W. S. JOHNSON.

MECHANICAL STARTER.

APPLICATION FILED MAR. 12, 1917.

1,252,579.

Patented Jan. 8, 1918.

2 SHEETS—SHEET 1.

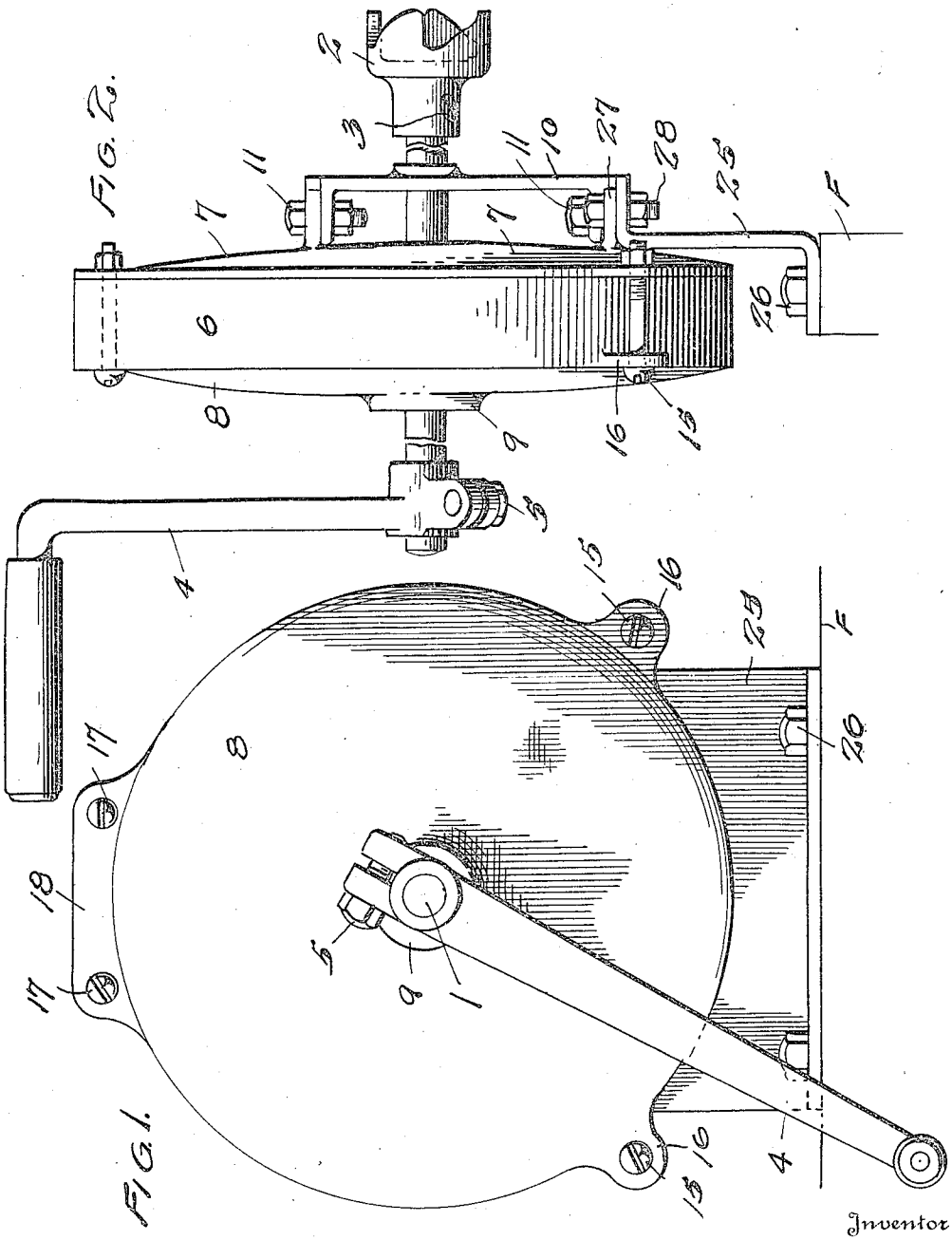


FIG. 2.

FIG. 1.

Inventor

W. S. JOHNSON

By Thomas C. Hansen

Attorney

W. S. JOHNSON.

MECHANICAL STARTER.

APPLICATION FILED MAR. 12, 1917.

1,252,579.

Patented Jan. 8, 1918.

2 SHEETS—SHEET 2.

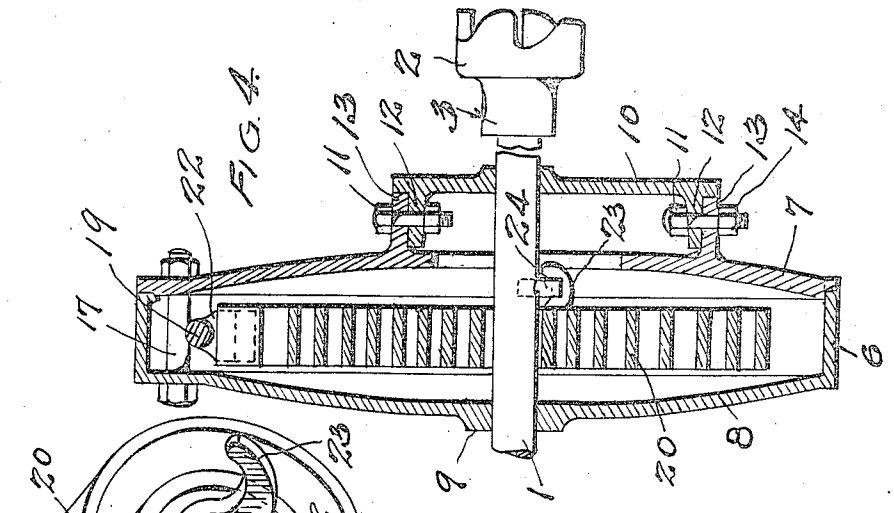


FIG. 4.

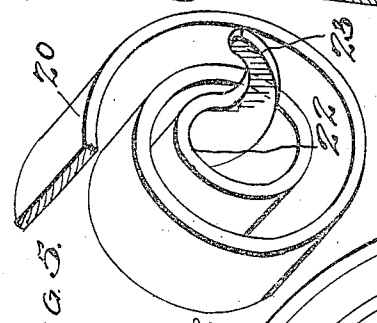


FIG. 5.

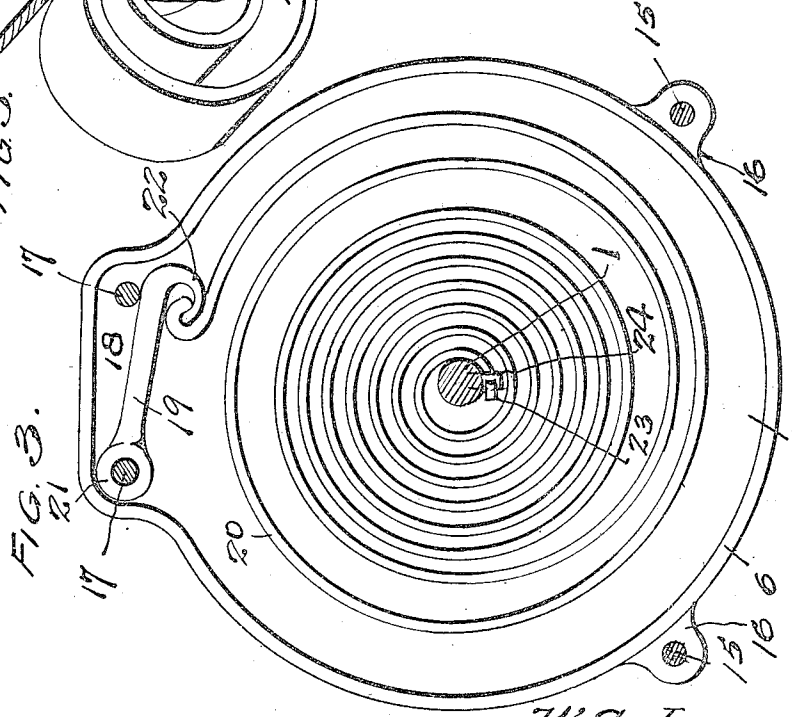


FIG. 3.

Inventor

W. S. JOHNSON

By Thomas R. Harris

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM S. JOHNSON, OF WACO, TEXAS.

MECHANICAL STARTER.

1,252,579. Specification of Letters Patent. Patented Jan. 3, 1918.

Application filed March 12, 1917. Serial No. 154,174.

To all whom it may concern:

Be it known that I, WILLIAM S. JOHNSON, a citizen of the United States of America, residing at Waco, in the county of McLennan and State of Texas, have invented certain new and useful Improvements in Mechanical Starters, of which the following is a specification.

The present invention relates to improvements in mechanical starters for internal combustion engines and is designed to provide a device of this character especially adapted for use on automobiles, trucks and similar vehicles, the object of the invention being the provision of a starter simple in construction and operation, durable, comparatively inexpensive in production, but withal efficient in performing the functions for which it is intended.

The invention consists in certain novel combinations and arrangements of parts including the cranking shaft and a resilient device adapted to be coupled with the shaft for assisting in cranking the engine, and also for absorbing the rotary motion of the crank shaft should the engine back-fire before the clutch is disengaged.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles of my invention, and which has proven highly satisfactory in actual use on automobiles.

Figure 1 is a front elevation of a starter constructed according to and embodying my invention.

Fig. 2 is a side or edge view of the device of Fig. 1.

Fig. 3 is a rear view of the housing with the back plate removed, parts in section, and the helical spring shown in side elevation.

Fig. 4 is a vertical central section through the housing and spring, showing the cranking shaft and a member of the clutch in full side elevation.

Fig. 5 is an enlarged, fragmentary, perspective view of the inner end of the coiled or helical spring illustrating the hook for coupling with the cranking shaft.

In the preferred embodiment of my invention illustrated in the drawings I have shown the device as attached at the front of the automobile, preferably to a frame piece F upon which the device is supported in proper positions to coöperate with the crank shaft of the internal combustion engine of the automobile.

The cranking or starting shaft 1 is provided with a clutch member 2 secured thereto by the set screw 3 or other device, and the outer or free end of the starting shaft has the usual crank handle 4 clamped thereto by means of the clamp screw 5. The starting shaft is passed through a housing composed of the cup shaped body 6 and the back plate 7, the former having a dished or concave front plate 8, and the latter also dished so that the front plate and back plate of the housing swell outwardly from each other as shown clearly in Figs. 2 and 4. The front plate 8 has a perforated bearing boss 9 at its center for the starting shaft and another bearing for the shaft is provided in the flanged bracket 10 secured at the back of the plate by bolts 11 passing through the flanges or lugs 12 of the bracket and similar lugs 13 of the back plate, the nuts 14 being employed for their usual functions. The two parts of the housing are held together by means of the screws or bolts 15 passing through perforated ears 16 near the bottom of the housing, and screws 17 passing through perforations at the top of the housing. Preferably the upper part of the housing is formed with an offset recess or extension 18 for the two screws 17, and through the medium of these screws and the hook 19, the helical spring 20 is retained in coiled position. The hook has an eye 21 fitted over one of the screws 17 and the free end of the hook, as 22 is pressed up against the other screw 17 which confines the outer or free end of the spring. As is plainly evident the spring is incased within the housing and surrounds the starting shaft 1, the inner end being coiled about the shaft, but not however, normally fixed thereto.

The spring may be coupled to the shaft through the medium of the hooked end 23 of the spring, this hook being formed, preferably by turning the end of the spring out at right angles to its spiral plane so that this hook may be brought into the path of a stud or pin 24 that projects radially from the shaft 1 within the housing. In Fig. 4 the purpose of swelling or dishing the front and back plates will be evident and it is apparent that the intermediate and center coils of the helical spring may be pushed to the right or pulled to the left, when the hook 23 and stud

24 are coupled together, by manipulating the shaft 1. Thus when it is desired to turn over or crank the engine the crank handle 4 is grasped and the crank is turned to the left until the hook 23 is encountered by the stud 24 and then the continued turning to the left of the crank handle will cause the helical spring to be compressed or wound up, and the degree of compression may be great or slight as desired. With the spring wound up or compressed about the starting or cranking shaft, the latter is pushed toward the engine so that its member 2 engages the other member of the clutch, and then the shaft is turned to the right as usual to crank or turn over the engine. In addition to the force expended by the person cranking the engine, it will be apparent that the stored up energy in the compressed spring will also aid in turning over the engine, and in some instances the energy of the spring will be sufficient to turn over the engine without the assistance of the person. An additional function of the spring is to receive the shock or rotary movement of the cranking shaft in case of back fire of the engine. The size of the spring may be varied, of course, to suit different requirements, and on trucks and other vehicles with large engines, the heavier spring will be specially advantageous in assisting the operator to crank with ease. On many engines the piston has become worn so that the gas will leak past the piston if the compression stroke is slow, but with the utilization of my special starter, the engine may be turned over with a jerk or quick movement thus preventing leak of gas, and another meritorious factor of this device is that the engine may be started with sufficient "spin" to start the magneto. It will be seen that the hook at the inner end of the spring will automatically engage the shaft when it is turned to the left, and also automatically disengage itself from the shaft when the engine starts and exceeds its speed, and the swell to the two plates provides for the movement of the spring as it is moved by the starting shaft.

By means of the metallic angle plate 25 which is attached to the frame F by bolts or lag screws 26 the starter is supported through the medium of a pair of lugs, one of which is indicated at 27, and the bolt 28 passing through these lugs and the angle plate, as shown in Figs. 1 and 2.

What I claim is:—

1. The combination with a housing and an open center helical spring within the housing with its outer end fixed, of a longitudinally movable shaft passed through the housing and the spring and means for operating the shaft, and normally disengaged elements on the spring and shaft adapted to co-act for winding the spring.

2. The combination in a mechanical starter for an internal combustion engine with a housing and an open center helical spring therein having an outer fixed end, a longitudinally movable shaft journaled in the housing, and passed through the open center of the spring, a hook at the inner end of the spring and a stud on the shaft adapted to engage said hook for the purpose described.

3. The combination in a mechanical starter for an internal combustion engine with an open center housing having oppositely swelled back and front plates and a longitudinally movable shaft journaled in the housing provided with a stud, a crank handle and a clutch member, a spring coiled about the shaft but independent thereof, a hook at the inner end of the spring adapted to engage said stud, and the outer end of said spring having fixed connection with the housing, for the purpose described.

In testimony whereof I affix my signature.

WILLIAM S. JOHNSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."