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Patented Sept. 25, 1900.

P. H. BRENNAN.
CYCLE CRANK MECHANISM.

(Application filed Aug. 28, 1897.)

(No Model.)

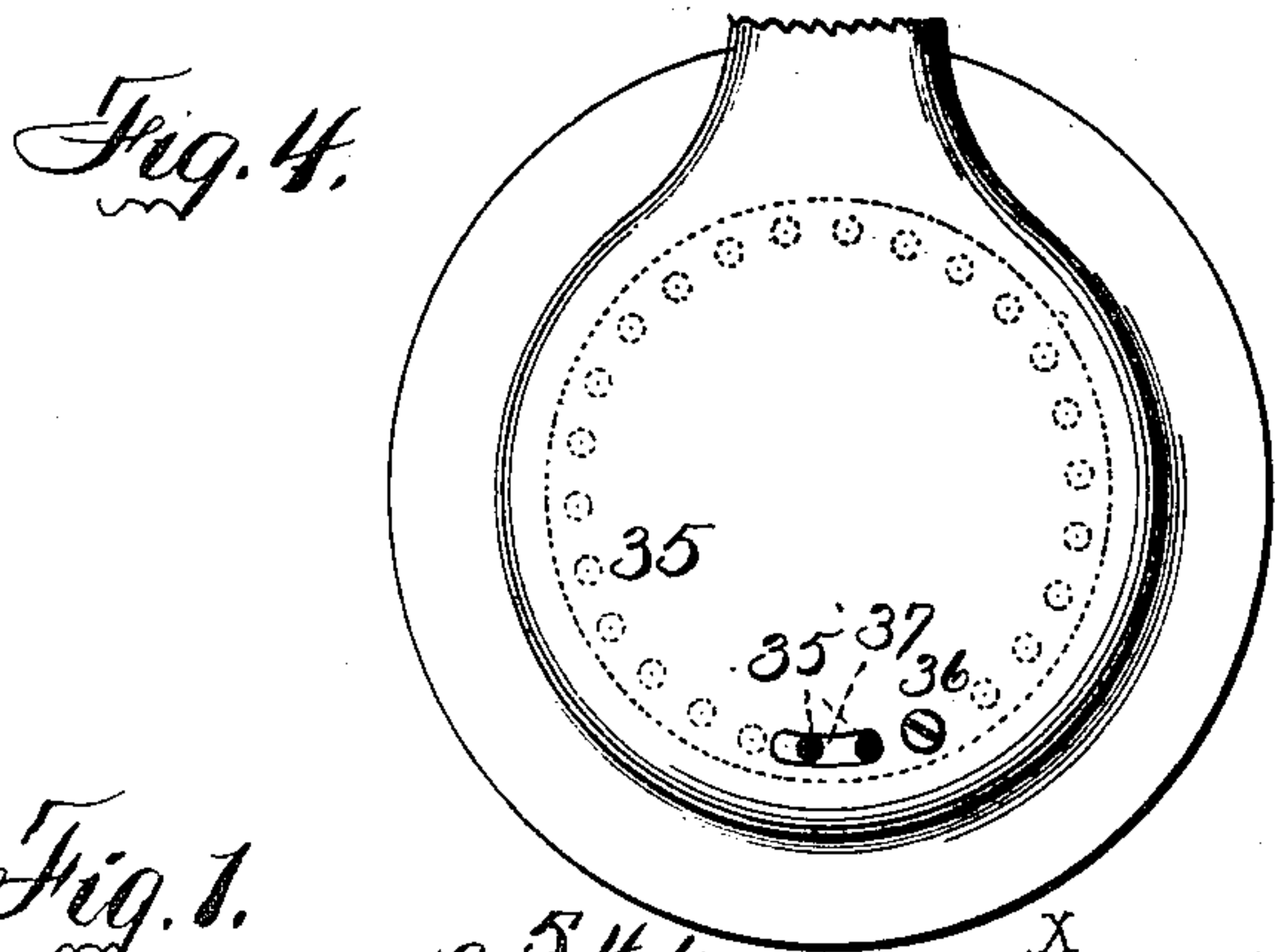


Fig. 1.

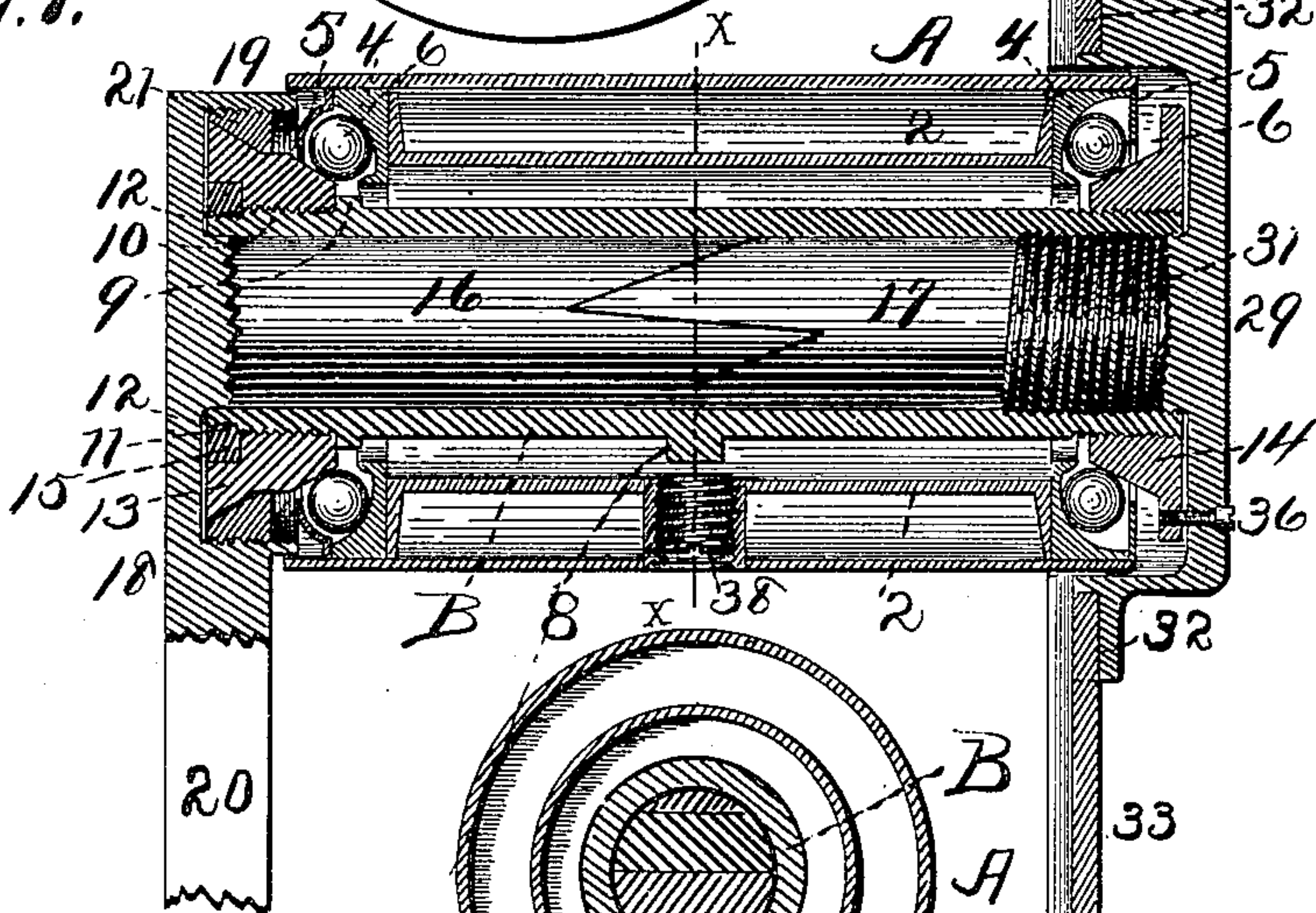


Fig. 2.

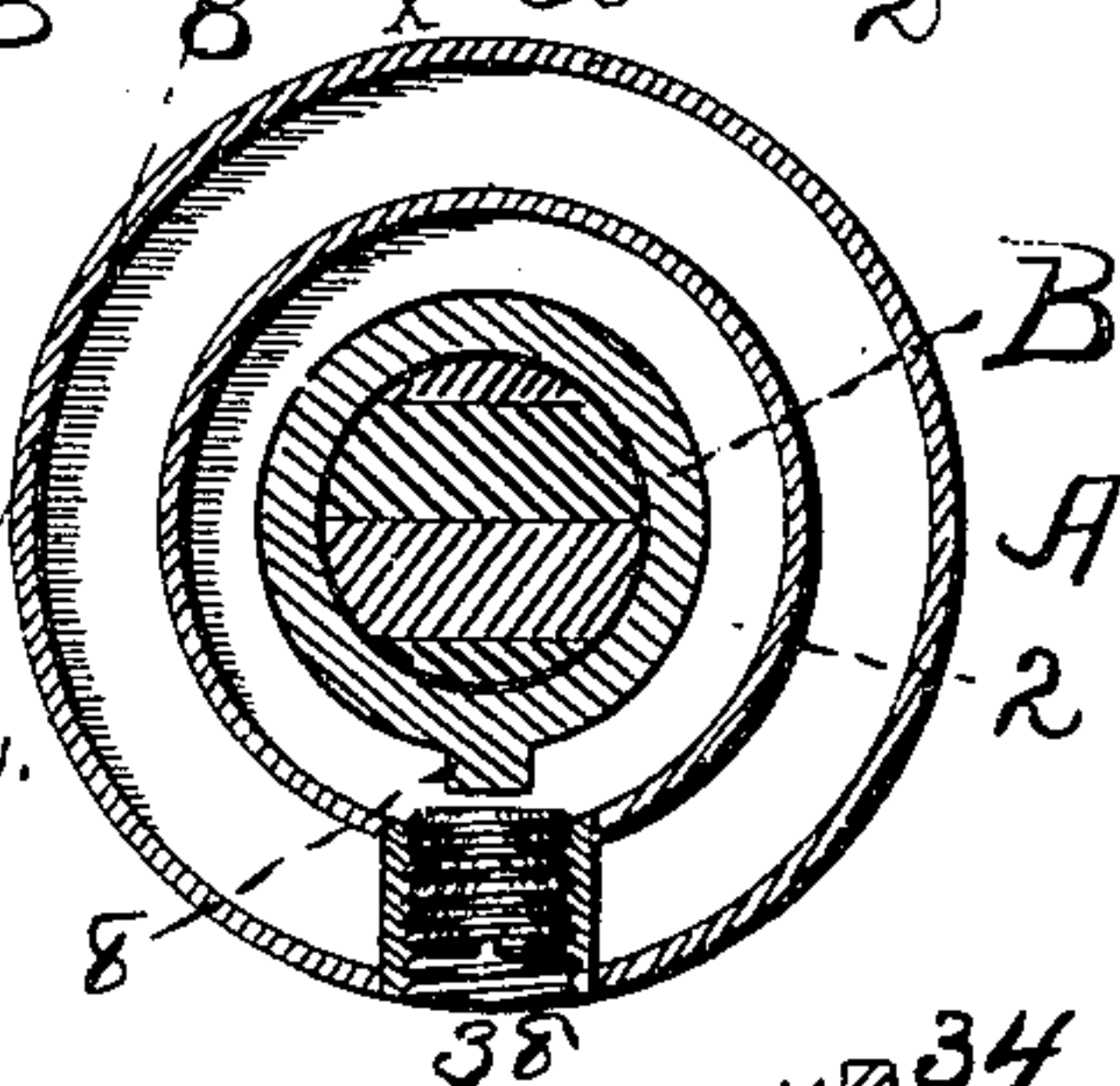
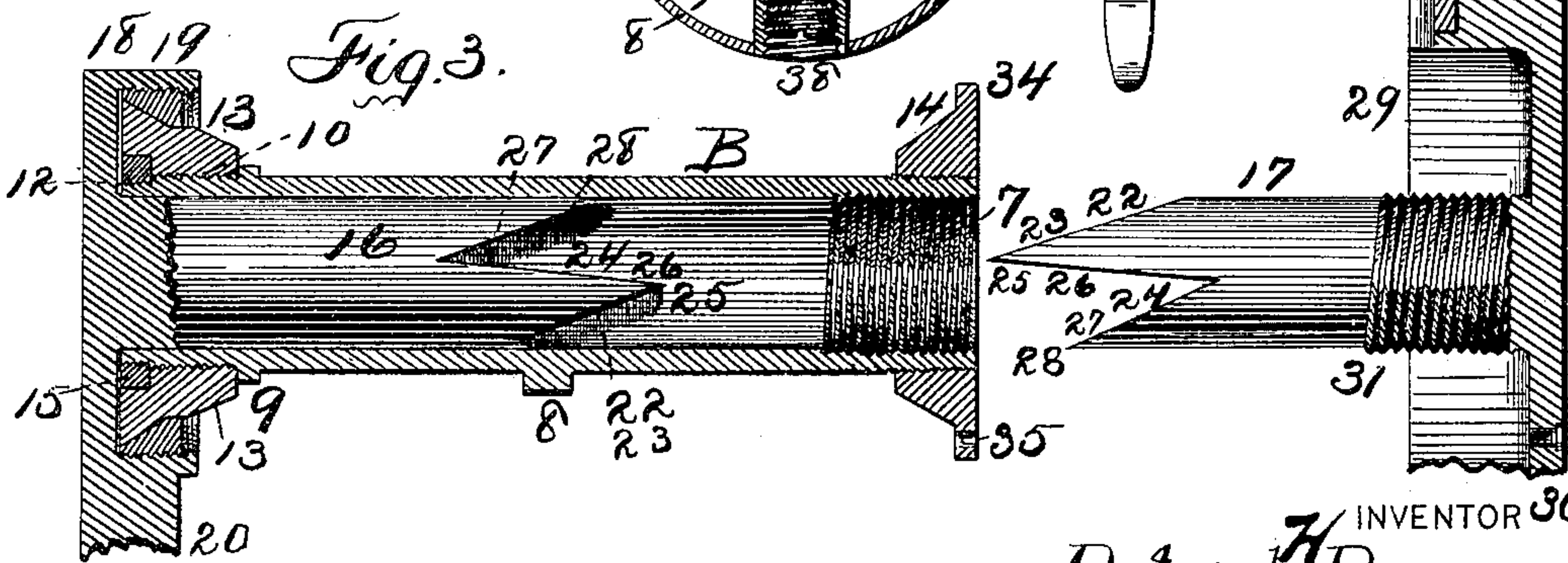


Fig. 3.



WITNESSES:

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CYCLE CRANK MECHANISM.

SPECIFICATION forming part of Letters Patent No. 658,424, dated September 25, 1900.

Application filed August 28, 1897. Serial No. 649,899. (No model.)

To all whom it may concern:

Be it known that I, PATRICK H. BRENNAN, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Cycle Crank Mechanism, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to cycles, and particularly to crank-shaft hangers or bearings and to divided crank-shafts.

My object is to produce a cycle crank-shaft hanger comprising a crank-section integral with each crank and having their inner ends adapted to interlock, one section being permanently and yet detachably connected to a rotatable sleeve and the other screwing into said sleeve, so that normally said sleeve revolves the same as though it was integral with said shaft or cranks, means being provided to lock said sleeve against rotation when it is desired to remove the crank-shaft therefrom. The driving-sprocket is suitably secured to one crank, and therefore normally the cranks, shaft, sleeve, and sprocket all revolve together. The means for interlocking the shaft-sections comprises scarfs and undercuts in intersecting planes, creating points and interior angles in such manner that a scarfed point on one section enters the angular undercut of the other to lock them together. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of the apparatus complete. Fig. 2 is a vertical cross-section on line $x x$. Fig. 3 is a sectional detail of the crank-shaft sections and sleeve, one crank-section being shown as mounted in the sleeve and the other as detached ready for insertion. Fig. 4 is an end elevation of the right-hand end of Fig. 1, omitting the sprocket.

A is a suitable casing, in which an inner tube 2, having end flanges, is suitably mounted, said tube being a member of the joint by which the frame-bars converging at the crank-hanger are secured thereto; but as this constitutes no part of this invention such frame-bars and joints are omitted. Suitable ball-cups 4 are inserted into the casing, bearing inwardly against said flanges, and 5 is an

inwardly-projecting ring operating to retain the balls 6 in said cup.

B is a tubular sleeve having an interior thread 7 in one end, a central exterior lug 8, an exterior circumferential shoulder or collar 9, being also exteriorly threaded at 10 adjacent to said lug, being also exteriorly rabbeted at 11 and exteriorly threaded at 12. Ball-cones 13 14 are screwed onto said exterior threads, the cone 13 abutting against the collar 9 and the cone 14 being adjustable. The cone 13 is interiorly rabbeted to coincide with the rabbet 11, and 15 is a locking-ring screwed into said double rabbet and operating as a jam-nut to hold said cone securely in position. A crank-shaft consisting of sections 16 17 is mounted in said sleeve. The section 16 is integral with a head 18, interiorly recessed to create an interiorly-threaded rim or flange 19, and 20 is a crank integral with said head. The sleeve, with the ball-cone and nut 15 thereon, is inserted into said recess in said head and secured therein by the interiorly-beveled retaining-ring 21, screwed into said rim, whereby said crank, head, sleeve, ball-cup, and crank-shaft section are secured together and normally revolve with the sleeve. By setting the nut 21 tight enough to produce friction I prevent the unscrewing of the crank by vibration and prevent the sleeve B from turning.

Each crank-shaft section is provided with meeting surfaces the planes of which are upon lines more or less angular or inclined to the axis of said shaft, as by a scarf 22, creating a plane 23, and an undercut 24, creating the point 25, planes 26 27, and point 28. When joined together, the points 25 enter the angle between the planes 26 and 27 and the points 28 and planes 27 fit over or onto the scarfs 22 and planes 23. The head 29 upon the crank-shaft 30 is also interiorly recessed, and the crank-shaft section 17 is integral therewith and concentric to said recess and is exteriorly threaded, as at 31, to be screwed into the sleeve. The head is also rabbeted to create a flange 32 and a seat for the driving-sprocket 33, which is suitably secured to said flange. The ball-cone 14 is provided with a flange 34, in which is a row of threaded holes 35, severally adapted to receive a set-screw 36, inserted through said head. This head is also

provided with a suitable slot 37, through which access is had to said cone, as by inserting a wire, to rotate it for adjustment a distance regulated by the space between said
 5 holes, and when adjusted said screw is screwed into the hole then in alinement therewith and the cone locked to said head and the adjustment made perfect and permanent. As one head fits over said case and the other
 10 enters it the screwing in of said cone and the insertion of said screw into it will operate to tighten the opposite ball-bearing by the resultant movement of said sleeve and head 18, and thus said screw operates with double
 15 effect to permanently maintain the adjustment of both ball-bearings. When the crank-shaft section 16 has been inserted into the sleeve, as shown in Fig. 3, the sleeve is ready to receive the other section.

20 A suitable screw 38 is suitably inserted through the case and tube 2 in such manner as to permit it to be screwed inwardly to project into said tube and engage with the lug 8 upon the sleeve in such manner as to prevent
 25 its revolution. Then the shaft-section 17 is screwed in by turning the head on that side through that crank until the joint is made with the other section, as shown in Fig. 1. Then said screw 38 is retracted to release said
 30 sleeve, and thereafter said sleeve revolves simultaneously with both heads, cranks, and the then solid crank-shaft.

The members of this mechanism are assembled as follows: Taking the sleeve, the cone
 35 13 is screwed on into position and the ring-nut screwed in to lock the cone. Then the ring 21 is put on over the sleeve and cone, the crank 20, its head 18, and flange or rim 19 placed in position, the shaft-section 16 within the sleeve,
 40 and then the ring 21 is screwed into the rim 19 until the bevels of the cone and ring are tightly together. The tube 2, cup 4, balls 6, and retainer 5 having been placed in the hub or casing the sleeve, with the crank 20, is in-
 45 serted. Then the other cup, balls, and retainer are inserted into the hub, the cone 14 screwed onto the sleeve, and the shaft 17 is inserted and screwed in until the shaft-sections are securely interlocked. Although the
 50 ring 21 only bears frictionally against the cone

13 it performs its function of retaining the section 16 in the sleeve. When the section 17 is screwed into the sleeve, the sections 16 and 17 rotate together and independently of the sleeve and cones, the friction of the ring
 55 21 on the cones 13 not being sufficient to prevent this, the parts slipping at this point.

Having described my invention, what I claim, and desire to secure by Letters Patent, is— 60

1. In a cycle, the combination with a crank provided with an interiorly-recessed head, and a crank-shaft integral therewith and concentric to said recess, of a sleeve slid onto said shaft, a ball-cone screwed onto said sleeve, 65 and a ring-nut screwed into said recess exterior to and engaging with said cone, whereby said sleeve is connected to said head and crank.

2. In a cycle, the combination with a casing, 70 a sleeve concentric with it, and threaded substantially as shown, ball-cups in said casing, ball-cones screwed onto said sleeve, and balls between said cups and cones, of cranks having heads recessed, one to fit into and the other 75 over an end of said casing, a nut engaging said head and cone to connect one end of said sleeve to that head, a crank-shaft section integral with this head, and retained in said sleeve by said nut, and a crank-shaft section 80 integral with the other head and adapted to be screwed into said sleeve and make a joint with the inner end of the other section.

3. In a crank-shaft mechanism, the combination with a crank-hanger casing, ball-cups 85 within it, a sleeve having both ends projecting beyond said casing, ball-cones upon it also projecting in like manner, cranks having heads recessed to close the ends of said casing, a nut connecting one end of said sleeve to the 90 adjacent head, and a crank-shaft connected to said sleeve and connecting said head to the head upon the opposite crank.

In witness whereof I have hereunto set my hand this 10th day of August, 1897.

P. H. BRENNAN.

In presence of—

MARY A. FRANKLIN,
 HOWARD P. DENISON.