No. 705,996. Patented July 29, 1902.

G. A. GRAVES.

SPARKER FOR EXPLOSIVE ENGINES.

(Application filed Oct. 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

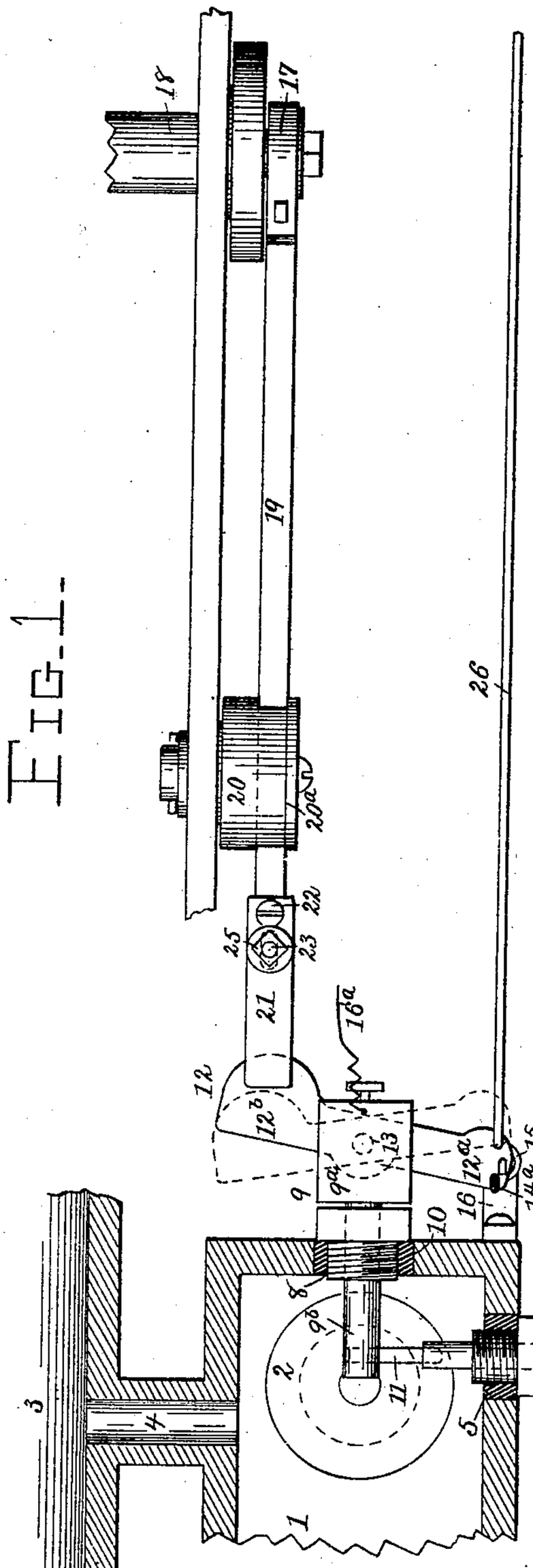
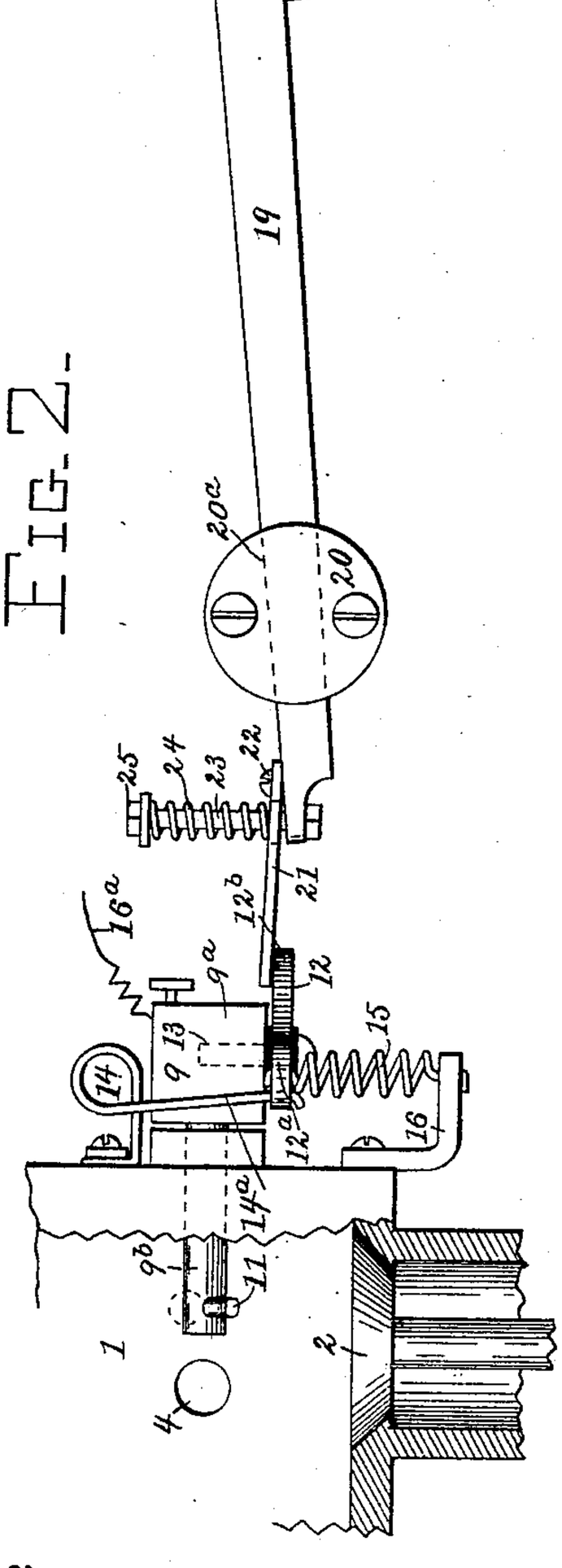


FIG. 2.



Witnesses:
F. L. Ourand.
Frank G. Radelfinger.

Inventor:
George A. Graves,
by Lamb Ruggles & Co.
Attorneys.

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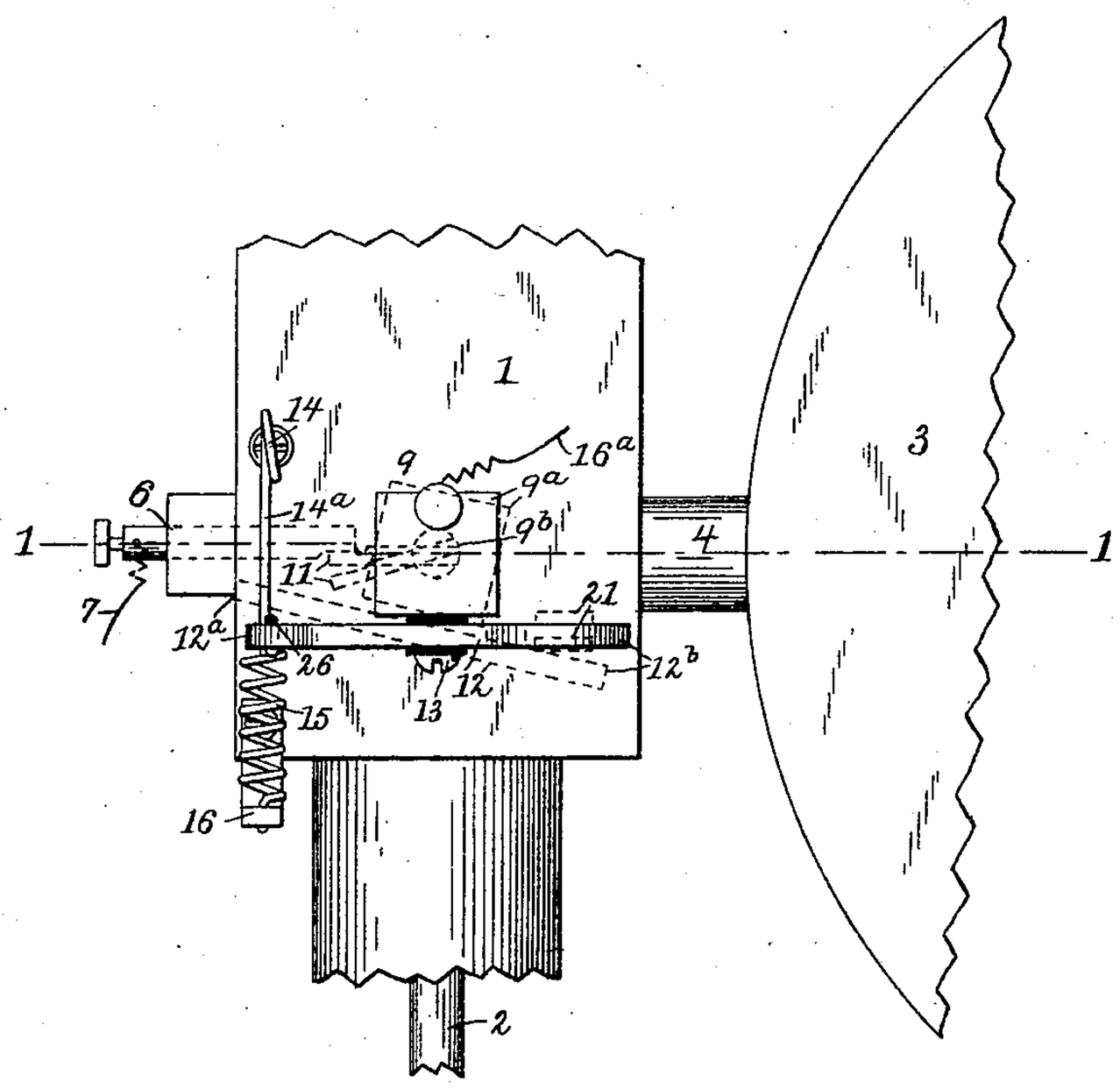
FIG. 3.



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F. L. Ourand
Frank G. Radelfinger.

Inventor:
George A. Graves,
by Lamb Sagger & Co.,
Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE A. GRAVES, OF JOPLIN, MISSOURI, ASSIGNOR OF TWO-THIRDS TO ALFRED REYNOLDS AND THOMAS W. CUNNINGHAM, OF JOPLIN, MISSOURI.

SPARKER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 705,996, dated July 29, 1902.

Application filed October 15, 1901. Serial No. 78,690. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. GRAVES, a citizen of the United States, residing at Joplin, in the county of Jasper and State of Missouri, have invented new and useful Improvements in Sparkers for Explosive-Engines, of which the following is a specification.

My invention relates to sparkers for gas or vapor engines; and the object of the same is to design a device of this character which will be simple in construction, efficient in operation, and which can be regulated to spark at any time. The novel construction by which this object is attained is fully described in this specification and claimed, and illustrated in the accompanying drawings, forming a part thereof, in which—

Figure 1 is a plan view of my device, partially in section, on line 1 1, Fig. 3, and with parts broken away. Fig. 2 is a side elevation of the same with parts broken away. Fig. 3 is an end elevation of the same.

Like numerals of reference designate like parts in the different views of the drawings.

The numeral 1 designates a valve-chamber containing an exhaust-valve 2, normally closed and intermittently actuated by mechanism. (Not shown.) The chamber 1 is connected to a cylinder 3 of an engine by a passage 4. Mounted in an aperture 5 in the side of the chamber 1 is a fixed electrode 6, insulated from the casing 1 and extending thereinto. A conductor 7 is clamped in the electrode 6 and connects with a battery. (Not shown.)

Extending at right angles to the electrode 6 and mounted in an aperture 8 in the casing is an electrode-shaft 9, having a head 9^a thereon and a shank 9^b. The shank is insulated from the casing by a ring 10, of insulating material. The inner end of the shank 9^b bears an electrode 11, which is designed to engage the inner end of the fixed electrode 6, and thereby form a sparker, as will appear.

The head 9^a has a flat face which provides a support for a lever 12, fulcrumed centrally on a pivot 13 and having arms 12^a and 12^b. To the arm 12^a are attached two springs 14 and 15. The spring 14 is mounted on the casing and has a vertical arm 14^a, which extends down and passes through a perforation in the arm 12^a. The spring 15 is a spiral and is attached at its upper end to the arm 12^a and at its lower end to an arm 16, secured to the casing of the chamber 1. A conductor 16^a is joined to the shaft 9 and in combination with the conductor 7 completes a circuit.

To provide means for operating the lever 12 to operate the sparker, an eccentric 17 is mounted on a shaft 18, geared to make one revolution to two of the engine. Attached to the eccentric 17 is a pitman 19, slidingly mounted in a guide 20^a, formed in the head of a swivel 20, seated in an aperture in the frame. The free end of the pitman 18 bears an arm 21, held by a screw 22 and pin 23, fitted in apertures in the pitman. The pin 23 is prolonged and is surrounded by a spiral spring 24, which bears at its lower end on the arm 21 and at its upper end on a nut 25. The pitman and eccentric and the position of the stud are so related that the end of the arm 21 will describe an ellipse which will pass through the arm 12^b of the lever 12 when this arm is in its normal horizontal position through the action of the springs 14 and 15. A lead-wire 26 is connected to the arm 12^a and serves to operate it by hand.

The operation of my device can now be sketched. The combined action of the springs 14 and 15 will normally throw the lever 12 into the position indicated by solid lines in Fig. 3. The eccentric 17 is revolved in a clockwise direction, (denoted by the arrow,) which action causes the arm 21 to describe an ellipse in a counter clockwise direction. As the arm 21 comes around it will engage the arm 12^b of the lever 12 and throw it into the position shown in dotted lines in Fig. 3, which will turn the shaft 9 and throw the electrode 11 up into contact with the inner end of the electrode 6, and thereby complete a circuit via conductor 7, electrode 11, shaft 9, and conductor 16^a. When the arm 21 reaches the lowest point of its path and begins to move horizontally, the arm 21 will snap off of the lever 12, thereby permitting the lever to be once more thrown into the tilted position through the action of

the springs 14 15, thereby separating the electrodes 11 and 6, breaking the circuit and causing a spark.

I do not wish to be limited as to details of construction, as these may be modified in many particulars without departing from the spirit of my invention.

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

1. In a sparker, the combination with a fixed electrode, of a shaft bearing an electrode located to be brought into engagement with said fixed electrode, a lever pivoted on said shaft, a pair of springs connected to said lever and each mounted to exert a component of force on the lever at right angles to the force of the other, and means for intermittently engaging and releasing said lever to make and break a circuit through said electrode to make a spark, substantially as described.

2. In a sparker, the combination with an electrode, of a shaft bearing an electrode located to engage said first-mentioned electrode, a lever pivoted on said shaft, a first spring having an arm slidingly mounted in an aperture in said lever, a second spring connected to said lever and arranged to exert a component of force at right angles to the force exerted by said first spring, and means for intermittently engaging and releasing said lever to make and break a circuit through said electrode, substantially as described.

3. In a sparker, the combination with an electrode, of a shaft having an electrode located to be brought into engagement with said first-mentioned electrode by rotating said shaft, a lever mounted on a pintle extending at right angles to said shaft, two springs connected to said lever and arranged to exert pulls on said lever at right angles to each other, and a pitman bearing a spring-actuated yielding arm secured at one end and located to intermittently engage said lever as said pitman is operated, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE A. GRAVES.

Witnesses:

TILLIE MULLER,

BLANCHE JENKINS.