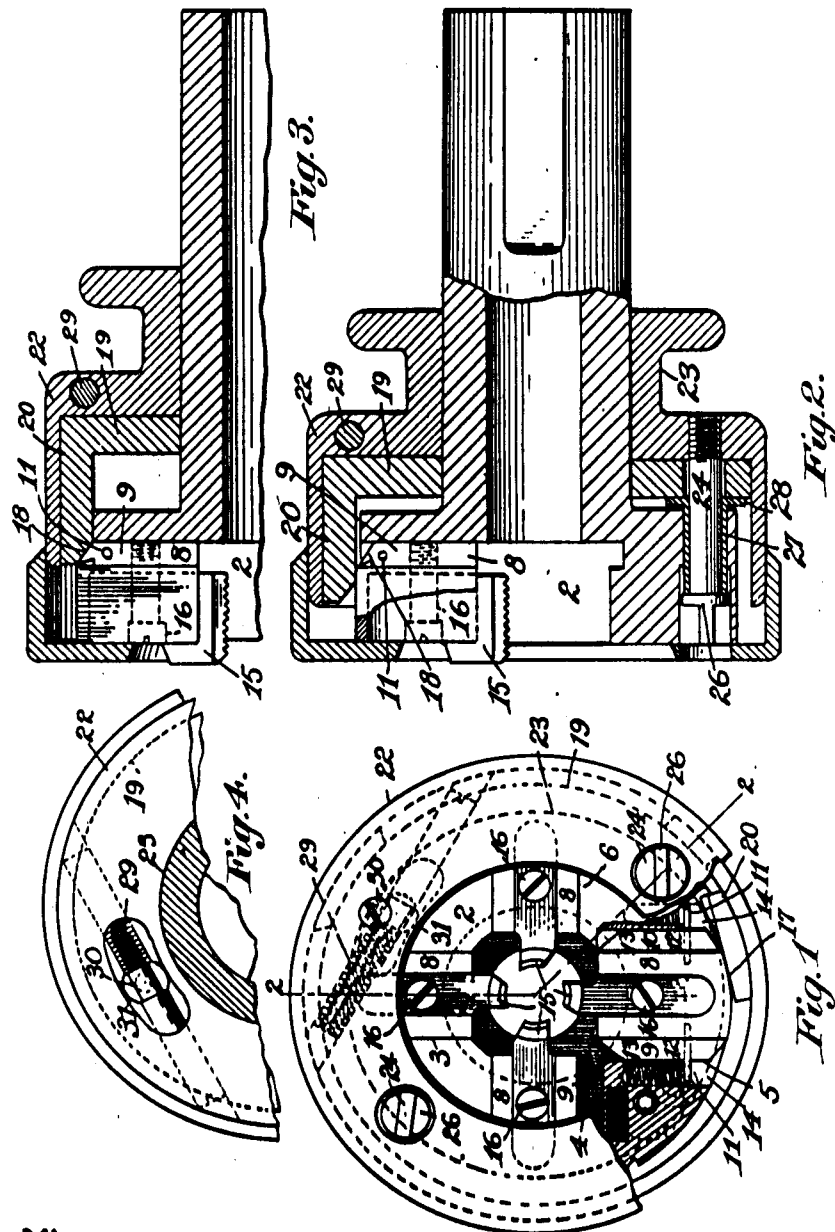


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O. A. SMITH.
THREADING DIE.
APPLICATION FILED MAR. 30, 1911.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.



Witnesses:
R. W. Pittman
F. B. Royce.

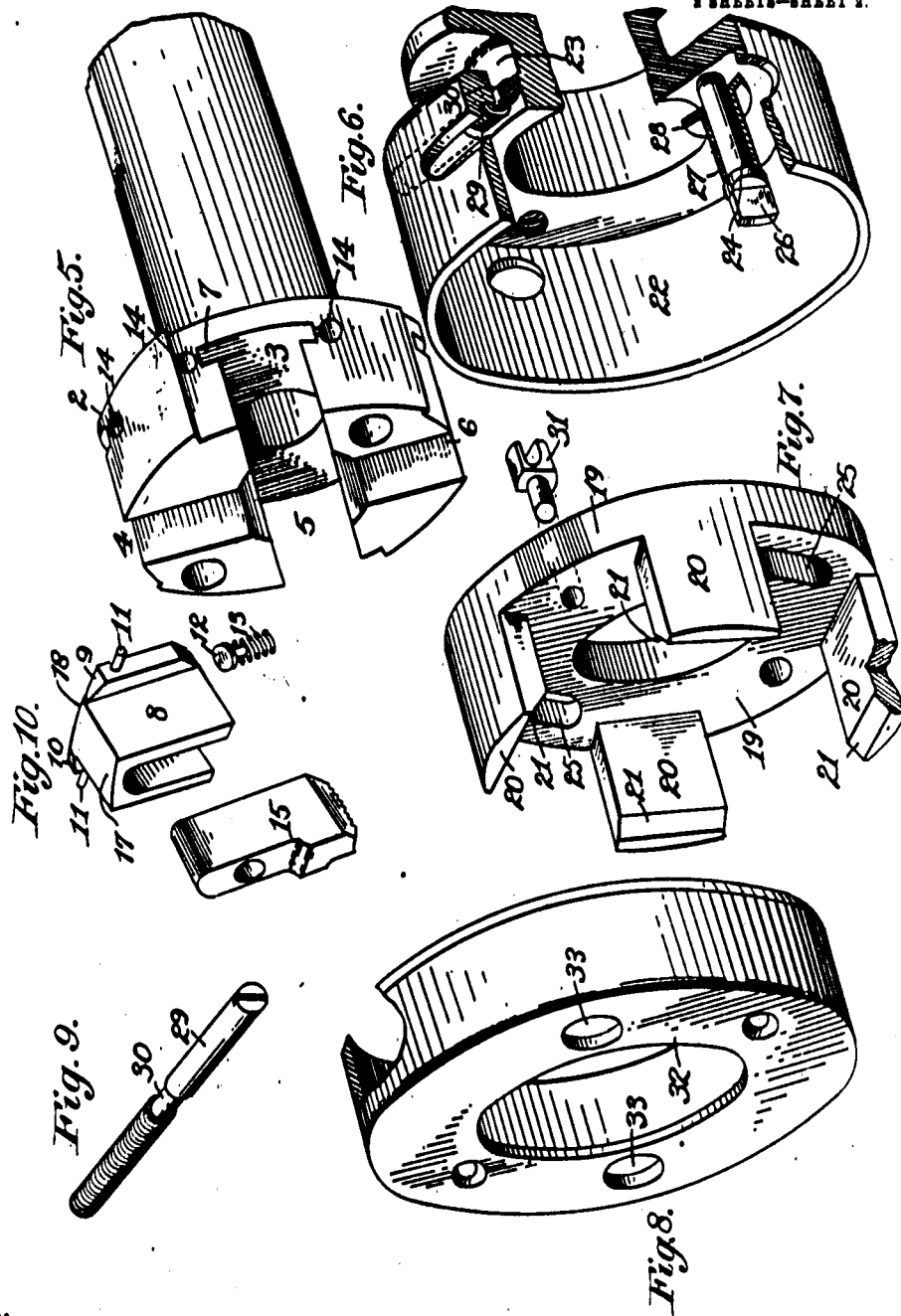
Inventor
Oscar A. Smith
By his Attorney
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UNITED STATES PATENT OFFICE.

OSCAR A. SMITH, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL-ACME MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

THREADING-DIE.

1,038,670.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed March 30, 1911. Serial No. 617,634.

To all whom it may concern:

Be it known that I, OSCAR A. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Threading-Dies, of which the following is a specification.

This invention relates to threading dies of the character known as opening or self-opening dies, the object of the invention being to provide an improved tool of this character simple in construction and easily operated, and in the use of which there will be no variation in the thread during the operation of the die by reason of the fact that the construction is such that it is impossible for the die chasers to open while a thread is being cut even though the die chaser operating means should be slightly shifted and in which also the die will cut the full length of the stock.

In threading tools as usually constructed the die chaser blocks, or the means for closing them, are provided with tapered surfaces extending depthwise of the tool, in consequence of which any slight movement of the die chaser operating means permits the opening of the die chasers and consequently a variation in the thread cut, thus materially interfering with the proper action of the tool, and one of the objects of the present improvement is to avoid this defect in threading dies of this class and also to avoid the necessity of moving the dies in the direction of the axis of the die in order to open such dies.

In the drawings accompanying and forming part of this specification, Figure 1 is a front end view, partly broken away and partly in section, of this improved threading die; Fig. 2 is a cross-sectional view thereof taken on the line 2-2, Fig. 1; Fig. 3 is a similar cross sectional view of a part of the threading tool shown in Fig. 2, illustrating the open position of one of the die chasers; Fig. 4 is a detail view illustrating the means for adjusting the die chasers; Fig. 5 is a perspective view of the die body; Fig. 6 is a perspective view, partly in section, of the die head; Fig. 7 is a perspective view of the die block operating means or cam; Fig. 8 is a perspective view of the end cap for the tool; Fig. 9 is a detail view

of the micrometer adjusting means for the die chaser blocks; and Fig. 10 is a detail view illustrating one of the die chasers, its block and one of the spring-actuated devices for opening the die chasers.

Similar characters of reference indicate corresponding parts throughout the figures of the drawings.

The threading tool, in the preferred embodiment herein shown and described, comprises a die body 2 having an axial bore and a plurality, as four, guides or ways 3, 4, 5 and 6 extending radially of the die body. The rear portions of these ways are undercut, as shown at 7, Fig. 5, to form recesses or grooves. In these ways slide die carriers or blocks 8, see Fig. 10, having lateral extensions 9 and 10 which slide in the recesses or grooves 7, by which construction the blocks are guided in their opening and closing movements and are maintained against depthwise movement. Each of these blocks is provided with projecting pins 11 in position to engage a headed pin or plunger 12 pressed outward by a coil spring 13, each pin and spring being located in an opening 14 in the die body, one at each side of the die block. These springs are effective to shift the die blocks outwardly from the axis of the body.

In each of the die blocks is secured a die or die chaser 15, it being secured therein by a screw 16. The die blocks are shown as of U-shaped form for the reception of such die chasers. The outer end of each die block is tapered circumferentially throughout the major portion thereof, as at 17, and at the rear outer end thereof is also tapered depthwise of the tool, as at 18.

For closing the die chasers suitable means is provided, herein designated as the die chaser or die chaser block operating means or member and consists of an axially bored disk 19 having forwardly extending projections or arms 20 preferably tapered on their under forward edges, as at 21, whereby they will cooperate more easily with the depthwise tapered surfaces 18 of the chaser blocks. Encircling this disk and its forwardly extending arms 20 is the die head 22 having the usual collar or groove 23 by means of which the head is shifted depthwise or back and forth relatively to the die body. This collar 23 is guided by the rearwardly ex-

tending shank forming part of the core or body and which projects beyond such collar to permit to and fro movement of the collar to open and close the dies, such shank forming the means for attaching the dies to the holding means or chuck, so that the die body and die chasers are held stationary against independent movement in the direction of the axis of the die. For limiting the rearward movement of the die head suitable devices are provided, shown as a pair of screws 24 projecting through openings in the die body and passing through elongated slots 25 in the disk 19 and into threaded openings in the rear or back wall of the die head. These screws are provided with enlargements or heads 26 adapted to engage the outer end of a sleeve 27 located in the countersunk bores or openings of the die body through which the screws pass, the heads 26 of which screws thus limit the rearward movement of the die head. The sleeves 27 have the heads 28 thereof in engagement with the forward side of the chaser operating means or disk 19, whereby this disk and the die head are maintained in operative engagement for simultaneous movement forward and backward.

For adjusting the chasers toward and from the work a suitable micrometer screw 29 is provided extending diagonally through the head, and this screw is provided with a portion of less diameter, as 30, for the reception of the bifurcated end of a stud, as 31, see Fig. 7, which stud is carried by the disk 19, so that on the adjustment of this screw it will oscillate or rotate the disk 19 relatively to and independently of the head in one direction or the other according to the direction in which the adjusting screw is turned, and so adjust the chasers relatively to the work by reason of the fact that the forwardly projecting arms of the disk 19 are, as hereinbefore stated, in engagement with the circumferentially tapered portions of the chaser blocks, this taper being transverse to the axis of the tool; the major portion of the outer end of the chaser block, however, being a straight surface in the direction of the axis of the tool, or depthwise of the block. In other words, it is not tapered in the direction of the axis of the tool except at its rear side, so that when the chasers are closed by the forward movement of the head and the chaser block closing means the arms of the latter are in engagement with the outer depthwise straight surfaces of the chaser blocks, and therefore no slight shifting of the head and the chaser block operating means in the forward or backward direction will permit any movement of the chaser blocks and the chasers carried thereby, while by oscillating the disk 19 by means of the micrometer screw the

chasers will be adjusted in the manner stated. Or, to put it in other language, the outer ends of the chaser blocks are tapered transversely to the axis of the tool, by reason of which taper the chaser blocks and thereby the chasers may be adjusted on swinging or oscillating the arms of the disk 19 by means of the micrometer screw, but as the outer ends of these blocks are straight depthwise throughout the major portion thereof it follows that when the tool is at work no slight movement of the disk 19 or the head carrying the same forward or backward will permit any movement of the chaser blocks or chasers carried thereby, since the arms at this time have passed beyond or forward of the tapered surfaces 18 and are in engagement with the depthwise straight surfaces of the blocks, whereas heretofore it has been the usual practice to have the outer ends of the blocks tapered in the direction of the axis of the tool, or depthwise, so that any slight movement of the head backward or forward would affect the position of the chasers and result in a variation in the thread being cut. It will thus be seen that the outer ends of the die chaser blocks are tapered in two directions, one transversely relatively to the axis of the tool and the other depthwise of the tool, but that the latter tapered surface is at the rear side of the block, so that when the chasers have been completely closed the arms of the operating means or disk 19 have passed away from or are forward of the depthwise tapered surfaces of the blocks and consequently there is no opportunity for the chasers to shift from their proper positions should the head be moved backward or forward other than in the proper manner and by the means provided for that purpose. The elongated slots 25 in the disk 19, through which the screws 24 and sleeve 27 extend, permit this swinging or oscillating movement of the chaser block operating means or disk 19 in the manner hereinbefore described. From the foregoing it will be observed that the operating means for the chaser blocks thus has a backward and forward movement for opening or closing the chaser blocks, so that the die chasers are stationary at all times, that is have no movement whatsoever in the direction of the axis of the die, and also a movement in a direction transverse thereto, or as hereinbefore described an oscillating or swinging movement for positioning the chaser blocks and thereby the chasers relatively to the work to be operated upon, the latter movement being effected by the micrometer screw hereinbefore referred to, or by any other suitable means which it may be desired to use, while the former is effected by the shifting of the head backward and forward by the means usually provided for this purpose. Thus,

each die jaw or chaser block is provided with a pair of cam or tapered surfaces located at right angles to each other, one of which coöperates with the chaser closing means to close and open the chasers while the other coöperates therewith to adjust the positions of the chasers relatively to the work, as the result of which if the die or the head should move the least bit in cutting the chasers, however, will always keep the same position at which they were set until the die is opened, so that until the chaser block operating means or cam disk is completely pulled off from the ends of the die chaser blocks there can be no opening or closing of the chasers on the work and consequently the thread will not be made thicker at the end as heretofore.

In operation, when the head is moved forward the cam operating disk 19 closes the die in a manner which will be readily understood from the foregoing, and when the head is moved rearwardly or backwardly the arms 20 are withdrawn from the outer ends of the die blocks, whereupon the springs 18 press the die blocks outward so as to shift the chasers outwardly and thereby open the die. The spring actuated studs not only act to open the die blocks, but also hold the same in engagement with the arms of the disk when the latter are shifted forward to engage the outer ends of the blocks.

The front end of the die is covered with a cap 32, see Fig. 8, secured thereto by suitable screws, and which cap is provided with a pair of openings 33 located in register with the limiting screws 24, whereby the movement of these screws relatively to the die body as the head slides forward and backward is not interfered with.

I claim as my invention:

1. The combination of a die body and shank, said body having an axial bore and provided with ways, members provided with thread cutting means movable radially in said ways, means shiftable relatively to said body and shank to shift the thread-cutting members, means for shifting said means and beyond which the shank projects for attachment to its holding means, and means for holding said shiftable means and its shifting means in operative relation thereby to prevent premature independent movement of said shiftable means in any direction relatively to said thread-cutting members. said thread-cutting members and shiftable means having one a cam surface extending in one direction and one a cam surface extending in another direction whereby on the operation of said means in one direction the thread cutting members will be closed and on the operation of one of said members in another direction the thread cutting members will be adjusted relatively to the work.

2. The combination of a die body and

shank, said body having an axial bore and provided with ways, members having thread cutting means movable radially in said ways, each of said thread cutting members having a pair of cam surfaces extending in opposite directions, shiftable means having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means for closing the thread cutting members by engagement with one of said cam surfaces and also having a swinging movement to adjust the thread cutting members on the swinging of said means relatively to the other of said cam surfaces, means for shifting said shiftable means, and means for holding said shiftable means and its shifting means in operative relation thereby to prevent premature independent movement of said shiftable means in any direction relatively to said thread-cutting members.

3. The combination of a die body and shank, said body having an axial bore and provided with ways, members having thread cutting means movable radially in said ways, each of said thread cutting members having a pair of cam surfaces extending in opposite directions, shiftable means having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means for closing the thread cutting members by engagement with one of said cam surfaces and also having a swinging movement to adjust the thread cutting members on the swinging of said means relatively to the other of said cam surfaces means for swinging said operating means and comprising a micrometer screw, means for shifting said shiftable means, and means for holding said shiftable means and its shifting means in operative relation thereby to prevent premature independent movement of said shiftable means in any direction relatively to said thread-cutting members.

4. The combination of a die body and shank, said body having an axial bore and provided with ways, members having thread cutting means movable radially in said ways, each of said thread cutting members having at its rear outer end a cam surface extending depthwise thereof and having in front thereof a straight surface extending transversely of such straight surface, shiftable means having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means and a swinging movement and effective to close the thread cutting means on engagement with the depthwise extending cam surface and to hold them against movement on engagement with such straight surface and

effective to adjust the thread cutting members on the swinging thereof relatively to the transversely extending cam surface, means for swinging the same, means for shifting said shiftable means backward and forward, and means for holding said shiftable means and its shifting means in operative relation thereby to prevent premature independent movement of said shiftable means in any direction relatively to said thread-cutting members.

5. The combination of a die body and shank, said body having an axial bore and provided with ways, members having thread cutting means movable radially in said ways, each of said thread cutting members having at its rear outer end a cam surface extending depthwise thereof and having in front thereof a straight surface extending depthwise thereof and a cam surface extending transversely of such straight surface, shiftable means having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means and a swinging movement, and effective to close the thread cutting means on engagement with the depthwise extending cam surface and to hold such thread cutting means against movement on engagement with such straight surface and effective to adjust the thread cutting members on the swinging thereof relatively to the transversely extending cam surface, means for swinging the same, said shiftable means comprising a disk having forwardly projecting arms, means comprising a head inclosing said disk and arms, for shifting said disk, and means for holding said disk and its head in operative relation thereby to prevent premature independent movement of said disk in any direction relatively to said thread-cutting members.

6. The combination of a die body and shank, said body having an axial bore and provided with ways, members having thread cutting means movable radially in said ways, each of said threaded cutting members having at its rear outer end a cam surface extending depthwise thereof and having in front thereof a straight surface extending depthwise thereof and a cam surface extending transversely of such straight surface, shiftable means having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means and a swinging movement, and effective to close the thread cutting means on engagement with the depthwise extending cam surface and to hold them against movement on engagement with such straight surface and effective to adjust the thread cutting members on the swinging thereof relatively to the transversely extending cam surface,

means for swinging the same, means for shifting said shiftable means backward and forward, means for holding said shiftable means and its shifting means in operative relation thereby to prevent premature independent movement of said shiftable means in any direction relatively to said thread-cutting members and for limiting the backward movement thereof.

7. The combination of a die body and shank, said body having an axial bore and provided with ways, die blocks movable radially in said ways, each of said blocks having at its rear outer end a cam surface extending depthwise of the block and having in front thereof a straight surface extending depthwise of the block and a cam surface extending transversely of such straight surface, means, comprising a disk having forwardly projecting arms and a head inclosing said disk and arms, and having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means, said disk also having a swinging movement and effective to close the dies on engagement with the depthwise extending cam surfaces and to hold them against movement on engagement with such straight surfaces and effective to adjust the dies on the swinging thereof relatively to the transversely extending cam surfaces, a micrometer screw for swinging said disk, means for moving said operating means backward and forward, and means for limiting the backward movement of said operating means and comprising means effective to hold the same in operative relation with the die head.

8. The combination of a die body and shank, said body having an axial bore and provided with ways, die blocks movable radially in said ways, each of said blocks having at its rear outer end a cam surface extending depthwise of the block and having in front thereof a straight surface extending depthwise of the block and a cam surface extending transversely of such straight surface, means, comprising a disk having forwardly projecting arms and a head inclosing said disk and arms, and having a forward and backward movement relatively to said body and shank and beyond which the shank projects for attachment to its holding means, said disk also having a swinging movement and effective to close the dies on engagement with the depthwise extending cam surfaces and to hold them against movement on engagement with such straight surfaces and effective to adjust the dies on the swinging thereof relatively to the transversely extending cam surfaces, a micrometer screw for swinging said disk, means for moving said operating means backward and forward, means for limiting the backward movement of said operating means and com-

prising means effective to hold the same in
operative relation with the die head, and
means for opening each of said die blocks
and comprising a projection carried by the
5 blocks and a spring operated device carried
by the body in engagement with said projec-
tion.

Signed at Cleveland, Ohio, this 28th day
of March, 1911.

OSCAR A. SMITH.

Witnesses:

P. F. MELLINGER,
A. B. BREEZE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."