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E. F. MOY & P. H. BASTIE.

APPARATUS FOR FORMING SCREW THREADS.

APPLICATION FILED APR. 13, 1907.

Fig. 1.

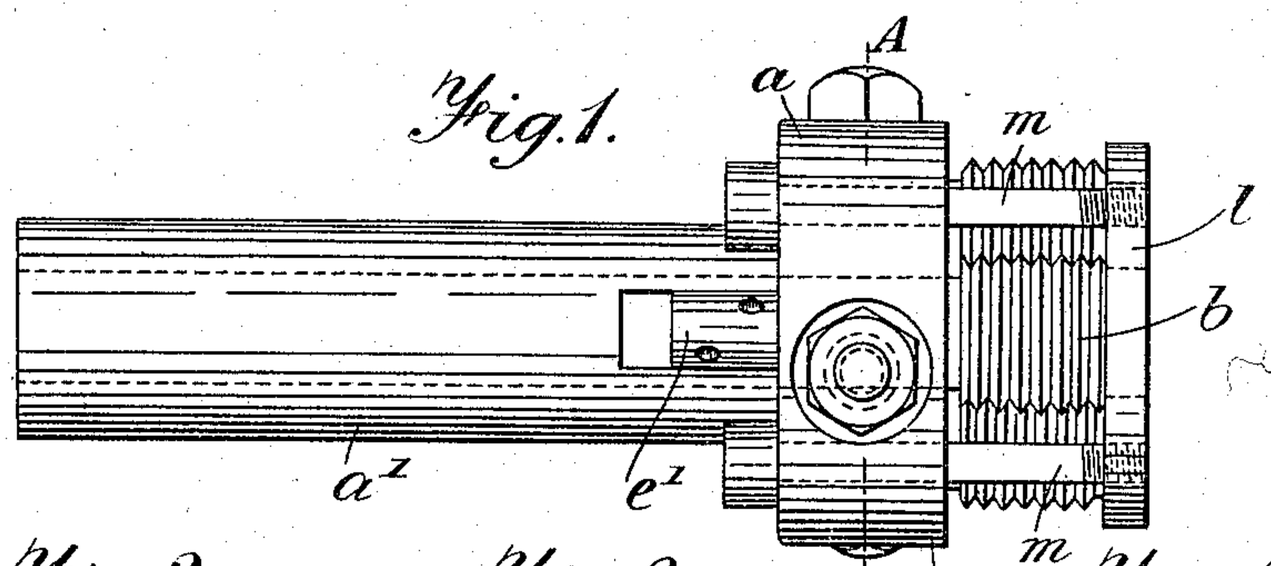


Fig. 2.

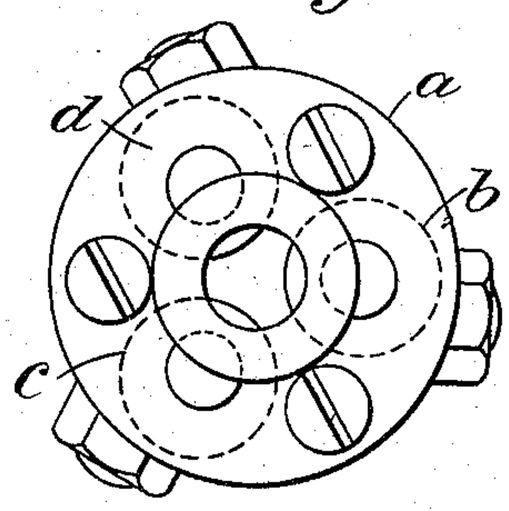


Fig. 3.

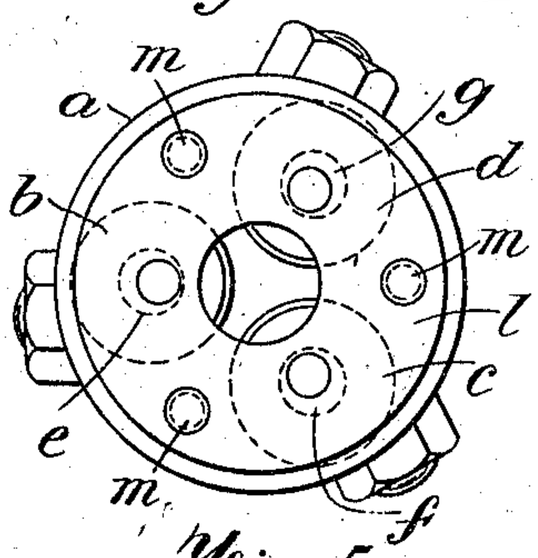


Fig. 4.

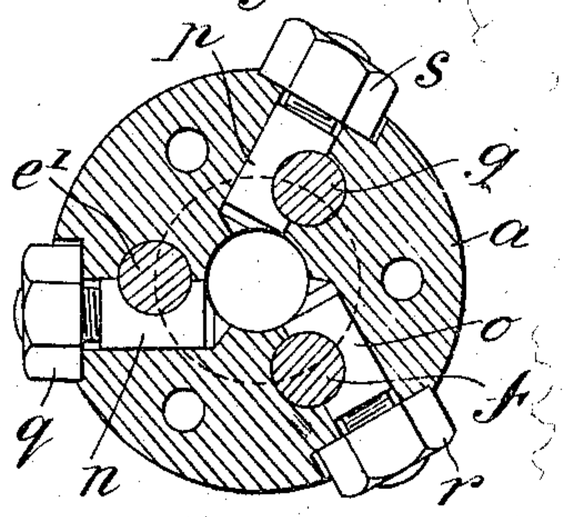


Fig. 5.

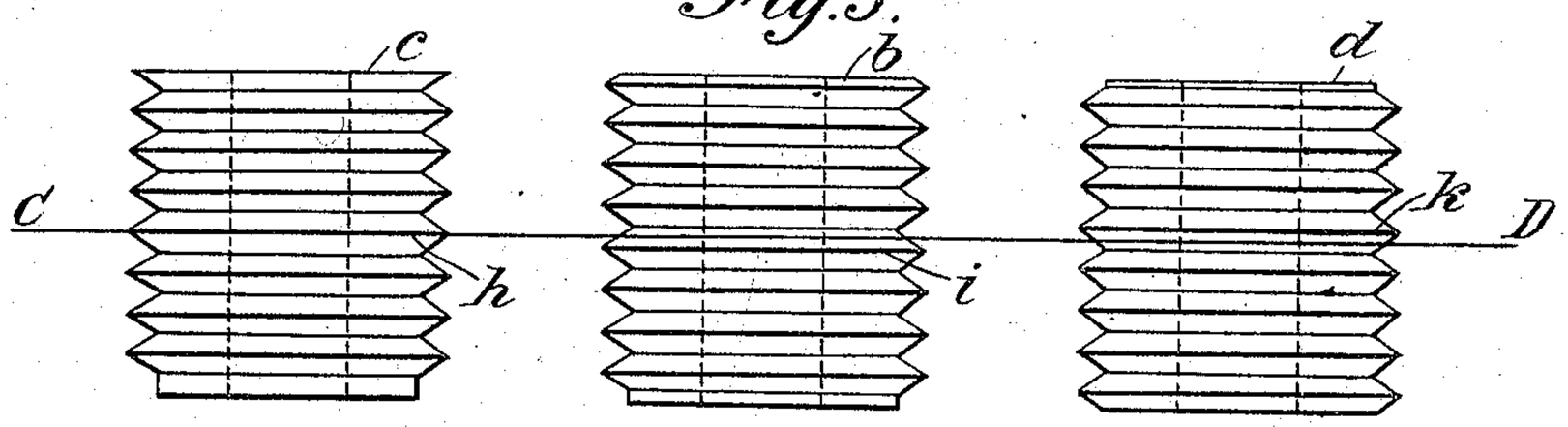


Fig. 6.

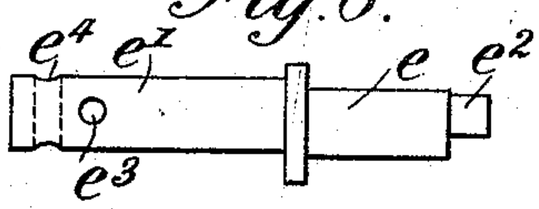


Fig. 7.

Fig. 8.

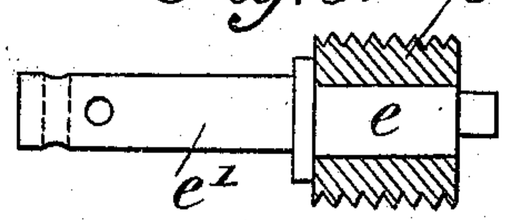
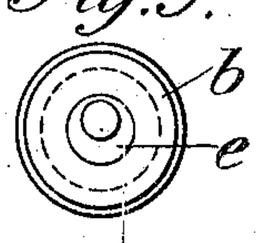


Fig. 9.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING SCREW-THREADS.

No. 885,068. Specification of Letters Patent. Patented April 21, 1908.

Application filed April 13, 1907. Serial No. 367,971.

To all whom it may concern:

Be it known that we, ERNEST FRANCIS MOY and PERCY HENRY BASTIE, subjects of the King of the British Dominions, residing at London, England, have invented certain new and useful Improvements in Apparatus for Forming Screw-Threads, of which the following is a specification.

The means generally employed for forming screw-threads on metal or other suitable substances may be divided into two types or methods. The type most commonly used comprises dies or chasers for cutting the groove and leaving a raised ridge or thread at a constant angle to the axis of the screw-cylinder, and the other type, less commonly used, raises a thread by compressing the screw blank between grooved steel blocks or by causing it to revolve between helically grooved rollers which must be geared together by tooth wheels, so as to turn simultaneously and at the same speed. In the latter method the blank cylinder has a diameter slightly smaller than the finished screw, the thread being formed by displacing the surface of the metal without removing any particles and leaving the diameter, as compared with the original blank, smaller at the bottom of the thread and larger at the top of the thread. This system is only suitable for forming or raising threads on ductile metal or substances, such as mild steel, copper or aluminium.

Our invention has for its object to simplify the construction of this type of screwing appliance by dispensing with the use of gear wheels and to provide a tool, which can be readily adapted to existing screw-making machines constructed for using cutting dies, so as to improve the output of such machines at small cost.

Our improved apparatus is also constructed so as to be readily adjustable to the exact diameter of the screw thread it is desired to form, such adjustment being also available to compensate for any wear in our screwing mechanism.

In the accompanying drawings Figure 1 is a side view of a screwing appliance embodying our invention, Fig. 2 is a rear view and Fig. 3 a front view of the same, Fig. 4 is a section along line A—B of Fig. 1, Fig. 5 shows the relative position of the grooves formed in the rollers on a larger scale, Fig. 6 is a side view and Fig. 7 an end view of one of the spindles serving as pivots for the forming rollers, Fig. 8 is a longitudinal section of one of the forming rollers and side view of the spindle, and Fig. 9 is an end view of the same.

In carrying our invention into effect we mount upon a suitable tool holder, such as *a*, three or more forming rollers, preferably three parallel cylindrical rollers, *a*, *b*, *c* of equal diameter. Into the surface of the rollers we cut grooves separated by ridges parallel to each other and at right angles to the axis of the rollers. The grooves are exactly equal in pitch on all the rollers and are also equal to the pitch of the screw-thread we desire to form.

The rollers are of hardened steel, mounted on spindles, such as *e*, *f* and *g*, so that they can revolve freely and independently of one another. The spindles are mounted on the tool holder *a* parallel to each other, and if the grooved rollers are of equal diameter, the spindles are mounted at equal distances from the center of the holder, such distance being determined by the diameter of the forming rollers and the diameter of the thread to be raised. If three rollers are employed, the distance between the end of each roller and the center of the first groove varies one-third of the width of a groove, in other words, the distance between the center of the first groove of any roller and the center of the first groove of either of the other rollers is exactly one-third of the width of a groove, as indicated by Fig. 5, which shows the three rollers placed side by side, instead of being arranged in a circle.

C—D indicates a plane through one of the circular ridges *h* of the roller *c*, at right angles to the axis of the roller and of the tool holder. As shown by Fig. 5, the corresponding ridges *i* and *k* of the rollers *b* and *d* are situated on opposite sides of the plane C—D at a distance equal to one-third of the width of a groove.

The rear end of each spindle is mounted in a cylindrical head or holder *a*, and the front end is held in an annular disk or ring *l* fixed to the head *a* by means of stays *m* at equal distances apart.

The operation of forming a screw-thread on ductile metals or other suitable materials is carried out by forcing a cylindrical bar or blank cylinder of the material between the group of grooved rollers parallel to the axes on which they are free to revolve and in a

line with the center or axis of the tool holder. Either the blank or the tool holder with its set of forming rollers is turned on its axis by suitable means, and if the blank is of the correct diameter and the distance between the forming rollers is properly adjusted, a screw-thread will be produced equal in pitch to the pitch of the grooves on the rollers. The different grooved rollers must be arranged in their proper order in regard to position of grooves according to the direction of thread required to be formed, that is, whether a right or left hand thread is desired.

Means are provided for adjusting the distance between the grooved rollers and the axis of the toolholder, in order to obtain exactly the diameter or depth of the screw-thread to be formed, and also to compensate for wear on the spindles and on the surface of the forming rollers. For this purpose we provide the spindles with eccentric journals and bearings, as illustrated by Fig. 6, which shows the spindle e of the roller b, with the eccentric rear part e^1 passing through the head a of the holder, and the eccentric journal e^2 held in the guide ring l. The rear end of each spindle projects to the rear of the head a and has a pair of diametrical holes e^3 e^4 at right angles to each other, in order to insert a pin, by means of which the spindles may be turned on the axis of the rear part e^1 and thereby the part e carrying the roller caused to approach or recede from the axis of the holder. After the desired adjustment of the spindles, they are secured in their position by means of adjusting screws n, o, p, and screw-nuts q, r, s. The axis of each adjusting screw is approximately tangential to the circumference of the corresponding spindle, and the circumference of the screw has a recess to fit the circumference of the spindle.

The rear part a^1 of the tool-holder a or head is tubular to receive the cylindrical bar, after the formation of the screw-thread; it also serves for fixing the tool in a lathe or screw-making machine.

What we claim is:—

1. Mechanism for forming screw-threads by a rolling process, comprising a plurality of grooved rollers mounted in a holder parallel to the axis of the same, each roller adapted to turn on its axis and having on its circumference a series of equidistant ridges and grooves at right angles to the axis of the roller, the portions of the ridges which are nearest to the axis of the holder arranged in a helical path around the axis of the holder.

2. Mechanism for forming screw-threads by a rolling process, comprising three grooved rollers mounted in a holder parallel to the axis of the same, each roller adapted to turn on its axis and having in its circumference a series of equidistant ridges and grooves at right angles to the axis of the roller, the portions of the ridges which are nearest to the axis of the holder arranged in a helical path around the axis of the holder, substantially as described.

3. Mechanism for forming screw-threads by a rolling process, comprising a plurality of grooved rollers of equal diameters mounted in a holder parallel to the axis of the same at equal distances from the said axis, each roller adapted to turn on its axis and having on its circumference a series of equidistant ridges and grooves at right angles to the axis of the roller, the portions of the ridges which are nearest to the axis of the holder arranged in a helical path around the axis of the holder.

In testimony whereof we have set our hands hereunto in the presence of two subscribing witnesses.

ERNEST FRANCIS MOY.
PERCY HENRY BASTIE.

Witnesses:
EUSTACE H. BARKER,
JOHN J. NEWPORT.