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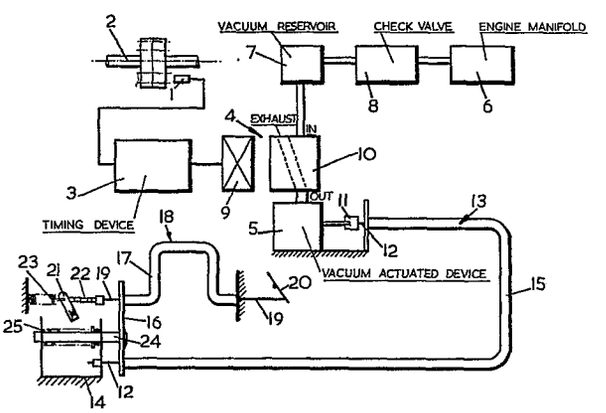
(54) A maximum speed control device.

(57) A maximum speed control device for limiting the top speed of a internal combustion engine, comprising means (21) for supplying fuel to the engine, a throttle control (20) linked to the fuel supply means (21) by a cable (18), means (1) for monitoring the speed of the engine, means (3) for providing an output when the speed of the engine exceeds a predetermined limit, and means for automatically reducing the supply of fuel to the engine in response to said output. The means for automatically reducing the supply of fuel to the engine comprises means (11, 13 and 16) for increasing the effective length of the throttle cable (18) in response to said output, thereby reducing the supply of fuel, until such time as the engine speed falls below the said predetermined limit and said output ceases.



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The present invention relates to a maximum speed control device, for limiting the top speed of an internal combustion engine.

According to the present invention there is provided a maximum speed control device for limiting the top speed of an internal combustion engine, comprising means for supplying fuel to the engine, a throttle control linked to the fuel supply means by a cable, means for monitoring the speed of the engine, means for providing an output when the speed of the engine exceeds a predetermined limit, and means for automatically reducing the supply of fuel to the engine in response to said output, characterised in that said means for automatically reducing the supply of fuel to the engine comprises means for increasing the effective length of the throttle cable in response to said output, thereby reducing the supply of fuel, until such time as the engine speed falls below the said predetermind limit and said output ceases.

Preferably increasing the effective length of the throttle cable makes the throttle control non-effective on the carburettor and allows the carburettor to return to its closed position.

Preferably the throttle cable comprises a portion there of which during normal engine operation is held taut by said means for increasing the effective length of the throttle cable, but which when the engine exceeds the said predetermined limit is slackened by said means for increasing the effective length of the throttle cable.

Preferably the supply of fuel is reduced until such time as the engine speed falls below a further predetermined limit set below the said predetermined limit, at which further predetermined limit said output ceases.

Preferably the means for increasing the effective length of the throttle cable comprises an outer cable disposed over said portion of the throttle cable and through which the throttle cable is movable, one end of the outer cable being fixed in position and the other end being movable back and forth along the throttle cable to tension or slacken the throttle cable.

Preferably the said movable end of the outer cable is attached to a plate which is movable in response to said output.

The plate may be held in position by a cam which is rotated in response to said output, thereby moving the plate.

Alternatively the plate may be attached to the outer cable of a control cable, the inner cable of which is movable through the outer cable of the control cable and which is shortened in response to said output, thereby causing the said outer cable of the control cable to move over the inner cable, moving the plate with it.

Preferably the means responsive to said output comprises a vacuum solenoid valve which vacuum solenoid valve supplies a vacuum to a vacuum actuated device which device actuates the plate moving means.

Preferably the vacuum is derived from the engine

manifold.

Embodiments of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a schematic diagram of a motor vehicle maximum speed control device embodying the present invention; and

Fig. 2 shows an alternative carburettor shut down mechanism to the mechanism of Fig. 1.

Referring to Fig. 1 there is shown a sensor 1 which produces pulses at a rate proportional to the rate of rotation of the drive shaft 2 of a vehicle (not shown). The pulses are input to an electronic timing device 3, of the type described in Published British Patent Application No: 2,045,475 which monitors the rate of pulses and produces an output when the rate thereof exceeds a reference rate held in the timing device 3. Since the rate of rotation of the drive shaft 2 is proportional to the speed of the vehicle, the timing device 3 produces an output only when the speed of the vehicle exceeds a predetermined limit as set by the reference rate. Since the sensor 1 and timing device 2 are known from Published British Patent Application No. 2,045,475 a detailed description thereof is not given here.

The output of the timing device 3 is used to operate a solenoid valve 4 which controls the application of a vacuum to a vacuum actuated device 5. The vacuum is drawn from the engine manifold 6 and stored in a vacuum reservoir 7 for use during periods of reduced vacuum. A check valve 8

prevents the vacuum being lost back to the manifold 6. The solenoid valve 4 comprises a solenoid 9, the operation of which needs no explanation, and a valve 10, which is switched, by the solenoid from an "exhaust" position to an "in" position, when the speed of the vehicle exceeds the predetermined limit. When switched the valve 10 applies the vacuum in the vacuum reservoir 7 to the vacuum actuated device 5.

The vacuum actuated device 5 comprises a movable member 11 which is attached to the inner cable 12 of a control cable 13. The inner cable 12 is fixed in position at its other end from the device 5 to, for example, the body of the engine indicated at 14. An outer cable 15 is located over the inner cable 12 which is movable through the outer cable 15. The outer cable 15 is held in position at its end adjacent the device 5 and is shorter than the inner cable 12 so that it exposes a portion thereof at its other end from the device 5, which end is attached to a plate 16. A certain degree of slack is provided in the control cable 13 as indicated by the U shaped portion thereof.

When a vacuum is applied to the vacuum actuated device 5, as a result of the speed of the vehicle exceeding the predetermined limit, the vacuum actuated device 5 causes the movable member 11 to pull on the inner cable 12 of the control cable 13. This has the effect of taking up the slack in the inner cable 12 of the control cable 13, that is shortening its effective length. However it does not take up any of the slack in the outer cable 15, which as

a result of the decreases in the effective length of the inner cable 12 therethrough moves over the exposed portion of the inner cable 12.

Since the outer cable 15 is attached to the plate 16, the plate 16 is caused to move when the outer cable does so.

Also attached to the plate 16 is the outer cable 17 of the vehicle throttle cable 18. The other end of the outer cable 17 is fixed in position. The inner cable 19 of the throttle cable is movable through the throttle outer cable 17 and is attached at one end to the accelerator pedal 20 of the vehicle and at the other end to the carburettor 21 of the vehicle through a chain 22. A spring 23 fixed at one end and attached at its other end to the carburettor 21 pulls the carburettor 21 to the closed position and the accelerator pedal 20, through the throttle inner cable 19, to the idle position. Pushing down on the accelerator pedal 20 against the spring 23 opens the carburettor 21. The length of the throttle inner cable 19 such as to provide a degree of slack therein between carburettor 21 and the accelerator pedal 23, however this slack is taken up by the throttle outer cable 17.

During normal operation of the vehicle the plate 16 is pushed on the end of a rod 24 by a spring 25 towards the fixed end of the throttle outer cable 17, thus decreasing the effective length of the throttle inner cable between the plate 16 and the fixed end of the throttle outer cable 17, thus keeping the throttle inner cable 19 taut. However, when the vehicle speed exceeds

the predetermined limit set in the timing device 3 the plate 16 is moved away from the fixed end of the throttle outer cable, as described hereinabove, slackening the throttle inner cable 19. As a result the carburettor 22 is pulled back to the closed position by the spring 23 and the accelerator pedal 20 goes down to the floor of the car. In this way power from the engine is lost and the driver is reminded that he is exceeding the speed limit set for the vehicle.

Once the speed of the car falls back to the predetermined limit the movable member 11 ceases to pull on the inner cable 12 of the control cable 15. As a result the spring 25 pushes the plate 16 back to its normal position, removing the slack in the throttle inner cable 19.

Referring now to Fig. 2 there is shown an alternative carburettor shut down mechanism to the mechanism of Fig. 1. Only the mechanism itself is shown, the mechanism actuating apparatus being identical to that of Fig. 1 up to the vacuum actuated device.

When the vehicle speed exceeds the predetermined limit set by the timing device 3 (see Fig. 1) the vacuum actuated device 5 (see Fig. 1) pulls on the inner cable 26 of a control cable 27. The inner cable 26 is attached to an actuator cam 28 which is pivotal about a point 29. The position of the cam 28 about its pivotal point 29 determines the position of a plate 30 which is attached to the outer cable 31 of the vehicle throttle cable 32. When the inner cable 26 of the control cable 27 pulls on the cam 28 the plate 30 moves changing the position of the throttle outer

cable 32. As explained with reference to Fig. 1 adjusting the position of the throttle outer cable 32 increases or decreases the amount of slack in the throttle inner cable 33 thereby allowing a carburettor return spring 34 to return the carburettor 35 to its closed position or the accelerator pedal (not shown) to open the carburettor 35. In Fig. 2 when the inner cable 26 pulls on the cam 28 the plate 30 moves and increases the slack in the throttle inner cable 33.

As a vehicle speed falls below the predetermined limit the tension in the inner cable 26 is relaxed and a cam actuator return spring 36 pulls the cam 28 back to its normal position, changing the position of plate 30 and decreasing the slack in the throttle inner cable.

It will be appreciated that other means may be provided for changing the position of the throttle inner cable to thereby increase or decrease the amount of slack in the throttle inner cable.

It will further be appreciated that the means for operating the carburettor shut down mechanism need not be only vacuum operated. For example, the output of the timing device may be used to operate an electrically operated actuating device.

CLAIMS

1. A maximum speed control device for limiting the top speed of an internal combustion engine, comprising means for supplying fuel to the engine, a throttle control linked to the fuel supply means by a cable, means for monitoring the speed of the engine, means for providing an output when the speed of the engine exceeds a predetermined limit, and means for automatically reducing the supply of fuel to the engine in response to said output, characterised in that said means for automatically reducing the supply of fuel to the engine comprises means for increasing the effective length of the throttle cable in response to said output, thereby reducing the supply of fuel, until such time as the engine speed falls below the said predetermined limit and said output ceases.

2. A maximum speed control device according to claim 1 characterised in that increasing the effective length of the throttle cable makes the throttle control non-effective on the carburettor and allows the carburettor to return to its closed position.

3. A maximum speed control device according to claims 1 or 2 characterised in that the throttle cable comprises a portion thereof which during normal engine operation is held taut by said means for increasing the effective length of the throttle cable, but which when the engine speed exceeds the said predetermined limit is slackened by said means for increasing the effective length of the throttle cable.

4. A maximum speed control device according to claims 1, 2 or 3 characterised in that the supply of fuel is reduced until such time as the engine speed falls below a further predetermined limit, set below the said predetermined limit, at which further predetermined limit said output ceases.

5. A maximum speed control device according to any preceding claim characterised in that the means for increasing the effective length of the throttle cable comprises an outer cable disposed over said portion of the throttle cable and through which the throttle cable is movable, one end of the outer cable being fixed in position and the other end being movable back and forth along the throttle cable to tension or slacken the throttle cable.

6. A maximum speed control device according to claim 5, characterised in that the said movable end of the outer cable is attached to a plate which is movable in response to said output.

7. A maximum speed control device according to claim 6, characterised in that the plate is held in position by a cam which is rotated in response to said output, thereby moving the plate.

8. A maximum speed control device according to claim 6, characterised in that the plate is attached to the outer cable of a control cable, the inner cable of which is movable through the outer cable of the control cable and which is shortened in response to said output,

thereby causing the said outer cable of the control cable to move over the inner cable, moving the plate with it.

9. A maximum speed control device according to any of claims 6, 7 or 8, characterised in that the means responsive to said output comprises a vacuum solenoid valve, which vacuum solenoid valve supplies a vacuum to a vacuum actuated device which device actuates the plate moving means.

10. A maximum speed control device according to claim 9, characterised in that the vacuum is derived from the engine manifold.

11. A maximum speed control device substantially as hereinbefore described with reference to the accompanying drawings.

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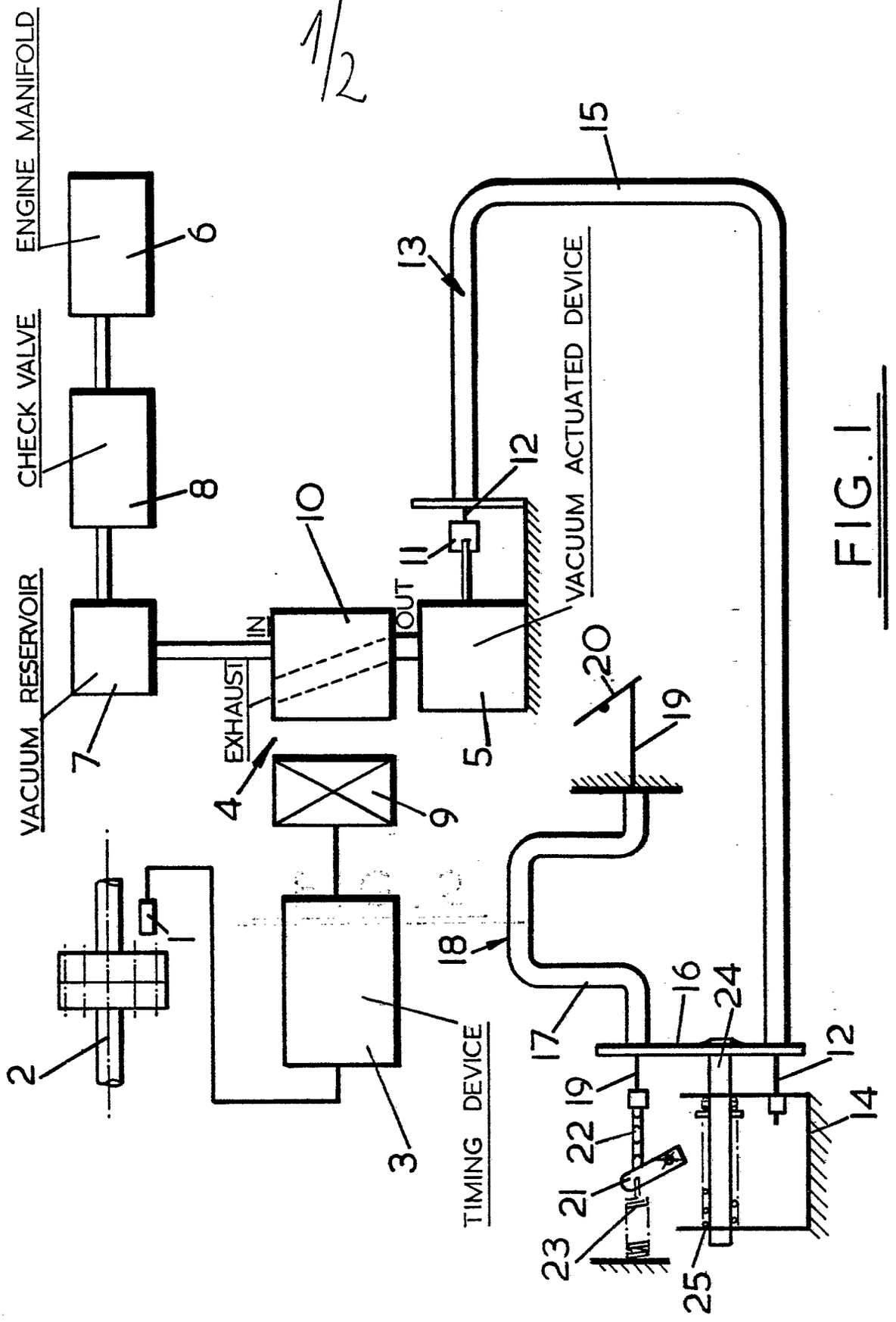

FIG. 1

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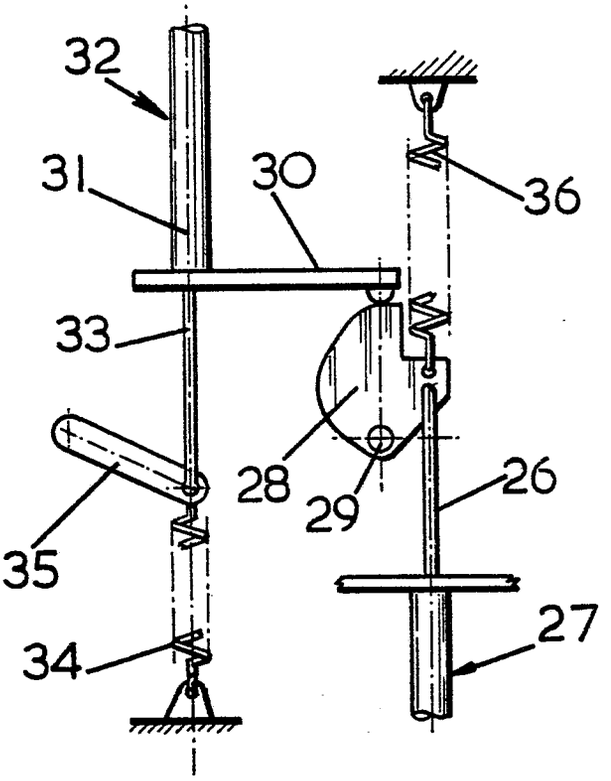

FIG. 2