(12) UK Patent Application (19) GB (11) 2 251 277 (13) A

(43) Date of A publication 01.07.1992

(21) Application No 9028191.6

(22) Date of filing 29.12.1990

(71) Applicant
Dah Tsang Huang
No.10, East 1 Lane, Meei Maan Street, Shi Twon District, Taichung City, Taiwan

(72) Inventor
Dah Tsang Huang

(74) Agent and/or Address for Service
Potts, Kerr & Co
15 Hamilton Square, Birkenhead, Merseyside, L41 6BR, United Kingdom

(51) INT CL[5]
B60T 17/16

(52) UK CL (Edition K)
F2F FHD
F2Y YCL Y3201
U1S S2013

(56) Documents cited
GB 2167507 A **GB 1173072 A** **GB 0614551 A**
US 4867289 A **US 4076093 A**

(58) Field of search
UK CL (Edition K) **F2F FA FBH FHD, F2Y YSN**
INT CL[5] **B60T**
Online databases: W.P.I.

(54) Vehicle brake maintaining system

(57) An auxiliary brake control system of a vehicle includes an auxiliary switch (2) disposed below the brake pedal (11) to be operated thereby and to operate in turn means (5-8) to hold the brake pedal depressed and a restoring switch (4) disposed below the accelerator pedal (3) to be operated thereby releases the holding means (5-8). The holding means may comprise an electric motor (6), a clutch (7) operated by a controller (5) and a take-up drum for winding a steel rope (8) connected with the brake pedal. Alternatively the switches may actuate a valve in a hydraulic or pneumatic brake circuit. A switch (9) selectively renders the auxiliary system active or inactive. The switch (9) may be associated with a hydraulic switching device.

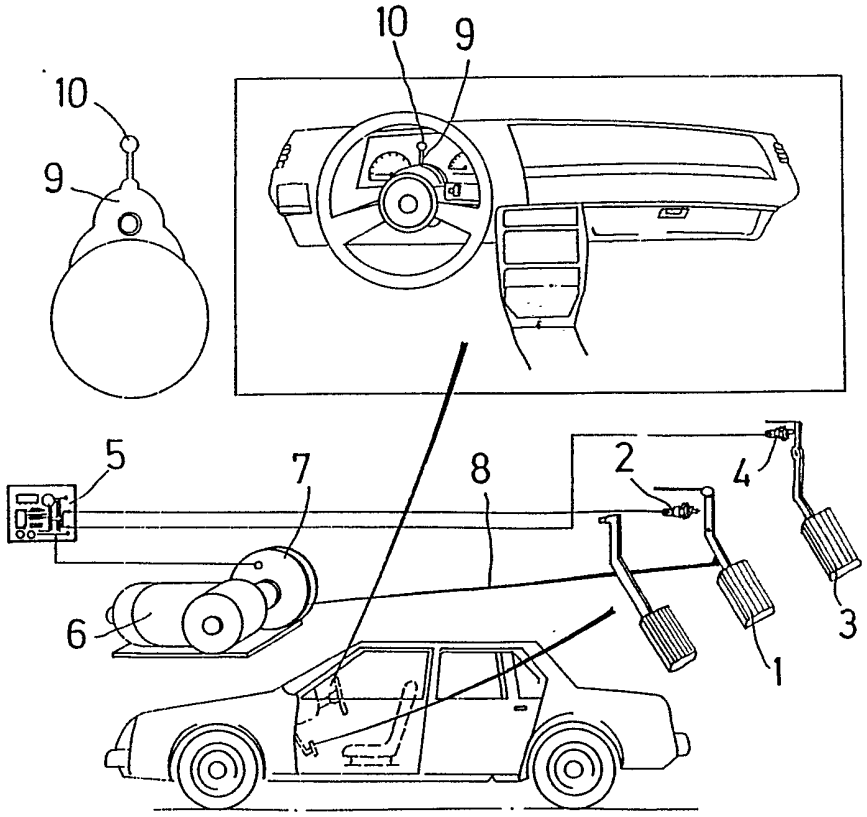

FIG. 1

GB 2 251 277 A

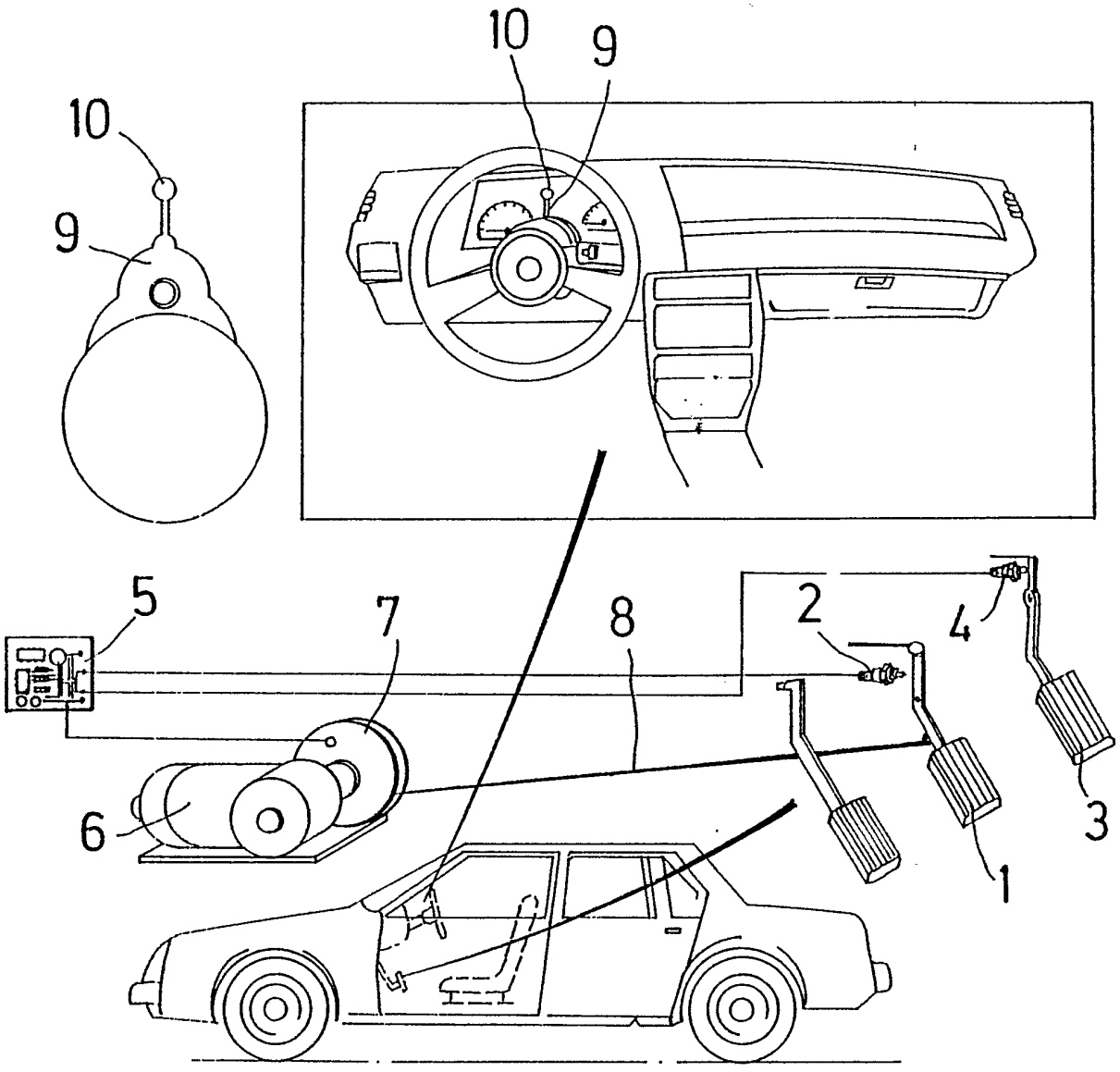

FIG. 1

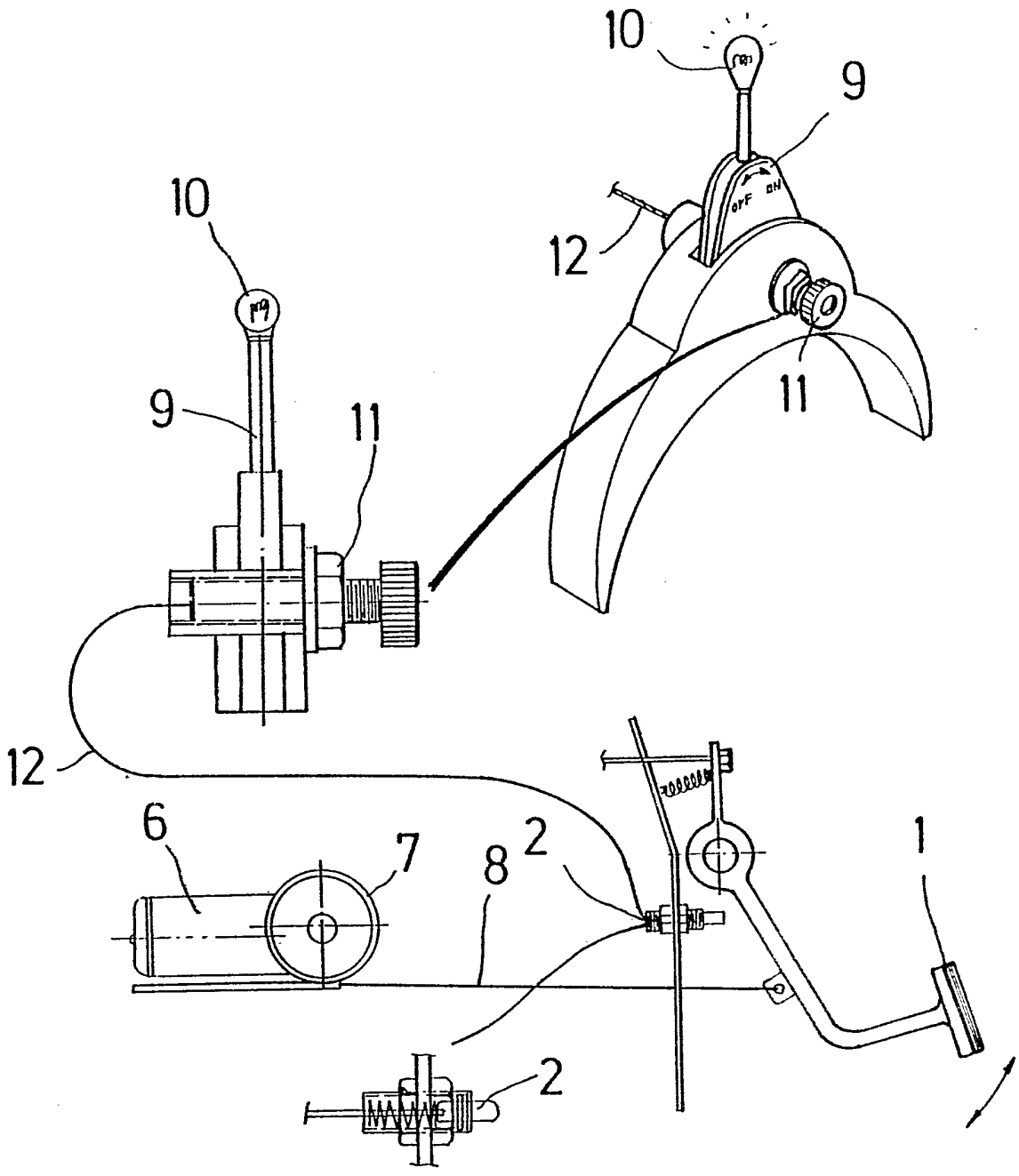

FIG. 2

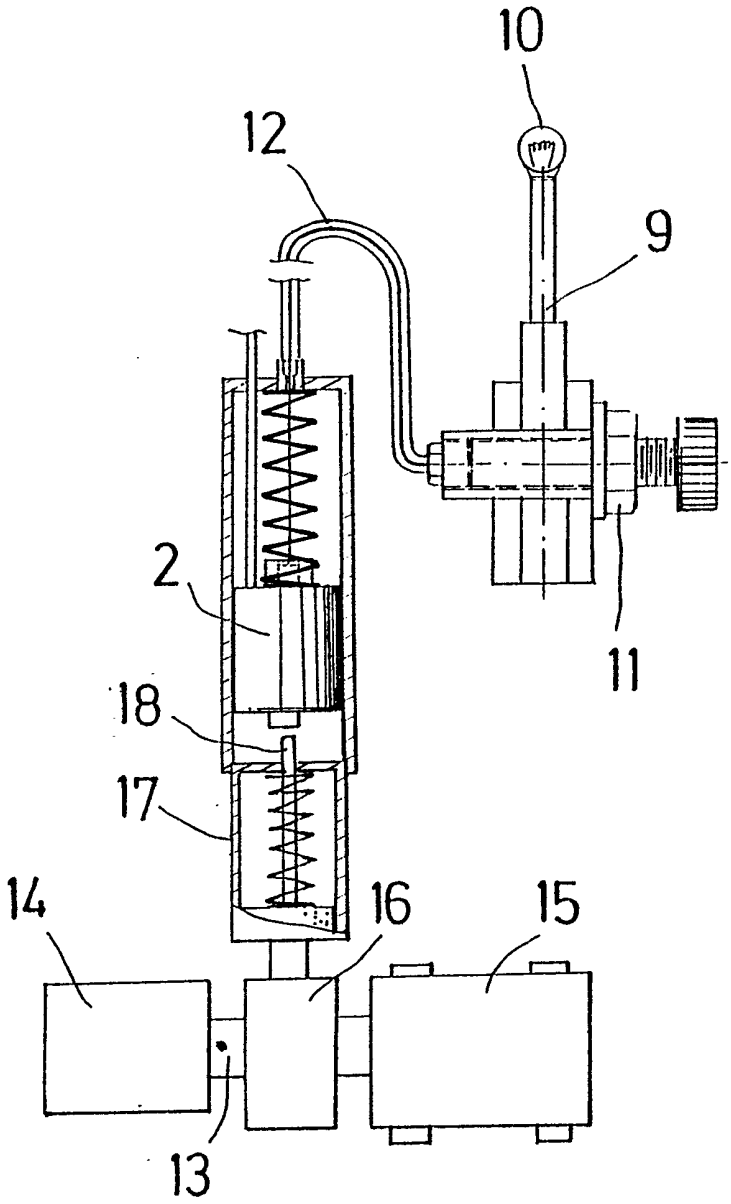

FIG. 3

AN AUXILIARY BRAKE CONTROL SYSTEM FOR A VEHICLE

The present invention relates to an auxiliary or modified brake control system of "brake control" for a vehicle and also to an automotive vehicle including such.

Brake systems for automotive vehicles are known which may be operated by depression of a foot pedal and disengaged by release thereof.

Frequently when a vehicle is stopped on the road, for example, whilst waiting for a green light at traffic lights, and the gear lever or shift lever has been put into the neutral position, if the driver does not continuously step down the brake pedal, the vehicle may roll forwards or backwards without the driver noticing such; for a certain distance as a result of an inclination in the road surface. If the vehicle rolls backwards, a driver behind may press his horn button to remind the driver in front whilst if vehicle rolls forward, it may collide with the vehicle in front of it to cause possible damage and/or annoyance.

Moreover, when climbing a slope or passing through a subway or a bridge, a vehicle driver often finds that when a vehicle in front stops, the driver must depress the brake pedal and keep the brake pedal in the depressed position. In case of traffic jam, the hand-brake is often applied instead of the foot-brake. However, if only the foot pedal is applied or in any event, when the vehicle is to advance again, the right foot of the driver should leave the brake pedal to substutively depress the accelerator. Such procedure should be performed precisely; otherwise the vehicle will quickly roll downward. Therefore, a novice driver

often becomes nervous to perform such operation and either makes the vehicle coast downward or turns the engine off.

With respect to a vehicle with an automatic transmission or gearbox, the problem of starting on a slope can possibly be eliminated or minimised. However, at a stop light, the right foot of the driver must continuously step or press down on the brake pedal to prevent the vehicle from moving forward and this often appears onerous to the driver. If the shift lever is placed into the neutral position, the vehicle is also apt to roll forward or backward.

Therefore, an auxiliary brake control system for a vehicle which can solve or minimise the above problems and ensure the safety of the driver is required.

According to the present invention there is provided in an automotive vehicle including a pedal operated braking system for at least some of the wheels, an auxiliary braking control system comprising brake maintaining means for maintaining the braking system in the operative or "on" condition when the brake pedal is depressed, and disengaging means operable upon depression of the accelerator pedal of the vehicle, to disengage said brake maintaining means so as to release the brakes and permit the vehicle to move.

Advantageously and preferably the present invention provides an auxiliary brake control system for a vehicle which employs as the brake maintaining means a motor and a clutch having a take-up drum on which a steel cable or rope is wound to draw and

control the brake pedal so that when the vehicle is stopped, the brake effect is fully maintained.

Also the present invention preferably provides in the above auxiliary brake control system an auxiliary switch disposed below the brake pedal for energising the brake maintaining means and a restoring switch disposed below the accelerator as the deactivating or disengaging means for releasing the brake means whereby a safe auxiliary brake effect can be conveniently achieved.

Also according to the present invention there is provided an auxiliary brake control system for a vehicle comprising:

a brake pedal operable to control the brakes of the vehicle;

a brake auxiliary switch for the brakes disposed below said brake pedal or otherwise located relative thereto to be driven thereby upon depression of the pedal for producing opening/closing of the switch;

an accelerator for controlling the acceleration of a vehicle;

a restoring switch disposed below said accelerator to be operable thereby for producing opening/closing of the switch;

a controller comprising a timer, a solenoid and an adjusting switch, said controller being connected with said auxiliary switch and restoring switch so as to be driven thereby to produce various controlling signals;

a motor preferably with reducing mechanism, said motor being driven by said controlling signals of said controller;

a clutch disposed on a rotary shaft of said

motor, said clutch having a steel rope or wire take-up drum;

a steel rope or wire having one end of which wound on said take-up drum of said clutch and the other end of which is secured on said brake pedal; and

a selection switch connected with said controller operable for the vehicle driver to select if the braking system of the vehicle should be controlled by the present auxiliary brake system.

The present invention advantageously provides an auxiliary brake control system which provides an excellent brake effect for the vehicle when stopping or starting on a slope so as to prevent the rolling or coasting of the vehicle and permit the driver to freely relax and move his/her body.

The invention will be described further by way of example, with reference to the accompanying drawings, in which,

Fig. 1 is a composite drawing comprising a perspective view of one embodiment of the auxiliary brake control system of the invention and illustrating by way of elevations the location of a control on the vehicle steering wheel and pedal location in the vehicle;

Fig. 2 shows the connection between the brake pedal, brake auxiliary switch, motor, clutch, steel rope, selection switch, indicator, and adjusting screw of the system of the invention; and

Fig. 3 is a part sectional view of an alternative embodiment of the invention, showing the brake pedal, hydraulic pump, three-way connector, hydraulic cylinder and the brake auxiliary switch driven thereby of the system of invention.

Referring first to Figs. 1 and 2, the vehicle auxiliary brake system of the invention includes:

a brake pedal 1 operable to control the braking action of a vehicle;

a brake auxiliary switch 2 disposed below the brake pedal 1 to be operated thereby for producing open/close effect;

an accelerator pedal 3 operable to control the acceleration of the vehicle;

a restoring switch 4 disposed below the accelerator 3 to be driven thereby for preducing open/close effect;

a controller 5 comprising a timer, a solenoid and an adjusting switch or other equivalent electronic circuit, the controller 5 being connected with the brake auxiliary switch 2 and restoring switch 4 so as to produce various controlling signals in accordance with the movements thereof;

a motor 6 with reducing mechanism and with said motor 6 being operated by the controlling signals of the controller 5;

a clutch 7 disposed on a rotary shaft of the motor 6, the clutch 7 having a steel take-up drum for a steel rope or cable;

a steel rope or cable 8 one end of which is wound on the take-up drum of the clutch 7 and the other end of which is fixed on the brake pedal 1; and

a selection switch 9 connected with the controller 5 so as to permit the vehicle driver to select whether the vehicle should be controlled by the auxiliary brake system.

The controller 5 is used to control the pulling displacement of the steel rope 8 displaced by the motor 6 by being wound round the take-up drum and

to control the connection/disconnection of the clutch 7 and to adjust the driving force of the clutch 7.

The selection switch 9 can be disposed behind the steering wheel or at any other position suitable for operation. When the selection switch 9 is switched to an "ON" position, the brake system of the vehicle operates according to the working mode of the present invention, whilst when the selection switch 9 is switched to an "OFF" position, the brake system of the vehicle will operate like that of a normal vehicle.

The indicator 10 is used to indicate the operational mode of auxiliary brake system and an adjusting screw 11 can be mounted on the instrument panel of the vehicle and connected to the steel cable 12 to adjust the position of the brake auxiliary switch 2 so as to meet various drivers' requirements.

When the vehicle driver feels tired and if the vehicle is having to stop frequently, the selection switch 9 can be put into the "ON" position whereby when the vehicle stops and the brake pedal 1 is pressed to the lowest position, the brake auxiliary switch 2 is closed to activate the motor 6 to rotatably drive the take-up drum of the clutch 7 so as to pull the steel rope 8 and keep the brake pedal 1 in the depressed position. As a result, the whole vehicle is then maintained stationary by the auxiliary braking system without any displacement so that the driver can relax and move his/her body. When the vehicle is to start again, the driver only needs to step down (depress) the accelerator pedal 3 to touch or operate the restoring switch 4 so as to disengage the clutch 7 and release the steel wire 8 from tension. Consequently, the brake pedal 1 is restored to its home or normal position and

the driver can continuously depress the accelerator pedal 3 to increase the engine speed and to enable the vehicle to move.

Because the system of the present invention employs a computerised clutch to control the brake pedal operating such that when the vehicle is braked in an emergency, the auxiliary system will work immediately. If the driver relieves or releases the brake pedal, the clutch will automatically restore to maintain about 70% braking force to slow down the vehicle. In case the vehicle needs to be stopped immediately, the driver only needs to again heavily step down on or depress the brake pedal. If the vehicle should need to go forward right away, the driver can press down on the accelerator again to advance the vehicle.

A hydraulically operable, auxiliary switch forming part of a second embodiment of the invention is shown in Fig. 3, which otherwise is similar to the system of Figs. 1 and 2, and wherein a three-way connector 16 is connected in a brake oil nose or duct 13 of a hydraulic pump 14 of the brake system of the vehicle between the pump 14 and the distributing disk or manifold 15. A hydraulic piston-cylinder 17 is further connected to the three-way connector 16. The hydraulic piston-cylinder 17 has an output shaft 18 in front of which a brake auxiliary switch 2 is disposed. When the driver depresses the brake pedal 1, the oil in the hydraulic pump 14 will flow through the brake oil hose 13 towards the distributing disk or manifold 15 and four oil hoses connecting the distributing disk or manifold 15 and the front and rear wheel brake systems. A part of the oil flowing through the three-way connector 16 will flow into the hydraulic cylinder 17

and force the output shaft 18 to move to activate the auxiliary switch 2. In this embodiment, the motor 6, clutch 7, steel rope or wire 8, brake pedal 1 are all similar to the components shown in Figs. 1 and 2. Similarly, when the vehicle is to advance again, the driver needs only to depress the accelerator 3 to activate the restoring switch 4 to separate or disengage the clutch 7 and detach the steel wire 8 so as to restore the brake pedal 1 to its original position. The position of auxiliary switch 2 which is biassed towards shaft 18 by a spring is adjustable by means of adjusting screw 11 which also operates on a Bowden cable or like to effect the adjustment of position of switch 2.

The aforesaid embodiment is used for describing the objects, features and functions of the present invention; any person skilled in the art may make changes and modifications without deviating from the spirit and scope of the invention defined by the attached claims. For example, the switch means may operate a valve in the hydraulic or pneumatic circuit of a brake system instead of the mechanical means (wire) referred to in the embodiment.

CLAIMS

1. In an automotive vehicle including a pedal operated braking system for at least some of the wheels, an auxiliary braking control system comprising brake maintaining means for maintaining the braking system in the operative or "on" condition when the brake pedal is depressed, and disengaging means operable upon depression of the accelerator pedal of the vehicle, to disengage said brake maintaining means so as to release the brakes and permit the vehicle to move.

2. An auxiliary system as claimed in claim 1, in which a switch is provided and connected to control means so as to enable the driver to optionally activate or deactivate the auxiliary system.

3. An auxiliary brake control system for a vehicle comprising:

a brake pedal operable to control the brakes of the vehicle;

a brake auxiliary switch for the brakes disposed below said brake pedal or otherwise located relative thereto to be driven thereby upon depression of the pedal for producing opening/closing of the switch;

an accelerator for controlling the acceleration of a vehicle;

a restoring switch disposed below said accelerator to be operable thereby for producing opening/closing of the switch;

a controller comprising a timer, a solenoid and an adjusting switch, said controller being connected with said auxiliary switch and restoring switch so as to be driven thereby to produce various

controlling signals;

a motor preferably with reducing mechanism, said motor being driven by said controlling signals of said controller;

a clutch disposed on a rotary shaft of said motor, said clutch having a steel rope or wire take-up drum;

a steel rope or wire having one end of which wound on said take-up drum of said clutch and the other end of which is secured on said brake pedal; and

a selection switch connected with said controller operable for the vehicle driver to select if the braking system of the vehicle should be controlled by the present auxiliary brake system.

4. An auxiliary brake control system as claimed in claim 3, wherein an indicator is connected with said selection switch for indicating to the driver the operational state of said system.

5. An auxiliary brake control system as claimed in claim 3 or 4, wherein an adjusting screw or means is disposed in the driver's compartment of the vehicle and connected with a steel rope or wire for adjusting the distance between said auxiliary switch or the activation position thereof and said brake pedal.

6. An auxiliary brake control system as claimed in claim 1, wherein a three-way connector is connected with a hydraulic pump of a brake oil hose and a distributing disk or manifold, and a hydraulic cylinder is further connected with said three-way connector, said hydraulic cylinder having an output shaft in front of which said brake auxiliary switch is disposed.

7. An auxiliary brake system of an automotive vehicle substantially as herein described with reference to Figs. 1 and 2 or as modified by Fig. 3 of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number 9028191.6

Relevant Technical fields

(i) UK Cl (Edition K) F2F (FA, FBH, FHD); F2Y (YSN)

(ii) Int Cl (Edition 5) B60T

Search Examiner

A LITTLEJOHN

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

2.4.91

Documents considered relevant following a search in respect of claims 1-7

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2167507 A (VOLVO) see whole document	1-6
X	GB 1173072 A (MIZUNO) see whole document, eg page 2 lines 90-105 and 117-126	1,2
X	GB 614551 A (FORD) see eg page 3 line 82 to page 4 line 26	1
X	US 4867289 A (WOOTERS) see eg column 4 to line 55 to column 5 line 30	1
X	US 4076093 A (MIZUNO) see eg column 5 line 15 to column 6 line 3	1,2

SF2(p)

ME8AAE

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1992 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.