E. R. BRODTON.

AUTOMOBILE STARTING DEVICE.

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1,024,394.

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Fig. 1

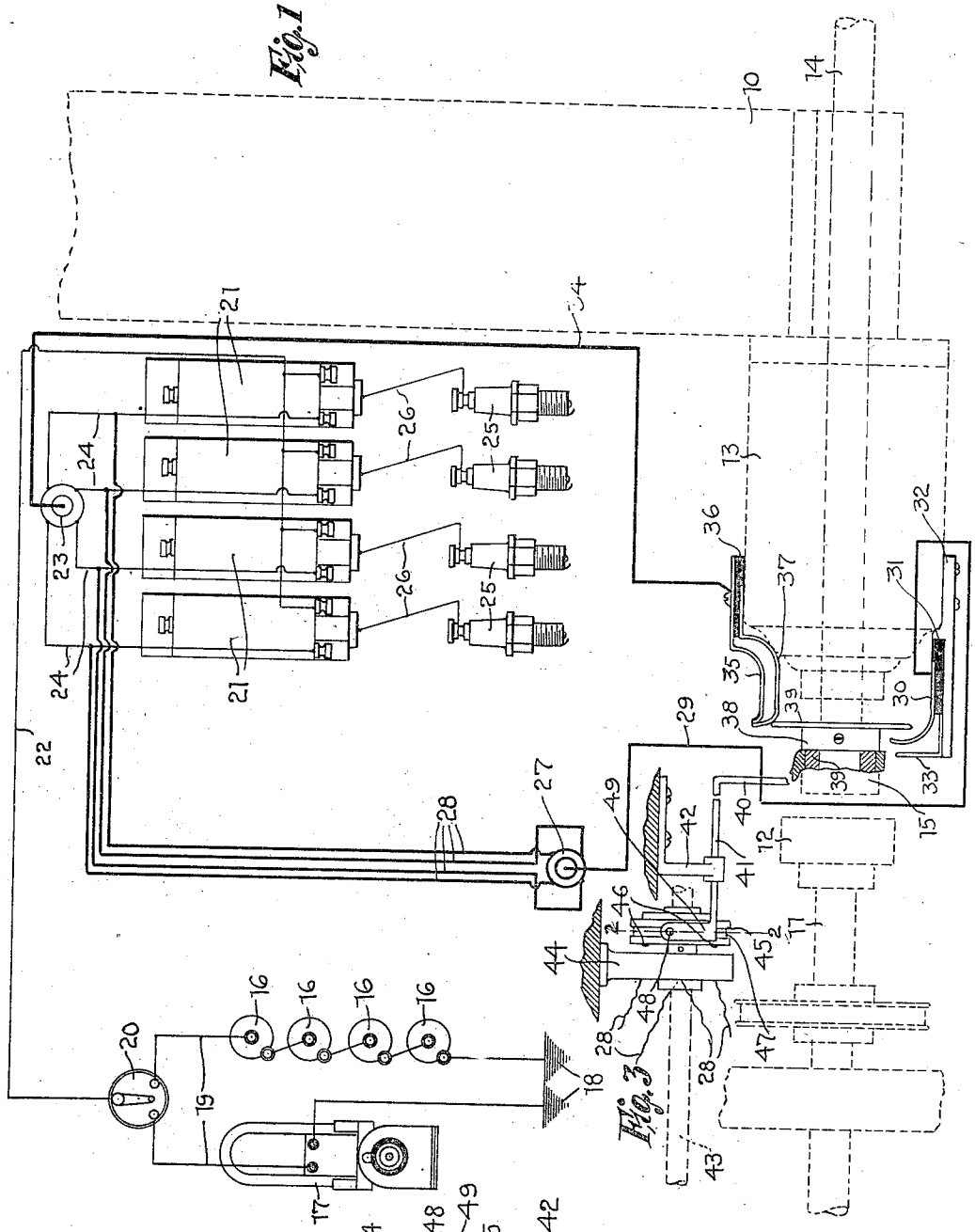

Fig. 3

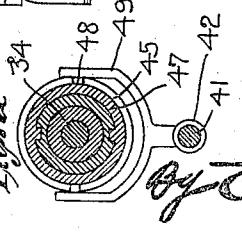

Fig. 2

WITNESSES

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EDWARD R. BRODTON, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOSEPH A. GARTLAND, OF BOSTON, MASSACHUSETTS, AND ONE-FOURTH TO R. M. STEPHENS, OF HACKETTSTOWN, NEW JERSEY.

AUTOMOBILE STARTING DEVICE.

1,024,394. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed September 26, 1911. Serial No. 651,404.

To all whom it may concern:

Be it known that I, EDWARD R. BRODTON, a citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Automobile Starting Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to internal combustion engines and has special reference to a starting device for engines of this description.

It is a well-known fact that various attempts have been made to eliminate the danger caused by back kicks during the cranking of the engine. These attempts have heretofore been confined to preventing the backward rotation of the crank handle.

The principal object of the present invention is to prevent premature explosion which causes the back kick, and thus to eliminate such back kick when caused by premature sparking. This object is attained by means of certain improved mechanism connected with the cranking device for advancing and retarding the spark at the spark plug so that while the engine is being cranked the spark will take place only when the engine crank has passed the upper dead center and the piston begun to descend.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel arrangements of parts and combinations of details, hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings like characters of reference indicate like parts in the several views, and Figure 1 is a view partly diagrammatic and partly in outline showing the arrangement used for advancing and retarding the spark. Fig. 2 is a section on the line 2—2, in detail of the mechanism illustrated in Fig. 1. Fig. 3 is a detail side elevation of a portion of the apparatus shown diagrammatically in Fig. 1, said figure being shown in its relation to Fig. 1 for the purpose of better illustrating the device.

The numeral 10 indicates a portion of the frame of an automobile or other like device forming a support for a gas engine wherein a crank shaft is provided as at 11. Upon the end of the crank shaft 11 which projects forwardly from the engine proper there is provided a clutch member 12. Forward of this crank shaft there is mounted on the frame 10 a casing 13 which contains certain safety mechanism not deemed necessary here to be described. Through this casing extends a slidable and rotatable shaft 14 adapted to receive a suitable handle for the purpose of rotating the same, the latter not being deemed necessary here to be disclosed. On the rear end of the shaft 14 is a clutch member 15 adapted for engagement with the clutch member 12. All of these parts are here shown diagrammatically in dotted lines, that is the specific construction of these parts forms no part of the present invention and are fully described in my copending application for patent on automobile cranking device, filed August 7th, 1911, and bearing the Serial No. 642,640.

In order to insure the explosion taking place in the cylinders at the the proper point in the revolution to drive the engine in a forward direction and to prevent explosions prior to the crank having passed beyond the upper dead center, the present apparatus has been devised. This apparatus employs the usual battery 16 and magneto 17. This battery 16 and magneto 17 each having one pole grounded as indicated at 18, and the other poles of the battery and magneto are connected by wires 19 to a two pole switch 20 which in turn connects with the spark coils 21 by means of a wire 22. At 23 is indicated a timer of the usual construction which is connected to the spark coils 21 by means of the wires 24, and these spark coils are also connected to the spark plugs 25 by means of wires 26. These parts are all of the ordinary construction now employed and the arrangement is the same as that common to all automobiles. On this ac-

count the parts have been shown in light full lines while the improved arrangement has been shown in heavy lines. In the improved arrangement there is employed an additional timer 27 which is connected with the wires 24 by means of wires 28. The other pole of this timer is connected by means of a wire 29 to a spring contact member 30 carried on a block of insulation 31, which is in turn mounted on a bracket 32 preferably secured to the casing 13. This bracket 32 is also provided with a second spring contact member 33 against which the member 30 is adapted to be forced for the purpose of grounding the timer 27 through the frame of the machine. The timer 23 has its remaining pole connected by a wire 34 to a spring contact member 35 which is carried on a block of insulation 36 mounted on the casing 13. This spring contact member 35 is arranged for contact with a spring contact member 37 carried on the casing 13. Upon the shaft 14 is mounted a collar 38 provided with a flange 39 which is adapted to contact with the members 37 and 30, respectively, according as the shaft 14 is in its forward or rear position. The timer 27 is so arranged that the spark passes during the down stroke of the piston in the engine and the timer 23 is in normal position with reference to the motion of the piston in the cylinder.

It will be seen that when the clutch members are disengaged, the timer 23 will be rendered operative by reason of the grounding of the wire 34 since the flange 39 will close the contact between the members 35 and 37. It will also be seen that when the clutch is thrown in the members 30 and 33 will be brought together while the members 35 and 37 will spring apart. Thus the timer 23 will be rendered inoperative while the timer 27 will be cut in and rendered operative by the grounding of the wire 29. By means of this arrangement it is impossible for the explosion to take place at such time that the tendency will be to reverse the engine, that is to say, on the upstroke of the piston. The possibility of back kicks is thus eliminated to the greatest possible extent, as this can only occur by reason of incandescent carbon deposits on the inside of the cylinder, which is a matter of rare occurrence although it does happen that at long intervals this incandescent carbon will cause explosions. However, a clutch arrangement of any desired type may be used to prevent injurious effects from even these rare explosions.

Provision is also made to mechanically render the timer 27 inoperative and this mechanical means is illustrated in Figs. 1 and 3. Upon the shaft 14 is a collar 39 and from this collar extends an arm 40 which is bent to form a portion 41 parallel with the shaft 14. This portion 41 is slidably mounted in a bracket 42 secured to some fixed point. At 43 is indicated the timer shaft of the engine, and this timer shaft passes through a stationary timer member 44 carrying contact points for the wires 28. Splined upon the shaft 43 is a movable contact member 45 which rotates with the shaft and which is provided with the contact points 46. The construction of this timer is not deemed necessary to be specifically shown since any form may be used in which one member rotates with the timer shaft and the other remains stationary. In any event the movable member is provided with a shipper groove 47 wherein are held shipper pins 48 of a shipper fork 49 formed upon the end of the bar 41. By means of this arrangement as the clutch members are brought together the movable timer member will in like manner be brought into operative position with relation to the fixed timer member so that the timer 27 is controlled both mechanically and electrically.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

Having thus described my invention, what I claim as new, is:—

1. In an internal combustion engine, a plurality of timers, a cranking device, and means controlled by said cranking device to render either of said timers operative.

2. In an internal combustion engine, a normally active timer, a normally inactive timer, a cranking device, and means controlled by said cranking device for rendering the normally active timer inactive and the normally inactive timer active.

3. In an internal combustion engine starter, a clutch device comprising a plurality of members, a sparking device including a normally open circuit closer carried by one member of the clutch, and means to close said circuit closer carried by another member of the clutch.

4. In an internal combustion engine starter, a clutch device including a movable operating member, a sparking device including a normally active timer mechanism, and a normally inactive timer mechanism, each of said timer mechanisms including a circuit closer, and means on said operating member for selectively closing either of said circuit closers.

5. In an internal combustion engine, a normally inactive timer including a fixed portion and a revolving portion, a cranking device, and means movable by the cranking device for moving one timer portion to and from the other portion.

6. In an internal combustion engine, a normally active timer, a normally inactive

timer including a fixed portion and a revolving portion, a cranking device, means operable by the movement of the cranking device for grounding said timers selectively, and other means operatively connecting the movable timer element of the normally active timer with the crank device.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

EDWARD R. BRODTON.

Witnesses:
C. A. BAKER,
GUSTAVUS W. MCCUEN.