Nov. 13, 1956 A. H. WINKLER 2,770,146

AUTOMOTIVE VEHICLE CONTROL MECHANISM

Filed July 3, 1952 3 Sheets-Sheet 1

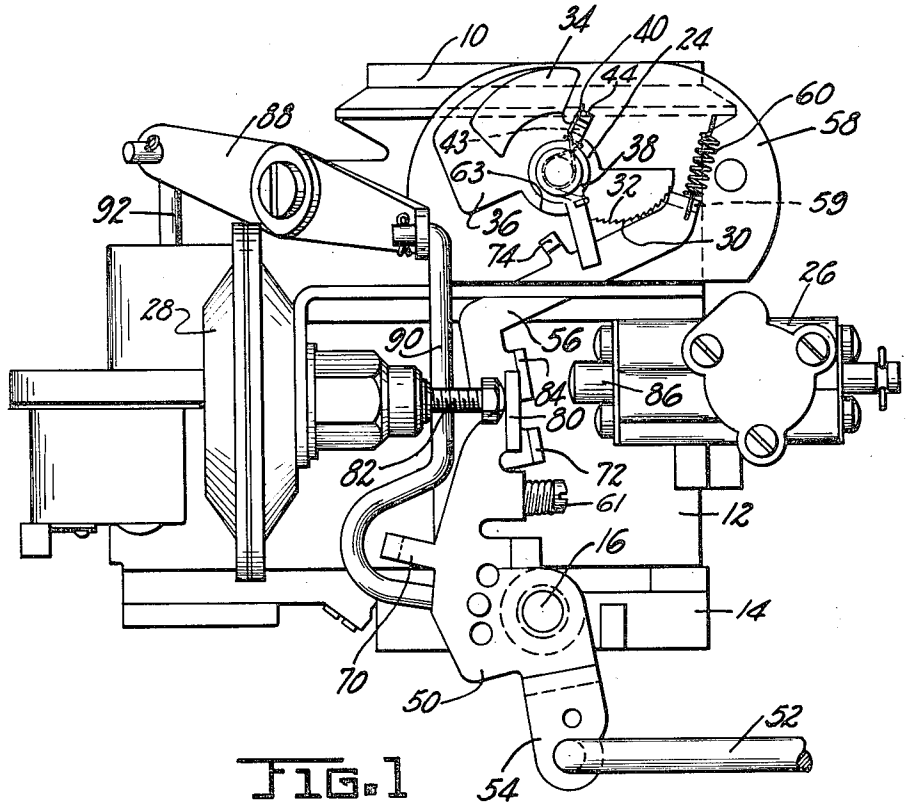

FIG. 1

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AUTOMOTIVE VEHICLE CONTROL MECHANISM

Filed July 3, 1952. 3 Sheets-Sheet 2

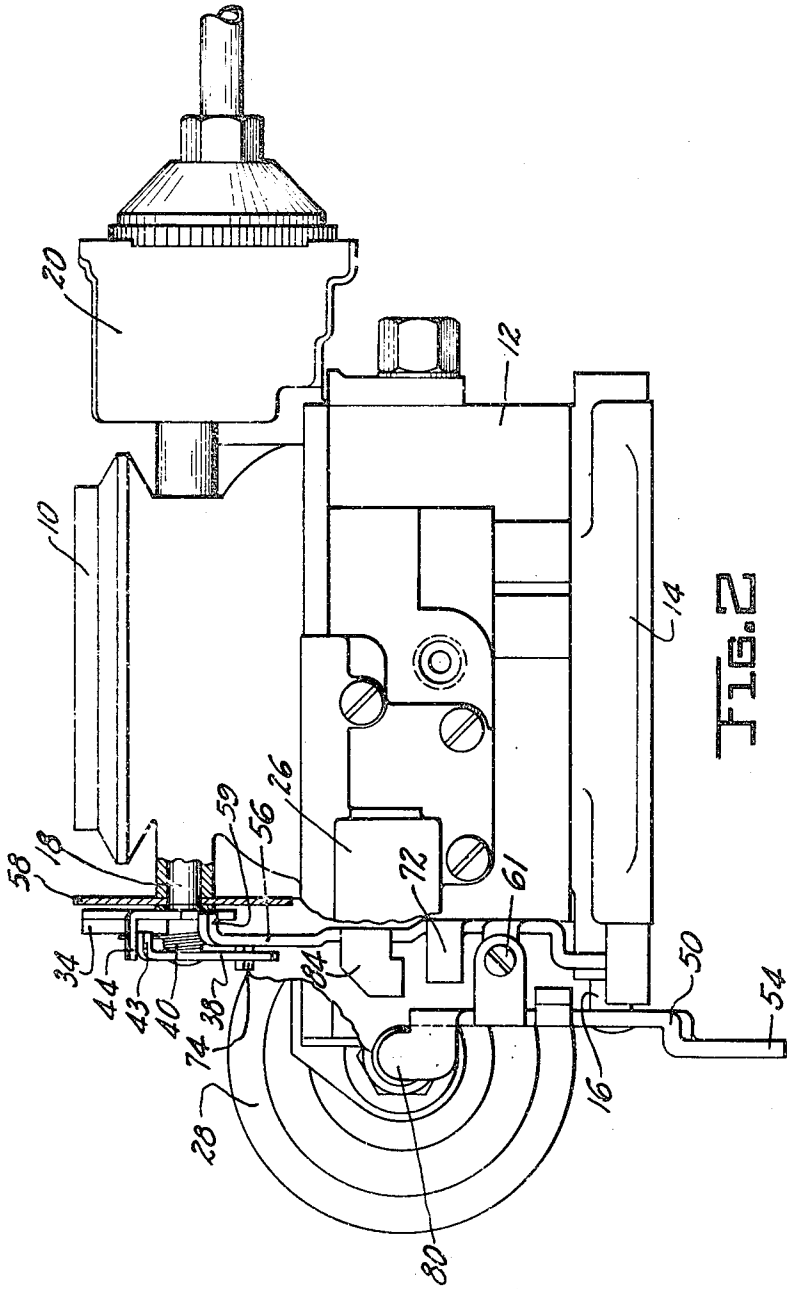

FIG. 2

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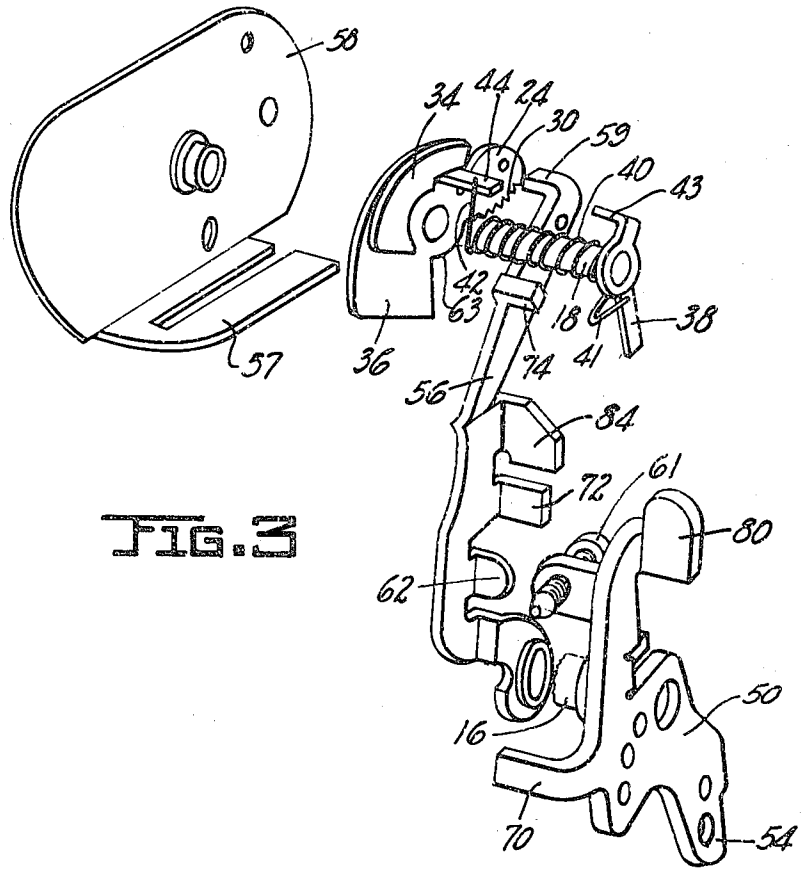

FIG. 3

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AUTOMOTIVE VEHICLE CONTROL MECHANISM

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3 Claims. (Cl. 74—472)

The present invention relates to carburetors and more particularly to a control mechanism for carburetors for use on automotive internal combustion engines.

Some types of our present day carburetors are equipped with an automatic choke, fast idle cam, a dashpot, and a kickdown switch for the initiation of a change in transmission speed ratio drive. These elements are arranged to cooperate with the movement of the throttle lever under certain conditions of engine operation and are either controlled by or have an effect on the operation of the throttle of a carburetor. It is, therefore, one of the principal objects of the present invention to provide a compact, relatively simple mechanical linkage for operatively connecting these elements with the throttle. Another object of the invention is to provide mechanical linkage of the aforesaid type which is easy to maintain in good operating condition and which can readily be serviced whenever the need arises. Further objects and advantages of the present invention will become apparent from the following description with reference to the accompanying drawings, wherein:

Figure 1 is a side elevation of a downdraft carburetor, showing my mechanism in one operating position;

Figure 2 is another side elevation of a carburetor, showing my mechanism in the same operating position as in Figure 1; and

Figure 3 is an exploded view of my operating mechanism, showing the operative relationship of the various elements constituting the mechanism.

Referring more specifically to the drawings, numeral **10** designates an air horn of a downdraft carburetor, numeral **12** a main body, and **14** a throttle body in which is mounted a throttle (not shown) on a throttle shaft **16**. A choke valve (not shown) preferably off-set in the direction to be openable by air flow in the carburetor induction passage is mounted in air horn **10** on shaft **18** and is controlled by an automatic choke unit **20** consisting of a vacuum actuated piston and a temperature responsive thermostatic coil. Hot air is supplied to the choke housing to operate the thermostat from a stove (not shown) on the exhaust manifold of the engine. Mounted on the choke shaft **18** opposite the choke unit **20** is a fast idle cam member **24** which is also controlled by the choke unit during the warming up period of the engine to determine the limit to which the throttle can be closed. A kickdown switch **26** for initiating a change in transmission speed ratio drive of the engine is secured to the main body of the carburetor and is actuated in response to the movement of the throttle. Also secured to the main body is an electrically controlled dashpot **28** for retarding the final closing movement of the throttle to permit gradual deceleration of the engine to normal idling speed. For the purpose of the present description, the automatic choke unit, the kickdown switch and the dashpot will be considered conventional elements and will not be described in detail herein except as is required for a complete understanding of the present invention. The carburetor contains, in addition to those elements mentioned, a main fuel discharge system, an idle system, an accelerating pump, a fuel bowl and a power enrichment jet, usually found in conventional float type carburetors, and since the construction of these elements is well known, description of them here is unnecessary.

The fast idle cam **24** is adapted to rotate freely on shaft **18** and includes a cam surface **30** having a series of notches **32**, the purpose of which will be fully explained hereinafter, and a counter weight **34** secured to an arm **36** opposite cam surface **30** for constantly urging the cam in a counterclockwise direction. A lever **38** is rigidly secured to the end of shaft **18** and is operatively connected to the cam by a coil spring **40** mounted on shaft **18** between said cam and lever **38**. One end **41** of the spring is hooked around lever **38** and the other end **42** presses against but extends beyond an inwardly extending finger **43** on lever **38**. The cam is provided with an outwardly extending finger **44** rotating on a greater radius than finger **43** in the path of end **42** of spring **40** when said spring rotates as the choke valve is moved toward closed position. The cam is thus urged clockwise as the choke valve is closed.

A throttle lever **50** is secured to throttle shaft **16** and is adapted to be actuated by the vehicle operator through an accelerating pedal (not shown) and a rod **52** connected to the lower arm **54** of lever **50**. A lever **56** is rotatably mounted at its lower end on the throttle shaft **16** between the throttle lever and the end of the throttle body **14** and extends upwardly to a point adjacent the fast idle cam. Lateral movement of lever **56** is prevented by arm **57** on the lower edge of the backing plate **58**. A finger **59** on the upper end of lever **56** is adapted to engage the fast idle cam surface when the choke valve is in closed or partially closed position and thereby limit the movement of lever **56** to the left, as shown in Figure 1. Finger **59** is urged away from the cam by a spring **60**. A one-way connection is formed between throttle lever **50** and lever **56** by an adjustable screw **61** on lever **50** and an ear **62** on lever **56**. As the throttle is closed, the screw engages ear **62** which, together with lever **56** and fast idle cam **24**, limits the closing movement of the throttle. When the choke valve is in closed or partially closed position finger **59** engages one of the notches toward the outer end of the cam surface and holds lever **56** at a point further to the right than when the choke valve is open and finger **59** is engaging either hub **63** or one of the inner notches. Hence, when the choke valve is closed, ear **62** and screw **61** prevent the throttle lever from rotating in the counterclockwise direction to the extent that it does when the choke valve is open, thus holding the throttle in a partially open position for fast idling. The notches in the cam surface prevent finger **59** from sliding on the cam surface and moving the fast idle cam toward its slow idle position.

An arm **70** on throttle lever **50** is adapted to engage an ear **72** on lever **56** when the throttle is moved to wide open position and to move lever **56** to the right, as shown in Figure 1, causing a finger **74** on lever **56** to engage the lower arm of lever **38** when the latter lever is in the position shown, i. e. when the choke valve is closed. Further movement of lever **56** and finger **74** to the right causes lever **38** to rotate counterclockwise, thus moving the choke valve to a partially open position for deflooding the engine. When the throttle valve is again closed, finger **74** moves away from lever **38**, permitting the choke valve to return to close.

An ear **80** is provided on the upper arm of throttle lever **50** for engaging stem **82** of dashpot **28** as the throttle valve approaches closed position and thereby retards the final closing movement of the valve to permit the engine

to decelerate gradually. In the dashpot shown in the drawings, an electrically controlled valve (not shown) is included in order to render the dashpot ineffective under certain operating conditions. An ear **84** is provided on lever **56** for engaging stem **86** of kickdown switch **26** as arm **70** engages ear **72** and moves lever **56** to the right when the throttle valve is moved to wide open position.

The accelerating pump of the carburetor is actuated mechanically by a pivoted lever **88**, a rod **90** connecting one end of lever **88** with the throttle lever, and a rod **92** connecting the other end of lever **88** with the piston of the pump. The operation of the pump linkage has no direct effect on the operation of the linkage between the dashpot, kickdown switch and fast idle cam.

In the operation of my mechanism, as the choke shaft **18** is rotated toward choke closed position by automatic choke unit **20**, lever **38** and spring **40** are rotated in a clockwise direction causing end **42** of said spring to engage finger **44** of the fast idle cam, carrying said cam in a clockwise direction toward its fast idle position. If the throttle is closed and lever **56** held to the left, the cam will hit finger **59** and stop. Further movement of the choke valve is permitted, however, by the resilient connection provided by spring **40**. When the throttle valve is opened spring **60** moves lever **56** to the right, permitting the cam to rotate further toward its fast idle position under the force of spring **40**. If the throttle is moved to wide open position while the choke is closed, finger **70** on the throttle valve lever engages ear **72** and moves lever **56** and finger **74** to the right, causing finger **74** to engage lever **38** and rotate the choke toward open position. This operation is performed in the event the engine becomes flooded during starting. If the choke is open when the throttle is moved to wide open position, finger **74** passes under lever **38** since the lower arm of said lever is rotated counterclockwise as the choke is opened beyond the reach of finger **74**. As the throttle approaches wide open position, ear **84** engages stem **86** and moves it in the direction to close kickdown switch **26**.

When the throttle valve is closed while the choke valve is in closed or partially closed position, finger **59** engages the cam surface in one of the notches and is held in a position further to the right than when the choke is fully open, thus causing screw **60** to engage ear **62** before the throttle is fully closed. The throttle in this partially open position permits the engine to idle fast while it is becoming warm. As the throttle approaches closed position ear **72** engages stem **82** of the dashpot which under certain operating conditions retards the final closing movement of the throttle.

Although a cover for the fast idle cam is not shown in the drawings, one may be used to prevent oil, grease, and dirt from accumulating on the cam and levers **38** and **56**. Various changes may be made in the levers comprising my operating mechanism as well as in the arrangement of the levers without departing from the scope of the present invention.

I claim:

1. The control mechanism for the throttle of a carburetor having a choke valve, a shaft for said valve, a throttle and a shaft for said throttle, comprising a lever rigidly secured to said choke shaft, a fast idle cam adapted to rotate on said choke shaft, a spring operatively connecting said lever and cam, a throttle lever rigidly secured to said throttle shaft, an adjustable stop member on said throttle lever, a control lever rotatably mounted at one end on said throttle shaft and adapted at the other end to engage said cam, a lug on said control lever forming a one way connection with said stop member and forming the sole limitation to the closing movement of said throttle.

2. A control mechanism for the throttle of a carburetor having a choke valve, a shaft for said valve, a throttle and a shaft for said throttle, comprising a lever rigidly secured to said choke shaft, a fast idle cam adapted to rotate on said choke shaft, a spring operatively connecting said lever and cam, a throttle lever rigidly secured to said throttle shaft, a control lever rotatably mounted on said throttle shaft adjacent said throttle and adapted to engage said cam, means forming a one way connection between said control lever and said throttle lever, means on said throttle lever formed to rotate said control lever only when said throttle valve has been opened a predetermined amount, and means on said control lever for engaging the lever on said choke shaft for opening said choke when said control lever is rotated by said last mentioned means.

3. A control mechanism for a carburetor having a kickdown switch mounted thereon comprising a choke valve, a choke lever operatively connected to said choke valve, a throttle, a throttle lever operatively connected to said throttle, a control lever rotatably mounted adjacent said throttle lever, abutment means on said control lever adapted to engage said choke lever and switch, and an arm on said throttle lever adapted to move said control lever into engaged position with said choke lever and switch when said throttle is opened a predetermined amount.

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