

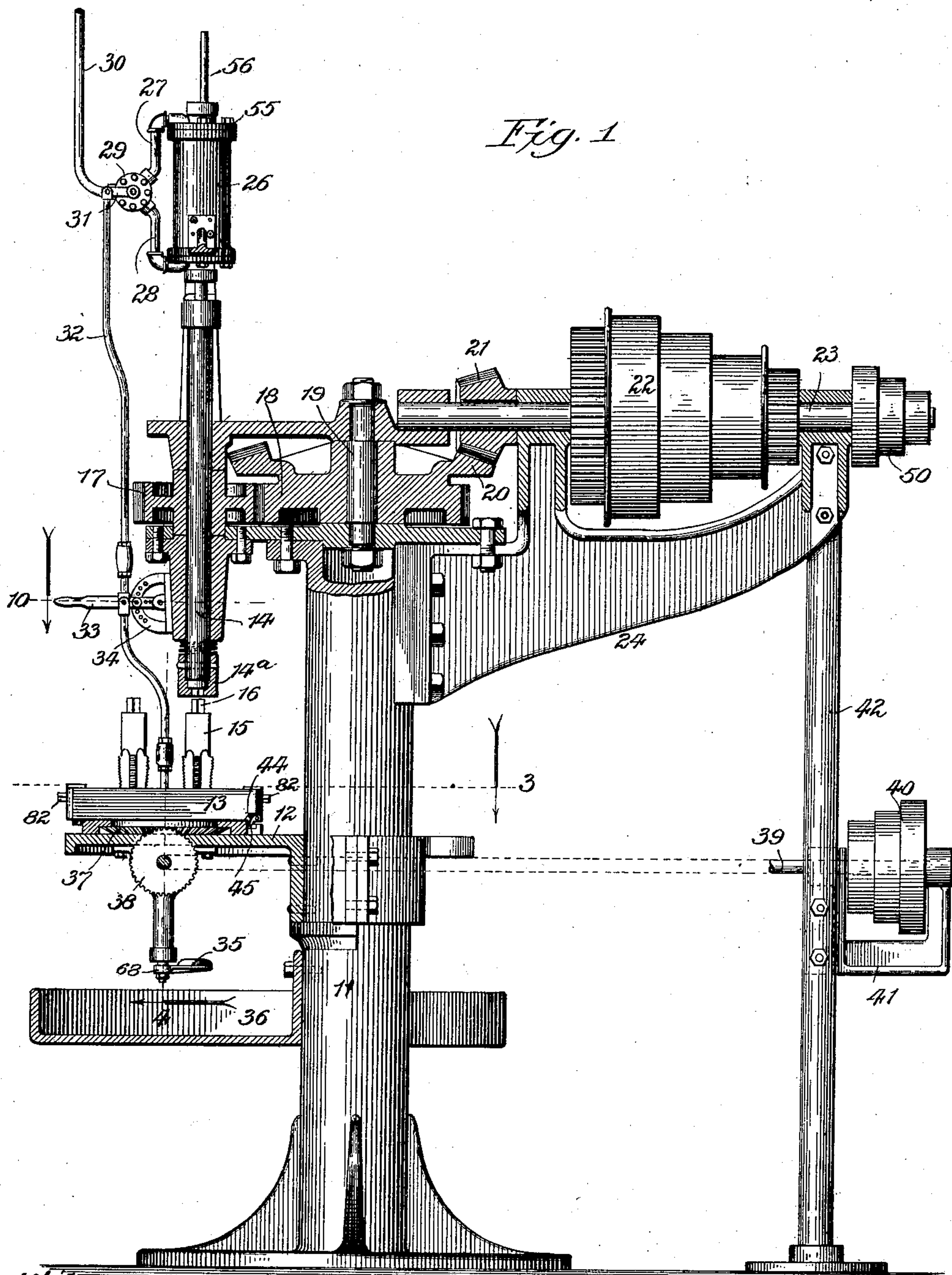
No. 734,572.

PATENTED JULY 28, 1903.

H. KOESTER.
THREADING MACHINE.
APPLICATION FILED APR. 23, 1902.

NO MODEL.

6 SHEETS—SHEET 1.



Witnesses:

Edw. S. Taylor,
John Enders, Jr.

Inventor:

Henry Koester
By *Paul Synnestvedt*
Att'y.

No. 734,572.

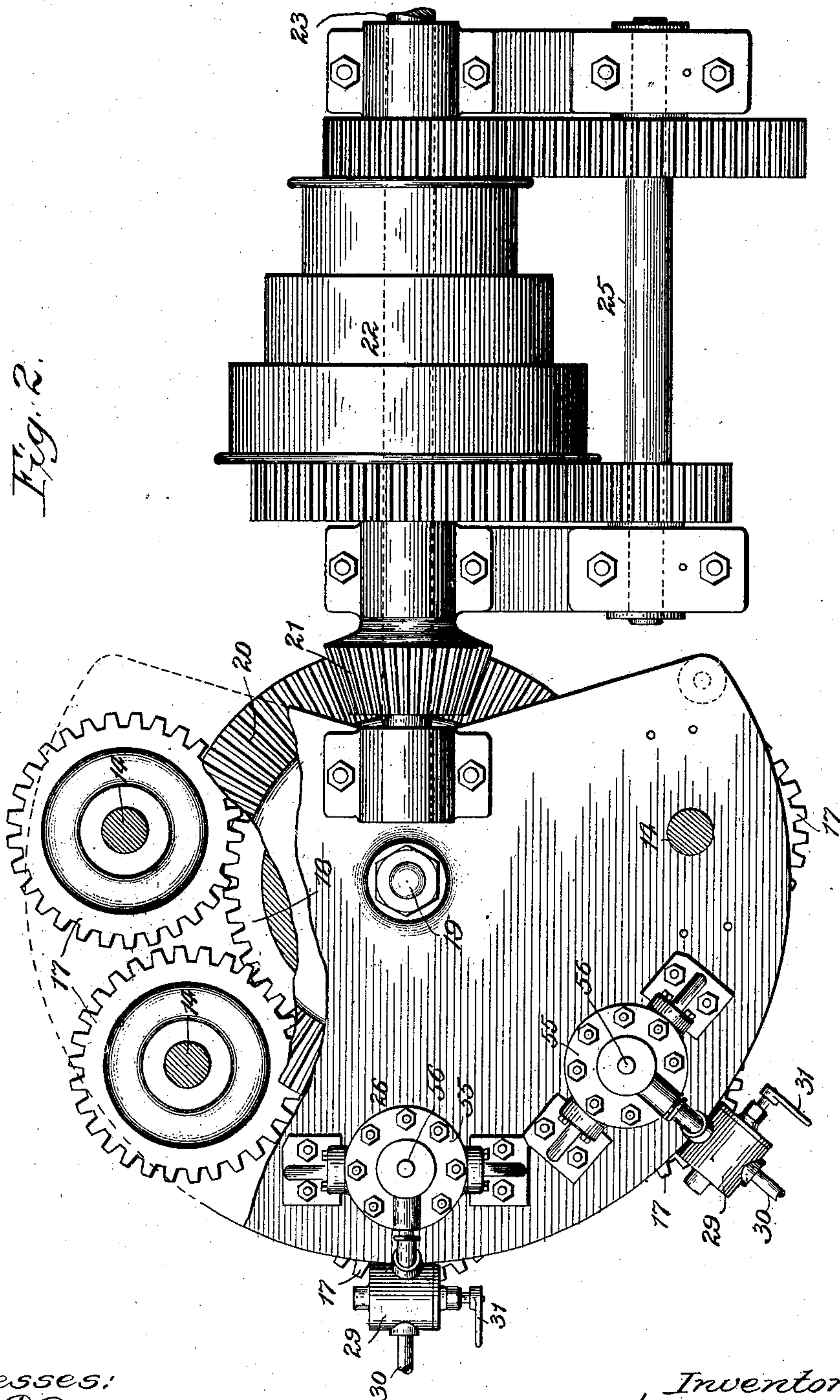
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6 SHEETS—SHEET 2.



Witnesses:
Paul E. Gaylord.
John Enders.

Inventor:
Henry Koester
By *Paul Lynnestred*
Att'y.

No. 734,572.

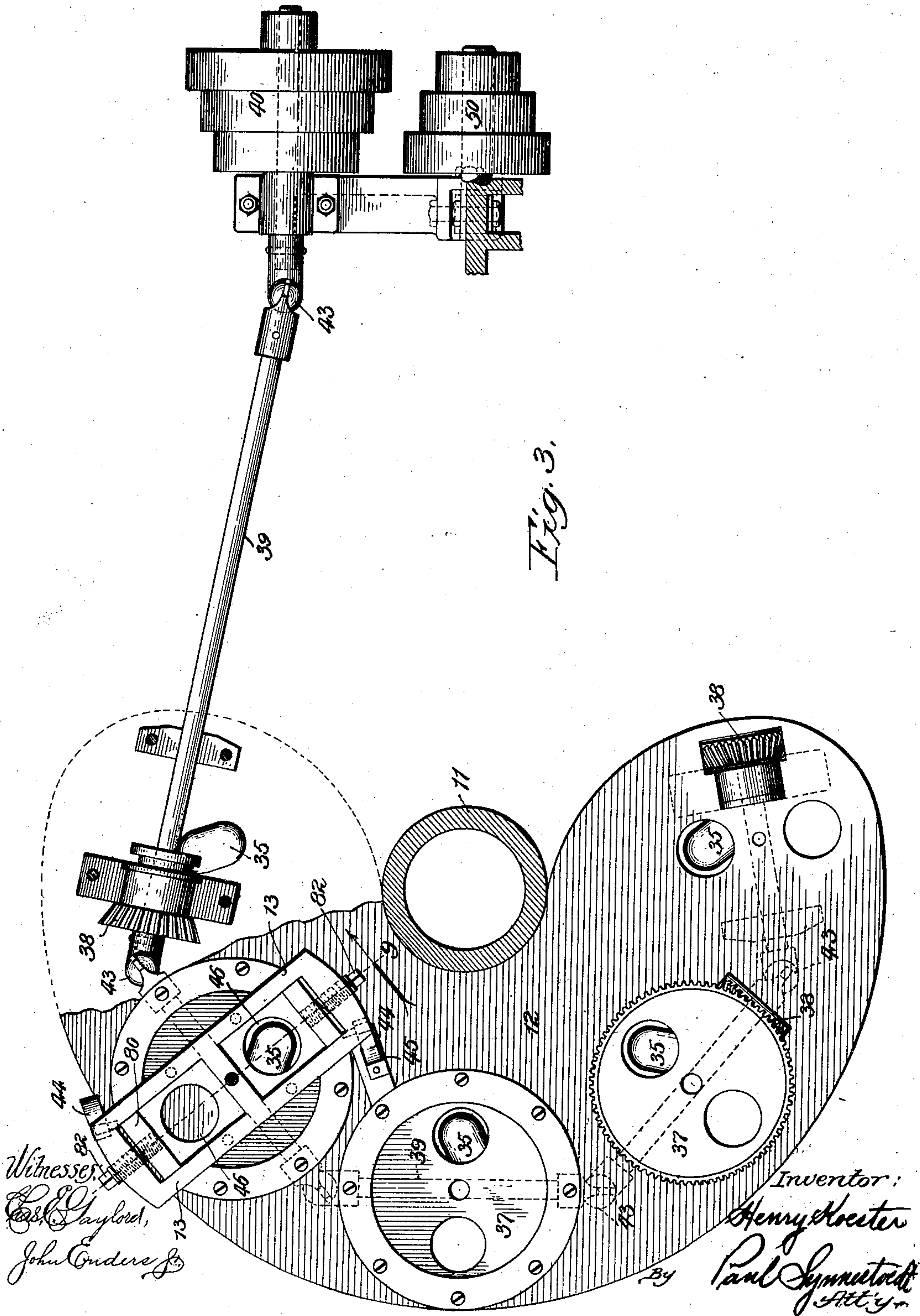
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6 SHEETS—SHEET 3.



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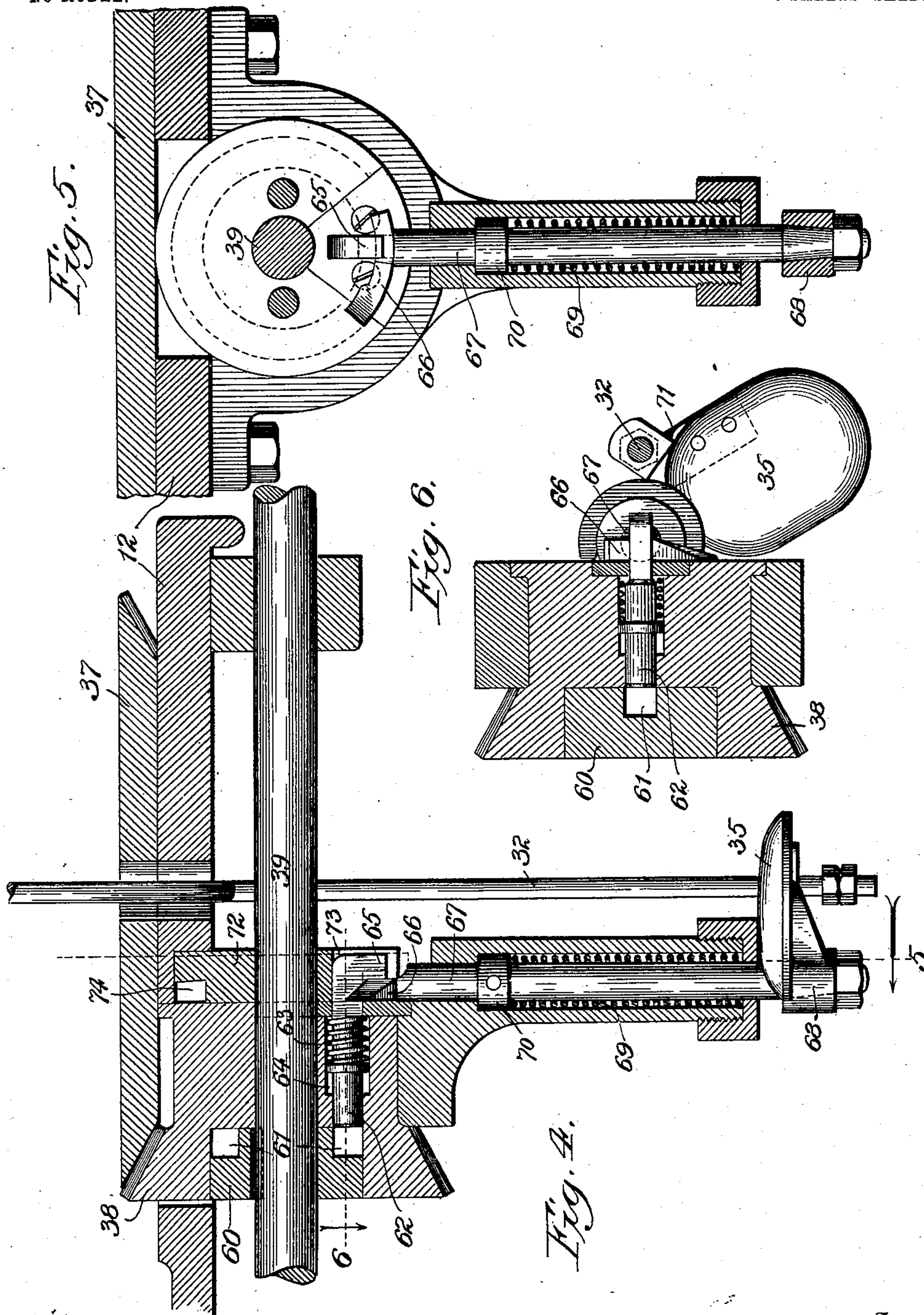
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NO MODEL.

6 SHEETS—SHEET 4.



Witnesses:
E. C. Chyford,
John Enders & Co.

Inventor:
Henry Koester
By Paul Symmetts
Att'y

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6 SHEETS—SHEET 5.

Fig. 7.

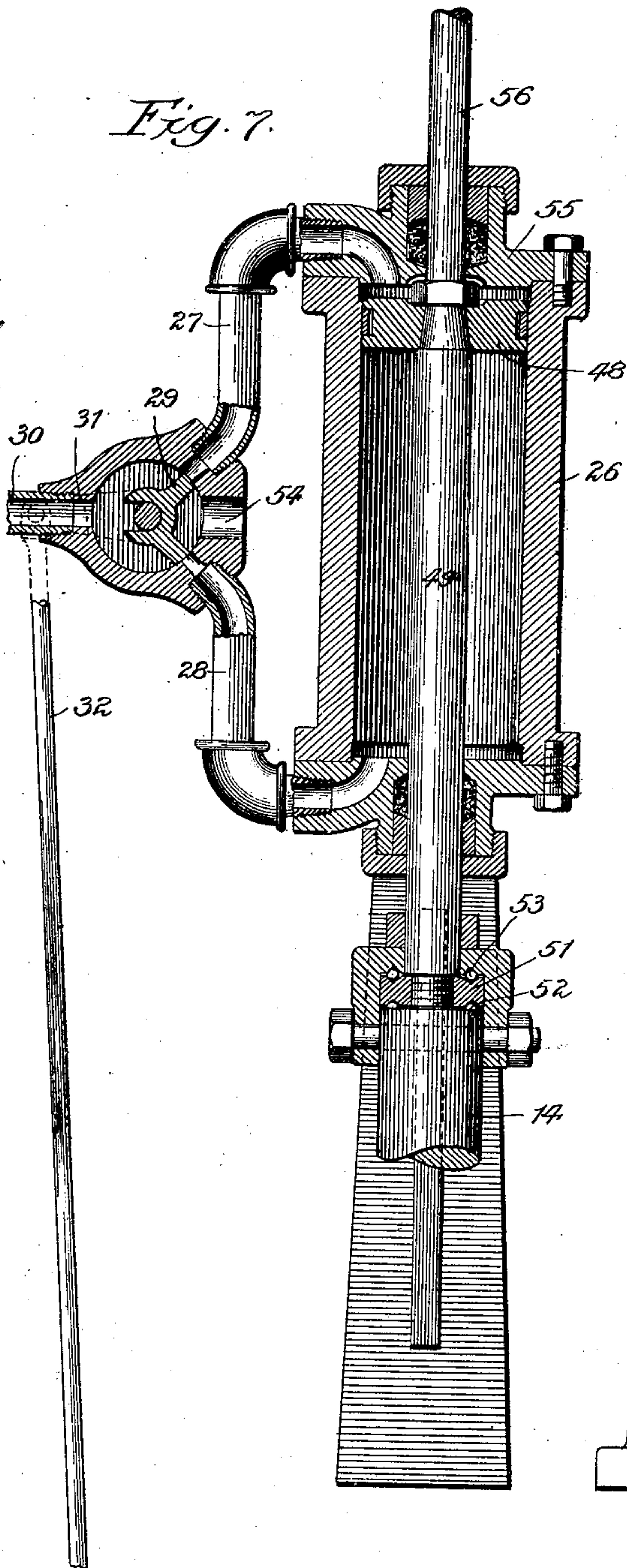
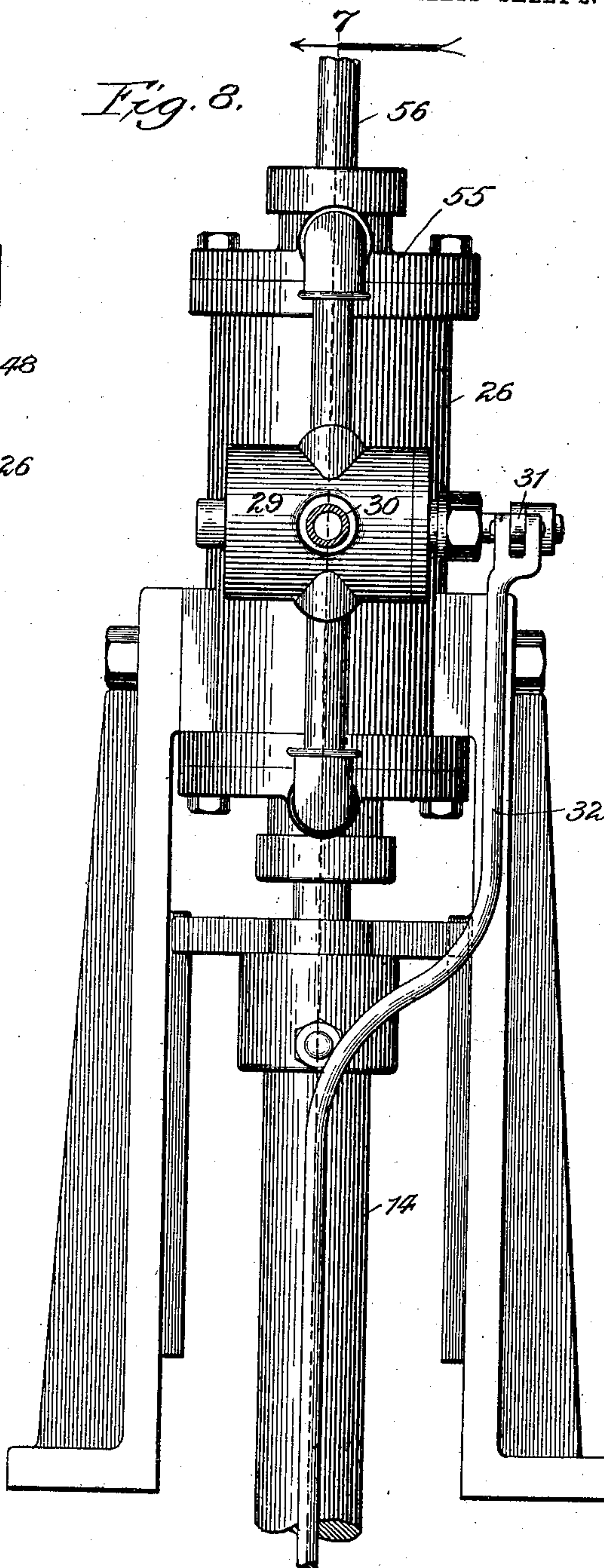


Fig. 8.



Witnesses:

Carl E. Gaylord,
John Enders Jr.

Inventor:

Henry Koester
By Paul Lynne Jacobs
Att'y.

No. 734,572.

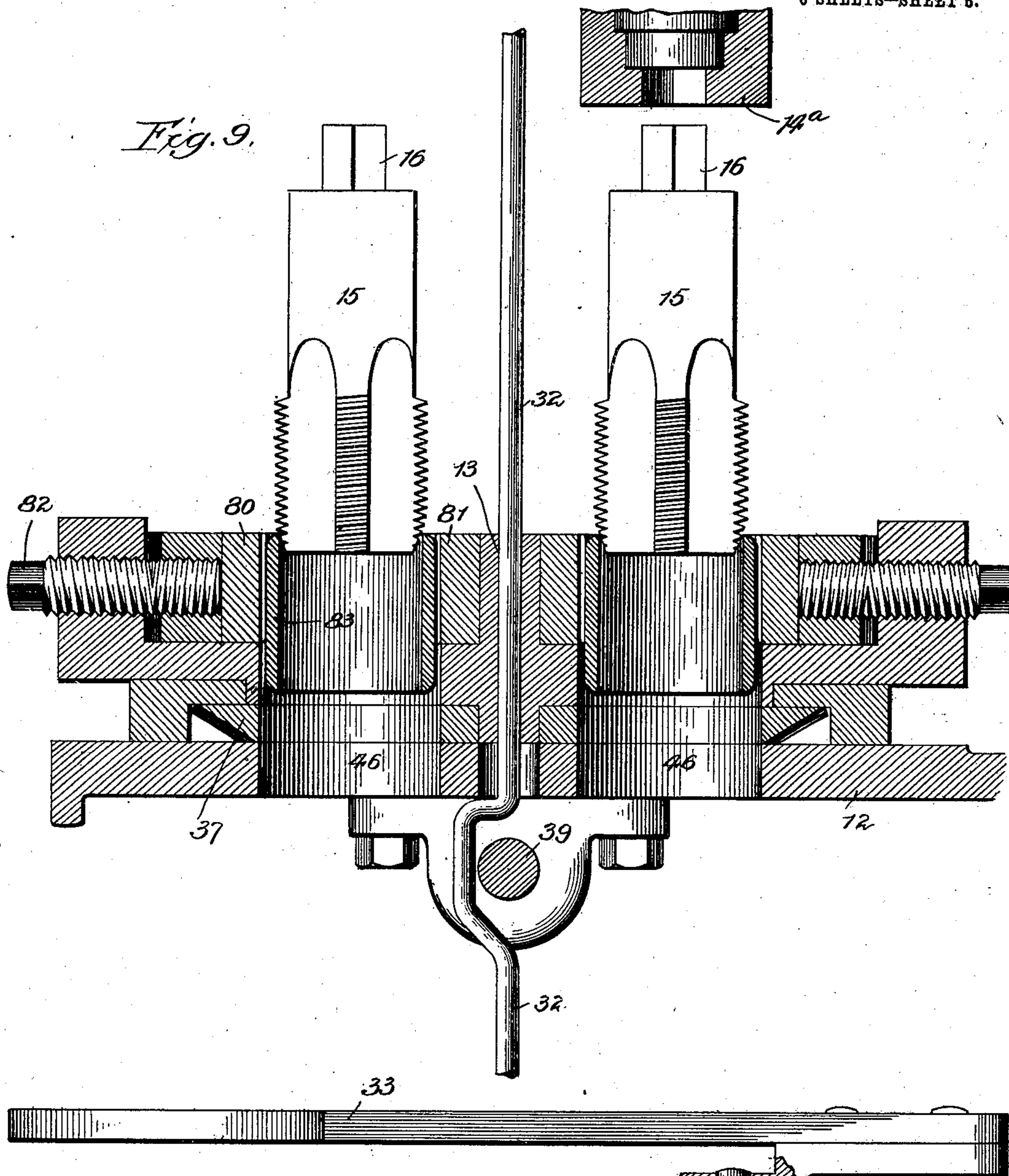
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H. KOESTER.
THREADING MACHINE.

APPLICATION FILED APR. 23, 1902.

NO MODEL.

6 SHEETS—SHEET 6.



Witnesses:
Carl E. Gaylord.
John Anders Jr.

By

Inventor:
Henry Koester
Paul Lynnebro
Att'y

UNITED STATES PATENT OFFICE.

HENRY KOESTER, OF CHICAGO, ILLINOIS, ASSIGNOR TO CRANE COMPANY,
OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

THREADING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 734,572, dated July 28, 1903.

Application filed April 23, 1902. Serial No. 104,354. (No model.)

To all whom it may concern:

Be it known that I, HENRY KOESTER, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have
5 invented certain new and useful Improvements in Threading-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention has reference to the provision of certain improved mechanism for cutting threads, and particularly to the means employed for reversing the feeding mechanism of the threading-tool after the thread has been cut, the said reversing means being constructed so as to be absolutely certain and
15 reliable in its operation—that is, so that it will produce a reversal of the feeding mechanism quickly after the thread has been completed—and which at the same time will not
20 and cannot by any possibility produce a reversal of the feeding mechanism before the thread has been completed, such as may occur where stop or trigger devices are used actuated by some means upon the machine
25 not directly connected with the tap or the completion of the thread itself. Machines of this character have been constructed in which reversing devices have been actuated by stop projections on different parts of the machine
30 arranged to trip the reversing mechanism at a certain predetermined point; but, as will be obvious, this requires that the piece or article to be threaded shall be always of the same size and placed in the same position with
35 considerable accuracy, so that it will be operated upon by the tap or other threading-tool to the same extent in each case before the tripping or reversing mechanism comes into play.

40 My improvements are particularly applicable to machinery designed for the purpose of tapping pipe-couplings or nuts or any other like articles and have special reference to an apparatus in which the tap operates vertically and the mechanism for holding the
45 article to be tapped supports the same in a position where the opening to be threaded is substantially vertical, so that the tap after it is fed clear through the opening and has
50 completed the thread can fall and operate upon suitable reversing devices constructed

to be actuated by the impact of the tap as it falls, all as will hereinafter more particularly appear from an examination of the accompanying drawings in connection with the following description. 55

The accompanying drawings show an apparatus embodying my improvements in preferred form.

Figure 1 is a side elevation, partly in section, of a machine, showing the general arrangement of the devices. Fig. 2 is a plan view, also partly in section, of the same machine as is shown in Fig. 1. Fig. 3 is a view, partly in plan section, showing certain of the
65 mechanisms illustrated in Fig. 1, the view being taken on the line 3 of Fig. 1. Fig. 4 is a sectional view taken on the line 4 of Fig. 1. Fig. 5 is a sectional view taken on the line 5 of Fig. 4. Fig. 6 is a sectional view of a
70 detail of the apparatus, taken on the line 6 of Fig. 4. Fig. 7 is a vertical section through the reversing and feeding mechanism, taken on the line 7 of Fig. 8, and Fig. 8 is a side elevation of the same. Fig. 9 is a view, partly
75 in section, showing the revolving chuck which I employ for holding the article to be tapped with the tap in position to be started to cut the threads in the same, the view being taken on the line 9 of Fig. 3; and Fig. 10
80 is a view, partly in section, taken on the line 10 of Fig. 1.

Referring now more particularly to Fig. 1, it will be seen that upon an upright post or standard 11 there is mounted a bracket-table
85 12, carrying a revolving chuck 13, above which in substantially vertical position is disposed a tapping-spindle 14, constructed to drive a tap 15 when the latter is in place and in engagement with the spindle by means
90 of the squared projecting end 16. The vertical spindle 14 is arranged to be driven by means of a gear-wheel 17 from a main driving-gear 18, mounted about an axle 19, which stands in vertical position above the center
95 of the post or supporting-standard 11. The gear 18 has a set of beveled teeth 20 thereon, constructed to be driven by a beveled pinion 21, which receives its movement from the belt-cone 22, carried by the horizontal shaft
100 23, which is supported in bearings in the bracket-arm 24, which extends out from the

upright standard 11. The belt-cone 22 (see Fig. 2) has the usual arrangement of back gear 25, such as is commonly employed on lathes and other screw-cutting tools.

5 As will be seen by reference to Fig. 2, I provide in the preferred arrangement of the machine a plurality of the vertical tapping-spindles 14 grouped about the center axle 19 of the main driving-gear 18, so that the
10 driving-gear 17 of each of said spindles 14 will be actuated by the same main driving-gear 18. At the upper end of each of the spindles 14 there is a air-cylinder 26, provided with a pipe connection 27, leading to
15 its upper end, and one, 28, to the lower end, the said pipe connections being controlled by a valve 29, the inlet whereof is through the tube marked 30 and the outlet through a cavity shown in the detailed figures of the
20 valve. The actuating-lever 31, which operates the valve, receives its movement from a vertically-disposed rod 32, that at a point near its lower end has a hand-lever 33, with a quadrant 34 arranged in such posi-
25 tion that the rod can be raised and lowered by hand and locked by means of the quadrant in any desired position when occasion requires. The rod 32 extends down through the bracket-table 12 and at its lower end en-
30 gages with a projecting arm or step 35, disposed in a position where it will intercept the tap 15 as the same falls after having completed the cutting of the thread in the article which is held by the chuck 13. Below the
35 ends of the rod 32 and the step 35 there is a receiving-pan 36, intended to catch the tap when it falls, as well as the articles which have been threaded when they are released from engagement by the chuck. The chuck
40 13 is of the revolving type well known in the art and is arranged to be driven by means of the beveled gears 37 and 38, the latter whereof is constructed to receive its driving motion from a shaft 39, which in turn is
45 driven by a belt-pulley 40 from the belt-pulley 50 on the shaft 23, the pulley 40 being supported in the bracket 41 upon an upright standard 42, which also aids in supporting the upper outer end of the bracket 24. Since
50 there are five revolving chucks and each has a driving beveled gear 38, the shaft 39 is arranged with a number of universal joints 43 therein, so that it can be extended around the center of the supporting-standard 11, as
55 clearly shown in Fig. 3. The revolving chucks are provided with gravity-pawls 44, arranged to engage notches 45 when the chucks are in proper position, so as to bring the article directly under the tapping-spindle at each half-
60 revolution of the chuck. Immediately under the tapping-spindle 14 of each of the five sets of apparatus the table-bracket 12 is apertured, as indicated at 46, so that when the tap has completed the thread it can fall
65 through the table and strike the step 35. The

gears 37 are apertured in like manner and for the same purpose.

Referring now more particularly to Fig. 7, it will be seen that the cylinder 26 contains within it a piston 48, which is attached to the
70 piston-rod 49, that by means of a collar 51 and an inclosing sleeve 52 is secured to the tapping-spindle 14, the ball-bearings 53 being introduced to reduce the friction so far as possible. The piston is intended to be actu-
75 ated by means of air-pressure or other equivalent fluid controlled, as already stated, by the valve 29, which is arranged to be moved by the rod 32, so as to admit air either to the
80 upper or lower end of the cylinder, as required, and at the same time exhaust the opposite end through the exhaust-port 54. The rod 49 is extended upward through the upper cylinder-head 55, as indicated at 56, in
85 order to provide means for observing the movement of the piston and attached rod.

Referring now more particularly to Figs. 4, 5, and 6, it will be seen that the gear 38 is rotatably mounted about the shaft 39 and
90 has within it a collar 60, which is keyed to the shaft 39 and provided with pin holes or openings 61, adapted to receive the end of a spring-pin 62, held by the spring 63 in a re-
95 cess 64 in the body of the gear 38, the spring acting to hold the pin in engagement with the opening 61 except when it is pulled out by the bent end 65, engaging the inclined end
100 66 of the rod 67, which at the lower end supports the bracket 68, that carries the step 35, the rod 67 being held in upright position at the upper end of its stroke by means of the
105 spring 69 and collar 70. The rod 32 is also secured to the step 35 by means of a small bracket 71, as indicated in Fig. 6. Surrounding the shaft 39 and adjacent to the gear 38
110 there is a collar 72, rotatably mounted about the shaft, the said collar 72 having a slot or opening 73, within which the head or side projection 65 of the bolt 62 is housed, the said
115 collar 72 also being provided with a peripheral channel or rabbet 74 sufficiently large to allow the wedge-shaped or inclined end 66 of the rod 67 to be projected upward in the position shown in Fig. 4, so that it will come
120 into the path of movement of the offset head 65 of the bolt 62 when the rod 67 is in such upper position, but will not interfere with the bolt when the step is depressed, as takes place when the tap falls and strikes it, which releases the offset head 65 and permits the
125 spring 63 to push the bolt 64 into engagement with the keyed collar 60, causing the gear 38 to rotate with the shaft 39 for a full revolution—that is, until the parts return again to the position shown in Fig. 4, as they
130 will by the action of the spring 69 as soon as the tap has fallen clear of the step 35. The gear 38 being one-half the diameter of the gear 37, a full rotation or revolution of the gear 38 will thus produce a half-revolution of

the gear 37 and a half of a complete turn of the revolving chuck, which will serve to bring the side which is outward and has another coupling placed in it into position under the tapping-spindle ready for the tapping of the piece.

Referring now more particularly to Figs. 9 and 10 and Fig. 1, I will proceed to describe the operation of my improved machine. The article to be tapped, 83, is placed in position between the two jaws 80 and 81 on one side of the revolving chuck 13 and tightened in place by means of the screw 82 in the usual manner with devices of this kind and the tap 15 inserted in position, as shown in Fig. 9, after which the machine is started and the chucks revolve the half-turn, bringing the article 83 around with the tap in it into a position under the end 14^a of the tapping-spindle, which is provided with a square opening to fit the squared end 16 of the tap, and the handle 33 is then pushed upward to admit air-pressure to the upper end of the cylinder 26, which by means of the piston 48 pushes down the tap and exerts pressure of air against the tap, tending to feed the same into the article to be threaded, the rotative movement of the tap cutting the thread until the tap has passed completely through the coupling 83, when it will fall through the hole 46 and strike the step 35. This acts upon the rod 32 to pull the valve 29 into a position which will admit air under the piston 48 and exhaust the pressure from above the piston, thus raising the tapping-spindle at the same time that it acts upon the rod 67 against the force of the spring 69 to pull down the wedge-shaped device 66, so as to permit the spring 63 to push the bolt 62 into engagement with the keyed collar 60 on the shaft 39, causing rotation of the gear 38 and the driving of the gear 37 and attached revolving chuck for a half-turn of the revolving chuck, which brings the other end of the same into position, another coupling having been meanwhile put in place with a tap in it, as indicated at Fig. 9. The release of the screw 82 of course permits the coupling to fall down through the opening 46 at the time that a new coupling is inserted, so that the operator does not need to take out manually the coupling which has been already threaded. The coupling after it is inserted and fastened in place has the tap placed in it by hand, the operator picking it out of the tray 36 and setting it up in the position indicated in Figs. 1 and 9.

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

1. A threading-machine comprising in combination a threading-tool, mechanism for feeding the same, mechanism for holding a piece to be threaded, and a reversing means for said feeding mechanism actuated by the threading-tool striking it after completing the thread, substantially as described.

2. A threading-machine comprising in combination a tap, mechanism for feeding the same, mechanism for holding a piece to be tapped, constructed so as to permit the tap to fall after completion of the thread, and means for reversing said threading mechanism, constructed to be actuated by impact of the tap as it falls, substantially as described.

3. A threading-machine comprising in combination, mechanism for holding a tap, mechanism for feeding said tap, mechanism for holding a piece to be tapped, said feeding and holding mechanism constructed so as to permit the tap to fall after completion of the thread, and also constructed so as to hold the article to be threaded in substantially vertical position, means for reversing said feeding mechanism, constructed to be actuated by impact of the tap as it falls, substantially as described.

4. A threading-machine comprising in combination, mechanism for holding a tap, mechanism for feeding the same, mechanism for holding a piece to be tapped, comprising a revolving chuck, said feeding and holding mechanism constructed so as to permit the tap to fall after completion of the thread, and means for reversing said feeding mechanism constructed to be actuated by impact of the tap as it falls, and means for rotating said revolving chuck, constructed also to be put in motion by impact of the tap as it falls, substantially as described.

5. In a tapping-machine, the combination with a plurality of revolving chucks grouped about a central support, of a driving-shaft for imparting revolving movement to said chucks, said driving-shaft extending around said central support, and being provided with a plurality of universal joints, substantially as described.

6. In a threading-machine the combination with a plurality of revolving chucks arranged about an upright support, of a continuously-running driving-shaft for imparting driving movement to said revolving chucks, and trip mechanism connected with said driving-shaft arranged to couple the revolving chucks with said driving-shaft for a half-revolution of the chuck, and an actuating device for putting the chuck in motion, constructed to be operated by the striking of the tap as it falls after completion of the thread, substantially as described.

7. In a tapping-machine the combination with means for holding an article to be tapped, means for releasably holding the tap, and driving mechanism for rotating said tap, of fluid-pressure mechanism for feeding said tap, and automatic means for reversing said fluid-pressure mechanism by the falling of the tap, substantially as described.

8. In a tapping-machine the combination with means for holding an article to be tapped, means for releasably holding the tap, and driving mechanism for rotating said tap, of

fluid-pressure mechanism for feeding said
tap, and means for controlling said fluid-
pressure mechanism, and devices construct-
ed to be actuated by impact of the tap as it
5 falls, for setting in motion said fluid-pressure
mechanism, substantially as described.

In testimony whereof I have hereunto set

my hand in the presence of two subscribing
witnesses.

HENRY KOESTER.

In presence of—

PAUL CARPENTER,

PHILIP J. FINNEGAN.