

(No Model.)

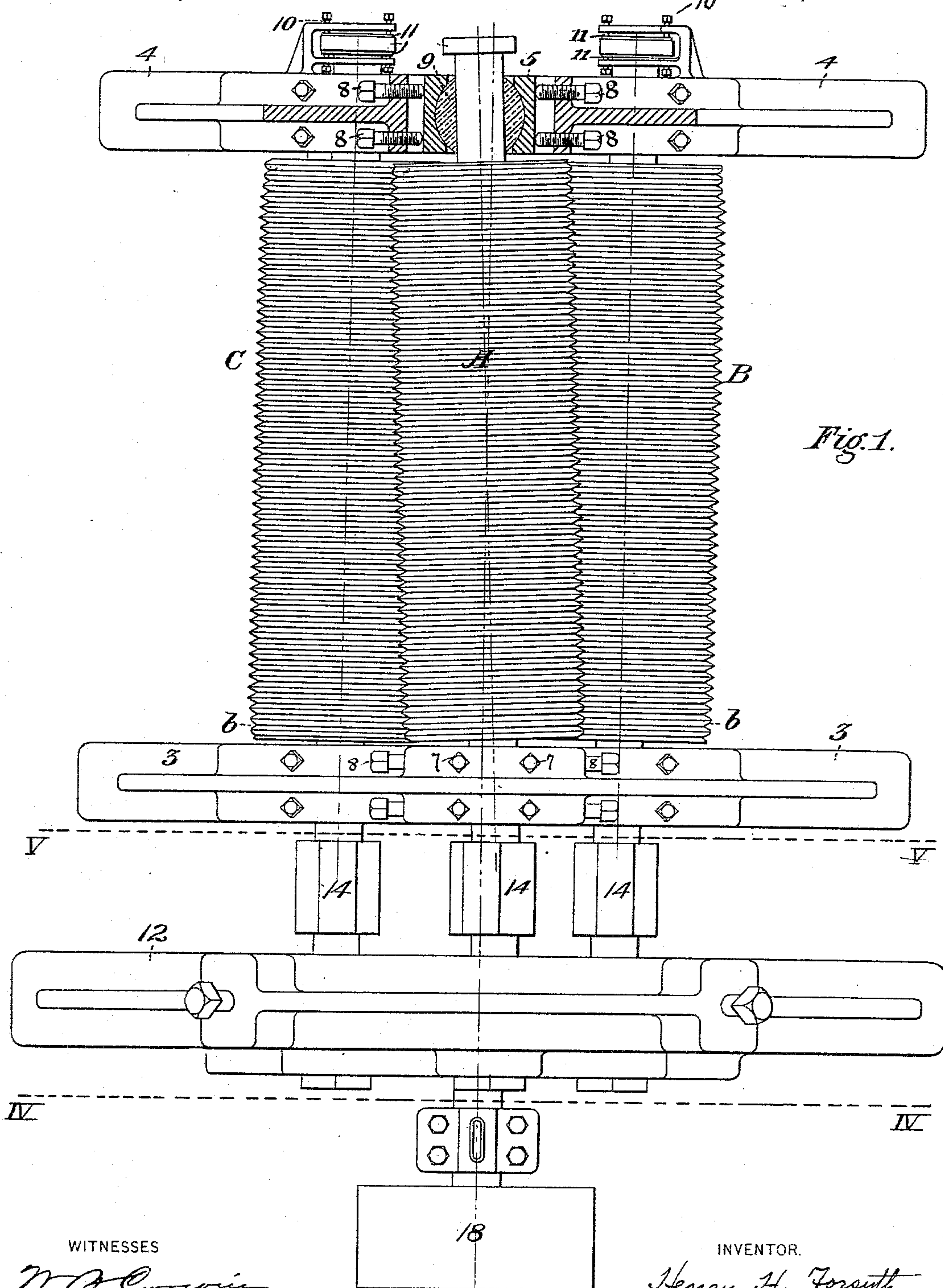
3 Sheets—Sheet 1.

H. H. FORSYTH.

APPARATUS FOR MAKING SPIRAL SCREW THREADS.

No. 412,082.

Patented Oct. 1, 1889.



WITNESSES

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INVENTOR.

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W. B. Corvies & Sons

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(No Model.)

3 Sheets—Sheet 2.

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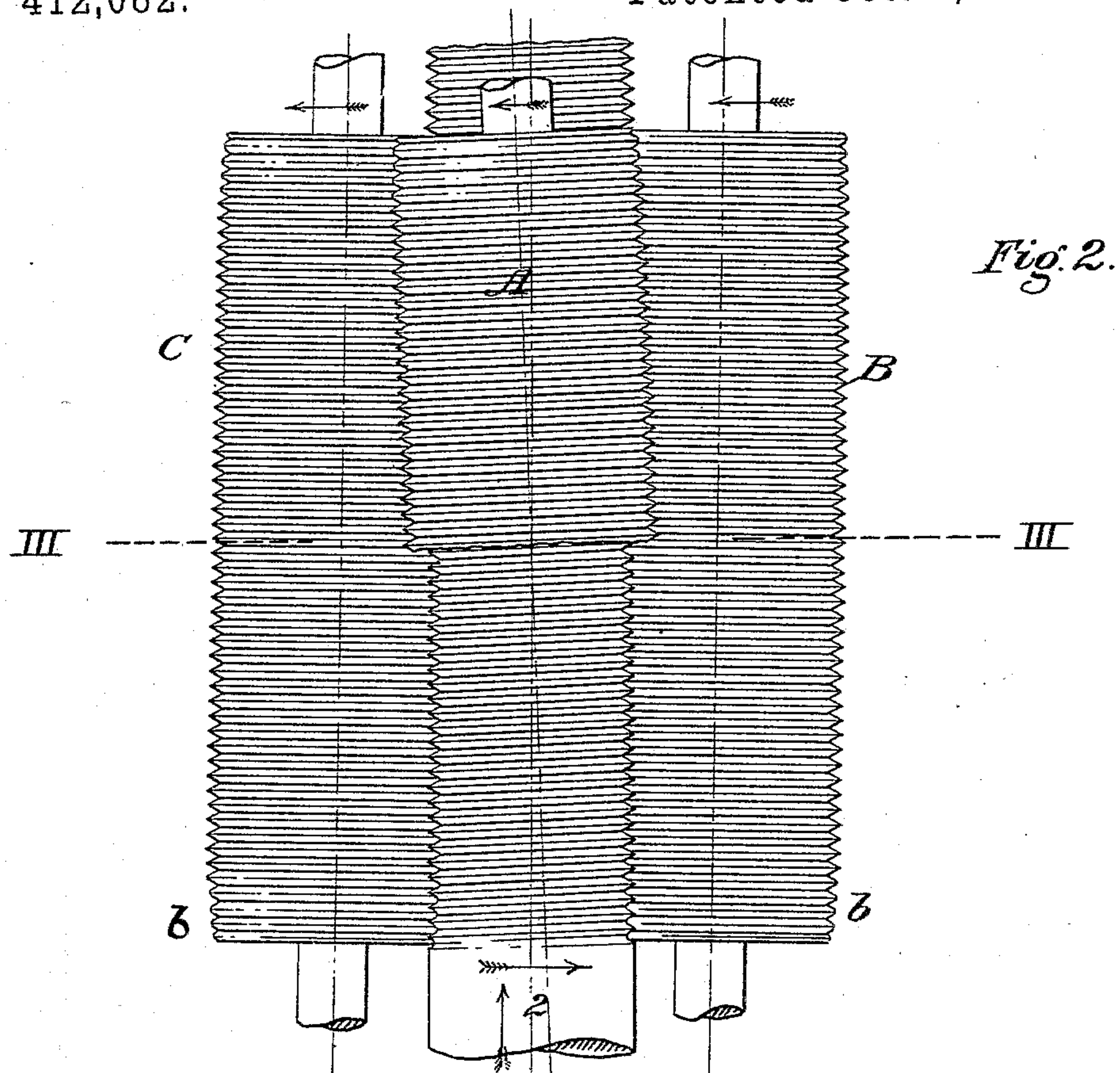


Fig. 2.

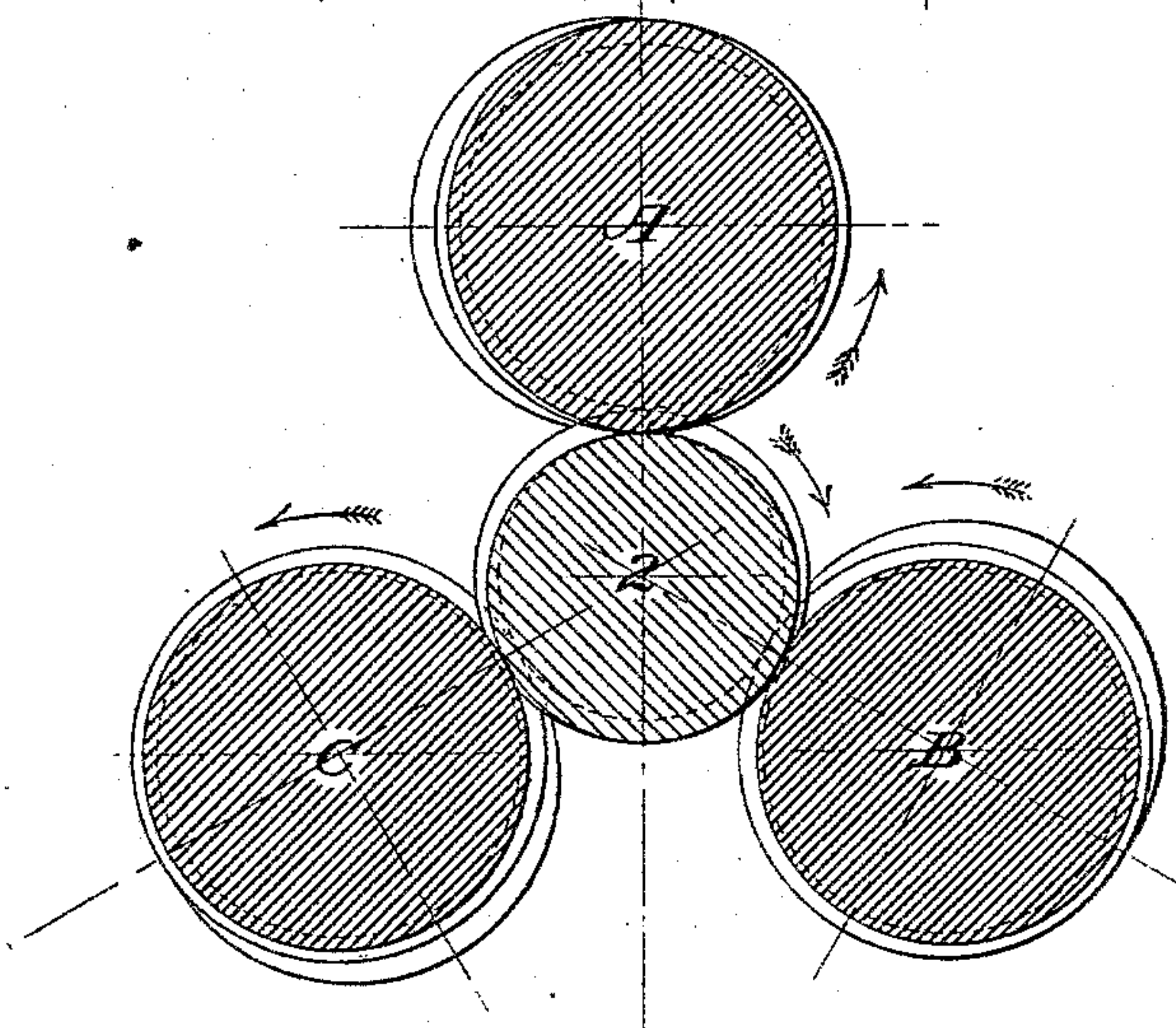


Fig. 3.

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(No Model.)

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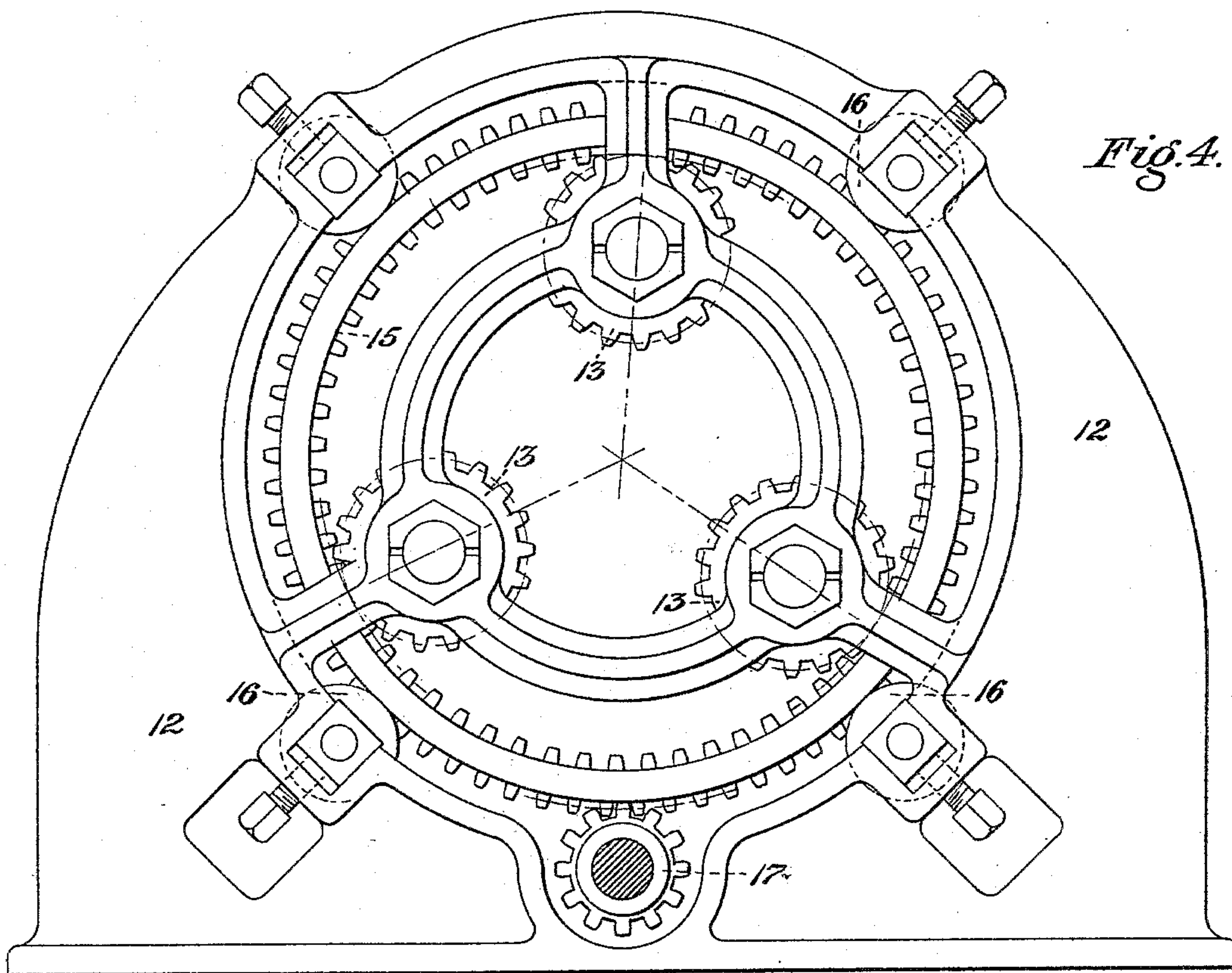


Fig. 4.

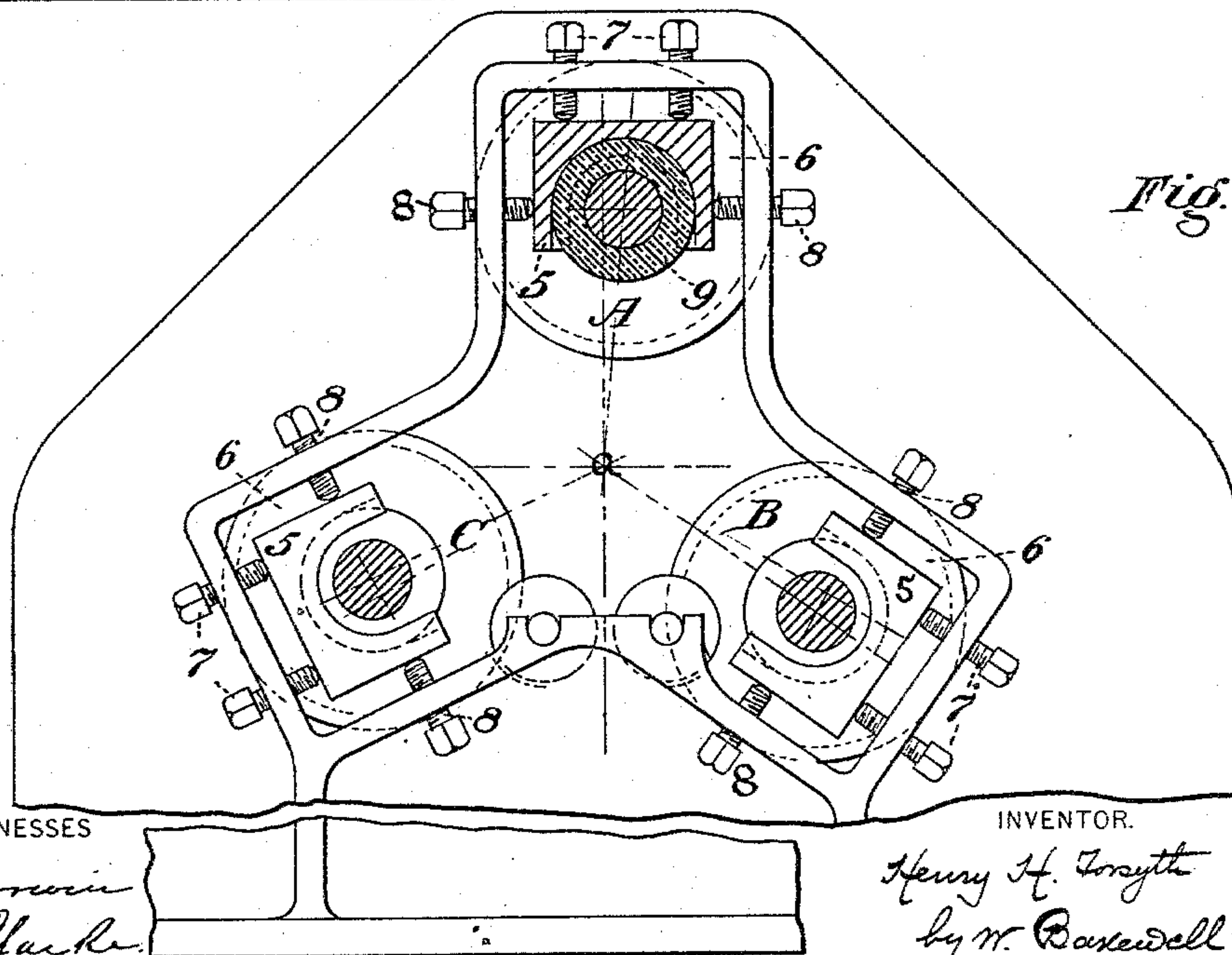


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY H. FORSYTH, OF CHICAGO, ILLINOIS.

APPARATUS FOR MAKING SPIRAL SCREW-THREADS.

SPECIFICATION forming part of Letters Patent No. 412,082, dated October 1, 1889.

Application filed February 7, 1889. Serial No. 298,984. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. FORSYTH, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Apparatus for Making Spiral Threads, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved machine. Fig. 2 is a plan view of the rollers by which the threads are formed, showing the same in the act of forming a blank. Fig. 3 is a vertical cross-section on the line III III of Fig. 2. Fig. 4 is a sectional end elevation of one end of the machine, the section being on the line IV IV of Fig. 1. Fig. 5 is a vertical sectional view on the line V V of Fig. 1.

Like symbols of reference indicate like parts in each.

I shall first describe my improvement generally with reference to Figs. 2 and 3, in which the rolls used for forming the screw-threads are shown without housings or driving mechanism, and shall then with reference to the other figures of the drawings describe the preferable form of the remaining parts of the machine.

The principal and distinctive feature of the apparatus is the use of rolls, preferably three in number, having peripheral parallel teeth, which rolls are arranged with their axes extending in substantially the same direction, but somewhat inclined to each other. The blank on which the thread is to be formed is passed longitudinally through the intermediate space between the rolls, and by the action of the peripheral teeth thereon a spiral thread is produced on the surface of the blank and the latter is caused to move forward through the rolls. The pitch of the thread will be dependent upon the degree of inclination of the axes of the rolls, which is preferably arranged to be variable and adjustable, and the rolls are also preferably adjustable to and from each other to vary the size of the intermediate space.

In Figs. 2 and 3, A, B, and C are the rolls, and 2 represents a blank on which the screw-thread is being formed by action of the rolls. The end of this blank, which is a piece of iron or steel, preferably heated to a red

heat, is placed between the rolls, which have been properly adjusted and correlated, and by driving the rolls in the directions of the several arrows the blank is caused to rotate in the opposite direction, and is fed longitudinally between them, while the action of the rolls on the blank is to form the screw-threads thereon, as will be readily understood. A blank of any length can thus be rolled, and as the elongation of the blank occurs only from the place of its entrance into the rolls in a direction reverse to its longitudinal motion, the threads are not distorted thereby.

In the practice of my invention I may either rotate the rolls and feed the blank without imparting to the latter any rotation other than the rotation induced by the rolls; or the blank may be rotated without imparting rotation to the rolls; or both the blank and rolls may be rotated. The first of these modes, which I have already described, I deem to be much preferable.

I shall now describe the means which I prefer to use for supporting and driving the rolls in my improved apparatus. The rolls A, B, and C are set between two housings 3 and 4, and their necks are journaled in bearings 5, arranged in ways 6 in the housings, which ways converge to a central point *a*, as shown in Fig. 5, and the bearings 5 are adjustable radially and also transversely in these ways by means of adjusting-screws 7 and 8, the adjusting-screws 7 enabling the size of the intermediate space for the blank to be varied, and the adjusting-screws 8 enabling the inclination of the roll to be varied. In order to prevent the necks of the rolls from binding in their bearings during such adjustment, I provide them with ball-bearings 9, which are arranged within the exterior bearing-blocks 5. The interior of each of the latter blocks is made spherical or partially spherical in form, and the ball-bearing 9 is of corresponding shape and fits within the same in such manner as to be capable of turning freely in any direction. The rolls are also adjustable longitudinally by suitable adjusting mechanism—such as set-screws 10 and collars 11—the arrangement of which is shown in Fig. 1.

The rolls A, B, and C are driven in any suitable manner, but preferably as follows:

12 is a pinion-housing, in which are journaled three pinions 13, the wabblers of which are connected by coupling-boxes 14 with the wabblers of the rolls. The pinions 13 are in gear with the interior periphery of an annular gear-wheel 15, which is supported and guided externally by adjustable guide-wheels 16, and is driven by means of a pinion 17 in gear with teeth formed on the exterior of the wheel. The shaft of the pinion 17 is driven by suitable power connections—such, for example, as a belt-wheel 18—from a driving-engine.

The operation of my improved apparatus is as follows: In order to adjust the rolls so as to adapt them to the production of a screw-thread of a certain pitch on a blank of a certain diameter, I take a screw which has already been formed of substantially the diameter and with a thread of substantially the pitch of that desired, and place it between the rolls A, B, and C, and by means of the several adjusting-screws shown in the drawings and already described I adjust these rolls so as to bring them exactly to the relative positions required to cause their peripheral teeth to fit in the thread of the interposed screw. This screw may then be removed from the rolls by rotating it between the latter, and the rolls will then be in proper adjustment to manufacture screws of the desired shape and size. The screw-blank having been preferably heated, (though it may be worked cold,) is carried to the rolls, and is inserted between the ends of the latter, the threads on which are preferably beveled, as shown at *b* in Figs. 1 and 2, to permit the easy entrance of the blank. The rotation of the rolls will now draw the blank into and through the same, and will form the thread thereon in the manner hereinbefore explained. If desired, one or more of the rolls may be lifted to permit the blank to be inserted more readily.

The advantages of my invention will be appreciated by those skilled in the art. It enables the rapid and economical formation of screw-threads on blanks, and obviates all the difficulties which have been incident to prior apparatus of the same general character, (in which it has been attempted, though, as I believe, unsuccessfully, to form screw-threads by means of spirally-grooved rolls.)

The rolls may be used to form either right

or left hand threads by a simple change in adjustment of the rolls, as will be readily understood.

My improved apparatus may be modified by those skilled in the art to effect the same result, as I have described, in substantially the same way, without involving a departure from the principles of my invention, as stated in the following claims. For example, the shape of the teeth or tongues on the rolls may be varied according to the shape of the thread desired to be produced. They may also be mutilated or serrated in the manner of the teeth of a circular saw.

Instead of making each of the rolls in one solid piece, as I have shown and described, a number of circular disks may be placed side by side on a central shaft, so as to constitute a sectional roll; or for some purposes, as before indicated, rolls or disks having but a single peripheral tooth or tongue may be employed, the only essential in such case being that its axis shall be inclined to the position of the blank.

The driving and adjusting mechanism of the rolls may also be modified in various ways by those skilled in the art.

I claim—

1. In apparatus for forming spiral threads, rolls axially inclined to the direction of the blank, and having a series of parallel peripheral tongues or teeth, and adjusting mechanism by which the rolls may be adjusted longitudinally and the said tongues or teeth properly correlated, substantially as and for the purposes described.

2. In apparatus for forming spiral threads, three or more rolls, axially inclined and disposed around a central line, substantially as and for the purposes described.

3. In apparatus for forming spiral threads, rolls axially inclined to each other, and having a series of parallel peripheral teeth, said rolls being beveled at the ends to permit insertion of the blank, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 28th day of January, A. D. 1889.

HENRY H. FORSYTH.

Witnesses:

W. B. CORWIN,

THOMAS W. BAKEWELL.