

Feb. 1, 1944.

A. ILLSCHE

2,340,472

FORMING DIE

Filed Sept. 27, 1941

Fig. 1.

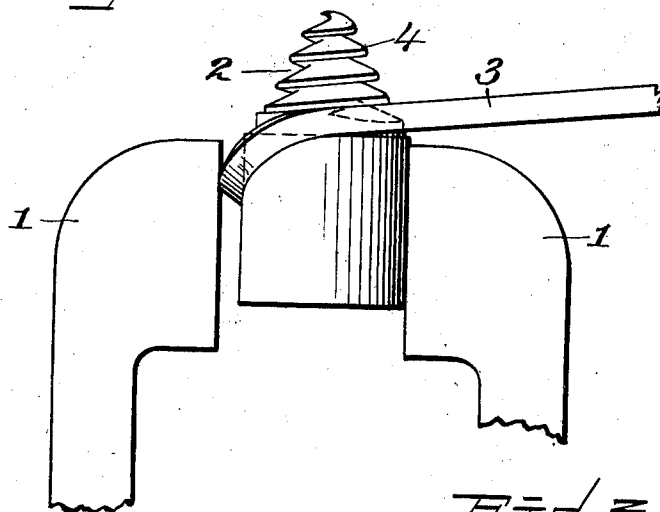


Fig. 3.

Fig. 2.

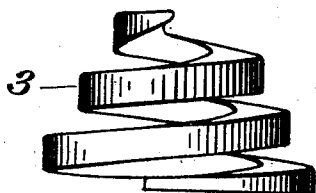


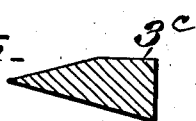
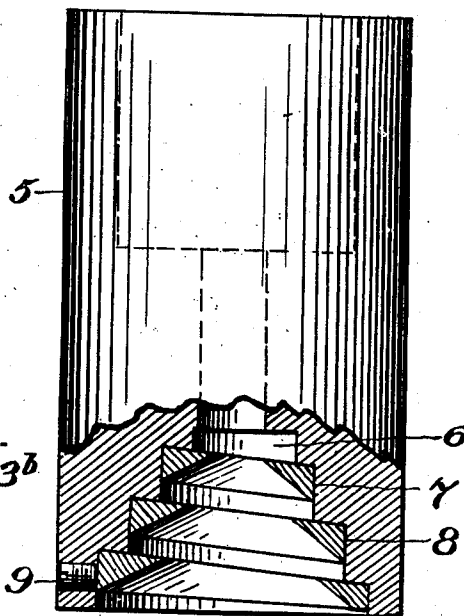
Fig. 4.



Fig. 5.



Fig. 6.



INVENTOR
Arthur Illsche
BY
Walter H. Humphrey
ATTORNEY

UNITED STATES PATENT OFFICE

2,340,472

FORMING DIE

Arthur Illsche, Rye, N. Y.

Application September 27, 1941, Serial No. 412,594

1 Claim. (Cl. 76—90)

The invention relates to forming dies for screw-threading blanks of sheet metal or other material of frustro-conical and other forms. While the invention is adaptable for making either member of a pair of screw-threading dies and substantially the same method is employed in producing them, it will not be necessary to describe both and the description will accordingly be limited to the making of the female die.

Heretofore, the difficulties encountered have made it practically impossible to make female forming dies for screw-threading small blanks, particularly blanks of tapered form of the size used as fasteners for detachably securing buttons to garments or for women's hand-bags and various other purposes, where the over-all dimension of the fastener does not exceed a half or three-quarters of an inch in any direction. The main difficulty met with results from the lack of space for the operation of a cutting or other tool in the small end of the tapered die socket, in which the thread of the socket must be extended to make the die effective for its intended purpose. As the space mentioned is insufficient to accommodate the smallest workable tool, the impossibility of cutting a thread of any appreciable depth and particularly a deep thread, which requires a larger, stronger tool, will be apparent.

Recognizing the impracticability of milling or otherwise cutting the thread of the female die, the thread is pre-formed by the present invention, as a separate element, for insertion in the socket, of the die block in which it may be permanently or removably secured.

In carrying my improved method into effect, a helix is produced by winding a strip of heat-softened metal or other suitable material, edge on, on a former, which may or may not be helically grooved to receive the strip. The cross sectional form of the strip is such that when coiled, as described, it presents within the helix, a counterpart of the thread to be formed by the die on the blanks. The helix thus prepared, is then removed from the former and after being finished and hardened, if required, is fitted, seated and secured in the socket of the die-block or holder, ready for use.

While the former on which the strip is wound, may be smooth surfaced, it is preferably helically grooved to receive the strip and the cross sectional form of the groove corresponds, in counterpart, to that portion of the strip that enters the groove.

In order to solidly seat the helix in the socket

of the die-block or holder, the strip is given such width that the overlapping turns of the helix form a square or other shaped thread exteriorly thereof, which is fitted to a seat of counterpart formation within the socketed die-block and either permanently or removably secured, as above stated.

The cross sectional shape of the strip and the groove in the former may be varied to produce any form of thread desired and the former may likewise be varied from uniform diameter throughout, to any degree of taper required by the blanks to be threaded.

The accompanying drawing will serve to illustrate means suitable for carrying the invention into effect but I do not wish to be understood as intending to limit myself to either the exact form or details shown, as various changes may be made therein without departing from the spirit and scope of the invention, as outlined in the appended claim.

In the drawing—

Fig. 1 illustrates the method of producing a tapered helical thread.

Fig. 2 is a view in side elevation of the finished thread.

Fig. 3 is a vertical central section, showing the helical thread seated and secured in a die-block or holder the bore of which is indicated in dotted lines and

Figs. 4, 5 and 6 show different cross sectional forms of the strip to produce different threads.

Referring now to the drawing, 1, 1 represent, diagrammatically, any suitable or well known clamping means, for securely holding the former 2 and the strip 3, to be wound thereon. To simplify the illustration, the former and the strip are shown held by a single clamping means but it will be understood that they may be separately and independently held, if found more convenient in carrying out the operation of producing the helix.

In its preferred form, the former 2, is substantially a duplicate of the male die that co-operates with the female die in the threading operation, being here shown as frusto-conical and provided with a helical thread 4, that extends from the base to the apex. The former 2, in general outline, follows the shape of the blanks to be threaded, which may be of uniform diameter or tapered to different degrees to meet the requirements of the use for which they are designed. While the groove of the thread on the former 2 is of material aid in the winding operation, in receiving the shaped edge portion of the

strip and spacing the turns apart as required, a smooth surfaced former may be effectively employed, if desired, by giving the strip the required cross sectional shape to space the turns of the thread apart and permit the strip to be closely wound on the former.

The strip 3 is ordinarily made of steel and is annealed or heat is applied to soften it as it is being wound on the former but any other suitable metal may be employed, if preferred. The cross sectional shape of the strip corresponds, in counterpart, to the thread to be formed on the blanks and may be varied, as illustrated in Figs. 4, 5 and 6, to produce any form of thread desired. When helically coiled, as shown in Fig. 2, that portion of the strip presented inside of the helix, is an exact counterpart of the threaded former on which it was wound.

The helix thus produced is removed from the former and after being reduced to the required length and hardened and polished, is seated and either permanently or removably secured in a die-block or holder 5, which is socketed at 6, as shown in Fig. 3, to receive the same.

In order to seat the helix firmly and securely in the socket, the strip from which it is formed, is given sufficient width to produce an overlapping effect in the turns, exteriorly of the helix, forming a square or other shaped thread 7, which extends throughout its length. A counterpart formation 8, in the socket 6, is provided as a seat for the thread.

To permanently secure the helix in the socket of the die-block, it is ordinarily spot-welded or brazed and when it is to be removably secured, a set-screw is employed, as indicated at 9 in Fig. 3.

In the use of a cooperating pair of the dies, they are axially aligned, one above the other and normally spaced apart a sufficient distance to provide clearance for a strip of sheet metal or

other material to be fed step by step between them. The blanks to be threaded are pressed up, spun or otherwise preformed at equi-spaced points on the strip and the step by step feed of the latter brings the blanks thereon successively in axial alignment with the dies. Assuming a blank to be thus positioned, the dies, rotating in opposite directions, are advanced towards each other and engage the blank interiorly and exteriorly thereof and by combined pressure and spinning action, shape the blank and cause it to conform to the opposing faces of the dies. The rotation of the dies is then reversed and they move away from each other to clear the formed blank and permit the strip to be advanced a step to bring a new blank into position for the next operation.

Having described my invention, I claim:

The female member of a cooperating pair of dies for forming by spinning and pressure action a screw thread in frustro-conical blanks of sheet metal and other materials, consisting of a helically wound strip of hardened material of frustro-conical form terminating at the smaller end short of the center of the helix to provide an opening through which the end of the blank is forced as the dies come together to give the thread formed by the die a rounded entering point, the inner edge of the strip presented within the helix being shaped in cross section to conform in counterpart to the cross section of the thread to be formed by the die, and a holder provided at one end with a socket in which the helix is seated and removably secured and in which the strip is of such width that the turns of the helix overlap and project sufficiently beyond each other to form a helical shoulder exteriorly of the helix and the socket in the holder is of counterpart formation to provide a seat for the shoulder.

ARTHUR ILLSCHE.