

No. 685,377.

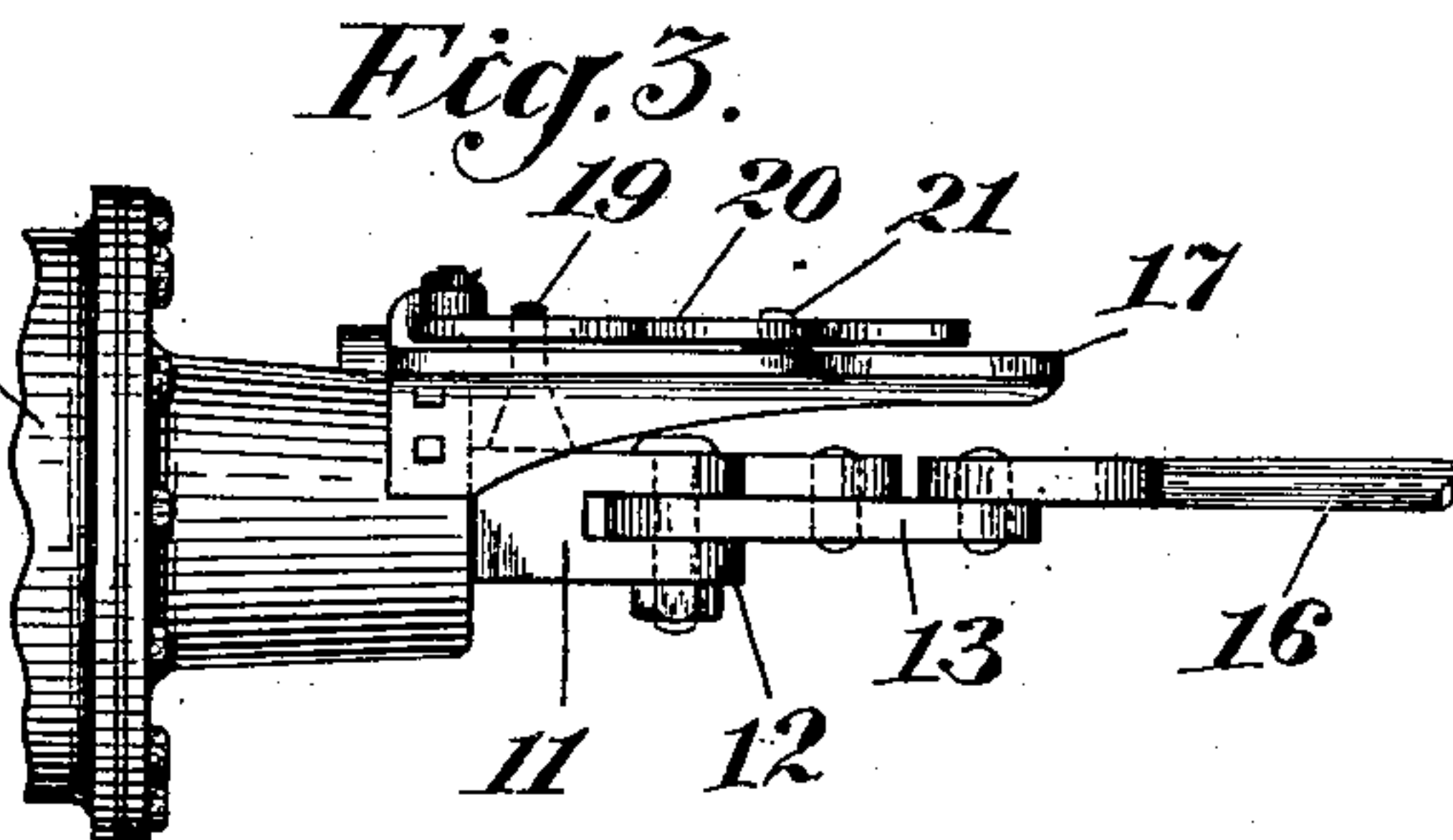
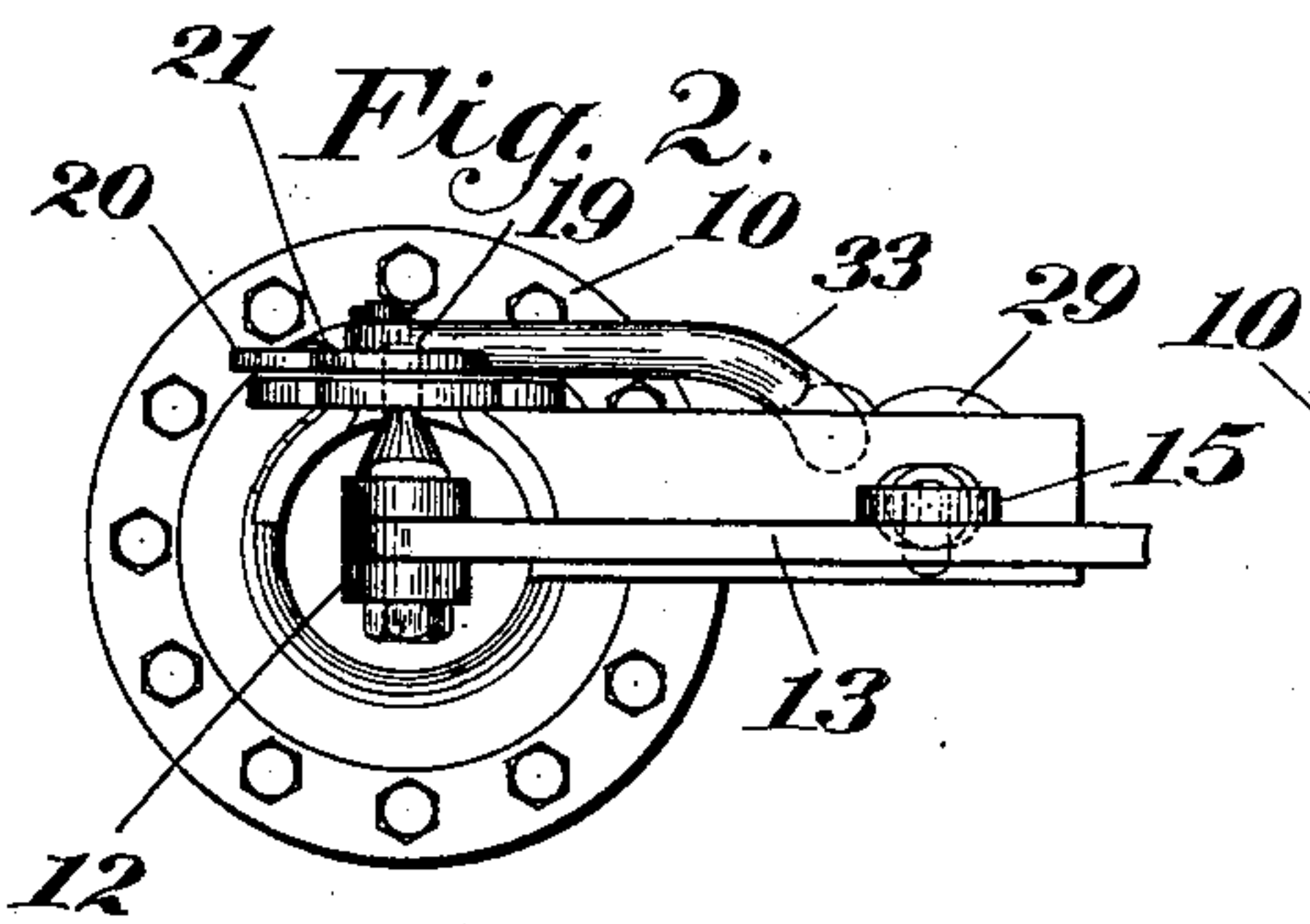
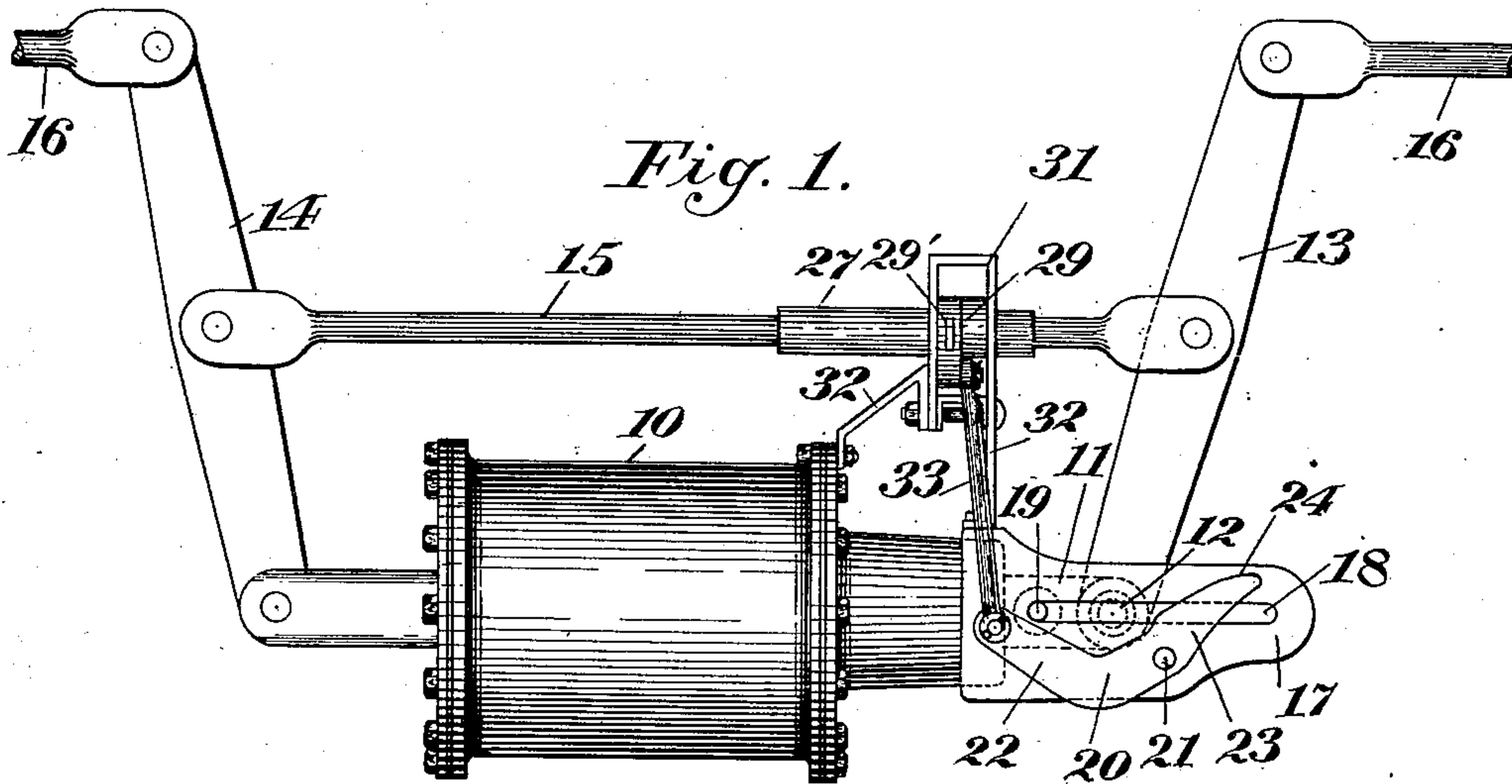
Patented Oct. 29, 1901.

S. J. JOHNSON.  
SLACK ADJUSTER FOR BRAKES.

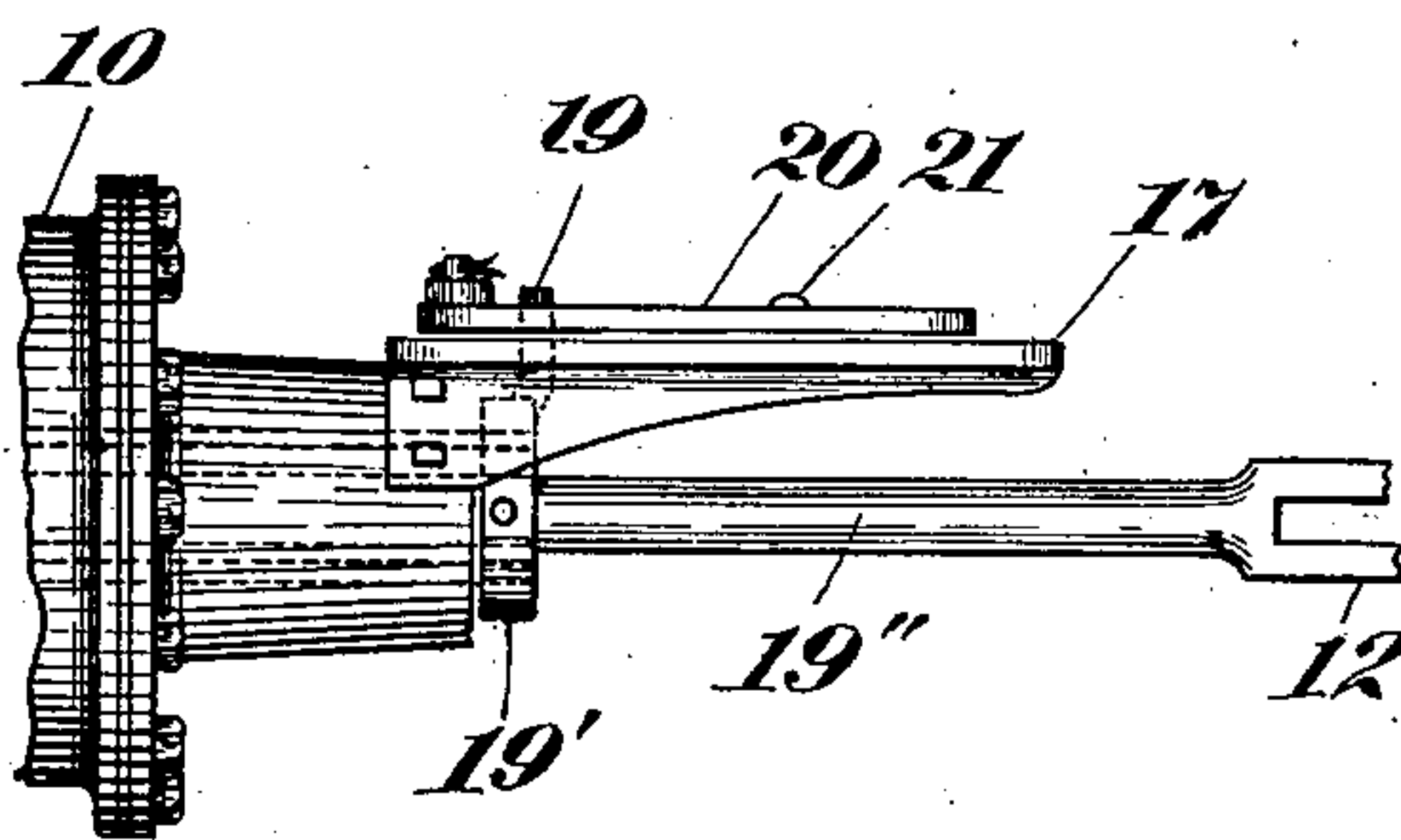
(Application filed Dec. 1, 1900.)

(No Model.)

2 Sheets—Sheet 1.



*Fig. 8.*



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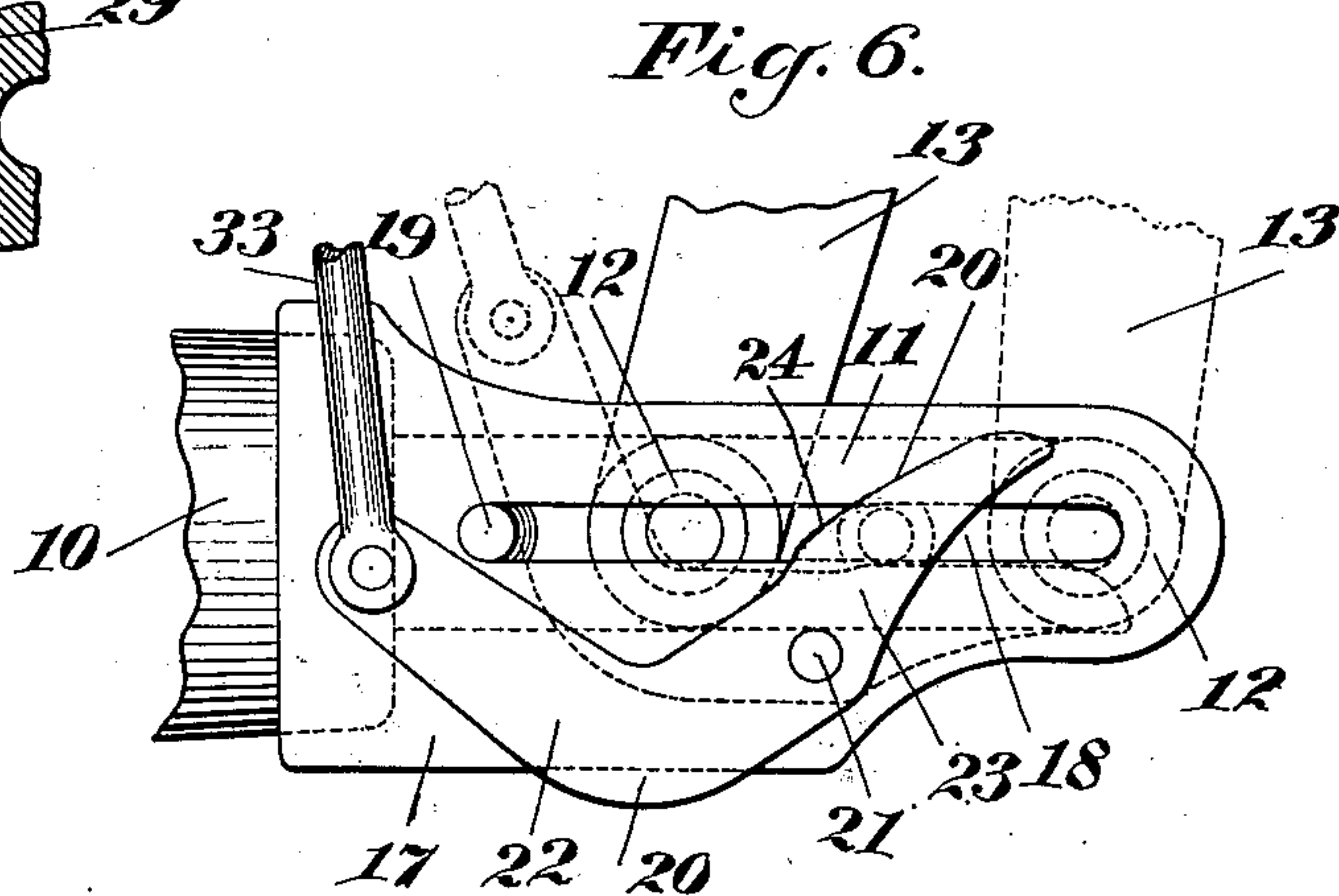
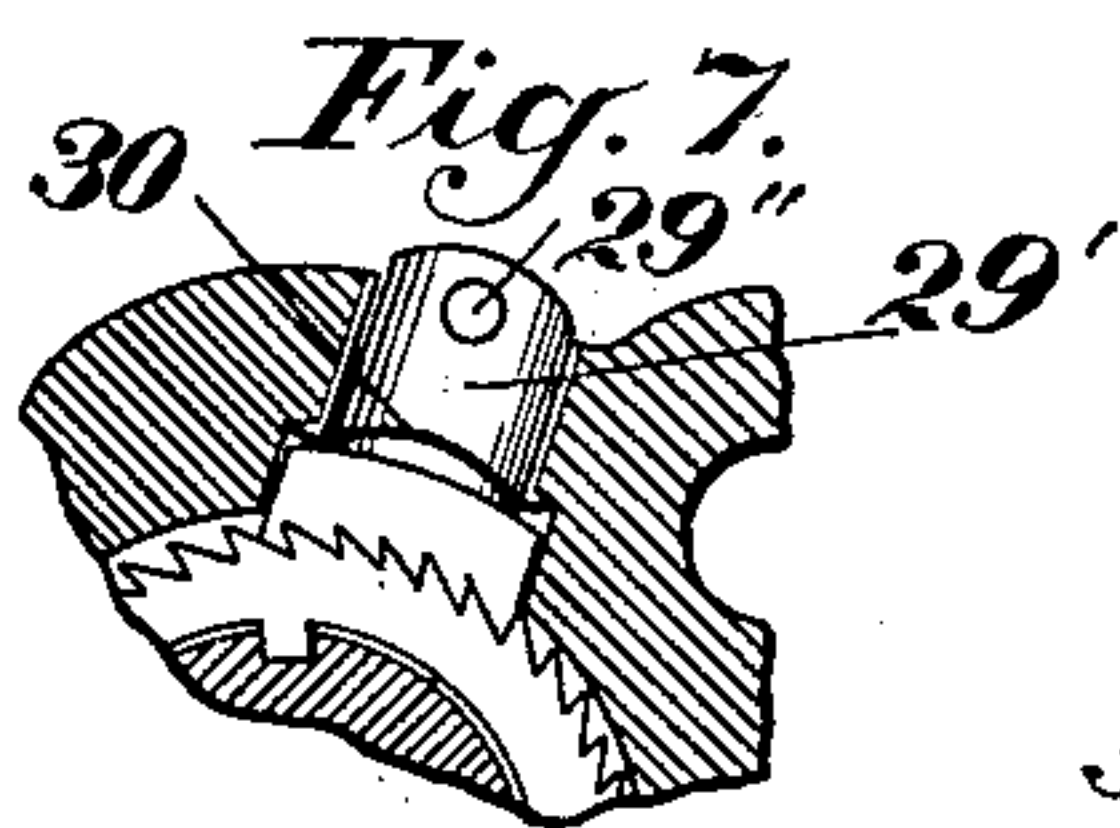
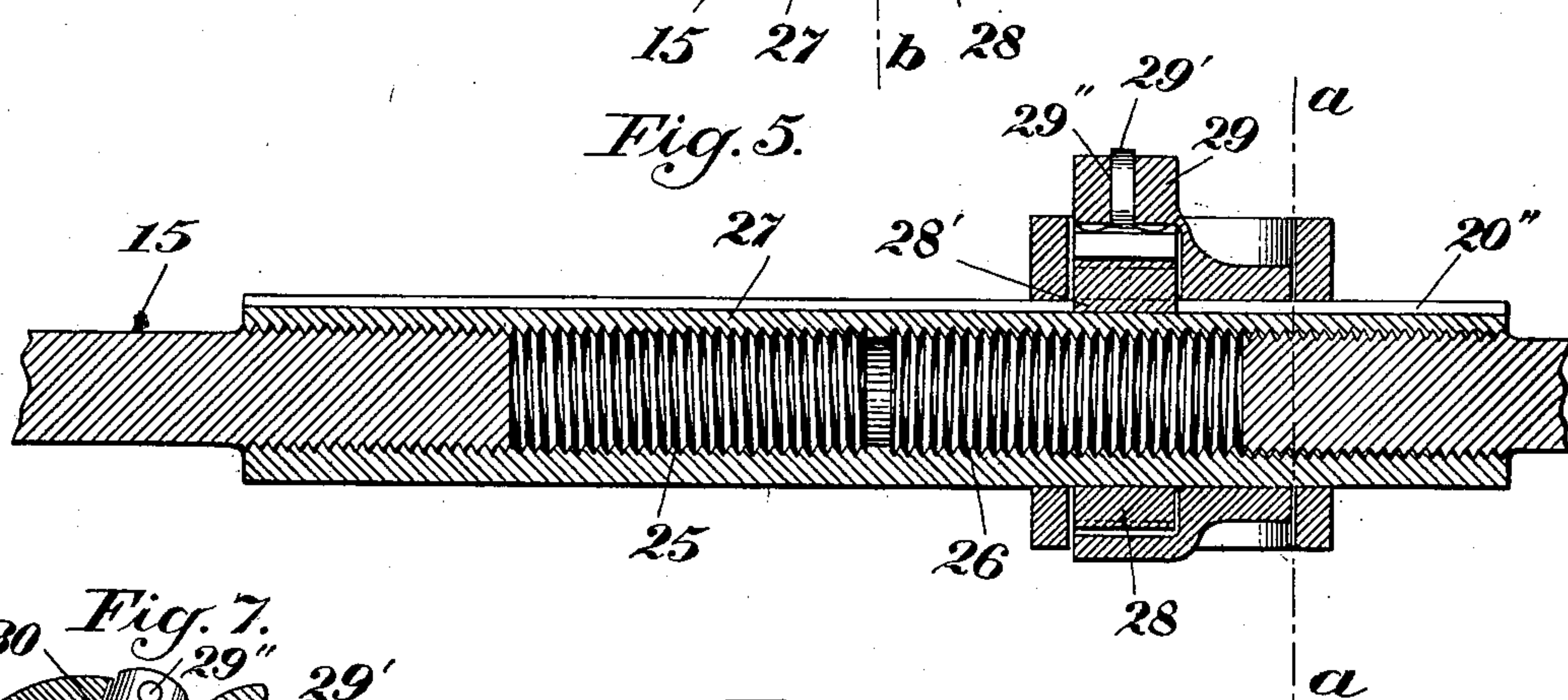
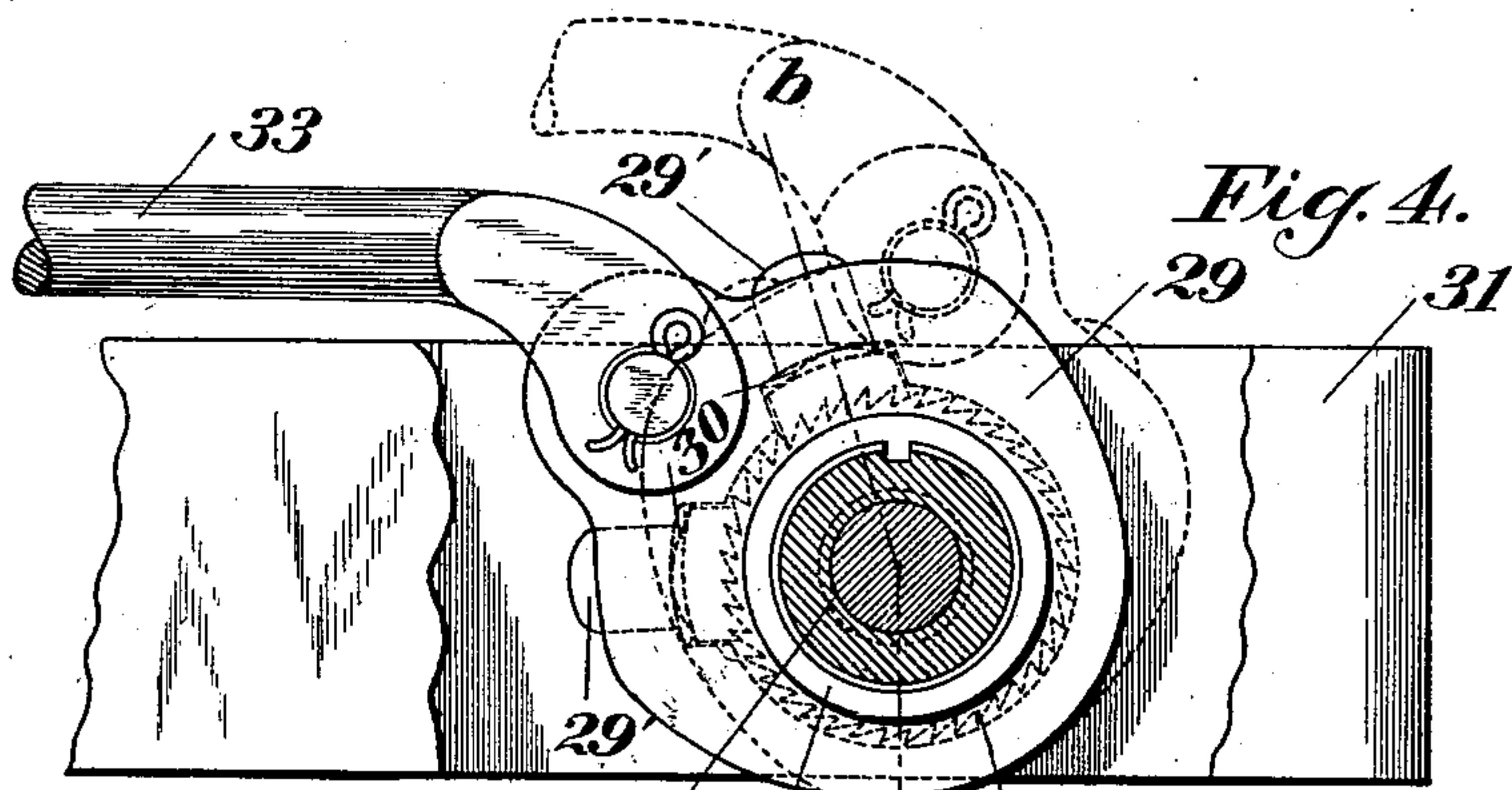
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(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

SINCLAIR J. JOHNSON, OF NUTLEY, NEW JERSEY.

## SLACK-ADJUSTER FOR BRAKES.

SPECIFICATION forming part of Letters Patent No. 685,377, dated October 29, 1901.

Application filed December 1, 1900. Serial No. 38,289. (No model.)

*To all whom it may concern:*

Be it known that I, SINCLAIR J. JOHNSON, a citizen of the United States, residing in Nutley, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Slack-Adjusters for Brakes, of which the following is a specification.

This invention relates to improvements in slack-adjusters for brake mechanism, being more particularly adapted for use in connection with air-brakes upon railway rolling-stock, and has for its object the provision of simple and efficient means for taking up the slack or space in the connections caused by the wear of the brake-shoes or other parts or by the springing of various members.

In the drawings accompanying this specification, Figure 1 is a plan view of slack-adjusting mechanism made according to the present invention, being shown with a brake-cylinder for passenger-cars and a portion of the brake connections therefor. Fig. 2 is an end elevation thereof. Fig. 3 is a side elevation of the right-hand portion of Fig. 1. Fig. 4 is a section of the ratchet mechanism on the line *a a* of Fig. 5. Fig. 5 is a section of the same on the line *b b* of Fig. 4. Fig. 6 is an enlarged plan of the actuating mechanism. Fig. 7 is an enlarged detail of a pawl, and Fig. 8 is a side elevation showing a connection between the piston member and the actuating device in the form of brake mechanism used for freight-cars.

Similar characters designate like parts in the different figures of the drawings.

As shown in Figs. 1 to 7 of the drawings, the numeral 10 designates a brake-cylinder, herein shown as of the type used in the well-known Westinghouse system upon passenger-cars, from which projects a piston-rod 11, carrying a cross-head 12, the piston, piston-rod, and its cross-head forming what is hereinafter termed the "piston member." To the cross-head a cylinder-lever 13 is pivoted in the usual manner. At the end of the cylinder is pivoted a lever 14, and a cylinder-lever rod 15 pivotally connects the two levers together. From the outer ends of the levers 13 14 lead rods 16 16, furnishing connection with the brakes.

To the brake-cylinder or the head thereof, in proximity to and at one side of the piston-

rod, is secured a plate or support 17, having a slot 18, through which extends a pin or projection 19, here shown as mounted directly upon the cross-head, but which might be connected to the piston member in other ways. Upon the support 17, conveniently situated upon the opposite side from the cross-head, a lever, shown in this case as bent, (designated as a whole by 20,) is fulcrumed upon a pin 21, which is fixed relatively to all movable portions of the brake mechanism. This lever, which serves as a movable but non-flexible actuator for mechanism to be hereinafter described is formed with a bent portion 22, which lies clear of the slot 18, out of contact with the pin on the cross-head during its normal range of movement in the operation of setting the brakes, and a portion 23, forming the other arm, extending across the slot. The arm 23 has upon the edge toward the pin 19 a cam-surface 24, which may be formed with a short abrupt incline where it first crosses the slot-opening, and then with a more gradually-inclined surface of sufficient length to reach approximately the outer end of the slot.

A portion of the brake connections, preferably the cylinder-lever rod, is divided, its two portions at their adjacent ends being provided with right and left hand screw-threads 25 26, respectively, these preferably being near the end of the cylinder through which the piston-rod projects. The sections of the rod are connected by a correspondingly-threaded sleeve 27, which has attached to it a collar 28, having ratchet-teeth upon its edge, the collar being held by a projection 28', fitting in a longitudinal groove or way 20'' to turn with the sleeve, while the latter is permitted to slide through it. Surrounding sleeve 27 and turning loosely thereon, and also having a portion extending over the collar 28, is a collar 29. In recesses in the latter is situated one or more sliding pawls 29' (here shown as two in number) to secure engagement upon comparatively slight movement, which may be pressed against the ratchet-teeth by a spring 30, which rests in an enlarged portion of each recess and against a like portion of the pawl. The pawls are here shown as extending through the collar and each provided with an opening 29'', by which it may be drawn out of contact with



the ratchet-teeth, if desired. To retain the collars 28 29 against movement along the sleeve, they preferably have about them a retaining-frame 31, supported by arms 32 32 from the brake-cylinder. The collar 29 may have an enlargement at one side, and to this is pivoted a connecting-rod 33. This also has pivotal connection with the actuating-lever 20 at or near its inner end to oscillate the collar.

In the operation of this device the pin connected to the cross-head during the normal travel of the piston before the parts become worn or sprung moves between the inner end of the slot and the arm 23 of the lever and in the space between this arm and the other arm 22. When wear of the parts causes the brake-shoe to be held farther from the wheel in its off position, so that a longer stroke of the piston is necessary to bring the two together, the pin 19 in its increased travel on the application of the brakes comes in contact with the inclined cam-surface of the lever. This quickly presses the arm 23 outward, and therefore the bent arm inward, the parts assuming the position shown in dotted lines in Fig. 6. By means of the connecting-rod this movement of the lever turns the collar 29 to the position shown in dotted lines in Fig. 4, the pawls sliding loosely over the ratchet-teeth in this direction. Then when the brakes are released and the piston-rod is forced back by its spring the pin moving through the slot until it comes in contact with the arm 22, which now lies across the path of the pin, and pressing it downward returns the lever to substantially its original position, and thus turns the collar 29 in the opposite direction. In this movement the ratchet-teeth are engaged by the pawls, and as a result the collar 28 is rotated, turning the threaded sleeve with it and shortening the rod 15, thus taking up slack. By varying the length of the cylinder-lever rod rather than some other portion of the brake connections a symmetrical adjustment of the mechanism on both sides of the brake-cylinder is effected.

Although the form of actuating-lever shown is a convenient one to effect the desired result, it might be widely varied and still make the proper contact with a projection carried by the piston member.

It will be seen that the action of the adjuster in taking up slack comes at a time when the parts are relaxed, so there will be little strain or friction in the rotating mechanism for varying the length of the cylinder-lever rod and also that the action of the actuating mechanism is intermittent, it only coacting with the piston member at times when adjustment of the slack is to be effected.

By mounting the supporting and retaining elements directly upon the cylinder, as shown, a correct relative positioning of the various

parts is assured, they not being subjected to changes which might result from sagging or like movements if secured, for example, to the car-body.

In the use of the invention with a freight brake mechanism, as illustrated in Fig. 8, the arrangement may be substantially the same as that just described, except that the projection 19 may be conveniently made upon a collar 19', which is fastened in any desired way upon the end of the tubular piston-rod, the push-rod 19" extending loosely through it. Here, however, the term "piston member" includes only the piston and piston-rod, the cross-head being carried by the push-rod and not rigidly connected to the piston member.

Having described my invention, I claim—

1. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection between the piston member and the brake mechanism; a threaded portion surrounding the same; means for rotating one of the threaded elements; a movable member adapted to be intermittently operated during the travel of the piston member; and a connection therefrom to the rotating means.

2. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection between the piston member and the brake mechanism; a threaded portion surrounding the same; oscillating means for rotating one of the threaded elements; a movable member adapted to be intermittently operated during the travel of piston member; and a connection therefrom to the rotating means.

3. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection between the piston member and the brake mechanism; a threaded portion surrounding the same; ratchet mechanism for rotating one of the threaded elements; a movable member adapted to be intermittently operated during the travel of piston member; and a connection therefrom to the ratchet mechanism.

4. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection with the brake mechanism; a threaded portion surrounding the same; means for rotating one of the threaded elements; a lever fulcrumed at a point fixed relatively to the piston member and adapted to be operated thereby when the travel of said piston member exceeds the normal; and a connection therefrom to the rotating means.

5. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection with the brake mechanism; a threaded portion surrounding the same; means for ro-



tating one of the threaded elements; a movable member supported upon the cylinder adjacent to the piston member and adapted to be operated thereby; and a connection therefrom to the rotating means.

6. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the position of a portion of said brake connections; and an actuator therefor movable about a fixed point and adapted to be operated by the piston member during each half of its stroke when the travel exceeds the normal.

7. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and an actuator therefor movable about a fixed point and adapted to be operated by the piston member during each half of its stroke when the travel exceeds the normal.

8. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and a movable actuator therefor adapted to be operated by the piston member only when the movement thereof exceeds its normal amount.

9. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and a movable actuator therefor formed with a space through which an element operated by the piston member may move during its normal travel; and a surface with which it contacts when the travel exceeds the normal.

10. The combination, with a brake-cylinder, a piston member and brake connections, of a mechanism for varying the length of a portion of said brake connections; and a movable actuator therefor, which is movable only when it acts upon the length-varying mechanism.

11. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and a movable actuator therefor, which is movable only when it acts upon the length-varying mechanism.

12. The combination, with a brake-cylinder, a piston member and brake connections, of a mechanism for varying the length of a portion of said brake connections; and a normally stationary lever for actuating same.

13. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and a normally stationary lever for actuating same.

14. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; and a lever fulcrumed intermediate its ends

to a support mounted upon the cylinder for actuating said rotating means.

15. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism varying the length of a portion of said brake connections; and a lever fulcrumed intermediate its ends to a support mounted upon the cylinder for actuating said rotating means.

16. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connection; and a bent lever for actuating same, both arms of which are separately operated upon by the piston member.

17. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; a projection carried by the piston member; and a movable member intermittently contacting therewith for actuating said rotating means.

18. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating mechanism for varying the length of a portion of said brake connections; a support provided with a slot through which an element operated by the piston member projects; and a movable actuator for the rotating mechanism carried by the support and normally extending across the slot.

19. The combination, with a brake-cylinder, a piston member and brake connections, of a rotating member for varying the length of a portion of said brake connections; a support provided with a slot into which an element operated by the piston member projects; and a lever fulcrumed to the support and having one arm normally extending across the slot.

20. The combination, with a brake-cylinder, and a piston member, of a divided rod forming a part of the connection with the brake mechanism and having its adjacent ends oppositely threaded; a correspondingly-threaded sleeve engaging said ends; and means through which the sleeve may move longitudinally for rotating it in one direction operated by the piston member.

21. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection with the brake mechanism; a threaded sleeve thereon; a collar loose upon said sleeve and fixed against longitudinal movement, provided with means adapted to rotate the sleeve in one direction; and means operated by the piston member for oscillating said collar.

22. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection with the brake mechanism; a threaded sleeve thereon; a collar loose upon said sleeve provided with means operated by



the piston member to rotate the sleeve in one direction; and a fixed retaining-frame surrounding said collar.

23. The combination, with a brake-cylinder and a piston member, of a rod having a threaded portion and forming a part of the connection with the brake mechanism; a threaded sleeve thereon; a collar loose upon said sleeve provided with means operated by the piston member to rotate the sleeve in one direction; and a retaining-frame supported upon the cylinder surrounding said collar.

24. In a slack-adjuster for brakes, the combination, with a brake-cylinder and a piston member, of a connecting-rod actuated by said piston member to operate the brakes; means of varying the length of said rod to take up slack; and non-flexible actuating means therefor adapted to be moved about a fixed point by the piston member and in opposite directions.

25. In a slack-adjuster for brakes, the combination, with a brake-cylinder and a piston member, of a connecting-rod actuated by said piston member to operate the brakes; means for varying the length of said rod to take up slack; and a movable lever for actuating the same fulcrumed with one arm in the path of an element operated by the piston member.

26. In a slack-adjuster for brakes, the combination, with a brake-cylinder and a piston

member, of a connecting-rod actuated by said piston member to operate the brakes; a threaded connection for varying the length of said rod to take up slack; and non-flexible means for turning said threaded connection adapted to be moved about a fixed point by the piston member and in opposite directions.

27. In a slack-adjuster for brakes, the combination, with a brake-cylinder and a piston member, of a connecting-rod actuated by said piston member to operate the brakes; a threaded connection for varying the length of said rod to take up slack; a ratchet mechanism held against bodily movement carried by said threaded connection actuated by means adapted to be moved by the piston member.

28. In a slack-adjuster for brakes, the combination, with a brake-cylinder and a piston member, of a connecting-rod actuated by said piston member to operate the brakes; a threaded connection for varying the length of said rod to take up slack; a ratchet mechanism carried by said threaded connection actuated by means adapted to be moved by the piston member; a support for said movable means; and a retaining device for the ratchet mechanism mounted upon the cylinder.

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