No. 888,196. PATENTED MAY 19, 1908.

E. RUUD & C. REGENBOGEN.

IGNITER MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED MAY 18, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

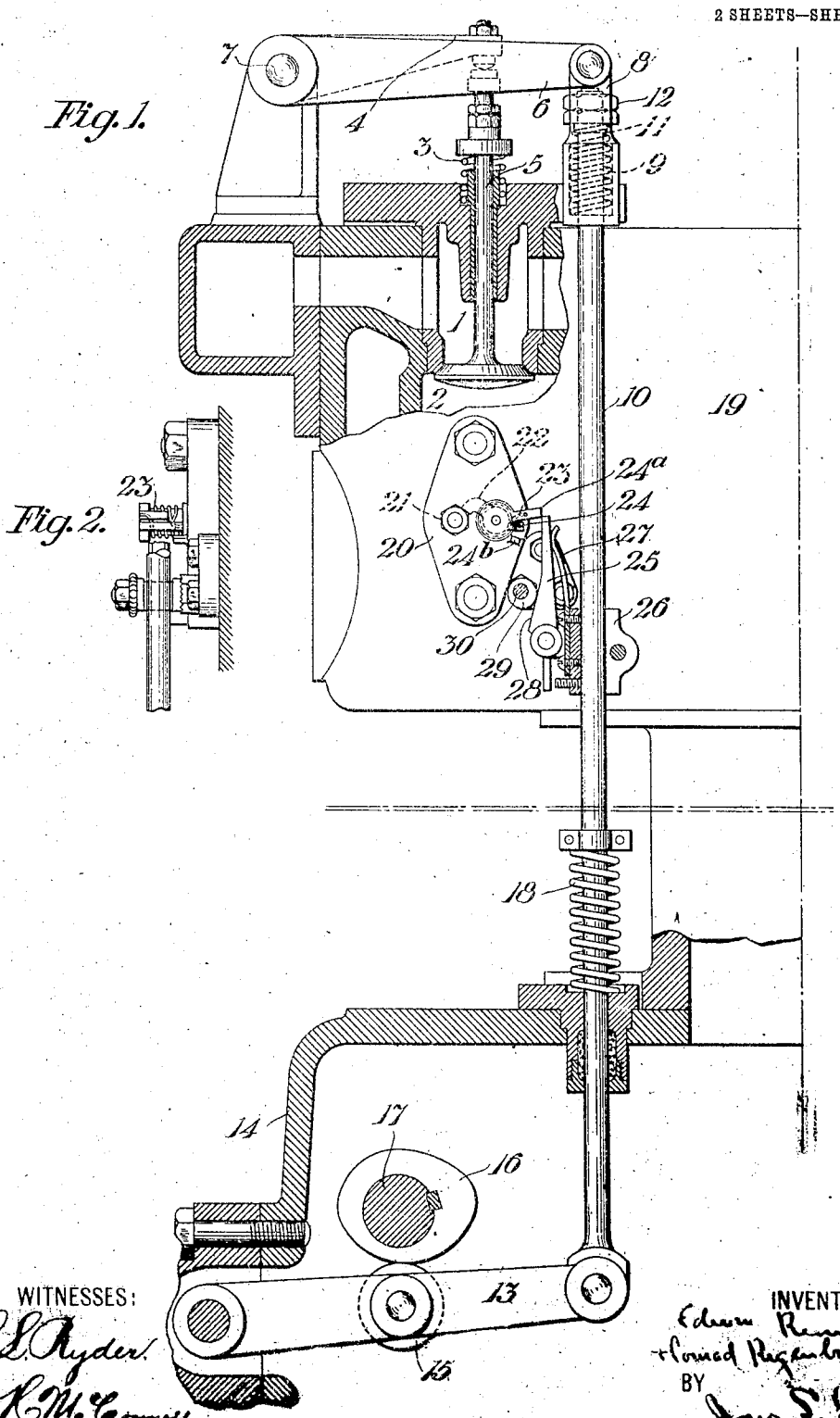

Fig. 2.

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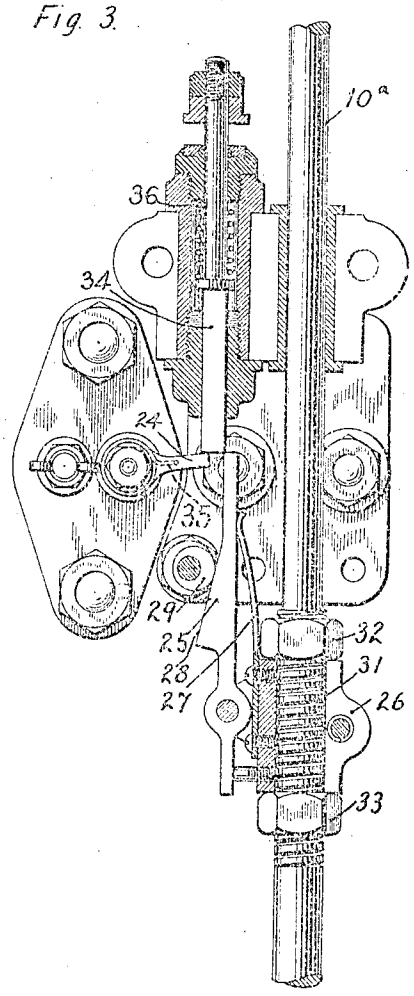
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWIN RUUD, OF PITTSBURG, PENNSYLVANIA, AND CONRAD REGENBOGEN, OF MANCHESTER, ENGLAND, ASSIGNORS TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

IGNITER MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

No. 888,196. Specification of Letters Patent. Patented May 19, 1908.

Application filed May 18, 1904. Serial No. 208,577.

To all whom it may concern:

Be it known that we, EDWIN RUUD, a citizen of the United States, and CONRAD REGENBOGEN, a subject of the King of Prussia, residents, respectively, of Pittsburg, in the county of Allegheny and State of Pennsylvania, and of Manchester, in the county of Lancaster, England, have invented a new and useful Improvement in Igniter Mechanism for Internal-Combustion Engines, of which the following is a specification.

Our invention relates to internal combustion engines, and particularly to means for operating the mechanism which is utilized for igniting the explosive charges which are periodically admitted to the combustion chambers of such engines.

It is a usual practice to operate the sparking points of combustion engines by means of cams or eccentrics on rotary parts of such engines in order to insure the production of sparks that will ignite the explosive charges in the ignition chambers at proper intervals.

Our present invention materially simplifies the construction of such apparatus, by reason of utilizing a single cam and rod for operating both the inlet valve of the engine and the igniting device.

In the accompanying drawings, Figure 1 is a view, partially in side elevation and partially in section, of a portion of a gas engine constructed in accordance with our invention. Fig. 2 is a detail view of a portion of the igniter mechanism shown in Fig. 1, parts being broken away, and Fig. 3 is a view, partially in side elevation and partially in section, corresponding to the portion of the mechanism shown in Fig. 1, but illustrating a modification.

Referring now particularly to Figs. 1 and 2 of the drawings, the inlet valve 1, which serves, when depressed, to admit a charge of explosive mixture from a suitable source, such, for example, as a mixing valve, (not shown), to the explosion chamber 2, is normally held to its seat by means of a coil-spring 3 and is depressed to admit the explosive mixture, at suitable intervals, by means of a rocking lever 4, the free end of which engages with the upper end of the valve stem 5. A lever 6 is rigidly connected, at one end, to the corresponding end of the lever 4 by means of a rod or shaft 7 and, at its other end, is pivotally connected to a head 8 in which is located a coil-spring 9. A valve-operating rod 10 is provided, at its upper end, with a collar 11 against which the upper end of the spring 9 bears, and this collar may be adjusted by means of nuts 12, an automatically adjustable connection between the rod 10 and the lever 6 being thus provided. The lower end of the rod 10 is attached to the free end of an operating lever 13, the other end of which is pivoted to the frame 14 of the engine. The lever 13 is provided with a roller 15, with which engages a suitably shaped cam 16 that is mounted upon a shaft 17 and is operated from the main shaft of the engine by means of suitable gearing, (not shown). The rod 10 is moved to and held in its uppermost position, when not pressed downward by the action of the cam 16, by a coil-spring 18.

Suitably mounted upon the side of the cylinder 19 is an ignition device 20 having a stationary contact terminal or electrode 21 and a pivotally mounted contact terminal or electrode 22. The movable terminal 22 is provided with a laterally projecting arm 24, and a hammer member 24^a, pivotally mounted concentric with the terminal 22, normally forces the projecting arm 24 of terminal 22 in contact with a stop 24^b by means of a coiled spring 23. The elements are so arranged that when arm 24 is in contact with stop 24^b, terminal 22 will be out of contact with terminal 21, and when the hammer member 24^a is raised or rotated toward the terminal 22, the arm 24 will follow the same until the two terminals are in contact. The outer end of hammer member 24^a when in its lowest position, which is when it is holding the arm 24 in contact with stop 24^b, is in the path of travel of the upper end of a tripping bar 25, which is pivotally mounted upon a block 26. The block 26 is clamped to the rod 10 and is provided with a spring 27, the free end of which rests against the upper end of the tripping bar 25 and tends to press it inward in line with the outer end of the hammer member.

The bar 25 is provided with a beveled or inclined edge 28, which engages with a collar 29, the latter being here shown as in the form of an eccentric mounted upon a pin 30, so that it may be adjusted to vary the throw of the bar 25 in accordance with the conditions of operation desired.

The operation of the mechanism thus far described is as follows: With the parts in the position indicated, it is assumed that the cylinder and ignition chamber of the engine contain a charge of explosive mixture which has been previously admitted, and the cam 16 is rotated to very nearly the point where the ignition should properly take place. A slightly additional degree of movement of the cam will serve to permit the raising of the rod 10 and with it the arm 25 to such a point as will bring the terminals in contact. A slight additional degree of movement will cause the eccentric 29 to move bar 25 out of engagement with the hammer member 24^a and the spring 23 will instantly separate the terminals and produce the necessary spark. As the cam 16 continues to rotate it will lower the rod 10 and through the action of the levers 6 and 4 will move the inlet valve to open position, and together with the spring 27 will move the bar 25 downward and inward beneath the hammer member 24^a.

In Fig. 3, we have shown a rod 10^a a portion of which is provided with a screw-head 31 upon which is supported the block 26 and with which engages adjusting nuts 32 and 33 in order to vary the position of the block upon the rod. In this modification, we have also shown a separate tripping rod 34 for engagement with the arm 24 of the movable member of the igniter and have shown said movable member as provided with a spring 35 that is so arranged as to tend to hold the sparking points in engagement. The tripping rod 34 is normally held in its lowest position by means of a coil-spring 36 and its lower end is engaged by the bar 25 and moved upward as the main rod 10^a is moved upward. When the bar 25 is moved out of engagement with the end of the tripping rod 34 by the eccentric 29 at substantially the upper limit of the stroke, the spring 36 causes the tripping rod 34 to quickly descend and strike the arm 24 a sharp blow, thus quickly separating the terminals of the igniter and producing the desired spark.

Other variations from what is shown in the drawings and specifically described may be made by those skilled in the art without departing from our invention and we therefore desire it to be understood that our invention is to be accorded such scope as may be warranted by the state of the art, regardless of any specific illustration and description which we may have given.

We claim as our invention:

1. In an internal combustion engine in combination with an inlet valve, a pivoted valve-operating lever, a cam-actuated rod for actuating said lever, a yielding connection between said rod and said lever whereby said rod is capable of further motion after said valve is closed, an igniter trip bar pivotally mounted on said rod, a stationary igniter terminal, a pivoted igniter terminal adapted to be moved into contact with said stationary terminal by said rod through the agency of said trip bar, an adjustable timing device for controlling the pivotal motion of said bar and releasing said movable terminal and means for forcing said movable terminal out of contact with said stationary terminal.

2. In an internal combustion engine, the combination with an inlet valve, a pivoted valve-operating lever, a cam-actuated rod, a yielding connection between said rod and said lever whereby said rod is capable of further motion after said valve is closed, an igniter trip bar mounted on said rod, a stationary igniter terminal, a movable igniter terminal, means rendered operable by said trip bar for moving said movable terminal into contact with said stationary terminal, a device for moving said terminals apart and an adjustable timing cam for rendering said device operable.

3. In combination with an internal combustion engine valve, a valve-operating lever, a cam-actuated rod, a yielding connection between said rod and said lever whereby said rod is capable of further motion after said valve is closed, a pivotally mounted igniter terminal, a stationary igniter terminal, a spring-controlled rod for normally holding said igniter terminals apart, a trip bar pivotally mounted on said cam-actuated rod for moving said trip rod to permit said pivotally-mounted igniter terminal to move to contact with said stationary terminal, an adjustable timing device for releasing said trip rod to break the contact between said terminals.

4. In combination with an internal combustion engine valve, a valve-operating rod, a lost motion connection between said rod and said valve whereby said rod is capable of further motion after said valve is closed, igniter terminals, a trip rod adapted to normally hold said terminals apart, a pivoted bar carried by said valve-operating rod for moving said trip rod to permit said terminals to contact and a timing device for releasing said trip rod and thereby breaking the contact of said terminals.

In testimony whereof, I have hereunto subscribed my name this 21st day of April, 1904

EDWIN RUUD.

Witnesses:
E. H. L. MUMMENHOFF,
OTTO W. HELLMRICH.

In testimony whereof, I have hereunto subscribed my name this 26th day of March, 1904.

CONRAD REGENBOGEN.

Witnesses:
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