

No. 828,016.

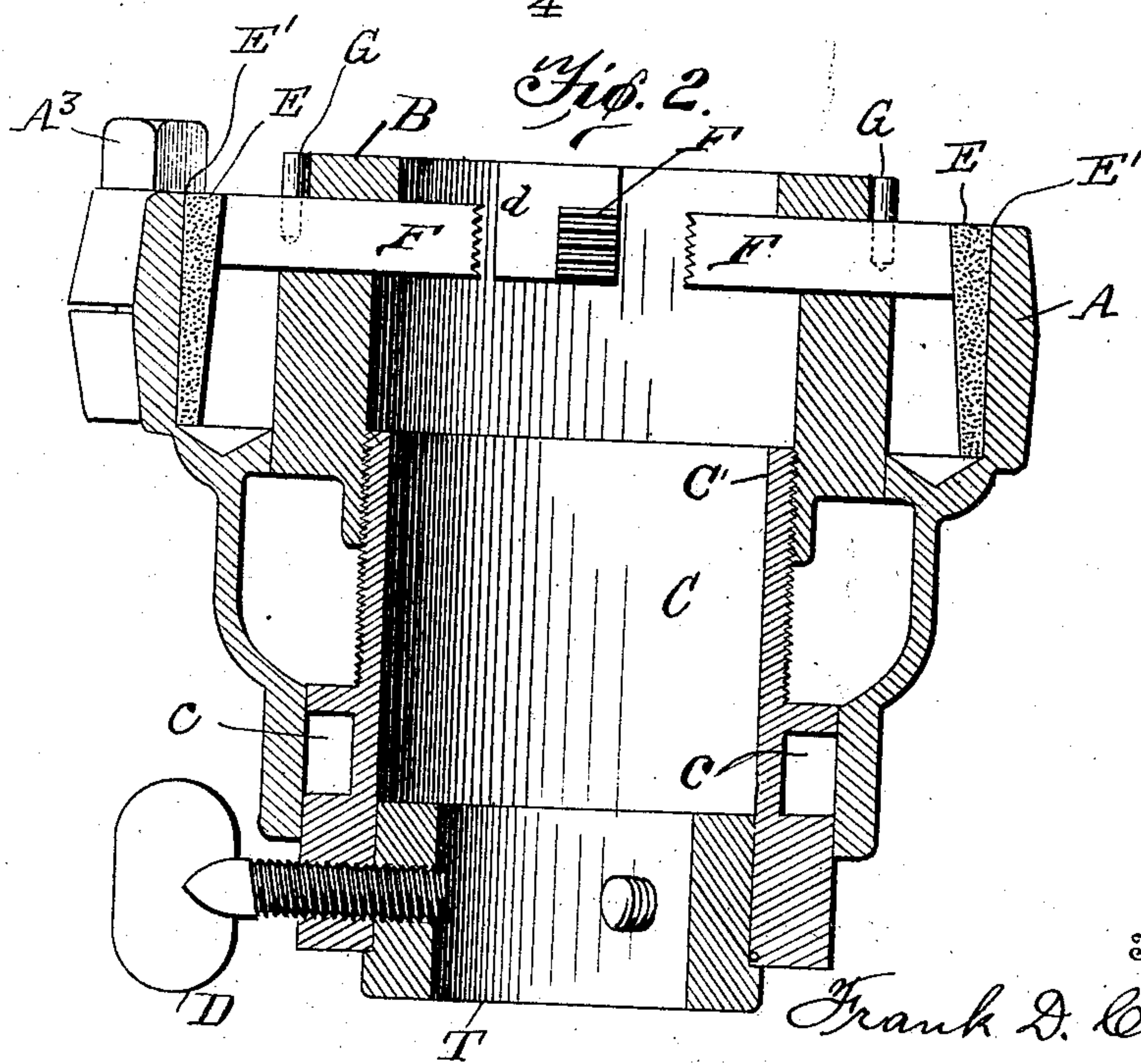
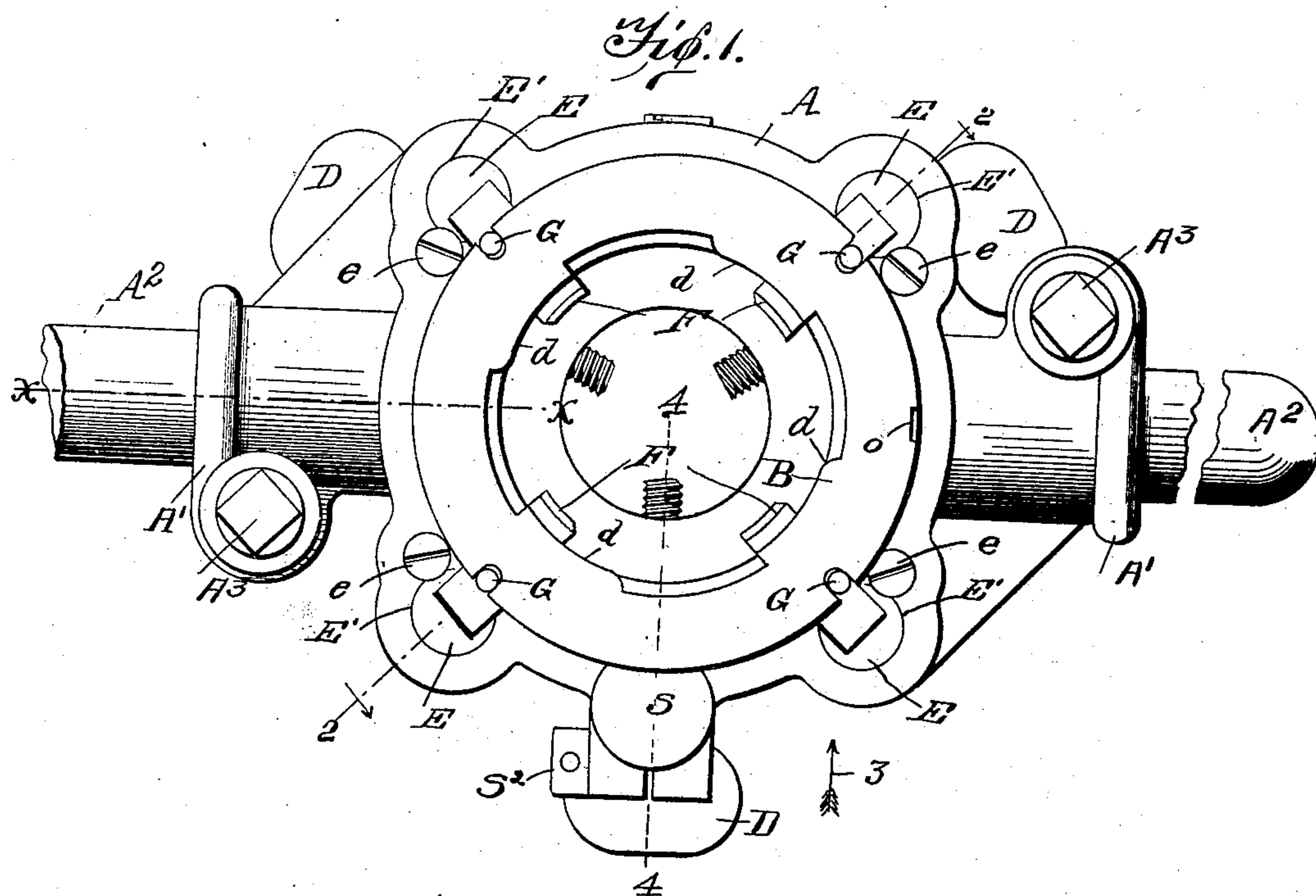
PATENTED AUG. 7, 1906.

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APPARATUS FOR CUTTING SCREW THREADS ON PIPES, &c.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.



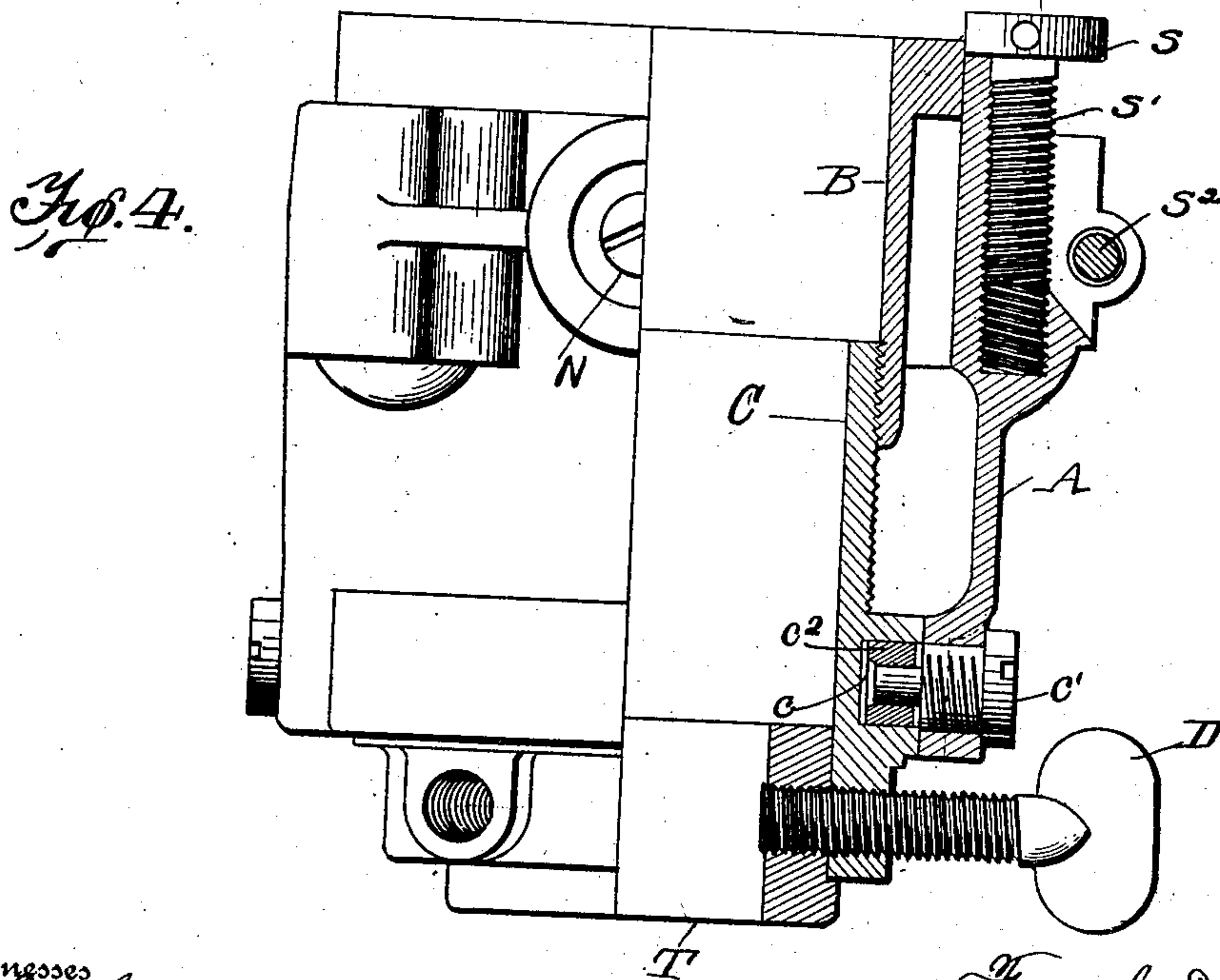
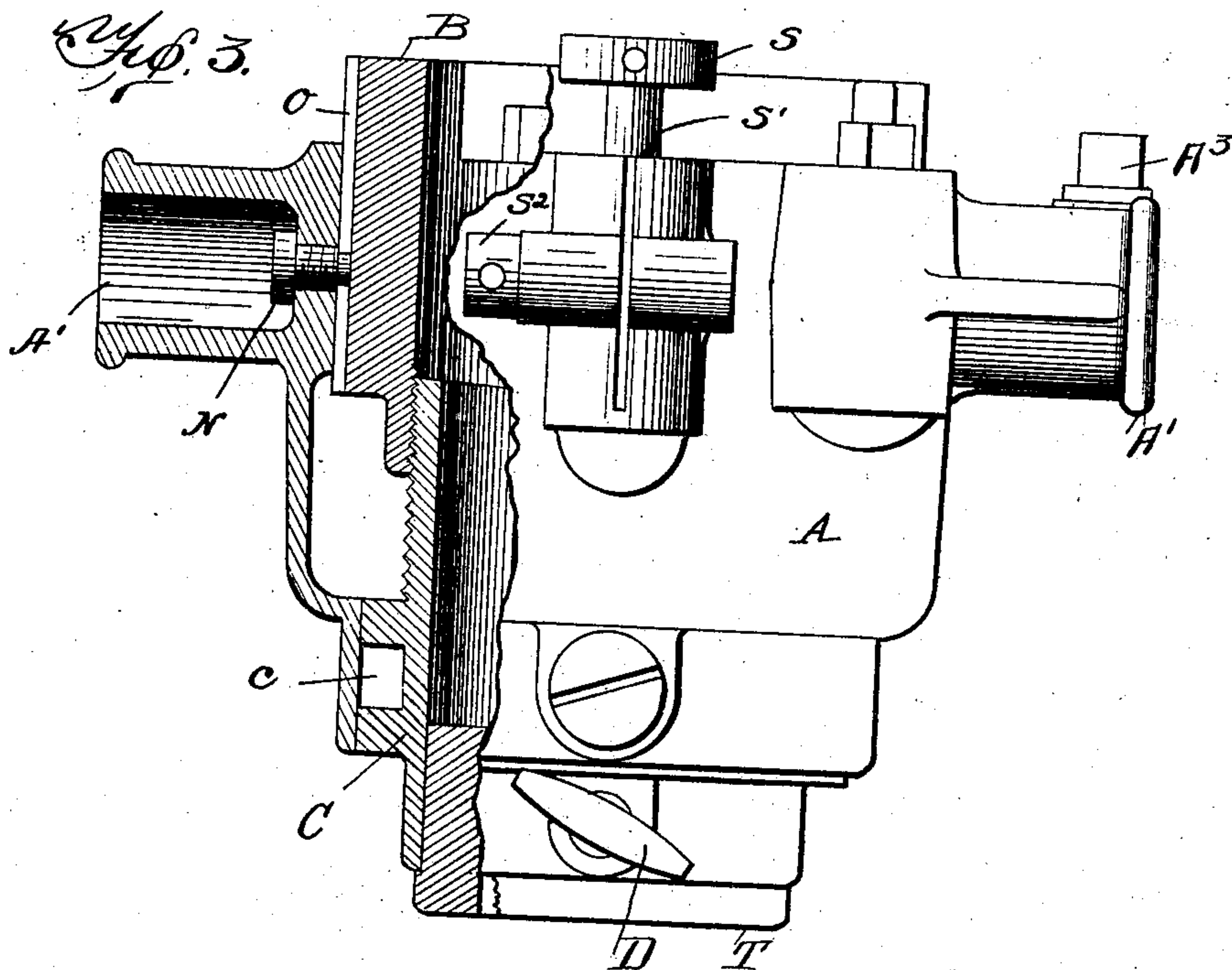
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Witnesses  
*Thomas Durant.*

Inventor  
*Frank D. Cable*  
By *Church & French*  
Attorneys



# UNITED STATES PATENT OFFICE.

FRANK DAVID CABLE, OF TOLEDO, OHIO, ASSIGNOR TO ETNA MACHINE COMPANY, OF TOLEDO, OHIO, A COPARTNERSHIP.

## APPARATUS FOR CUTTING SCREW-THREADS ON PIPES, &c.

No. 828,016.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed September 11, 1905. Serial No. 277,979.

*To all whom it may concern:*

Be it known that I, FRANK DAVID CABLE, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Apparatus for Cutting Screw-Threads on Pipes, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to apparatus or means for cutting screw-threads on metallic pipe or other cylindrical objects, and more particularly to that class of apparatus designed to be manipulated manually to screw-thread work which is suitably held or supported in a separate vise or other holding appliance.

The invention has for its object to provide a highly-efficient device capable of cutting accurate taper threads and which may be used with equal facility for cutting threads on work of several different diameters.

A further object of the invention is to provide an apparatus which will perform its functions with the expenditure of little power by the operator and which shall be capable of easy and quick manipulation or adjustment.

The invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be now described, and pointed out particularly in the appended claims.

Referring to the accompanying drawings, Figure 1 is a plan view looking at the face of the apparatus. Fig. 2 is a section longitudinally of the die-head, said section being taken on the line 2 2 of Fig. 1. Fig. 3 is a side elevation looking in the direction of the arrow 3 in Fig. 1, but with a portion broken away to show a section on line X of Fig. 1. Fig. 4 is an elevation, one half in section, on the line 4 4 of Fig. 1.

Like letters of reference in the several figures indicate the same parts.

The working parts of the apparatus are mounted in or carried by a casing or frame A, having radial sockets A' at opposite sides in which the ends of handles A<sup>2</sup> may be inserted for turning the apparatus in cutting the thread or in backing the threading dies or

chasers out of the cut thread. The sockets A' are preferably made adjustable and adapted to be clamped on the ends of the handles by set-screws or bolts A<sup>3</sup>, so as to form a convenient means for applying or removing the handles to facilitate storage or transportation. The cylindrical casing or frame A at its rear end is connected with a tubular guide C, preferably by a groove-and-roller connection whereby the guide and casing may be rotated with relation to each other without permitting relative longitudinal movement. As shown in Fig. 4, the groove c is adapted to receive the inner ends of oppositely-arranged screws c', having antifriction-rollers c<sup>2</sup> mounted thereon, said rollers being of such size as to approximately fill the grooves and afford a firm support against longitudinal movement of the parts with relation to each other, but at the same time will permit said parts to revolve freely with relation to each other. The guide C is provided with means whereby it may be detachably connected with the work or article to be threaded, such means preferably consisting of an equally-spaced series of thumb-screws D, passing radially into the guide, so that their inner ends will contact with the work and constitute either a bearing for positioning the device upon the work or a means for connecting the work and guide rigidly together during the formation of taper threads, as will be presently described.

Guided within the cylindrical casing A is a die-head B, said head being formed to fit the chamber between the externally-threaded extension C' of the guide and the interior of the casing itself. At the lower end the die-head is provided with internal threads adapted to mesh with the external threads of the extension C', referred to. With such construction the rotation of the head in one direction or the other will cause the head and guide to approach or recede from each other, according to the direction of rotation.

The dies or chasers F are mounted in the die-head B, so as to be capable of a radial movement therein. Thus in the preferred construction said chasers are substantially rectangular in cross-section and work radially in slots or openings extending through the die-head B, their inner ends, however, being preferably supported by abutments d, the portion of the die-head around said abutments



and dies or chasers being cut away to facilitate the escape of chips or droppings. At their outer ends the said dies or chasers project into guides or ways formed in the cylindrical casing or frame, and obviously the conformation of the supporting-surfaces of these guides in the frame will determine the projection of the dies or chasers toward the center of the die-head. Inasmuch as the apparatus is designed primarily for cutting tapering threads, the said guides or ways are formed with inclined supporting-surfaces for the outer ends of the said dies or chasers, and the inclination of such supporting-surfaces determines the angle of the taper cut by the dies.

As illustrated in the drawings, the cylindrical casing or frame is provided with sockets  $E'$ , arranged parallel with each other and with the axis of the die-head, and in the sockets  $E'$  cylinders  $E$  are mounted and held firmly in place by set-screws  $e$ . Said cylinders are channeled on their inner sides to constitute the guides for the outer ends of the dies or chasers. By this arrangement the parts may be accurately machined and assembled in position, so as to give accurate and certain results in operation. The cylinders  $E$  may be made of hard metal well calculated to withstand wear and stress, while the frame or casing may be made of cast-iron or other relatively cheap or light metal.

Each die or chaser is preferably provided on the outer side of the die-head with a pin, such as  $G$ , which will limit its inward movement, and in order to permit of the removal and substitution of dies or chasers of different length for operating on work of different diameters the die-head  $B$  is capable of an outward movement sufficient to bring the dies or chasers above the face of the cylinder or frame, after which the dies or chasers may be drawn radially out of their sockets and others substituted. In this preferred construction the pins  $G$  are adapted to enter recesses in the die-head  $B$ , as shown in Fig. 1, and the pins and recesses are preferably so disposed that they will enter only when the proper die is in the socket. Thus it is mechanically impossible to mix the dies or chasers so as to cut imperfect threads.

To relieve the dies from turning strain during the cutting of screw-threads, the die-head  $B$  and external cylinder or frame are connected together so as to resist relative movement around the axis of the die-head and at the same time permit of free relative longitudinal movement. As a convenient construction the die-head may be formed with a key-way or groove  $o$ , into which the end of a key or set-screw  $N$  may project, as shown in Fig. 3, and this set-screw may conveniently be arranged with its head in one of the sockets  $A'$ , so as to be entirely concealed from view.

An adjustable stop is provided for limiting

the relative outward movement of the die-head, and this adjustable stop preferably consists of a screw  $S'$ , threaded into the cylinder or casing and having a head  $S$ , which may be turned so as to project over the die-head and to contact therewith when the die-head reaches the desired outward position of adjustment. To permit of a movement of the die-head outward sufficiently far for the removal of the dies or chasers, the stop-screw  $S$  may be turned into position so as to permit the die-head to pass the same, although in the ordinary working of the device it is designed that the stop-screw shall be so adjusted as to arrest the movement of the die-head at the proper point for determining the diameter of the entering end or smaller portion of the screw-thread to be formed. The socket for the stop-screw  $S'$  is preferably a clamp-socket having a set-screw  $S^2$  for drawing its sides together to hold the screw very firmly in its adjusted position.

In some instances it is desirable to provide supplemental guides for work of different diameters, and, as shown, internal sleeves  $T$  may be mounted in the guide  $C$  and held by the set-screws  $D$  the screws, however, passing through the sleeves, so as to engage the work when it is desired to connect the work and guide.

It will be noted that the supporting-guides for the dies or chasers are removable, and consequently supporting-guides having different degrees of taper may be inserted or supporting-guides having slots of different depth may be inserted, so as to project the dies or chasers to a greater or less extent and permit chasers of standard length to be used for cutting threads on work of different diameters.

To thread a pipe or other object, it is passed into the guide and positioned by the set-screws. This should be done after the die-head has been backed off or moved to its outward limit, as determined by the stop-screw. The work is held in any suitable vise or holder and rotation imparted to the casing and die-head, so as to feed the latter in along the lead-screw on the guide, thereby bringing the dies or chasers into engagement with the work to form the thread. As the die-head and chasers move longitudinally of the work in forming the thread, the chasers move radially outward in accord with the inclined surfaces of the guiding-supports. Should it be desired to form a thread without taper, the guide is disconnected from the work after the chasers have been started, thereby permitting the apparatus to revolve as a unity and the chasers to feed themselves as an ordinary threading-die. Obviously by properly adjusting the die-head in the casing straight threads may be cut either deep or shallow, as desired.

Having thus described my invention, what



I claim as new, and desire to secure by Letters Patent, is—

1. In a screw-thread-cutting apparatus, the combination with the tubular work-guide having exterior screw-threads and a die-head having internal screw-threads meshing with those on the guide, of radially-movable chasers mounted in the die-head, a casing rotatably mounted on the guide and surrounding the die-head, guiding-supports in the casing for the chasers and means whereby pressure may be exerted on the casing to rotate the die-head and casing; substantially as described.
2. In a screw-thread-cutting apparatus, the combination with the tubular work-guide having exterior screw-threads, means whereby the guide may be detachably connected with the work and a die-head having internal threads adapted to fit the threads on the guide for effecting a longitudinal movement of the die-head, of radially-movable chasers mounted in the die-head, a casing rotatably connected with the guide and forming a housing for the die-head, means for preventing the relative rotation of casing and die-head and guiding-supports in the casing for the outer ends of the chasers; substantially as described.
3. In a screw-thread-cutting apparatus, the combination with the casing and the die-head guided to slide longitudinally in one end of said casing and having internal screw-threads, of the tubular work-guide journaled in the opposite end of said casing and held against longitudinal movement therein and having external screw-threads cooperating with the screw-threads of the die-head, radially-movable chasers mounted in the die-head and guiding-supports located within and supported throughout their length by the casing and having inclined faces against which the ends of the chasers rest; substantially as described.
4. In a screw-thread-cutting apparatus, the combination with the die-head, radially-movable chasers carried thereby, inclined guiding-supports for the chasers for effecting

a radial movement of the chasers as they advance longitudinally of the work, a carrier for the guiding-supports and means for moving the die-head and carrier longitudinally with relation to each other, of an adjustable stop for limiting the longitudinal movement of the die-head and chasers with respect to the inclined guiding-supports and carrier; substantially as described.

5. In a screw-thread-cutting apparatus, the combination with the die-head and work-guide in screw-thread engagement with each other to effect relative longitudinal movement, of radially-movable chasers mounted in the die-head, inclined guiding-supports held in position by the work-guide and controlling the radial position of the chasers, an adjustable stop for limiting the longitudinal movement of the die-head and means for detachably connecting the work-guide to the work; substantially as described.

6. In a screw-thread-cutting apparatus, the combination with the outer casing, the work-guide journaled in one end of the casing and the die-head slidably mounted in the opposite end of the casing but held against rotation therein, said die-head and guide being connected by a screw-thread connection, of an adjustable stop on the casing for limiting the outward movement of the die-head, radially-movable chasers in the die-head and supporting-guides in the casing having inclined bearing-surfaces for cooperation with the chasers; substantially as described.

7. In a screw-thread-cutting apparatus the combination with the die-head, radially-movable chasers mounted therein and casing carrying the die-head, of supporting-guides for the outer ends of the chasers having inclined bearing-surfaces and removably mounted in the casing and means for effecting a relative longitudinal movement of the die-head and supporting-guides; substantially as described.

FRANK DAVID CABLE.

Witnesses:

GILBERT HARMON.

WM. M. HAMILTON.