Oct. 23, 1934. C. E. MARKHAM 1,978,052

CHOKE VALVE

Filed May 19, 1933

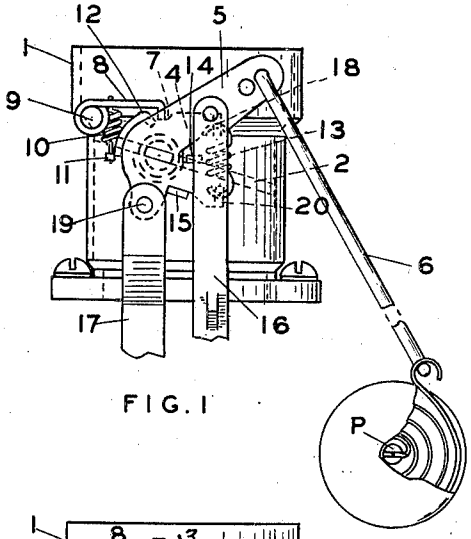

FIG. 1

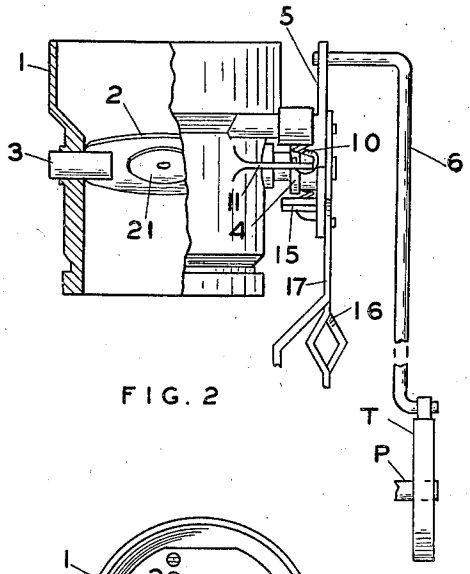

FIG. 2

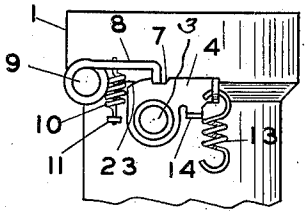

FIG. 3

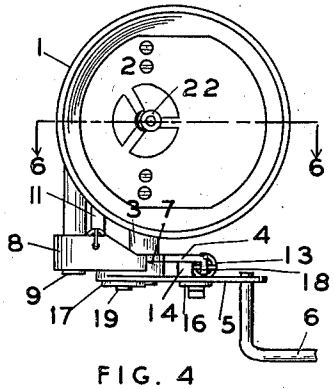

FIG. 4

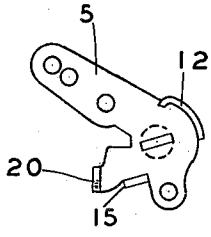

FIG. 5

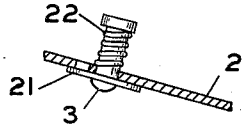

FIG. 6

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CHOKE VALVE

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Application May 19, 1933, Serial No. 671,851

13 Claims. (Cl. 261—39)

It will be understood that the invention is susceptible of many modifications, and, accordingly, I do not wish to be limited in my protection, except as set forth in the accompanying claims.

This invention relates to an improvement in choke valves and particularly to an improvement in latching devices for automatic choke valves. The invention is an improvement on the construction shown in the application of Otto Henning, Serial No. 610,865, filed May 12th, 1932.

The object of the invention is to produce a generally new and improved device operating on the general principle of the choke valve shown in the Henning application above referred to and having greater simplicity of construction, durability and being more convenient to manufacture.

Another object of the invention is to provide means for permitting a slight and accurately regulated breathing action at each suction impulse of the engine during the cranking period, and at the same time to hold the choke valve firmly latched in closed position, the breathing action and the unlatching of the choke valve being separately controllable by separate springs.

Other objects will appear from the following description and accompanying claims and drawing. Referring to the drawing:

Figure 1 is a side view showing the air horn of a carburetor, fitted with a choke valve according to my invention.

Figure 2 is an elevation of the parts shown in Figure 1 taken from another angle, with parts broken away and others shown in section.

Figure 3 is a view similar to Figure 1 except that parts have been removed for better illustration of others.

Figure 4 is a plan view of the device shown in Figure 1.

Figure 5 is a detail view showing a rear elevation of the choke valve operating arm.

Figure 6 is a detail sectional view of the choke and poppet valves.

The reference numeral 1 shows an air horn or air inlet member of a carburetor. The carburetor itself forms no part of the invention and is not shown, but it may be noted that my improved air horn is suitable for application to plain tube carburetors generally and particularly to plain tube carburetors of the type shown in the United States patent to George M. Bicknell #1,858,615, issued May 17, 1932, and in patent application #666,118 filed April 14, 1933 by Bicknell and Henning.

The air horn is provided with a butterfly choke valve 2 eccentrically mounted on a shaft 3, which shaft is rotatably mounted in the air horn. The latch member 4 is rotatably mounted on the shaft and an operating lever 5 is fixedly mounted on one end of the shaft outside of the latch member 4. The outer end of the operating shaft 5 is connected to a link 6, the other end of which may be connected to any suitable operating device such as a thermostatic coil spring T. This thermostat may be attached to any part of the engine such as the exhaust manifold, by any suitable means such as the post P. The details of this attachment form no part of the present invention and are not shown.

The latch member 4 is provided with a recess 7 adapted to be engaged by the hook 8 which is rotatably mounted on the post 9 and held in engagement with the latch member 4 and the recess 7 by means of a spring 10, the lower end of which is anchored to the boss 11 on the air horn. The operating arm or lever 5 is a sheet metal stamping having a flat central body portion provided with an upturned flange 12 which serves as a cam to disengage the hook 8 from the recess 7. The operating lever is also provided with an upturned extension 20 which is perforated to receive the hooked end of a coil spring 13, the other end of the spring 13 being similarly hooked into the end of the latch member 4 so as to provide a yielding resistance to the opening of the choke valve under the influence of suction as long as the hook 8 is engaged in the recess 7. In order to maintain the approximate relative positions of the latch 4 with respect to the lever 5, the latch is provided with an upturned flange 14 which extends outwardly between the main portion of the lever 5 and the extension 20 thereof. In order to fix the wide open position of the choke valve 2, the lever 5 is provided with a projection 15 which comes into contact with the boss 11 whenever the choke valve is fully open. In both the latch member 4 and the member 5, the upturned portions are formed in a plane at right angles to the plane of the central portion of the member, so that the member may be completely formed from sheet metal at a single stamping operation.

Any suitable linkage may be provided for interconnecting the choke and throttle valves such as the links 16 and 17. This linkage forms no part of the present invention but is shown and claimed in the above mentioned application of George M. Bicknell and Otto Henning. It may be noted however, that these links are pivoted to the lever 5 at 18 and 19 respectively. In order to provide a primary breathing action during the cranking

period, the choke valve 2 is provided with a poppet valve 21 mounted in the central portion of the valve, the shaft 3 being cut into two parts to permit the mounting of the poppet valve in the middle. The poppet valve is normally held in closed position by a spring 22 of well known construction.

In operation the choke valve is moved to closed position whenever the temperature is low by means of the link 6 and the hook 8 drops into position in the recess 7 of the latch 4, the choke valve being eccentrically mounted on the shaft 3. Suction applied by the engine will intermittently open the valve 21 during the cranking period and will tend to open the valve 2, but at cranking speeds this opening movement will be substantially prevented by the spring 13.

When the speed of the engine increases due to its beginning to run under its own power, the suction becomes strong enough to produce a substantial opening movement of the choke valve 2 against the spring 13, and the cam 12 comes into contact with the hook 8 and lifts it out of the recess 7. The spring 13 will then rotate the latch 4 in a clockwise direction and the end of the hook 8 will ride on the circular cam surface 23 of the latch 4, so that this member will not present any further resistance to opening of the choke valve under the influence of suction or a pull from the link 6. The choke valve is then free to move to fully open position, and when this position has been reached, further movement will be stopped by contact with the member 15 with the anchor bolt 11, and this position will be maintained throughout the normal operation of the engine. After the engine has stopped and cooled off the choke valve is again closed by means of the link 6 and the above described operation is repeated when the engine is again started.

I claim:

1. In a device of the class described, an air horn, an eccentrically mounted butterfly choke therein, the eccentric mounting for said choke comprising a shaft extending outwardly from one side of said air horn, an operating lever mounted on said shaft, a latch member loosely mounted on said shaft, a projection on said latch member adapted to contact with said operating lever to prevent complete rotation of said latch member and operating lever with respect to each other, and a spring connection between said latch member and operating lever.

2. In a device of the class described, an air horn, an eccentrically mounted butterfly choke therein, the eccentric mounting for said choke comprising a shaft extending outwardly from one side of said air horn, an operating lever mounted on said shaft, a latch member loosely mounted on said shaft, a projection of said latch member adapted to contact with said operating lever to prevent complete rotation of said latch member and operating lever with respect to each other, a spring connection between said latch member and operating lever, a boss mounted on said air horn, a hook member pivotally mounted on said boss for engaging said latch, and a cam surface on said operating lever for disengaging said hook from said latch.

3. A latch member for automatic chokes comprising a sheet metal stamping having an opening therein adapted to loosely receive a choke valve shaft, a cam surface on said latch member terminating in a recess, an upturned flange on said latch member having a perforation therein to receive the hooked end of a spring, and another upturned flange on said latch member adapted to serve as a stop.

4. An operating lever for choke valves comprising a sheet metal stamping having a non-circular central opening adapted to receive the end of a choke valve shaft, an inturned flange on said member, said flange having a portion concentric with said opening and another portion eccentric with respect to said opening, said member having an extension of substantial length, said extension being perforated at its outer end to receive an operating member.

5. An operating lever for choke valves comprising a sheet metal stamping, said stamping having a central non-circular opening adapted to receive the end of a choke valve shaft, said member having an extension of substantial length and perforated at its end to receive an operating member, said stamping having a cam surface thereon eccentrically arranged with respect to said opening, said stamping having an upturned lug adapted to serve as a stop member, and a second extension having a perforation therein.

6. In a device of the class described, an air horn having a butterfly choke valve therein, a shaft for said choke valve, said shaft being eccentrically mounted with respect to said air horn, an operating lever fixedly mounted on said shaft, a latch member loosely mounted on said shaft between said operating lever and said air horn, a hook member carried by said air horn for releasably engaging said latch member, said operating member being formed with a cam surface for disengaging said hook from said latch member, and a direct spring connection between said latch member and said operating lever.

7. In a device of the class described, an air horn having a butterfly choke valve therein, a shaft for said choke valve, said shaft being eccentrically mounted with respect to said air horn, an operating lever fixedly mounted on said shaft, a latch member loosely mounted on said shaft between said operating lever and said air horn, a hook member carried by said air horn for releasably engaging said latch member, said operating member being formed with a cam surface for disengaging said hook from said latch member, a spring connection between said latch member and said operating lever, and means in addition to said spring for preventing complete rotation of said latch member with respect to said lever.

8. In a device of the class described, an air horn having a butterfly choke valve therein, a shaft for said choke valve, said shaft being eccentrically mounted with respect to said air horn, an operating lever fixedly mounted on said shaft. a latch member loosely mounted on said shaft between said operating lever and said air horn, a hook member carried by said air horn for releasably engaging said latch member, said operating member being formed with a cam surface for disengaging said hook from said latch member, a spring connection between said latch member and said operating lever, and means in addition to said spring for preventing complete rotation of said latch member with respect to said lever, and a spring held relief valve carried by said choke valve.

9. In a device of the class described, an air horn, a choke valve mounted in said air horn, a shaft for said choke valve eccentrically mounted with respect to said air horn and projecting from one side thereof, an operating lever for said choke valve, a latch member loosely mounted on said choke valve shaft between said operating mem-

ber and said air horn, a hook member pivotally mounted on said air horn and adapted to releasably engage said latch member, an anchor post mounted on said air horn, a spring connecting said anchor post with said hook, and a stop member carried by said operating lever, said stop member being adapted to engage said anchor post when the choke valve has been moved to fully open position to prevent further movement thereof.

10. In a device of the class described, an air horn, a choke valve mounted in said air horn, a shaft for said choke valve eccentrically mounted with respect to said air horn and projecting from one side thereof, an operating lever for said choke valve, a latch member loosely mounted on said choke valve shaft between said operating member and said air horn, a hook member pivotally mounted on said air horn and adapted to releasably engage said latch member, an anchor post mounted on said air horn, a spring connecting said anchor post with said hook, a stop member carried by said operating lever, said stop member being adapted to engage said anchor post when the choke valve has been moved to fully open position to prevent further movement thereof, said operating lever having a cam surface for disengaging said hook from said latch member whenever said choke valve is substantially displaced from closed position.

11. An operating lever for choke valves comprising a sheet metal stamping having a non-circular central opening for receiving the end of a choke valve shaft, an outwardly extending lever portion having a perforation near its end to receive an operating member, an upturned portion at one edge of said stamping forming a cam surface on the periphery thereof, an upturned stop portion and an upturned spring supporting portion, said cam portion, said stop portion and said spring supporting portion all projecting upwardly at an angle of substantially 90° to the main body of said stamping whereby said stamping may be completely formed at a single stamping operation.

12. A latch member for choke valves comprising a sheet metal stamping, said stamping having a substantially flat central portion, a circular opening in said central portion, a part of the periphery of said flat portion forming a cam surface, a recess in the periphery of said stamping at one end of said cam surface, an upturned stop member and an upturned spring supporting member formed integral with said stamping, said stop member and said spring support being turned upwardly in the same direction at an angle of substantially 90° with respect to the said flat central portion, whereby said member may be completely formed by a single stamping operation.

13. In a carburetor, an air horn having an air inlet passageway therein, a choke valve mounted in said passageway, a choke valve shaft eccentrically mounted with respect to said valve and passageway, a relief valve carried by said choke valve, a heat responsive device for operating said shaft, a latching device for yieldably holding said choke valve in closed position, said latching device including a latching member rotatably mounted on said shaft and a hook carried by said air horn and engaging said latching member.

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