

L. T. RHOADES.
CURRENT CONTROLLING MECHANISM FOR INTERNAL COMBUSTION ENGINES.
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955,204.

Patented Apr. 19, 1910.

Fig. 1

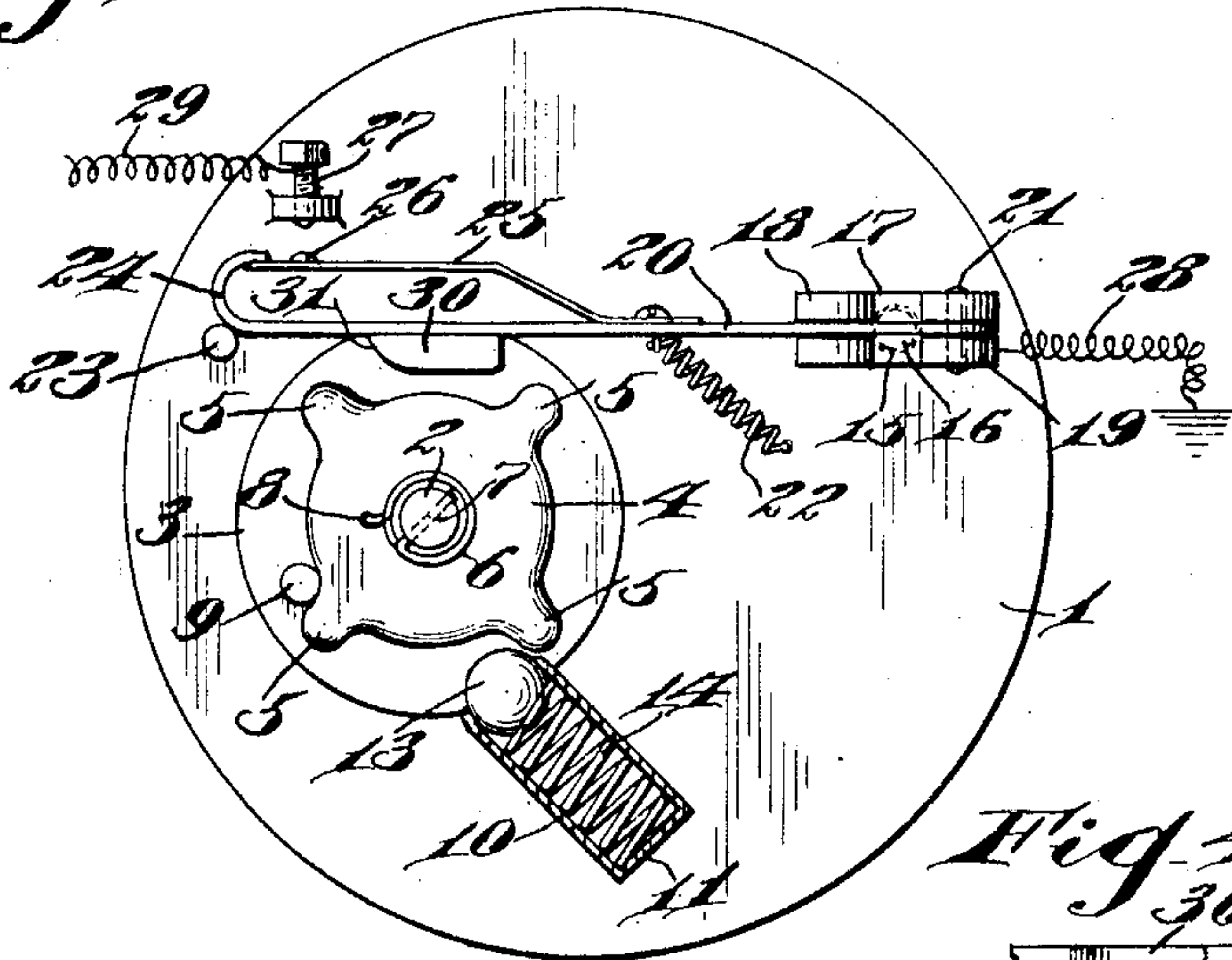


Fig. 4

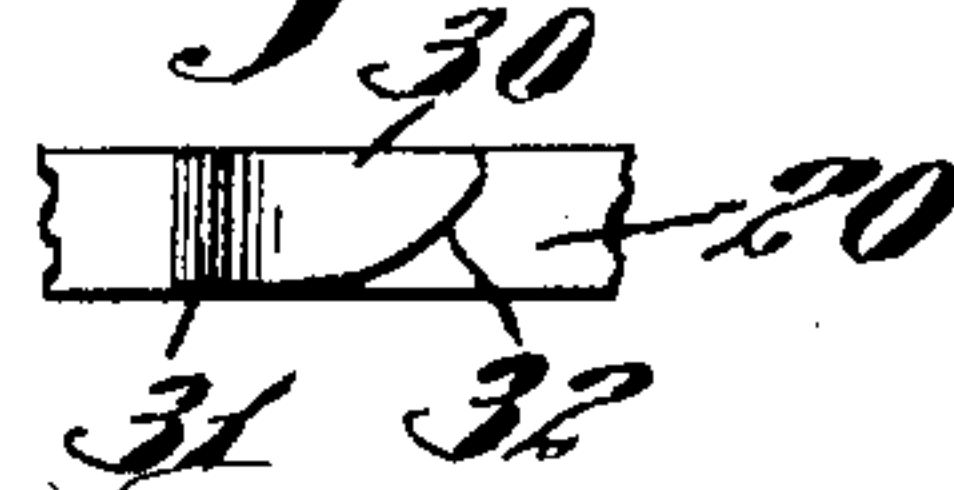


Fig. 2

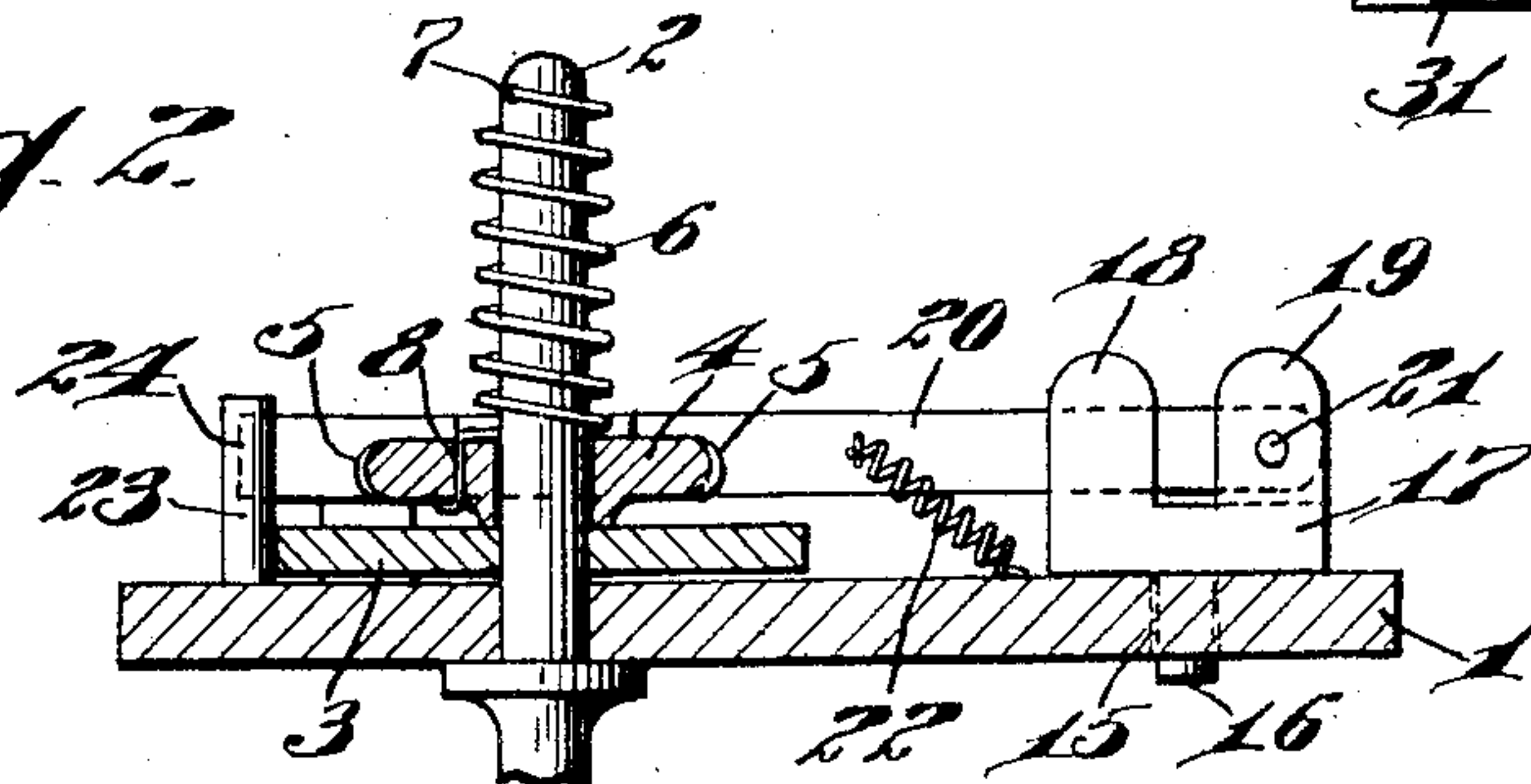
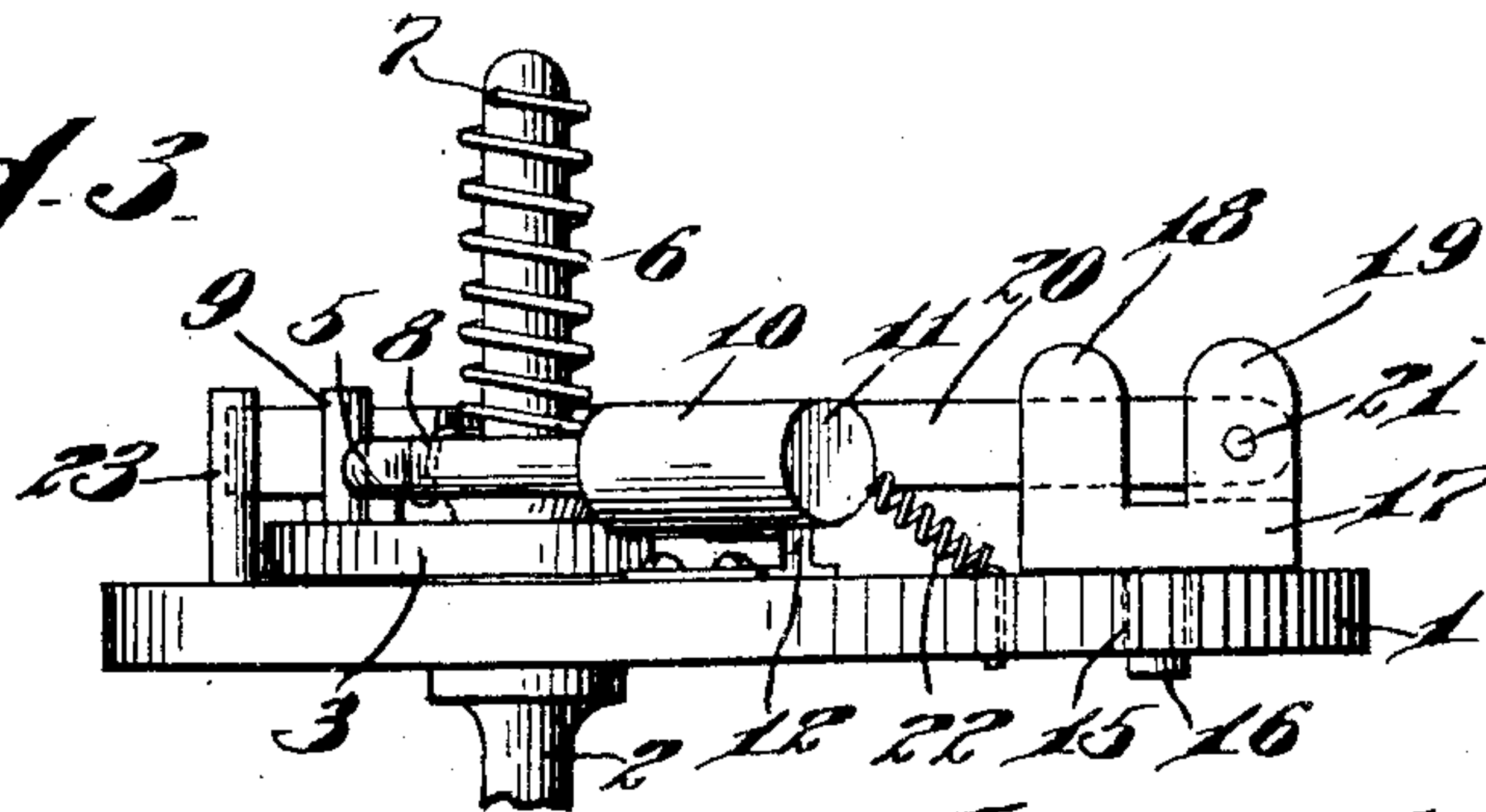


Fig. 3



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CURRENT-CONTROLLING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

955,204.

Specification of Letters Patent.

Patented Apr. 19, 1910.

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To all whom it may concern:

Be it known that I, LEWIS T. RHOADES, a citizen of the United States, residing at Mont Clare, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Current-Controlling Mechanism for Internal-Combustion Engines, of which the following is a specification.

My invention relates to improvements in current controlling mechanism for internal combustion engines, the object of the invention being to provide improved mechanism which will temporarily retard the movement of the circuit closing contact device, to temporarily increase the torsional pressure of a moving spring, and then release the movable contact device, so that it will rapidly make and break the electric circuit to give the proper spark for the explosion in the cylinder or cylinders, and insure a uniform spark regardless of the speed of the engine or engines, by the combination of a high tension distributor, and induction coil of the well known construction.

A further object is to provide improvements of this character, which, when the engine pistons and crank shafts are moved in a reverse direction, the contact device will not close the electric circuit to make a spark.

With these and other objects in view, the invention consists in certain novel features of construction, and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1, is a plan view partly in section illustrating my improvements. Fig. 2, is a view in longitudinal section. Fig. 3, is a view in side elevation, and Fig. 4, is a fragmentary view in side elevation of the contact arm and its cam.

1 illustrates a support, which though shown of circular form, may of course be of other forms, and may be located at any suitable portion of the machinery. Projecting through this support 1 is a time shaft 2, to which above the support a disk 3 is fixed, and constructed to turn with the shaft. Mounted loosely upon shaft 2 above disk 3, is a rotary contact device 4, having a series of projections or contacts 5 thereon, located an equi-distance apart, and as many of said contacts provided as there are cylinders to be fired.

6 represents a coiled spring, which is bent at one end, and projected through an opening 7 in the shaft 2, and at its lower end is bent and positioned in an opening 8 in the contact device 4, said spring being under sufficient torsional tension to turn the contact device 4, so as to position one of its contacts 5 against a pin or stop 9 fast to disk 3, and normally hold the contact device in this relation to the disk 3.

10 represents a tube or cylinder, having a closed outer end 11, and supported upon a suitable bracket 12 fast to support 1. The inner open end of the tube or cylinder 10 is restricted slightly, so as to confine or limit the outward movement of a steel ball 13, and a coiled spring 14 is located in the cylinder back of the ball 13, and normally holds the ball in its forward or projecting position, until forced backward by one of the contacts 5, as will more fully hereinafter appear.

The support 1 is provided with an opening or bearing 15, in which a pin or journal 16 on a bracket 17 is mounted to turn. This bracket is provided with two bifurcated members 18 and 19 respectively, and a contact arm 20 is pivotally secured in the bifurcated portion 19 by means of a pin 21, and is guided and supported in the bifurcated portion 18, and a coiled spring 22 located preferably at the peculiar angle shown, normally holds said arm not only against the bifurcated guide portion 18, but also against a pin or stop 23 on support 1. This arm 20 is bent at its free end into general hooked form as shown at 24, which is engaged by a flat spring 25 secured to arm 20, and this spring 25 is made with a contact 26 adapted when the arm is properly moved, to contact with a screw 27, and close the electric circuit, it being understood that the support and the parts carried thereby, except the screw 27, are grounded, a wire 28 being shown for this purpose, while a wire 29 is shown to illustrate the connection between the screw 27 and the primary winding of an induction coil of well known construction.

To the side of arm 20 adjacent the contact device 4, a block 30 is fixed, and is provided with a cam face 31 against which the contacts 5 move in the normal operation of the device, and with a second cam face 32 against which the contact points 5 move when the contact device is moved in a direction opposite to its normal direction, said

cam faces 31 and 32 being at right angles to each other, so as to move the arm 20 in different directions, as will now be explained.

The normal operation of the device is as follows: As time shaft 2 revolves, it turns disk 3, and due to the spring 6, which holds one of the contact points 5 against pin 9, also turns the contact device 4 until one of the contact points 5 engages the steel ball 13. As the frictional resistance of the ball 13 against point 5 is greater than the torsional strength of the spring 6, contact device 4 will be momentarily stopped until the pin 9 reaches the contact point 5 in advance, when it will force the contact device forward so that the contact point 5 in engagement with ball 13 will force the latter back in the cylinder, to permit the contact point to pass. This operation of holding the contact device temporarily serves to wind the spring 6, increasing its torsional strain, and as soon as the contact passes the ball 13, this increased torsional strain will compel one of the contact points 5 to rapidly wipe past block 30 until a point 5 again engages pin 9. This movement or wiping of the point 5 against block 30, due to the action of the cam surface 31, forces the arm 20 toward the contact screw 27, and moves the contact 26 momentarily into engagement with the contact screw, long enough however, to give the desired length of time necessary to build up a core of the ordinary induction coil, as is well understood, and as the contact is broken by the point 5 passing block 30, spring 22 moves the arm 20 away from screw 27, and back against its stop or pin 23, thus insuring a uniform spark, regardless of the speed of the engine. Should the time shaft 2 and the parts carried thereby be moved in a reverse direction, a contact 5 will engage the cam surface 32 of block 30, and instead of moving the arm 20 toward screw 27, will move it at an exact right angle to the said normal movement, permitting the contacts 5 to pass, when the spring 22 will draw the arm back to normal position, without having made contact with the screw 27.

A great many slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not restrict myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the claims.

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

1. In a device of the character described, the combination with a shaft, a disk fixed to the shaft, a contact device mounted to turn on the shaft, and having an annular series of contacts or projections, a pin or stop on the disk, a spring around the shaft

secured at one end to the shaft, and at its other end to the contact device, and exerting torsional pressure on the contact device to normally hold one of the projections in engagement with the pin, and compel the contact device to turn with the shaft, means operated by said projections to close an electric circuit, and means for temporarily retarding the movement of the contact device to increase the tension of the spring, and accelerate the movement of the contact device when released from the retarding means.

2. In a device of the character described, the combination with a shaft, a disk fixed to the shaft, a contact device mounted to turn on the shaft, and having an annular series of contacts or projections, a pin or stop on the disk, a spring around the shaft secured at one end to the shaft, and at its other end to the contact device, and exerting torsional pressure on the contact device to normally hold one of the projections in engagement with the pin, and compel the contact device to turn with the shaft, means operated by said projections to close an electric circuit, a tube, a spring in said tube, and a ball in the end of said tube pressed by said spring and adapted to be engaged by the said projections to temporarily retard the movement of the contact device, and increase the tension of the first mentioned spring whereby the speed of the contact device will be accelerated when released from contact with the ball.

3. In a device of the character described, the combination with a fixed contact, of a support, an arm pivoted to said support, a contact on said arm, a cam block on said arm having two cam faces, a rotary contact device, projections on the rotary contact device adapted to normally engage a cam face on said block to move the arm into contact with the fixed contact, and when moved in the opposite direction to move the arm in a direction at right angles to its normal direction of movement, and a spring returning said arm to normal position.

4. In a device of the character described, the combination with a support, a fixed contact on the support, a bracket having rotary mounting in the support, an arm pivotally connected to the bracket, a spring on said arm, a contact on said spring adapted to engage the fixed contact, a second spring holding said arm in normal position, a block on said arm having two cam faces, a rotary contact device, lugs or projections on said contact device adapted in normal operation to engage one of the cam faces of the block to move the arm and the spring into contact with the fixed contact, and when moved in the opposite direction to move the arm in a direction at right angles to its normal movement to prevent contact, a spring

pressed ball for temporarily retarding the movement of the rotary contact device, and means for accelerating the movement of the rotary contact device when released from the retarding means.

5 5. In a device of the character described, the combination with a support, a fixed contact on the support, a bracket having rotary mounting in the support, an arm pivotally
10 connected to the bracket, a spring on said arm, a contact on said spring adapted to engage the fixed contact, a second spring holding said arm in normal position, a block on said arm having two cam faces, a rotary
15 contact device, lugs or projections on said contact device adapted in normal operation to engage one of the cam faces of the block

to move the arm and the spring into contact with the fixed contact, and when moved in the opposite direction to move the arm in
20 a direction at right angles to its normal movement to prevent contact, means for temporarily retarding the movement of the rotary contact device, and means for accelerating the movement of the rotary contact
25 device when released from the retarding means.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEWIS T. RHOADES.

Witnesses:

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THEO. RISEMANN.