United States Patent

Glover et al.

[15] **3,640,253**

[45] **Feb. 8, 1972**

[54] CARBURETOR THROTTLE CONTROL ASSEMBLY

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[22] Filed: **May 1, 1970**

[21] Appl. No.: **33,583**

[30] **Foreign Application Priority Data**

Mar. 31, 1970 Australia 13,181/70

[52] **U.S. Cl.** ..... **123/103 B**

[51] **Int. Cl.** **F02d 31/00**

[58] **Field of Search** ..... 123/103 B, 119, 179 A, 179 B, 123/179 BG

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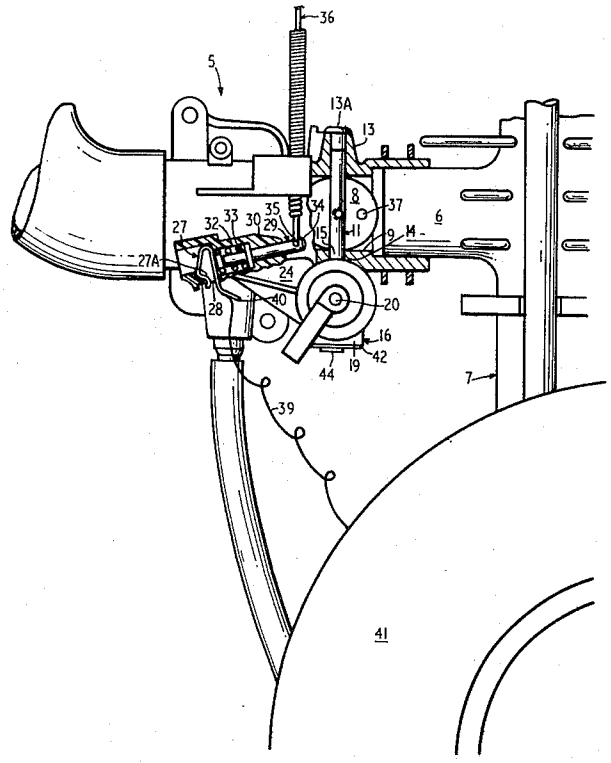
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[57] **ABSTRACT**

A single-ended control arrangement for the butterfly spindle in a carburetor, in which a speed governor shaft is geared to one end of the spindle while the other end is sealed off, and an accelerator element is connected through a spring to the shaft to influence together with a governor vane the rotation of the shaft.

5 Claims, 4 Drawing Figures



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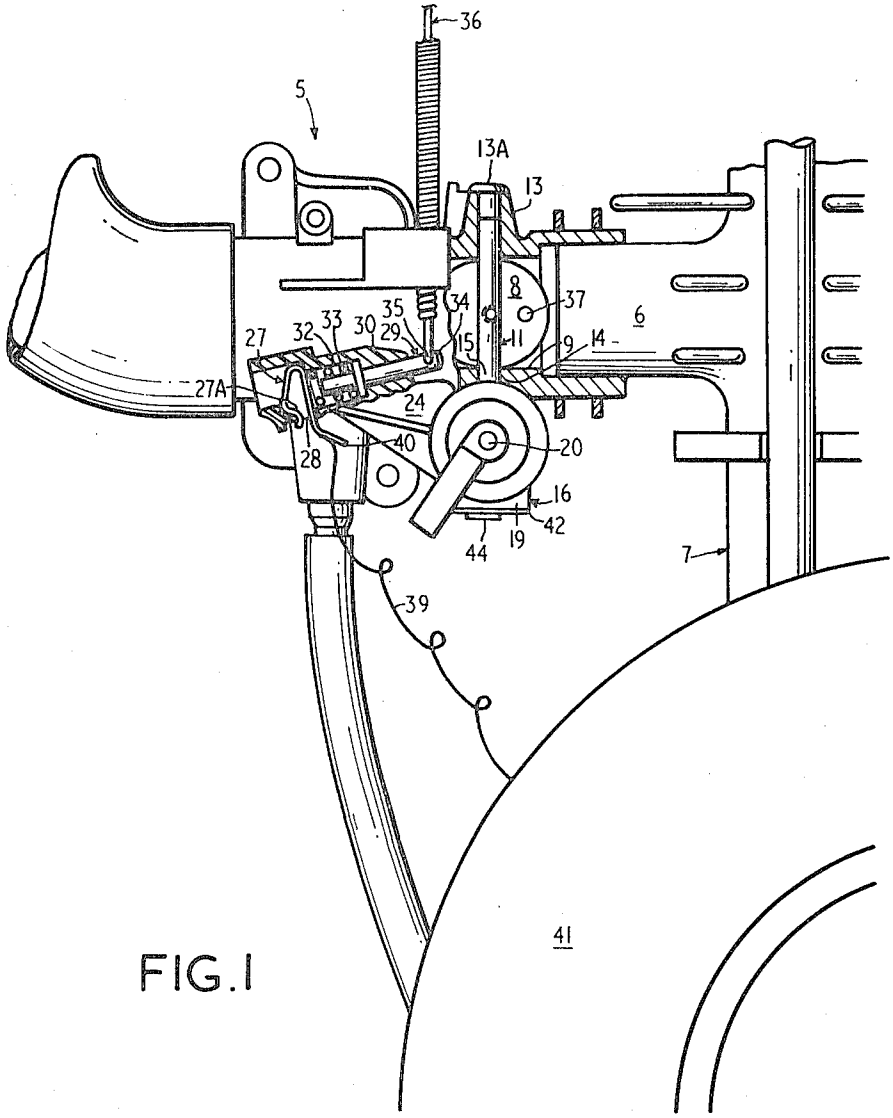


FIG.1

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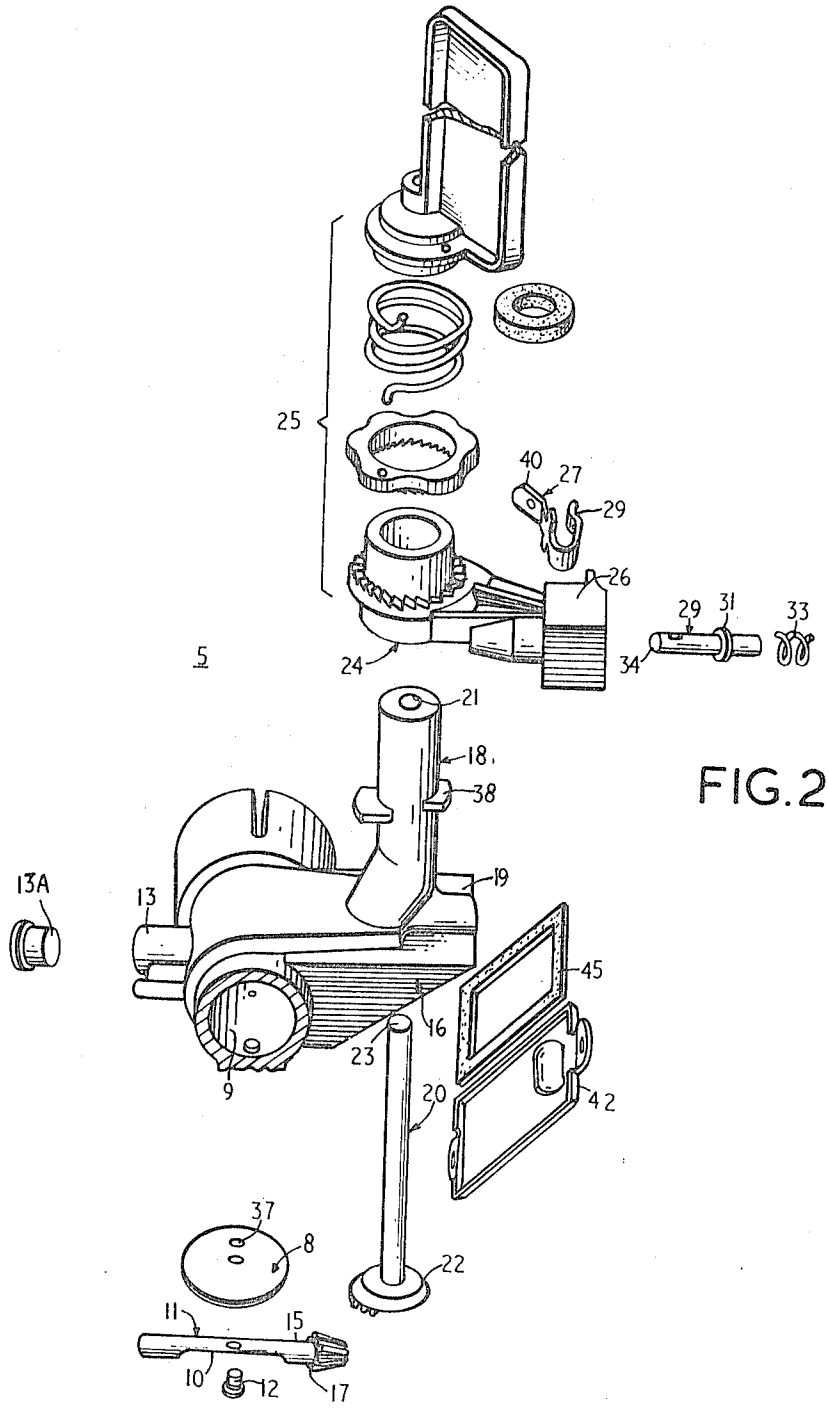


FIG. 2

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PATENTED FEB 8 1972

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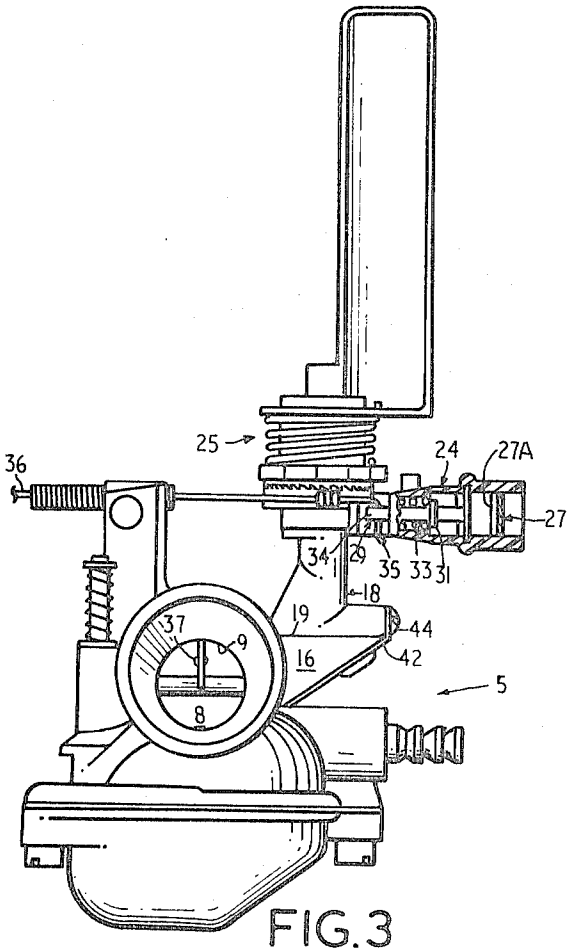


FIG. 3

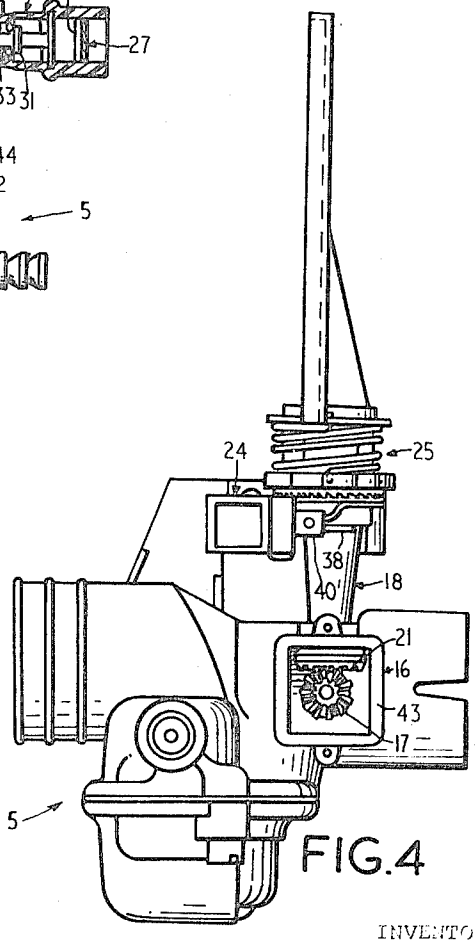


FIG. 4

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CARBURETOR THROTTLE CONTROL ASSEMBLY

This invention relates to carburetor throttle controls and more particularly to assemblies of this kind which incorporate speed governing means for an associated engine.

Invariably, due to the amount of required linkages, carburetors incorporating such features have their spindles mounting a butterfly valve controlled at both ends, frequently with governing means connected at one end and accelerator control at the other. When such assemblies are incorporated in a carburetor upon a lawnmower difficulties arise in providing adequate sealing of the butterfly spindle in the foul air conditions which often exist.

It is the principal object of the invention to provide an improved form of throttle control assembly incorporating a speed governor, preferably one that is compact and has improved sealing.

In one general form of the invention there is provided a throttle control assembly for a carburetor having a butterfly control valve mounted within a housing upon a rotatable spindle, said assembly comprising a governor vane on one end of a shaft rotatable upon the housing and extending substantially normal to the butterfly spindle, gearing interconnecting the shaft with one end of the spindle, a rotatable accelerator element surrounding the shaft, manually controlable linkage to the accelerator element, resilient means connecting the accelerator element to the governor vane to relay through the tension of said resilient means accelerator control to the butterfly valve, and means for sealing off the other end of the spindle.

A preferred form of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a fragmentary plan view of a typical lawnmower engine showing the carburetor mounted thereon with the throttle control arm fully displaced so as to open the throttle butterfly valve with the engine cutout switch in the open position;

FIG. 2 is an exploded perspective view of the relevant component parts of the carburetor;

FIG. 3 is an outer end elevation of the carburetor only showing the throttle control arm and butterfly valve fully closed and the engine cutout switch closed; and,

FIG. 4 is a front elevation of the carburetor only with the cover removed from the bevel gear housing.

The carburetor **5** is mounted on the air intake port **6** of an engine cylinder **7**. A throttle butterfly valve **8** is mounted in the carburetor throat **9** in the recess **10** of a spindle **11** and is held in place by a setscrew **12**. The spindle **11** is rotatably mounted in bearings **13** and **14** on each side of the throat **9**. The bearing **13** is closed by a polyethylene cap **13A** which is a press fit in the bore of the bearing **13** and keeps dust excluded from this end of the spindle **11**. The other end **15** of the spindle **11** mounted in the bearing **14**, passes into a housing **16** and a bevel pinion **17** is mounted on the end of the spindle **11** within the housing **16**. A tubular extension **18** extends vertically from and integrally with, the roof **19** of the housing **16**. A vertical shaft **20** is rotatably mounted within the bore **21** of the extension **18**. A bevel gear **22** is mounted on the lower end of the shaft **20**, within the housing **16**, and said gear **22** meshes with the pinion **17**.

The upper end **23** of the shaft **20** is drivably connected to a throttle control arm **24** through an adjustable torsion spring mechanism **25** in the manner described in our copending application Ser. No. 24,129 and no further description seems necessary. The outer end of the control arm **24** is provided with an integral boxlike housing **26** which is adapted to receive a U-shaped strip **27** which forms one pole of an engine cutout switch. A rectangular opening **28** is formed in one side of the housing **26** to receive the strip **27**. One leg **27A** of the strip **27** is bent inwardly to form a step which snaps behind the opening **28** to lock the strip **27** in place when it is pushed into the opening **28**. A cylindrical pin **29**, which forms the other pole of the engine cutout switch, is mounted in a radial barrel **30** extending medially from the housing **26**. A flange **31** is formed near the outer end of the pin **29** and is accommodated in an enlarged bore **32** in the barrel **30**. A compression spring **33**, formed from a nonconductive plastic material is also mounted in the bore **32**, and normally forces the pin **29** away from the strip **27**. The free end **34** of the pin **29** is bored to receive the end **35** of a bowden cable **36** which extends to the throttle lever (not shown) on the handle of the mowing machine to which the engine cylinder **7** is filled.

In FIG. 1 the bowden cable **36** has pulled the throttle control arm **24** to the position shown in which the butterfly valve **8** is fully open. The spring **33** will act so as to force the pin **29** away from the strip **27** and the engine cutout switch will therefore be open.

When the bowden cable **36** is moved so as to swing the arm **24** to the other extremity of its travel as shown in FIG. **3**, the throttle butterfly **8** is closed. The engine **7** will continue to run however as an air bleed hole **37** is provided in the butterfly valve **8** so that sufficient mixture reaches the engine **7** to enable it to run at idling speed. The control arm **24** is engaged by a stop **38** on the extension **18** in this idling position. Further pressure on the bowden cable **36** cannot therefore displace the arm **24**, but will instead force the pin **29** into contact with the strip **27**, against the action of the spring **33**. The engine cutout switch is thus closed. A flexible lead **39** secured to the longer leg **40** of the strip **27** connects said strip to the primary winding of the engine magnet **41**. The winding is thus earthed through the body of the carburetor **5** and the engine **7** stops.

It will be seen that the housing **16** is provided with a cover **42** which is secured to the face **43** of the housing by setscrews **44**. A gasket **45** is interposed between the cover **42** and housing face **43** so that no dirt can enter the carburetor **5** from this side of the throttle butterfly spindle **11**. The other end of the said spindle **11** is protected from the ingress of dirt by means of the cap **13A**. This is a distinct improvement on previous carburetors in which the corresponding butterfly valve spindle always projected through both sides of the carburetor throat, and into the atmosphere. Dirt could therefore not be excluded so that wear took place in spindle bearings. The extra air admitted to the carburetor via the worn bearings upset the fuel-air mixture ratio and rendered the engine difficult to start.

What we claim is:

1. In an internal combustion engine having provision for a cooling air stream, a carburetor comprising a housing, an induction throat within the housing, a butterfly valve within the throat, a spindle rotatably supported in a bore in the housing and extending across the throat and carrying said valve, means for closing one end of the bore against the ingress of dust to a first end of the spindle, a control shaft geared to a second end of the spindle, a governor vane fixed on the shaft for angular deflection by the engine-cooling airstream, a manually controlled accelerator element rotatable about the shaft, and resilient means interconnecting the accelerator element and the shaft to permit rotation of the shaft under influence of the governor vane independent from rotation of the accelerator element.

2. In an internal combustion engine as claimed in claim **1**, wherein the gearing between said control shaft and said spindle is enclosed within a compartment sealed by a removable cover.

3. In an internal combustion engine as claimed in claim **1**, wherein said housing includes an extension above the gearing between said control shaft and said spindle, and said control shaft is rotatably mounted therein.

4. In an internal combustion engine as claimed in claim **1**, wherein a control arm is provided on said accelerator element and carries a housing, electrical switch means mounted in said last-named housing, and a control cable is attached through said switch means to said control arm, said switch means being connected with the electrical system of the engine to stop the engine when operated.

5. In an internal combustion engine as claimed in claim **4**, wherein said electrical switch means is a pair of contacts separated from each other by spring action, and an end of said

cable connects to said control arm through one of said contacts so that a drawing force applied to said cable serves to move said control arm to close said butterfly valve and upon further application of a drawing force to said cable closes said contacts against said spring action.

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