

May 1, 1923.

1,453,635

M. D. MORRIS

BREAKER ARM SYNCHRONIZER

Filed March 14, 1921

3 Sheets-Sheet 1

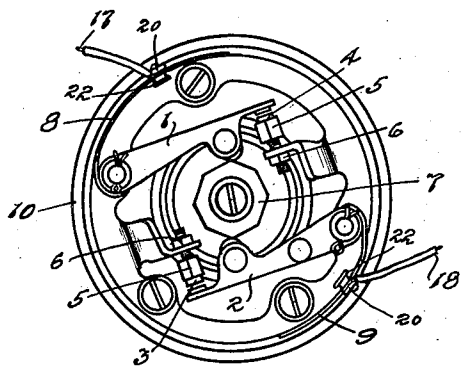


Fig 1

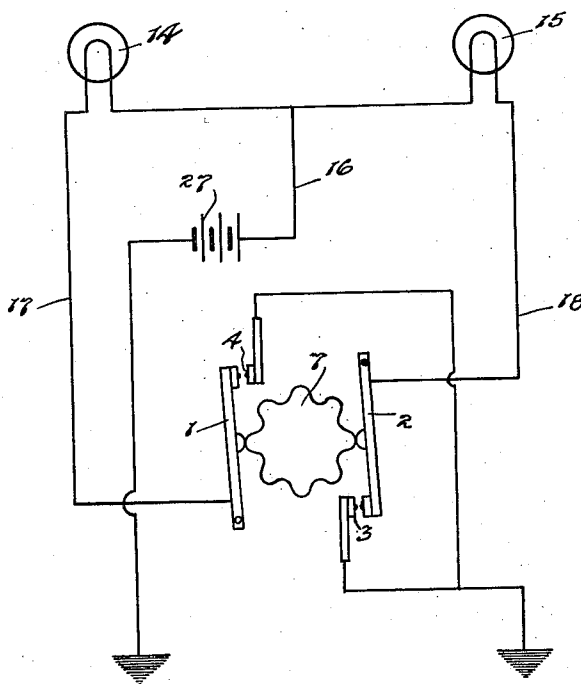


Fig 7

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3 Sheets-Sheet 2

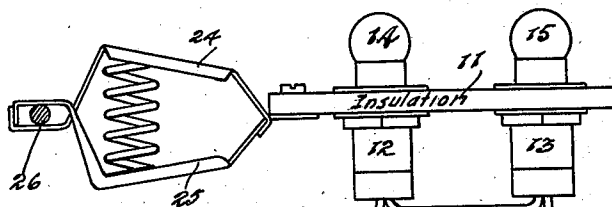


Fig 2

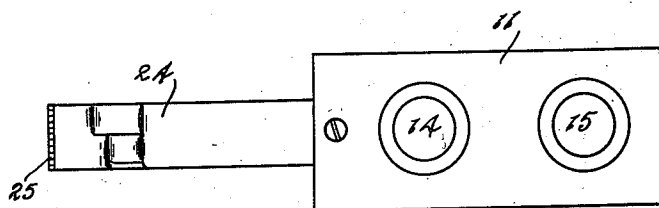


Fig 3

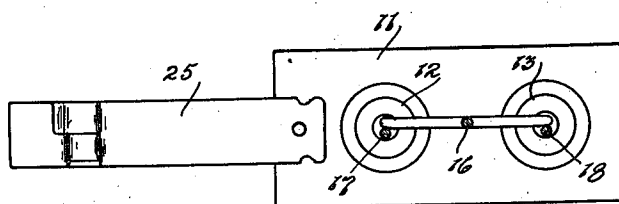


Fig 4

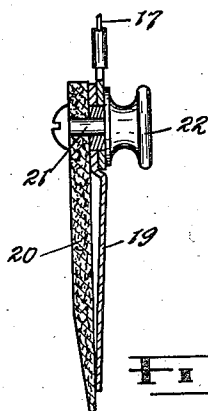


Fig 5

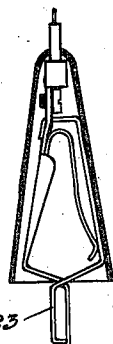
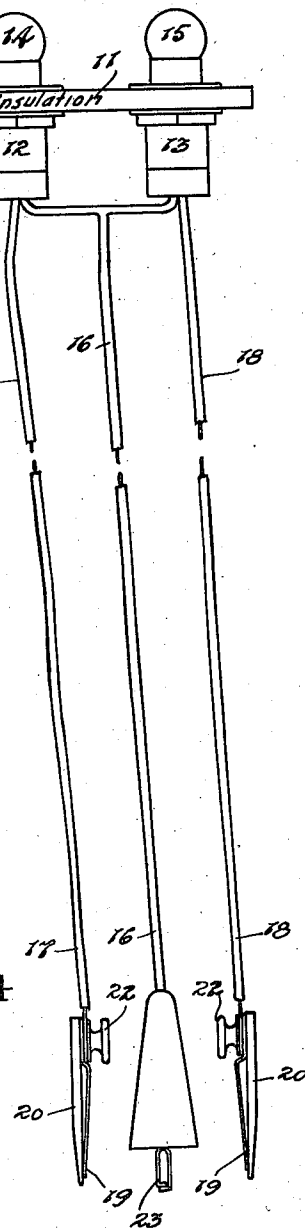


Fig 6



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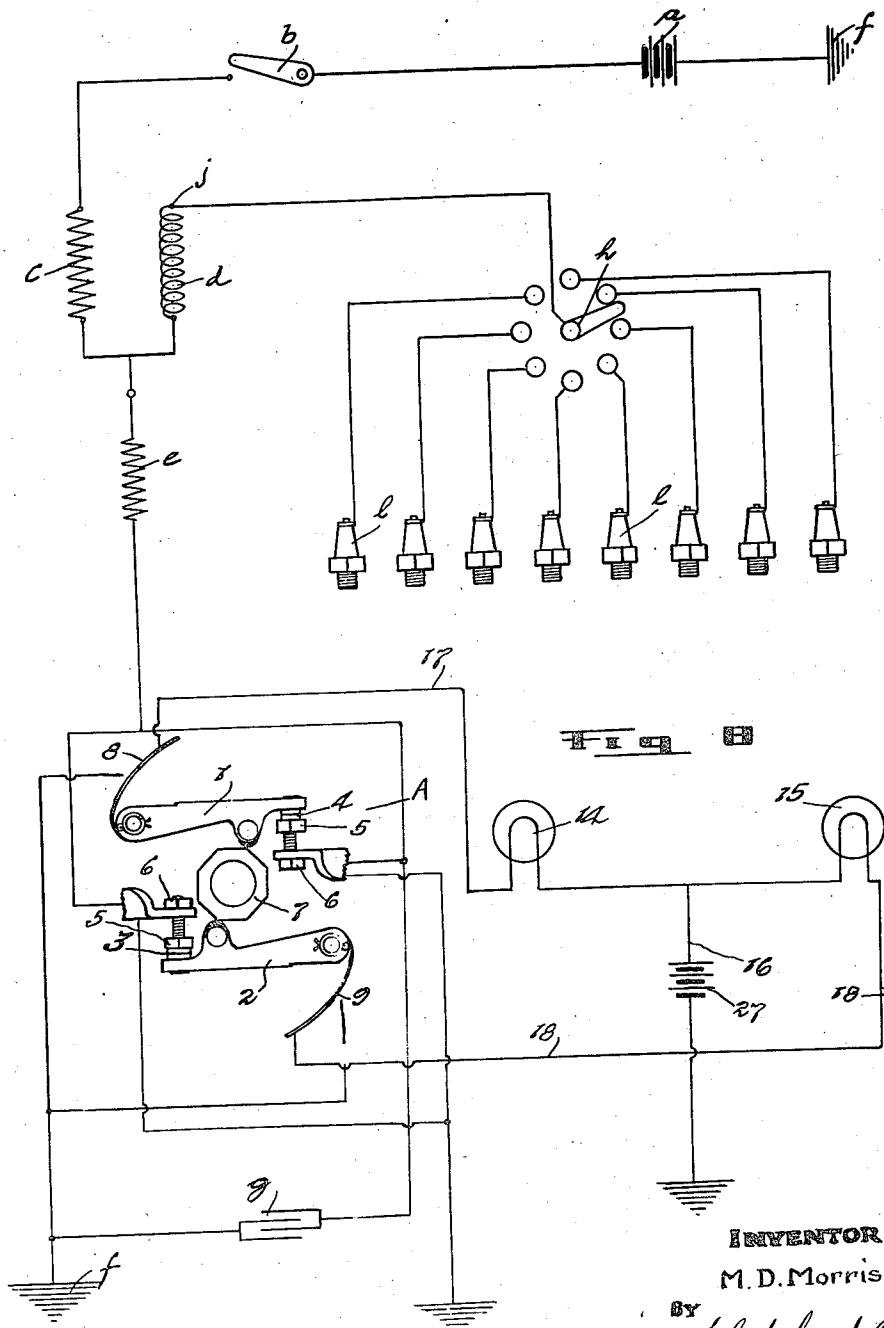
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M. D. MORRIS

BREAKER ARM SYNCHRONIZER

Filed March 14, 1921

3 Sheets-Sheet 3



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Patented May 1, 1923.

1,453,635

UNITED STATES PATENT OFFICE.

MAYNARD D. MORRIS, OF WINNIPEG, MANITOBA, CANADA, ASSIGNOR OF ONE-HALF
TO JESSE J. HOWE, OF DAUPHIN, MANITOBA, CANADA.

BREAKER-ARM SYNCHRONIZER.

Application filed March 14, 1921. Serial No. 452,177.

To all whom it may concern:

Be it known that I, MAYNARD D. MORRIS, of the city of Winnipeg, in the Province of Manitoba, Canada, have invented certain new and useful Improvements in Breaker-Arm Synchronizers, of which the following is the specification.

The invention relates to improvements in breaker arm synchronizers and the object of the invention is to provide a means whereby one can positively synchronize the dual contact points of the interrupter as used on an automobile engine, the adjustment being made by synchronizing electric lamps arranged in circuit with the interrupter and adapted to positively and visibly indicate by illumination the simultaneous contacting of the dual contacts.

A further object of the invention is to arrange the appliance in a simple manner and so that it can be readily attached and operated.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described and later pointed out in the appended claims, reference being had to the accompanying drawings in which:—

Fig. 1 is a plan view of the upper end of the interrupter showing the contacting parts and other parts associated therewith.

Fig. 2 is a side view of my synchronizing appliance.

Fig. 3 is a plan view of the same.

Fig. 4 is an inverted plan view of the insulating plate and parts carried thereby.

Fig. 5 is an enlarged detailed sectional view through one of the insulated contacts which I provide.

Fig. 6 is a side view of the jaw contact.

Fig. 7 is a view representing diagrammatically the circuit.

Fig. 8 is a diagrammatic view illustrating the invention as applied to the ignition system as used with an internal combustion engine having multiple cylinders.

In the drawings like characters of reference indicate corresponding parts in the several figures.

I might here explain that in automobile, aeroplane and such like engines wherein eight and more cylinders are used the practice is to use an interrupter controlling the ignition circuit which is provided with

double or dual contacts. Such arrangement is resorted to to reduce burning and corroding of the points. In Fig. 1 of the drawings I have shown an interrupter as used in such multi-cylinder engines and for best working conditions it is essential that the dual contact points open and close together.

In order to have a clear understanding of the invention I have shown diagrammatically in Figure 8 the arrangement of the ignition circuit and have introduced my breaker arm synchronizer in the circuit. The ignition circuit embodies a source of current supply such as a battery (a) and a manually operated switch (b) for closing the circuit to an induction coil which comprises the usual primary coil (c) and the secondary coil (d). A resistance coil (e) is interposed between the induction coil and the timer A which is described more particularly hereinafter:

The timer is supplied with a plurality of sets of contacts which are adapted to open and close the circuit to the ground connection (f) which forms a return to the source of current (a). It will be noticed that the usual condenser (g) may be arranged to bridge across the gap made by the contacts of the timer so broken thereby. A distributor (h) of the usual form is connected with the secondary coil (d) of the induction coil, as at (j). The various spark plugs (l) of the engine are connected to the distributor (h).

Referring now to the timer A:

1 and 2 represent the customary contact arms of the interrupter and 3 and 4 the contact points, these contact points being adjustable towards and away from the contact arms, the adjustment being made by manipulating the squared head 5 and the nut 6 in each instance. The interrupter cam is indicated at 7 and presents lobes on which the contact arms ride. The contact arms are each provided with springs 8 and 9 which make contact under ordinary conditions with the body or casing 10 of the interrupter, which is normally grounded at (f). Up to the present time, as far as I am aware, the contact points of the timer are adjustable by a wrench or similar tool and such an adjustment is not to be depended upon as they cannot be positively synchronized by hand adjustment purely. According to my invention I provide a synchronizer embody-

ing two electric lamps which are connected in circuit with the dual contact points and are arranged so that when the proper adjustment of the contact points has been made the lamps will flash or illuminate together. When the appliance is in use it is only necessary for the attendant to turn the engine crank shaft slowly and as it turns the interrupter is driven in the usual way and if the contact points of the interrupter are properly synchronized the lamps will illuminate together and go out together. The contacts are adjusted by the application of a wrench or similar tool in the customary way, but the lamps visibly indicate when the adjustment is correct.

My synchronizing device is now described in detail:

11 is an insulating plate carrying two insulated electric lamp sockets 12 and 13, each socket being fitted with an electric light 14 and 15. 16 is a central wire and 17 and 18 are two side wires, the central wire being branched and connected to two of the terminals of the lamps, whilst the other two wires 17 and 18 are connected to the other two terminals of the lamps.

The wires 17 and 18 are fitted at their extremities each with an insulated contact which in the present instance comprises a spring metal tongue 19 lying on a fibre or insulating back 20. The tongue is connected to the back by a screw 21 fitted with a terminal nut 22 and the wire in each instance makes direct contact at the screw with the tongue. The lower end of the insulated back 20 is tapered. The extending end of the wire 16 is provided with a jaw contact indicated at 23, the arrangement being that such wire can be readily clipped on to any suitable part to make a proper electrical connection. The fibre block 11 is also supplied with a pair of spring jaws 24 and 25 which allow the appliance to be supported from any suitable part of the automobile engine, the support in the present instance being shown as a rod 26.

When the appliance is to be used the wires 17 and 18 are brought into direct electrical contact with the springs 8 and 9 of the interrupter, this being done by inserting the contacts as shown in Fig. 5 between the springs and the casing with the fibre or insulating part 20 engaged with the casing. This position of the insulating contacts is shown in Fig. 1. The wire 16 is connected by means of the jaw contact 23 with a battery or circuit breaker, the battery being indicated at 27 Fig. 7.

The contacts 3 and 4 are next short cir-

cuted or grounded. The arrangement then appears as shown diagrammatically in Fig. 7. One then turns the crank shaft of the engine and watches the lights. If they illuminate and go out together no adjustment is required in the contacts 3 and 4. Otherwise one properly adjusts the contacts by means of a wrench or similar tool until the lamps light and extinguish together. This can be readily done by turning the crank shaft and adjusting the contacts.

Obviously the adjustment is a very positive one as the lamps visibly indicate when the adjustment is properly made and the dual contacts are what might be termed properly synchronized.

Whilst I have entered into a detailed description of the insulated contact and the jaw contact, still it will be readily understood that these parts could be modified without departing from the spirit of the invention as set forth in the appended claims.

I might explain in connection with Figure 8 that the usual wires, which ground at (f) the body or casing 10 of the interrupter and consequently the springs 8 and 9, have been shown as disconnected from the ring or springs as this is actually what occurs when my synchronizing device is introduced, the fibre or insulating parts 20 actually breaking contact between the springs 8 and 9 and the ground and in so doing putting the dual contacts in circuit with his lamps as shown in Fig. 8.

What I claim as my invention is:—

1. A breaker arm synchronizer, comprising a pair of electric lamps, a pair of tongue like contacts mounted on insulating strips, a jaw contact, and electric wire connections connecting the lamps in parallel between the tongue contacts and the jaw contacts.

2. A breaker arm synchronizer, comprising an insulating block provided with attaching means, a pair of electric lights independently mounted on the block, a central wire branched and connected to two of the terminals of the lamps, side wires connected to the other two terminals of the lamps, a jaw contact secured to the free end of the central wire, and tongue contacts secured to the free ends of the side wires, said tongues being backed by insulating strips at one side.

Signed at Winnipeg, this 12th day of February, 1921.

MAYNARD D. MORRIS.

In the presence of—

GERALD S. ROXBURGH,
K. B. WAKEFIELD.