Oct. 28, 1947. R. GEDSTAD 2,429,714

AUXILIARY DECELERATOR FOR INTERNAL-COMBUSTION ENGINES

Filed Dec. 21, 1945 2 Sheets-Sheet 1

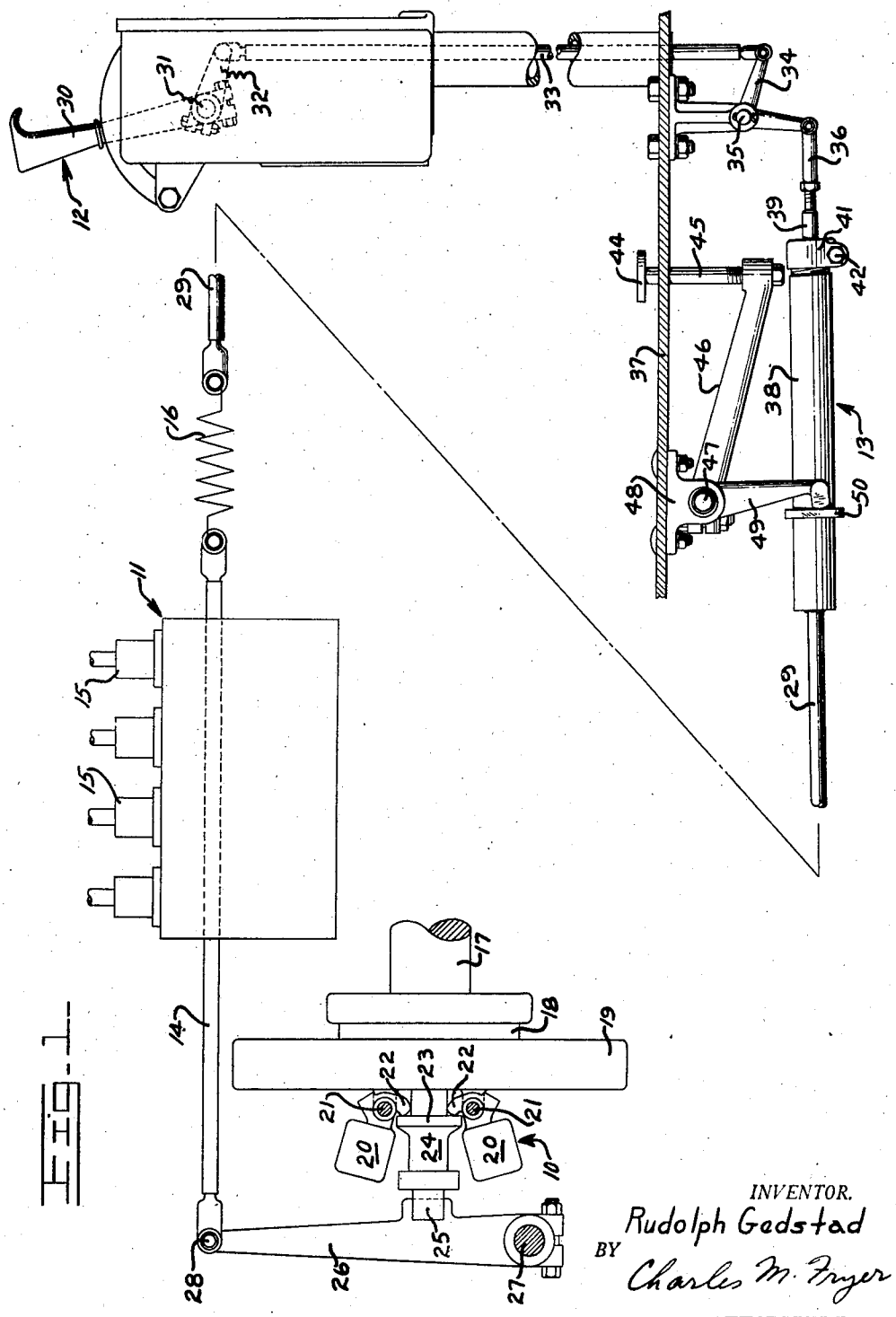

Fig. 1

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Fig. 2.

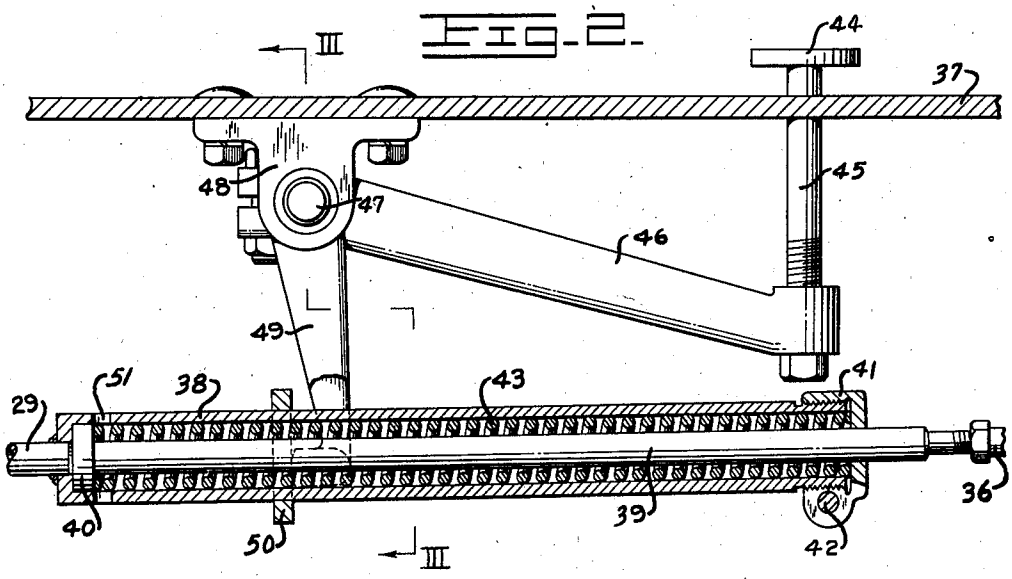
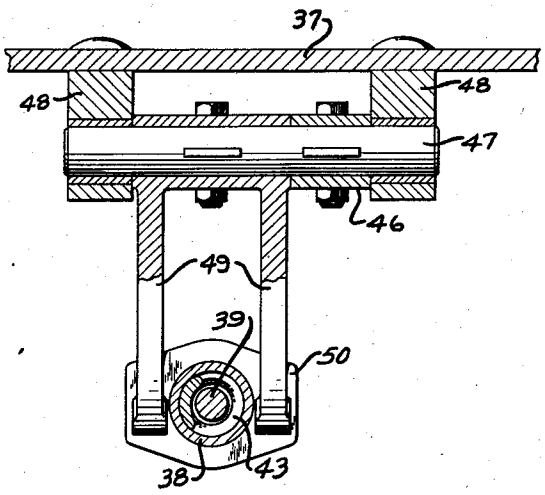


Fig. 3.



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AUXILIARY DECELERATOR FOR INTERNAL-COMBUSTION ENGINES

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1 Claim. (Cl. 74—482)

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The present invention relates to an auxiliary decelerator for internal combustion engines and particularly to an engine decelerating device which may be operated by foot in conjunction with an engine which is normally accelerated and decelerated through the medium of a manually controlled system.

In many tractors, as well as other types of road grading and earth moving vehicles, there are several hand actuated levers under the operator's control. For example, there are, in addition to steering means, various clutches and levers for controlling the movement of the vehicle over the ground and also manually controlled means for raising or lowering a bulldozer blade or other similar earth handling equipment. The operation of the engine which drives the vehicle is customarily controlled by a hand throttle capable of being set for any desired engine speed. Frequently, the hand throttle is set at full load position and, due to a change in operating conditions, the load which the vehicle is handling is reduced calling for an adjustment of the throttle. This may occur while the operator is negotiating a turn or while the vehicle is passing over the crest of a high spot in the terrain or under various other circumstances requiring adjustments which occupy both hands of the operator and render it impractical for him to adjust the throttle.

It is desirable, therefore, in order to provide improved operating conditions, that the operator of such a vehicle be able momentarily to decelerate the engine while his hands are otherwise occupied.

It is an object of the present invention to provide in combination with a vehicle having an engine and a manually actuated throttle therefor an auxiliary foot actuated decelerating means. A further object of the invention is to provide a foot decelerator for an engine normally controlled by a hand throttle which will effect momentary deceleration upon being depressed and which will permit immediate acceleration upon being released without disturbing the position or controlling effect of the hand throttle. Further objects and advantages of the invention are made apparent in the following specification in which reference is made to the accompanying drawings.

The drawings illustrate the invention as applied to the throttle control system of a compression ignition engine though it will be apparent from reading the following specification that the decelerator of the present invention is applicable to other types of engines.

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In the drawings:

Fig. 1 is a diagrammatic view illustrating the fuel control system for an internal combustion engine of the compression ignition type showing the application thereto of a foot decelerator constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary view of the foot decelerator illustrated in Fig. 1 with parts shown in section; and

Fig. 3 is a sectional view taken on line III—III of Fig. 2.

The fuel control system illustrated in Fig. 1 comprises a governor assembly generally indicated at 10, a fuel pump housing 11, a hand throttle 12 and the foot decelerator mechanism of the present invention generally indicated at 13. A control rod 14 extends through the fuel pump assembly 11 and, through conventional mechanism, not shown, engages with plungers of pumps 15 within said assembly in such a manner that reciprocation of the control rod 14 adjusts the pump plungers to effect the volume of fuel delivered thereby to the cylinders of the engine. The position of the control rod 14 and therefore the volume of fuel delivered to the engine is controlled by the governor mechanism 10 engaging the rod 14 at one end and by a spring 16 engaging the rod at the other end and adjustably tensioned by the throttle 12.

The governor 10 is usually driven by a cam shaft 17 of the engine with which it is associated. The cam shaft, through gears indicated at 18 and 19, revolves a pair of governor fly weights 20 which are pivotally connected to the gear 19 as by pins 21. As the gear 19 rotates the fly weights 20 tend to swing outwardly and fingers 22 thereon engage a flange 23 on a slidable sleeve 24. The end of the sleeve 24 has a bifurcated portion 25 engaging a lever 26 which swings about a stationary pivot 27 at one end and is pivotally connected at its other end as by a pin 28 with the control rod 14. The spring 16 is connected at one end to the control rod 14 and at its opposite end with a rod 29 which is extended as indicated by the broken line in Fig. 1 to a point adjacent the operator's station on the vehicle which is driven by the engine.

The tension on the spring 16 which counterbalances the operation of the governor is under control of the throttle 12 which has a hand lever 30 fixed to a shaft 31. Also fixed to the shaft 31 is a lever 32 which is pivoted to a connecting rod 33. One end of the connecting rod 33 is pivoted to a bell crank 34 pivotally supported on

a pin 35 and the bell crank is also connected with a rod 36 which, through the medium of the foot decelerator mechanism 13 is connected with the rod 29 in a manner presently to be described. The rods 29 and 36 may be considered as a single rod which would be constructed in one piece were it not for the interposition of the decelerator mechanism 13 of the present invention. The hand throttle operating connections just described form no part of the present invention but are disclosed as typical of conventional control mechanism.

A portion of the rod 29 as illustrated in Figs. 1 and 2 is arranged to underlie the operator's platform, a fragment of which is illustrated at 37. Directly beneath the platform 37 the rod 29 is connected with the rod 36 by means of the structure illustrated in Fig. 2 wherein the rod 29 is shown as having an elongated cylindrical casing 38 secured to its end as by welding and the rod 36 is shown as having a plunger 39 with an enlarged head 40 thereon reciprocably disposed within the cylinder 38. A threaded cap 41 serves as an enclosure for one end of the cylinder 38 and is locked in place by means of a cap screw 42. An expansible coil spring 43 is disposed within the cylinder 38 and bears at one end against the cap 41 and at its opposite end against the enlarged head 40 of the plunger 39. The plunger 39 is therefore held by the spring 43 in the position illustrated in Fig. 2 with its head 40 against the end of the cylinder 38 to which the rod 29 is secured. The spring 43 is heavier than the governor controlled spring 16 and is sufficiently heavily loaded that it is not effected upon adjustment of the hand throttle 12 for establishing the desired tension of the spring 16 which balances the operation of the governor. Therefore, in normal operation of the engine under control of the hand throttle, the rods 29 and 36 operate in the manner of a single rod and the auxiliary decelerator has no effect. The engine, however, may be quickly decelerated without the necessity of disturbing the position of or in any way moving the hand throttle.

By urging the cylinder 38 to the left, as viewed in Figs. 1 and 2, against the resistance of the spring 43, the tension on the spring 16 may be reduced to decelerate the engine. This is accomplished by a foot pedal 44 which extends to a position above the platform 37 where it may be readily depressed by the operator's foot. The foot pedal 44 has a shaft 45 which extends downwardly through the platform and connects at its lower end with a lever 46. The lever 46 is keyed to a shaft 47 which rotates in bearing brackets 48 also secured to the platform 37 as best shown in Figs. 2 and 3. Also keyed to the shaft 47 for oscillation therewith is a bifurcated lever 49, the

lower ends of which embrace the cylinder 38 and are engageable against a collar 50 which is rigidly secured to the exterior of the cylinder as by welding or the like.

With the construction illustrated, the pressure of the foot pedal 44 effects swinging of the lever 49 to the left as illustrated in Figs. 1 and 2 and through engagement of the lever with the collar 50 the cylinder 38 and rod 29 are moved in a direction to relieve tension on the spring 16 thus decelerating the engine while the rod 36 and manually controlled throttle to which it is connected are left undisturbed. The deceleration of the engine in this manner, of course, imposes an additional load on the spring 43 which is compressed and when the operator's foot is removed from the pedal 44 the spring expands to return the cylinder and the rod 29 to their original position determined by the setting of the hand throttle. The cylinder 38 is preferably provided with vents as indicated at 51 to admit atmosphere and prevent the creation of a partial vacuum in the cylinder as it moves with relation to the head 40.

The operator of a vehicle provided with the decelerator of the present invention may at any time effect immediate deceleration of the engine without the necessity of using his hands and without the necessity of thereafter resetting the hand throttle to reestablish the normal engine speed under which the vehicle is being operated.

I claim:

In a vehicle having an engine and an operator's platform, a manually actuated throttle lever adjacent the platform and connected with the engine by a control rod underlying the platform, a cylinder on one portion of said rod, a plunger on another portion of said rod disposed for reciprocation in said cylinder, a spring surrounding the rod and interposed between the cylinder and plunger and maintaining the effective length of the rod fixed during manipulation of the manual control, a foot actuated pedal extending through the platform, a lever actuated by said pedal and a collar on said cylinder engageable by said lever to move the cylinder and compress the spring therein to effect throttling independently of the manual control.

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