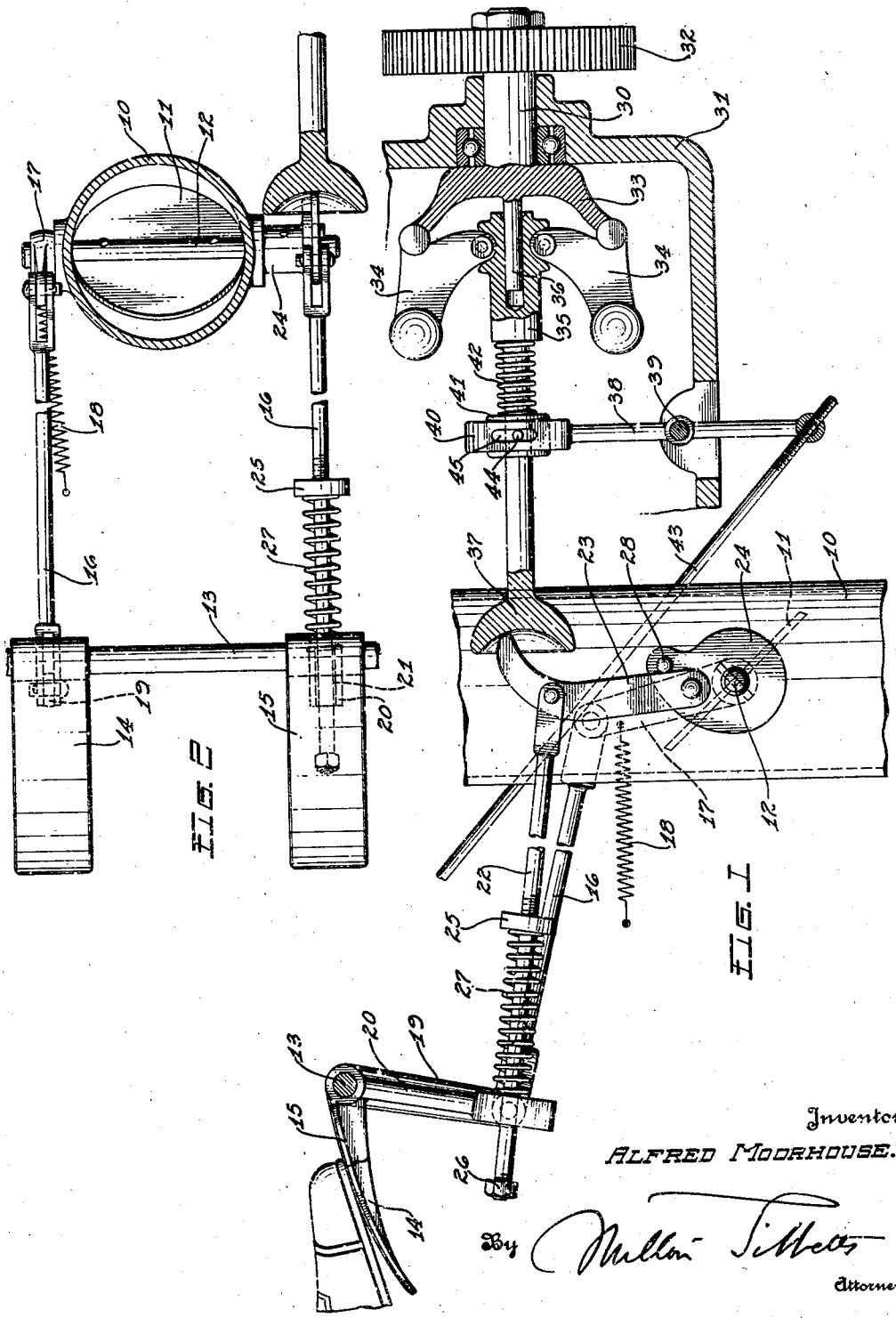
Oct. 4, 1932. A. MOORHOUSE 1,880,456

INTERNAL COMBUSTION ENGINE

Filed Aug. 19, 1929 2 Sheets-Sheet 1



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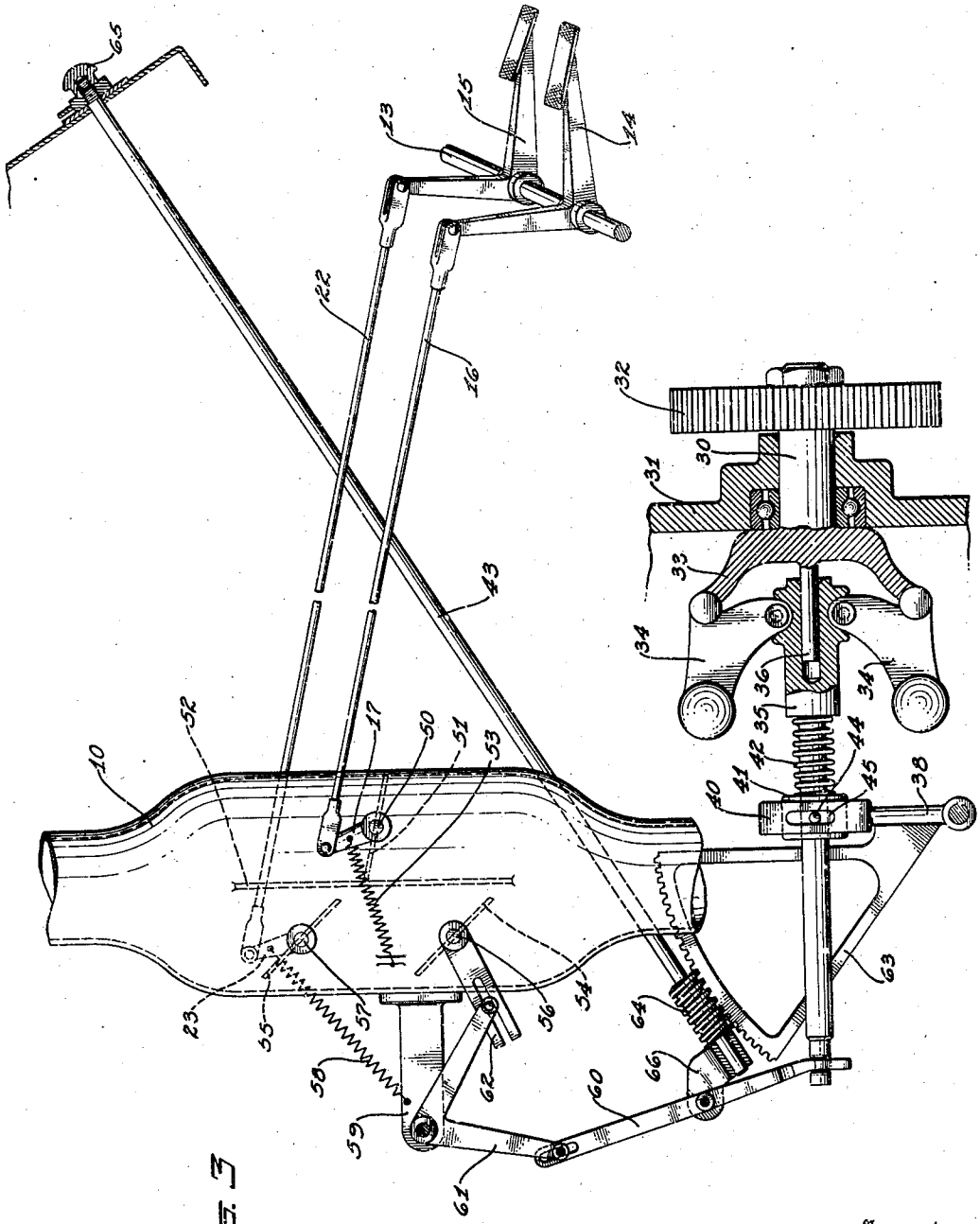


FIG. 3

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INTERNAL COMBUSTION ENGINE

Application filed August 19, 1929. Serial No. 387,020.

This invention relates to internal combustion engines, and more particularly to control mechanism therefor.

Automatic mechanism has been used to control the power developed by engines in order to limit the speed at which a motor vehicle can be driven, and a governor controlling the throttle is one manner of accomplishing this result. Situations are encountered with the employment of such a device where greater speed or acceleration, beyond that allowed, are desired or necessary. For example, serious accidents can sometimes be avoided by full acceleration, traffic congestion in crowded business areas require quick acceleration when the signal to go is given, greater power is required in climbing some hills, and then, the driver may wish to increase his speed upon a highway. To attain speed beyond the governor setting, it is necessary to either adjust or disconnect the control mechanism and in order to do this the driver must stop in order to make such manipulations. It is an object of my invention to provide a throttle control for the engine of a motor vehicle which can be readily actuated by the driver at will to cause the vehicle to travel within a limited range of speed or at any range of speed which is possible.

Another object of my invention is to provide a dual throttle control for determining the speed at which a motor vehicle will travel, one of the controls permitting travel within a predetermined speed limit and the other control permitting travel within the entire speed range which can be developed.

These and other objects will appear in the following specification, as the description progresses.

In the accompanying drawings, Fig. 1 is a partial side elevation and sectional view showing throttle control mechanism associated with a fragment of an engine;

Fig. 2 is a plan view of the same, partially in section; and

Fig. 3 is a diagrammatic view of a modified form of the throttle control mechanism.

Referring now to the drawings by characters of reference, 10 represents a portion of the engine intake pipe through which fuel is supplied to the distributing manifold of an engine, and a butterfly throttle valve 11 is arranged within the intake pipe to control the quantity of fuel passing therethrough. The valve is secured to a rotatable shaft 12 which extends through the intake pipe and projects therefrom so that the ends can have actuating mechanisms attached thereto.

The mechanism associated with one end of the valve shaft is arranged to operate the valve into any position between full open and closed, while the mechanism associated with the other end of the valve shaft will operate the valve in a range between closed and a predetermined partially open position.

A shaft 13 is arranged adjacent the foot board of an automobile and provides a mounting for a pair of foot operated pedals 14 and 15, the pedals being pivotally mounted on the shaft. One end 19 of the pedal 14 is pivotally connected to the rod 16 which in turn is pivotally connected to the link 17 secured to one end of the valve shaft 12. A coil spring 18 is attached to the link 17 and is suitably anchored to continuously exert sufficient tension to normally move the actuating structure so that the valve is in closed position. When the foot pedal 14 is pressed down toward the floor board, the arm 19 will be moved forward causing a similar forward movement of the rod and the link, which will move the shaft 12 and the valve in an opening direction, the range of which is from closed to wide open positions.

The pedal 15 is provided with a depending arm 20, the lower end of which has an aperture 21 therein. A rod 22 projects through such aperture and is pivotally connected to the link 23 which in turn is pivotally secured eccentrically to the flanged end of the sleeve 24 which is pinned to an end of the valve shaft. A collar 25 is screwed upon a threaded intermediate portion of the rod, and a nut 26 is placed on the free end of the rod to prevent its displacement endwise through the opening 21. A stiff coil spring 27 is arranged to encircle the rod intermediate the collar 25 and the arm 20, such spring being under sufficient tension to provide an un-

yielding connection between the collar and the foot lever upon normal actuation of the pedal 15, within limits. The tension exerted by the spring 27 can be adjusted through screwing the collar 25 along the rod 22. A boss 28 projects from the flange of the sleeve 24 and provides engagement means for the link 23, whereby the sleeve and associated shaft are moved in a clockwise direction through pressure on the pedal 15, motion being transmitted through the spring 27 and the rod 22 to the link 23. The spring 18 will function automatically to retain the boss 28 against the link 23 as the foot pressure is released, unless the shaft 12 is being actuated by the other valve operating mechanism.

Associated with the mechanism operated by the pedal 15 is provided mechanism for limiting the movement of the link 23 to open the valve so that the maximum fuel supply which can be secured through this mechanism is determined. The throttle actuation can be regulated in different ways, however, I prefer to utilize a speed operated governor in this connection.

A shaft 30 is suitably mounted upon the engine casing 31, and is rotated by a gear 32 driven from the engine crankshaft. The shaft terminates in a central extension 36 and in a yoke 33, and weighted arms 34 are pivotally connected to such yoke and to the rod 35 which is adapted to rotate with and slide upon the shaft extension 36. Rotation of the shaft 30, through centrifugal force, will move the weighted arms to control the rod position in accordance with the speed of rotation so that the throttle valve will be moved in a closing direction when the speed is above a predetermined amount. One end of the rod is formed with a head, or stop section 37 having an arcuate face which is arranged in the line of the operating movement of the link 23 and limits its travel in a direction tending to open the throttle valve. A lever 38, mounted on the shaft 39, is formed with a head 40 and associated therewith is provided a two part bearing 41 for the reception of the rod 35 which projects therethrough. Arranged between the bearing and shouldered portion of the rod 35 is a coil spring 42 which exerts a greater tension than the spring 27.

The position of the head 40 determines the tension of the spring 42 extending between the bearing and the shouldered portion of the rod 35, so that through this medium the limit of movement of the rod in a direction permitting further opening of the valve is determined or set. A control rod 43 extends from the vehicle dash to the lever 38, so that the lever can be rocked to move the bearing to govern the degree of spring tension as desired to establish the maximum valve opening. This setting determines the maximum engine power developed by operation of the pedal 15, so that the speed at which a vehicle is driven by the engine is accordingly limited.

As before stated the spring 27 is under tension such that it will not be compressed by pressure on the pedal over the valve opening range, however when the link strikes the stop member 37 such spring will be compressed upon further pressure on the pedal without effecting a corresponding movement of the rod 22. It will be seen that the link 23 engages the boss 28 and rotates the valve shaft to open the valve. As pressure on the pedal 15 is relieved, the spring 18 will cause the shaft to close as allowed by the position of the lever 23 through engagement of the boss 28. The amount of pressure on the pedal 15 will therefore determine the speed of travel within a range from zero to the predetermined limit.

It will be seen also that the throttle control mechanism associated with the pedal 15 will be automatically moved in a closing direction by the governor when the motor speed exceeds that required for the limited speed result, even though the driver's foot pressure is applied to the pedal. Under such circumstances the arms 34 will cause the rod 35 and stop member 37 to move in a direction toward the pedal, carrying the lever 23 and rod 22 therewith, and the valve will be closed by the spring 18 as permitted by the position of the lever 23. If the pedal 15 is held down, the action just described will still take place as the spring 27 will be compressed and the rod 22 will move rearwardly through the arm 20. The relation of the boss 28 with the lever 23 is such, however, that the mechanism operated by the pedal 14 can function to open the valve regardless of the governor action or the position of the mechanism operated by the pedal 15. However, the driver will probably shift his foot from one pedal to the other as he selectively desires a limited speed or greater acceleration.

In Fig. 3 I have illustrated a modified form of the invention in which the governor mechanism and a pair of pedals are utilized to control throttle valves so that the same result as above described will be obtained. In this form of the invention the pedal 14 mounted on the shaft 13 operates the rod 16 connecting with the link 17 which is keyed to the shaft 50 carrying the throttle valve 51. The intake pipe 10 in this modification is provided with an enlarged control portion which is centrally divided by a partition 52 providing two passage-ways one of which is controlled by the valve 51. A coil spring 53 is associated with the pipe and the link 17 to normally maintain the valve 51 in a position closing the passage-way in which it is arranged.

The other passage-way is provided with a pair of flow control valves 54 and 55, the valve 54 being mounted upon a shaft 56 and the valve 55 being mounted upon the shaft

57. The valve 55 is opened by pressure on the pedal 15 which is connected with the operating rod 22 and the link 23, the link 23 being secured to the shaft 57. A coil spring 58 is anchored to a bracket 59 and to the link 23 for normally maintaining the valve 55 in substantially closed position, this valve being always open sufficiently to permit idling of the engine when the valve 51 is closed.

The valve 54 is controlled by governor mechanism of the same character as described in the preferred form of the invention, however there is a different form of connection and adjustment utilized. The rod 35 is connected at one end with a lever 60 which in turn is pivoted to a bell-crank 61 which in turn is associated with a link 62 secured to the shaft 56 upon which the valve 54 is mounted. A tooth segment 63 extends from the arm 38 and is engaged by the worm gear 64 carried by a rod 43 which extends to the dash and is provided with a knob 65 to permit rotation thereof by the driver, such a rod 43 being also connected with the lever 60 through means of a bracket 66. This bracket or bearing 66 is pivotally connected to the lever 60. The tension of the spring 42 and the relation of the head 40 therewith determines the position of the rod 35 as previously described, and through rotation of the shaft 43 the segment 63 will be rocked, thereby tilting the head 40 and shifting the bearing 41 so that the tension on the spring 42 can be increased or decreased depending on the maximum limited speed desired. The connections between the rod 35 and the valve 54 normally maintain the valve in an open position permitting sufficient fuel to pass through the surrounding passageway to produce engine power sufficient to operate the automobile at a predetermined maximum speed. The valve 55 is operated by the pedal 15 to provide a driving range anywhere below that at which the throttle 54 is set to permit, while any speed below such setting must be controlled by throttle valve 55. The throttle valve 51 can be operated regardless of the positions of the throttle valves 54 and 55 to provide sufficient fuel to produce a speed range, the maximum determined only by the capacity of the engine.

Various changes can be made in the details of construction herein described without departing from the spirit of the invention and the scope of what is claimed.

What I claim is:

1. In a throttle control for engines, a fuel feed pipe, a shaft extending through said pipe, a valve fixed to said shaft interiorly of the pipe for controlling the passage of fuel, mechanism including an actuator for rotating said shaft to move the valve into open position, and a governor associated with the mechanism, said governor limiting the opening effect of the mechanism and moving the mechanism in a direction closing the valve upon engine rotation beyond a predetermined limit without affecting the position of the actuator.

2. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit controlling the passage of fuel therethrough, a rotatably mounted shaft associated to control the valve position, mechanism for rotating the shaft, and adjustable governor mechanism for limiting movement of said mechanism in a valve opening direction.

3. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit controlling the passage of fuel therethrough, a rotatably mounted shaft associated to control the position of said valve, mechanism for rotating the shaft, governor mechanism associated to limit the valve opening movement of said mechanism, and means extending remotely from the engine and manually operable to adjust said governor mechanism to vary the degree to which said valve can be opened.

4. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit for controlling the passage of fuel therethrough, a rotatably mounted shaft for controlling the valve position, means associated with the shaft to normally close the valve, mechanism for actuating the shaft to place the valve in any position in its full range of adjustment, a second mechanism for actuating the shaft to place the valve in any position in a limited range of adjustment beyond closure, and a separate adjustable governor mechanism associated to determine the extent to which said valve can be opened by the second mechanism.

5. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit for controlling the flow of fuel therethrough, a rotatably mounted shaft associated to control the valve position in the conduit, a spring associated with the shaft to normally close the valve, mechanism for actuating the shaft to place the valve in any position of its full range of adjustment, a second mechanism adapted to be actuated to rotate the shaft to open the valve, a spring normally urging said mechanism into a disengaged relation with the shaft, and an adjustable governor mechanism arranged in the path of the movement of said second mechanism to limit the extent to which the valve can be opened thereby.

6. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit adapted to control the flow of fuel therethrough, a rotatably mounted shaft associat-

ed to control the valve position in the conduit, means associated with the shaft to normally place the valve in closed position, mechanism for actuating the shaft to place the valve in any position of its full range of adjustment, mechanism pivoted to the shaft and positively engageable therewith to move the valve in a limited open range, a spring for urging said second mechanism out of operative relation with the shaft, a pedal engaging said spring and adapted to move the spring and second mechanism to open said valve in the limited range, and an adjustable stop member against which said second mechanism engages in its movement to limit the extent to which the valve can be opened thereby.

7. In a motor vehicle, a throttle control mechanism for the engine comprising a fuel feeding conduit, a butterfly valve in the conduit controlling the passage of fuel therethrough, a rotatably mounted shaft associated to control the valve position in the conduit, a spring associated with the shaft to normally move the valve to closed position, mechanism associated with the shaft adapted to be operated to move the valve in an opening direction, a governor mechanism limiting the extent to which said mechanism can be moved to open the valve, and means extending to the vehicle dash and associated with the governor mechanism to adjustably position the same to stop the opening movement of said valve operating mechanism at a desired engine speed.

8. In a throttle control mechanism for internal combustion engines, a fuel feeding conduit, a butterfly valve in the conduit adapted to control the passage of fuel therethrough, a rotatably mounted shaft to which the valve is fixed, a spring associated with the shaft for normally moving the same to close the valve, mechanism adapted to be manually operated to open the valve, a rod adjustably mounted in the path of the movement of said mechanism to limit the opening of said valve, a governor associated with said rod for controlling the position thereof, and mechanism for adjusting the effect of said governor upon said rod.

9. In an engine throttle control, a fuel feed pipe, a valve controlling the passage of fuel through said pipe, a pair of independently operating mechanisms for said valve, and adjustable means for limiting the movement of one of said mechanisms in a valve opening direction, the other of said mechanisms being freely operable at all times to open the valve any desired extent.

10. In an engine throttle control, a fuel feed pipe, valve means controlling the passage of fuel through said pipe, a pair of independently operable mechanisms for regulating said valve means, and adjustable means independent of but associated to limit the opening movement of one of said mechanisms, the other mechanism being freely operable at all times to regulate the associated valve means within its entire range of adjustment.

In testimony whereof I affix my signature.

ALFRED MOORHOUSE.