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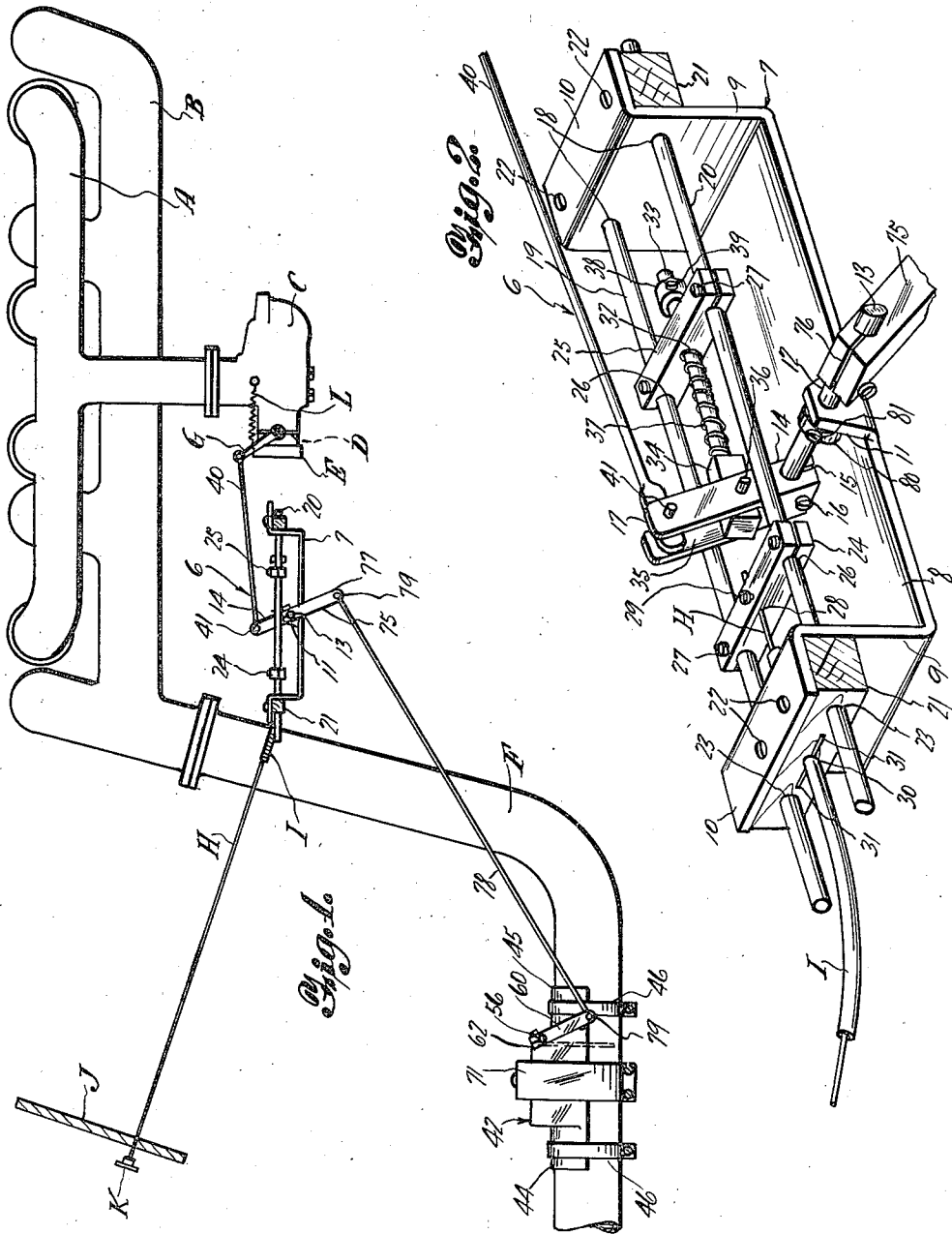
H. H. BOURN

2,052,601

AUTOMATIC CHOKE RELEASE

Filed Aug. 28, 1935

2 Sheets-Sheet 1



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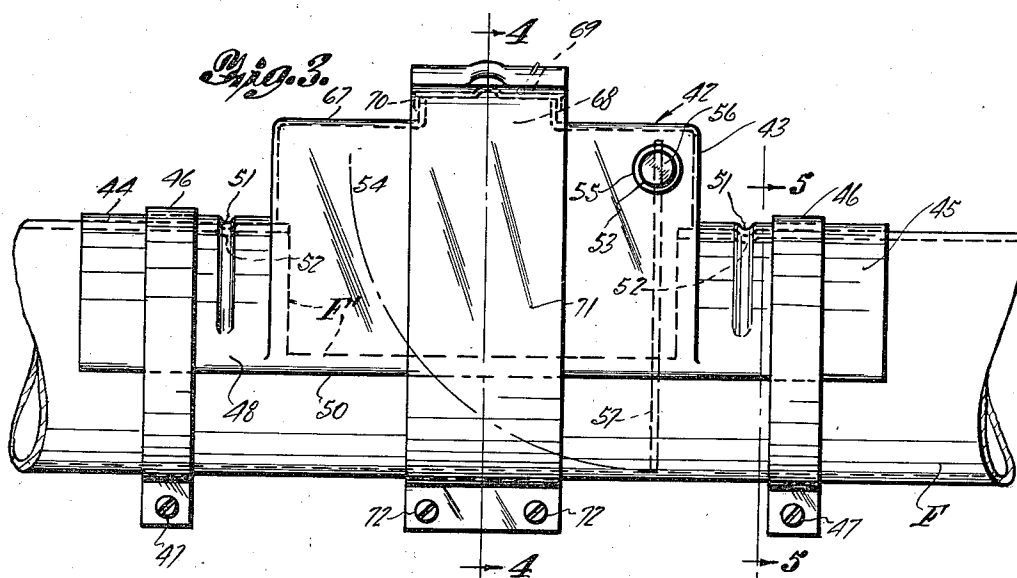
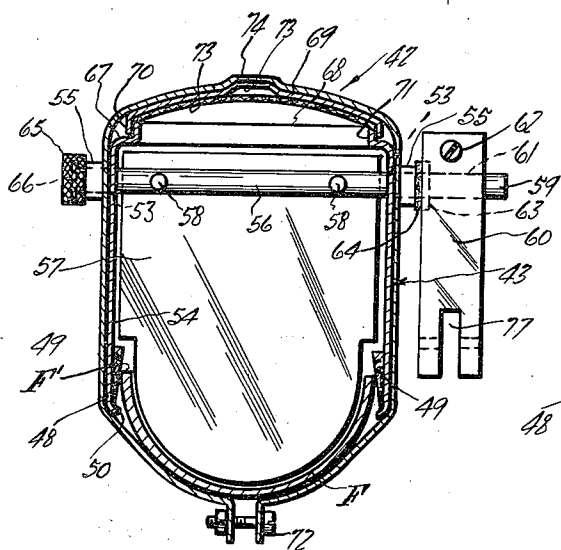
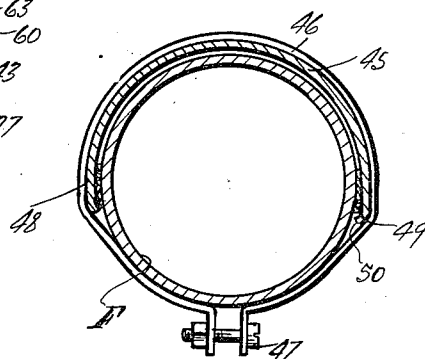
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,052,601

AUTOMATIC CHOKE RELEASE

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4 Claims. (Cl. 123—119)

This invention provides an automatic choke release for internal combustion and automobile engines.

In starting internal combustion and automobile engines it is customary to shut off or almost shut off the air intake to the carburetor so that almost pure gasoline enters the cylinders for more ready ignition. This is commonly called choking the engine and is customarily carried out by a butterfly valve in the air intake controlled from the dash (in the automobile) by a choke rod. However, it is injurious to carry this action too far in that the cylinders will become flooded with gasoline and the engine will be well nigh impossible to start.

With the above in view it is the prime object of my invention to provide a means for automatically releasing the choke and opening the choke valve as soon as the engine starts so that the aforesaid flooding cannot occur.

Another object is to provide an automatic choke release which will not interfere in any way with the normal manual choking of the engine but which as soon as the engine starts and sets up a pressure in the exhaust will automatically open the choke valve.

Another object is to provide a device of this kind comprising a choke valve in the air intake of the engine, a choke valve operating device comprising a lever connected to the choke, slide rods connected to the usual manual choke control wire and resiliently connected to the lever whereby the normal movement of the choke control wire will swing said lever and close the choke valve to choke the engine, and an exhaust pressure controlled valve connected to the said lever whereby the same will be swung to position opening the choke valve as soon as an exhaust pressure is set up in the exhaust pipe by the engine starting.

With these and other objects in view the invention resides in the novel construction and arrangement of parts as hereinafter fully set forth and claimed, reference being had to the accompany drawings wherein:

Figure 1 is a side elevation of my invention as in position for use upon the intake and exhaust elements of an engine and showing the connection of the usual manual choke control wire.

Figure 2 is an enlarged perspective view of the choke valve operating mechanism alone.

Figure 3 is an enlarged side elevation of the control valve housing and associated parts.

Figure 4 is a cross section along the line 4—4 in Figure 3.

Figure 5 is a cross section along the line 5—5 in Figure 3.

Referring now with more particularity to the drawings the reference character A designates the intake manifold, B the exhaust manifold, C the carburetor, D the choke valve in the air intake pipe E, and F the exhaust pipe, all being the conventional parts of an internal combustion engine not shown. The choke valve D is provided with a crank G and this crank is normally attached to a manual choke wire H which leads back through tubing I to the instrument board J where a button K is affixed so that by pulling out on this button the valve D is closed (the position shown). Normally a spring as shown at L holds the choke D in open position.

My invention comprises a choke valve operating mechanism or assembly designated generally at 6 and made up of a frame 7 formed from heavy sheet metal to provide an elongated base 8 and upturned ends 9 terminating at their upper ends in out-thrust lips 10. Bearing ears 11 are turned up from the lateral margins of the base 8 near the center thereof and have apertures 12 through which a shaft 13 is journaled and extended across and above the upper face of said base. A lever 14 is apertured at one end at 15 to receive the shaft and is split and provided with a clamping screw 16 by which the lever is rigidly anchored to the shaft at a medial point between the ears 11 extending upwardly at its free end 17 from the base 8.

The ends 9 each have a pair of spaced slide rod apertures 18 near their upper extremities and spaced parallel slide rods 19 and 20 are slidably mounted and project at each end through these apertures. Bearing blocks 21 of wood or other suitable material are secured by screws 22 beneath the aforesaid lips 10 and have apertures 23 passing and supporting the ends of the slide rods 19 and 20. Intermediate their ends the slide rods 19 and 20 are joined by spaced cross bars 24 and 25 apertured at 26 near their ends to take the rods and split and provided with clamp screws 27 to secure them solidly to the rods. The cross bars are set far enough apart to clear both the ends 9 a substantial distance and to allow plenty of play for the lever 14. One cross bar, as 24, (the one remote from the choke valve D when in use) has a central aperture 28 in which the end of the choke control wire H is mounted and secured by a set screw 29 and the adjacent end and bearing block 21 are centrally apertured at 30 to pass this wire H and its surrounding guide tubing I. The said block 21

is slotted at 31 adjacent the aperture 30 and the screws 22 compress the block on the tubing I to anchor it in place.

The other cross bar 25 also has a central aperture 32 through which a connecting rod 33 is slidably mounted, the said rod having a head 34 at one end which is placed in a slot or fork 35 in the aforesaid free end 17 of the lever 14 where it is pivoted by a pin 36. An expansion coil spring 37 is coiled around the connecting rod 33 and braced between the head 34 and the cross bar 24 and normally urges the said cross bar forwardly away from the lever 14. A stop collar 38 secured by a set screw 39 to the extended end of the connecting rod limits this movement as it strikes the said cross bar 25. An operating rod 40 is pivoted at 41 in the fork 35 in the lever 14 above the said connecting rod head 34 and extends to the operating crank G of the choke valve D where it is pivotally attached as shown.

The operating mechanism as thus far described is mounted in any suitable manner on the engine preferably at the rear of the carburetor C but in any position so that with the operating rod 40 connected as described the normal position of the parts will hold the choke valve D in open or running position. Then a pull on the choke control wire H will pull the slide rods 19 and 20 sliding them through their mounting blocks and apertures and compressing spring 37 until the pressure on the lever 14 swings it to the rear and closes the choke valve D to choke the engine in usual manner. It will thus be evident that this device interferes in no way with the normal manual manipulation of the choke by its control wire.

An exhaust control valve assembly is provided comprising a housing 42 of elongated form of inverted box-shaped form at its center section 43 and with reduced ends 44 and 45 arcuate or semi-circular in cross section as shown. The exhaust pipe F has an upper half portion sawed or cut out as shown at F' in Figures 3 and 4 and the housing 42 is set over the pipe with the center section 43 resting over this cut out and the ends 44 and 45 fitting closely around the pipe at each end of the cut out. Annular parted clamp bands 46 are then placed over the ends 44 and 45 and the pipe F and the clamp screws 47 drawn tight rigidly mounting the housing 42 on the pipe. It will be noted that the lower side margins 48 of the housing depend down past the lower edges of the cut out or opening F' and long strip gaskets 49 are placed between these margins and the pipe to prevent the escape of gases from the pipe. The extremities of the said lower margins 48 of the housing are bent inward somewhat as shown at 50 to aid in holding the gaskets 49 in place. As a further aid in sealing the connection between the housing and exhaust pipe the ends 44 and 45 may have ribs 51 formed inwardly from side to side and the pipe F may have grooves 52 punched in to fit.

The squared enlarged center section 43 of the housing has bearing apertures 53 formed near one end and upper corners of its sides 54 in horizontal alignment and tubular extensions 55 are extended out a short distance around these apertures. A shaft 56 is journaled through these apertures 53 and a valve blade 57 is riveted or otherwise secured at 58 to the shaft within the housing. This blade 57 is flat and of such shape and size that it may swing downward into the pipe F or upward clear of the pipe into the housing 42 and in the former position will substantially close all passage through the pipe as shown.

One end of the shaft 56 is extended as at 59 and a lever 60 is secured by its aperture 61 and split clamping arrangement 62 thereon. The face of the lever 60 adjacent the extension sleeve 55 on that side has a recess 63 receiving an asbestos packing gasket 64 to prevent the escape of gas around the shaft at that point. A packing cap or gland 65 is threaded over the sleeve 55 on the other side and presses another asbestos gasket 66 over the other end of the shaft for the same purpose.

The top 67 of the center section 43 of the housing has an opening 68 the margins of which are bent or extended upwardly and a cap 69 is provided with downwardly turned margins 70 to lie over this opening. A center clamp band 71 is placed over the pipe F, housing 42 and this cap 69 and the screws 72 drawn tight to press the cap to its seat. An asbestos gasket 73 may be placed within the cap to seal the joint and the cap may have a boss 73 engaging a socket 74 in the band 71 to locate the cap and band.

In use the housing 42 is mounted as described on the exhaust pipe F below and to the rear of the choke operating unit previously described and with the side of the housing at which the shaft 56 is mounted turned to the front or toward the engine. A lever 75 is secured by its apertured parted clamping end 76 to the extended end of the aforesaid shaft 13 and the forked ends 77 of this lever and the lever 60 are pivotally connected by a control rod 78 pivotally mounted at its ends at 79 to the said lever as shown. Axial displacement of the shaft 13 may be prevented by a bearing collar 80 secured by a set screw 81 to the shaft within the adjacent bearing ear 11.

With the parts arranged as shown and described the aforesaid swinging of the lever 14 back to close the choke valve D will swing the valve blade 57 down into the exhaust pipe F as shown in Figure 1. Now as soon as the engine starts the pressure of the exhaust gas in the pipe will swing the valve blade 57 back up into the housing clear of the pipe and the resulting movement of the connected levers 60 and 75 will swing the operating lever 14 back forwardly and will open the choke valve D holding the same in this position and returning the parts to their initial positions as will be understood. Since this action is automatic and under control of the starting of the engine excess choking will be entirely prevented.

While I have herein set forth a certain preferred embodiment of my invention, it is understood that I may vary from the same in minor structural details, so as best to construct a practical device for the purpose intended, not departing from the spirit of the invention and within the scope of the appended claims.

I claim:

1. In combination with the choke valve, manual choke control wire and exhaust pipe of an automobile, a choke valve operating mechanism comprising a frame, an operating lever pivoted in the frame and connected to the choke valve, a slide rod assembly slidably mounted in the frame and resiliently connected to the lever, the said slide rod assembly being also connected to the manual choke control wire whereby manipulation of this wire will operate the lever to close the said choke valve, and a control valve mechanism attached to the exhaust pipe and to the said operating lever whereby pressure in the exhaust pipe will open the choke valve.

2. In combination with the choke valve, choke valve control wire and exhaust pipe of an auto-

mobile engine, a choke valve operating mechanism comprising a frame, an operating lever pivotally mounted in the frame and connected to the choke valve, slide rods slidably mounted in the frame at each side of the lever, cross bars secured to the slide rods, the said choke valve control wire being secured to one cross bar, the other cross bar having an aperture, a connecting rod pivotally connected to the lever and slidably mounted through the said aperture, an expansion coil spring coiled over the connecting rod and braced between the lever and the cross bar, a stop collar at the end of the connecting rod on the side of the cross bar remote from the spring, and a control assembly mounted on the exhaust pipe and controlled by the pressure therein to actuate the said operating lever and open the choke valve.

3. In combination with the choke valve, choke valve control wire and exhaust pipe of an automobile engine, a choke valve operating mechanism comprising a frame, an operating lever pivotally mounted in the frame and connected to the choke valve, slide rods slidably mounted in the frame at each side of the lever, cross bars secured to the slide rods, the said choke valve control wire being secured to one cross bar, the other cross bar having an aperture, a connecting rod pivotally connected to the lever and slidably mounted through the said aperture, an expansion coil spring coiled over the connecting rod and braced between the lever and the cross bar, a stop collar at the end of the connecting rod on the side of the cross bar remote from the spring, a housing mounted on the exhaust pipe, the said pipe having an opening into the said housing, a valve

blade pivotally mounted in the housing and adapted to swing into the exhaust pipe through the said opening therein, and means connecting the said valve blade and operating lever whereby the choke valve will be opened by exhaust pressure in the exhaust pipe.

4. In combination with the choke valve, choke valve control wire and exhaust pipe of an automobile engine, a choke valve operating mechanism comprising a frame, an operating lever pivotally mounted in the frame and connected to the choke valve, slide rods slidably mounted in the frame at each side of the lever, cross bars secured to the slide rods, the said choke valve control wire being secured to one cross bar, the other cross bar having an aperture, a connecting rod pivotally connected to the lever and slidably mounted through the said aperture, an expansion coil spring coiled over the connecting rod and braced between the lever and the cross bar, a stop collar at the end of the connecting rod on the side of the cross bar remote from the spring, a housing comprising a square inverted box-shaped central section and arcuate ends seated over the exhaust pipe, clamps around the said ends and the pipe, the said pipe having an opening communicating with the said central section of the housing, a shaft journaled through the center section of the housing adjacent the frontal end thereof, a valve blade secured to the shaft within the housing, a lever secured to the shaft outside the housing, a lever attached to the said operating lever of the valve operating mechanism, and a link connecting the said levers.

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