April 15, 1930. R. WHITLOCK 1,754,869

STARTING MEANS FOR INTERNAL COMBUSTION ENGINES

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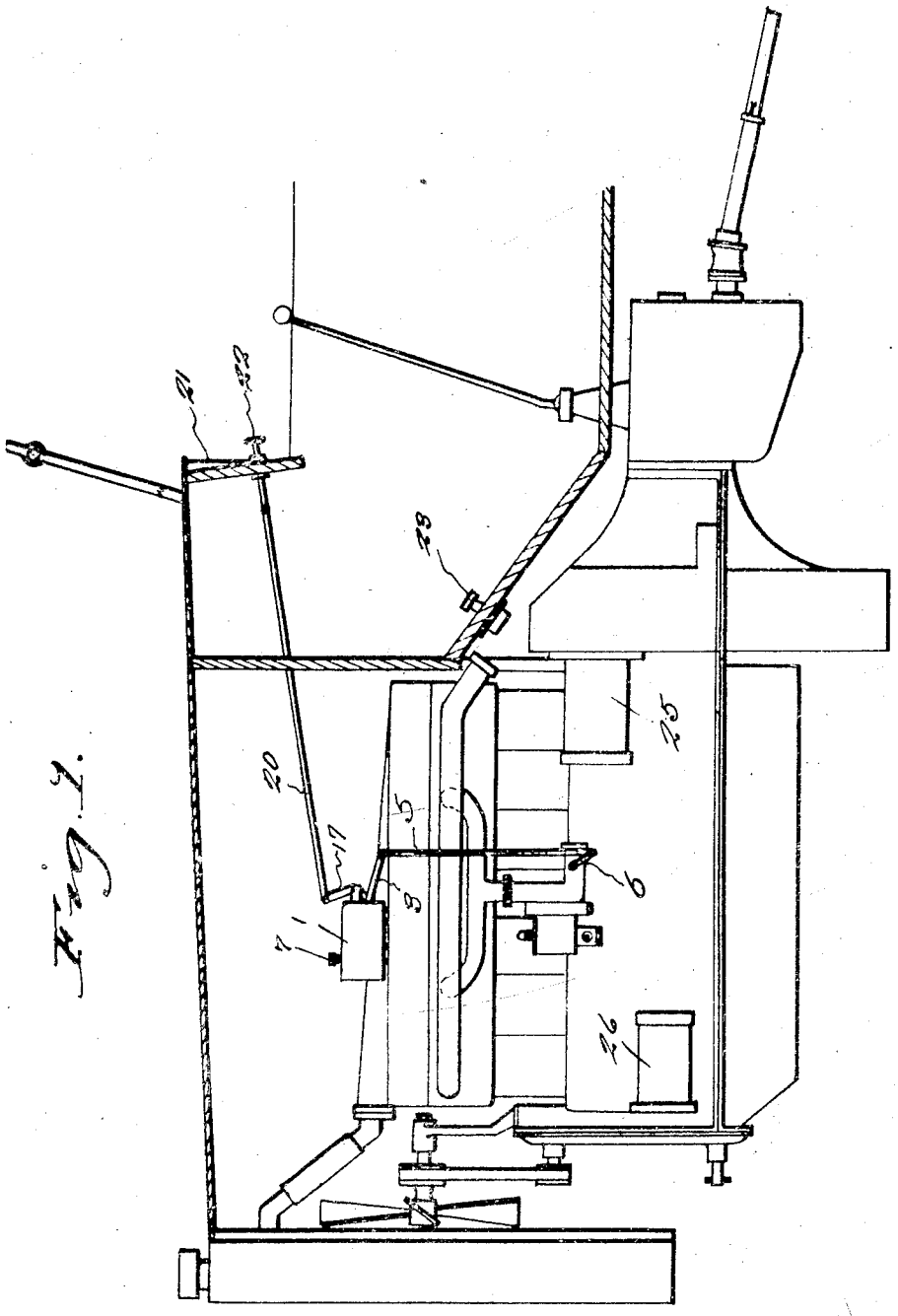


Fig. 1.

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Fig. 2.

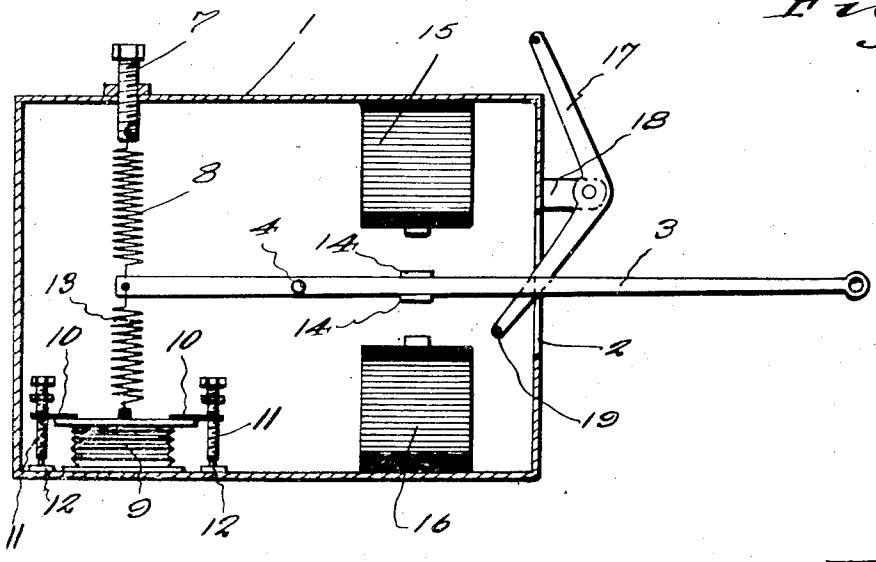


Fig. 3.

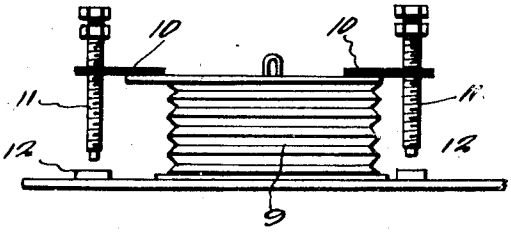


Fig. 4.

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Patented Apr. 15, 1930 1,754,869

UNITED STATES PATENT OFFICE

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STARTING MEANS FOR INTERNAL-COMBUSTION ENGINES

Application filed February 11, 1929. Serial No. 339,069.

The present invention appertains to improvements in internal combustion engines and more specifically to novel means for starting the same.

The principal object of this invention is to provide means whereby an engine may be efficiently choked during the operation of starting the same.

Another salient object is to provide means whereby the choke may be fully closed during the operation of the starter motor and whereby the choke will be entirely opened after the engine has reached a certain current generating rate.

Another object of the invention is to provide a thermostatic device for maintaining the choke open even though the starter motor is in operation, while the engine is hot from being previously operated.

These and other objects and advantages of the invention will become more apparent to the reader after considering the invention as described and claimed hereinafter.

In the drawings:

Figure 1 represents a fragmentary vertical sectional view through a portion of an automobile disclosing the engine equipped with the improved automatic means.

Figure 2 represents a vertical sectional view through the electro-magnetic operating means for operating the choke.

Figure 3 represents the thermostatic device in side elevation for operating the choke.

Figure 4 represents a diagrammatic view showing the various connections between the operable parts of the invention.

Referring to the drawings, wherein like numerals designate like parts, a housing 1 is mounted at a suitable place upon the engine and is provided at its rear end with an opening 2. A pivotal lever 3 pivoted at 4, has one end portion thereof projecting through the opening 2, in substantially the manner shown in Figure 2. The outer end of the lever 3 is pivotally connected to one end of a connecting rod 5, which is in connection with the choke lever 6.

An adjusting screw 7 is threadedly engaged through the top of the housing 1 and the inner end thereof is connected to one end of a coiled spring 8. The opposite end of the spring 8 is connected to the inner end of the lever 3. A thermostatic device 9 is mounted upon the bottom of the casing 1 and has a pair of insulating plates 10—10 projecting beyond the sides thereof. Elongated screws 11 are threaded through the plates 10—10 and are engageable with the ground contacts 12—12 on the casing 1. A coiled spring 13 is connected between the inner end of the lever 3 and the top of the thermostatic device 9. The upper and lower sides of the lever 3, outwardly of the pivot points 4 are provided with contacts 14—14. Depending from the top of the casing 1 is an electro-magnet 15, while upstanding from the bottom of the casing 1 is a section electro-magnet 16.

These magnets are in opposed relation to the contacts 14—14.

Referring to Figure 2, a rocker arm 17 is mounted on a bracket 18, projecting from the rear end of the housing 1. The lower end of the rocker arm is provided with a laterally disposed pin 19 for engagement with the lower side of the lever 3. The upper end of the rocker arm is pivotally connected to the forward end of the control rod 20 which extends at its rear end portion to the instrument board 21 and is equipped with a knob 22.

The diagrammatic view 24 will not now be taken into consideration.

The switch 23, which may be the usual starter switch button is adapted to be closed for permitting current to flow from the battery 24 to the starter motor 25, and simultaneously to the upper coil 15. The opposite side of the coil 15 is connected to one of the screws 11 associated with the thermostat 9. Normally the coil is grounded to the screw 11. The energized coil 15 will attract the lever 3 and cause the opening of the choke. By releasing the starter button, this circuit will be opened and the magnets 15 will become deenergized. The lever will then drop to the normal position shown in Figure 4, in which position the choke is partially opened. As the motor begins to speed up, the generator 26 will begin to generate sufficient current

to operate the cut out 27 and permit current to flow to the magnet 16.

The opposite side of the magnet 16 is also connected to one of the screws 11. Thus, the magnet 16 will become energized and attract the lever 3 downwardly, in which position the choke is completely open. The lever will remain in this position during the continuous operation of the engine. After the engine becomes heated and the same should become stalled, the magnets will not operate again when the starter button is actuated, if the heat of the engine is sufficient to have caused the thermostatic device 9 to operate to break the down connection. Thus, the unnecessary choking operation is dispensed with.

Obviously, certain changes in the specific shape, size and materials, may be resorted to, in the construction of the means without departing from the spirit and scope of the invention as claimed hereinafter.

What is claimed is:

Engine starting means comprising a starter motor, a battery, a pair of electromagnets, a lever pivotally mounted between said magnets, a connection between said battery and one side of one of the magnets, a switch in said connection, the opposite side of the coil being grounded, a connection between the lever and the usual engine choke, the other magnet being connected to the usual generator of the engine, equalizing springs for said lever for maintaining the same in partial choking position, the first mentioned magnet being energized when the switch is closed, to cause the lever to operate the choke, the other magnet being energized when the output of the generator is sufficient, so as to pull the lever to an off choke position.

In testimony whereof I affix my signature.

RALPH WHITLOCK.