Jan. 2, 1923.

1,440,375

J. CRAIG.
BOLT POINTING MACHINE.
FILED MAR. 18, 1921.

2 SHEETS-SHEET 1

FIG. I.

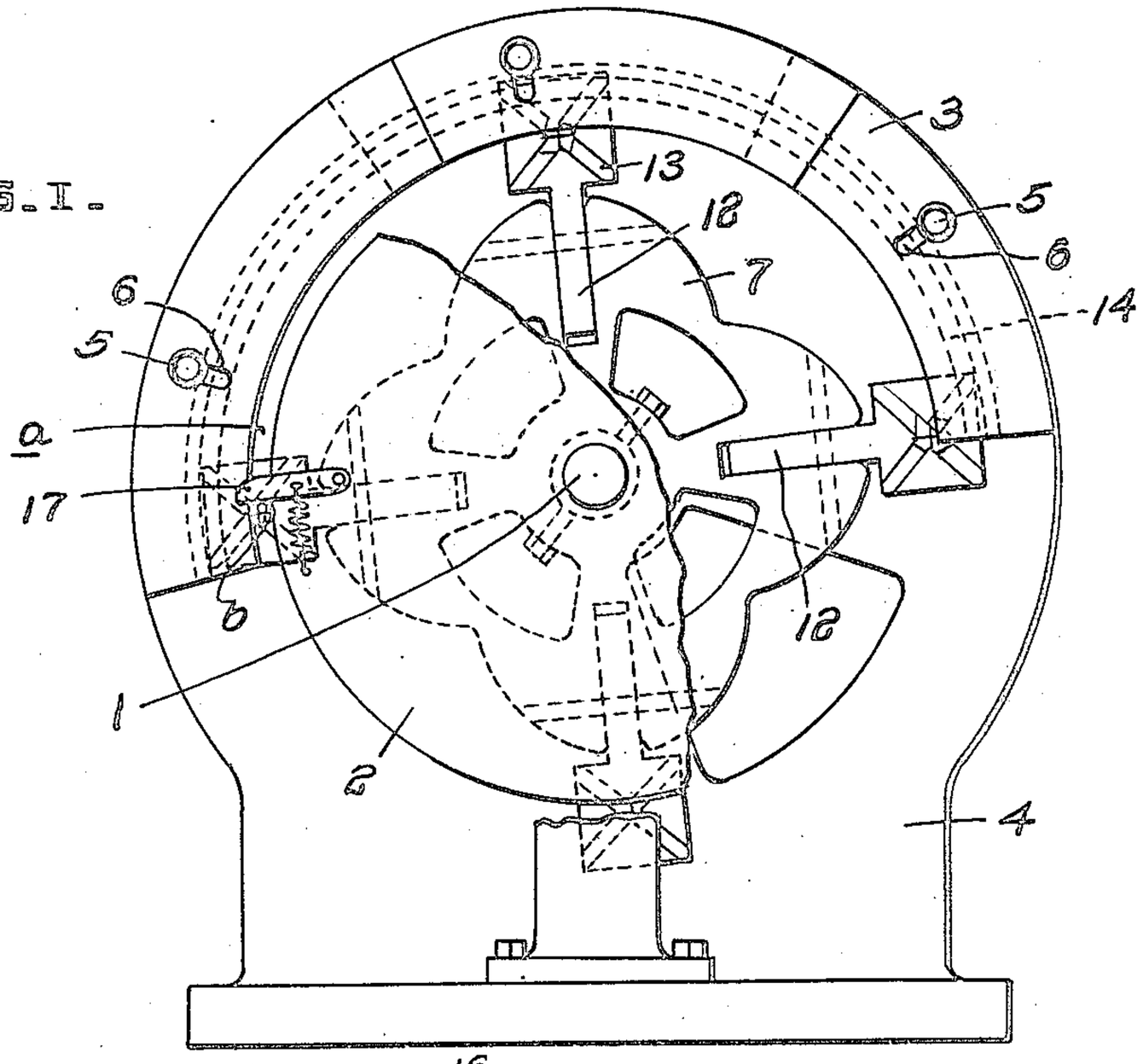
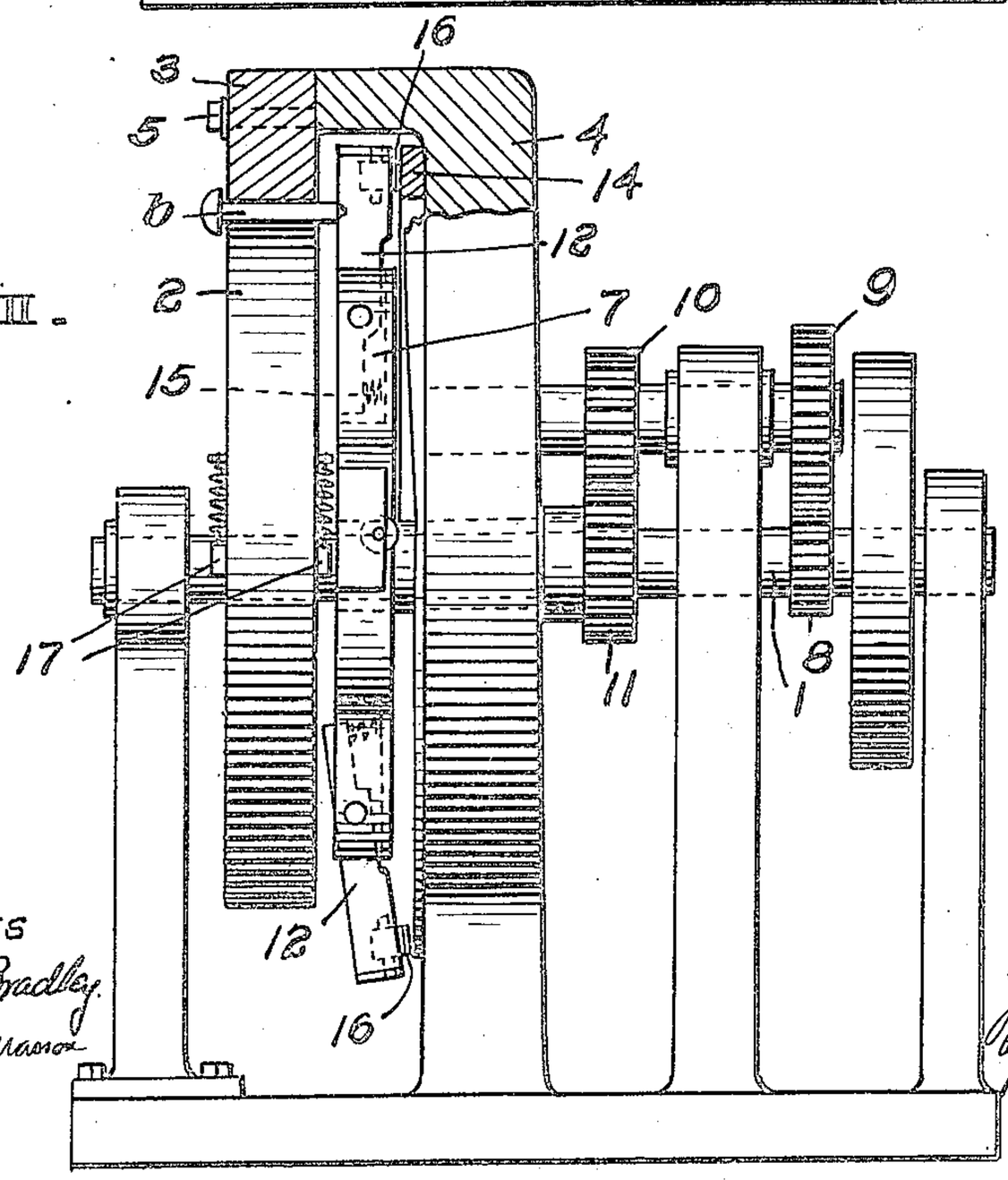


FIG. II.



WITNESSES
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2 SHEETS-SHEET 2

FIG. III.

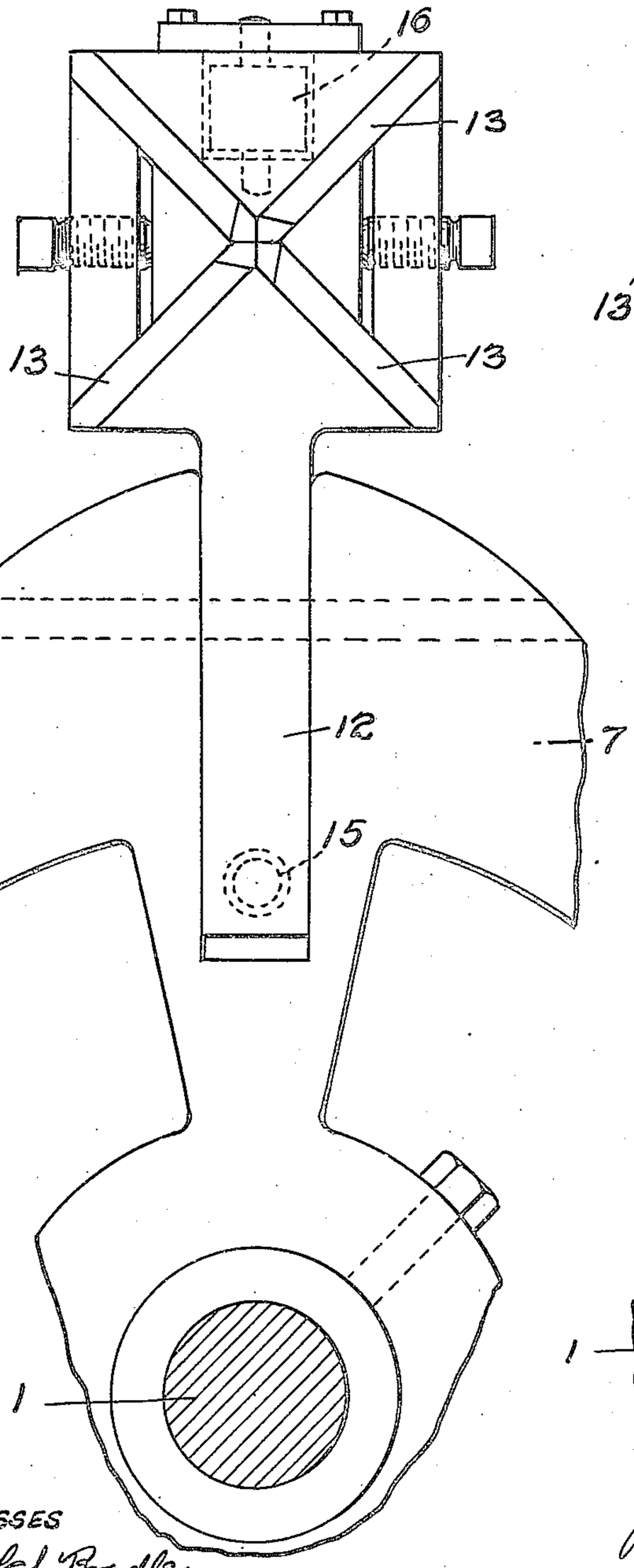
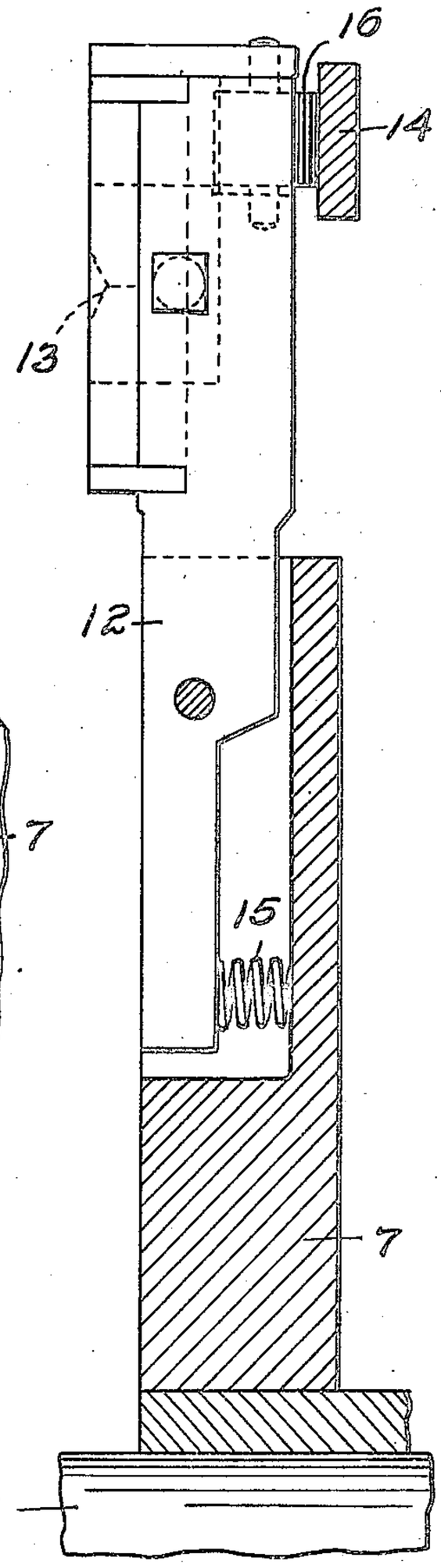


FIG. IV.



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Patented Jan. 2, 1923. 1,440,375

UNITED STATES PATENT OFFICE.

JAMES CRAIG, OF BUTLER, PENNSYLVANIA.

BOLT-POINTING MACHINE.

Application filed March 18, 1921. Serial No. 453,264.

To all whom it may concern:

Be it known that I, JAMES CRAIG, residing at Butler, in the county of Butler and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Bolt-Pointing Machines, of which improvements the following is a specification.

My invention relates to the machining of bolts, and more particularly to the turning of pointed ends upon bolts. Bolts are formed by forging from rolled stock, and it is requisite to form by a cutting operation a truer point upon the end than can be achieved in the general shaping operations. The objects of my invention are simplicity of structure and adequacy and economy in operation. In a co-pending application filed June 6th, 1921, Serial No. 475,289, I describe and claim a method which is accomplished in the operation of the machine of this application, and in a third application filed November 24, 1922, Serial No. 602,959, I describe and claim certain improvements in the machine itself.

The accompanying drawings show a machine in which my invention is embodied. Fig. I is a view of the machine in end elevation with certain parts broken away; Fig. II is a view of it, partly in side elevation, partly in vertical medial section; Figs. III and IV are views to larger scale, showing in front and in side elevation the knife member, and showing in elevation and in section parts with which the knife member is immediately associated in assembly.

On shaft 1, suitably mounted, and rotated from a suitable source of power, is carried a drum 2. At an interval from, and opposite the periphery of drum 2, is mounted a stationary block 3. This block presents a concave cylindrical face to drum 2, and this face in its curvature is concentric with the cylindrical face of drum 2. The interval at which drum 2 and block 3 stand apart (an interval equal to the diameter of the bolt to be pointed) may be nicely adjusted by securing block 3 to a standard 4 by bolts 5, and forming in blocks 3 radially extending slots 6 through which the securing bolts 5 extend. This standard (which, as presently will appear, serves other and additional purposes) is arranged opposite drum 2 at one side, and at an interval from drum 2. It is at the right-hand side, as shown in Fig. II, that is to rearward, of drum 2. Shaft 1 extends through an opening in this standard. As shown in Fig. I, the peripheral extent of block 3 around drum 2 amounts advantageously to approximately 180°. Accordingly, in order to provide for the adjustment desired, the block 3 is in this instance made in sections.

The space between drum 2 and block 3 constitutes a semi-circumferential slot *a*. When the machine is assembled, it will be understood that a bolt introduced into this slot and extending in the direction longitudinally of the drum, will be simultaneously tangent to the opposite faces of drum and block. It will further be understood that rotation of drum 2 within the stationary block 3 will cause the bolt lying between to roll, and as it rolls to advance along the slot, in the direction in which the drum turns; and it will be understood that the rate of advance of the bolt relatively to block 3 will be approximately one half the rate at which the surface of drum 2 turns, relatively to block 3. Accordingly, each complete rotation of drum 2 will effect the advance of a bolt substantially half way round the drum—it being understood that block 3 is so arranged as to engage a bolt introduced between, throughout a half circle.

Loosely mounted on shaft 1, adjacent drum 2 on its rearward side, and extending freely through the opening in standard 4, is a hub 7, and means are provided for turning this hub in the same direction with the shaft and at approximately half the speed at which shaft 1 turns. Such turning may conveniently be effected from shaft 1 itself, by interposed gearing, such as indicated at 8, 9, 10, 11.

From hub 7 in the interval between drum 2 and standard 4 extends an arm 12. This arm is pivoted to swing in a plane radial to the shaft—that is to say, longitudinally of drum 2. The arm 12 carries at its outer end cutting mechanism. This cutting mechanism, in the form shown, consists of a plurality of knives 13 secured to and capable of adjustment in the enlarged block with which arm 12 terminates. The position of the knives will be understood on comparing Figs. III and IV. The length of the arm is such that, when the machine is assembled, the center of the radiating knives comes opposite the center of slot *a*, in which the bolt rolls. A circular cam track 14 is borne in standard 4 opposite that side of arm 12

which is remote from drum 2, and arm 12 is by virtue of its pivotal mounting upon sleeve 7 held to bearing upon track 14 by a spring 15 exerting tension between arm and sleeve. A bearing roller 16 may be provided. The shape of cam track 14 is such that as shaft 1 rotates and arm 12 swings, the cutter will at proper time and at proper rate advance with positive thrust toward the slot in which the bolts advance, will continue in advanced position, and will ultimately at proper time under spring tension recede.

It has been said that a bolt introduced into slot *a* will advance at approximately half the peripheral speed at which drum 2 turns, and it has also been explained that hub 7 (which carries arm 12) rotates at approximately half the speed of shaft 1. Since the radius from the center of turning to the center of the cutter is equal to the distance from the center of turning to the center of a bolt carried in slot *a*, the advance of the rolling bolt and of the cutter (revolving about shaft 1) will be substantially synchronous.

Drum 2 is provided at its periphery with pairs of outward-extending yielding fingers 17. When the parts are assembled the arrangement is such that as the machine operates fingers 17 carry a bolt laid upon them into slot *a* at the very instant when the advancing cutter comes opposite the end of the slot. Immediately the bolt is engaged by the opposite surfaces of drum and block and it thereafter is controlled in movement by such engagement. The fingers 17 then yield under the pressure exerted upon them by the bolt (they are borne by the drum which, as has been explained, advances at twice the speed of bolt advance), they swing aside, and advancing, pass beyond contact with the bolt. They then resume their normal positions.

When a bolt is advancing along the semicircular slot *a*, fingers 17 borne by drum 2 make a complete revolution, and come to position again, to carry an unpointed bolt into the receiving end of the slot, at the moment when the bolt (now pointed) which they had previously introduced is passing from the discharge end of the slot. The bolt may be laid on a support from which is may be picked up by the fingers.

The number of arms 12 may be multiplied. I show four, extending at quadrant intervals. For cooperation with four cutters, two pairs of fingers 17 are required. The slot then always will contain two bolts under treatment, and as a third is introduced the first is released. In Figs. I and II I show a bolt *b* in position in the machine.

Operation is as follows: The parts being assembled as shown in Figs. I and II, the direction of rotation is anti-clockwise (cf. Fig. I). An unpointed bolt is laid on fingers 17 approaching the right-hand end of the slot. Rotation of shaft 1 carries the bolt into the slot, where immediately it begins its rolling advance, travelling at half the speed at which the surface of drum 2 turns. Fingers 17 continue to advance at faster speed. Under the pressure so imposed upon them, fingers 17 swing aside and advancing pass beyond the bolt which they have brought to position. Meanwhile, as the bolt enters the slot, a cutter has come opposite to the bolt, and this cutter continues to advance along the slot in synchronism with the advancing bolt. As the cutter advances it swings toward and bears upon the end of the bolt. The rotating bolt, so engaged by the relatively immovable cutter knives, is by its own rotation cut and pointed. At proper time the cutter recedes leaving the bolt pointed; and, when the end of the slot is reached, the now pointed bolt escapes.

I do not mean to limit myself to details of structure; in that respect the machine I have shown and now described is exemplary merely. It is manifest that this invention is applicable not merely to the pointing of bolts specifically, but generally to the cutting of points upon spindle-shaped articles.

I claim as my invention:

1. In a machine for pointing spindle-shaped articles, the combination of two parallel surfaces spaced apart and movable in the direction of parallelism, one relatively to the other, and a cutter arranged opposite the slot formed by and between such surfaces and movable longitudinally of the slot.

2. In a machine for pointing spindle-shaped articles, means for rolling such an article along a predetermined rollway, a cutter movable longitudinally of and opposite such rollway, and means for causing the cutter to swing laterally in the course of such advance.

3. In a machine for pointing spindle-shaped articles the combination of a rotary drum, a concave cylindrical surface arranged opposite and parallel with and at an interval from the convex cylindrical surface of said drum, and a cutter arranged at one side and movable opposite the slot formed by and between drum and opposite surface substantially as described.

4. In a machine for pointing spindle-shaped articles the combination of a rotary drum, a concave cylindrical surface arranged opposite and parallel with and at an interval from the convex cylindrical surface of said drum, a cutter arranged at one side opposite the slot formed by and between the said drum and opposite surface and movable longitudinally of said slot, and means for causing the cutter to swing laterally as it advances, substantially as described.

5. In a bolt-pointing machine, means for

rolling a bolt along a surface, a cutter, means for causing the cutter to advance synchronously with the rolling bolt, and for causing the cutter to swing as it advances toward the rolling bolt, substantially as described.

6. In a machine for pointing spindle-shaped articles the combination of a rotary drum, a concentric drum-surrounding block arranged at an interval from said drum, a cutter mounted on a common axis with said drum and extending opposite the slot formed by and between drum and block, and means for driving drum and cutter at speeds of turning of two to one, substantially as described.

In testimony whereof I have hereunto set my hand.

JAMES CRAIG.

Witnesses:

GEORGE T. CRAIG,

FRANCIS J. TOMASSON.