Sept. 29, 1964 R. W. McSEVENY 3,151,189

CARBURETOR

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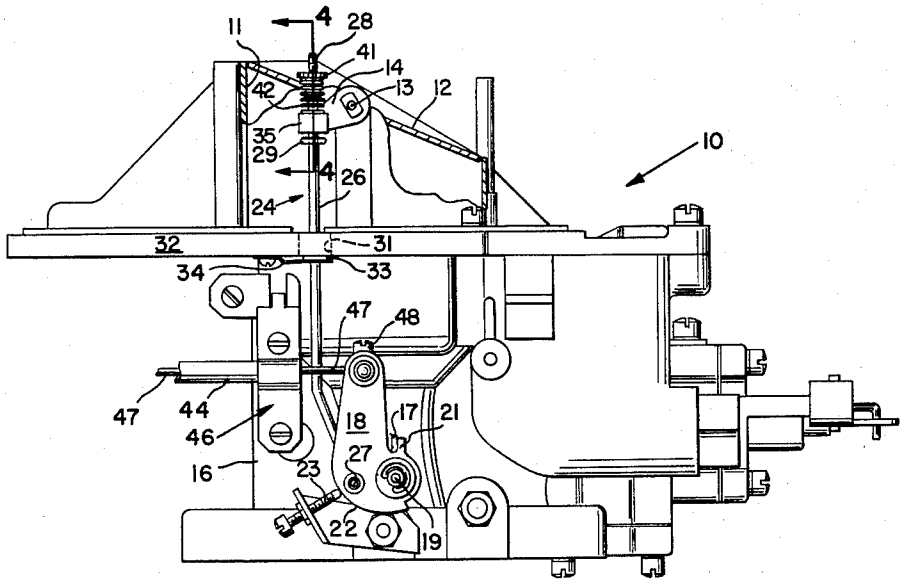


FIG. 1

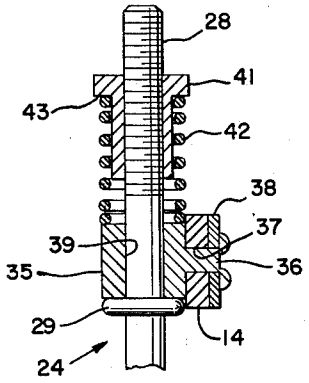


FIG. 4

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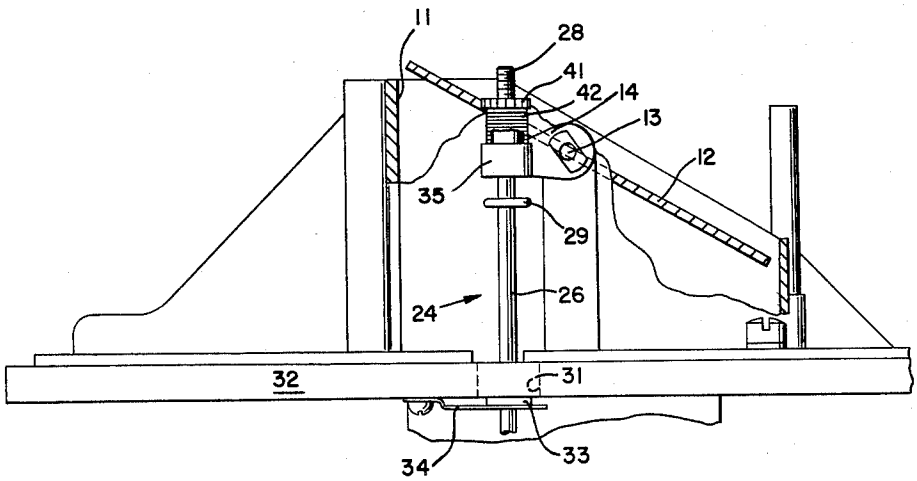


FIG. 2

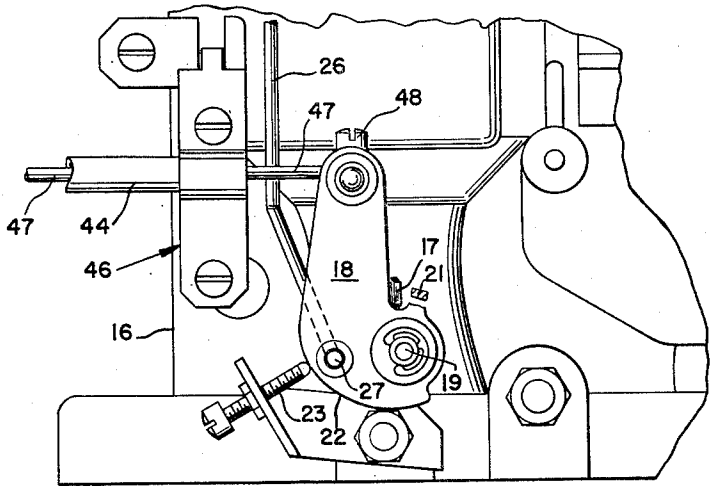


FIG. 3

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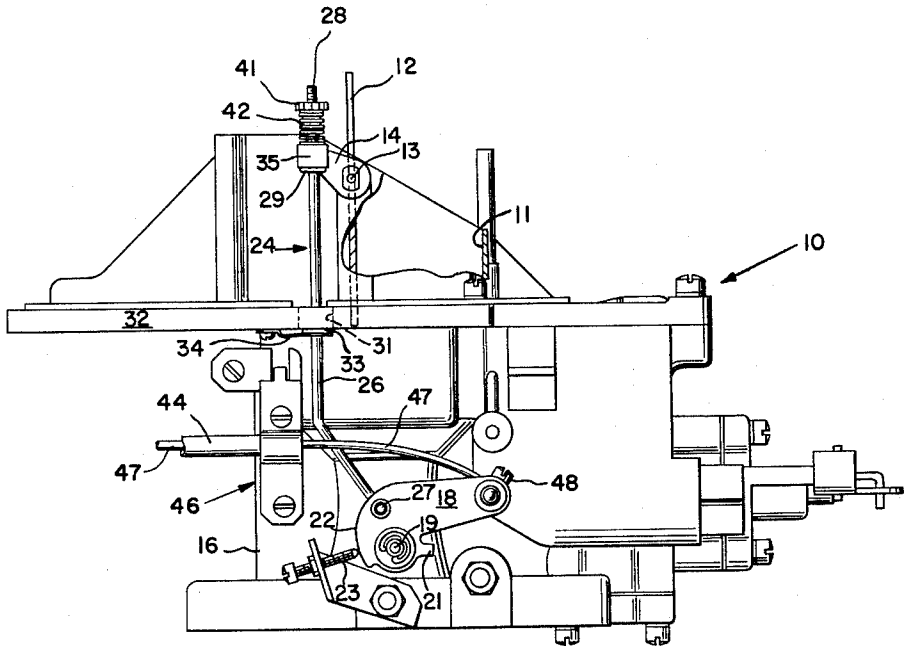


FIG. 5

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United States Patent Office 3,151,189
Patented Sept. 29, 1964

3,151,189

CARBURETOR

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Filed Sept. 11, 1961, Ser. No. 137,309
6 Claims. (Cl. 261—52)

This invention relates to the art of internal combustion engine carburetion and more specifically to an improved choke control mechanism.

When starting a cold engine, it is desirable to have the choke plate in the fully closed position. While in this position, an enriched mixture is obtained for the initial cranking and starting of the internal combustion engine. Upon starting, however, it is necessary to admit additional air in the induction system to prevent overchoking and its concomitant difficulties.

Various means have been devised to obtain this necessary additional air. Among others, for example, it is common practice in the automatic choke art to provide a spring biased hinged door in the choke plate. A door of this construction and design is shown in U.S. Letters Patent 2,862,488, issued to George Nastas on December 2, 1958. Doors of this type are also common in the manual choke art. A common problem with chokes embodying this type of design, however, is the difficulty in accurately setting and maintaining the required spring loading.

This invention contemplates an automatic device for opening the choke plate a predetermined amount to admit additional air required by an internal combustion engine after starting. Furthermore, the device may be employed with either an automatic choke or a manual choke.

In the manual choke art, an attempt has been made to provide means for opening the choke plate. This arrangement is shown in U.S. Letters Patent 1,881,560 issued in the name of Heitger on October 11, 1932. Heitger, however, permits this opening to be made only after the choke plate has been manually moved from a fully closed position to a partially open position.

It is one of the objects of this invention to provide a choke which is fully closed during the engine cranking and is partially opened automatically upon starting for admitting additional air.

It is a further object of this invention to provide a choke device which when the choke plate is set for a cold start fully closed position will open upon starting a predetermined amount to admit additional air in response to the induction requirements of the internal combustion engine.

Still a further object of this invention is to provide a manual choke employing calibrated means for obtaining a predetermined opening of the choke plate from a fully closed position upon starting.

Still a further object of this invention is to provide a choke plate which is spring loaded when positioned in the fully closed position and which upon starting will open against the spring load a calibrated distance to permit the engine to accelerate to a fast idle.

Still a further object is to provide choke means that are simple in design, dependable in operation and easy to manufacture and adjust.

Other objects and advantages of this invention will become more apparent when considered in connection with the accompanying drawings, wherein:

FIGURE 1 is a side elevational view, partly in section, of a carburetor embodying a manual choke device made in accordance with this invention and showing the choke plate and the automatic choke plate opening means positioned in the choke plate fully closed position during the cranking of the internal combustion engine, and

FIGURE 2 is an enlarged fragmentary showing of the choke plate and automatic choke plate opening means shown in FIGURE 1 and showing the position of the choke plate and automatic choke plate opening means in the choke plate partially open position assumed after the internal combustion engine has started, and

FIGURE 3 is an enlarged fragmentary view of the carburetor which shows the fast idle cam position when the choke plate has been positioned to the fully closed position and prior to rotating the fast idle cam to strike the stop and preload the choke plate, and

FIGURE 4 is a cross sectional view taken on the plane indicated by the line 4—4 of FIGURE 1 but showing the automatic choke plate opening means in the position assumed when the choke plate is fully closed and the fast idle cam is in the position shown in FIGURE 3, and

FIGURE 5 is a side elevational view, partly in section, similar to FIGURE 1 and showing the choke plate after being manually adjusted to the fully open position of a thoroughly warmed internal combustion engine.

Referring now to the drawings and in particular FIGURE 1, a carburetor embodying a manual choke is indicated generally at **10**. Carburetor **10** is provided with an air induction passage **11** through which air is drawn for mixing with the fuel in the carburetor in a well known manner. Choking means in the form of an over-center choke plate **12** is positioned in the air induction passage **11**. Choke plate **12** rotates on shaft **13** which extends through the air induction passage **11**. A choke plate arm **14** is secured to the shaft exteriorly of the air induction passage **11**.

The carburetor body **16** is provided with a cast stop **17**. A fast idle cam **18** is pivotally mounted upon shaft **19** which is secured to the carburetor body **16**. Fast idle cam **18** has an inwardly bent tang **21** that engages the stop **17** only after the choke plate **12** has been manually positioned in the fully closed position as shown in FIGURE 1. Fast idle cam **18** is also provided with a cam portion **22** that is engaged by the fast idle adjusting screw **23** in the conventional manner. The fast idle adjusting screw **23** is part of the conventional throttle operating mechanism which is not shown.

The fast idle cam **18** is connected to the choke plate arm **14** by a choke plate rod assembly indicated generally at **24**. Choke plate rod assembly **24** is comprised of a choke plate rod **26** that is provided with an outwardly bent end portion **27** which is pivotally mounted to the fast idle cam **18** eccentrically of and parallel to the shaft **19**. The opposite end of the choke plate rod **26** is provided with a threaded portion **28**. An upset stop **29** is disposed adjacent to the threaded portion **28**.

In the construction shown, the choke plate rod **26** extends through an opening **31** in the air cleaner mounting flange **32**. An apertured felt seal assembly **33** is movably mounted in a shelf **34** beneath the air cleaner mounted flange **32** for sealing the choke plate rod **26** in the opening **31**.

Referring now to the automatic choke plate opening means which is shown in detail in FIGURE 4, choke plate arm **14** is provided with a guide member **35** which has an axle-like portion **36** that extends through the aperture **37** in the choke plate arm **14**. A washer **38** is secured to the axle-like portion **36** by peening over the end of the axle-like portion **36**. Guide member **35** therefore is free to rotate in the choke plate arm **14**.

After passing through the air cleaner mounting flange **32** and associated structure, choke plate rod **26** extends through the bore **39** in the guide member **35**. An ad-

justable nut 41 is secured to the threaded portion 28 of the choke plate rod 26 in spaced apart relationship to the guide 35. A spring 42 is disposed between shoulder 43 of the nut 41 and the guide member 35. The spring 42 is preloaded by simply turning the nut 41 on the threaded portion 28. Nut 41 may then be staked or otherwise secured to the threaded portion 28 to avoid relative movement between the adjusting nut 41 and the choke plate rod 26.

The manual adjustment of the choke plate 12 is accomplished through a "Bowden wire" cable. The sheath 44 of the cable is secured by conventional screw and bracket means 46 to the carburetor body 16 while the wire 47 is secured to nut 48 pivotally mounted on the fast idle cam 18.

In actual operation and starting with a cold engine, the operator simply pulls the wire 47. Movement of the wire 47 results in the counterclockwise movement of the fast idle cam 18 about its shaft 19. Choke plate rod 26 is moved downwardly. Because the spring 42 urges the guide member 35 against the upset stop 29, the choke plate arm 14 is also moved counterclockwise. The movement of the choke plate arm 14 will continue until the choke plate 12 is fully closed. The relative position of the choke plate rod 26, upset stop 29, guide 35, spring 42, adjusting nut 41 and the fast idle cam 18 and associated mechanism is shown in FIGURES 3 and 4.

Continued pull, however, on the wire 47 results in the continued rotative movement of the fast idle cam 18. This movement continues until the tang 21 strikes the cast stop 17. This additional movement results in the predetermined preloading of the spring 42 by compression. The upset stop 29 has also moved away from the guide member 35. This position is shown in FIGURE 1 of the drawings. During the cranking operation of the engine, a choke plate 12 remains fully closed and an enriched fuel mixture is supplied to the induction system of the internal combustion engine.

Upon starting the engine there is a pressure drop across the choke plate 12 created by the internal combustion engine. The choke plate 12 will open as a result by compressing the spring 42. Choke plate 12 will continue to open until its movement is arrested by the guide member 35 contacting the underside of the adjusting nut 41. A sufficient air flow will then pass through the air induction passage to satisfy internal combustion engine breathing requirements. An increase in the engine idle will also take place. This position of the choke plate 12 is shown in FIGURE 2.

As the engine continues to warm up, the operator may continue to manually adjust the position of the choke plate until it has been moved to the fully open position shown in FIGURE 5.

Although this construction has been shown and illustrated with respect to a manual choke, it is, of course, possible to apply it to an automatic choke construction. It is further contemplated that the spring loading and guide member arrangement that is attached to the choke plate arm may be attached to the fast idle cam 18.

It will be understood that the invention is not to be limited to the exact construction shown and described but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A carburetor for an internal combustion engine comprising an induction passage, a choke valve for controlling the passage of air through said induction passage, said choke valve being unbalanced for movement toward an open position in response to an increase in suction in said induction passage posterior to said choke valve, choke valve actuating means supported for movement by said carburetor, guide means affixed for movement with said choke valve, said guide means being supported for movement upon said choke valve actuating means, first stop means adjustably secured to said choke valve actuating means on one side of said guide means, second stop means affixed to said choke valve actuating means on the other side of said guide means, spring means interposed between said first stop means and said guide means for urging said guide means toward said second stop means and for resisting suction inducted opening of said choke valve, said second stop means being engageable with said guide means upon movement of said choke valve actuating means in a first direction for moving said choke valve from a closed to an opened position, said actuating means being movable in a second direction through two ranges of movement, said first stop means and said spring means acting upon said choke valve during the first range of movement of said actuating means in said second direction to move said choke valve from an opened to a fully closed position, said guide means being held in a fixed position by the closed choke valve during the second range of movement of said actuating means in said second direction, said first stop means being movable with said actuating means during the second range of movement for preloading said spring means, and third stop means for limiting the degree of movement of said actuating means in said second range for fixing the preload upon said spring means.

2. A carburetor as defined by claim 1 wherein the choke valve actuating means comprises an actuating rod and the guide means is slidable upon said actuating rod.

3. A carburetor as defined by claim 2 wherein the spring means comprises a coil spring encircling the actuating rod and interposed between the first stop means and the guide means.

4. A carburetor as defined by claim 1 wherein a fast idle cam is operatively connected for simultaneous movement with choke valve actuating means, a carburetor throttle valve linkage, said fast idle cam being engageable with said carburetor throttle valve linkage for providing an increased engine idle speed when the choke valve is closed.

5. A carburetor as defined by claim 4 wherein manually operable means are connected to the fast idle cam and thereby to the choke valve actuating means for positioning the choke valve and said fast idle cam.

6. A carburetor as defined by claim 5 wherein the third stop means is engageable with the fast idle cam.

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