No. 706,492. Patented Aug. 5, 1902.

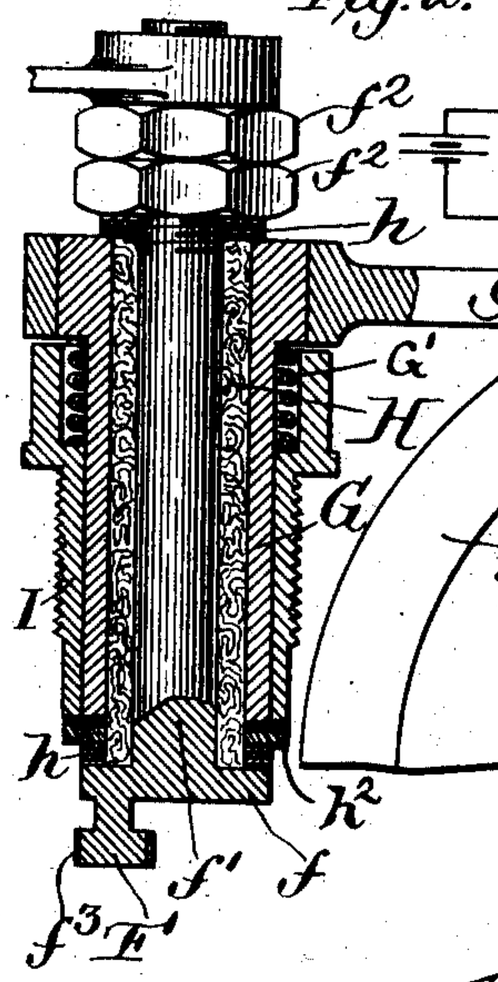
J. LIZOTTE.

SPARKING IGNITER FOR EXPLOSIVE ENGINES.

(Application filed Dec. 11, 1901.)

(No Model.)

Fig. 2.



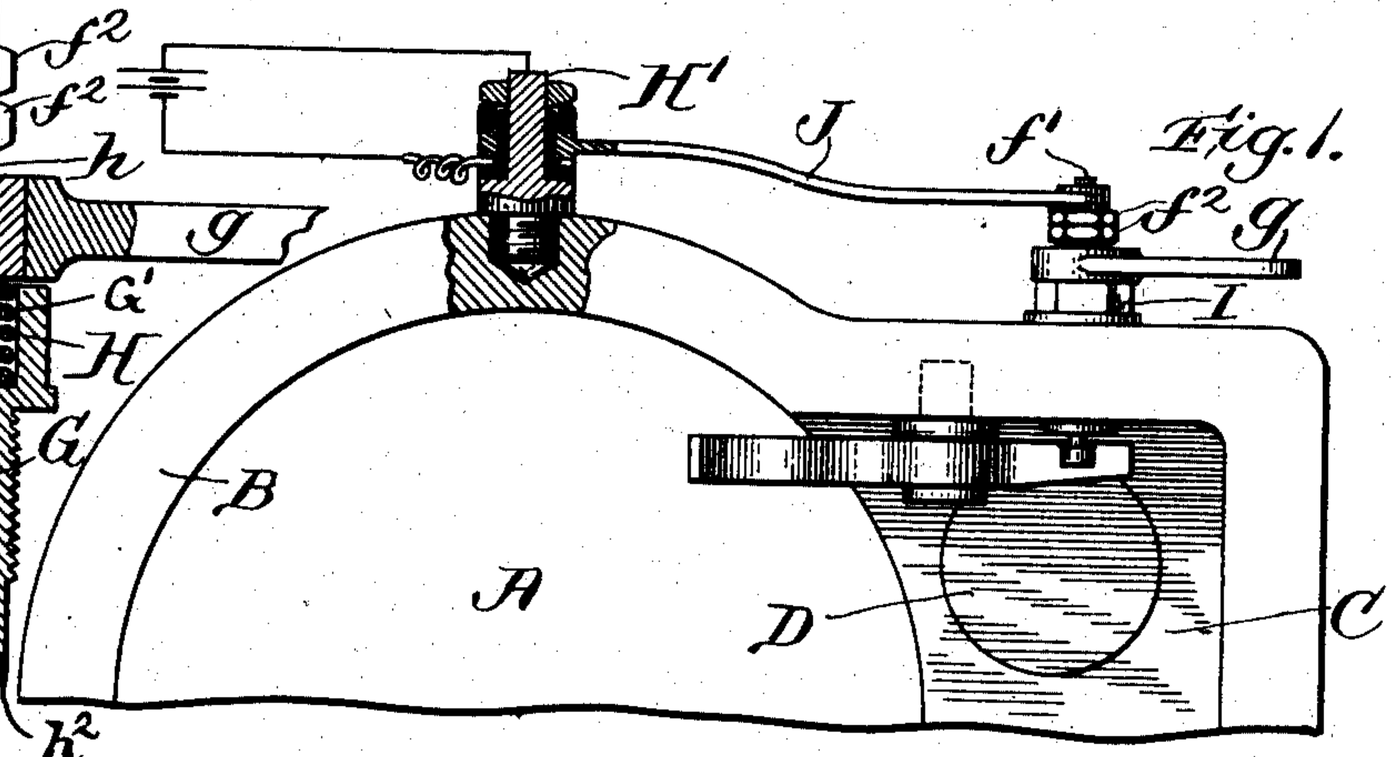


Fig. 1.

Fig. 3.

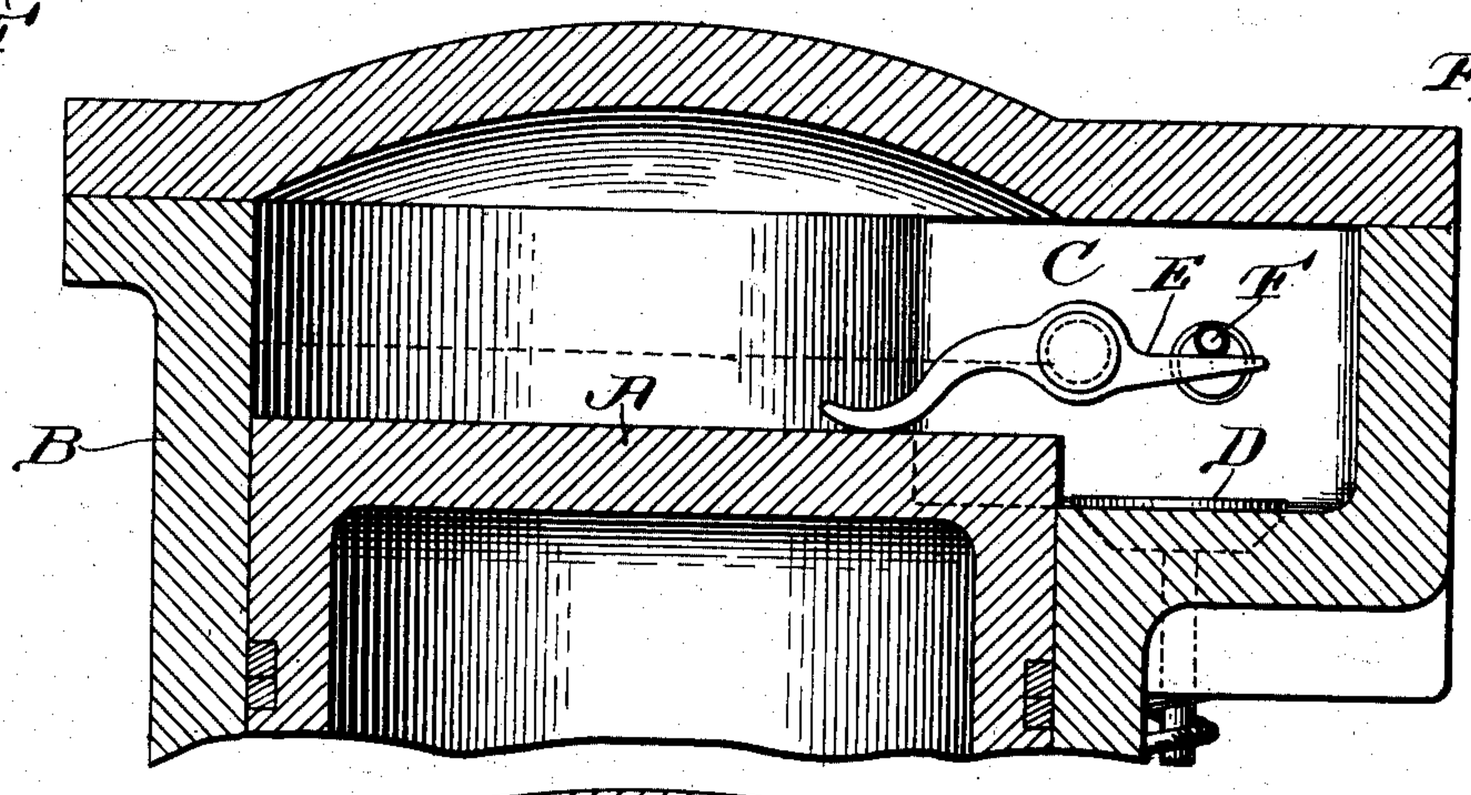
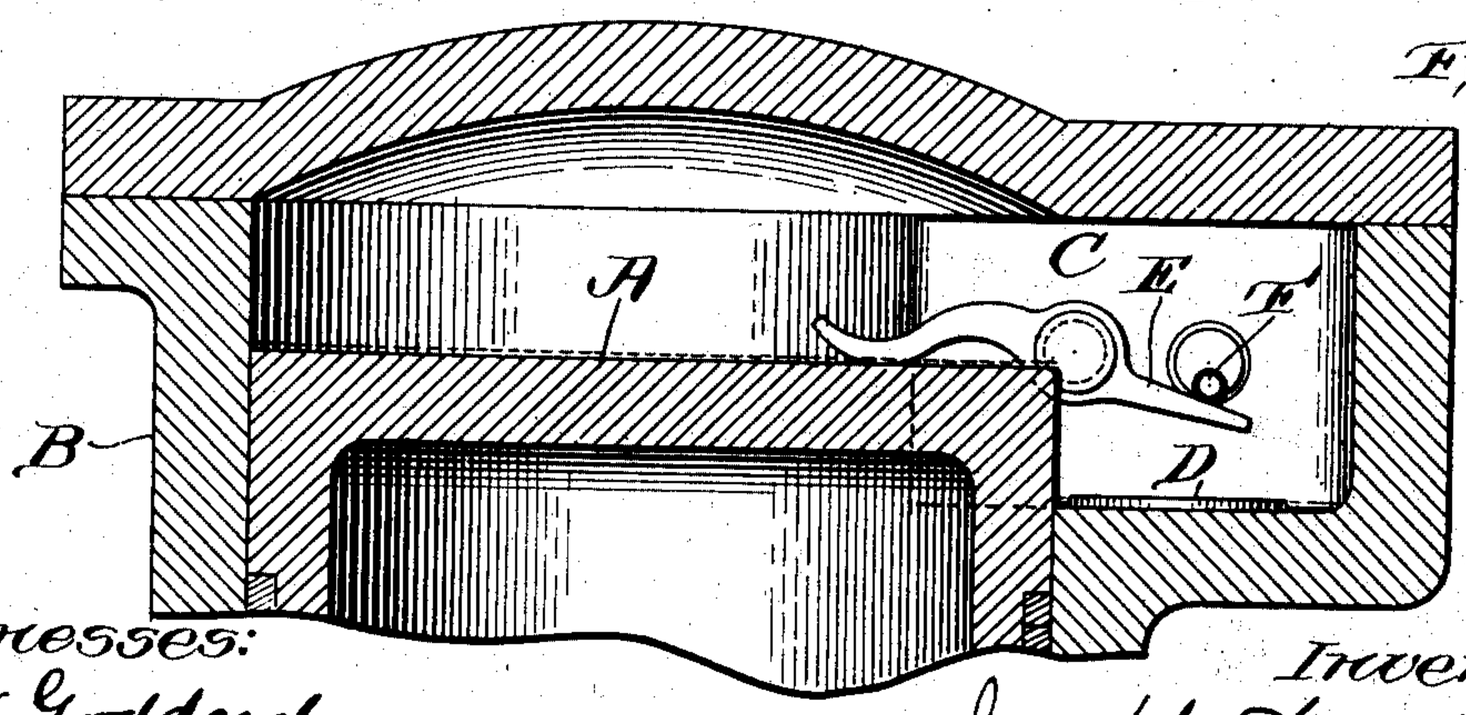


Fig. 4.



Witnesses:
G. N. Goddard
Katharine A. Dugan

Inventor:
Joseph Lizotte
by Ira L. Fish Attorney.

UNITED STATES PATENT OFFICE.

JOSEPH LIZOTTE, OF QUINCY, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MELLEN N. BRAY, OF BOSTON, MASSACHUSETTS.

SPARKING IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 706,492, dated August 5, 1902.

Application filed December 11, 1901. Serial No. 85,442. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LIZOTTE, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Sparkers for Explosive-Engines, of which the following is a specification.

The invention relates to igniting mechanisms or sparkers used in explosive-engines for igniting the explosive mixture which is introduced into the cylinder back of the piston. When engines of this character are running at high speed, it is desirable for their most efficient action that the ignition of the explosive mixture in the explosion-chamber should take place before the piston reaches the limit of its rearward stroke, and it is customary to so construct the igniting mechanism that it is operated during the return or compressing stroke of the piston and before the piston has completed its rearward movement. If the igniting devices are timed for the most efficient action of the engine when running at a high speed, the ignition will take place too soon for the most efficient action when running at slow speed. Moreover, when starting the engine the operation of the igniter before the piston has reached the limit of its stroke may cause the piston to "kick back." It is therefore desirable to provide the igniting mechanism with means for varying the time of ignition with relation to the travel of the piston and to so construct this means that the igniting devices may be operated at the proper time with relation to the position of the piston both when starting and when running at different speeds.

The igniting mechanism usually includes an electric sparker for producing an igniting-spark, and a simple and efficient construction which admits of the adjustments referred to comprises a sparker which may be adjusted with relation to its operating mechanism to vary the timing of its operation. This manner of effecting the adjustment in the igniting mechanism is advantageous not only in that it admits of a simple construction of igniting mechanism, but also in that it admits of the operation of the sparker by the piston, thereby insuring a more accurate and reliable action of the sparker, especially when running at high speed, than in cases where the sparker is operated from a cam-shaft or otherwise.

A construction embodying the invention is shown in the drawings, in which—

Figure 1 is an end view of the cylinder with the cylinder-head removed to show the sparker. Fig. 2 is a sectional view showing the manner of mounting the adjustable contact of the sparker. Figs. 3 and 4 are sectional views through the end of the cylinder, showing the adjustment of the sparker when running at high speed and when starting the engine.

The engine is provided with the usual piston A, which reciprocates in the cylinder B. The mixture of air and gas is introduced into the explosion-chamber C of the engine through the intake-valve D. The explosive mixture is ignited after being compressed by a sparker comprising two contacts E and F, included in an electric circuit, one of the contacts E being moved at the proper times to break the circuit, and thus produce a spark which ignites the mixture in the explosion-chamber.

When the engine is running at high speed, the highest efficiency is obtained by operating the sparker before the piston reaches the limit of its compressing stroke, and the point in the travel of the piston where the sparker should be operated will vary with different speeds. In starting engines of this character it is customary to turn the crank-shaft by hand, and at such time the sparker should be operated when the piston is substantially at the limit of its throw, as otherwise the piston will be suddenly forced forward before it reaches the limit of its rearward stroke, thus turning the crank-shaft in a direction opposite to that intended and opposite to the direction in which it is being turned by hand. In other words, with the sparker adjusted for the best results when running by power it would be difficult, if not impractical, to start the engine in the usual manner.

To enable the igniting mechanism to be operated to give the highest efficiency when running by power and also to be operated properly when starting the engine, the sparker is so constructed and mounted that it may be

adjusted with relation to its operating mechanism to vary the timing of its operation. To this end the contact E, which, as shown, is in the form of a lever, is arranged to be engaged at intervals by its operating mechanism, and the contact F is mounted for adjustment to change the position of the contact E with relation to its operating mechanism. As shown, the lever E is arranged to be engaged by the piston on its rearward stroke, and the piston in this construction forms the operating mechanism for the sparker. This mode of operating the sparker is preferred because of the simplicity of the construction and because of the accuracy and reliability of the operation.

The adjustment of the contact F is effected by mounting the contact eccentrically in the wall of the explosion-chamber and providing external means whereby the contact may be turned. As shown, the contact F is a pin projecting from a flange *f*, formed on the end of a stud *f'*, the pin being eccentric to the axis of the stud. The pin may be provided with a platinum sleeve f^3. The stud *f'* is carried by a sleeve G and is separated therefrom by a tube H, of asbestos or other suitable insulating material. The stud *f'* is secured in the sleeve G by nuts f^2, screwed onto the end of the stud and serving to bind the parts together. Disks *h*, of insulating material—such, for instance, as mica—are interposed between the flange *f* and a washer h^2, which engages the end of the sleeve G and between the nuts f^2 and the outer end of the sleeve. The sleeve G is mounted to turn in a bushing I, screwed into the wall of the explosion-chamber, and the outer end of the sleeve is provided with a handle *g*, by which the sleeve may be conveniently turned to adjust the sparker.

Electrical connection is made with the stud *f'* through a stationary bar J, one end of which engages the outer nut f^2 and the other end of which is secured to a stud H', from which it is separated by suitable insulation. The bar J is connected with one of the wires of an electric circuit, the other wire of which connects with the contact E through the metallic parts of the engine.

When the engine is running at high speed, the sparker is adjusted, as shown in Fig. 3, and the piston operates the sparker before it reaches the limit of its rearward stroke. When the engine is to be started, the contact F is turned into the position shown in Fig. 4, thus bringing the lever E into such position that the piston will not operate the sparker until it is substantially at the end of its rearward stroke. If found desirable, the contact F may be moved into any position intermediate those shown to vary the timing of the sparker in accordance with the speed of the engine.

The sleeve G may be held in any of its adjusted positions by a tension-spring G', interposed between the bushing I and a flange on the outer end of the sleeve and holding the washer h^2 in frictional engagement with the end of sleeve G. The contact E may be held normally in engagement with the contact F by gravity or by a spring.

What I claim, and desire to secure by Letters, is—

1. In a sparker for an explosive-engine a contact F eccentrically formed on a stud *f'*, an adjustable sleeve G carrying the stud and insulated therefrom, and a bushing I in which the sleeve is frictionally held from rotation, substantially as described.

2. In a sparker for explosive-engines, a stud *f'* provided with an eccentric contact, an adjustable sleeve G in which said stud is secured against rotation, insulating material separating the stud and sleeve, and means for holding said sleeve in its adjusted positions, substantially as described.

3. In a sparker for explosive-engines, a stud *f'* provided with an eccentric contact F, a sleeve G, an insulating-sleeve H between the stud and the sleeve G, means for binding the stud and the sleeves G and H together, a bushing I in which the sleeve G is mounted, and a spring G' for frictionally holding the sleeve G in its adjusted positions, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH LIZOTTE.

Witnesses:

IRA L. FISH,

KATHARINE A. DUGAN.