

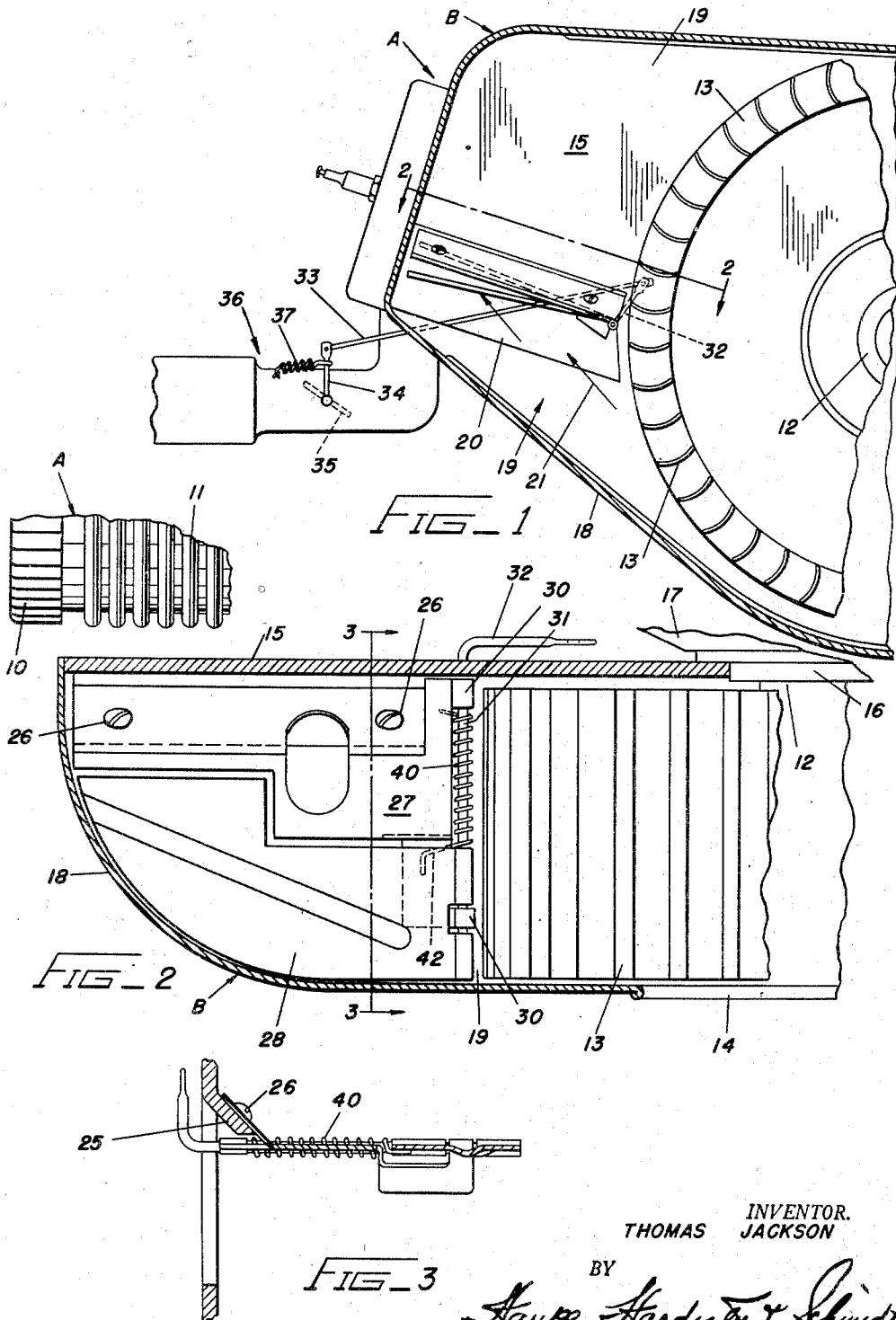
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ENGINE

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My invention relates to an internal combustion engine and more particularly to a novel type of governor construction especially applicable for small engines of the portable type.

It will be realized that engines of this type are quite competitive and the manufactured cost must be kept to a minimum. Weight is an important factor also. These small engines are used in motor bikes, lawnmowers, portable spraying apparatus, and many other miscellaneous applications, which are subjected to varying load conditions and in applications where manual throttle control is not desirable or practical. Therefore, it has been the practice to provide these engines with governors or other speed regulating devices. One of the most common type of governor constructions now employed are what is generally termed the vane type, as they are the most economical to manufacture. The vane type of governor does not give a close regulation of engine speed, but they are quite satisfactory for most applications, in fact it is found that ninety (90%) per cent of all applications can be satisfactorily served by a vane type governor.

An object of the present invention is to construct an improved governor of the vane type by providing a simple device for counterbalancing the weight of the valve so as to make for more accurate regulation of the engine operation.

Other objects of the invention will be more apparent as the description progresses, as it is the object of the present invention to provide a novel arrangement of parts and to provide a construction of the component parts which will facilitate manufacture and make for economical maintenance and general overall engine efficiency.

For a more detailed understanding of my invention, reference may be had to the accompanying drawing illustrating a preferred embodiment of the invention in which like parts throughout the several views are referred to by like characters, and in which:

Fig. 1 is a fragmentary elevational view of an engine of the air cooled type and showing my improved vane type governor associated therewith,

Fig. 2 is a plan view of the governor taken on the line 2—2 of Fig. 1, and

Fig. 3 is a detailed transverse sectional view taken substantially on the line 3—3 of Fig. 2.

In the accompanying drawing a fragmentary portion only of the engine A is illustrated, said engine being an air cooled internal combustion

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engine having fins 10 carried by the engine cylinder 11, said engine being of substantially conventional construction and provided with a crankshaft 12 on which is mounted an air impeller 13. The housing B mounted on said engine is constructed and arranged to house the air impeller and is provided with an air inlet 14. This housing comprises a back plate 15 piloted on a hub 16 carried by the engine crankcase 17 and a housing cover 18 is secured to the back plate 15 and encloses the impeller 13. The housing members cooperate to provide an air passage 19 extending along the cylinder, said back plate provided with an elongated opening 20 adjacent to the engine cylinder, which opening comprises an air discharge outlet through which the air is directed against the engine cylinder (see Fig. 2). The air is propelled by the impeller in the general direction as indicated by the arrow 21.

This rear plate or back plate 15 carries a support 25 to which is secured by bolts 26 or other suitable fastening means, a bracket 27, which bracket pivotally supports a vane 28. The support and bracket carried thereby overhang the air discharge opening 20 (see Figs. 1 and 3) and extends substantially for the full length of the opening, and terminate at the far end of the housing remote from the impeller, said other end of the opening terminating at the impeller periphery.

The bracket 27 carries ears 30 which support the pintle or shaft 31, and the vane 28 is fixed to said shaft. This shaft 31 carries an arm 32 which is connected with a rod 33, which is in turn connected to the throttle valve lever 34 and throttle valve 35 of the conventional carburetor 36. Any suitable type of spring means may be associated with the throttle valve to urge same to an open position in the conventional manner, and such a spring 37 is here shown conventionally.

On starting the engine the throttle valve is partially opened in the usual way and the vane 28 is partly lowered to the normal engine operating condition as shown in Fig. 1. As the engine tends to speed up, more air is forced through the passage 19 by the impeller and this air impinging on said vane as it is deflected into the discharge opening 20, tends to lift said vane and close the throttle valve against the force of the spring means 37 which urges the throttle valve towards open position. As this vane is moved or lifted due to increased air flow resulting from increased engine speed, the engine is automatically throttled down, thus decreasing

engine speed. This governing action satisfactorily controls or regulates engine speed.

It will be observed that the weight of this vane 28, while not excessive, is of sufficient magnitude as to tend to lower said vane. In such engine governors, it has been found highly desirable to counterbalance the dead weight of the vane, in order to obtain a more accurate governing action for regulating engine operation.

I have accomplished this by mounting a spring 40 on the shaft 31, the spring being coiled about the shaft 31, anchored at one end as at 41 to the bracket 27 and at the other end as at 42 to the vane 28.

This bracket 27 and vane 28 together extend substantially in a common plane transversely of the housing and define one wall of the air passage 19. The plane of the bracket and vane is substantially normal to the plane of the back plate 15 and parallel to the long ways of the opening 20.

Although I have illustrated but one form of my invention and have described in detail but a single application thereof, it will be apparent to those skilled in the art to which my invention pertains, that various modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

I claim:

1. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, a pivotally supported vane in said passage and defining one wall of said passage, connections between said vane and said throttle and operable in response to movement of said vane to adjust said engine throttle and govern engine speed, and a yielding means acting on said vane to counterbalance the weight only of said vane, movement of said vane in one direction in response to an increased air flow in said passage tending to close the throttle against the spring tension acting on said throttle to open same.

2. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, a vane pivotally supported in said passage adjacent to said opening in the inner side of said housing and defining one wall of said passage, connections between said vane and said throttle and operable in response to movement of said vane to adjust the engine throttle and govern engine speed, and a yielding means acting on said vane to counter-balance gravity force only acting on said vane, the increase of air flow in said passage tending to close the throttle against the spring tension acting on said throttle to open same.

3. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner

side in register with the cylinder, a vane pivotally supported by said housing and extending in a generally horizontal plane normal to the plane of the inner wall of said housing and substantially immediately above the opening in said inner housing wall said vane defining one wall of said passage, connections between said vane and said throttle and operable in response to movement of said vane to adjust the engine throttle and govern engine speed, and a yielding means acting on said vane to counterbalance only the force of gravity acting on said vane, the increase of air flow in said passage tending to close the throttle against the spring tension acting on said throttle to open same.

4. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, a vane bracket secured to the inner wall of said housing immediately above the opening therein, a pin pivotally supported by said bracket and extending into said passage normal to the plane of the inner wall and projecting through the said opening, a vane secured to said pin and positioned generally horizontally in the plane of said bracket and acting therewith to define one wall of said passage, means connecting said pin to the engine throttle and operable in response to movement of the vane to adjust the engine throttle and govern engine speed, and a spring supported by the pin and anchored at one end to said bracket and to the vane at the other end, said spring constructed and arranged to counterbalance only the force of gravity acting on said vane, the increase of air flow in said passage tending to close the throttle against the spring tension acting on said throttle to open same.

5. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, said inner wall portion immediately above said opening flanged outwardly into said passage, a vane bracket secured to the flanged portion of said inner wall, a vane pivotally supported by said bracket, said bracket and vane extending substantially in a common horizontal plane normal to the plane of the inner wall and transversely of said housing to form a baffle to deflect the air flow from said impeller through said opening onto the engine cylinder, and means connecting said vane to said throttle and operable in response to movement of said vane to adjust said engine throttle and govern engine speed, the movement of said vane in one direction in response to an increased air flow in said passage tending to close the throttle against the spring tension acting on said throttle to open same.

6. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, a combination vane

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and baffle pivotally supported in said passage and extending transversely of said passage in a horizontal plane extending generally normal to the plane of the inner wall of said housing immediately above the opening therein to define one wall of said passage, said vane constructed and arranged to extend the full length of said opening and terminating at the far end of said passage remote from said impeller, and means connecting said vane to said engine throttle.

7. The combination with an internal combustion engine having a cylinder, a throttle for controlling the speed of said engine, spring means urging said throttle toward an open position, an air impeller, of a housing associated with the impeller and having a passage leading therefrom to the cylinder and open along its inner side in register with the cylinder, a baffle assembly comprising a bracket fixed to the housing and a vane hinged to the bracket and supported in said passage, said bracket and vane lying substantially in a common plane extending normal to the inner

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wall of said housing and overhanging said opening therein to define one wall of said passage, said vane pivotally hinged at its forward end to said bracket nearest the impeller, and positioned at a slight angle downwardly with respect to the plane of the bracket during normal engine operation, and spring means operable on said vane tending to lift same about its hinge and acting to counter-balance only the force of gravity acting on said vane, said spring means acting to open said throttle being resisted by the air flow in said passage tending to close said throttle by action of the air on said vane.

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The following references are of record in the file of this patent:

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