

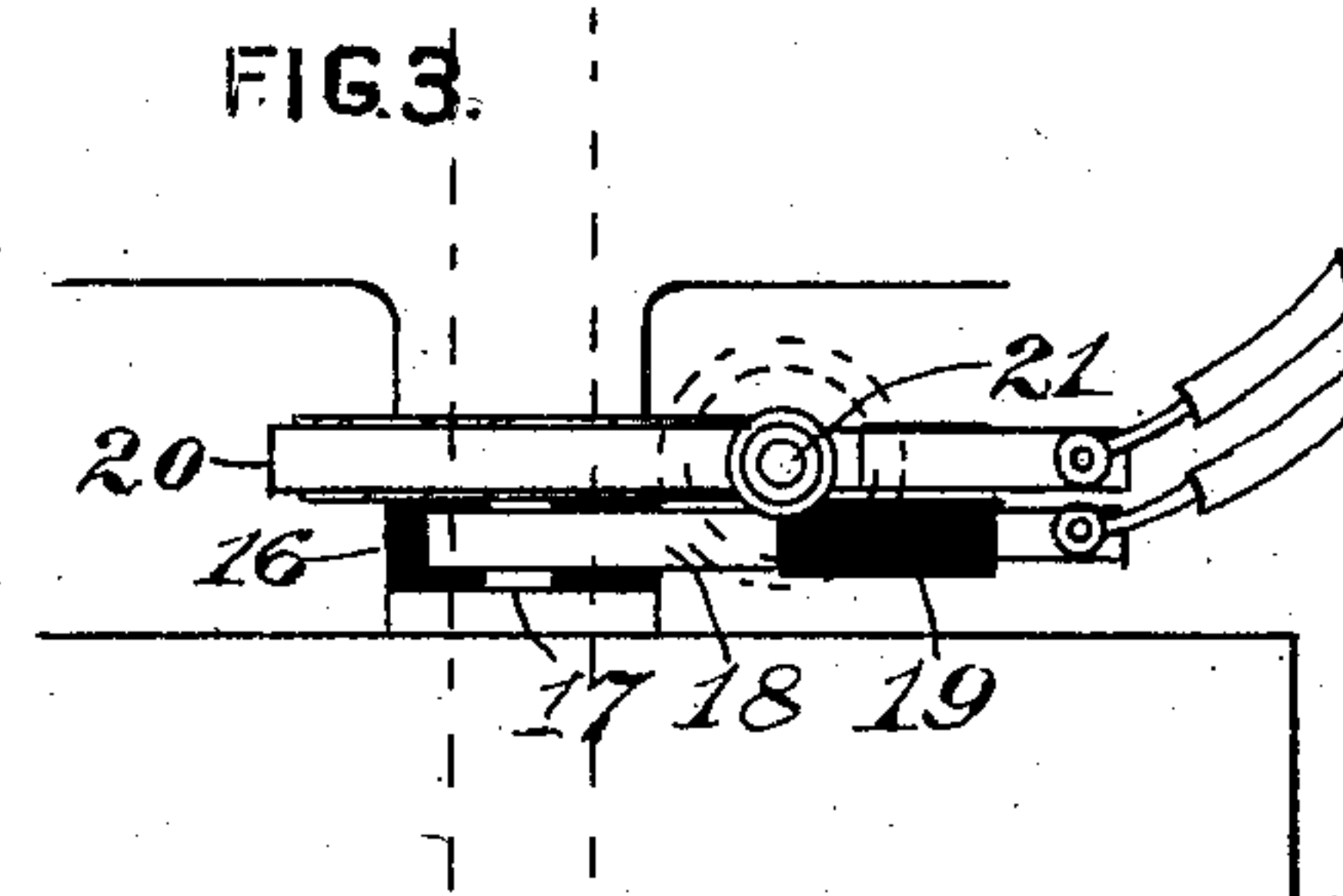
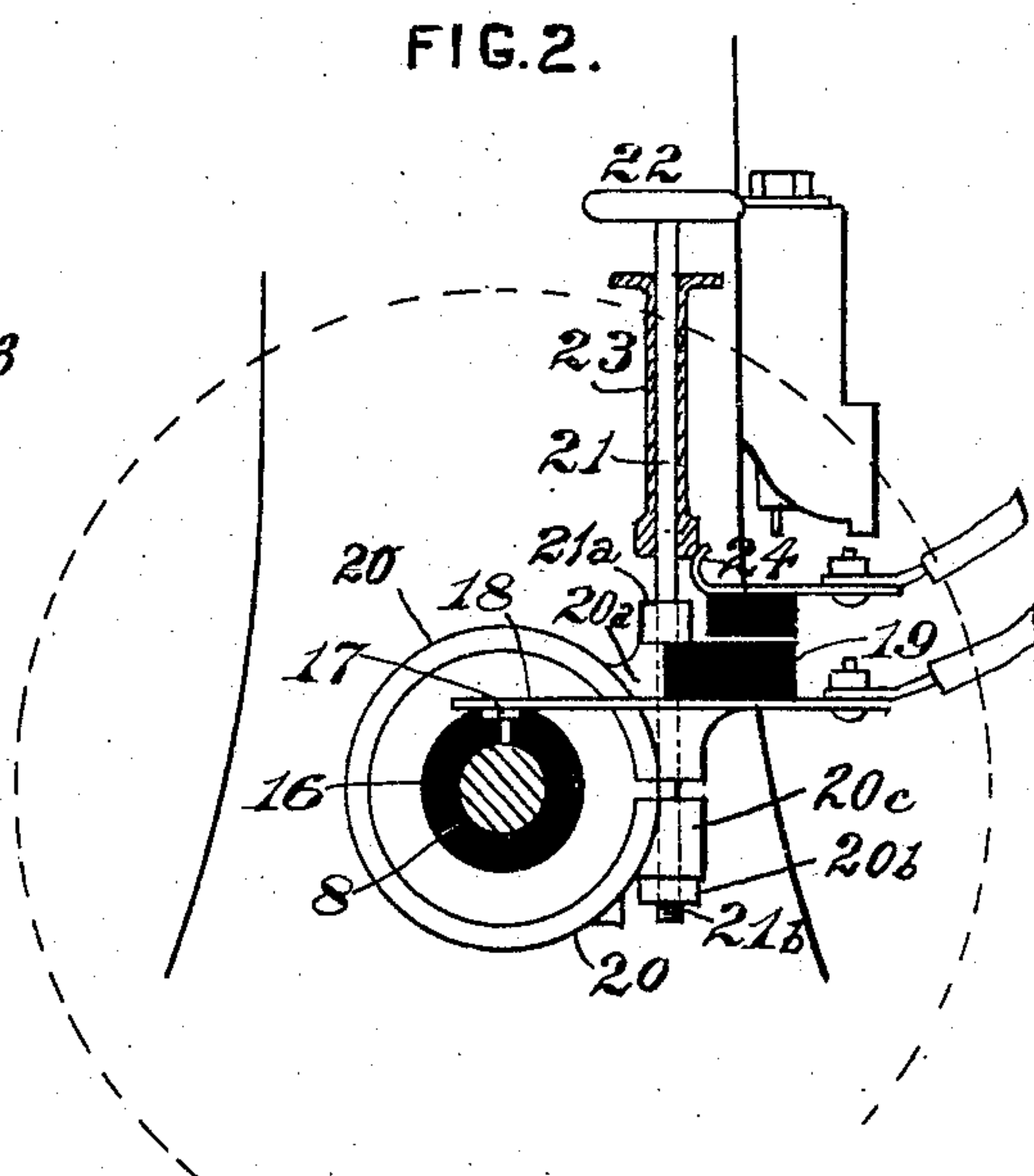
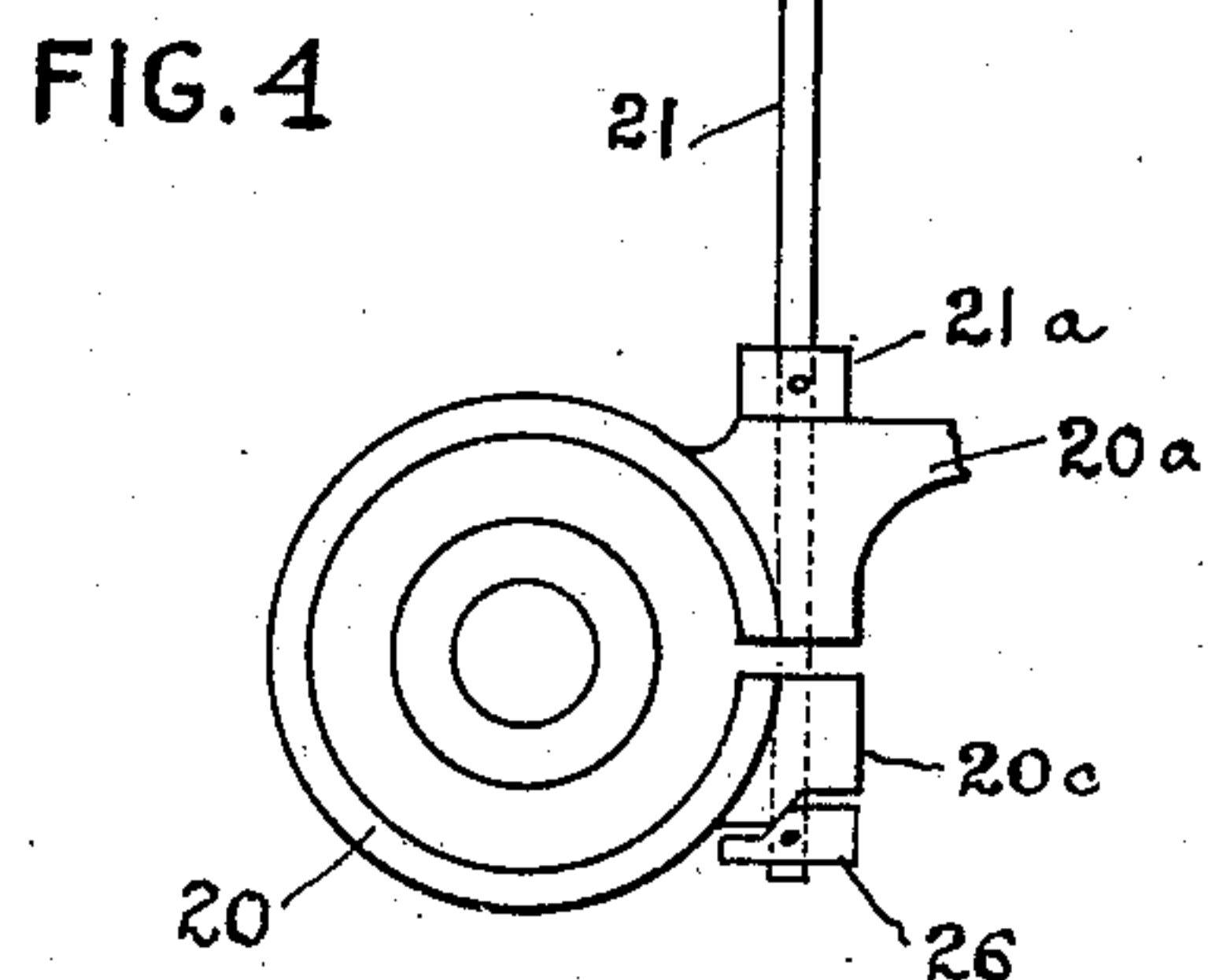
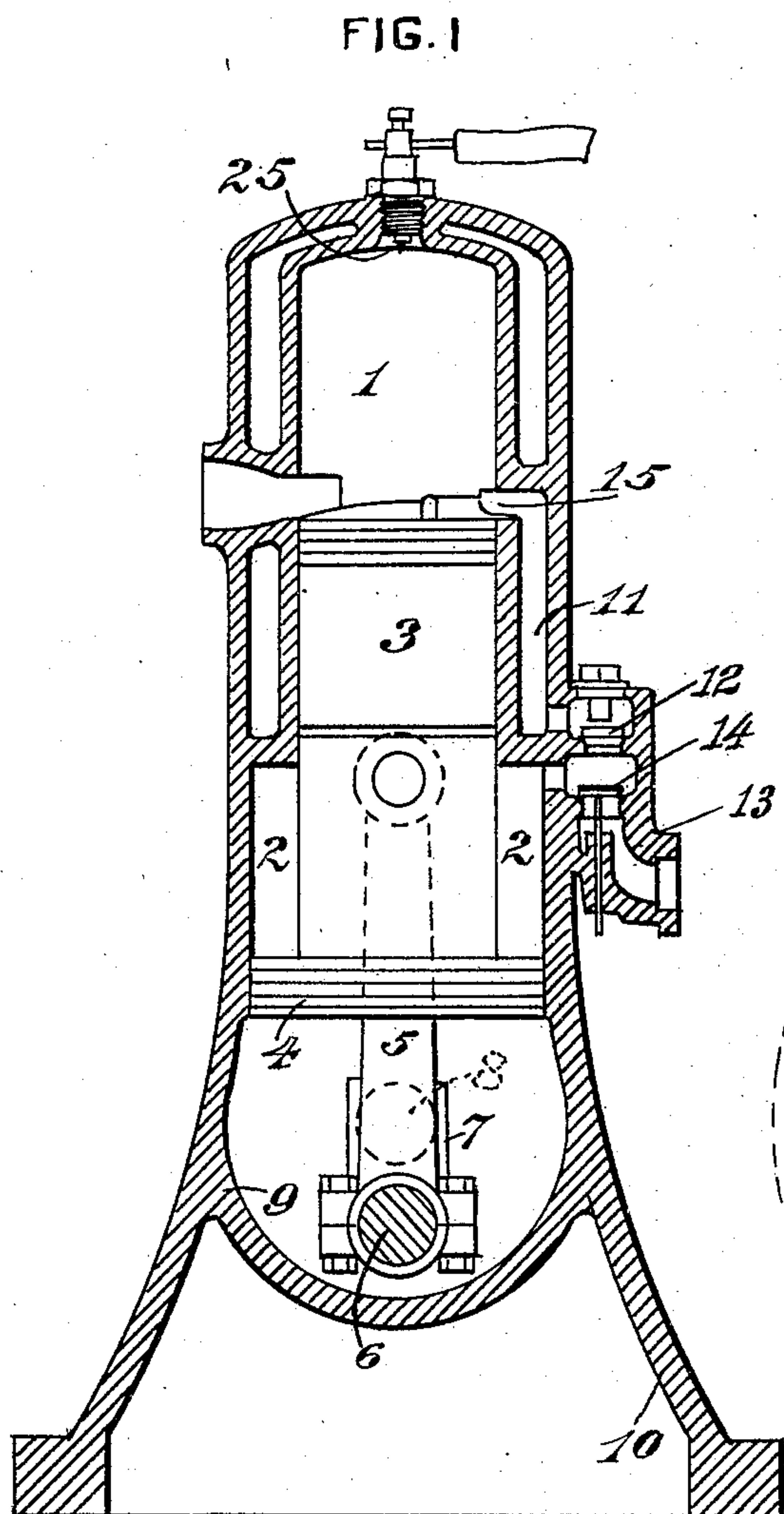
No. 788,253.

PATENTED APR. 25, 1905.

C. S. DUTTON.

ELECTRIC SPARKING DEVICE FOR EXPLOSIVE ENGINES.

APPLICATION FILED JAN. 26, 1904.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES SEYMOUR DUTTON, OF PERTH AMBOY, NEW JERSEY.

## ELECTRIC SPARKING DEVICE FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 788,253, dated April 25, 1905.

Application filed January 26, 1904. Serial No. 190,689.

*To all whom it may concern:*

Be it known that I, CHARLES SEYMOUR DUTTON, of Perth Amboy, in the county of Middlesex and State of New Jersey, have invented  
5 a certain new and useful Improvement in Electric Sparking Devices for Explosive-Engines, of which improvement the following is a specification.

My invention relates to engines of the internal-combustion type; and its object is to  
10 provide means for igniting the gas at any desired point in the revolution of the engine and for varying the time of ignition at will and to provide means for conveniently interrupting the ignition.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a gas-engine, illustrating an embodiment of my invention; Fig. 2, a partial end view of the same  
20 with the crank-shaft in section, and Fig. 3 a partial plan view. Fig. 4 is a modified form of the means for adjustably clamping the brush-holder.

In the practice of my invention I provide a cylinder having an upper working chamber 1 and an adjoining pump-chamber 2 of larger diameter, in which cylinder there is fitted a  
30 differential piston composed of a body 3, which fits the bore of the working chamber 1, and a head 4, which fits the bore of the pump-chamber 2. The piston is coupled by a connecting-rod 5 to the pin 6 of a crank 7, formed  
35 on a crank-shaft 8, which rotates in bearing in a crank-case 9, which, with a lower bed plate or base 10, is cast integral with the cylinder.

An annular reservoir 11 is located around the lower portion of the working chamber 1  
40 of the cylinder, and communication between said reservoir and the pump-chamber 2 is controlled by an inlet-valve 12, which opens inwardly or toward the reservoir. A gas-supply nozzle 13, to which a gas-supply pipe  
45 is connected, is formed on the side of the pump-chamber, and communication between said nozzle and the pump-chamber is controlled by a delivery-valve 14, which opens inwardly or toward the pump-chamber. A port 15 leads  
50 from the reservoir 11 to the working cham-

ber 1 of the cylinder in such position as to be uncovered by the body 3 of the piston at or near the outer end of its stroke, the piston in the instance shown acting as the valve which controls said port.

A circular commutator 16, which is made of insulating material or is insulated from the crank-shaft 8, is secured to said shaft and carries upon its periphery a metallic contact-piece 17, which is electrically connected to  
55 the crank-shaft and through the same to the frame of the engine. A brush 18 of electrical conducting material which is supported through the intermediation of a plate or block of insulating material 19 on an adjustable  
60 brush-holder 20 abuts continuously on the periphery of the commutator 16 and is connected with any suitable source of electric current. The brush-holder 20 is in the specific  
65 instance exemplified in the form of a metal band embracing a circular support on the engine-frame concentric with the shaft, said band being cut through on one side and having its extensions or ends 20<sup>a</sup> and 20<sup>c</sup> connect-  
70 ed by a shifting or actuating rod 21, which in this instance is shown as passing through the extensions or ends 20<sup>a</sup> and 20<sup>c</sup> and having a screw-thread 21<sup>b</sup> at and near its lower end, engaging a nut 20<sup>b</sup>, attached in any suitable  
75 manner to the lower side of the extension 20<sup>c</sup>. A collar 21<sup>a</sup> is attached to the rod in any suitable manner and abuts on the upper extension or end 20<sup>a</sup> of the brush-holder, said rod 21 being for convenience of operation provided  
80 at its upper end with a hand-wheel 22. The shifting or actuating rod 21, it will be seen, can be operated with one hand to effect the two functions of angularly adjusting the brush-holder on its support and clamping it in ad-  
85 justed position, and it will be obvious that, if preferred, instead of providing the end of the rod 21 with a screw-thread, which engages the fixed nut 20<sup>b</sup> or the extension or end 20<sup>c</sup>, the  
90 nut 20<sup>b</sup> may be done away with and the lower end of rod 21 be provided, as shown in Fig. 4, with a cam 26 or other equivalent means,  
95 whereby the two extensions or ends 20<sup>a</sup> and 20<sup>c</sup> may be brought closer together, and thereby causing the cut metal band of the ad-  
100 justable brush-holder 20 to tightly embrace



its circular support. A metal tube 23 is fitted to slide on the rod 21 into and out of contact with an electrical terminal 24, supported on the brush-holder, but insulated therefrom.

5 An igniting-plug having points 25, connected through an induction-coil or other suitable means with the contact-piece 17 and brush 18, is inserted in the working chamber 1 of the cylinder.

10 In the operation of the engine the outward or downward stroke of the piston by tending to form a vacuum in the pump-chamber 2 raises the valve 14 and draws gas from the supply-nozzle into said chamber. The inward  
15 or upward stroke of the piston raises the valve 12 and forces the gas into the reservoir 11. Near the end of the outward stroke the piston uncovers the port 15 and allows the gas in the reservoir to escape into the working chamber  
20 1 of the cylinder. As all the openings in the working chamber are closed early in the inward stroke, the gas is strongly compressed in said chamber. At or near the end of the inward stroke the revolution of the crank-  
25 shaft brings the contact-piece 17 under and in contact with the brush 18, as shown in Figs. 2 and 3, thereby establishing an electric current which causes a spark or series of sparks to pass between the points 25 of the igniting-  
30 plug, thereby firing the gas and effecting the downward stroke of the piston. When it is desired to vary the time of ignition, the brush-holder 20 is loosened slightly by turning the rod 21 (shown either in Fig. 1 or 4) in one di-  
35 rection, when the two extensions or ends 20<sup>a</sup> and 20<sup>c</sup> of the holder will separate and permit the same to be adjusted angularly on its support, which may be done by movement of the shifting or actuating rod 21 transverse to the  
40 axis of shaft, so as to cause the sparks to be made earlier or later in the cycle, as desired,

and may be quickly accomplished by the use of one hand only. The brush-holder is then clamped in the adjusted position by turning the rod 21 in the opposite direction, and there- 45 by bringing the two extensions or ends 20<sup>a</sup> and 20<sup>c</sup> together. The electric current may be broken and ignition stopped when desired by sliding the metal tube 23 on the rod 21 out of contact with the terminal 24. 50

It will be obvious to those skilled in the art that two or more cylinders may, if desired, be employed in connection with a single crank-shaft and that a single reservoir common to all the cylinders may be applied. A single 55 commutator, brush, and switch may in such case be used to regulate the period of ignition in the several cylinders. Mechanically-operated valves of the slide, piston, puppet, or other type may be substituted for the auto- 60 matically - operating valves described and shown without departure from the spirit of my invention, and in lieu of controlling the port which establishes communication be- 65 tween the reservoir and the working chamber of the cylinder by the piston a valve opening toward the working chamber and either automatically or mechanically actuated may, if desired, be employed to control said port.

I claim as my invention and desire to secure 70 by Letters Patent—

In a gas-engine, the combination of an igniting-plug located in the cylinder of the engine, a terminal in the line of an electric circuit connected with the igniting-plug, a shift- 75 ing or actuating rod, and a metal piece movable on the shifting or actuating rod into and out of contact with the terminal.

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Witnesses:

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