

(No Model.)

E. I. NICHOLS.
IGNITOR FOR GAS ENGINES.

No. 480,272.

Patented Aug. 9, 1892.

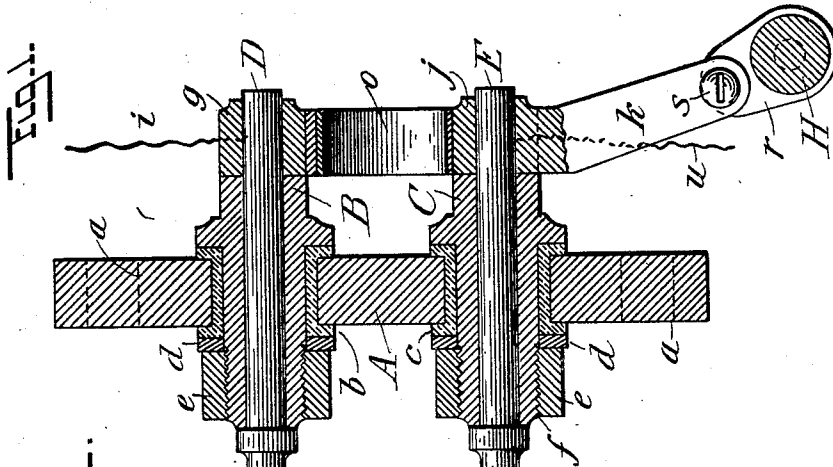
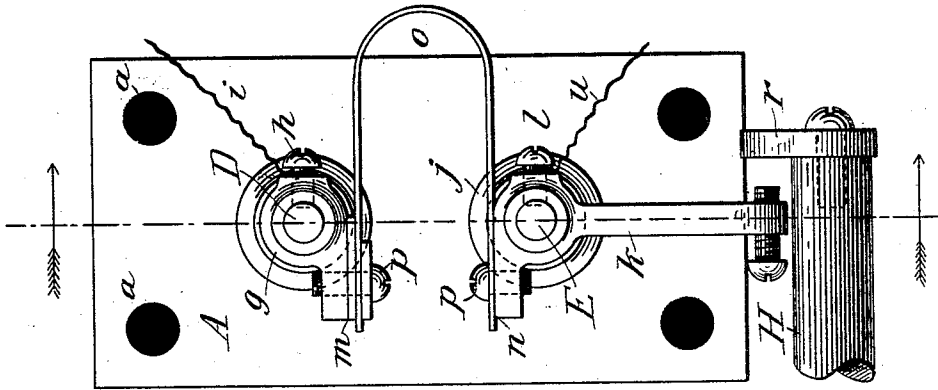


Fig. 2.

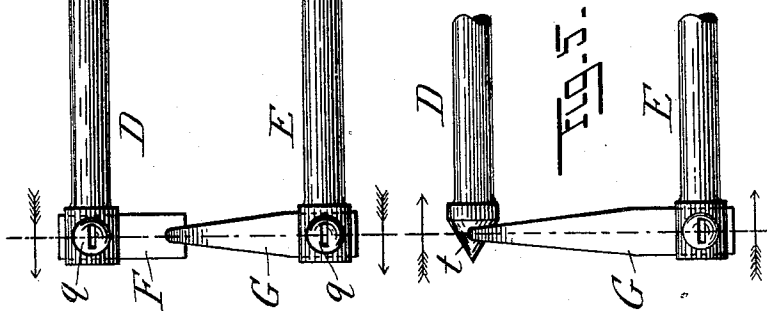


Fig. 3.

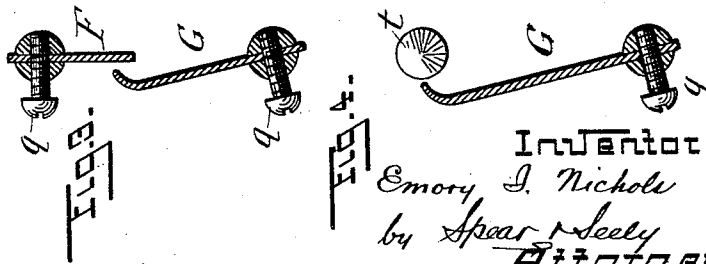


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

EMORY I. NICHOLS, OF SAN FRANCISCO, CALIFORNIA.

IGNITOR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 480,272, dated August 9, 1892.

Application filed May 26, 1891. Serial No. 394,190. (No model.)

To all whom it may concern:

Be it known that I, EMORY I. NICHOLS, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Ignitors for Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same.

10 This invention relates to electrical igniting devices for producing the explosion of gas in the cylinder of a gas or vapor engine, and thus actuating the reciprocating piston.

My invention is applicable to engines of either the horizontal or vertical type, and in the present case is supposed to be used in connection with one of the former class.

In an application for patent executed and filed by me as of the same date as the present case, Serial No. 394,189, I described and showed a complete gas-engine and illustrated in detail the connections from the crank-shaft for operating an ignitor substantially like that which is the subject of this specification. I there describe and show the construction of the ignitor itself without special reference to the means for operating it, although I indicate them sufficiently for any one skilled in the art to understand them.

30 My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the face-plate secured to one side of the engine-cylinder, of the external portions of the ignitor, and also of the rod for actuating the ignitor, broken away. Fig. 2 is a section on the line *xx* of Fig. 1. Fig. 3 is a sectional view of the electrodes shown in Fig. 2. Figs. 4 and 5 are respectively a section and an elevation of a modified shape of electrodes or terminals.

Before describing the details of my invention it should be explained, what those skilled in the art will readily understand, that my ignitor consists, essentially, of two electrodes within the engine-cylinder, which are alternately brought into and released from contact with one another. These electrodes are connected in open circuit with an electrical generator. When the circuit is closed and then opened, a spark is produced, which explodes a charge of gas or vapor in the cylinder, by which explosion the piston is actuated.

The igniting devices are supported by a plate A, secured to the side of the cylinder, near one end, by bolts passing through holes 55 *a*. Mounted on this plate are fixed plugs B C, prevented from contact with the plate by flanged insulating-collars *b c*, Fig. 2, all being held in place by washers *d* and nuts *e* upon the threaded inner ends *f* of the plugs. Each 60 plug is bored out centrally and longitudinally to receive the movable stems D E, to which the electrodes F G are respectively attached. The stem D is mounted loosely in the plug B and is surrounded at its outer end by a boss 65 *g*, secured to it by a set-screw *h*. One of the line-wires *i* may be connected to this screw. The stem E, which has a slight rotary motion, is provided with an external boss *j*, having a downwardly-projecting arm *k*, the boss and 70 stem being secured together by a set-screw *l*, and both bosses are provided with flat seats *m n* to receive the ends of the bow-spring *o*, which is held in place by screws *p p*. The other battery-wire *u* is connected to the set- 75 screw *l*.

The electrodes, which are normally separated, are shown in Figs. 2 and 3 and slightly modified in Figs. 4 and 5. In Figs. 2 and 3 the inner ends of stems D and E are slotted 80 in order to admit the metallic non-elastic plates which compose the electrodes, screws *q* being used to hold them in the slots. By a slight rotary movement of stem E a contact will be made, the electrode F yielding sufficiently to avoid any shock, and the circuit will be closed. This rotary movement is produced by the rod H, which derives a reciprocating movement in any suitable manner, or, as shown in my application before referred 90 to, from the engine-shaft. A projection *r*, insulated from this rod or composed of insulating material, strikes an adjustable stud or screw *s* upon the arm *k* and moves said arm sufficiently to give the required movement to 95 stem E. When released at the return stroke of the rod, the spring *o* will separate the electrodes, producing the spark, and will return them to normal position. The rod H may, if preferred, be pivoted to the arm *k*, so as to operate it positively in both directions. 100

I prefer in practice to use the conical electrode *t*, (shown in Figs. 4 and 5,) and which may be secured to or may form a part of the

stem D. By making it of conical shape a slight rubbing action is caused, which tends to keep the coned surface bright and cause better contacts, while at the same time new surfaces may be presented for contact when too great wear has been caused at any particular point.

It will be observed that the entire igniting device is carried by the removable plate A and forms a construction independent of the engine-cylinder, so that it may be very easily attached to and detached therefrom. Thus a defective ignitor can be removed for examination or repair by simply taking off the plate A, and the entire device, not being a permanent attachment, can be manufactured to be kept and sold separately.

Having thus described my invention, what I claim as new, and desire to secure protection in by Letters Patent of the United States, is—

1. In combination, the ignitor-stems insulated from their support, the contacts on the stems, the means for operating one of the stems to bring the contacts together, and the spring O in connection with both stems for

keeping the contacts normally apart, substantially as described.

2. In combination, the plate A, the plugs B C, extending through the same, the insulating-collars *b c*, the ignitor-stems extending through the plugs and carrying the contact-points, the arm *k*, extending from one of the stems and carrying an adjustable stud *s*, and the sliding shaft H, carrying a projection *r* to engage said stud, and the means for returning the stem to normal position, substantially as described.

3. In combination, the ignitor-stems with means for operating one of them, one of said stems having a conical end *t*, and the contact G, secured to the other stem and extending transversely of the stems to contact with the conical end *t*, substantially as described.

In testimony whereof I have hereunto affixed my signature, in the presence of witnesses, the 14th day of May, 1891.

EMORY I. NICHOLS.

Witnesses:

L. W. SEELY,

W. B. CLAYTON.