

No. 685,416.

Patented Oct. 29, 1901.

L. WILLIAMS.
SPIKE GROOVING MACHINERY.

(Application filed June 2, 1898.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

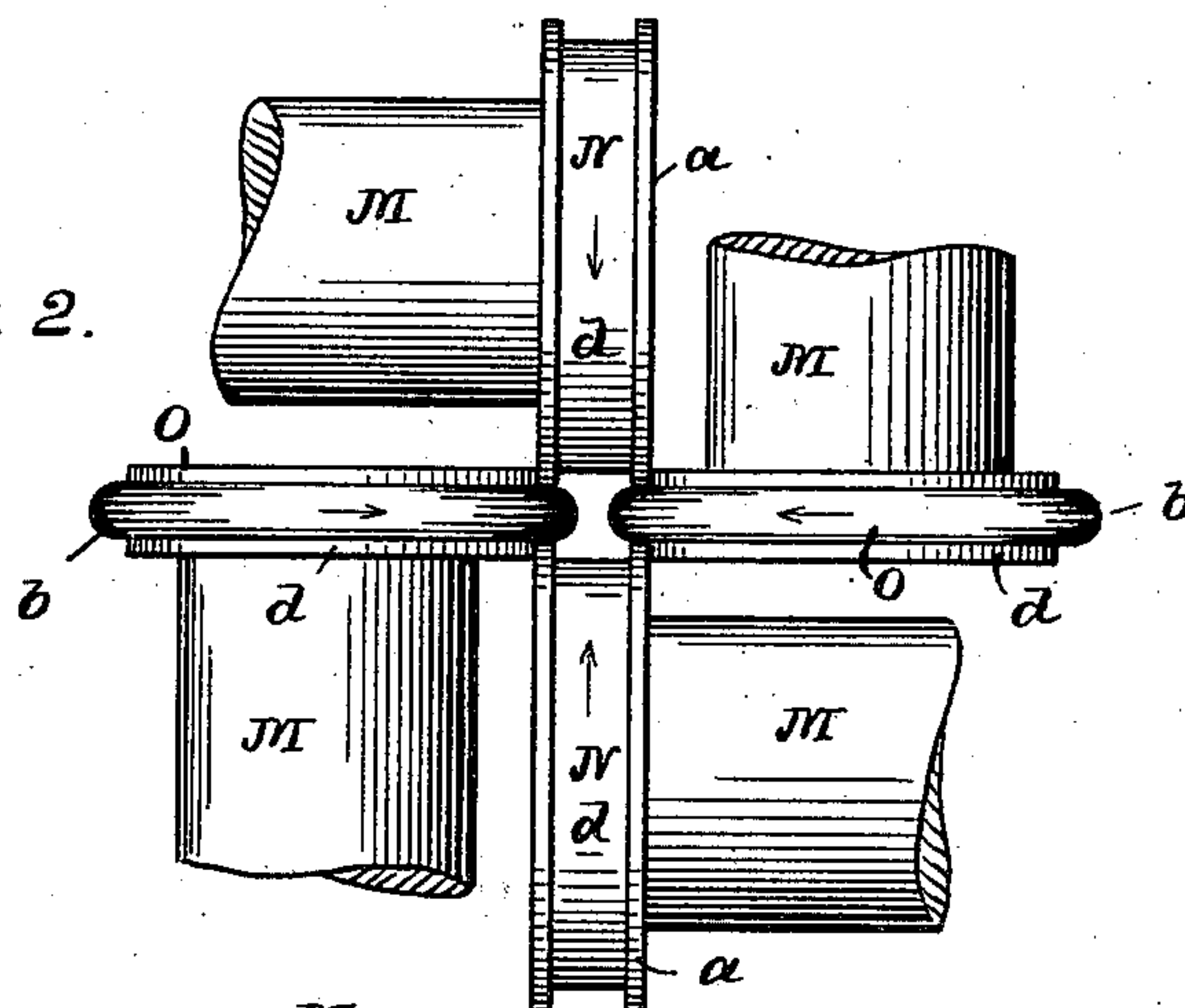


Fig. 1.

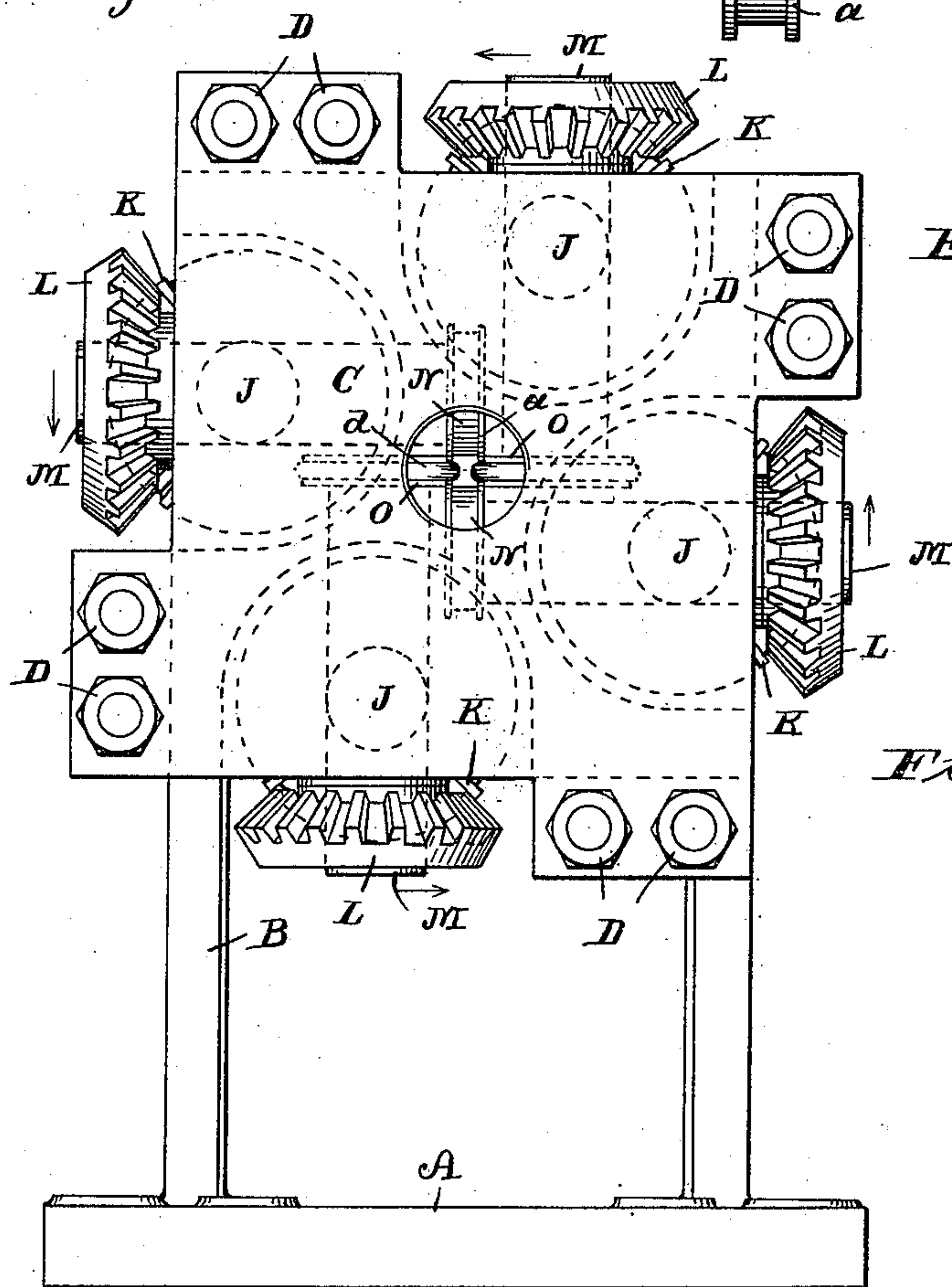


Fig. 3.

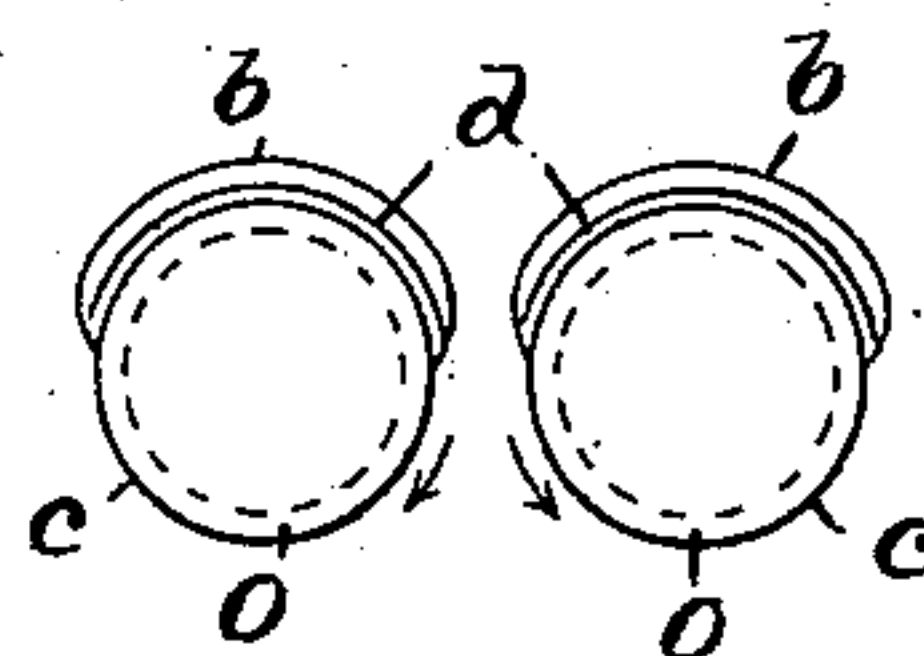
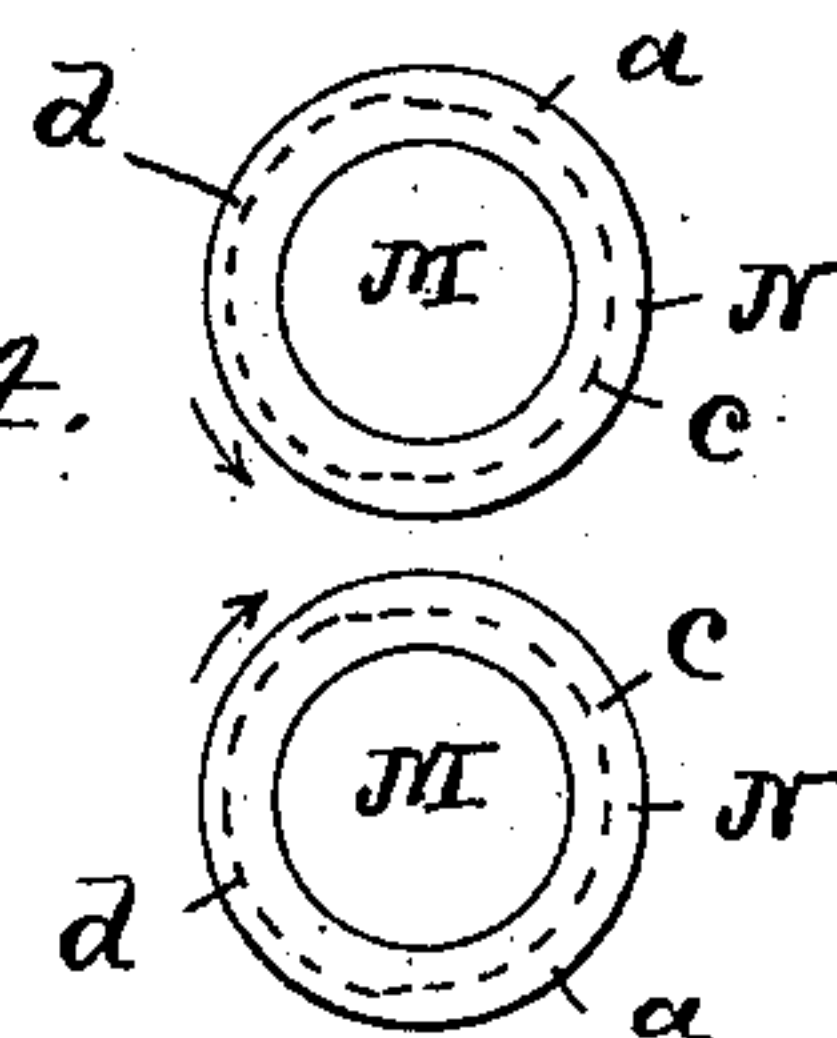


Fig. 4.



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Fig. 7.

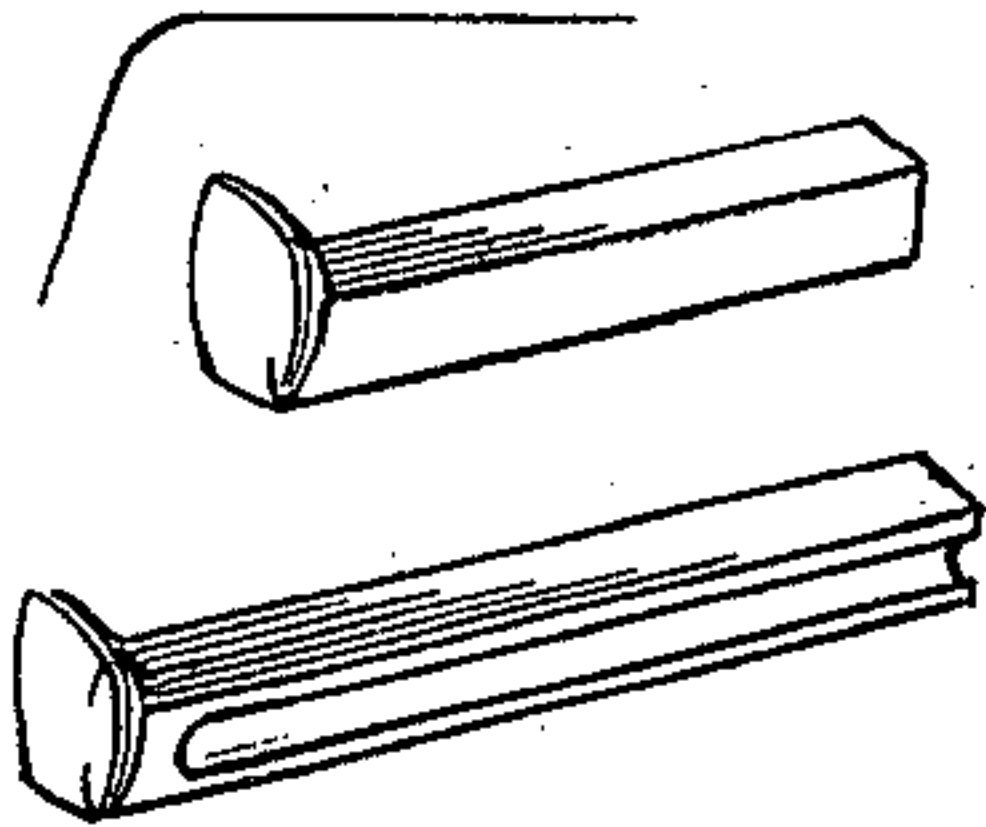


Fig. 6.

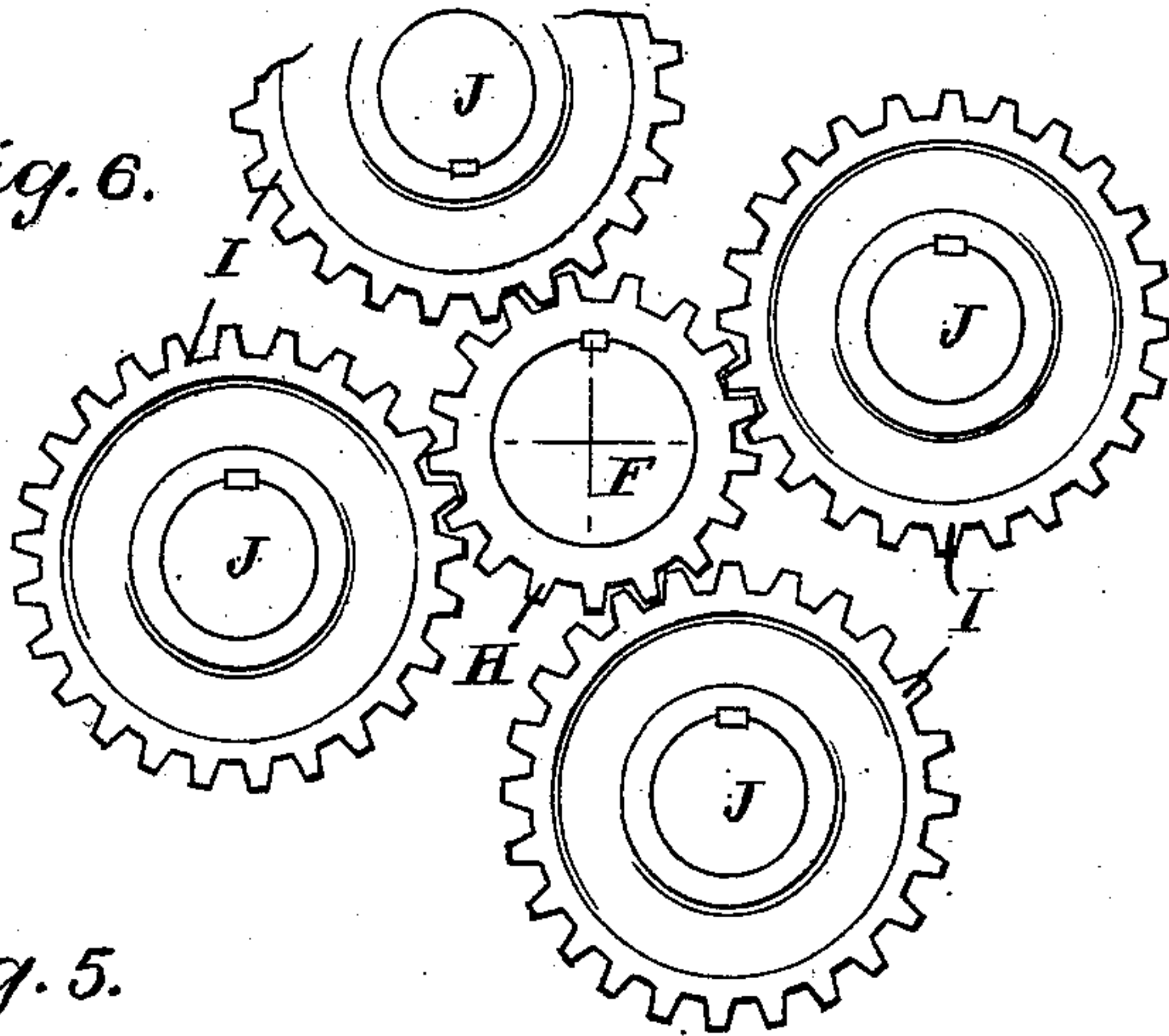
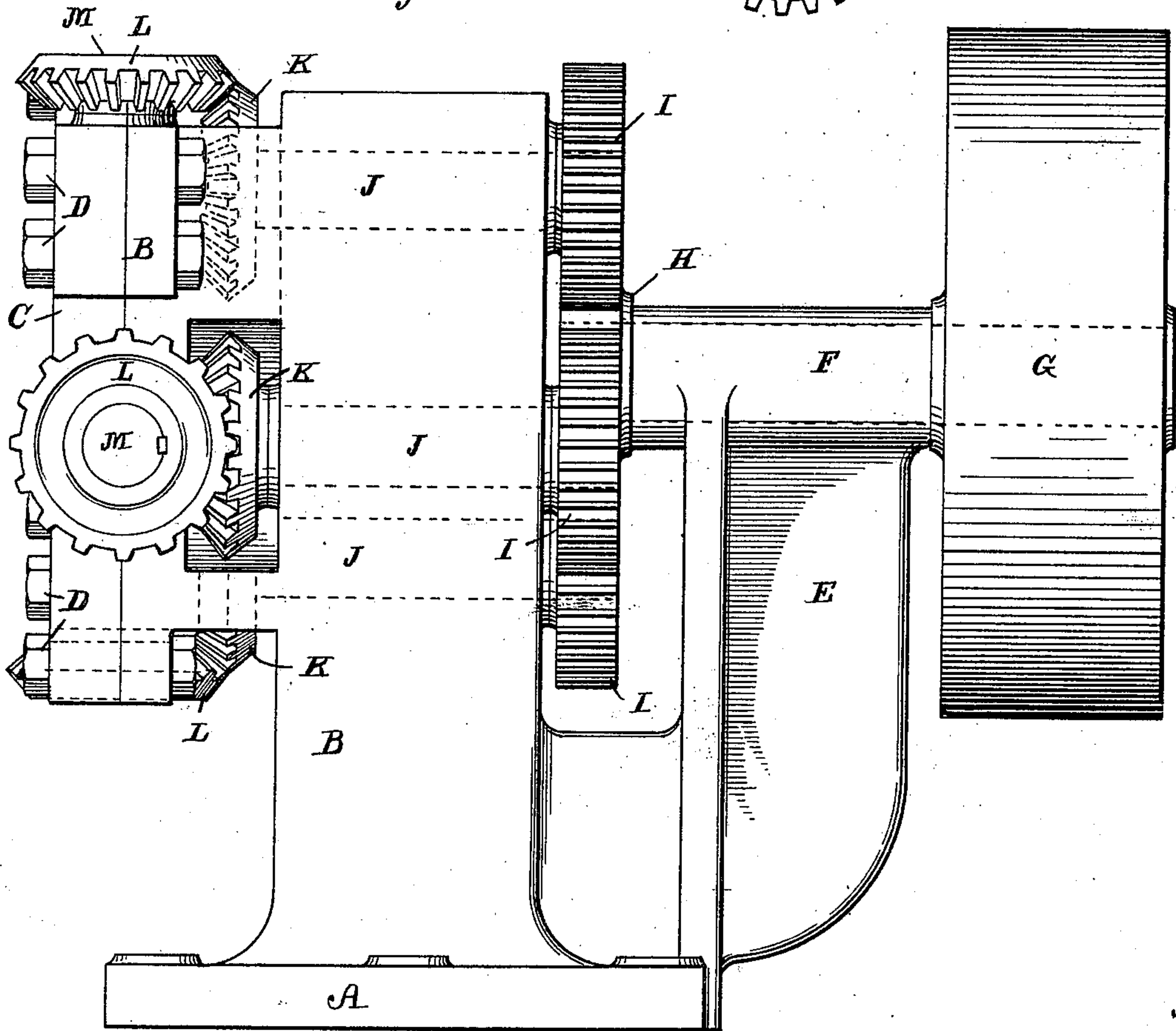


Fig. 5.



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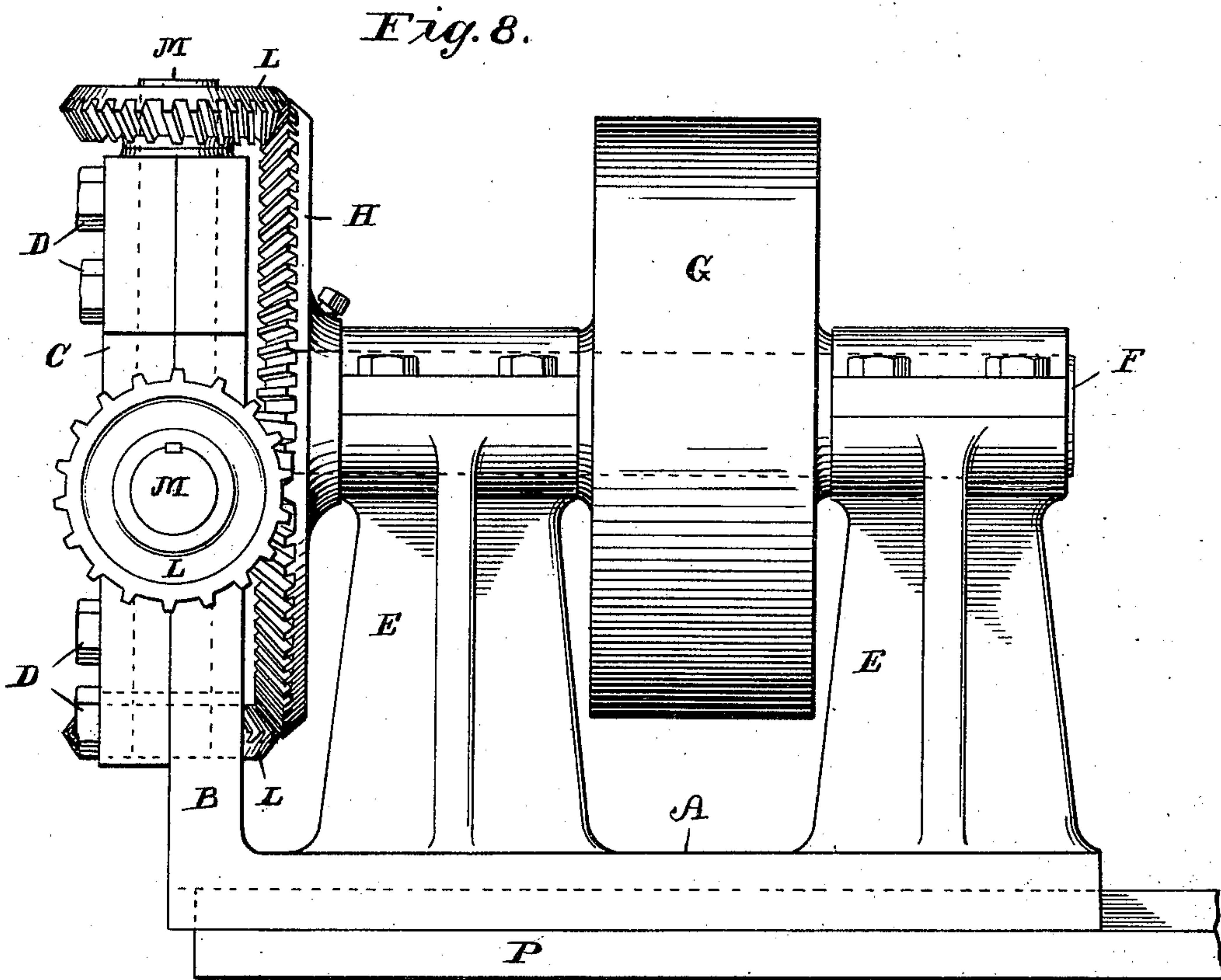
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

LEWIS WILLIAMS, OF JOHNSTOWN, PENNSYLVANIA.

SPIKE-GROOVING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 685,416, dated October 29, 1901.

Application filed June 2, 1898. Serial No. 682,364. (No model.)

To all whom it may concern:

Be it known that I, LEWIS WILLIAMS, a citizen of the United States, residing at Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Spike-Grooving Machinery; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for grooving and forming the sides or shanks of railroad-spikes of improved styles. It is so constructed as to be used as a separate machine, or it can form a part of an automatic machine, wherein a completed spike is produced by a series of operations. This machine is particularly designed for working metal in its heated state, said metal being supplied in square bars and of proper lengths for a single spike, or it can operate upon the ends of a long bar, after which the blank is severed therefrom.

It is the object of my invention to produce a grooving-machine which is simple in construction, easy of operation, and whose operating-rolls are of a small diameter, continuously driven in a single direction and in a manner to form a spike-shank with each rotation thereof. I further generally improve upon the construction and product of the machine by the employment of tangentially-arranged roll-shafts, which are driven by gearing, thus affording a power which is both uniform and positive.

Similar letters of reference denote like or corresponding parts throughout the several figures of the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a front elevation of my machine complete. Fig. 2 is an enlarged detail front view of the forming-rolls which operate upon the spike-blank. Figs. 3 and 4 show detail side views, respectively, of the two pairs of grooving and shaping rolls. Fig. 5 is a side view complete of the construction shown in Fig. 1. Fig. 6 is a detail rear view of the gearing shown in Fig. 5. Fig. 7 shows perspective views of the spike-blanks before and after operation by my machine. Fig. 8 is a

side elevation of a modified form of my machine.

Referring to the characters of reference marked upon the drawings, A indicates a base, which may be either a fixed or movable structure, as preferred, according to the means for retaining and manipulating the spike. Upon said base is formed a head B, having a cap-plate C, secured in place by bolts D, as shown. At the rear of the head and to the base are secured one or more bearings E. Within this bearing is journaled a driving-shaft F, which is provided with a belt-wheel G, by means of which power is applied to the machine. The inner end of this shaft is provided with a gear H, through which power is distributed to the several forming-rolls, either through intermediate gearing, as shown in Figs. 1, 5, and 6, or more direct, as shown in Fig. 8.

In the construction shown in Figs. 1, 5, and 6 the gear H meshes with and drives a series of similar gears I I I I, each of which is fixed upon longitudinal spindles J, journaled in the head. The forward ends of these spindles are each provided with a bevel-gear K, which meshes with a bevel-gear L, fixed upon inwardly-extended tangent shafts M, mounted in the head and at right angles to the spindles in question. Said shafts are set an equal distance apart and mounted vertically and horizontally slightly to one side of the center in such a way that their axes are tangential to a circle the center of which is the spike center. Upon the inner ends of these shafts are mounted small forming and shaping rollers N and O, the peripheral surfaces of which intersect, as will be apparent. As before stated, these rolls consist of pairs, two preferably operating in a vertical plane and two in a horizontal plane. The vertical rolls are provided with flanges *a* and are designed to form the flat top and bottom sides of a spike-blank, while the horizontal rolls are provided with convex central ribs *b*, whereby the concave groove is produced in the two other sides of said blank. The rolls are adapted to operate during a part of their rotation only, by reason of the fact that the peripheral surface of each is of two diameters or of eccentric or cam-shaped form. This division of size is

substantially in the center, as will be seen from Figs. 3 and 4, wherein *c* represents the smaller side and *d* the larger or operating surface of the two pairs. By reason of the
 5 above variation in the individual rolls it will be obvious that their action is to engage the blanks for a short time only, during which period said blank is fed inward and is formed by the action of the rolls, said introduction
 10 and removal of the blank being accomplished with each rotation of the rolls.

Referring now to Fig. 8, *P* is a slide or way upon which the base of the machine is movably mounted, as hereinbefore referred to,
 15 and by means of this construction the spike-blank may be stationary and the rolls fed longitudinally to and from said blank in the direction of the axis thereof. This form of construction, which permits the blank to be stationary
 20 while the rolls operate and move longitudinally upon it without moving said blank bodily, is a particular feature of my invention which makes it applicable to turret or universal machines, in which, to avoid other
 25 complications, the blank is preferably stationary during the time when each of the successive operations is performed upon it, and a turret-machine of the class referred to is shown and described in my prior patent, No.
 30 600,052, dated March 1, 1898. Although this sliding arrangement is shown in Fig. 8 of the drawings, it can be also used in connection with the other forms shown in Figs. 1 and 5, as may be readily understood, and my invention
 35 includes these various combinations.

No means are shown on the drawings for feeding or moving the frame and the contained rolls longitudinally to and from the blank, as this may be accomplished in any
 40 desired manner; but during the act of rolling a stationary blank the roll-frame should preferably travel at a speed equal to that of the peripheries of the rolls, so that their forming-surfaces may exert a purely rolling action
 45 on the blank, thus avoiding undue friction or distortion.

In cases where the blank may move longitudinally the roll-frame may be stationary and the blank may be fed to and from it, as
 50 customary in ordinary metal-rolling operations.

Owing to my novel form of driving connections, including the tangent shafts *M*, I am enabled to use continuously-driven forming-rolls of very small diameter, which in practice I find are more desirable for the purpose
 55 than large rolls or other forms of mechanism; as they are less liable to form fins upon the blank and are also more easily operated.

It will be seen that my invention differs essentially from one in which only one pair of the four rolls are positively driven in that in my case the metal which is displaced by the cam-surfaces must flow in a direction longitudinal
 60 of the blank, and each roll being positively driven materially aids this flow. In fact, I have learned by experience that when

two of the rolls are idle, as in machines known heretofore, the metal must drive the idle rolls, and thereby become distorted. My invention
 70 overcomes this serious objection.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A spike-forming machine comprising intersecting shaping and forming rolls provided
 75 with eccentric or cam-shaped operating-surfaces, tangentially - arranged shafts upon which said rolls are mounted and means for positively operating all of said shafts and
 80 rolls.

2. A spike-forming machine comprising two pairs of shaping, and grooving rolls with alternately - intersecting eccentric or cam-shaped operating-surfaces, and means for
 85 positively and continuously driving said rolls.

3. A spike-grooving machine comprising two pairs of positively-driven forming-rolls, the axes of which are arranged tangentially to the work operated upon, alternately-inter-
 90 secting eccentric or cam-shaped operative surfaces on said rolls whereby a spike is engaged and released with each rotation.

4. In a spike-grooving machine the combination with two pairs of grooving and shaping
 95 rolls, of tangentially-arranged shafts upon which said rolls are mounted, gears upon each of said shafts and means for driving all of said rolls by means of said gears, substantially as shown.
 100

5. In a spike-grooving machine the combination of two pairs of shaping and grooving rolls having alternately engaging and operating surfaces, and means for positively and
 105 continuously driving each of said rolls, substantially as shown.

6. In a spike-forming machine, the combination of two pairs of shaping-rolls bearing alternately - intersecting eccentric or cam-shaped operative surfaces, tangential shafts
 110 upon which they are mounted, bevel-gears on each of said shafts, pinions engaging said gears and means for operating the same.

7. In a spike-grooving machine, the combination of two pairs of shaping-rolls bearing
 115 eccentric or cam-shaped operative surfaces, tangential shafts carrying said rolls, bevel-gears on each of said shafts, spindles bearing pinions engaging said gears and means for operating said spindles.
 120

8. In a spike grooving and shaping machine, the combination of two pairs of forming - rolls, provided with eccentric or cam-shaped operating-surfaces, shafts for operating the same, gear connections therewith, spindles
 125 operating said gears and a driving-shaft for operating said spindles.

9. The combination in a spike-grooving machine, of a base carrying a head, a driving-shaft supported on said base, vertical and
 130 horizontal shafts journaled in said head, the axes of said vertical and horizontal shafts being in the same plane, operative connections between the driving and driven shaft, two

pairs of intersecting shaping and grooving rolls each provided with eccentric operating-surfaces, and carried on said driven shafts.

- 5 10. The combination in a spike-grooving machine, of a base supporting a head, a series of shafts mounted therein, two pairs of intersecting rolls provided with eccentric operating-surfaces, said rolls being mounted upon the inner ends of shafts, the axes of
10 which are in the same plane, gear connections for positively operating said shafts, substantially as shown.

11. In a machine for grooving spike-blanks, the combination with two pairs of positively-driven rolls provided with alternately-intersecting cam-shaped or eccentric operating-surfaces, of a base mounted upon a slide or way extending longitudinally of said blank.

In testimony whereof I affix my signature in the presence of two witnesses.

LEWIS WILLIAMS.

Witnesses:

D. J. JONES,

ROBT. J. HUTCHISON.