

T. K. STRAND.
STARTING DEVICE.
APPLICATION FILED NOV. 8, 1911.

Patented Apr. 22, 1913.
2 SHEETS—SHEET 1.

1,059,407.

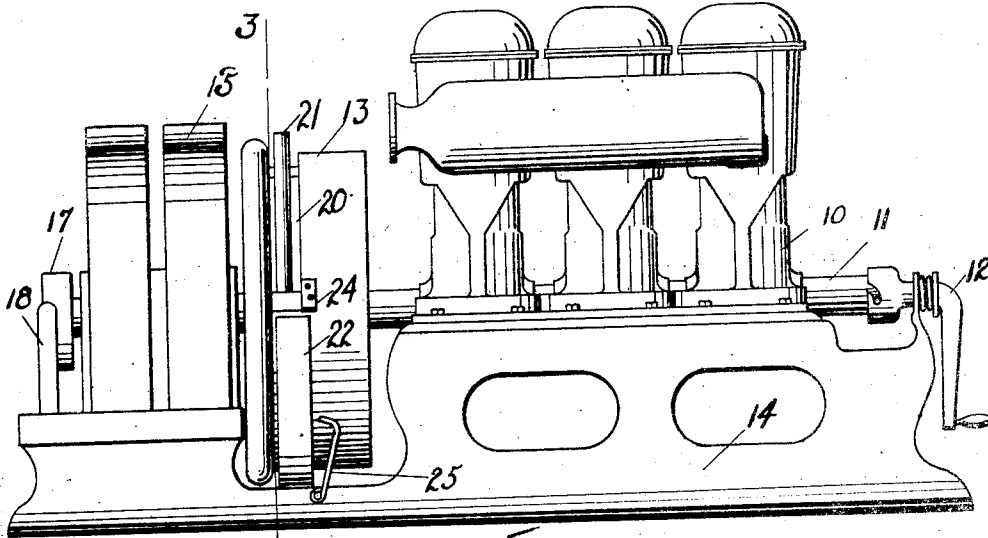


FIG 1

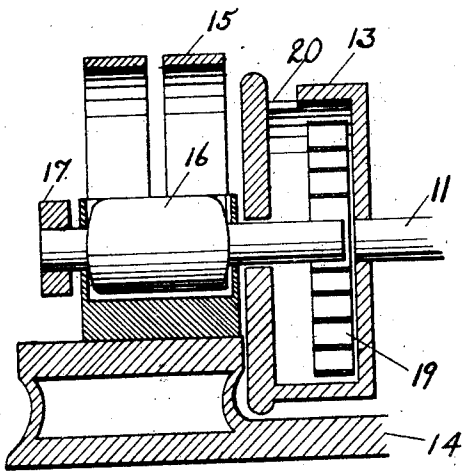


FIG 2

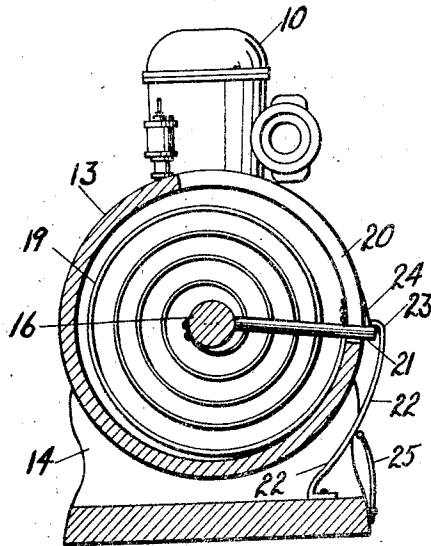


FIG 3

Witnesses

Howard P. King
Francis Boyle

By

T. K. Strand

Attorneys

1,059,407.

Patented Apr. 22, 1913.
2 SHEETS-SHEET 2.

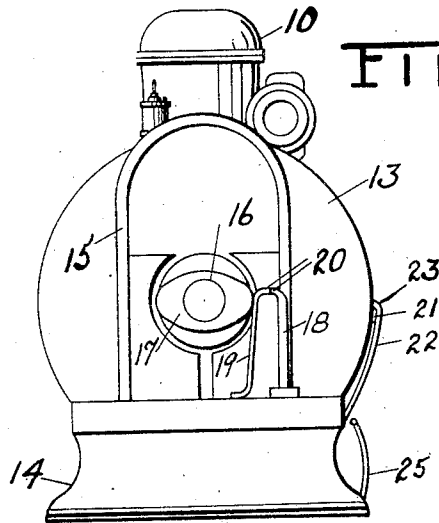


FIG 4

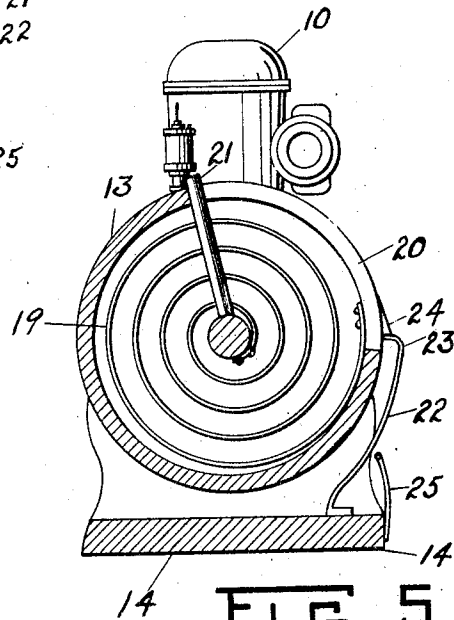


FIG 5

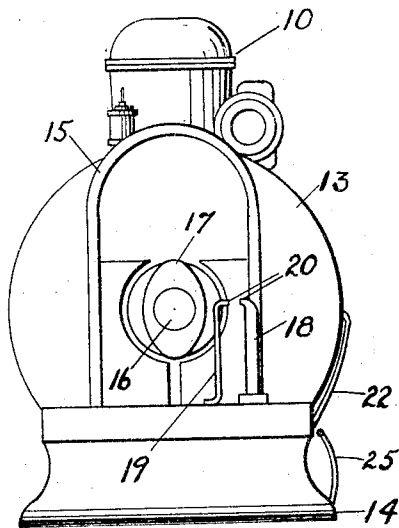


FIG 6

Witnesses

Howard P. King

Francis Boyle

Inventor

T. K. Strand

By

Howard P. King

Attorneys

UNITED STATES PATENT OFFICE.

THOMAS K. STRAND, OF ROLETTE, NORTH DAKOTA.

STARTING DEVICE.

1,059,407.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed November 6, 1911. Serial No. 658,787.

To all whom it may concern:

Be it known that I, THOMAS K. STRAND, a citizen of the United States, residing at Rolette, in the county of Rolette, State of North Dakota, have invented certain new and useful Improvements in Starting Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to new and useful improvements in starting devices for internal combustion engines and the object of my invention is to provide means for operating the magneto to obtain the initial spark needed to start the engine, thus doing away with the necessity for a dual ignition system.

A further object of my invention is to provide means whereby the armature shaft of the magneto may be revolved at a high rate of speed independent of the rate of speed at which the crank shaft of the engine is revolved, the difference in speed being sufficient for adequate current production. And a still further object of my invention is to so accomplish the above mentioned objects that when the engine has once acquired sufficient speed the speed increasing mechanism of the armature may be eliminated and the latter revolved at a constant speed equal to that of the crank shaft of the engine.

With these and other objects in view, my invention will be more fully described, illustrated in the drawings which show a preferred embodiment of my device, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the accompanying drawings, Figure 1 is a side elevation of an explosive engine with my device applied thereto. Fig. 2 is a central longitudinal section of the starting mechanism. Fig. 3 is a transverse section on the line 3—3 of Fig. 1, the parts being shown in the position occupied immediately prior to the forming of the spark. Fig. 4 is an end elevation of the device showing the position occupied by the circuit breaking cam when the device is in the position shown in Fig. 3. Fig. 5 is a section similar to that of Fig. 3 but showing the position of the parts immediately after the spark has been formed. Fig. 6 is a view

similar to Fig. 4 showing the position of the cam after the circuit is broken.

Referring more specifically to the drawings, in which similar reference numerals designate corresponding parts throughout, it will be seen that I have shown my device applied to a conventional form of internal combustion engine of the stationary type but it will of course be understood that the structure may be modified to adapt it for use upon automobile engines and the like without in any way departing from the spirit of my invention.

In the drawings 10 designates in general the engine having a crank shaft 11 upon one end of which is positioned the customary form of starting crank 12 and mounted upon the opposite end of this crank shaft and secured against rotation thereon is a hollow drum 13. As shown this engine is mounted upon a suitable frame 14 and also mounted upon the frame and adjacent the drum 13 is a magneto 15 of the customary type having an armature shaft 16 one end of which extends through a centrally located bore formed in the free end of the drum 13 while the other end of this armature shaft is provided with a circuit closing cam 17. The primary circuit of this magneto includes spring contact plates 18 and 19 preferably provided with platinum contact points 20 and these plates are carried by the frame and are so positioned that the circuit between them is opened and closed by means of the cam 17 which revolves with the armature shaft of the magneto.

Surrounding that end of the armature shaft which is within the drum 13 is a coil spring 19 one end of which is secured to the shaft while the opposite end is secured to the inner face of the drum, this spring being of such strength that the armature shaft of the magneto is normally revolved by the revolving of the drum carried by the crank shaft of the engine.

The drum 13 is provided with a circumferentially extending slot 20 and extending through this slot is an arm 21 the inner end of which is secured to the armature shaft. Secured to the frame and extending upwardly therefrom is a spring arm 22 terminating at its upper end in a lateral extension 23 adapted to engage with the extended end of the arm 21 when the drum is revolved and to so hold the armature shaft

against revolution. Secured to and extending outwardly from the drum 13 is a cam member 24 said member being so positioned as to engage the extended end 23 of the spring arm when the arm 21 has reached its limit of movement in the slot and to thus release said arm, when the tension of the coil spring 19 will immediately rotate the armature shaft at a high rate of speed until the arm 21 has reached the opposite limit of the slot 20. As a means for holding the spring arm 22 out of position when not in use I have provided a hook 25 which is pivoted by one end to the frame and adapted to be swung into engagement with said arm when the latter is sprung away from the drum.

In starting the engine with my improved device the charge is first admitted to the cylinders and the crank shaft 11 is then turned by means of the hand crank 12 until the parts are in the position shown in Figs. 3 and 4 of the drawings, at which point the engine is slightly over dead center and the primary circuit of the magneto is closed. The crank shaft is then further rotated thus forcing the spring arm 22 out of engagement with the arm 20 when the spring 19 immediately rotates the armature shaft at a high rate of speed thus breaking the primary circuit of the magneto and forming the initial spark.

Because of the cam 24 the crank shaft of the engine is free to revolve, the arm 20 being engaged once during each revolution by the spring arm 22. As soon however as the engine has attained normal speed this spring arm 22 is drawn back out of operative position and engaged by the hook 25. The spring 22 is drawn out by hand to engage it with the hook 25, said action being entirely independent of the mechanism of applicant's structure. When this has been done the armature shaft is revolved by the crank shaft and at the same speed at which the latter revolves, this being accomplished by means of the spring connection between the armature shaft and the drum.

As will be seen from the foregoing description I have provided a simple and effi-

cient device for obtaining the initial spark by means of the magneto and without the necessity of employing a dual ignition system.

What I claim is:—

1. In a device of the character described, the combination with the crank shaft of an internal combustion engine, of a magneto having an armature shaft in alinement with said crank shaft, a hollow drum provided with a circumferentially extending slot keyed upon said crank shaft, said armature shaft extending at one end into said drum, a coil spring surrounding said armature shaft and with one end secured to the armature shaft and the other end to the drum, an arm secured to said armature shaft by one end and with its other end extending through the slot of the drum, a resilient arm adapted to engage said arm, means carried by the drum for disengaging said resilient arm from said arm, and circuit breaking means carried by said armature shaft.

2. In a device of the character described, the combination with the crank shaft of an internal combustion engine, of a magneto having an armature shaft in alinement with said crank shaft, a hollow drum provided with a circumferentially extending slot keyed upon said crank shaft, said armature shaft extending at one end into said drum, a coil spring surrounding said armature shaft and with one end secured to the armature shaft and the other end to the drum, an arm secured to said armature shaft by one end and with its other end extending through the slot of the drum, a resilient arm adapted to engage said arm, means carried by the drum for disengaging said resilient arm from said arm, said means comprising a cam carried by the drum and in alinement with said resilient arm, and circuit breaking means carried by said armature shaft.

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

THOMAS K. STRAND.

Witnesses:

P. L. ARMS,
G. C. BAKER.