L. F. HART.

DEVICE FOR CUTTING SCREW THREADS.

APPLICATION FILED APR. 20, 1907.

985,168.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1

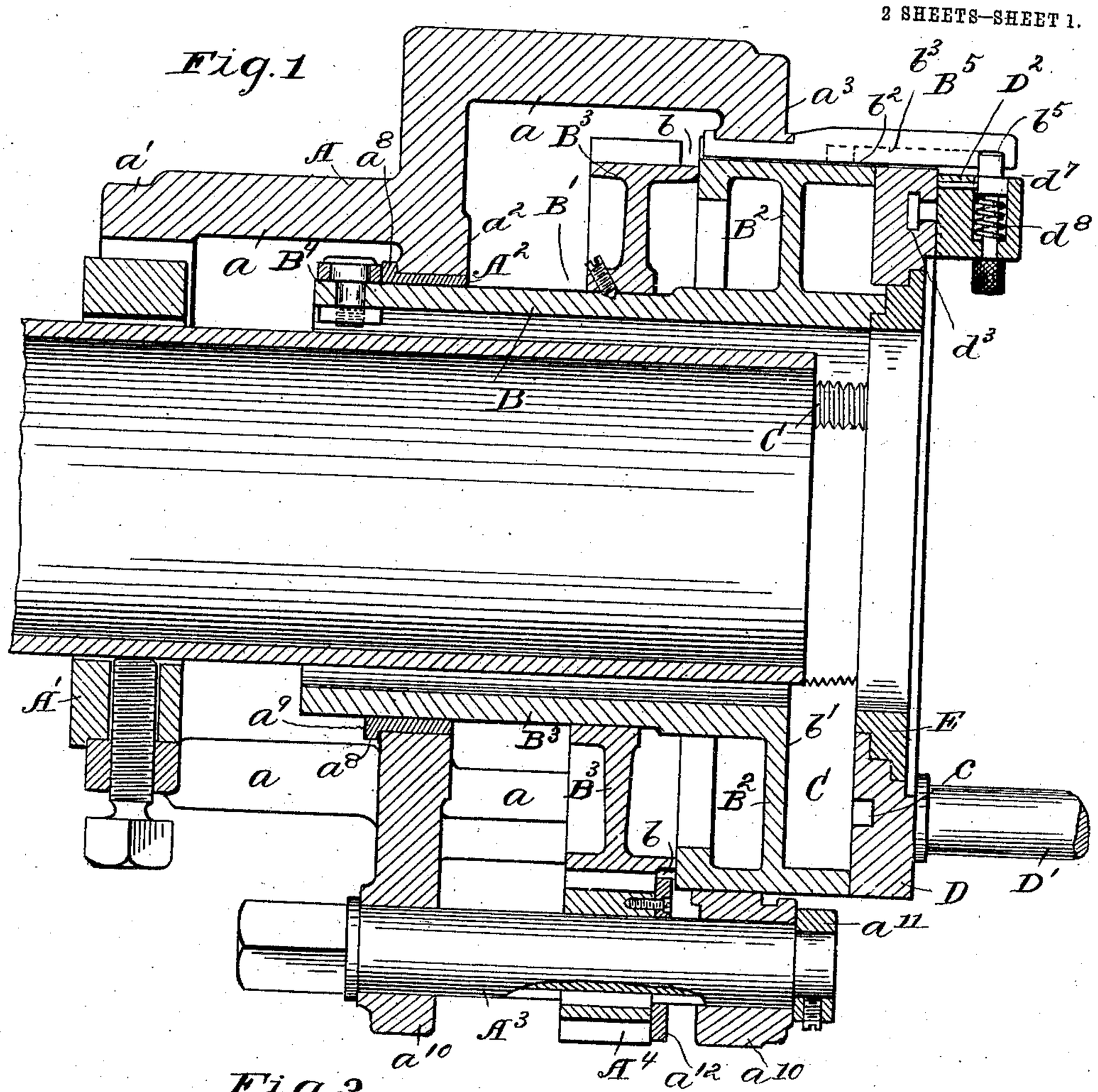


Fig. 3

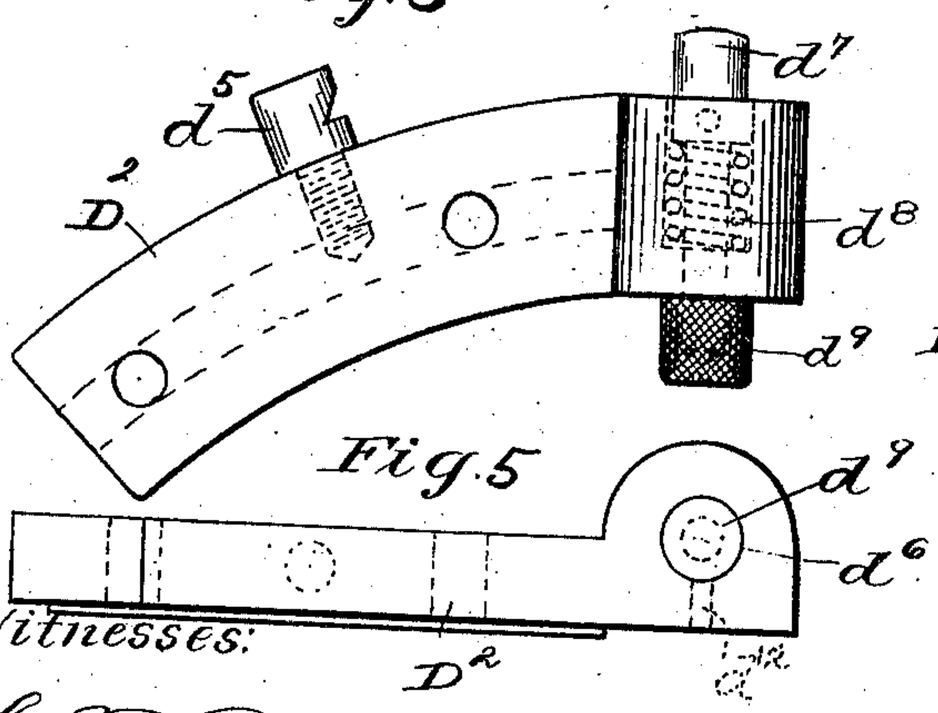


Fig. 4

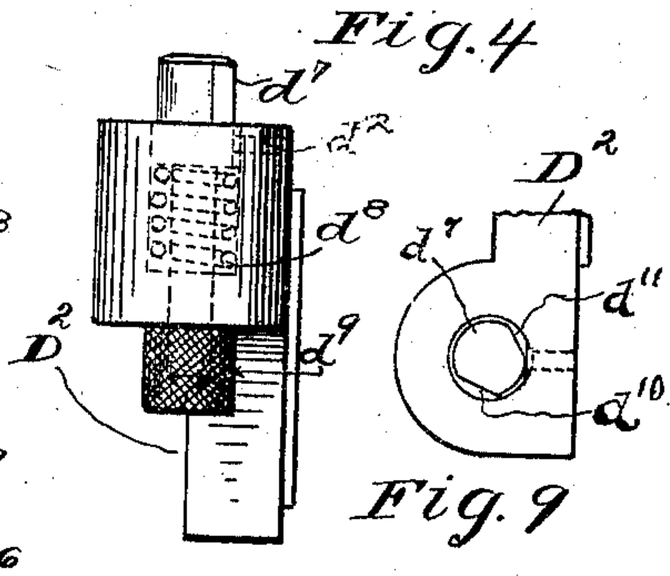


Fig. 9

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2 SHEETS—SHEET 2.

Fig. 2

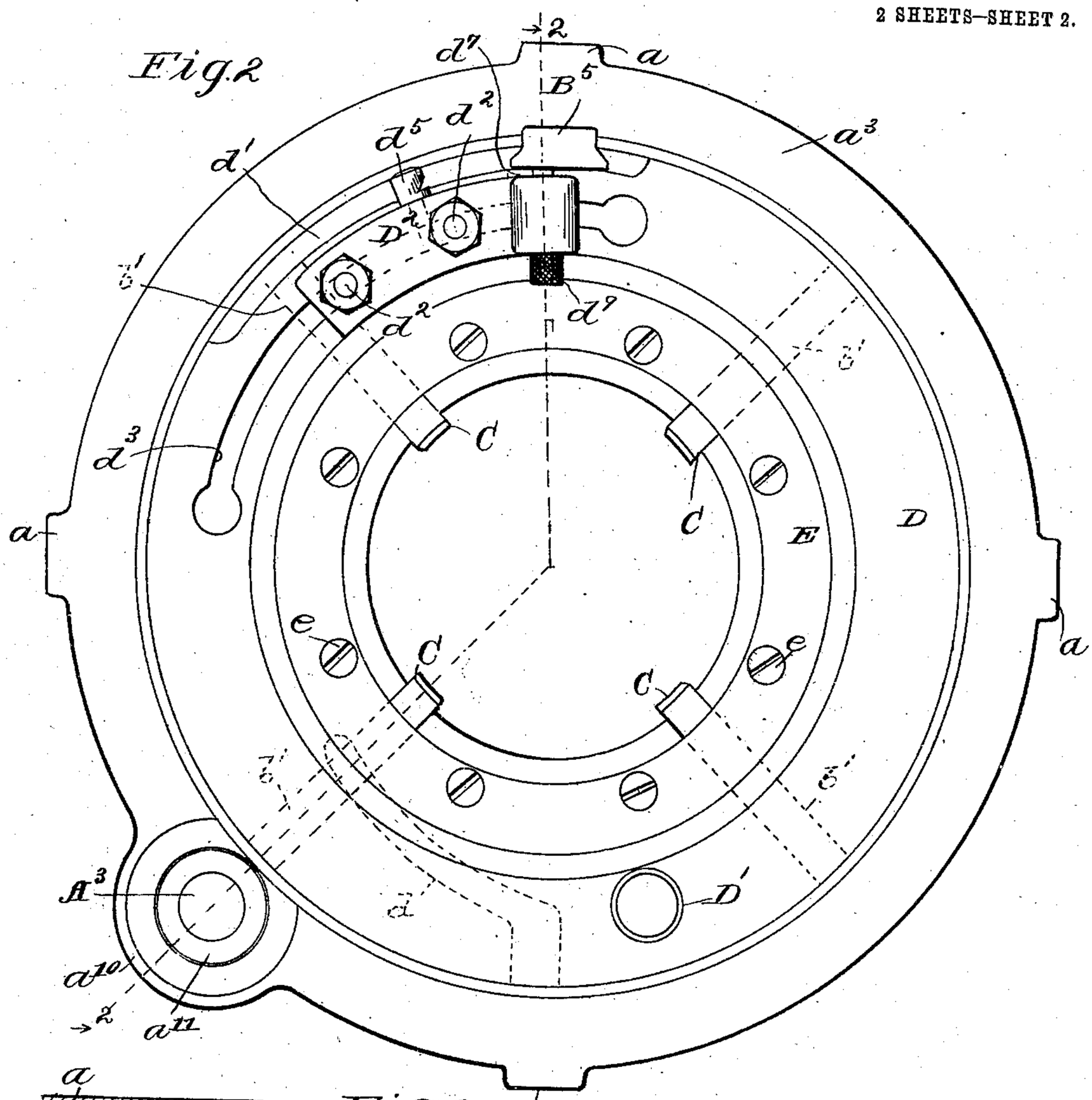



Fig. 6

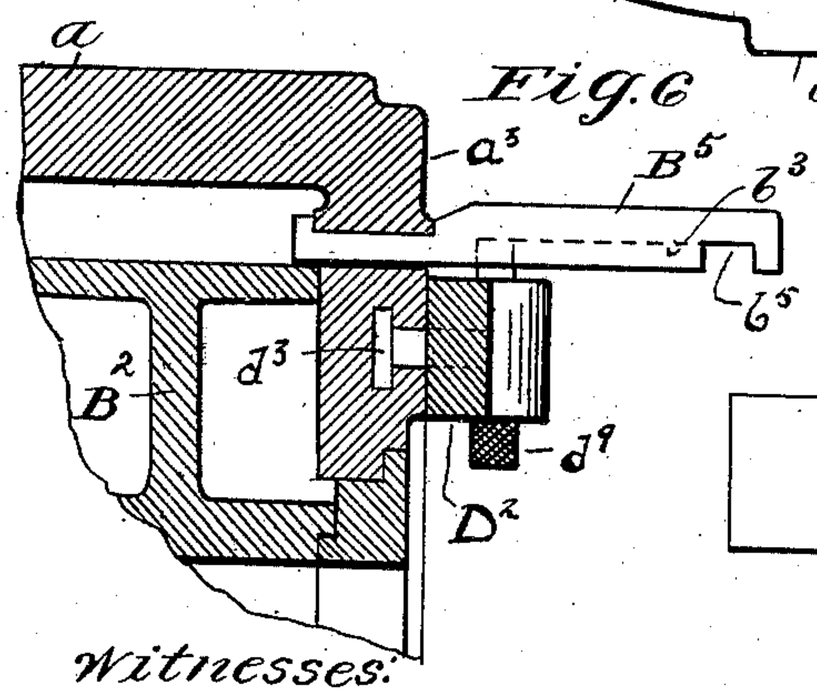



Fig. 7

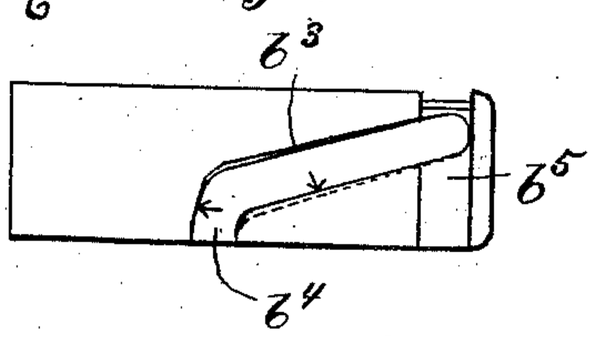
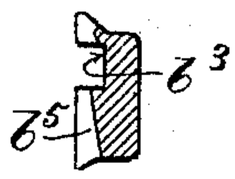



Fig. 8

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THE NORRIS PETERS CO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

LOUIS F. HART, OF CLEVELAND, OHIO, ASSIGNOR TO THE HART MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

## DEVICE FOR CUTTING SCREW-THREADS.

985,168. Specification of Letters Patent. **Patented Feb. 28, 1911.**

Application filed April 20, 1907. Serial No. 369,246.

*To all whom it may concern:*

Be it known that I, LOUIS F. HART, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Devices for Cutting Screw-Threads, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to devices for cutting screw threads, particularly for cutting screw threads on pipes and the like where it is generally desirable to make such thread with a taper in order to insure a tight fitting joint.

My invention accordingly has as its object the provision among other things of means for automatically producing such a tapered thread.

Other and equally important objects are the provision of means for quickly adjusting the device to fit work of different dimensions and to automatically positively release such work when the standard length of thread has been cut.

To the accomplishment of the above and related ends, said invention consists of means hereinafter fully described and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 represents, in central longitudinal cross section, a die stock embodying the several improved features of construction of my invention; Fig. 2 is a front elevation of such device; Figs. 3, 4 and 5 are respectively a front elevation, a plan and an end elevation of an adjustable catch forming a feature of such invention; Fig. 6 is a cross sectional detail corresponding to that appearing in Fig. 1, but showing the parts in a different operative position; Figs. 7 and 8 are respectively a bottom plan view and a transverse cross section of a grooved rider-bar that forms another feature of said invention; and Fig. 9 is an end view of a plunger forming a part of the catch shown in Figs. 3, 4 and 5.

As has been stated the specific form of device chosen as best illustrating my invention is a pipe-threading tool or die stock. The general form of such tool or machine as it may be variously designated, depending upon the size of work it is designed to accommodate, and upon whether it is to be operated manually or by power, is clearly shown in Figs. 1 and 2. From an inspection of these figures the tool will be seen to be made up of two main elements, a stock holding frame member A, and a die-holding member or head revolubly mounted in said frame member. Frame member A, although integral in actual construction, may be regarded as being made up of three concentric but axially separated annular portions $a'$, $a^2$ and $a^3$ joined together by connecting portions $a$. Annular portion $a'$ of the frame is designed to serve as the work holding device. To this end it is provided with a removable guide sleeve A′ of the usual construction. In the type of tool illustrated it is of course intended that the pipe should be held against rotation in a suitable vise or the like, the purpose of the work holding mechanism just described being merely to hold the tool frame from rotation on the pipe. However, by providing frame A with a foot or base whereby it can be attached to work bench or the floor, use of such a vise may be obviated.

Annular portion $a^3$ of the frame A is of larger diameter than portion $a^2$, and the inner faces of both portions form bearings for the die holding member or head B. Said die-holding member or head comprises a sleeve portion B′ thus journaled within part $a^2$ of the frame, and a flange portion $B^2$ journaled in part $a^3$. Such bearing is formed directly by the face of the annular portion $a^3$; in the case of portion $a^2$, however, a bushing $A^2$, Fig. 1, is introduced. This bushing is designed to be removably secured in place and is provided with an integral collar $a^8$ adapted to fit against frame portion $a^2$. Such bushing is designed to operate as a leader ring, its rear

end being formed to present a cam surface $a^9$ as shown in Fig. 1, this surface being of a suitable pitch to start or lead the dies onto the work. Disposed to coöperate with such cam surface $a^9$ is a roller $B^4$ mounted on the rear end of sleeve portion B′ of the die-holding member B. By coöperation of such roller and cam face the die holding member is obviously moved forward during its first turn a distance equal to the pitch of the cam and thereby cause the dies to initially grip the work; the feeding for the remaining turns is intended to be left entirely to the dies, a form of die especially designed to thus fit itself on the work being fully described and claimed in my copending application filed March 23, 1906, Serial No. 307,598.

On one side of frame A preferably intermediately of two connecting portions $a$ are provided bearings $a^{10}$ in which is journaled a short shaft $A^3$ held in place therein by a collar $a^{11}$ secured to its one end, and shaped square at the other end to receive a ratchet wrench, not shown, whereby it may be rotated. Splined on such shaft $A^3$ intermediately of its bearings is a small pinion $A^4$ that is adapted to mesh with a gear $B^3$ secured on sleeve portion B′ of member B and just to the rear of flange portion $B^2$ thereof. By this means it will be seen that rotary motion may be communicated to said member B. An encircling notch $b$ is formed between the rim of flange $B^2$ and this gear $B^3$, and pinion $A^4$ has attached to its outer face a collar $a^{12}$ that registers in such groove. Thus the pinion is moved along shaft $A^3$, as the gear is shifted longitudinally with member B within frame A, and the two are kept constantly in mesh.

In its flanged face, member B is provided with a plurality of radial slots or recesses $b'$, Figs. 1 and 2 that are designed to receive and slidably hold the dies C. The number of such slots and corresponding dies may of course be varied as desired, there being four in the form of device illustrated. The dies are normally retained in their respective slots by means of an annular plate D revolubly secured to the face of member B by means of a shoulder ring E, the latter being attached to such member by suitable screws $e$. Plate D bears on its inner face a series of cam grooves $d$, Fig. 2, where, however, only one is shown in order to avoid confusion. Such grooves correspond in number and disposition with dies C which are formed with integral projections or pins $c$, Fig. 1, adapted to register in the grooves. Rotation of the cam plate obviously serves to either advance or retract the dies in the slots as may be desired, and in one position, in view of the conformation of the latter, such rotation is adapted to permit their release from such slots entirely. Manual rotation of the cam plate is facilitated by provision of a handle D′ on its outer face.

At a convenient point in the periphery of the flange $B^2$ of die-holding member B is formed a recessed longitudinal slot $b^2$ and slidably mounted therein is a rider-bar or post $B^5$, Figs. 1, 2 and 7. The rear end of this rider-bar lies substantially flush with the bearing surface of flange $B^2$ so as not to interfere with the rotation of the latter, being transversely recessed near such end so as to engage opposite sides of annular portion $a^3$ of the frame A, whereby said bar is retained from longitudinal movement relatively to said frame. The outer end of the bar, in the normal position of the parts shown in Fig. 1, projects a trifle beyond the front face of cam plate D, and an elongated recess $d'$, Fig. 2, is cut in the periphery of the latter so as to allow it the rotative movement required in adjusting the position of the dies. In the under side of rider-bar $B^5$ is provided a groove $b^3$ of substantially helical form having the axis of the device as its axis and a pitch depending on conditions presently to be set forth. Such groove $b^3$, Fig. 7, beginning near the forward end of the bar extends for substantially half the length of the same and terminates in an inclined groove portion $b^4$ that intersects one of the lateral edges of the bar. Said bar is also formed on its under side with a transverse slot $b^5$ that intersects the forward end of the groove $b^3$, the bottom of said slot being outwardly beveled on one side of said groove and both inwardly and outwardly beveled on the other, see Figs. 7 and 8.

Cam plate D is provided on its face with a recess or T slot $d^3$ of circular conformation adapted to receive bolts $d^2$ which serve in turn to secure a second plate $D^2$, Figs. 2, 3, 4 and 5, in any desired axial position on the cam plate. Such plate $D^2$ bears on its upper edge a fixed stop member or stud $d^5$ adapted to laterally engage rider bar $B^5$ to prevent further rotation of the cam plate in one direction. The position of this stop member is designed to be such as to prevent rotation of the cam-plate D such as would be sufficient to entirely release the dies from cam-grooves $d$ without first loosening bolts $d^2$ and retracting plate $D^2$ to the farther end of slot $d^3$. In a radially disposed bore $d^6$ in the forward end of said plate is mounted a catch or projection consisting of a plunger $d^7$ that is normally upwardly actuated by a spring, $d^8$. The disposition of this catch is such that in the normal assembled position of the parts shown in Fig. 1 its upper end is adapted to enter the groove $b^3$ in the rider bar $B^5$, by way of the transverse slot $b^5$ intersecting the same, from either side of said bar. Once engaging such groove such engagement is continued as will be obvious by

the pressure of the spring upwardly upon the plunger. To permit the catch to be manually withdrawn at any point in the course of its movement along this groove, its lower end is desirably provided with a milled head $d^9$. So long as it remains positioned in the forward end of the groove, moreover, it is adapted to escape therefrom by virtue of the doubly beveled bottom of transverse slot $b^5$, merely upon rotation of the cam-plate, its own end, Figs. 3 and 4, being oppositely beveled to conform with the two different bevels of such slot bottom. The end of the plunger is furthermore flattened on two sides as shown in the end view thereof appearing in Fig. 9. The one $d^{10}$ of such flattened surfaces is designed to conform with that wall of helical groove $b^3$ against which the plunger end is forced by the outward pressure of the dies when the device is in operation; the other flattened surface $d^{11}$ is similarly shaped to conform with that wall of the inclined groove portion $b^4$ against which the plunger end is pressed at the conclusion of the cutting operation. The walls of the respective groove portions, against which the plunger end thus presses in the case of the form of my device here illustrated, are indicated by small arrows in Fig. 7. In order that the catch may always properly present these flattened faces to the groove walls in question it is necessary that it be held against rotation in catch-plate $D^2$. To this end the body of the plunger is also flattened slightly on one side and a small pin $d^{12}$ intersects the bore $d^6$ and contacts with such flat surface, Figs. 4, 5 and 9.

The general combination of a rider bar with a stop plate adjustably mounted on the die-positioning cam plate is, it should here be explained, also shown and described in the earlier filed co-pending application hereinbefore referred to, such combination being there presented in its broader patent aspect.

Having thus described, with what is thought sufficient detail, the structure of my improved threading tool, it only remains to indicate briefly its manner of operation. Assuming that a thread of a given pitch is to be cut on a section of pipe, the pipe in question will be first securely gripped in a vice. To adjust the thread cutting tool, dies of the pitch desired are fitted in slots $b$ and the leader bushing $A^2$ of pitch to correspond with such dies is fitted in annular portion $a^2$ of the frame. A guide sleeve A′ of the proper diameter is next fitted in the frame of the tool and die-holding member B thereupon rotated to position roller $B^4$ at the beginning of the cam or leader bushing $A^2$. Then cam-plate D is rotated to bring the dies into proper position for cutting thread on the size of pipe in hand. In order to facilitate this adjustment the faces of the cam-plate and ring E are preferably provided with graduations as will be readily understood, by the alinement or registration of which the proper position is indicated. Thereupon catch-bearing plate $D^2$ is moved along slot $d^3$ until plunger $d^7$ registers in the groove $b^3$ in rider-bar $B^5$; bolts $d^2$ are then drawn tight. The tool being now secured in place on the pipe with the pipe end resting on the inner beveled edge of the dies, the actual operation of cutting is begun by rotating shaft $A^3$ and thereby die-holding member B. The leader bushing $A^2$ assists the dies in firmly gripping the stock during the first rotation of such member; upon further rotation of the latter the dies are designed to automatically advance on the stock as has been stated. Coincidentally with the advance of the dies, and therefore of die-holding member B, upon the stock, a limited rotative movement of cam-plate D occurs by virtue of the construction of rider-bar $B^5$ and plunger $d^7$ engaging therewith, by means of which movement the dies gradually retreat and so cut a tapered thread. The pitch of the groove $d^3$, wherewith said plunger $d^7$ engages, determines the amount of rotation imparted to the cam plate, and thus in conjunction with the degree of divergence of the cam grooves in the latter determines the taper of such thread, as will be obvious. This rotative movement of the cam plate relatively to the die-holding member or die-head during the cutting operation, may be imparted thereto either by the pressure of one wall of the groove portion $b^3$ in the rider-bar's under face against the plunger $d^7$, or by the pressure or the dies in cam grooves $d$ of the plate, in which case the other wall of such groove portion $b^3$ serves to control the rotation of the plate. In either event a positive, yet at the same time a controlled or regulated, movement of the dies is obtained outwardly from the axis of the device. Thus if the cam-grooves $d$ are sufficiently inclined, when the device is in operation, the pressure of the pipe against the dies will cause the cam-plate and the second plate $D^2$, that carries plunger $d^7$, to turn axially. Under such conditions the turning of the cam-plate is controlled or limited by the plunger engaging with the lower side of the groove portion $b^3$ in the bottom plan view of rider-bar $B^5$ designated by the arrow in Fig. 7. On the other hand, if the inclination of the cam grooves $d$ is such as to render that component of the outward thrust of the dies, which tends to rotate the cam-plate, insufficient to overcome the frictional and other resistance, the turning of the plate will be brought about by the other side of groove $b^3$ engaging with the plunger $d^7$. Otherwise stated, when the cam-plate is formed with grooves of

relatively little inclination, the recession, or retraction, of the dies is caused by the action of groove $b^3$ in the rider bar effecting the turning of the plate; whereas, when the slots are of greater inclination, such that the pressure of the dies imparts a rotative tendency thereto, the retraction of the latter is permitted and uniformly controlled in a positive way by such groove $b^3$.

When the standard length of thread has been cut the plunger $d^7$ enters upon groove portion $b^4$ and is thereby forced out of engagement with the rider-bar, at the same time effecting rotation of the cam plate at an increased speed such as to sufficiently retract the dies from the stock to cause the same to cease cutting. The final turn forward given member B, incidentally to this retraction of the dies, serves automatically to clean out the thread and remove the bur from them; no additional movement or operation, in other words, is necessary to accomplish this important result. To withdraw the tool, the cam plate D is then simply rotated through the medium of handle D′ sufficiently to entirely free the dies from the stock, and, upon releasing the stock-holding device, the tool can be forthwith removed. Undue rotation of the cam-plate, such as might permit the dies to escape from the cam-plate and fall out, is prevented by engagement of the rider-bar $B^5$ with stop $d^5$, as has been previously explained.

When the cam-grooves $d$ are properly designed so as to function in one or the other of the two ways above described, it is obvious that but one wall of the groove portion $b^3$ is really required, since the plunger will remain in contact therewith throughout the whole of its normal travel along the rider bar. It will be equally evident that the more sharply inclined groove portion $b^4$ will operate in the manner explained, irrespective of which wall the plunger has thus followed. In other words it is contemplated that, even where the outward pressure of the dies is utilized to impart a rotative tendency to the cam-plate, such tendency may not in all cases produce the quick-opening effect desired. This effect, however, is admirably accomplished by the inter-engagement of the plunger with such sharply inclined groove-portion, when the predetermined, or full, length of thread has been cut. As a matter of fact, such positive opening means may be dispensed with in the case of the cam-plate actuated by the pressure of the dies, and this pressure relied on alone to relieve said dies at the end of the cut, such being the construction which I describe in my co-pending application, Serial No. 307,598, to which I have hereinbefore referred.

If now it is desired to repeat the operation on the same size of stock, all that is necessary to prepare the tool is to return member B and cam plate D to their initial positions. This, in the case of the latter, is easily done as above described, the plunger $d^7$ being brought into engagement with groove $b^3$ of the rider bar by way of the singly beveled portion of transverse slot $b^5$. Should it be desired to withdraw such plunger from the groove in order to further rotate the cam plate in the same direction for purposes of adjustment or otherwise, this is permitted by the double bevel of the other portion of such transverse slot.

The manner in which my tool may be adjusted to cutting thread on a different size of stock should be sufficiently obvious to those skilled in the art from what has been said above of its construction and mode of operation. That to which I particularly desire to call attention is the means whereby a tapered thread is produced automatically pending the cutting operation. Such means aside from being quite simple and in themselves easy of adjustment, are as has been explained, positive in action, and assure not merely the cutting of a thread of exactly the right taper but also the release of the dies from the stock at the close of such cutting operation. At the same time the various other adjustments embodied in the type of thread cutting tool herein described are in no wise interfered with by the inclusion of such taper threading means. It should be stated in conclusion that I contemplate, as coming within the scope of my invention, a reversal or exchange of position as regards the rider-bar and catch engaging therewith. In other words the groove of the rider-bar might be provided in connection with the cam-plate and the plunger with the die-holding member. One specific construction embodying this arrangement of the parts in question will be found illustrated and described in another co-pending application filed April 28, 1909, Serial No. 492,622.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a screw-cutting device, the combination of work-holding means and a member longitudinally and rotatably movable with reference to each other; dies movable in said member; an element carried by said member and operatively connected with said dies to position the same; and another element rotatable but not longitudinally movable with said member, said elements being adapted to inter-engage upon a pre-

determined longitudinal movement between said work-holding means and member to positively withdraw said dies from the work.

2. In a screw-cutting device, the combination of work-holding means and a member longitudinally and rotatably movable with reference to each other; dies movable in said member; means adapted to control movement of said dies outwardly upon relative longitudinal movement between said work-holding means and member; and means adapted positively to withdraw said dies from the work upon a predetermined amount of such movement.

3. In a screw-cutting device, the combination of work-holding means and a member longitudinally and rotatably movable with reference to each other; dies movable in said member; means adapted to control movement of said dies outwardly upon relative longitudinal movement between said work-holding means and member; and elements adapted to inter-engage upon a predetermined amount of such movement to positively withdraw said dies from the work.

4. In a screw-cutting device, the combination of work-holding means; a member longitudinally and rotatably movable with reference thereto; dies movable in said member; means adapted automatically to retract said dies as said member moves longitudinally; and means adapted positively to withdraw said dies from the work upon a predetermined amount of such movement.

5. In a screw-cutting device, the combination of work-holding means, a member longitudinally and rotatably movable with reference thereto; dies movable in said members; means adapted automatically to retract said dies as said member moves longitudinally; and elements adapted to inter-engage upon a predetermined amount of such movement to positively withdraw said dies from the work.

6. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said frame; and a cam-plate rotatably secured to said member and adapted to position said dies, said bar and cam-plate being provided with elements adapted to inter-engage upon a predetermined amount of longitudinal movement on the part of said bar to positively withdraw said dies from the work.

7. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said frame; and a cam-plate rotatably secured to said member and adapted to position said dies, said bar and cam-plate being provided the one with a groove and the other with a projection adapted to engage such groove, the latter being formed to positively withdraw said dies from the work upon a predetermined amount of longitudinal movement on the part of said bar.

8. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said frame; and a cam-plate rotatably secured to said member and adapted to position said dies, said bar being provided with a groove and said cam-plate with a projecting element adapted to engage such groove, the latter being formed to positively withdraw said dies from the work upon a predetermined amount of longitudinal movement on the part of said bar.

9. In a screw-cutting device, the combination of work-holding means and a member longitudinally and rotatably movable with respect to each other; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said work-holding means; and a plate movably secured to said member and adapted to position said dies, said bar being adapted to engage said plate to positively move the same relatively to said member pending a predetermined longitudinal movement of the latter, the length of the engaging faces of said bar and plate being proportioned to the length of thread to be cut, whereby said plate is left free to move upon proper longitudinal movement of said bar with respect to said member.

10. In a screw-cutting device, the combination of work-holding means and a member longitudinally and rotatably movable with respect to each other; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said work-holding means; and a plate movably secured to said member and adapted to position said dies, said bar being adapted to engage said plate to positively move the same relatively to said member pending a predetermined longitudinal movement of the latter, the respective engaging faces of said bar and plate being formed to effect such movement at varying rates of speed, and the length of the portion of said faces for effecting the normal rate of speed being proportioned to the length of thread to be cut, the other rate of speed serving to move said plate to free the dies from engagement with the work.

11. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member; a bar longitudinally movable with respect to said member, and held against such movement relatively to said frame; and a cam-plate rotatably secured to said member and adapted to position said dies, said bar being adapted to engage said cam-plate to positively rotate the same relatively to said member pending a predetermined longitudinal movement of the latter, the length of the engaging faces of said bar and cam-plate being proportioned to the length of thread to be cut, whereby said cam-plate is left free to rotate upon proper longitudinal movement of said bar with respect to said member.

12. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member, a bar longitudinally movable with respect to said member and held against such movement relatively to said frame, and a cam-plate rotatably secured to said member and adapted to position said dies, said bar being adapted to engage said cam-plate and to positively rotate the same relatively to said member, pending a predetermined longitudinal movement of the latter, the respective engaging faces of said bar and cam-plate being formed to effect such rotation at varying rates of speed, and the length of the portion of said faces for effecting the normal rate of speed being proportioned to the length of thread to be cut, the other rate of speed, thereupon had, serving to rotate said cam-plate to free the dies from engagement with the work.

13. In a screw-cutting device, the combination of work-holding means, a member longitudinally and rotatably movable with reference thereto; dies movable in said member; means adapted automatically to retract said dies as said member moves longitudinally; and elements adapted to interengage upon a predetermined amount of such movement to positively withdraw said dies from the work.

14. In a screw-cutting device, the combination of a frame; a member longitudinally and rotatably movable therein; dies movable in said member; a bar longitudinally movable with respect to said member and held against such movement relatively to said frame; and a cam-plate rotatably secured to said member and adapted to position said dies, said bar and cam-plate being provided with elements adapted to interengage upon a predetermined amount of longitudinal movement on the part of said bar to positively withdraw said dies from the work, and the element on said cam-plate being adjustably positioned thereon.

15. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable with respect to said member and held against longitudinal movement relatively to said frame, said bar being formed with a guide-way on its inner face, a cam plate rotatably secured to said member and adapted to position said dies, and a radially disposed spring pressed catch borne by said cam-plate and adapted to engage said guide-way.

16. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable in said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a groove inclined with respect to a line parallel with the axis of the device and intersecting a lateral edge of said bar, a cam-plate rotatably secured to said member and adapted to position said dies, and a radially disposed, spring-pressed, catch borne by said cam-plate and adapted to engage the groove in said bar.

17. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable with respect to said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a helical groove having the axis of the device as its axis, a cam-plate rotatably secured to said member and adapted to position said dies, a radially disposed catch born by said cam-plate, and a spring normally pressing said catch outwardly to engage the groove in said bar.

18. In a screw-cutting device, the combination of a frame comprising alined annular portions; a flanged sleeve longitudinally and rotatably mounted in said portions; dies movable in the flange of said sleeve; a rider-bar longitudinally movable in the periphery of such flange and held against longitudinal movement with respect to said frame, said bar being provided on its inner face with a groove comprising a portion of helical form with the axis of the device as its axis and an inclined portion continuous therewith and intersecting a lateral edge of said bar; a cam-plate rotatably secured on the face of said flange and engaging said dies to position the same; a radially disposed catch adjustably mounted on said cam-plate; and a spring normally pressing said catch outwardly to engage the groove in said bar.

19. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable in said member and held against longitudinal movement relatively to said frame,

said bar being provided on its inner face with a groove inclined with respect to a line parallel with the axis of the device and with a transverse slot intersecting the forward end of said groove, a cam-plate rotatably secured to said member and adapted to position said dies, and a radially disposed plunger borne by said cam-plate and adapted to enter the groove in said bar by way of such transverse slot.

20. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable in said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a groove inclined with respect to a line parallel with the axis of the device and with a transverse slot intersecting the forward end of said groove, the bottom of said slot being outwardly beveled on one side of said groove and both inwardly and outwardly beveled on the other, a cam-plate rotatably secured to said member and adapted to position said dies, and a radially disposed plunger borne by said cam-plate and adapted to enter the groove in said bar by way of such transverse slot.

21. In a screw-cutting device, the combination of a frame comprising alined annular portions; a flanged sleeve longitudinally and rotatably movable in said portions; dies movable in the flange of said sleeve; a rider-bar longitudinally movable in the periphery of such flange and held against longitudinal movement with respect to said frame, said bar being provided on its inner face with a groove comprising a portion of helical form with the axis of the device as its axis and an inclined portion continuous therewith and intersecting a lateral edge of said bar, and with a transverse slot intersecting the forward end of said groove, the bottom of said slot being outwardly beveled on one side of said groove and both inwardly and outwardly beveled on the other; a cam-plate rotatably secured on the face of said flange and engaging said dies to position the same; a radially disposed plunger adjustably mounted on said cam-plate and adapted to enter the groove in said bar by way of such transverse slot; and a spring adapted to retain said plunger in engagement with such groove.

22. In a screw-cutting device, the combination of a frame comprising alined annular portions; a flanged sleeve longitudinally and rotatably mounted in said portions; dies movable in the flange of said sleeve; a rider-bar longitudinally movable in the periphery of such flange and held against longitudinal movement with respect to said frame, said bar being provided on its inner face with a groove comprising a portion of helical form with the axis of the device as its axis and an inclined portion continuous therewith and intersecting a lateral edge of said bar, and with a transverse slot intersecting the forward end of said groove, the bottom of said slot being outwardly beveled on one side of said groove and both inwardly and outwardly beveled on the other; a cam-plate rotatably secured on the face of said flange and engaging said dies to position the same, a radially disposed plunger adjustably mounted on said cam-plate and adapted to enter the groove in said bar by way of such transverse slot, said plunger having its outer end oppositely beveled to conform with the oppositely beveled bottom of such slot; and a spring adapted to retain said plunger in engagement with such groove.

23. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable with respect to said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a helical groove having the axis of the device as its axis, a cam-plate rotatably secured to said member and adapted to position said dies, and a radially disposed plunger borne by said cam-plate and adapted to engage the groove in said bar, said plunger being held against rotation and having its end flattened to conform with walls of said groove.

24. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable in said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a helical groove having the axis of the device as its axis, a cam-plate rotatably secured to said member and adapted to position said dies; and a radially disposed plunger borne by said cam-plate and adapted to engage the groove in said bar, said plunger having its engaging end flattened on one side to conform with the side of said groove against which the pressure of the dies forces said plunger when said dies are in operation.

25. In a screw-cutting device, the combination of a frame, a member longitudinally and rotatably movable therein, dies movable in said member, a bar longitudinally movable in said member and held against longitudinal movement relatively to said frame, said bar being provided on its inner face with a groove comprising a portion of helical form with the axis of the device as its axis and an inclined portion continuous therewith and intersecting a lateral edge of said bar; a cam-plate rotatably secured to said member and adapted to position said dies; and a radially disposed, spring-

pressed, plunger borne by said cam-plate and adapted to engage the groove in said bar, said plunger having its engaging end flattened on one side to conform with the wall of said helical groove portion against which it pressed during the cutting operation of the dies and another side flattened to conform with the wall of said inclined groove portion against which it presses at the conclusion of such operation.

Signed by me, this 18th day of April 1907.

LOUIS F. HART.

Attested by—
D. T. DAVIES,
JNO. F. OBERLIN.

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