Dec. 25, 1934. R. S. SANFORD 1,985,428.

DECLUTCHING MECHANISM

Filed Aug. 7, 1931

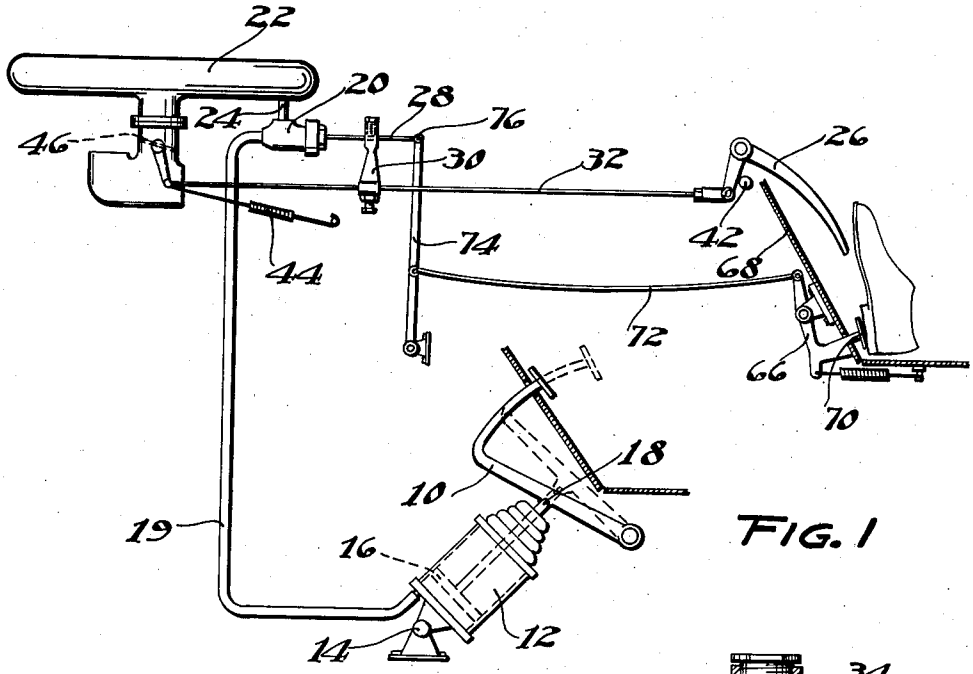


FIG. 1

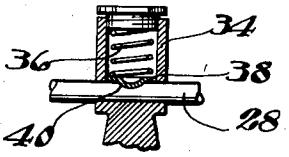


FIG. 3

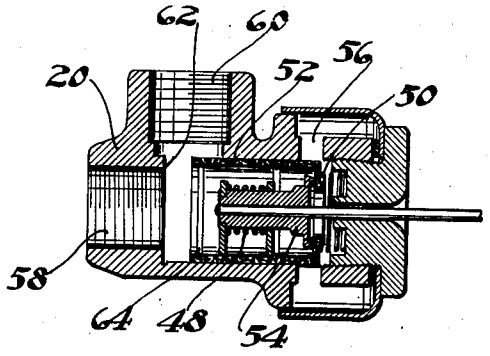


FIG. 2

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DECLUTCHING MECHANISM

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10 Claims. (Cl. 192—.01)

This invention relates in general to vacuum operated power means for operating the clutch mechanism of an automotive vehicle and in particular to a control for such means whereby either of two manually operable members is adapted to operate the control valve for the power means, and thereby effect a disengagement of the clutch.

The invention is specifically designed as an improvement to the construction of the patent to Belcia, No. 1,470,272, dated October 9, 1923, wherein actuation of the accelerator pedal serves to operate the control valve of a vacuum operated fluid motor, the latter thereby functioning to automatically engage and disengage the clutch with the operation of the throttle.

There is, however, a distinct need of providing means collateral to the accelerator pedal to effect the disengagement of the clutch at the will of the driver. Such an operation is particularly desirable in cold weather when it is often necessary to suddenly declutch to warm up the engine without closing the throttle.

It is, therefore, the principal object of the invention to supplement the aforementioned patented structure with manually operated means for effecting a disengagement of the clutch without releasing the accelerator pedal. In one preferred embodiment there is suggested a lever member supplementing the accelerator pedal, said lever being so connected to the linkage for actuating the throttle and control valve as to permit a positive actuation of the valve to open the same and effect a disengagement of the clutch without, however, disturbing the then existing setting of the throttle controlling connections.

Other objects of the invention and desirable details of construction and combinations of parts will become apparent from a reading of the following detailed description of a preferred embodiment of the invention taken in conjunction with the accompanying drawing, in which:

Figure 1 is a diagrammatic view of the clutch operating mechanism constituting the invention;

Figure 2 is a sectional view disclosing, in detail, the control valve for the clutch operating power actuator; and

Figure 3 discloses, in section, the detail of the friction connection between the accelerator and valve operating links.

In that embodiment of the invention disclosed diagrammatically in Figure 1 there is provided a conventional clutch pedal 10 adapted to be actuated by a vacuum operated power actuator 12. The actuator comprises a casing pivotally mounted to a fixed portion of the chassis at 14, and a reciprocable piston 16 pivotally connected to the clutch pedal at 18. A conduit 19 is provided to interconnect the control valve 20 of the actuator with the actuator casing to thereby provide for the creation of a vacuum in the actuator to actuate the piston and disengage the clutch. The valve is connected to the engine manifold 22 by a short conduit 24.

The control valve is arranged to be operated by means of the accelerator pedal 26 of the vehicle, the rigid operating link 28 of the valve being connected, by means of an arm 30, to a link 32, the latter connecting the pedal 26 and throttle 32. A friction connection between the arm 30 and link 28 is provided, as disclosed in detail in Figure 3, and preferably comprises a hollow boss 34 on the end of the arm, said boss housing a spring 36, the latter serving to press a washer member 38 into frictional engagement with a recess 40 in the body of the link 32.

To the aforementioned extent the structure is, in a very general way, similar to that of the patented structure previously referred to in that application of the accelerator pedal serves to operate the valve to vent the actuator and effect clutch engagement, whereas release of the accelerator pedal effects the reverse operation; namely, an opening of the valve to energize the actuator and disengage the clutch. The aforementioned structure is shown in its clutch disengaged position in Figure 1, the accelerator pedal being shown in its released position against a stop 42.

In operation, application of the accelerator pedal serves to further tension a return spring 44 and open the butterfly valve member 46 of the carburetor to accelerate the engine. Compressed springs 48 and 50, Figure 2, of the control valve 20 are by this operation permitted to expand to successively close the vacuum valve member 52 and open the atmospheric valve member 54, the total movement of the two valve members summing up to approximately one-eighth of an inch, thereby providing a like movement of the connected links 28 and 32. The opening of the atmospheric valve member 54 serves to vent the actuator via valve ports 56 and 58 and conduit 19, resulting in the engagement of the clutch as the throttle is opened. The reverse of the aforementioned operation is effected as the accelerator pedal is released under the action of spring 44, valve members 54 and 52 being successively closed and opened to place the actuator in circuit with the manifold 22 via valve ports 60 and 58 and conduit 19 to evacuate the

actuator and disengage the clutch as the throttle is closed. In general this valve operation is similar to that more fully described and disclosed in an application of Victor W. Kliesrath, No. 568,082, filed October 10, 1931.

Accordingly, with the aforementioned construction the first one-eighth inch of linear movement of the link 32 serves to close the valve and vent the actuator, the valve member 52 abutting a stop 62 and the valve member 54 abutting the end 64 of the valve member 52 in this movement. Any further movement of the link 32 as the pedal 26 is actuated serves to more completely open the throttle, the arm 30 moving relative to the link 28 and the washer 38 leaving its recess 40 and riding upon the face of the link 32. Upon release of the accelerator pedal the valve is first opened, and subsequent movement returns the arm 30 to its original position with the washer 38 housed in the recess 40. In order to effect the aforementioned sequence of operations, the combined load of valve springs 48 and 50 is made less than that of spring 36 in the friction connection, and spring 36 in turn is of less strength than the return spring 44. With this construction the control valve 20 is closed and opened during the first one-eighth inch movement of the link 32 in its throttle opening and closing movements, respectively.

The invention is specifically directed, however, to collateral means for opening the valve to disengage the clutch, which operation is carried out without affecting the throttle control. The above described friction or slip joint in the connection between the arm 30 and link 28 facilitates or rather makes possible the operation of said collateral means as will be made apparent in the description to follow.

Describing such collateral control in detail there is provided a supplemental lever member 66 spring pressed into engagement with the floor board 68 and adapted to be operated by the heel of the driver contactable with a treadle extension 70 on the lever. The treadle 70 normally serves as a heel rest for the foot of the operator in toe application of the accelerator 26. A flexible cable 72 is also provided which interconnects the lever 66 with a lever member 74, the latter pivotally connected at its end 76 to the end of the valve operating link 28.

Describing now the functioning of the supplemental operating means for the actuator valve 20, it is to be noted that sufficient play is provided in the flexible connecting means 72 to insure the one-eighth inch closing movement of the valve 20. The supplemental valve control means, therefore, in no way interferes with the normal operation of the control valve by the accelerator pedal.

Should it be desired, however, to disengage the clutch with the accelerator applied and without disturbing the setting of the accelerator, it is merely necessary to depress the heel, rocking lever 66 clockwise and tensioning link 28 to "crack" or open the valve. The necessary relative movement between link 28 and arm 30 is insured by virtue of the aforementioned slip joint at the washer 38. This operation is particularly desirable in cold weather when the engine may be missing as it labors with the car in gear. It is the usual practice under such conditions to disengage the clutch and step up the R. P. M. of the motor to heat up the power system; however, with the positive connection between the accelerator pedal and the actuator control valve as disclosed in the aforementioned patent this operation is impossible. With the aforementioned construction, embodying the slip joint and supplemental valve operating lever means, such operation is made possible in the patented construction. There is also provided, by this construction, an emergency means for disengaging the clutch in the event of failure of the accelerator linkage to accomplish this function.

While one illustrative embodiment has been described, it is not my intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

I claim:

1. In an automotive vehicle, the combination with a throttle controlled internal combustion engine, a clutch, a fluid operated motor for operating said clutch, a valve for controlling the operation of said motor, and fluid transmitting connections interconnecting said engine, valve and motor, of a manually operable member for controlling the operation of the engine throttle and valve, a connection between said member and throttle, force transmitting means for operating the aforementioned valve, means interconnecting said latter means and connection whereby the valve is rendered operable to engage the clutch with actuation of said manually operable member and other means connected to said force transmitting means providing supplemental means for operating said valve at the will of the driver to render said motor operative to disengage the clutch.

2. In an automotive vehicle, the combination with an internal combustion engine, a throttle therefor, a clutch, a fluid operated motor for operating said clutch, a valve for controlling the operation of said motor, and fluid transmitting connections interconnecting said engine, valve and motor, of a manually operable member for controlling the operation of the engine throttle, a connection between said member and throttle, force transmitting means for operating the aforementioned valve, means providing a lost motion connection between said latter means and connection whereby the valve is rendered operable to engage the clutch with actuation of said manually operable member and other manually operable means connected to said force transmitting means providing supplemental means for operating said valve at the will of the driver to cut-in the operation of said motor to disengage the clutch.

3. In an automotive vehicle, the combination with an internal combustion engine, a throttle therefor, a clutch, a fluid operated motor for operating said clutch, a valve for controlling the operation of said motor, and fluid transmitting connections interconnecting said engine, valve and motor, of a foot operated member for controlling the operation of the engine throttle, a connection between said member and throttle, force transmitting means for operating the aforementioned valve, means providing a lost motion connection between said latter means and connection whereby the valve is rendered operable with actuation of said manually operable member to engage the clutch, and other foot operated means connected to said aforementioned connection providing supplemental means for either operating said valve or maintaining the same open to render said motor operative to disengage the clutch, said operation being independent of

the operation of said first mentioned foot operated member.

4. In an automotive vehicle having an internal combustion engine, a throttle therefor, and an accelerator pedal connected to said throttle to operate the same, the combination with a clutch, a fluid operated motor for operating said clutch, valve means for controlling the operation of said motor and fluid transmitting connections interconnecting said engine, valve and motor, of means providing a lost motion friction connection interconnecting said valve and accelerator pedal, said means being operable to permit a closing of the valve to vent the motor during the initial movement of said pedal, said means being also so constructed that subsequent pedal movement serves to open the throttle without further affecting the valve.

5. In an automotive vehicle having an internal combustion engine, a throttle therefor, and an accelerator pedal connected to said throttle to operate the same, the combination with a clutch, a fluid operated motor for operating said clutch, valve means for controlling the operation of said motor, and fluid transmitting connections interconnecting said engine, valve and motor, of means providing a lost motion friction connection interconnecting said valve and accelerator pedal, said means being operable to permit a closing of the valve to vent the motor during the initial movement of said pedal, subsequent pedal movement serving to open the throttle without further affecting the valve, and collateral valve operating means operable by the foot of the driver, said latter means being unaffected by said initial valve operating pedal movement.

6. An automotive vehicle comprising a throttle controlled internal combustion engine, an accelerator pedal, a connection between said pedal and throttle, a clutch, a power actuator for operating said clutch, a valve for said actuator, connections interconnecting said engine, valve and actuator, means interconnecting said valve and first mentioned connection whereby said valve is rendered operable upon actuation of said pedal, and collateral means for actuating said valve independently of said pedal, all of the aforementioned parts being so constructed and arranged as to permit a closing of the valve as the throttle is opened, an opening of the valve as the throttle is closed and an opening of the valve by said collateral means as the throttle is held open by the accelerator pedal without, however, disturbing the throttle-open setting of said pedal.

7. An automotive vehicle comprising a throttle controlled internal combustion engine, an accelerator pedal, connections between said pedal and throttle, a clutch, a power actuator for operating said clutch, a valve for said actuator, connections interconnecting said engine, valve and actuator, means interconnecting said valve and first mentioned connections whereby said valve is rendered operable upon actuation of said pedal, and collateral means operable by the heel of the operator for actuating said valve independently of said pedal, all of the aforementioned parts being so constructed and arranged as to permit a closing of the valve as the throttle is opened, an opening of the valve as the throttle is closed and an opening of the valve by said collateral means as the throttle is held open by the accelerator pedal without, however, disturbing the throttle-open setting of said pedal.

8. An automotive vehicle comprising an internal combustion engine having an intake manifold, a throttle for said engine, an accelerator pedal, a connection between said pedal and throttle, a clutch, a fluid motor for operating said clutch, a control valve for said motor, and fluid transmitting connections interconnecting said manifold, valve and motor, a rigid link for operating said valve, and a link interconnecting said valve operating link and aforementioned connection, the connection between said interconnecting link and rigid valve operating link comprising means permitting relative movement between the links.

9. An automotive vehicle comprising an internal combustion engine having an intake manifold, a throttle for said engine, an accelerator pedal, a connection between said pedal and throttle, a clutch, a fluid motor for operating said clutch, a control valve for said motor and fluid transmitting connections interconnecting said manifold, valve and motor, a rigid link for operating said valve, a link interconnecting said valve operating link and aforementioned connection, the connection between said interconnecting link and rigid valve operating link comprising means permitting relative movement between the links, together with two lever members interconnected by a flexible member, one of said lever members being connected to said rigid link and the remaining lever member being positioned to be actuated by the heel of the operator, the aforementioned parts being so constructed and arranged as to provide two independent means for operating the control valve of the fluid motor.

10. In an automotive vehicle, the combination with a throttle controlled internal combustion engine, a clutch, a fluid operated motor for operating the clutch to disengage the same, a valve for controlling the operation of said motor, and fluid transmitting connections interconnecting said engine, valve and motor, of a manually operable member operatively connected with said valve, the connection including a lost motion means and a second manually operable member operatively connected with said latter connection, said connections being such as to provide for a selective operation of either of said manually operable members to effect a clutch disengaging operation of the valve.

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