

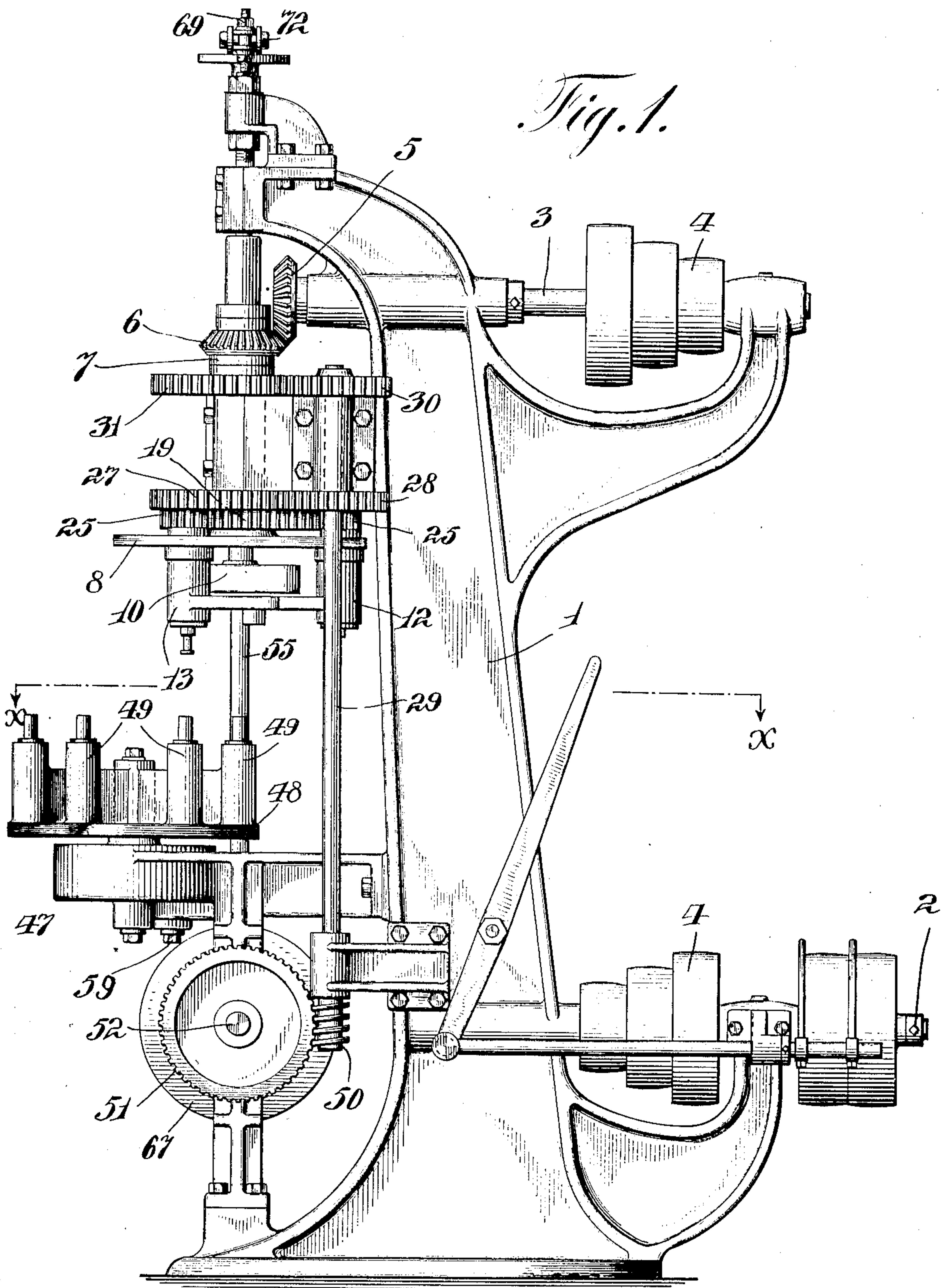
No. 871,857.

PATENTED NOV. 26, 1907.

O. S. BEYER.  
SEAMING MACHINE.

APPLICATION FILED DEC. 26, 1903. RENEWED JUNE 5, 1906.

9 SHEETS—SHEET 1.



Witnesses  
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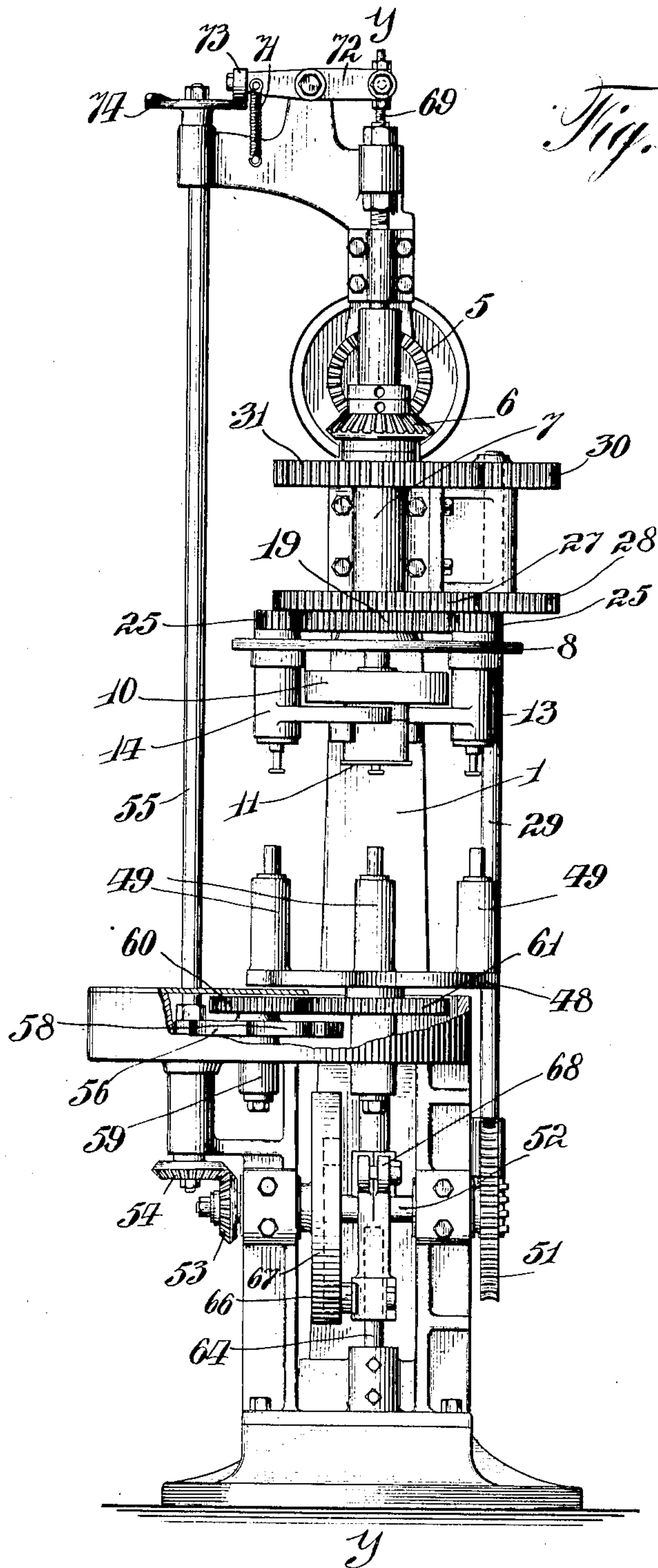
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9 SHEETS—SHEET 2.



*Fig. 2.*

Witnesses  
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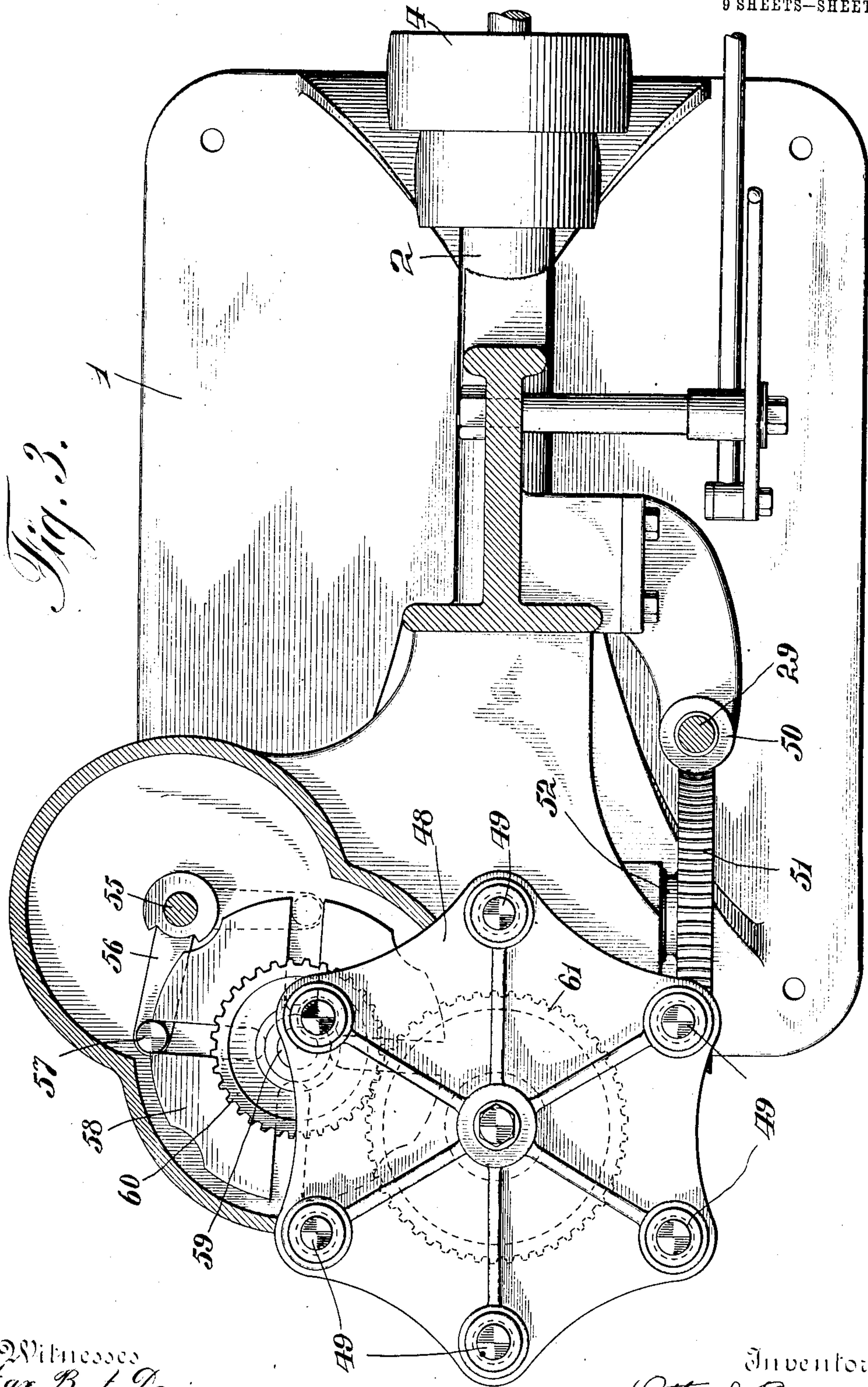
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9 SHEETS—SHEET 3.



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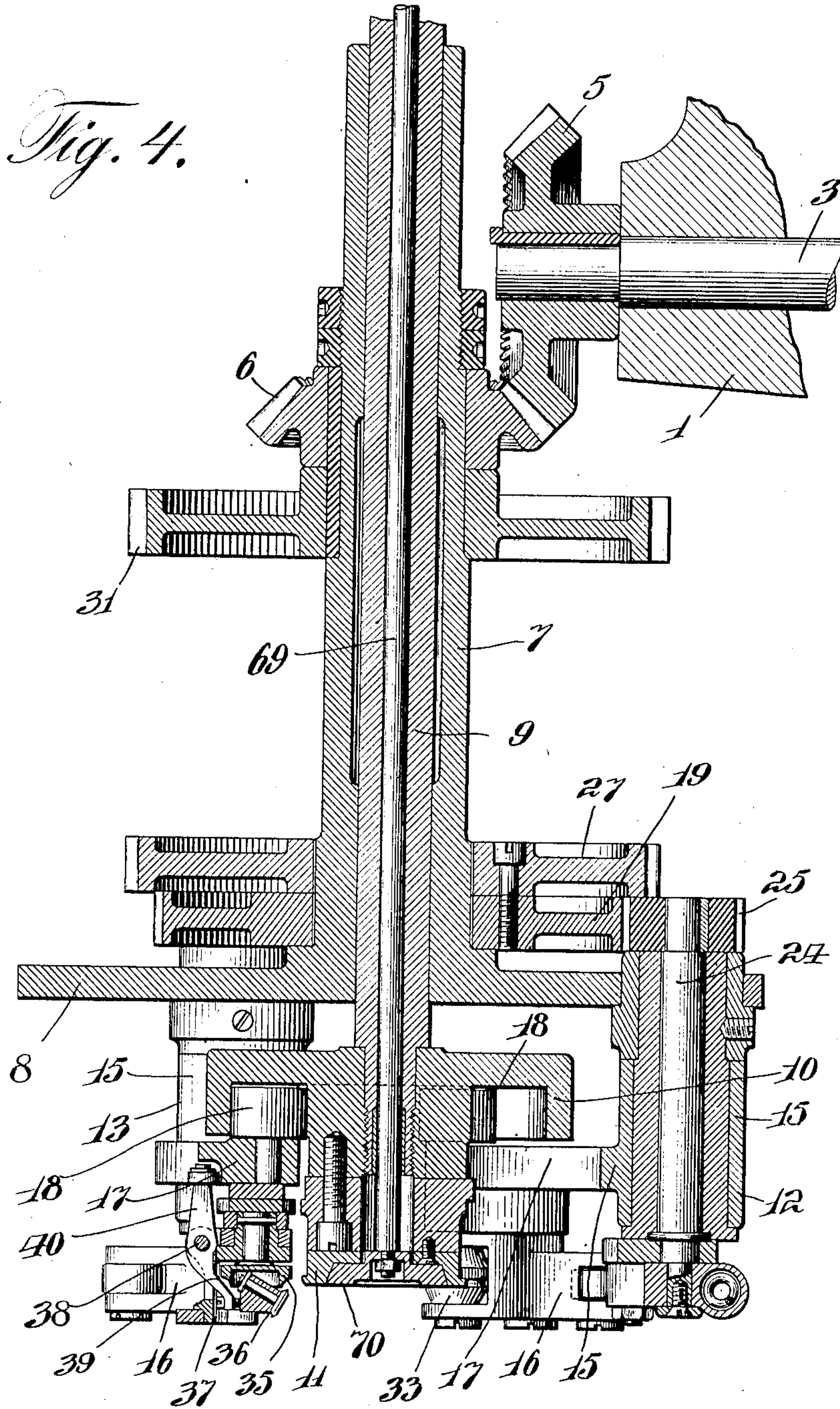
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9 SHEETS—SHEET 4.



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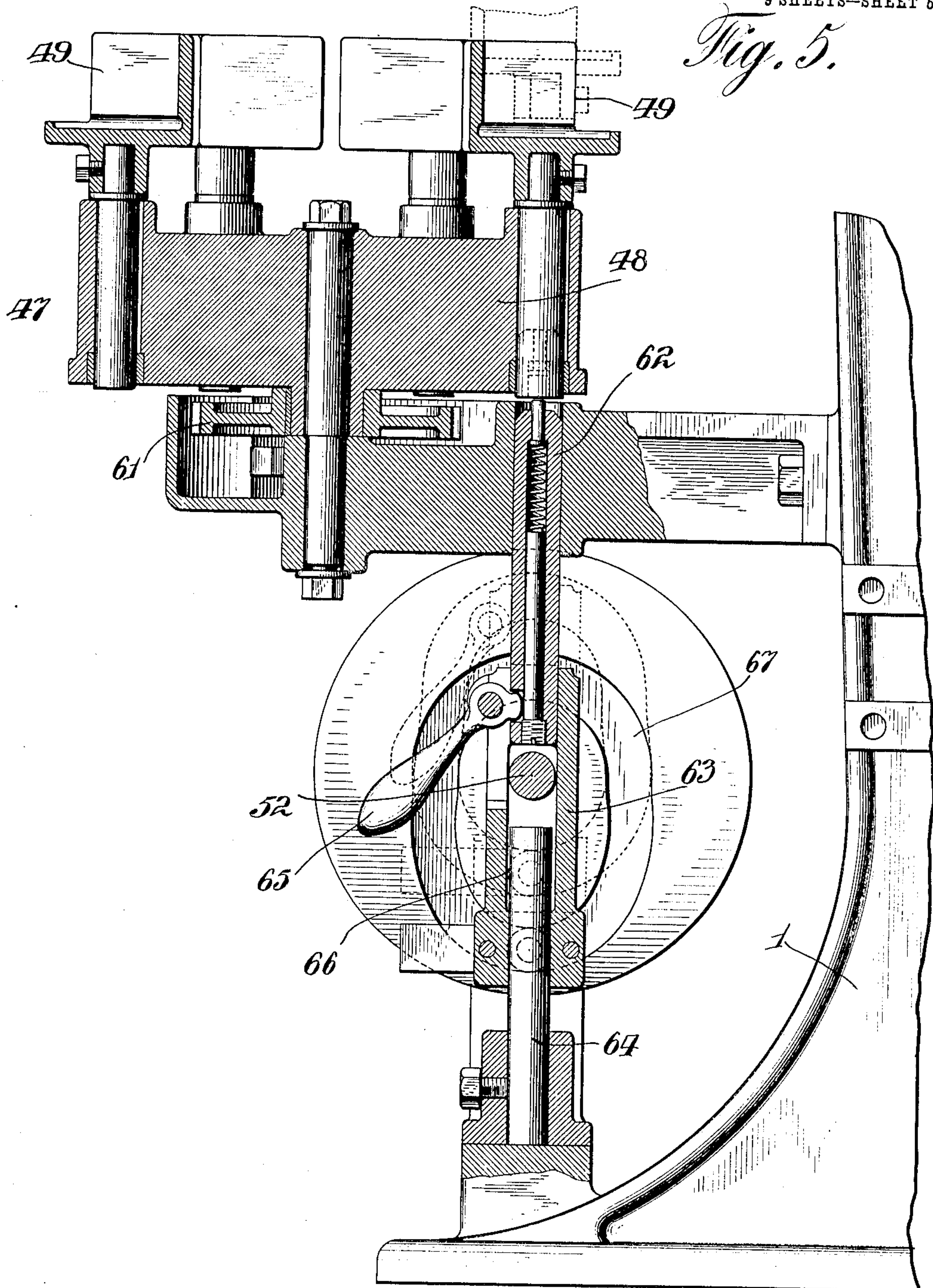
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O. S. BEYER.  
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9 SHEETS—SHEET 5.



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No. 871,857.

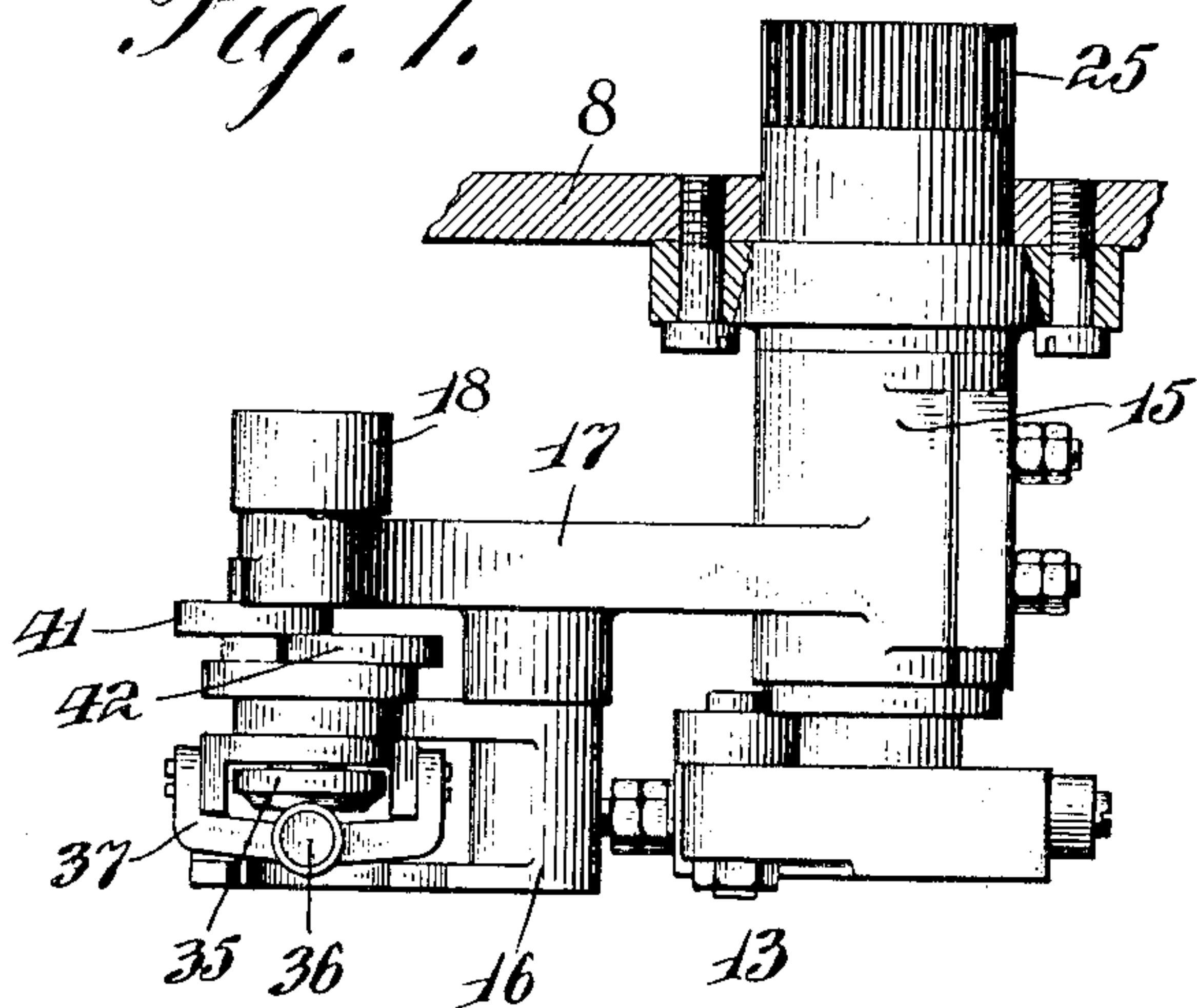
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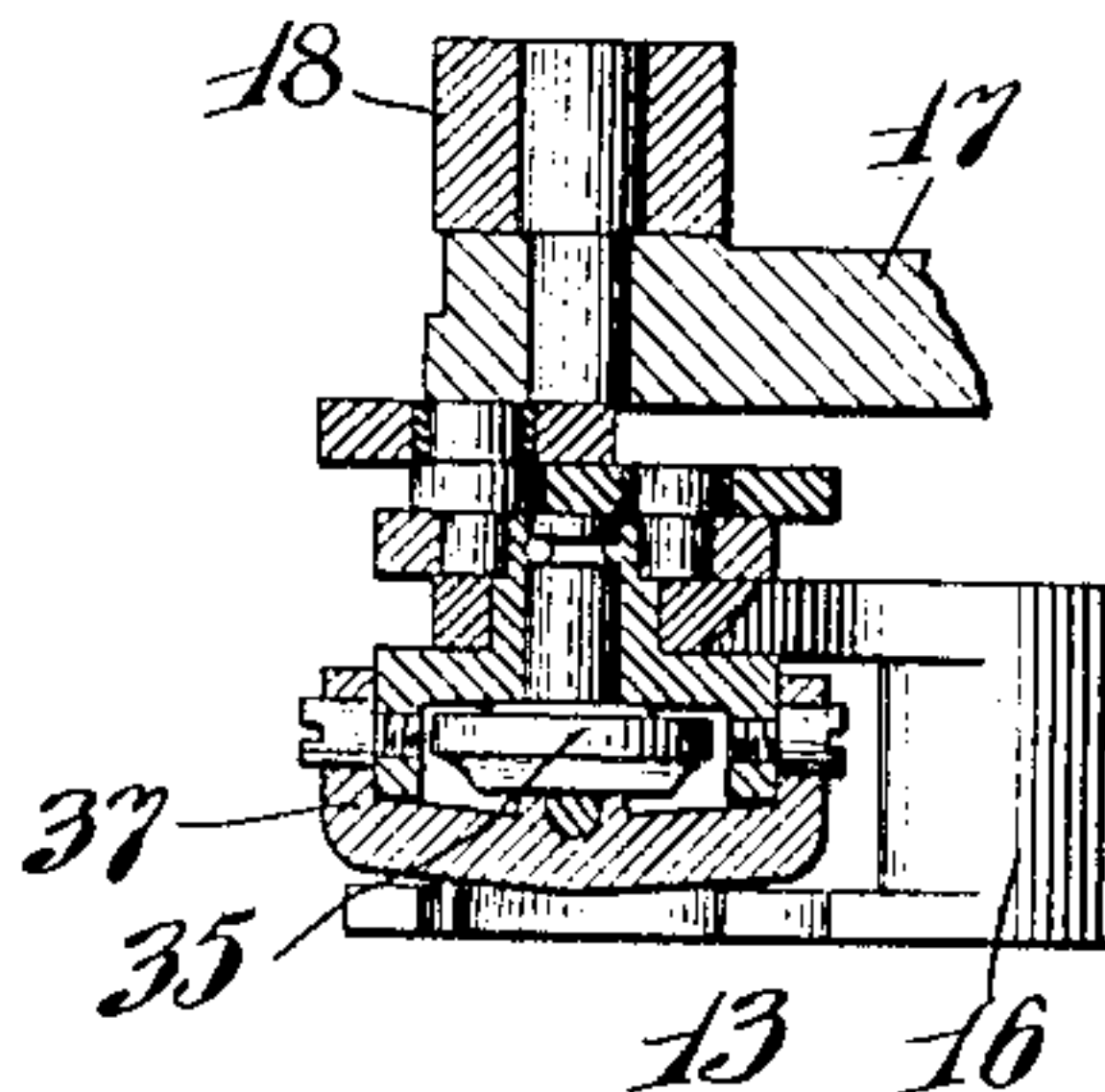
APPLICATION FILED DEC. 26, 1903. RENEWED JUNE 5, 1906.

9 SHEETS—SHEET 8.

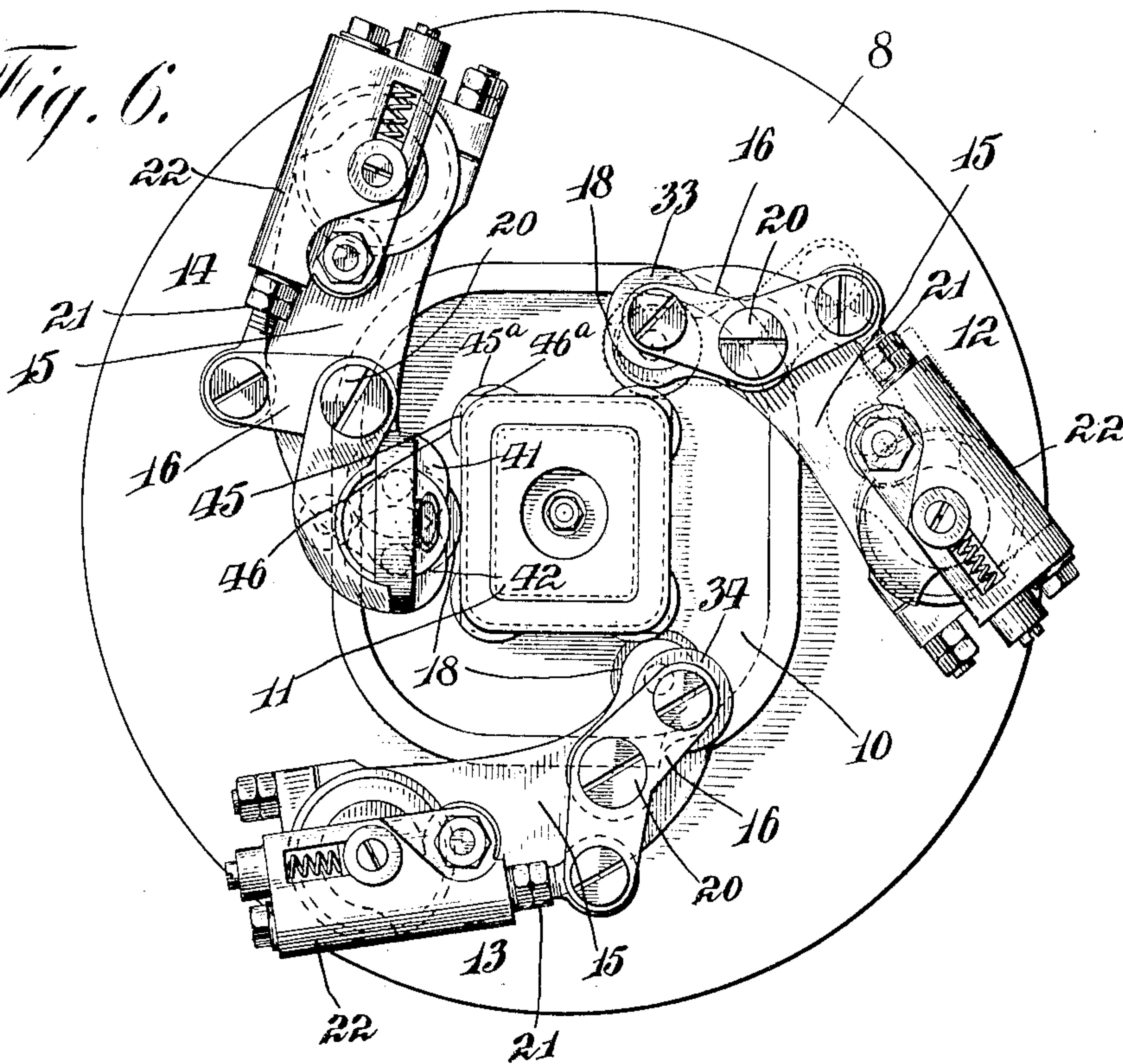
*Fig. 7.*



*Fig. 8.*



*Fig. 6.*



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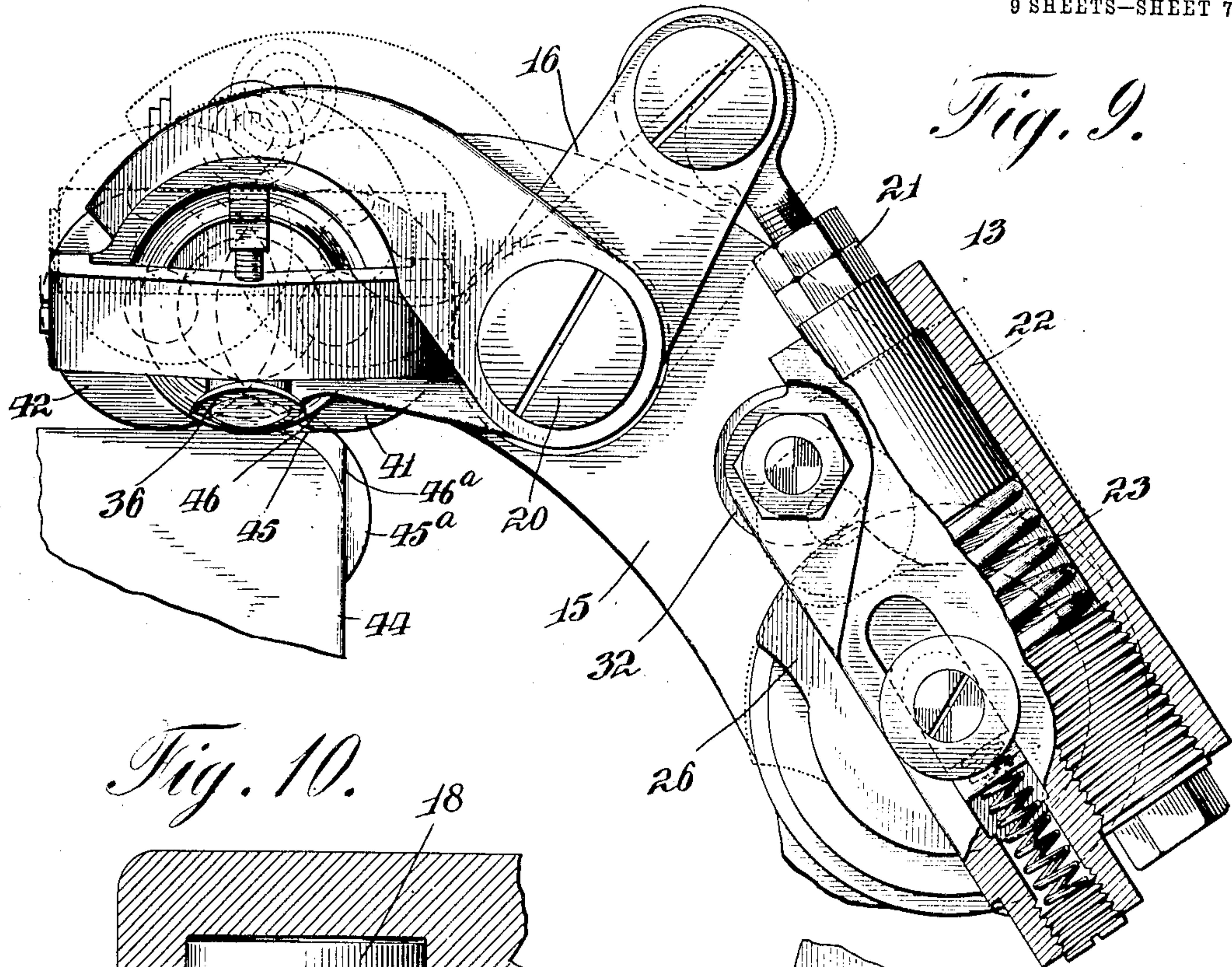
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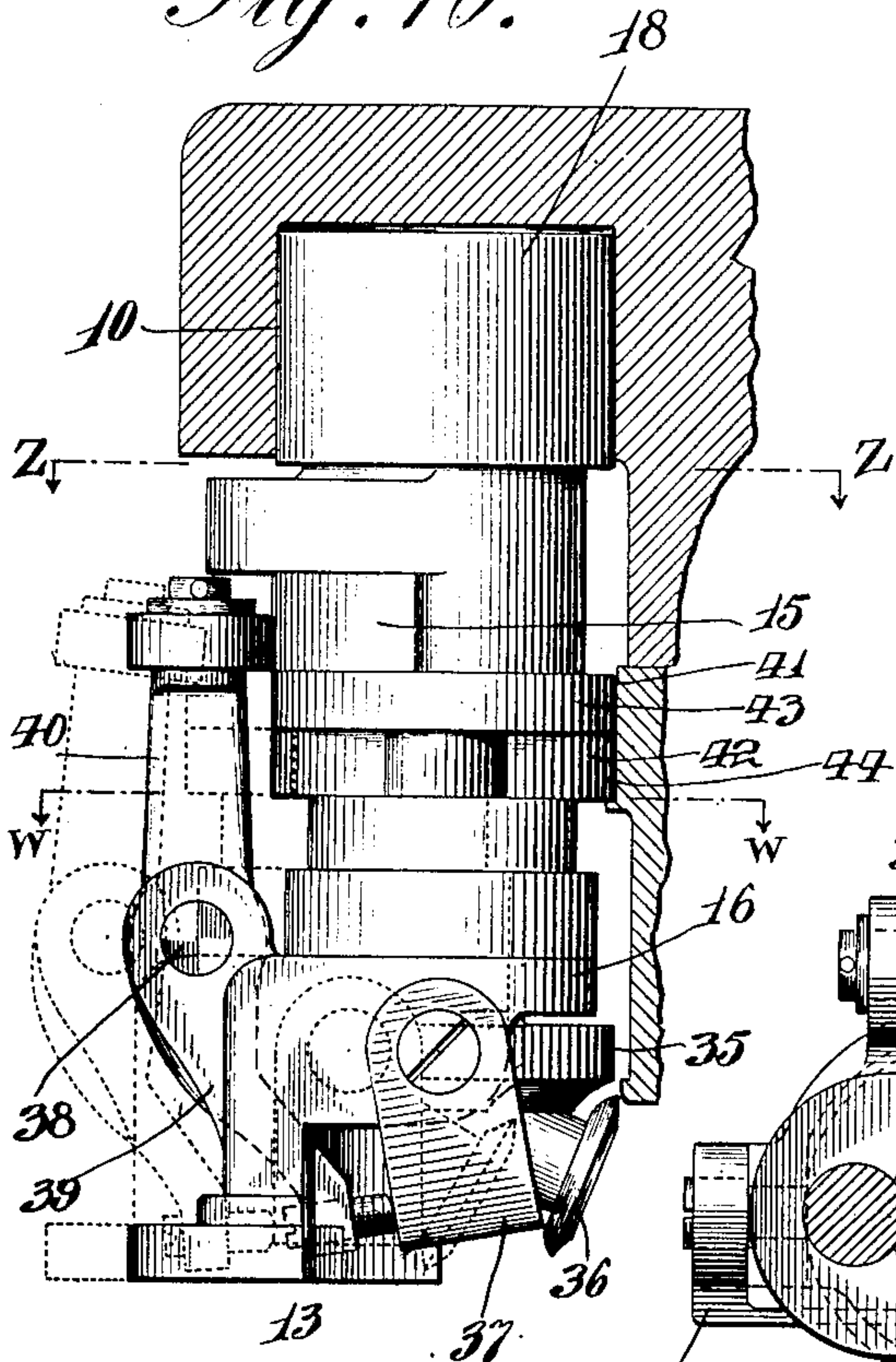
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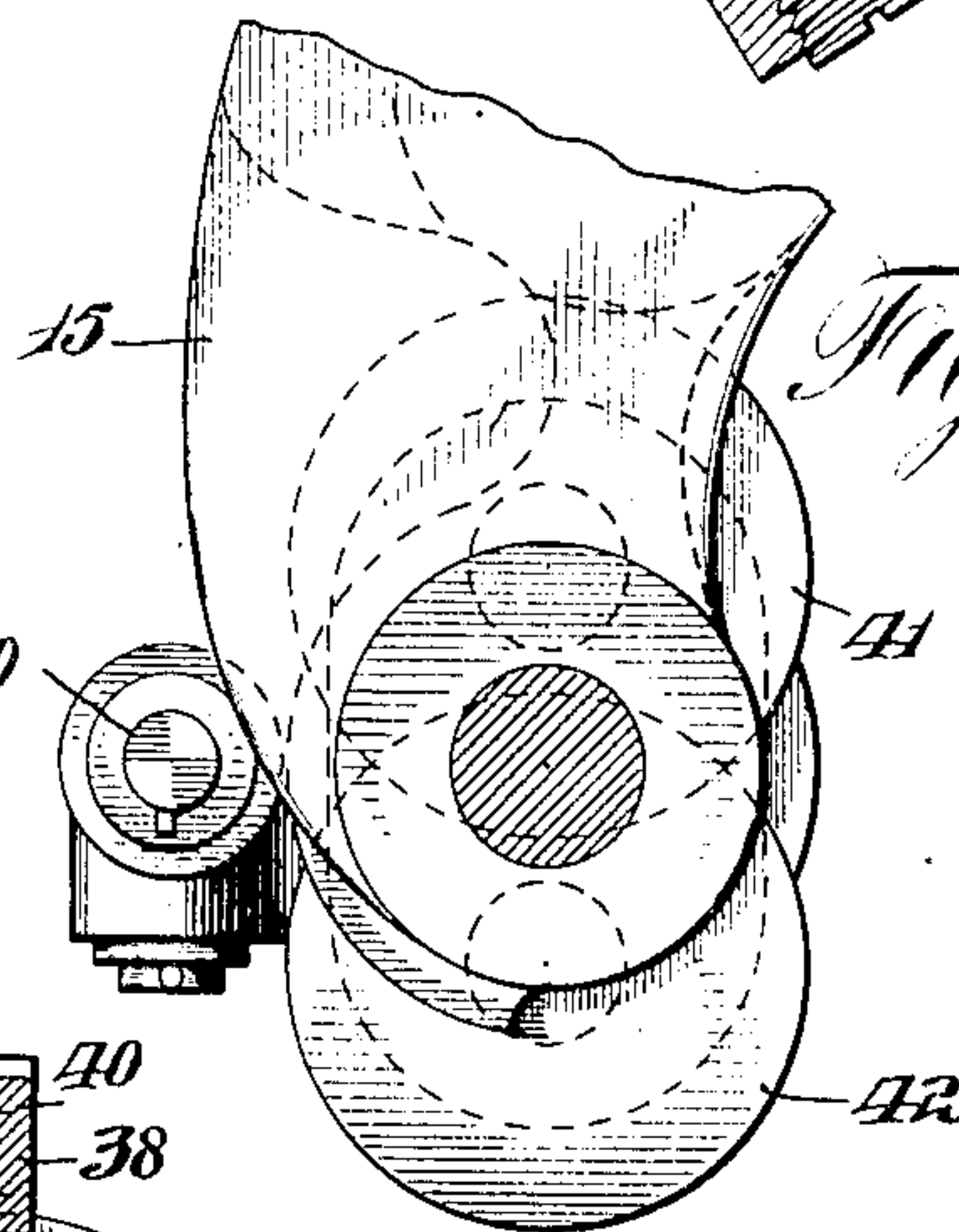
9 SHEETS—SHEET 7.



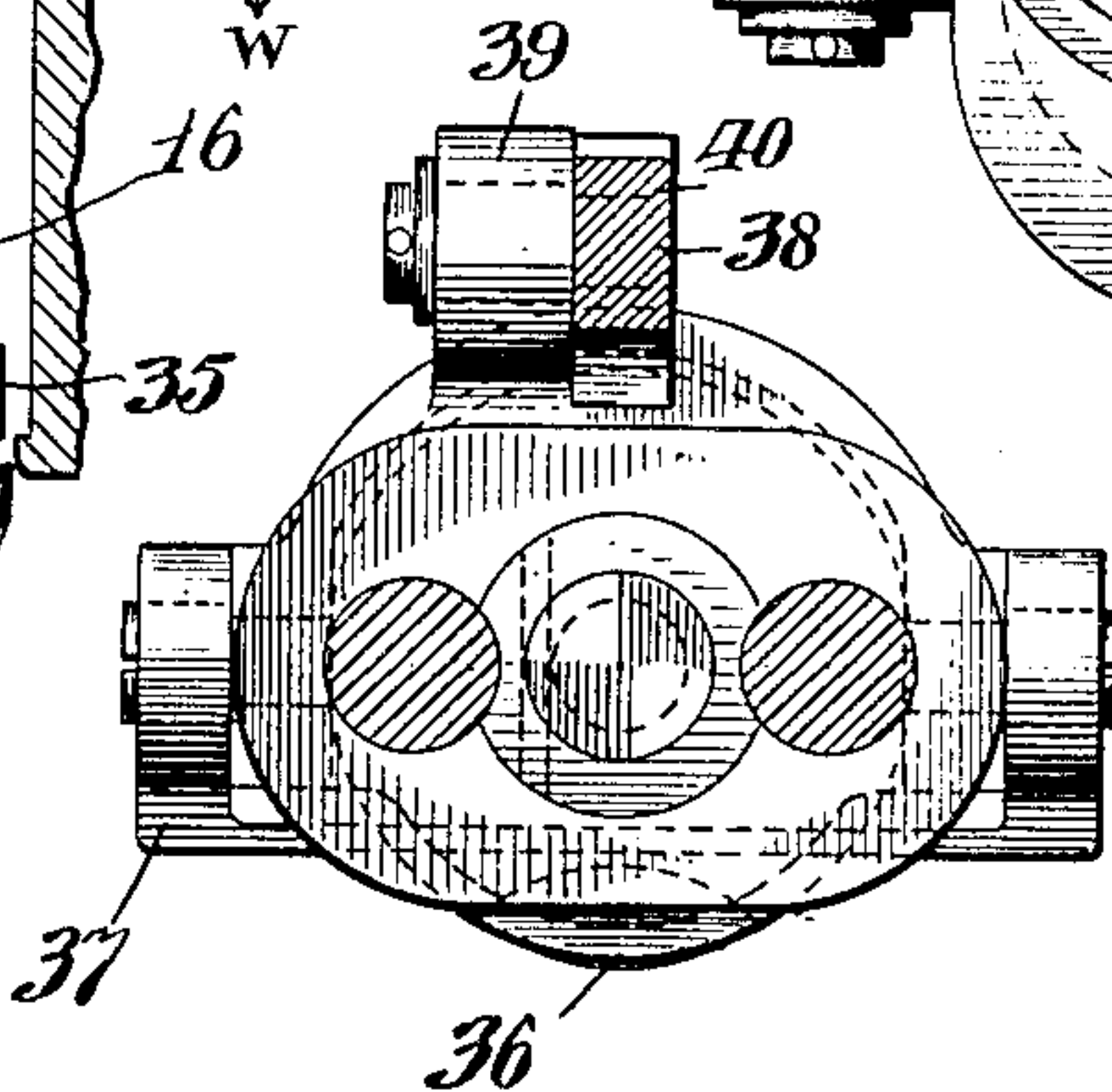
*Fig. 9.*



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*Fig. 11.*



*Fig. 12.*

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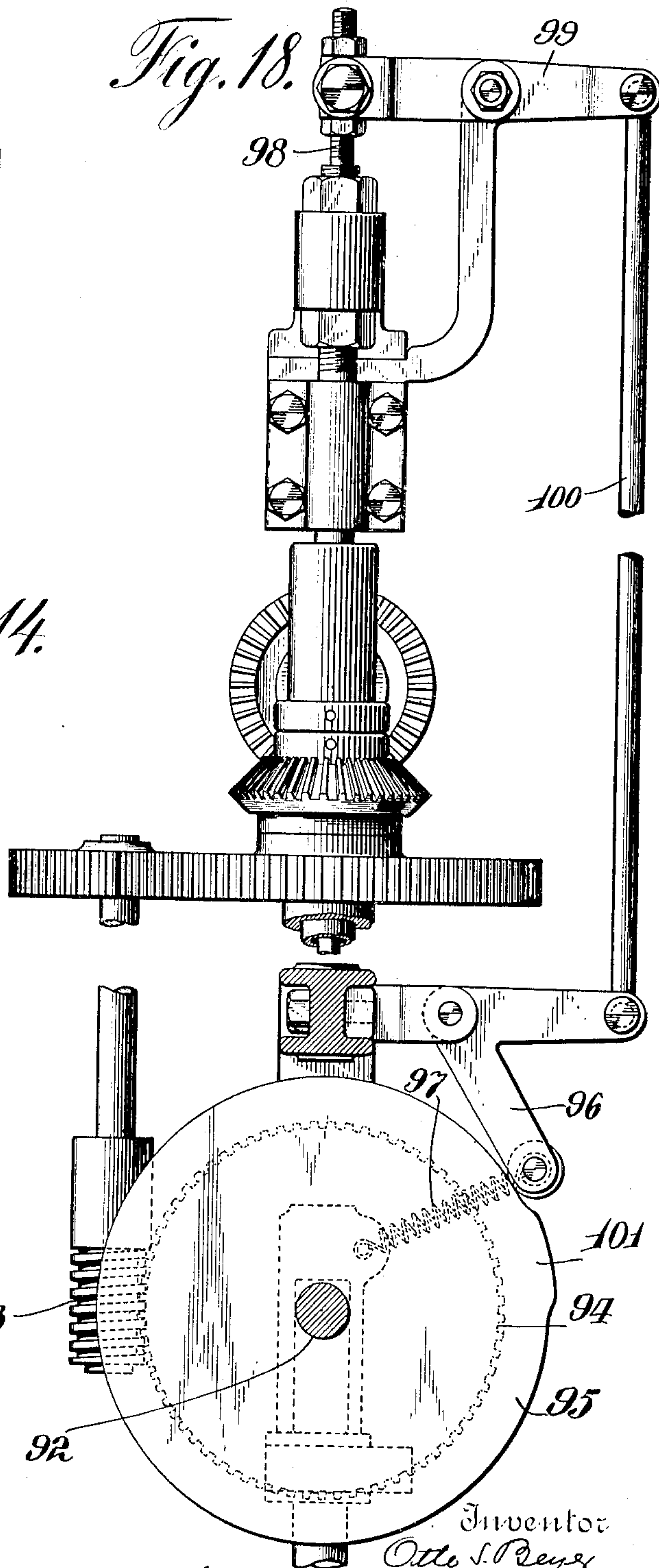
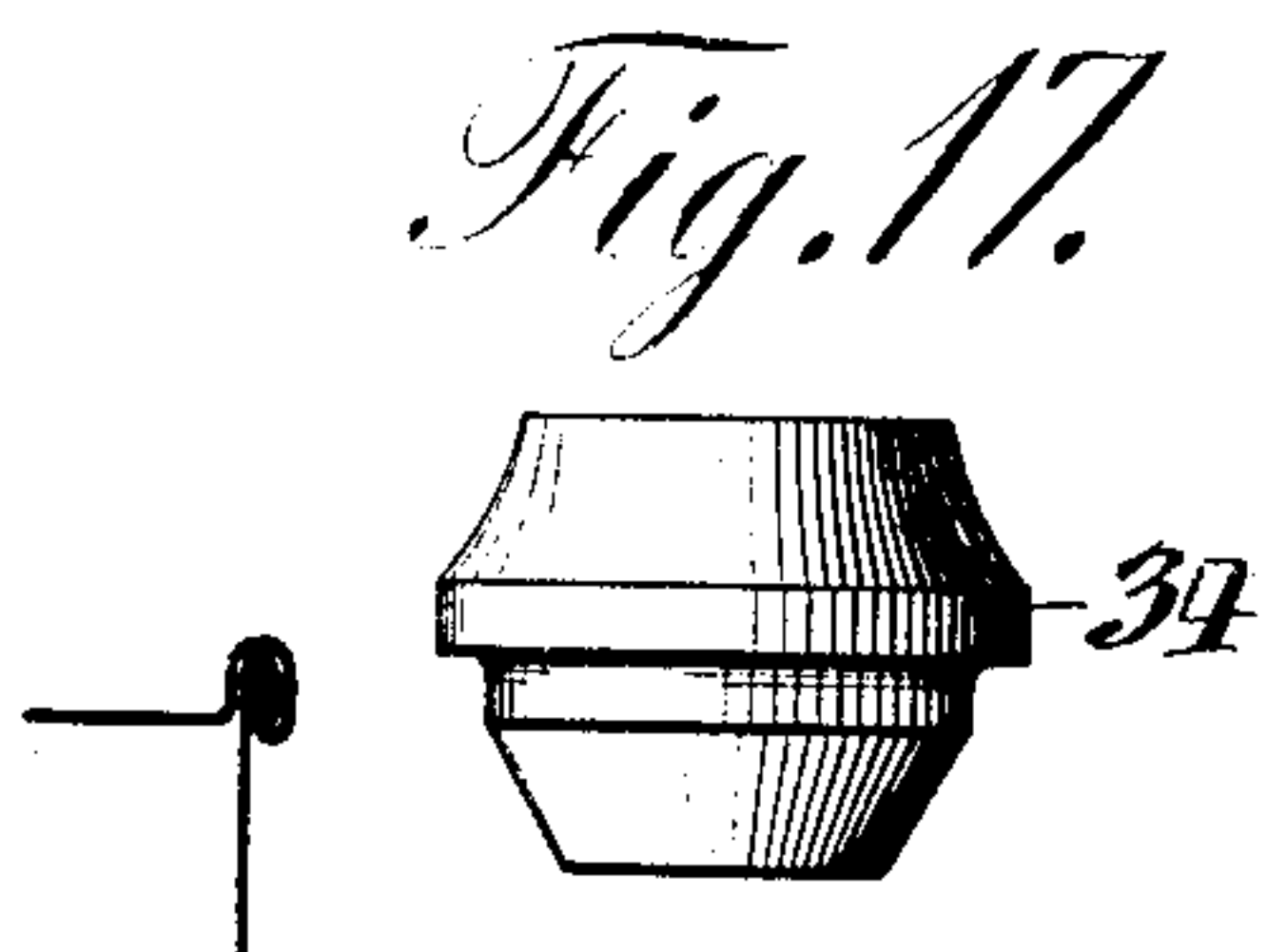
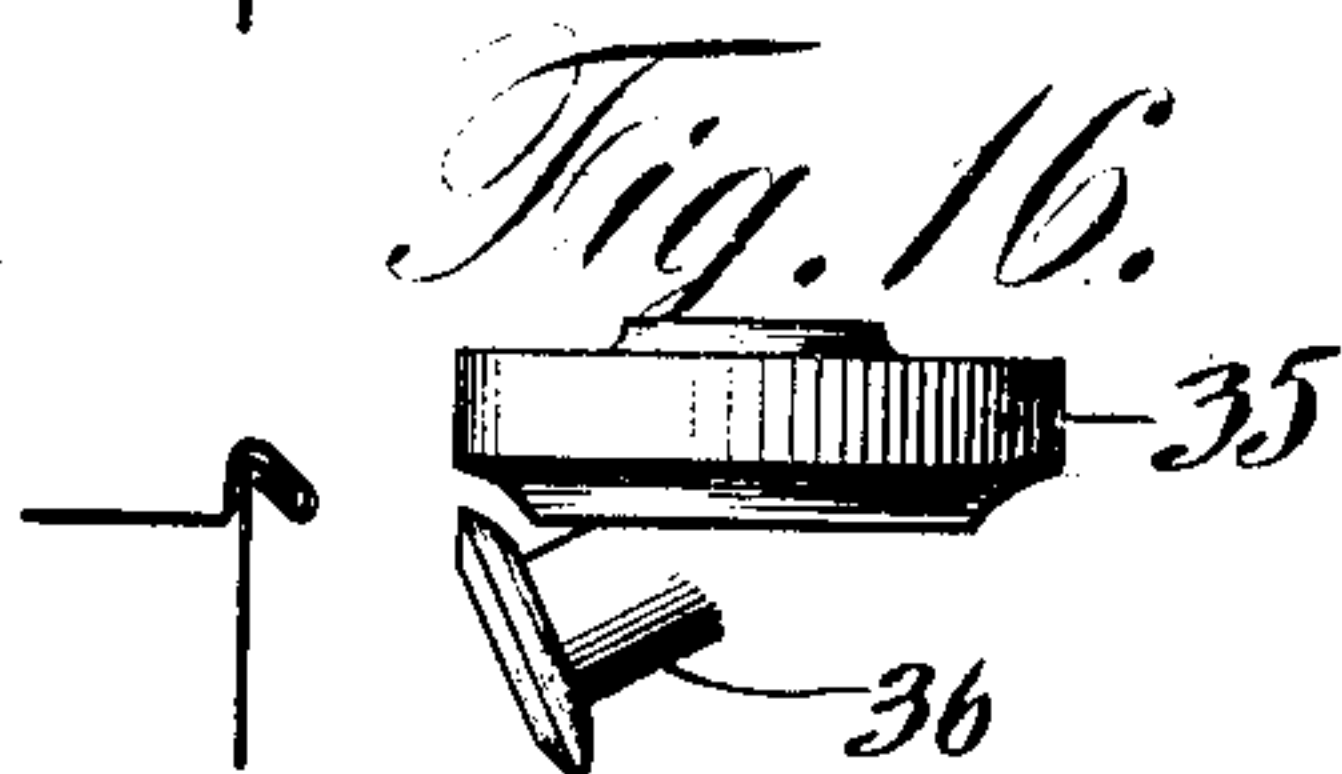
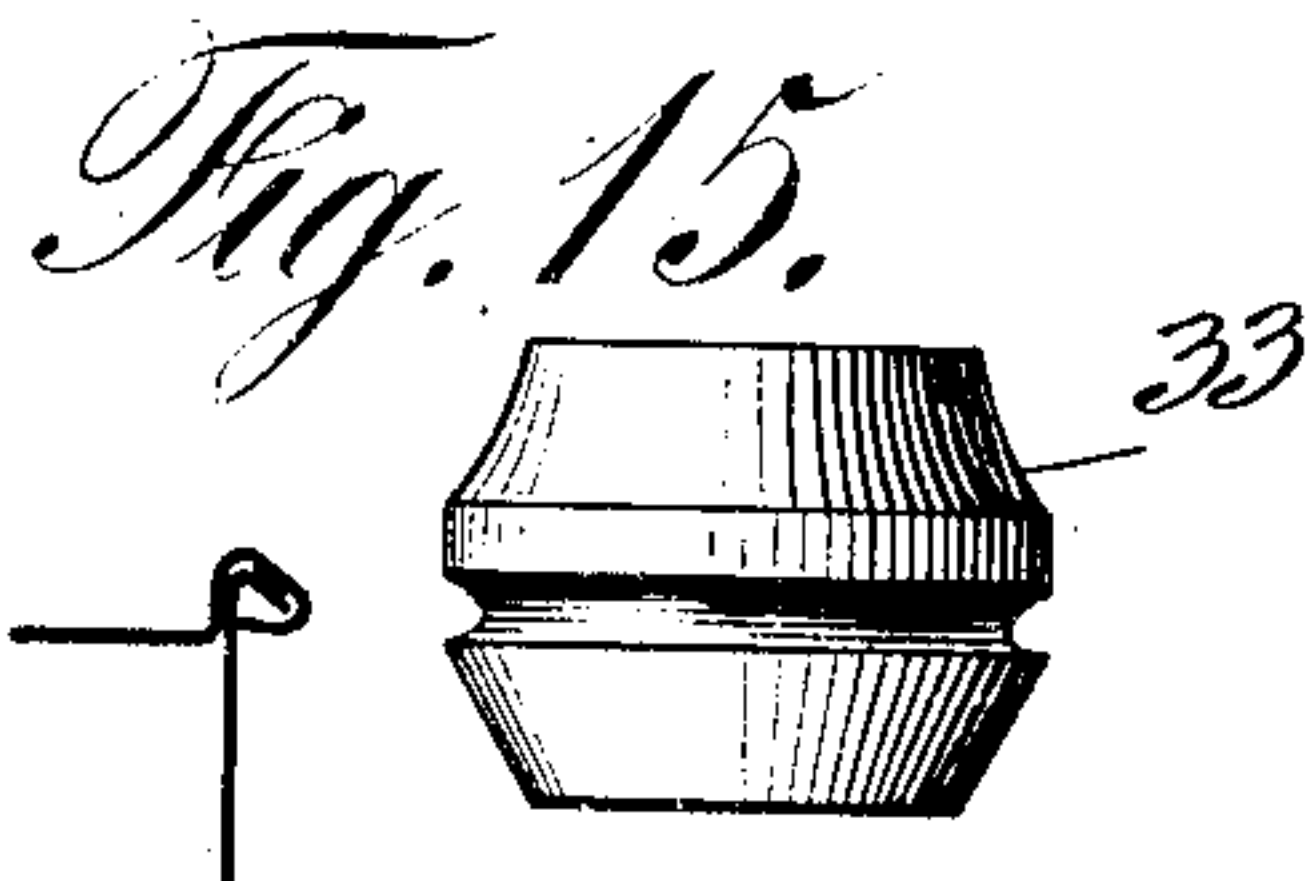
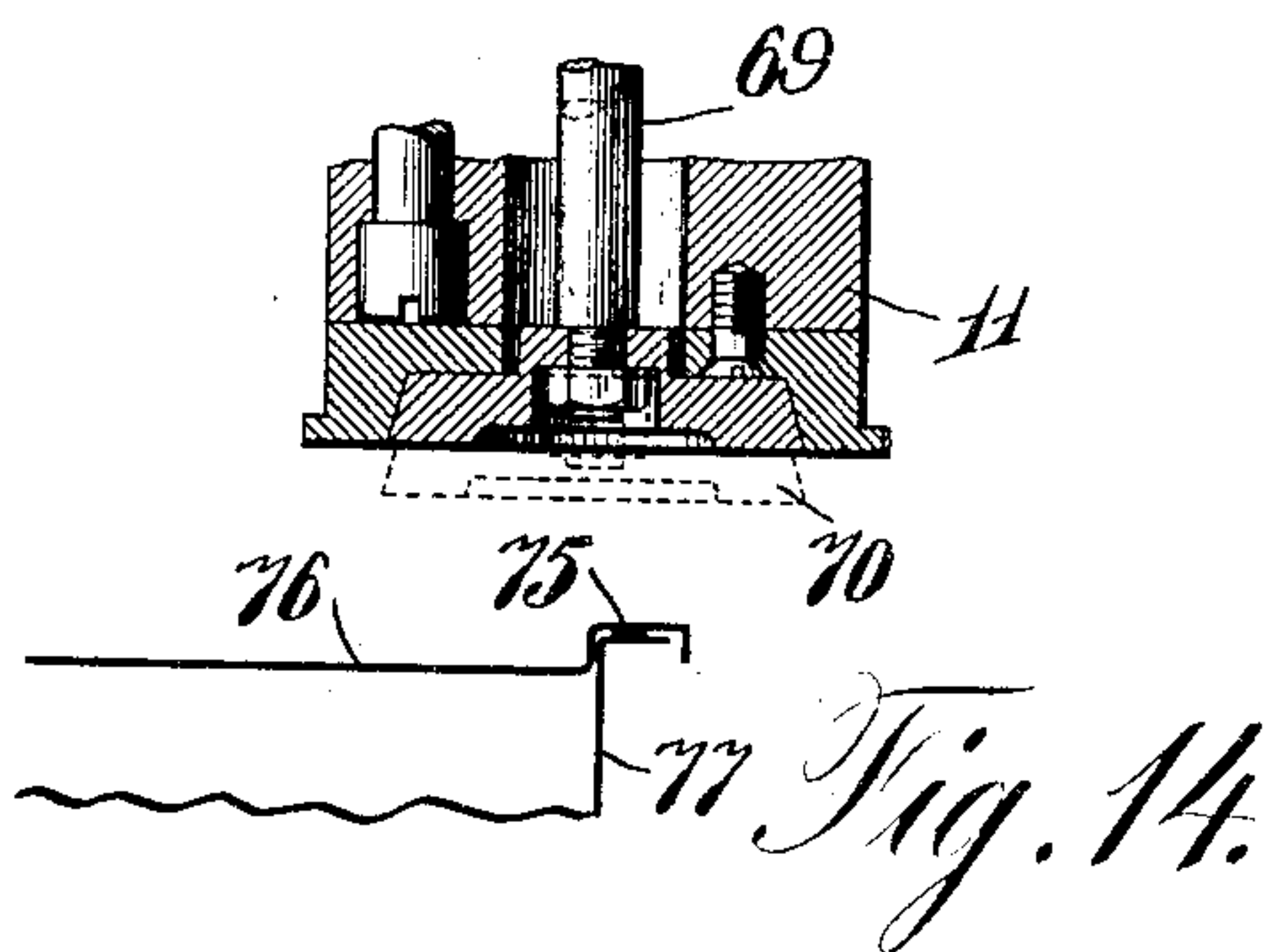
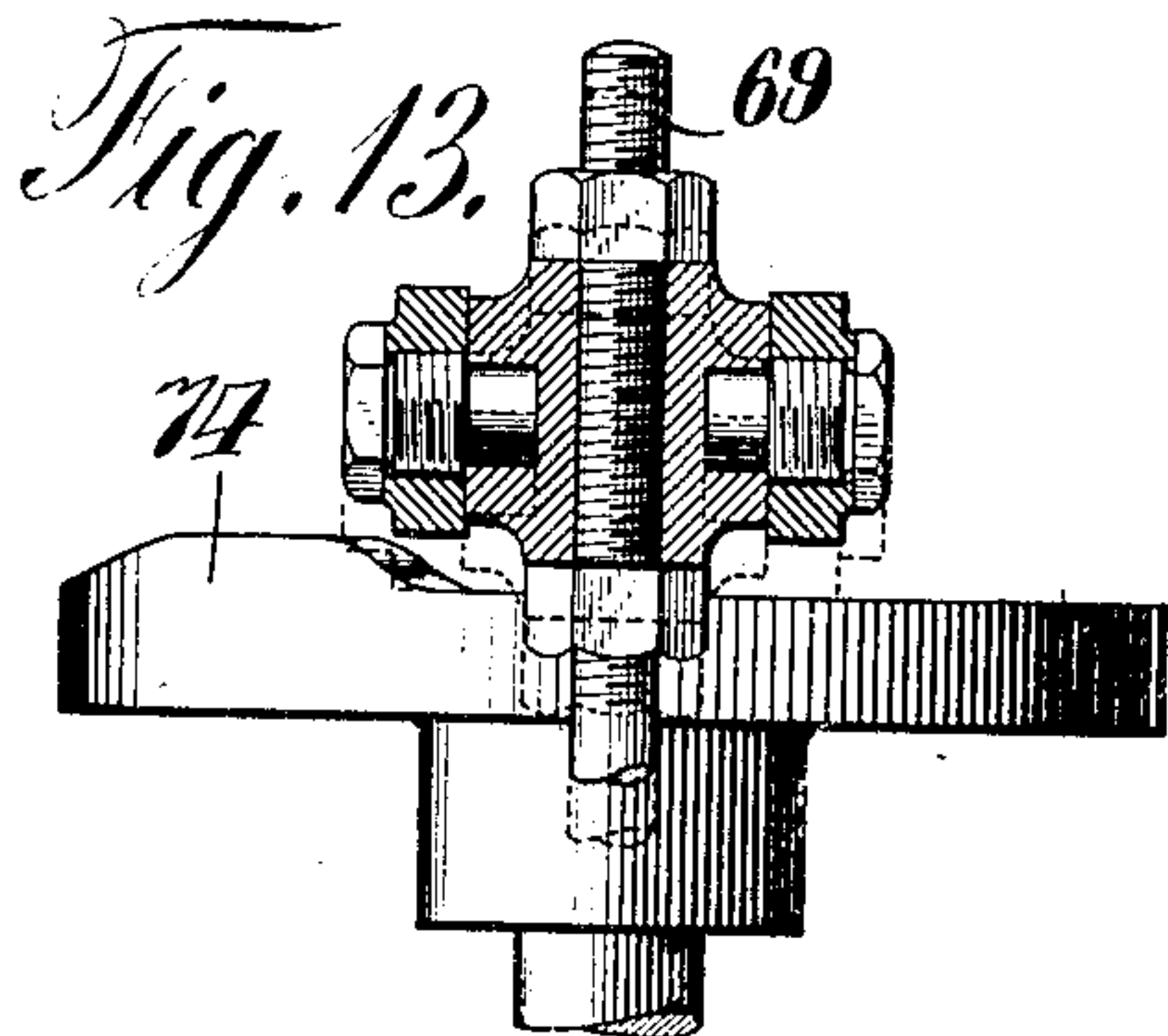
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9 SHEETS—SHEET 8.



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No. 871,857.

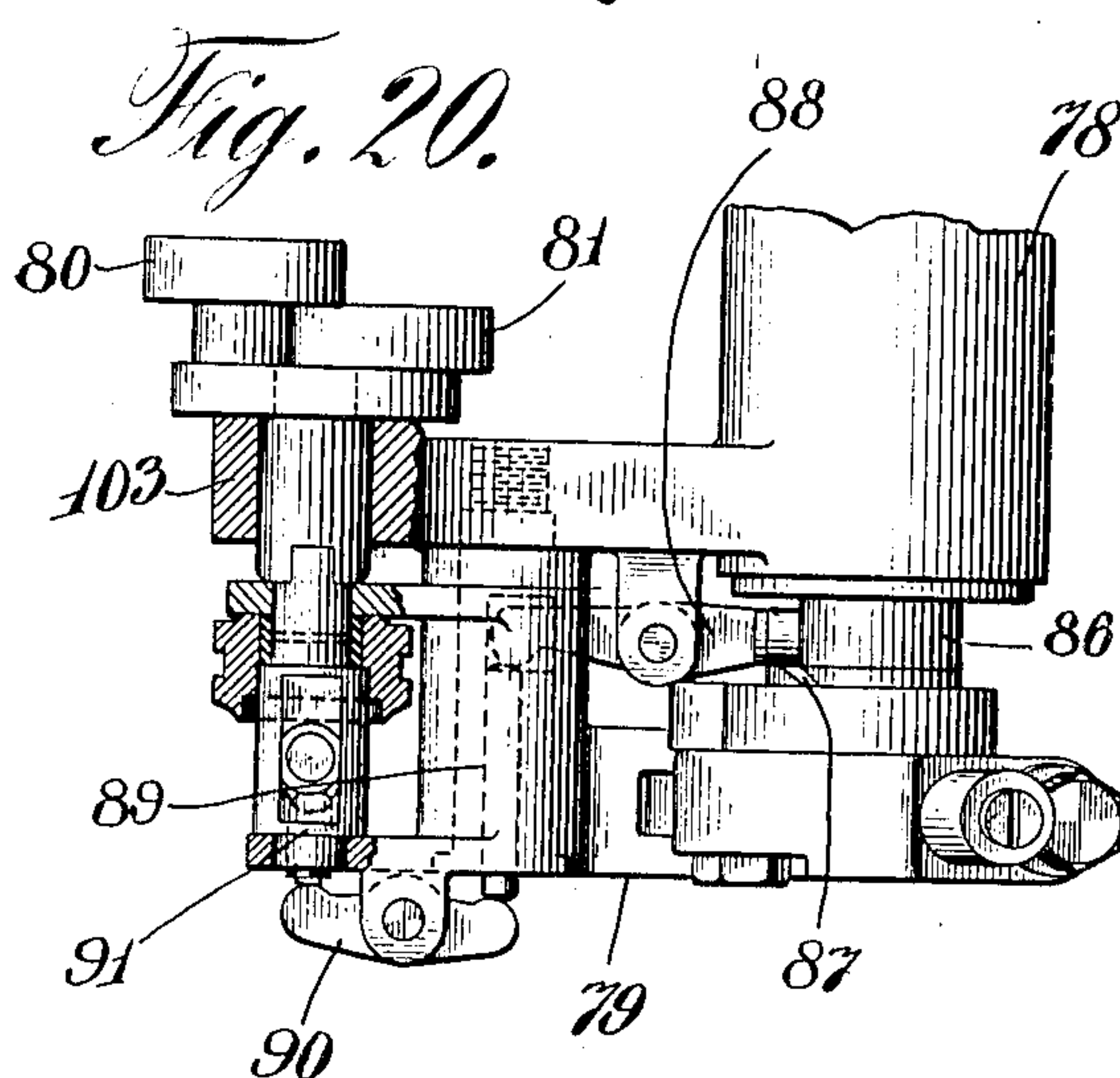
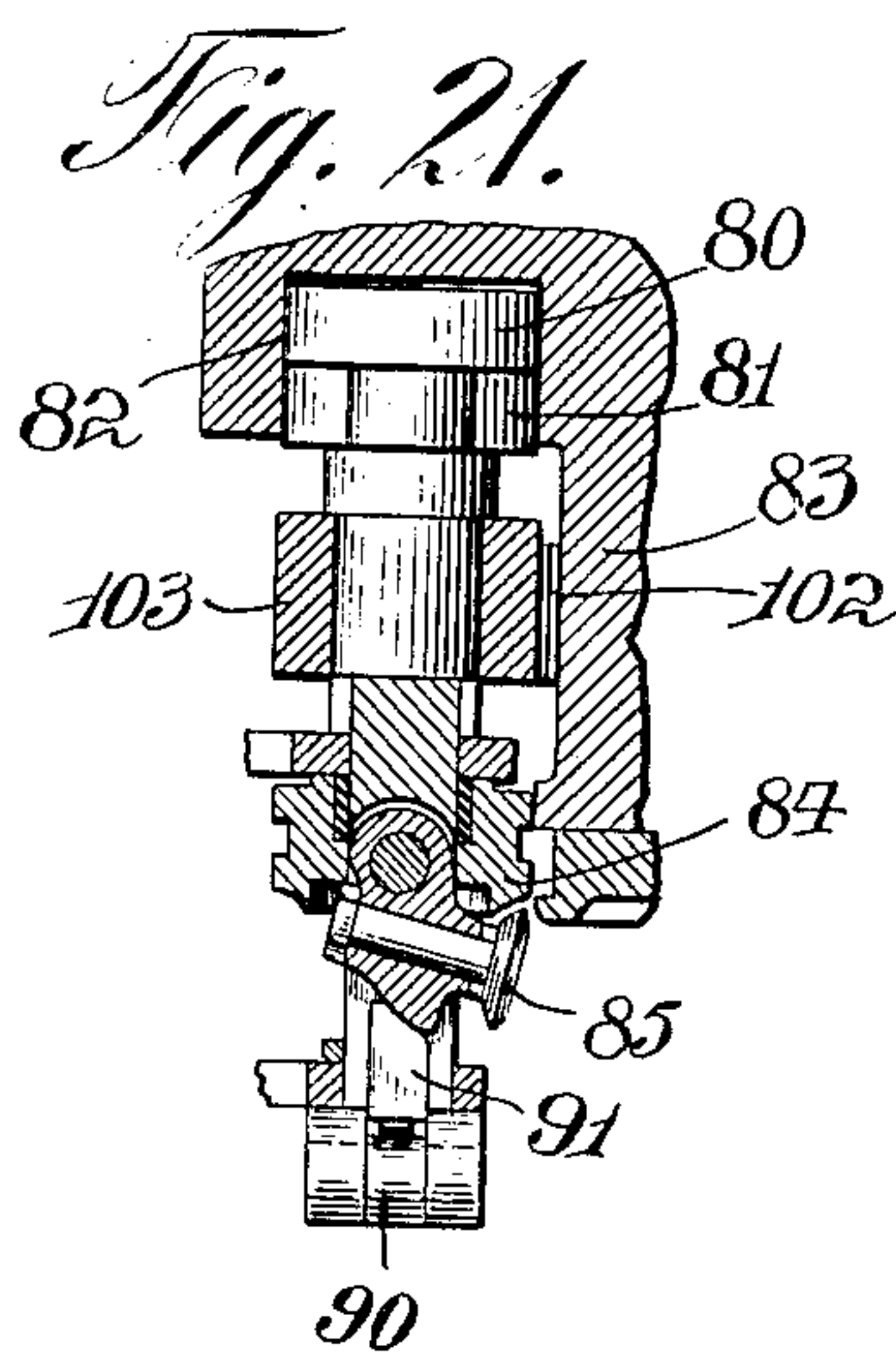
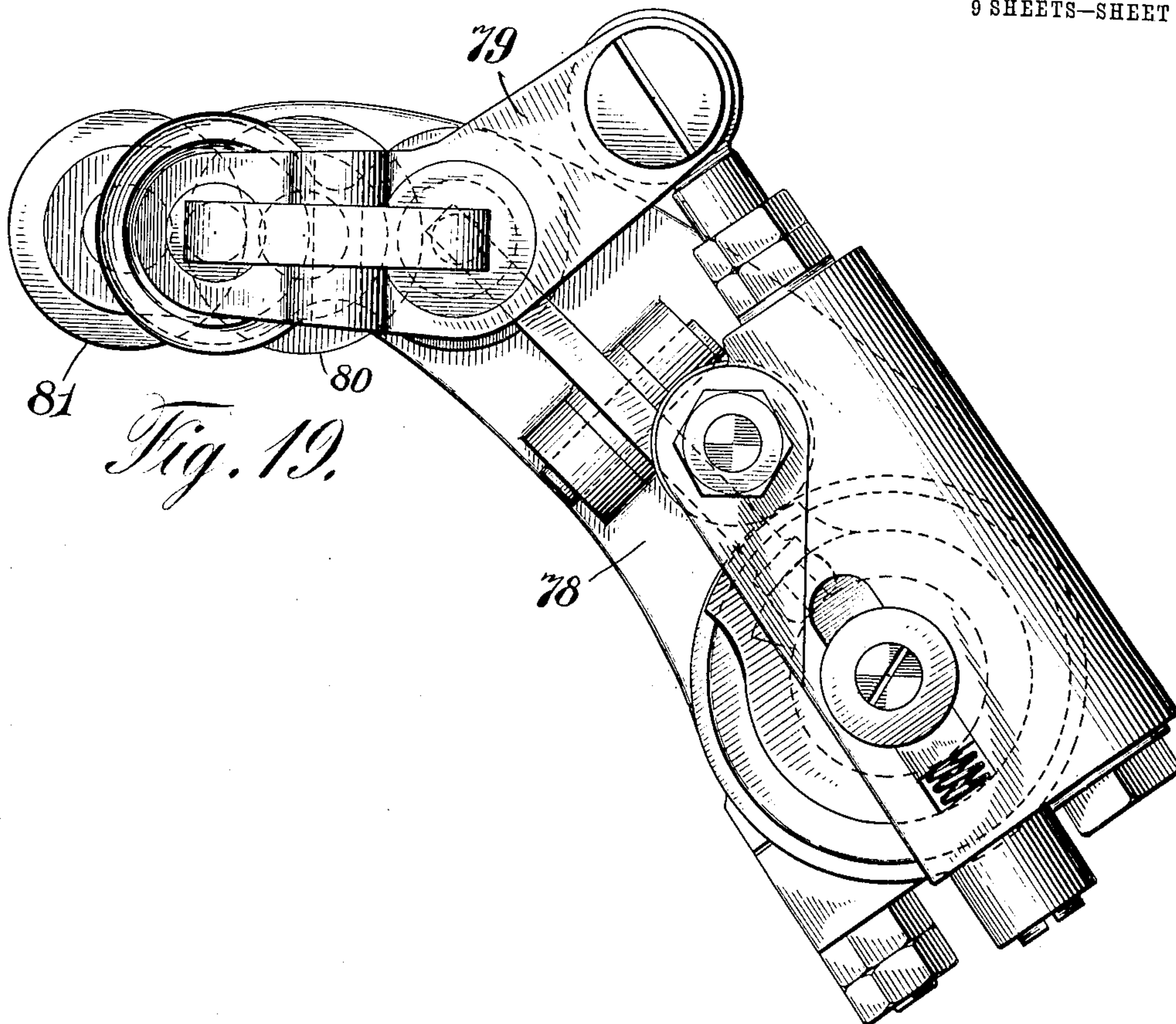
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O. S. BEYER.

SEAMING MACHINE.

APPLICATION FILED DEC. 26, 1903. RENEWED JUNE 5, 1906.

9 SHEETS—SHEET 9.



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# UNITED STATES PATENT OFFICE.

OTTO S. BEYER, OF EAST RUTHERFORD, NEW JERSEY, ASSIGNOR TO E. W. BLISS COMPANY, A CORPORATION OF WEST VIRGINIA.

## SEAMING-MACHINE.

No. 871,857.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed December 26, 1903. Serial No. 186,602. Renewed June 5, 1906. Serial No. 320,228.

*To all whom it may concern:*

Be it known that I, OTTO S. BEYER, a citizen of the United States of America, and a resident of East Rutherford, county of Bergen, and State of New Jersey, have invented certain new and useful Improvements in Seaming-Machines, of which the following is a specification.

My invention relates generally to seaming machines for joining the heads or ends of cans to the bodies of the same, and has more particular reference to double seaming machines.

The heads of cans or other containing vessels are variously formed, and my machine, while capable of seaming the several styles known in the art, is especially designed to seam a can with a certain style of head, a style produced by the exigencies of trade, as will be understood from the following. When shipping cans to the packer, one head or end of the can is shipped separately. In order to get a tight joint, it has been found useful to provide the flange of the head, which generally is straight horizontally, with a rubber ring or with a ring of paste or paint. During the shipment above referred to, this ring is frequently injured, and for that reason the said flange of the head is now usually turned down at its outer edge or "burred" so as to protect the rubber ring. To properly seam a can with a style of head of this character requires a three step operation, or the action of three seaming members, one member of which consists of two opposed conical deflecting rolls.

In an application for Letters Patent of the United States filed on the 9th day of January, 1903, Ser. No. 138,346, I have shown a construction in which this principle is embodied in a machine in which the work to be acted upon rotates and the seaming members are relatively stationary. In the present application a construction is shown in which this principle is applied to a machine in which the work to be acted upon is relatively stationary while the seaming members travel around the work. It is obvious that this principle can be applied to machines for seaming either circular or irregular-shaped cans, and that furthermore the machine can be operated either by hand or automatically.

In the present instance, I have shown a machine in which irregular-shaped cans are acted upon and which is automatic, though

the claims should not be construed as being limited to the said particular construction. It is desirable, however, when opposed conical deflecting rolls are used in connection with the seaming of non-circular or irregular shaped cans, that, in addition to the usual cam and roller for causing the seaming rolls to follow the general contour of the can, there be provisions for justifying the position of the conical deflecting rolls at the points of irregularity so as to maintain the said conical deflecting rolls tangent to the work at the said points of irregularity. This improvement is claimed generally in the companion application Ser. No. 186603, and is claimed specifically with relation to a structure when the work holding means are stationary and the seaming members travel in the present application. The seaming rolls may of course be of any suitable construction, though one of particular advantage is shown herein.

A further improvement resides in a positive knockout mechanism adapted to be operated automatically with the completion of each can.

Other improvements will appear as the specification proceeds.

In the drawings: Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a front view of Fig. 1. Fig. 3 is a sectional plan view on the line  $x-x$  of Fig. 1. Fig. 4 is a vertical sectional view on the line  $y-y$  of Fig. 2. Fig. 5 is a vertical sectional view on the line  $y-y$  of the lower parts of Fig. 2 on an enlarged scale. Fig. 6 is a bottom plan view of the seaming members. Fig. 7 is a detail view of the opposed conical rolls and parts adjacent to the same. Fig. 8 is a vertical sectional view corresponding to Fig. 7. Fig. 9 is a bottom plan view of the opposed conical rolls and adjacent parts on an enlarged scale. Fig. 10 is a detail view of the opposed conical rolls looking in the direction of the arrow on Fig. 9. Fig. 11 is a sectional view on the line  $z-z$  of Fig. 10. Fig. 12 is a sectional view on the line  $w-w$  of Fig. 10. Fig. 13 is a vertical sectional view through the head and lower part of the cam-actuated knockout mechanism. Fig. 14 is a cross-section of a can to be seamed. Figs. 15, 16 and 17 show the action of the various seaming members on the seam of the can. Fig. 18 is a modification of the cam-actuated



knock-out. Fig. 19 is a plan view of the opposed conical deflecting rolls showing a modification. Fig. 20 is a view in elevation of the said modification shown in Fig. 19. Fig. 21 is a vertical sectional view of the said modification.

1 represents a frame of a suitable construction for properly supporting the various parts of the mechanism. Power is derived in any suitable way as from the shaft 2 connected with the countershaft 3 as by means of pulleys 4 and belts (not shown). The countershaft 3 carries a bevel gear 5 engaging with the bevel gear 6 on the upright shaft 7 carrying the revolving head 8. Located inside of the shaft 7 is a spindle 9 carrying the cam 10 and chuck 11.

The revolving head 8 carries the three seaming members 12, 13 and 14 respectively. As the second seaming member embodies all the new features of construction, this will be described first, and reference will then be had afterwards to the first and third members. It will be understood that a double motion has to be imparted to all three seaming members, viz: a motion parallel to the shape of the work to be acted upon and a motion toward and away from the said work to cause the said seaming members to properly engage with the said work and act upon the same and thereafter to withdraw from the same. In order to carry this into effect, the said seaming members are provided with a contour carrier 15 pivoted on the head 8 in a suitable manner. Mounted upon the contour carrier is a seaming carrier 16, which, in turn, carries the seaming tool. This arrangement could of course be reversed, and the contour carrier be mounted upon the seaming carrier, in which instance the seaming tool would be carried by the contour carrier; the only requisite being that the said seaming tool partakes of the motion of both carriers.

The contour carrier 15 will conveniently take the form of an arm having an extension 17 carrying the roller 18 adapted to travel in the cam 10 carried by the chuck 11. As the head 8 revolves, the seaming members will be carried around with the same and will be caused to travel in an orbit around the work to be acted upon parallel with the contour of the said work. In the present instance where the work is square the cam 10 will of course have a contour substantially identical with the contour of the can or work to be acted upon. If the can were round the cam 10 would of course be in the shape of a circle. In other words the cam 10 will always have the same contour as the work to be acted upon. The cam 10 is of course stationary with the work to be acted upon.

The seaming carrier 16 will conveniently take the form of a bell crank lever and is pivoted at 20 on the contour carrier 15.

This seaming carrier carries the seaming tool which in the present instance are in the form of rolls the second member having two opposed conical deflecting rolls. Means are provided for moving this seaming carrier toward and away from the work as follows: One end of the lever or seaming carrier 16 is connected with the plunger 21 sliding in the tube or cylinder 22 and normally adapted to hold the seaming tool in engagement with the work by means of the spring 23 or by other suitable means. Inside the contour carrier 15 is a spindle 24 carrying the pinion 25 at its upper end and the cam 26 at its lower end. This pinion 25 engages with the gear 19 moving in unison with the gear 27 meshing with the gear 28 on the upright shaft 29, which latter carries a second gear 30 engaging with the gear 31, moving with the bevel gear 6. Connected with the plunger 21 is a roller 32 with which the cam 26 is adapted to engage to move the seaming carrier away from the work. This construction is common to all three seaming members; the seaming carrier on the first and second seaming member carrying the crimping or curling roll 33 and finishing roll 34 respectively, while the second seaming member carries two opposed conical deflecting rolls 35 and 36 respectively.

The foregoing describes the construction of the first and third seaming members. The second seaming member, however, must, in addition to the above means, be provided with mechanism for moving the two opposed conical deflecting rolls toward and away from each other at the proper moment and further with justifying means at the points of irregularity for maintaining the said opposed conical deflecting rolls tangent to the contour of the work at the said points of irregularity. These additional means will now be described. Pivoted on the seaming carrier 16 is a straddling link 37 which carries the lower deflecting roll 36. 38 indicates a stud also mounted on the seaming carrier carrying a lower arm 39 adapted to engage with the straddling link 37. Mounted on the said stud 38 is an upper arm 40 which bears upon the portion of the contour carrier 15. When the seaming carrier moves in toward the work, the arm 40 will engage with the contour carrier 15 thereby causing the arm 39 to move the straddling link 37 and the roll 36 in an upward direction so as to move the said roll 36 up against the upper conical deflecting roll 35. Upon the return movement of the seaming carrier the reverse action will take place. The seaming carrier is further provided with two justifying rollers 41 and 42 mounted eccentrically one above the other and adapted to engage with the superposed cams 43 and 44 on the chuck 11. These cams 43 and 44 being of a shape substantially parallel to the contour of the work to



be acted upon, the said justifying rolls will always keep the said opposed conical deflecting rolls tangent to the work to be acted upon. In case of a non-circular can, as in the present instance, it is obvious that on rounding a corner the deflecting rolls will project a distance in over the said corner thereby causing an improper operation of the machine, having the result of spoiling the can. It is therefore necessary to provide means or to so construct the parts comprising this second seaming member as to allow the said deflecting rolls to recede slightly from turning a corner. In the present instance, this means will take the form of projecting portions 45 and 45<sup>a</sup> and 46 and 46<sup>a</sup> located on the corners of turning point of the said cams 43 and 44 or at other points of irregularity. The roll 41 in rounding the corner will engage with the straight projection 45 and then with the rounded projection 45<sup>a</sup> while the roll 42 will engage first with the rounded projection 46 and then with the straight projection 46<sup>a</sup>. Of course if a circular can is to be seamed, these projections will be dispensed with.

The machine being in the present instance automatic throughout, an automatic feed mechanism 47 is provided in this instance comprising: an intermittently rotatable disk 48 carrying a plurality of can supporters 49. Suitable motion is imparted to this disk by means, the motion being derived in the present instance from the shaft 29 through the worm 50 to the gear 51 mounted on the shaft 52, carrying at its other end a miter gear 53 engaging with the gear 54 mounted on the upright shaft 55 and carrying an arm 56 having a roller 57 adapted to engage with the transversely slotted disk 58 mounted on the stud 59 and moving with the gear 60 which in turn engages with the gear 61 moving with the disk 48. This mechanism serves to bring the cans to be seamed successively in alinement with the chuck 11. Below the disk 48 and in alinement with the chuck 11 there is provided means for automatically elevating each can supporter as it is brought in alinement with the said chuck. This means may be of any suitable construction; but in the present device takes the form of a plunger 62 adjustably on the sleeve 63 mounted on the stem 64 by means of the lever 65 in a well known manner. The sleeve 63 carries the roll 66 engaging with the cam 67 whereby proper movement of the plunger 62 is effected to raise and lower the can supporters 49 at the proper moment. Suitable clamping means as 68 is also provided for fastening the plunger 62 in the position to which it has been adjusted. This device is well known in the art and need not be described further.

It has been found advantageous to have positive mechanism for stripping the can

from the chuck 11. In the present instance this means takes the form of a spindle 69 extending through the shaft 9 and through the chuck 11 and having at its lower end the head 70 which forms part of the chuck 11. This spindle 69 and head 70 will normally be held in their uppermost positions by means of the spring 71 attached to the pivoted link 72 located at the upper end of the framework and attached with one end to the said spindle 69. At its other end, the said link 72 carries a roller 73 engaging with the horizontal cam 74 which is conveniently mounted on the shaft 55 although of course the motion could be obtained otherwise.

The cans being placed upon the can supporters 49, the disk will rotate bringing the can into proper alinement with the chuck 11 whereupon the said can supporter will be elevated so that the can comes in contact with the said chuck 11 by means previously described. The can will be of a construction shown in Fig. 14 although it may be otherwise formed; but as the present machine is more particularly adapted to seam a can in which a rubber flange as 75 is interposed between the end 76 of the can and the body 77 of the same it is shown in the present instance. The disk 8 as it rotates, will bring the first seaming member carrying the curling or crimping roll into juxtaposition with the can, the said seaming member traveling in an orbit parallel to the contour of the can and moving gradually in toward the said can by reason of the construction previously described, and causing the crimping or curling roll 33 to act upon the can producing the effect shown in Fig. 15. The said crimping roll 33 remains in engagement with the can during several revolutions of the disk 8 after which it withdraws whereupon the two opposed conical deflecting rolls are moved in toward the can producing the effect shown in Fig. 16. In so doing, the lower conical deflecting roll 36 will move up toward the upper roll 35 the said roll being held tangent to the contour of the work by the justifying means as they travel in an orbit parallel to the contour of the can and recede slightly on turning a corner. After the said opposed conical deflecting rolls have acted upon the can during several revolutions of the disk 8, they are withdrawn in the manner described and the finishing roll 34 brought into contact with the can to flatten or finish the seam as shown in Fig. 17, the movement of the said roll 34 being substantially identical to that of the roll 33. The seam being now formed the can supporter will move down and simultaneously therewith the cam actuated knock-out will cause the said can to be stripped from the chuck 11 whereupon another can will be moved into alinement with the chuck and elevating mechanism while the finished



can is moved away by the automatic feed mechanism.

It is of course obvious that the various parts are so timed as to cause the operation just described to take place in the proper manner. The words "Crimping" and "Curling" used to denote the first of the three seaming tools is of course interchangeable and has merely reference to a difference in the construction of the said rolls and the claims should be so construed. The finishing roll may finish the seam with either a flat or a rounded seam, as may be desired, in a well known manner.

In Figs. 19, 20 and 21 I have shown a modification of the second seaming member. In this instance, the contour carrier 78 merely serves to support the seaming carrier 79; the said seaming carrier being provided with two justifying rolls 80 and 81 engaging with the cam 82 on the chuck 83, the roll 18 being dispensed with entirely in the present instance so that the two rolls 80 and 81 serve both to cause the seaming member to travel in an orbit parallel to the contour of the work to be acted upon and also serves to justify the position of the opposed conical deflecting rolls 84 and 85 by maintaining them tangent to the contour of the work. In this instance furthermore the stud 86 which rotates in the same manner as the stud 24 carries the cam 87 adapted to rock the pivoted lever 88 the other end of which engages with the pushing pin 89 which in turn operates a second pivoted lever 90 which engages with a second pushing pin 91 which acts directly to move the lower deflecting roll 85 into and out of contact with the upper roll 84. In this instance the deflecting rolls are caused to recede slightly in turning the corner by means of the cam 102 and roller 103.

In Fig. 18 I have shown a modification of the cam actuated knock-out. In this instance motion is imparted to the shaft 92 by means of the worm 93 and worm gear 94. Located upon the said shaft 92 is a cam 95. Mounted in the framework is a crank lever 96 caused to bear against the said cam 95 by means of the spring 97, the said spring further having the function of normally keeping the spindle 98 which carries the knock-out in its uppermost position through the instrumentality of a pivoted lever 99 and connecting rod 100. As the cam 95 rotates, the raised surface 101 of the same will engage with the crank lever 96 and raise the same thereby depressing the spindle 98. Various other means could of course be used to effect the same movement.

Having thus described my invention, what I claim is:

1. In a seaming machine, the combination with a relatively stationary work holding means, of a plurality of seaming members

consisting of a crimping roll, two opposed conical deflecting rolls, and a finishing roll, adapted to travel in an orbit parallel to the contour of the work to be acted upon and also to be moved toward and away from the said work, and automatic means for moving the seaming members including the conical deflecting rolls toward and away from the said work in the order named.

2. In a seaming machine, the combination with relatively stationary work holding means, of a plurality of seaming members including in part two opposed conical deflecting rolls, adapted to travel in an orbit parallel to the contour of the work to be acted upon and also to be moved toward and away from the said work, means for moving one of the said conical deflecting rolls toward and away from the other, means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the said work, and automatic means for effecting the various movements of the said seaming members.

3. In a seaming machine for seaming non-circular can bodies or the like, the combination with relatively stationary work holding means, of a plurality of seaming members including in part two opposed conical deflecting rolls, adapted to travel in an orbit parallel to the contour of the work to be acted upon and also to be moved toward and away from the said work, means for moving one of said conical deflecting rolls toward and away from the other and means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the work, the parts being so arranged that the said deflecting rolls will recede slightly from the work on turning a corner.

4. In a seaming machine, for seaming non-circular can bodies or the like, the combination with relatively stationary work holding means, of a plurality of seaming members including in part two opposed conical deflecting rolls, adapted to travel in an orbit parallel to the contour of the work to be acted upon and also to be moved toward and away from the said work, means for moving one of said conical deflecting rolls toward and away from the other, means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the work, the parts being so arranged that the said deflecting rolls will recede slightly from the work on turning a corner, and automatic means for effecting the various movements of the said seaming members.

5. In a seaming machine, the combination with relatively stationary work holding means, of a crimping roll, two opposed con-



ical deflecting rolls, and a finishing roll all adapted to travel in an orbit parallel to the contour of the work to be acted upon, and also to be moved toward and away from the said work, means for moving one of said conical deflecting rolls toward and away from the other, and means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the work.

6. In a seaming machine, the combination with relatively stationary work holding means, of a crimping roll, two opposed conical deflecting rolls and a finishing roll all adapted to travel in an orbit parallel to the contour of the work to be acted upon, and also to be moved toward and away from the said work, means for moving one of said conical deflecting rolls toward and away from the other, means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the said work by maintaining them tangent to the contour of the work, and automatic means for effecting the various movements of the said seaming rolls.

7. In a seaming machine adapted to seam non-circular cans or the like, the combination with relatively stationary work holding means, of a crimping roll, two opposed conical deflecting rolls and a finishing roll, all adapted to travel in an orbit parallel to the contour of the work to be acted upon, and also to be moved toward and away from the said work, means for moving one of the conical deflecting rolls toward and away from the other, and means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the said work, the parts being so arranged that the said deflecting rolls recede slightly from the work on turning a corner.

8. In a seaming machine adapted to seam non-circular cans or the like, the combination with relatively stationary work holding means, of a crimping roll, two opposed conical deflecting rolls and a finishing roll, all adapted to travel in an orbit parallel to the contour of the work to be acted upon, and also to be moved toward and away from the said work, means for moving one of the conical deflecting rolls toward and away from the other, means for justifying the said opposed conical deflecting rolls with relation to the work as they travel around the same by maintaining them tangent to the contour of the said work, the parts being so arranged that the said deflecting rolls will recede slightly from the work on turning a corner, and automatic means for effecting the various movements of the said seaming rolls.

9. In a seaming machine, the combination

with a chuck, of a work supporter adapted to be elevated so as to clamp the work between itself and the said chuck, a movable head located in the said chuck normally flush with the said chuck, a spindle connected to the said movable head, and mechanism for automatically causing the said head to protrude from the said chuck when the work supporter is lowered away from the said chuck.

10. In a seaming machine, the combination with a chuck, a plurality of work supporters adapted to be brought into alinement with the said chuck, means for elevating and lowering each work supporter as it comes in position with relation to the chuck so as to clamp the work between the said work supporter and the said chuck, a positive knock-out in said chuck and means for operating the said knock-out at periods corresponding to the lowering of the said work supporters away from the chuck.

11. In a seaming machine, the combination of a stationary work supporter and a stationary cam, two conical deflecting rolls traveling in an orbit around the work supporter, a roller for engaging with the said cam moving with the said conical deflecting rolls, means for causing the conical deflecting rolls to act upon the work, and two justifying rolls located eccentric with relation to each other, and means stationary with the work for justifying the position of the two conical deflecting rolls with relation to the said work.

12. In a seaming machine adapted to seam non-circular or irregular shaped cans, the combination with a stationary work supporter, and two opposed conical deflecting rolls traveling in an orbit around the same, of means for moving the said rolls into and out of engagement with the work, cooperative means connected to the rolls and work holding means whereby the said deflecting rolls will follow the general contour of the can, justifying means connected to the rolls, and provisions on the work holding means cooperating with the justifying means and located at the points of irregularity of the can adapted to maintain the said deflecting rolls tangent to the work at the said points of irregularity.

13. In a seaming machine adapted to seam non-circular or irregular shaped cans, the combination with a stationary work supporter, and two opposed conical deflecting rolls traveling in an orbit around the same, of means for moving the said rolls into and out of engagement with the work, cooperative means connected to the rolls and work holding means whereby the said deflecting rolls will follow the general contour of the can, two justifying rolls connected to the conical deflecting rolls, and cams on the work holding means for engaging with the said justifying rolls at the points of irregularity, whereby



the said deflecting rolls are maintained tangent to the work at the said points of irregularity.

14. In a seaming machine adapted to seam  
 5 non-circular or irregular shaped cans, the combination with a stationary work supporter, and two opposed conical deflecting rolls traveling in an orbit around the same, of means for moving the said rolls into and  
 10 out of engagement with the work, cooperative means connected to the rolls and work holding means whereby the said deflecting rolls will follow the general contour of the

can, two justifying rolls connected to the conical deflecting rolls and mounted eccentrically one above the other, and two superposed cams on the work holding means for engaging with the said justifying rolls at the said points of irregularity. 15

Signed at Brooklyn, N. Y., this 14th day 20 of October 1903.

OTTO S. BEYER.

Witnesses:

GEO. C. ESKHOLME,  
 HY. KLOECK.