Aug. 30, 1927. 1,640,725

G. SCHADEE

IGNITION TIMER

Filed Nov. 28, 1925 3 Sheets-Sheet 1

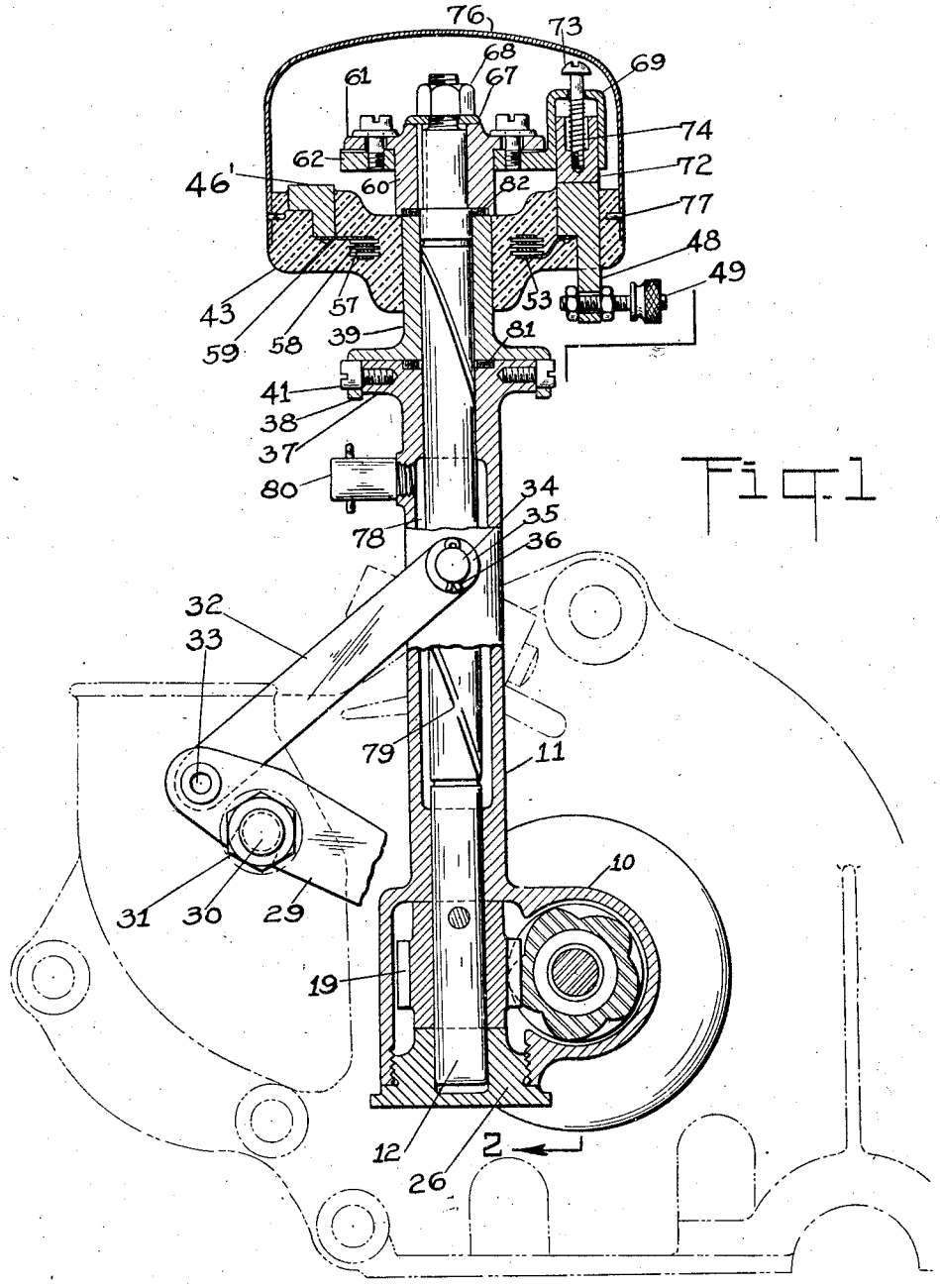


Fig. 1

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IGNITION TIMER

Filed Nov. 28, 1925 3 Sheets-Sheet 2

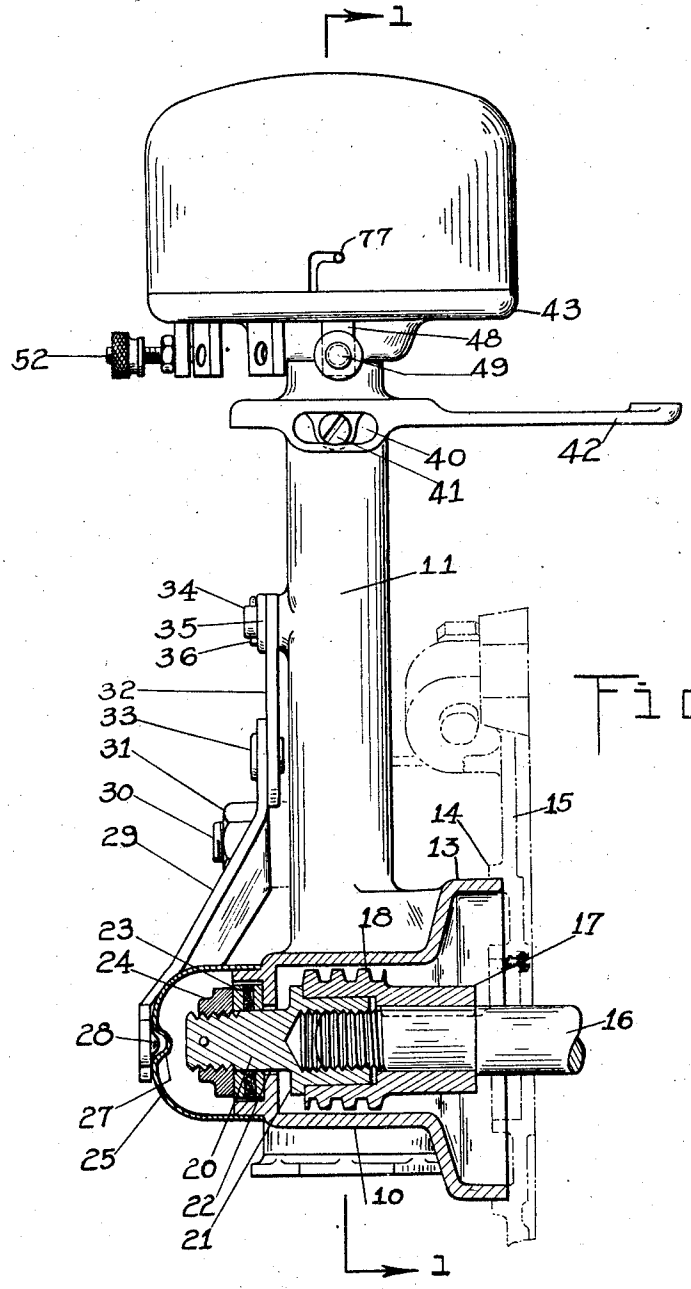


Fig. 2

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Aug. 30, 1927. 1,640,725

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IGNITION TIMER

Filed Nov. 28, 1925 3 Sheets-Sheet 3

Fig. 3

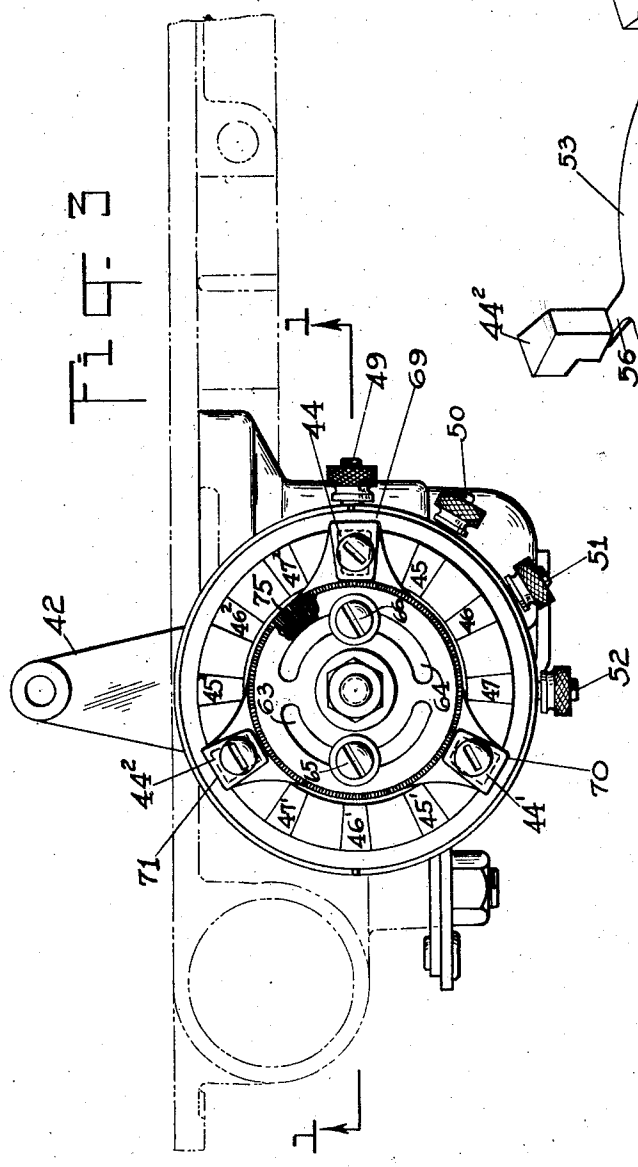
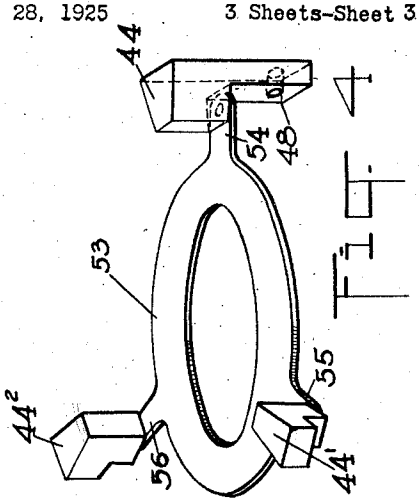


Fig. 4



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Patented Aug. 30, 1927. 1,640,725

UNITED STATES PATENT OFFICE.

GUSTAV SCHADEE, OF NEW YORK, N. Y.

IGNITION TIMER.

Application filed November 28, 1925. Serial No. 71,884.

My present invention relates to ignition timers for internal combustion engines and particularly to that type of ignition timers in which there are a plurality of contacts, the number of the contacts being a multiple of the number of cylinders in the engine or motor with which the timer is employed so that the timer shaft may be geared down to turn at a correspondingly lower speed than the cam shaft in order to produce a longer period of ignition, to obtain a more complete ignition of the fuel, and to appreciably decrease the wear on the parts of the timer. In the timer made in accordance with my invention I employ a complete or continuous distribution ring for each of the cylinders of the engine and to which one of the sets of contacts is connected, whereby if for any reason any of the distributor rings are broken or injured the spark circuit to the cylinder of that particular ring will not be broken but is positively completed at all times when the distributor brushes are brought into contact with any of the sets of contacts for the given cylinder. In carrying out the invention I also prefer to form the contacts and the brushes in such a manner as to provide a maximum bearing surface between them and to also cause a complete make and a complete break in the bearing between the contacts and the brushes with each engagement thereof.

Furthermore in carrying out my invention, the construction of the timer is such that the parts are readily demountable without detaching the entire apparatus from the motor, and also such that the timer is connected to the motor in such a manner as to be maintained in its proper position and to permit within certain limits of a lateral yielding motion to take up possible end thrusts of the cam shaft. Still furthermore, while the construction forms no particular part of my present invention the parts of the timer are also preferably so made that they may be readily separated and dismantled for the purposes of repairs or adjustments or otherwise without demounting the entire apparatus, the structure being such for example that the timer shaft may be removed without disconnecting the casing and other parts of the apparatus from the frame of the motor or engine with which it is employed.

In the drawing Figure 1 is a sectional longitudinal elevation of an ignition timer made in accordance with my invention.

Fig. 2 is a side elevation and partial section.

Fig. 3 is a plan showing the cover removed for the purposes of illustration. and

Fig. 4 is a perspective view of one of the closed distributor rings and the contacts connected therewith.

By reference to the drawings it will be seen that in carrying out the invention the ignition timer made in accordance therewith is constructed to include a gear casing 10 and a timer shaft casing 11, which members are preferably made integral with one another and adapted to receive the timer shaft 12 which extends through and is journaled in the timer shaft casing. The gear casing 10 is provided with a flange 13 adapted to fit within a boss 14 which is provided on the engine or motor frame 15 for this purpose. The cam shaft 16 of the motor extends through the casing as is usual and into the gear casing 10. On the outer end of the cam shaft a sleeve 17 is secured by being keyed thereto or otherwise connected. This sleeve 17 is so constructed as to include a worm gear 18 which meshes with a spiral gear 19 secured on the timer shaft 12. The outer end of the sleeve 17 is recessed to receive the inner end of a stud socket 20 which is adapted to be turned down on the screw threaded extremity of the cam shaft 16 and is adapted to fit within the recessed end of the sleeve 17 so that when the parts are in position as clearly indicated in Fig. 2, a shoulder 21 on the stud socket 20 bears against the outer extremity of the worm gear portion 18 of the sleeve 17. The gear casing 10 is provided with an opening 22 through which the outer portion of the stud socket 20 extends, and exteriorly of the gear casing this stud socket 20 is provided with a set of washers 23 which as will be understood act as bearings for the stud socket and consequently for the outer end of the cam shaft. The washers 23 are preferably maintained in position by means of a nut 24 or otherwise. Also as illustrated, the gear casing is provided with a cap 25 adapted to cover the outer end of the stud socket and washers and nut thereon. The gear casing is also fitted with a plug bearing 26 adapted to receive the lower end of the timer shaft, and the construction is such that when this

plug bearing is removed and the parts carried by the timer shaft as hereinbefore described are disconnected, the timer shaft may be entirely removed from the timer.

The outer portion of the cap 25 is recessed as indicated at 27 and adapted to receive a boss 28 provided for this purpose at one extremity of a tension bar 29. Adjacent its opposite end the tension bar 29 is secured to the motor frame by a stud 30 and a nut 31 or otherwise. The timer is maintained in its proper upright position by means of this tension bar 29 and a brace bar 32. One end of the brace bar 32 is pivotally connected as indicated at 33 to the end of the tension bar 29 adjacent the point of adjustment of the tension bar to the motor frame and the opposite end of the brace bar is secured to the timer shaft casing by means of a pin 34, a washer 35, and a cotter pin 36 or otherwise. It will now be understood that the cap 25 is yieldingly maintained in position, that suitable provision is made for end thrusts in the action of the cam shaft, and that the timer is adequately maintained in its upright position relatively to the frame of the motor.

At the upper end of the timer shaft casing there is a head 37 over which is fitted a flange 38 of a sleeve 39 through which the upper portion of the timer shaft passes. The sleeve 39 is adjustable revolubly relatively to the timer shaft casing and is maintained in position thereon by providing slots 40 in the flange 38 and employing suitable screws 41 or otherwise, which as will be understood not only maintain the sleeve in position but to limit its revoluble turning movement relatively to the timer shaft casing. The flange 38 is also provided with an arm 42 which in customary manner is connected to a lever to be operated by the driver of a motor car or the attendant of the motor for advancing or retarding the spark as occasion may require.

The timer mechanism proper includes a base 42 made of suitable insulating material and having embedded therein a plurality of spaced contacts arranged in sets as indicated at 44, 45, 46, 47, 44′, 45′, 46′, 47′, 44², 45², 46², and 47². The timer as illustrated is constructed for use in a four cylinder engine and the contacts are arranged in sets so that there is a set of contacts for each engine cylinder, the contacts 44, 44′ and 44², being those for one cylinder, and the correspondingly indicated contacts are arranged in sets, one set for each of the other cylinders. As illustrated, one of these contacts for each cylinder is provided with an extension 48 which is carried through the insulating base so as to project appreciably beyond the same to form a binding post 49. The extension 48 and the binding post 49 are those employed for the set of contacts designated by the reference numerals 44, 44′, and 44², the binding post 50 for the set of contacts indicated at 45, 45′, and 45², the binding post 51 for the contacts 46, 46′ and 46², and the binding post 52 for the contacts 47, 47′ and 47². Each of these sets of contacts is connected to a continuous or closed distributing ring embedded in the insulating base. 53 is the distributing ring to which the contacts 44, 44′ and 44², are connected, and as clearly illustrated in Fig. 4, this distributor ring in equally spaced positions is provided with lugs 54, 55 and 56 by which the respective contacts are respectively connected thereto. The other distributor rings are indicated at 57, 58 and 59 and as will be understood are similarly connected to their respective sets of contacts and insulated from one another and are embedded in the insulating base.

On the upper end of the timer shaft there is a sleeve 60. This sleeve is flanged as indicated at 61. The sleeve passes through an opening provided therefor in a distributor head 62 and the sleeve is provided with circular slots 63, 64 through which screws 65, 66 pass and are adapted to be turned down in tapped openings provided therefor in the distributor head in order as will be understood, to adjust the distributor head revolubly in its relationship to the sleeve 60. The sleeve 60 is preferably keyed or otherwise connected to the timer shaft and may be additionally secured thereto by means of a washer 67 and a nut 68 turned down on the screw threaded upper extremity of the timer shaft 12.

In equally spaced positions the distributor head 62 is provided with brush holders 69, 70, and 71. Each of these brush holders is adapted to receive a brush 72. These parts are similarly constructed and but one of them will be specifically described. As illustrated, the brush 72 fits within the brush holder 69 and is provided with a screw 73 which passes through an opening provided therefor in the brush holder and carries a spring 74 coacting between the brush holder and the brush to normally maintain the brush in contact with the surface of the base so as to bear against the contacts therein.

In order to insure the fixed relationship between the sleeve 60 and the distributor head 62 the upper surface of the distributor head and the lower or inner surface of the flange 61 of the sleeve are preferably provided with series of small ribs or serrations 75 adapted to fit one within the other, and as will also be understood to provide for relatively fine adjustment of the positions of these parts in their relationship to each other.

Fitting over the base 43 of the timer there is a cover 76 which may be connected to the base by means of a bayonet joint 77 or otherwise.

Also as illustrated, one or more portions

of the timer shaft casing may be enlarged interiorly to provide a chamber 78 within the casing and between the same and the timer shaft for the reception of a suitable lubricant and in order to elevate the lubricant and to insure the proper lubrication of the timer shaft the same may be provided with a spiral groove 79. As illustrated, the lubricant may be admitted through a suitable oil cap 80 or otherwise. It will also be noted that the timer shaft casing may be provided with packing washers 81 and 82 at the upper end of the sleeve 39 and at the joint between the upper end of the casing and sleeve 39 in order to prevent the lubricant from leaking out.

Although it forms no part of my present invention, it will be noted that the contacts 44, 45, 46 and 47, 44′, 45′, 46′ and 47′, 44^2, 45^2, 46^2, and 47^2, have their sides lying in lines which are radial from the center of the timer shaft and that the faces of the brushes are correspondingly constructed to conform with the contacts whereby as each contact is made it is complete along the entire edge and is broken in like manner, making it possible to obtain a maximum line of contact between the parts while in engagement with one another.

I claim as my invention:

1. In an ignition timer, a timer shaft, an insulating base, a plurality of closed distributor rings spaced in the said base, a set of stationary contacts connected to each ring with each contact extending transversely of the base and terminating in a contact face in an outer surface of the said base, one of the contacts of each set being extended through the base to form a terminal, and a group of revoluble contacts corresponding in number with the number of fixed contacts in each set thereof and adapted simultaneously to bear on all the contacts in each set thereof.

2. In an ignition timer, a timer shaft, an insulating base, a plurality of closed distributor rings spaced in the said base, a set of stationary contacts connected with each ring with each contact extending transversely of the base and terminating in a contact face in an outer surface of the base, one of the contacts in each set being extended in the opposite direction through the said base to form a terminal, a distributor head adjustably mounted on the timer shaft, and a group of brushes carried by the distributor head and adapted to engage the contact face of the base, the number of the said brushes corresponding with the number of fixed contacts connected to each ring and the spacing of the brushes being such that they bear simultaneously on all the contacts connected with any one ring.

3. In an ignition timer, a timer shaft, an insulating base, a plurality of closed distributor rings spaced in the said base, a set of stationary contacts extending from each distributor ring with each contact terminating in a contact face in an outer surface of the said base, one of the contacts of each set thereof being extended to form a terminal, a distributor head, and a plurality of brushes carried by the distributor head and adapted to engage the said contact face of the base, the number of the said brushes corresponding with the number of fixed contacts connected to each ring and the position of the said brushes being such that they are adapted to bear simultaneously on all the contacts in one ring.

Signed by me this 23rd day of November, 1925.

GUSTAV SCHADEE.