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J. E. DILLARD

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COMPOSITE LINKAGE

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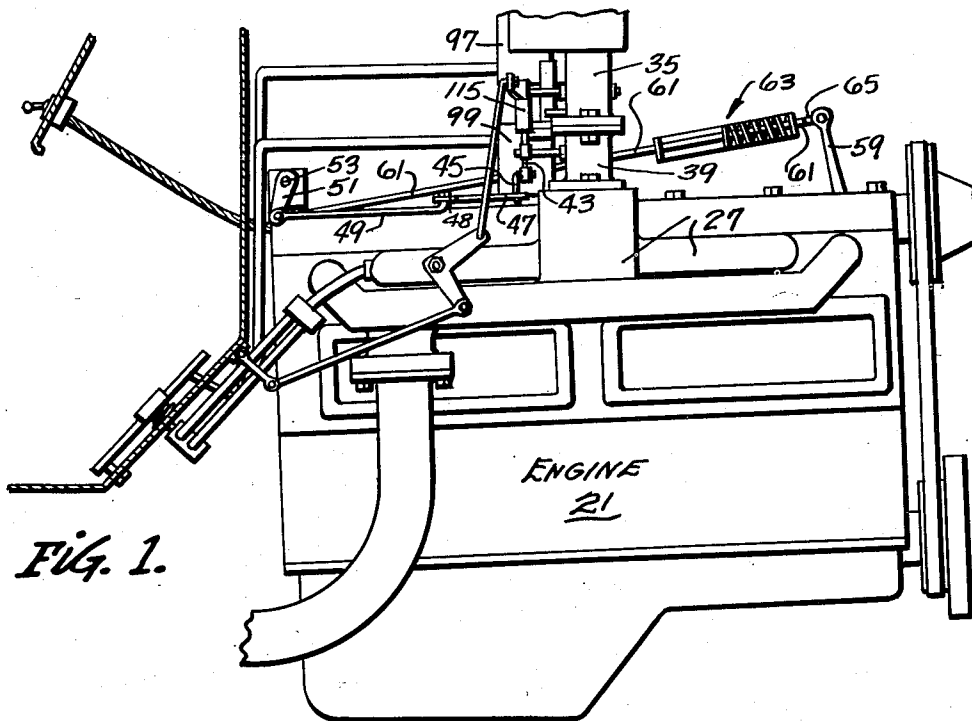


FIG. 1.

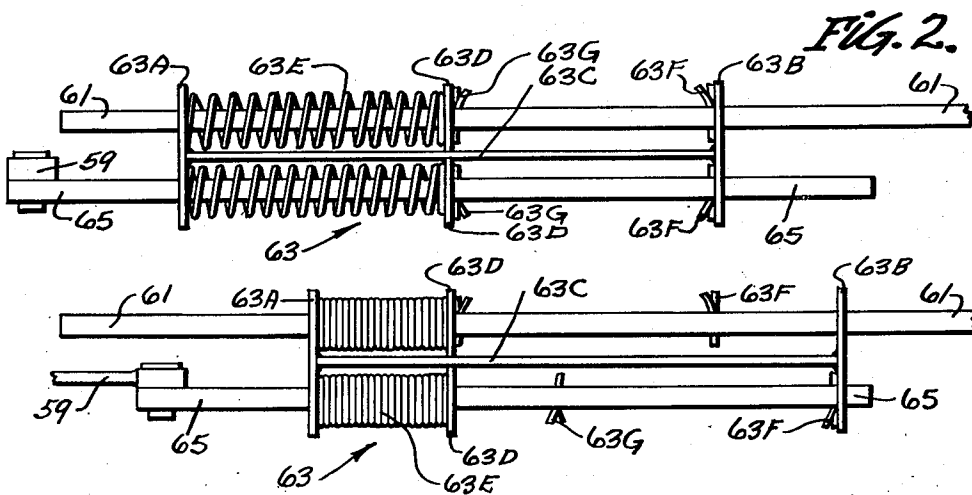


FIG. 2.

FIG. 3.

Inventor

JAMES E. DILLARD

Weatherford and Weatherford
Attorneys

UNITED STATES PATENT OFFICE

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COMPOSITE LINKAGE

James E. Dillard, Memphis, Tenn.

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2 Claims. (Cl. 74—582)

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This invention relates to certain new and useful improvements in linkage means and particularly relates to a composite linkage of a type which is adapted to be used in the coupling of a governor, for example for an internal combustion engine, to a throttle valve associated with such engine, and particularly relates further to a composite linkage which includes an overload member adapted to impart governor movement to a throttle valve and to absorb governor movement when the throttle valve is immobilized.

This application is a division of my co-pending application Serial No. 138,627, filed January 14, 1950.

The principal object of the invention is to provide a new and improved combination linkage for use in coupling moving members.

A further object of the invention is to provide a combination of new and novel linkage particularly adapted for use in the coupling of a governor for an internal combustion engine to a throttle valve.

A further object of the invention is to provide a composite linkage including an overload member normally adapted to impart governor movement to a throttle valve and to yield and absorb governor movement when the throttle valve is immobilized.

And a further object of the invention is to generally improve linkage means for effecting couplings.

The means by which the foregoing and other objects of the invention are accomplished and the manner of their accomplishment will readily be understood from the following specification upon reference to the accompanying drawings, in which:

Fig. 1 is a side elevational view of a conventional internal combustion engine, including a governor, with the preferred form of composite linkage applied in the coupling between a governor arm and a throttle valve.

Fig. 2 is a top plan view on an enlarged scale illustrating details of an overload member employed in the invention; and

Fig. 3 is a view similar to Fig. 2 illustrating the overload member under overload.

Referring now to the drawings in which the various parts are illustrated by numerals, the present invention is illustrated as mounted on an engine 21 of the conventional type employed in automobiles or other motor vehicles. Conventional vehicle portions and related instrumentalities are shown in Fig. 1, although not specifically referred to herein.

As is customary, the engine 21 is provided with an intake manifold 27 to which is connected an induction pipe which may consist of sections 35, 39, through which fuel for the engine flow, with a butterfly or gate valve adapted for control of

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fuel flow being mounted in the induction pipe, as in the section 39. Operation of the gate valve is accomplished by an arm 43, which, in the arrangement here depicted, is coupled by a link 45 to one leg 47 of the bell crank mounted on the upper surface of engine 21, the opposite leg 48 of the bell crank being shown as coupled by a link 49 to an arm 51 mounted on the engine block. The opposite end of shaft 53 is coupled by a composite linkage to the upstanding end of a governor arm 59, operation of the arm being effected by a governor, not shown, which may be of a conventional type responsive to engine speed and effecting movement of the governor arm in response to changes in engine speed.

Preferably the composite linkage consists of an elongated rod 61 coupled at its rearward end to shaft 53, preferably through an arm, not shown, similar to the arm 51, and extending forwardly from the coupling and being coupled by an overload unit 63 to a forward elongated rod 65, the forward end of rod 65 being pivoted to the upper end of governor arm 59. The rods 61, 65 are overlapped throughout a substantial portion of their lengths, substantially all of the rod 65 lying alongside the forward portion of rod 61.

Overload unit 63 preferably consists of a substantially I-shaped member having forward and rearward flanges 63A, 63B and a longitudinally extending central member 63C to which the flanges are rigidly attached, preferably as by welding. Intermediate the flanges a plate member 63D is slidably mounted on central member 63C and spring means, preferably in the form of compression springs 63E, are interposed between forward flange 63A and intermediate plate member 63D, the springs being adapted to urge relative separating movement between the forward flange and the intermediate plate member.

Flanges 63A, 63B and plate member 63D are apertured to slidably receive rods 61, 65 in parallel spaced relation and the rods are provided with stop members such as cotter pins 63F which are positioned to abut the forward face of rearward flange 63B upon rearward movement of the rods and to thereby limit such rearward movement relative to the rearward flange 63B. The rods are also provided with similar intermediate stop members, such as the cotter pins 63G positioned to abut the rearward face of plate member 63D and thereby limit relative movement between the plate member and the rods. Preferably spring members 63E surround the respective rods 61, 65 and urge intermediate plate member 63D into contact with intermediate stop members 63G.

Governor arm 59 is adapted to be oscillated under action of the governor and upon rearward movement of the upper end of arm 59 from the position as shown in Figs. 1 and 2, rearward thrust

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is imparted to rod 65, transferred by stop members 63F to rear flange 63B; through central longitudinal portion 63C to forward flange 63A and thence through springs 63E to rearwardly move the intermediate plate 63D, which, being engaged with intermediate stops 63G, effects rearward movement of rod 61, the motion of arm 59 being thus transferred to rod 61 and effecting operative movement through the linkage of the gate valve housed in the induction pipe.

Upon forward movement of the upper end of arm 59 rod 65 is also moved forwardly and through its intermediate stop 63G effects forward movement of intermediate plate 63D, which, through springs 63E, transfers this movement to the I-shaped member and through the engagement of rear flange 63B with the stop member 63F of rod 61 effects forward movement of that rod and consequent opposite operating movement of the gate valve to which the rod is coupled.

The present invention is shown as employed in an arrangement in which the gate valve member may be selectively immobilized. In the present embodiment, a pair of vacuum cylinders 97, 99 are mounted vertically and in opposition with their rods coupled, and are supported in suitable fashion. An oscillatable member 115 is coupled to the joined rods and is adapted to be moved into engagement with valve arm 43, such engagement moving the valve arm downwardly and immobilizing the valve arm and its attached valve by such engagement. Suitable operating means are provided for this immobilizing means.

With the valve arm immobilized it is desirable to compensate for governor arm shift without disturbing the immobilized arm, and the overload member of the present invention is particularly adapted for this purpose. The action is best illustrated in Figs. 2 and 3 in which the operation of the overload member under a condition of immobilization of valve arm 43 is shown. Thus upon rearward movement of the end of arm 59 from the position shown in Fig. 2 to the position shown in Fig. 3, the thrust imparted to rod 65 has, through its rear stop 63F, effected rearward movement of the I-shaped member 63. Such rearward movement has, as illustrated in Fig. 3, been absorbed by compression of springs 63E so that no rearward movement of rod 61 has been effected against the immobilization of the coupling between rod 61 and immobilized valve arm 43. In this manner the overload unit is enabled to absorb the thrust of shift of the governor arm and springs 63E are constantly urging return of the coupling to its normal position illustrated in Fig. 2. Thus upon forward movement of the upper end of governor arm 59 from the position shown in Fig. 3, releasing pressure on rear flange 63B by moving stop 63F forwardly away from the flange, the action of springs 63E will be effective to return the device to the position shown in Fig. 2.

I claim:

1. Linkage means, for operably coupling an engine throttle valve and valve operating means, which includes a rod having one end connected to said operating means and having its opposite end extending away from said operating means, a second rod having one end coupled to said valve and having its opposite end extending toward said operating means, said opposite rod ends being disposed in lapped relation, a substantially I-shaped member consisting of a pair of flanges

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spaced apart longitudinally of said rods, and a longitudinal member rigidly fixed to said flanges maintaining said flanges in spaced relation, said flanges lying transverse said rods and being apertured to slidably receive said lapped rod ends, said lapped rod ends being disposed in said apertures, a plate slidably mounted on said longitudinal member and said rod ends intermediate said flanges, spring means disposed between said plate and the said flange proximate said operating means urging said plate toward the said flange remote from said operating means, stop means carried by said lapped rod ends intermediate said flanges, positioned for engagement by said plate during spring urged plate movement toward said remote flange to limit said movement, and stop means carried by said lapped rod ends adjacent said remote flange positioned to engage said remote flange during rod movement away from said operating means to limit said rod movement, whereby to yieldingly couple said lapped rod ends.

2. Linkage means, for operably coupling an engine throttle valve and valve operating means, which includes a rod having its forward end connected to said operating means and extending rearwardly away from said operating means, a second rod having its rear end coupled to said valve and extending forwardly toward said operating means, the rearward end portion of the first said rod overlapping the forward end portion of said second rod, said end portions being substantially parallel and transversely spaced apart, a substantially I-shaped member consisting of a forward flange and a rearward flange spaced apart longitudinally of said rods and a longitudinal member extending between said rod ends, said longitudinal member being rigidly fixed to and spanning between said flanges and maintaining said flanges in spaced relation, said flanges lying transverse said rods and being apertured to slidably receive said end portions, said lapped end portions being disposed in said apertures, a plate slidably mounted on said longitudinal member and rod ends intermediate said flanges, compression spring means surrounding said end portions intermediate said plate and said forward flange, said spring means urging said plate toward said rearward flange, stop means carried by said lapped end portions intermediate said flanges, positioned for engagement by said plate during spring urged plate movement toward said rearward flange to limit said movement, and stop means carried by said lapped end portions adjacent said rearward flange, positioned to engage said rearward flange during rod movement away from said operating means to limit said rod movement, whereby to yieldingly couple said lapped end portions.

JAMES E. DILLARD.

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