

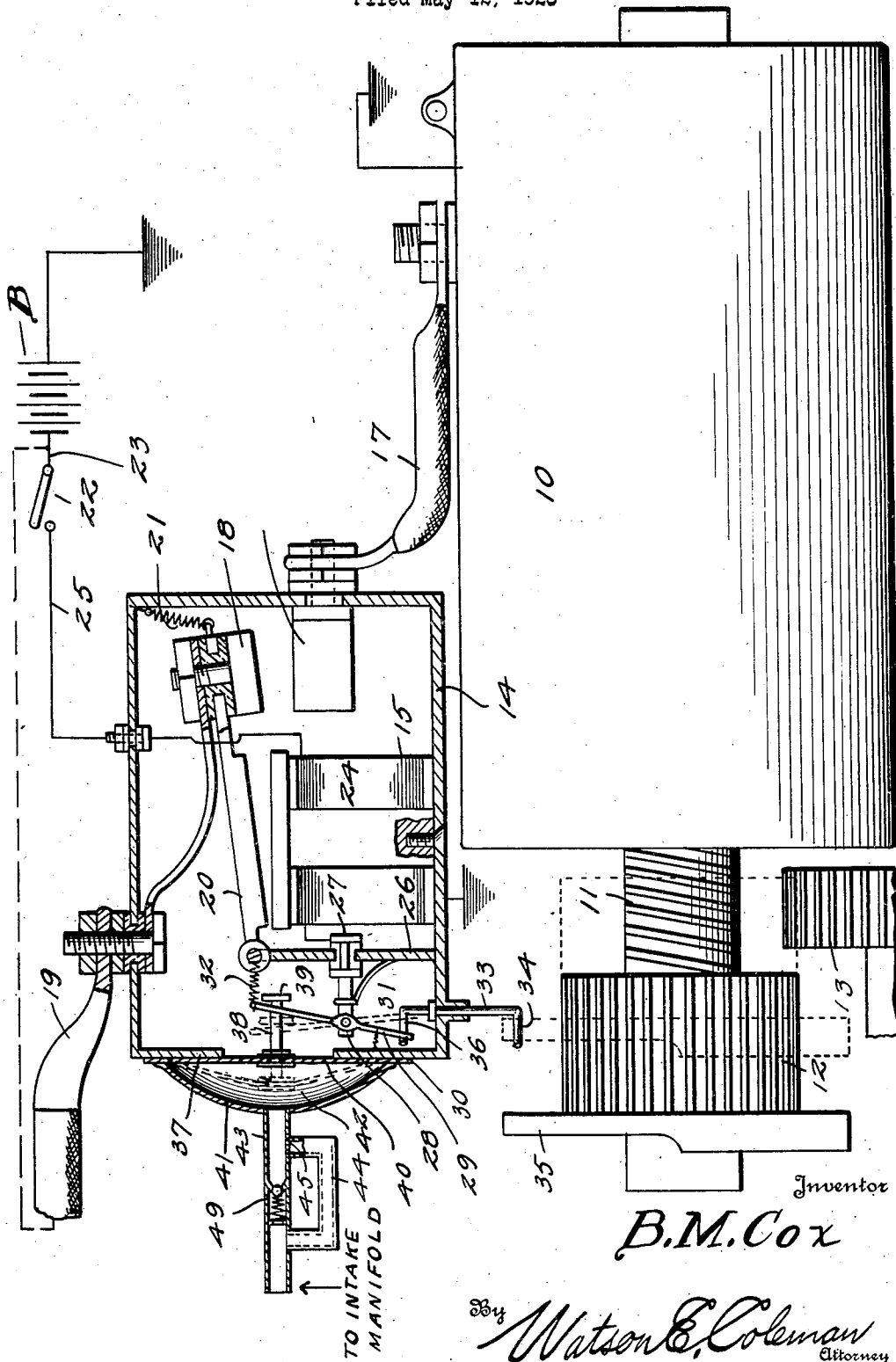
Jan. 28, 1930.

B. M. COX

1,744,868

AUTOMATIC STARTING MECHANISM FOR AUTOMOBILE ENGINES

Filed May 12, 1928



UNITED STATES PATENT OFFICE

BELTRUM M. COX, OF DETROIT, MICHIGAN

AUTOMATIC STARTING MECHANISM FOR AUTOMOBILE ENGINES

Application filed May 12, 1928. Serial No. 277,299.

This invention relates to automatic starting mechanism for automobile engines and more particularly to a means for automatically operating the electric starting mechanisms of internal combustion engines.

An important object of the invention is to provide a starting mechanism whereby operation of the ignition switch brings the electric starter of the engine into operation, and means are provided rendering the control mechanism inoperative after the engine starts and until it again stops, thus insuring automatic restarting of the engine in event it is stalled in traffic.

A further object of the invention is to provide a device of this character which requires absolutely no operation upon the part of the driver of the vehicle so that his attention may be entirely directed to driving the machine.

These and other objects I attain by the construction shown in the accompanying drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

The figure is a view partially sectional and partially diagrammatic illustrating automatic starting mechanism constructed in accordance with my invention.

Referring now more particularly to the drawings, the numeral 10 generally designates the usual starting motor and 11 the Bendix shaft and 12 the gear which, by rotation of this shaft, is engaged with the fly wheel gear 13 of the engine to rotate the same. This gear, as is well known to those familiar with the art, in its engagement shifts longitudinally of the shaft. In accordance with my invention, I provide a casing 14 within which I dispose a relay 15, one contact 16 of which is directly connected to the motor by a lead 17 and the other contact of which, indicated at 18, is connected to the battery B by a lead 19. As at present disclosed, the contact 18 is carried by the armature 20 of the relay and is normally withdrawn from engagement with the contact 16 by the bias spring 21 of this relay.

The numeral 22 generally designates the ignition switch which is connected to the bat-

tery B by a lead 23 and to one terminal of the coil 24 of the relay by a lead wire 25. Mounted upon a suitable support within the casing, at present shown as the standard 26 of the relay armature, is the stationary contact 27 of the switch which is connected to the second terminal of the relay coil 24.

The movable contact 28 of the switch is in the form of a suitably guided plunger to which is pivotally connected an operating lever 29. This lever operates in proximity to an end wall 30 of the casing and has one end thereof connected to this end wall by a spring 31 and its opposite end connected to the upper end of the standard 26 by a spring 32. The spring 31 tends to move the lever in a direction disengaging the plunger 28 from the contact 27 while the spring 32 tends to urge the lever in a direction causing engagement of the plunger with the contact. In the normal position of the plunger, as defined by these springs and their connection with the lever, the plunger 28 is in engagement with the contact 27. This plunger is grounded so that when the ignition switch is closed, the circuit is closed through the coil of the relay.

Rotatably directed through the casing wall is a shaft 33, the outer end of which has an angular arm 34 disposed in the path of the flange 35 of the starter gear 12 and the inner end of which has an angular arm 36 engaging the end of the lever 29 with which the spring 31 is connected. The end wall 37 of the casing in opposition to the opposite end of the lever has directed therethrough a shaft 38, one end of which extends through the lever and is provided with a head 39 and the opposite end of which is secured to a diaphragm 40. A false end wall 41 is provided which combines with this diaphragm to form a chamber 42 which communicates with the intake manifold of the engine (not herein shown) through a conduit 43. About this check valve, the conduit is by-passed, as at 44, this by-pass communicating with the conduit through a very small port 45.

The operation is as follows: Closing of the starter switch 22 completes a circuit through the coil 24 of the relay with the result that the armature 20 thereof is at-

tracted and the contacts 16 and 18 closed, supplying current to the motor 10. Operation of the motor causes the starter gear 12 to move to engage the fly wheel gear of the engine and during its movement, the flange 35 thereof will engage the arm 34 of the shaft 33, thereby rocking this shaft and causing the arm 36 thereof to shift the coacting end of the lever 29. As the operation of the motor continues, the suction created in the intake manifold will cause the diaphragm 40 to be drawn outwardly and the shifting of the lever prevents disengagement of the contacts prior to starting of the engine. When the engine starts, the starting gear, due to the increased speed of rotation thereof caused by self-induced operation of the engine, shifts again to its normal position, with the result that the pressure placed against the lever 29 by the arm 36 of the shaft is relieved. At this time, a pull will be exercised upon one end of the lever 29 by the spring 31 and upon the opposite end thereof by the shaft 38 which withdraws and holds the contact plunger 28 out of engagement with the contact 27. If, however, the motor stops for any reason, the release of the diaphragm will permit the spring 32 to again place the contact plunger in engagement with the contact 27, reclosing the operating circuit of the relay so that the operations above described are repeated.

While I have disclosed the device as operated by fluid pressure derived from evacuation, it will be obvious that this fluid pressure might be supplied in other ways and that it is merely necessary that the shaft 38 be shifted when the engine is started.

It will be obvious that with a structure of this character, there will be no excessive drain upon the battery and at the same time an apparatus is provided which is constantly ready for operation at any time when the ignition switch is closed and which needs no further attention on the part of the operator of the vehicle after the ignition switch has been closed.

Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In automatic starting mechanism for internal combustion engines and in combination with an internal combustion engine, a starting motor therefor, a circuit for the motor, a relay for closing said circuit, a circuit for the relay, means operated by the engine for opening the circuit of the relay, and means operated by operation of the motor for rendering the first named means inoperative.
2. In automatic starting means for internal

combustion engines in combination with an internal combustion engine and a starting motor, having a bendix nut shifted in one direction by operation thereof, a circuit for the motor, a relay for closing said circuit, means operated by operation of the internal combustion engine for opening the circuit of the relay, and means operated by said bendix nut when positioned in response to operation of the motor for rendering the means opening the circuit of the relay inoperative.

3. In automatic starting mechanism for internal combustion engines and in combination with an internal combustion engine, a starting motor therefor, a circuit for the motor, a relay for closing said circuit, a circuit for the relay, suction controlled means for opening the circuit of the relay, and means operated by operation of the motor for rendering the suction controlled means inoperative.

4. In automatic starting mechanism for internal combustion engines and in combination with an internal combustion engine, a starting motor therefor, a circuit for the motor, a relay for closing said circuit, a circuit for the relay, fluid pressure operated means for opening this circuit of the relay, and means operated by operation of the motor for rendering the first named means inoperative.

In testimony whereof I hereunto affix my signature.

BELTRUM M. COX.