Sept. 28, 1937. H. W. LINDENMUTH ET AL 2,094,177

STARTING APPARATUS FOR AUTOMOBILES

Filed April 29, 1936 2 Sheets-Sheet 1

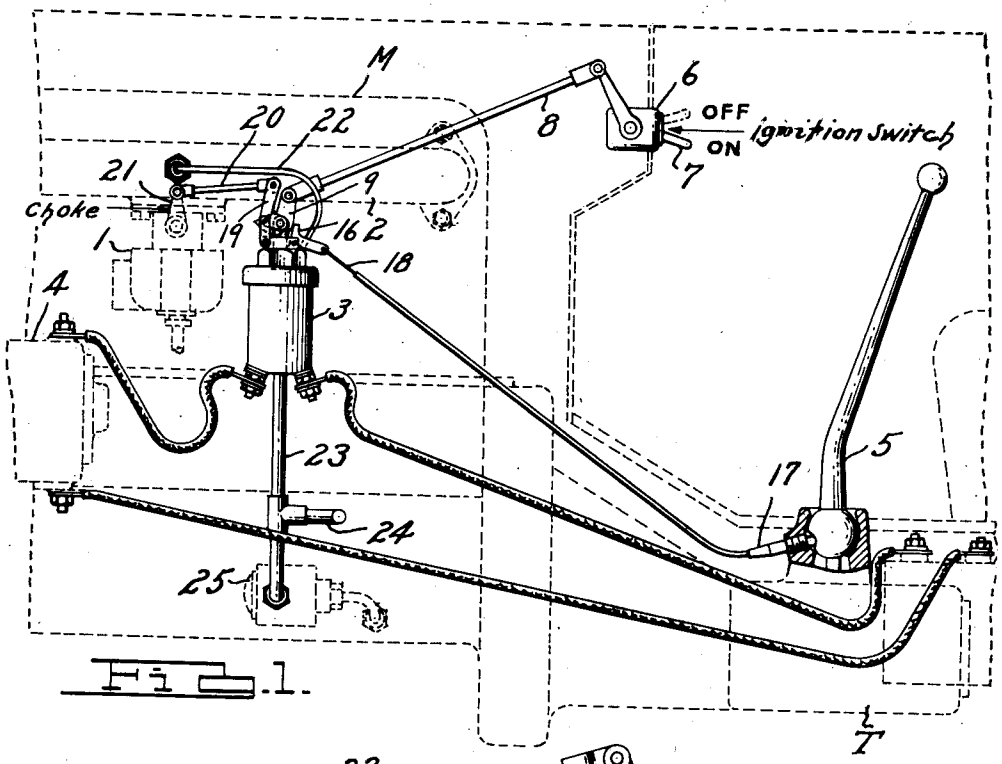


Fig. 1.

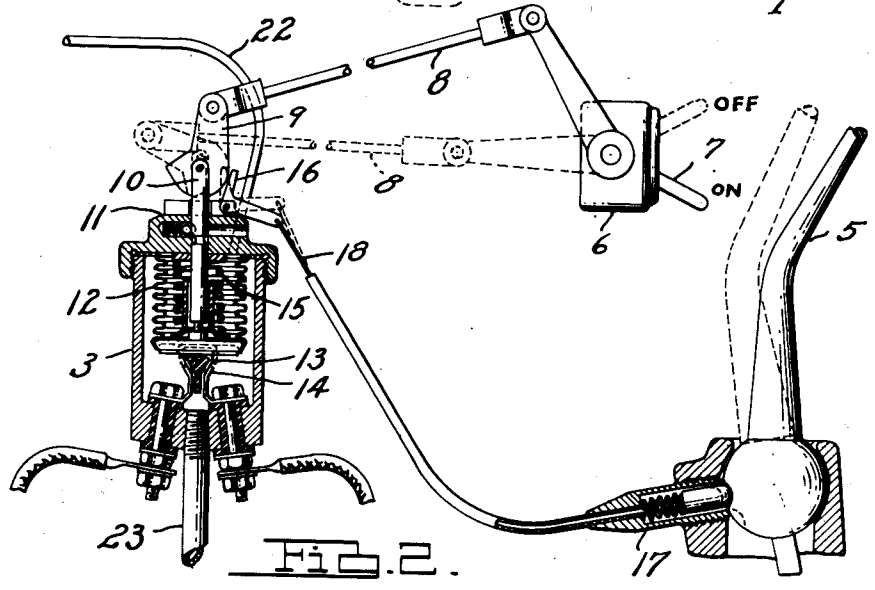


Fig. 2.

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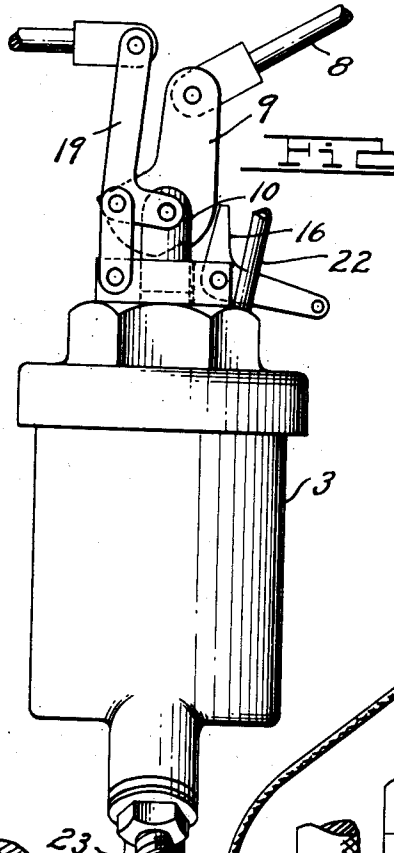


Fig. 3.

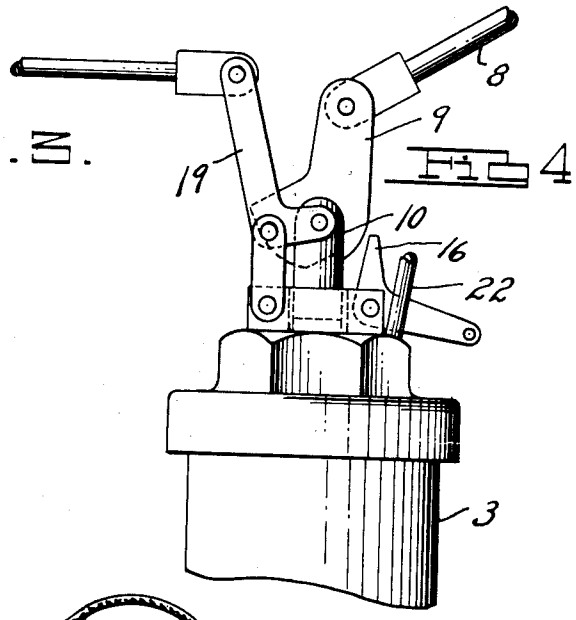


Fig. 4

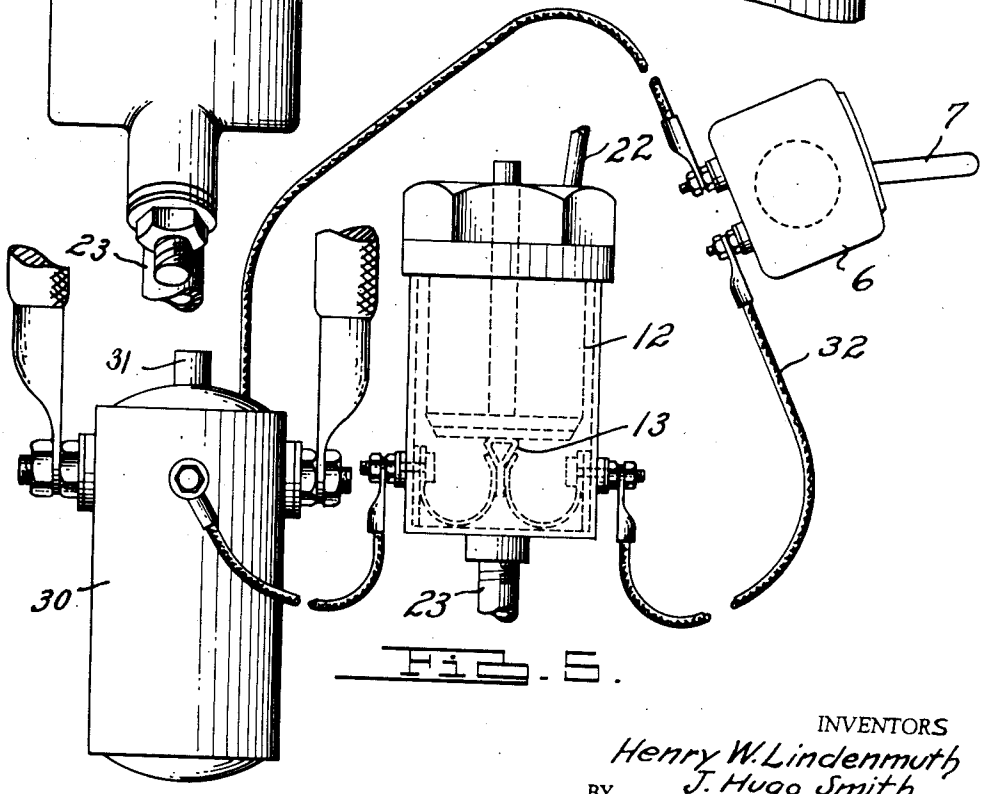


Fig. 5.

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STARTING APPARATUS FOR AUTOMOBILES

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Application April 29, 1936, Serial No. 76,964

4 Claims. (Cl. 290—38)

This invention relates to starting apparatus for an automobile which will not only start the motor, but if the motor stalls will automatically restart it.

An arrangement is also provided whereby, when the car is in gear, the starting switch cannot be operated.

By still another arrangement when the starting switch is thrown into operation, it automatically operates a choke on the carburetor.

In the drawings:

Fig. 1 is a schematic view showing the apparatus connected to a car.

Fig. 2 is a vertical section showing the starting switch and the connection with the gear shifting lever.

Fig. 3 is an elevation of the starting switch in position of actual operation.

Fig. 4 is an elevation of the starting switch after it has been turned on and the motor is running.

Fig. 5 shows a modified form.

M is the internal combustion engine, 1 the carburetor, 2 the manifold, 3 the starting switch, 4 the electric starting motor, T the transmission, and 5 the gear shifting lever. On the instrument board is located an ignition switch 6 with lever 7 that operates the linkage 8 which connects the eccentric lever 9 on the top of the switch housing 3. This lever is pivoted on the top of a sliding rod 10 which has an upper and lower position by reason of a ball detent 11 engaging in an annular groove in the rod. The end of the rod is fastened to the end of a bellows 12 to which is also fastened the bridging member 13 of a blade type of electric switch. The bridging member straddles an insulating blade 14.

The bellows is kept distended by the spring in its bellows-like wall and also by the helical spring 15. When the eccentric lever 9 is turned to the "off" position shown by the dotted lines of Fig. 2, the eccentric portion of greatest radius holds the bridge of the switch in its uppermost position against the pressure of the spring 15 and the bellows. When the switch lever 7 is thrown to the "on" position (Fig. 2) the spring 15 will immediately throw the switch 13 into contact with the terminals as shown in Fig. 2 and complete the circuit, unless the transmission lever be in the position that it occupies when the gears are in mesh. If that is the case, then the dog 16 will engage under the shoulder as shown in the dotted lines of Fig. 2 and the starting switch will not operate. But as soon as the gear shifting lever 5 is thrown to neutral, the spring 17 will pull the wire 18 and shift the dog 16 to the full line position shown in Fig. 2 and the switch is in operative position.

The upper end of the sliding rod 10 is pivoted to a bell crank lever 19 which in turn fulcrums the bell crank lever which is connected by rod 20 with choke 21 on the carburetor. Hence, every time the electric starting circuit is closed, the carburetor is automatically choked a given amount to provide the necessary richness of mixture for starting.

As soon as the engine starts, the conduit 22 connecting with manifold 2 tends to provide a vacuum in the bellows and on the outside of the bellows oil under pressure is afforded from the conduit 23 that connects with the force feed oil distributing pipes 24 and the oil pump 25.

It will be obvious that as soon as the motor stalls or fails, the control lever being in the "on" position, the spring will immediately close the starting switch because the spring and the natural expansibility of the bellows will throw the bridging member to the switch-closing position as the vacuum and the oil pressure have now each failed. The oil in the switch which releases the terminals when the engine starts has also the function of smothering the arc.

The choke is only a slight choke to compensate for the lack of perfect mixture which takes place when the air is drawn through the carburetor at a relatively low speed of cranking.

Fig. 5 shows a modified form of starting switch which may be used with some cars. 6 is the control switch which may preferably be the ignition switch. This operates a solenoid 30 which may operate a solenoid plunger 31 to operate on any starting button of the conventional starting switch. It will be obvious that when the ignition switch lever 7 is in the "off" position that it does not make any difference whether the switch is closed for the reason that no current will flow through the circuit 32 but as soon as the lever 7 is thrown, this circuit is closed and the current will go through this circuit around the solenoid and operate the plunger 31 to engage the starter button. As soon as the motor starts, it throws off the switch by reason of the action of either the suction line 22 or the oil line pressure 23 or both.

In the claims we have used a broad reference to the control device by which the operator can "countervail" the effect of the propulsive means, that is the spring 15 and the bellows. This is intended to be a broad enough statement to cover either this electrical arrangement of discon-

tinuing the current to "countervail" the effect of the propulsive means or the mechanical arrangement in Figs. 1–4 inclusive, which actually locks the terminal bridging member in the open position for the circuit.

What we claim is:

1. In a starting apparatus for an internal combustion motor, the combination with an internal combustion engine and a starting motor, of a manifold, a force feed oil system, a starting switch comprising terminals connected with a source of electrical energy and with a starting motor, a terminal bridging member, propulsive means for forcing the terminal bridging member into engagement with the terminals to close the circuit through the motor and source of electric energy, means operative by the driver for countervailing when in "off" position the effect of the propulsive means in closing the switch, means operated by the engine for opening the switch and overcoming the effort of the propulsive means when the engine starts, the propulsive means comprising a bellows with a spring tending to expand the bellows and project the bridging member carried on the end of the bellows into contact with the terminals, a suction connection between the inside of the bellows and the manifold of the engine and a connection between the force feed oil system of the engine and the outside of the bellows serving to open the switch when the engine starts.

2. In a starting apparatus for an internal combustion engine having transmission gears and a gear shifting lever, the combination with the gear shifting lever, of a starting switch having propulsive switch closing means, means for controlling the starting switch to permit the propulsive means to close the switch, means for overcoming the propulsive means when the engine starts and a connection between the gear shifting lever and the starting switch which blocks the starting switch unless the lever is in neutral position.

3. In a starting apparatus for an internal combustion engine having transmission gears and a gear shifting lever, the combination with the gear shifting lever, of a starting switch having propulsive switch closing means, means for controlling the starting switch to permit the propulsive means to close the switch, means for overcoming the propulsive means when the engine starts, and a connection between the gear shifting lever and the starting switch which blocks the starting switch unless the gear lever is in neutral position, said connection comprising a dog located on the starting switch arranged to block the closing of the starting switch when the same is released and a connection between said dog and the fulcrum of the gear shifting lever, the gear shifting lever having a notch in its fulcrum which registers with the connection from the starting switch when the lever is in neutral position, a spring for thrusting the end of said connection into said notch to release the dog on the starting switch but only when the gear shifting lever is in neutral position.

4. In a starting apparatus for an internal combustion engine, the combination with the transmission having a gear shifting lever, of a starting switch having a propulsive switch closing means, a means having "off" and "on" positions for controlling the starting switch to permit the propulsive means to close the switch, means for overcoming the propulsive means when the engine is running and a connection between the transmission and the starting switch which blocks the starting switch unless the transmission lever is in neutral position, said propulsive means operating to close the switch and start the car as long as the means for controlling the starting switch is in "on" position and engine is not running.

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