

H. C. WILLIAMSON.
CIRCUIT CLOSER.
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924,123.

Patented June 8, 1909.

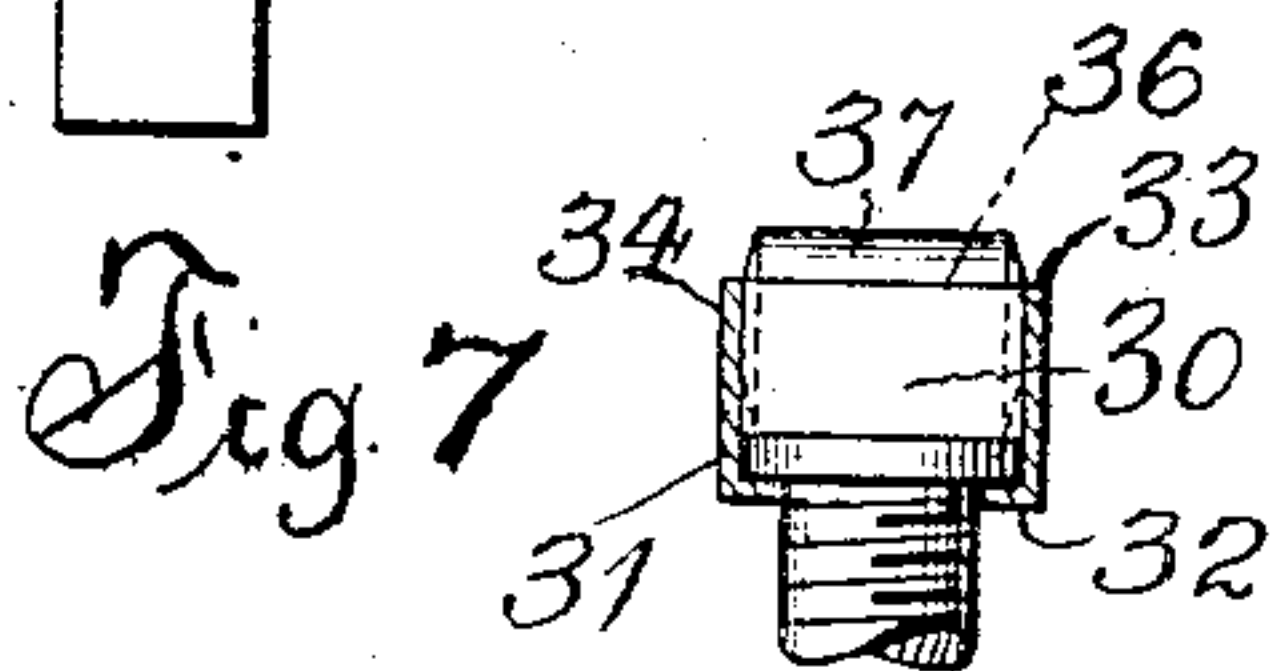
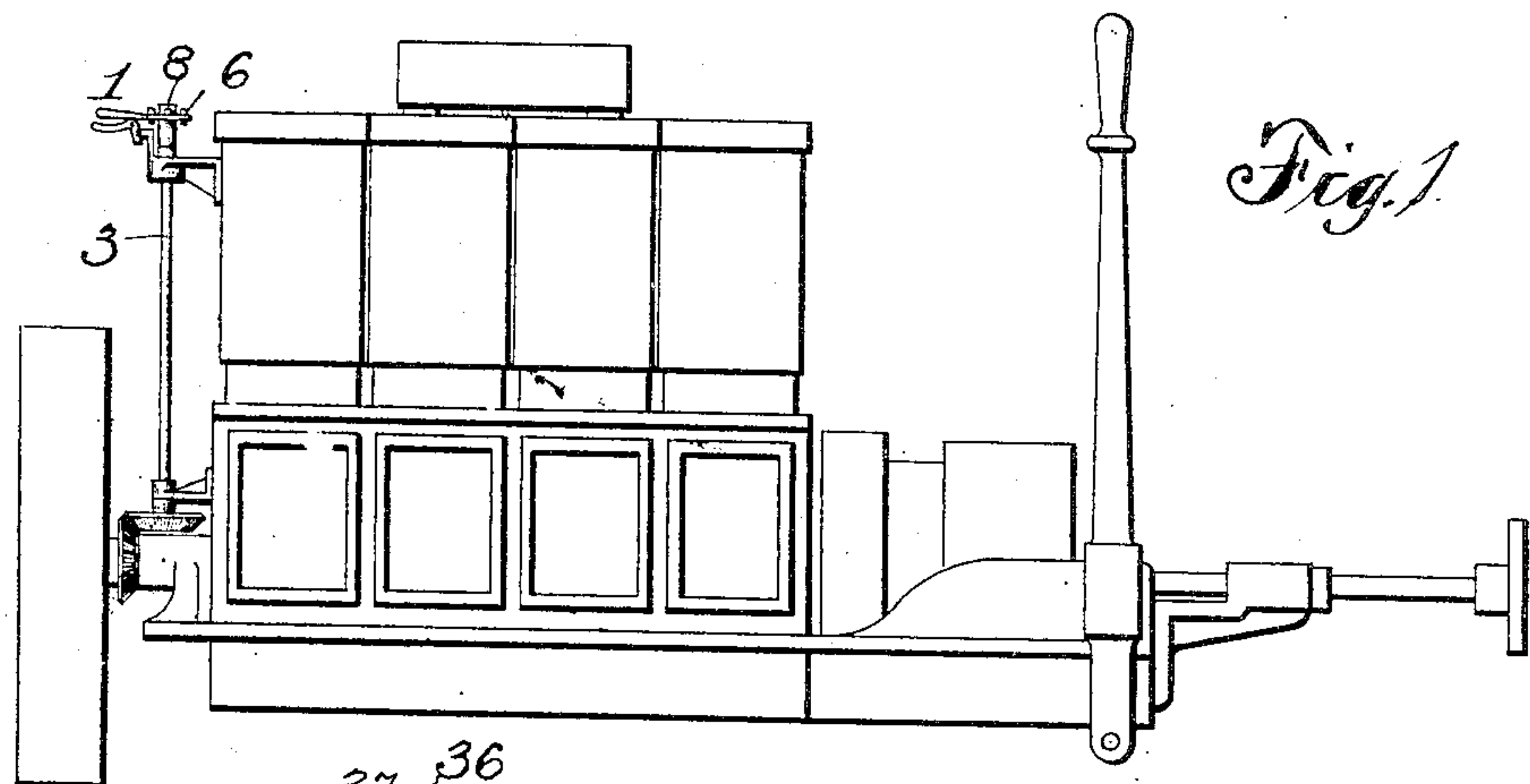


Fig. 2

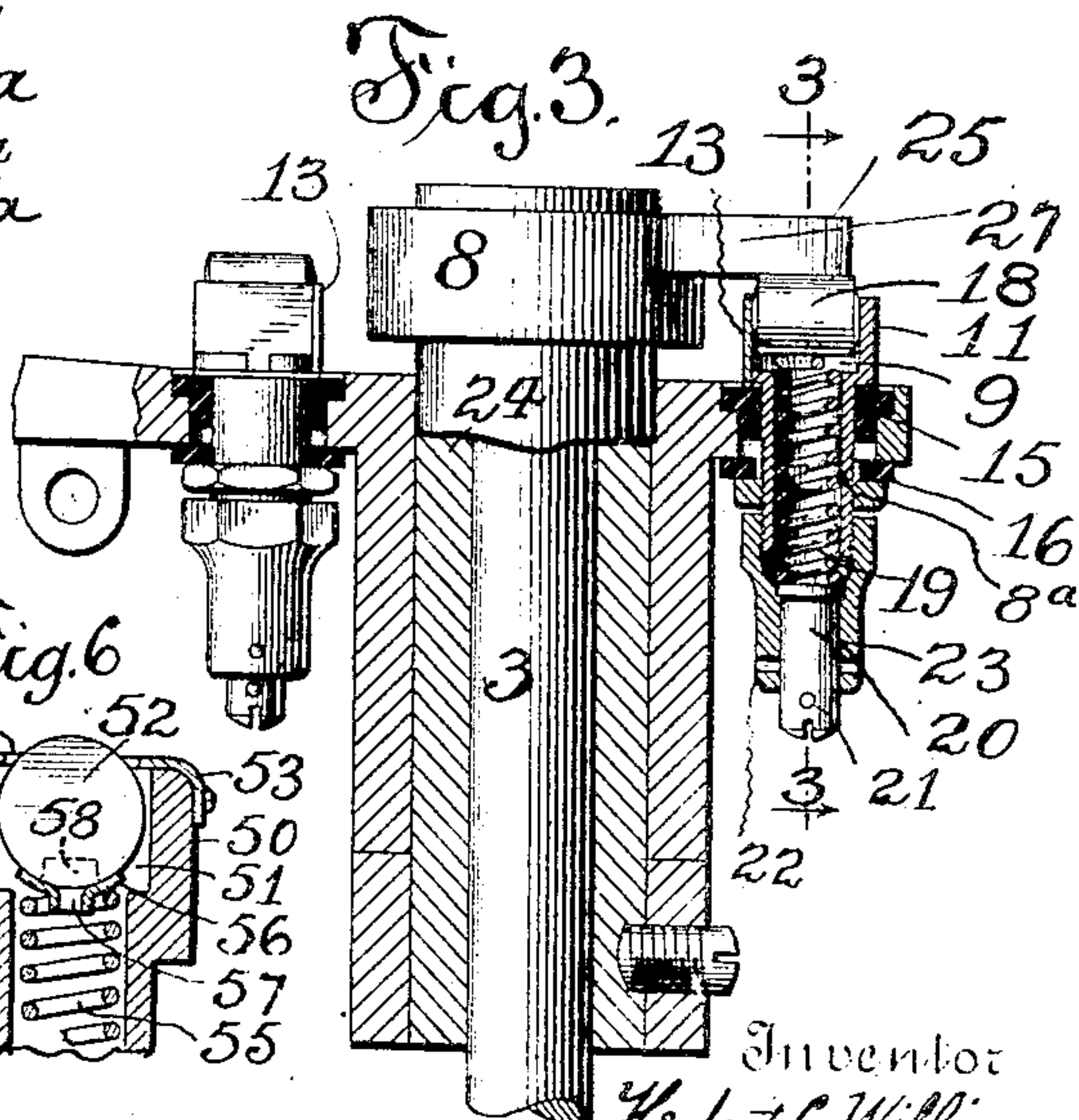
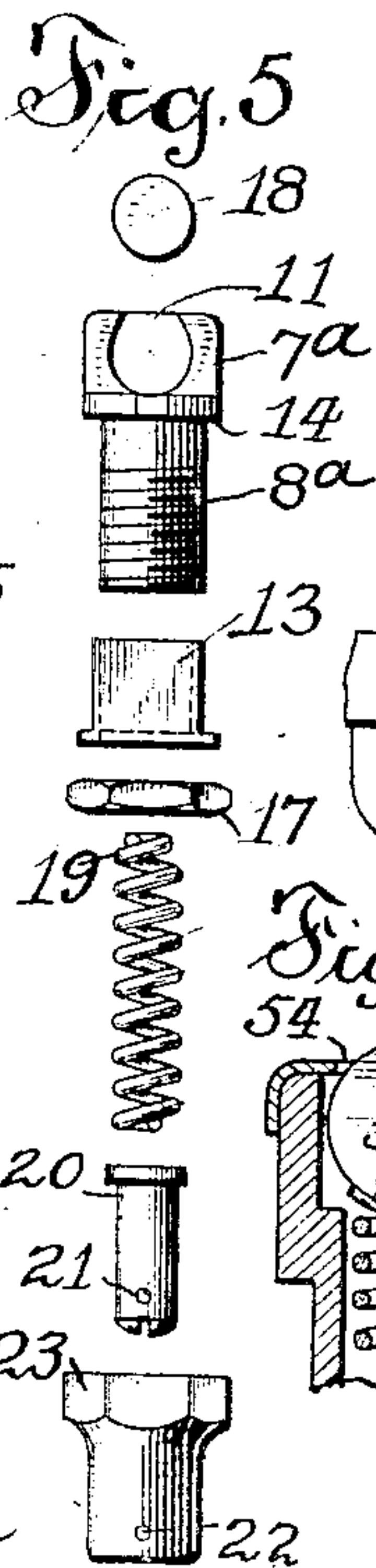
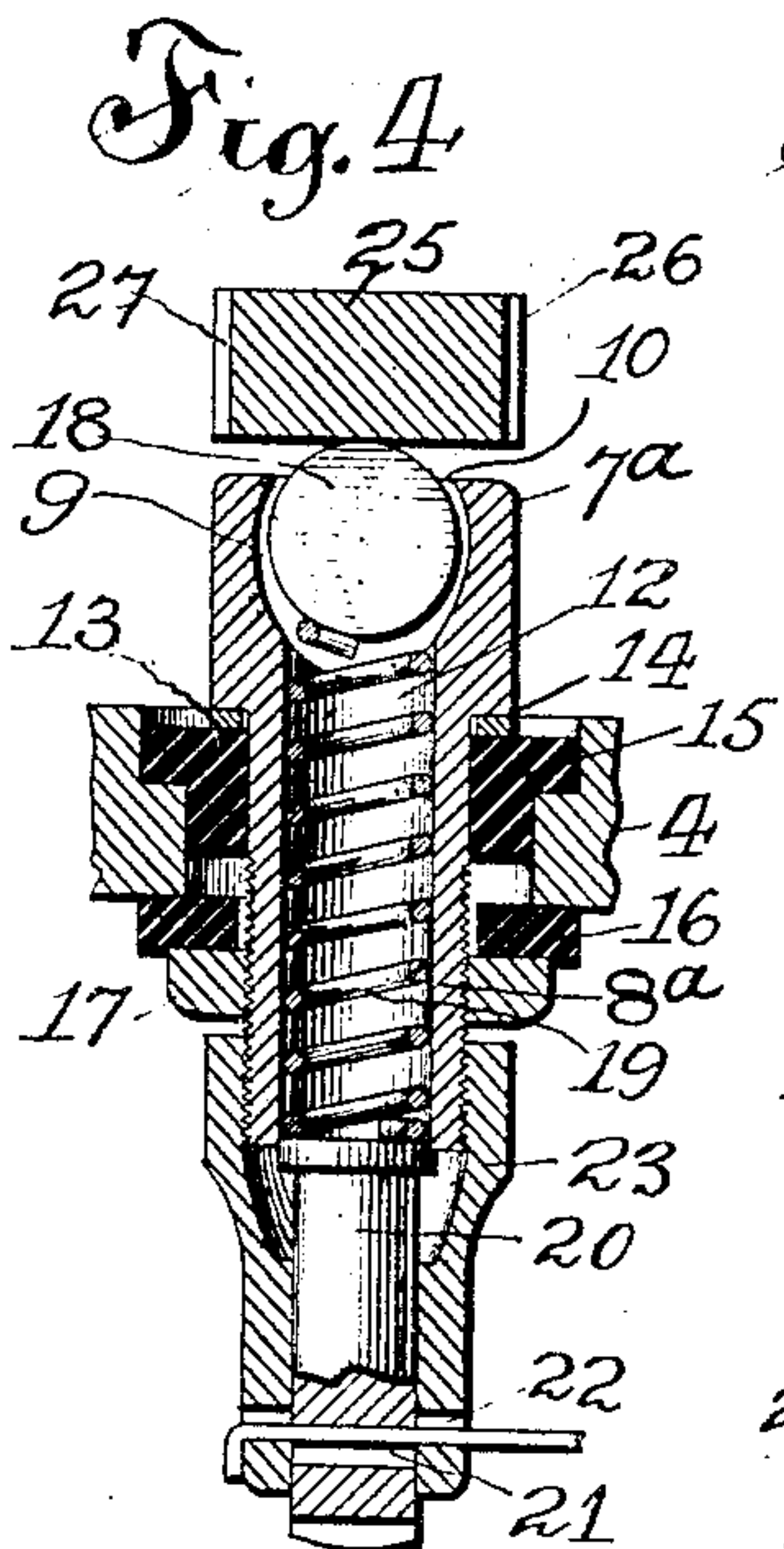
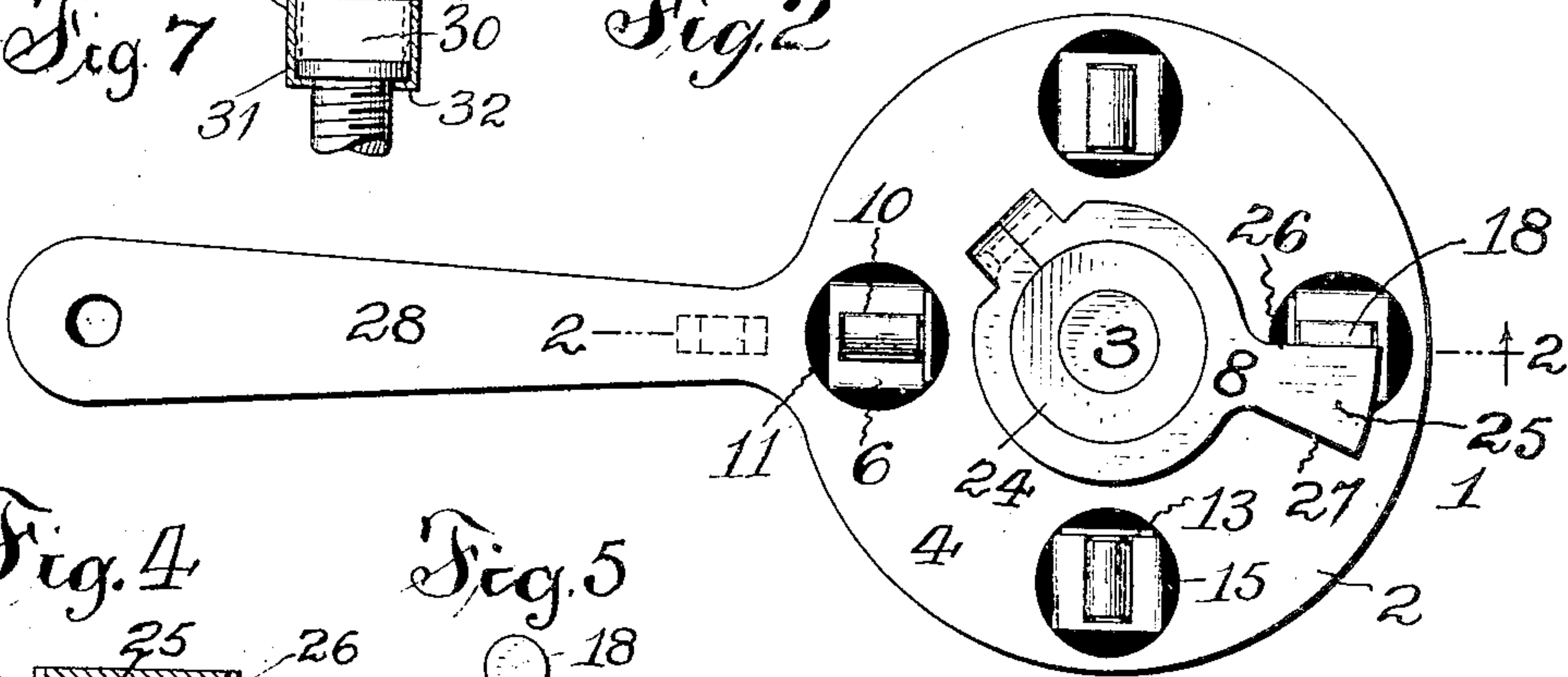
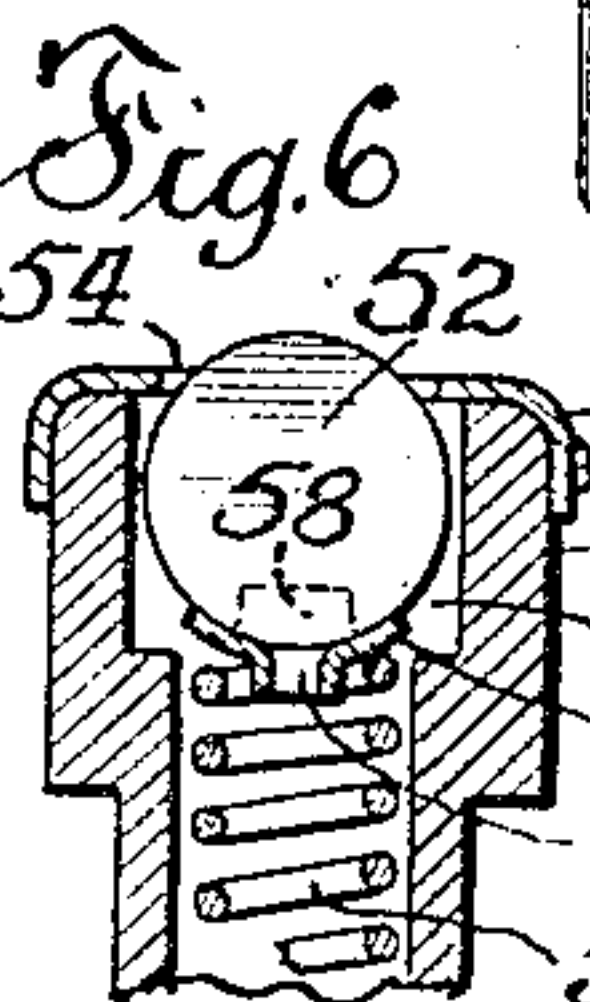


Fig. 6



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UNITED STATES PATENT OFFICE.

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CIRCUIT-CLOSER.

No. 924,123.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERBERT C. WILLIAMSON, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, (whose post-office address is Worcester, Massachusetts,) have invented certain new and useful Improvements in Circuit-Closers, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates to a circuit closer or what is commonly known as a distributor for directing the flow of an electric current in a predetermined manner.

It relates more particularly to such a device as applied to the ignition systems of gas engines.

The objects of the invention are to provide a very simple, compact and positive mechanism by which the igniter or other electrical system may be controlled with precision.

A further object is to secure a device in which the contacting parts will operate with a minimum of friction and with little or no liability of arcing of the circuit and consequent pitting of the contact members.

A still further object is to provide adjustable means to compensate for wear or setting of the parts.

Referring to the drawings:—Figure 1 is a general view illustrating the device. Fig. 2 is a detailed plan view of the circuit closer. Fig. 3 is a sectional view through the parts shown in Fig. 2 on the line 2—2. Fig. 4 is a detailed sectional view in elevation of one of the binding posts and its contact on enlarged scale and in section on the line 3—3 of Fig. 3. Fig. 5 is a detail view illustrating the various parts of one of the contact devices unassembled. Fig. 6 is a sectional view showing a slightly modified form of contact device. Fig. 7 is a modified construction of head-piece.

It has been common practice in circuit closers for gas engines to provide a rotary contact member adapted to cooperate with a number of stationary contacts; said rotary member acting as a distributor to divert the current of electricity at predetermined instants to the various cylinders of the engine where a spark plug having fixed terminals serves to fire the charge in the cylinder as the circuit is closed by the circuit closer. In such devices difficulty has been encountered

in securing a sufficient contact to properly transmit the electric current. A still further difficulty has resulted from the arcing and pitting of the contacts and undue wear of the parts.

It is one of the principal objects of the present invention to provide an arrangement in which there will be little or no appreciable wear and in which such wear may be compensated for by proper adjustments. It is also intended to provide instead of a "point" or minimum contact surface a maximum surface both in making and disrupting the circuit.

In the accompanying drawings, the numeral 1 denotes the circuit closer which is, of course, properly located with reference to the engine or other device in connection with which it is used. When used upon an engine, its base plate 2 is suitably mounted to be rotated with reference to an actuating shaft 3. The base plate 2 as shown herein, comprises a plate section 4 provided with openings in which are seated the relatively stationary contacts 6. This base plate has an extended hub providing a long bearing for a movable contact 8 which is secured to and rotates with the driving shaft or spindle 3.

The stationary contacts 6 comprise a box-like head piece 7^a, having a screw threaded shank 8^a; the latter extending through the plate 4. The heads of these contact boxes are bored as at 9 from one end and an opening 10 extends from the main bore 9 through the exterior of the box leaving an end wall 11 integral with said box. The screw threaded shank 8^a is also bored as at 12, this bore connecting the exterior of the shank with the interior opening 9.

The open end of the bore 9 is closed by a plate 13, the bottom of which encircles the head piece and is clamped between a shoulder 14 and an insulating bushing 15; an insulating washer 16 is arranged upon the lower side of the plate and a nut 17 screwed upon the tubular shank 8 secures the parts firmly in place.

Arranged within the bore 9 and with its surface projecting through the opening 10 is a contact roll 18; and when the contact boxes are assembled upon the plate 4, these rolls have their axes disposed radially of said plate or disk 4 with their surfaces projecting above the surface of the box-like members 7. The rolls are resiliently held

in this projecting position by springs 19, the lower ends of which abut against contact plugs 20 provided with perforations 21 adapted to register with openings 22 in screw threaded nipples 23 which are screwed upon the tubular shanks 8.

The openings 21—22 serve as a convenient clamp by which the line wires may be secured to the stationary contact members and provide, through the medium of the springs 19, a resilient clamp permitting ready removal or insertion of the line wires.

Centrally arranged with reference to the plate 4 and its stationary contacts above described, is the movable contact 8. This comprises a tubular shaft member 24 having a bearing in a central opening of the plate 4 and its hub 7, and having at its upper end an extended contact piece 25. This contact piece is preferably mounted upon the sleeve 24 in such manner that it may be adjusted about said sleeve or vertically with reference thereto as indicated in the drawings; and its outer edges 26—27 are of somewhat peculiar form. The outer edges 26—27 are arranged upon radial lines with reference to the center of the shaft and, as a consequence, the contact piece 25 as it revolves engages and disengages the contact rolls 18 on lines extending the entire length of said rolls. This provides a large surface of contact engagement and disengagement and, of course, as the body of the contact piece 25 passes over the surface of the rolls, this large contact line is maintained. A close contact is secured by the pressure of the springs 19, and the rolls are, of course, rotated constantly offering a new surface for the engagement of the rotary member 25. Of course, it is understood that the tubular shaft 24 is connected in proper relation with the main shaft of the engine and, as it rotates, the proper circuit connections are made for the various cylinders through the contact rolls and the movable contact 25.

In using the device on engines, it is, of course, necessary to advance or retard the instant of ignition at the spark plug terminals which are arranged within the cylinders. A convenient means for securing such an adjustment is provided by loosely mounting the disk 4 and hub 7 upon the tubular shaft 24. A lug or arm 28 projects from one side of the disk and through this arm and suitable connections, the plate 4 may be rotated to bring the contact rolls 18 into engagement with the rotating contact arm 25 at varying intervals with reference to the rotation of said arm 25. Of course, it is understood that the arm 25 is constantly rotating.

In Fig. 7 there is shown a modified form of contact device in which the box-like member 30 is bored from end to end. In this case a shield 31 is used, having a perforated

base 32 with oppositely upturned ends 33—34 which serve as a closure for the ends of the bore 36 in the heads 30, and retain the contact rolls 37 in proper position.

In Fig. 6 there is shown a slightly modified form of device in which the head-piece 50 is milled through as at 51 to provide the recess for the roll 52. Covering the recess 51 is a plate 53 properly secured to the head 50 and with a slot 54 through which the surface of the roll may project. The roll 52 is held up to its work by the spring 55 as in the preferred form of the device above described. At its upper end there is interposed between it and the roll, a sheet metal seat 56. This seat piece has a curved surface to conform to the surface of the roll and a downwardly extending boss 57 which coöperates with the spring to hold the parts in proper relative position. The ends of the seat piece are stamped up as at 58, to prevent longitudinal movement of the roll.

Obviously, the details of the device might be varied to a considerable extent without departing from the spirit or intent of the invention and various forms of circuit closers might be used. It is also apparent that the device is not limited in its application to a gas engine and might be used in connection with electrical devices of any nature where a circuit closer is necessary.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a circuit closer in combination, a supporting disk, insulated contact supports mounted thereon, resilient contact members mounted in said supports and with their lines of contact and their axes extending radially of the supporting disk from a common center, and a rotary contact concentrically arranged with reference to the stationary contacts and provided with a contact arm having its edge of engagement and disengagement arranged radially of its center of rotation and co-incident with the radial lines of the resilient contact members.

2. In a circuit closer in combination, a supporting plate, a rotary contact shaft concentrically journaled therein and provided with a contact arm having its edge radially disposed with reference to its center of rotation, a coöperating contact member mounted upon the supporting disk, said contact being of cylindrical form with its axis disposed radially with reference to said disk and the center of rotation of the movable contact said cylindrical contact lying with its axis in a plane parallel to the disk and means for securing a resilient action between the contact members.

3. In combination in a circuit closer, a disk having a hub, said disk and hub rotarily mounted upon a supporting shaft, a movable contact member concentrically arranged to rotate with reference to the disk, and cylin-

dricul contacts mounted upon the disk and with their axes radially disposed with reference thereto and with reference to the rotary contact member said cylindrical contacts arranged with their axes in a plane parallel to the plane of the disk and the rotary contact member adapted to engage said cylindrical contacts and having its opposite edges disposed radially from the center of the disk.

4. In combination in a circuit closer comprising a movable supporting disk and a rotary contact member centrally mounted with reference thereto, a series of cylindrical contacts concentrically arranged with reference to the rotary contact member and with their axes extending radially from the center of the disk and lying in a plane parallel therewith, each contact comprising a retaining head, a tubular shank projecting therefrom through the supporting disk, means for attachment of a line wire thereto, a cylindrical contact retained in said head and a

resilient cushion intermediate said contact and the means of attachment for the line wire.

5. In combination in a circuit closer, a rotatable contact plate, cylindrical contacts mounted thereon with their axes extending radially from the center of the contact plate and lying in a plane parallel with said plate, a rotary contact member concentrically arranged with reference to said plate and cylindrical contacts and having an engaging and disengaging surface arranged to intimately engage the stationary contacts along an entire element of their surface, and means for securing an adjustment of said rotary contact member with reference to the co-operating contacts.

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