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F. A. SEITZ.

SPARKING IGNITER FOR EXPLOSIVE GAS ENGINES.

(Application filed July 18, 1901.)

(No Model.)

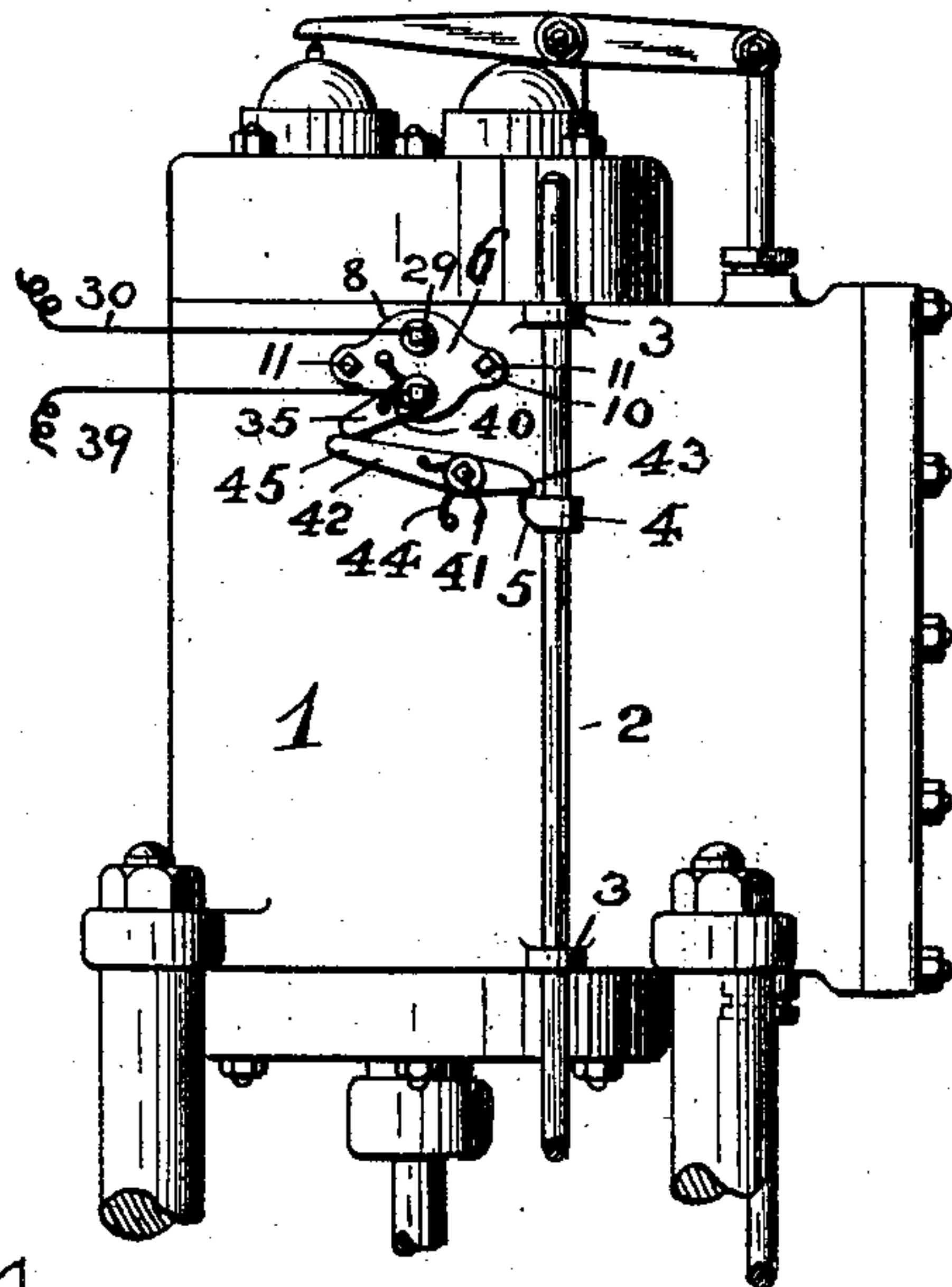


FIG. 1

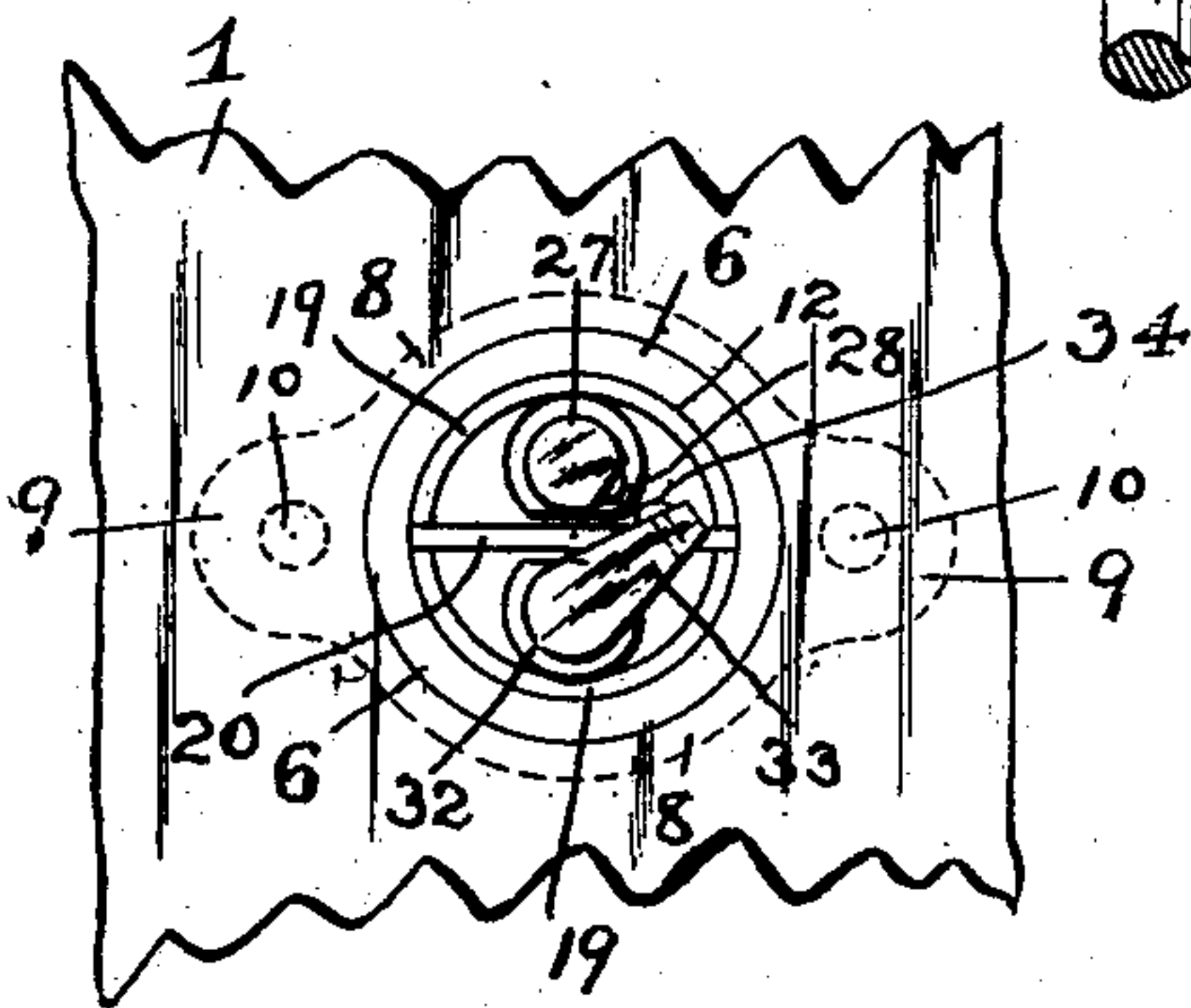


FIG. 2

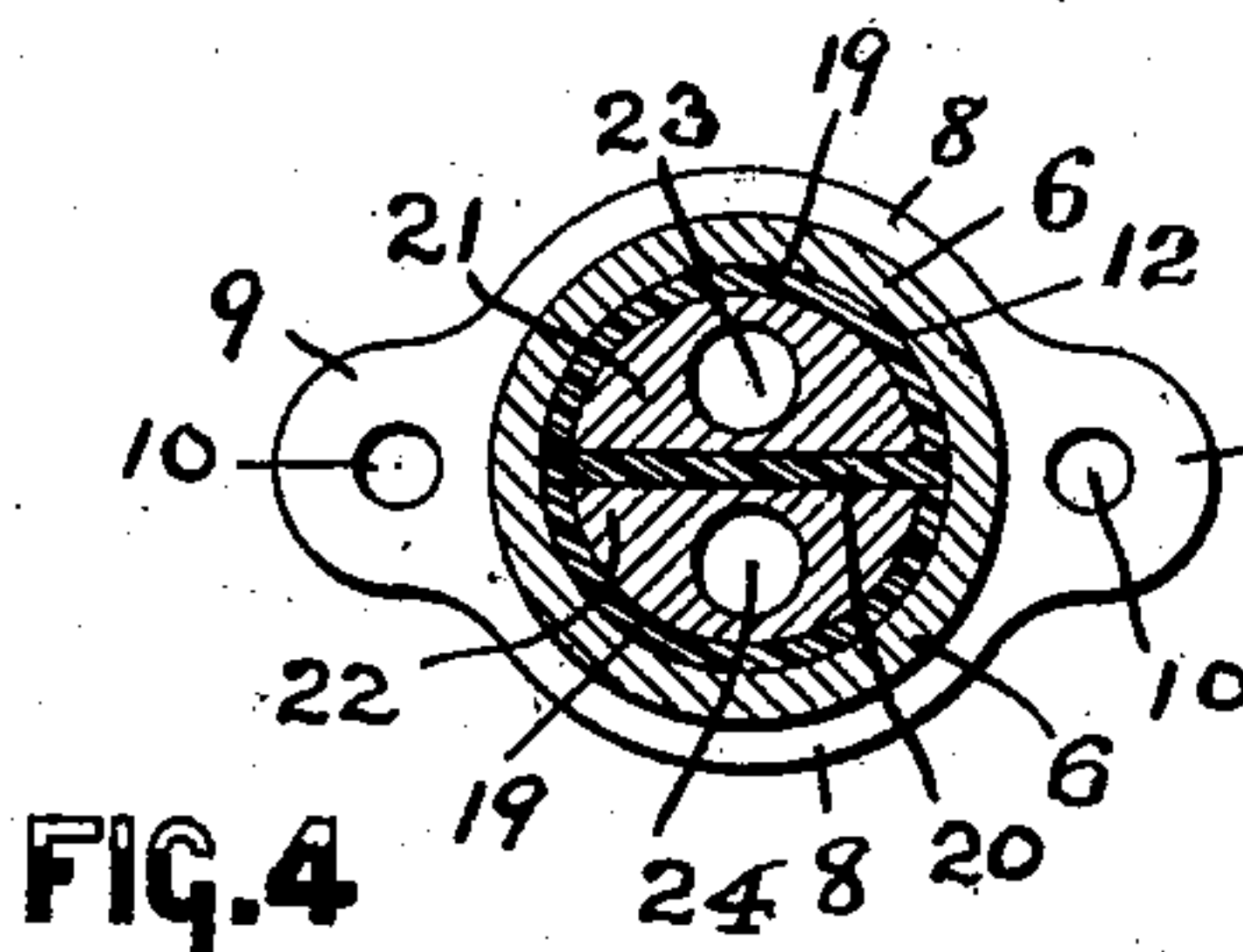


FIG. 4

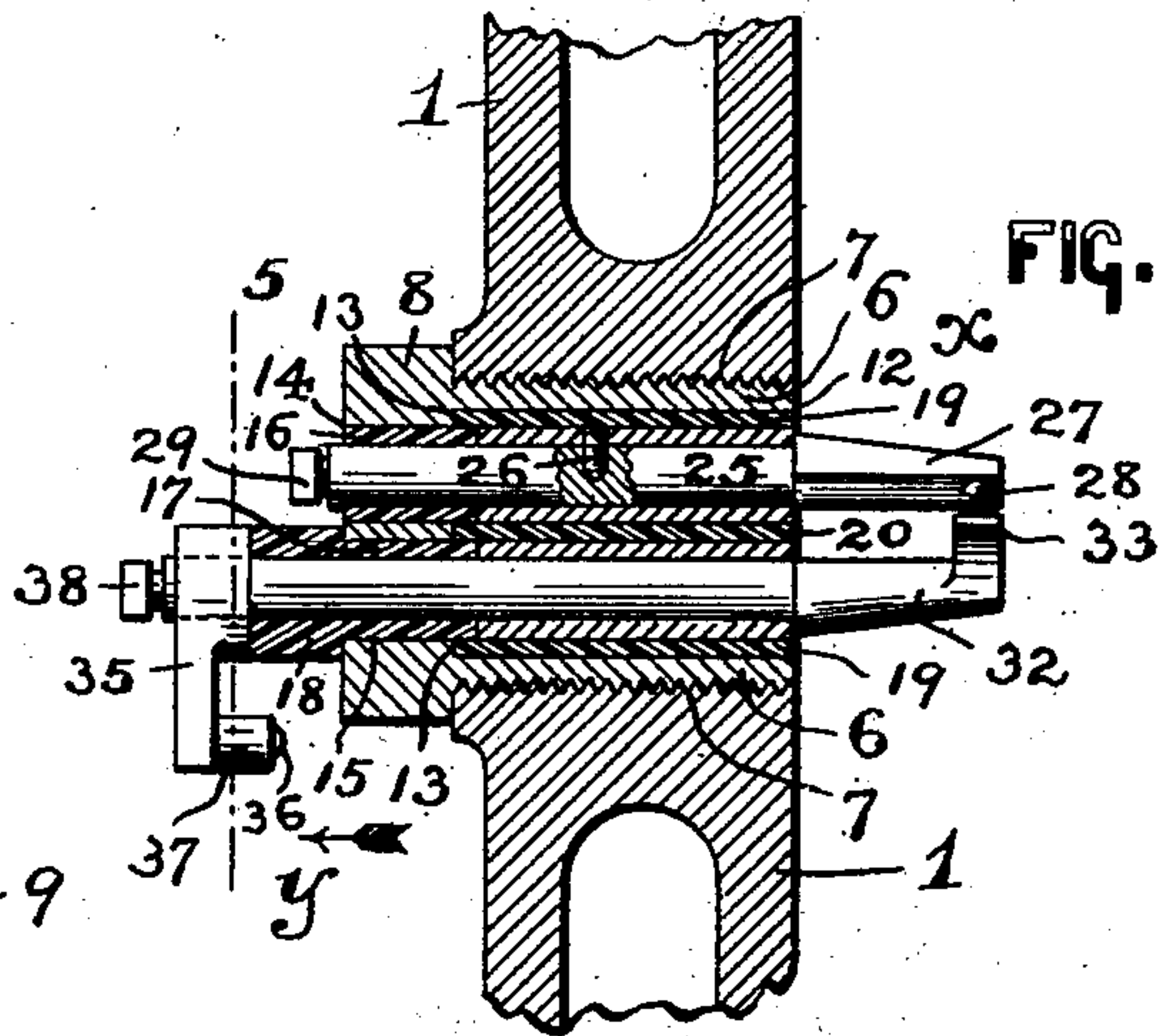
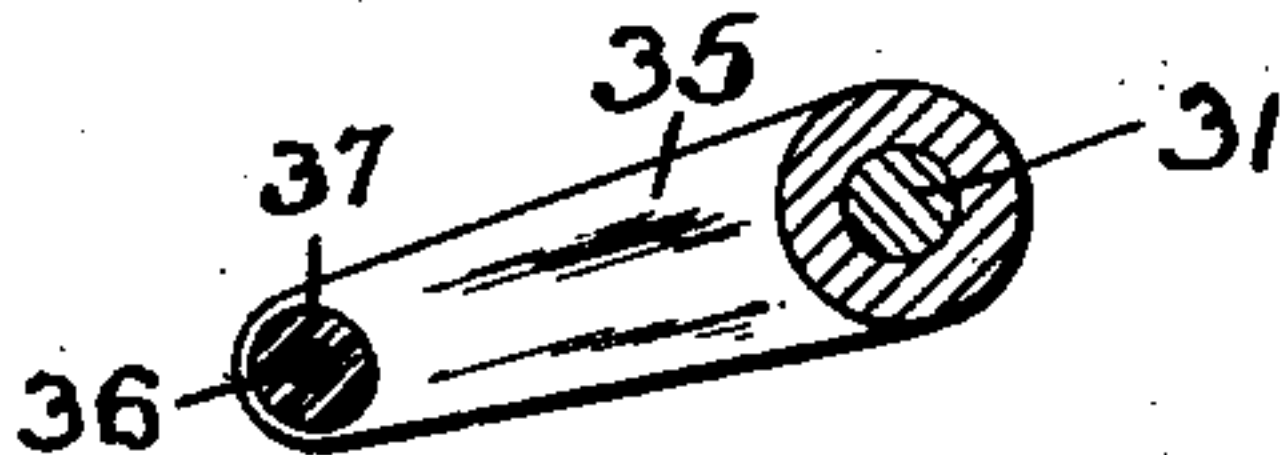


FIG. 3

WITNESSES:

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FIG. 5



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SPARKING IGNITER FOR EXPLOSIVE-GAS ENGINES.

SPECIFICATION forming part of Letters Patent No. 696,201, dated March 25, 1902.

Application filed July 18, 1901. Serial No. 68,730. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. SEITZ, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sparking Igniters for Explosive-Gas Engines; 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, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

This invention relates generally to improvements in explosive-gas engines; and the invention has reference more particularly to a novel construction of sparking igniter for explosive-gas engines.

My invention therefore has for its primary objects to provide an efficient, cheap, and simply-constructed electric igniter or sparker for engines of the character above set forth which is provided with a pair of contact making and breaking rods properly insulated from each other and both of which are directly in circuit with a source of electric current by having each contact making and breaking rod attached directly to a circuit-wire instead of connecting but one of said contact-making rods with a circuit-wire and attaching the other electric wire directly to the framework or cylinder of the engine, as heretofore.

My invention therefore consists in the novel construction of sparking igniter for explosive-gas engines as well as in the novel arrangements and combinations of the various parts thereof, all of which will be fully described in the accompanying specification and then finally embodied in the clauses of the claim.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a cylinder and valve-chest of one form of gas-engine, illustrating in connection therewith in front view the electric igniter or sparker and a means for causing the oscillatory motion of one of the contact making and breaking rods, (which will be hereinafter termed a "rock-shaft") for producing an electric spark. Fig. 2 is a rear end view of the sparking igniter and a

portion of the inner part of the engine-cylinder. Fig. 3 is a longitudinal vertical section of the igniter and a portion of the engine-cylinder. Fig. 4 is a vertical cross-section of the igniter, the two contact making and breaking rods being omitted in this view; and Fig. 5 is a vertical cross-section taken on line 5 in said Fig. 3 looking in the direction of the arrow *y*.

Similar numbers of reference are employed in all of the said above-described views to indicate corresponding parts.

In the said drawings, 1 indicates one form of piston-cylinder of an explosive-gas engine, and 2 is an actuating means, preferably in the form of a rod, which moves vertically in a pair of bearings 3. The said reciprocatory sliding rod 2 is provided with a suitable lug or projection 4, which is preferably formed with a chambered edge 5, as clearly illustrated in Fig. 1 of the drawings.

The sparking or igniting device, which is more clearly illustrated in Figs. 2, 3, and 4, consists, essentially, of a bushing 6, provided with an external screw-thread 7 for screwing it into a correspondingly screw-threaded hole or opening in the side of the cylinder 1, as clearly indicated in Fig. 3 of the drawings. This bushing is formed upon its outer face with a flange or shoulder 8, which is preferably provided with a pair of ears 9, having holes 10, in which may be arranged the bolts or screws 11 for securing the said bushing in position against turning after it has been screwed into place in the hole in the side of the cylinder 1. The interior of the bushing 6 is formed with a large cylindrical bore 12, which extends from the rear edge of the bushing to a point near the front of the bushing, whereby an internal shoulder or offset 13 is formed, as will be clearly seen from an inspection of Fig. 3. In its forward face the said bushing 6 is provided with a pair of holes or openings 14 and 15, as shown in said Fig. 3. Within the said hole or opening 14 is arranged a ring-shaped piece of insulating material 16, having its inner edge preferably extending slightly into the chamber formed by the bore 12, and in the other hole or opening 15 is placed a sleeve 17, also of insulating material, the said sleeve having its inner end projecting slightly into the chamber formed by

the said bore 12 and being provided with an enlarged portion 18 at its opposite end outside of the said bushing 6, substantially as illustrated. The inner cylindrical surface of the said bore 12 is lined with a ring or member 19, made of insulating material, and the chamber formed by the said bore 12 is also divided into two parts by a horizontally-arranged and flat sheet or piece 20, of insulating material, the inner edges of both the said ring or member 19 and said piece 20 extending directly back to the said shoulder 13, as clearly represented in said Fig. 3. The inner spaces formed by the said insulating members 19 and 20, as will be seen from an inspection of Figs. 2 and 4, provide two chambers, which are nearly of a semicylindrical internal configuration. Into each of these chambers I have slipped metallic blocks 21 and 22, which have a nearly semicylindrical configuration, as shown, the said block 21 being formed with a duct 23, and the block 22 being likewise formed with a duct 24. Within the said duct 23 is arranged a rod 25, the same being immovably held in its fixed position in the block 21 by means of a small set-screw 26, as shown in Fig. 3. The rear end portion 27 of this stem or rod 25 extends from the back of the bushing 6 and is provided with a suitable contact-making point 28. Into the forward end of the said rod or stem 25 is screwed a binding-screw 29, to which is attached one of the electric-circuit wires 30, as indicated in Fig. 1 of the drawings. Within the duct 24 of the other block 21 is arranged, so as to oscillate therein, a rock-shaft 31, which has its rear end 32 projecting from the rear of the bushing 6 and extending into the piston-chamber of the engine. This end portion 32 of the rock-shaft 31 is formed with a laterally-extending arm 33, on which there is a contact-making point 34, which is placed in such a manner upon the said arm 33 that it will make and break electrical contact with the point 28 as the rock-shaft is made to oscillate in the manner to be hereinafter set forth. Suitably secured upon the forward end of the said rock-shaft 31 is a rocker-arm 35, which is provided at its lower end with a pin 36 and a roller 37, made of insulating material. This end of the said rock-shaft is also provided with a binding-screw 38, to which is connected the other circuit-wire 39, coming from a suitable source of electrical energy. The said rocker-arm 35 is also connected by means of a spring 40, which is suitably insulated from the said shaft, with the face of the bushing 6, whereby the rocker-arm 35 will normally rest in the position indicated in Fig. 1, and the rock-shaft and its parts will be in the position indicated in Fig. 2, at which time there is no electrical connection between the two contact-points 28 and 34.

Pivotaly arranged upon a pin 41 on the side of the cylinder 1 is a spring-actuated dog 42, having its curved end 43 normally directly above the lug or projection 4 on the previously-

mentioned rod 2. Connected with the dog 42 and the side of the cylinder 1 is a spring 44, which is of greater strength than the spring 40, so that the lifting end 45 of the said dog 42, which rests against the insulated roller 37 of the rocker-arm 35, will normally cause the rock-shaft 31 to be in the position where there is no electrical contact between the points 28 and 34. During an upward stroke of the rod 2 the projection or lug 4 lifts the curved end 43 of the dog 42 and removes its opposite end 45 from engagement with the roller 37 on the rocker-arm 35 of the rock-shaft 31. The spring 40 will now force the arm 35 to follow the downward movement of the end 45 of the dog 42, and the points 28 and 34 will immediately establish a complete electrical circuit between the several parts of the mechanism, the wires 30 and 39, and the source of electrical supply to which said wires are connected. This electric circuit is established just before the projection or lug 4 has passed the curved end portion 43 of the dog 42. As soon as the said projection or lug 4 has passed this portion 43 the spring 44 of the dog 42 will immediately force the end 45 in an upward direction, whereby it strikes the roller 37 of the rocker-arm 35 with sufficient force to oscillate the rock-shaft 31, and thereby break the electrical contact between the points 28 and 34 and cause a spark, which ignites the gas in the cylinder and causes the explosion. Upon the return stroke of the rod 2 the inclined or chamfered edge 5 of the projection or lug 4 permits the lug 4 to pass the curved end portion 43 of the dog 42 without sufficiently moving the said dog to cause another electric spark.

From the above description of my invention it will be clearly seen that I have devised an efficient and effective as well as a simple construction of sparking igniter for explosive-gas engines in which a weak current of electricity can be used, since the igniter mechanism is directly connected with both electric wires, and I thereby avoid charging the whole frame or the cylinder of the engine with electricity to a great disadvantage, as heretofore.

In view of modifications of which the invention is obviously susceptible I do not limit my invention to the exact constructions and combinations of parts herein shown and described; but various changes and alterations may be made which fall within the spirit and scope of my invention.

Having thus described my invention, what I claim is—

1. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a bore, an insulating-ring in said bore, and a dividing-wall of insulating material, forming a pair of chambers, and an electrical contact making and breaking rod in each chamber, substantially as and for the purposes set forth.

2. A sparking igniter for explosive-gas en-

gines, consisting, essentially, of a bushing provided with a bore, an insulating-ring in said bore, and a dividing-wall of insulating material, forming a pair of chambers, a block in
5 each chamber, each block being provided with a duct, and an electric contact making and breaking rod in each duct, substantially as and for the purposes set forth.

3. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a bore, an insulating-ring in said bore, and a dividing-wall of insulating material, forming a pair of chambers, a block in
15 each chamber, each block being provided with a duct, a contact-making rod in one of said ducts, and means for securing said rod in its fixed position in said duct, a rock-shaft in the other of said ducts, and means for rocking said shaft and causing it to make and
20 break electric contact with said contact-making rod, substantially as and for the purposes set forth.

4. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a cylindrical bore, an insulating-ring in said bore, and a dividing-wall of insulating material, forming a pair of semicylindrical chambers, a semicylindrical block in each semicylindrical chamber, each block being
30 provided with a duct, a contact-making rod in one of said ducts, and means for securing said rod in its fixed position in said duct, a rock-shaft in the other of said ducts, and means for rocking said shaft and causing it to make and break electric contact
35 with said contact-making rod, consisting, of a rocker-arm on said rock-shaft, an insulated roller on said arm, and a spring-actuated dog, adapted to be brought in forcible engagement with said roller, substantially as
40 and for the purposes set forth.

5. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a cylindrical bore, and a pair of
45 insulated openings 14 and 15, a shoulder 13 in said bushing, an insulating-ring in said bore, and a dividing-wall of insulating material, said ring and wall abutting against said shoulder 13 and forming a pair of semicylindrical chambers, and an electric contact
50 making and breaking rod in each insulated opening 14 and 15, extending into said chambers, substantially as and for the purposes set forth.

6. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a cylindrical bore, and a pair of
55 insulated openings 14 and 15, a shoulder 13 in said bushing, an insulating-ring in said bore, and a dividing-wall of insulating material, said ring and wall abutting against

said shoulder 13 and forming a pair of semicylindrical chambers, a semicylindrical block in each semicylindrical chamber, each block being provided with a duct, and an electric
65 contact making and breaking rod in each insulated opening 14 and 15, extending into the said ducts, substantially as and for the purposes set forth.

7. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a cylindrical bore, and a pair of
70 insulated openings 14 and 15, a shoulder 13 in said bushing, an insulating-ring in said bore, and a dividing-wall of insulating material, said ring and wall abutting against said shoulder 13 and forming a pair of semicylindrical chambers, a semicylindrical block in each semicylindrical chamber, each block
75 being provided with a duct, a contact-making rod in said insulated opening 14, extending into the duct in one of said semicylindrical blocks, and means for securing said rod in its fixed position in said duct, a rock-shaft in said
80 insulated opening 15, extending into the duct in the other of said semicylindrical blocks, and means for rocking said shaft and causing it to make and break electric contact with said contact-making rod, substantially as and
85 for the purposes set forth.

8. A sparking igniter for explosive-gas engines, consisting, essentially, of a bushing provided with a cylindrical bore, and a pair of
90 insulated openings 14 and 15, a shoulder 13 in said bushing, an insulating-ring in said bore, and a dividing-wall of insulating material, said ring and wall abutting against said shoulder 13 and forming a pair of semicylindrical chambers, a semicylindrical block in each semicylindrical chamber, each block
95 being provided with a duct, a contact-making rod in said insulated opening 14, extending into the duct in one of said semicylindrical blocks, and means for securing said rod in its fixed position in said duct, a rock-shaft in
100 said insulated opening 15, extending into the duct in the other of said semicylindrical blocks, and means for rocking said shaft and causing it to make and break electric contact with said contact-making rod, consisting, of
105 a rocker-arm on said rock-shaft, an insulated roller on said arm, and a spring-actuated dog, adapted to be brought in forcible engagement with said roller, substantially as and
110 for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this
16th day of July, 1901.

FREDERICK A. SEITZ.

Witnesses:

FREDK. C. FRAENTZEL,
GEO. D. RICHARDS.