

No. 860,332.

PATENTED JULY 16, 1907.

W. C. RUNGE.

ADJUSTABLE REPRODUCER ARM FOR TALKING MACHINES.

APPLICATION FILED AUG. 18, 1906.

3 SHEETS—SHEET 1.

FIG. 1

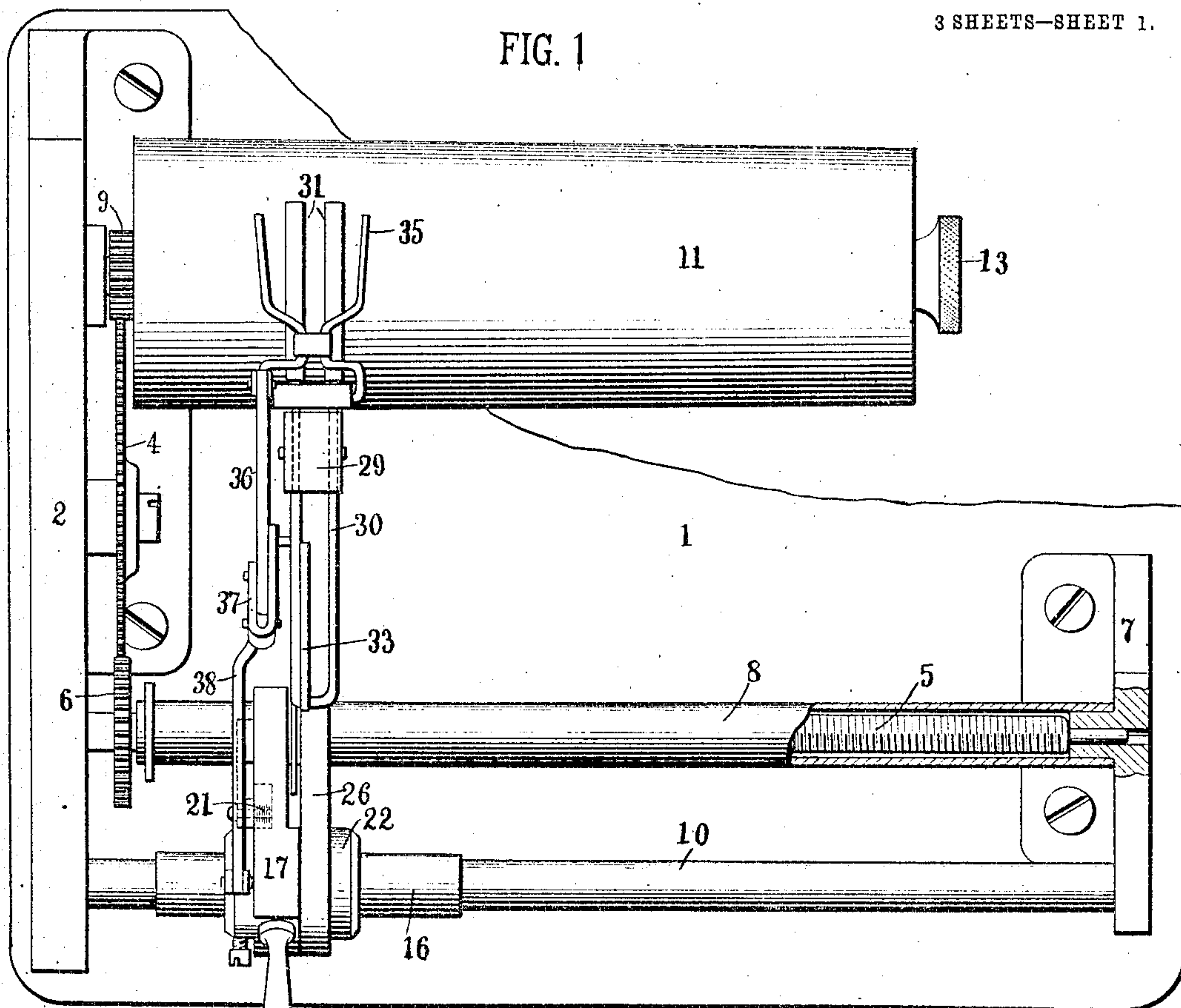
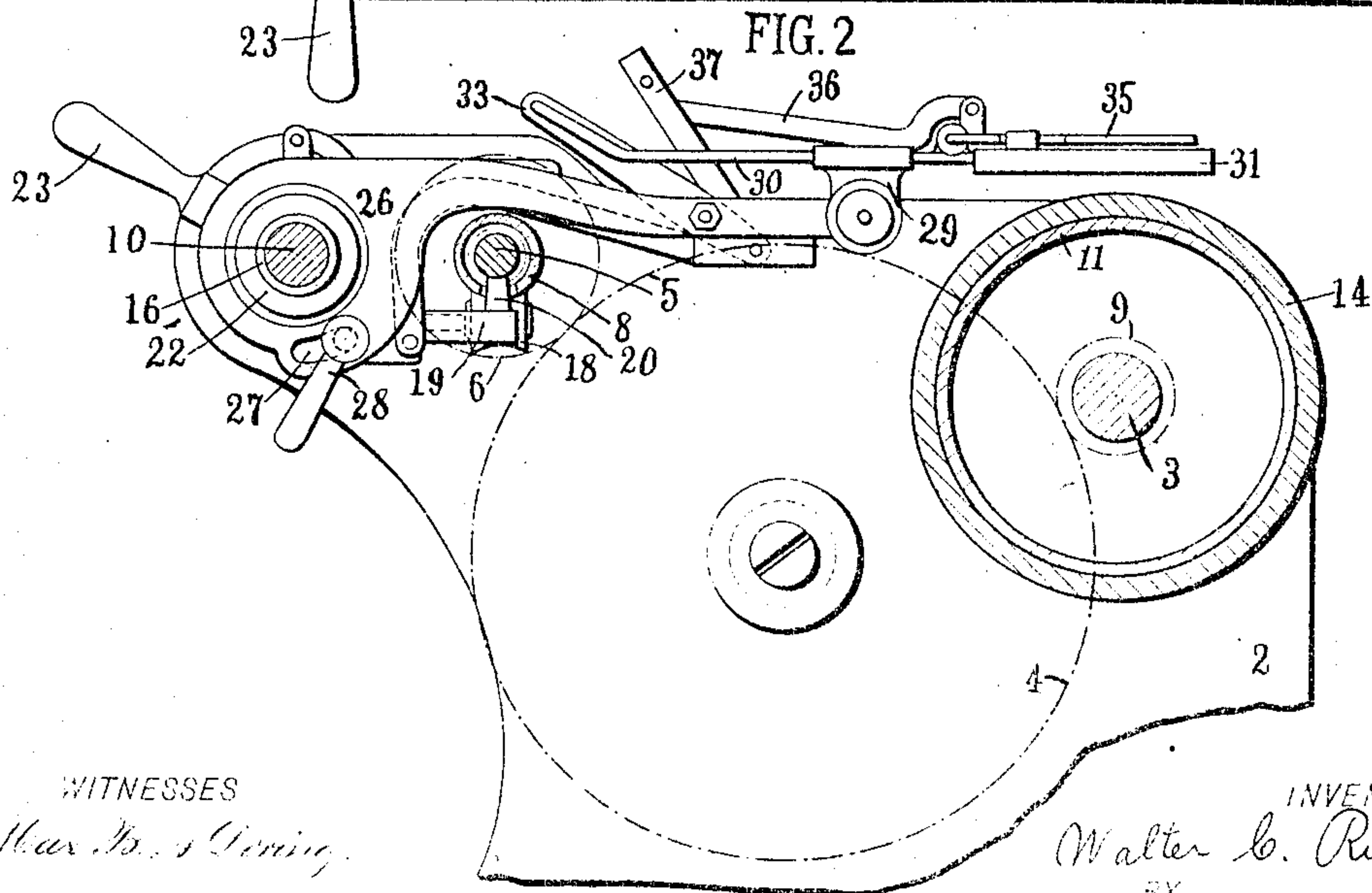


FIG. 2



WITNESSES

Max B. & Gering.

Conrad Liehl

INVENTOR

Walter L. Runge,
BY

25

Robert Killgore
ATTORNEY

ATTORNEY

No. 860,332.

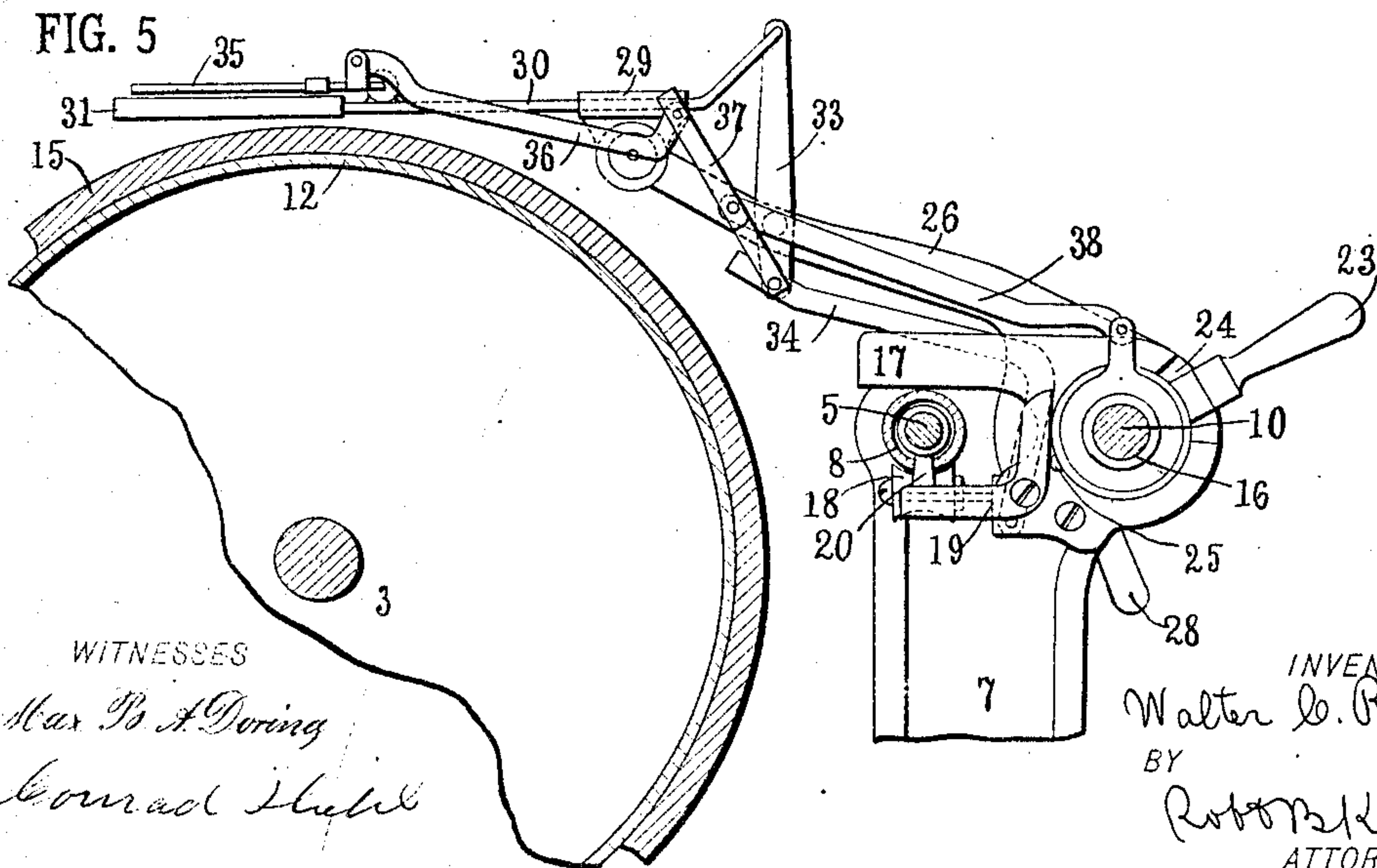
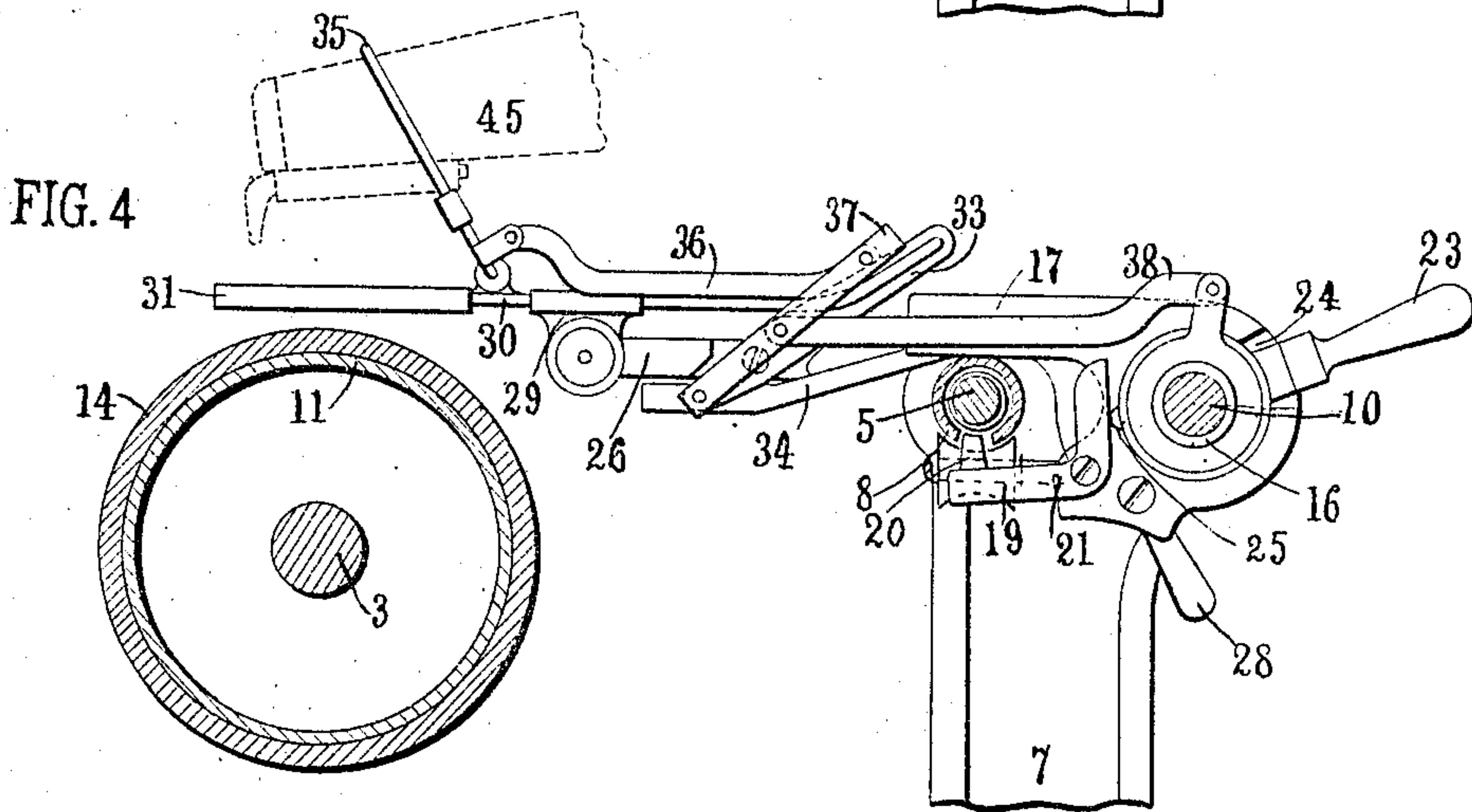
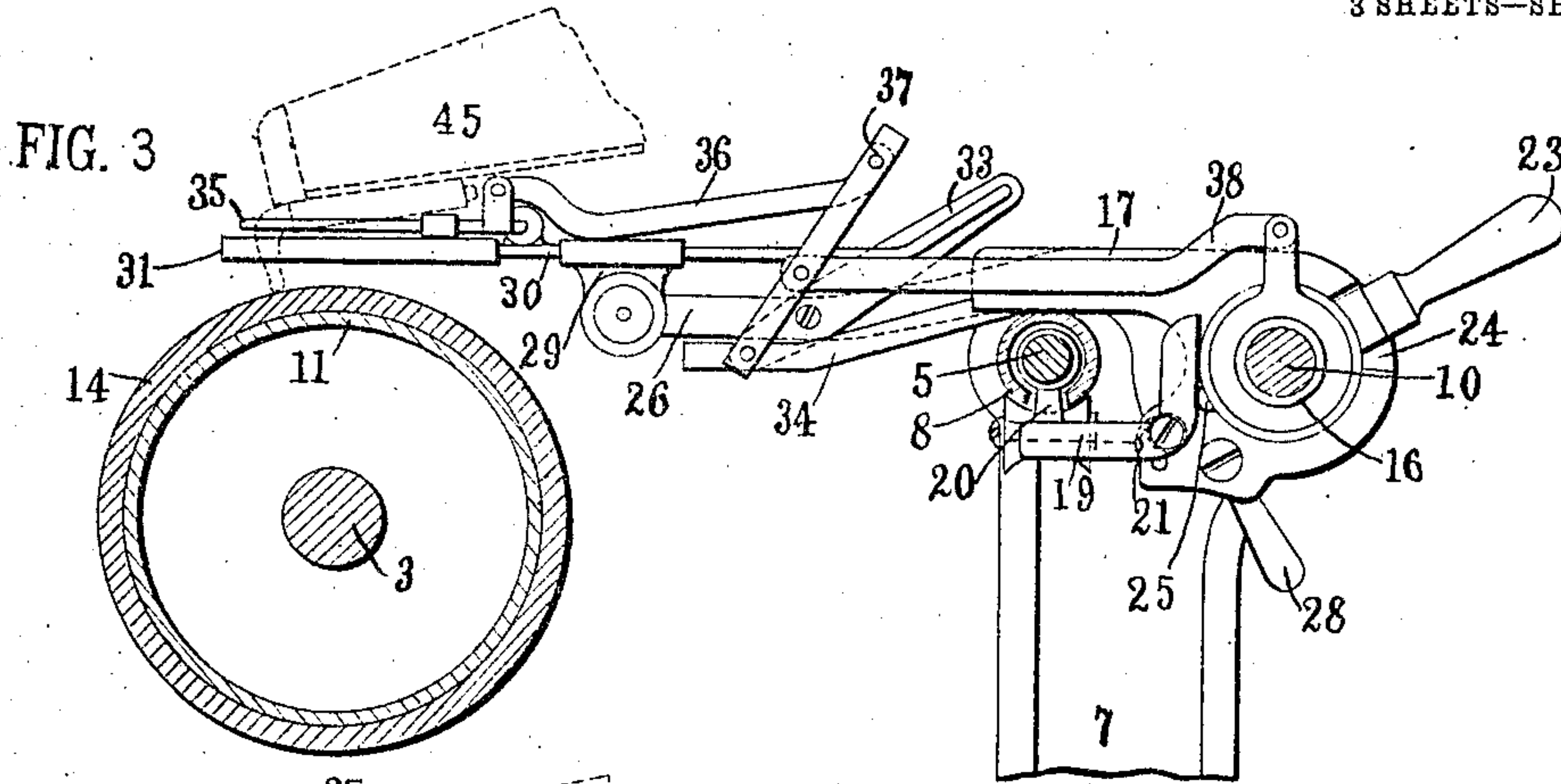
PATENTED JULY 16, 1907.

W. C. RUNGE.

ADJUSTABLE REPRODUCER ARM FOR TALKING MACHINES.

APPLICATION FILED AUG. 18, 1906.

3 SHEETS—SHEET 2.



WITNESSES

Max B. A. Doring
Conrad Hubel

INVENTOR

Walter C. Runge,

BY

Robert Hillgar, ATTORNEY

No. 860,332.

PATENTED JULY 16, 1907.

W. C. RUNGE.

ADJUSTABLE REPRODUCER ARM FOR TALKING MACHINES.

APPLICATION FILED AUG. 18, 1906.

3 SHEETS—SHEET 3.

FIG. 6.

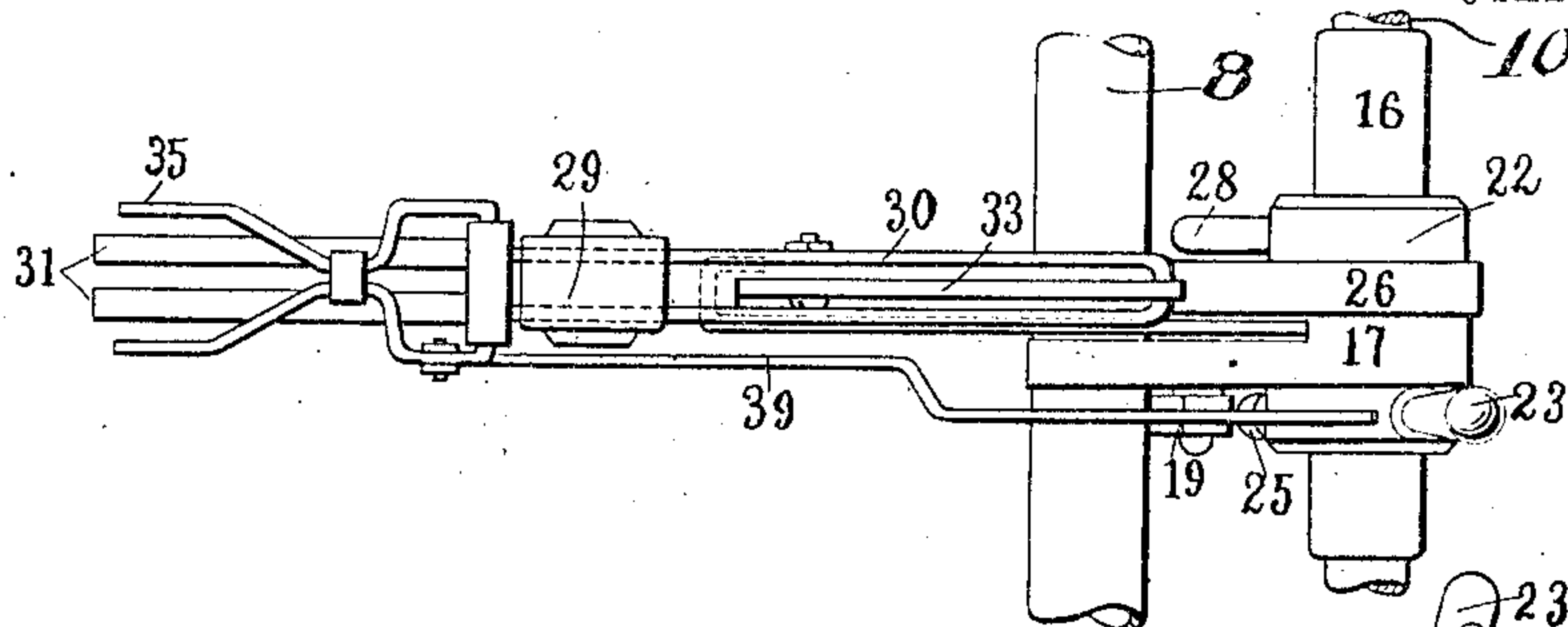


FIG. 7.

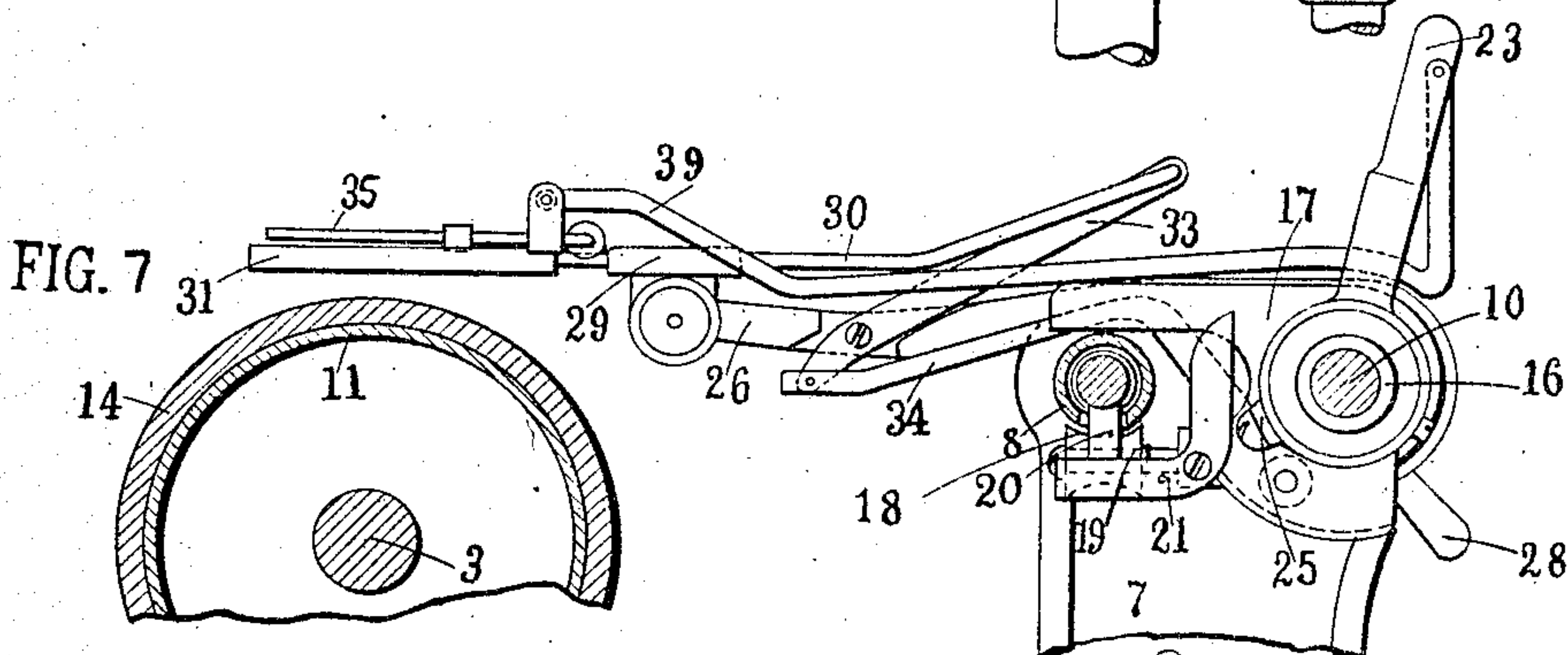


FIG. 8.

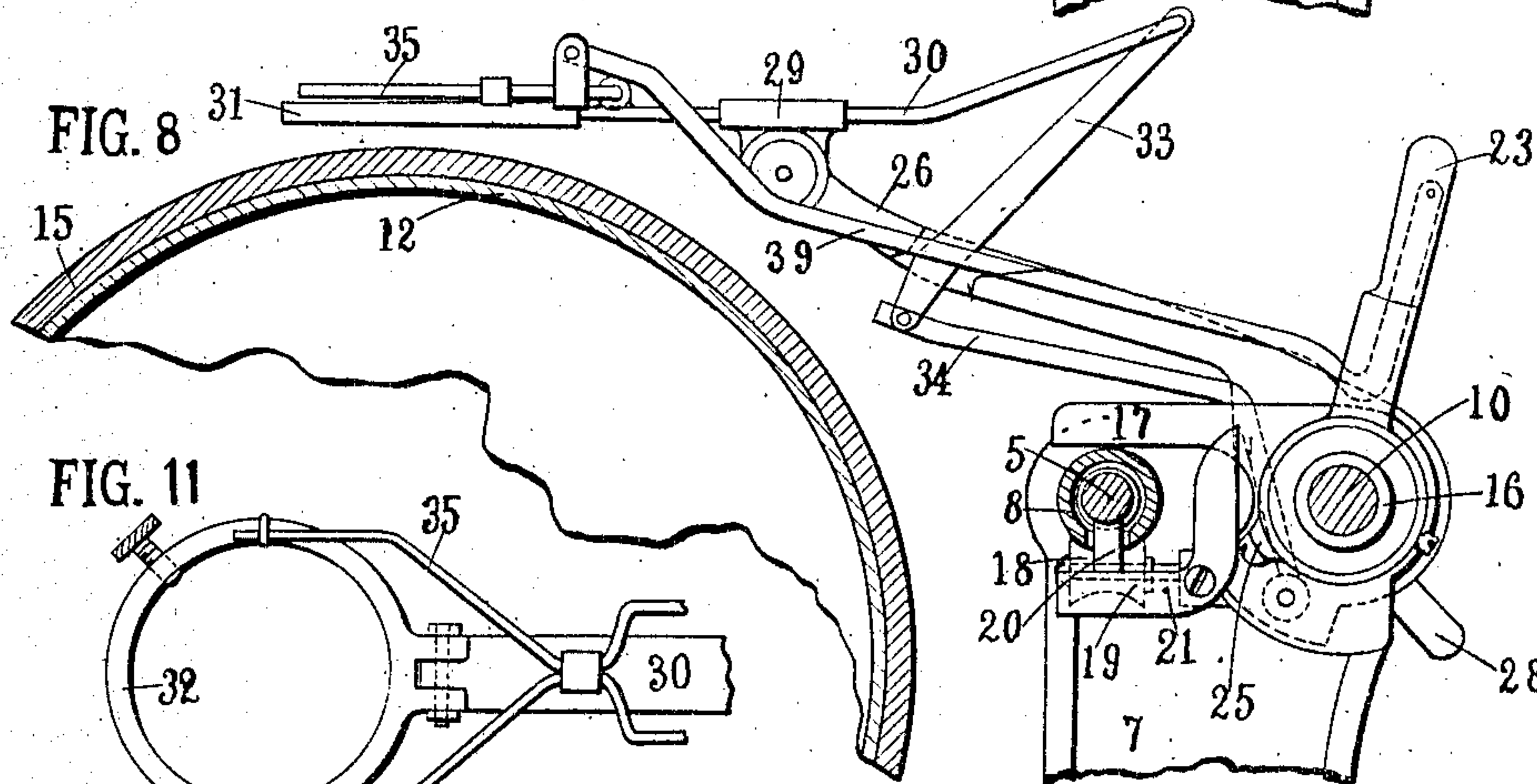


FIG. 11.

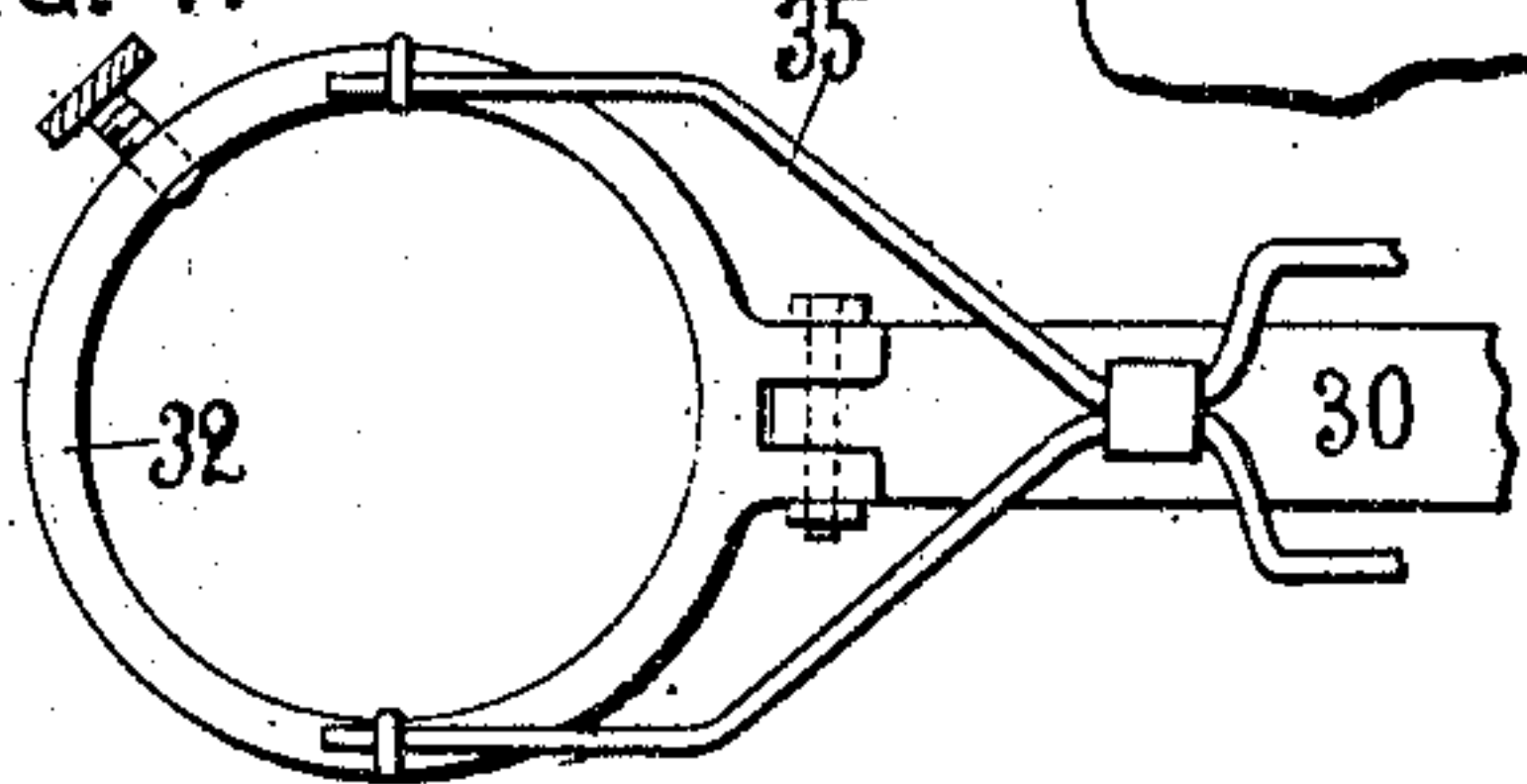


FIG. 9.

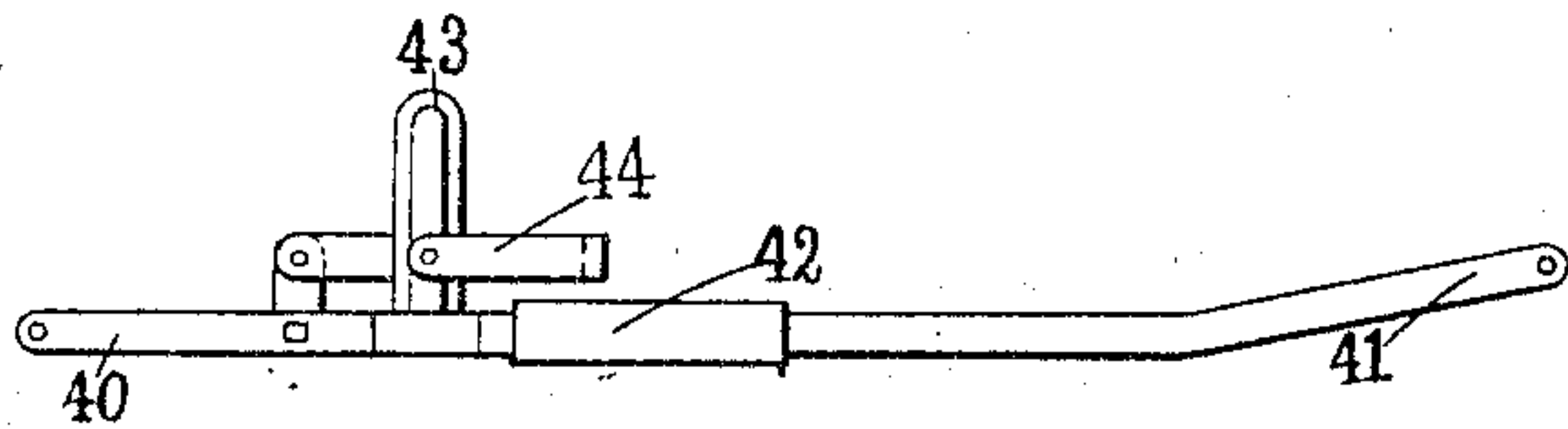
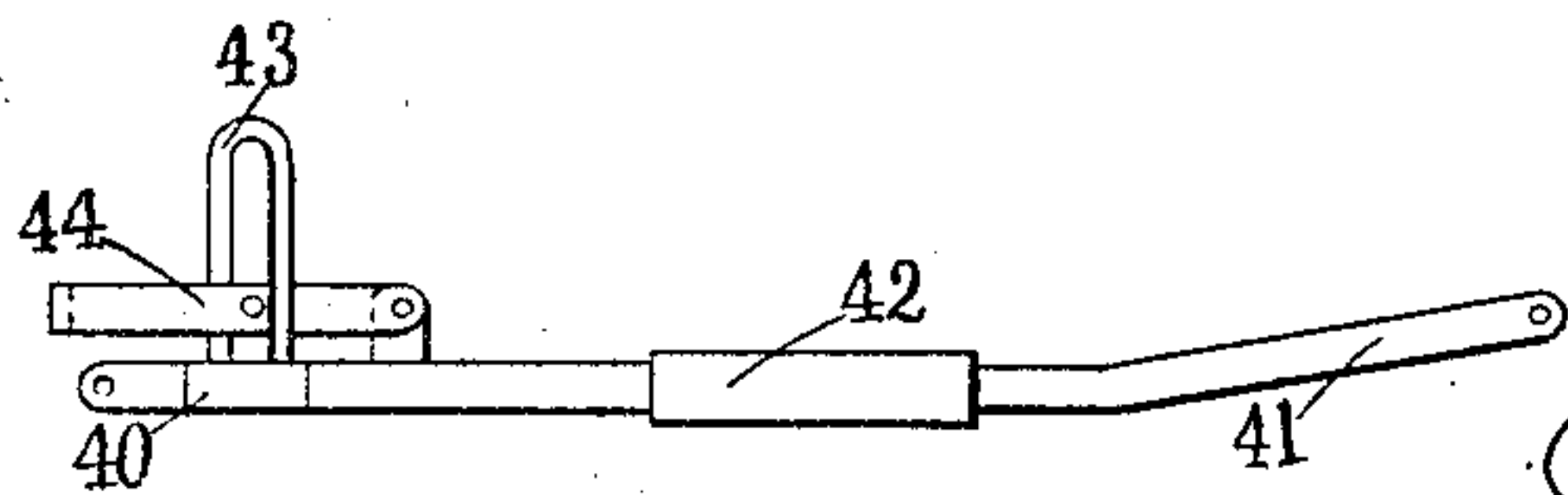


FIG. 10.



WITNESSES

Max F. A. Doring

Conrad Fuchs

INVENTOR

Walter C. Runge,

BY

Robert Killgore,
ATTORNEY

UNITED STATES PATENT OFFICE.

WALTER C. RUNGE, OF CAMDEN, NEW JERSEY, ASSIGNOR TO INTERNATIONAL ROYAL PHONE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

ADJUSTABLE REPRODUCER-ARM FOR TALKING-MACHINES.

No. 860,332.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed August 18, 1906. Serial No. 331,158.

To all whom it may concern:

Be it known that I, WALTER C. RUNGE, a citizen of the United States, residing in Camden, Camden county, New Jersey, have invented a new and useful
5 Improvement in Adjustable Reproducer-Arms for Talking-Machines, of which the following is a specification.

My invention relates to reproducer arms for talking machines using different mandrels of various diameters
10 on a mandrel shaft having a fixed position and in which the reproducer is shifted with respect to the sound record by adjusting the arm instead of shifting the mandrel shaft as in previous machines.

One of my objects is to provide mechanism by
15 means of which the reproducer can be shifted with respect to the mandrel shaft so that records and mandrels of different diameters may be used on the same machine.

Another object is to provide means whereby the reproducer stylus will be automatically placed in proper
20 position on records of various diameters.

Another object is to provide means for placing the reproducer into or out of operative engagement with the record regardless of the diameter of the latter or the
25 position of the arm.

Another object is to provide means for guiding a reproducing trumpet along the record in such manner that it will be free to move universally under irregularities in the record but will hold the stylus firmly in
30 the sound groove.

I attain my objects in the manner shown in the accompanying drawings of my preferred form of mechanism in which

Figure 1 is a top view of a graphophone provided
35 with my improved adjustable reproducer arm; Fig. 2 a side view of a portion of the structure of Fig. 1; Fig. 3 a side view of a portion of the structure of Fig. 1; with the raising and lowering device down; Fig. 4 a corresponding view with the raising and lowering device up;
40 Fig. 5 a side view of the arm in conjunction with a record of large diameter; Fig. 6 a top view of a slight modification of the arm in conjunction with a record of small diameter; Fig. 7 a side view of the structure of Fig. 6; Fig. 8 a side view of the structure of Figs. 6
45 and 7 in conjunction with a record of large diameter; Figs. 9 and 10 detail views of a form of manually operated lever system; Fig. 11 a detail view of a sound box holder mounted on the arm in place of the trumpet yoke.

50 Like reference characters designate like parts throughout.

As shown in the drawings the talking machine is in the form of the well known graphophone using cylindrical records and comprises a base plate 1, a side frame

2 secured thereto, carrying a mandrel shaft 3 revolubly
55 mounted thereon in a fixed position. A feed screw 5 provided with a pinion 6 is carried by the side frame 2 at one end and an end frame 7 at the other. This feed screw is protected by a slotted or split tube 8
60 surrounding it which tube also acts as a rail for the carriage to slide on. A gear 4 on the frame 2 meshes with the pinions 6 and 9 thereby causing the feed screw and mandrel to revolve in the same direction at predetermined relative rates of speed. A slide rod 10 is
65 secured to the frame 2 and 7 in front of the feed screw and acts as the second rail for the carriage. The mandrel shaft is adapted to receive mandrels of different diameters as 11 and 12 which are held in position by a thumb nut 13. Sound records 14 and 15 are adapted
70 to be placed on these mandrels.

The reproducer arm comprises a carriage made up of a sleeve 16 provided with a boss or stop 22 and is slidably mounted on the rod 10. A yoke block 17, provided with a roller 18 on its lower horn, is loosely
75 mounted on the sleeve 16 and straddles the split tube 8, the roller running on the under side thereof. A bell crank 19 is secured to the yoke 17 and is provided with a knife edge 20 adapted to engage the feed screw 5 through the slot in the tube 8, being held in engagement therewith by a spring 21. A finger piece 23 is
80 fixed to the sleeve 16 and is partially revoluble therewith, the recess 24 in the yoke block limiting the motion. A cam or projection 25 engages the bell crank 19 for the purpose of throwing the knife 20 out of engagement with the feed screw 5. It is apparent that
85 the carriage way comprises two tracks one of which incloses the feed screw thereby simplifying and cheapening the construction.

A swinging bracket 26 is also loosely mounted on the
90 sleeve 16 and is limited in its movement by the slot 27 which engages a lock screw 28 on the yoke block 17. The outer end of the bracket 16 is provided with a guide 29 hinged thereto. A slide bar 30 reciprocates in the guide and terminates in a reproducer holder
95 which may be either a pair of elastic fingers 31, 31 or a sound box holder 32.

A compound lever system connects the end of the bar 30 to the yoke block 17. This comprises a lever 33 pivoted to the bracket 26 with the long end pivoted to
100 the inner end of the slide bar 30. A link 34 connects the short end of the lever 33 and the carriage. On raising or lowering the bracket 26 the slide bar 30 is moved in or out in the guide 29, the bend therein acting as a stop to limit the forward motion.

105 To raise or lower a reproducer so its stylus will be in or out of operative engagement with a record a yoke 35 is hinged to the slide bar 30, the hinge acting as a stop to limit the rearward motion. A second lever

system is provided to oscillate this yoke and comprises a link 36 pivoted to a lug on the yoke, a lever 37 pivoted to the parts 33 and 34 at one end and to the link 36 at the other and a link 38 pivoted to the lever 37 at a point between its ends and to a lug on the finger piece 23. This second lever system may be replaced by a single bent lever 39 connecting the yoke 35 and finger piece 23 which may be extended and slotted to receive it as shown in Figs. 6, 7 and 8. As shown in Fig. 11 the yoke 35 may engage a sound box holder 32.

Figs. 9 and 10 show manually operated means for lengthening or shortening the second lever system. The two bars 40 and 41 telescope on each other through the tube 42. The bar 41 carries a slotted piece 43 while the lever 44, provided with a pin engaging the slot, is pivoted to the bar 40. On throwing the lever 44 from one side to the other of the slotted piece the length of the lever system will be varied. It is apparent that when the finger piece is moved up or down the yoke 35 will be oscillated and the trumpet 45 or the sound box holder 32 will be raised or lowered, throwing the stylus into or out of operative contact with the record.

In use on a small record the bracket 26 is pushed down as shown in Figs. 1, 2, 3, 4 6 and 7, bringing the yoke 35 and elastic fingers 31 over the proper position on the small record 14, the bracket being locked in position by the screw 28. To lower the stylus onto the record the finger piece is raised as shown in Figs. 1, 2, 3, 6 and 7 turning the yoke 36 down, the cam 25 moving to allow the knife edge 20 to engage the feed screw 5 which propels the entire reproducer arm across the machine. At the end of the record the operations are reversed and the arm slid back into its initial position.

If a record of large diameter is to be played the small mandrel is replaced by a large one and the lock screw 28 loosened so the bracket 26 can be raised, being re-locked in its new position. Simultaneously with the raising of the bracket 26 the slide bar 30 is moved transversely with respect to the mandrel shaft by the action of the first lever system so that the stylus will occupy its proper position on the large record. As the distance between the yoke 35 and the finger piece 23 has increased the effective length of the second lever system must be increased and this is effected by the increased throw of the parts 36, 37 and 38 or by the change in the relative locations of the pivotal points of the bent lever 39 of Figs. 6, 7 and 8 or by manually lengthening the lever as shown in Figs. 9 and 10. The stylus is raised and lowered on the large record exactly as it was on the small one and the knife edge is affected in precisely the same manner. The elastic fingers 31 serve to guide the trumpet stylus across the record but yield when irregularities occur permitting the stylus to follow the record groove. The lock screw fastens the bracket 26 firmly to the sliding carriage so there is no play or vibration of the parts when in use. The carriage slides freely along the slide rod 10 and the tube 8, the roller 18 reducing the friction. As the knife edge 20 is held in contact with the feed screw by the spring 21, irregularities or eccentricities in the carriage movement do not affect the feeding of the reproducer across the record.

I claim:—

1. A reproducer arm for talking machines comprising a carriage slidably mounted on the machine; a bracket mounted on the carriage; a slide bar mounted on the outer end of the bracket; means for raising and lowering the bracket; and means for simultaneously shifting the bar transversely with respect to the mandrel. 70

2. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar mounted on the outer end of the bracket; means for raising and lowering the bracket; means for simultaneously shifting the slide bar transversely with respect to the machine mandrel; and means for moving the reproducer into or out of operative contact with the record. 80

3. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar pivotally mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; a lever fulcrumed on the bracket one end of which is pivoted to the slide bar; a link connecting the other end of the lever and the carriage whereby the slide bar is moved transversely on the upward or downward movement of the bracket. 85

4. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar pivotally mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; a first lever fulcrumed to the bracket, one end of which is pivoted to the slide bar; a link connecting the other end of the lever and the carriage whereby the slide bar is moved transversely with respect to the mandrel on the upward or downward movement of the bracket; a finger piece on the carriage; a second lever fulcrumed on the first lever; a link connecting the finger piece and second lever; a yoke mounted on the slide bar; and a link connecting the second lever and yoke whereby the yoke is oscillated on a movement of the finger piece. 90 95 100

5. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; means for locking the bracket at any desired point; a slide bar mounted on the outer end of the bracket; means for raising and lowering the bracket; means for simultaneously shifting the slide bar transversely with respect to the mandrel; and means for moving the reproducer into or out of operative contact with the record. 105 110

6. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; means for locking the bracket at any desired point; a slide bar pivotally mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; a first lever fulcrumed on the bracket, one end of which is pivoted to the slide bar; a link connecting the other end of the lever and the carriage whereby the slide bar is moved transversely with respect to the machine mandrel on the upward or downward movement of the bracket; a finger piece on the carriage; a second lever fulcrumed on the first lever; a link connecting the finger piece and second lever; a yoke mounted on the slide bar; and a link connecting the yoke and second lever whereby the yoke is oscillated on a movement of the finger piece. 115 120 125

7. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; means for locking the bracket at any desired point; a slide bar mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; means for raising or lowering the bracket; means for simultaneously shifting the slide bar transversely with respect to the machine mandrel; means for moving the reproducer into or out of operative contact with the record; and means for propelling the arm across the record. 130 135

8. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar pivotally mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; a first lever fulcrumed to the bracket, one end of which is pivoted to the slide bar; a link connecting the other end of the lever and the carriage whereby the slide bar is shifted transversely with respect to the 140 145

mandrel on the upward or downward movement of the bracket; a finger piece on the carriage; a second lever fulcrumed on the first lever; a link connecting the finger piece and second lever; a yoke mounted on the slide bar; a link connecting the yoke and second lever whereby the yoke is oscillated on a movement of the finger piece; a bell crank provided with a knife edge pivoted to the carriage and adapted to engage the machine feed screw; means for holding the knife edge in yielding contact with the screw; and a projection on the finger piece adapted to move the knife edge out of engagement with the feed screw.

9. In a talking machine an adjustable reproducer support comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar a lever fulcrumed to the bracket, one end of which is pivoted to the slide bar; a link connecting the other end of the lever and the carriage whereby the slide bar is moved transversely with respect to the mandrel on the upward or downward movement of the bracket; a finger piece mounted on the carriage a yoke pivotally mounted on the outer end of the slide bar; and a lever system of variable throw connecting said finger piece and yoke whereby the latter is oscillated by the movement of the finger piece irrespective of the position of the bracket.

10. An adjustable reproducer support for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar pivotally mounted on the outer end of the bracket; elastic fingers on the end of the slide bar; means for raising or lowering the bracket; and means for simultaneously shifting the slide bar transversely with respect to the mandrel.

11. An adjustable reproducer arm for talking machines comprising a carriage mounted on the machine; a bracket mounted on the carriage; a slide bar mounted on the outer end of the bracket; a reproducer holder on the end of the slide bar; stops on the slide bar for limiting the transverse movement; means for raising and lowering the bracket; and means for simultaneously shifting the slide bar with respect to the machine mandrel.

12. In a talking machine the combination of a slide rod mounted on the machine; a feed screw revolvably mounted on the machine parallel to the rod; a split tube surrounding the feed screw, an adjustable reproducer arm slidably mounted on said slide rod and split tube; and means carried by the arm adapted to engage the feed screw to propel the carrier across the record.

13. In a talking machine the combination of a slide rod mounted on the machine; a feed screw revolvably mounted on the machine parallel thereto; a split tube surrounding the feed screw; a reproducer arm slidably mounted on said slide rod and tube; a bell crank provided with a knife edge mounted on the arm; means for normally holding the knife edge in contact with the screw; and means for disengaging the knife edge therefrom.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

WALTER C. RUNGE.

Witnesses:

ROBT. B. KILLGORE,
CONRAD DIEHL.