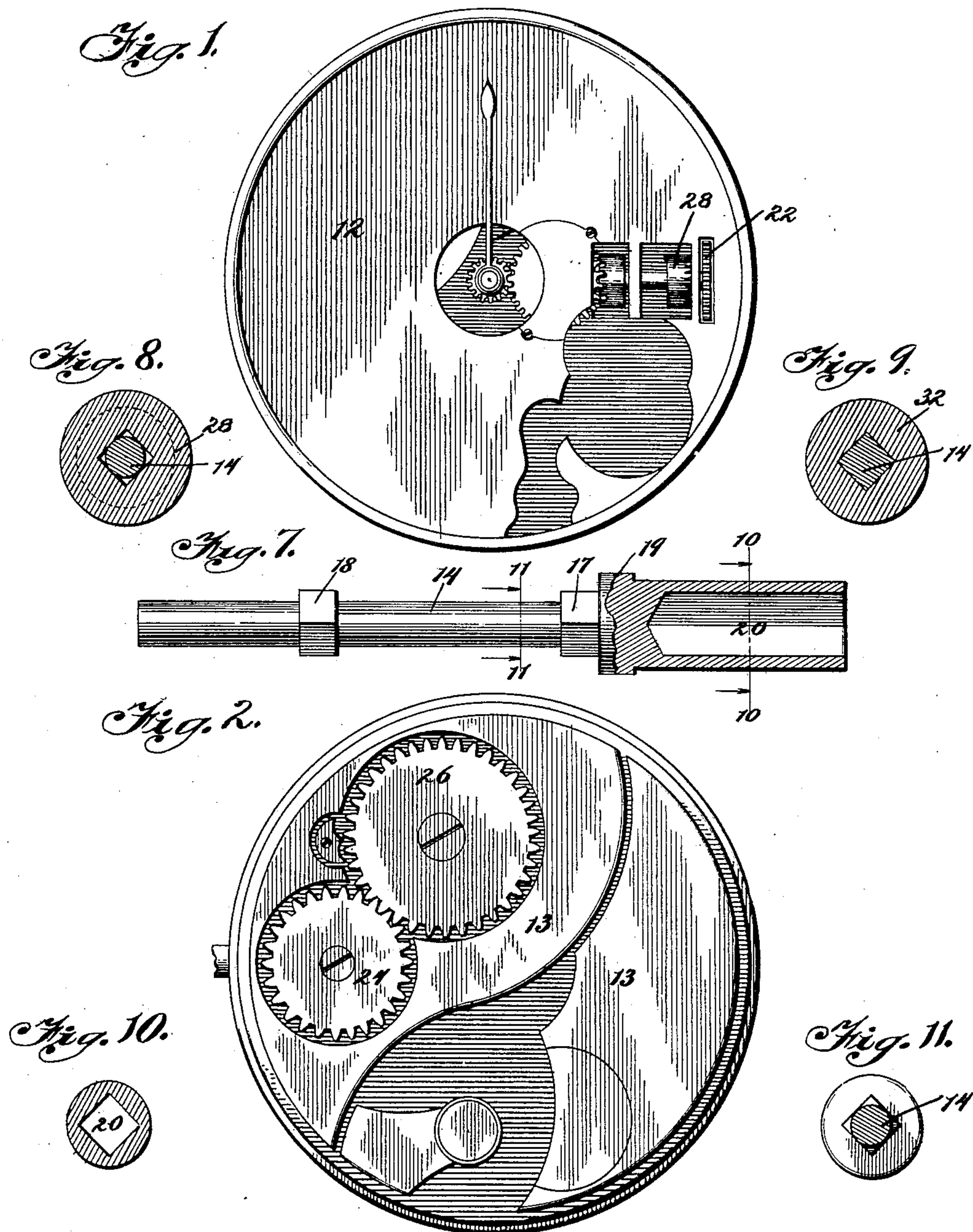


C. T. HIGGINBOTHAM.
STEM WINDING WATCH.

(Application filed Oct. 3, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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STEM WINDING WATCH.

(Application filed Oct. 3, 1901.)

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2 Sheets—Sheet 2.

Fig. 3.

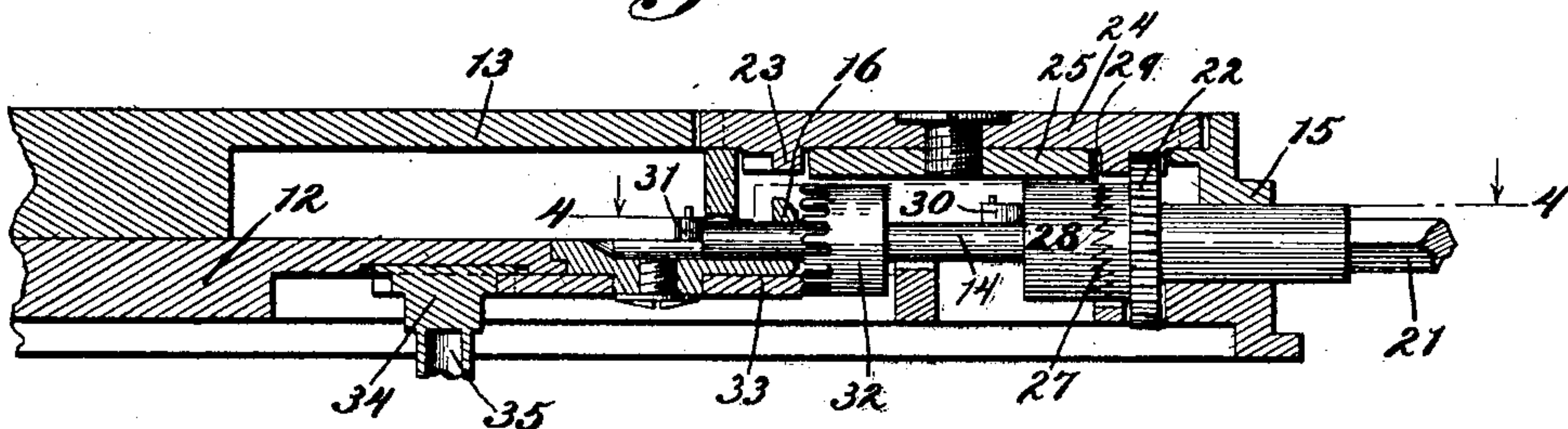


Fig. 4.

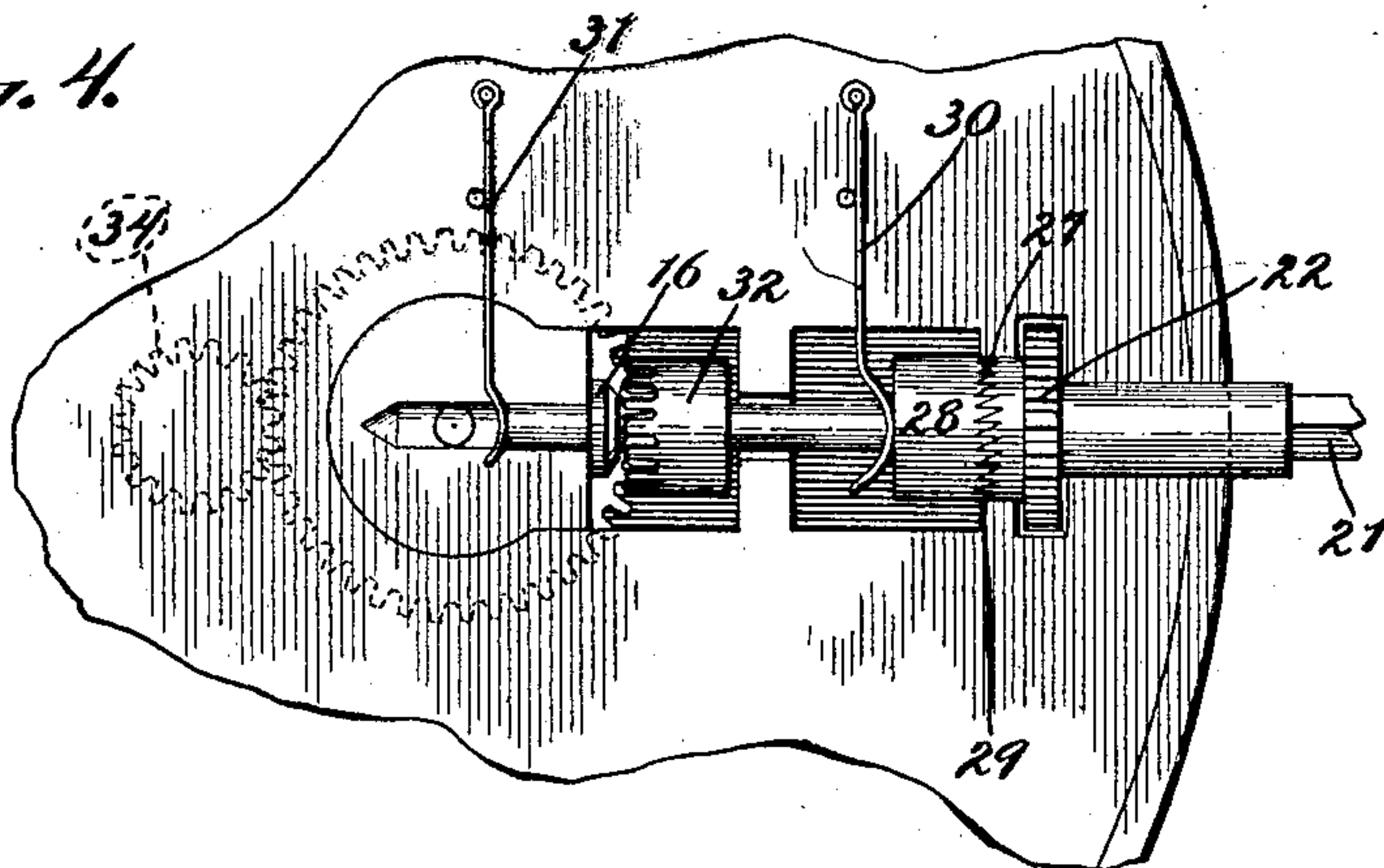


Fig. 5.

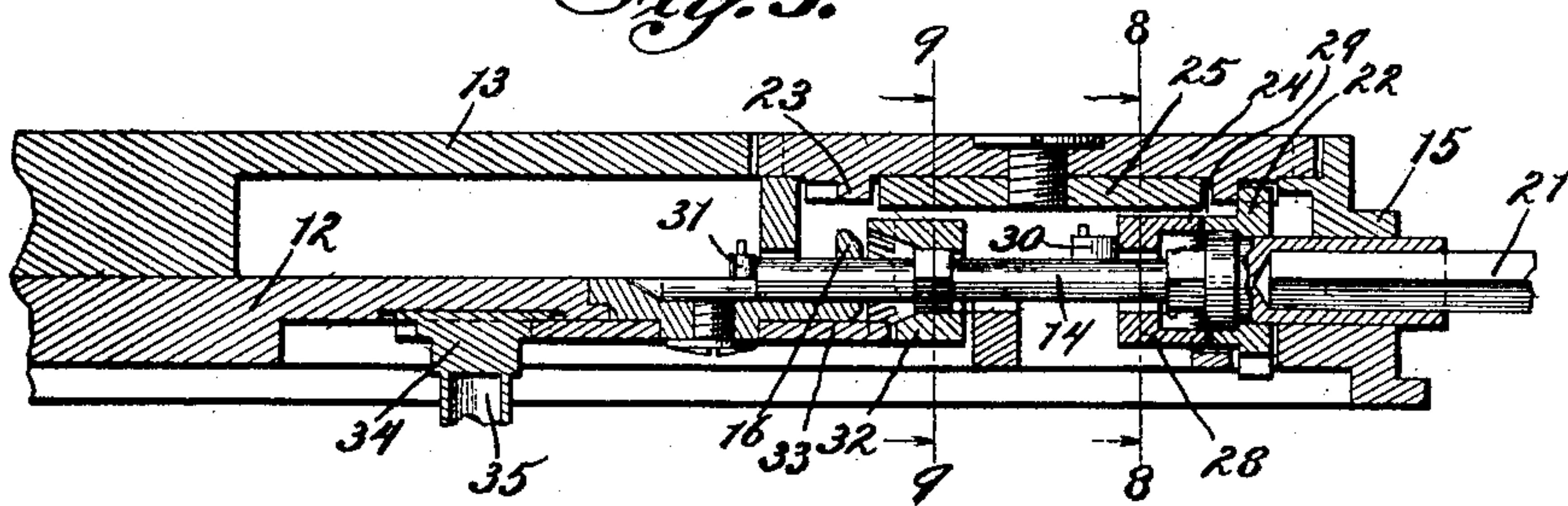
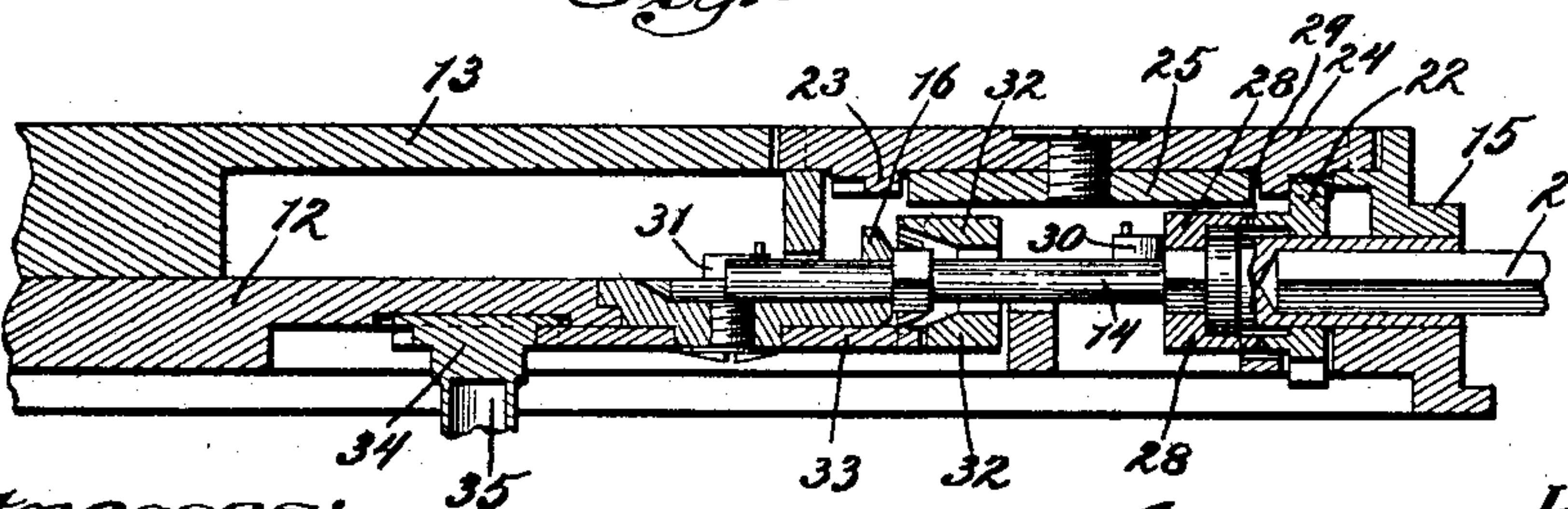


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES T. HIGGINBOTHAM, OF SPRINGFIELD, ILLINOIS, ASSIGNOR TO
ILLINOIS WATCH COMPANY, OF SPRINGFIELD, ILLINOIS, A CORPORATION OF ILLINOIS.

STEM-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 706,656, dated August 12, 1902.

Application filed October 3, 1901. Serial No. 77,406. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. HIGGINBOTHAM, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Pendant-Set Watches, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to what are known as "pendant-set watches"—that is to say, to watches which may be wound or set by the rotation of the pendant-stem and in which the winding and hand-setting mechanisms are thrown into and out of engagement by the longitudinal movement of the pendant-stem in said pendant; and its object is to provide a simple and effective means by which the winding and setting mechanisms may be thrown into and out of engagement by the longitudinal movement of the stem-arbor in said pendant without the employment of intermediate yokes or levers. Its object is, further, to provide a mechanism by means of which a rotatable and longitudinally-movable arbor in the movement, having no positive connection with the case or with the pendant stem-arbor of said case and connected with either the winding or the setting train, according to its longitudinal position in the watch, may be thrown into or out of engagement with the winding or the setting train by the longitudinal movement of the stem-arbor of the pendant without the use of an intermediate yoke or an intermediate lever or levers. Its object is, further, to provide a mechanism of the character above described in which a rotatable and longitudinally-movable arbor located wholly within the watch-movement and adapted to be rotated by the stem-arbor in the pendant of the case, but having no positive connection therewith, and adapted to be connected with either the winding or the setting train, according to its longitudinal position in the watch, may by the pushing inward of the arbor in the pendant-stem be connected with the winding-train in such a way that the engagement with said winding-train may be surely but not forcibly effected and by the pulling out of the stem-arbor of the pendant of the case be left free to be automatically

moved so as to certainly but not forcibly connect with the hand-setting train of the movement.

It has for a further object the improvement of pendant-set watch mechanism in sundry details hereinafter described and claimed.

That which I regard as new will be set forth in the claims.

In the drawings, Figure 1 is a top or plan view of the outer or dial face of the pillar-plate. Fig. 2 is a plan view of the outer side of the top or bridge plate, showing a portion of the winding-train. Fig. 3 is an enlarged detail, being a central vertical section through a portion of a watch, showing my improvement in winding engagement. Fig. 4 is an enlarged detail plan view, being a section on line 4 4 of Fig. 3. Fig. 5 is an enlarged detail, being a vertical section showing my devices in setting engagement. Fig. 6 is an enlarged detail, being a vertical section showing my devices in winding engagement. Fig. 7 is an enlarged detail, being a view of the movement-arbor, partly in longitudinal section. Fig. 8 is an enlarged detail, being a vertical section of the winding-clutch on line 8 8 of Fig. 5 and showing the arbor pulled out of operative engagement therewith. Fig. 9 is a view of the same parts as Fig. 8 with the arbor in operative engagement therewith. Fig. 10 is an enlarged detail, being a section of the crown-pinion adapted to engage with the setting-train on line 10 10 of Fig. 5; and Fig. 11 is an enlarged detail, being a section through the movement-arbor on line 11 11 of Fig. 5, showing the other side of the crown-pinion engaging the setting-train.

Referring to the drawings, 12 indicates the pillar-plate of a watch-movement, and 13 the top or bridge plate.

14 indicates an arbor which is journaled in suitable bearings 15 16 below the inner surface of the pillar-plate 12 and is longitudinally movable in said bearings. The arbor 14 is provided with squared portions 17 18 and with a shoulder 19, and its outer end is provided with a longitudinal opening 20. The longitudinal opening 20 is squared or polygonal and is adapted to receive the squared or polygonal end of a pendant-arbor 21 in the case. The pendant-arbor may be of the or-

dinary and usual form and construction and mounted in the pendant of the movement in any well-known and approved way and is rotatable and longitudinally movable in the pendant of the case in the well-known and usual way and is controlled and held at the outer and inner limits of its motion in said pendant in any well-known and approved manner. As the pendant-arbor 21, of which the squared end is shown, is of the well-known and ordinary construction and forms of itself no part of my invention, it is not further illustrated and described.

By the rotation of the pendant stem-arbor 21 the arbor 14 may be rotated in either direction. The arbor 14, with the exception of the squared portions 17 18, is cylindrical. 22 indicates a pinion which is journaled upon the stem-arbor 14, near the outer edge of the movement, and is constantly in engagement with teeth 23 upon the under side of a pinion 24, which is journaled on the bridge 25 of the top or bridge plate of the watch. The pinion 24 engages with a ratchet-wheel 26, which is connected with the barrel-arbor of the watch in the usual manner, performing the usual function of winding the mainspring of the watch. Being of the usual form and construction, the barrel-arbor is not shown, the wheels 24 and 26 forming a part of what is usually known as the "winding-train" of a watch.

The pinion 22 is slightly recessed upon its side facing the interior of the watch in order to provide a shoulder against which the shoulder 19 of the arbor 14 is adapted to contact, and is also provided upon its inner surface with ratchet-teeth 27.

28 indicates a collar-clutch which is mounted upon the arbor 14 and is provided with a squared opening through which said arbor 14 passes. The squared opening, as is best shown in Fig. 8, has the sides of the squares of the same length as the cylindrical portion of the arbor 14 beyond the squared portion 17 in order to support the said collar-clutch upon said arbor, and the said squared opening is of proper size to admit the squared portion 17 of the arbor 14 when the arbor is moved longitudinally inward. When the parts are in the position shown in Fig. 5, the arbor 14 will rotate freely in said collar-clutch. When the parts are in the position shown in Fig. 6, the squared opening 17 of the arbor 14 enters the squared opening of the collar-clutch 28, and said clutch will be rotated by the rotation of the arbor 14. The collar-clutch 28 has upon its outer side or side toward the exterior of the watch-movement ratchet-teeth 29, adapted to engage with the ratchet-teeth 27 of the pinion 22. As is shown in the drawings, these ratchet-teeth are so shaped that when the stem-arbor, and with it the arbor 14, is rotated from left to right in the usual manner, the squared portion of the arbor 14 being in engagement with the squared opening of the clutch 28, the ratchet-

teeth on said clutch will engage the ratchet-teeth on the pinion 22 and rotate the same to wind the watch.

30 indicates a spring which is secured on the inner surface of the pillar-plate and bears against said clutch 28, holding the same constantly in yielding engagement with the clutch on the pinion 22. When the pendant stem-arbor is rotated from right to left, the ratchet-teeth on the clutch and pinion 22 will slide over each other, the clutch being thrown inward against the spring 30, so that the pinion 22 will not be rotated.

31 indicates a spring secured to the inner surface of the pillar-plate 12 and bearing against the inner end of the arbor 14. The spring 31 by its tension tends to throw said arbor longitudinally outward to the outer limit of its motion, which outer limit is controlled by the contact of the shoulder 19 on said arbor 14 against the shoulder in the recess on the interior surface of the pinion 22, above described.

32 indicates a crown-pinion, which is mounted on the arbor 14, so as to rotate thereon, and rests in a suitable recess in the pillar-plate 12. The teeth of the crown-pinion 32 are constantly in engagement with the teeth of a pinion 33, which is journaled on the pillar-plate 12 and forms one of the hand-setting train meshing with a pinion 34 on the cannon-pinion 35 of the watch. When the pinion 33 is rotated, the hands are set in the usual manner. The crown-pinion 32 has a squared axial opening adapted to fit the squared portion 18 of the arbor 14, the sides of the square being of the same length as the diameter of the cylindrical portions of the arbor 14, immediately adjoining the squared portion 18. The inward longitudinal movement of the arbor 14 is limited by the inner surface of the squared portion 18 coming in contact with the surface of the bearing 16, in which the arbor is journaled. The inner portion of the crown-pinion 32 is recessed or cut away, as is best shown in Figs. 5 and 6, upon the side of said crown-pinion facing the interior of the watch-movement, so as to provide a space within which the squared portion 18 may rotate with the rotation of the arbor 14 when said arbor 14 is pushed inward and the squared portion 18 freed from engagement with the squared axial opening of the crown-pinion 32.

The normal position of the arbor 14 and of the other parts when the movement is out of the case is shown in Fig. 5, being held in that position when out of the case by reason of the fact that the arbor 14, not being engaged with and held by the pendant stem-arbor, is free to move outward and is forced outward to the outer limit of its longitudinal motion by the action of the spring 31, as above described. In this position the squared portion 17 is out of engagement with the squared axial opening of the clutch 28 and the squared portion 18 is engaged with the squared axial opening

of the crown-pinion 32. It follows that any rotation of the arbor 14 will carry with it the crown-pinion 32, which, gearing with the setting-train, causes the movement of the hands and the setting of the watch.

When the movement is in the case, the position of the parts will of course be controlled by the longitudinal position of the pendant stem-arbor 21 of the case. When the stem-arbor 21 of the case is pushed inward to the inner limit of its motion in the well-known manner, it engages with the end of the recess 20 in the stem-arbor 14 and pushes the stem-arbor 14 longitudinally inward to the inner limit of its motion against the action of the spring 31. In this position the parts are in winding engagement, the squared portion 17 of the stem-arbor 14 entering the squared axial opening of the clutch 28 and causing the engagement of said clutch by the stem-arbor. By the same longitudinal movement the squared portion 18 is thrown out of the squared axial opening of the crown-pinion 32.

When the pendant stem-arbor is rotated from left to right in the ordinary winding direction, as is said above, the parts being in the position last described, the stem-arbor will be caused to rotate in the same direction, rotating the clutch 28, which is held by the spring 30 in constant yielding engagement with the clutch 27 on the pinion 22. The pinion 22 will thus be rotated in the same direction, and, being in engagement with the winding-train 24 26, the watch will be wound. It will be noticed also that when the pendant stem-arbor is thrust inward to effect the winding engagement, while the arbor 14 is moved longitudinally inward thereby, the arrangement of the parts is such that the engagement of the squared portion 17 with the squared axial opening of the clutch 28 will not be a violent one if the squared portion and the squared axial opening should not exactly register, for in such case the clutch 28, which is normally held in engagement with the clutch on the pinion 22 by the action of the spring 30, will be pushed inward against the action of the spring, and when the arbor is rotated as soon as the squared portion of the arbor and the squared axial opening of the clutch come in register the spring 30 will throw the clutch 28 outward, so that the squared portion of the arbor will enter the squared axial opening, and engagement will be effected between the ratchet-teeth of the clutch 28 and the ratchet-teeth on the inner surface of the pinion 22.

When it is desired to set the watch, the pendant stem-arbor is pulled out in the usual manner. This leaves the arbor 14 free to move longitudinally outward, and the spring 31, thus being left free to act, will cause the arbor 14 to move outward to the outer limit of its motion, causing the squared portion 18 to enter the squared axial opening of the crown-pinion 32. If the parts are not in register to effect such engagement when the pendant stem-arbor is moved outward, the spring

31 as soon as the arbor is rotated to bring the parts in proper register will act to effect the engagement between the squared portion 18 and the squared axial opening of the crown-pinion 32, thus preventing any violent engagement of the parts upon the pulling out of the pendant stem-arbor, which would be apt to cause breakage of the parts if permitted.

I have shown and described the arbor 14 as having squared portions which are adapted to enter correspondingly-squared axial openings in the pinion 22 and crown-pinion 32, and this is the form in which I prefer to construct it. It is obvious, however, that instead of being squared the squared portions might be of some other polygonal shape, the axial openings in the pinion 22 and crown-pinion 32 being correspondingly shaped, and I therefore do not confine myself to having the portions of the stem-arbor squared and to having squared openings in the respective pinions. It is obvious also that instead of having squared or polygonal portions on the stem-arbor and corresponding openings in the respective pinions, which is the form in which I prefer to construct the device, some other well-known form of clutch might be used, and I therefore do not confine myself to providing the stem-arbor with squared or polygonal portions and providing the pinions with squared or polygonal openings to correspond therewith, except as hereinafter specifically claimed.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a pendant-setting watch, the combination with a longitudinally-movable and rotatable arbor, of a rotatable member slidably mounted thereon and held in constant yielding engagement with the winding-train, a rotatable setting member carried on said arbor and constantly engaged with the setting-train, and means for alternately connecting said arbor with and disconnecting the same from said rotatable and sliding member and said rotatable setting member, by the direct longitudinal movement of said arbor, substantially as described.

2. In a pendant-setting watch, the combination with a rotatable longitudinally-movable arbor, of a clutch rotatably mounted on said arbor, longitudinally movable thereon and normally held in constant yielding engagement with the winding-train, a pinion rotatably mounted on said arbor and in constant engagement with the setting-train, and means for causing the alternative engagement and disengagement of said arbor with said clutch and said pinion by the longitudinal movement of said arbor, substantially as described.

3. In a pendant-setting watch, the combination with a rotatable longitudinally-movable arbor having no positive connection with the case-arbor, of a clutch rotatably mounted on said arbor, longitudinally movable thereon and normally held in constant yielding engagement with the winding-train, a pinion

rotatably mounted on said arbor and in constant engagement with the setting-train, and means for causing the alternative engagement and disengagement of said arbor with
5 said clutch and said pinion by the longitudinal movement of said arbor, substantially as described.

4. In a pendant-setting watch, the combination with a rotatable and longitudinally-
10 movable arbor adapted to be moved longitudinally inward by the inward movement of a case-arbor, but having no positive connection therewith, a spring adapted to move said arbor longitudinally outward and hold the
15 same at the outer limit of its motion when left free by the outward movement of the case-arbor, and means for limiting the longitudinal movement of said arbor in both directions, of a clutch rotatably mounted on
20 said arbor, longitudinally movable thereon and normally held in constant yielding engagement with the winding-train, a pinion rotatably mounted on said arbor and in constant engagement with the setting-train, and
25 means for causing the alternative engagement and disengagement of said arbor with said clutch and said pinion by the longitudinal movement of said arbor, substantially as described.

30 5. In a pendant-setting watch, the combination with a winding-train, a setting-train, a winding-pinion constantly in engagement with said winding-train and having ratchet-teeth on its inner face, and a setting-pinion
35 having constant engagement with the setting-train, of a rotatable longitudinally-movable arbor having no positive connection with the case-arbor and passing through said winding-pinion and said setting-pinion, rotatable
40 in said winding-pinion and rotatable in said setting-pinion when at one limit of its longitudinal motion, a clutch member rotatably and slidingly mounted on said arbor, provided with ratchet-teeth, and normally held
45 in constant yielding engagement with the ratchet-teeth on said winding-pinion, and means for causing the alternative engagement and disengagement of said arbor with said clutch member and with said setting-pinion
50 by the longitudinal movement of said arbor, substantially as described.

6. In a pendant-setting watch, the combination with a winding-train, a setting-train,
55 and a pinion in constant engagement with said setting-train and having a squared axial opening, of a rotatable longitudinally-movable arbor having no positive connection with the case-arbor, passing through said setting-pinion and having two squared portions
60 thereon, and a clutch rotatably mounted on said arbor, longitudinally movable thereon and normally held in constant yielding engagement with the winding-train and having a squared axial opening, said squared portions of said stem-arbor being adapted to alternately engage with and disengage from the

squared axial openings on said clutch and on said setting-pinion, by the longitudinal movement of said arbor, substantially as described. 70

7. In a pendant-setting watch, the combination with a winding-train, a setting-train, and a pinion in constant engagement with said setting-train and having a squared axial opening, of a rotatable longitudinally-mov- 75 able arbor having no positive connection with the case-arbor, passing through said setting-pinion and having two squared portions thereon, a clutch rotatably mounted on said arbor, longitudinally movable thereon and normally 80 held in constant yielding engagement with the winding-train and having a squared axial opening, said squared portions of said stem-arbor being adapted to alternately engage with and disengage from the squared axial 85 openings on said clutch and on said setting-pinion, by the longitudinal movement of said arbor, and a spring adapted normally, when free to act, to force said arbor longitudinally outward to engage one of the squared por- 90 tions thereon with the squared axial opening of said setting-pinion, substantially as described.

8. In a pendant-setting watch, the combination with a winding-train, and a setting- 95 train, of a rotatable, longitudinally-movable arbor having no positive connection with the case-arbor and having two squared portions thereon, a pinion rotatably mounted on said arbor and having constant engagement with 100 the setting-train, and provided with ratchet-teeth upon its inner surface, a clutch rotatably mounted on said arbor, longitudinally movable thereon and having a squared axial opening, and provided with ratchet-teeth 105 upon its outer surface, a spring adapted to normally and yieldingly hold said clutch in constant engagement with said winding-pinion, a setting-pinion rotatably mounted on said arbor in constant engagement with the 110 setting-train and having a squared axial opening, one of the squared portions on said stem-arbor being adapted to engage with the squared axial opening of said clutch when said stem-arbor is moved longitudinally in- 115 ward, and to be disengaged from it when said arbor is moved longitudinally outward, the other of said squared portions being adapted to engage with the squared axial opening in said setting-pinion when said stem-arbor is 120 moved longitudinally outward and to be disengaged therefrom when said stem-arbor is moved longitudinally inward, and a spring bearing on said stem-arbor and adapted normally, when free to act, to move said stem- 125 arbor longitudinally outward into engagement with said setting-pinion, substantially as described.

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Witnesses:

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