(No Model.)

L. S. SCOTT.

SCREW CUTTING DIE.

No. 563,810. Patented July 14, 1896.

FIG. 1.

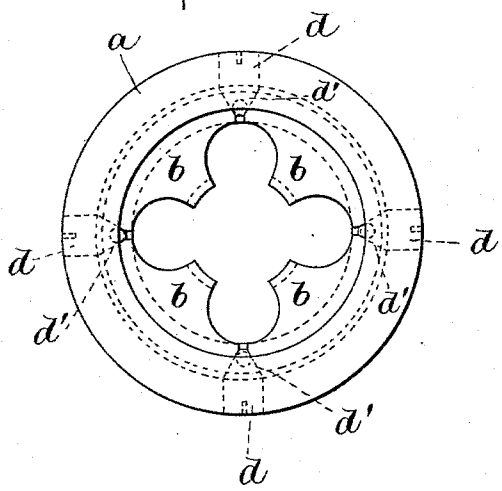


FIG. 2.

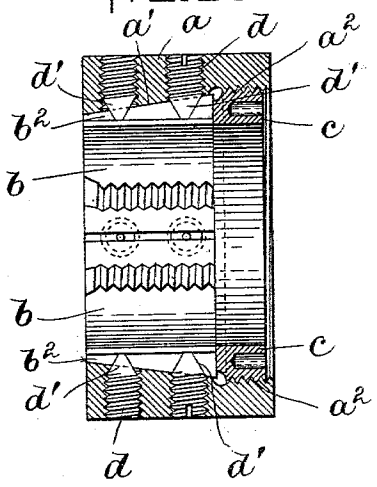


FIG. 3.

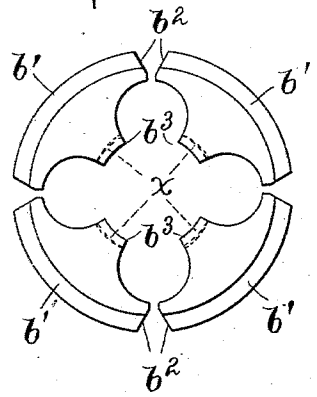
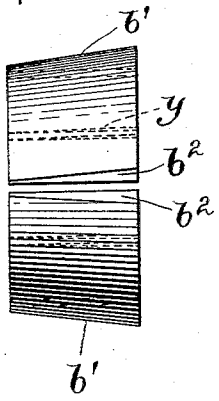


FIG. 4.



WITNESSES:

A. D. Harrison

a. H. Abell.

INVENTOR:

L. S. Scott

By Wright Brown & Quinby Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LAFAYETTE S. SCOTT, OF SPRINGFIELD, VERMONT.

SCREW-CUTTING DIE.

SPECIFICATION forming part of Letters Patent No. 563,810, dated July 14, 1896.

Application filed May 25, 1895. Serial No. 550,693. (No model.)

To all whom it may concern:

Be it known that I, LAFAYETTE S. SCOTT, of Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Screw-Cutting Dies, of which the following is a specification.

This invention relates to that class of screw-cutting dies in which the cutters or members of the die proper are held in a ring or collet and fill the circle of the same.

Heretofore it has been customary to make the cutter or die member in a semicircular form, there being thus two such cutters or members in the die and each having two cutting sections or faces. The capabilities of such a die in point of adjustment to different diameters are quite limited, and it is the purpose of my invention to provide a novel construction of die which will permit greater latitude in this respect.

For promoting practical operations of the cutting-sections of a die it is apparent that unnecessary contact of these sections with the work should be avoided. Only the front edges of the sections and a slight extent of thread back of the same need act on the work, and it is therefore desirable that the remaining portions of the cutting-faces retreat from the work. Now in a semicircular cutter having two cutting-sections it is an extremely difficult matter to provide such a clearance, which should be produced in the hobbing operation. It is apparent that in order to remove more metal at the back edge or heel of a cutting section or face than at the front edge the heel must be advanced toward the center of the hob, so that the latter in rotating will cut angularly into the face of the blank. Where two cutting-faces occur on the same piece, as in a semicircular die member, it will be readily seen that by advancing the heel of one face the whole of the other face is advanced, and the hob, while cutting angularly as desired into the first face to leave a cutting edge at the front, will at the same time so cut back the other face as to prevent any cutting contact of it with the work, and thus destroy it for any practical purpose.

Even assuming that the acting sections of the semicircular die members are made by some process or other with a full circumferential clearance, yet this clearance will only exist under adjustment of the die to one diameter; for, considering the die to be adjusted to that diameter and the semicircular members to then be moved toward each other to a smaller diameter, it is apparent that the clearance is diminished, if it does not entirely vanish, for the cutting-faces have not moved radially toward the center of the work, but more tangentially.

I overcome both difficulties above explained by separating the die into four parts, each having a single cutting-face, and by providing expanding means at each place of division. It will be seen that in hobbing each of the four sections can have the heel part of its acting face advanced toward the center and suitably backed up, and the hob in rotating will cut into each face angularly, so that each face will have the proper clearance and the proper cutting edge. Morever, with the four sections in the collet of the die they can be adjusted to various diameters, while the circumferential clearance is preserved, for the die being quartered its sections can be moved radially and the angular relation of the acting faces to the work need not vary to any appreciable extent. In this connection the necessity of expanding means at each division of the die will be apparent, for the sections should all partake of equal extent of movement in adjustment to a certain diameter of work.

The drawings which accompany and form part of this specification illustrate an embodiment of the invention.

Figure 1 shows a face view of the complete die. Fig. 2 shows a longitudinal central section of the same. Fig. 3 shows the die proper in front end elevation. Fig. 4 shows the same in side elevation.

The letter *a* designates the collet of the die, which collet, for the purposes of adjustment, as will hereinafter appear, is made with a tapering bore *a'*, extending part way its length from the front end, where it is of smallest diameter. Back of the tapering bore there is an internally-screw-threaded part a^2 not partaking of the taper.

The die proper is made up of four quarter-sections *b*, together making a die of annular form, and this die has a tapering outer surface *b'* to correspond with the tapering bore of the collet. It will be seen that this sec-

tional die can be regulated as to diameter by its longitudinal position in the tapered bore of the collet.

The means for expanding the die to bring its tapering outer surfaces into intimate contact with the wall of the collet are of the following description: The longitudinal confronting edges of the quarter-sections b are beveled, as shown at b^2, the bevel extending throughout the length of the die. Screws d are entered through holes tapped in the sides of the collet, and these screws have conical ends d' to coact with the beveled edges b^2 of the die-sections. There are two of these screws between each two die-sections, the two screws of each pair being in a longitudinal line of the die. The opposed bevels form a substantially V-shaped groove whose base is parallel with the axis of the die, and hence the two screws of each pair work uniformly and hold the die-sections true.

The die having been brought to the proper position longitudinally of the collet for a certain diameter of work, the screws d are tightened so that their inner conical ends by acting on the beveled confronting edges of the die-sections expand the die against the wall of the collet. When the adjustment of the die is to be changed, it is only necessary to loosen the screws slightly, and then the die can be moved longitudinally in the collet. Besides expanding the die the screws also serve the purpose of preventing its turning in the collet. An externally-screw-threaded ring c is engaged with the screw-threaded portion a^2 of the collet and serves to back up the die, said ring being screwed up tight against the die when the latter is ready for use.

The dotted lines x in Fig. 3 indicate the circumferential clearance produced in the hobbing operation, and dotted lines y in Fig. 4 indicate longitudinal clearance, which may also be produced in the hobbing operation by building out the inner ends of the die-sections, as will be apparent.

It will be seen that a die of the construction shown possesses the capabilities explained at the outset of this specification.

Having thus described my invention, what I claim is—

1. The combination of a suitably-formed collet; four similar segmental thread-cutting sections together forming an annular die to occupy the collet and each having a single cutting-face; and means for holding the sections at different positions of radial adjustment to provide for different diameters of work, substantially as described.

2. The combination of a collet having a tapering bore, four similar segmental thread-cutting sections together forming an annular die longitudinally adjustable in the collet and having tapering outer surfaces to fit the tapering bore of the latter and each section having a single cutting-face; expanding-screws entered between each pair of confronting edges of the die-sections whereby each section may partake of like adjustment, and adjustable means for backing up the die, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 22d day of May, A. D. 1895.

LAFAYETTE S. SCOTT.

Witnesses:

JEROME W. PIERCE,

F. G. ELLISON.