No. 649,778. Patented May 15, 1900.

D. M. TUTTLE.

ELECTRICAL IGNITER FOR GAS ENGINES.

(Application filed Feb. 20, 1899.)

(No Model.)

FIG. I.

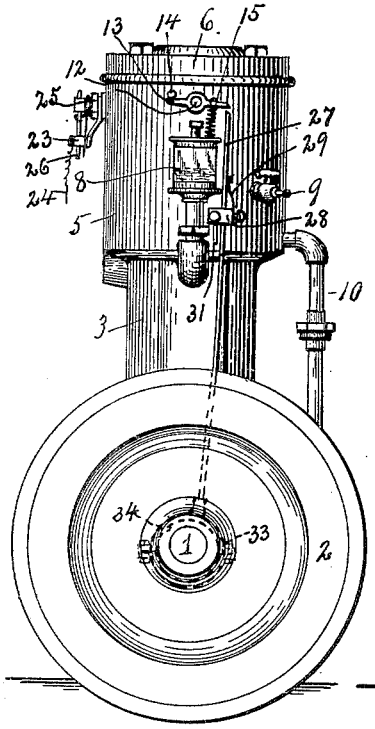


FIG. II.

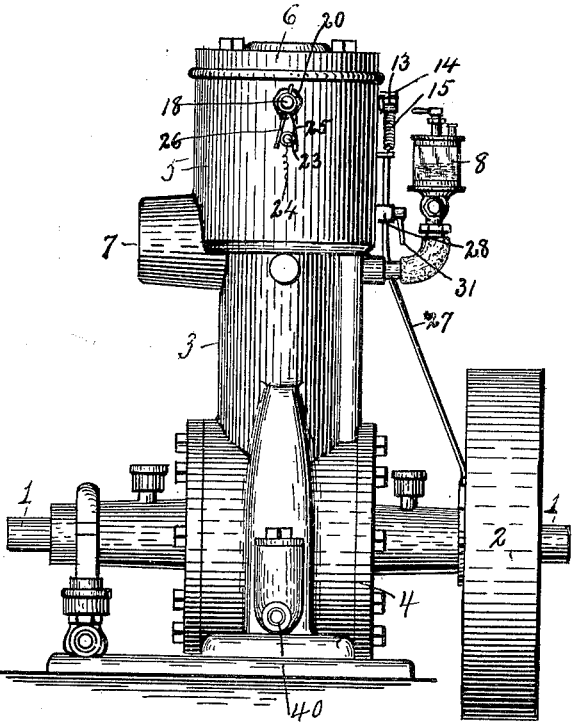


FIG. V.

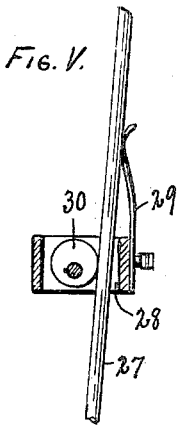


FIG. III.

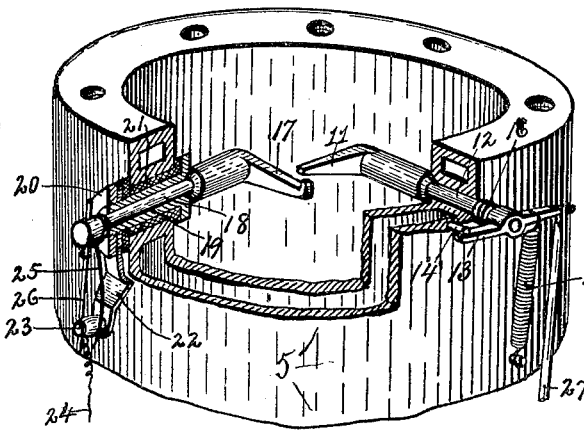
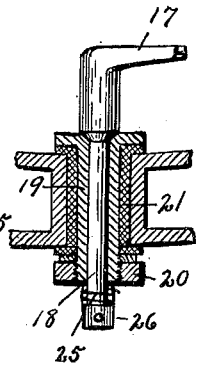


FIG. IV.



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DANIEL M. TUTTLE, OF CANASTOTA, NEW YORK.

ELECTRICAL IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 649,778, dated May 15, 1900.

Application filed February 20, 1899. Serial No. 706,246. (No model.)

To all whom it may concern:

Be it known that I, DANIEL M. TUTTLE, of Canastota, in the county of Madison, in the State of New York, have invented new and useful Improvements in Gas-Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to gas-engines; and it consists in a new and improved construction of sparking mechanism which is durable, effective, cheap, and easy to renew when necessary. The engine may be of any desired construction, the form which I show being particularly strong and simple.

My invention will be better understood by reference to the accompanying drawings, in which the same reference-numerals indicate the same parts in all the figures.

Figure I is a front elevation of my engine, showing my sparking mechanism. Fig. II is a corresponding side elevation. Fig. III is an isometric view of the cylinder, the top being removed and portions broken away. Fig. IV is a horizontal section of the insulated terminal. Fig. V shows a certain detail.

In the figures the well-known parts of the engine are indicated as follows: 1 is the shaft; 2, the balance-wheel, secured thereon; 3, the cylinder; 4, the base thereof, in which the shaft rotates, being connected by a crank to the piston. 5 is the water-jacket, surrounding the upper portion of the cylinder; 6, the water-jacketed top, secured thereto; 7, the exhaust; 8, the oil-cup; 9, petcock; 10, the pipe for introduction of circulating water. 40 is gas-inlet to base of cylinder through a sprayer.

The new parts are as follows: 11 is an uninsulated terminal secured on shaft 12, journaled near the top of the cylinder extending out through the water-jacket, 13 being an arm secured to its outer end, of which one end engages with a stop 14, and to the other is connected a spring 15 for normally throwing the terminal upward as the parts are here arranged or in other operative direction.

16 is a spring interposed between the side of the cylinder and arm 13 for forcing shaft 12 outwardly, so that the tapering end of its enlarged portion shall be forced into the shaft-hole, making an air-tight joint.

17 is the insulated terminal, secured to the inner end of shaft 18, journaled in metallic bushing 19, 20 being a nut fitted to the outer end thereof for securing the parts in position; 21, an insulating-bushing to insulate the terminal and attached parts from the cylinder; 22, an arm secured on said metallic bushing and connected electrically thereto, carrying binding-post 23 for the attachment of the wire 24. 25 is a spring having the double function of throwing the terminal 17 toward terminal 11 upwardly, as here shown, and forcing outwardly the terminal-shaft 18 to make the joint air-tight by means of tapering end of enlarged portion, as in case of the other terminal.

26 is a small rod secured to the outer end of shaft 18 and engaging with binding-post 23, which thus acts as a stop to limit the movement of the terminal 17 toward terminal 11. The spring 25 is coiled on the outer end of its shaft and has an outwardly-extending end engaging binding-post or stop 23, thus having the double function, as aforesaid.

The terminals are operated by rod or pitman 27, which is elevated and depressed by the action of an eccentric 34 on the shaft, which rotates against inner surface of collar 33, secured to the lower end of the rod. The rod or pitman is held in operative position by guide 28, to which is secured spring 29, bearing against the rod for forcing it against cam 30, journaled in guide and turned by handle 31, by which position of operating-rod is regulated.

From this description the operation of my sparking mechanism will be clear. At each rotation of the shaft operating-rod 27 is thrown upwardly, engaging with spring end of terminal-arm 13, forcing it up against the action of spring 15 and depressing the terminal 11, which engages with and depresses terminal 17 against the force of spring 25. After this downward movement of the terminals has progressed to a certain point the lower end of operating-rod is thrown to left by eccentric and the upper end to the right, the guide acting as a fulcrum whereby the rod is thrown out of engagement with terminal-arm and clear therefrom. The springs 25 and 15 come suddenly into play, forcing the terminals in the reverse direction from that in which they had been traveling. This return movement of

terminal 17 is stopped by engagement of small rod 26 with binding-post 23, while that of terminal 11 continues, making a quick break and drawing out a spark until it is arrested by engagement of arm 13 with stop 14.

It is evident that the spark must be regulated with relation to position of piston so that it will come exactly at its highest position and before it has started on its downward movement; otherwise part of its power will be wasted. This regulation is effected by the turn of the cam forcing the operating-rod more or less to one side, and thus hastening or retarding its disengagement with terminal-arm. For instance, when the engine is started the parts may be adjusted so that the spark will come at the proper instant; but as the engine gets up speed the spark falls behind the motion of the piston and must be hastened, which is easily done by this construction.

By loosening nut 20 arm 22 and binding-post 23, with which small rod 26 engages, may be turned easily from the outside to adjust the position of the terminal, by which the wear is taken up and the length of spark controlled. It is evident that this exact arrangement of terminals is not necessary, as they may be journaled in different positions in the cylinder and in different relations to each other without departing from the spirit of my invention.

My sparking mechanism is simple and easily operated, as described. The parts are easy of access and adjustment, the terminals being adjusted from the outside. Platinum is not necessary. The terminals are preferably made of iron and are cheap and easy to renew, if necessary. As there is a rubbing or wiping contact between them, corrosion and the formation of all needle-points are prevented and great durability is obtained. The result is a good spark of sufficient thickness, with a break which does not depend on the operation of the engine. In a word, I obtain simplicity, cheapness, durability, easy adjustment and renewal, a good quick break, and wiping contact, with iron terminals.

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

1. In a gas-engine in combination with the cylinder, an insulated terminal and an uninsulated terminal arranged in the interior of the cylinder, normally out of contact, said terminals secured on the inner ends of shafts journaled in the upper portion of the cylinder and extending horizontally and outwardly through the water-jacket, an arm secured on the outer end of the uninsulated-terminal shaft, a stop-pin engaging with one end of said arm, a spring connected to the other end of said arm tending to draw it down and force the terminal upwardly, a second spring arranged between said arm and the outer surface of the cylinder, said insulated-terminal shaft journaled in a metallic bushing surrounded by an insulated bushing, an insulated arm secured to the outer end of said metallic bushing and supported thereby, a binding-post secured on the end of said arm engaging with said binding-post and arranged to force said shaft outwardly and said insulated terminal upwardly, a rod also secured to the outer end of said shaft engaging with said binding-post to limit said upward motion, and a pitman operated by the main shaft engaging temporarily with the spring end of said uninsulated-terminal arm to force said terminals downwardly against the action of the spring and in contact for a certain distance.

2. In a gas-engine in combination with the cylinder, an uninsulated terminal arranged within the cylinder and secured to a shaft journaled in the top of and extending outwardly through the water-space, said shaft having an enlarged tapering portion fitted to the inner mouth of the aperture to close the same tightly, an arm secured to the outer end of said shaft, a spring arranged between said arm and the surface of the cylinder to force the parts outwardly and maintain a tight joint, a pin engaging with one end of said arm to limit its upward motion, a spring secured to the other end to draw it downwardly and force the terminal upwardly; an insulated terminal arranged within said cylinder having its end beneath the end of the uninsulated terminal and a short distance therefrom, a shaft supporting said insulated terminal, extending outwardly and journaled in a metallic bushing insulated from the cylinder by an insulating-bushing, said shaft having an enlarged tapering portion fitting the inner end of the aperture, a nut fitted to the outer end of said metallic bushing, an insulated arm secured thereto carrying a binding-post for the wire connection, a spring secured to the outer end of said second shaft for drawing the parts outwardly to close the joint air-tight and to force upwardly the end of the terminal, a rod secured to the end of the shaft and engaging with said binding-post to limit the motion of said terminal, and a pitman operated by the main shaft engaging temporarily with the spring end of said uninsulated-terminal arm to force said terminals down against the action of the springs and in contact for a certain distance, and then to disengage from said arm.

3. In a gas-engine in combination with the cylinder, a shaft 18, journaled in a metallic bushing 19, insulated by an insulating-bushing 21, an integral terminal 17 on said shaft, arranged at right angles thereto and within the cylinder, an insulated arm 22, secured on the outer end of said metallic bushing by means of an insulated nut 20, and carrying a binding-post 23, for attachment of one of the line-wires, a rod 26 secured to the outer end of said shaft to engage with said binding-post and limit the return movement of said terminal, a spring 25 coiled on the outer end of said shaft between said rod and nut

and having its lower end engaging with said binding-post; an uninsulated shaft 12, journaled in the cylinder and having a terminal 11, extending at right angles therefrom adjacent to terminal 17, an arm 13, secured to the outer end of said shaft 12, a spring 15, secured to one end of said arm, a stop 14 engaging with the other end of said arm to limit the movement of terminal 11, a spiral spring 16 arranged on said shaft 12, between said arm 13 and the outer surface of the cylinder; and a pitman 27 operated by means of an eccentric 34 on the shaft 1 of the engine to engage with the spring end of the arm 13, to force said terminals into contact and for a certain distance against the action of their return-springs.

In testimony whereof I have hereunto signed my name.

DANIEL M. TUTTLE. [L. S.]

Witnesses:
H. M. SEAMANS,
ALFRED WILKINSON.