

No. 855,101.

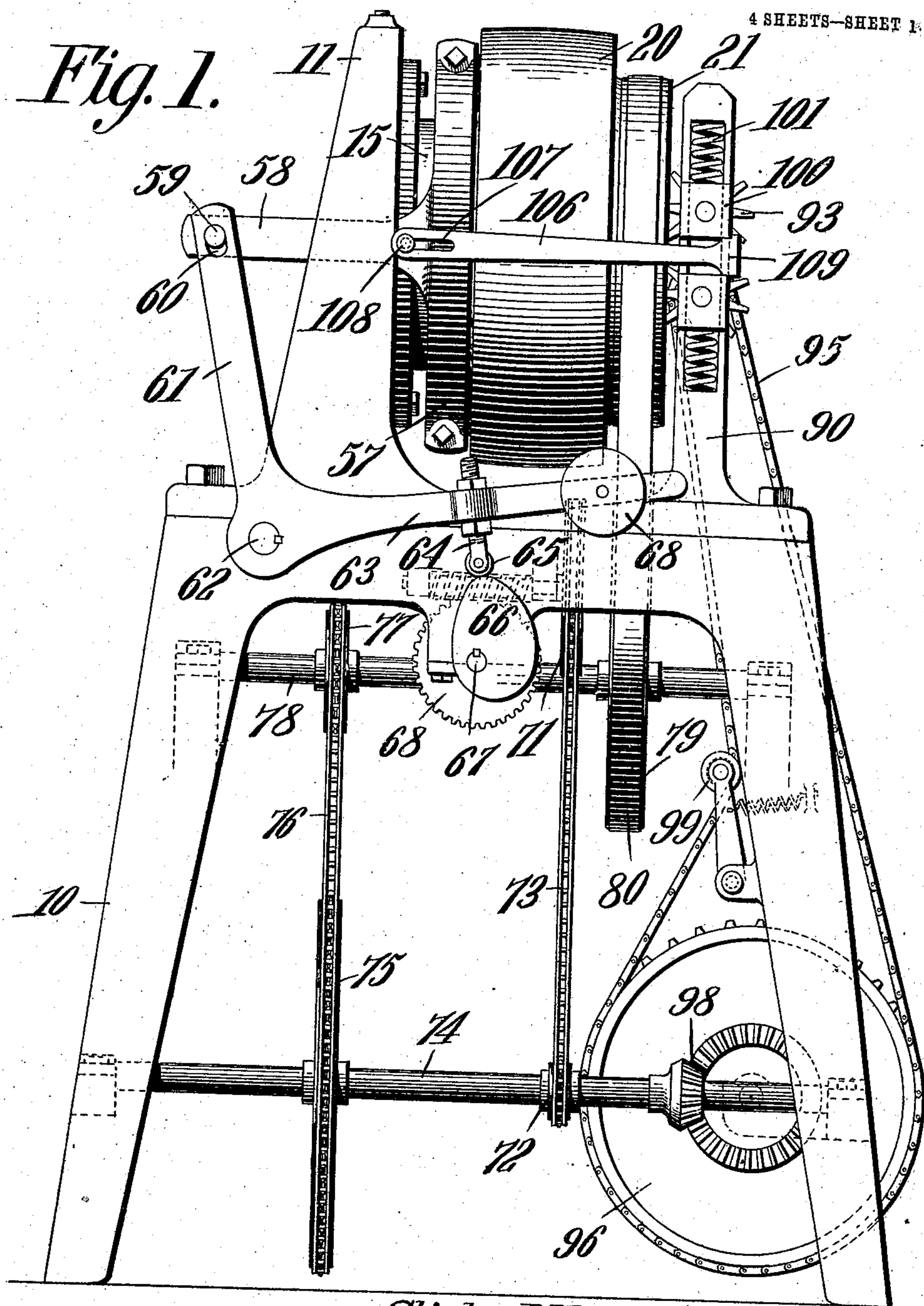
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G. M. FENN & C. D. YOUNGS.

LATHE.

APPLICATION FILED OCT. 4, 1906.

4 SHEETS—SHEET 1.



WITNESSES:

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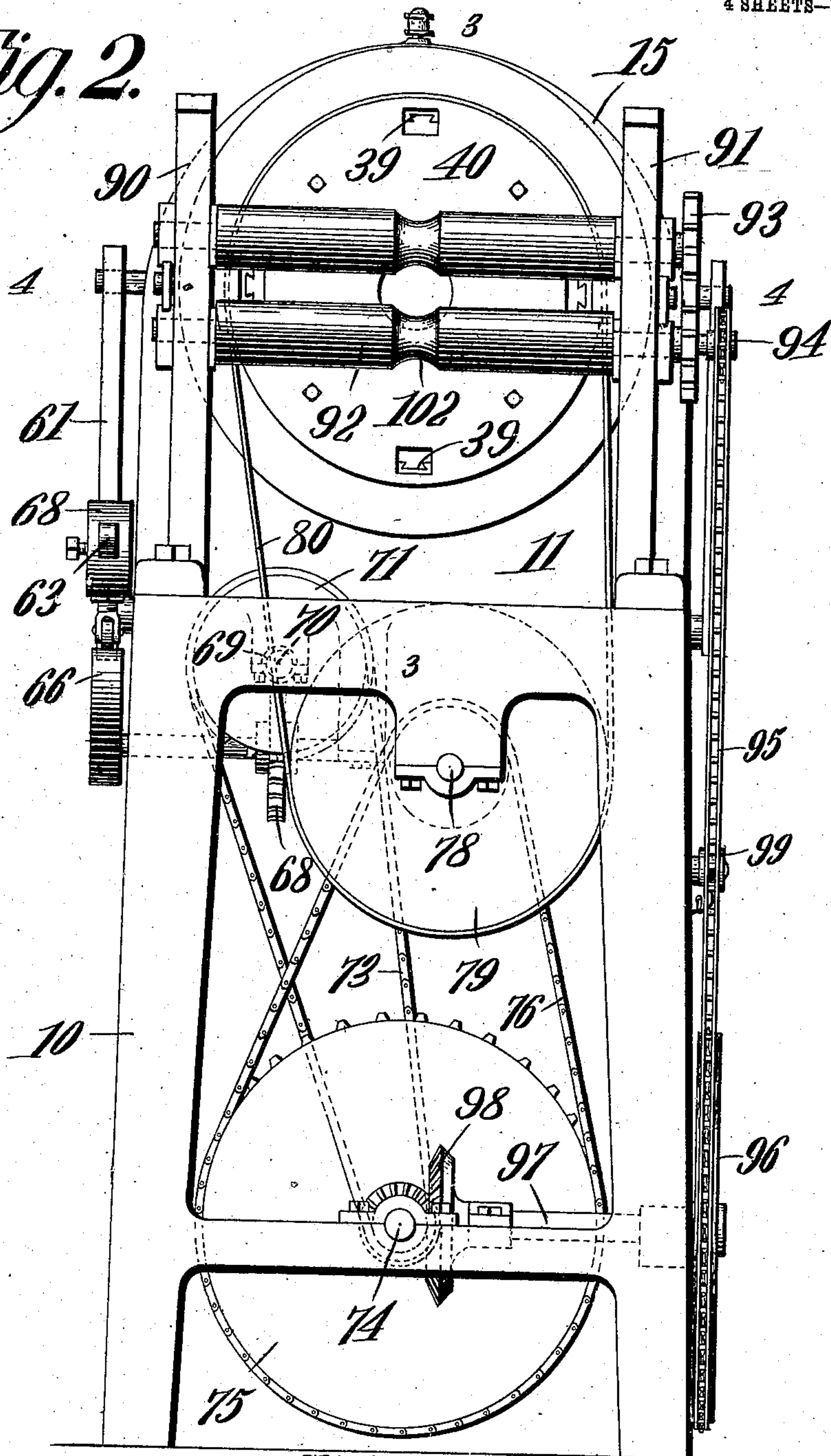
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4 SHEETS—SHEET 2.

*Fig. 2.*



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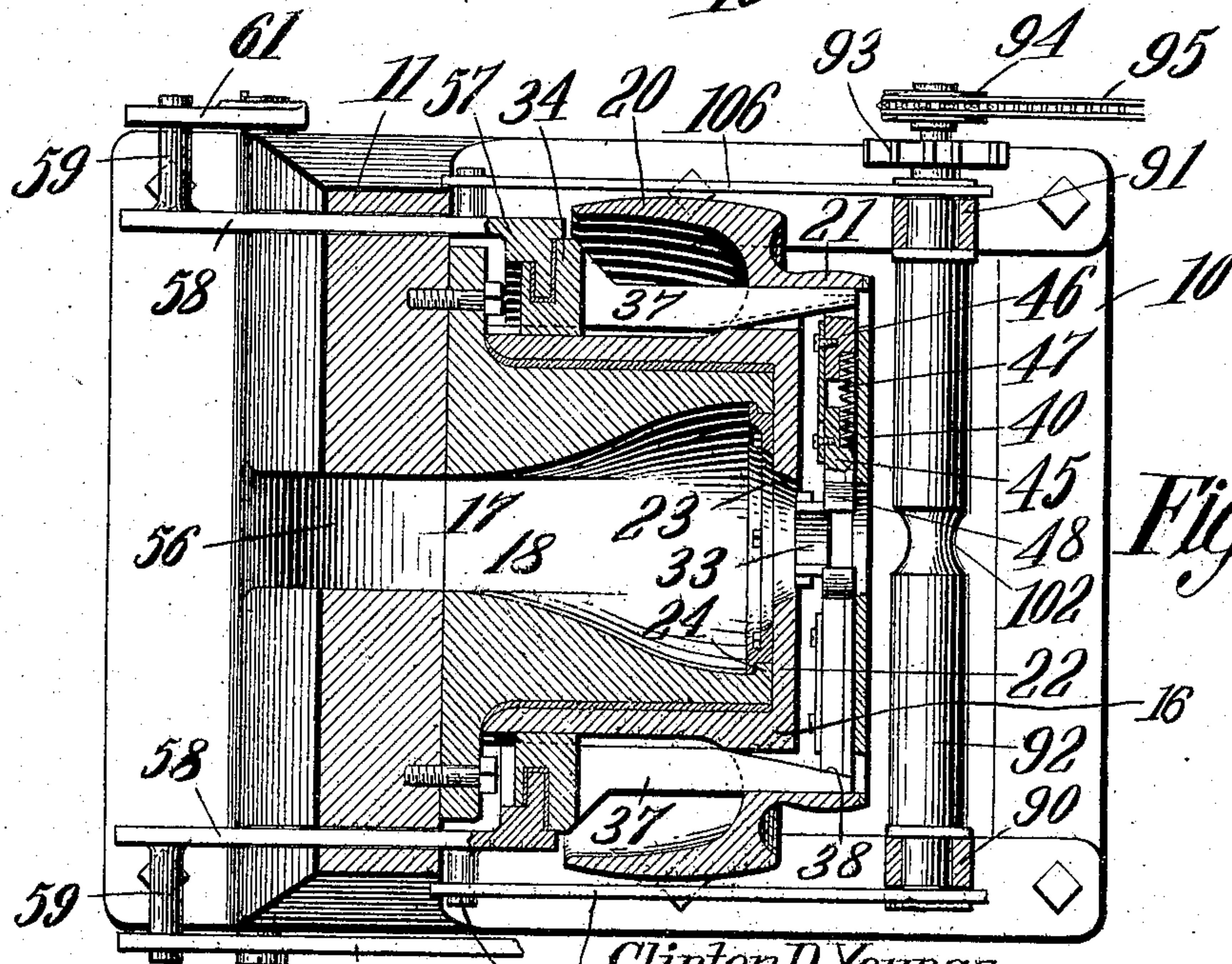
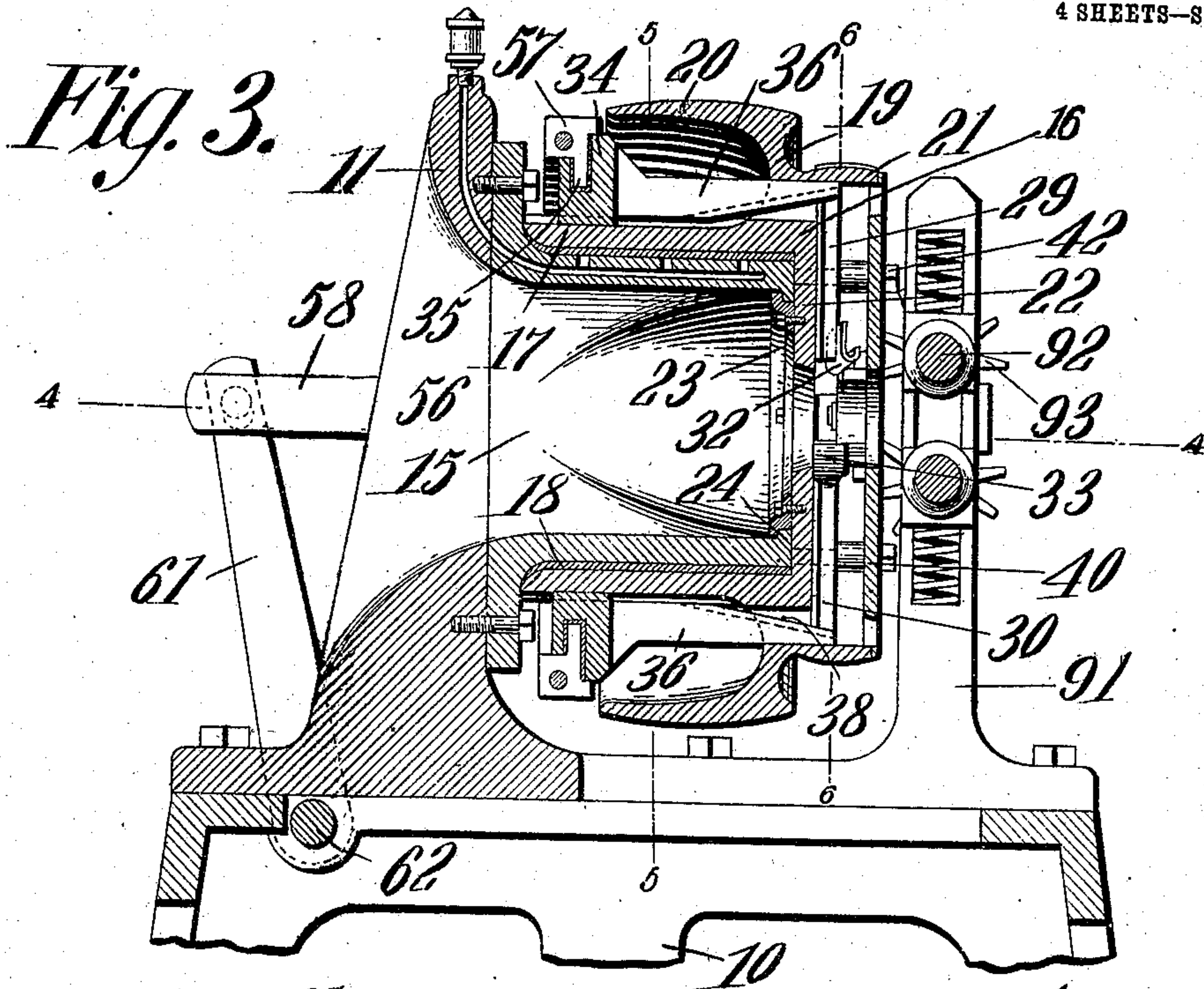
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4 SHEETS—SHEET 3.



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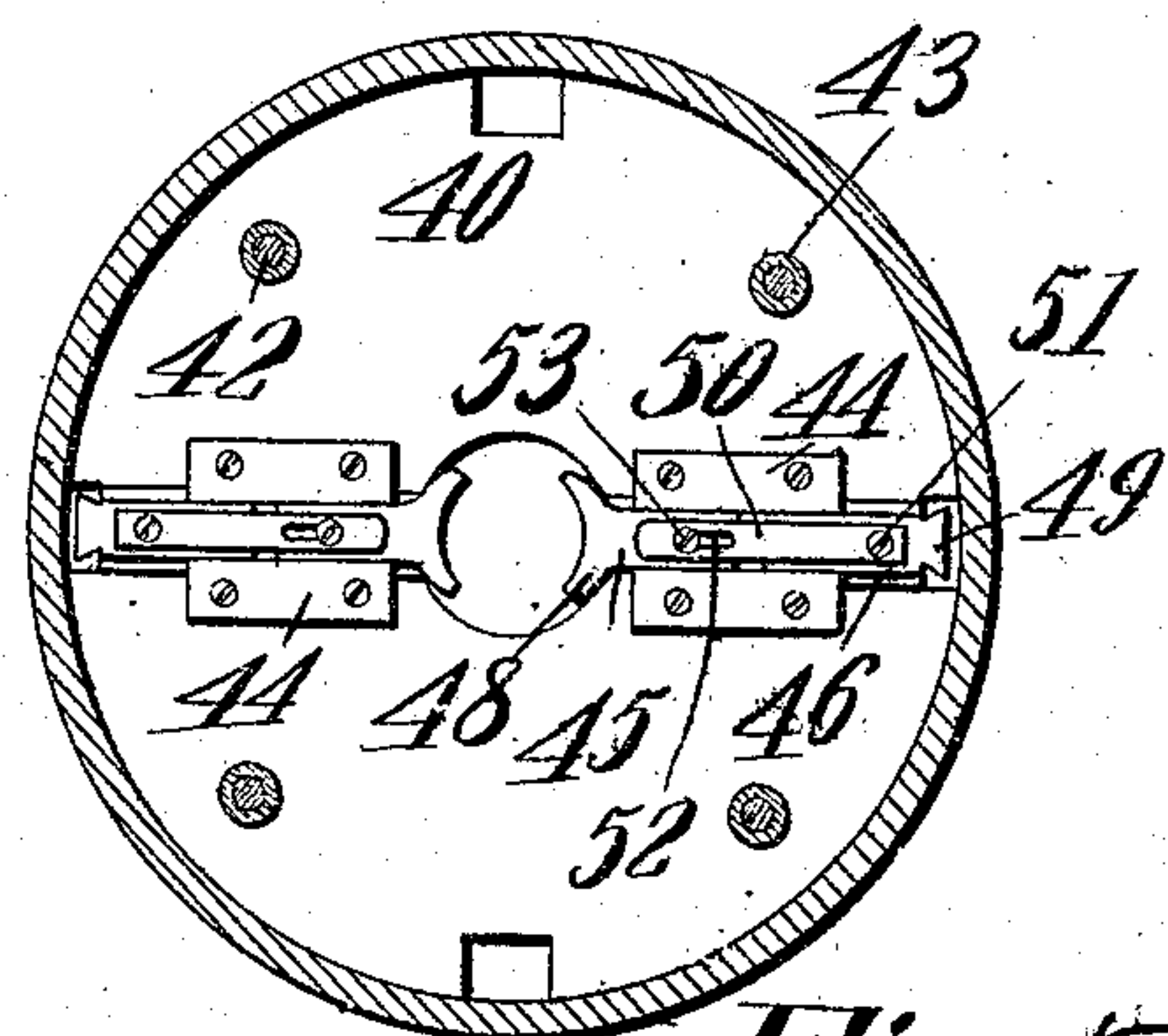
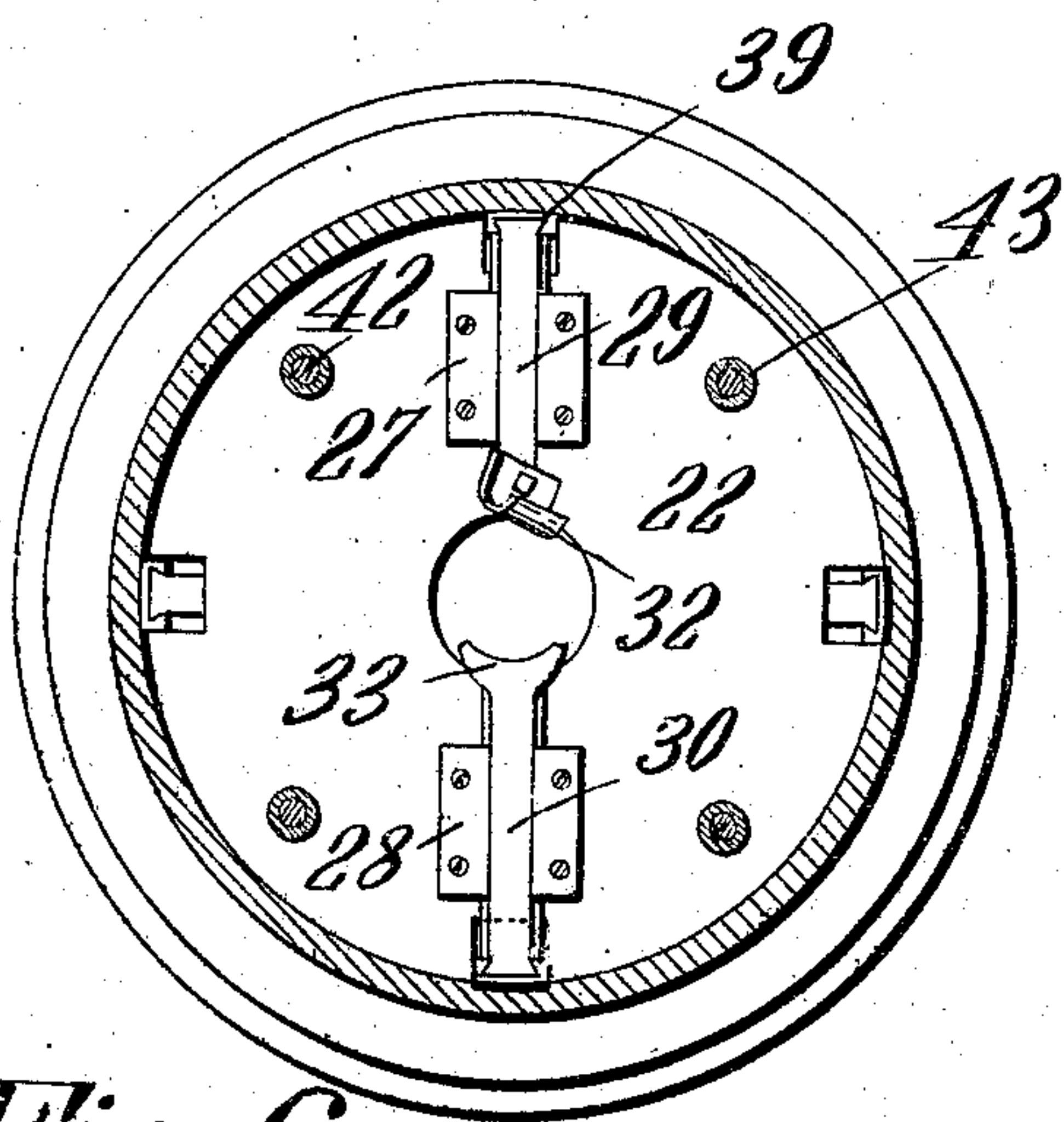
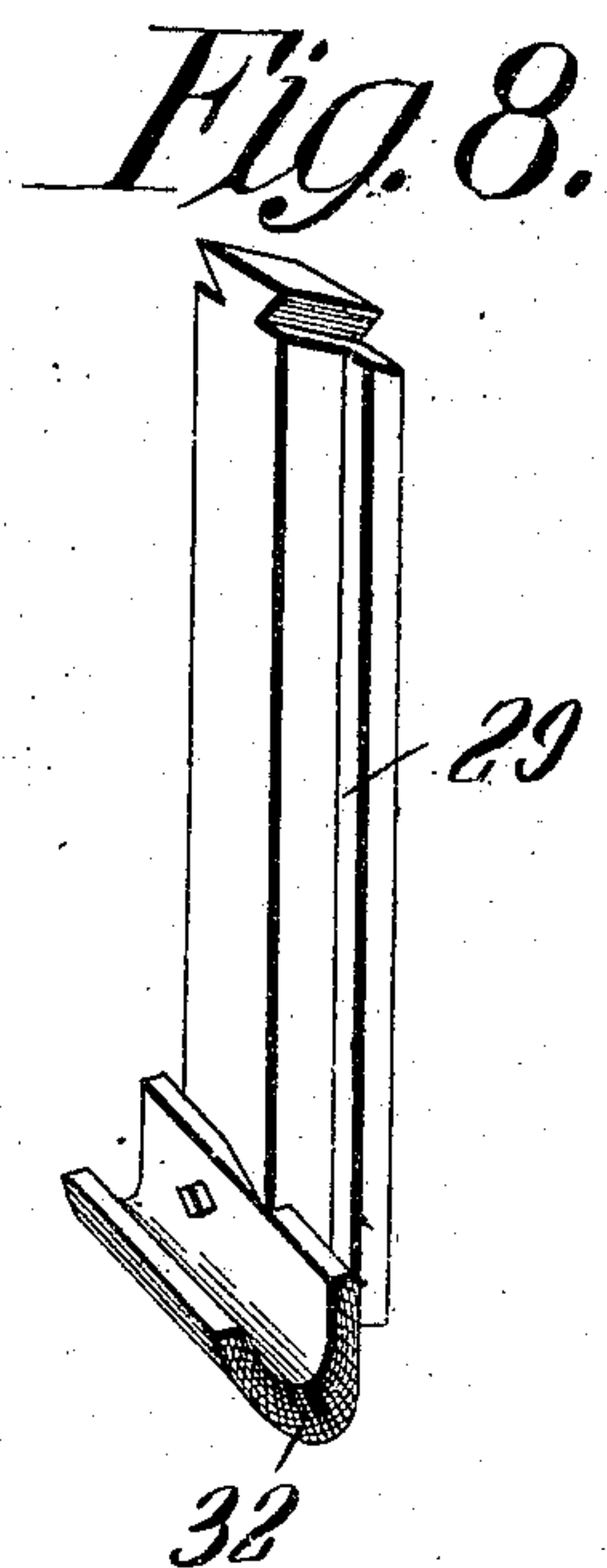
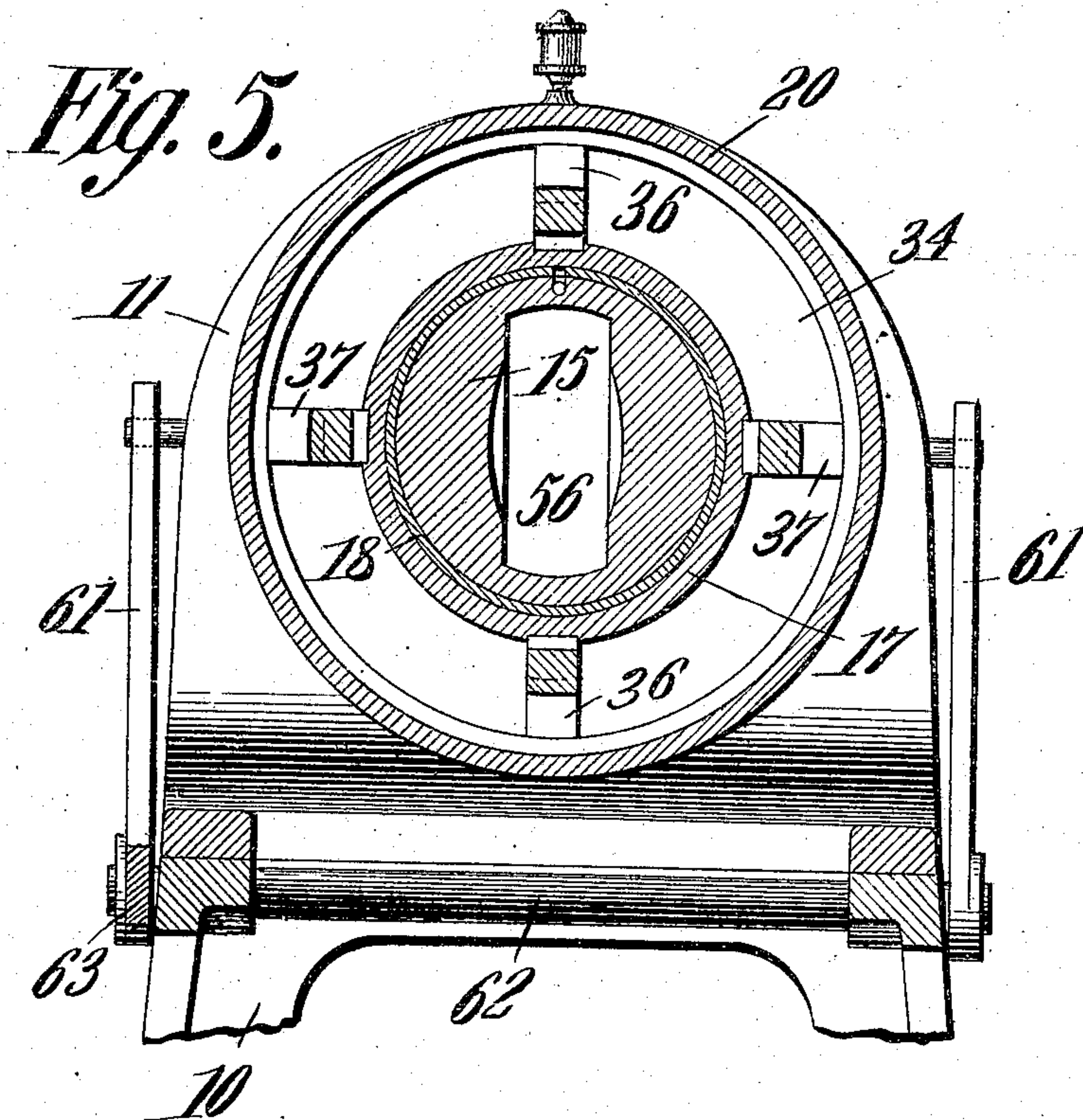
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4 SHEETS—SHEET 4.



*Fig. 6.*

*Fig. 7.*

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# UNITED STATES PATENT OFFICE.

GEORGE M. FENN AND CLINTON D. YOUNGS, OF CHARLOTTE, MICHIGAN.

## LATHE.

No. 855,101.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed October 4, 1906. Serial No. 337,449.

*To all whom it may concern:*

Be it known that we, GEORGE M. FENN and CLINTON D. YOUNGS, citizens of the United States, residing at Charlotte, in the county of Eaton and State of Michigan, have invented a new and useful Lathe, of which the following is a specification.

The object of the present invention is to provide a machine for turning or truing sticks of irregular form, such, for instance as scythe snaths. In the manufacture of these and other bent wood articles, more or less splintering occurs, and it is usual to finish the articles by hand, an operation that entails considerable expense and loss of time.

A further object of the invention is to provide a machine in which sticks of regular or irregular form may be turned to a pattern, so that the product of the machine will be uniform in shape and size.

A still further object of the invention is to provide a lathe, the parts being so arranged as to feed the work at proper speed with respect to the action of the cutters, and to adjust the cutters in accordance with the pattern to be followed.

A still further object of the invention is to provide a machine of this type in which the feeding mechanism is arranged to accommodate articles of varying diameter, and in which provision is made for adjusting the feeding mechanism to position to receive another article, as soon as one is completed.

A still further object of the invention is to provide a machine of this type in which the cutting devices are under the control of a pattern cam or like member, and are moved toward and from the center of rotation for the purpose of increasing or decreasing the diameter of the article being made as dictated by the pattern.

A still further object of the invention is to provide a novel means for automatically centering the work, so that the cutters or other tools may properly act thereon.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing

from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a side elevation of a lathe constructed in accordance with the invention. Fig. 2 is an end elevation of the same. Fig. 3 is a vertical section of the upper portion of the mechanism on the line 3—3 of Fig. 2. Fig. 4 is a sectional plan view on the line 4—4 of Fig. 3. Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 3. Fig. 6 is a transverse section on the line 6—6 of Fig. 3, showing the cutting knife and the work support arranged opposite thereto. Fig. 7 is a view of the same plan looking in the opposite direction and showing the opposed work guides. Fig. 8 is a detail perspective view of the cutter and its carrying slide detached.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The working parts of the machine are supported on a suitable frame which includes lower standards 10 and an upper frame or standard 11, and secured to or formed integral with the standard 11 is an annular bearing post 15 arranged for the support of a revoluble cutter head 16. The cutter head 16 is provided with a tubular portion 17 having a lining 18 of Babbitt metal or the like to reduce friction on the bearing post 15, and near the outer end of the cutter head is arranged a flange 19 from which extend two pulleys 20 and 21, the pulley 20 being belted to a suitable source of power and constituting the main drive pulley of the machine, while the second pulley 21 serves to transmit movement through a suitable belt to the mechanism which controls the operation of the pattern and feeding mechanism, as hereinafter described. At the forward end of the cutter head is a face plate or disk 22, to which is secured a flanged ring 23 that fits over an inturned flange 24 carried by the post 15, these members serving to prevent any movement of the cutter head in the direction of its length.

The outer face of the plate 22 is provided with a pair of diametrically opposed guides 27 and 28, and mounted in these guides are slides 29 and 30, respectively. The slide 29 carries a suitable knife 32 for shaping and finishing the stick or other article during its passage through the lathe, and provision is



made for moving the knife and its carrying slide toward and from the center of rotation of the cutter head, in order to vary the diameter of the work as dictated by the pattern mechanism. The slide 30 is provided at its inner end with a rounded jaw 33 which forms a support for the work during the operation of the cutter, and this slide moves simultaneously with the slide 29, both slides being moved inward or outward at the same time, as dictated by the pattern.

Mounted on the tubular portion 17 of the cutter head is a cam carrying ring 34 that is provided with an annular groove 35 that is preferably lined with Babbitt metal, and projecting from one side of this ring are two sets of arms 36 and 37, the arms 36 being arranged at diametrically opposite points with respect to each other, while the arms 37 are also disposed diametrically opposite each other, and are in a plane at a right angle to the plane of the arms 36. All of these arms are provided at their outer ends with tapered cam faces 38 having undercut dove-tailed grooves 39, and the dove tailed grooves of the arms 36 serve to receive correspondingly shaped ribs at the outer ends of the slides 29 and 30, so that as the ring 34 is moved outward, the slides 29 and 30 will be moved on radial lines toward the center of rotation of the cutter head, but when the ring 34 is moved back, that is to say, in the direction of the standard 11, the two slides 29 and 30 will be moved away from the center of rotation of the cutter head, and in this manner the distance between the cutting knife and the work supporting guide 33 may be varied in order to vary the diameter of the work.

Secured to the outer face of the cutter head is a face plate or ring 40, the edge of the ring being grooved for the reception of the outer portion of the annular flange which forms the pulley 21, and this outer face plate is secured to the cutter head by bolts 42 which pass through spacing collars 43, so that the outer plate or ring will be held positively in position.

To the inner face of the plate or ring 40 are secured two pairs of guides 44 in which are mounted work guiding slides, said slides being arranged at diametrically opposite points with respect to each other, and being disposed at a right angle to the plane of the slides 29 and 30. Each of the work guiding slides is formed in two sections 45 and 46, these being normally spaced apart by a small compression spring 47 that is seated within recesses formed in the adjacent ends of the sections. The inner end of the inner section 45 carries a curved jaw 48 for engagement with the work while the outer end 49 of the outer section is in the form of a dove-tailed rib that fits within the dove tailed groove 39 of one of the cam arms 37. The spreading movement of the sections 45 and 46 is limited by a small

tie plate 50 which is secured at one end to the section 46 by means of the screw 51, and the opposite end is provided with a slot 52 for the passage of a screw 53 that enters a threaded opening in the section 45. This tie plate may further serve as a means for retaining the spring 47 in place.

As the cam carrying ring 34 is moved in the direction of the length of the cutter head, the arms 37 will cause either inward or outward movement of the auxiliary guides and the movement of these guides corresponds to the movement of the slides 29 and 30, while the springs 47 permit slight yielding of both guides and tend to maintain the work in the central position by exerting equal pressure on opposite sides of the work.

The supporting post 15 of the cutter head is hollow to permit the free passage of the work, and the standard 11 is provided with an opening 56 through which the work may pass, but the opening 56 is preferably in the form of an elongated and comparatively narrow slot so that in case the cutter strikes a knot in the work, and there is a tendency to revolve the work, or stick, the latter will not be allowed to whirl around and injure the workman who is feeding the machine. The slot is of sufficient width to permit the ready passage of bent or crooked sticks, but if the work commences to turn, it will be stopped by engagement with one wall of the slot and thus will never be wholly beyond the control of the workman.

Arranged within the groove 35 of the cam carrying ring is an inwardly projecting rib carried by an adjusting ring 57, and extending rearward from the latter is a pair of arms 58 that are preferably rectangular in cross section and extend through correspondingly shaped openings in the standard 11. From the outer face of the rear portion of each arm extends a pin 59 which enters a groove 60 formed in a rocker arm 61 carried by a rock shaft 62 mounted in bearings in the main frame, there being two of such rocker arms arranged one at each side of the machine, so that the movement of the cam ring may be accomplished without strain or binding. One of the rocker arms 61 is extended to form an arm 63 which carries a screw 64, the latter being provided with an anti-friction roller 65 that bears on a pattern cam 66 mounted on a transversely disposed shaft 67, and the anti-friction roller is maintained in contact with the cam by means of a suitable weight 68 carried by the arm 63. The pattern is revolved in the manner hereinafter described, and serves by adjustment with the cam carrying ring 34 to control the movement of the cutter and the guides toward and from the center of rotation of the cutter head for the purpose of varying the diameter of the work.

The cam 66 is detachable from its carrying shaft 67 so that cams of different shape and



size may be substituted therefor when the character of the work is to be altered. For driving purposes, the shaft 67 is preferably provided with a worm wheel 68 with which  
 5 engages a worm 69 on a shaft 70, and this shaft carries a sprocket wheel 71 that is connected to a sprocket wheel 72 by a link belt 73. The sprocket wheel 72 is mounted on a  
 10 shaft 74 having bearings in the lower portion of the frame, and on said shaft is a sprocket wheel 75 that is connected by a link belt 76 to a sprocket wheel 77 on a counter shaft 78. This shaft 78 carries a belt wheel 79 that is  
 15 connected by a belt 80 to the smaller pulley 21 of the cutter head. This arrangement of gearing permits of free, rapid rotation of the cutter head, and a single complete rotation of the pattern cam during the passage of each piece of work through the machine.

20 Projecting from the front of the frame are two brackets 90 and 91, the bracket 90 having bearings for the reception of a pair of feed rollers 92 which are connected to each other by gears 93, and on the projecting end  
 25 of one of such rollers is a sprocket wheel 94 that is driven by a link belt 95 from a sprocket wheel 96 on a shaft 97, this latter shaft being connected to the shaft 74 by bevel gears 98. The link belt is provided with a tightening  
 30 roller 99 of ordinary construction. The opposite ends of the rollers are mounted in bearings blocks 100 that are adapted to a vertical slot formed in the bracket 91, and are thrust toward each other by small com-  
 35 pression springs 101, or weights or similar devices. These rollers are provided with annular grooves 102 of a shape approximating the cross section of the work and grip and feed the work forward through the machine,  
 40 said rollers yielding as the diameter of the work varies, and always gripping the same with sufficient force to accomplish the feeding operation.

45 In the machine as at present constructed, it is intended that the smallest end of the work be first introduced, and that the pattern mechanism shall gradually move the cutter and the work guides outward as the diameter of the work is to be increased. In order to  
 50 hold the feed rollers open at the end of an operation, so that another article may be conveniently introduced, an arm 106 is provided at each side of the machine, and one end of this arm is provided with a slot 107  
 55 which fits over a headed pin 108 carried by one of the arms 58. The opposite end of the arm has an enlarged head 109 that is arranged to enter between the bearings 100 as the article nears completion. Just before  
 60 the article passes beyond the cutter, the bearings 100 will be separated by the work to an extent sufficient to permit the enlarged head 109 to pass between them, and when the work finally emerges from the feed rollers,  
 65 the bearing blocks will be forced toward each

other by the springs or weights, but will be held in spaced relation by the enlarged head 109. At this time the pattern cam will be in the position shown in Fig. 1, and the cutters and similar members will be separated to  
 70 the fullest extent. The workman will then introduce another article through the machine until its end is entered between the feed rollers. The machine continues to operate until the cutter and the work guides have  
 75 moved to the full in position, that is to say, with the smallest radius of the pattern cam in engagement with the arm 63. By this time the pin 108 engages the forward end of the slot 107, and the enlarged end 109 will  
 80 be thrust outward from its position between the bearings 100, so that the feed rollers which are still rotating, may be moved into engagement with the work and start the feeding operation. The shape of the pattern  
 85 cam may, of course, be altered in order to vary the diameter of the work as required and produce a continuous taper from end to end of the work, or to vary the diameter at different points in the length of the work, so  
 90 that alternate ribs and grooves may be formed.

While the device is found of especial value in the turning and finishing of scythe snaths, it may, of course, be used in connection with  
 95 all bent wood work, such for instance as chair arms, legs or backs, cane and umbrella handles, and it may, also, be successfully used on straight work without departing from the invention.

We claim:—

1. In combination, a revoluble cutter head having a pair of face plates, a pair of work guides carried by one of said face plates, a work support, and a cutter carried by the  
 105 other face plate, and a pattern mechanism for adjusting the positions of the guides, the work support and the cutter.

2. In combination, a revoluble cutter head, a pair of face plates carried thereby, a pair  
 110 of work guides on one of said face plates, a work support, and a cutter on the other face plate, a pattern mechanism, and means operable therefrom for simultaneously adjusting the guides, the support and the cutter.

3. In combination, a revoluble cutter head, a pair of face plates carried thereby, a pair of diametrically opposed work guides, mounted on one of said plates and formed of yieldably connected sections, a work sup-  
 120 port, and a cutter arranged diametrically opposite each other on the other plate, the common plane of the work guides being at a right angle to the common plane of the work support and cutter, a pattern mechanism,  
 125 and means operable therefrom for simultaneously adjusting the guides, the support and the cutter.

4. The combination with a lathe, of a revoluble cutter head, a tubular support post  
 130



therefor, inner and outer face plates on said cutter head, a plurality of slides carried thereby, a cutter mounted on one of said slides, and the remainder of the slides acting  
5 as work guides, the outer ends of all of the slides being provided with dove tailed ribs, a cam ring, a plurality of arms mounted thereon and provided with inclined dove tailed  
10 grooves for the reception of the ends of the slides, and a pattern cam mechanism for adjusting the position of said ring.

5. In a machine of the class described, a revoluble cutter head, a cutter, a pair of diametrically opposed work guides each formed  
15 of a pair of yieldably connected sections, and means for adjusting said work guide.

6. In a machine of the class described, a revoluble cutter head, a cutter supported thereby, a pattern mechanism controlling the  
20 position of the cutter, a pair of spring pressed feed rollers, journal boxes carrying the said rollers, means for operating the feed rollers, a

pair of cam arms arranged to move between the journal boxes, and means connecting  
said cam arms to the pattern mechanism, 25 whereby the feed rollers are separated and held in spaced relation at the completion of each operative movement of the pattern mechanism.

7. In a machine of the class described, a 30 revoluble cutter head having a central work passage, and a cutter head support having an elongated slot to permit the passage of the work and limit whirling movement of the work.

In testimony that we claim the foregoing  
as our own, we have hereto affixed our signatures in the presence of two witnesses. 35

GEORGE M. FENN.  
CLINTON D. YOUNGS.

Witnesses:

C. W. MORRELL,  
ESTELLA S. KLAISS.