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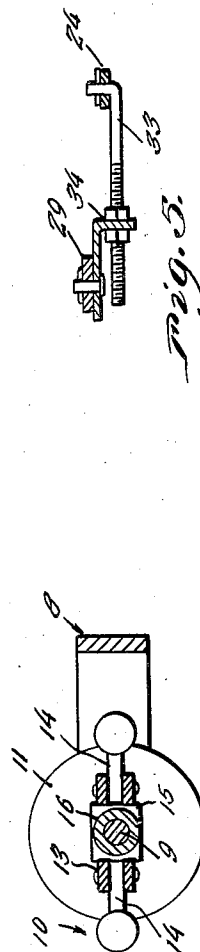
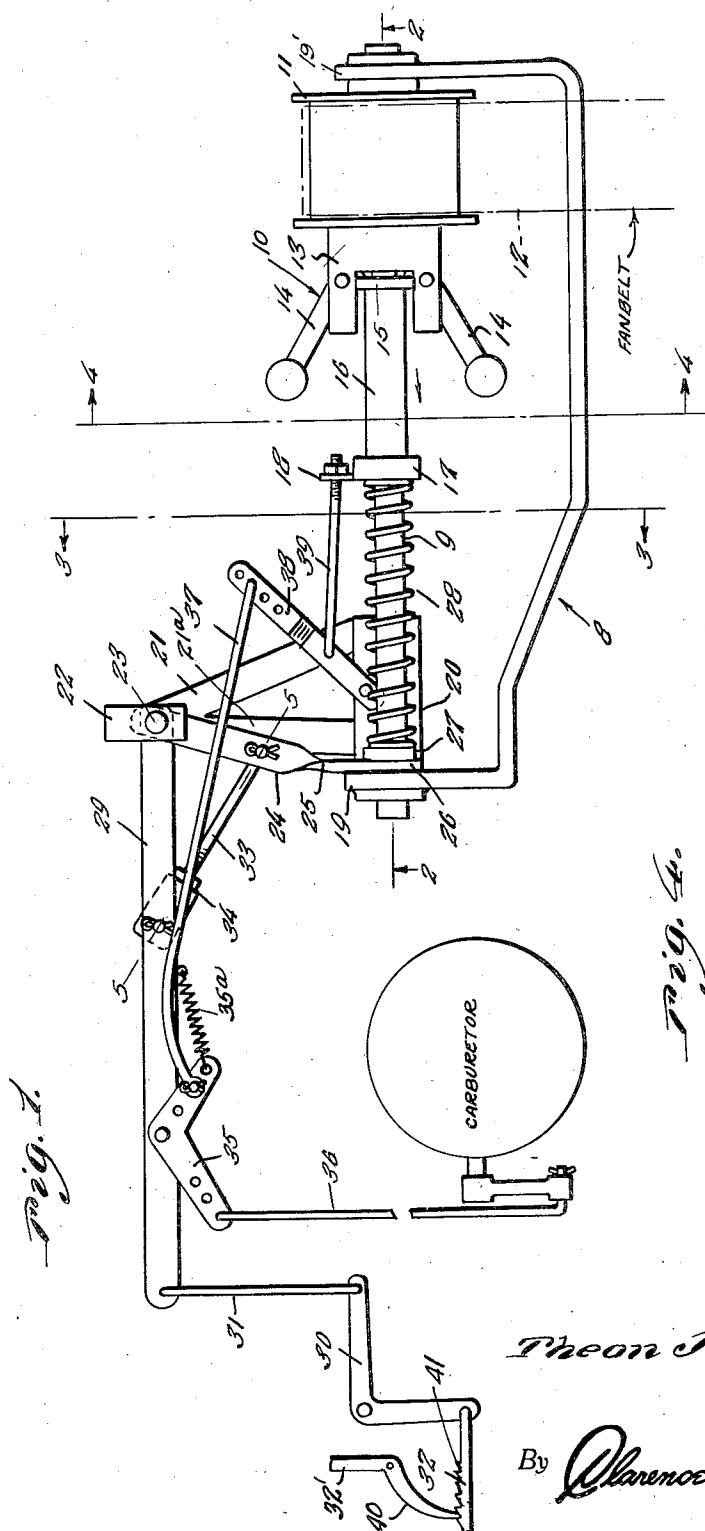
T. J. SCHLOSSER

2,039,495

SPEED GOVERNOR

Filed April 13, 1932

2 Sheets-Sheet 1



Inventor

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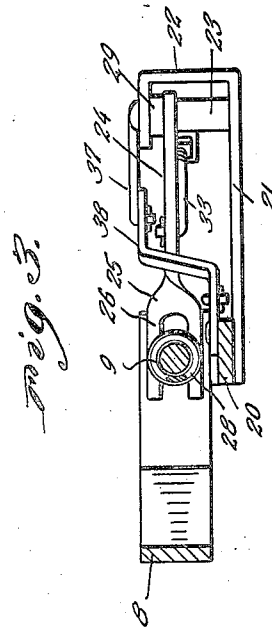
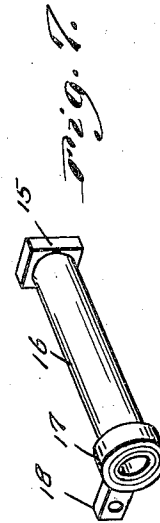
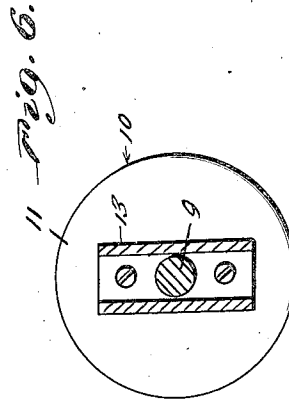
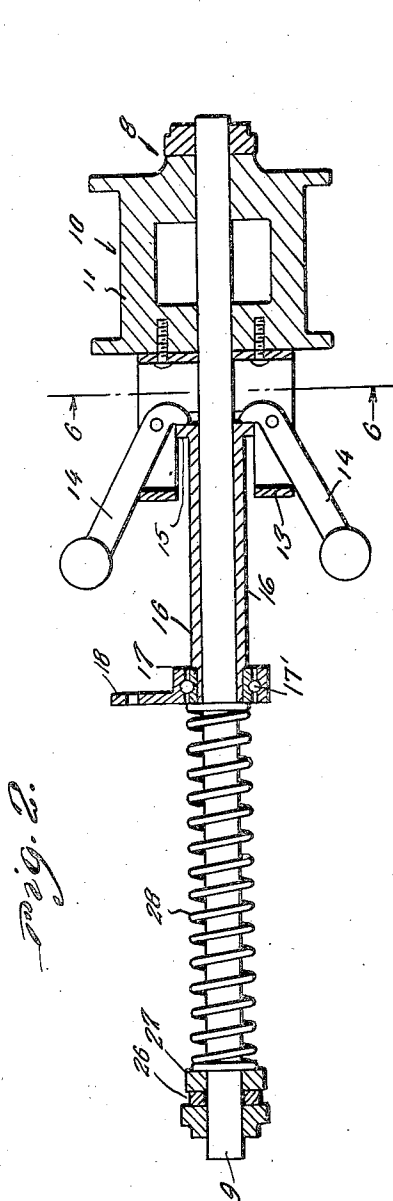
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SPEED GOVERNOR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,039,495

SPEED GOVERNOR

Theon J. Schlosser, Illinois, Mo.

Application April 13, 1932, Serial No. 605,103

7 Claims. (Cl. 264—3)

My invention relates to means for controlling the speed of operation of internal combustion engines, especially automobile and tractor engines, said means being arranged to keep the engine running at a predetermined minimum speed despite variations in the load imposed thereon, said means permitting increasing the speed of the engine by manipulation of the engine's accelerator and effecting a return to said predetermined minimum speed when the accelerator is released.

The invention includes manual means for setting the throttle valve of the engine's carburetor for the predetermined speed, and compensating means connected between the throttle valve and the governor means for opening the throttle to keep the engine running at the predetermined minimum speed despite varying increases in the load imposed upon the engine.

An important object of the invention is to provide a device embodying the described means, the said device being simple and accurate in operation, and readily adjustable for different speeds and for installation on different types of engines.

Other objects and advantages of the invention will be apparent from a reading of the following description in connection with the drawings wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawings:—

Figure 1 is a side elevational view of the embodiment showing portions of an internal combustion engine with which said embodiment is immediately connected.

Figure 2 is a horizontal sectional view taken approximately on the line 2—2 of Figure 1, and looking in the direction of the arrows.

Figure 3 is a vertical transverse sectional view taken approximately on the line 3—3 of Figure 1, and looking in the direction of the arrows.

Figure 4 is a vertical transverse sectional view taken approximately on the line 4—4 of Figure 1 and looking in the direction of the arrows.

Figure 5 is a longitudinal sectional view taken approximately on the line 5—5 of Figure 1.

Figure 6 is a transverse sectional view taken approximately on the line 6—6 of Figure 2.

Figure 7 is a perspective view of the slide.

Referring in detail to the drawings, the numeral 8 refers generally to a U-shaped frame between and through whose arms 19, 19' the stationary shaft 9 is mounted. The frame is fastened to some suitable place on the internal combustion engine, usually on the carburetor side thereof and so positioned as to have its forward end located adjacent the fan belt of the engine.

Rotatable on the forward part of the shaft 9 rearwardly of the frame front member 19' is the governor assembly generally designated 10 which includes the flanged drum 11 which acts as a pulley and over which the engine fan belt 12 is trained for rotating the governor assembly.

To the rear face of the pulley drum 11 is fastened a U-shaped mounting 13 which is composed of a pair of parallelly spaced U-shaped plates connected at their forward and rearward ends but unconnected and open at their opposite sides. Weighted governor arms 14 extend into the opposite side openings of the mounting 13 and have their inner ends pivoted between the plates of said mounting. The mounting 13 is so arranged that the shaft 9 passes through an opening in the outer end of the mounting and between the legs of the mounting.

A tubular slide 16 rotatably and slidably receiving the shaft 9 has the square flange 15 at its forward end and at its rearward end the rotatable annulus 17. The slide 16 is so positioned that its square flange is located between the legs of the mounting 13, opposite sides of the square flange being engaged with inner edge portions of the legs of the mounting 13 as shown in Figure 2, whereby the sleeve or slide 16 is connected for rotation with the governor mechanism although permitted to slide on the shaft 9 relative thereto. Since the drum 11 cannot move forwardly on the shaft 9 because of its abutment with the front member of the frame 8, any outward movement of the governor arms 14 which are arranged to engage the outer end of the square flange 15 will cause rearward sliding of the slide 16 on the shaft 9 against the resistance of the spring 28 which is circumposed on the shaft 9 between the rearward end of the slide 16 and the rear member 19 of the frame 8. The spring 28 is operative to return the governor arms 14 to initial position after outward movement thereof by sliding the slide 16 forwardly. The annulus 17 is rotatably mounted on the rear end of the slide 16 and fixed against axial movement on the slide 16 by ball bearings 17' which are confined in suitably formed channels in the slide 16 and in the inner surface of the annulus 17. The annulus 17 has fixed thereto the lateral rigid arm 18 to which the forward end of the link 39 is connected.

The upper part of the rear member 19 of the frame 8 has an extension 20 which projects forwardly alongside of the spring 28. Attached to the outside of the extension 20 and rising therefrom is one leg 21 of an inverted U-shaped bracket 22, which leg 21 slants upwardly and

rearwardly as shown in Figure 1. Depending from the upper end of the leg 21 is a substantially perpendicular brace 21a which has its lower end connected to the outside of the extension 20, like the lower end of the leg 21. A pivot 23 extends between the short leg and the leg 21 of the bracket 22 and has pivoted thereon the upper end of a depending lever 24 which has a bifurcated lower end 25 the furcations of which straddle the shaft 9 between the rear member of the frame 8 and the rear end of the spring 28, and engage a washer 27 which is slidable on the shaft 9 and abuts the rear end of the spring 28.

Having its forward end pivoted on the pivot 23 between the short arm of the bracket 22 and the upper end of the bifurcated lever 24 is an elongated generally horizontal lever 29. The bifurcated lever 24 and the horizontal lever 29 are maintained in fixed but adjustable angular relation by an adjustable link 33 (see Figs. 1 and 5) which has a laterally directed end pivotally cotter pinned in an opening intermediate the ends of the furcated lever, and a threaded end threaded through a lug 34 which lug is pivoted to the side of a forward point of the horizontal lever 29 as shown in Figure 1. The manner of adjusting the link 33 is believed to be obvious. The purpose of having the link 33 longitudinally adjustable is to enable conveniently adjusting the angular relationship of the horizontal lever which may be required to correctly apply the device to different types of engines and carbureters. Another function of the adjustability of the link 33 will be mentioned later.

Horizontally pivoted at its elbow to one side of a rearward point of the horizontal lever 29 is a bell crank lever 35 in each of whose downwardly directed arms is a number of holes. A carbureter throttle valve operating rod 36 has its upper end pivotally connected in one of the holes in the rearward one of the arms of the bell crank 35, and has its lower end connected to the throttle valve of the carbureter. (A contracting helical spring 35a is stretched between the extremity of the forward one of the arms of the bell crank 35 and a forwardly spaced point of the horizontal lever 29 whereby the bell crank normally has a position in which it yieldably holds the rod 36 down in carbureter throttle valve opening position.) It is obvious that on different engines or carbureters the upper end of the rod 36 may be advantageously connected in one of the remaining holes in the rearward arm of the bell crank 35.

Having its rear end pivotally connected in a selected one of the holes in the forward arm of the bell crank 35 is a link 37 which extends forwardly and has its front end pivotally connected in a selected one of a number of longitudinally spaced holes in the upper part of a compensating lever 38 which has its lower end horizontally pivoted to the inside of the frame extension 20 at the point substantially indicated in Figure 1. Below the upper part of the compensating lever 37 is a single hole in which is pivotally connected the rear end of a longitudinally adjustable connecting link 39 which has its front end threaded and passing through a lug 18 on the rear end of the slide 16. A nut threaded on the front end of the link 39 bears against the front side of the lug 18 to preserve the adjustment of the length of the link 39.

A suitable locking dog 40 engages notches 41 on a horizontal speed selecting rod 32 which has its front end pivotally connected to one arm of a bell crank 30 which is rockably supported on

a suitable part of the vehicle rear or on the engine. The remaining arm of the bell crank 30 has pivotally connected thereto the lower end of a vertical link 31 whose upper end is pivotally connected to the rear end of the horizontal lever 29. By pushing and pulling the speed selecting rod forwardly and rearwardly as may be required, and locking it by means of the dog 40 in the selected position, the device may be set for maintaining a predetermined minimum engine speed.

It is obvious that if the speed selecting rod 32 be pulled rearwardly from the position in which it is shown in Figure 1 that the rear end of horizontal lever 29 will be pulled downwardly. This angular depressing of the horizontal lever 29 will lower the bell crank 35 and the carbureter throttle valve rod 36 thereby opening said valve, and will swing the bifurcated lever 24 forwardly whereby the spring 28 is compressed a predetermined amount so as to cause the spring 28 to offer correspondingly increased resistance to subsequent rearward movement of the slide 16 by the operation of the governor assembly.

A predetermined opening of the carbureter throttle valve accompanies the described depressing of the carbureter throttle valve operating rod 36, whereby the minimum speed of the engine without load or with a specified load imposed thereon is predetermined. If while the engine is running at the predetermined minimum speed with the arms of the governor outwardly swung and pushing the slide rearwardly against the spring 28 an increased load is imposed on the engine, as would be occasioned by the vehicle's meeting an upgrade or a difficult stretch of ground, the speed of the engine will be momentarily decreased and this will permit the governor arms to subside inwardly because of reduced centrifugal force and permit the spring 28 to push the slide 16 forwardly toward its initial position. This forward movement of the slide pulls on the link 39 and tilts the compensating lever forwardly. The forwardly moving upper part of the compensating lever 38 pulls on the link 37 so as to tilt the bell crank 35 forwardly, thereby depressing the rear arm of the bell crank 35 and carbureter throttle valve operating rod 36 without changing the position of the horizontal lever 29, and causing the carbureter throttle valve to open sufficiently to make the engine pick up speed, notwithstanding the added load thereon, until the speed of the engine is at the predetermined minimum.

Of course, as soon as the engine is relieved of some of the extra load, the governor arms fly out again and push the slide 16 rearwardly against the resistance of the spring 28 so as to operate the arrangements described in a manner to elevate the carbureter throttle valve operating rod in the proper amount to close the carbureter throttle valve sufficiently to slow the engine down to the predetermined minimum speed.

After the device has been installed and an approximate angular relationship of the horizontal lever 29 and the furcated lever 24 has been selected and fixed, adjustment of the length of the link 33 enables accurately predetermining the degree of initial compression of the spring 28.

The ordinary carbureter throttle valve control means (not shown), such as the accelerator pedal or hand gas lever of the vehicle, may be operatively connected to the throttle valve and operated to operate the engine at speeds higher than the predetermined minimum speed, and when the accelerator pedal or hand gas lever is

released or rendered inoperative, the functioning of my device returns the engine to said predetermined minimum speed. It is obvious that the speed selecting rod 32 might, if desired, be connected for operation by such an accelerator pedal or hand gas lever.

Although I have shown and described herein a preferred embodiment of my invention it is to be definitely understood that I do not desire to limit the invention beyond the spirit of the invention and the scope of the subjoined claims.

I claim:

1. A device of the character described for an internal combustion engine having a carburetor including a throttle valve, said device comprising a first generally horizontal lever, a bell crank pivoted on said first lever and having one arm operatively connected to said throttle valve, a support on which one end of said first lever is pivoted, a second depending lever pivoted on said support, a link extending between and respectively pivoted at its opposite ends to said first lever and to said second lever, governor means, said governor means including longitudinally acting spring means arranged to be compressed while said governor means is operated at a higher than normal speed and to be relatively relaxed while said governor means is operated at a normal speed, said second lever being operatively engaged with one end of said spring means, a third vertically projecting lever pivoted on said support, a second link having one end pivotally connected to the remaining arm of said bell crank and its opposite end pivoted to said third lever, and means operatively connecting said third lever with the other end of said spring means in opposition to said second lever.

2. Governor mechanism for an internal combustion engine having a carburetor including a throttle valve, said governor mechanism comprising a first lever, a support to which one end of said first lever is pivoted, a bell crank pivoted to an intermediate portion of said first lever, said bell crank having one of its arms operatively connected to said throttle valve of the carburetor, a second lever pivoted at one end on said support and extending at an angle diverging from the longitudinal axis of said first lever, a link extending between and respectively pivoted at its opposite ends to said first lever and said second lever, a third lever pivoted at one end to said support and extending at an angle diverging from the longitudinal axis of said first lever, a second link extending between and having its opposite ends respectively connected to the remaining arm of said bell crank and the free end of said third lever, a governor, said governor including longitudinally acting spring means, said spring means being arranged to be compressed by said governor, one end of said spring means being operatively engaged with the free end of said second lever, means operatively connecting the other end of said spring means with said governor, and manual means for moving said first lever for adjusting said throttle valve into a selected open position.

3. Governor mechanism for an internal combustion engine, said engine having a carburetor including a throttle valve, said governor mechanism comprising a first lever, a support to which one end of said first lever is pivoted, a bell crank pivoted to an intermediate portion of said first lever, said bell crank having one of its arms operatively connected to said throttle valve of the carburetor, a second lever pivoted at one end on said support and extending at an angle diverging from

the longitudinal axis of said first lever, a link extending between and respectively pivoted at its opposite ends to said first lever and said second lever, a third lever pivoted at one end to said support and extending at an angle diverging from the longitudinal axis of said first lever, a second link extending between and having its opposite ends respectively connected to the remaining arm of said bell crank and the free end of said third lever, said governor including longitudinally acting spring means, said spring means being arranged to be compressed by said governor, one end of said spring means being operatively engaged with the free end of said second lever, means operatively connecting the other end of said spring means with said third lever, and manual means for moving said first lever for setting said throttle valve into a selected open position, said first link containing means enabling longitudinally adjusting said first link for changing the angular divergence of said first and second levers with respect to each other.

4. In a speed regulator for an internal combustion engine having a fan belt and a carburetor throttle valve, governor mechanism supported to be actuated by said fan belt, spring means engaging a portion of said governor mechanism in a manner to resist centrifugal functioning of said governor mechanism, a swingable lever, means for swinging said lever, lock means for locking said lever in a selected position, rockable means carried by said lever having operative connection with said throttle valve, connection means between a portion of said governor mechanism and said rockable means whereby the governor mechanism is conditioned to operate said throttle valve through the medium of said connection means independently of the position of said swingable lever, and a second swingable lever supported adjacent to the first mentioned swingable lever and having engagement with said spring means, and an adjustable connection between said first and second swingable levers enabling adjusting said second swingable lever relative to said first swingable lever in a direction to increase the tension of said spring means, thereby conditioning the maintenance of a higher speed by said engine.

5. In a speed regulator for an internal combustion engine, said engine having a carburetor throttle valve, the combination of a swingably supported lever arranged to be set in a selected position, a bell crank pivoted on said lever and having one arm thereof operatively connected to said throttle valve, a speed governor adapted to be operated by said engine and including a member supported to change its position in accordance with the action of the governor, spring means engaging said member and arranged to substantially maintain an initial position of said member at a low speed of said engine and to be compressed when said member is moved away from initial position at a higher speed of the engine, second means operatively connected to and between the other arm of said bell crank and said member, and third means operatively connected to and between said lever and said spring means, said third means engaging said spring means in opposition to said member whereby the angular positions of said bell crank relative to said lever are affected by the movements of said member.

6. In a speed regulator for an internal combustion engine, said engine having a carburetor throttle valve, the combination of a swingably supported lever arranged to be set in a selected

position, a bell crank pivoted on said lever and having one arm thereof operatively connected to said throttle valve, a speed governor adapted to be operated by said engine and including a member supported to change its position in accordance with the action of the governor, spring means engaging said member and arranged to substantially maintain an initial position of said member at a low speed of said engine and to be compressed when said member is moved away from initial position at a higher speed of the engine, second means operatively connected to and between the other arm of said bell crank and said member, and third means operatively connected to and between said lever and said spring means, said third means engaging said spring means in opposition to said member whereby the angular positions of said bell crank relative to said lever are affected by the movements of said member, said third means including a pivotally supported arm having its free end engaged with said spring means, and fourth means extending between and connected to said swingably supported lever and said pivotally supported arm and determining the angular relationship thereof, said fourth means including means enabling

adjusting said fourth means to vary said angular relationship.

7. In a speed regulator for an internal combustion engine, the combination of a bell-crank, a link connecting one arm thereof to the throttle valve of the engine, a speed governor actuated by said engine and connected to the remaining arm of said bell-crank and arranged to swing said bell-crank as the speed of the engine changes, a lever on which said bell-crank is pivoted, manually operable means to position said lever to predetermine the speed of the engine, and manually adjustable means having a portion connected with said lever and a second portion engaging a part of said governor, said manually adjustable means being adjustable to change the predetermined speed of the engine, said part of the governor including a spring interposed between said second portion of said adjustable means and a member actuated by operation of said governor, the tension of said spring being changed by adjustment of said manually adjustable means, whereby the speed of the engine is affected.

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