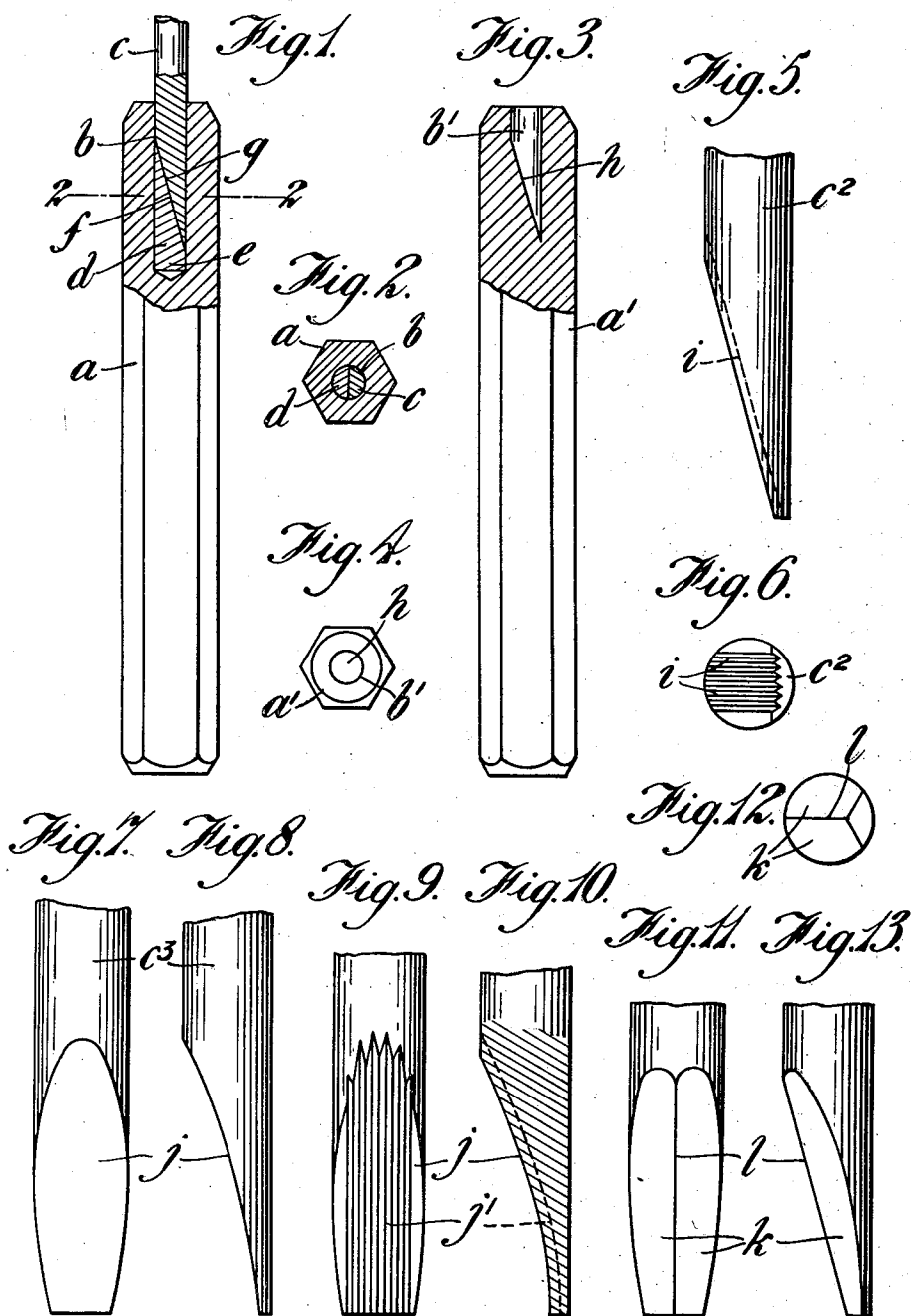
J. J. RAWLINGS

2,087,814

DRILL AND HOLDER THEREFOR

Filed April 4, 1935

2 Sheets-Sheet 1



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Fig. 14.

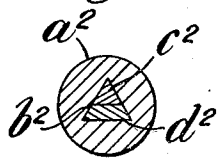


Fig. 15.

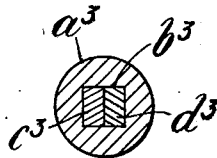


Fig. 16.

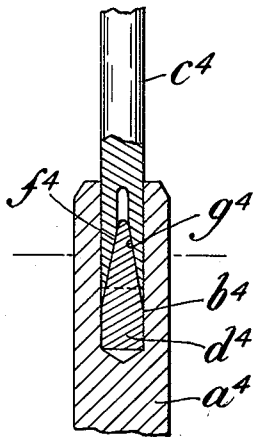


Fig. 18.

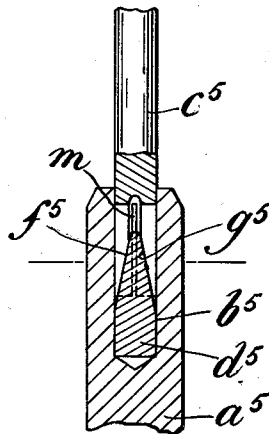


Fig. 17.

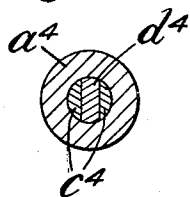
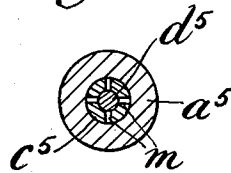


Fig. 19.



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DRILL AND HOLDER THEREFOR

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Application April 4, 1935, Serial No. 14,727
In Great Britain May 14, 1934

4 Claims. (Cl. 279—103)

This invention relates to drills or bits and holders or chucks in which the same can be held for useful operation and the said invention is especially applicable to percussive drills of the kind in which the drill or bit is held in a holder or handle to which blows are delivered by a hammer by hand or mechanically, the drill or bit being removable from the holder so that a worn or broken drill or bit can be replaced by a new one, or drills or bits of different sizes can interchangeably be held in the same holder.

Heretofore bits of different sizes have been provided with tangs of a uniform size so that they can be held in a holder or handle provided with a bit receiving socket of a corresponding size, this socket and the tang of the bit being in some cases made slightly tapered. In the use of a bit thus held in a holder, the bit generally becomes firmly gripped in the socket so that when it is desired to remove the bit from the holder special means have to be provided to effect this operation. Thus the holder sometimes has a transverse hole formed therein to allow a punch or wedge to be inserted behind the end of the tang and employed to force the bit out of the socket.

An object of this invention is to avoid the making of such a transverse hole in the holder and to avoid the necessity of employing a separate implement for freeing the bit from the holder in hand operated or mechanically operated tools.

According to this invention, the end of the tang is formed with a surface which is oblique to the axis of the bit and the inner end of the hole in the holder is formed with a similar oblique surface, these surfaces being in contact when the bit is in use and the blows delivered to the holder being transmitted to the bit wholly or in part through the said surfaces. It has been found in practice that with a bit tang and socket thus formed the bit is held firmly in the socket during the time the bit is in use in forming a hole under the effect of hammer blows delivered to the holder and the bit is not jarred out of or dislodged from the socket by such blows. The force of the blow is then transmitted from the holder to the bit mainly through the oblique surfaces which when the bit is held against material in which a hole is to be cut, tends to press the bit tang more forcibly against the wall of the socket or hole in the holder. When however, a blow, or succession of blows, is or are delivered to the holder laterally near to the end in which the socket is formed, the bit is immediately

loosened and can be easily drawn or allowed to fall out of the said socket. In some cases it is sufficient, when the bit is not in contact with a solid body, to strike the holder axially in order to eject the bit from the holder.

The accompanying drawings show different forms of bits and holders in accordance with this invention.

Figure 1 is a side view of a bit and holder partly in section.

Figure 2 shows the same in transverse section on the line 2—2, Figure 1.

Figure 3 is a side view of a modified form of the holder.

Figure 4 is an end view thereof.

Figures 5 and 6 show a side view and an end view of a modified form of an end of a drill or bit.

Figures 7 and 8 show side views respectively at right angles illustrating another form of the drill or bit.

Figures 9 and 10 are views similar to Figures 6 and 7 of a further form of the drill or bit.

Figure 11 is a side view of an end of another form of drill or bit.

Figure 12 is an end view thereof, and

Figure 13 a side view taken at right angles to the view shown in Figure 11.

Figures 14 and 15 are views similar to Figure 2, illustrating diverse forms of the bit and holder.

Figures 16 and 17 respectively show a longitudinal section and a transverse section of a bit and holder, wherein oblique surfaces within the socket enter between similar oblique surfaces formed in the bit.

Figures 18 and 19 are similar views to Figures 16 and 17 illustrating a bit and holder having conical or pyramidal surfaces in contact.

As shown in Figures 1 and 2, *a* is a holder with an axial socket *b*, and *c* is an end or tang of a drill or bit from which a part *d* has been severed on an oblique plane. The part *d* is inserted in the socket *b* to provide an oblique abutment *f* for the oblique surface *g* of the end or tang of the drill or bit to be subsequently inserted in the said socket. The diameter of the substantially cylindrical socket is such that a correspondingly shaped part of the tang of the bit fits snugly therein, the outer surface of the tang being in contact with the wall of the socket around its entire periphery. The abutment piece *d* can be made of such a size that it will be retained permanently in the socket *b*. It can be made with a cylindrical end portion *e* fitting

tightly in the socket into which it is driven and it may be formed in such a manner that in use the end first inserted in the socket tends to expand. For example, this end of the abutment piece may be made with a slightly conical axial recess which under percussive action when the tool is in use, owing to the rim only at this end being supported by the walls of the socket b formed by a drill, tends to cause an increase in the diameter of this end of the abutment piece. When the abutment piece d is cut from the tang of the drill or bit by an implement of the nature of a saw, the planes of the abutting faces f , g will be equally angularly disposed with reference to the common axis of the drill and the holder.

Obviously the abutment piece can be made separately from the tang of the drill or bit and can be made of a different kind of metal, for example, a softer metal, the angles of the two contacting faces with reference to the axis of the drill or the holder being however made substantially equal.

Also, as shown in Figure 3, the use of a separate metal insert to provide the oblique abutment face can be avoided by forming an oblique face h in the drill or bit receiving hole b' in a holder a' by means of a punch, the metal of the holder being first heated to a suitable temperature if necessary.

In the last described arrangements, the abutment piece and tang of the drill or bit are shown as formed with plane oblique surfaces fitting closely together when in contact. These contacting surfaces may however be ribbed or grooved, the ribs or grooves extending preferably in the direction of the major axis of the elliptical contour of the end surface of the tang or the abutment piece provided by forming plane oblique surfaces on these cylindrical parts. Figures 5 and 6 show a ribbed or grooved end face of a bit c^2 with ribs or grooves i extending in the direction of the major axis of the ellipse but the ribs or grooves i can, if desired, be made extending in any other direction, and the abutment for this tang, if desired may have corresponding grooves in its face in which the ribs of the tang fit closely.

The contacting surfaces of the tang and abutment piece, instead of being plane surfaces may be curved surfaces, as shown in Figures 7 and 8 at j at the end of a tang of a bit or drill c^3 , and as shown in Figures 9 and 10, such curved surfaces j may be ribbed or grooved as at j' . The curvature of such surfaces may be either convex or concave.

If desired more than one oblique surface can be formed on each of the parts in contact and in such cases where for example, two oblique surfaces are provided, as shown in Figures 11, 12 and 13, these surfaces k on each part preferably intersect, thus providing an oblique ridge l on the tang. The corresponding oblique surfaces in the hole in the holder form a groove. The oblique surfaces may be plane, as shown, or they may be curved, and in the latter case the ridge will be curved also. The reverse of this arrangement may be employed by forming a tapered groove in the tang whilst the abutment piece is provided with a rib to fit this groove.

It is to be understood that the invention is not limited to cylindrical sockets and tangs as it is also applicable to such parts having an oval, triangular, rectangular or other polygonal form in cross section, for example, as shown in Figure 14 in which a^2 is a cylindrical holder with a

triangular socket b^2 , triangular abutment d^2 and triangular tang c^2 .

Figure 15 shows a cylindrical holder a^3 with rectangular socket b^3 , abutment d^3 and tang c^3 .

The arrangement illustrated in Figures 16 and 17 also provides two oblique surfaces f^4 formed on opposite sides of the abutment piece d^4 . The end or tang c^4 of the drill or bit is then forked to provide corresponding oblique abutment surfaces g^4 . The holder or handle a^4 and the socket b^4 to receive the abutment piece d^4 may be of hexagonal or other convenient cross section instead of being circular as shown.

As shown in Figures 18 and 19 the abutment piece d^5 has a conical abutment face f^5 on which a conical abutment face g^5 in the end or tang c^5 of the drill or bit can be stepped or seated. The handle or holder a^5 and the socket b^5 can be hexagonal in cross section, the part of the abutment piece fitted to the wall of the socket being correspondingly shaped. The abutment faces f^5 and g^5 may be pyramidal instead of being conical. In addition to the cavity formed in the tang of the drill or bit, slots such as shown at m may be formed radially to the axis of the drill or bit.

As hereinabove mentioned the tang shaped as described will be held firmly in the socket whilst the drill or bit is in use to cut a hole by delivering a succession of blows axially to the holder but the drill or bit can be immediately loosened by tapping the holder with a hammer near to the socket end thereof, or tapping this part against the edge of an anvil or like body.

By reason of the manner in which the blow delivered by a hammer to the holder is transmitted by the oblique abutment to the bit, in some cases, a vibratory movement of the bit is set up which tends to enlarge the hole diametrically so that clearance is provided to allow the bit to be readily drawn out of the hole.

I claim:

1. A drill holder having a socket formed therein to receive a percussion drill, wherein the wall of the socket is parallel to the longitudinal axis of the said socket, and an end abutment provided at the inner closed end of the socket intersects the parallel wall of the socket obliquely to the said longitudinal axis at opposite sides of the said wall.

2. A drill holder having a socket formed therein to receive a drill, wherein the wall of the socket is parallel to the longitudinal axis of the said socket and a separate abutment piece inserted in the closed inner end of the said socket is formed with an abutment surface for contact with an end oblique surface of the drill, said abutment surface being oblique to the said axis and having its periphery located on the lateral wall of the socket.

3. A drill holder having a socket formed therein to receive a drill, wherein the wall of the socket is parallel to the longitudinal axis of the said socket, and the inner end of the socket is formed with a plurality of end abutment surfaces respectively in different planes which intersect along a line oblique to the said axis.

4. A drill having a shank the wall of which at the terminal part of the said shank is in part parallel to the longitudinal axis of the shank and in part is formed with a plurality of intersecting terminal abutment faces which are respectively oblique to the longitudinal axis of the shank and have lateral edges intersecting the said parallel part of the wall.

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