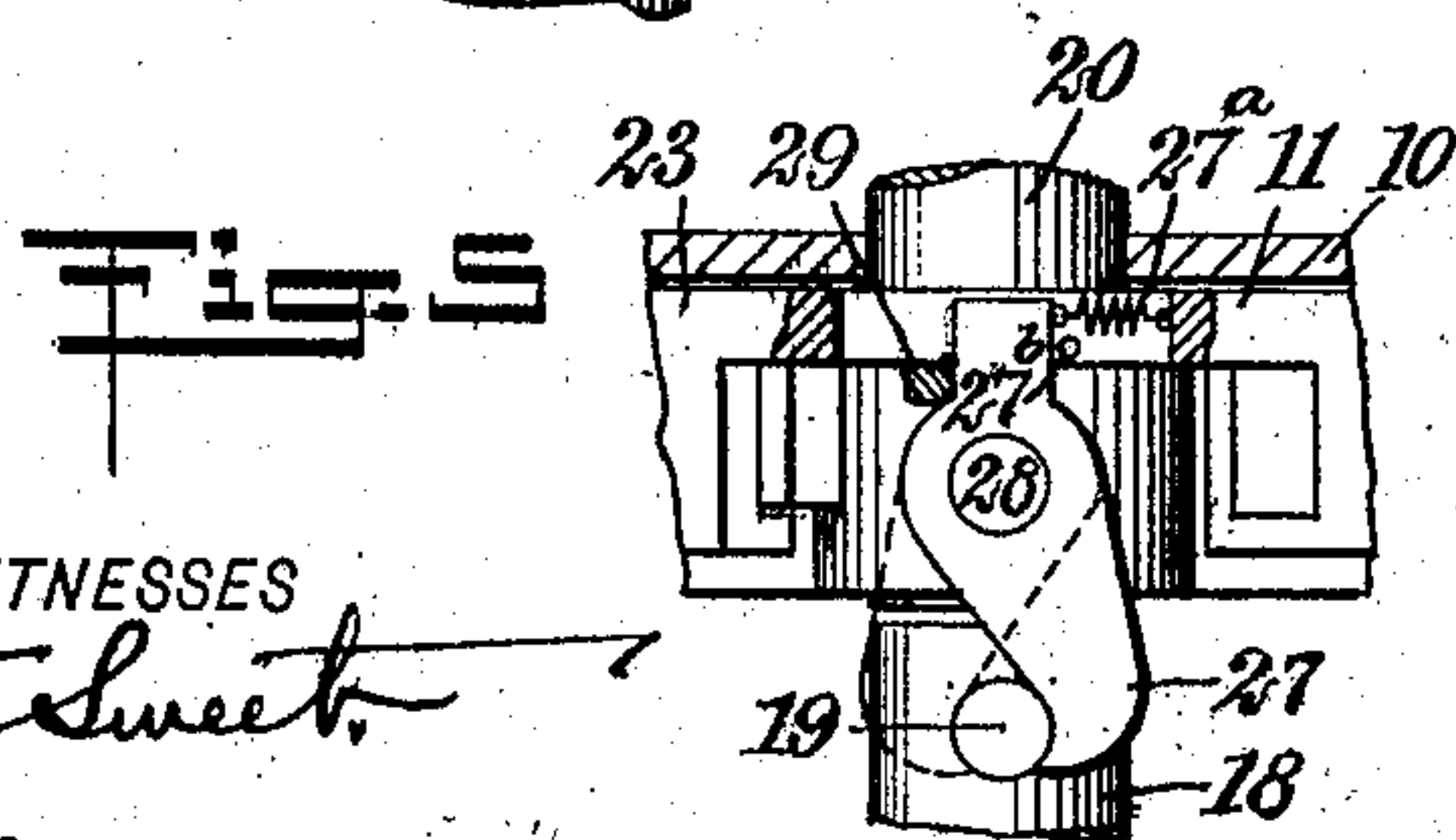
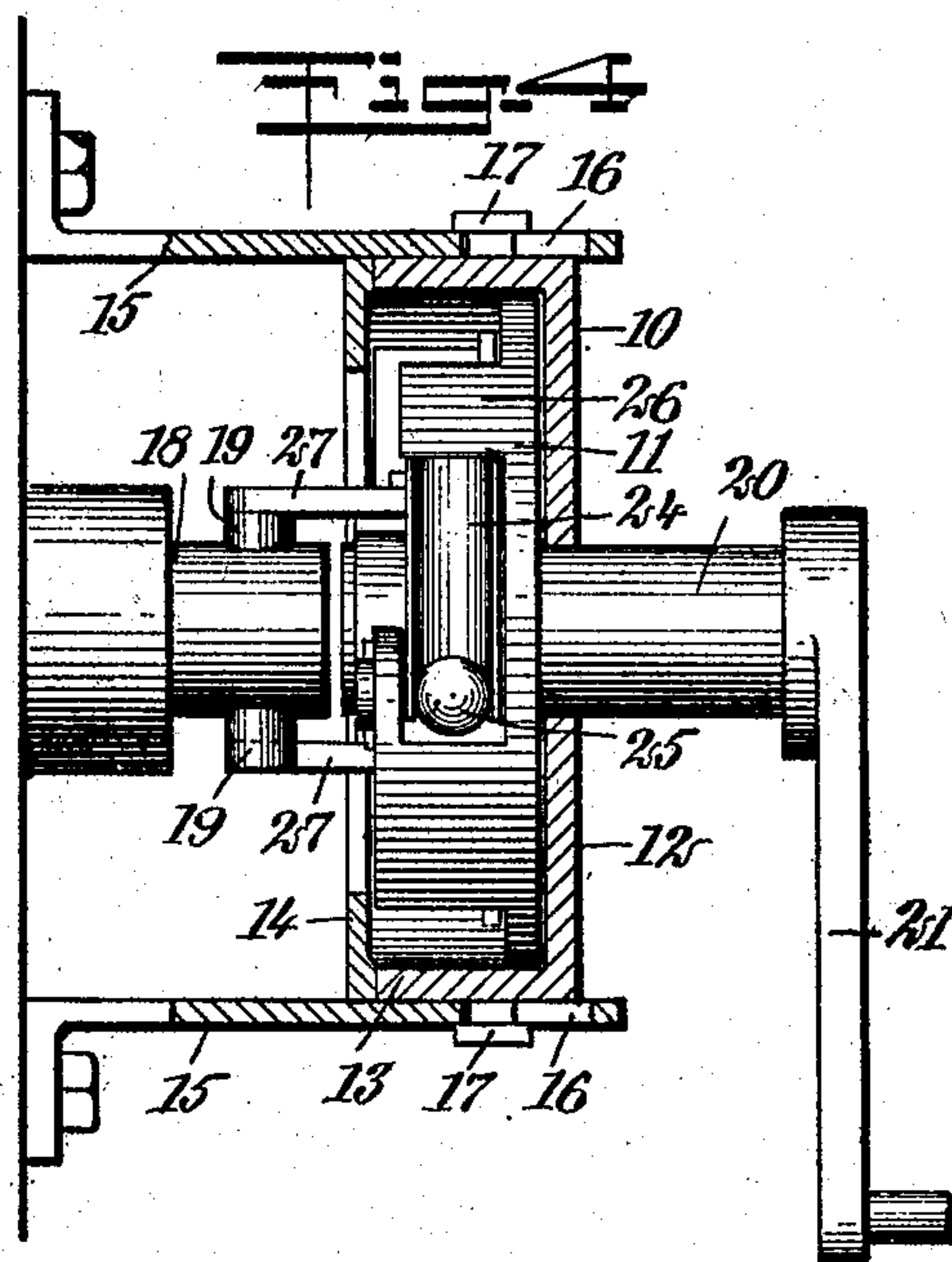
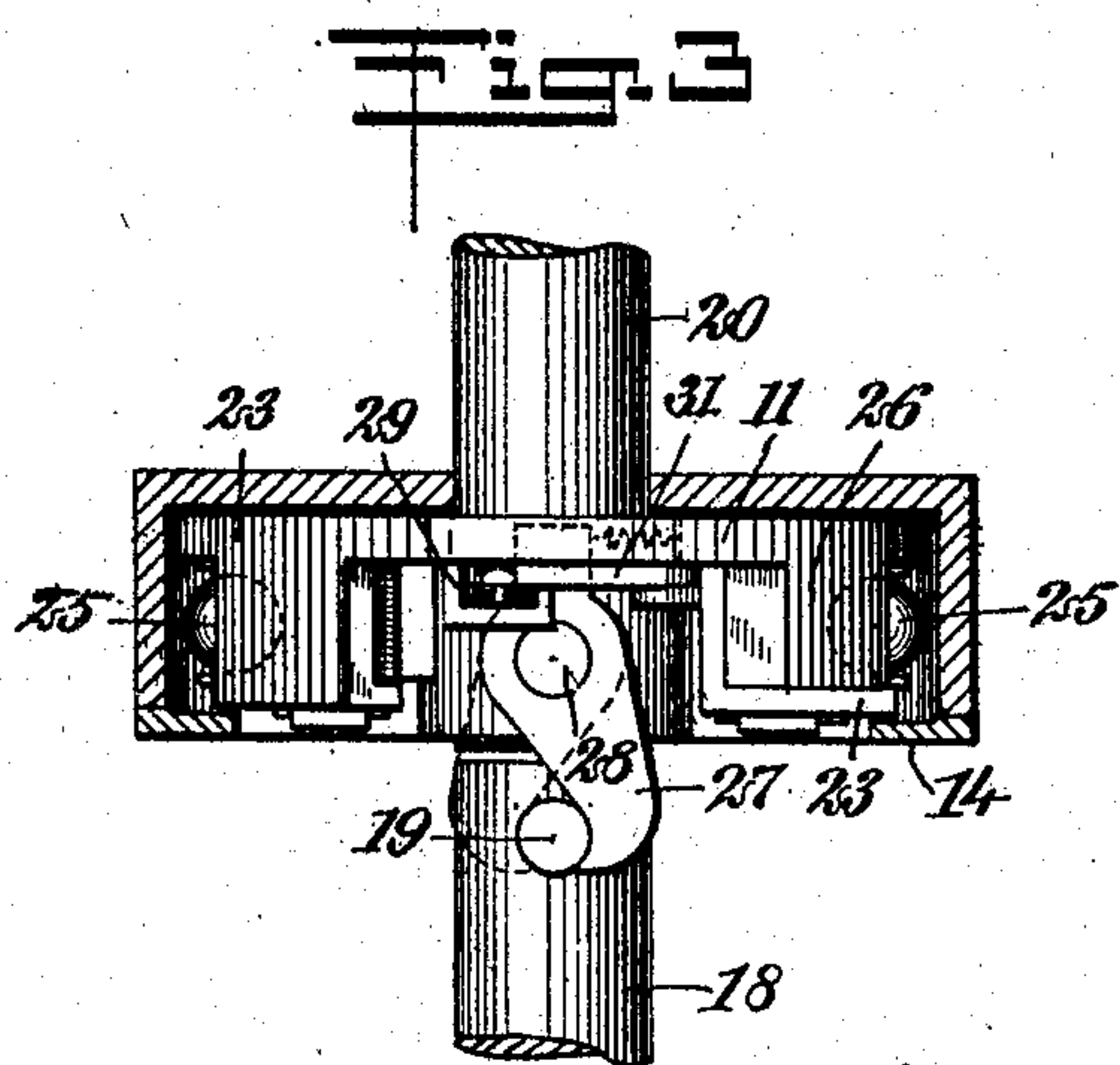
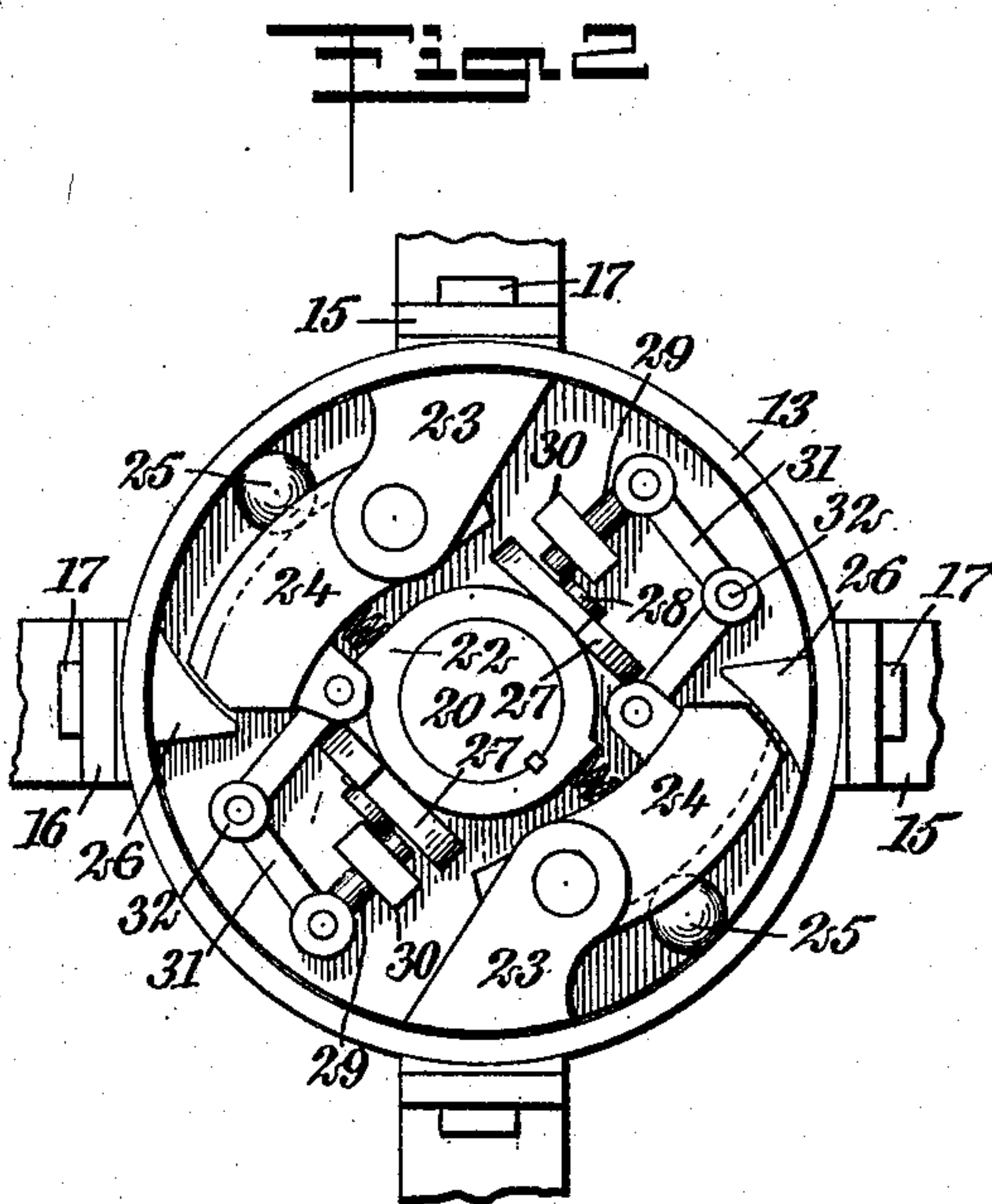
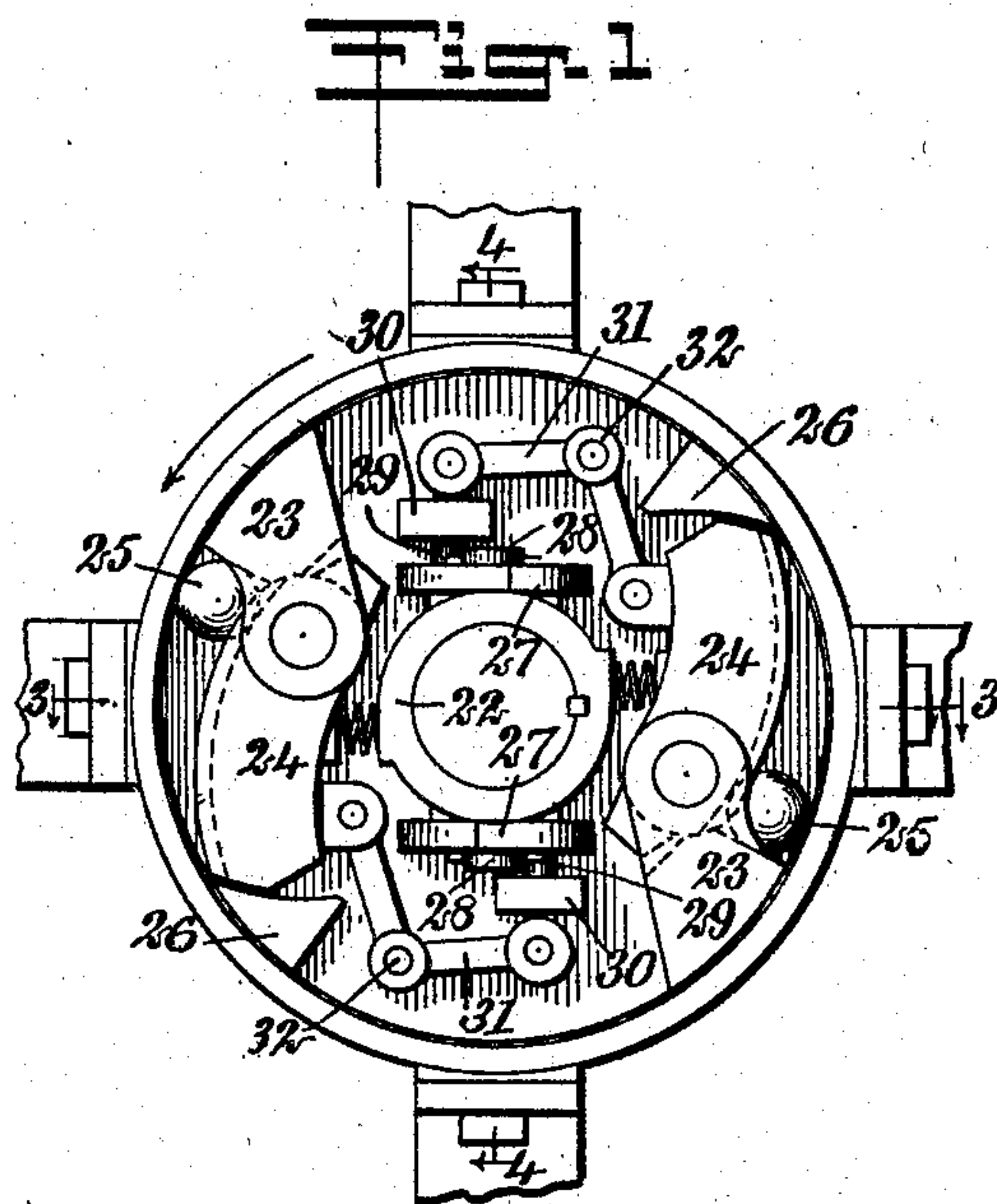


A. C. WELLS.
 STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED OCT. 7, 1908.

916,073.

Patented Mar. 23, 1909.



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ARTHUR CORNWALL WELLS, OF AMITYVILLE, NEW YORK.

STARTING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

No. 916,073.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed October 7, 1908. Serial No. 456,536.

To all whom it may concern:

Be it known that I, ARTHUR CORNWALL WELLS, a citizen of the United States, and a resident of Amityville, in the county of Suffolk and State of New York, have invented a new and Improved Starting Device for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in devices for controlling the starting crank of an internal combustion engine and for detaching the crank from the engine in case of a "back fire".

The invention consists in certain details of construction hereinafter described and more particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a face view of a mechanism constructed in accordance with my invention, the parts being in normal or starting position; Fig. 2 is a view similar to Fig. 1, but showing the parts in the position they occupy after a back fire; Fig. 3 is an edge view of the operating parts, the casing being shown in section on the line 3—3 of Fig. 1; Fig. 4 is an edge view of the operating parts, the casing being shown in section on the line 4—4 of Fig. 1, and Fig. 5 is a view similar to a portion of Fig. 3, but showing the upper portion of one member and the locking device broken away.

My improved device is made up primarily of two main members 10 and 11, one of which is non-rotatably mounted and the other of which is rotatable with the starting frame. One of these members carries a gripping device such that the second-mentioned member may be freely rotated in one direction and locked to the engine shaft, but upon rotating in the opposite direction, the gripping device acts not only to prevent the rotation of said second member, but also operates to detachably connect the crank shaft to the engine shaft.

In the specific form illustrated, the member 10 is in the form of a cylindrical casing having an end wall 12, a cylindrical wall 13, and an inwardly-directed flange 14 opposite to the end wall 12. This casing is supported by the engine frame in any suitable manner, as, for instance, by a plurality of brackets 15, extending outwardly from the engine and

each having a slot 16 extending longitudinally thereof and through which projects a corresponding stud or pin 17 on the cylindrical wall of the casing. The brackets serve to hold the casing against rotation in respect to the engine frame but permit of a limited longitudinal movement of the casing. This longitudinal movement permits the starting device to be moved longitudinally into or out of operative engagement with the engine shaft. The casing is supported in alinement with the engine shaft 18 and concentric in respect thereto, said engine shaft terminating adjacent the open inner end of the casing and having oppositely-disposed radially-extending projections 19, by means of which the starting mechanism may grip the shaft.

The second main member 11 is disposed within the casing 10 and is secured to the shaft 20 of the starting device. This crank extends through the end wall 12 of the casing and is provided at its outer end with a crank 21, or any other suitable means for rotating the shaft. The main body of the member 11 is in the form of a plate adjacent the end wall 12, but extending outwardly from this plate is a central collar 22, keyed to the shaft 20, and a series of lugs arranged adjacent the periphery of the plate. Two of these lugs serve as pivotal supports for levers 24, which are disposed at diametrically opposite points and have their outer peripheries substantially parallel to but spaced from the inner surface of the cylindrical wall 13. The free ends of these levers are normally forced outwardly toward said cylindrical wall by the action of springs intermediate the inner surfaces of the levers and the collar 22, and intermediate each lever and said wall is a rotatable member 25, preferably in the form of a ball. The movement of the ball in one direction is limited by the lever-supporting lugs 23, while its movement in the opposite direction is limited by lugs 26, comprising portions of the member 11. With the balls adjacent the pivotal supports of the levers 24, the free ends of the latter may come adjacent the inner surface of the cylindrical wall, but with the balls in their opposite limiting position, the outer surfaces of said levers come substantially parallel to said wall. For retaining the balls in position, the outer surfaces of the levers may, if desired, be longitudinally grooved.

Pivotally secured to opposite sides of the collar 22, are two catches 27, which extend

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outwardly and engage with the pins or projections 19 on the engine shaft when the cranking device is in use. These catches are mounted upon radially-disposed pivot pins 28 and they are normally held in a predetermined position by corresponding tension springs 27^a and stops 27^b. When the parts are in operative position the catches 27 are in the position indicated in Fig. 5 and they are locked against movement by corresponding locking pins 29, which engage with the inner ends of said catches. These locking pins are movable substantially radially through guide lugs 30, carried by the member 11, and the limits of movement of said pins are such that they may be brought into or out of engagement with the catches 27. The locking pins 29 are operatively connected to the levers 24 by corresponding bell crank levers 31, pivoted upon pins 32 extending outwardly from the member 11. With the balls 25 adjacent the pivotal supports of the levers 24, the locking pins will be in operative position, but as the free ends of the levers are moved away from the casing wall, the pins are drawn outwardly and to inoperative position to liberate the catches 27.

In the operation of my improved device, the parts are brought to the position shown in Fig. 1 and the casing 10 is moved inwardly to bring the catches 27 into the annular path of the pins or studs 19. By rotating the member 11 in the direction indicated by the arrow in Fig. 1, the catches 27 engage with the pins or studs and the engine shaft is positively rotated in the proper direction to start the engine. Should the engine properly start, the engine shaft will begin rotating at a faster speed than the starting device, and when the studs engage with the rear side of the catches 27, the entire starter is moved longitudinally upon the brackets 15 and the shaft 18 is free to rotate entirely independently thereof. In case of back fire, the starting device would be compelled to rotate in the reverse direction with the engine shaft for a short distance, but the reverse rotation of the member 11 will cause the balls 25 to travel along the inner surface of the cylindrical casing wall 13, and this movement of the balls will swing the levers 24 inwardly, as indicated in Fig. 2. This movement of the levers 24 serves to withdraw the locking pins 29 and the catches 27 may then swing freely out of the path of the pins or studs 19. The balls 25 operate by frictional engagement both with the levers 24 and with the wall 13, so that as soon as the reverse rotation is started, the balls instantly travel away from the lugs 23 and roll toward the free ends of the levers to force the latter inwardly against

the action of the springs. As soon as the engine shaft stops and the starting device is again rotated in the direction indicated by the arrow in Fig. 1, the balls will return to the lugs 23 and the catches 27 will be returned to their normal position by their corresponding springs and will again be locked in operative position by the locking pins 29.

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

1. A starting device for engine shafts, comprising a casing having an annular friction surface, a member within said casing and having a lever adjacent said surface, means operatively connected to said lever for connecting said member and said shaft, to rotate the latter in one direction, and a roller intermediate said lever and said friction surface for operating the lever and detaching the member from the shaft upon the rotation of the latter in the reverse direction.

2. In combination, an engine shaft having outwardly-extending studs or projections, a rotatable member having catches for engaging with said projections, locking means for holding said catches in predetermined relationship to said member, and a lever carried by said member for operating said locking means upon the rotation of the shaft and member in one direction.

3. In combination, an engine shaft having outwardly extending studs or projections, a rotatable member having catches for engaging with said studs, locking means for holding said catches in predetermined relationship to said member, levers operatively connected to said locking means, a non-rotatable member, and rollers intermediate said non-rotatable member and said levers, for operating the latter upon the rotation of the shaft and member in one direction.

4. A starting device for engine shafts, comprising a non-rotatable casing, a rotatable member mounted therein, means for operatively connecting said member to the shaft to rotate the latter in one direction, lever mechanism for controlling said connecting means, and a member operated by frictional contact with said casing and said lever mechanism for moving said lever and disconnecting said rotatable member and shaft upon the rotation of the latter in the reverse direction.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR CORNWALL WELLS.

Witnesses:

J. LELAND WELLS,
HENRY W. ARCHIBALD.