Feb. 17, 1931. A. WRIGHT 1,792,884

CARBURETOR ATTACHMENT

Filed May 5, 1926 2 Sheets-Sheet 1

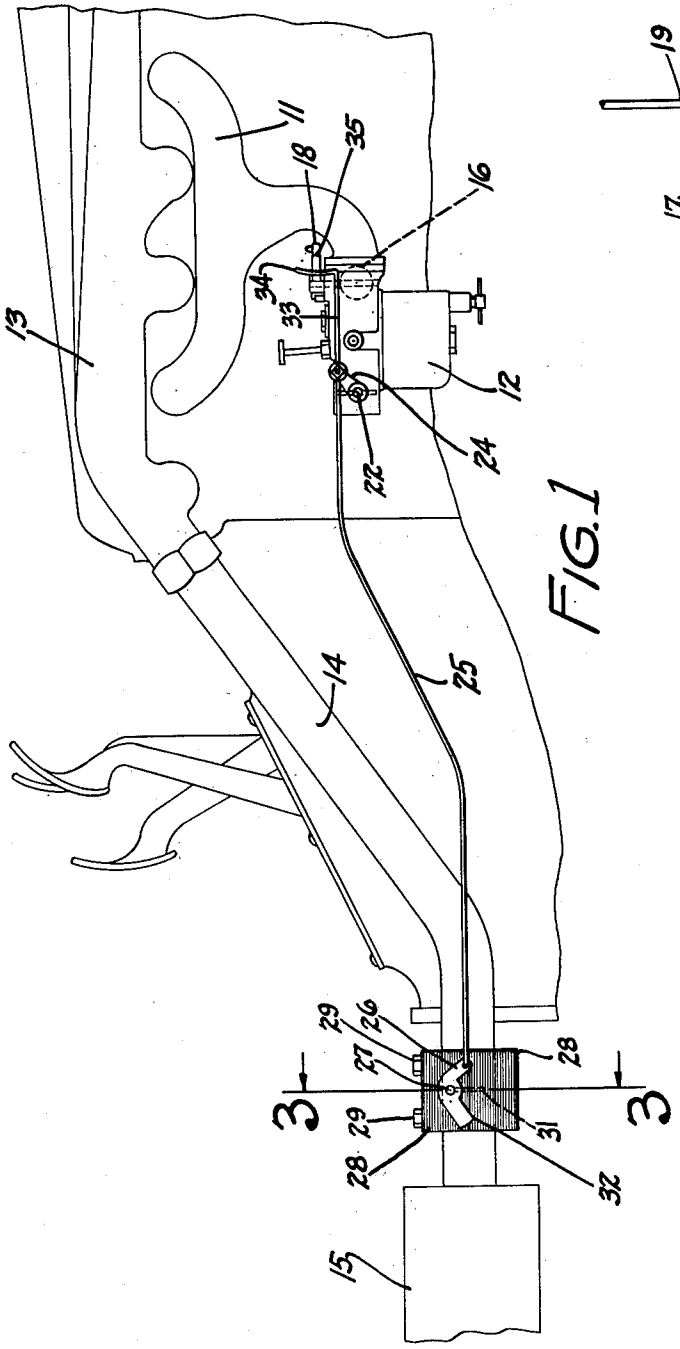


FIG. 1

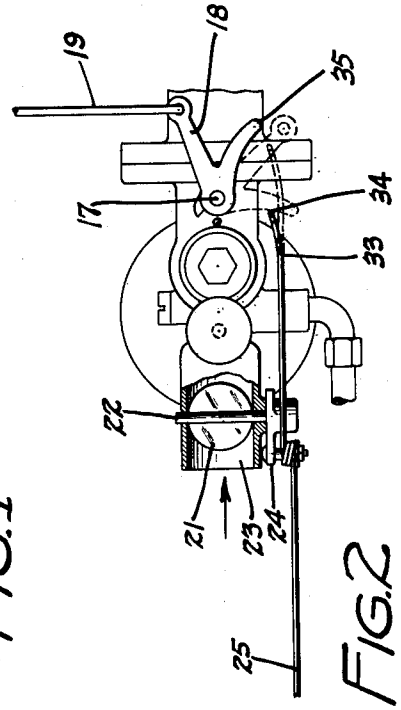


FIG. 2

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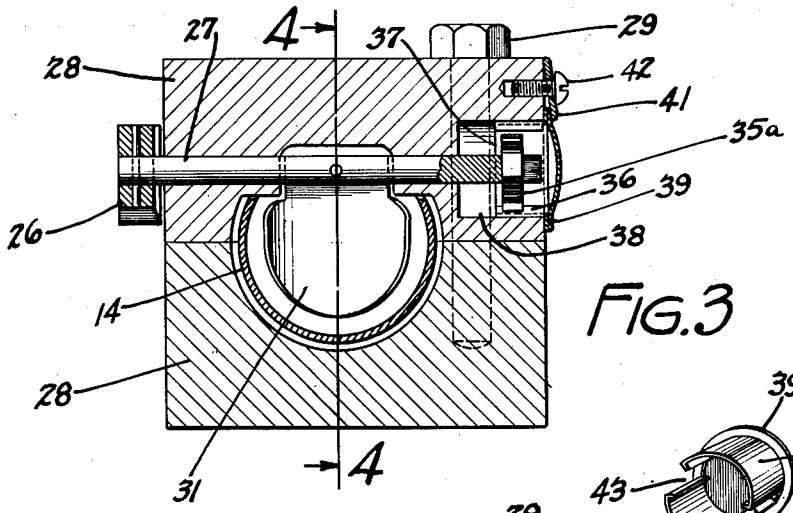


FIG. 3

FIG. 5

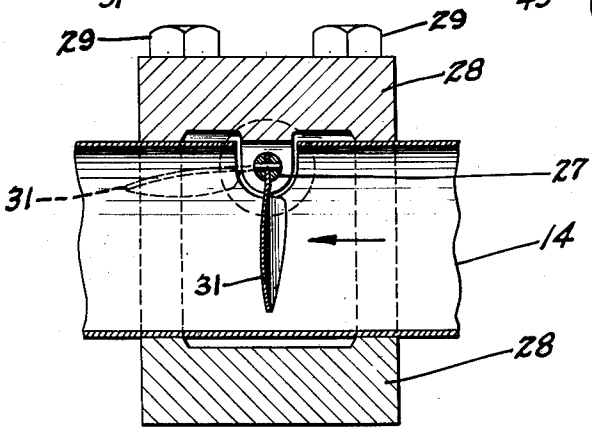


FIG. 4

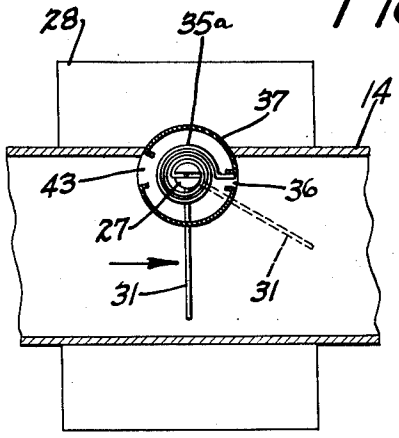


FIG. 6

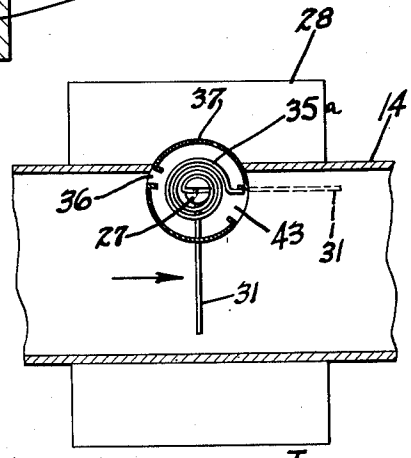


FIG. 7

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UNITED STATES PATENT OFFICE

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CARBURETOR ATTACHMENT

Application filed May 5, 1926. Serial No. 106,976.

This invention relates to an improved carburetor attachment particularly adapted for use in connection with carburetors of ordinary construction, to automatically control the operation of the usual choke valves thereof, when initially starting the engine.

An object of the invention is to provide a carburetor attachment having means mounted within the usual exhaust passage of the engine and operable by the passage of exhaust gases therethrough, to automatically effect the opening of the choke valve upon initial starting of the engine, and to maintain such valve in open position during normal functioning of the engine.

A further object of the invention is to provide a carburetor attachment comprising a member pivotally mounted within the exhaust pipe of the engine, and having a connection with the carburetor choke valve whereby, when the engine is initially started, the exhaust gases being discharged from the engine through the exhaust pipe, will impinge against the pivotally mounted member therein and cause it to be moved into open position with the resultant opening of the choke valve to increase the supply of air to the carburetor, and the member also tending to maintain the choke valve in open position during normal functioning of the engine.

A further object of the invention is to provide such an attachment having a damper mounted in the usual exhaust passage of the engine adapted to obstruct the passage therethrough when the engine is at rest, and said member having a connection with the carburetor choke valve whereby, when the engine is initially started, the exhaust gases therefrom will actuate said damper to cause the choke valve to open, and a thermo-element connected with said damper and responsive to the heat of combustion to permit the damper to be gradually moved into full-opening position, thereby causing the choke valve to be similarly opened, with the resultant automatic regulation of the supply of air to the carburetor.

A further object is to provide a carburetor attachment having means operable by the exhaust of the engine to automatically open the choke valve thereof, and tend to maintain it in open position during normal functioning of the engine, and means also being provided for positively maintaining the choke valve in such open position upon abnormal functioning of the engine as in the event of ignition failure, thereby preventing back pressure in the exhaust pipe of the engine from causing the choke valve to be moved into closing position with the resultant flooding of the carburetor.

A further and more specific object is to provide a damper in the usual exhaust pipe of the engine which is operatively connected with the usual choke valve of the carburetor for simultaneous operation therewith, and the damper being secured to a shaft mounted in a heat-retaining member or block secured to and encircling the exhaust pipe, and a thermo-element connected with the shaft and functioning to normally maintain the damper in closed position, whereby, when the engine is initially started, the opening of the damper by the flow of exhaust gases through the exhaust pipe, will be retarded to gradually open the choke valve to automatically increase the supply of air to the carburetor as the engine heats up, after which the thermo-element will flex and will temporarily maintain the damper and choke valve in open position after temporary interruption of the engine, and will cause the choke valve to automatically be moved into closing position as the engine cools.

A further object is to provide a carburetor attachment of the above type of simple and inexpensive construction, and which may readily be used in connection with the carburetors of internal combustion engines of ordinary construction.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various

changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification,

Figure 1 is a view in side elevation of a portion of an engine showing the invention applied thereto;

Figure 2 is a plan view of the engine carburetor showing the means provided for positively maintaining the choke valve in open position, upon abnormal functioning of the engine;

Figure 3 is an enlarged detail sectional view on the line 3—3 of Figure 1 showing the damper in normal closed position;

Figure 4 is a detailed sectional view on the line 4—4 of Figure 3;

Figure 5 is a perspective view of the thermo-element adjusting member removed from the heat-retaining block;

Figure 6 is a diagrammatic view illustrating the damper and thermo-element in normal inoperative position, and the means provided for adjustably securing one end of the thermo-element to the heat retaining block; and

Figure 7 is a view similar to Figure 6.

In the selected embodiment of the invention here shown, for purposes of disclosure, there is illustrated a portion of an internal combustion engine of ordinary construction, comprising the usual intake manifold 11, carburetor 12, exhaust manifold 13 and exhaust pipe 14, having a connection with the usual muffler 15. The carburetor is provided with the usual throttle valve 16 mounted upon the shaft 17 having an arm 18 secured thereto which has a rod 19 connecting it with the usual means provided for operating the throttle. The usual choke valve 21 is also shown mounted upon the usual shaft 22 interposed in the air intake 23 of the carburetor, as particularly shown in Figure 2.

A feature of this invention resides in the novel means provided for automatically opening the choke valve 21 of the carburetor after the engine has been initially started. This choke valve is adapted to be normally maintained in closed position as shown in Figure 1. An arm 24 is terminally mounted upon the shaft 22 and has a rod 25 connecting it with an arm 26 mounted upon a rock shaft 27 rotatably mounted in the upper portion of a split heat retaining member or block 28, the two halves of which are securely clamped to the exhaust pipe 14 by means of screws or bolts 29. A damper 31 is secured to the rock shaft and is disposed within the exhaust pipe 14 as shown in Figures 3 and 4. This damper is normally held in closed position as shown, tending to obstruct the passage of the exhaust gases through the exhaust pipe when the engine is started. As soon as the engine is started, however, the exhaust gases will impinge against the damper 31 and cause it to be moved into open position, as indicated by the dotted lines in Figure 7. Such opening of the damper 31 will cause the choke 21 to be simultaneously opened as a result of its connection therewith by means of the rod 25. A weight 32 is preferably mounted upon the shaft 27 and is adapted to return the damper 31 to its normal closed position, when the engine ceases to function, as shown in Figures 1, 3 and 4. Other means may be employed, if desired, to return the damper 31 to its normal position such, for instance, as a spring connected either to the arm 26, rod 25 or to the arm 24, it being essential that a means be provided for thus returning the damper to its normal closed position.

Thus it will be noted that when the engine crank shaft is being rotated to initially start the engine, the choke valve 21 will remain in closed position as shown in Figure 1, until the engine begins to fire, after which the pressure built up in the exhaust pipe 14 as a result of such firing, will cause the damper 31 to be moved into open position, thereby automatically causing the choke valve to be opened to increase the supply of air to the carburetor. The choke valve 21 will remain in such open position as long as the engine continues to normally function, as a result of the flow of exhaust gases through the pipe 14 impinging against the damper 31, thereby holding it in open position. As soon as the operation of the engine is interrupted, the weight 32 will tend to move the damper 31, and therefore, the choke valve 21, into closed or normal starting positions, as shown in Figure 1.

Means are provided, however, whereby the choke valve 21 may be positively held in open position, should ignition temporarily fail causing the carburetor to become flooded, as a result of the choke valve being moved into closing position caused by the closing of the damper 31 when the flow of gases through the exhaust pipe is interrupted. Such means preferably consists of an extension 33 being provided upon the rod 25, and having an upright portion 34 provided thereon adapted to be positioned in the path of an arm 35, preferably integrally formed with the throttle arm 18, as shown in Figure 2. When the throttle is in open engine-running position as shown in Figure 2, and the engine is normally functioning, the upright portion 34 of the extension 33 will be positioned as shown in Figure 2. Should ignition fail, however, causing the choke valve to automatically be moved into closing position as shown in Figure 1, then the upright portion 34 of the extension 33 will be moved into the path of the arm 35 as shown in dotted lines in Figure 2 and full lines in Figure 1, in which position it may be engaged by the arm 35 and returned to open position, when the throttle arm 18 is moved into throttle-closing position shown in dotted lines in

Figure 2. Thus should the carburetor accidentally become flooded as a result of ignition failure when attempting to start the engine, the throttle arm 18 may be operated to close the throttle and thereby simultaneously to open the choke valve 21, after which the engine may be turned over a few times to draw the rich mixture out of the intake manifold and discharge it into the exhaust pipe, after which the engine may be started. This extension 33 also functions to prevent back pressure in the exhaust pipe 14 from closing the choke valve 21, should the supply of fuel to the motor suddenly be cut off when the engine is running at a high speed. In some instances it may be desirable to actuate the extension 33 by the usual spark control mechanism of the engine, instead of actuating it by the throttle arm as herein described, the object being to provide means whereby the choke valve may be positively moved into and held in open position.

Another important feature of this invention resides in the means provided for retarding the opening movement of the damper 31 when the engine is initially started. Such means preferably consists of a thermo-element 35^a coiled about one end of the shaft 27 and having one end secured thereto, and its other end mounted in a slot 36 provided in a sleeve 37 adjustably mounted in a bore 38 provided in the upper portion of the heat-retaining block 28, as shown in Figure 3. One end of the sleeve 27 is closed to provide a closure for the bore 38 when the adjusting member 37 is mounted therein as shown in Figure 4. An annular outwardly extending flange 39 is also provided upon the adjusting member 37 adapted to be engaged by a suitable lock device such as a washer 41, whereby it may be locked in adjusted positions by means of a screw 42 mounted in threaded engagement with the upper portion of the block 28. By relatively adjusting the position of the member 37 within the bore 38, the thermo-element 35^a may be put under more or less tension to cause it to retard the opening of the damper 31 to properly regulate the opening of the choke valve 21 as the engine starts. This thermo-element 35^a may be so adjusted that when cold it will be exerting a slight force upon the damper 31 to retain it in closed position. As soon as ignition takes place, however, the exhaust gases discharged from the engine through the exhaust pipe 14, will cause the latter to warm up with the result that the element 35^a will flex to permit the damper 31 to gradually be moved into open position, thereby gradually opening the choke valve to increase the supply of air to the carburetor as the engine warms up. When the exhaust pipe has become thoroughly heated, the thermo-element 35^a will cause the damper 31 to be held in full-open position, as shown by the dotted lines in Figure 4. Should the operation of the engine be temporarily interrupted after the exhaust pipe and the heat retaining block 28 have become thoroughly heated, the damper 31, and therefore, the choke valve 21, will be temporarily held in open position as a result of the coiled or flexed condition of the thermo-element 35^a. As the engine and exhaust pipe gradually cool, the damper 31 will be gradually moved into closing position, caused by the action of the thermo-element 35^a as it cools.

A relatively wider slot or gap 43 is also provided in the adjusting member 37, which, when used, will permit the damper 31 to immediately return to its normal closed position when the operation of the engine is interrupted. Thus it will be noted that by the employment of the adjusting member 37 and the thermo-element 35^a in connection with the damper 31, the opening and closing of the choke valve 21 may be controlled and regulated to meet the requirements of practically all types of internal combustion engines.

In the drawings, I have shown the damper 31 mounted in the heat-retaining block 28 and depending therefrom through an elongated opening provided in the wall of the exhaust pipe 14, and into the path of the exhaust gases flowing therethrough when the engine is functioning. It is to be understood that other means may be provided for supporting the damper such, for instance, as a plug mounted in the wall of the exhaust pipe and having the damper shaft 27 axially mounted therein and extending into the exhaust pipe; the main object being to provide means within the exhaust pipe adapted to be actuated by gaseous flow therethrough to automatically effect the opening and closing of the carburetor choke valve.

I claim as my invention:

1. The combination with an internal combustion engine including an exhaust pipe and a carburetor having a normally closed choke valve, of a damper mounted in said exhaust pipe and having a connection with said choke valve, said damper normally being held in closed position and adapted, upon initial starting of the engine, to be opened by the flow of gaseous fluid through said exhaust pipe, thereby causing said choke valve to be opened to increase the supply of air to said carburetor, and a thermo-element connected with said damper and functioning to retard the initial opening thereof and to temporarily maintain said damper and choke valve in open positions, upon temporary interruption of said engine.

2. The combination with an internal combustion engine including an exhaust pipe and a normally closed carburetor choke valve, of a damper mounted in said exhaust pipe and normally obstructing the passage therethrough, a shaft, a supporting member there-

for secured to said exhaust pipe, means connecting said damper with said choke valve, a coiled thermo-element mounted upon said shaft and having one end secured thereto, and the other end of said element having a connection with an adjusting member mounted for rotation in said shaft-supporting member, whereby the tension in said element may be adjusted to properly regulate the damper opening when said engine is initially started and the exhaust gases therefrom impinge against said damper.

3. The combination with an internal combustion engine including an exhaust pipe and a carburetor having a choke valve adapted to be normally maintained in closed position when said engine is at rest, of a heat-retaining member mounted upor and encircling said exhaust pipe, a rock shaft mounted in said member and having a damper secured thereto and normally positioned to obstruct the passage through said exhaust pipe, means connecting said rock shaft with said choke valve whereby said valve will be opened when said damper is opened by the passage of gaseous fluid through said exhaust pipe, and a thermo-element also mounted upon and secured to said shaft and having one end secured to said heat-retaining member, said element being confined within said member whereby, when the engine is initially started, the heat of the exhaust gases passing through said exhaust pipe, will cause said element to flex and permit the gaseous flow through said pipe to gradually and fully open said damper, thereby effecting a similar opening of said choke valve with the resultant automatic regulation of the supply of air to said carburetor.

4. The combination with an internal combustion engine having an exhaust passage, a throttle, and a normally closed carburetor choke valve, of a device mounted within said exhaust passage and having a connection with said choke valve whereby, when the engine is initially started, the flow of exhaust gases through said passage will actuate said device and open said choke valve and tend to maintain it in open position during normal functioning of the engine, and means actuatable by movement of the throttle to positively maintain said choke valve in open position.

5. The combination with an internal combustion engine having an exhaust passage, a throttle, and a normally closed carburetor choke valve, of a device mounted within said exhaust passage and having a connection with said choke valve whereby, when the engine is initially started, the flow of exhaust gases through said passage will actuate said device and open said choke valve and tend to maintain it in open position during normal functioning of the engine, and means connected with said choke valve and adapted to be actuated by movement of said engine throttle to positively maintain said choke valve in open position when the throttle is closed.

6. The combination with an internal combustion engine having an exhaust pipe and a carburetor, said carburetor having a normally closed choke valve and a throttle arm, of a member pivotally mounted in said exhaust pipe and having a rod connecting it with said choke valve whereby, when said engine is initially started, the exhaust gases passing through said exhaust pipe will actuate said member and open said choke valve and will tend to maintain said valve in open position during normal functioning of the engine, and means on said rod adapted to project into the path of said throttle arm when said choke valve is in closed position, whereby said means may be engaged by said throttle arm to positively maintain said choke valve in open position when the throttle is closed.

In witness whereof, I have hereunto set my hand this 24th day of April, 1926.

ART WRIGHT.