L. R. WINTERS AND O. E. GIBSON.

SPARK TIMER.

APPLICATION FILED SEPT. 30, 1919.

1,366,994. Patented Feb. 1, 1921.

Fig. 2.

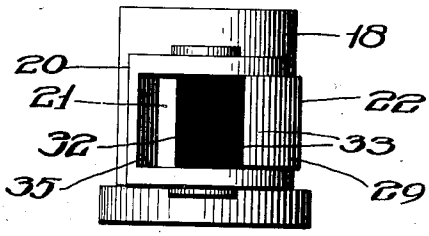


Fig. 1.

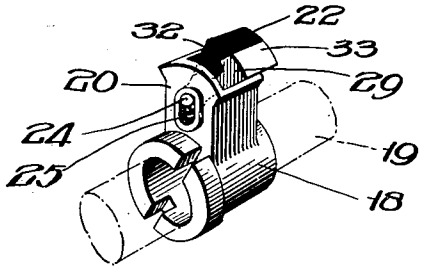


Fig. 3.

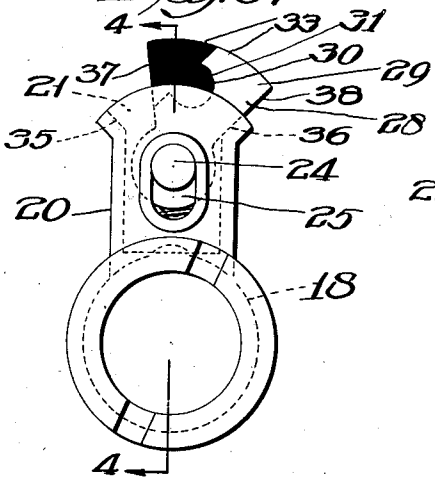


Fig. 4.

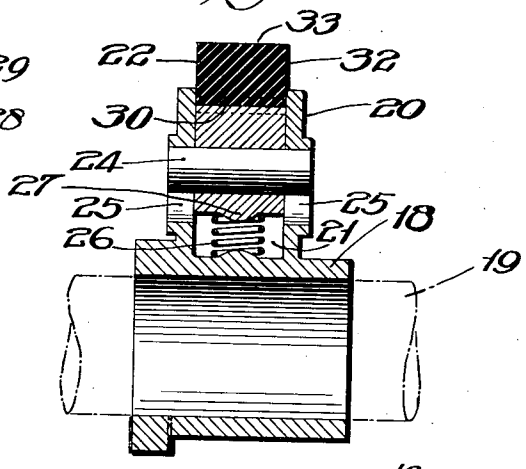


Fig. 5

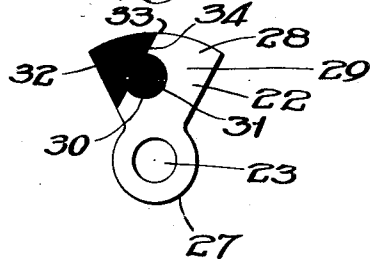
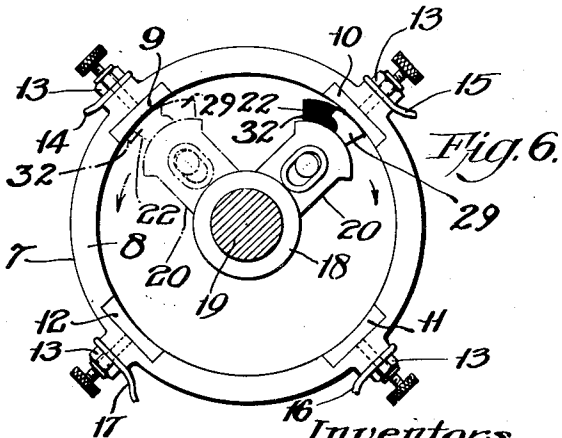


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SPARK-TIMER.

1,366,994. Specification of Letters Patent. Patented Feb. 1, 1921.

Application filed September 30, 1919. Serial No. 327,542.

To all whom it may concern:

Be it known that we, LEONARD R. WINTERS and OLIVER E. GIBSON, citizens of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Spark-Timers, of which the following is a specification.

One object of our invention is to provide an improved spark timer which is particularly adapted for use in connection with internal combustion engines, such for example as used on automobiles, and to so construct our invention that it will be durable and effective in operation so as to positively cause the production of sparks at the proper times within a series of engine cylinders.

Another object is to so construct the parts of our improved timer that the movable contacting member will engage the interior of the housing in such manner that the wear caused by the engagement of said member with the insulation and contacting plates will not be of a wavy or undulated character, but on the contrary the parts will act so that even after operating for a considerable time, the interior of the housing will be smooth and practically free of any irregularities which would cause the improper operation of the parts.

A further object is to so construct our invention that it will prevent injury to a person cranking the engine which injury previous to our invention often occurred due to the back firing of the engine.

A still further object is to make our invention of a simple construction and so that it can be easily and quickly manufactured and put together.

These objects, and other advantageous ends which will be described hereinafter, we attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a perspective view showing our invention,

Fig. 2 is a top plan view of Fig. 1,

Fig. 3 is an elevation of Fig. 2,

Fig. 4 is a section taken on the line 4—4 of Fig. 3,

Fig. 5 is an elevation of a contacting finger which forms a part of our invention, and

Fig. 6 is an elevation showing our invention as applied to a four-point spark distributing housing or commutator, such for example as would be used in connection with an internal combustion engine employing four cylinders.

Referring to the drawing, 7 represents a housing including a ring 8 of insulating material or material which is a non-conductor of electricity and 9, 10, 11 and 12 represent metallic contacting plates which are spaced apart within the ring 8 and connected by binding posts 13 to which wires 14, 15, 16 and 17 are attached, said wires leading to the respective spark coils, in the present instance, of a four cylinder internal combustion engine (not illustrated).

A collar 18 is secured to a shaft 19, such for example as shown in dot-and-dash lines in Fig. 4; said shaft for example being the cam shaft of the engine and which can be connected by a ground connection with an electric generator as is the usual custom. A hollow extension 20 projects laterally from the collar 18 and provides a cavity 21. This cavity is preferably made rectangular in cross section as illustrated.

A contacting finger 22 has a hole 23 through which a pin 24 extends. This pin 24 has its opposite end portions adapted to extend within slots 25 formed in two oppositely disposed sides of the extension 20. The finger 22 is adapted to rock or oscillate within the cavity 21 of the extension 20 and a coiled spring 26 is interposed between the inner end 27 of the finger 22 and the collar 18 as clearly shown in Fig. 4. The finger 22 includes an outwardly flared stem 28; the portion 29 of which being made of metal and formed integral with the end 27. The portion 29 has an arcuate socket 30 into which fits a part 31 of the stem portion 32; said stem portion being made of fiber or other material which is a non-conductor of electricity. As illustrated, the socket 30 is of an arc greater than 180° so that the part 31 when slipped laterally therein will be locked to the portion 29 of the stem 28. Thus it will be understood that the stem 28 includes the portion 29 which is of metal and a conductor of electricity, and the portion 32 which is made of material which is a non-conductor of electricity.

The outer edge surface 33 of the stem 28 is preferably made arcuate and concentric to the axis of the hole 23 and the parting 34 between the portions 29 and 32 of the stem 28 is substantially located in the

middle of the edge surface 33 so that one half of the edge surface 33 is of metallic or electrically connecting material, while the other half of the edge surface 33 is of material which is a non-conductor of electricity. The outermost portion of the extension 20 is flared so as to provide ledges 35 and 36, as clearly shown in Fig. 3, said ledges forming abutments for the oppositely disposed edges 37 and 38 of the stem 28 of the contact finger 22; it being noted that the edge portion 33 of said contact finger extends beyond the outermost end of the extension 20 and is held in various contacting positions with the interior of the ring 8 and contact plates 9, 10, 11 and 12 as will hereinafter be described; said spring 26 serving to move the pivot pin 24 toward the outer ends of the slots 25.

From the foregoing description it will be understood that when the collar 18 is moved clockwise due to the rotation of the shaft 19, the finger 22 will rock due to the action of the spring 26 and contact with the inner surface of the housing 7 into a position to cause the metallic portion of the edge 33 to engage the inner surface of the ring 8 and the inner surfaces of the contact plates 9, 10, 11 and 12 so that when the shaft 19 is operating, due to the proper action of the engine, the electric current will be successively distributed to the contact plates 9, 10, 11 and 12 due to the engagement of the metallic portion 29 of the finger 22 with said contact plates. During this clockwise movement of the device, the edge 37 of the contact finger 22 will be in engagement with the ledge 35 so that the device will operate to positively engage the contact plates to produce the succession of sparks; such position being illustrated in full lines in Fig. 6.

If, however, the shaft 19 rotates in an opposite or contra clockwise direction, the contact finger will rock within the cavity 21 into engagement with the ledge 36 so as to move the portion 32 into engagement with the inner surface of the housing 7 and the portion 29 will be immediately moved out of engagement with said inner surface of the housing 7; thereby preventing any electric current being supplied to the contact plates. Thus for example if the engine "back fires" during the cranking of the engine our improved contact finger will immediately swing or rock into a position to present the non-conducting portion 32 into engagement with the inner surfaces of the ring 8 and contact plates, and thereby prevent a continuation of the back firing movement of the engine.

It will be further understood that since our improved contact finger engages the inner surfaces of the contact plates and ring 8 with a dragging movement that the same will serve to keep said surfaces clean and will also prevent the formation of any waves or irregularities on said surfaces; it being well known that prior to our invention where rollers or similar contact members were employed that the contact members produced indentations and other irregularities which soon destroyed the proper smooth operation of the device and also cause jumping of the parts producing improper ignition.

In practical demonstration and after extended use we have found that our improved device as above described operates to efficiently produce the proper ignition and also that when our invention is employed in connection with an internal combustion engine that the engine will not back fire to a degree capable of injuring a person cranking the same. Furthermore, by said actual demonstration we have found that after extended use that the inner surfaces of the contact plates and housing ring are smooth and free of the objectionable irregularities above noted.

While we have described our invention as taking a particular form, it will be understood that the various parts of our invention may be changed without departing from the spirit thereof, and hence we do not limit ourselves to the precise construction set forth, but consider that we are at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. A timer of the character described including contact members spaced apart; means rotatable in either of two directions; and contacting means movably connected to said rotatable means and adapted to drag against said contact members, said contacting means having electrically conducting and non-conducting portions, said conducting portion due to the friction caused by said dragging movement being adapted to move into a position to frictionally and successively engage said contact members during the rotation of said contacting means in one of said directions, said contacting means due to the friction exerted by said drag also being adapted to move said non-conducting portion into position to engage said contact members and to move said conducting portion out of position to engage said contact members when said rotatable means is moved in the other of said directions; substantially as described.

2. A timer of the character described including a housing having contact members spaced apart and extending to its inner surface; a shaft extending through said housing; a collar secured to said shaft and hav-

ing an extension providing oppositely disposed sides having slots therein; a contacting finger having a pivot pin extending into said slots; and a spring operative to move said finger outwardly to hold a portion of said finger in contact with the inner surface of said housing, said portion of the finger being made up of parts of electrically conducting and non-conducting material whereby when the shaft and extension is rotated in one direction said portion of the finger will rock due to its frictional engagement with said surface of the housing to present said conducting part so as to engage said members during rotation, said finger during a rotation of said shaft and extension in an opposite direction being adapted to rock so as to present said non-conducting portion in a position to engage said members; substantially as described.

3. A timer of the character described including a housing having contact members therein spaced apart; means rotatable in either direction; and a contacting finger rockably mounted on said means, said finger having electrically conducting and non-conducting portions, said conducting portion being operative to rock into a position to frictionally engage said contact members during rotation of said contact finger in a desired direction, said non-conducting portion being adapted to rock into a position to frictionally engage said contact members and thereby rock said conducting portion out of operative position during a rotation of said contact finger in a reverse direction; substantially as described.

4. A timer of the character described including a housing having contact members therein spaced apart; means rotatable in either direction; and a contacting finger operatively connected to said rotatable means and having a surface for engagement with said contact members, said finger including electrically conducting and non-conducting portions, each forming a part of said surface, said parts of said surface being adapted to respectively engage said contact members when said means is moved in opposite directions to rock said fingers; substantially as described.

5. A timer of the character described including a housing having contact members spaced apart and extending to its inner surface; a shaft extending through said housing; a collar secured to said shaft and having an extension providing oppositely disposed sides having slots therein; a contacting finger having a pivot pin extending into said slots; and a spring operative to move said finger outwardly to hold a portion of said finger in contact with the inner surface of said housing, said portion of the finger being made up of parts of electrically conducting and non-conducting material whereby when the shaft and extension is rotated in one direction said portion of the finger will rock due to its frictional engagement with said surface of the housing to present said conducting part so as to engage said members during rotation, said finger during a rotation of said shaft and extension in an opposite direction being adapted to rock so as to present said non-conducting portion in a position to engage said members, said extension having portions located at opposite sides of said finger forming ledges to limit the rocking movement of said finger; substantially as described.

6. A timer of the character described including a housing having a ring of electrically non-conducting material; contact members spaced apart within said ring and having inner surfaces substantially flush with the inner surface of said ring; means rotatable in either direction; and a contacting finger movably mounted on said means and having a surface adapted to engage the inner surface of said ring and contact members during the rotation of said means, said contacting finger including portions of electrically conducting and non-conducting material, said surface of the finger being formed partly by said conducting and non-conducting material whereby when said means is rotated in alternate directions, the parts of said latter surface will be respectively moved into and out of engagement with said inner surface of said ring and contact members; substantially as described.

7. A timer of the character described including a housing having a ring of electrically non-conducting material; contact members spaced apart within said ring and having inner surfaces substantially flush with tne inner surface of said ring; means rotatable in either direction; and a contacting finger movably mounted on said means and having a surface adapted to engage the inner surface of said ring and contact members during the rotation of said means, said contacting finger including portions of electrically conducting and non-conducting material, said surface of the finger being formed partly by said conducting and non-conducting material whereby when said means is rotated in alternate directions, the parts of said latter surface will be respectively moved into and out of engagement with said inner surface of said ring and contact members, said surface of the finger being arcuate; substantially as described.

8. A timer of the character described including a housing having a ring of electrically non-conducting material; contact members spaced apart within said ring and having inner surfaces substantially flush with the inner surface of said ring; means rotatable in either direction; a contacting finger

movably mounted on said means and having a surface adapted to engage the inner surface of said ring and contact members during the rotation of said means, said contacting finger including portions of electrically conducting and non-conducting material whereby when said means is rotated in alternate directions, the parts of said latter surface will be respectively moved into and out of engagement with said inner surface of said ring and contact members; and a spring for holding said surface in frictional contact with the surface of said ring and contact members; substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

LEONARD R. WINTERS.
OLIVER E. GIBSON.

Witnesses:
ANNA RENTON,
CHAS. E. POTTS.