

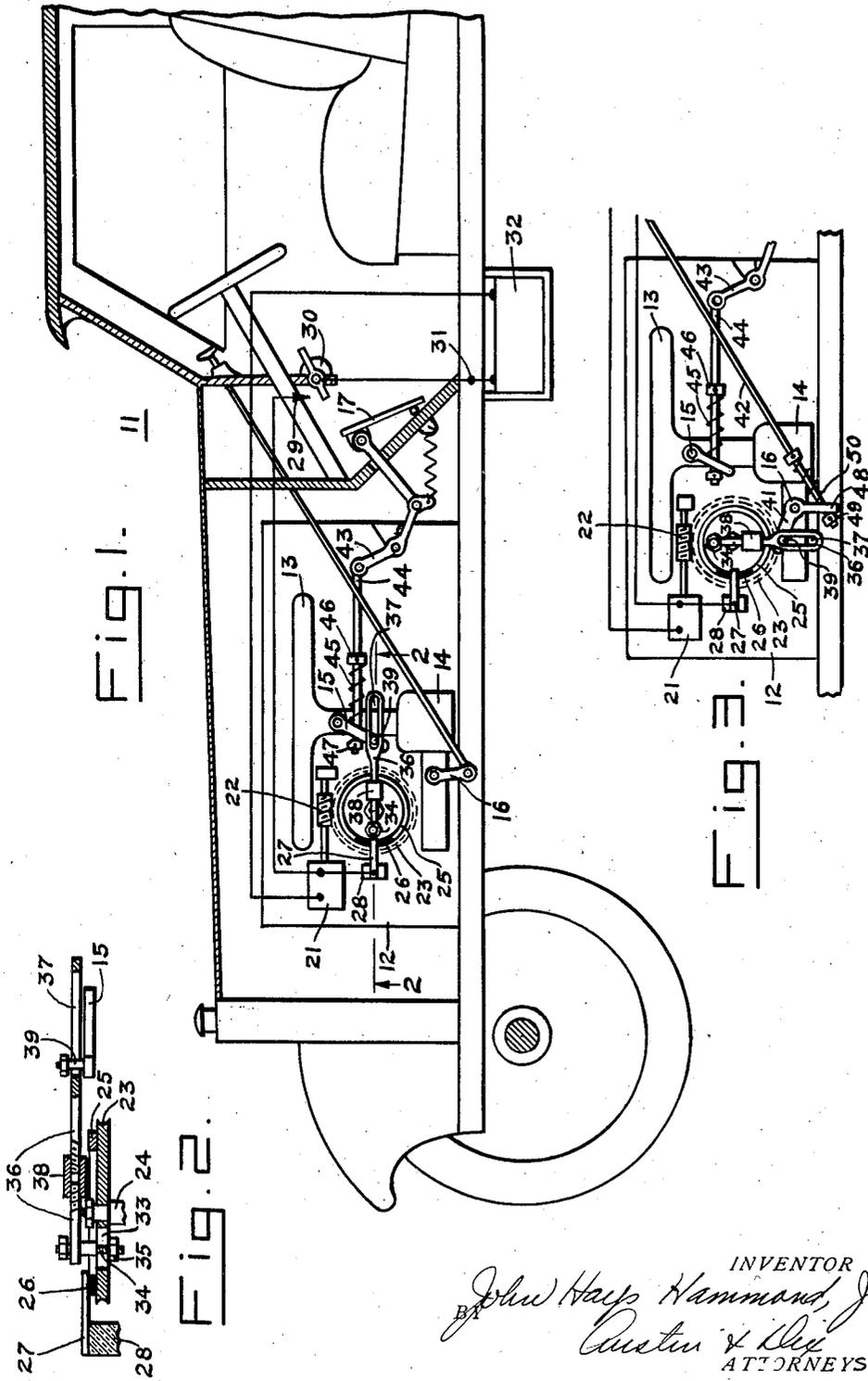
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MEANS FOR FACILITATING ENGINE STARTING

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MEANS FOR FACILITATING ENGINE STARTING

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8 Claims. (Cl. 123—179)

This invention relates to internal combustion engines and more particularly to means for facilitating the starting of said engines.

The invention preferably provides a mechanism for automatically oscillating the throttle valve or choke valve of an engine at the time the engine is started.

The invention may further provide means for automatically returning this mechanism to a rest position in which it will not interfere with the normal operation of the throttle or choke when the engine is running.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which;

Fig. 1 is a side elevation, partly in section, of the invention as applied to an automobile engine;

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a side elevation of a modified form of the invention.

Like reference characters denote like parts in the several figures of the drawing.

In the following description and in the claims, parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

In the form of the invention shown in Figs. 1 and 2 the automobile 11 is provided with the usual engine 12, intake manifold 13, carburetor 14, throttle 15, choke 16 and foot operated accelerator 17.

An auxiliary motor such as a motor 21 is mounted on the side of the engine 12. To the shaft of this motor there is attached a worm 22 which meshes with a worm wheel 23 rotatably mounted on a pin 24 (see Fig. 2) which is secured to the side of the engine 12. Mounted on the worm wheel is a commutator made up in two sections 25 and 26, the section 25 being made of conducting material and the section 26 being made of insulation. Engaging this commutator is a brush 27 mounted on a block of insulation 28, which is secured to the side of the engine

12. The brush 27 is electrically connected to one terminal of the motor 21, which is also connected to a contact 29 of a snap switch 30, which may be mounted in any convenient position on the dashboard of the car. The blade of this switch is grounded to the frame of the car at 31. One terminal of the battery 32 is also grounded at 31. The other terminal of this battery is electrically connected to the other terminal of the motor 21.

The worm wheel 23 is provided with a radial slot 33 (Fig. 2) through which a crank pin 34 passes. This pin may be secured in any position along this slot by means of a nut 35. Rotatably connected to the other end of the crank pin 34 is a reciprocating arm 36 which is provided at its opposite end with a longitudinal slot 37 and has a turn buckle 38 intermediate of its length whereby its length may be adjusted. Slidably mounted in the slot 37 is a pin 39 which is secured to the throttle arm 15. The turn buckle 38 thus permits the limiting position of the pin 39 in the slot 37 to be adjusted.

Accelerator lever or pedal 17 is fixed in the operator's compartment of the automobile and is arranged to control, by means of connecting lever 43 and rod 44, the throttle arm 15. Helical spring 45 slides on rod 44 and is attached at one of its ends to collar 46 on this rod. At the other end it presses against throttle arm 15. Arm 15 is thus held between spring 45 and collar 47 also mounted on rod 44.

In the operation of the form of the invention shown in Figs. 1 and 2 when it is desired to start the engine 12 the snap switch 30 is thrown to the down position, thus connecting the battery 32 to the motor 21. The motor starts rotating, thus causing a rotation of the worm wheel 23. This causes the arm 36 to be reciprocally oscillated back and forth, which in turn causes a corresponding oscillation of the throttle arm 15 against the pressure of spring 45. The starter (not shown) of the engine 12 is then operated in the usual manner until the engine starts, whereupon it is released. For a brief period after the engine starts, the motor 21 is allowed to operate. Then the switch 30 is thrown up. If the brush 27 is on the segment 25 the motor 21 will continue to turn as a circuit is completed from the battery 32 through the motor 21, brush 27, segment 25 to ground on the frame of the automobile thence back to the battery 32. This will continue until the segment 26 moves under the brush 27 when the circuit to the motor 21 will be opened, thus stopping the motor so that the

arm 36 is in the position shown in the figures. In this position, it will be noted that it does not interfere with the normal operation of the throttle arm 15 by means of the accelerator pedal 17, as the slot 37 allows the pin 39, and therefore the throttle arm 15 unrestricted normal motion.

In this way it is possible to manipulate the throttle automatically when the engine is being started, thus greatly facilitating the starting. It is also seen that when the mechanism is thrown out of operation, it will automatically move into a position where it will not interfere with the usual throttle controls.

By changing the position of the crank pin 34 in the slot 33 and securing the same by the nut 35, the length of the stroke of the reciprocating arm 36 is varied and by adjusting the turn buckle 38 the length of this arm can be changed thus giving any desired operation of the throttle arm 15.

In the modified form of the invention shown in Fig. 3, the system is shown as controlling the choke of the carburetor instead of the throttle. In this case the mechanism is identical to that already described in Figs. 1 and 2 up to and including the pin 39 which in this case however, is secured to an arm 41 which operates the choke 16. The arm 41 may also be controlled by choke rod 42, which is used for the normal operation of the choke. This rod exerts forces on projection 48 of arm 41 by means of collar 49 and helical spring 50 in a manner similar to that described in connection with rod 44.

In the operation of the modified form of the invention shown in Fig. 3, the switch 30 is closed when it is desired to start the engine, thus causing the arm 36 to be oscillated in a manner similar to that already described. This causes an oscillation of arm 41 and the choke 16 at the time the engine is started, thus greatly facilitating the starting. This continues until the switch 30 is opened, at which time the mechanism is returned to the position shown in Fig. 3, in a manner similar to that described in connection with Figs. 1 and 2. In this position the mechanism does not interfere with the normal operation of the choke as the pin 39 is free to move in the slot 37.

Although the operation of the mechanisms shown in the accompanying figures is controlled by a manually operated switch, this switch may be arranged to operate automatically, at the time the starting device for the motor is put into operation. The oscillating mechanism may also be connected directly to the starting motor, thus eliminating the motor 21, if desired. In this case, however, the oscillator would cease to operate as soon as the starter is released. The arrangement shown in the drawing has the advantage of continuing the control for an appreciable time after the engine has started to run.

Although only a few of the various forms in which this invention may be embodied have been shown herein, it is to be understood that the invention is not limited to any specific construction, but might be embodied in various forms without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. The combination, in a machine for facilitating the starting of internal combustion engines of

a mechanism comprising a motor, an oscillatory member driven by said motor and means interconnecting said oscillatory member and the throttle of said engine for causing said throttle to be opened and closed at a predetermined rate.

2. The combination, in a machine for facilitating the starting of internal combustion engines of a mechanism comprising a motor, an oscillatory member driven by said motor and means interconnecting said oscillatory member and the choke of said engine for causing said choke to be opened and closed at a predetermined rate.

3. The combination, in a machine for facilitating the starting of internal combustion engines, of a mechanism comprising a motor, an oscillatory member driven by said motor and means operated by said member for intermittently varying the feed of fuel to said engine during the starting operation in a predetermined manner.

4. The combination, in a machine for facilitating the starting of internal combustion engines of a mechanism comprising a motor, an oscillatory member driven by said motor and means operated by said member for increasing and decreasing the amount of fuel fed to said engine at regular intervals.

5. In a device for facilitating the starting of an internal combustion engine, a fuel control lever on said engine, electrically operated means for oscillating said lever, said electrically operated means when in rest position being adapted to permit normal operation of said lever, and means to stop said electrically operated means in said rest position.

6. In combination, an internal combustion engine, a fuel supply controlling lever for said engine, an electric motor, crank means operated by said motor for oscillating said lever, said crank means, when in rest position, being adapted to permit normal operation of said lever, means for starting said motor, and means for stopping said crank means in said rest position.

7. In a device for facilitating the starting of an internal combustion engine, in combination, a fuel throttle, an electric motor, two energizing circuits for said motor, a manually operated switch in the first of said circuits, a wheel driven by said motor, said wheel having an uninsulated commutator segment and a crank arm, a commutator brush making contact with said uninsulated segment, said brush and segment being in the second of said circuits, and a reciprocating arm connecting said crank arm and fuel throttle to oscillate said throttle when said motor is operating.

8. In a device for facilitating the starting of an internal combustion engine, in combination, a choke throttle, an electric motor, two energizing circuits for said motor, a manually operated switch in the first of said circuits, a wheel driven by said motor, said wheel having an uninsulated commutator segment and a crank arm, a commutator brush making contact with said uninsulated segment, said brush and segment being in the second of said circuits, and a reciprocating arm connecting said crank arm and choke throttle to oscillate said throttle when said motor is operating.

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