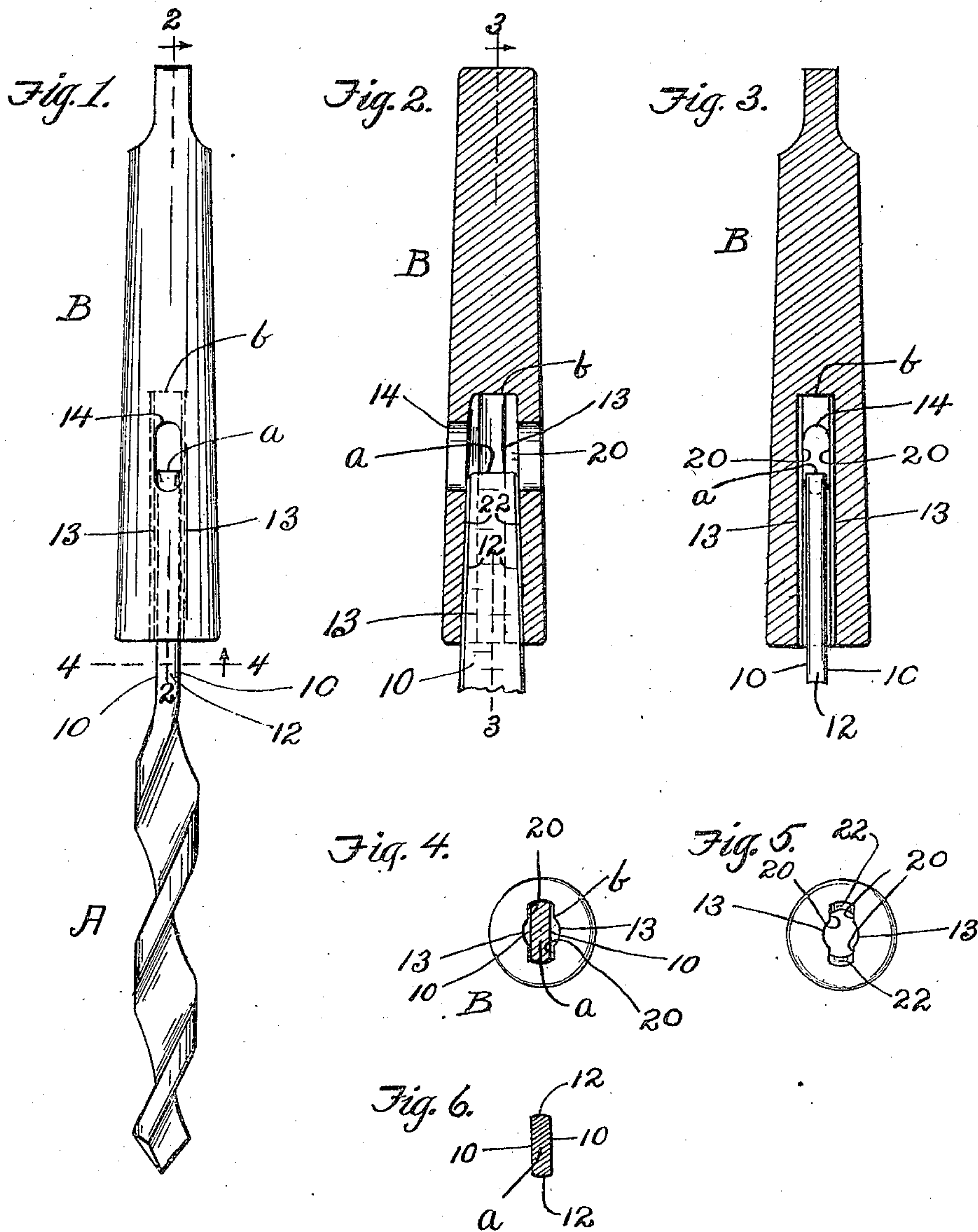


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DRILL HOLDER.

APPLICATION FILED FEB. 18, 1909.

935,035.

Patented Sept. 28, 1909.



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UNITED STATES PATENT OFFICE.

ALBERT H. KNIGHT, OF CLEVELAND, OHIO.

DRILL-HOLDER.

935,035.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed February 18, 1909. Serial No. 478,696.

To all whom it may concern:

Be it known that I, ALBERT H. KNIGHT, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drill-Holders; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in drill-holders, and pertains more especially to a twist-drill-holder comprising a drill-socket suitable for use in holding a twist drill having a flat shank.

The primary object of this invention is to provide a drill-socket of the character indicated which is simple and durable in construction and in which the flat shank of the drill is readily inserted into the socket but firmly held in place within the socket when inserted.

With this object in view, and to the end of realizing other advantages hereinafter appearing, this invention consists in certain features of construction, and combinations of parts, hereinafter described, pointed out in the claims, and illustrated in the accompanying drawings.

In the said drawings, Figure 1 is a side view of a twist drill and drill-socket embodying my invention. Fig. 2 is a vertical section on line 2—2, Fig. 1, looking in the direction indicated by the arrow. Fig. 3 is a vertical section on line 3—3, Fig. 2, looking in the direction indicated by the arrow. Fig. 4 is a horizontal section on line 4—4, Fig. 1, looking upwardly. Fig. 5 is an inner end view of the drill-socket. Fig. 6 is a cross section of the shank of the drill.

Referring to the drawings, A indicates a twist drill which is composed of a spirally bent flat metal bar having an end-portion *a* which forms the shank of the drill. The shank *a* is flat, having its opposite sides 10 and 10 flat and substantially parallel. The shank *a* is gradually reduced in width toward the free extremity of the shank so that the two longitudinal edges 12 of the shank converge somewhat toward the said extremity of the shank, as shown in Fig. 2. The two edges 12 slope therefore toward each other in the direction of the free extremity of the shank.

B indicates the drill-socket which is pro-

vided in its inner end-portion and centrally with a bore *b* for receiving the shank *a* of the drill. The bore *b* extends from the inner extremity of the socket a suitable distance toward the outer end of the socket. The bore *b* has two opposite side walls 20 and 20 which are flat and substantially parallel but centrally thereof preferably cut away, as at 13. The walls 20 and 20 of the bore *b* are spaced laterally a distance enough greater than the distance between the sides 10 and 10 of the shank *a* to render the latter loose at its sides relative to the drill-socket and to facilitate the insertion of the said shank into the said bore. The walls 20 and 20 are preferably spaced laterally only the distance necessary to properly receive the flat shank *a* sidewise between them. The side walls 20 and 20 of the bore *b* are gradually reduced in width from the inner end of the socket toward the inner end of the said bore and are arranged equidistantly from but at opposite sides respectively of the axis of the drill-socket. The other and narrower side walls 22 and 22 of the bore *b* are arranged equidistantly from but at opposite sides respectively of the axis of the drill-socket and converge from the inner end of the socket outwardly toward the outer end of the socket, and, of course, are spaced far enough apart at the inner end of the socket to permit of the passage of the shank *a* into the said bore a suitable distance. The two walls 22 slope therefore toward each other in the direction of the outer end of the drill-socket and the slope of the said walls 22 corresponds with the slope of the edges 12 of the shank *a* so that the said shank upon being inserted into the drill-socket will tightly fit the said walls at its said edges. To produce more especially a nice fit between the shank *a* and the sloping walls 22 of the bore *b* the said walls not only converge somewhat toward each other in the direction of the outer end of the socket as hereinbefore described but are rounded or curved concentrically relative to the center or axis of the drill-socket, as shown very clearly in Fig. 5, and the longitudinal edges 12 of the shank are correspondingly rounded or curved concentrically relative to the said axis, as shown very clearly in Fig. 6.

My improved drill-holder is especially provided for a drill made from a flat metal bar. It is obvious that the shank *a* of the drill would not have as efficient a bearing in

the drill-holder if its edges 12 and the walls or bearing surfaces 22 of the drill-socket were flat, but by having the said bearing surfaces and the said edges curved circumferentially of the center of axis of the drill-socket an adequate and very efficient connection is established between the drill-shank and the drill-socket.

By the construction hereinbefore described it will be observed that the shank of the drill can be readily inserted into and removed from the drill, and that the shank is firmly held in the socket upon its insertion into the socket.

The sloping walls 22 of the bore *b* in the drill-socket are slotted laterally, as at 14, near the inner end of the bore to accommodate the insertion of a tool (not shown) employed in loosening the drill-shank relative to the drill-socket preparatory to the withdrawal of the drill from the drill-socket. The side walls 20 of the bore in the drill-socket are cut away centrally and longitudinally, as at 13, as already hereinbefore indicated, to facilitate the peculiar formation of the bore. The recesses 13 formed centrally and longitudinally of the side walls 20 of the bore *b* in the drill-socket communicate at the inner end of the drill with the external atmosphere and communicate through the slots 14 near the inner end of the bore *b* with the external atmosphere, so that the said slots and the said recesses form air-passages whereby air can circulate through the drill-socket at opposite sides of the drill-shank when the drill is attached to the socket, and the circulation of air along the said shank keeps the shank in a sufficiently cool condition to prevent such undue expansion of the metal in the shank as would too tightly wedge the shank between and in contact with the sloping walls of the bore in the socket.

What I claim is:—

1. A drill-holder comprising a socket provided in its inner end-portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two opposite substantially parallel laterally spaced side walls which are gradually reduced in width from the inner end of the socket toward the inner end of the bore, said bore having its other walls converging toward the inner end of the bore.

2. A drill-holder comprising a socket provided in its inner end-portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two opposite laterally spaced side walls which are gradually reduced in width from the inner end of the socket toward the inner end of the bore, said bore having its other walls converging toward the inner end

of the bore and circumferentially of the axis of the socket.

3. A drill-holder comprising a socket provided in its inner end-portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two opposite laterally spaced side walls which are gradually reduced in width from the inner end of the socket toward the inner end of the bore and cut away centrally and longitudinally to form passageways which extend from the inner extremity of the socket toward the inner end of the bore, said bore having its other walls converging toward the inner end of the bore and provided with slots arranged at the inner end-portion of the bore and in communication with the aforesaid passageways.

4. The combination, with a twist drill composed of a spirally bent flat metal bar having one of the end-portions therefor forming a flat shank which is gradually reduced in width toward the free extremity of the shank so that the longitudinal edges of the shank converge toward the said extremity of the shank, of a drill-socket engaged by the said shank and provided in its inner end-portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two opposite side walls which are spaced laterally far enough to easily receive the drill-shank sidewise between them and gradually reduced in width from the inner end of the socket toward the inner end of the bore, said bore having its other walls converging toward the inner end of the bore and engaging and corresponding in convergence with the convergence of the converging edges of the drill-shank.

5. The combination, with a twist drill composed of a spirally bent flat metal bar having one of the end-portions thereof forming a flat shank whose two sides are substantially parallel, which shank is gradually reduced in width toward the free extremity of the shank so that the longitudinal edges of the shank slope toward each other in the direction of the said extremity of the shank, of a drill-socket engaged by the said shank and provided in its inner end portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two substantially parallel side walls which are spaced laterally a distance enough greater than the distance between the sides of the drill-shank to render the latter loose at its sides relative to the drill-socket and gradually reduced in width from the inner end of the socket toward the inner end of the bore, and the other walls of the said bore sloping toward each other in the direction of the inner end of the bore

and engaging the sloping edges of the drill-shank.

5 6. The combination, with a twist drill composed of a spirally bent flat metal bar having one of the end-portions thereof forming a flat shank which is gradually reduced
10 in width toward the free extremity of the shank so that the longitudinal edges of the shank converge toward the said extremity of the shank, of a drill-socket engaged by the
15 said shank and provided in its inner end-portion and centrally with a bore which extends from the inner extremity of the socket a suitable distance toward the outer end of
20 the socket, which bore has two opposite side walls which are spaced laterally far enough to easily accommodate the drill-shank side-ward the inner end of the bore, said bore
25 having its other walls converging toward the inner end of the bore and engaging and corresponding in convergence with the convergence of the converging edges of the drill-
30 shank, said converging walls of the bore in the socket being rounded or curved concentrically relative to the axis of the drill-socket, and the aforesaid sloping longitudinal edges of the drill-shank being correspondingly rounded or curved concentrically
relative to the said axis.

7. The combination, with a twist drill having a flat shank whose two sides are substantially parallel, which shank is gradually

reduced in width toward the free extremity 5
of the shank so that the longitudinal edges of the shank converge toward the said extremity of the shank, of a drill-socket engaged by the said shank and provided in its
inner end portion and centrally with a bore 40
which extends from the inner extremity of the socket a suitable distance toward the outer end of the socket, which bore has two side walls which are spaced laterally substantially equidistantly from end to end and
45 far enough to easily accommodate the drill-shank sidewise between them and gradually reduced in width from the inner end of the socket toward the inner end of the bore, said bore having its other walls converging to-
50 ward the inner end of the bore and engaged by the converging edges of the drill-shank, and the first-mentioned walls of the bore being cut away centrally and longitudinally to form passageways which are in communica-
55 tion at the inner extremity of the socket with the external atmosphere and are placed in communication at the inner end-portion of the bore with the external atmosphere
60 through the converging walls of the bore.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

ALBERT H. KNIGHT.

Witnesses:

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B. C. BROWN.