No. 687,874. Patented Dec. 3, 1901.

J. S. DIKEMAN.

SPARKING MECHANISM.

(Application filed June 5, 1901.)

(No Model.)

FIG. 1.

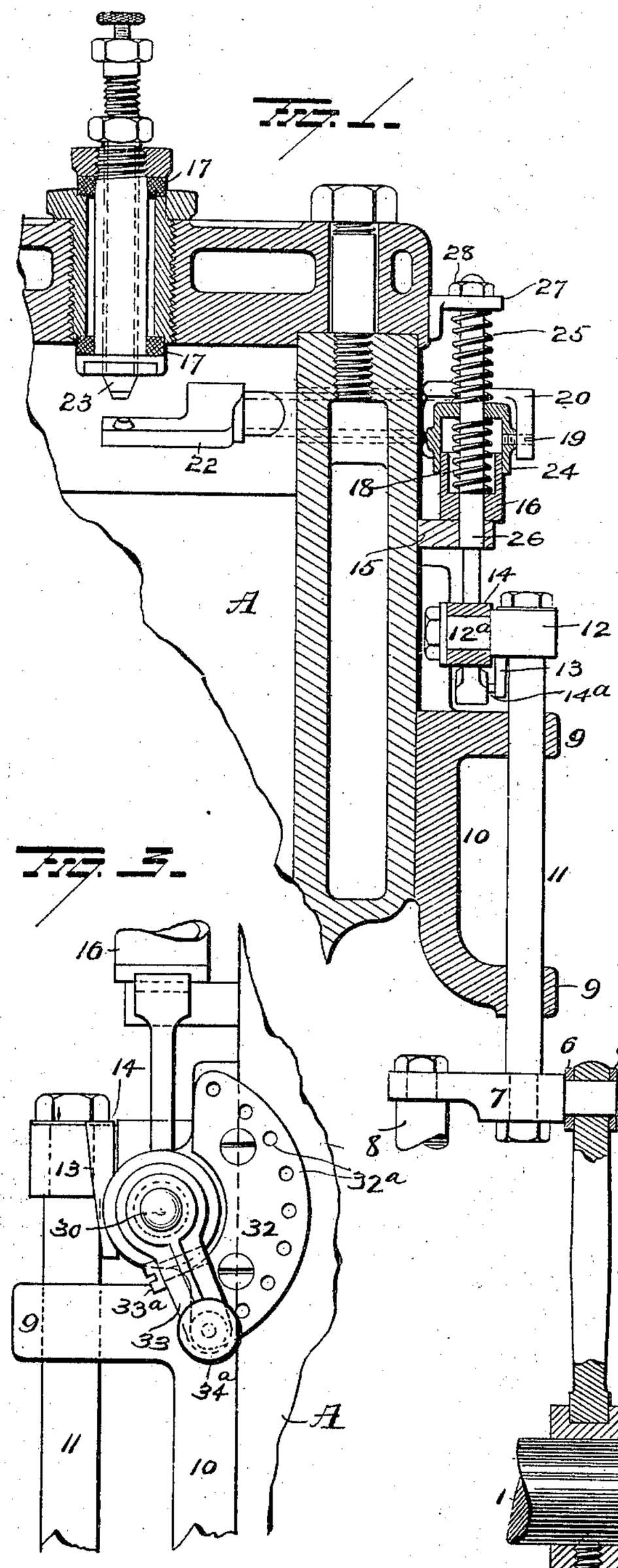

FIG. 2.

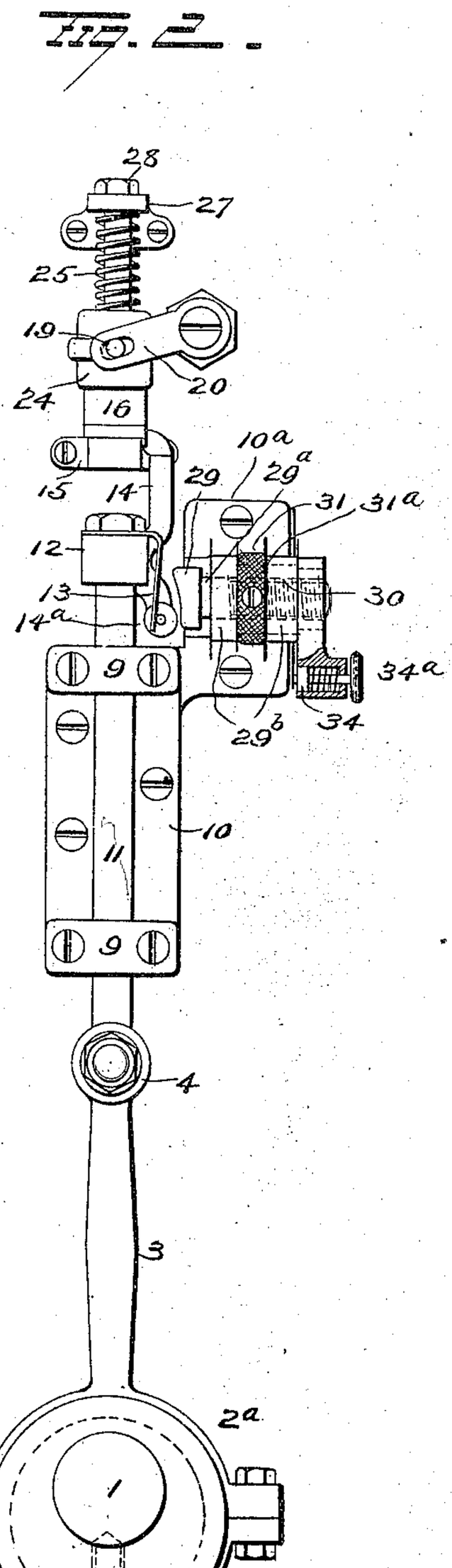

FIG. 3.

WITNESSES

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SPARKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 687,874, dated December 3, 1901.

Application filed June 5, 1901. Serial No. 63,275. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. DIKEMAN, a resident of Torrington, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Sparking Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved sparking mechanism for explosive-engines, an object of the invention being to provide means for timing the sparks according to the position of the piston.

A further object is to provide improved means to cause a spark and consequent explosion at varying positions of the piston.

A further object is to provide improved means for increasing or diminishing the speed of the engine within certain limits without interference or readjustment of the working parts of the device.

A further object is to provide improved mechanism of this character which can be operated to start the engine without the necessity of turning the fly-wheel to bring the piston under full lead, hence obviating the danger to the operator due to this sudden starting under full lead while his hand is upon the fly-wheel.

With these 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 side view, partly in section, illustrating my improvements. Fig. 2 is a front view of my improvements removed, and Fig. 3 is a detail view of the adjusting or spark-timing mechanism.

A represents the cylinder of an explosive-engine, and 1 the crank-shaft. On the crank-shaft 1 and preferably back of the fly-wheel (not shown) a cam or eccentric 2 is secured by a set-screw, as shown, and is adapted to turn in a sectional ring 2^a, carried by one end of a rod or pitman 3 and oscillate the latter. The upper end of the pitman is bored to receive the round end on an angular cross-bar 7, which latter is screw-threaded at its end to receive a nut 4 and secure the parts together, and interposed washers 6 between the opposite faces of rod or pitman 3, bar 7, and nut 4. The other end of bar 7 is bored to receive a pump-plunger 8, secured thereto by a nut screwed onto the plunger above the cross-bar. This plunger 8 is connected with and adapted to operate the pump (not shown) for supplying air, gas, liquid, or a mixture to the engine simultaneously with the operation of the sparking mechanism and by means of the same eccentric 2.

To the side of the cylinder A a bracket 10 is secured by screws or other means and is provided with alined angular bearings for a sliding angular rod 11, which latter is held in the bearings against displacement by screw-held caps or strips 9. The lower end of this rod 11 is milled square to a shoulder securely held in an angular hole in the central portion of cross-bar 7 by a nut screwed onto the rounded and threaded extreme lower end thereof, hence holding the shoulder firmly against the upper face of the bar to make a rigid connection. The upper end of this rod 11 is also milled square to form a shoulder, and an angular sleeve or ring 12 is held down onto said shoulder by a nut screwed onto the circular threaded upper end of the rod, and said sleeve or ring 12 is provided on one side with an integral pintle 12^a, on which a cam-lever 14 is fulcrumed between its ends and secured thereon by a nut. The lower end of cam-lever 14 is enlarged and made with an outwardly-projecting pin 14^a, against which the free end of a flat spring 13 bears, said spring being secured beneath the nut on the upper end of rod 11 and holds the lower end of the cam-lever against a cam 29, for a purpose which will more fully hereinafter appear. The other or upper end of the cam-lever 14 is notched to engage one corner of a cup 16, loosely mounted on an angular rod 26, secured to the side of the engine-cylinder by means of a clamping-bracket 15, having an angular bearing therein to receive the rod 26 and prevent rotary movement of the latter. The upper end of rod 26 is milled round and secured in a bracket 27 by a nut 28, screwed onto the upper threaded end of the rod, and hence pre-

vents longitudinal movement thereof. The cup 16 is made angular on its lower end, where it is engaged by the notched upper end of cam-lever 14, but throughout the greater portion of its length is cylindrical to slide freely in an oppositely-disposed larger cup or sleeve 24, forming, in effect, a compression-cup. The cup 24 is provided on one side with a screw or pin 19, disposed in the slotted free end of a crank-arm 20, secured on the end of a sparking shaft or lever 22, projecting into the cylinder A, supported in a sleeve 22 and forming the movable contact-point of the device. This sparking-lever is adapted to make and break contact with a contact-point 23, supported in the end of the cylinder by insulating-washers 17, as shown.

A coiled spring 18 is located on rod 26 and bears at its respective ends against the cups 16 and 24, and another coiled spring 25 of less strength is located on said rod between the upper cup 24 and bracket 27.

The bracket 10 is provided on its upper end on one side with an extension 10^a, made with alined bearings 29^b for a screw-threaded rod 29^a, carrying at one end the cam 29, heretofore referred to, which latter is made angular or flat on its lower edge to move along a flat face on the bracket and prevent rotary movement of the cam. An internally-screw-threaded sleeve 30 is screwed onto rod 29^a and located in the bearings 29^b and has secured thereon by a set-screw 31^a an adjusting-ring 31, adapted to practically fill the space between bearings 29^b and prevent longitudinal movement of sleeve 30. To the outer end of sleeve 30 a split pawl-lever 33 is securely clamped by a set-screw 33^a and carries at its free end a spring-pressed pawl 34, provided on its outer end with a milled-head button 34^a to facilitate the withdrawal of the pawl from any of a series of holes or sockets 32^a in a plate 32. This plate 32, having holes therein to receive the pawl, is adapted to hold the cam 29 in any desired position as the turning of the lever 33 revolves sleeve 30, and the ring 31 preventing longitudinal movement of the sleeve compels the rod 29^a to move longitudinally, and hence move cam 29 toward or away from cam-lever 14 to vary the time of release of lower cup 16 by the cam-lever, as will now be explained.

The operation of my improvements is as follows: The revolving of the crank-shaft 1 operates eccentric 2 to move rod 3 upward, hence raising cross-bar 7 and rod 11, to the upper end of which the cam-lever 14 is connected by sleeve 12, and hence the lever 14 is raised and owing to its notched upper end being in engagement with the lower cup 16 raises the latter and contracts first spring 25 until the sparking-lever is forced against contact-point 23, when a further upward movement of the cam-lever contracts spring 18 and telescopes the lower cup in the upper one. The lower enlarged end of the cam-lever being held against cam 29 by spring 13 is as it moves upward over the face of the cam forced inward on its fulcrum, so that when the piston of the engine is in position for the explosion of the charge the cam will have moved the lower end of the cam-lever far enough to release the upper notched end thereof from lower cup 16, when spring 25 will force upper cup 24 downward to draw sparking-lever 22 from contact-point 23, making a spark and exploding the charge the spring 18 returning lower cup 16 to its normal position against bracket 15. As the eccentric moves around it will draw the cam-lever 14 downward until the notched upper end again engages the lower cup, so that the operation above described can be repeated.

If desired to change the speed of the engine, it is simply necessary to move pawl-lever 33 to a position to permit pawl 34 to spring into any of the other holes in plate 32, this movement of the pawl-lever 33 moving cam 29 toward or away from the cam-lever, as above described, hence varying the time of release of the notched upper end of the cam-lever from lower cup 16, and consequently varying the time of the spark.

If it is desired to start the engine and the piston therein has only partially compressed the charge, it is simply necessary to move pawl-lever 33 to force cam 29 outward sufficiently to release cam-lever 14 from lower cup 16 to make a spark and explode the partially-compressed charge, when the pawl-lever can be moved back to its normal position to explode the next charge at any compression desired, and it will be seen that the engine can thus be started without handling the fly-wheel, which is a source of great danger.

Various slight changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I would have it understood that I do not wish to limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a sparking mechanism, the combination with a contact-point and a contact-lever, of a sliding bar, a pivoted lever carried by said bar for operating the contact-lever in one direction, a spring for moving the contact-lever in the other direction, a cam for tripping said pivoted lever and means for adjusting said cam relatively to the pivoted lever.

2. In a sparking mechanism, the combination with a contact-point and a contact-lever, of a sliding bar, a pivoted lever carried by said bar for moving the contact-lever in one direction, a spring for moving the contact-lever in the other direction, a longitudinally-movable bar having a cam end to be engaged by said pivoted lever and means for adjust-

ing said longitudinally-movable bar relatively to the pivoted lever.

3. In a sparking mechanism, the combination with a contact-point and a contact-lever, of a sliding bar, a pivoted lever carried by said bar for moving the contact-lever in one direction, a spring for moving said contact-lever in the opposite direction, a longitudinally-movable bar disposed at right angles to one end of said lever, a cam-head on said bar, means for operating said longitudinally-movable bar to adjust the cam-head thereon relatively to the pivoted lever, and means for locking said longitudinally-movable bar at any desired adjustment.

4. In a sparking mechanism, the combination with a stationary and a movable contact-point, of an eccentric on the crank-shaft, a rod oscillated by the eccentric, a cam-lever fulcrumed between its ends on said rod, a stationary rod, telescoping cups loose on said stationary rod, a coiled spring interposed between said cups, another coiled spring on the stationary rod bearing against one of said cups, said movable contact-point connected to said last-mentioned cup, said cam-lever normally engaging the other cup to contract the springs when the eccentric turns and thereby force the contact-points together, and means for throwing the cam-lever out of engagement with the cup.

5. In a sparking mechanism, the combination with a sliding support and a cam-lever fulcrumed between its ends on said support, of telescoping cups mounted to slide, a spring between the cups, another spring pressing the cups against one end of the lever, a sparking-lever connected to one of said cups and adapted to be forced against a stationary contact-point when the cups are moved in one direction by the cam-lever, and a cam adapted to engage the lever and force it from the cups to permit the last-mentioned spring to separate the contact-points.

6. In a sparking mechanism, the combination with a sliding support, and a cam-lever fulcrumed between its ends on said support, of movable compression-cups normally engaged by the cam-lever, a sparking-lever connected with one of said cups, a coiled spring between the cups and a spring pressing against the outside of one of said cups, a cam adapted to be engaged by the cam-lever to release the latter from the cups and means for adjusting the position of the cam to vary the time of release of the lever.

7. In a sparking mechanism, the combination with a sparking-lever, a compression-cup connected to the sparking-lever, a cam-lever to move the compression-cup in one direction and a spring to return the cup when the cam-lever is disengaged therefrom, of a cam to disengage the cam-lever from the cup, a pawl-lever to move the cam toward and away from the cam-lever, a spring holding the lever against the cam, and a plate adapted to hold the pawl-lever in any position to which it is moved.

8. In a sparking mechanism, the combination with a sparking-lever, a compression-cup connected to the sparking-lever, a cam-lever adapted to move the compression-cup in one direction, and a spring to return the cup when the cam-lever is disengaged therefrom, of a bracket, an internally-screw-threaded sleeve in said bracket, a ring securing the sleeve against longitudinal movement, a threaded rod in the sleeve, a cam on one end of the rod to be engaged by the cam-lever to force the latter out of engagement with the compression-cup, a pawl-lever secured on the sleeve to turn the latter, and a plate adapted to lock the pawl-lever in any position to which it may be moved.

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

JOSEPH S. DIKEMAN.

Witnesses:
BERNARD E. HIGGINS,
WM. M. ALLEN.