No. 640,252. Patented Jan. 2, 1900.

C. R. ALSOP.

IGNITER FOR GAS ENGINES.

(Application filed Feb. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

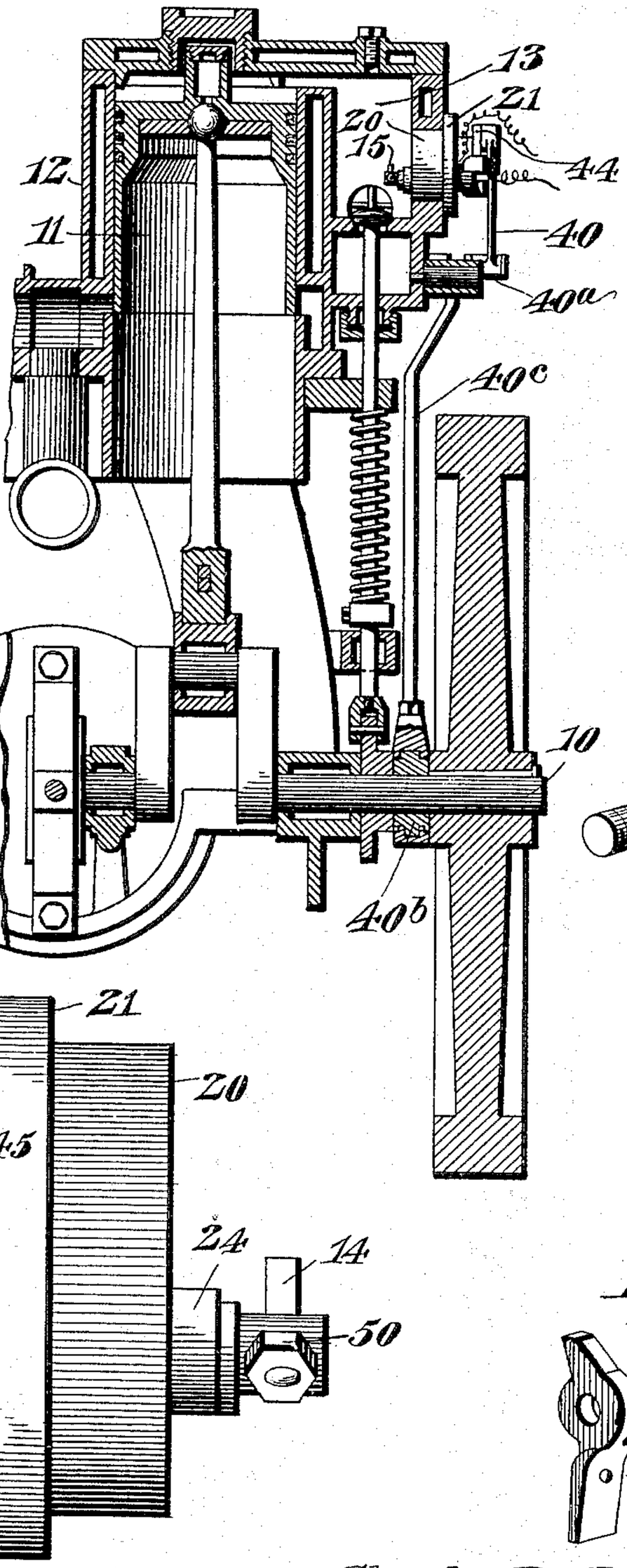


Fig. 6.

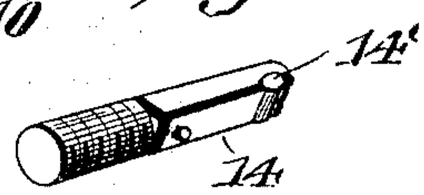
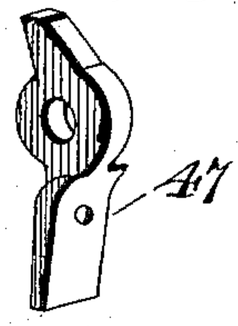


Fig. 7.

Fig. 5.



Witnesses

Jas. K. McCathran

D. E. Cook

Charles R. Alsop Inventor

By his Attorneys.

Church & Co.

No. 640,252. Patented Jan. 2, 1900.

C. R. ALSOP.

IGNITER FOR GAS ENGINES.

(Application filed Feb. 7, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

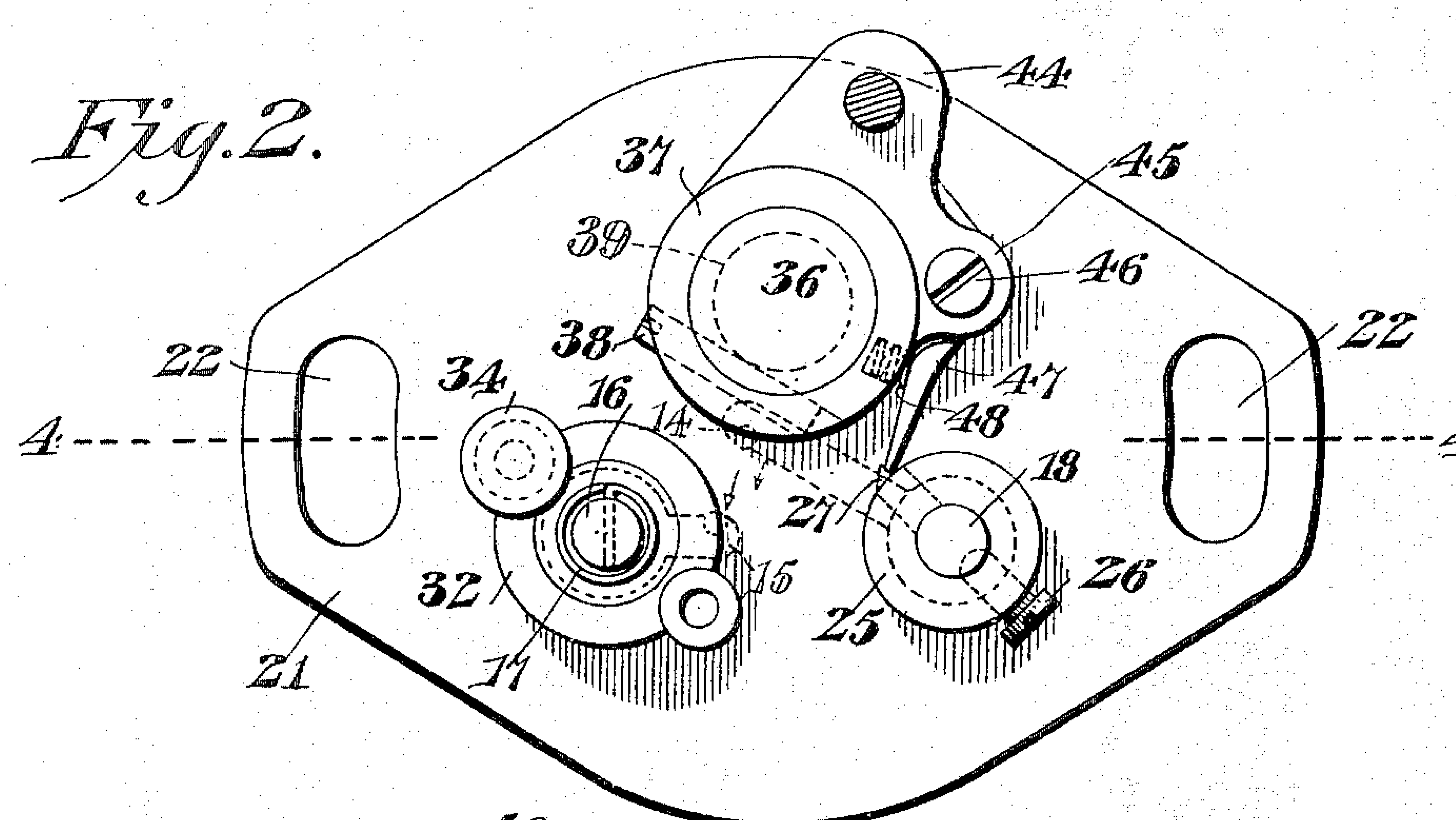


Fig. 4.

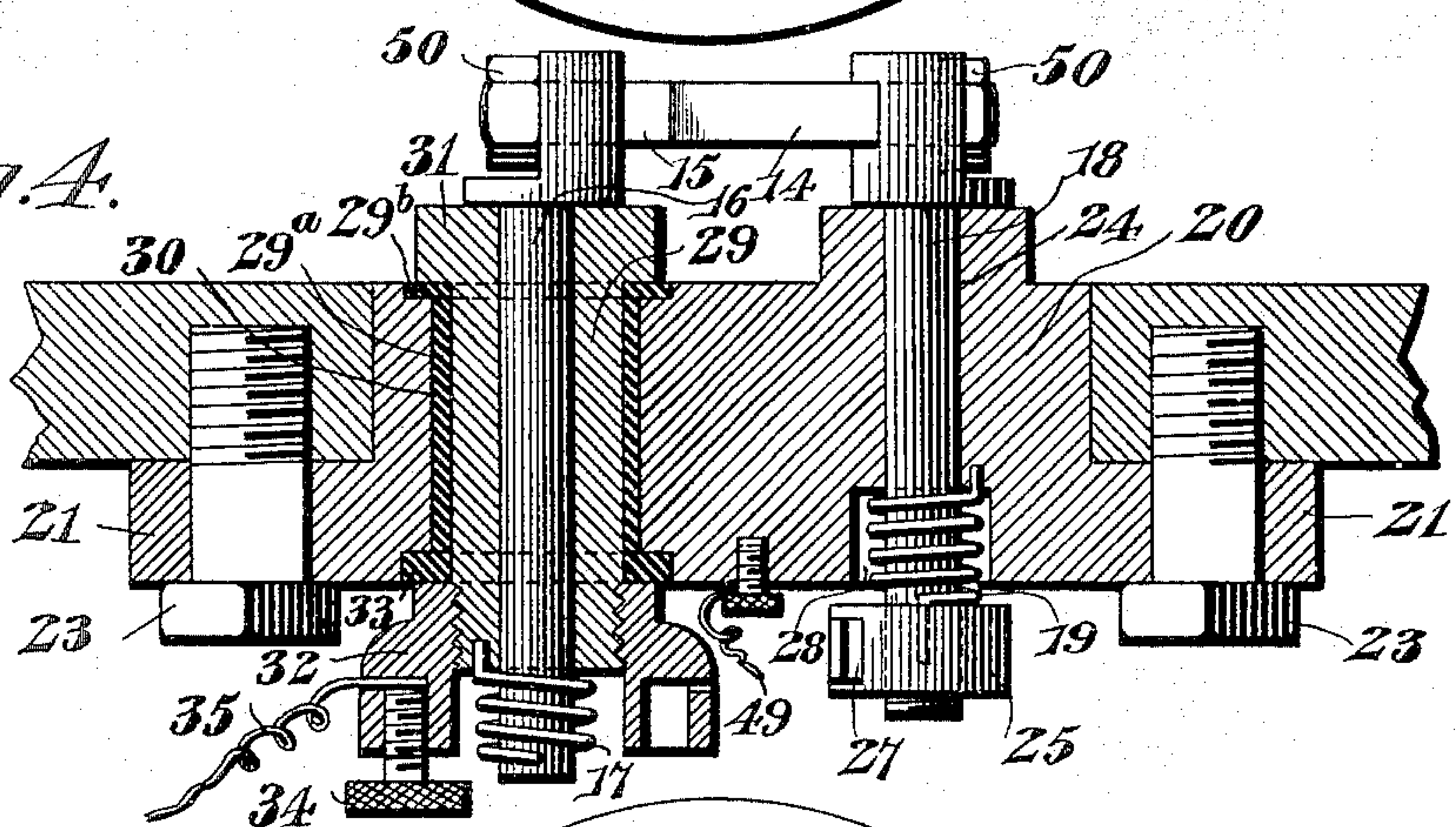
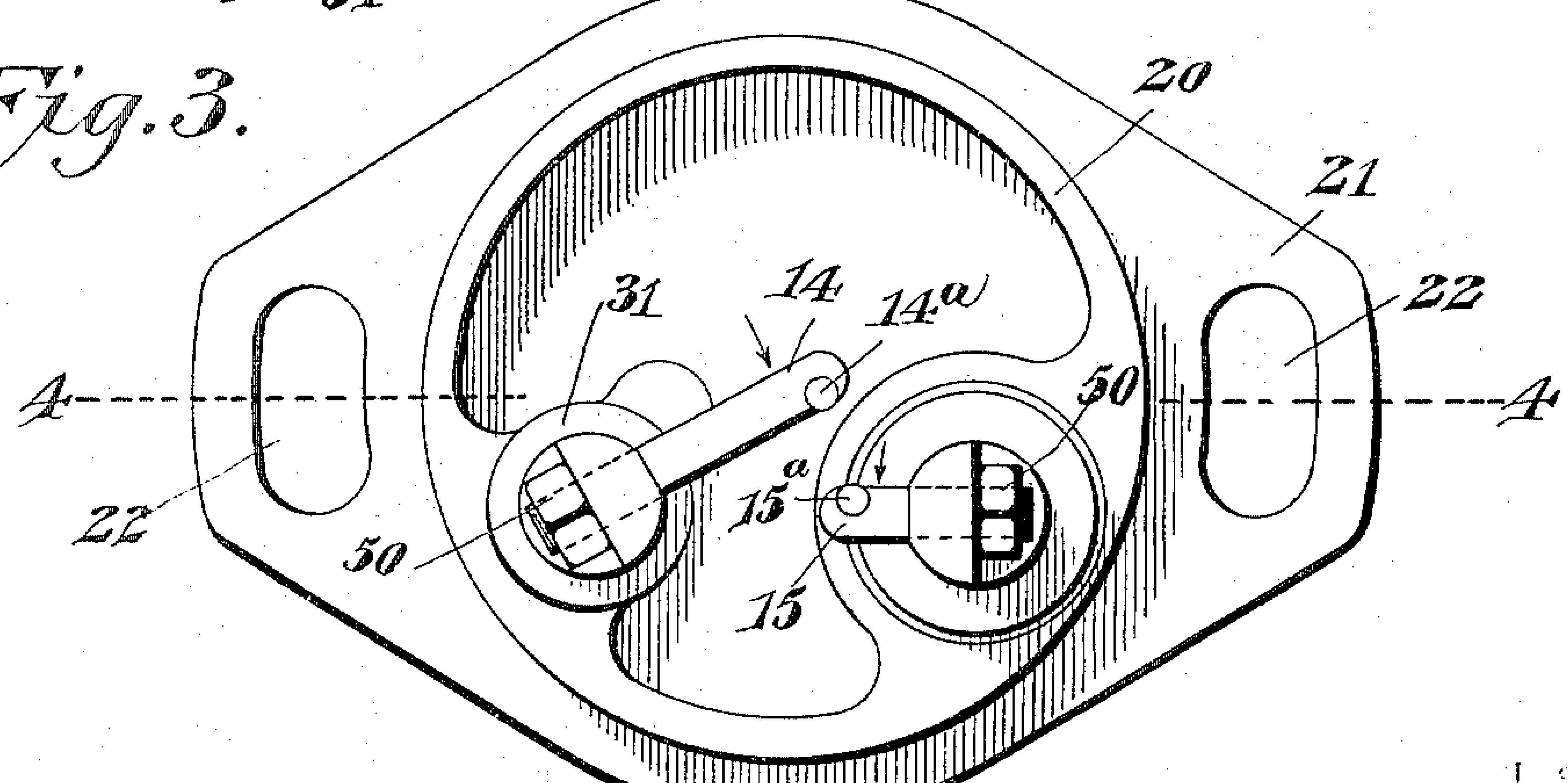


Fig. 3.



Witnesses

Jas. K. McCathran

[signature]

Charles R. Alsop Inventor

By his Attorneys.

C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES RICHARD ALSOP, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR OF ONE-HALF TO GEORGE A. COLES, OF SAME PLACE.

IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 640,252, dated January 2, 1900.

Application filed February 7, 1899. Serial No. 704,809. (No model.)

To all whom it may concern:

Be it known that I, CHARLES RICHARD ALSOP, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented a new and useful Igniter for Gas-Engines, of which the following is a specification.

My invention relates to igniting mechanisms for gas-engines of the explosion type, and has for its object to provide an igniter adapted for actuation by the main shaft or valve-controlling mechanism of the gas-engine in connection with which it is employed, the circuit-breaking members of the igniter being so constructed and arranged as to form automatic cleansing or wiping means for preserving a proper condition of the contact-points, and thus insure a proper communication of the electrical current when the points are in contact.

A further object of the invention is to provide an igniter having the minimum number of parts, so arranged as to reduce the friction due to the contact of the circuit-breaking elements to the minimum, the circuit-breaking elements being arranged within the explosion-chamber of the engine.

A further object of the invention is to provide a construction of igniter wherein the parts are readily detachable for the purpose of cleansing and repairing the same, and wherein suitable adjustment may be made to compensate for wear and insure the production of the spark at the desired stage in the operation of the mechanism.

Further objects and advantages of this invention will appear in the following description and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view of an igniter applied in the operative position to a portion of a gas-engine constructed in accordance with an invention forming the subject-matter of Patent No. 618,972, granted to me on February 7, 1899, a portion of the engine being shown in section and means being illustrated in connection therewith for communicating motion to the driving element of the igniter. Fig. 2 is an exterior face view of the igniter mechanism detached. Fig. 3 is an inner face view of the same. Fig. 4 is a horizontal section on the plane indicated by the lines 4 4 of Figs. 2 and 3. Fig. 5 is a detail view of the operating-pawl detached. Fig. 6 is a similar view of one of the circuit-breaking or terminal pins. Fig. 7 is an end view of the igniter.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

Of the engine to which the igniter mechanism forming the subject-matter of my present invention is applied it is necessary only to indicate that 10 represents a continuously-revolving element, such as a shaft suitably connected with the piston 11 of the power-cylinder 12, and that 13 represents an explosion-chamber in which the explosive mixture of whatever component parts may be selected is ignited. In this explosion-chamber are arranged the circuit-breaking elements 14 and 15 of the igniter forming the subject-matter of my invention, said elements being eccentrically mounted for swinging movement and having rounded extremities for contact to close the circuit. One of these elements 15, which I will term the "motion-receiving" element, is provided with a spindle 16, to which is attached a coiled return-spring 17, whereby said element is yieldingly held in its normal or initial position, and the other element 14, which I will term the "motion-imparting" element, is similarly provided with a spindle 18, also having a coiled return-spring 19, by which the element 14 is yieldingly held in a normal or initial position. In said normal positions, however, the elements 14 and 15, which constitute the terminals of the electrical conductors, are out of contact.

Owing to the eccentric mounting of the elements 14 and 15, the extremities thereof traverse segmental or arc-shaped paths, and the spindles of said elements are arranged in such relation that the segmental or arc-shaped paths of the extremities thereof intersect, the extremity of the terminal 15 being in the path of the extremity of the terminal 14, whereby when the latter is swung in the direction indicated by the arrows in Figs. 2 and 3 it will come in contact with the terminal 15, and thus impart swinging movement thereto in a

similar direction. To reduce to the minimum the friction due to the contact of the extremities of the elements 14 and 15, I preferably provide them in their adjacent faces with platinum contact-points 14^a and 15^a, and not only are these points brought into contact by the swinging movement of the element 14, but after such contact has been attained the further movement of the element 14 in communicating motion to the element 15 causes a rubbing contact, which serves to remove any accumulation of foreign matter, such as soot, from the contact-points, and thus maintain them in such condition as to insure the making of a circuit, as will be hereinafter more fully explained.

The spindles of the circuit-breaking elements are carried by a plug 20, which is removably fitted in a suitable opening formed in the wall of the explosion-chamber 13 of the engine, said plug having exterior lateral ears 21, provided with segmental slots 22, for engagement by securing-bolts 23, the elongation of the bolt-openings allowing an angular adjustment of the plug to secure such a relation between the igniter and the driving element of the engine as to cause the production of a spark at the desired point in the throw of the engine-piston. This plug 20 is provided with a bearing 24, in which the spindle 18 is mounted, and at its front end said spindle is fitted with a collar 25, secured in place by a set-screw 26 and carrying a tooth 27. One end of the return-spring 19 may be suitably attached to said collar, while the other is fixed to the plug, said spring being fitted in a counterbored enlargement 28 to provide for the desired compactness of construction. The spindle 16 of the element 15 is mounted in an insulated bushing 29, fitted in an opening 30 in the plug, said bushing being provided at its inner end with a head 31 to bear against the inner surface of the plug and being fitted at its outer end with a removable nut 32, between which and the exterior surface of the plug is arranged an insulating-washer 33. Preferably the bushing is insulated by means of a surrounding cylindrical sheath 29^a, with an insulating-washer 29^b interposed between the head of the bushing and the inner surface of the plug. This nut carries a binding-screw 34 for one of the electrical conductors 35, and the extremities of the return-spring 17, which is coiled upon the portion of the spindle 16 projecting beyond the plane of the outer surface of the nut 32, are secured in any suitable manner, respectively, to the said spindle and nut.

36 represents a stub-shaft projecting outward from the plane of the plug, and mounted thereon is a rocker 37, held in place by a key 38, engaging an annular groove 39 in the stub-shaft. This rocker is adapted to be connected by any suitable means, such as a rod 40, suitably driven by a rotary element of the engine, said rod in the construction illustrated consisting of a pitman connected with a rocker 40^a, which in turn is driven by an eccentric 40^b through an eccentric-rod 40^c, said eccentric being carried by the driving-shaft of the engine, whereby as said shaft rotates the member 37 receives an oscillatory or rocking movement. In the construction illustrated the rocker is provided with a radial arm 44 for connection with said rod 40. Also the rocker is provided at a point to one side of its axis with an ear 45, in which is arranged the pivot 46 of an operating-pawl 47, this operating-pawl being terminally arranged in operative relation with the above-mentioned detent 27, carried by the spindle 18 of the motion-imparting circuit-breaking element 14. Also said pawl is yieldingly held in operative relation with the detent 27 by means of a spring 48.

As above indicated, one of the electrical conductors is actuated by the binding-screw 34 with the insulated spindle of the circuit-breaking element 15, and the other conductor, which is indicated at 49, may be connected with any suitable part of the engine or of the igniter, whereby the circuit will be closed only when the elements 14 and 15 are in contact.

With the parts constructed and arranged as described the operation is as follows: The rocker receives a continuous oscillatory movement during the operation of the engine, and during the movement thereof in one direction motion is communicated through the pawl 47 and detent 27 to the spindle of the element 14, thus swinging the latter in the direction indicated by said arrows in Figs. 2 and 3 until the contact-point 14^a comes in contact with the point 15^a. As the movement of the rocker continues, the element 15 receives motion from the element 14, whereby a rubbing contact of said points is obtained to insure the wiping or cleansing thereof. The swinging movement in the described direction of the elements 14 and 15 continues until the extremity of the operating-pawl (which obviously travels in a segmental path intersecting but eccentric with relation to the path of the detent 27) slips from the detent, and thereby releases the spindle 18 to allow its return by the spring 19. This return movement of the spindle promptly withdraws the extremity of the element 14 from the element 15, and thus breaks the circuit and produces a spark to ignite the contents of the explosion-chamber. The return of the element 14 to its original position is followed immediately by the return movement of the element 15, whereby the said parts are again located, as indicated in Figs. 2 and 3, preparatory to a succeeding contact, and upon the return stroke of the rocker 37 the operating-pawl 47 slides freely over the detent 27 and again assumes its position in rear thereof to insure the succeeding communication of motion from the rocker to the spindle 18.

It will be seen that the platinum or other soft-metal contact-points provide for such a relation between the elements 14 and 15 as to

insure the effective making of the circuit, while at the same time the rubbing contact thereof during the communication of motion from the element 14 to the element 15 serves to remove foreign material and keep the contact-points clean, while the breaking of the circuit by the return movement of the motion-imparting element avoids excessive friction, it being obvious that the paths of movement of the elements are so related that the element 14 never advances far enough to cause its extremity to slip in a forward direction from that of the element 15. The circuit is broken by the abrupt return movement of the motion-imparting element due to the release thereof by the operating-pawl 47 slipping from the detent 27.

In the construction illustrated the enlarged inner ends of the spindles 16 and 18 are flattened at one side and are perforated to receive the threaded stems of the pins forming the elements 14 and 15, and these pins are engaged by nuts 50 to secure them to the spindles, whereby when necessary the terminals may be replaced at a small cost and without disarranging any of the other members of the igniting mechanism. It will be understood, furthermore, that in practice various changes in the form, proportion, size, and minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. In an igniter mechanism, the combination with a continuously-revolving element, a power-cylinder having a piston therein connected to said element and an explosion-chamber, of a plug removably fitted in an opening in the wall of the explosion-chamber and having exterior lateral ears provided with segmental slots for engagement by securing-bolts, the said slots permitting an angular adjustment of the plug to secure a relation between the igniter and driving element of the engine of such nature as to cause the production of a spark at the desired point in the throw of the piston, motion-imparting and motion-receiving terminals adapted for mutual engagement and providing the igniter proper, each of said terminals having a shaft journaled in the plug and a contacting portion of the motion-imparting terminal lying at a greater distance from its axis than the contacting portion of the motion-receiving terminal, yieldable connection between said shafts and the device in which each has bearing, a collar carried on the exterior portion of the shaft of the motion-imparting terminal and provided with a radially-projecting tooth, a rocker mounted upon the plug above the plane of the shafts, a pawl pivotally connected to the rocker and having a tangential plane of disposition in relation thereto and adapted to engage the tooth on the collar, and means for operating the rocker.

2. In an igniter mechanism, the combination with a continuously-revolving element, a power-cylinder having a piston therein connected to said element and an explosion-chamber, of a plug removably fitted in an opening in the wall of the explosion-chamber and having exterior lateral ears provided with segmental slots for engagement by securing-bolts, the said slots permitting an angular adjustment of the plug to secure a relation between the igniter and driving element of the engine of such nature as to cause the production of a spark at the desired point in the throw of the piston, motion-imparting and motion-receiving terminals adapted for mutual engagement and providing the igniter proper, a shaft for each of the said terminals, the contacting portion of the motion-imparting terminal lying at a greater distance from its axis than the contacting portion of the motion-receiving terminal does from its axis, an insulating-bushing fitted in the plug and having therein the shaft of the motion-receiving terminal, said bushing being provided at one end with an enlargement and at the other end with a removable engaging nut provided with a binding-screw, both shafts being in the same plane and that of the motion-imparting terminal bearing directly in the plug, a return-spring having one end seated in the said bushing and the other end connected to the shaft of the motion-receiving terminal, a collar adjustably connected to the exterior end of the shaft of the motion-imparting terminal and provided with a radially-extending tooth, a return-spring for the shaft of the motion-imparting terminal, a rocker located in a plane above the said shafts and carrying an operating-pawl to engage the tooth on the collar, and means for operating the said rocker.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES RICHARD ALSOP.

Witnesses:
H. C. DANFORTH,
F. A. COLES.