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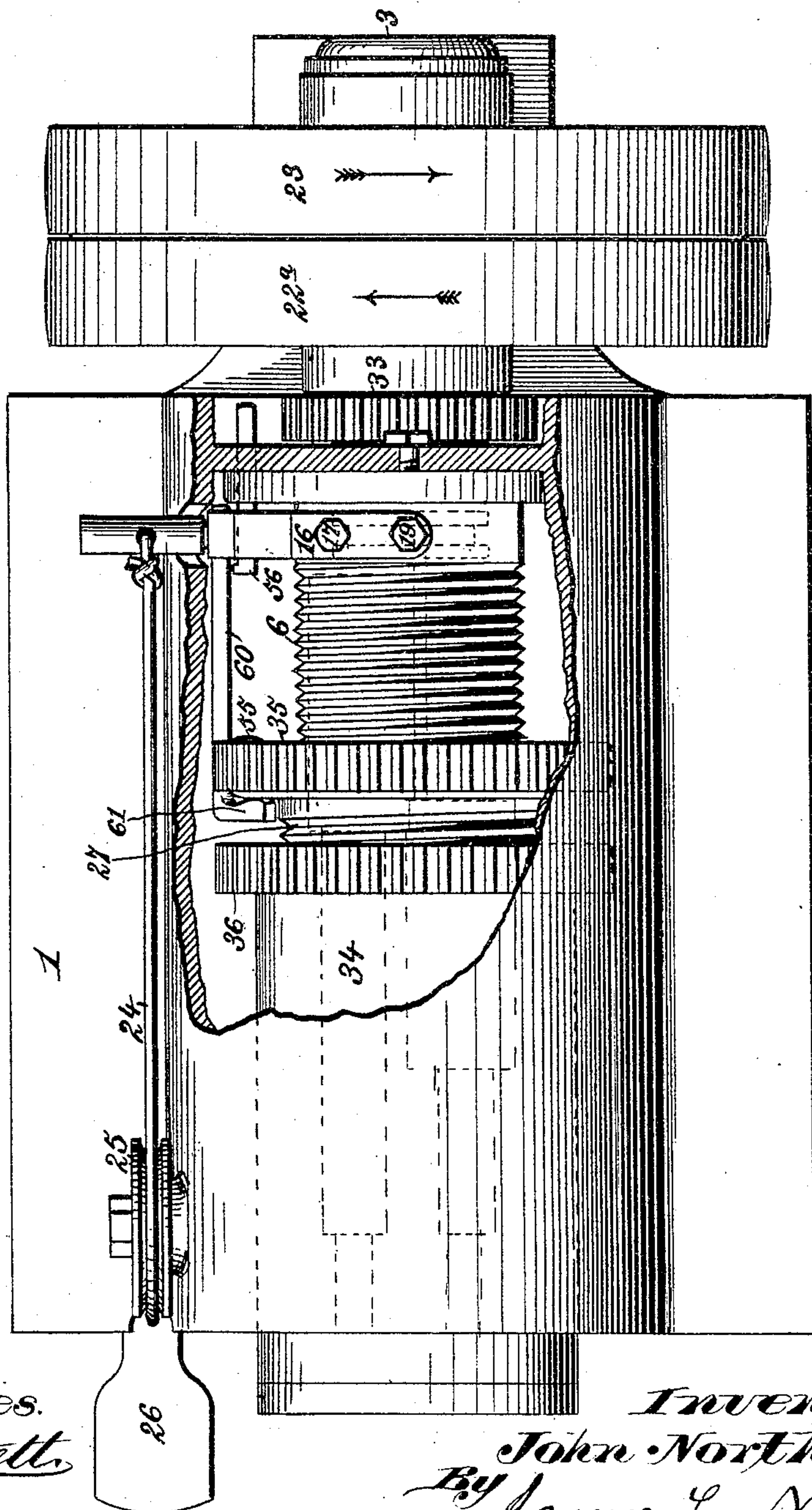
5 Sheets—Sheet 1.

J. NORTH.

MACHINE FOR SCREW THREADING BOLTS, &c.

No. 321,841.

Patented July 7, 1885.



Witnesses.

Robert Everett.

Dennis Sumby

Inventor:

John North.

By James L. Norris,
Atty.

Atty.

(No Model.)

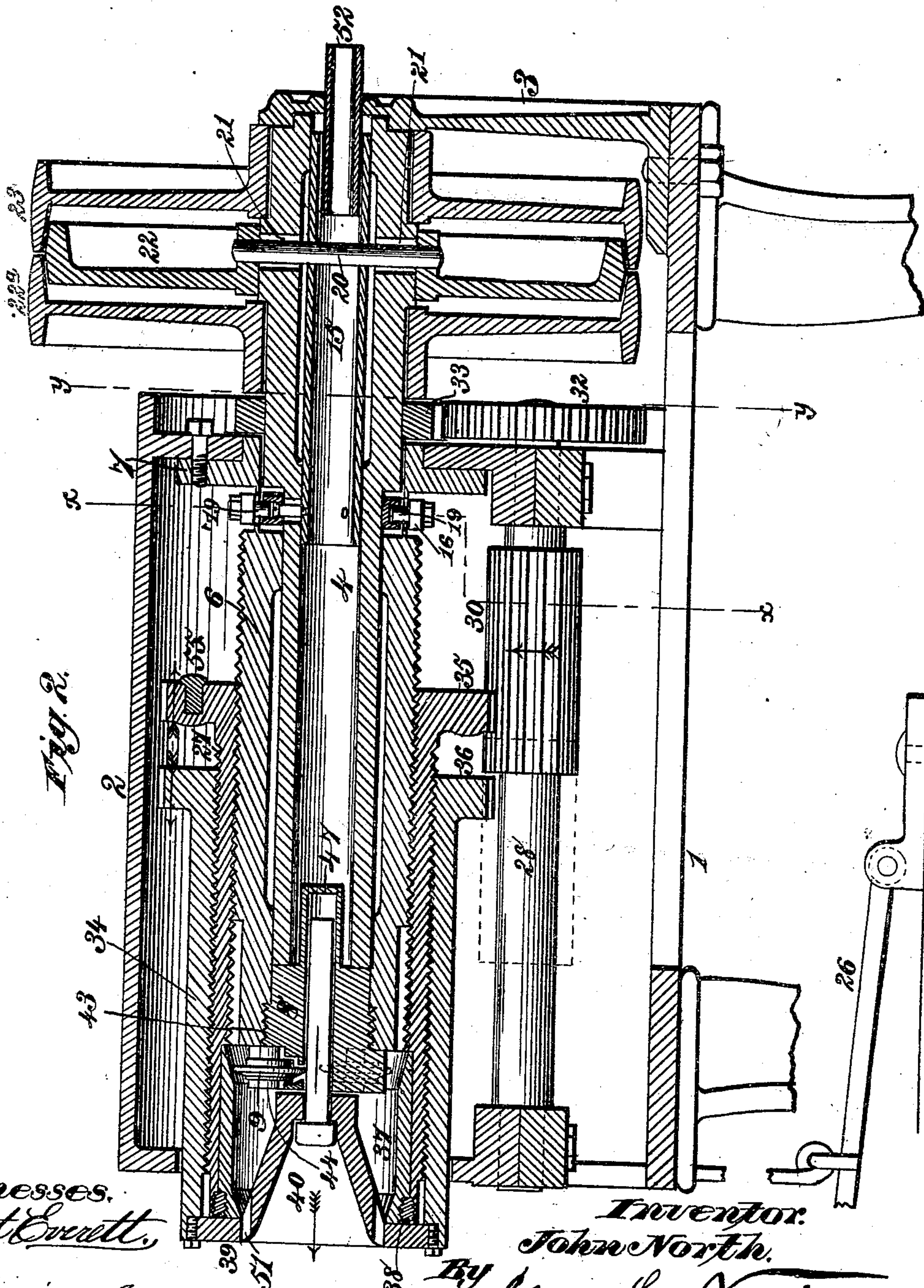
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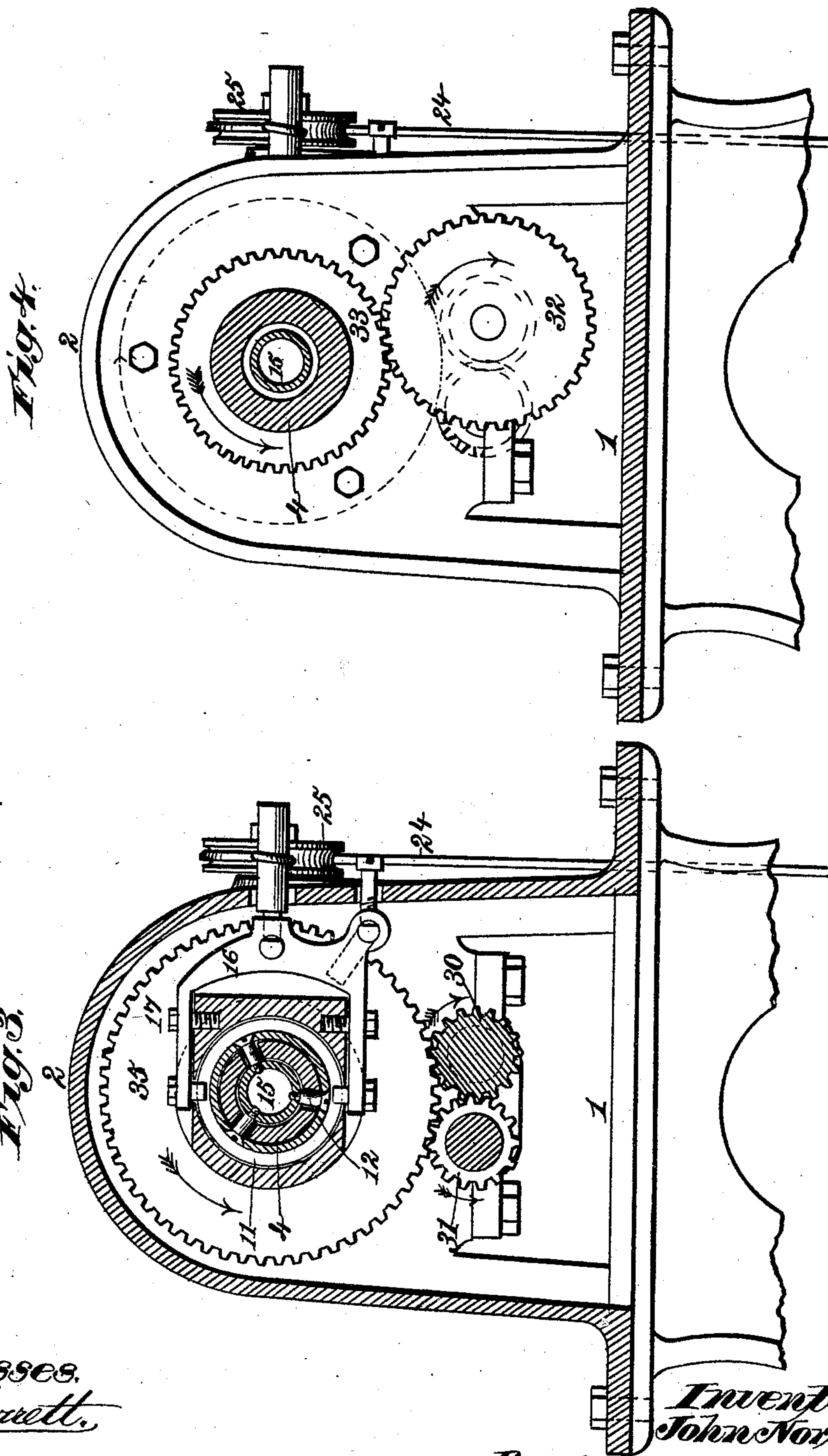
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Fig. 5.

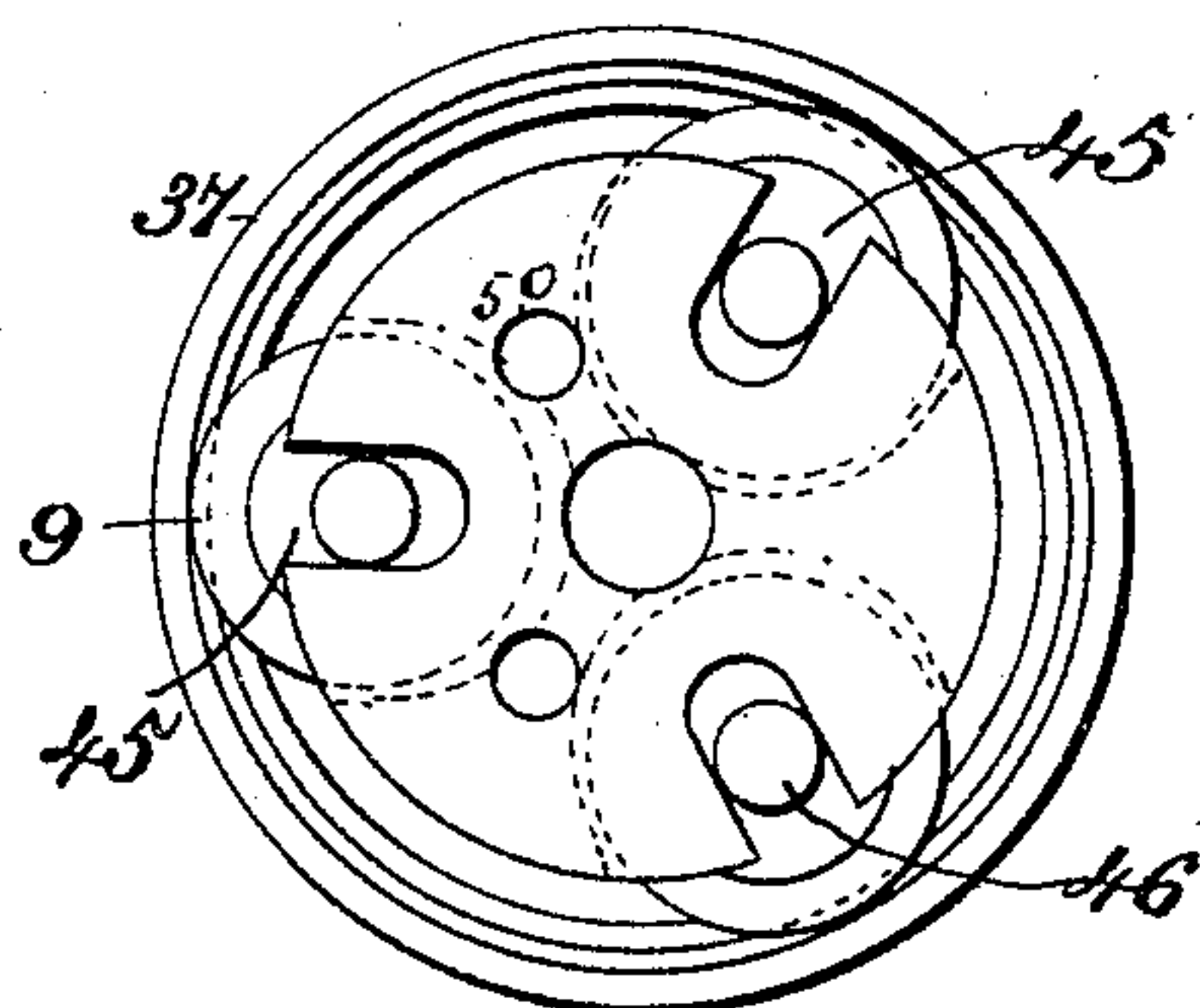


Fig. 6.

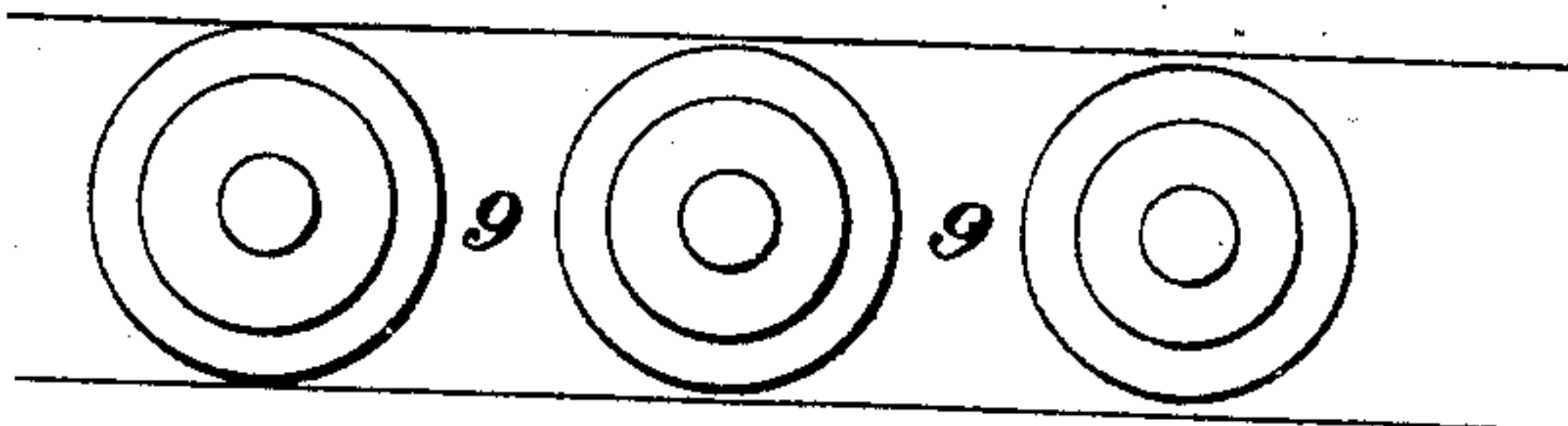


Fig. 7.

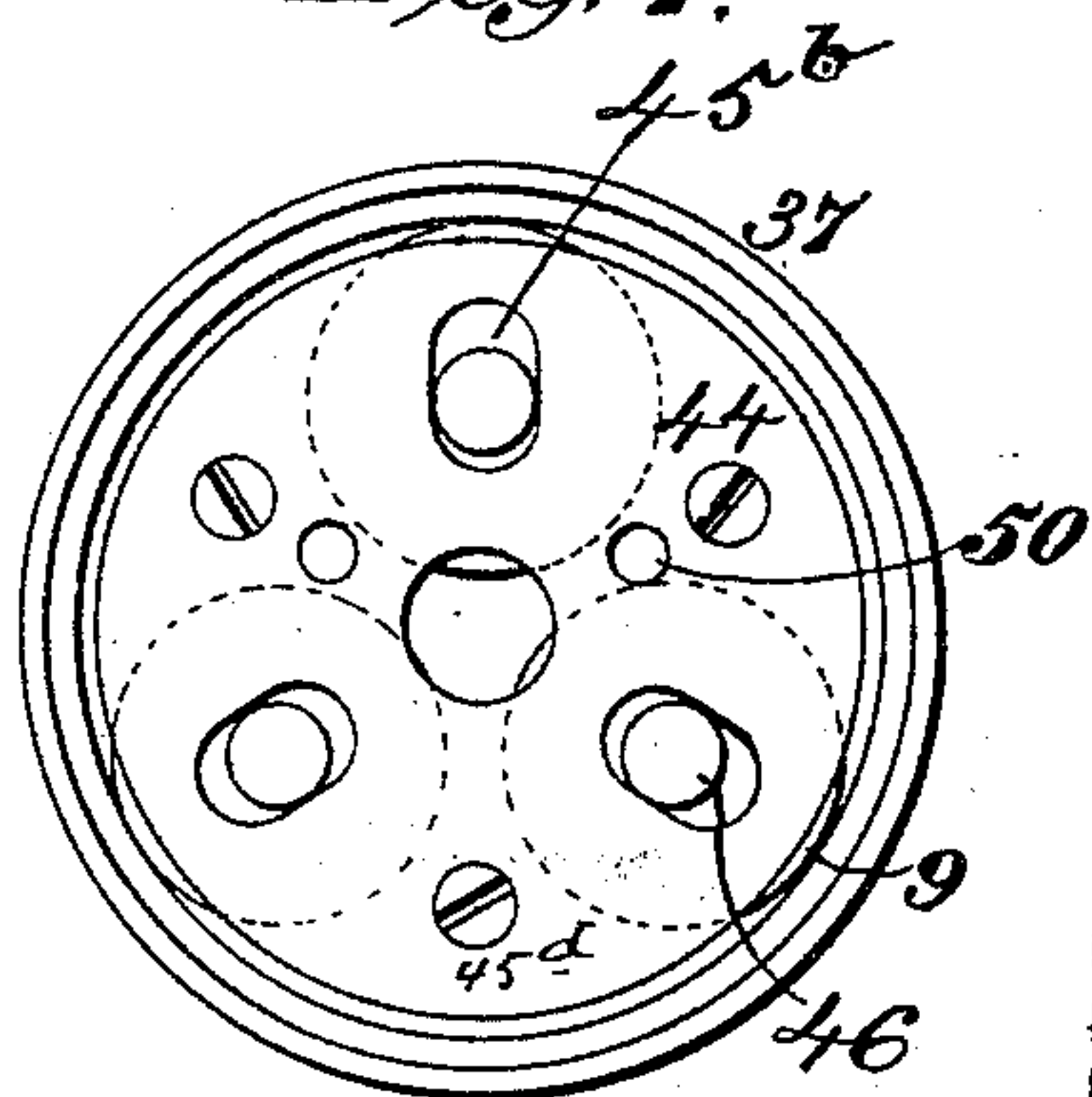


Fig. 8.

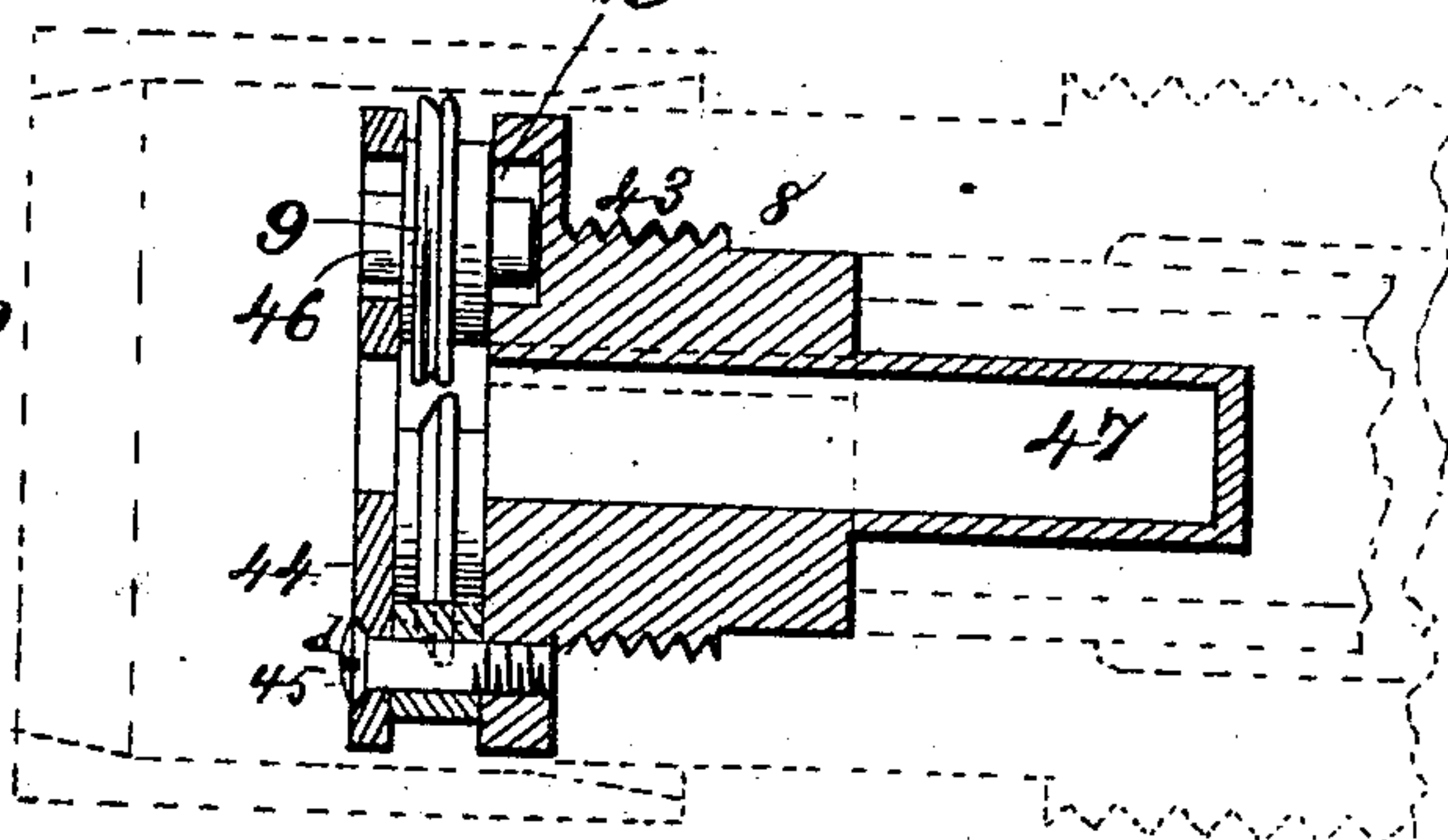


Fig. 9.

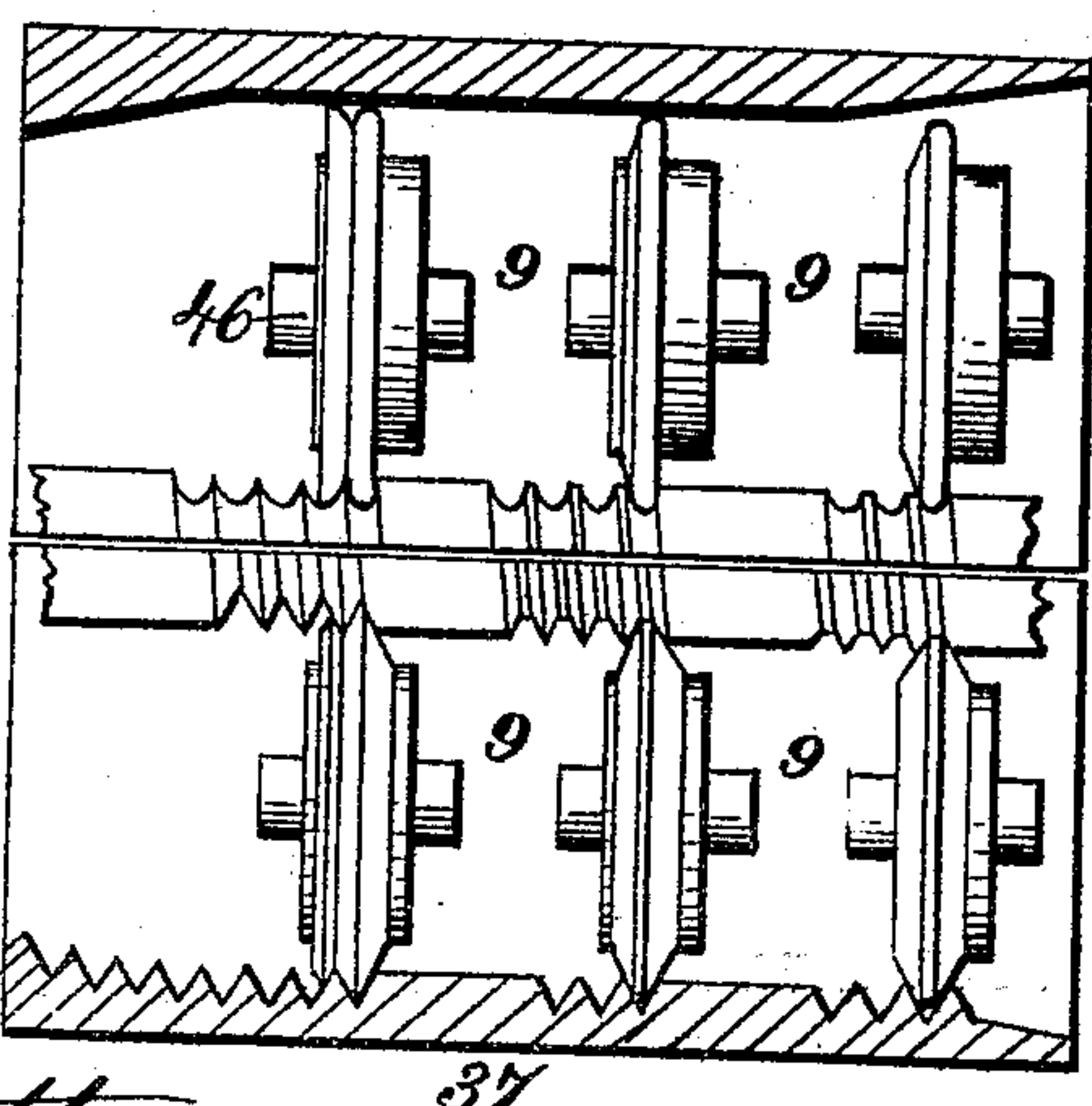


Fig. 10.

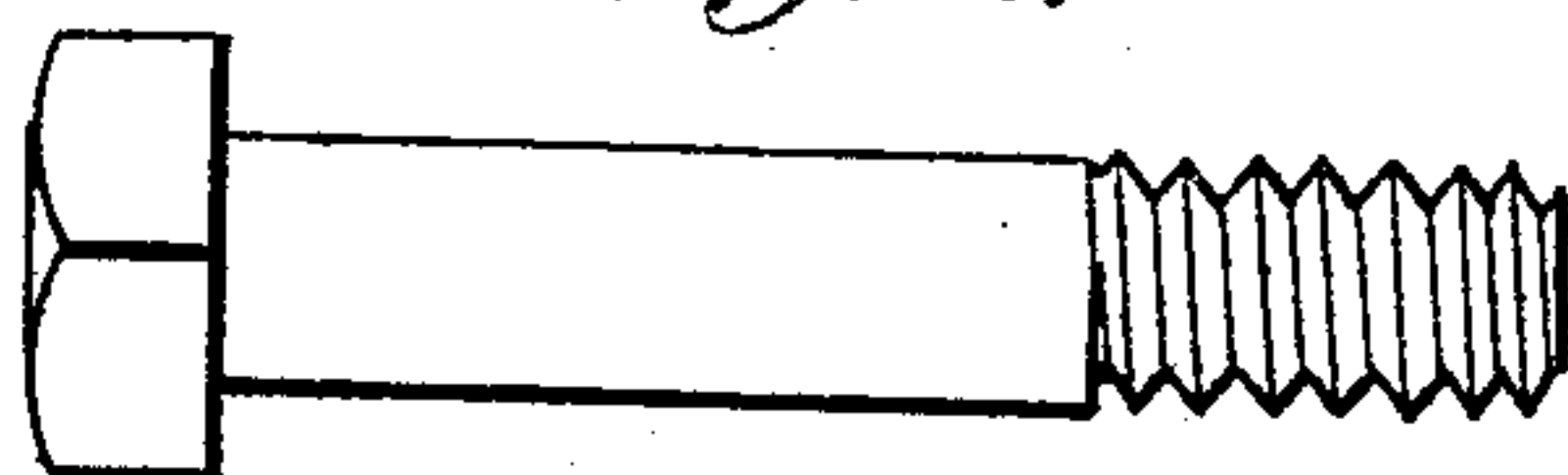
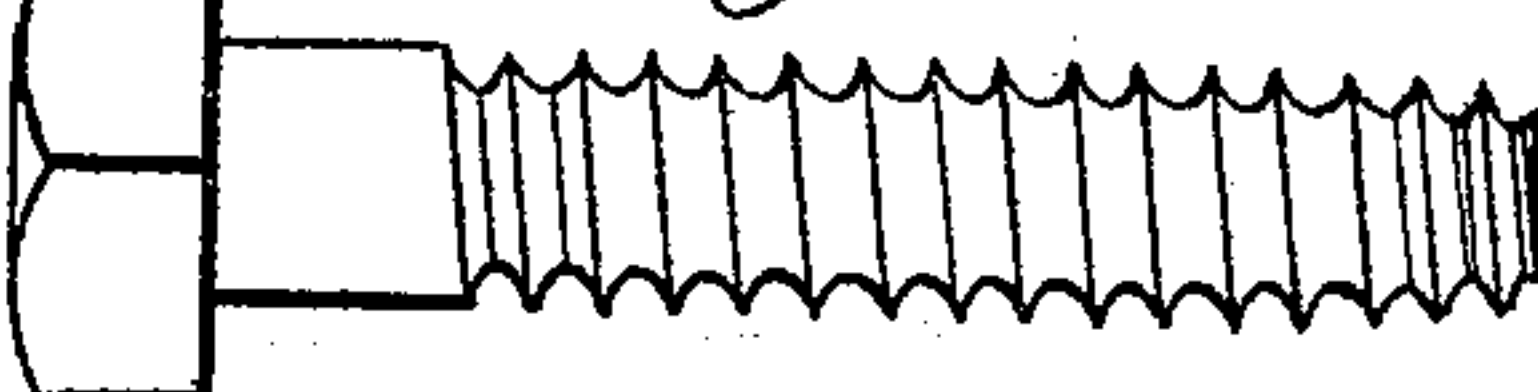


Fig. 9^a

Fig. 10^a



Witnesses,

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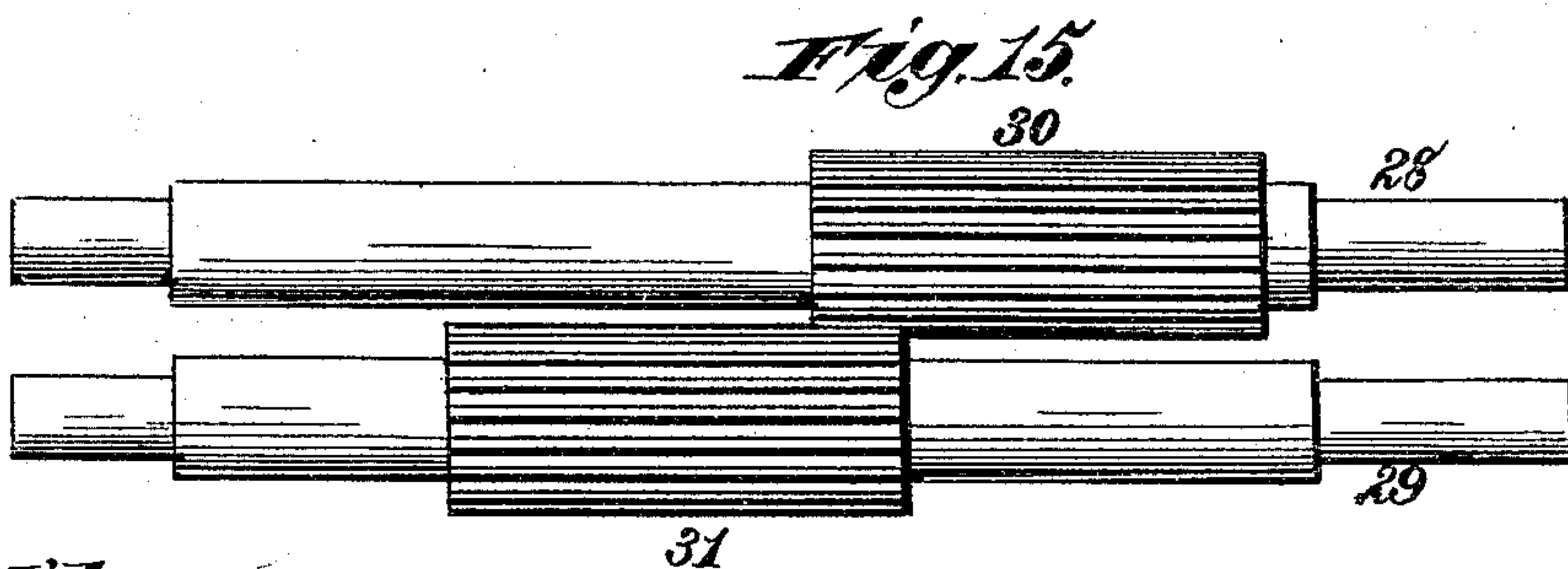
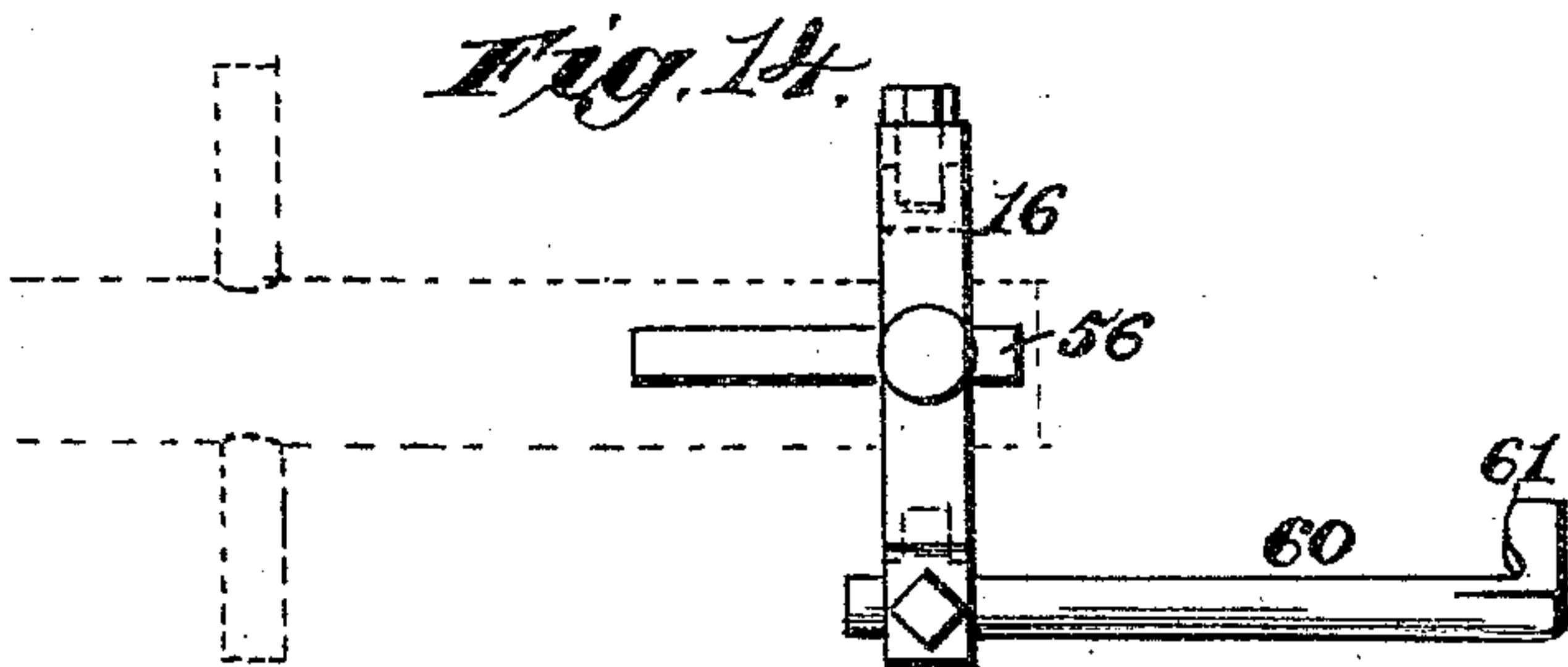
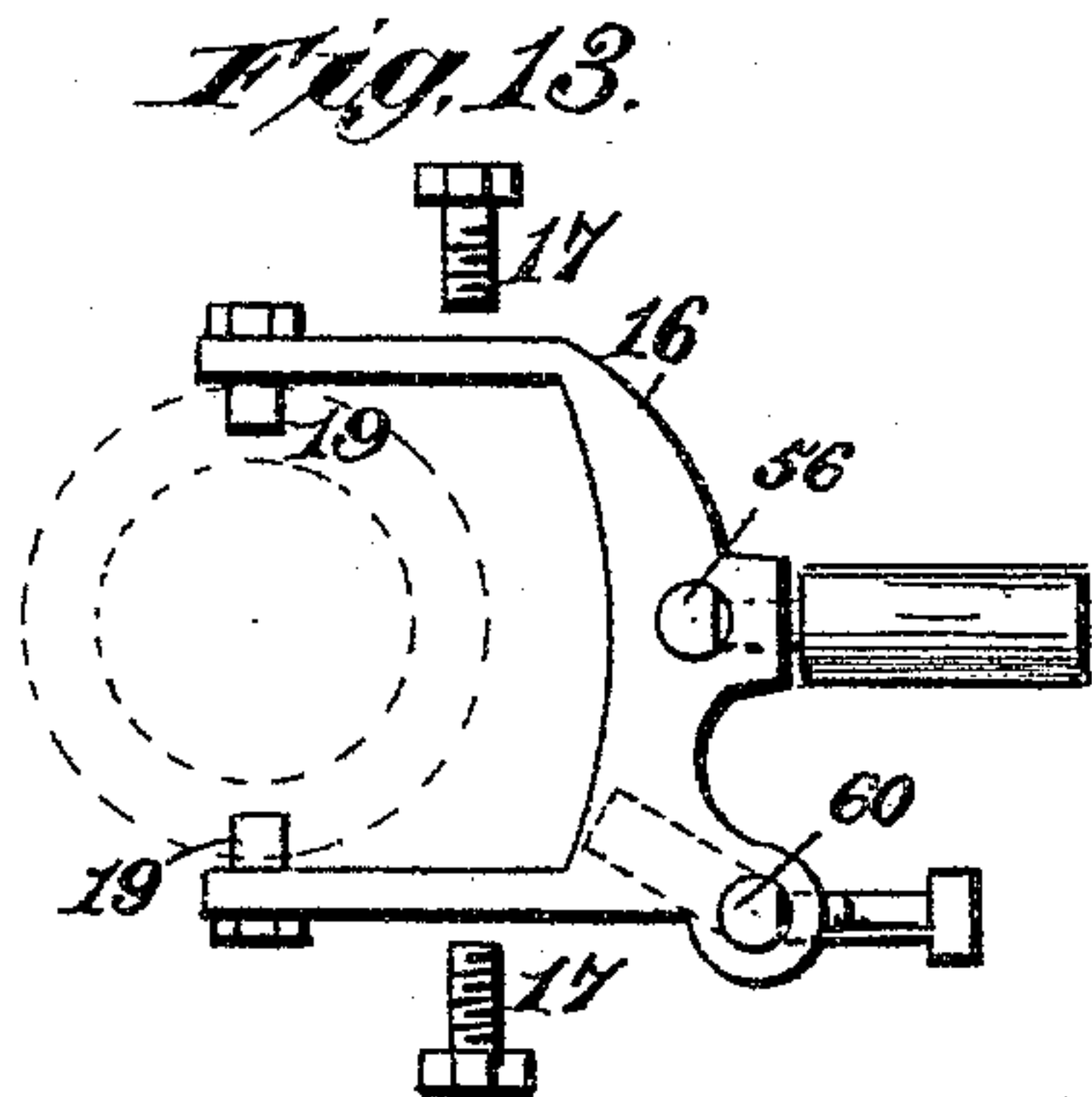
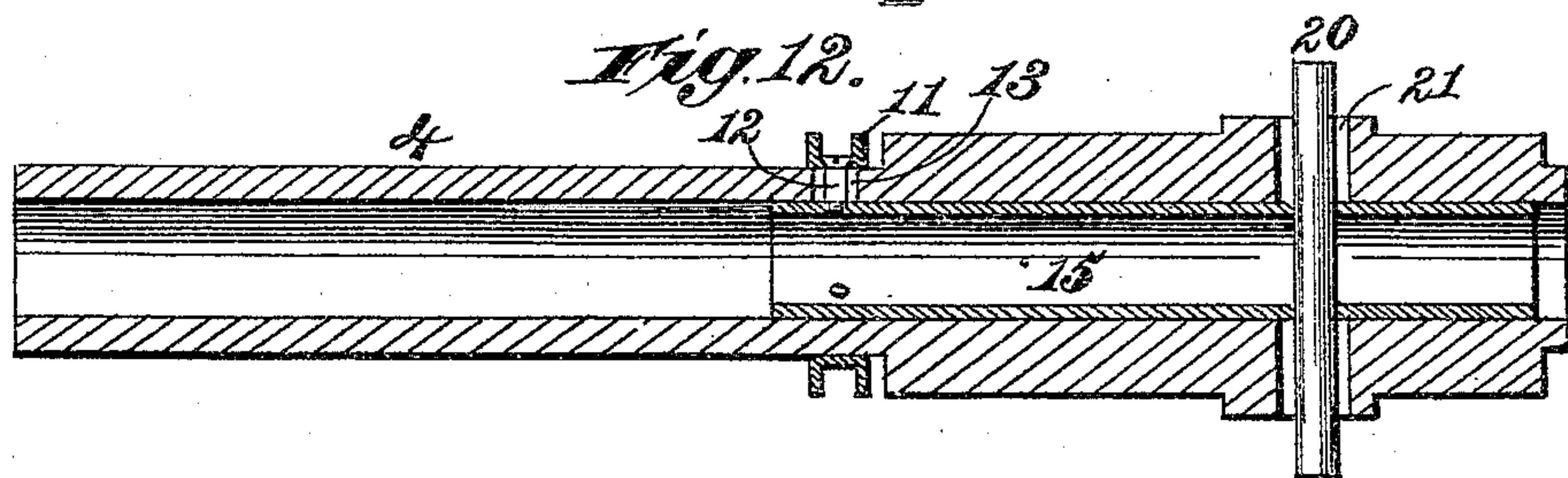
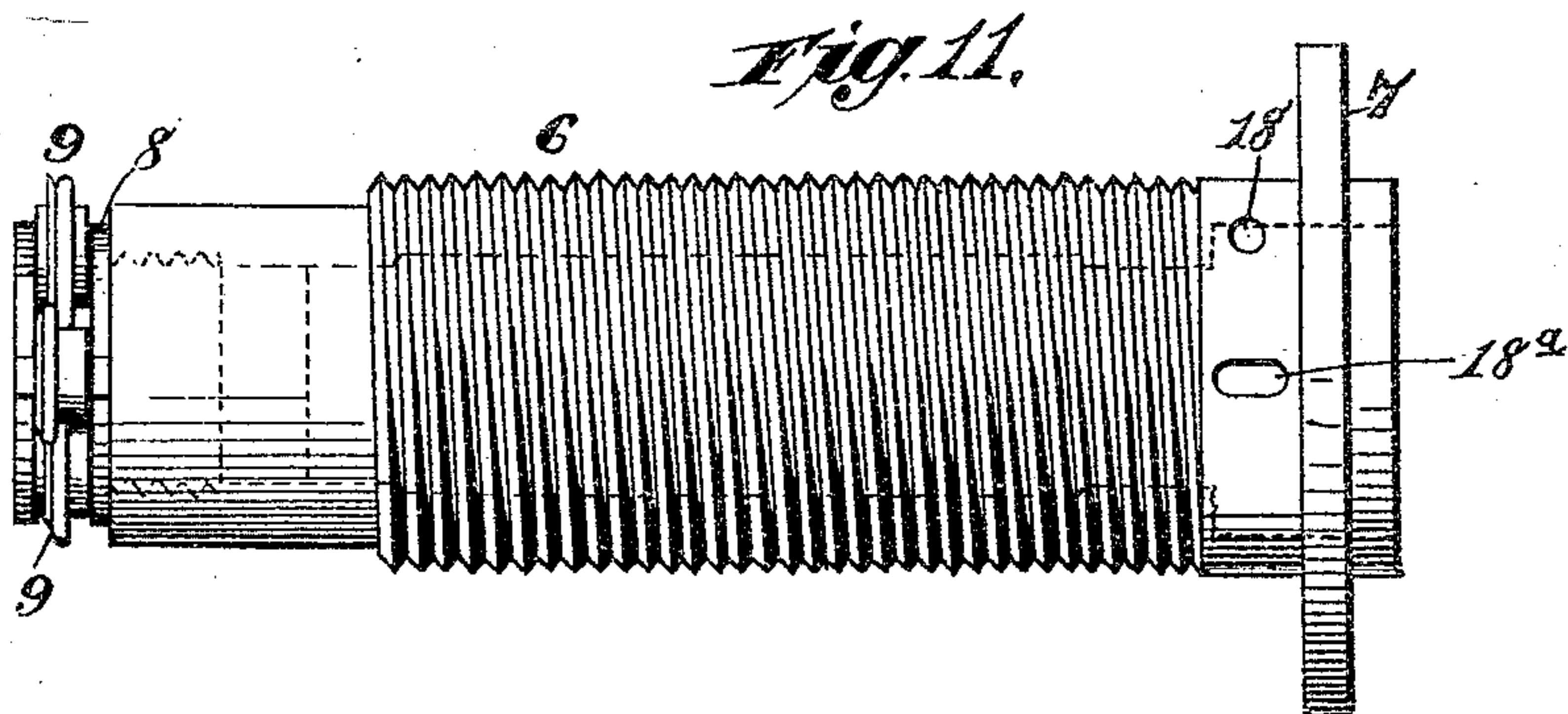
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UNITED STATES PATENT OFFICE.

JOHN NORTH, OF MIDDLETOWN, CONNECTICUT.

MACHINE FOR SCREW-THREADING BOLTS, &c.

SPECIFICATION forming part of Letters Patent No. 321,841, dated July 7, 1885.

Application filed June 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN NORTH, a citizen of the United States, residing at Middletown, Connecticut, have invented new and useful
5 Improvements in Machines for Screw-Threading Bolts and other Objects, of which the following is a specification.

The object of the present invention is to furnish a machine for forming or rolling screw-
10 threads on bolts and other objects, which is simple in construction, can be conveniently operated, and is capable of turning out with ease and dispatch threaded screw-bolts of different sizes or varying degrees of taper or di-
15 ameter.

To these ends the invention consists in the combination of a blank or bolt holder having a sliding movement in a longitudinal direction or axial, and a rotary movement, a holder for
20 several rollers or disks, and a holder for a rotating and sliding shell that encircles said rollers or thread-forming disks and travels in an opposite direction from the bolt or blank holder in order to force the rollers into the
25 metal of the blank for performing the threading operation.

The invention also consists in mechanism for operating the sliding and rotary blank-holder and shell for exerting pressure upon
30 the thread-forming dies, said mechanism consisting, essentially, of a central shaft that bears a clutch or shifting mechanism for causing a friction-pulley thereon to engage alternately with a pair of driving-pulleys in order
35 to effect a reciprocating movement of the blank-holder and die-pressing shell alternately in opposite directions.

The invention also consists in mounting the circular or roller dies in a shell or holder that
40 is constructed to allow said rollers or dies to be moved radially or in an outward and inward direction for the proper insertion and removal of the blank or the threaded bolt.

It further consists in means for cooling the
45 threading dies by admitting water to the same, and in such other details of construction and arrangement as will be hereinafter more fully described, and set forth in the claims.

In the drawings, Figure 1 is a plan view of
50 a bolt-threading machine constructed according to my invention, a part of the exterior casing being broken away to show the mech-

anism beneath. Fig. 2 is a vertical sectional view taken longitudinally through the entire machine. Fig. 3 is a vertical transverse sec- 55 tion taken on the line *x x* of Fig. 2. Fig. 4 is a transverse section taken through the line *y y* of Fig. 2. Fig. 5 is an end view of the rollers or dies, or dies and their holder, the surrounding supporting-frame of the latter 60 being also shown. Fig. 6 is a diagram view showing the roller-dies of increasing diameter for gradually perfecting the thread formed by them. Fig. 7 is an end view of another form of holder for the rollers or dies, and Fig. 8 is 65 a sectional view of such holder, showing its hollow tube or socket for the bolt-blank. Fig. 9 is a diagram view of rollers with rounded peripheries for forming rounded grooves. Fig. 9^a is a similar view of V-shaped rollers or dies 70 for forming sharp-edged threads. Figs. 10 and 10^a are views of the threaded bolts formed by the rollers or dies shown in Figs. 9 and 9^a. Fig. 11 is a detail view of the stationary threaded sleeve bearing the support for the rollers or 75 dies. Fig. 12 is a sectional view of the hollow water-supply and pulley-shifting shaft that is designed to receive the clutch and reversing pulley. Figs. 13 and 14 are detail 80 views of the clutch and reversing and stopping mechanism. Fig. 15 is a detail view of the long gear-wheels and their shafts that move the blank-holder and die-pressing shell.

The reference-numeral 1 designates the frame or table of my machine, upon which is ar- 85 ranged a cylindrical casing or housing, 2, that incloses the operating mechanism or the devices directly concerned in the operation of forming screw-threads upon bolts or other objects. At one end of the frame 1 rises a 90 standard, 3, in which is journaled a longitudinal shaft, 4, that also has a second bearing in the end wall of the housing 2, or in a bracket that serves to secure said housing to the table. The shaft 4 is made tubular, and passes through 95 a stationary cylindrical shell or hollow box, 6, that is secured to the inner side of the end wall of the housing 2, or to the attaching-bracket on the end of the latter. A vertical flange, 7, formed on said box 6 has holes for the pas- 100 sage of bolts that serve to secure it to the housing. The outer surface of the box 6 is screw-threaded from near the point of its attachment to the housing to near its opposite

end, as is clearly shown in Fig. 11. An internal screw-thread formed in the bore of the box 6 at its outer end receives a holder or carrier, 8, for a series of rollers, disk-shaped, or dies, 9, the special construction of which will be hereinafter fully adverted to. At or near the point where the box 6 is secured to the housing 2 a threadless portion thereof has flat top and bottom faces, and in a recess in its end there is a collar or ring, 11, that has several screws 12 projecting from its inner periphery. These screws project through elongated holes 13 in the shaft 4, and enter sockets in a short supplementary hollow-shaft, 15, fitted to have a limited longitudinal movement within the shaft 4. The collar or ring 11 engaging with a forked lever or arm, 16, that has lugs or pivot-pins 17, which enter holes 18, made in the flat faces of the shell 6, and other pins or projections 19 on the forks of said lever pass through elongated openings 18^a and enter the periphery of the collar or ring 11. The shaft 15 also carries a fixed pin, 20, which passes through a slot, 21, in the shaft 4, and is secured to a friction disk or wheel, 22, encircling said shaft 4, and arranged between a pair of pulleys, 22^a and 23, loosely mounted on said shaft 4. These pulleys 22^a and 23 are rotated in opposite directions by suitable driving-belts or other gearing, and they have overhanging flanges against the inner peripheries of which the disk or wheel 22 is made to engage alternately for the object hereinafter stated. The forked lever or arm 16 is connected with a stop or chain, 24, which passes over a suitable guide-pulley, 25, and is attached to a treadle, 26, arranged at the base of the machine and conveniently located for operation by the attendant of the machine.

The externally screw-threaded box 6 receives a cylindrical shell or sleeve, 27, which has internal and exterior screw-threads, and is itself encircled by an outer sleeve or shell, 34, having an internal screw-thread for engagement with the outer screw-thread of the sleeve 27. These sleeves receive a rotary and a backward and forward movement through the medium of aforesaid threaded box 6 and the shafts 28 and 29, which carry long intermeshing spur-wheels or cannon-pinions 30 and 31. Rotary motion is given to said shafts 28 and 29 by means of a large spur-wheel, 32, which is mounted on the end of the shaft 28 and meshes into a spur-wheel, 33, fitted on the hollow rotary shaft 4. The movement imparted to the shafts 28 and 29 by the gearing 32 and 33 is communicated to the concentric sleeves or shells 27 and 34 by means of spur-disks 35 and 36, that are formed on the ends of said shells and mesh, respectively, into the spur-wheels 30 and 31. It will be obvious that the shafts 28 and 29, bearing said wheels 30 and 31, are rotated in opposite directions, and consequently it follows that the concentric sleeves 27 and 34 are made to rotate and travel or slide in opposite directions for the object here-

inafter explained. The inner sleeve, 27, carries at its outer end a cylindrical shell or ring, 37, which is fitted into said shell, and is secured thereto by screws 38, or other fastening devices. The inner periphery of said shell 37 is so shaped that it will bear upon the peripheries of the rollers or circular dies 9, mounted in the carrier 8, and by the sliding movement which said shell 37 receives when in operation the rollers are gradually forced inward upon the bolt-blank encompassed by said dies. The outer sleeve, 34, carries at its outer end a disk or plate, 39, which has a funnel or cone shaped inward extension, 40, that serves as a holder for the bolt-blank, as is clearly shown in the drawings. The inner end or apex of the cone 40 is made sufficiently large to inclose and hold the head and adjacent body portion of a bolt-blank to be screw-threaded.

The holder or carrier for the circular dies or rollers may be described as a shell or body that has a screw-threaded portion, 43, which enters the screw-threaded socket in the end of the stationary shell 6. As shown in Figs. 2 and 5, the die-holder has recesses or pockets in its periphery which receive the rollers or dies 9, and the gudgeons 46 on said rollers fit into radial slots 45, formed in said die-holder so as to permit the dies or rollers to move in said slots, it being understood that the dies or wheels are in this instance held in place by the shell 37.

In the construction shown in Figs. 7 and 8 the rollers or dies have their gudgeons fitted in grooves 45^a, made in the end flange or head of the die-holder and in slots 45^b of an attachable and detachable cap-plate, 44, secured to the die-holder by screws 45^a.

In the construction shown in Fig. 8 the body of the die-carrier is provided with an inwardly-extending tube or socket, 47, that is located in line with the opening in the guide-funnel 40, so as to allow the bolt-blank to readily enter said tube. The inner end of the latter is closed, and it projects into the hollow shaft 4, where it is surrounded by water made to run through said shaft for properly cooling the dies and washing away the scales produced in the operation of threading the bolts.

The die-carrier is provided with longitudinal channels or openings 50, that serve to allow the passage of water therethrough and bring the same in contact with the dies or roller-cutters. Similar openings, 51, in the guide-funnel of the bolt-holder allow the water and scales to pass from the machine.

The water necessary for cooling the dies in the above-described manner is supplied to the main hollow shaft through the supplementary or adjustable interior shaft and a feed-tube, 52, extending from said interior shaft and projecting through the outer bearing of the main shaft.

The object of the socket or pocket 47 for the bolt-blank, as shown in Fig. 8, is to prevent the water from coming in direct contact with

the end portion of the bolt-blank, as the same is entered into the machine for having a screw-thread formed thereon.

The operation of my machine has been outlined in the description of its component members, but it will be more completely set forth, as follows, viz: The parts being in their normal positions and the machine at rest, a bolt-blank is entered into the trumpet-shaped holder and made to glide between the peripheries of the rollers or dies, the latter being free to move outward for allowing the blank to pass, and the shell or ring that surrounds the dies for subsequently exerting pressure thereupon being cut away at its inner end to permit the rollers or dies to move in the described manner. The bolt-blank having been properly centered or fitted in position, the friction-disk on the hollow driving-shaft is moved in an outward direction by depressing the treadle beneath the machine, the intermediate strap, clutch-lever, and inner sliding shaft permitting such movement to take place.

By the contact of the friction-disk with the outer driving-pulley the hollow shaft and all parts carried thereby are rotated, and the spur-wheel on said shaft is caused to effect the rotation of the two shafts that carry the long spur-wheels or cannon-pinions. The latter being in gear with the spur-disks on the concentric sleeves that carry the bolt-holder and the die-operating ring, it follows that said sleeves are rotated and made to move respectively outward and inward in relation to the part of the machine where the driving-pulleys are located. This outward movement of the bolt-blank between circular dies that are being gradually forced upon the metal of the bolt-blank will cause the formation of a spiral screw-thread in a uniform and expeditious manner.

It is obvious that the dies should be made of varying diameters and grouped or disposed so that the smallest die will commence its operation first, after which the others follow in the order of their size, and complete or finish the threading operation. The outward movement of the bolt-blank and the inward movement of the ring that bears upon the peripheries of the dies will serve to hold the latter to their work as long as the bolt-blank is being fed through the same.

It is obvious that bolts having their bodies tapered more or less may be threaded in the same machine by using interchangeable rings or shells of the proper interior size or configuration that will act upon the dies in the manner above described.

When the two concentric sleeves and the parts carried thereby have reached the limit of their inward and outward movement, and the screw-forming operation is completed, a dog or projection, 55, carried on the inner sleeve, comes in contact with a stop-pin, 56, on the shifting-lever, throwing the latter backward, the ring or collar on the sta-

tionary shell is moved forward the length of the slots in the latter, and the inner hollow shaft connected with the friction-wheel is made to move the latter in contact with the rim of the inner driving-pulley. In this manner the direction of rotation is changed and the two concentric sleeves and their adjuncts are moved in a reverse direction from that in which they traveled when performing the threading operation. Such movement will again bring the parts in position for receiving a bolt-blank, the finished bolt having been dropped out of its guide-funnel as soon as the dies released their hold.

In order to arrest the movement of the devices concerned in the thread-forming and feeding operations, when a bolt-blank is being inserted, I provide a disengaging-arm, 60, which extends from the shifting or clutch lever, and has a projection, 61, that fits behind the spur-disk on the inner sliding sleeve. Inclined planes or surfaces on the latter come in contact with the arm 60. At the proper time, which is just at the instant when the two sleeves are in their normal positions, and by such contact the clutch-lever is operated and the friction-disk thrown to the center of the space between the two driving-pulleys, whereby said friction-disk is removed from contact with either pulley, and the sleeves and their adjuncts are held in a state of rest until the bolt-blank has again been properly entered. When this has been done, pressure upon the foot-treadle will throw the threading and feeding mechanism into gear in the manner already described.

The degree of longitudinal movement of the concentric sleeves is determined by the length of the stop pins and disengaging arm or lever, or the period of time when such parts are in contact with the clutch mechanism. In this manner I am enabled to set the parts for forming threads on short or long bolts, and I preferably make said stop-pin and disengaging-lever adjustable by set-screws, so that these parts will answer for different-sized bolts.

Having thus described my invention, what I claim is—

1. In a machine for screw-threading bolts and other objects, the combination of a rotary and sliding blank-carrier, a group of circular dies or roller-disks through which the bolt-blank is fed, and a sliding and rotary device for forcing the dies or disks to their work, substantially as described.

2. In a machine for screw-threading bolts and other objects, the combination of the concentric screw-threaded shells or sleeves, a blank-carrier and a die-pressing ring carried by said sleeves, and a holder for a series of roller-disks or circular dies, arranged in co-operative relation to said blank-carrier and die-pressing ring, with mechanism for imparting a sliding and rotary movement to said screw-threaded sleeves, substantially as described.

3. In a machine for screw-threading bolts and other objects, the combination of the stationary screw-threaded shell and the concentric screw-threaded sleeves fitted on said shell, and having spur-disks, the long spur-wheels and their shafts co-operating with said concentric sleeves, a rotary driving-shaft, friction-pulleys, and shifting mechanism for effecting an alternate movement of the concentric sleeves in opposite directions, with a blank-carrier, a die-holder carrying circular dies or roller-disks, and a device for forcing the latter to their work, substantially as described.

4. In a machine for screw-threading bolts and other objects, the combination of the hollow shaft, means for admitting water to the same, a stationary shell carrying a holder, a group of circular dies or roller-disks mounted in the latter, mechanism for drawing a blank through said group of dies or disks, and mechanism for forcing the latter to their work, substantially as described.

5. In a machine for screw-threading bolts or other objects, the combination of the hollow rotary main shaft having two drive-pulleys and an intermediate shifting-pulley or friction-disk, the internal longitudinally-movable shaft carrying said shifting-pulley and the clutch or shifting mechanism, with the longitudinally-movable sleeves or blank-carrier and die-operating device adapted to engage with said shifting device, substantially as described.

6. In a machine for screw-threading bolts and other objects, the combination of the stationary shell having an exterior screw-thread, an end screw-socket for a die-holder, and an inner unthreaded portion provided with flat surfaces, a forked lever mounted on said unthreaded portion, and treadle and connecting mechanism, with a rotary shaft fitted in said stationary shell, a supplementary and longitudinally-movable shaft arranged inside said rotary shaft, and connected with the forked shifting-lever, the driving-pulleys mounted on the aforesaid rotary shaft, and a friction-

disk connected with the supplementary shaft, substantially as described.

7. The combination of the blank-holder having a cone-shaped socket, the die-holder having circular dies or roller-disks arranged in rear of said cone-shaped socket, the shell for pressing the dies upon the blank, and means for drawing the latter through the dies, substantially as described.

8. In a machine for screw-threading bolts and other objects, the combination of the shifting or clutch device having adjustable stop pins or arms with the supporting device and the traveling sleeves carrying the blank-carrier and die-closing devices, substantially as described.

9. The combination of the die-holder, the radially-movable circular dies or roller-disks mounted therein, and the encircling-shell having its inner portion made flaring or otherwise shaped for exerting pressure upon the peripheries of the dies, with means for drawing the blank to be threaded through said dies, substantially as described.

10. In a machine for screw-threading bolts or other objects, the combination of the blank-holder having a funnel-shaped mouth provided with water and scale outlet openings, the die-holder having water-passages, and the die closing or pressing shell surrounding said die-holder, substantially as described.

11. A die-holder having a cylindrical extension or pocket closed at its rear end and open at its front end, the circular dies or roller-disks fitted in said holder, means for closing said dies and drawing the blank between the same, and a hollow shaft carrying the die-holder for applying water to the same, substantially as described.

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

JOHN NORTH.

Witnesses:

WILLIAM R. PLUM,
RUFUS KING.