Dec. 2, 1958 J. L. BAUGHMAN ET AL 2,862,587

BRAKE PEDAL ACTUATED AUXILIARY DECELERATOR FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 26, 1956 2 Sheets-Sheet 1

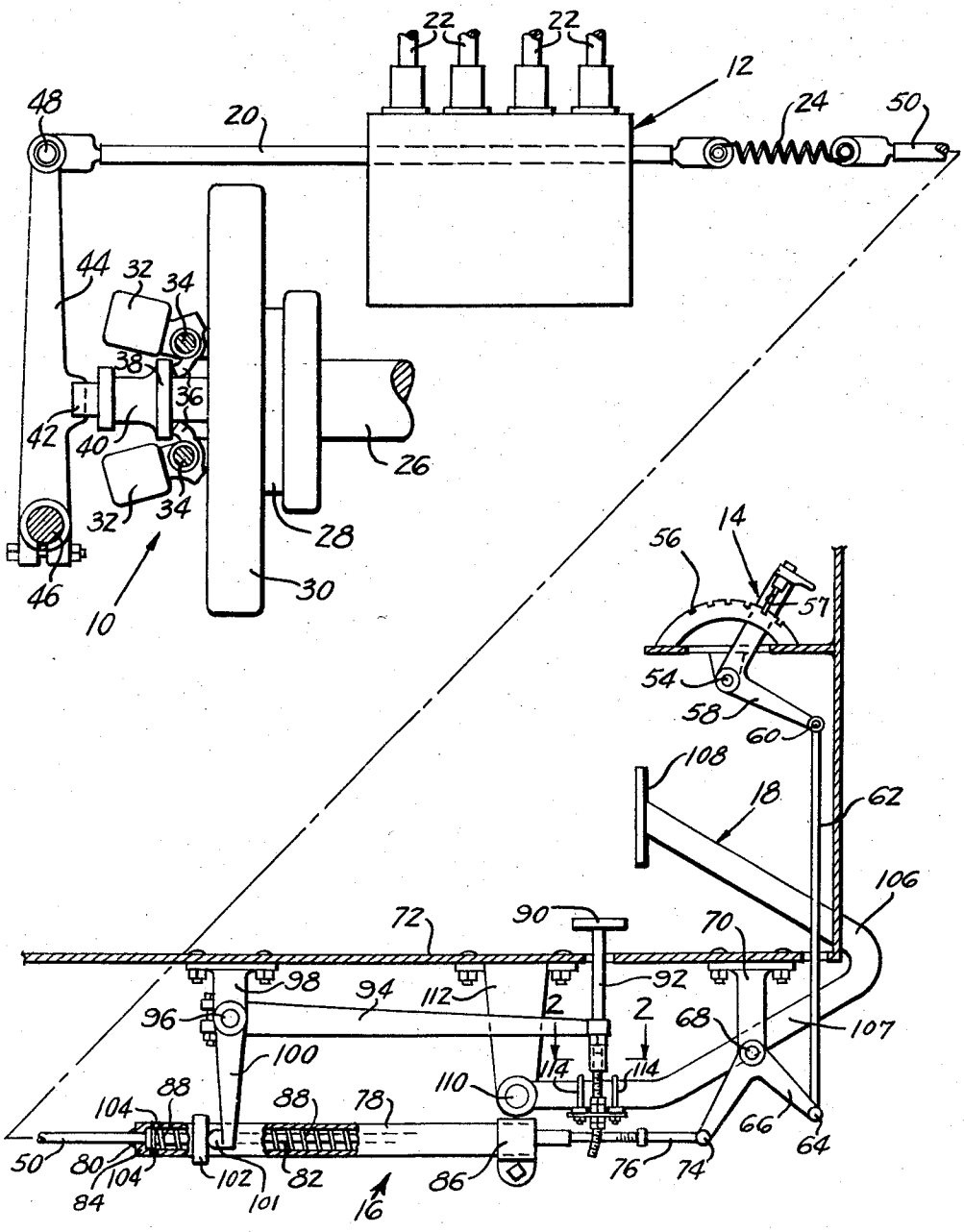

FIG. 1

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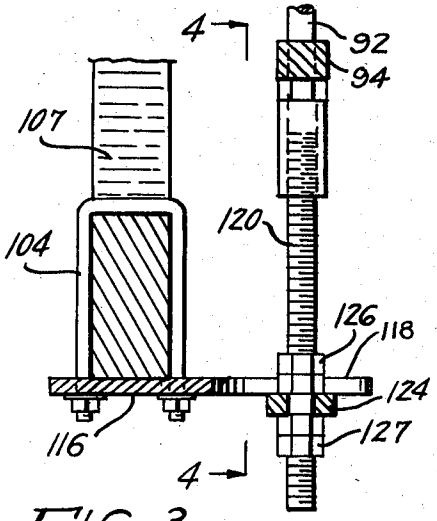

FIG. 3

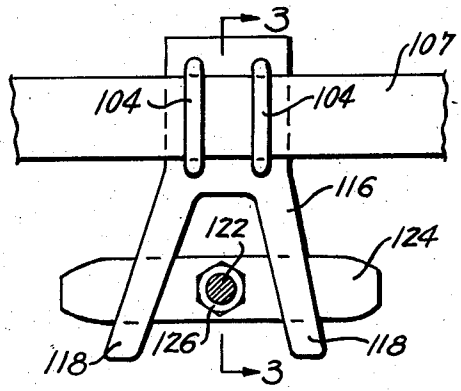

FIG. 2

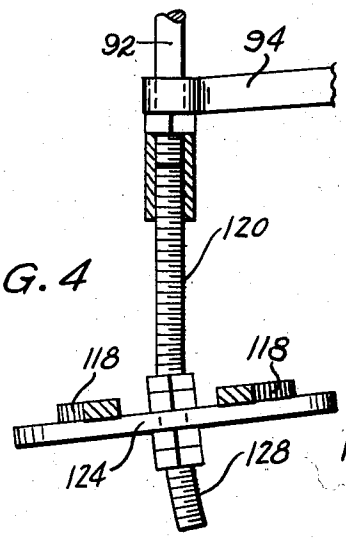

FIG. 4

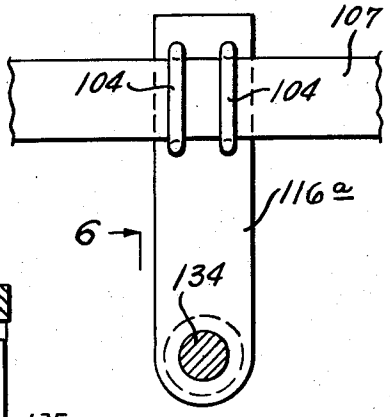

FIG. 5

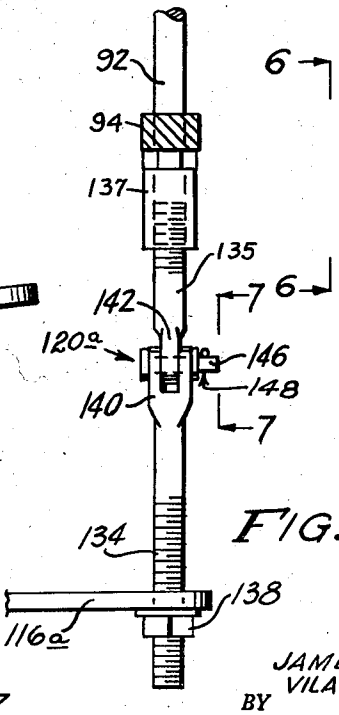

FIG. 6

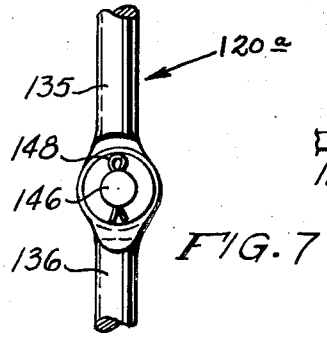

FIG. 7

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2,862,587

BRAKE PEDAL ACTUATED AUXILIARY DECELERATOR FOR INTERNAL COMBUSTION ENGINES

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Application October 26, 1956, Serial No. 618,510

3 Claims. (Cl. 192—3)

This invention relates to an improved internal combustion engine decelerating device which is automatically actuated by depression of a brake pedal, and the engine is normally accelerated and decelerated through the medium of a manually controlled system.

In the operation of heavy equipment, such as earth movers, road graders, dozers, and the like, the engine thereof is normally set by means of a hand throttle to operate at a constant relatively high speed, and it is desirable when the vehicle is braked, to decelerate the engine so as to reduce the power thereof, and to save fuel and wear upon the engine.

A primary object of invention is to provide an efficient and reliable brake pedal actuated control of the kind indicated for use in systems such as that disclosed in the Patent No. 2,429,714 to Rudolph Gedstad, issued October 28, 1947.

Another object of the invention is to provide a control of the character indicated which can be made in rugged and serviceable forms at relatively low cost, is easily installed and maintained, and is highly satisfactory, practical and acceptable for the purpose intended.

These, together with other objects and advantages which will become apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout the several views and in which:

Figure 1 is a schematic view showing a fuel control system for an internal combustion engine of the compression ignition type with which is associated a brake pedal decelerator control in accordance with the present invention;

Figure 2 is an enlarged fragmentary horizontal sectional view taken substantially on line 2—2 of Figure 1;

Figure 3 is a fragmentary vertical transverse sectional view taken substantially on line 3—3 of Figure 2;

Figure 4 is a fragmentary vertical longitudinal sectional view taken substantially on line 4—4 of Figure 3;

Figure 5 is a fragmentary horizontal sectional view similar to Figure 2, showing an alternate arrangement of the structure thereof;

Figure 6 is a fragmentary vertical transverse sectional view looking substantially from line 6—6 of Figure 5, showing approximately the same structure as in Figure 3; and

Figure 7 is a further enlarged fragmentary side elevational view looking substantially from line 7—7 of Figure 6.

Referring to the drawings in detail, and more particularly to Figure 1, there is therein shown a fuel control system similar to that disclosed in Patent No. 2,429,714, which comprises a governor 10, a fuel pump 12, a hand throttle lever 14, a foot brake pedal 18, and decelerating mechanism 16. A control rod 20 extends through the fuel pump 12 and through conventional mechanism,

not shown, engages with plungers 22 within the pump in such a manner that reciprocation of the control rod 20 adjusts the pump plungers to effect control of the volume of fuel delivered to the cylinders of an engine. The position of the control rod 20 and, therefore, the volume of fuel delivered to the engine is controlled by the governor 10 to which one end of the rod 20 is connected, the other end of the rod 20 being connected by a spring 24 and linkage to the throttle lever 14.

The governor 10 is driven by a cam shaft 26 of the engine with which it is associated. The cam shaft, through gears indicated at 28 and 30, revolves a pair of governor fly weights 32 which are pivotally connected to the gear 30 by means of pivot pins 34. As the gear 30 rotates the fly weights 32 tend to swing outwardly and fingers 36 thereon engage a flange 38 on a slidable sleeve 40. The end of the sleeve 40 has a slot 42 receiving an intermediate part of a lever 44 which is mounted at one end on a supporting pivot 46 and is connected at its other end as by a pin 48 with the control rod 20. The spring 24 is connected at one end to the control rod 20 and at its opposite end with a rod 50 which is extended as indicated by the broken line in Figure 1 to a point adjacent the vehicle operator's station.

The tension of the spring 24 counterbalances the operation of the governor 10 and is under control of the throttle lever 14 which is fixed to a shaft 54. Position holding means for the lever 14 may comprise a ratchet sector 56 and a spring pressed dog 57 engageable therewith. The throttle lever 14 includes a radial arm 58 pivotally connected at its free end, at 60, to the upper end of a connecting rod 62. The lower end of the connecting rod 62 is pivotally connected at 64 to one arm of bell crank 66 pivotally supported on a pivot pin 68 carried by a depending support bracket 70 secured to the under side of the vehicle floorboard 72. The other arm of the bell crank 66 is pivotally connected at 74 to the forward end of a rod 76 which is operatively connected to the decelerator mechanism 16.

The mechanism 16 includes the rod 50 which underlies the floorboard 72 in alignment with the rod 76. Extending between the rod 50 and rod 76 is an elongated cylinder 78 secured at its rear end, as by welding 80, to the forward end of the rod 50. The rod 76 has on its rear end a plunger rod 82 having an enlarged head 84 thereon working in the cylinder 78. A threaded cap 86 is secured on the forward end of the cylinder 78. An expanding coil spring 88 is circumposed upon the plunger rod 82 within the cylinder 78 and is compressed between the end cap 86 and the head 84, whereby the rod 76 is held by the spring 88 in the rearwardly retracted position shown in Figure 1, with the head 84 against the rear end of the cylinder 78 to which the rod 50 is secured. The spring 82 is stronger than the governor control spring 24 and is strong enough so that the described positions of the parts are not affected by adjustment of the hand throttle lever 14. As a result, in normal operation of the engine under the control of the hand throttle lever 14, the rods 50 and 76 operate in unison or in the manner of a single rod, and the auxiliary decelerator mechanism has no effect.

However, the engine can be quickly decelerated without the necessity of disturbing the position of or in any way moving the hand throttle lever 14, moving the cylinder 78 rearwardly or to the left in Figure 1, against the resistance of the spring 88, so as to reduce the tension of the spring 24. In accordance with the present invention, this is accomplished by providing a foot-operated means which comprises a pedal 90 above the floorboard 72 of the vehicle where it can be readily depressed by the operator's foot. The foot pedal 90 is fixed on a depending rod 92 which extends downwardly

through the floorboard 72 and is secured to the forward end of a horizontal lever 94. The rear end of the lever 94 is keyed on a support shaft 96 which rotates in a pair of spaced bearing brackets 98 (only one being shown), depending from the floorboard 72. Also keyed on the support shaft 96 is a fork 100 having arms at opposite sides of the cylinder 78 having noses 101 bearing against the forward side of an annular collar 102 which is fixed about the cylinder 78.

The above described structure is substantially that disclosed in the patent to Gedstad, Patent No. 2,429,714, wherein downward pressure on the foot pedal 90 produces swinging of the lever 100 to the left, as seen in Figure 1, and rearward movement of the cylinder 78 and rod 50, so as to relieve the tension of the spring 24 and thereby decelerate the engine, while the rod 76 and the hand throttle lever 14 are left undisturbed. Deceleration of the engine in this manner compresses the spring 88 in the cylinder 78, so that when the operator's foot is removed from the pedal 90 the spring 88 expands and returns the cylinder 78 and the rod 50 to the original positions thereof which were determined by the setting of the hand throttle lever 14. The cylinder 78 is provided with vents 104 to prevent creation of a partial vacuum in the cylinder as it moves with relation to the head 84.

The foot brake pedal 18 includes a V-shaped lever 106 having on its upper end a foot rod 108. The lower arm 107 of the lever 106 extends rearwardly beneath the floorboard 72 and is pivoted at its rear end on a transverse shaft 110 which is supported on a bracket 112 depending from the floorboard 72 behind the pedal rod 92.

U-bolts 114 embracing an intermediate portion of the lever arm 107 secure to the under side thereof a laterally extending plate 116 which has on its outer end spaced diverging legs 118 disposed at opposite sides of a vertical connecting rod 120 which is secured to the lower end of the pedal rod 92. Extending crosswise of the rod 120 is an elongated abutment plate 124 whose ends are positioned beneath the legs 118, the plate 124 being adjustably secured on the rod 120 by upper and lower nut assemblies 126 and 127 disposed at opposite sides of the plate 124. The lower end portion 128 of the rod 120, see Figure 4, is curved to conform to the arcuate path of rotation of the lever 94 about the shaft 96. Depression of the brake pedal 18 results in downward swinging of the lever 94 and rearward movement of the cylinder 78 for decelerating the engine as described hereinabove.

In Figures 5 through 7 is shown a different form of connection between the brake pedal lever 106 and the lever 94, which comprises a jointed connecting rod 120*a* which comprises a lower section 134 and an upper section 135, the upper section having on its lower end a lug 142 engaged in a clevis 140 on the upper end of the lower section 134, the lug and the clevis being traversed by a headed pivot pin 146 secured in place by a cotter pin 148. On the upper end of the upper section 135 is a threaded connection 137 to the rod 92. Secured on the lower end of the lower section 134 by a nut 138 is a lateral plate 116*a*, corresponding to the plate 116, and which is secured to the under side of the brake lever arm 107 by U-bolts 104. When the abutment plate 116*a* is moved downwardly and engages the upper side of the abutment nut 138, the lever 94 is swung downwardly and forces the cylinder 78 rearwardly so as to decelerate the engine in the manner described hereinabove.

The foregoing is considered as illustrative only of the principles of the invention. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, as fall within the scope of the appended claims.

What is claimed as new is as follows:

1. In combination, a vehicle floorboard an internal combustion engine governor, a fuel pump, first means operatively connecting the governor to the fuel pump, a manually settable throttle lever, decelerating means, spring tensioned means yieldably and operatively connecting said first means to said decelerating means, a brake pedal pivoted on said floorboard having a lower arm beneath said floorboard, said decelerating means comprising a cylinder having a rear end connecting to said spring tensioned means, a plunger rod having an enlarged head working in said cylinder, said cylinder having a forward end from which said plunger rod emerges, a spring compressed between said head and the forward end of the cylinder, second means operatively connecting said throttle lever to said plunger rod, a fork swingably supported from said support having legs straddling the cylinder and having noses, a fixed abutment collar on said cylinder having a forward side with which said noses are engaged, a forwardly extending lever fixed to said fork and having a forward end, a decelerator pedal above said support and having a depending rod secured to the forward end of said forwardly extending lever, a laterally extending first abutment plate secured on said lower arm of the brake pedal lever, a connecting rod having an upper end secured to said decelerator pedal rod and a lower end, a second abutment plate secured on the lower end of said connecting rod and positioned beneath said first abutment plate, said second abutment plate being unconnected to said first abutment plate and arranged so that the decelerator pedal can be depressed to swing the forwardly extending lever downwardly and cause the fork to push the cylinder rearwardly against the resistance of said spring without moving the brake pedal lever for decelerating an engine, and said brake pedal lever can be depressed independently of the decelerator pedal to engage the first abutment plate onto said second abutment plate and produce rearward movement of the cylinder for decelerating the engine.

2. In combination, a vehicle floorboard an internal combustion engine governor, a fuel pump, first means operatively connecting the governor to the fuel pump, a manually settable throttle lever, decelerating means, spring tensioned means yieldably and operatively connecting said first means to said decelerating means, a brake pedal pivoted on said floorboard having a lower arm beneath said floorboard, said decelerating means comprising a cylinder having a rear end connecting to said spring tensioned means, a plunger rod having an enlarged head working in said cylinder, said cylinder having a forward end from which said plunger rod emergers, a spring compressed between said head and the forward end of the cylinder, second means operatively connecting said throttle lever to said plunger rod, a fork swingably supported from said support having legs straddling the cylinder and having noses, a fixed abutment collar on said cylinder having a forward side with which said noses are engaged, a forwardly extending lever fixed to said fork and having a forward end, a decelerator pedal above said support and having a depending rod secured to the forward end of said forwardly extending levers, a laterally extending first abutment plate secured on said lower arm of the brake pedal lever, a connecting rod having an upper end secured to said decelerator pedal rod and a lower end, a second abutment plate secured on the lower end of said connecting rod and positioned beneath said first abutment plate, said second abutment plate being unconnected to said first abutment plate and arranged so that the decelerator pedal can be depressed to swing the forwardly extending lever downwardly and cause the fork to push the cylinder

rearwardly against the resistance of said spring without moving the brake pedal lever for decelerating an engine, and said brake pedal lever can be depressed independently of the decelerator pedal to engage the first abutment plate onto said second abutment plate and produce rearward movement of the cylinder for decelerating the engine, said connecting rod being one-piece with said first abutment plate fixed adjustably on the lower end of the connecting rod.

3. In combination, a vehicle floorboard an internal combustion engine governor, a fuel pump, first means operatively connecting the governor to the fuel pump, a manually settable throttle lever, decelerating means, spring tensioned means yieldably and operatively connecting said first means to said decelerating means, a brake pedal pivoted on said floorboard having a lower arm beneath said floorboard, said decelerating means comprising a cylinder having a rear end connecting to said spring tensioned means, a plunger rod having an enlarged head working in said cylinder, said cylinder having a forward end from which said plunger rod emerges, a spring compressed between said head and the forward end of the cylinder, second means operatively connecting said throttle lever to said plunger rod, a fork swingably supported from said support having legs straddling the cylinder and having noses, a fixed abutment collar on said cylinder having a forward side with which said noses are engaged, a forwardly extending lever fixed to said fork and having a forward end, a decelerator pedal above said support and having a depending rod secured to the forward end of said forwardly extending lever, a laterally extending first abutment plate secured on said lower arm of the brake pedal lever, a connecting rod having an upper end secured to said decelerator pedal rod and a lower end, a second abutment plate secured on the lower end of said connecting rod and positioned beneath said first abutment plate, said second abutment plate being unconnected to said first abutment plate and arranged so that the decelerator pedal can be depressed to swing the forwardly extending lever downwardly and cause the fork to push the cylinder rearwardly against the resistance of said spring without moving the brake pedal lever for decelerating an engine, and said brake pedal lever can be depressed independently of the decelerator pedal to engage the first abutment plate onto said second abutment plate and produce rearward movement of the cylinder for decelerating the engine, said connecting rod comprising an upper section and a lower section, said upper section being secured to the decelerator pedal rod at its upper end and having a lower end, said lower section having an upper end pivoted to the lower end of the upper section, said lower section having a lower end, said second abutment plate being engaged on said lower section, and an abutment nut on the lower end of the lower section in stop relation to said second abutment plate.

References Cited in the file of this patent

UNITED STATES PATENTS

1,548,565	Taylor	Aug. 4, 1925
1,658,325	Bragg et al.	Feb. 7, 1928
1,914,283	Otto	June 13, 1933
2,429,714	Gedstad	Oct. 28, 1947