

(No Model.)

6 Sheets—Sheet 1.

M. A. YEAKLEY.

SAFETY ATTACHMENT FOR RAILWAY TROLLEYS.

No. 476,028.

Patented May 31, 1892.

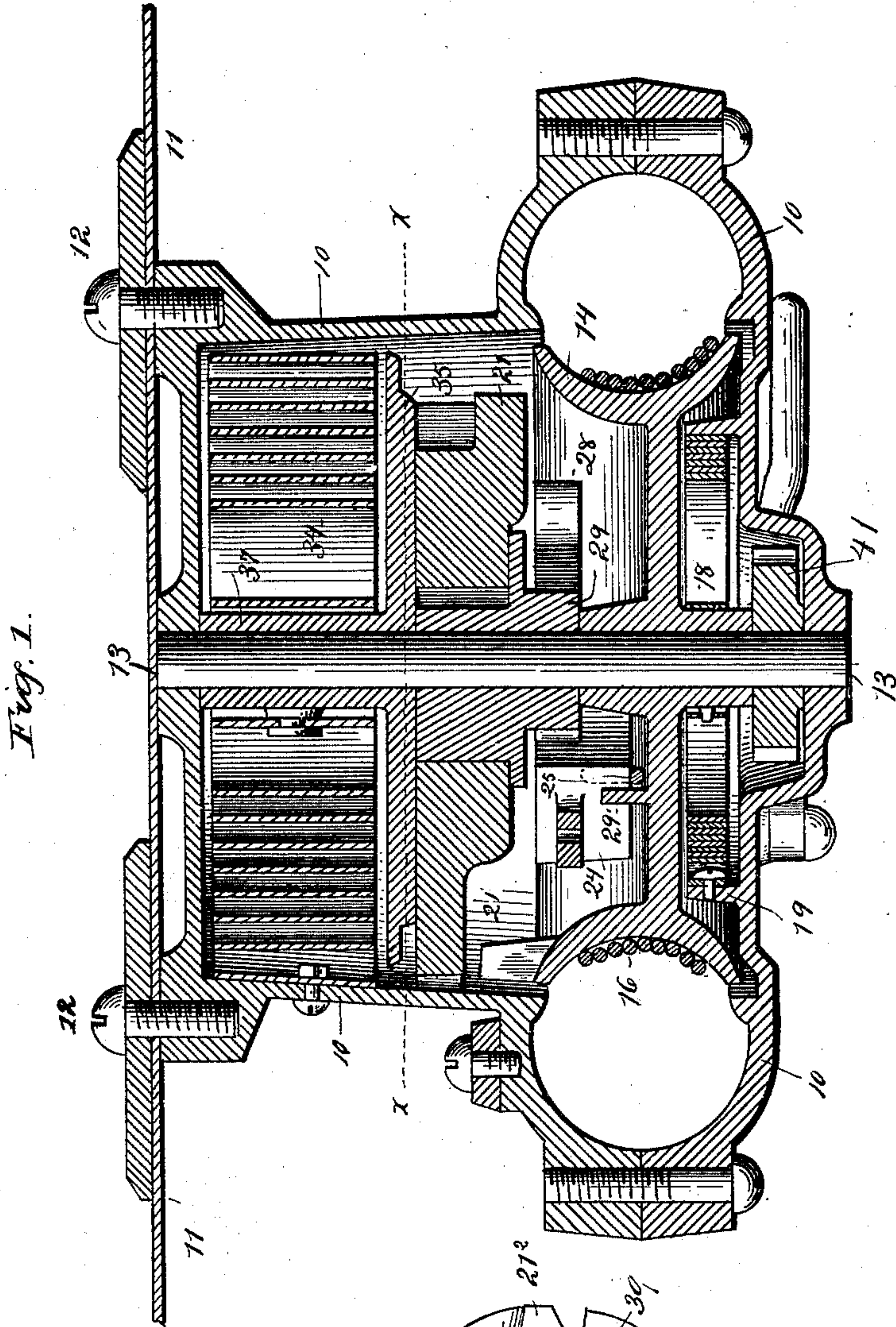
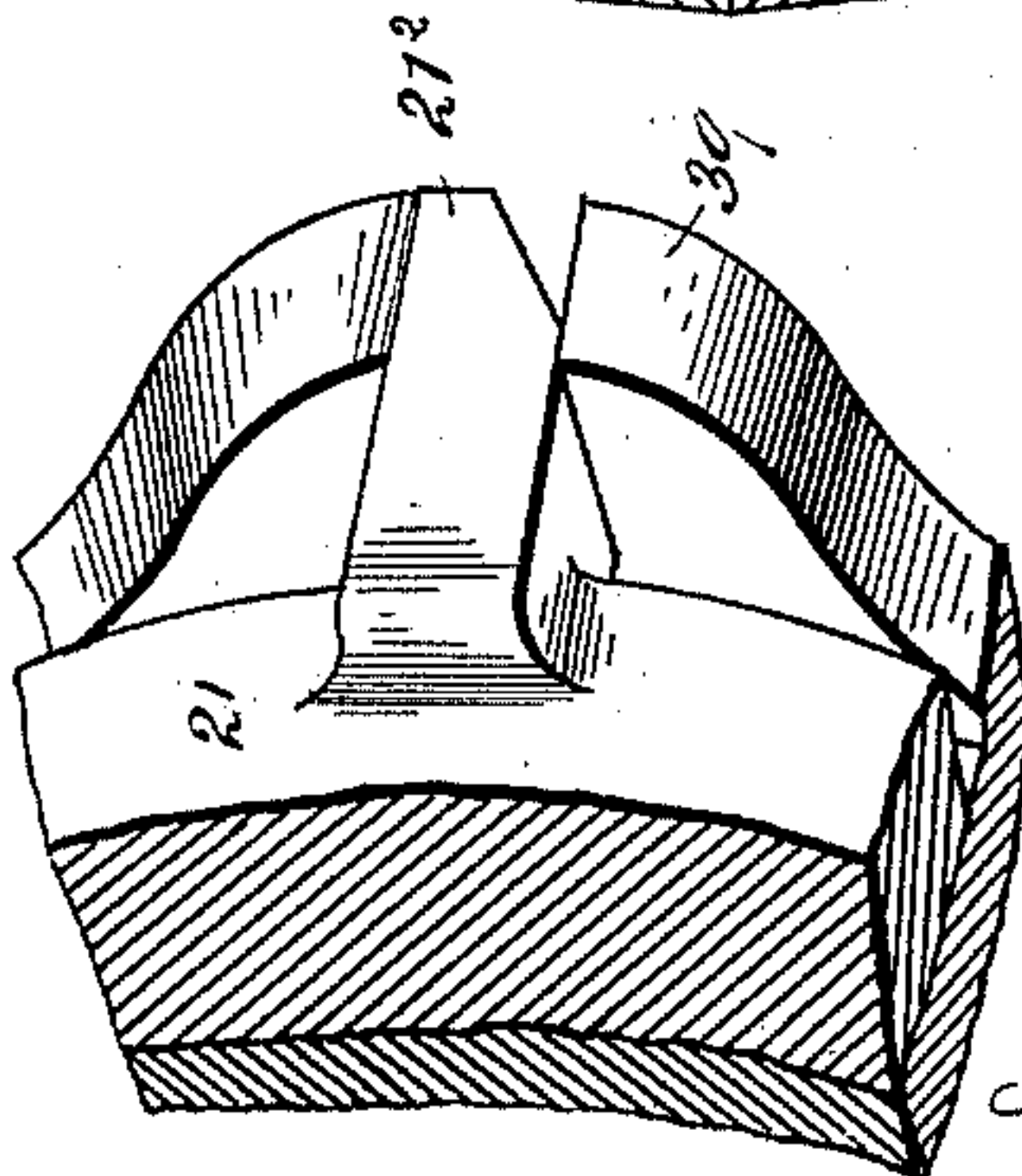


Fig. 15.



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Fig. 2.

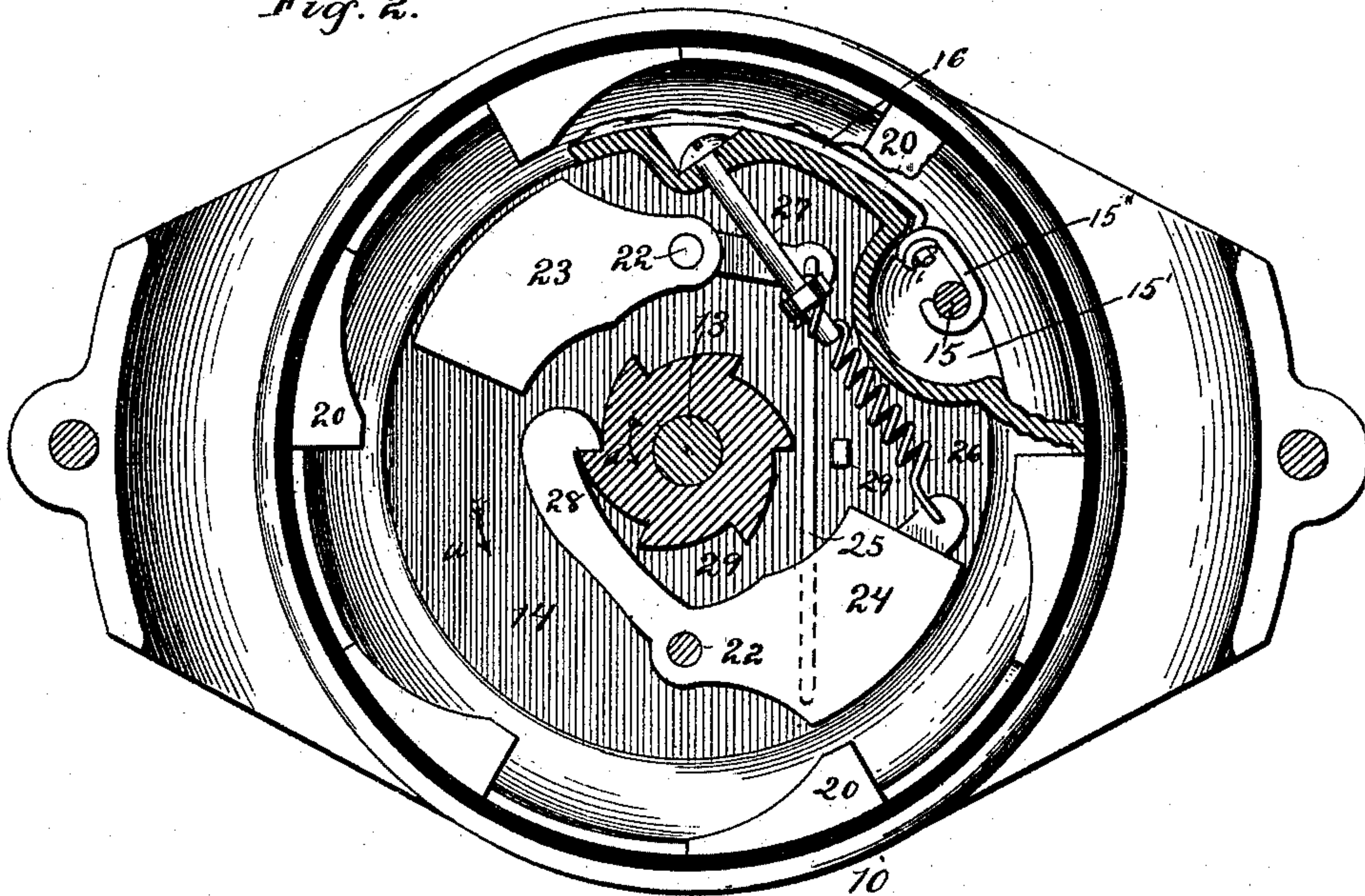
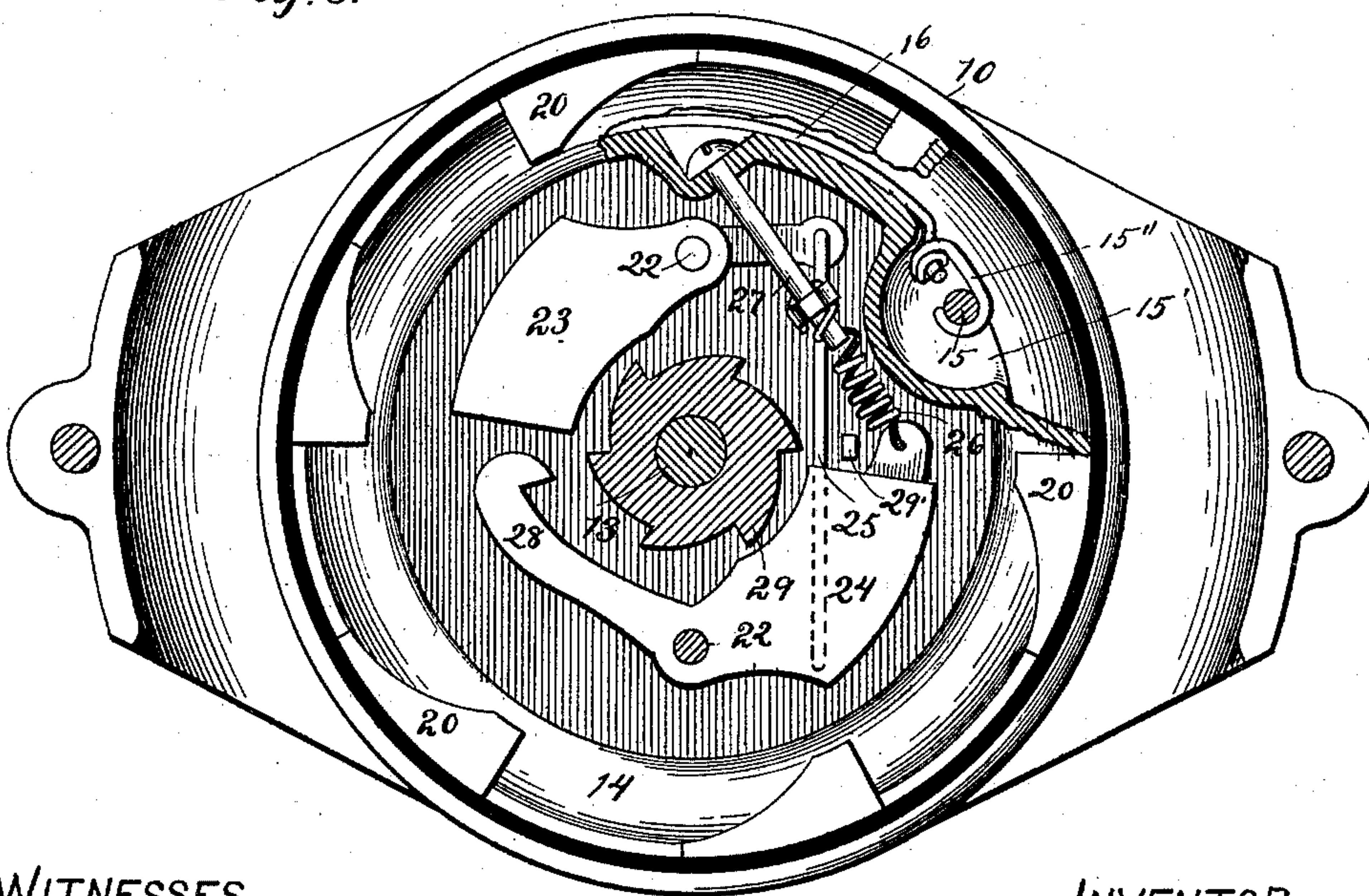


Fig. 3.



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Fig. 4

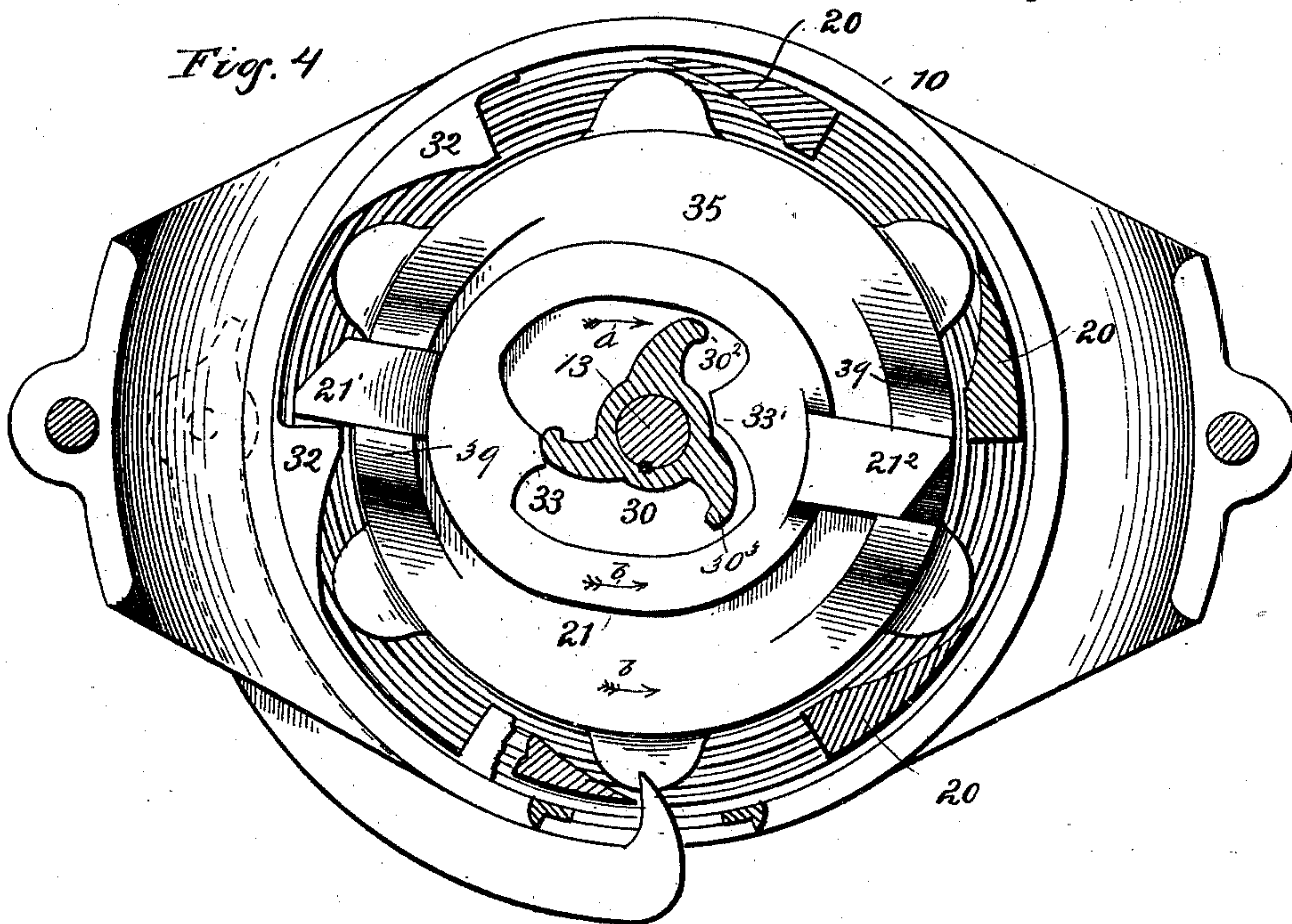
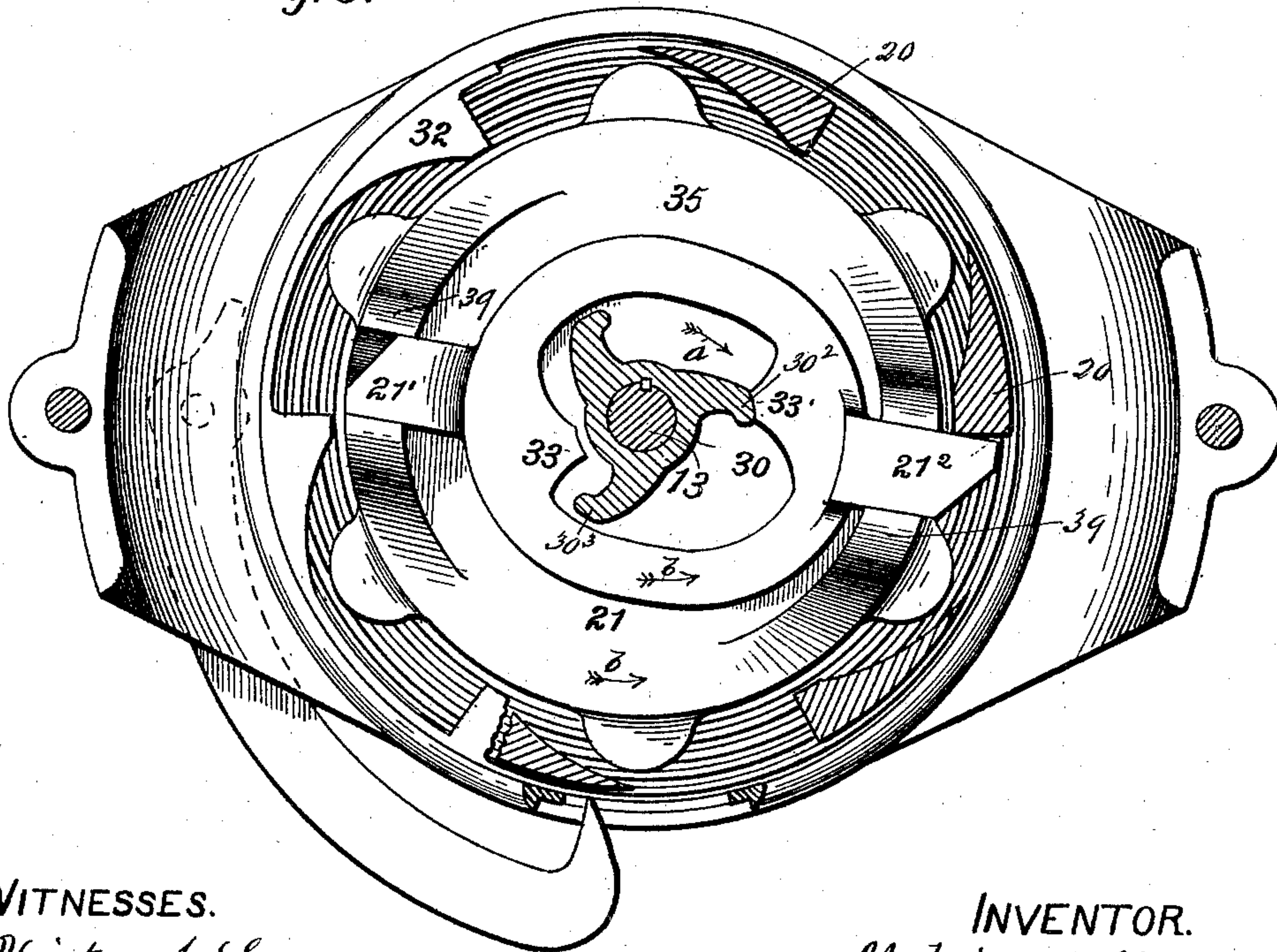


Fig. 5.



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Fig. 6.

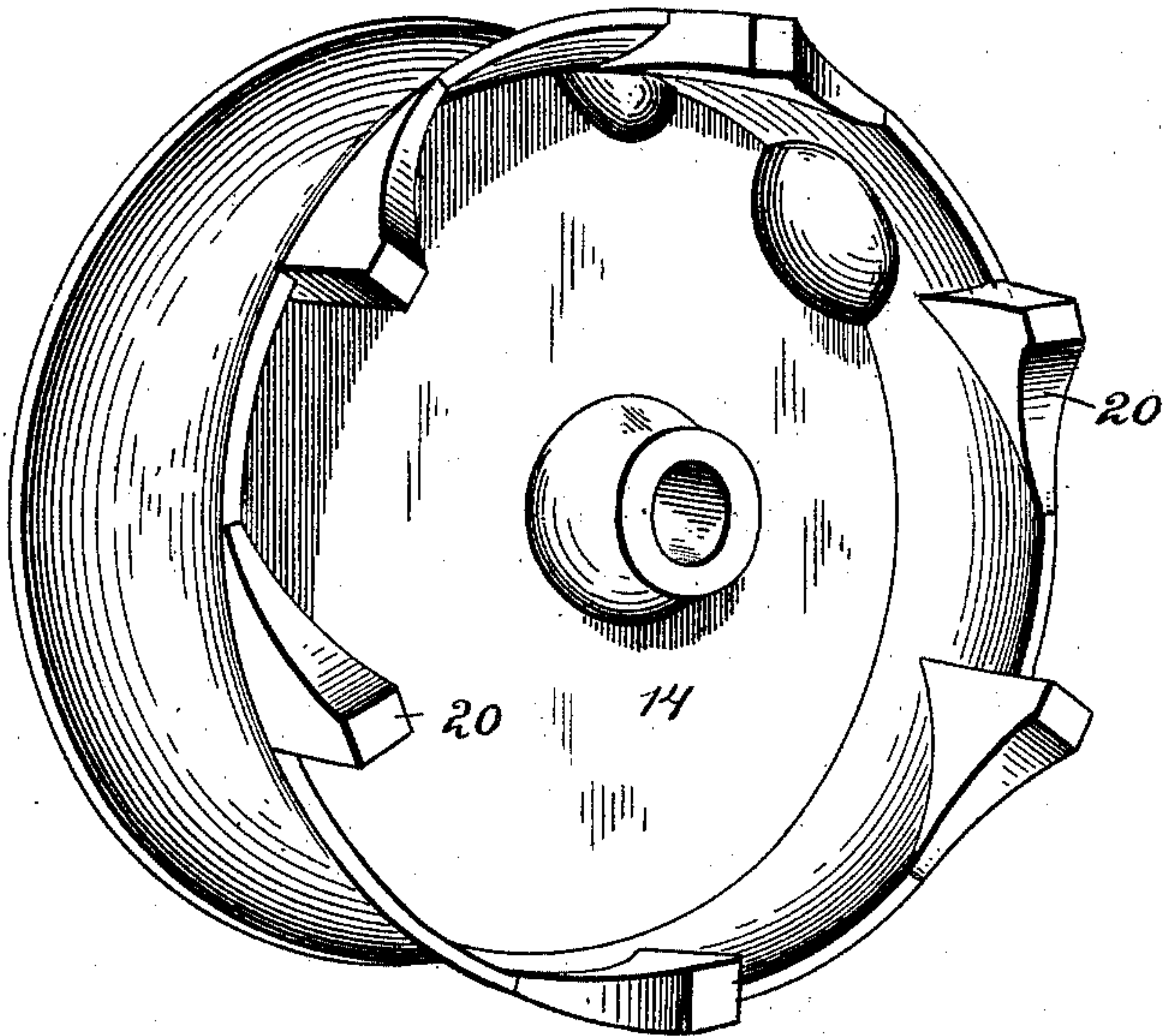
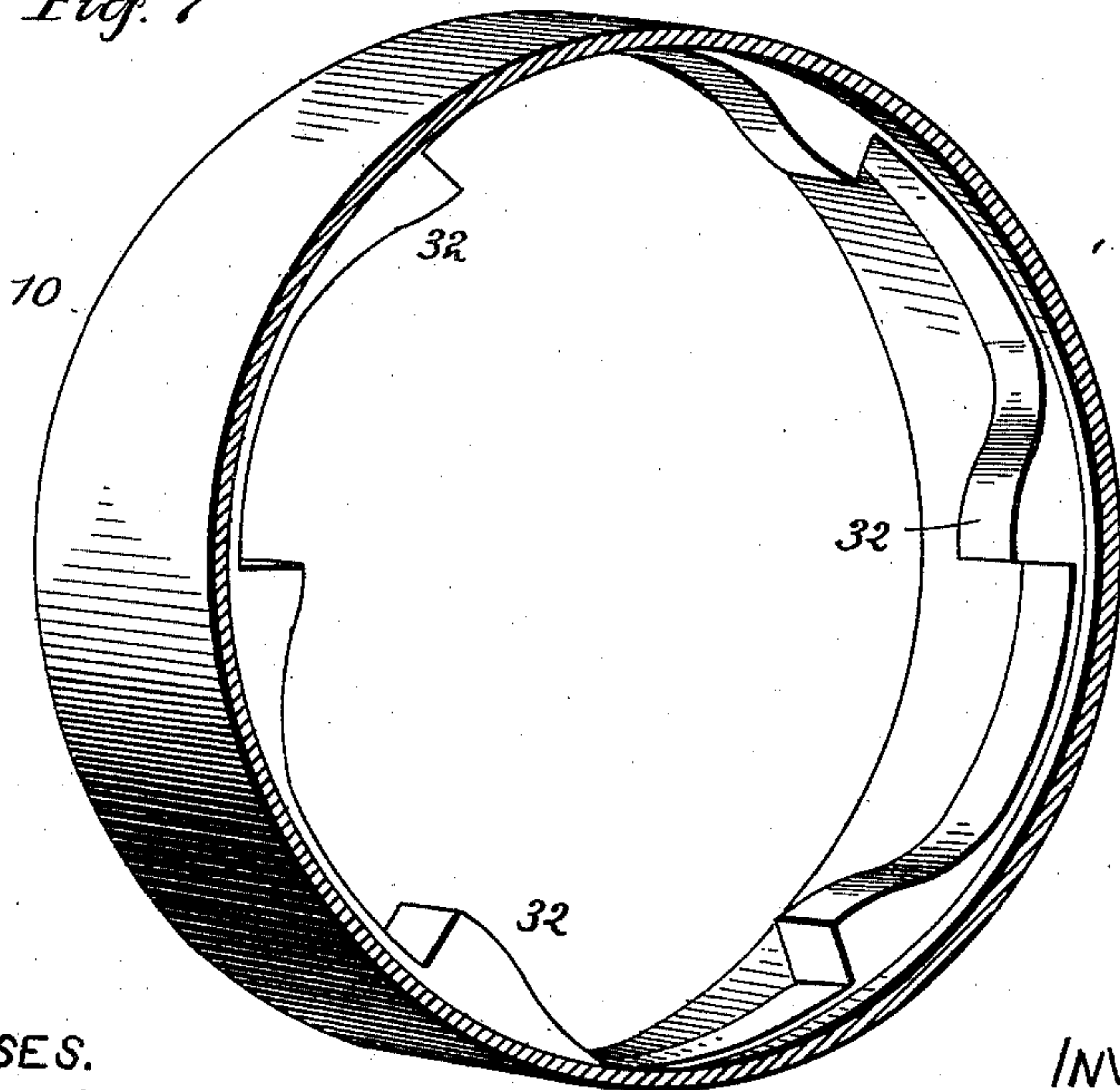


Fig. 7.



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Fig. 8.

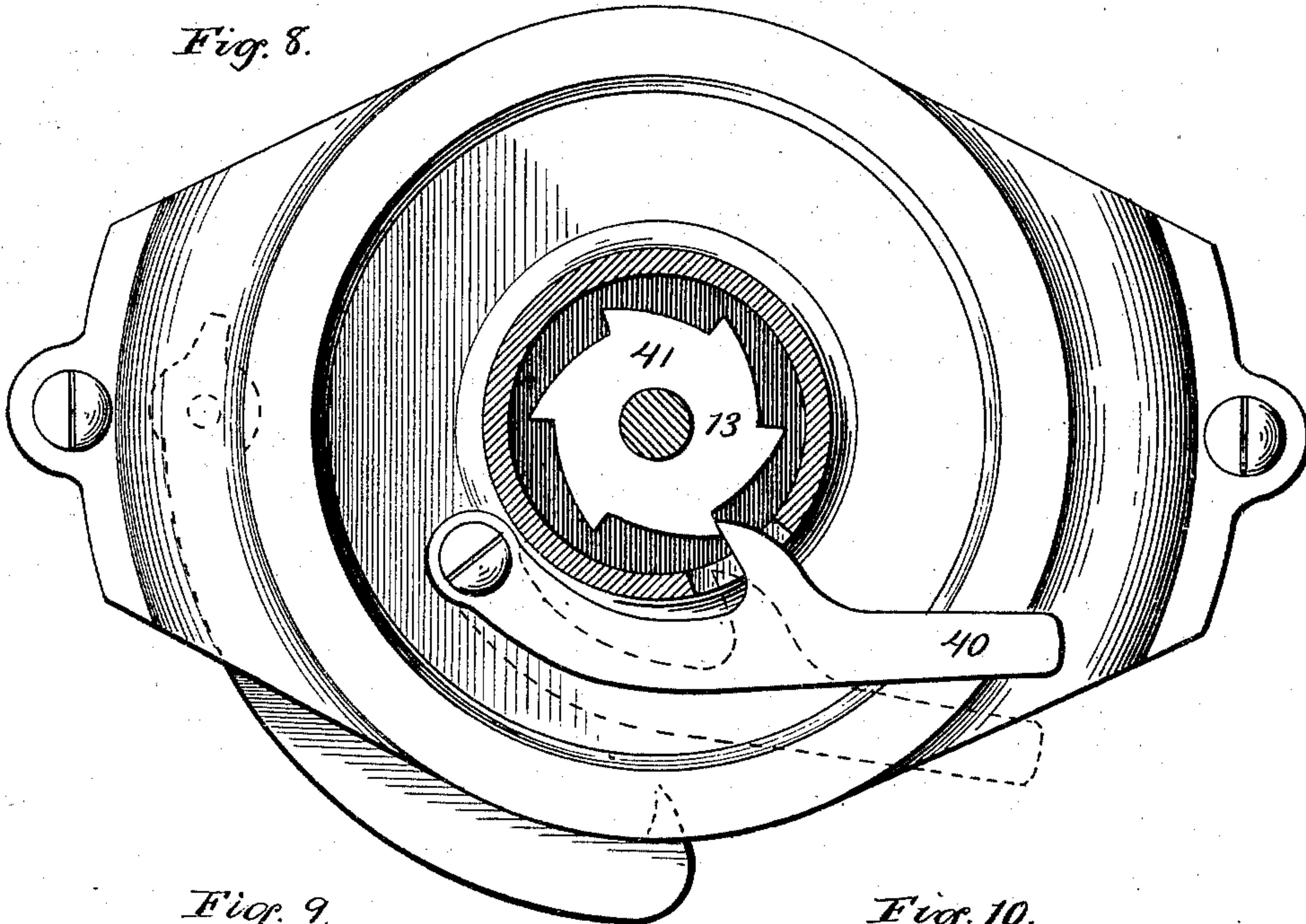


Fig. 9.

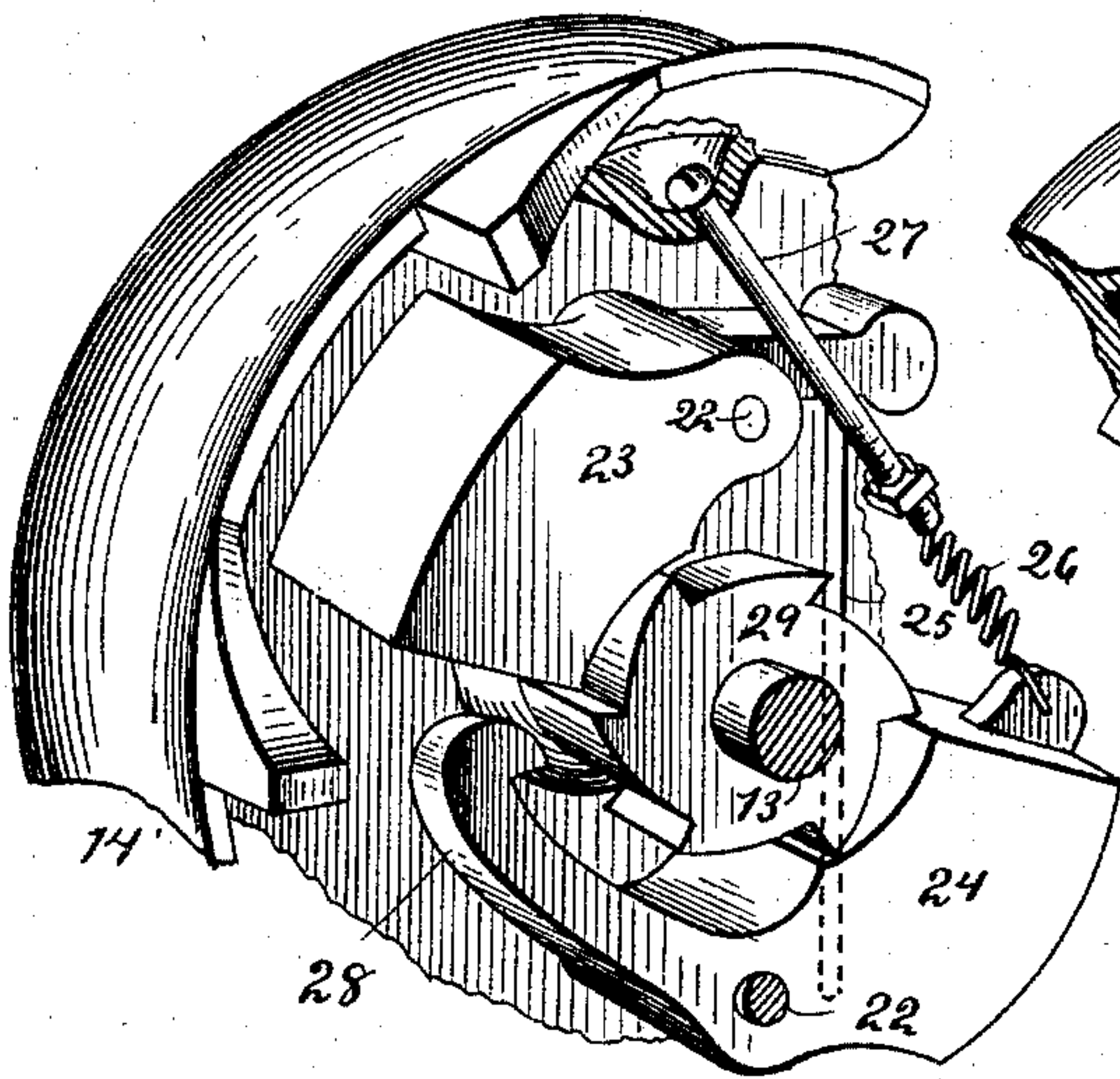
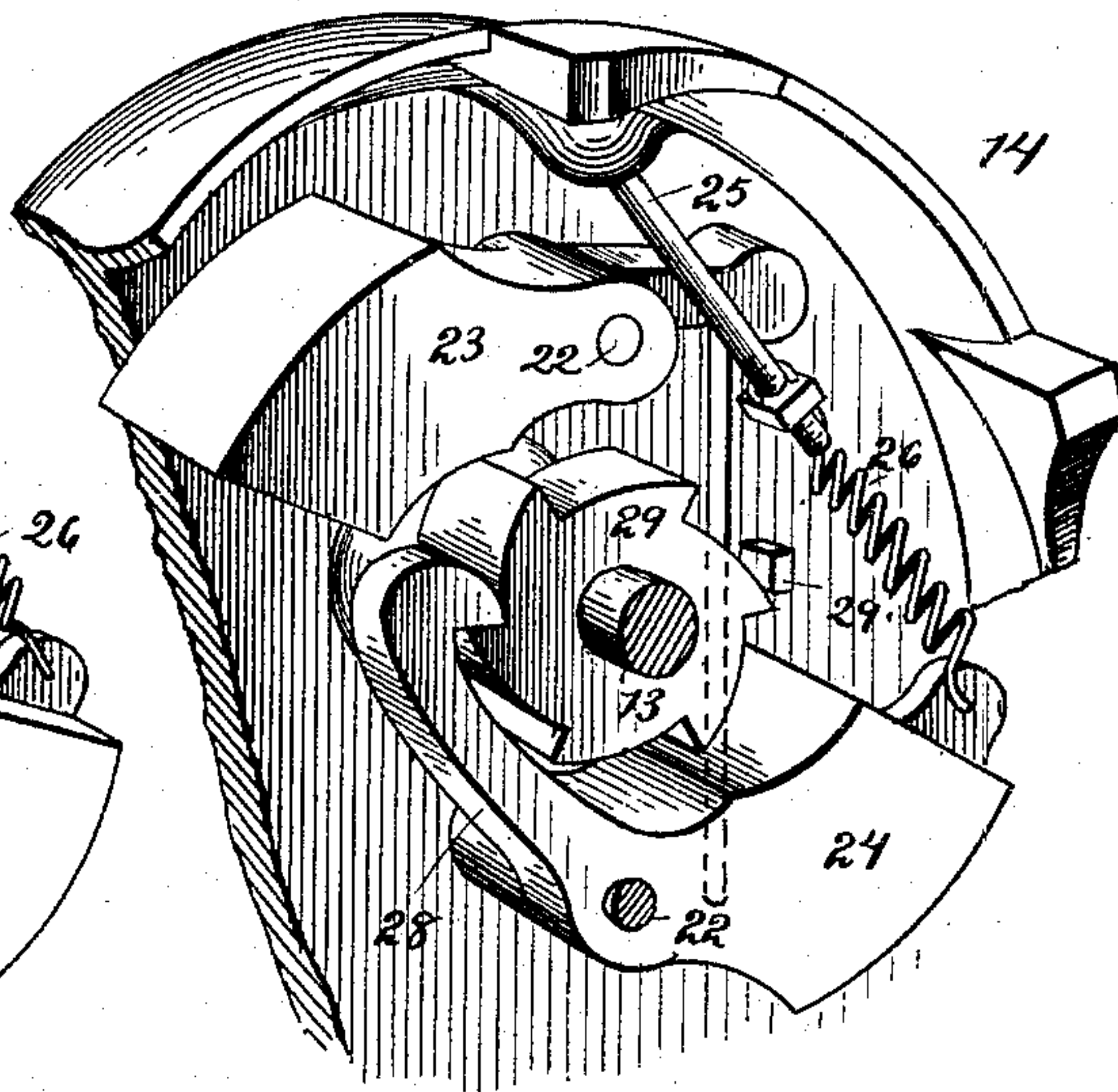


Fig. 10.



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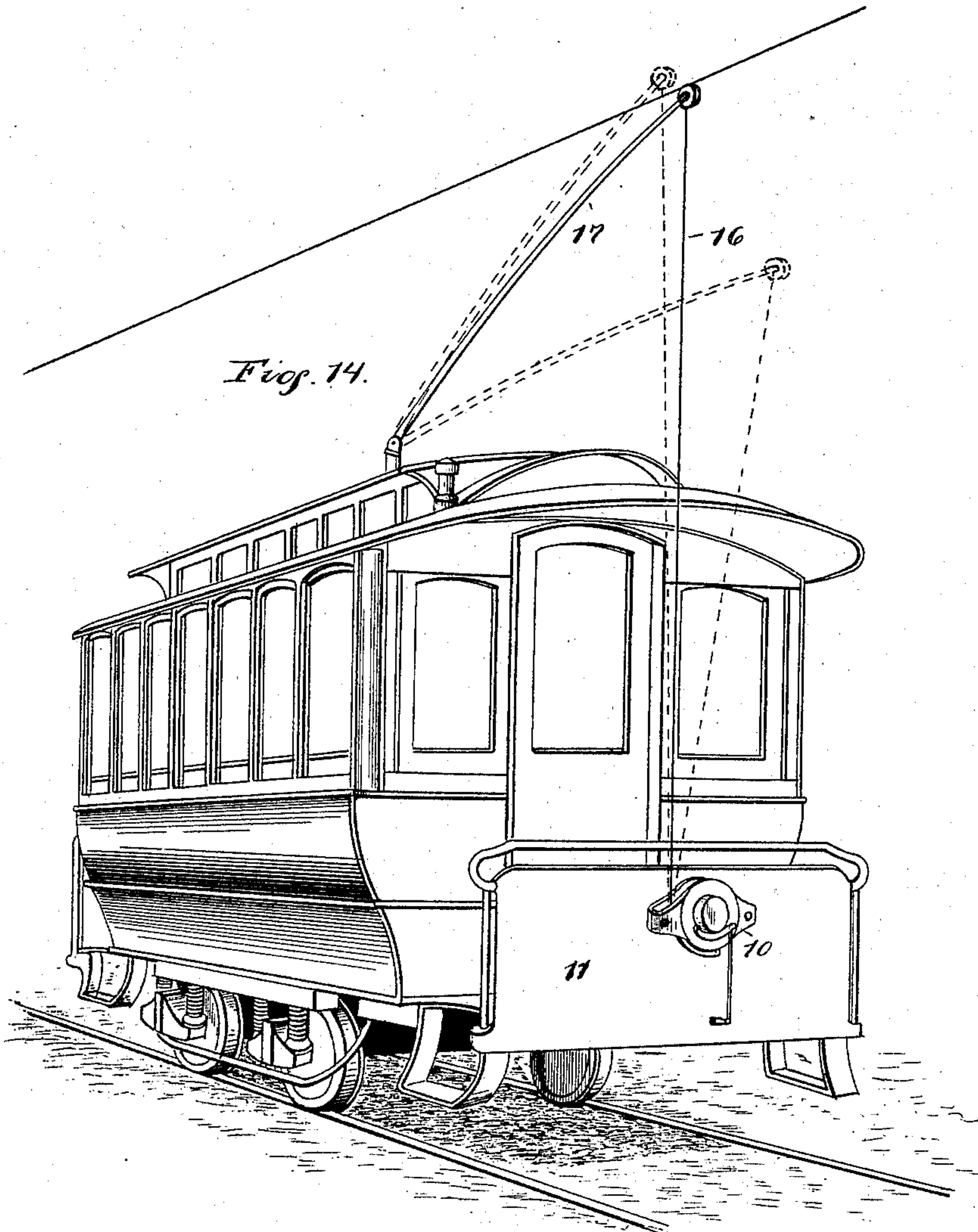


Fig. 11.

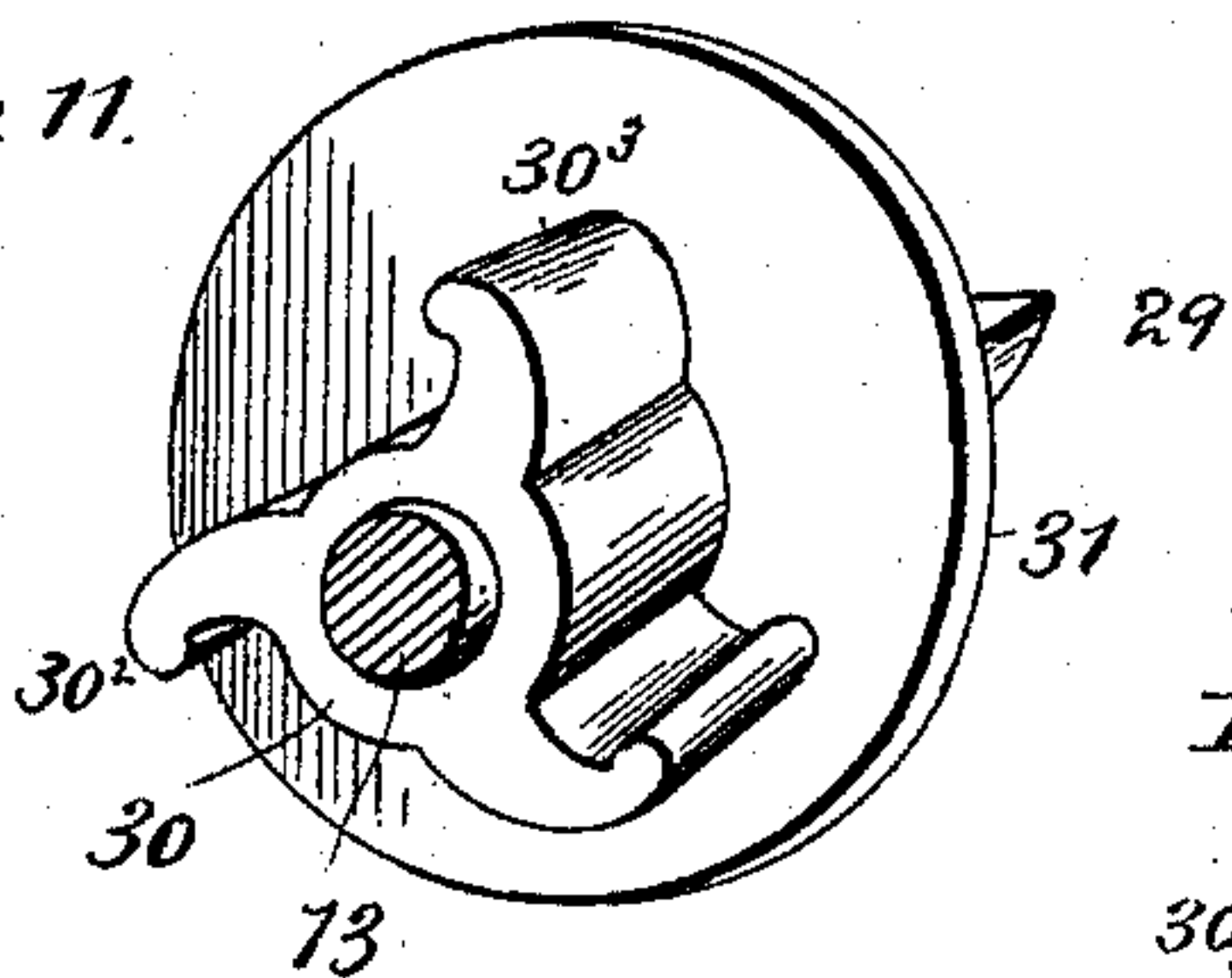


Fig. 12.

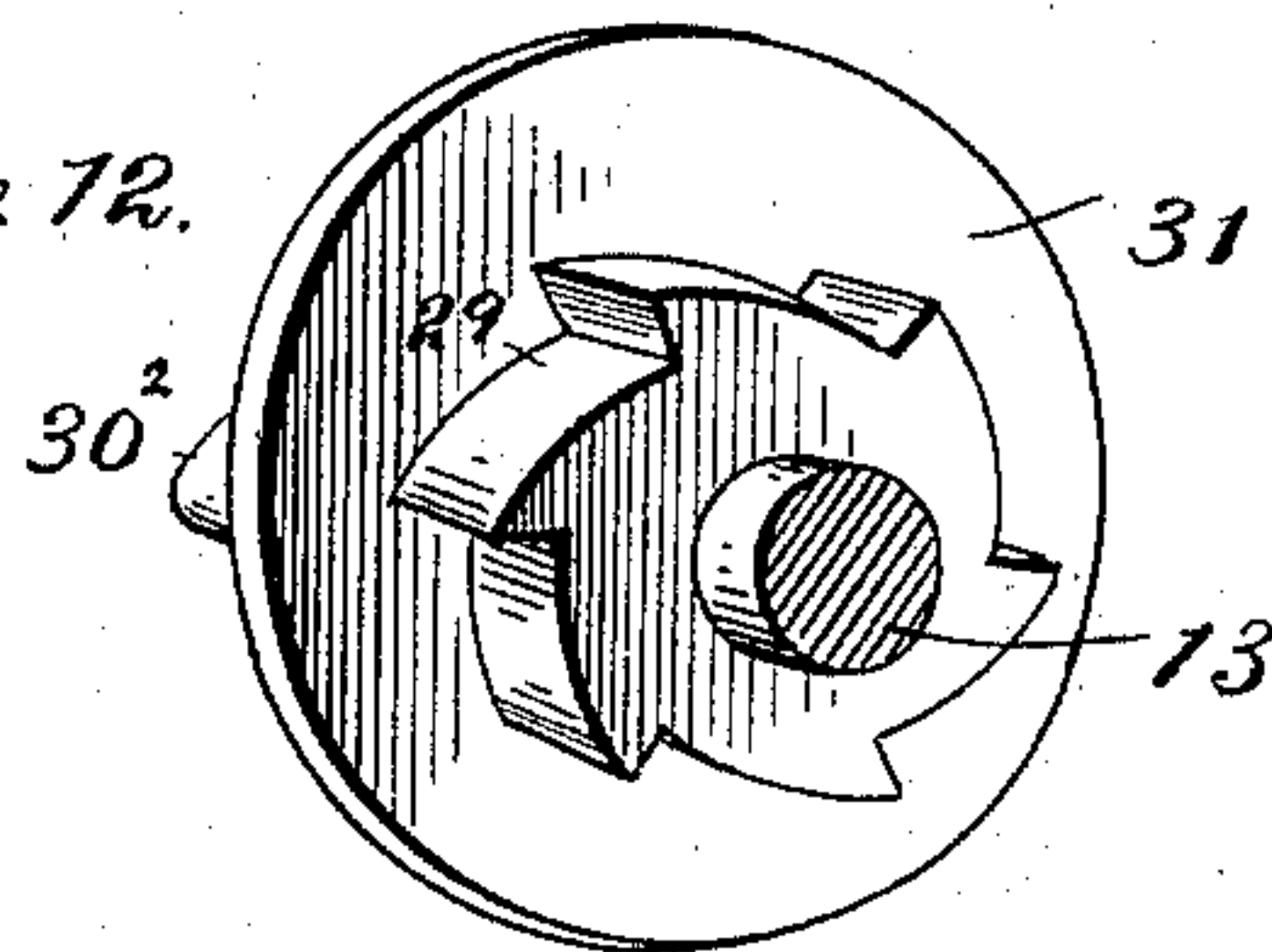
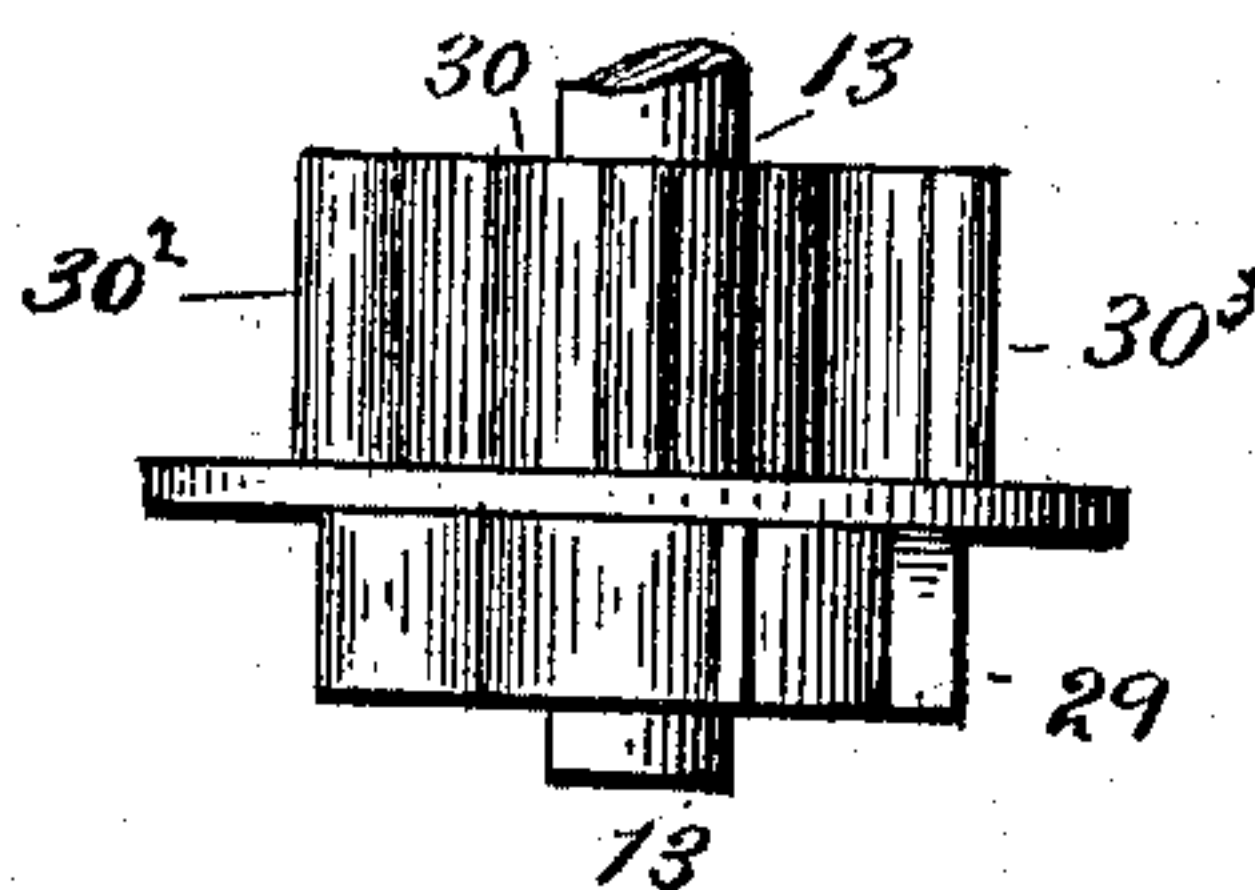


Fig. 13.



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UNITED STATES PATENT OFFICE.

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SAFETY ATTACHMENT FOR RAILWAY-TROLLEYS.

SPECIFICATION forming part of Letters Patent No. 476,028, dated May 31, 1892.

Application filed April 7, 1891. Serial No. 387,947. (No model.)

To all whom it may concern:

Be it known that I, MELVIN A. YEAKLEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Safety Attachments for Railway-Trolleys; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to safety attachments for railway-trolleys, and is an improvement on the invention embodied in my application, Serial No. 374,705, filed December 15, 1890.

This improvement, like the original invention set forth in said application, is wholly independent of and separate from the usual trolley mechanism, and performs the office of a safety attachment by drawing the trolley down beneath the overhead wires the instant the trolley runs off or leaves the wire and holds the same in a lowered position until it is restored to place by hand.

In the accompanying drawings, Figure 1 is a horizontal transverse section of the mechanism complete, taken on line of the common spindle or axle upon or with which a number of parts rotate. Fig. 2 is a sectional view looking inward from the left of the sheave, the mechanism behind the same being removed, and showing the counter-weights and the mechanism connected therewith in position as when the counter-weights have been thrown out to engage the ratchet-wheel on the main shaft to release the main spring, all as hereinafter more fully described. Fig. 3 is a similar view to Fig. 2 with the counter-weights in their normal position. Fig. 4 is a transverse section taken immediately behind the counter-weights and with said weights, the sheave, and the mechanism in front thereof removed. In this view the locking-piece is shown as in engagement with a tooth on the casing, in which position the main spring is locked, the locking-piece preventing the rotating of the shaft. Fig. 5 is a transverse view taken on the same line as Fig. 4 and showing the locking-piece disengaged from the casing and engaging a tooth on the sheave. When

this latter engagement is made and the main spring released, the sheave is revolved by the force of the main spring in the reverse direction to that which it takes when the trolley jumps the wire, and takes up the cord connecting the sheave with the trolley and draws the trolley down to the position about as shown in dotted lines, Fig. 14. Fig. 6 is a perspective view of the sheave detached, looking from the inside; and Fig. 7 is a perspective view of the casing looking inward from the left on line *xx*, Fig. 1, on which line the casing is sectioned. Fig. 8 is a front elevation of the casing and parts with the casing immediately about the shaft broken away and disclosing the ratchet on the shaft and the dog for temporarily engaging the same and holding the shaft against a backward rotation when the device is being set in readiness for further operation. Fig. 9 is a perspective view of the counterbalance-weights and showing a fragment of the shell or casing behind the same, the weights being in their normal position; and Fig. 10 is a perspective of the weights in the same relation as in Fig. 2. Fig. 11 is a perspective view of the sleeve on the axle which has a central separating-disk and a ratchet-wheel on one side and a three-winged cam on the other side for actuating the locking-piece. Fig. 12 is a perspective view looking from the opposite side of said sleeve and showing the ratchet on the opposite side of the central disk which divides the cam from the ratchet. Fig. 13 is a plan view of said sleeve and a section of the shaft. Fig. 14 is a perspective view of a car, showing the safety attachment secured to the dash-board and connected with the trolley by a cord. The upper dotted position of the trolley and pole shows the position to which the trolley may spring before it is stopped by the safety attachment and drawn down to substantially the lower dotted position shown. Fig. 15, Sheet 1, is a perspective view of a section of the disk in front of the main spring, showing the guide-lugs thereon for the locking-bolt.

In Fig. 1 is represented the full size of the device as now made for service; but it may be larger or smaller, and consists in the casing 10, attached to the dash-board 11 in this

instance by screws 12. This implies a permanent attachment, but in case only one device is used to a car it can be provided with means for making a temporary attachment either to the dash-board or to the hood or the roof of the car or other suitable place, by which means it may be temporarily secured to either end and be made portable from one end to the other when the car is reversed. Centrally through the shell extends the shaft or spindle 13, and upon this shaft, just within the shell at the front, is a sheave 14, which turns freely on the shaft and has a recess 15' in its grooved periphery, with a pin 15, (see Figs. 2 and 3,) to which the end of the retracting-rope 16 is fastened by a hook 15'', and the said cord or rope wound around the sheave a sufficient number of times to do the required work, and its end is connected with the trolley-pole 17 at or near its upper end. Immediately on the outside of the sheave is a light spring 18, secured at one end upon the hub of the sheave and at the other end to a flange 19 of the front of the casing. This flange is annular and forms a housing or guard for the spring. By means of this spring the slack cord or rope extending from the sheave to the trolley-pole is taken up under a slight but sufficient tension. Around its inner edge at the periphery and at intervals thereon the sheave 14 has inwardly-projecting teeth 20, with which the sliding bolt 21 is adapted to make engagement when the movement of the sheave is reversed by the main spring, as hereinafter more fully described.

Upon the inside of the sheave, on suitable pivots 22 on opposite sides of the shaft, are supported counter-weights 23 and 24. The purpose of these counter-weights is to throw the parts into engagement when the trolley runs off the wire, and the principal of centrifugal action is called into requisition to effect this result. These counter-weights are connected by a link, wire, or rod 25, so that they will move in unison, and on the same side of the shaft 13 is a spring 26, connected at one end to an ear on the counter-weight 24 and at the other end to a screw 27, extending through the flange of the sheave. The respective weights 23 and 24 are arranged on opposite sides of their pivots and above and below the shaft, so that they will practically balance one another when thus connected. The weight 24 has a dog 28, rigid therewith and arranged in position to engage the ratchet-pinion 29, fastened to the shaft. The weights naturally fly apart under a sudden start of the sheave, and upon rotating a short distance engage the dog 28 on the ratchet-wheel. Then when the main spring is released and the ratchet 29 carried in the reverse direction the spring 26 draws the dog 28 and its weight back to normal position. A projection 29' on the casing limits the movement of the weights under the tension of the spring 26. Now if the trolley jumps off the wire and is thrown instantly upward by its

spring it gives a quick jerking turn to the sheave 14 through the connecting-cord between the sheave and the trolley. In this movement the tendency of the weights is to fly apart into the position shown in Fig. 2, and this carries the dog 28 up into position against the ratchet to engage the first tooth it comes to. Several teeth being provided, the dog travels but a short distance before a tooth is engaged, and in making the engagement it gives a sudden start to the shaft, which in turn actuates the hub 30, which is integral with the ratchet-pinion and separated therefrom in this instance by a disk 31, as seen in Figs. 11 and 12. The hub 30 is spider-shaped or has three cam arms or wings, any one of which may engage the locking-bolt 21, according to the relation the parts may sustain toward one another at the time the movement occurs to operate said bolt. This locking-bolt 21 is constructed with an opening at its center having cam projections or surfaces 33 33', through which the shaft passes, so that it is free to move back and forth on the shaft which it surrounds. The bolt has two arms 21' 22', extending in opposite directions, adapted to engage in one instance the inwardly-projecting teeth 32 on the casing or shell, as in Fig. 4, when the main spring is supposed to be locked, or the teeth 20 on the sheave, as in Fig. 5, when the main spring is unlocked and the bolt engages the sheave and turns the same. The cam projections 33 and 33' on the inside of the opening of the bolt are in turn engaged by the wings of the hub 30, and the bolt at one end is fashioned to engage the teeth on the casing and at the other end to engage the teeth on the sheave, which teeth are in different vertical planes.

At the rear of the casing a chamber is formed for the main spring 34 by a disk 35, which separates the spring from the locking-bolt 21, and this disk has a sleeve or hub 37, which extends back against the inside of the rear of the casing. The main spring 34 is secured at one end to this sleeve, around which it is wound, and at the opposite end to the casing, and is designed to exert all the requisite tension when it unwinds, not only to intercept the upward tendency of the trolley when it jumps the wire, but to instantly pull it down the requisite distance.

The disk 35 and its sleeve are free to rotate on the shaft 13, and on its inner face said disk has guide lugs or studs 39, Fig. 15, between which the ends or arms of the locking-bolt are confined and adapted to slide back and forth. The disk 35 and its hub are therefore rotated or turned whenever the bolt is turned and to the same extent and in the same direction, and when the bolt is locked in engagement with any one of the teeth 32 on the casing the disk and main spring will be held immovable, and when it is locked with the sheave all the said parts will rotate together.

In Fig. 8 is shown a dog 40, pivoted on the

casing and provided with a tooth to engage a pinion 41, rigid on the shaft 13 outside of the sheave. This dog is designed to temporarily hold the shaft from turning when, after the device has acted, it is to be reset. Suppose, for example, that the trolley has been drawn down, as in the lower dotted position, Fig. 14. This has occurred by the unwinding of the main spring and the incident rotation of the sheave. Much of the rope or cord 16 is now wound about the sheave. To again let the cord out so as to replace the trolley on the wire and to wind the main spring to the requisite tension, the attendant unwinds the cord from the sheave by turning the sheave, and the locking-bolt being in engagement with the sheave and with the disk 35 it of course winds up the spring. This turning of the sheave is in the direction of the arrow *a*, Fig. 5, and the same direction the sheave takes when the trolley jumps the wire. Then having wound up the main spring by this movement of the sheave, the dog 40 is thrown up into engagement with pinion 41 to temporarily hold the shaft from turning, and, this done, the hold on the cord 16 is released and instantly all the parts fly into locking position and at the same time free the sheave. This result is accomplished as follows: Referring to Fig. 5, we find bolt 21 in engagement with a tooth 20 on the sheave. Now, remembering that shaft 13 and hub 30 thereon are locked by dog 40, and that up to said locking the unwinding of rope 16 and the sheave was done against the increasing tension of the main spring, which was being wound, we find that all the other parts are interlocked and under the unrestrained back-pull of the main spring. Thus bolt 21 engages the sheave, the disk 35 engages the bolt, and the main spring exerts a turning tension on the disk, and all are now free to rotate together on the shaft. Hence instantly upon releasing the sheave the main spring turns all these interlocked parts backward as far as it can. This, however, is not far. The pull now being in the direction of arrow *b*, Fig. 5, the sheave and bolt can only turn till one of the cam projections 33—for instance—of the bolt engages the wing 33³ of the now stationary hub 30. When this contact occurs, the bolt is carried around so that its end 21' is in the recess or cavity behind the tooth 32, into which it is forced, and then, as it turns a little farther and the dog 40 being released, it strikes the next tooth 32 and prevents the spring from unwinding any farther. The same movement of the bolt releases the sheave, which now drops back under the influence of the light spring 18 on its hub. The parts are now practically in engagement, as seen in Fig. 4, though in a different relation on the drawings, and the trolley is supposed to be replaced on the wire. It is immaterial whether one or another of the teeth 32 is engaged, and six of these are employed in this instance, so as to allow only a slight reverse

rotation before the locking occurs. Suppose now that the trolley suddenly leaves the wire, as it frequently does when least expected. The quick jerk of the movement on the sheave throws the counter-weights apart and the dog 28 into engagement with the first tooth it reaches on the ratchet-wheel 29. The rotation now continues till the cam-wing 30² engages the projection 33', Fig. 4, and forces the bolt 21 to the right. The arm 21² of the bolt has just passed the tooth 20 next to it, and there is nothing in the way of the cross movement of the bolt to release it from the tooth 32 opposite. Instantly upon this release the main spring asserts itself, and the rotation of the sheave is reversed by the engagement of the bolt 21 upon the first sheave-tooth 20, as seen in Fig. 5. Then the action is as hereinbefore described.

It will be remembered that Figs. 2 and 3 are taken from a point looking to the right, and Figs. 4 and 5 from the same point or line looking to the left, so that the parts in the latter figures are not really reversed from those shown in Figs. 2 and 3, as they might seem to be.

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

1. A safety device for trolleys, comprising a sheave or drum, means connecting said drum and the trolley-support, adapted to be operated by the rotation of the former to move the latter, mechanism for rotating said drum, and means connecting the said drum and rotating mechanism, adapted to be operated by the movement of said drum to release the rotating mechanism, substantially as set forth.

2. A safety device for trolleys, comprising a sheave or drum, means connecting said drum and the trolley-support, adapted to be operated by the rotation of the former to move the latter, mechanism for rotating said drum normally disconnected therewith, and means connecting the said drum and rotating mechanism, adapted to be operated by the movement of said drum to release the rotating mechanism, substantially as set forth.

3. A trolley safety device comprising a drum or sheave, a cord or rope to be wound upon the sheave, mechanism for rotating the sheave, and means connecting the sheave and rotating mechanism, adapted to be operated by the movement of the sheave to release the rotating mechanism, substantially as set forth.

4. A trolley safety device comprising a drum or sheave, means connecting said drum and trolley-support, adapted to be operated by the rotation of the former to move the latter, a spring for rotating said drum, and means connecting said drum and spring, adapted to be operated by the movement of said drum to release the spring, substantially as described.

5. A safety device for railway-trolleys, consisting of a sheave provided with a rope or cord to connect with the trolley, a main spring, and mechanism between the main spring and

the sheave operated by the movement of the sheave to release the spring, substantially as described.

6. The trolley and its support, the safety device having a sheave connected by a rope or cord with the trolley, a main spring in said device wound and locked, and mechanism actuated by the sheave for disengaging said lock and throwing the spring into action, substantially as described.

7. The trolley and the sheave connected by a rope or cord, a main spring having a lock to hold it in tension, and mechanism connected with and operated by the movement of the sheave to release the said lock when the sheave is quickly rotated, substantially as described.

8. A safety attachment to connect with railway-trolleys, consisting in a sheave adapted to be rotated back and forth, a main spring normally disengaged from said sheave, and mechanism to throw the spring into engagement with and operated by the movement of the sheave, substantially as described.

9. A safety device for trolleys, having a shaft and a sheave free to rotate in opposite directions thereon, a main spring free on the shaft and having a lock normally disconnected with the sheave, and mechanism between the lock and sheave for connecting these parts actuated by the sheave, whereby the sheaves will be turned by the spring when the lock is released, substantially as described.

10. The safety attachment consisting in a casing adapted to be fixed to a car, a main spring and a lock therefor, a sheave for the trolley safety-rope, and a catch actuated by the sheave to loosen the main-spring-locking mechanism, substantially as described.

11. The safety attachment for trolleys, having a main spring and a lock, a sheave for the trolley safety-rope having a counter weighted dog, and a sleeve constructed to release the main-spring lock engaged by said dog when the sheave is quickly rotated, substantially as described.

12. In a safety attachment for trolleys, the casing and the shaft and means to lock the shaft from turning, and a sheave and main spring with intermediate locking connections free to turn together on the shaft, substantially as described.

13. The casing and shaft, the sheave for the trolley safety-rope and a spring connected therewith to stretch the rope, a main spring, and interlocking connections between the main spring and the sheave, substantially as described.

14. In a trolley safety device, the casing and shaft, a main spring free on the shaft, and a lock for the spring engaging the casing, the sheave, and mechanism actuated by the sheave and supported on the shaft to disengage the main spring, substantially as described.

15. In a safety device for trolleys, the casing and the main spring and sheave therein, the lock for the main spring, and a set of counter-weights on the sheave, and mechanism be-

tween the counter-weights and the main-spring lock to engage said lock, substantially as described.

16. In a trolley safety device, the sheave and the main spring, a bolt to lock said spring and said sheave together, and a shaft provided with means to move said bolt into and out of the locking position, substantially as described.

17. In a trolley safety attachment, the shaft, a main spring, a locking device for the spring on the shaft, the sheave having projections to be engaged by said locking device, and means on the shaft to move the locking device into engagement, substantially as described.

18. In a trolley safety device, the casing and shaft, a main spring and a lock therefor, a division-piece between said spring and lock to which the spring is attached and having guides for the lock to slide in, means on the shaft to move the lock back and forth, and the sheave, substantially as described.

19. In a safety device for trolleys, the casing having inward projections at intervals, the sheave having lateral projections at intervals, the main spring, a sliding lock therefor constructed to alternately engage the said projections, and the shaft provided with means to move said lock, substantially as described.

20. In a trolley safety attachment, the casing and shaft, the sheave having counter-weights, and a ratchet-dog connected therewith, a sleeve on the shaft with a ratchet-wheel to be engaged by said dog, a main spring, a sliding lock for the spring, and means on the shaft actuating the lock, substantially as described.

21. In a trolley safety device, the casing and shaft, a sheave free on the shaft, a ratchet-wheel rigid with the shaft, a dog on the sheave to engage the ratchet-wheel, a main spring, a lock therefor, and means rigid on the shaft and arranged to throw said lock back and forth, substantially as described.

22. In a safety device for trolleys, the sheave, a pair of connected counter-weights connected therewith having a dog, a spring to hold the dog normally out of engagement, a ratchet-wheel rigid on the shaft arranged to be engaged by said dog, a main spring, and a lock therefor, the shaft having means to throw the lock into and out of engagement, substantially as described.

23. In a safety attachment for railway-trolleys, the shaft, the main spring, the sheave for the safety-rope, mechanism on the side of the sheave for connecting it with the shaft, consisting of a pair of pivoted connected counter-weights provided with a dog, a spring to keep said weights normally in a given position, and a ratchet-wheel on the shaft to be engaged by said dog, substantially as described.

24. In a trolley safety device, the casing, a shaft, a main spring normally wound and

locked, a sheave free upon the shaft, a bolt to lock the main spring, and mechanism on the shaft to disengage said bolt, substantially as described.

5 25. In a safety device for trolleys, the casing, the shaft, the main spring, the sheave free to turn upon the shaft, a bolt connected with said spring to lock against the casing and upon the sheave alternately, and means
10 fixed to the shaft to throw the bolt into engagement, substantially as described.

26. In a trolley safety device, the casing having inward projections at intervals, the main spring, the shaft, a plate free on the

shaft having a sleeve supporting one end of 15 the main spring, the locking-bolt having cam-surfaces and carried by the plate, a hub rigid on the shaft adapted to engage said cam-surfaces to throw the bolt into and out of engagement with the projections on the casing 20 and sheave, and the sheave provided with said projections, substantially as described.

Witness my hand to the foregoing specification this 2d day of April, 1891.

MELVIN A. YEAKLEY.

Witnesses:

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N. L. McLANE.