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C. SINTZ

2,041,027

THREAD CUTTING MECHANISM

Filed July 16, 1934

Fig. 2.

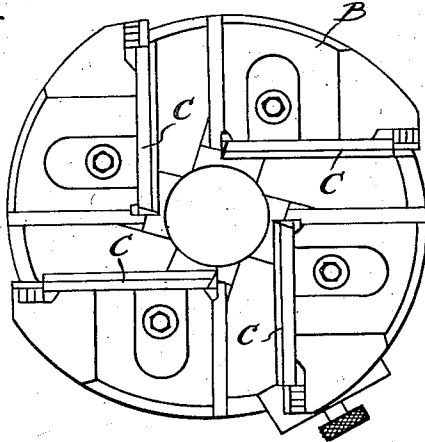


Fig. 1.

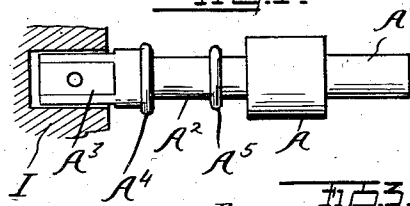


Fig. 3.

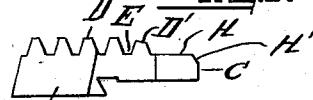


Fig. 4.

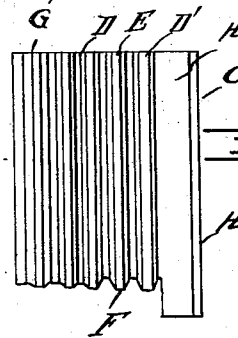


Fig. 5.



Fig. 6.

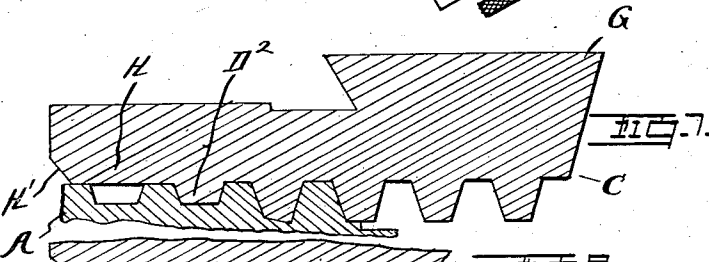
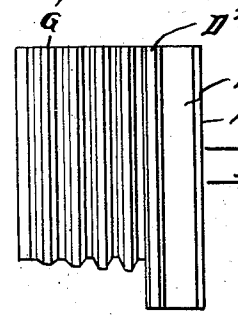


Fig. 8.



Fig. 9.



Fig. 10.



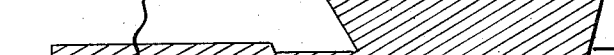
Fig. 11.



Fig. 12.



Fig. 13.



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THREAD CUTTING MECHANISM

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Application July 16, 1934, Serial No. 735,523

5 Claims. (Cl. 10—111)

The invention relates to thread cutting mechanisms of that type in which the work is floatingly held in relation to the thread cutters. It is the object of the invention to obtain a construction in which, first, the thread will be accurately centered in relation to the cylindrical periphery of the blank; second, to relatively feed the cutter and blank axially without the necessity of a separate feed screw and without any danger of distorting or mutilating the thread; third, to provide for the cutting of the thread in a plurality of passes and for maintaining the concentric relation and the proper lead for the thread in each pass.

My improvement is applicable to the construction of various specific constructions including a threaded portion but I shall specifically describe its application to the manufacture of collared and headed shanks provided with a threaded portion of greater diameter.

In the drawing:

Fig. 1 is an elevation of the blank which has been machined to form the reduced shank, the collars and the head, leaving a portion of the original diameter of the stock which is to be threaded;

Fig. 2 is a front elevation of the cutter head showing the mounting of the cutters or chasers thereon;

Figs. 3 and 4 are respectively an end elevation and plan view of one of the chasers for the first operation;

Figs. 5 and 6 are similar views of a chaser for a succeeding operation;

Fig. 7 is a longitudinal section showing the work in engagement with one of the chasers;

Figs. 8, 9 and 10 are diagrams illustrating the relation of the succeeding chasers in the same head as that of Fig. 7;

Figs. 11, 12, 13 and 14 are similar diagrams showing the relation of the chasers in the same head for a succeeding operation.

The specific blank shown in Fig. 1 which is used to illustrate the operation of my improved machine comprises an un-cut cylindrical portion A of the diameter of the original stock and reduced shanks A', A² on opposite ends of the portion A with a squared end A³ adjacent to the portion A² and with the collars A⁴ and A⁵. In the completed structure the portion A is threaded and it is essential that the thread should be concentric with the axis of the reduced shanks. As these shanks have been machined to be concentric with the un-cut cylindrical portion A, it is obvious that one problem

is to maintain a uniform depth of thread in relation to the periphery of this portion A. There is the further problem of advancing the blank axially in relation to the thread cutters at the same rate in each of several successive cutting operations, thereby avoiding distortion or mutilation.

As shown in Fig. 2, B is a rotary cutter head of any suitable construction adapted to have mounted thereon a plurality of thread cutting tools or chasers C. My invention consists in the peculiar construction of these chasers by which the thread cut thereby is always concentric with the periphery of the un-cut blank. The construction is further such that in each succeeding cutting operation the thread of the previous cut is compelled to register with the cutters for deepening the same and the work is compelled to axially advance at the same rate.

The construction of the chasers C illustrated in Figs. 3 to 6 inclusive comprises a bar having parallel ribs D corresponding in cross sectional contour to the grooves of the thread and intermediate spaces E corresponding to the cross section of the thread. One end of the bar is ground to form cutters of each of these ribs as indicated at F and on the bottom of the bar is a dove-tail section G by means of which it is clamped to the head B. The setting is such that the cutter ends F are substantially tangent to the work when fed through the tubular center of the head B. At the side of the ribs D is a portion H, the face of which is flush with the bottom faces of the grooves E and this portion H extends beyond the cutting edge F. The chaser illustrated in Fig. 3 has the ribs D adjacent to the portion H partly ground away to produce a taper from the full cross section to the surface of the portion H, as indicated at D'. The chaser illustrated in Figs. 5 and 6 is similar to that shown in Figs. 4 and 5, with the addition of a rib D² which extends the full length of the portion H and is spaced from the adjacent ribs D the same as the spacing between the others of these ribs. The rib D² is not, however, of the height of the other ribs D and D' but corresponds to the cross section of the groove which has been cut by the previous operation of the chasers.

The chasers C are arranged in sets mounted on a head in the same transverse plane and the different sets may be mounted either on heads on separate spindles or if desired, can be mounted on heads on the same spindle arranged in different planes. The relative arrangement between the ribs of the chasers in the same plane is illustrated in Figs. 7 to 10 and 11 to 14. Thus it will

be noted that the ribs in the successive chasers are off-set an amount equal to the pitch of the thread so as to cooperate with each other in feeding the blank forward. Relative rotational movement between the blank and the chasers is effected by loosely engaging the squared head A³ with a socket I which transmits torque while leaving the blank in a floating relation with respect to the chasers. Thus by first moving the work axially into engagement with the chasers in the first head, the beveled end H' of the portion H will mount over the periphery of the portion A and the surface of the portions H will then center such portion A to hold the same concentric with the axis of the rotary head. The tapering teeth D' will then engage and will draw the work axially until it is past the chasers. In the second operation, the portions H will again engage with the periphery of the portion A which has the shallow thread cut therein, but this time the rib D² which has no cutting edge will engage with the shallow groove and will form a positive feed for axially advancing the blank. The rib D² is limited in height to the depth of the groove previously cut so that it will not interfere in any way with passage through said groove. Succeeding cuts are produced in the same way, each time the height of the rib D² corresponding with the depth of groove previously cut, so as to permit of passing through said groove. Due to the fact that both the portion H and the rib D² extend past the point of tangency with the work, there is no possibility of fouling or jamming with the threads previously cut.

What I claim as my invention is:

1. In a thread cutting tool, a chaser having a series of cutter teeth in an axial direction and a guide portion for engaging the periphery of the work in advance of said teeth, said guide being arranged in the plane of the bottoms of the interdental spaces of said chaser extending in a tangential direction beyond the plane of the cutting edges of said teeth.

2. In a thread cutting tool, a chaser having a series of cutter teeth in an axial direction and a guide portion for engaging the periphery of the work in advance of said teeth, said guide being arranged in the plane of the bottoms of the interdental spaces of said chaser extending in a tangential direction beyond the plane of the cutting edges of said teeth, and a bevel portion in advance of said guide for directing the work into engagement therewith.

3. In a thread cutting finishing tool, a chaser having a series of parallel ribs having the ends thereof ground to form cutter teeth and a guide rib of lesser height than and in advance of the aforesaid ribs extending beyond the plane of the cutting edges thereof.

4. In a thread cutting finishing tool, a chaser having a series of parallel ribs of a cross section corresponding to the groove of the thread to be cut, said ribs being ground at one end to form cutter teeth, an additional rib in advance of the aforesaid ribs and extending longitudinally beyond the plane of the cutting edges thereof, and a guide in advance of the latter rib in the plane of the bottoms of the spaces between said ribs for engaging the periphery of the blank and holding the cutter teeth concentric therewith.

5. In a thread cutting finishing tool, a chaser having a series of parallel ribs corresponding in cross section to the groove of the thread to be cut, said ribs being ground at one end to form cutter teeth, a rib in advance of the aforesaid ribs in similar spaced relation thereto, and extending beyond the plane of the cutting edges thereof, the latter rib being of lesser cross section and corresponding to the depth of the groove formed in the blank by a previous cut, a guide portion for first engaging the periphery of the blank being arranged in the plane of the bottoms of the grooves between said ribs and being beveled at its forward end to direct the periphery of the work into engagement therewith.

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