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G. A. RUBISSOW

2,258,625

FLEXIBLE ACCELERATOR DEVICE

Filed April 26, 1939

Fig. 1

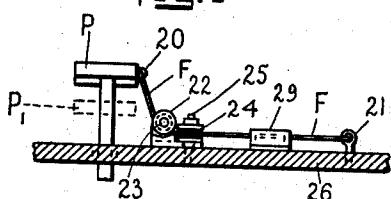


Fig. 6

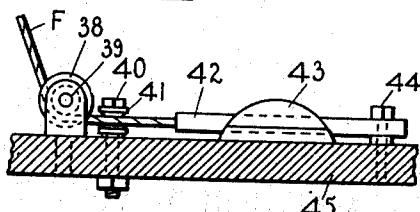


Fig. 2

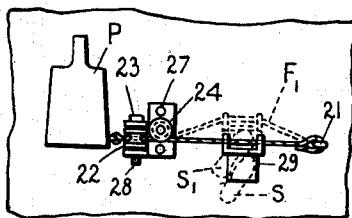


Fig. 7

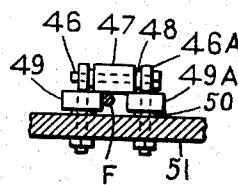


Fig. 8

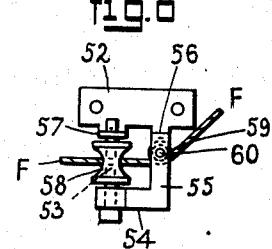


Fig. 3

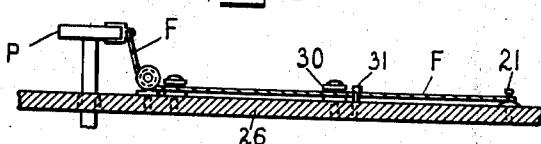


Fig. 9

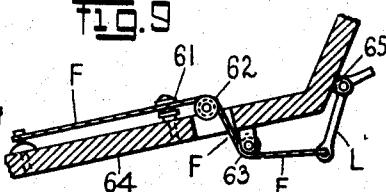


Fig. 4

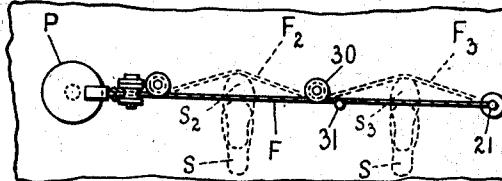


Fig. 10

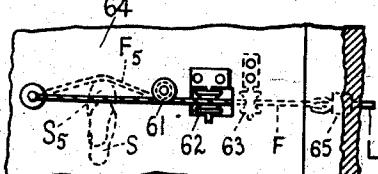


Fig. 5

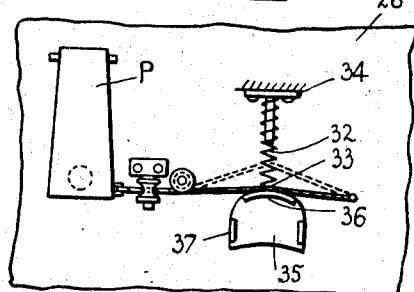


Fig. 11

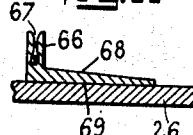
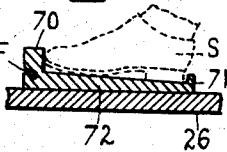


Fig. 12



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UNITED STATES PATENT OFFICE

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FLEXIBLE ACCELERATOR DEVICE

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12 Claims. (Cl. 74—513)

The existing accelerator devices actuated by means of footwear (or foot) are all very defective because they require a constant pressure from the footwear of the operator, which pressure may only be maintained if constant will-power is used and is maintained in the muscles and nerves of the leg and/or the feet of the operator. Furthermore, in existing accelerator pedal devices, the driver must always lift his toes and sometimes the entire foot in order to put the sole of his shoe on the pedal. No doubt this is not only extremely tiring but also very damaging to the health of the operator, especially if the operator is a professional driver or has to drive several hours at a time.

Many inventors have tried to eliminate the said inconveniences of the existing throttle and/or accelerator arrangements and by different means, in particular as described for instance in the U. S. A. Patents Nos. 1,080,936, 1,103,095, 1,238,126, 1,274,491, 1,344,466, 1,399,519, 1,423,489, 1,434,319, 1,439,194, 1,468,378, 1,475,111, 1,489,482, 1,490,144, 1,502,523, 1,515,847, 1,530,894, 1,700,643, 1,880,152, 1,993,935, 2,045,993, and 2,069,349; British Patents Nos. 1,295, 18,338, 211,103, 211,025, 258,042, 258,072, 426,183, and 445,015; and in the French Patents Nos. 762,492, and 376,369.

The present invention consists in a device which may be adapted and installed in a few minutes to any existing type of throttle, and when so installed, the said device offers the following advantages:

The driver, instead of keeping his foot (or footwear) in a permanently raised position, may rest his foot on the floor without any tension or intentional force to be provided in his muscles and/or in his nerves to maintain the foot in its raised operating position. That means that the operator who uses the present invention will use his foot exactly in the same manner as if he were sitting in the chair of a theater, when his feet are just resting on the floor without any will-action and without any special force to be provided in the muscles and nerves, or with only a very slight pressure to be used to compensate for the reaction of the accelerator when the resilient means which causes this reaction is too strong.

Furthermore, the driver, instead of pressing the footwear against the throttle (as the operators do at the present time with the existing throttles), will only be obliged to move his footwear to and fro (or sideways or both) contacting during this movement the operating part of the device, subject of this invention, and will

operate, by means of this displacement of his footwear (resting or sliding on the floor), the throttle to which the member is connected by suitable means.

One aspect of this invention consists in attaching a flexible means to an appropriate part of the accelerator pedal and of attaching the other end of this flexible connection to the floor; furthermore to place in an appropriate part of this flexible connection a guide means affixed rigidly in respect to the flooring so that the suitable operating part of this flexible connection will remain substantially parallel or adjacent to the flooring before the operation and during same. The flexible connection should be slightly tightened so that when the parallel or adjacent part of it is pushed forward by the footwear, the pedal will be pressed down and the required acceleration produced.

Another aspect of this invention consists in a flexible connection, one end of which is connected with any linkage of the throttle valve of a carburetor. The other end of the flexible connection passing through a suitable means (one or more) is affixed rigidly in respect to an appropriate part of the flooring in such a way that the operating part of the said flexible connection included between the guide means and the fixation on the flooring remains, before the operation and during same, substantially parallel or adjacent to the flooring when pushed to and fro by the shoe of the driver when the said foot is adjacent to the floor.

The above and further objects and novel features will more fully appear from the following detailed description when the same is read in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is for purposes of illustration only and is not intended as a definition of the limits of the invention.

In the drawing, wherein like reference characters refer to like parts throughout the several views,

Figure 1 shows schematically a front view of the device attached to the pedal.

Figure 2 is a plan view of Figure 1.

Figure 3 shows schematically the same device as in Figs. 1 and 2, but for simultaneous use by two drivers.

Figure 4 is a plan view of Figure 3.

Figure 5 shows schematically a plan view of the device assisted by resilient means.

Figure 6 is a front view of one of the arrangements of the guide means.

Figure 7 is a side view of a combination guide means.

Figure 8 is a plan view of two guide means in one device.

Figure 9 is a device which is attached, not to the pedal, but to any lever of the throttle. It is schematically a front view.

Figure 10 is a plan view of Figure 9.

Figures 11 and 12 are pusher-footrests.

In Figure 1, P is the pedal, which, when accelerated, takes the position of P₁. F is the flexible connection which is attached by one of its ends to a fixation means 20 and by its other end to a fixation means 21. F passes through guide means 22 which is rotated around axis 23 and passes further through a guide means 24 rotatable around an axis 25, both axes 23 and 25 being rigidly affixed in respect to the flooring 26. The flexible connection may be made from any suitable material. By way of example, it may be a cord, a band, a thread or it may even be made from metal in the form of flexible wire or flexible cable or it may be a link chain. It may also be partly composed from flexible material and partly from rigid material.

It may be affixed by any means to the pedal.

In Figures 1 and 2 are shown guide means in form of rollers or the like which are articulated on suitable axes. For instance, the roller 22 is articulated on the axis 23, which is rigidly affixed to the flooring by fixation means 21. The rollers are provided with arresting means 28 to prevent the same from moving. The axis 25 of the roller 24 is affixed directly to the flooring. Means may be provided between the roller 24 and the flooring to diminish the friction, such as a spherical washer, bearings, etc. Arresting means may be provided on the axis to prevent the roller from moving upwards.

The fixation means 21 may be of any form and design and be affixed to the flooring in any way. In certain cases it would be preferred to make this fixation means of such heights that the flexible connection F will remain on desirable heights or substantially adjacent to the flooring. The flexible connection F when mounted, should preferably be so mounted that it will already be in a slightly tightened position. It will also be advisable to make the reaction of the pedal (provided by all resilient means of the accelerator system) of such a force that its compensation by the resting foot without muscle strain will be easily done by the weight of the foot itself. However, even if it is difficult to provide such small reaction, this device is still of the greatest practical utility and offers many advantages in comparison with any existing throttle.

The shoe S as shown in Figure 2, when moving in its position S₁ tightens the flexible connection F and by doing so, the same actuates the pedal and so acceleration is obtained.

It is easy to remark that the shoe can actuate this device by remaining all the time substantially adjacent to the flooring. The flexible connection may have any desirable cross section and, if necessary, the operating part of it may be provided with small pusher element 29 affixed rigidly to the flexible connection and being of such heights and of such a form that it will suit the base when contacting the sole of the shoe or the shoe. It may be, for this, provided with soft cushion layers or cloths or rubber, or sponge, leather, etc., to prevent the wear of the shoe and provide more comfortable driving.

Instead of using the guide means composed of

two roller elements, if necessary, one roller may be used in combination with a non-roller guide or several rollers may be used.

For cheaper devices, instead of rollers, ordinary guide elements could be used having forms of crooks or rings and the like, affixed suitably on the flooring. Such devices are not shown on the drawing.

This device could easily be so arranged that simultaneously two drivers could operate it, which is self-explanatory from Figures 3 and 4. In this case the additional roller or guide means 30 should be provided. This is extremely important in case of responsible driving, such as buses or military trucks, etc., when one driver could lose the control or be killed so that the other one could, if necessary, continue the operating of the throttle without changing his place.

In order to prevent the flexible connection F from unnecessary movements, arresting guide means 31 may be provided as shown on Figures 3 and 4. Several of them, if necessary, could be put on appropriate places. They may be made from glass or from metal or from any suitable material and may also be in the form of a roller which rotates around its axis or rollers which form one rigid body with the axis and the axis may rotate in its bearings. This remark also refers to all other guide means, such as 22, 24, etc.

In case the reaction of the accelerator system will be too strong, it may be advisable in certain cases to use resilient means 32, Figure 5 such as a spring, rubber, etc., which in tightened condition will be affixed on a suitable part 33 of the flexible connection F and the other end of which spring is affixed by suitable fixation means 34 to the flooring 26 as it is shown in Figure 5. In non-operating condition, the flexible connection F may be tightened in advance as shown in Figure 40 5, and when it is operated by the foot or the pusher 35, it then takes the position F₄, and this action is assisted by the reaction of the spring 32 so that the operator has less force to use in tightening the flexible connection F.

The pusher-footrest 35 may be affixed to the flexible connection or may be used separate from it. It may have arresting means 36 slightly rising in front of the pusher to help the sole of the shoe to direct it. Arresting means 37 of sufficient heights may be used on the side of the pusher 35 in order to enable the driver to control the pusher in its side movements.

In Figure 6 43 is another aspect of such a pusher.

Figures 11 and 12 show a cross-section front view of another aspect of a pusher. 66 is the front arresting means provided with the cut-out 67 in which the flexible connection F could be put. The footrest part 68 of the pusher may slowly diminish in thickness, and it may be provided with a rough surface if the friction should be increased or with a smooth surface if friction should be diminished on its contact surface with the flooring, which contact surface itself may also be provided with friction increasing or diminishing means.

The pusher-footrest 70 on Figure 12 has a front cutout for receiving the flexible connection F and is sufficiently long to receive the whole shoe 70 S, being provided with abutment 71 for the heel and with two abutments 72 for the sides of the sole of the shoe.

This invention also includes the use of different guide means, some of which are shown here by way of example. The guide means 38

in Figure 6 in the form of a roller being affixed on the flooring 45 by suitable means, through which their axis 39 passes, the flexible connection F passes through this roller 38 and is then guided by another roller 41 which rotates on its axis 40, also rigidly affixed to the flooring.

The guide means as shown in Figure 7 consists of one U form element 46, which is rigidly affixed to the flooring 51. The side parts of this element 46 are provided with rollers, one or two, 49, and the upper part is provided with a roller 47 so that it is nearly adjacent to the roller 49. Abutment 48 may be provided to diminish the friction. The flexible connection F, when it passes through this guide means, is first pressed against the roller 47 by means of the tension from the throttle and simultaneously F is pressed against the roller 49 by the foot when operating. This device, instead of having U form may have only one axis with the roller 49 affixed to the flooring and another axis at any angle to it at which the other roller 47 may be affixed. The part where is shown roller 49a and 36a could be omitted. Such a construction will be very cheap and offer as good efficiency. The rollers 49 may be provided with bearing 50 or metal washers of suitable form, preferably spherical to prevent friction between the rollers and the flooring 51.

Another aspect of a combination guide means is shown in Figure 8 wherein a support 52 is affixed to the flooring and to the same support is rigidly affixed the axis 53 on which rotates the roller 58. This axis 53 is thereafter bent in 54 and once more bent in 55 and thereafter descends in 56 and is attached to the support 52. On its way between 55 and 56, it receives the axis 60 at any suitable angle to the axis 53, on which axis 60 is placed the other roller 59. The flexible connection is shown in its operative condition F.

Another aspect of this invention consists in using the same arrangement of the flexible connection F laid substantially parallel or adjacent on the flooring, but not connected to the pedal as shown in Figure 1 or 3, but connected through the intermediary of one or more guide means with one of the linkages of the throttle of the carburetor. By way of example, the flexible connection F passes through guide means 61, 62, and 63, all of which being rigidly affixed in respect to the flooring 64. The other end of F is affixed to a lever L connected with the carburetor and rotating around its axis supported by a fixation 65. On the plan view, Figure 10, the shoe S, when in operating position S₅, displaces the cable in its position F₅.

Another aspect of this invention consists in combining the flexible connection F, as shown in Figure 6, after this flexible connection has passed the guide means (one or more), with a rigid lever 42. If this lever is then pushed by the foot or by the pusher 43, this lever 42 being pivotally attached on the axis 44 will then, when pushed by the foot, tighten the flexible connection and effect the operation of the pedal. Axis 44 should preferably be affixed perpendicular to the flooring or to the operating surface of the flooring in order to permit the lever, when in operation, to remain substantially adjacent or parallel to the flooring. The said lever 42, if necessary, may, instead of being rigidly attached to the axis 44, be attached to it with freedom to move downward with respect to the flooring; so in this latter case, such lever may then remain adjacent to the flooring.

The described aspects of the devices and the

method used are not limiting the invention to the drawing and examples described herein and other devices using the same idea form the subject of this invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A foot controlled device consisting of a flexible connection, one end of which is affixed rigidly on the flooring and the other end of which is attached to a suitable linkage of the throttle operating device, at least one guide means rigidly affixed in respect to the flooring through which said guide means the said flexible connection is guided, the operative portion of the said flexible connection between at least one of the said guide means and the end of the said flexible connection affixed on the flooring, being substantially parallel and substantially adjacent to the surface of the said flooring, whereby when the foot of the driver contacting the said operative portion of the said flexible connection is slid to and fro on the flooring the throttle valve is actuated.

2. A foot controlled device consisting of a flexible connection, one end of which is affixed rigidly on the flooring and the other end of which is attached to the existent common accelerator pedal of a vehicle, at least one guide means rigidly affixed in respect to the flooring through which said guide means the said flexible connection is guided, the operative portion of the said flexible connection between at least one of the said guide means and the end of the said flexible connection affixed on the flooring, being substantially parallel and substantially adjacent to the surface of the said flooring, whereby when the foot of the driver contacting the said operative portion of the said flexible connection is slid to and fro on the flooring the throttle valve is actuated.

3. A foot controlled device consisting of a flexible connection one end of which is affixed to a suitable linkage of the throttle operative device and the other end of which is attached to one end of a pivotal lever, the other end of which said pivotal lever is pivotally affixed to the flooring, at least one guide means being rigidly affixed to the flooring through which said guide means the said flexible connection is guided, the operative portion of the said flexible connection between at least one of the said guide means and the said lever and also the said lever itself being both substantially parallel and substantially adjacent to the surface of the said flooring, whereby when the foot contacting the said device is slid to and fro it tightens the said flexible connection and thus the operation of the throttle valve is actuated.

4. A foot controlled device consisting of a flexible connection, one end of which is affixed rigidly on the flooring and the other end of which is attached to a suitable linkage of the throttle operating device at least one pulley rigidly affixed in respect to the flooring through which the said flexible connection is guided, the operative portion of the said flexible connection between at least one of the said pulleys and the end of the said flexible connection affixed on the flooring, being substantially parallel and substantially adjacent to the surface of the said flooring, whereby when the foot of the driver contacting the said operative portion of the said flexible connection

is slid to and fro on the flooring the throttle valve is actuated.

5. A device as set forth in claim 1 where the operative portion of the said flexible connection is so extended that several operating portions of the flexible connection are formed through placing suitable additional guide means between the operating sections of the said flexible connection.

6. A device as set forth in claim 1 wherein the said guide means consists of a combination of one roller having an axis substantially parallel to the flooring and of another roller the axis of which is substantially perpendicular to the flooring, the said flexible connection passing simultaneously through both of the said rollers.

7. A device as set forth in claim 1 wherein the said flexible connection is provided with resilient means increasing the tightness of the said flexible connection.

8. A device as set forth in claim 1 wherein the said guide means constitutes two rollers, the axis of the first roller being at any suitable angle to the axis of the second roller, both axes being affixed to a common support, the said flexible connection being guided by the intersection of the adjacent surfaces of the said rollers.

9. A device as set forth in claim 1 wherein the said guide means consists of a rigid support on

which is mounted an axis substantially parallel to the flooring on which one roller is rotated, the same said support being provided with another axis substantially perpendicular to the flooring on which another roller is provided, the same said flexible connection passing through both rollers.

10. A device as set forth in claim 1 wherein a part of the said operating portion of the said flexible connection is provided with an abutment member.

11. A device as set forth in claim 1 wherein a part of the said operating portion of the said flexible connection is provided with a pusher-foot-rest, said pusher-foot-rest consisting of a

15 sliding member, the rear end of which is provided with an abutment and with fixation means through which it is connected to the said flexible connection, whereby, when the foot of the driver contacting the said abutment of the said pusher-foot-rest moves to and fro the said flexible connection actuates the throttle valve.

20 12. A device as set forth in claim 1 wherein the said flexible connection is provided with means to control the tightness of the said flexible connection.

25 GEORGE A. RUBISSOW.