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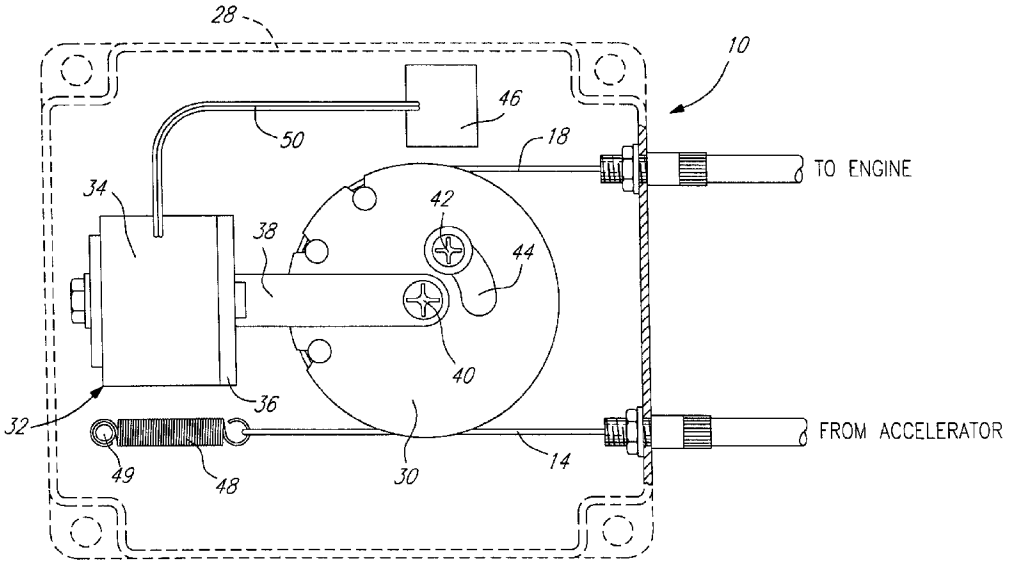
(54) **MECANISME DE BORNAGE DE VITESSE, ACTIONNE PAR CLE**

(54) **KEY OPERATED SPEED LIMITING MECHANISM**



(57) A speed limiting mechanism for motorized vehicles is described herein. The speed limiting mechanism is connected to a conventional steel pulling cable coming from the accelerator and to a conventional steel pulling cable going to the carburetor of the motorized vehicle. When the mechanism detects that the key used to start the motorized vehicle is a normal key, the solenoid actuator is energized and a pulley of the mechanism rotates about a central pivot. When the mechanism detects that the key used to start the motorized vehicle is a reduced speed key, the solenoid actuator is not energized and the pulley of the mechanism rotates about an offset pivot.

ABSTRACT OF THE DISCLOSURE

A speed limiting mechanism for motorized vehicles is described herein. The speed limiting mechanism is connected to a conventional steel pulling cable coming from the accelerator and to a conventional steel pulling cable going to the carburetor of the motorized vehicle. When the mechanism detects that the key used to start the motorized vehicle is a normal key, the solenoid actuator is energized and a pulley of the mechanism rotates about a central pivot. When the mechanism detects that the key used to start the motorized vehicle is a reduced speed key, the solenoid actuator is not energized and the pulley of the mechanism rotates about an offset pivot.

TITLE OF THE INVENTION

KEY OPERATED SPEED LIMITING MECHANISM

FIELD OF THE INVENTION

The present invention relates to speed limiting mechanisms for motorized vehicles. More specifically, the present invention is concerned with a speed limiting mechanism that is disengaged when a specific key is used to start the motorized vehicle.

BACKGROUND OF THE INVENTION

Speed limiting mechanisms for motorized vehicles are well known in the art. They are generally used on fleet of vehicles that, for safety reasons, should not exceed a predetermined speed limit.

For obvious reasons, these speed limiting mechanisms are not user disengageable and are thus not advantageously used on leisure type motorized vehicles.

OBJECTS OF THE INVENTION

An object of the present invention is therefore to provide an improved speed limiting mechanism.

Another object of the invention is to provide a key operated speed limiting mechanism for motorized vehicle that is

disengaged only when a specific key is used to start the motorized vehicle.

Other objects, advantages and features of the present invention will become more apparent upon reading of the following non restrictive description of preferred embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the appended drawings:

Figure 1 illustrates a block diagram illustrating a speed limiting mechanism according to the present invention;

Figure 2 is a schematic top plan view that illustrates a speed limiting mechanism according to a first embodiment of the present invention, shown in a non operating state;

Figure 3 is a schematic top plan view of the speed limiting mechanism of Figure 2, shown in a normal top speed position;

Figure 4 is a schematic top plan view of the speed limiting mechanism of Figure 2, shown in a reduced top speed position;

Figure 5 is a perspective view of the speed limiting mechanism of Figure 2;

Figure 6 is a block diagram illustrating the operation of the speed limiting mechanism of Figure 2; and

Figure 7 is a schematic top plan view that illustrates a speed limiting mechanism according to a second embodiment of the present invention, shown in a non operating state.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The general principle of the present invention is to provide a speed limiting mechanism between the accelerator and the engine of a motorized vehicle. In its default state, the speed limiting mechanism is in a speed limiting mode, where the top speed of the vehicle is less than the actual top speed that may be attained by the vehicle. However, when a particular key is used to start the vehicle, the speed limiting mechanism is forced in a non speed limiting mode where the top speed of the vehicle is equal to the actual top speed of the vehicle.

Turning now to Figure 1 of the appended drawings, the speed limiting mechanism 10 is mounted in a motorized vehicle (not shown), is connected to an accelerator 12 of the vehicle via a conventional pulling steel cable 14 and to the engine 16 of the vehicle via a conventional pulling steel cable 18. More specifically, the cable 18 is connected to a carburetor (not shown) of the engine 16.

The accelerator 12 may be of any type such as a pedal a rotatable grip handle or a lever that may be manually actuated, as long as the information to the engine is transmitted via a pulling cable.

The speed limiting mechanism 10 is also connected to a key receiving element 20 via a data cable 22. The key receiving element 20 is designed to enable the recognition of two types of keys, i.e. a normal key 24 and a reduced speed key 26 and to supply the information as to which type of key is used to the speed limiting mechanism under the form of an electric signal via the data cable 22.

While many types of key receiving element-key combinations may be used to supply information to the speed limiting mechanism of the present invention, it has been found advantageous to use a transponder system in which an interrogator circuit is used as a lock and a separate transponder circuit is used as a key. The interrogator circuit transmits a question signal (usually a Radio Frequency signal) that is received by the transponder. The question signal is then modified by the transponder according to a predetermined pattern to generate a response signal that is retransmitted. Upon receipt of this response signal, the interrogator compares the received response signal with two expected response signal, i.e. the normal key response signal and the reduced speed key response signal. If the comparison is accepted, the interrogator circuit generates an output signal, corresponding to the key detected, to deactivate a mechanical lock or any other mechanism (not shown) electrically connected to the interrogator circuit and to indicate which key is used to the speed limiting mechanism 10.

As will be easily understood by one skilled in the art, the installation of the speed limiting mechanism of the present invention in a conventional motorized vehicle is fairly simple. The steel pulling cable (not shown) conventionally interconnecting the accelerator 12 and the carburetor (not shown) of the engine 16 to convey information from the accelerator 12 to the engine 16 is removed and replaced with the cables 14 and 18. The key receiving element of the ignition system of the vehicle is removed and replaced with the key receiving element 20 configured to distinguish between two different types of keys and transmit the key information to the speed limiting mechanism under an electric signal form.

Turning now to Figure 2 of the appended drawings, the speed limiting mechanism 10 will be described in greater details.

The speed limiting mechanism 10 includes a body 28, a pulley 30, a solenoid actuator 32 having a fixed portion 34 mounted to the body 28 and a selectively movable portion 36, a forked pulley support 38 mounted to the movable portion 36 and pivotally connected to the pulley 30 through a pivot element 40, a second pivot element 42 fixedly mounted to the body 28 and inserted in a semi-circular aperture 44 of the pulley 30, an electrical connector 46 and a spring 48 connected to the pulley 30.

The solenoid actuator 32 is connected to the electrical connector 46 via a power cable 50. When the solenoid actuator 32 is energized, the movable portion 36 is fixedly maintained against the fixed portion 34 as illustrated in Figure 2. However, when the solenoid actuator

32 is not energized, the movable portion 36 is free to move with respect to the fixed portion 34, thus with respect to the body 28.

The conventional steel pulling cables 14 and 18 are connected to opposite sides of the pulley 30.

Turning now to Figures 3 and 4, the principle of operation of the speed limiting mechanism 10 will be described.

When the key receiving element 20 detects that a normal key has been used to start the motorized vehicle, the speed limiting mechanism 10 is placed in a non limiting state (see Figure 3) by energizing the solenoid actuator 32. The movable portion 36 is thus fixedly maintained against the fixed portion 34. When this is the case, a pulling action of the cable 14 (see arrow 52) will cause the pulley 30 to rotate about the pivot element 40 (see arrow 53) to cause an equal pulling action on the cable 18 (see arrow 54). The action on the engine 16 of the full deflection of the accelerator 12 will therefore be the same as if the speed limiting mechanism 10 was not present.

It is to be noted that the presence of the fixed pivot element 42 will have no ill effects on the rotation of the pulley 30 since the semi-circular aperture 44 allows the movement of the pulley 30 with respect to the fixed pivot element 42 as can be clearly seen in Figure 3. Of course, the semi-circular aperture 44 should be long enough to allow adequate rotation of the pulley 30.

When the key receiving element 20 detects that a reduced speed key has been used to start the motorized vehicle, the speed limiting mechanism is placed in a default speed limiting state (see Figure 4) by not energizing the solenoid actuator 32. The movable portion 36 is thus freely movable with respect to the fixed portion 34. When this is the case, a pulling action of the cable 14 (see arrow 56) will cause the pulley 30 to rotate about the fixed pivot 42 (see arrow 57) to cause a diminished pulling action on the cable 18 (see arrow 58). Indeed, as can be clearly seen in Figure 4, since the movable portion 36 is freely movable with respect to the fixed portion 34, a pulling action on the cable 14 will pull the movable portion 36 and thus the pulley 30. Since the fixed pivot element 42 is fixedly mounted to the body 28, the pulley 30 will rotate about the pivot element 42 as indicated by arrow 57 in Figure 4.

The action on the engine 16 of the full deflection of the accelerator 12 will therefore be significantly less that if the speed limiting mechanism 10 was not present.

As will be easily understood by one skilled in the art, the position of the pivot element 42 with respect to the central pivot element 40 of the pulley 30 will determine the ratio of displacement of the pulling cables 14 and 18.

It is to be noted that the spring 48 has a first end connected to a fixed post 49 and a second end connected to the pulley 30. When the pulley 30 is rotated counterclockwise by a pulling action of the cable 14, the spring 48 is extended (see Figures 3 and 4). The spring

48 will thus rotate the pulley 30 clockwise when the pulling action is stopped to take its normal state illustrated in Figure 2.

Turning briefly to Figure 5 of the appended drawings illustrating the speed limiting mechanism 10 in perspective view, the body 28 is shown having mounting apertures 60 allowing it to be fixedly mounted to the motorized vehicle. The electrical connector 46 is also shown mounted to an electronic circuit 62 controlling the operation of the solenoid actuator 32 from the information received from the key receiving element 20 (Figure 1).

Figure 6 illustrates the sequence of operation of the speed limiting mechanism.

In step 100 the mechanism starts. Upon key detection (step 102) the mechanism is powered up (step 104) and a retrieval of the key information is done (step 106).

If an unknown key is detected, the mechanism is powered down (step 108) and the mechanism waits for key detection.

If a reduced speed key is detected in step 106, the solenoid actuator 32 is not energized (step 110). Upon key removal (step 112), the mechanism is powered down (step 114) and waits for key detection.

If a normal speed key is detected in step 106, the solenoid actuator 32 is energized (step 116). Upon key removal (step

118), the solenoid actuator 32 is de-energized (step 120) and the mechanism is powered down (step 122) and waits for key detection.

Turning now to Figure 7 of the appended drawings, a speed limiting mechanism 100 according to a second embodiment of the present invention. The speed limiting mechanisms 10 and 100 are very similar and their principle of operation is identical. Thus, for concision considerations, only the differences between these two speed limiting mechanisms will be described hereinafter.

The major difference between the speed limiting mechanism 10 of Figure 2 and the speed limiting mechanism 100 of Figure 7 consists in the possibility to change the length of displacement of the cable 18 for a full deflection of the cable 14 when the speed limiting mechanism 100 is in a speed limiting mode.

As mentioned hereinabove with respect to Figure 2, the length of displacement of the cable 18 for a full deflection of the cable 14, when the speed limiting mechanism is in a speed limiting mode, is governed by the position of the fixed pivot 42 with respect to the center of the pulley 30.

The speed limiting mechanism 100 includes a pulley 130 provided with three smaller semi-circular apertures 144a, 144b and 144c in replacement of the semi-circular aperture 44 of Figure 2. The fixed pivot element 142 is also smaller than the pivot element 42 and may be mounted in any of the three apertures 143 of the body 28.

Therefore, as will be easily understood by one skilled in the art, the installation of the pivot element 142 in one of the three apertures 143 will determine the length of displacement of the pulling cable 18 for a full displacement of the cable 14. It is to be noted that the length of displacement of the cable 18 increases when the pivot element nears the center of the pulley 130.

It will also be noted that supplementary pulleys (not shown) could be interchangeable with the pulley 130 and provided with semi-circular apertures positioned differently from the positions shown in Figure 7 to enable the user to install the required pulley for the wanted length of displacement of the cable 18.

As it will be apparent to one skilled in the art, the solenoid actuator 32 could be replaced by other means configured to allow the pulleys 30 or 130 to be selectively placed in a fixed position or in a freely movable position as described hereinabove to allow the operation of the speed limiting mechanism.

It is to be noted that while the speed limiting mechanisms 10 and 100 have been described hereinabove as being mounted to a vehicle provided with an internal combustion engine, it would be within the scope of one skilled in the art to design and install a similar speed limiting mechanism to any type of motorized vehicle where the link between the accelerator and the engine is, or could be modified to be, under the form of a pulling cable. For example, the speed limiting mechanisms 10 or 100 could be installed on an electric golf cart or other electric vehicles.

Although the present invention has been described hereinabove by way of preferred embodiments thereof, it can be modified, without departing from the spirit and nature of the subject invention as defined in the appended claims.

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WHAT IS CLAIMED IS:

1. A speed limiting mechanism for a motorized vehicle comprising:

a body;

a solenoid actuator having a fixed portion mounted to the body and a movable portion provided with a pulley support;

a pulley rotatably mounted to the pulley support; said pulley including a semi-circular aperture; and

a fixed pivot mounted to said body and inserted in said semi-circular aperture.

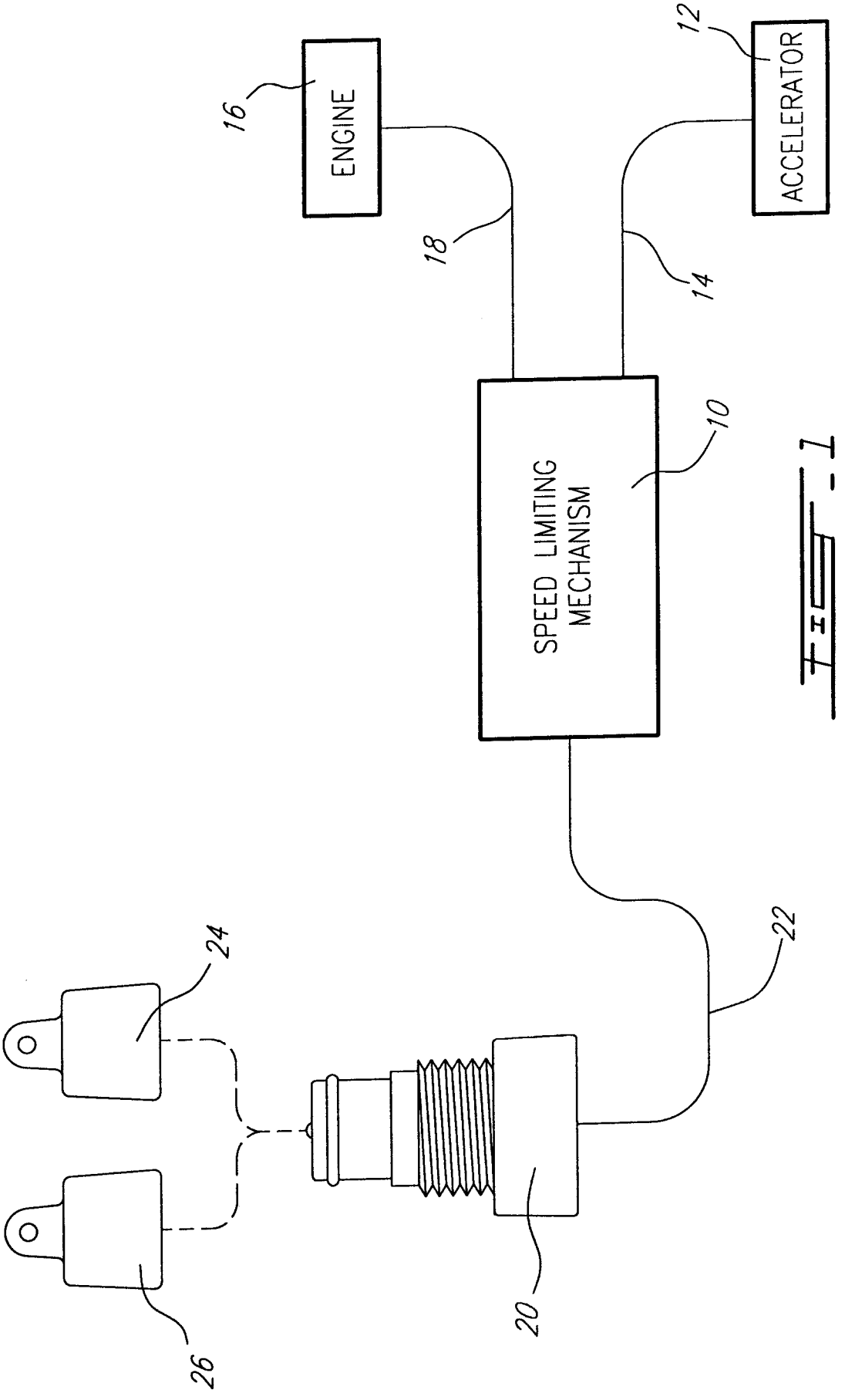

ENGINE
16
18
ACCELERATOR
12
14
SPEED LIMITING MECHANISM
10
22
24
26
20

FIG - 1

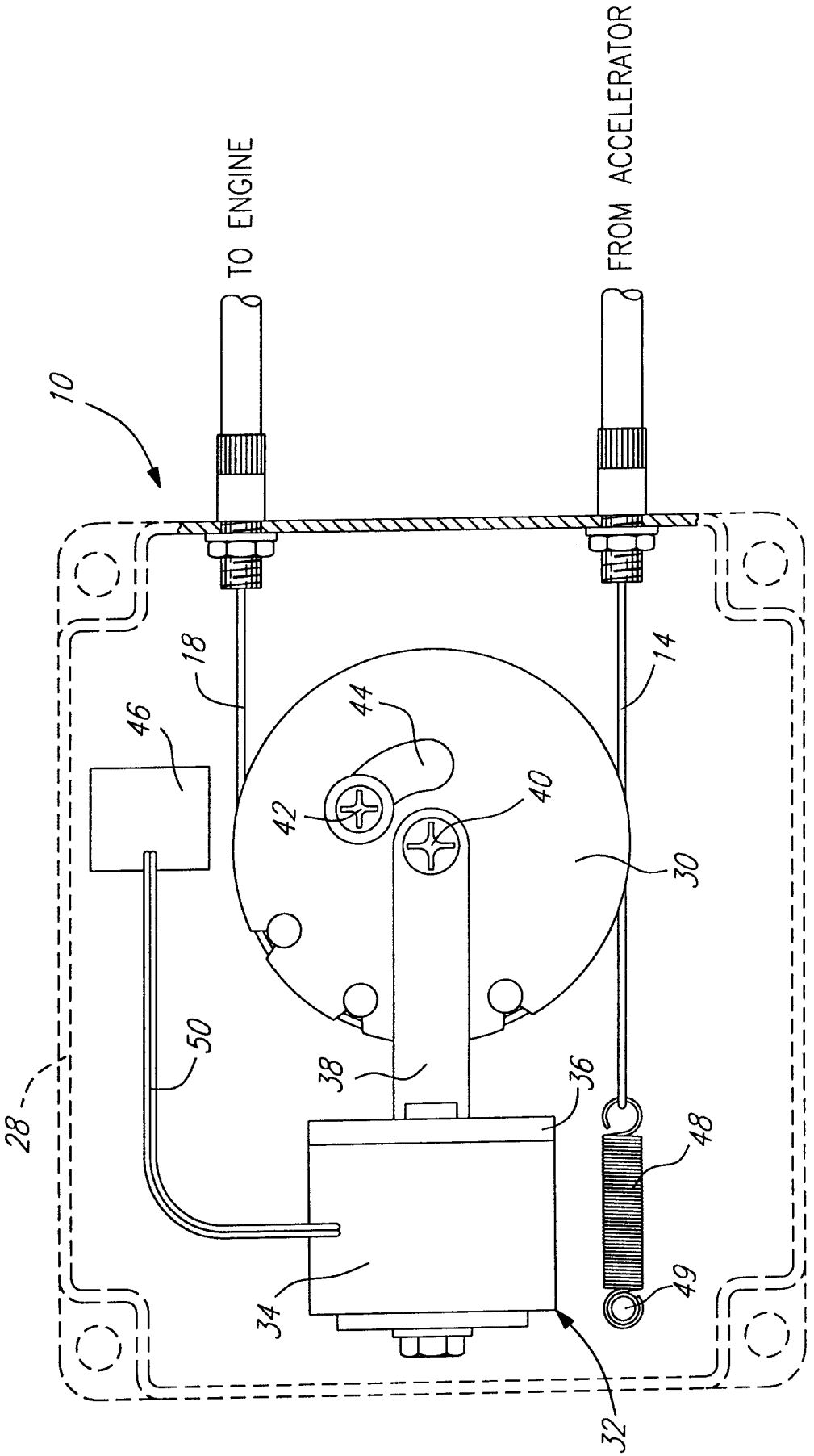

TO ENGINE
FROM ACCELERATOR
10
18
14
46
44
42
40
30
50
28
38
36
48
34
49
32

FIG - 2

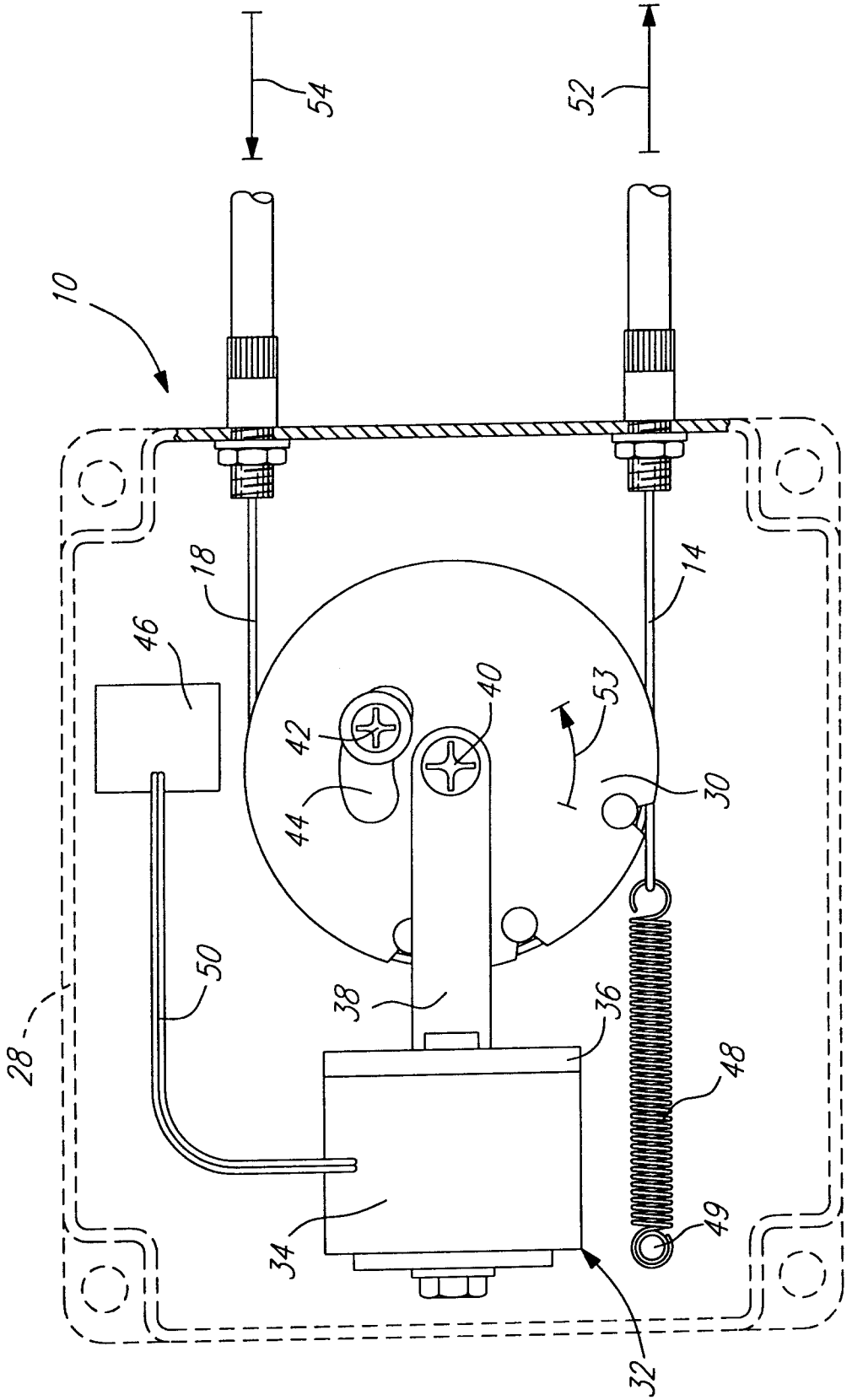


FIG. 3

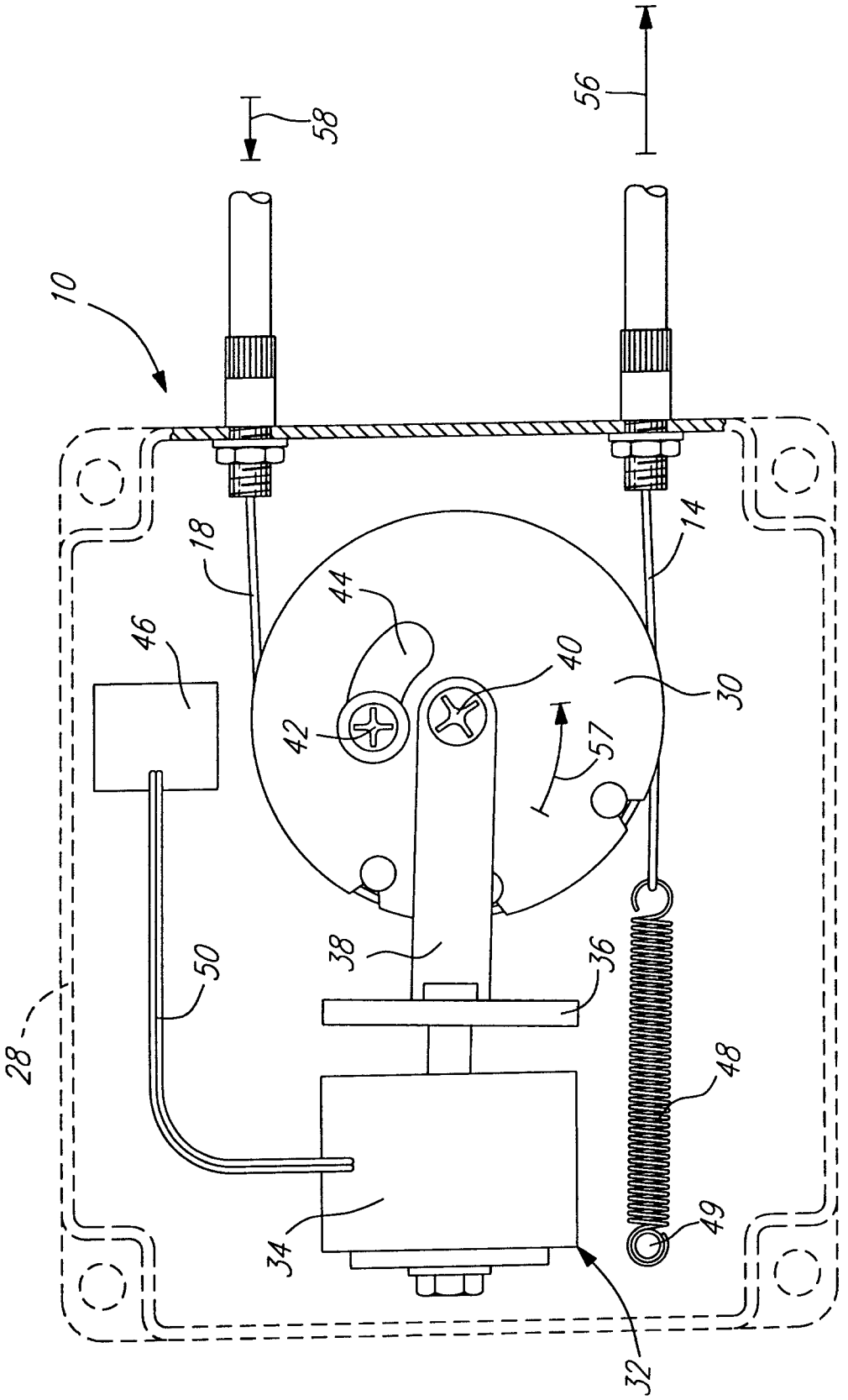


FIG-4

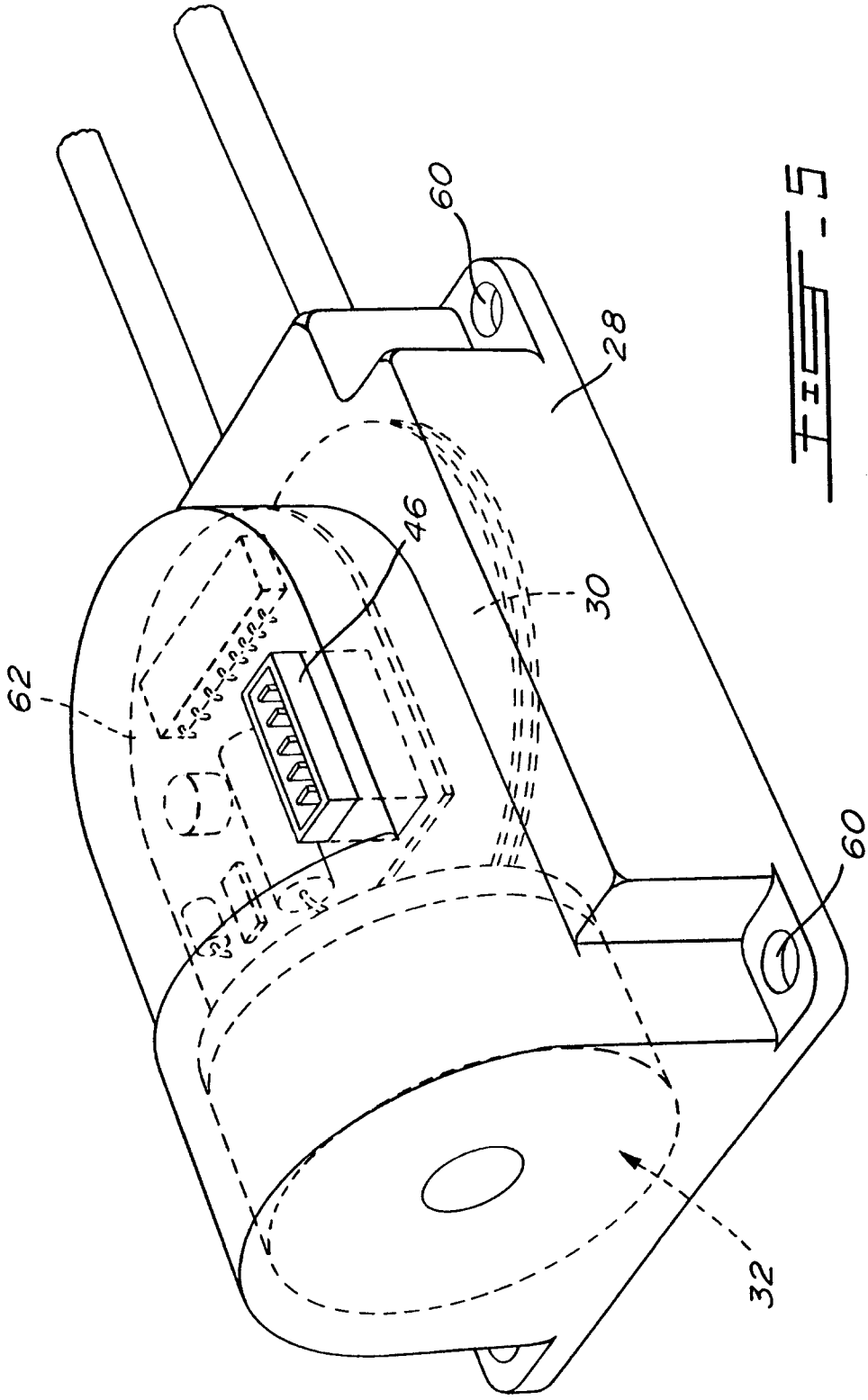


FIG-5

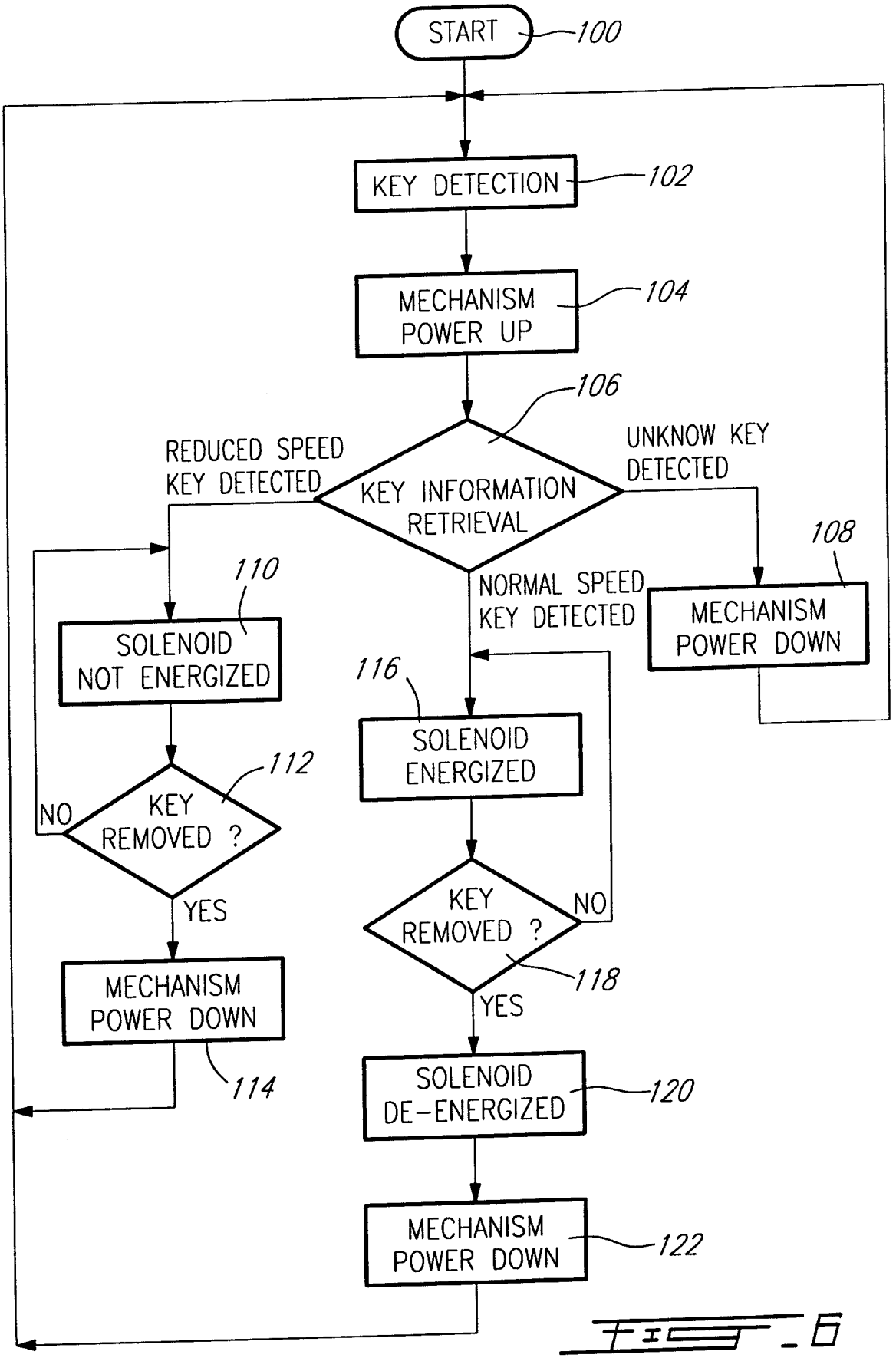

START
100
KEY DETECTION
102
MECHANISM POWER UP
104
106
KEY INFORMATION RETRIEVAL
REDUCED SPEED KEY DETECTED
UNKNOW KEY DETECTED
NORMAL SPEED KEY DETECTED
108
MECHANISM POWER DOWN
110
SOLENOID NOT ENERGIZED
112
KEY REMOVED ?
NO
YES
MECHANISM POWER DOWN
114
116
SOLENOID ENERGIZED
KEY REMOVED ?
NO
118
YES
SOLENOID DE-ENERGIZED
120
MECHANISM POWER DOWN
122

Fig. 6

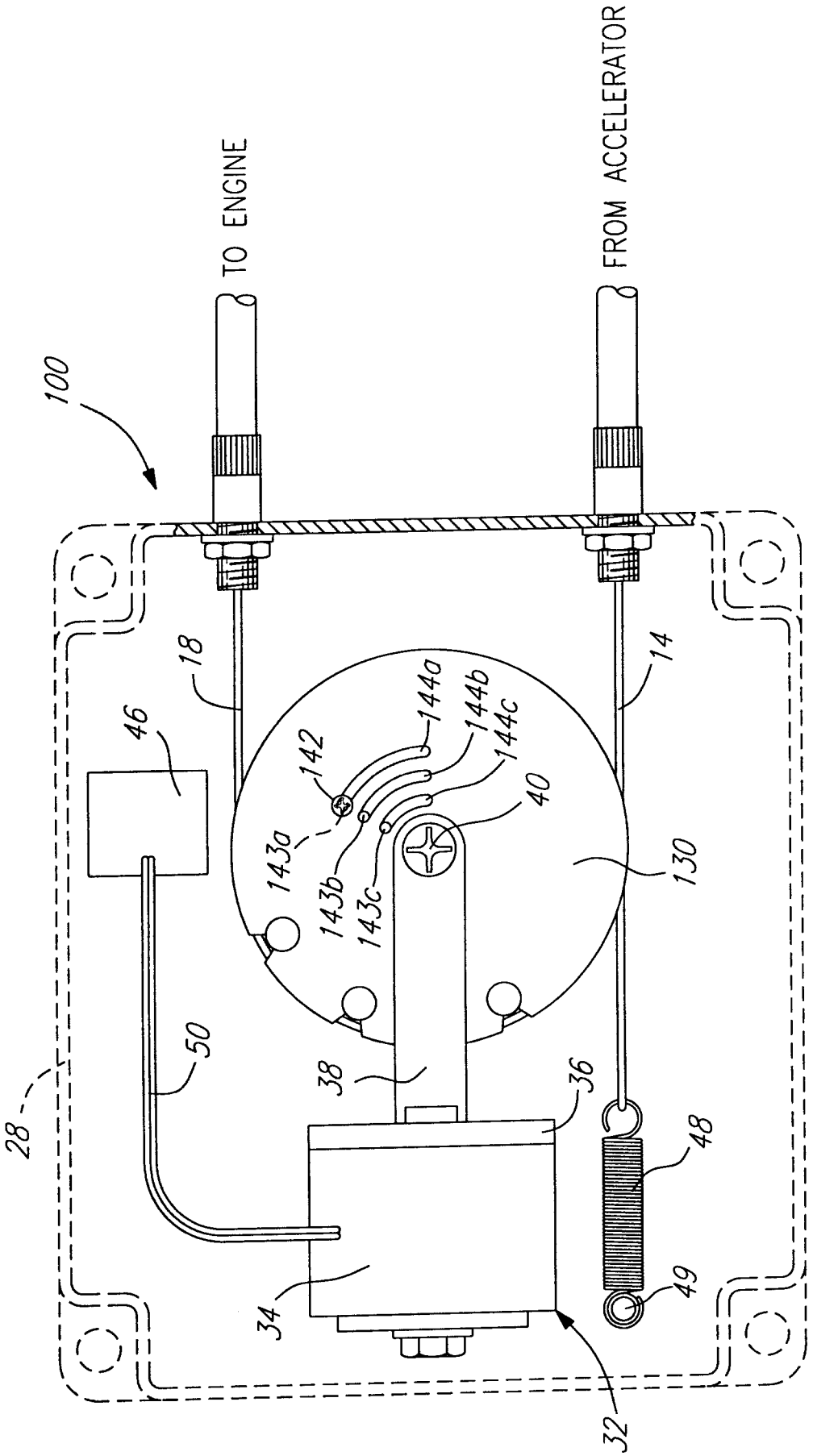
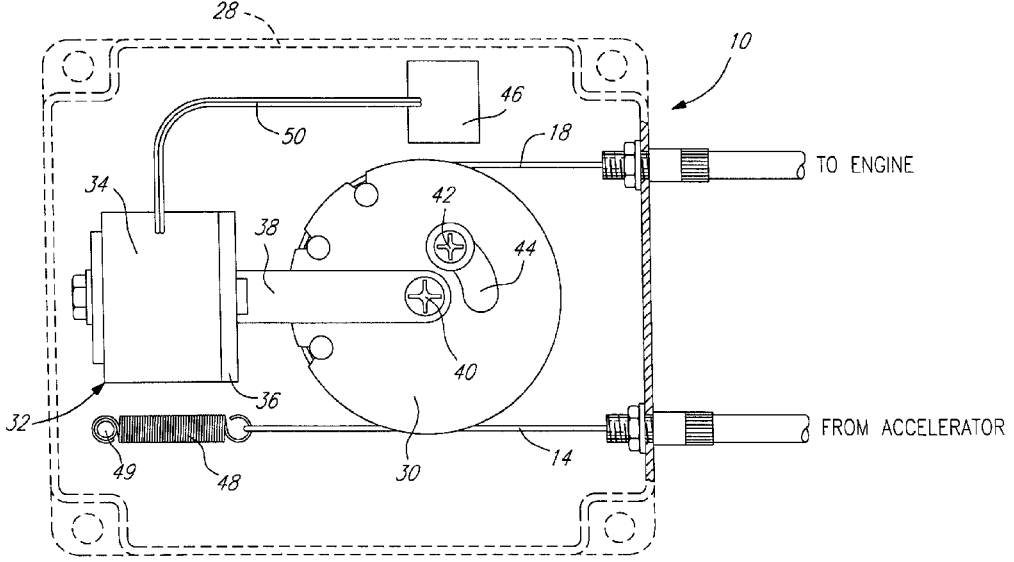

TO ENGINE
FROM ACCELERATOR
100
18
14
46
142
144a
144b
144c
143a
143b
143c
40
130
50
38
36
48
28
34
49
32

FIG - 7


28
10
46
50
18
TO ENGINE
34
42
38
44
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36
32
FROM ACCELERATOR
49
48
30
14