PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
B60K 28/00, E05F 15/20

A1

(11) International Publication Number: **WO 96/40533**

(43) International Publication Date: 19 December 1996 (19.12.96)

(21) International Application Number: PCT/US95/10370

(22) International Filing Date: 14 August 1995 (14.08.95)

(30) Priority Data:
08/484,471 7 June 1995 (07.06.95) US

(71) Applicant *(for all designated States except US)*: THERM-L-TEC, INC. [US/US]; 119 Osage Avenue, Kansas City, KS 66105 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: COLE, Steven, C. [US/US]; 15115 Chestnut, Basehor, KS 66007 (US). KILGORE, Stephen, V. [US/US]; 13001 West 101st Street, Lenexa, KS 66215 (US). WINAND, Robert, D. [CA/CA]; 265 King George Road - Unit #7, Brantford, Ontario N3R 6Y1 (CA).

(74) Agent: WERESH, John, A.; Hovey, Williams, Timmons & Collins, Suite 400, 2405 Grand Boulevard, Kansas City, MO 64108 (US).

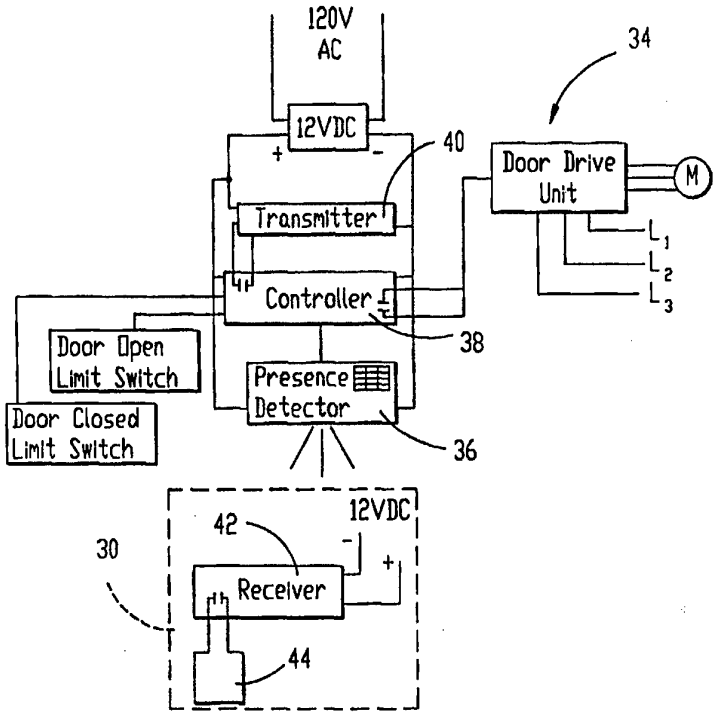
(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: VEHICLE DISABLING APPARATUS

(57) Abstract

A vehicle disabling apparatus for disabling a vehicle (30) travelling too closely to a restricted area is disclosed. The vehicle disabling apparatus includes a presence sensor (36) for sensing when the vehicle (30) is within a predetermined distance of the restricted area, a transmitter (40) responsive to the presence sensor (36) for transmitting a disabling signal to the vehicle (30) when the vehicle (30) is within a predetermined distance from the restricted area, a receiver (42) coupled with the vehicle (30) for receiving the disabling signal, and a disabling circuit (44) responsive to the receiver (42) for disabling the vehicle (30) when the receiver (42) receives a disabling signal.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	**GB**	United Kingdom	**MW**	Malawi
AT	Austria	**GE**	Georgia	**MX**	Mexico
AU	Australia	**GN**	Guinea	**NE**	Niger
BB	Barbados	**GR**	Greece	**NL**	Netherlands
BE	Belgium	**HU**	Hungary	**NO**	Norway
BF	Burkina Faso	**IE**	Ireland	**NZ**	New Zealand
BG	Bulgaria	**IT**	Italy	**PL**	Poland
BJ	Benin	**JP**	Japan	**PT**	Portugal
BR	Brazil	**KE**	Kenya	**RO**	Romania
BY	Belarus	**KG**	Kyrgystan	**RU**	Russian Federation
CA	Canada	**KP**	Democratic People's Republic of Korea	**SD**	Sudan
CF	Central African Republic			**SE**	Sweden
CG	Congo	**KR**	Republic of Korea	**SG**	Singapore
CH	Switzerland	**KZ**	Kazakhstan	**SI**	Slovenia
CI	Côte d'Ivoire	**LI**	Liechtenstein	**SK**	Slovakia
CM	Cameroon	**LK**	Sri Lanka	**SN**	Senegal
CN	China	**LR**	Liberia	**SZ**	Swaziland
CS	Czechoslovakia	**LT**	Lithuania	**TD**	Chad
CZ	Czech Republic	**LU**	Luxembourg	**TG**	Togo
DE	Germany	**LV**	Latvia	**TJ**	Tajikistan
DK	Denmark	**MC**	Monaco	**TT**	Trinidad and Tobago
EE	Estonia	**MD**	Republic of Moldova	**UA**	Ukraine
ES	Spain	**MG**	Madagascar	**UG**	Uganda
FI	Finland	**ML**	Mali	**US**	United States of America
FR	France	**MN**	Mongolia	**UZ**	Uzbekistan
GA	Gabon	**MR**	Mauritania	**VN**	Viet Nam

VEHICLE DISABLING APPARATUS

Background of the Invention

1. Field of the Invention

The present invention relates to a vehicle disabling apparatus for disabling a vehicle travelling too closely to a restricted area. The invention also relates to a forklift disabling apparatus for disabling a forklift approaching too closely or too quickly to a power operated door that has not fully opened.

2. Description of the Prior Art

Vehicles commonly travel near areas that are restricted from vehicle traffic such as school playgrounds, crosswalks, and government buildings. Occasionally, vehicle operators drive too closely to these restricted areas or lose control of their vehicles and crash into the restricted areas, resulting in property damage and possible injuries and loss of lives. Currently, no practical devices exist for sensing when a vehicle is too close to a restricted area and for disabling the vehicle as a result to prevent collisions.

One specific example of the above-described problem includes the passage of forklifts and trucks through power operated doors. Commercial or industrial freezers and other storage facilities typically have large doors for permitting passage of forklifts or other large loads. These commercial or industrial doors are typically fitted with a drive assembly including a motor for moving the doors between opened and closed positions. The drive assembly opens the doors in response to an input signal actuated by a manual or sensed control device such as a pushbutton switch or motion detector.

To increase forklift operators' productivity, the drive assemblies often include an input device that automatically opens the doors upon sensing the presence of a forklift. This allows the forklift operator to pass through the door passageway without getting off of the forklift. A manual or sensed input control device is also provided on the opposite side of the door for controlling closure of the door after the forklift has been driven through the doorway.

Although automatically actuated drive assemblies increase forklift operators' productivity, they cause several problems. For example, since the doors open automatically, many forklift operators drive their forklifts towards the doors at high rates of speed and assume that the doors will open rapidly enough to allow them to pass safely therethrough. However, the motors on many power operated doors do not open the doors fast enough to allow a forklift operating at full speed to pass through the doorways. By the time the forklift operator realizes that the doors are not opening rapidly enough to allow safe passage, it is too late to avoid collision. Accordingly, it has become a common occurrence for forklift operators to crash their forklifts into doors that have not fully opened. This often results in serious damage to both the doors and the forklifts and results in a large loss of money and time.

One solution to the above-described forklift collision problem is to equip the door drive assemblies with larger and faster motors to more rapidly open the doors. Although this reduces collisions, it results in other problems. For example, the doors and their support assemblies often become damaged when the doors slam together after opening or closing too rapidly. Additionally, it is dangerous to close doors too rapidly because people or objects passing therethrough can be hit

by the closing doors. Additionally, the larger motors needed for the rapid opening cycles are more expensive and are under-utilized in normal opening and closing cycles.

Another solution to the above-described collision problem is to use DC motors rather than AC motors for opening and closing the doors. Since DC motors are powered by direct current, their speed can be easily adjusted to ramp the opening and closing speeds up and down as needed. Thus, the doors can be initially opened rapidly, and subsequently slowed at the end of their travel to reduce slamming. The doors can also be closed at speeds independent of the opening speeds. Although this solution reduces some forklift collisions, it also suffers from several limitations. For example, DC motors are significantly more expensive than comparably sized AC motors. DC motors are also not as reliable as AC motors and cannot be operated above their rated speed and torque levels. Thus, the use of DC motors to open and close the doors increases the cost and decreases the reliability and flexibility of the apparatus.

Objects and Summary of the Invention

In view of the above-described problems associated with the travel of vehicles near restricted areas, it is an object of the present invention to provide an apparatus for preventing unauthorized vehicle entry into restricted areas.

It is another object of the present invention to provide a vehicle disabling apparatus for sensing when a vehicle is too close to a restricted area and for disabling the vehicle as a result to prevent collisions.

It is another object of the present invention to provide a forklift disabling apparatus for sensing when a forklift or truck is approaching too closely or quickly to a power operated door that has not fully opened and for

either accelerating the opening speed of the door or disabling the forklift to avoid forklift collisions with the door.

In view of these objects and other objects that become evident from the following description of the preferred embodiments of the invention, a vehicle disabling apparatus is provided. In a first embodiment of the invention, the vehicle disabling apparatus is operable for disabling a vehicle approaching too closely to a restricted area and broadly includes sensing means for sensing when the vehicle is within a predetermined distance of the restricted area, transmitting means responsive to the sensing means for transmitting a disabling signal to the vehicle when the vehicle is within a predetermined distance of the restricted area, receiving means coupled with the vehicle for receiving the disabling signal, and disabling means responsive to the receiving means for disabling the vehicle when the receiving means receives a disabling signal.

In operation of the first embodiment of the invention, the sensor means senses the presence of an approaching vehicle and determines the distance of the vehicle from the restricted area. The sensor outputs a continuous analog signal to the controller that is proportional to this distance. The controller receives the analog signal and compares the distance of the vehicle to a predetermined distance set-point. When the controller determines that the vehicle is approaching too closely to the restricted area, it triggers the transmitter for transmitting a disabling signal to the vehicle. The receiver means and disabling means on the vehicle receive this disabling signal and disable the operation of the vehicle in response thereto.

In a second embodiment of the invention, a forklift disabling apparatus is provided for disabling a

forklift approaching too closely or too quickly to a power operated door that has not fully opened. The preferred forklift disabling apparatus broadly includes sensing means for sensing the presence, position, and speed of a forklift as it approaches the power operated door, a controller responsive to the sensing means for providing a control signal to the door drive unit control assembly for controlling the operation of the power operated door, transmitting means responsive to the sensing means and the controller for transmitting a disabling signal to the forklift when the controller determines that the forklift is too close to the power operated doors, receiving means coupled with the forklift for receiving the disabling signal, and disabling means responsive to the receiving means for disabling the forklift when the receiving means receives a disabling signal.

In operation of the second embodiment of the invention, the sensor means senses the presence of an approaching forklift and determines the distance of the forklift from the doors. The sensor may also determine the speed of the approaching forklift. The sensor then transmits analog signals to the controller that are proportional to the distance and speed of the forklift. The controller is also coupled with a plurality of door limit switches for determining the position of the doors. Based upon the position of the doors and the distance and speed of the forklift, the controller calculates whether the doors are opened or are opening fast enough to allow the forklift to pass therethrough. The controller is also coupled with the door drive unit control assembly and the transmitter means and is operable for either triggering the door drive unit control assembly to accelerate the opening speed of the doors or for triggering the transmitter for transmitting a disabling signal to the forklift.

Initially, if the controller receives an output from the sensing means that indicates that an approaching forklift is within a certain distance of the doors, it determines how far the doors are opened by sensing the position of the door limit switches and signals the door drive unit control assembly to accelerate the opening speed of the power operated doors if the doors are not opened far enough. Subsequently, if the controller receives an output signal from the sensing means that the forklift is within a second, closer distance to the doors, it again determines how far the doors are opened by sensing the position of the door limit switches and triggers the transmitter to transmit a disabling signal to the forklift for disabling the forklift if the doors are not opened far enough or opening rapidly enough to allow safe passage therethrough. In this way, the opening speed of the door can be initially increased as a forklift approaches the power operated door, and the forklift can then be disabled only if the controller senses that the door is not opening rapidly enough to allow the forklift operator to pass freely therethrough.

By providing a vehicle disabling apparatus constructed in accordance with the present invention, numerous advantages are realized. For example, by providing an apparatus for preventing unauthorized vehicle entry into restricted areas, property damage and injuries resulting from vehicle collisions with restricted areas can be reduced or eliminated.

Additionally, by providing a vehicle disabling apparatus for sensing when a vehicle is too close to a restricted area and for disabling the vehicle as a result, restricted areas such as school playground or crossing zones can be protected from nearby vehicle traffic.

More specifically, by providing a forklift disabling apparatus for sensing when a forklift or truck

is approaching too closely or too quickly to a power operated door that has not fully opened and for either accelerating the opening speed of the door or disabling the forklift to avoid collisions, damage to forklifts and power operated doors resulting from collisions can be reduced or eliminated.

Brief Description of the Drawing Figures

A preferred embodiment of the present invention is described in detail below with reference to the attached drawing figures, wherein:

Figure 1 is a perspective view of a vehicle disabling apparatus constructed in accordance with a first preferred embodiment of the invention;

Fig. 2 is an electrical block diagram illustrating the components of the vehicle disabling apparatus;

Fig. 3 is a perspective view of a forklift disabling apparatus constructed in accordance with a second preferred embodiment of the invention; and

Fig. 4 is an electrical block diagram illustrating the components of the forklift disabling apparatus.

Detailed Description of the Preferred Embodiments

The preferred vehicle disabling apparatus is described in Section I of the application, and the preferred forklift disabling apparatus is described in Section II.

I. Vehicle Disabling Apparatus

Turning now to Figs. 1 and 2, a vehicle disabling apparatus constructed in accordance with a first embodiment of the invention is illustrated. The vehicle disabling apparatus is operable for disabling a vehicle 10

approaching too closely to a restricted area 12 such as a school playground, crosswalk, or government building.

Referring specifically to Fig. 2, the preferred vehicle disabling apparatus broadly includes a presence sensor 14 for sensing the distance of the vehicle 10 from the restricted area 12, a controller 16 coupled with the presence sensor 14 for calculating when the vehicle 10 is too close to the restricted area 12, a transmitter 18 responsive to the presence sensor 14 and the controller 16 for transmitting a disabling signal to the vehicle 10 when the vehicle 10 is within a predetermined distance of the restricted area 12, a receiver 20 coupled with the vehicle 10 for receiving the disabling signal, and a disabling circuit 22 responsive to the receiver 20 for disabling the vehicle 10 when the receiver 20 receives a disabling signal.

In more detail, the presence sensor 14 is preferably a sonic sensor such as a Model No. PL 425 sensor manufactured by Miltronics. The preferred presence sensor 14 may also include a radar presence device, an infrared presence device, or any conventional presence sensor 14 operable for detecting the presence and speed of a vehicle 10.

As illustrated in Fig. 1, the presence sensor 14 is mounted proximate the restricted area 12. The presence sensor 14 detects the distance of a vehicle 10 from the restricted area 12 and transmits a 4-20 milliamp signal to the controller 16 representative of this distance. The presence sensor 14 is also operable for determining the speed at which the vehicle 10 is approaching the restricted area 12 and for transmitting a second 4-20 milliamp signal to the controller 16 representative of this speed. The presence sensor 14 is programmable so that the 4-20 milliamp signals can be representative of any distance and space.

The controller 16 receives the 4-20 milliamp control signals from the presence sensor 14 and calculates when the approaching vehicle 10 is too close to the restricted area 12. The controller 16 can be programmed to merely compare the distance of the vehicle 10 from the restricted area 12 to a set-point or to take into account the speed of the vehicle 10 during the comparison step. For example, the controller 16 can be programmed to disable all vehicles within 50′ of the restricted area 12. Alternately, the controller 16 can be programmed to disable vehicles traveling 10 m.p.h. or less only after they are within 10′ of the restricted area 12. In this way, slow-moving vehicles can be treated differently than fast-moving vehicles.

When the controller 16 determines that the vehicle 10 is too close to the restricted area 12, it triggers the transmitter 18 to transmit a disabling signal to the vehicle 10. The preferred controller is a PLC-STD-2 type controller.

The transmitter 18 transmits a disabling signal to the vehicle 10 upon receipt of a signal from the controller 16. The transmitter 18 is preferably a Model No. GM 300 radio signal transmitter manufactured by Motorola. The transmitter 18 may also include a hand-held type device for use by police officers and other safety personnel for transmitting disabling signals to vehicles that enter restricted areas or that are being driven unlawfully.

The receiver 20 is positioned on the vehicle 10 and is operable for receiving the disabling signal transmitted by the transmitter 18. The receiver 20 is preferable a Model No. M130 radio signal receiver manufactured by Motorola.

The disabling circuit 22 is also positioned on the vehicle 10 and is responsive to the receiver 20 for

disabling the vehicle 10 when the receiver 20 receives a disabling signal. The disabling circuit 22 preferably includes a normally closed relay contact coupled with the vehicle's ignition system. When the receiver 20 receives a disabling signal, the normally closed relay contact is opened, thus disabling the vehicle 10.

The disabling circuit 22 may also include a relay contact coupled with the vehicle's electric carburetor for disabling the carburetor, a relay operable for applying the vehicle's brakes, a relay operable for limiting the electrical impulse to the vehicle's carburetion system, a relay operable for limiting the electrical impulse to the vehicle's electronic ignition, or a relay and servo valve for limiting the flow of fuel delivered to the vehicle's engine. Those skilled in the art will appreciate that the disabling circuit may include various other types of vehicle control devices.

The disabling circuit 22 is preferably coupled with the vehicle's speedometer for sensing the speed of the vehicle 10. In this way, the disabling circuit 22 can monitor the vehicle's 10 speed and slowly limit the flow of fuel delivered to the vehicle's engine when the receiver 20 receives a disabling signal if the speed exceeds a predetermined level. This prevents drastic vehicle stops that may cause the driver to lose control of the vehicle 10.

In operation, the vehicle disabling apparatus is operable for preventing a vehicle 10 from colliding with or approaching too closely to a restricted area 12. The presence sensor 14 senses the distance of the vehicle 10 from the restricted area 12 and the speed of the approaching vehicle 10 and generates control signals representative of this distance and speed. The controller 16 receives the control signals from the presence sensor 14 and determines when the vehicle 10 is too close to the

restricted area 12 based on these control signals. The controller 16 then triggers the transmitter 18 to transmit a disabling signal to the vehicle 10 when the vehicle 10 is approaching too closely to the restricted area 12. The receiver 20 receives the disabling signal and triggers the disabling circuit 22. The disabling circuit 22 then disables the vehicle 10 to prevent it from colliding with or approaching too closely to the restricted area 12.

II. Forklift Disabling Apparatus

Turning now to Figs. 3 and 4, a forklift disabling apparatus constructed in accordance with a second embodiment of the invention is illustrated. The preferred forklift disabling apparatus is operable for disabling a forklift 30, truck or other vehicle approaching too closely or too quickly to a power operated door 32 that has not fully opened.

In more detail, the power operated door 32 is shown installed over a doorway formed in the wall of a freezer. The door may also be coupled with other storage areas such as a warehouse or loading dock. The power operated door 32 includes a pair of doors supported for linear movement relative to the doorway between an open position and a closed position, an automated drive system 33 including a motor for moving the doors between the open and closed positions, and a door drive unit control assembly 34 for controlling the operation of the drive system.

The door drive unit control assembly 34 preferably includes a programmable micro-inverter such as the E-Trac Model XFC manufactured by T. B. Woods. The inverter is coupled between the drive system's AC power source and the motor and is operable for controlling and selectively varying the speed of the AC motor so that the doors can be moved between the open and closed positions

at varying speeds. The inverter is programmable, and can be selectively adjusted to deliver any voltage and frequency to the AC motor to provide an infinite amount of speed control. In the preferred embodiment, the inverter is programmed so that the motor initially opens the doors rapidly and then slows the doors to prevent slamming. Since the inverter supplies AC power to the motor, the speed can be adjusted without resultant loss of motor torque.

The power operated door 32 also includes opened and closed limit switches for sensing the position of the doors during their travel between opened and closed positions. The limit switches may be secured to the wall along the upper run of doors for sensing the position of the doors. A plurality of limit switches may be provided for sensing the position of the door during its entire travelling path.

The preferred forklift disabling apparatus is illustrated in Fig. 4 and broadly includes a presence sensor 36 for sensing the presence, position, and speed of a forklift 30 as it approaches a power operated door 32, a controller 38 responsive to the presence sensor 36 for providing a control signal to the door drive unit control assembly 34 for controlling the operation of the power operated door 32, a transmitter 40 responsive to the presence sensor 36 and the controller 38 for transmitting a disabling signal to the forklift 30 when the controller 38 determines that the forklift 30 is too close to the power operated doors 32, a receiver 42 coupled with the forklift 30 for receiving the disabling signal, and a disabling circuit 44 responsive to the receiver 42 for disabling the forklift 30 when the receiver 42 receives a disabling signal.

In more detail, the presence sensor 36 is preferably a sonic sensor such as a Model No. PL 425

sensor manufactured by Miltronics. The preferred presence sensor 36 may also include a radar presence device, an infrared presence device, or any conventional presence sensor operable for detecting the presence and speed of a forklift 30.

As illustrated in Fig. 3, the presence sensor 36 is preferably mounted above the power operated doors 32. The presence sensor 36 detects the distance of a forklift 30 from the doors and transmits a 4-20 milliamp signal to the controller 38 representative of this distance. The presence sensor 36 may also determine the speed that the forklift 30 is approaching the power operated doors 32 and transmit a second 4-20 milliamp signal to the controller 38 representative of this speed. The presence sensor 36 is programmable so that the 4-20 milliamp signals can be representative of any distance and speed. For example, in the preferred embodiment, the presence sensor 36 is programmed to output a 4 milliamp signal when the forklift 30 is at least 16' from the power operated doors 32 and a 20 milliamp signal when the forklift 30 is adjacent the power operated doors 32.

The controller 38 is operable for both controlling the door drive unit control assembly 34 and triggering the transmitter 40 in response to the control signals from the presence sensor 36. The controller 38 also receives input signals from the opened and closed limit switches of the power operated door 32 for determining the position of the doors and for disengaging the forklift 30 disabling apparatus when the doors are fully opened. The controller 38 may be coupled with a plurality of limit switches for sensing the exact position of the door during its travel. The preferred controller 38 is a PLC-STD-2 type controller and is mounted within the door drive unit control assembly 34 cabinet.

The controller 38 performs two primary control functions. First, the controller 38 triggers the door drive unit control assembly 34 for controlling the opening speed of the power operated door 32 in response to the 4-20 milliamp signals from the presence sensor 36. When the presence sensor 36 senses that the forklift 30 is within a pre-determined distance from the power operated door 32, it first determines how far the doors have opened by sensing the position of the door limit switches. If the controller 38 determines that the doors have not opened far enough to allow safe passage, it triggers the door drive unit control assembly 34 for accelerating the opening speed of the power operated door 32.

Second, if the controller 38 receives a signal from the presence sensor 36 indicating that the forklift 30 is within a second, closer distance from the power operated door 32, it once again determines how far the doors have opened. If the controller 38 determines that the doors have still not opened far enough to allow safe passage, it triggers the transmitter 40 to transmit a disabling signal to the forklift 30.

For example, the controller 38 can be programmed so that it 1) accelerates the opening speed of the power operated doors 32 when the forklift 30 is within 15′ and the doors have not fully opened, and 2) disables the forklift 30 when it is within 8′ and the doors have not fully opened. In this way, the opening speed of the doors can be initially increased as a forklift 30 approaches the power operated doors, and the forklift 30 can then be disabled only if the controller 38 senses that the doors have not opened far enough to allow the forklift operator to pass freely therethrough.

As described above, the controller 38 also receives input signals from the power operated door 32 opened and closed limit switches. When the power operated

door 32 is fully open, the controller 38 is disengaged so that it does not transmit signals to either the transmitter 40 or the door drive unit control assembly 34. Thus, the forklift 30 disabling apparatus is essentially turned off when the power operated door 32 is fully opened to prevent unnecessary delays in forklift traffic.

The transmitter 40 is coupled with the controller 38 and is operable for transmitting a disabling signal to the forklift 30 when triggered by the controller 38. The transmitter 40 is preferably a Model No. GM 300 radio signal transmitter manufactured by Motorola

The receiver 42 is positioned on the forklift 30 and is operable for receiving the disabling signal transmitted by the transmitter 40. The receiver 42 is preferable a Model No. M130 radio signal receiver manufactured by Motorola.

The disabling circuit 44 is also positioned on the forklift 30 and is responsive to the receiver 42 for disabling the forklift 30 when the receiver 42 receives a disabling signal. The disabling circuit 44 preferably includes a normally closed relay contact coupled with the forklift's ignition system. When the receiver 42 receives a disabling signal, the normally closed relay contact is opened, thus disabling the forklift 30. The disabling circuit 44 may also include a relay contact coupled with the forklift's electric carburetor for disabling the carburetor or a relay operable for applying the forklift's brakes. Those skilled in the art will appreciate that the disabling circuit 44 may include various other types of forklift control devices.

In operation, the forklift disabling apparatus is operable for preventing a forklift 30 from colliding with a power operated door 32. The forklift disabling apparatus initially accelerates the opening speed of the power operated door 32 if it has not opened far enough

when the forklift 30 is within a pre-determined distance of the door. If the forklift 30 disabling apparatus disables the forklift 30 only if it senses that the power operated door 32 is not open far enough when the forklift 30 is a second, closer distance from the door.

Although the invention has been described with reference to the preferred embodiment illustrated in the attached drawing figures, it is noted that equivalents may be employed and substitutions made herein without departing from the scope of the invention as recited in the claims. For example, although the forklift disabling apparatus is described and illustrated herein for use in preventing forklift collisions, those skilled in the art will appreciate that the forklift disabling apparatus can be used to disable any type of vehicle including automobiles, trucks or other conventional vehicles. Additionally, the vehicle disabling apparatus can be used to prevent vehicle traffic near any restricted area including school playgrounds, crosswalks, and government buildings.

Having thus described the preferred embodiment of the invention, what is claimed as new and desired to be protected by Letters Patent includes the following:

Claims:

1. A vehicle disabling apparatus for disabling a vehicle approaching a restricted area, said apparatus comprising:

sensing means for sensing when the vehicle is within a predetermined distance of the restricted area;

transmitting means responsive to said sensing means for transmitting a disabling signal to the vehicle when said sensing means senses that the vehicle is within a predetermined distance from the restricted area;

receiving means coupled with the vehicle for receiving the disabling signal; and

disabling means responsive to said receiving means for disabling the vehicle when said receiving means receives a disabling signal.

2. The apparatus as set forth in claim 1, said disabling means including means for disconnecting power to the vehicle's ignition.

3. The apparatus as set forth in claim 1, said disabling means including means for applying the vehicle's brakes.

4. The apparatus as set forth in claim 1, said disabling means including means for limiting the electrical impulse to the vehicle's carburetion system.

5. The apparatus as set forth in claim 1, said disabling means including means for limiting the electrical impulse to the vehicle's electronic ignition.

6. The apparatus as set forth in claim 1, said disabling means including means for limiting the flow of fuel delivered to the vehicle's engine.

7. The apparatus as set forth in claim 4, said disabling means including means for sensing the speed of the vehicle and for limiting the flow of fuel delivered to the vehicle's engine when the speed exceeds a predetermined level.

8. A forklift disabling apparatus for disabling a forklift approaching a power operated door, the power operated door having a door drive unit control assembly for controlling the operation and opening speed of the power operated door, said forklift disabling apparatus comprising:

sensing means for sensing the relative position of the forklift as it approaches the power operated door;

a controller for coupling with the door drive unit control assembly, said controller being responsive to said sensing means for triggering the door drive unit control assembly to accelerate the opening speed of the power operated door when said sensing means senses that the forklift is within a first predetermined distance of the power operated door;

transmitting means responsive to said sensing means for transmitting a disabling signal to the forklift when said sensing means senses that the forklift is within a second predetermined distance of the power operated door;

receiving means coupled with the forklift for receiving the disabling signal; and

disabling means responsive to said receiving means for disabling the forklift when said receiving means receives a disabling signal.

9. The apparatus as set forth in claim 8 further including a door position sensor coupled with said controller for sensing the position of the power operated door and for disabling said controller and said transmitting means when the power operated door is fully open.

10. The apparatus as set forth in claim 8, said disabling means including means for disconnecting power to the forklift's ignition.

11. The apparatus as set forth in claim 8, said disabling means including means for applying the forklift's brakes.

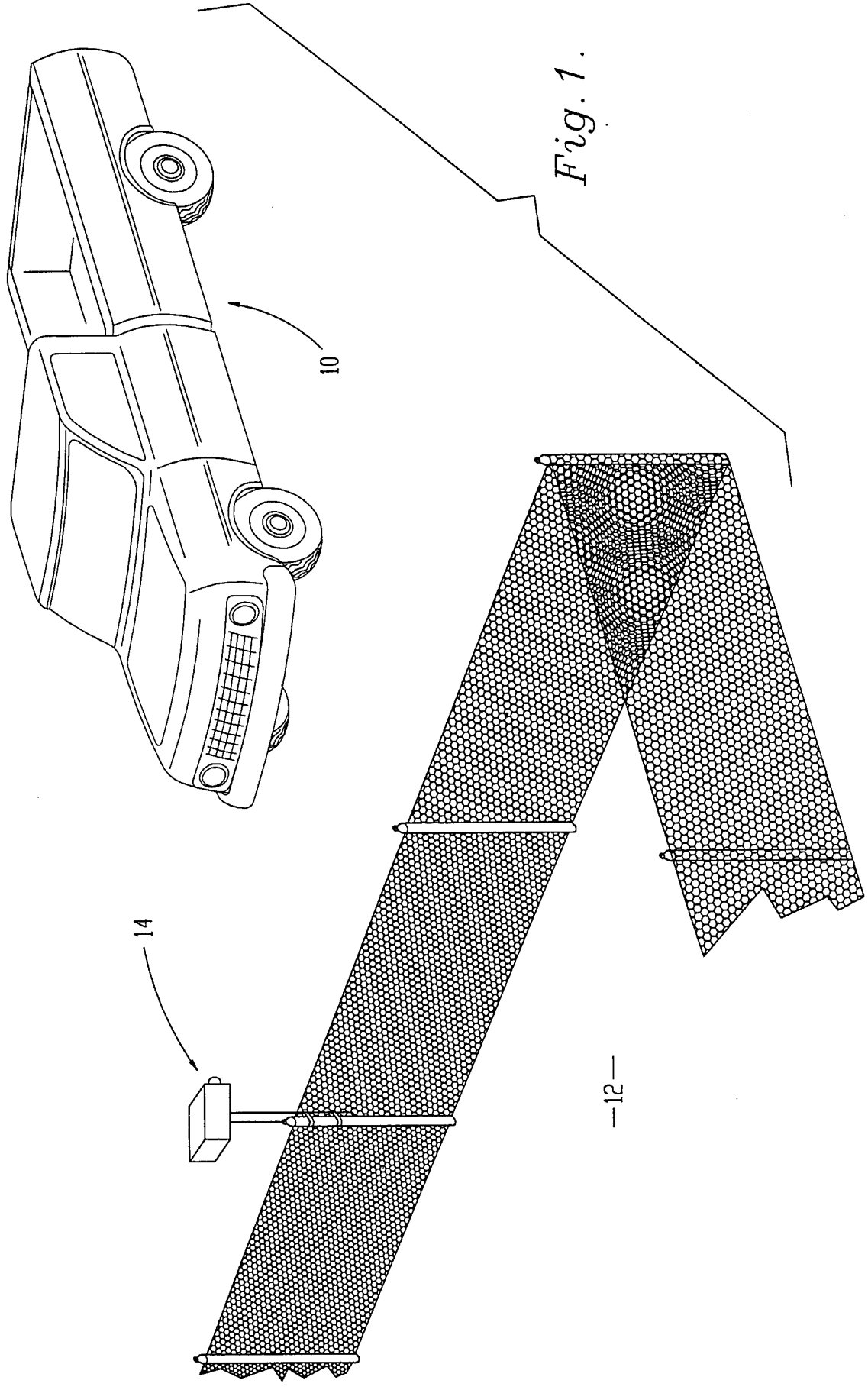


Fig. 1.

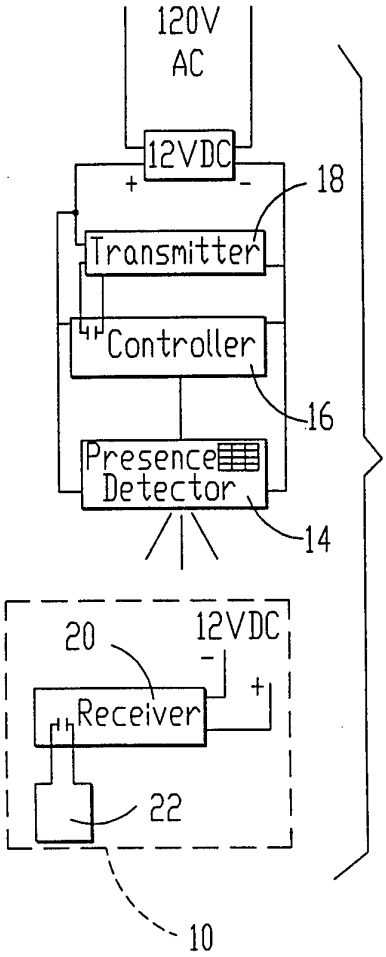

120V
AC
12VDC
+
-
18
Transmitter
Controller
16
Presence
Detector
14
20
12VDC
-
+
Receiver
22
10

Fig. 2.

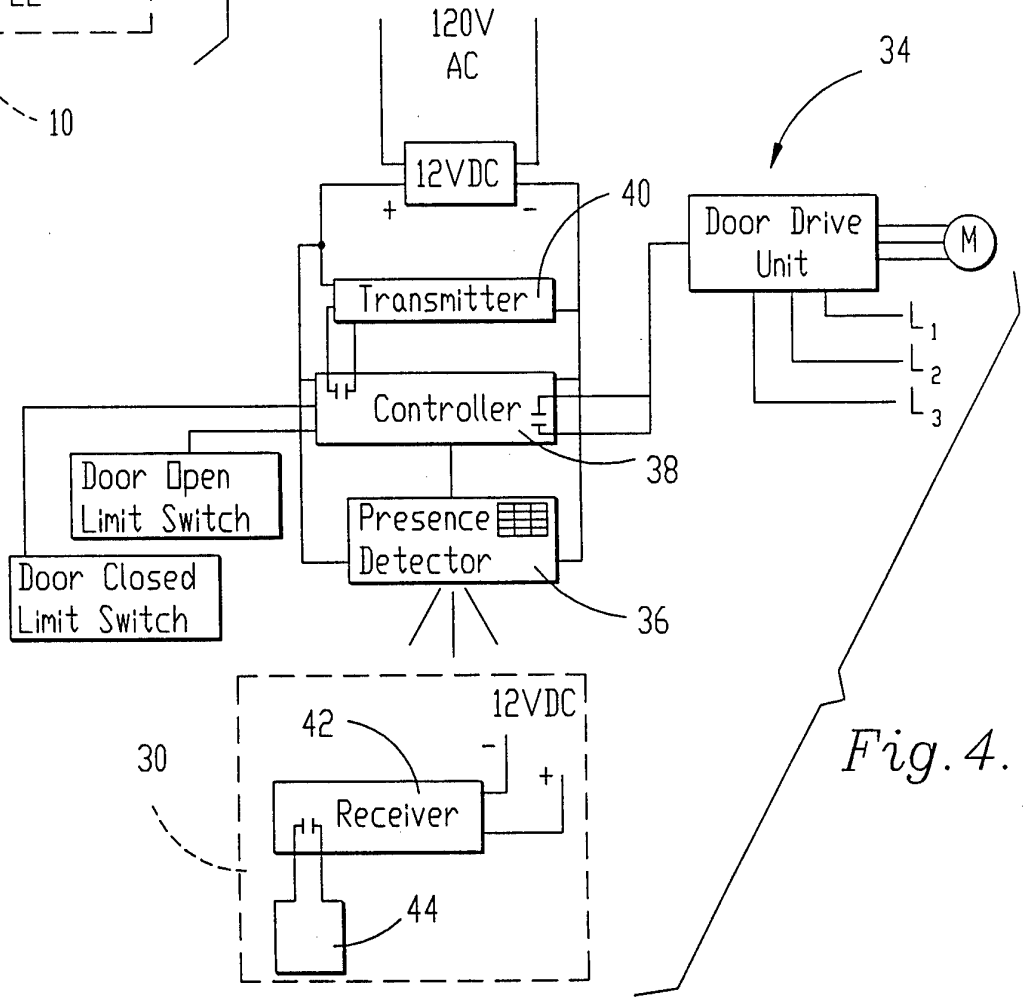

120V
AC
34
12VDC
+
-
40
Door Drive
Unit
M
Transmitter
L1
L2
L3
Controller
38
Door Open
Limit Switch
Presence
Detector
Door Closed
Limit Switch
36
12VDC
42
30
-
+
Receiver
44

Fig. 4.

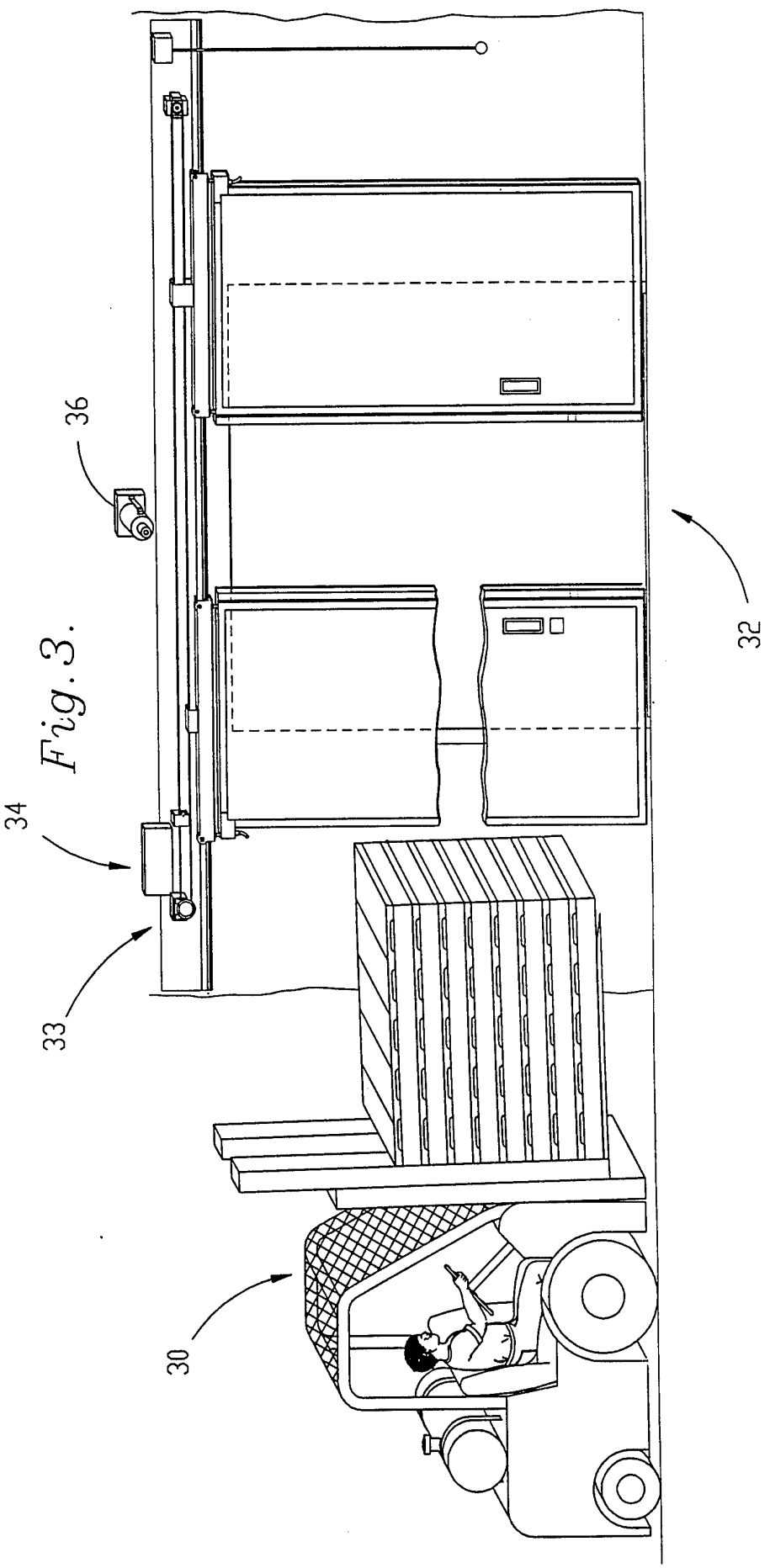


Fig. 3.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10370

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :B60K 28/00; E05F 15/20
US CL :180/167, 271; 49/25, 26; 340/901
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 180/167, 271, 272; 49/25, 26, 28, 138; 340/901, 905, 435, 436, 932.2, 928

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	DE, A, 38 35 249 (LUNZ) 19 APRIL 1990 (19.04.90), figure 2, col. 4, lines 2-64.	1, 2 ------ 3-7
Y	US, A, 1,883,107 (THOMAS) 18 OCTOBER 1932 (18.10.32), page 1, lines 46-67.	3-7
A	US, A, 1,846,032 (HART) 23 FEBRUARY 1932 (23.02.32)	1
A	US, A, 4,621,252 (JOHNS et al.) 04 NOVEMBER 1986 (04.11.86)	1
A	US, A, 4,849,735 (KIRTLEY et al.) 18 JULY 1989 (18.07.89)	1, 8

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
18 OCTOBER 1995

Date of mailing of the international search report
08 NOV 1995

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer
PETER ENGLISH
Telephone No. (703) 308-1113

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/10370

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,914,859 (GIONET et al.) 10 APRIL 1990 (10.04.90)	8
A	US, A, 4,967,083 (KORNBREKKE et al.) 30 OCTOBER 1990 (30.10.90)	8