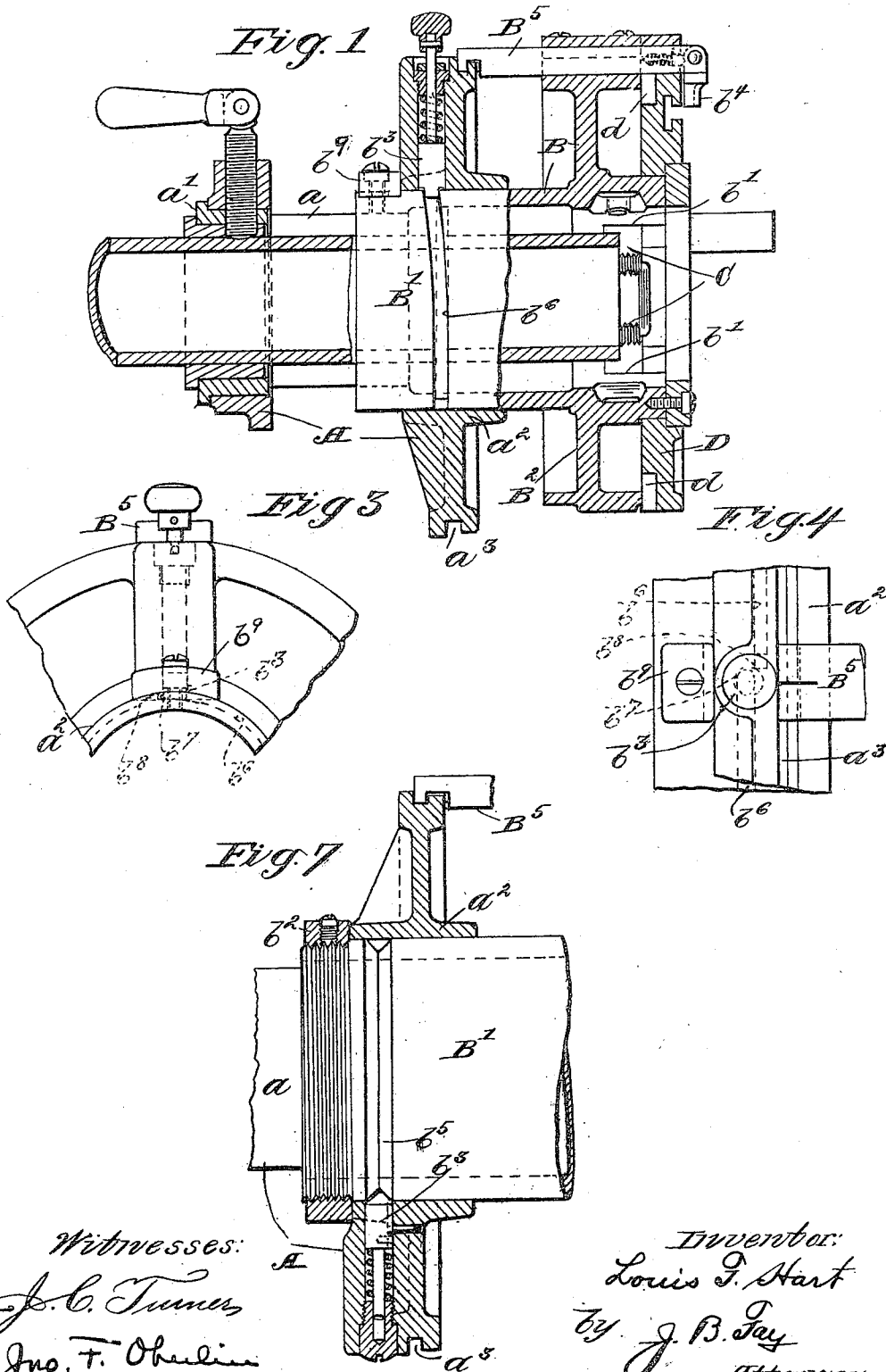


L. F. HART.
SCREW CUTTING DEVICE.
APPLICATION FILED APR. 28, 1909.

962,024.

Patented June 21, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2

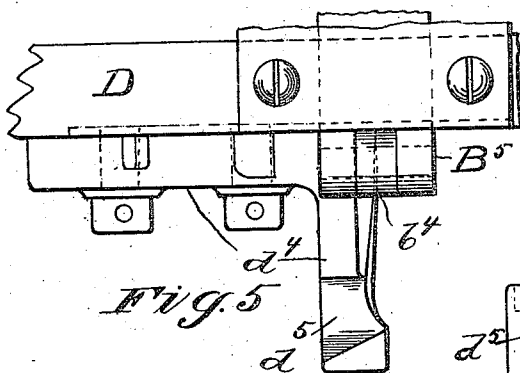
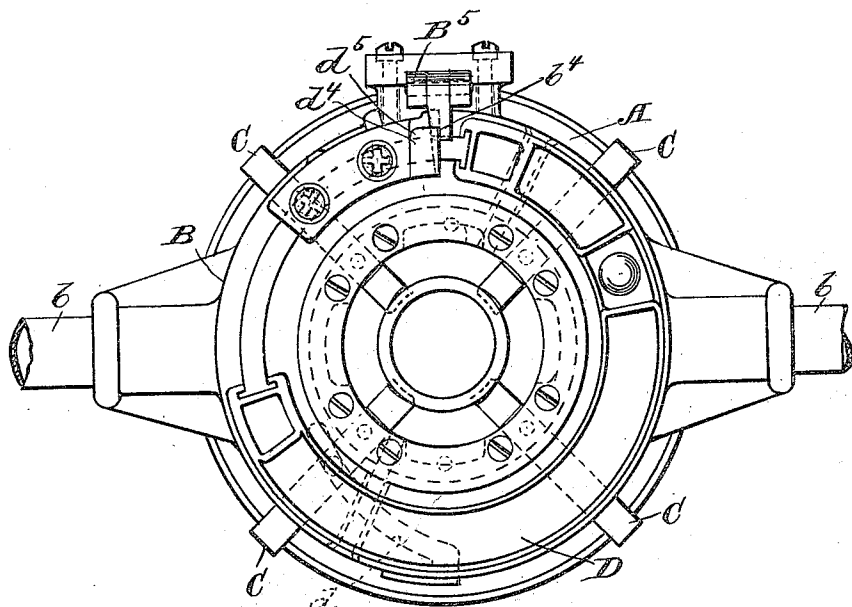
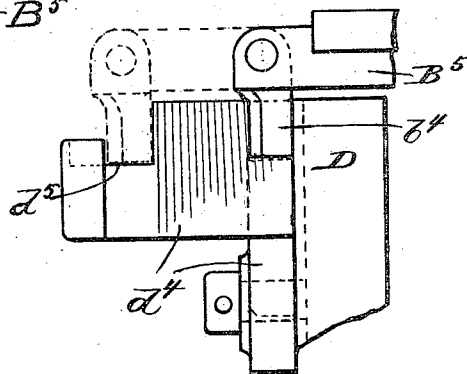


Fig. 5

Fig. 6



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UNITED STATES PATENT OFFICE.

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

SCREW-CUTTING DEVICE.

962,024.

Specification of Letters Patent. Patented June 21, 1910.

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To all whom it may concern:

Be it known that I, LOUIS F. HART, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Screw-Cutting Devices, 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.

The general type of screw cutting device to which the present invention belongs, forms the subject matter of a co-pending application Serial No. 307,598, filed March 23, 1906, such type being characterized by the provision of automatically operating means for producing the tapered threads that are found particularly desirable in threading pipes or the like, where it is essential that a tight fitting joint be secured.

The present invention is directed more specifically to certain details of improvement in an adaptation of the general form of device above described, which adaptation likewise forms the subject matter of my issued Patent No. 925,100, dated June 15, 1909, out of which the present case is in part divided. These improvements include means for more or less accurately locating the die-holding member in the work-holding member preparatory to starting to cut the thread, and associated with aforesaid means, are other means for effecting such starting. In addition to the foregoing, I herein show a modified form of means for effecting the automatic opening of the dies, upon the completion of the cutting of a thread of the desired length, such means being, however, broadly claimed in another co-pending application, Serial No. 369,246, filed April 20, 1907. These various means, together with other related features constituting the present invention, will be hereinafter fully described, and particularly pointed out 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 is a central longitudinal section, with parts

shown in side elevation, of a die stock embodying the improved features of construction constituting the present invention; Fig. 2 is a front elevation of such die-stock; Fig. 3 is a rear elevation of a detail of the same; Fig. 4 is a plan view of this same detail; Fig. 5 is a plan view of another detail, namely, the intergaging dog and stop whereby the rotation of the die-positioning cam plate is controlled; Fig. 6 is a side elevation of such detail; and Fig. 7 shows a modified construction of the locating means that form one of the features of the invention.

The general features of construction of the tool illustrated in the several figures just described, need be here but briefly noted. Such tool, specifically a die-stock as stated, will be seen (Figs. 1 and 2) to be made up of two members, a stock-holding frame A, and a die-holding member or head, B, revolvably mounted in said frame. Member A may be regarded as being made up of two concentric, but axially separated annular portions a' a^2 joined together by longitudinally disposed connecting portions a . Annular portion a' of the frame is designed to serve as a work-holding device, being secured to the work in the usual fashion; while annular portion a^2 of frame A has its inner face finished to form a bearing for the die-holding member B, which latter, in improved construction, comprises a sleeve portion B' adapted to be thus journaled within portion a^2 , and a flange portion B² in which the chaser dies C are designed to be supported. To rotate member B in frame A, the former is provided with two radially extending arms b of the usual type.

For the reception of the dies a plurality of slots b' , preferably radially disposed, are cut in the face of flange portion B² of member B, the dies being adjustably positioned in such slots by means of a cam plate D rotatably mounted on the face of the flange. The conformation of the grooves d in the cam-plate that engage with the dies, is such that the outward pressure of the latter is adapted to rotate the plate. Such rotation is controlled by slidably mounting in the flange B² of die-holding member B a rider bar B⁵, the rear end of which engages a slot or recess a^3 encircling annular portion a^2 of frame A, the front end of which extends a short distance in front of the cam plate

in question. By virtue of the engagement of the rear end of the rider bar with frame A in the manner described, such bar is obviously retained against longitudinal movement relatively to the frame while still being allowed to rotate freely along with member B. The front end of the bar is provided with a dog b^4 that in its normal position is adapted to engage a stop d^4 adjustably mounted on the face of the cam plate and, by virtue of such engagement, to control the rotation of the cam plate. The contacting faces of the dog and stop are so formed that, as the die-holding member B moves longitudinally within the work-holding member A, a slight rotation of the cam plate is permitted, thereby allowing the dies to expand and to cut a tapered thread.

It will be appreciated that in a device of the character described, in which the use of the troublesome leader screw has been abolished, some means should be nevertheless provided for locating the head or die holding member in proper position within the work-holding member for the commencement of the cutting operation and to retain the same in such position during the ordinary handling of the tool and while it is being secured to the work. As has been indicated in connection with the description of the drawings, two specific forms of means for the accomplishment of this result are herein shown.

Adverting first to the simpler form illustrated in Fig. 7, it will be noted that all leading means are omitted, the dies, assisted by the pressure the operator can apply to the stock, being alone relied on to start the device. A retaining collar b^2 is simply threaded on the rear end of the sleeve portion of member B' to prevent the entire separation of the two members composing the stock. The locating means here, then, simply comprise a plunger b^3 and an encircling groove b^5 in the sleeve wherewith said plunger is adapted to have engagement. This groove is of V cross-section and the inner end of the plunger is similarly formed so that the parts are only loosely held in the starting position, the plunger rising onto the main body, or barrel, of the sleeve as the dies lead onto the work.

In the preferred construction of the tool, viz., that illustrated in Figs. 1, 3 and 4, such groove, here designated b^6 is given a cam conformation, whereby it is made to function doubly, both as a locating device, as has been described in connection with the simple encircling groove b^5 , and as a leading device. To accomplish this latter result, the groove is given an advance or lead, in the course of its single turn about the sleeve, sufficient to cause the dies to properly grip the work in the course of one turn of the head B in the stock. The rear end b^7

of this groove terminates abruptly, so as to afford a stop adapted to limit the movement of the plunger in that direction; while the forward end b^8 of such groove is formed with an incline adapted to permit the plunger to rise up onto the outer cylindrical surface of the sleeve. In this form of the tool, a lug or block b^9 replaces the retaining ring or collar b^2 shown in Fig. 7.

While it is contemplated that the same outward pressure of the dies, that, in the normal operation of cutting the thread on the work, is effective to rotate the cam-plate D, will also serve to throw said dies free of the work as soon as the dog escapes the stop, I have modified (see Figs. 2, 5 and 6) the construction of such stop, so as to insure such retraction of the dies by positively imparting a slight rotative movement to the cam plate at the conclusion of the cutting operation proper. This modification consists simply in the provision at the outer end of the stop d^4 of a transversely disposed slot d^5 , into which the dog b^4 , depending from the rider-bar, slips, when the end of the inclined face of the stop is reached. The outer face of such slot is inclined to the axis of the tool, so that the effect of its engagement with the dog is to produce a slight but quick rotation of the cam plate, as will be obvious, and as a result a corresponding opening of the dies is affected. That is, the cam plate is forced to rotate more rapidly than when the other lateral face of the dog is in contact with the inclined or helicoidal face of the stop, so that the dies are actually withdrawn from the work instead of simply expanded at such a rate as to produce a tapered thread.

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 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 a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, one of said members having an encircling groove, and an element borne by the other member adapted removably to engage such groove.

2. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, said second member being formed with an encircling groove, and a spring-pressed plunger mounted in said first member and adapted to engage such groove.

3. In a screw-cutting device, the combination of a work-holding member, a die-hold-

ing member independently longitudinally and rotatably mounted therein, and means adapted, upon rotation of said second member to produce a limited longitudinal movement thereof, such means including a cam-groove encircling one of said members and an element borne by the other member adapted removably to engage such groove.

4. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, and means adapted, upon rotation of said second member, to produce a limited longitudinal movement thereof, such means including a cam-groove formed in the outer cylindrical surface of said second member and a spring-pressed plunger mounted in said first member and adapted to engage such groove.

5. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, and means adapted, upon rotation of said second member, to produce a limited longitudinal movement thereof, such means including a cam-groove formed in the outer cylindrical surface of said second member and a spring-pressed plunger mounted in said first member and adapted to engage such groove, the forward end of the latter being formed on an incline to permit escape of said plunger therefrom.

6. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, and means adapted, upon rotation of said second member, to produce a limited longitudinal movement thereof, such means including a cam-groove formed in the outer cylindrical surface of said second member and a spring-pressed plunger mounted in said first member and adapted to engage such groove, the rear end of such groove forming a stop for said plunger and the forward end of such groove being formed on an incline to permit the escape of said plunger therefrom.

7. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, and means adapted, upon rotation of said second member, to produce a limited longitudinal movement thereof, such means including a cam-groove formed in the outer cylindrical surface of said second member and a spring-pressed plunger mounted in said first member and adapted to engage such groove, the rear end of such groove forming a stop for said plunger.

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

9. 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 projecting element and said cam-plate with a slot adapted to engage such element, such slot being formed to positively withdraw said dies from the work.

10. In a screw-cutting device, the combination of a frame and a member relatively 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 frame; a cam-plate rotatably secured to said member and adapted to position said dies; and a stop borne by said plate, the outer portion of said stop being provided with an element adapted to positively engage said bar upon a predetermined amount of relative longitudinal movement between said bar and member, the form of such element being such as to rotate said cam-plate to withdraw the dies from 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; a cam-plate rotatably secured to said member and adapted to position said dies; a projecting element on said bar; and a stop borne by said plate, the outer portion of said stop being formed with a slot adapted to engage such projection to positively withdraw the dies from the work upon a predetermined amount of longitudinal movement on the part of said bar.

12. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally and rotatably movable with reference thereto; dies movable in said second member; a bar longitudinally movable with respect to said second member and held against such movement relatively to said first member; a plate

rotatably secured to said second member and adapted to position said dies, the outward pressure of the latter being effective to rotate said plate; and a stop borne by said plate and adapted to engage said bar, one portion of the contacting faces of said stop and bar being formed to permit rotation of said cam-plate at the proper rate to cut a thread of desired taper, as one member moves longitudinally of the other, and another portion of such faces being formed to positively withdraw the dies from the work.

13. In a screw-cutting device, the combination of a work-holding member, a die holding member longitudinally and rotatably movable with reference thereto; dies movable in said second member; a bar longitudinally movable with respect to said second member and held against such movement relatively to said first member; a plate rotatably secured to said second member and adapted to position said dies, the outward pressure of the latter being effective to rotate said plate; a stop borne by said plate; and a dog borne by said bar and adapted to engage said stop, said stop having an inclined face, whereby limited rotation of said plate relatively to said second member is permitted as one member moves longitudinally of the other, and said stop being

formed at its outer end to positively engage said dog, whereby the dies are withdrawn from the work.

14. In a screw-cutting device, the combination of a work-holding member, a die holding member longitudinally and rotatably movable with reference thereto; dies movable in said second member; a bar longitudinally movable with respect to said second member and held against such movement relatively to said first member; a plate rotatably secured to said second member and adapted to position said dies, the outward pressure of the latter being effective to rotate said plate; a stop borne by said plate; and a dog borne by said bar and adapted to engage said stop, said stop having an inclined face terminating in a transverse slot, such inclined face permitting limited rotation of said plate relatively to said second member as one member moves longitudinally of the other, and such slot thereupon engaging said dog to positively rotate said plate and withdraw the dies from the work.

Signed by me this 23rd day of April, 1909.

LOUIS F. HART.

Attested by—

D. T. DAVIES,
Jno. F. OBERLIN.