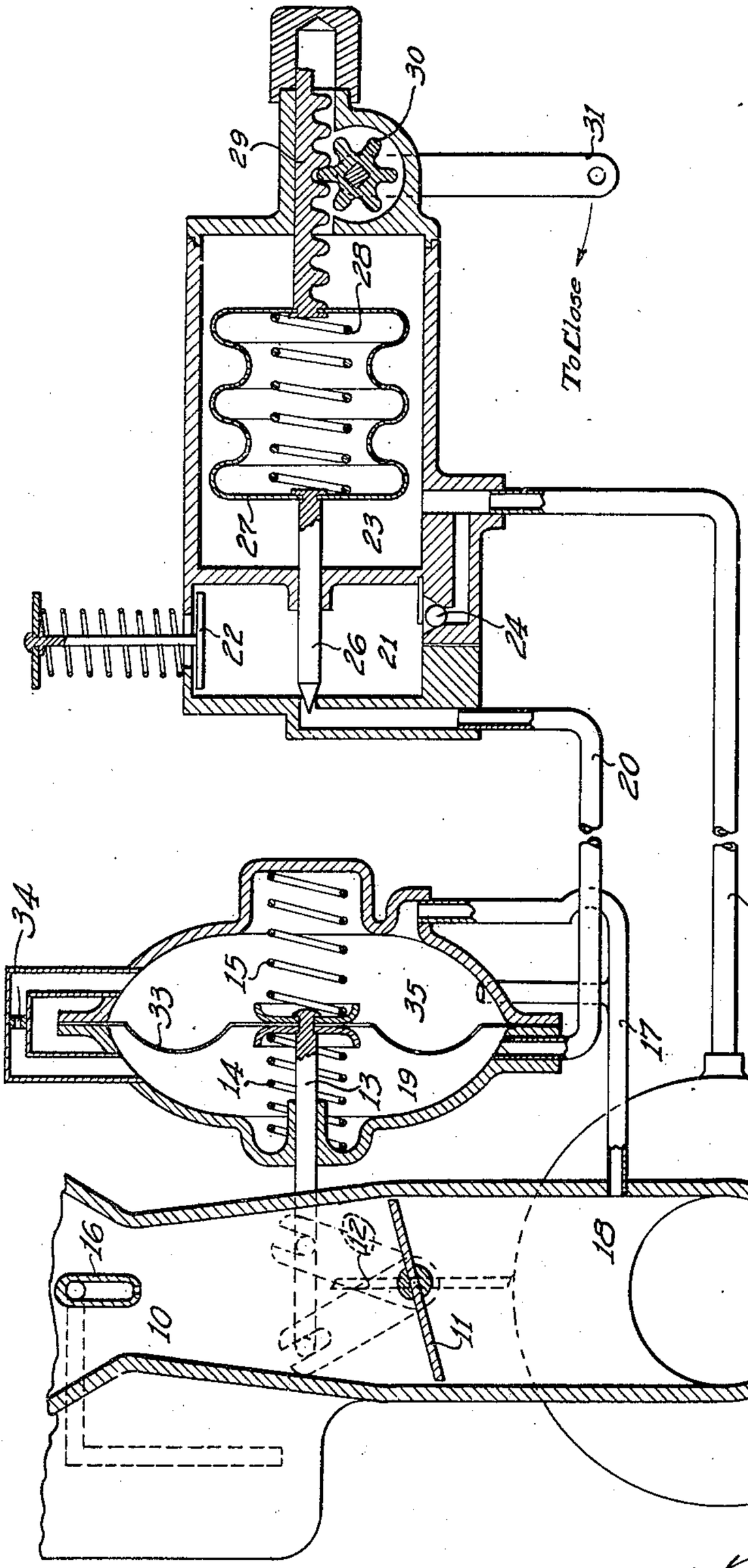
March 7, 1944. S. M. UDALE 2,343,718

THROTTLE CONTROL

Filed July 13, 1942



INVENTOR.

Patented Mar. 7, 1944

2,343,718

UNITED STATES PATENT OFFICE

2,343,718

THROTTLE CONTROL

Stanley M. Udale, Detroit, Mich., assignor to George M. Holley and Earl Holley

Application July 13, 1942, Serial No. 450,825

2 Claims. (Cl. 123—103)

The object of my invention is to open and close the throttle of an airplane engine carburetor by remote control, that is to say, to eliminate all the links that are now in use and substitute two pipes, one connected to the supercharger and delivering air under supercharger pressure to the dash, and the other pipe conveying air under supercharger pressure back to the throttle control mounted on the air entrance. With this arrangement, the pilot merely admits more or less of the supercharger pressure to the control and opens the throttle more or less without any links connecting the cockpit with the engine.

The drawing shows diagrammatically a preferred form of my invention.

In the drawing, 10 is the air entrance in which is shown a nozzle 16 discharging therein. However, it has been usual in recent years to place this nozzle 16 on the engine side of the throttle. 11 is this throttle and 12 is the throttle lever. 13 is the rod controlling the throttle. The rod 13 is pushed to the right by the spring 14 which closes the throttle. The rod 13 is pushed to the left by the spring 15. The spring 15 is located in the chamber 35 connected with the pipe 17 with the air entrance 18 located on the engine side of the throttle 11. The spring 14 is located in the chamber 19 connected with the pipe 20 with the chamber 21, which can communicate with the atmosphere, when the spring loaded valve 22 is opened by atmospheric pressure.

The chamber 21 also communicates with a chamber 23 past a gravity non-return check valve 24. The chamber 23 communicates through a pipe 32 with the supercharger 25. The chamber 23 is thus maintained at the pressure of the supercharger.

The valve 26 controls the opening between the chamber 21 and the pipe 20. The valve 26 is connected to an evacuated bellows 27 inside of which there is a compression spring 28.

The rack 29 is connected with the bellows 27 and is controlled by a pinion 30 which is rotated by the manually controlled lever 31. When this control lever moves to the left clockwise, the rack 29 moves to the right, the valve 26 moves to the right, and the supercharger pressure is admitted through the pipe 32 to the chamber 23 past the check valve 24, into the chamber 21, past the valve 26, through the pipe 20, into the chamber 19. Supercharger pressure is then exerted against a diaphragm 33 which separates the two chambers 35 and 19. The diaphragm 33 is connected to the rod 13, and assuming that the throttle is open, the throttle 11 closes under the influence of the supercharger pressure until the supercharger pressure 25 falls to a point at which the valve 26 is permitted to close, so as to restrict the flow of compressed air into the chamber 19 and to bring the throttle to a stationary position. By this means the supercharger pressure 25 is maintained at the pressure selected by the lever 31. When the supercharger pressure falls below the atmosphere, atmospheric pressure is admitted past the valve 22, so that the servomotor 14—15—33—19—35 thereupon operates with atmospheric pressure instead of with supercharger pressure.

A restricted by-pass 34 connects the two chambers 35 and 19 together for obvious reasons. It would be noted that pipe 7 has two branches. This double connection of pipe 17 with chamber 35 reduces the ever present hazard of freezing. If the lower of the two pipes should freeze, the upper would remain open and the device would remain in an operative condition for a longer period of time before it completely froze up. It is therefore, a device to reduce as much as possible the ever present hazard of freezing.

What I claim is:

1. A throttle control for an airplane engine having an air passage leading to said engine, a throttle valve therein, a throttle lever therefore, a supercharger communicating with said air passage, a chamber, a passage connecting said chamber with the engine side of said throttle, a movable wall in said chamber, a second chamber located on opposite side of movable wall, a passage connecting said second chamber with said supercharger, a valve in said passage, a third chamber in free communication with said supercharger pressure, an evacuated element in said third chamber, spring means for supporting said evacuated chamber against the effect of said supercharger pressure, manually operated means engaging with one end of said evacuated chamber, the other end being connected to said valve, said valve being adapted to be opened by an increase in supercharger pressure and to be closed by an increase in pressure applied by said manually operated means, the opening of said valve being adapted to close said throttle.

2. A throttle control for an internal combustion engine having an air passage leading to said engine, a throttle valve therein, a throttle lever therefor, spring means adapted to open said throttle, supercharger communicating with said air passage, a chamber in free communication with said supercharger pressure, an evacuated element in said chamber second spring means for

supporting said evacuated element against the effect of said supercharger pressure, manually operated means engaging with one of said evacuated element and said supporting spring, fluid pressure means adapted to close said throttle, a valve controlling the flow of said fluid pressure means, said valve being connected to the other end of said evacuated chamber whereby when said second spring is compressed by the effect of said supercharger pressure on said evacuated element, said valve is opened and said throttle is closed by said fluid pressure and when said evacuated element and its supporting spring is compressed by said manually operated means, said valve is closed and said throttle is opened by said first mentioned spring.

STANLEY M. UDALE.