Feb. 4, 1958 K. RÖDER 2,822,155

REGISTER CARBURETOR FOR INTERNAL COMBUSTION ENGINES

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Fig. 1a

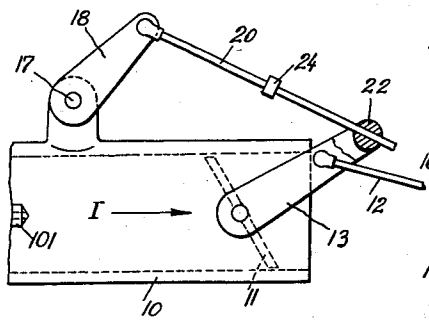


Fig. 1

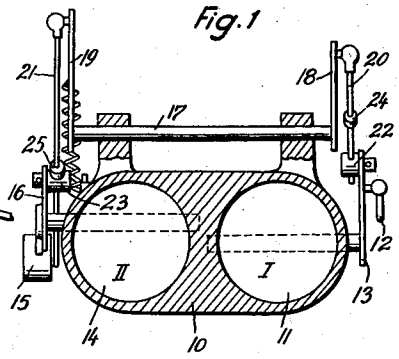


Fig. 2a

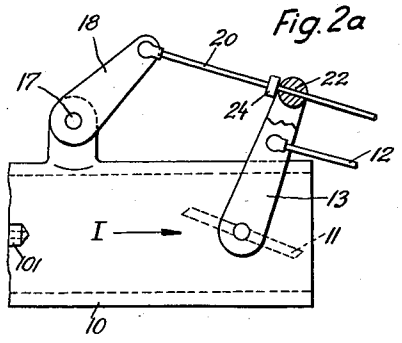
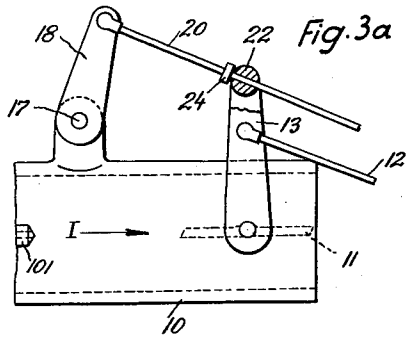


Fig. 3a



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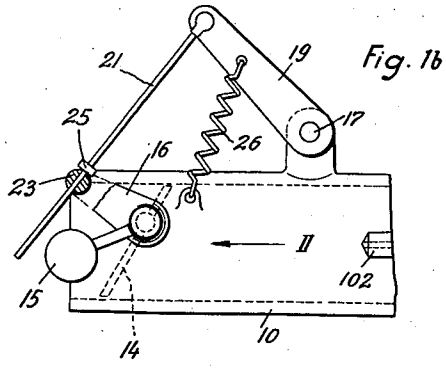


Fig. 1b

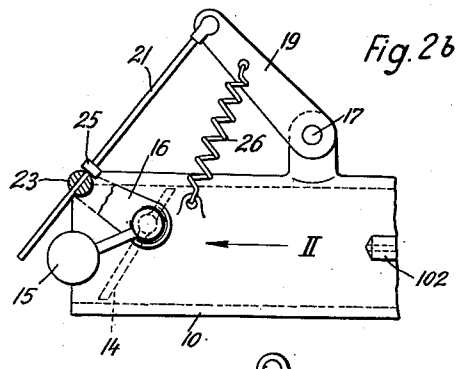


Fig. 2b

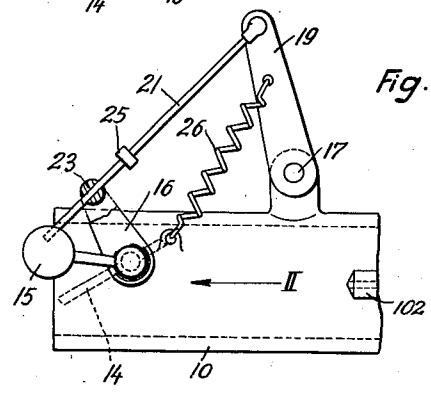


Fig. 3b

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REGISTER CARBURETOR FOR INTERNAL COMBUSTION ENGINES

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Application January 31, 1956, Serial No. 562,567

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1 Claim. (Cl. 261—23)

The present invention relates to a register carburetor for internal combustion engines of the type having a plurality of conduits for the combustion air, each conduit being provided with a throttle valve and with fuel supply means.

It is the object of the present invention to improve and simplify the means for controlling a carburetor of this type by the provision of a suitable linkage which is combined with the various throttle valves and is capable of opening the main throttle valve only in a certain range of operation and of additionally opening one or more auxiliary throttle valves in another range of operation.

More particularly, it is an object of the invention to eliminate the necessity existing in a prior register carburetor of providing in an auxiliary conduit an automatically controlled valve in addition to the auxiliary throttle valve, such valve being controlled in dependence on the vacuum in the intake manifold of the engine.

Further objects of the present invention will appear from a detailed description following hereinafter of a preferred embodiment of the invention, it being understood that the terms and phrases used in such detail description are chosen for the purpose of illustrating the invention rather than that of restricting or limiting the same, the features of novelty for which patent protection is desired being set forth in the appended claims. In the accompanying drawings,

Fig. 1 illustrates a cross sectional view through the carburetor showing the main conduit and the auxiliary conduit for the air to be carbureted, the associated butterfly valves being closed,

Fig. 1*a* is a side view of the carburetor shown in Fig. 1 being viewed from the right hand side,

Fig. 1*b* is a side view of the carburetor shown in Fig. 1 being viewed from the left hand side,

Figs. 2*a* and 2*b* are views similar to Figs. 1*a* and 1*b* respectively, the elements being shown in a position in which the main throttle valve has been actuated through the primary range of operation,

Figs. 3*a* and 3*b* are views similar to Figs. 1*a* and 1*b* showing the elements in a position in which the primary throttle valve has been actuated through its secondary range of operation, and in which the vacuum existing in the intake manifold acts to open the auxiliary throttle valve.

The carburetor housing **10** is provided with a main conduit I and an auxiliary conduit II both communicating with the intake manifold for supplying carbureted air thereto, such air flowing in the direction of the arrows shown in the drawings. Each of the conduits is provided with fuel supply means, such as nozzles **101** and **102**, connected with a source of a suitable liquid fuel and controlled in the conventional manner. Each conduit is provided with a throttle valve which, in the embodiment shown, is formed by a butterfly valve, the main throttle valve being shown at **11** and the auxiliary throttle valve at **14**. Both of the throttle valves are controlled by an accelerator link **12** which may be connected in the conventional manner with an accelerator pedal not shown for actuation between a normal non-operated position shown in Fig. 1*a* and a fully actuated position shown in Fig. 3*a*. In Fig. 2*a* an intermediary position of link **12** is shown. The main throttle valve **11** is carried by a diametrically disposed shaft which extends through the wall of the main conduit I outwardly. On its outer end a main valve arm **13** is fixed which is pivotally connected to the link **12** for positive actuation of the main throttle valve **11** by the link **12**. Thus, the link **12** is movable through a primary range of movement coordinated to a partially open condition of the main throttle valve **11** and movable through an adjoining secondary range of movement coordinated to the fully open condition of the throttle valve **11**, such primary range extending between the positions shown in Figs. 1*a* and 2*a*, and the secondary range extending between the positions illustrated in Figs. 2*a* and 3*a*.

The auxiliary throttle valve **14** is formed by a butterfly valve carried by a shaft which extends parallel to that of the main valve **11** outwardly through the wall of the auxiliary conduit. Its outer end is fixed to an arm **16** and to a second arm provided with a weight **15** which tends to keep the auxiliary throttle valve **14** in the closed position shown in Figs. 1*b* and 2*b*.

The auxiliary valve **14** cooperates with a member tending to hold it in closed position. This member is formed by a collar **25** on a rod **21** pivotally connected with an arm **19** of a shaft **17** which extends parallel to the shafts of the butterfly valves outside of the conduits through suitable lugs in which it is rotatably journalled. A helical spring **26** is extended between the arm **19** and a suitable lug provided on the outside of housing **10**. A cylindrical part **23** is rotatably mounted on the end of arm **16** for rotation about an axis extending parallel to that of the butterfly valves and has a diametrical bore through which the rod **21** extends. The spring **26** tends to keep the collar **25** in engagement with the cylindrical part **23**.

From the foregoing description it will appear that the collar or abutment **25** on the rod **21** constitutes a member which holds the auxiliary valve **14** in closed condition as long as the parts assume the position shown in Figs. 1*b* and 2*b*. When the parts are moved to the position shown in Fig. 3*b*, however, the auxiliary throttle valve **14** may open. This will occur under the effect of vacuum produced in the intake manifold of the engine provided that the speed of operation of the engine exceeds a certain limit. To this end, the axis of the butterfly valve **14** is slightly offset from its diameter, as shown in Fig. 1, so that the area beneath the axis is larger than the area above the same. Therefore, the vacuum produced in the intake manifold acting on the larger area will turn the butterfly valve in clockwise direction with reference to Figs. 1*b*, 2*b* and 3*b*, for instance into the open position shown in Fig. 3*b*. This opening movement will not be interfered with by the abutment **25** if the same assumes the position shown in Fig. 3*b*.

The shaft **17** on its right hand end as viewed in Fig. 1 is provided with another arm **18** fixed thereto, a rod **20** being pivotally connected to the end of arm **18**. The end of arm **13** is provided with a cylindrical part **22** which is rotatably mounted thereon and has a diametrical bore in which rod **20** is slidably guided. A collar **24** is provided on the rod **20** constituting an abutment adapted to be engaged by the member **22** when the link **12** moves in its secondary range of movement.

Hence, it will appear that the arms **13** and **16** are connected through the shaft **17**, the arms **18** and **19**, and the rods **20** and **21**.

The operation is as follows:

When the driver depresses the accelerator pedal moving link 12 to the left with reference to Figs. 1*a*, 2*a* and 3*a* through the primary range of movement confined by the limit positions shown in Figs. 1*a* and 2*a*, the main throttle valve 11 in conduit I only will be opened. During this initial actuation of link 12 the cylindrical member 22 slides on the rod 20 leaving the elements 18, 17, 19, 21, 25, 23, 16, 14 and 15 in resting condition, as shown in Figs. 1*a*, 2*a* and 1*b*, 2*b*. While the vacuum set up in the intake manifold of the engine tends because of the eccentric disposition of the axis of butterfly valve 14 to open this auxiliary valve contrary to the effect of weight 15, the valve 14 is held in closed condition by the member 25.

When the driver depresses the accelerator pedal beyond the position coordinated to that of link 12 shown in Fig. 2*a*, this link will be moved through the secondary range of movement confined by the limit positions illustrated in Figs. 2*a* and 3*a*. As a result, the main throttle valve 11 will be opened beyond the position shown in Fig. 2*a*. In the course of this movement through the secondary range the cylindrical part 22 engages the abutment 24 of rod 20 thereby turning the shaft 17 anti-clockwise with reference to Figs. 1*a*, 2*a*, and clockwise with reference to Figs. 1*b* and 2*b* beyond the position shown in Figs. 2*a* and 2*b*. As a result, the rod 21 is pulled upwardly moving the abutment 25 to a position in which it permits the vacuum prevailing in the intake manifold to open the auxiliary butterfly valve 14 in conduit II, as illustrated in Fig. 3*b*. The actuation of link 12 within the secondary range of its movement will have no effect on the auxiliary throttle valve 14, however, as long as the speed of operation of the engine is too slow to set up a vacuum of sufficient power to overcome the effect of weight 15. Therefore, the auxiliary conduit II will be kept closed under such conditions. It will not be opened until the speed of operation of the engine exceeds a certain limit.

While the invention has been described in connection with a preferred embodiment thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as fall within the scope of the invention or the limits of the appended claims.

What I claim is:

Register carburetor for internal combustion engines comprising a housing having a main conduit and an auxiliary conduit parallel thereto, a main throttle valve therein including a shaft extending through the wall of said main conduit in a plane including the axes of said conduits, a main valve arm fixed to said shaft and movable through a primary range of movement coordinated to a partially open condition of said main throttle valve and movable through an adjoining secondary range of movement coordinated to the fully open condition of said main throttle valve, an auxiliary throttle valve therein including a shaft parallel to said plane extending through the wall of said auxiliary conduit, an auxiliary valve arm fixed to said last-mentioned shaft, a third shaft extending parallel to said plane across said conduits and having a pair of arms, rods connecting said last-mentioned arms with said valve arms, each of the latter being slidable with respect to the associated rod, abutments on said rods adapted to engage said valve arms, said main valve arm being so disposed as to engage said abutment on the associated rod in said secondary range of movement only, and a spring connected with said third shaft and tending to urge said abutment associated with said auxiliary arm into contact therewith thereby tending to keep said auxiliary arm in the position in which said auxiliary throttle valve is closed as long as said main valve arm remains in said primary range.

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