Dec. 14, 1948. A. GREEN 2,456,407

MACHINE FOR PRODUCING SCREWTHREADS

Original Filed June 14, 1944

FIG. 1.

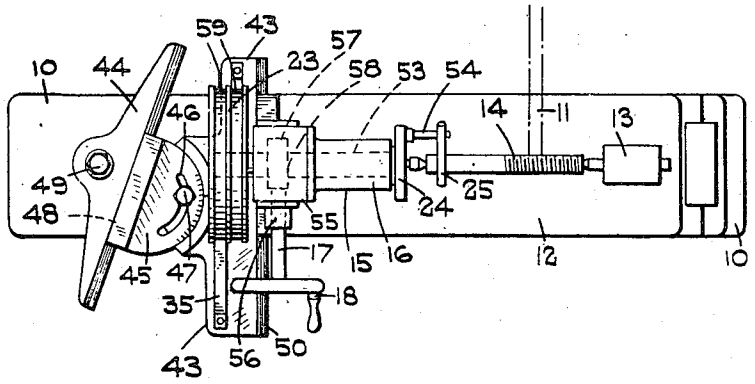
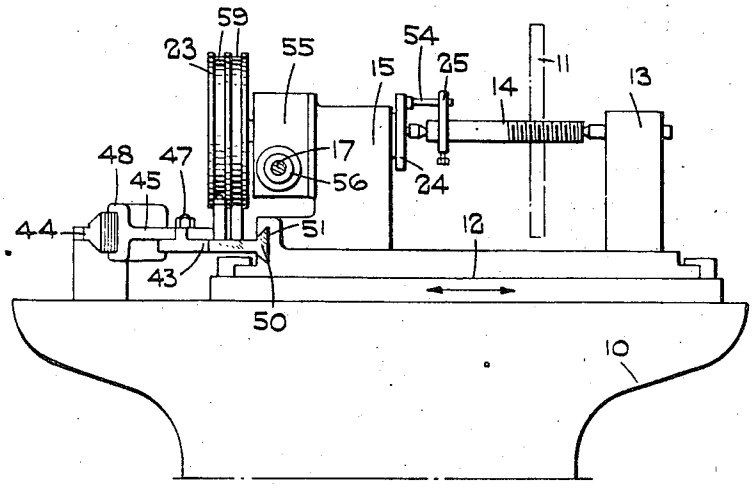


FIG. 2.



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MACHINE FOR PRODUCING SCREWTHREADS

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Original application June 14, 1944, Serial No. 540,285, now Patent No. 2,403,075, dated July 2, 1946. Divided and this application September 25, 1945, Serial No. 618,553. In Great Britain April 14, 1943

3 Claims. (Cl. 90—11.62)

Section 1, Public Law 690, August 8, 1946
Patent expires December 23, 1963

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This invention relates to machines for producing screwthreads of the kind having an element for supporting rotatably the work upon which the screwthread is to be produced, a driving member, for transmitting power to the machine, means for imparting rotary movement from said driving member to said work, an element adapted to support a tool for forming the screwthread, said two elements being relatively reciprocable in a direction substantially along the axis of the thread to be formed, means for imparting reciprocating movement from said driving member to one of said two elements, and means interconnecting said two movements so that the pitch of the thread to be formed may thereby be controlled, being a division of Patent No. 2,403,075, granted July 2, 1946.

With machines of the above kind, in the case of an ordinary parallel thread, the two elements would be reciprocated relatively in a direction which was parallel to the axis of the thread to be formed, but in the case of a taper thread they would be reciprocated relatively in a direction which was only substantially parallel to the axis of the thread to be formed, i. e. in a direction substantially along such axis, there being a slight angle of inclination between the axis of the thread to be formed and the direction of relative reciprocation of the two elements.

Furthermore, in such machines, the reciprocating movement is sometimes imparted to the tool supporting element, or sometimes to the work element, or sometimes both elements are displaced so as to produce a relative reciprocation.

In such machines it is a common practice to drive the rotating work and the reciprocating element from the same driving shaft, the drive being transmitted by gearing to the work rotating member and by gear, which may take the form of a leading screw and nut, to produce the reciprocating movement.

The mechanism forming the subject of this invention is not necessarily a complete machine for producing screwthreads, but may be an attachment adapted to be fitted to an existing machine having the necessary facilities for fitting and having a thread-producing tool.

The primary object of the present invention is to provide a new or improved form of mechanism for producing the movement of the reciprocating element.

Another object of the invention is to provide such mechanism which can conveniently be fitted as an attachment to an existing machine.

Other objects of the invention will become

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apparent from the following description and accompanying drawings, wherein:

Figure 1 is a plan view showing a machine constructed in accordance with the present invention.

Figure 2 is a view in side elevation.

In the construction illustrated, the machine comprises a stationary main support 10 which at one side carries a thread-producing or finishing tool indicated diagrammatically at 11. This tool may be of any known form, and may, for instance, comprise a rotary wheel having one or more annular ribs for cutting or grinding the thread, or the tool may consist of a non-rotary member shaped for forming the thread groove.

Mounted on the upper surface of the support 10 so that it can reciprocate thereover in guides in the direction indicated by the arrows shown in Figure 2, is the reciprocating element 12 which may be in the form of a table of known construction and may be mounted on the support in any known manner.

One end of the reciprocating element 12 carries a tail stock indicated at 13 for supporting one end of the work 14, and the opposite end of the reciprocating element is provided with a block 15 incorporating a bearing 16 for a shaft 53 carrying a head stock 24 for supporting the other end of the work, and having means 54 for driving the work through the medium of a lathe dog 25.

Mounted on the side of the block 15 is a casing 55 provided with a bearing 56 for a cross driving shaft 17 which may be power-driven or may be driven by a hand wheel 18. The driving shaft 17 is provided with a worm 57 engaging a worm wheel 58 on the shaft 53, the worm and worm wheel being located within the casing 55. Rotation of the shaft 17 drives the shaft 53, and the shaft 53 projects from one end of the casing 55 and is provided with a rotary disc 23 having two grooves 59, in which operate two flexible bands which extend around the disc 23 in opposite directions, and which have end portions 35 connected to a transverse slide 43.

The rotary disc 23 is thus mounted upon an axis which is parallel to the direction of movement of the reciprocating element 12 and the flexible bands have the end portions 35 connected to a transverse slide 43 extending at right angles to the direction of reciprocation which transverse slide acts in the manner of a wedge between the reciprocating element and an inclined abutment 44 mounted upon the stationary support 10.

Conveniently, the transverse slide is provided with an inclined surface member 45 which is angularly adjustable in relation to the slide by

providing the member 45 with an arcuate slot 46 through which extends an adjusting bolt 47, and this surface part is provided, at the end opposite to the slot, with a groove 48 into which extends the adjacent part of the abutment 44 while the latter is angularly adjustable in relation to the support 10 by fastening it thereto through the medium of an adjusting screw 49.

For supporting the transverse slide in relation to the element 12 it is provided with a dove-tail or T section rib 50 at the side opposite to the abutment which engages in a groove 51 of similar section shaped in the adjacent end of the reciprocating element, the rib and groove extending at right angles to the direction of reciprocation.

With such an arrangement when drive is imparted to the shaft 17 so that the work 14 and disc 23 are rotated in the manner already described the slide 43 is moved transversely to the axis of the work so that the inclined surface part 45 thereon moves along the inclined surface 44 of the abutment thus causing the slide to be displaced in the direction of movement of the axis of the work and the required reciprocatory movement to be transmitted to the element 12 and hence to the work 14.

The amount of movement transmitted for a given number of rotations of the work can readily be varied by altering the angle of inclination of the surface part 45 and the inclined abutment 44 as by slackening the screws 47, 49. As a result the machine can readily be adjusted to suit threads of different pitch.

The endwise displacement of the reciprocating element is produced by the inclined abutment 44 engaged by the inclined side 45 and the slide. The action is that of a wedge and it is immaterial whether the inclined surface is on the slide or on the abutment or on the end of the reciprocating element. Further the inclined surface may engage or be engaged by a similarly inclined surface or by a roller or other abutment. It is obviously desirable that the angle of inclination of the inclined surface shall be capable of adjustment.

A machine constructed in accordance with the present invention possesses the great advantage that by imparting the necessary movement to the reciprocating element from the rotary disc through the medium of one or more flexible bands in the manner described, lost or irregular motion between the relatively moving members is reduced to a minimum as compared with an arrangement in which the movement is transmitted by means of a lead screw or rack and pinion gearing so that the machine possesses a high degree of accuracy.

Although I have described a construction in which the reciprocating element carries the work and the thread producing tool is stationary it should be understood that it is within the scope of my invention that the thread producing tool could be mounted upon a reciprocating element so that it reciprocates therewith and the work merely rotates.

What I claim then is:

1. A machine for producing screwthreads comprising an element for rotatably supporting the work upon which the screwthread is to be produced at both ends, means for rotating said work, an element adapted to support a tool for forming the screwthread, said work supporting elements being mounted on said tool supporting element for reciprocatory movement relative thereto in a direction substantially along the axis of the thread to be formed, a disc mounted rotatably on said work supporting element with its plane transverse to the direction of reciprocation of said work supporting element and adapted to reciprocate therewith, means for imparting rotary movement to said disc, a slide member mounted in a rectilinear guide on said work supporting element for reciprocation thereon in a direction transverse to the direction of reciprocation of said work supporting element and parallel to the plane of the disc, abutments mounted on said slide member and said tool support, said abutments having interengaging faces adapted for relative sliding movement disposed at an inclination to the direction of relative reciprocation of said two elements and to the direction of reciprocation of the slide member, said abutments being adjustable relative to the slide member and work support to vary the angle of inclination of said interengaging abutment faces with respect to the said directions of reciprocation, a pair of flexible bands arranged side by side and engaging the periphery of the disc, one end of each of said bands being secured to the disc, the other end of each of said bands being secured to the slide member with the said other ends extending in opposite directions with respect to each other and substantially parallel to the direction of reciprocation of said slide member the interengaging faces on said abutments producing lateral movement of the slide which is directly transmitted to the work supporting element by pressure on the rectilinear guide.

2. A machine for producing screwthreads comprising an element having means for rotatably supporting the work upon which the screwthread is to be produced at both ends, an element adapted to support a tool for forming the screwthread, said work supporting element being mounted on said tool supporting element for reciprocatory movement relative thereto in a direction substantially along the axis of the thread to be formed, a gear casing mounted on one end of said work supporting element, an intermediate shaft mounted rotatably in said gear casing, extending substantially parallel to the direction of reciprocation of said work supporting element, means for imparting rotary movement to said intermediate shaft, one end of said intermediate shaft being adapted to impart rotation to said work, a disc mounted on the other end of said intermediate shaft with its plane transverse to said shaft and to the direction of reciprocation of said work supporting element, a slide member mounted on said work supporting element for reciprocation thereon in a direction transverse to the direction of reciprocation of said work supporting element and parallel to the plane of the disc, abutments mounted on said slide member and said tool support, said abutments having interengaging faces adapted for relative sliding movement, said abutments being adjustable relative to the slide member and work support to vary the angle of inclination of said interengaging abutment faces with respect to the said directions of reciprocation, a pair of flexible bands arranged side by side and engaging the periphery of the disc, one end of each of said bands being secured to the disc, the other end of each of said bands being secured to the slide member with the said other ends extending in opposite directions with respect to each other, and substantially parallel to the direction of reciprocation of said slide member whereby in operation movement of the slide produces an end thrust on the work supporting element causing

it to move parallel to the axis of the intermediate shaft.

3. A machine for producing screwthreads comprising a main support having at one side a thread producing or finishing tool, guides on the main support, a reciprocating element in said guides, a tail stock on said reciprocating element for supporting one end of the work, a block on said element, said block being spaced from the tail stock, a bearing in said block, a headstock shaft in said bearing, a headstock carried by said shaft and supporting the opposite end of the work, means associated with said shaft for driving the work, a casing mounted on the side of said block, a bearing in said casing, a cross driving shaft in said bearing, gearing in said casing connecting the cross driving shaft to the headstock shaft, said headstock shaft extending through and projecting from the side of said casing, a disc secured on the projecting part of the headstock shaft, two flexible bands each having one end secured to the disc, said bands extending around the disc in opposite directions, a guide in the reciprocating

element disposed at right angles to the direction of reciprocation thereof, a transverse slide operating in said guide, each of the flexible bands being connected to said transverse slide, an inclined surface member upon and angularly adjustable in relation to said transverse slide, and an abutment adjustably pivoted to said main support and engaged by said inclined surface member endwise movement of the slide causing it to be displaced in a direction parallel to the axis of the headstock shaft and being transmitted to the reciprocating element.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,791,424	Metzler	Feb. 3, 1931
2,375,052	Umbdenstock	May 1, 1945
2,378,302	Kline	June 12, 1945