

No. 687,455.

Patented Nov. 26, 1901.

L. FRANDSEN & L. HOLZHAUER.
STATIC ELECTRIC GENERATOR.

(Application filed Sept. 20, 1901.)

(No Model.)

3 Sheets—Sheet 1.

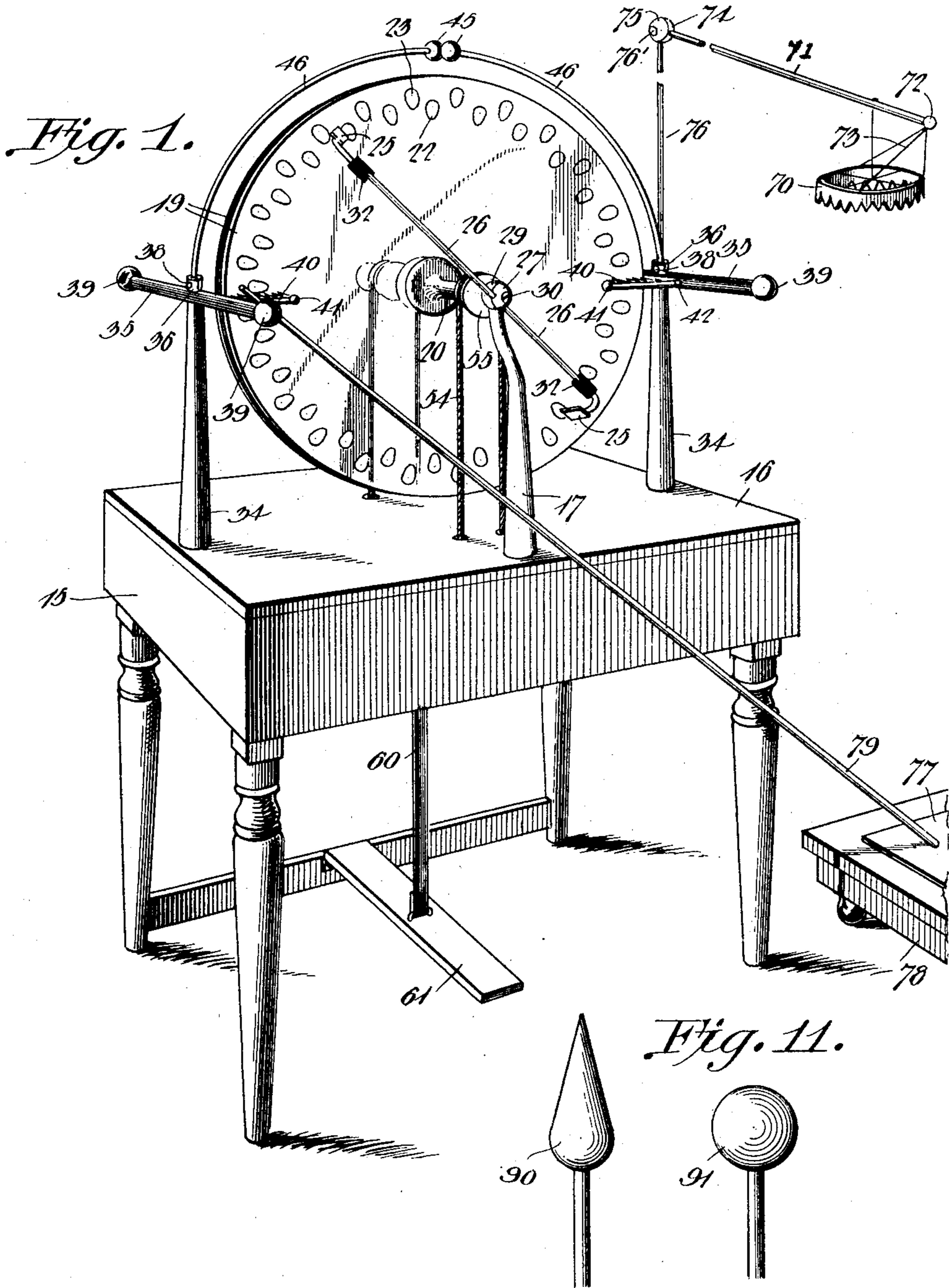


Fig. 1.

Fig. 11.

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by

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Attorneys

Witnesses

Frank C. L. ...
Jno. E. ...

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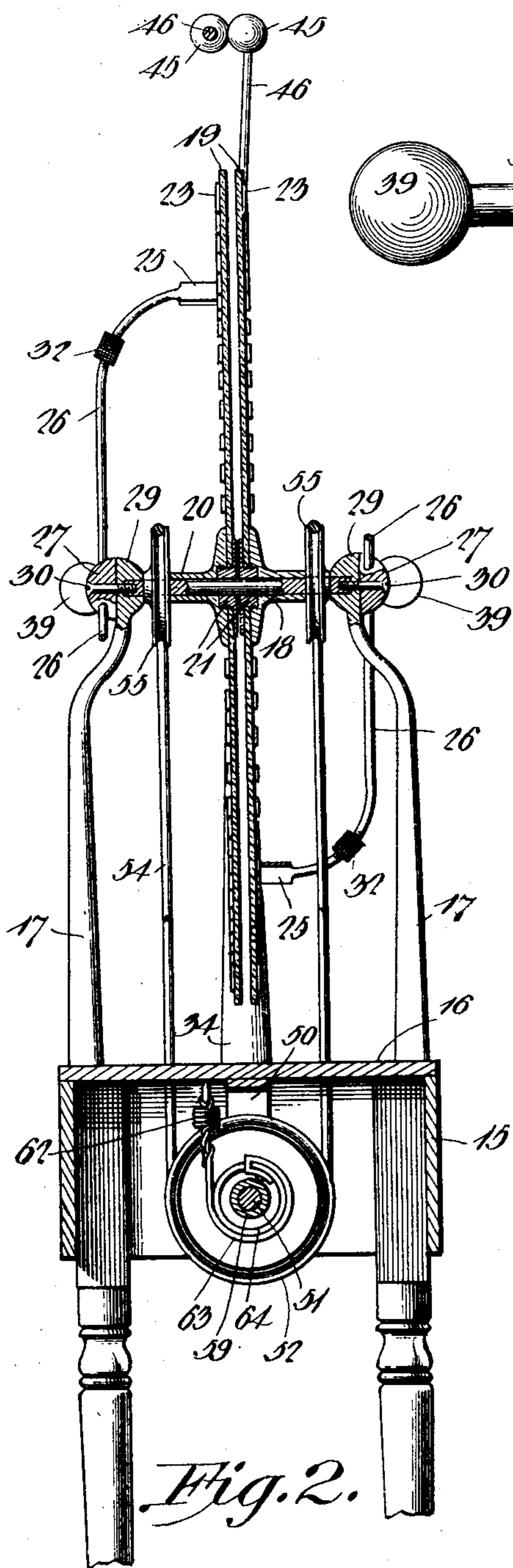


Fig. 2.

Witnesses

John Culverwell.
John E. Carter

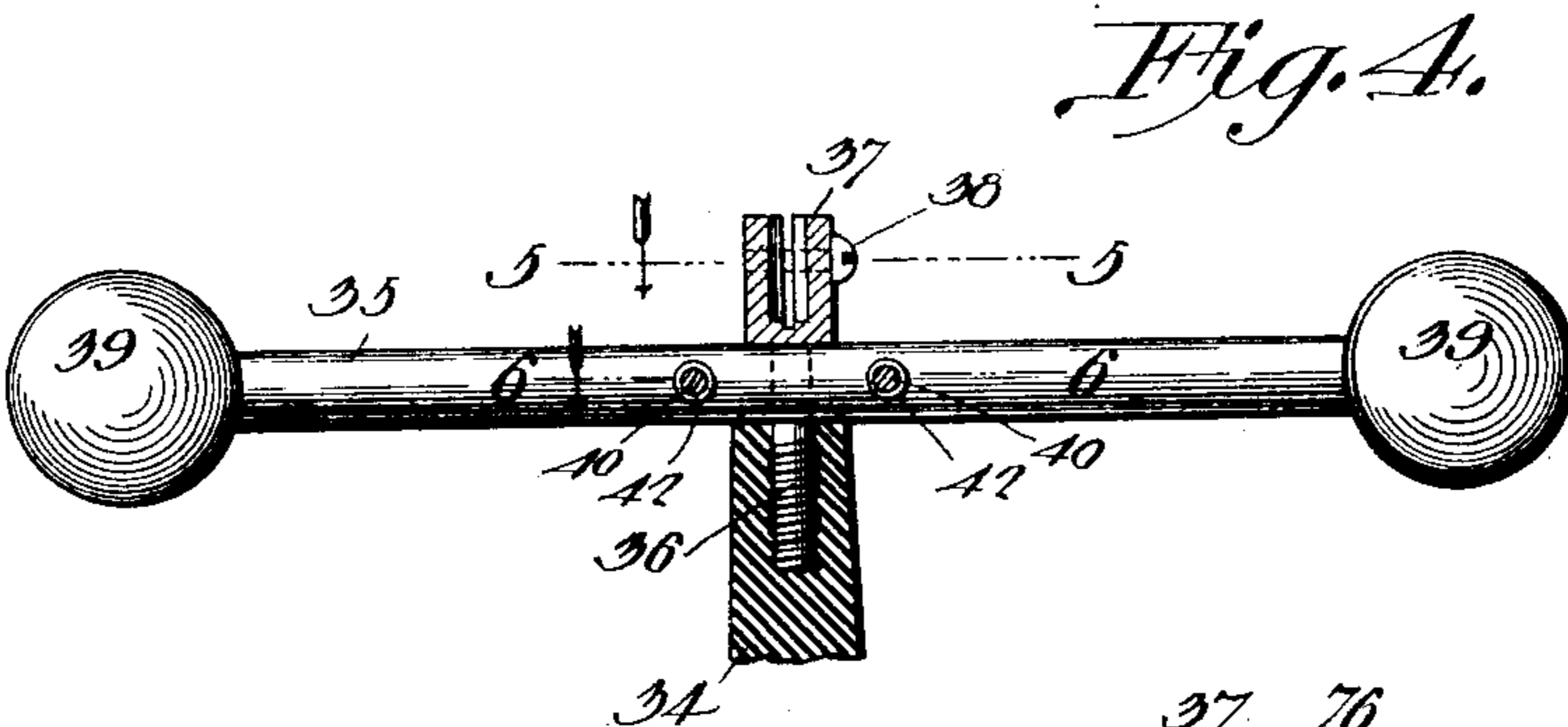


Fig. 4.

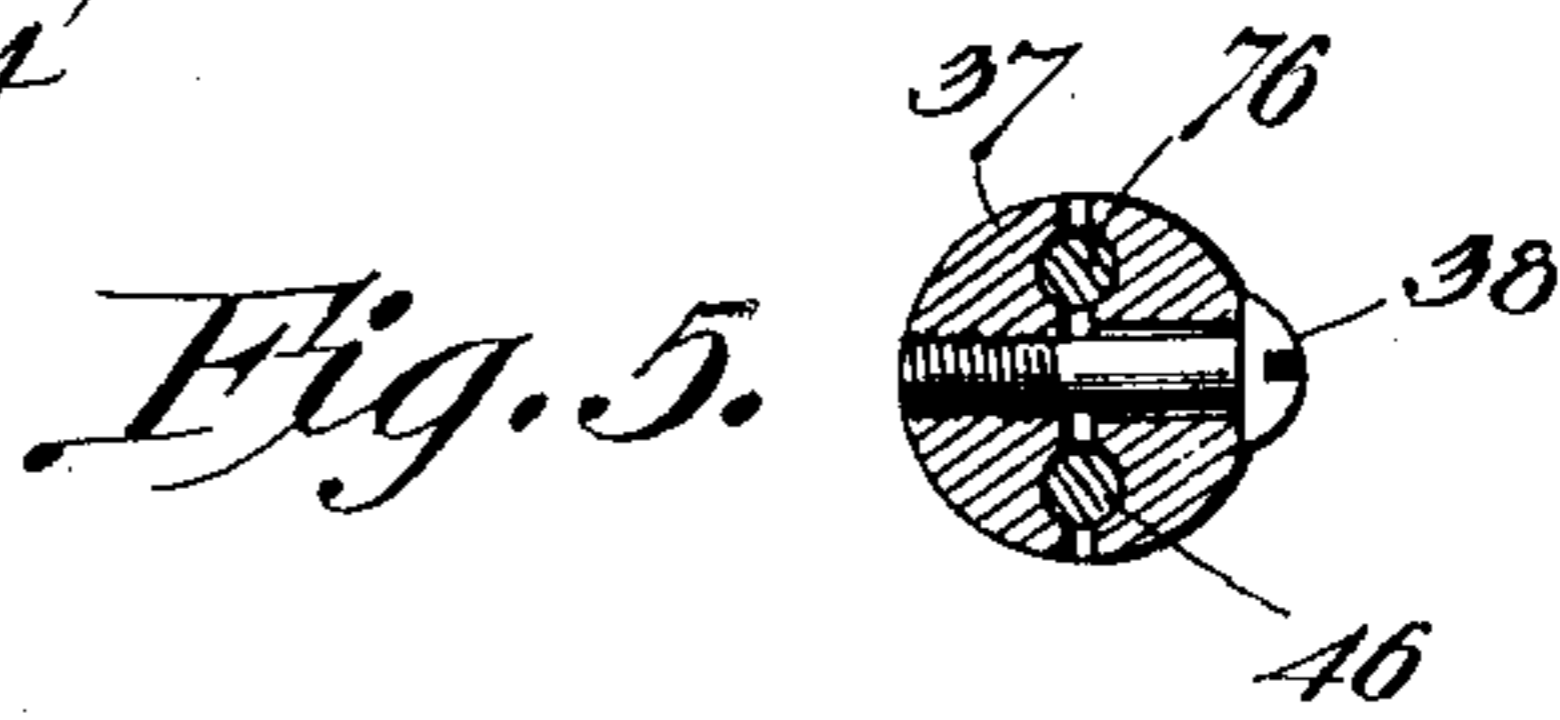


Fig. 5.

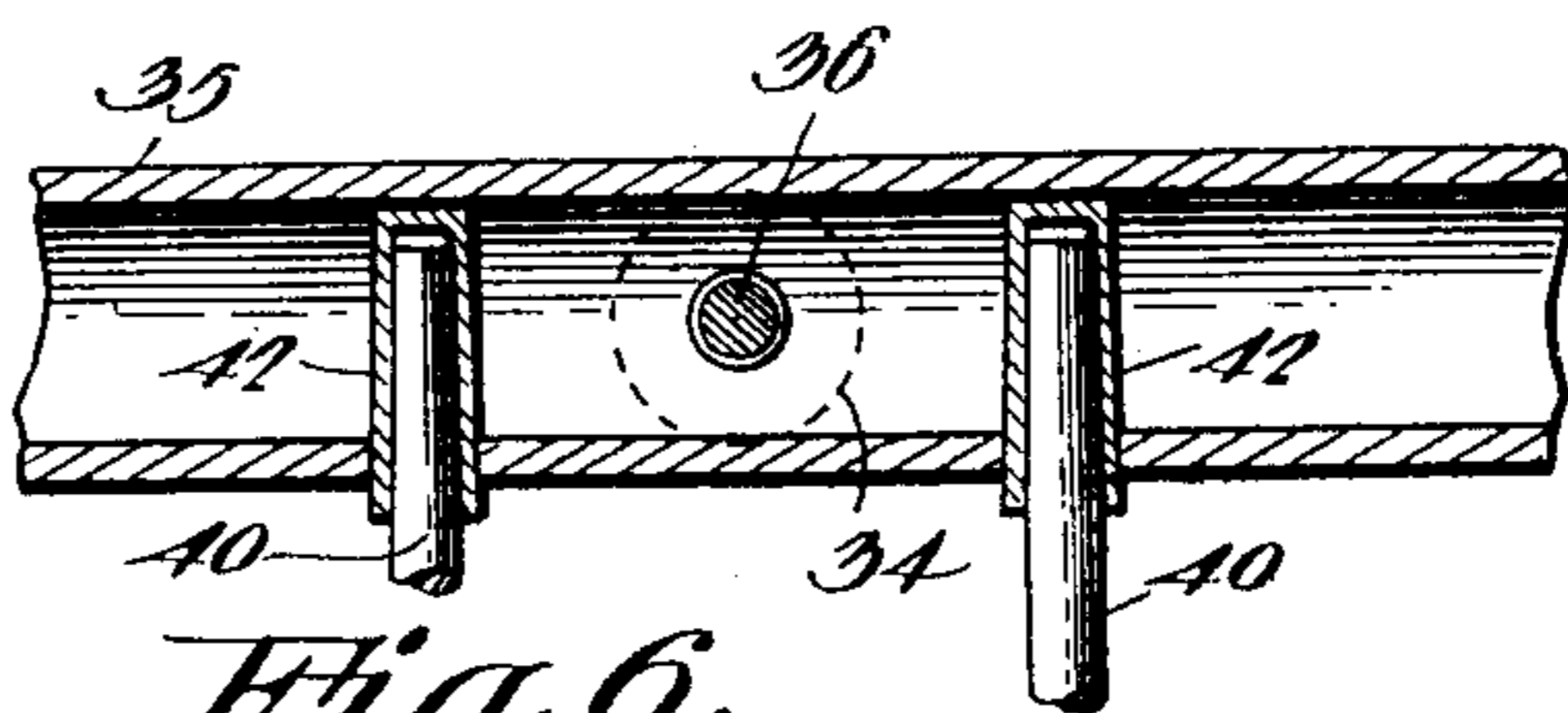


Fig. 6.

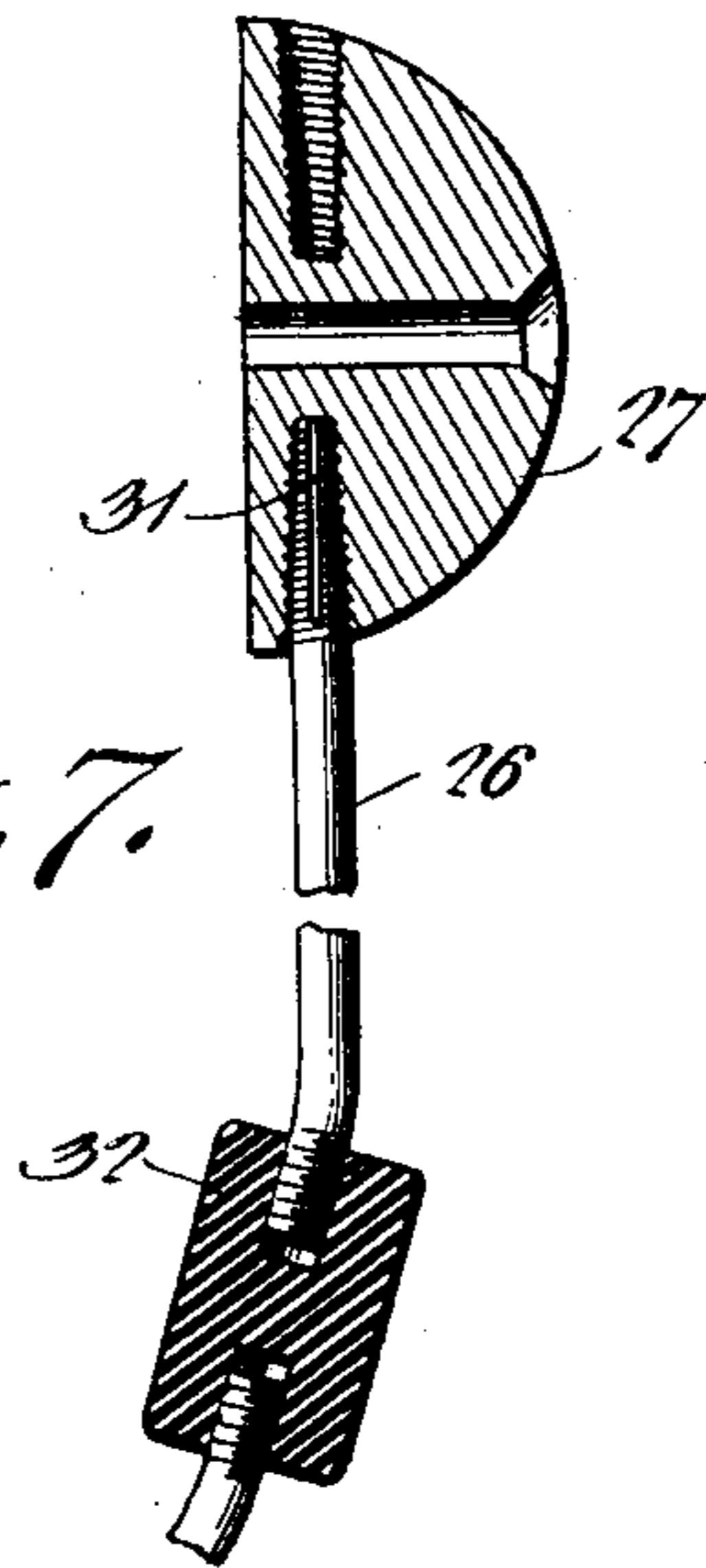


Fig. 7.

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L. FRANDSEN & L. HOLZHAUER.

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3 Sheets—Sheet 3.

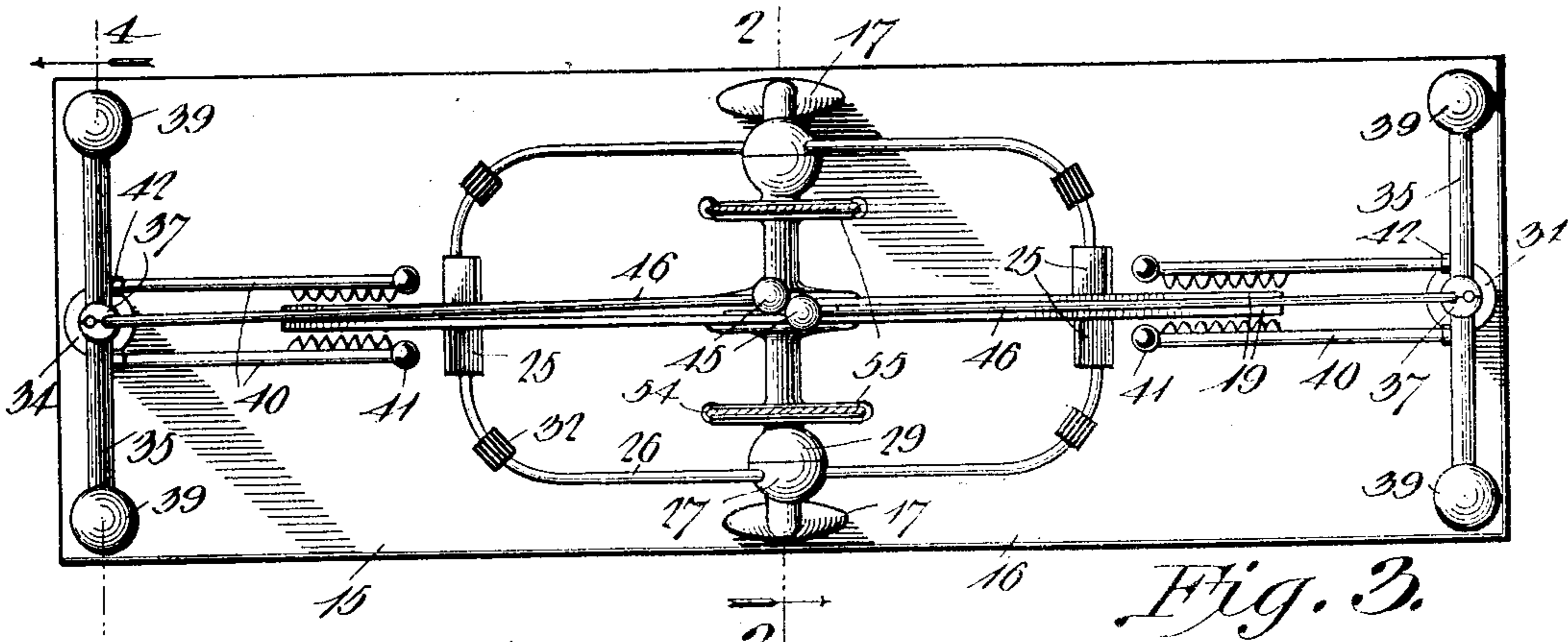


Fig. 3.

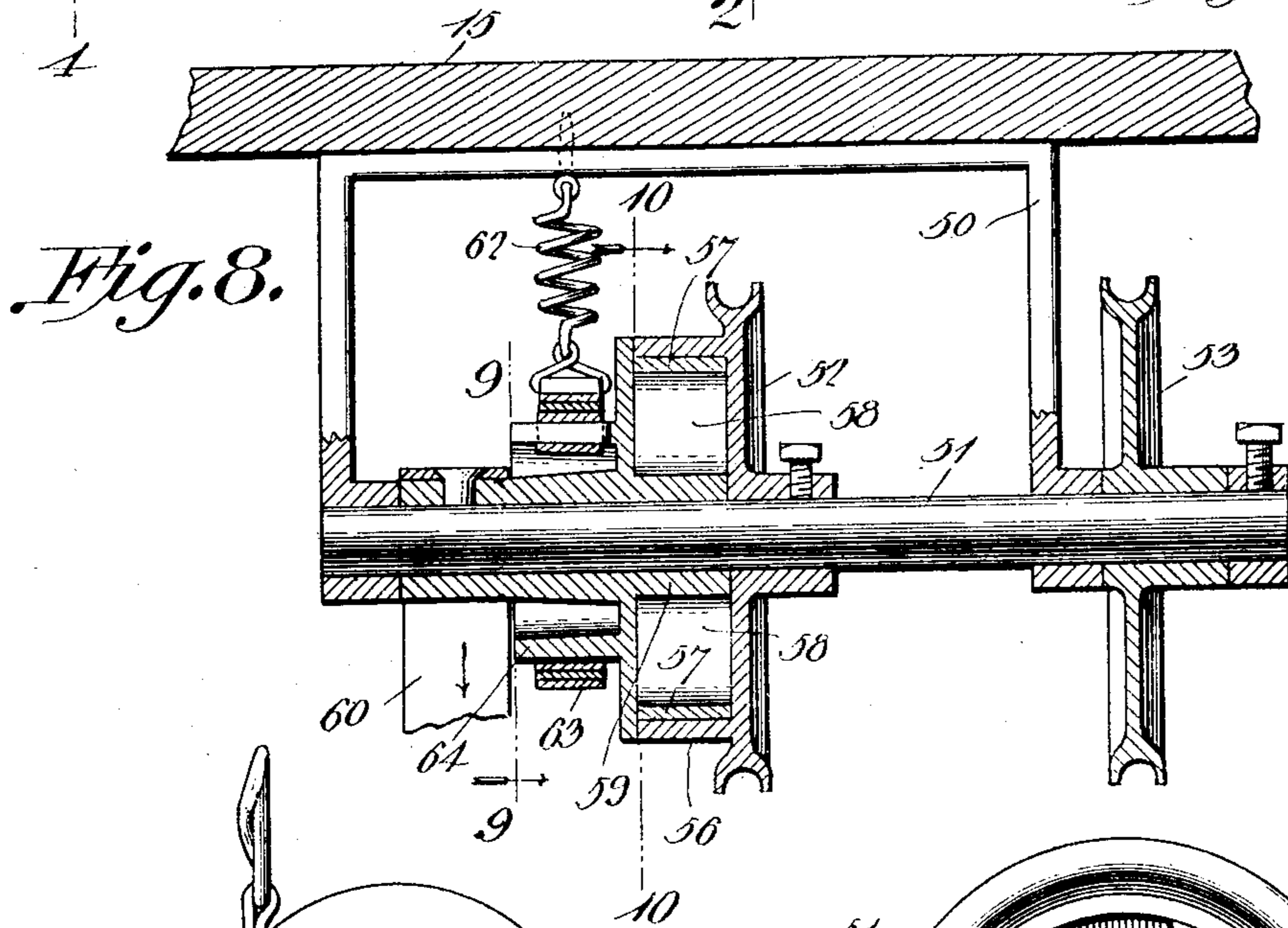


Fig. 8.

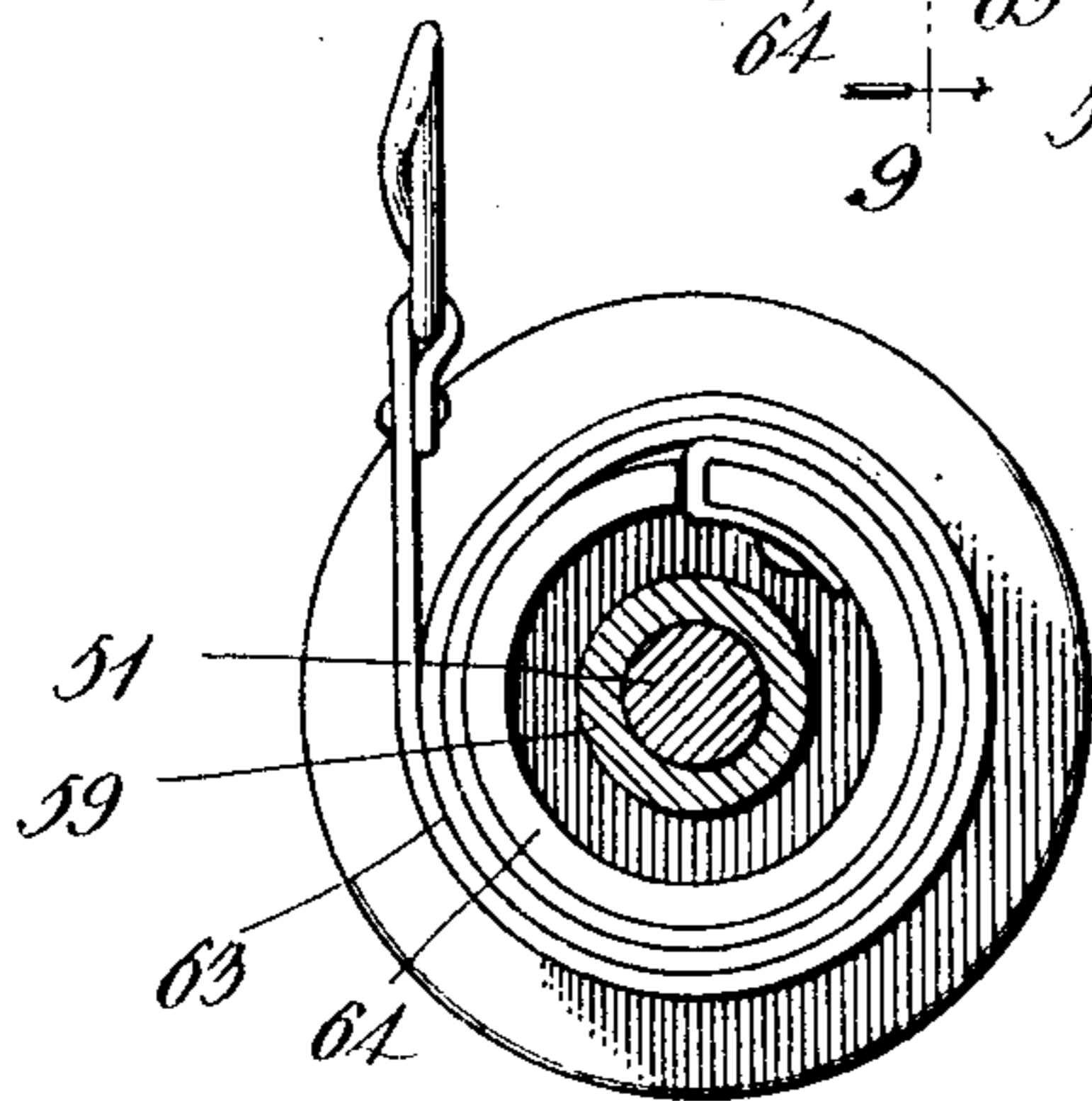


Fig. 9.

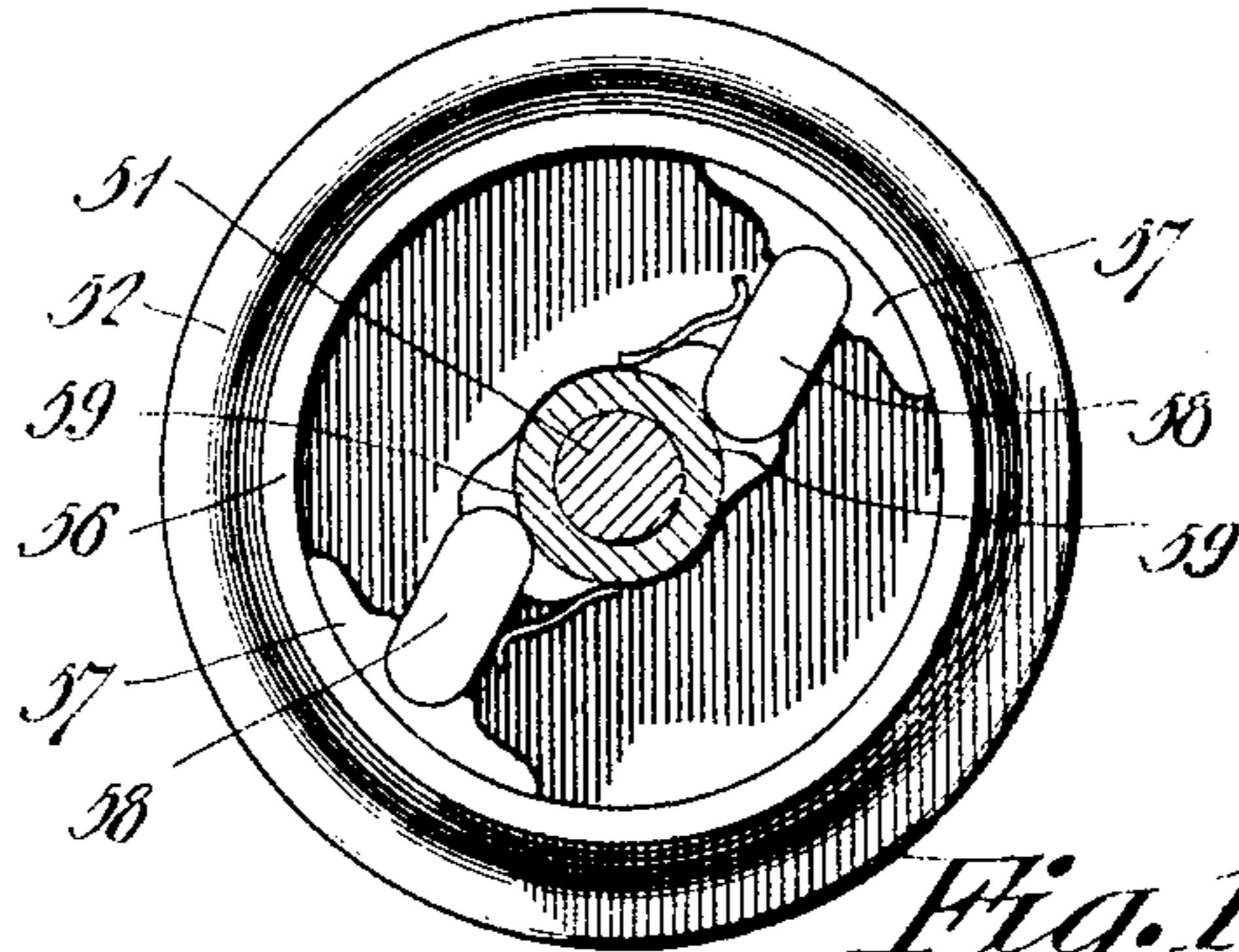


Fig. 10.

Witnesses

J. Frank Culverwell.
Jno E. Parker

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by *C. A. Snow & Co.* Attorneys

UNITED STATES PATENT OFFICE.

LAWRENCE FRANDBSEN AND LEWIS HOLZHAUER, OF SANDUSKY, OHIO.

STATIC ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 687,455, dated November 26, 1901.

Application filed September 20, 1901. Serial No. 75,827. (No model.)

To all whom it may concern:

Be it known that we, LAWRENCE FRANDBSEN and LEWIS HOLZHAUER, citizens of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented a new and useful Static Electric Generator, of which the following is a specification.

This invention relates to certain improvements in static electric generators of that general type known as the "Wimshurst" influence-machines, in which two oppositely-rotating glass disks are provided with sectors acting as carriers and conductors.

An object of the invention is to provide a strong and durable machine of low cost and capable of application to various classes of work.

A further object of the invention is to increase the capacity of the machine by arranging the sectors in two concentric rows, which slightly overlap each other, the upper portion of the inner row and the lower portion of the outer row being disposed for contact with the neutralizing-brushes.

Further objects of the invention are to provide for the regulation of the strength of the current by making the sparking-balls, the combs, and the brushes all adjustable; to provide for the insulation of the brushes from the frame of the machine and from each other; to provide an improved form of discharging-terminal for the production of electric waves in proximity to the head or body of a patient, and to provide for the more secure clamping of the combs.

Further objects and advantages of the invention will be apparent from the following description.

In the accompanying drawings, Figure 1 is a perspective view of a static electric generator constructed in accordance with the invention. Fig. 2 is a transverse sectional elevation of the same on the line 2 2, Fig. 3. Fig. 3 is a plan view of the apparatus. Fig. 4 is a sectional elevation, on an enlarged scale, on line 4 4 of Fig. 3. Fig. 5 is a sectional plan view, on an enlarged scale, on the line 5 5 of Fig. 4. Fig. 6 is a similar view on the line 6 6 of Fig. 4. Fig. 7 is a detail of one of the brush-carriers. Fig. 8 is a longitudinal sectional elevation on an enlarged scale,

illustrating the construction of the actuating mechanism. Fig. 9 is a transverse sectional elevation of the same on the line 9 9 of Fig. 8. Fig. 10 is a similar view on the line 10 10, Fig. 8. Fig. 11 illustrates electrodes of different constructions which may be employed for different treatments.

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

The working parts of the apparatus are supported on a suitable framework made in the form of a table 15, having an upper platform 16, carrying suitable standards 17. To the upper ends of the standards is rigidly secured a shaft 18, on which the glass disks 19 are mounted. The disks 19 are formed of glass of suitable thickness and at their centers are secured to hubs comprising a tubular member 20, mounted upon the shaft 18, and a flange-nut 21, extending through a suitable opening in the disk and secured to the enlarged portion of the hub.

On the outer side of each disk 19 are two rows 22 and 23 of sectors, each formed of a thin plate of brass or other metal and secured in position on the disk in such manner that the outer edge of the inner row will extend outwardly beyond the inner edge of the outer row. The disk is, as usual, covered with shellac or similar material, and the sectors are adapted to make contact successively with neutralizing-brushes, which in the present instance are in the form of thin flexible steel plates 25, carried at the outer end of arms 26, which extend in diametrically-opposed pairs across the face of the disk at an angle of about forty-five degrees. The inner end of each arm 26 is secured to a semispherical block 27, adapted to be secured to a similarly-shaped block 29, secured to or formed integral with the standard 17, the two blocks when together forming a perfect sphere. The blocks are secured together by a screw 30, by turning which the plates 25 may be forced into more or less intimate contact with the sector 22 23. The inner end of each arm 26 is tapered and provided with an exterior screw-thread and adapted to a threaded opening in the block 27, and the end of the arm is slit, as at 31, for the purpose of locking in

position, the turning of the rod permitting of the radial projection of the contact plate or brush 25 to adjust the area of contact with either of the two rows of sectors. Each of the rods or arms 26 is formed in two parts, coupled by a block 32 of rubber or similar non-conducting material, so as to prevent any electrical connection between the brushes and the frame.

At the opposite ends of the table 16 are secured standards 34, preferably formed of hard rubber and carrying at their upper ends transversely-disposed tubes 35, which are secured in place by bolts 36, having split and recessed heads 37, which are adapted to receive the electrode-carrying arms and the connecting wires or rods by which the current is conducted to any suitable distance from the machine, the connections being made by the insertion of the arms or the ends of the conductors in the recess or recesses and then drawing together the split head by a set-screw 38.

At the opposite ends of the tubes 35 are spheres 39 to prevent any leaking of the current. The tubes 35 act as supports for the combs 40, which are arranged in the usual manner, with the spikes facing the opposite sides of the disks, the free ends of the combs being provided with spheres 41. At the opposite ends of the combs are thimbles 42, tapering slightly and adapted to fit within suitable openings in the tubes 35. This arrangement permits of the adjustment of the combs in a direction radially of the disks and by slightly turning said combs the ends of the spikes may be adjusted from and toward the sectors.

The sparking electrodes 45 are of the usual spherical type, but are arranged at the top of the machine in the manner shown in Fig. 1. The electrodes are carried by curved arms 46, held in the recessed head 37, and are capable of adjustment to a greater or less distance from each other in order to govern the strength of the current.

Mounted in a suitable bracket 50, secured to the under side of the table 16, is a shaft 51, carrying a fast pulley 52 and a loose pulley 53, over which passes an endless band 54 to the pulleys 55, arranged on the hubs 20 of the glass disks, the belt being run in such manner that motion imparted by the driving-pulley 52 will revolve the disks at the same speed, but in opposite directions. The pulley 52 is provided with an annular flange 56, with the inner surface of which engage two friction-shoes 57, connected by operating-arms 58 to a sleeve 59, mounted loosely on the shaft 51. To the sleeve 59 is secured one end of a strap 60, the lower end of which is connected to a pedal 61, the strap having two or three turns around the sleeve 59 and being adapted to rotate said sleeve in one direction, movement in the opposite direction to effect the rewinding of the belt after each impulse being imparted to such sleeve by a spring 62, extending between the frame and the end of

a belt 63, wound upon an annular flange 64, forming part of the sleeve 59.

The oscillatory movement of the sleeve 59 imparts a continuous rotary movement to the driving-pulley 52, and the disks may be turned at any desired speed in accordance with the rapidity of movement of the pedal.

70 represents a bonnet in the form of a ring of metal having one of its edges formed into a series of comparatively sharp points, which will permit of the discharge of the current in a downward direction, the points being arranged at any desired distance from the head of the patient, the bonnet, suspended from a horizontally-disposed rod 71, having at its outer end a sphere 72 to prevent leakage of the current, the sphere being connected by a number of wires 73 to the bonnet 70. In order to permit of the vertical adjustment of the rod 71, the latter is secured to a semi-sphere 74, which is connected to a similar semisphere 75, arranged at the upper end of a vertical conductor 76, adapted to the recessed head 37 of the bolt 36. The two semispheres are connected by a screw 76', the head of which is arranged within a countersunk opening in one of the parts, so that the screw will be flush with the surface of the sphere and leave no sharp edges or projections for the leakage of the current. By loosening the screw the conductor 71 may be raised or lowered and then locked in any adjusted position. In a treatment of this kind provision is made for the return of the current by placing the patient on a metallic plate 77, arranged on an insulated platform 78 and connected by a return-wire 79 to the opposite side of the machine. When the bonnet is not employed, the vertical conductor 76 is removed from the recessed head 37 and any other suitable conductor is placed therein for the purpose of conveying the current to any suitable point for any desired purpose. In some cases special electrodes 90 91, as shown in Fig. 11, may be employed.

While the structure herein described and illustrated in the accompanying drawings is the preferred form, it is evident that many changes in the form, proportions, and minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described our invention, what we claim is—

1. In a device of the class specified, a glass disk having metallic sectors arranged in staggered order.
2. In a device of the class specified, a glass disk having concentric rows of metallic sectors.
3. In a device of the class described, a glass disk having two concentrically-arranged rows of metallic sectors, the outer edges of the inner row of sectors extending beyond the inner edges of the outer row of sectors, the sectors of the two rows being disposed in alternation.

4. In a device of the class described, a glass disk having two concentric overlapping rows of metallic sectors, and a brush adapted to engage with both rows of sectors.

5. In a device of the class specified, the combination with two oppositely-rotative disks having metallic sectors, of brushes each formed of a metallic plate adapted to make contact with said sectors.

6. In a device of the class specified, the combination with two oppositely-rotated disks having sectors, of brushes adapted to make contact with said sectors, said brushes being insulated from each other and from the frame of the machine.

7. In a device of the class specified, the combination of the two oppositely-rotated glass disks having metallic sectors, brushes adapted for contact with said sectors, insulated standards arranged at the opposite ends of the machine at a point beyond the periphery of the disks, a metallic tube having end spheres, arranged on said insulated standards, and metallic combs carried by said tubes.

8. In a device of the class specified, the combination of the glass disks having sectors, metallic plates adapted for contact therewith, carrying arms for said plates, each of said arms being formed in two sections, and a coupling of insulating material uniting said sections, substantially as specified.

9. In a device of the class specified, the combination of the two glass disks, means for rotating the same in opposite directions, plates or brushes adapted for contact with the sectors of the disks, insulated standards arranged at opposite ends of the machine at points beyond the peripheries of the disks, metallic tubes having spherical end portions supported by said standards, combs supported by said tubes, socketed bolts for locking said tubes in position, and electrode-carrying arms sup-

ported by said socketed bolts, substantially as specified.

10. The combination of the standards, integral semispherical blocks arranged at the upper ends of said standards, a stationary shaft carried by the blocks, glass disks mounted upon said shaft, means for rotating the same in opposite direction, brushes adapted for contact with the sectors of the disks, a semispherical block adapted to support said brushes, and an adjusting-screw uniting said supporting-block to the semispherical shaft-carrying block.

11. In a device of the class specified, a comb-supporting device comprising a metallic tube having an opening therein, and a tapering tube or socket adapted for the reception of the shank of the comb and confining the same in said opening, substantially as specified.

12. In a device of the class specified, a discharging-electrode and means for adjustably supporting the same, comprising a substantially vertical and a substantially horizontal rod each provided with a semispherical block, and a screw adapted to lock said blocks together, substantially as specified.

13. In a device of the class specified, a discharging-electrode comprising a metallic ring or annulus having its lower edge provided with a series of sharp points, means for supporting the same, and a series of conducting-wires connected to different points on the ring, substantially as specified.

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

LAWRENCE FRANDBSEN.
LEWIS HOLZHAUER.

Witnesses:

JULIUS FRANK,
GUST. THORP.