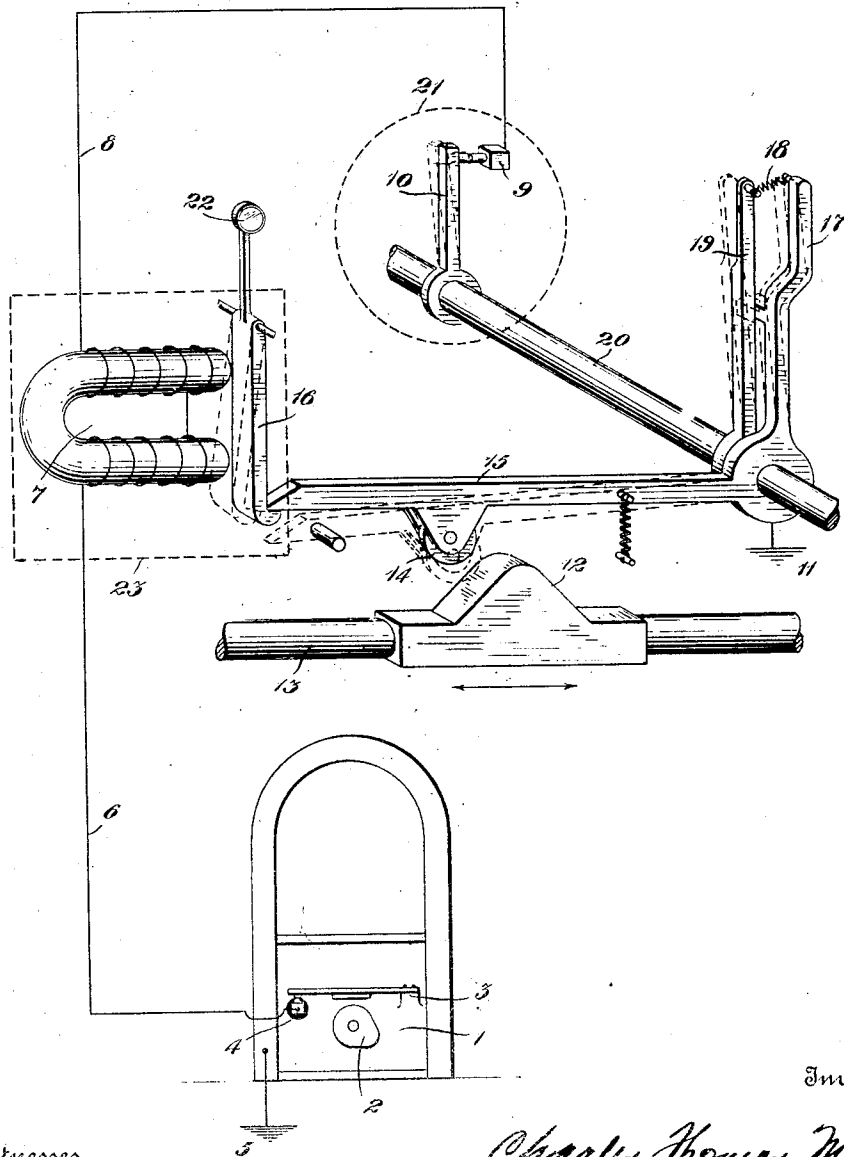


1,051,425.

Fig. 1.



Charles Thomas Mason

By H. R. Vane Dwyer. Attorney

Witnesses

Edward C. Cunniff
H. H. Livingston.

UNITED STATES PATENT OFFICE.

CHARLES THOMAS MASON, OF SUMTER, SOUTH CAROLINA.

IGNITION SYSTEM.

1,051,425.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed April 22, 1912. Serial No. 692,474.

To all whom it may concern:

Be it known that I, CHARLES THOMAS MASON, a citizen of the United States, residing at Sumter, in the county of Sumter and State of South Carolina, have invented certain new and useful Improvements in Ignition Systems, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to improvements in ignition systems in which make and break igniters are employed, and the objects of my improvement are, first, to provide a means for more accurately timing the sparking moment than has heretofore been possible—particularly with multi-cylinder engines; second, to provide means whereby the control of the make and break igniter is effected by an electric circuit closing device, one of which is sufficient for any number of igniters; and, third, to provide a visual indicating device which will show whether or not current is passing across the igniter points, thereby indicating whether or not a suitable spark is being produced in the engine cylinder. I attain these objects by the combination and arrangement of the various parts shown in the accompanying drawing which illustrates my system as applied to a single igniter, although it will be understood that any number of igniters may be operated in connection with each other.

On engines equipped with make and break igniters operated in the usual manner by means of cams, gears or push rods, considerable difficulty is experienced in keeping the ignition properly timed, or in advancing and retarding the time of ignition. This is due to the wear of the various mechanical parts, and to the inertia of same, for which due allowance must be made. In the case of engines having more than one cylinder it is quite difficult to time the various igniters so that they will work in harmony with each other and a common source of current such as a definitely timed alternating current magneto, and when it is necessary to advance the spark on such multiple-cylinder engines the arrangement necessary must be quite complicated and requires frequent adjustment. Some attempt has been made to overcome these difficulties by using what is commonly known as a magnetic plug, in which a movable contact of the make and break igniter is operated entirely by an

electromagnet, but such devices have not proven satisfactory in actual service because the electric current is required to operate the igniter, and the various parts of same must therefore be made very light and free moving, whereas they should be heavy and the movable electrode should fit tight enough to prevent leakage. It is also necessary with such plugs to have the magnet coils directly associated with the moving electrode stems, and in this position they are subjected to heat, which often affects the insulation and causes trouble.

I eliminate all the above troubles by using the ordinary mechanical movement to move the igniter into position ready to produce a spark and then by electric control mechanism release the igniter, thereby producing the spark. The exact time at which the igniter contacts close does not matter, as the igniting spark is only produced when they are separated; therefore, the mechanical operating device for setting the igniter may be considerably out of time, due to wear or looseness, without affecting the timing of the igniter, which is controlled by electrical means.

In the accompanying drawing 1 denotes a suitable source of current. This may be a magneto as shown, or a battery. Associated with this device or battery is the cam 2 operating the circuit interrupter indicated at 3 and 4; this interrupter may be so arranged as to normally short circuit the current source, although in case a battery is used it is preferable to include it in series therewith so that it will simply open and close the circuit when operated.

One side of the current source is usually grounded, as shown at 5 on the frame of the engine, while the other side is connected by means of conductor 6 to the electric control device, the coils of which are indicated at 7. Conductor 8 now carries the circuit to the insulated electrode 9 of the ordinary make and break igniter, the electrode 10 of which is usually movable and, being part of the engine frame, is of course grounded, as indicated at 11, and thereby completes the circuit.

In the case of multi-cylinder engines conductor 6 runs to one side of all the coils 7, but it will be noted that there is no circuit through any of the coils except when the igniter points in circuit therewith are closed.

12 denotes a cam of the usual type mounted on the push rod 13 which is operated by the engine in any well known manner. And it will be seen that as the cam 12 passes under the roller 14 the bar 15 will be raised upwardly and held in this position by reason of the armature 16 of the electric control device, and that arm 17, by means of spring 18, pulls on arm 19 attached to shaft 20, thereby closing the contacts 9 and 10. Now it will be noted that after 15 is once latched up cam 12 no longer affects the operation of the igniter.

In firing the igniter it will be understood that cam 2 revolves in definite time with the engine, and at the proper instant it operates the interrupter 3 and 4, thereby permitting current to flow in the circuit, and the points 9 and 10 being closed coils 7 are energized, armature 16 is drawn inwardly, igniter mechanism is operated, the points 9 and 10 separated, and the spark produced. The coils 7 may (although this is not essential) serve as the ordinary hump or spark coil, if battery is used instead of the magneto.

In the case of multi-cylinder engines it will be noted that no additional distributor or circuit interrupters are necessary, as the cam 2 may be driven at suitable speed to permit the current impulses to flow in the circuit at the proper time to electrically operate whichever igniter is latched shut, and that only such igniter will operate, the circuit through all the others being open.

The interrupter 3 and 4 is easily adjusted, particularly as compared with the mechanical adjustments necessary if the igniter is operated solely by mechanical means; furthermore, to vary the time of ignition with a single or multi-cylinder engine it is only necessary to move the interrupter in relation to the cam, thereby making the operation of the igniter early or late as desired, there being no necessity of changing the time of the operation of cam 12 in relation to its igniter, as there is a considerable interval of time between the closing of the igniter and the firing of same.

The igniter contacts within the cylinder, which is indicated by the dotted line 21,

often become foul, and the current ceases to flow. To indicate the condition of the circuit, I provide in combination with the electric control mechanism a suitable visual signal such as a target indicated at 22, which would project from the case, shown by the dotted line 23, and from the movement of this it can be readily ascertained whether or not current is flowing.

While I have shown but one circuit arrangement, it is obvious that coils 7 may be given a comparatively high resistance and placed in multiple with the igniter points 9 and 10 and the source of current. In fact I deem any circuit arrangement within the scope of my invention, also any mechanical means for operating the igniter in combination with the electric control device as herein described.

I claim:

1. In combination with an internal combustion engine, a source of current, a make and break igniter, a circuit connecting said source of current and igniter, interrupter mechanism in said circuit, means operated by the engine for closing the igniter contacts, locking mechanism for holding the igniter contacts closed, and electromagnetic means for releasing said locking mechanism to permit the igniter contacts to open in time with the circuit interrupter mechanism, substantially as described.

2. In an ignition system, a dynamo, a cam on the armature of said dynamo, a circuit closer operated by said cam and connected in multiple with said dynamo, a make and break igniter and means for operating same, circuit wires connecting said dynamo and igniter, a member connected to the movable contact of said igniter, and means for engaging and holding said member to hold the igniter contacts closed, said means including the armature of an electromagnet included serially in circuit between the dynamo and igniter.

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

CHARLES THOMAS MASON.

Witnesses:

F. C. MANNING,
S. C. McKEOWN.