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(54) Anti-collision safety device for fork-lift trucks and the like

Antikollisionssicherheitsvorrichtung für Gabelstapler und dergleichen

Dispositif de sécurité anti-collision pour chariots-élevateurs à fourches et analogues

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(73) Proprietors:
• **JOBS S.p.A.**
I-29100 Piacenza (IT)
• **G.D SOCIETA' PER AZIONI**
I-40133 Bologna (IT)

(72) Inventors:
• **Muselli, Roberto**
Piacenza (IT)

• **Neri, Armando**
Bologna (IT)
• **Orsi, Gianluigi**
Roveleto di Cadeo PC (IT)

(74) Representative: **La Ciura, Salvatore**
Via Francesco Sforza 3
20122 Milano (IT)

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Description

This invention relates to an anti-collision safety device designed in particular for fork-lift trucks and similar vehicles. More specifically, the invention relates to a device consisting of a bar or bumper, fitted to a telescopic support able to traverse and rotate slightly in relation to the truck, which activates suitable alarm and/or stop devices when it collides with an obstacle.

The invention is characterised by the special configuration of the parts, which is designed to improve and increase the practicality of the safety devices currently fitted to elevators, automatic-drive trucks, etc.

Safety devices designed to avoid or limit the damage deriving from collisions between the vehicle and an obstacle are already known, being generally fitted to trucks, elevators and vehicles designed for use in factories, construction sites and other workplaces.

These devices usually consist of bumpers, feelers or the like fitted to the truck which can counteract the force exerted by elastic elements to perform limited movements and which activate an alarm device or stop the movement of the vehicle in the event of a collision.

US-A-3,023,829 shows a safety device for fork-lift trucks comprising a bumper mounted on a pair of sleeve housings. The sleeve housings are secured to the frame of the vehicle and the bumper can slide with respect to each one or both said housings.

This movements of the bumper with respect to the housings activate means for stopping the vehicle when the movements of the said bumper exceeds a pre-set value.

FR-A-2 633 571 shows a safety device comprising a bumper mounted on an extensible support and comprising telescopically extensible, rearwards directed wings.

The invention relates to a safety device for fork-lift trucks, wherein a bumper is mounted on a pair of pistons sliding into corresponding cylinders which can rotate with respect to the chassis of the vehicle, so providing a simple safety apparatus.

In addition, a useful feature would be safety devices designed to detect obstacles at the sides of the truck when it is turning corners.

(Throughout the remainder of this description, the "front" of the truck will be taken to be the part where the forks are located, and movement in that direction will thus be described as "forward movement".)

In order to solve the problem described above, this invention proposes an anti-collision safety device for vehicles, in particular fork-lift trucks, which comprises a telescopic support to the front of which is fitted a bumper, preferably also telescopic, which can be extended further forward than the load on the forks and which is connected to the vehicle control equipment.

This telescopic support can slide and rotate slightly in relation to a pair of guides built into the truck chassis; during these movements it activates a set of micro-

switches connected to equipment designed to stop the vehicle.

This invention will now be described in detail, by way of example but not of limitation, with particular reference to the annexed figures in which:

- fig. 1 is a side view of a truck fitted with the devices in accordance with the invention;
- fig. 2 is a top view in diagram form of the truck fitted with the devices in accordance with the invention;
- fig. 3 is a cross section along line A-A in fig. 2;
- fig. 4 is a detail of the safety devices in accordance with the invention.

In a fork-lift truck indicated as a whole by the number 1 and fitted at the front with lifting forks 2, the safety device assembly in accordance with the invention is indicated by the number 3.

With reference to fig. 2, these devices basically consist of a pair of telescopic supports 4 to the end of which is fitted a bumper 5 equipped with a pair of lateral telescopic arms 6, each of which has the end 7 facing backwards.

The bumper width and its distance from the truck can therefore be suitably adjusted so that load 8 resting on the forks is surrounded at the front, and the bumper is kept at the most appropriate distance from the load.

Telescopic supports 4 comprise a pair of hydraulic cylinders 9, rigidly connected one to another by cross-pieces 10, which run inside a pair of guides 11 consisting of two C-sections fixed to the vehicle chassis.

Each of guides 11 (fig. 3) is fitted with a pair of horizontal-axis rollers 12 and a vertical-axis roller 13, which project slightly from the contour of the guide.

Cylinders 9 can perform limited movements along guides 11 and, resting against rollers 12 and 13 which keep them at a given distance from the said guides, can also rotate slightly around the point of contact with the rollers.

This allows the telescopic support assembly to perform limited rotations in relation to the guides and therefore in relation to the vehicle chassis.

The said structure of the telescopic support activates a pair of devices like the one illustrated in fig. 4 and indicated as a whole by the number 14, which are able to activate the vehicle control devices in the event that the bumper collides with an obstacle along the route.

These control devices comprise a shaft 15, built into one of crosspieces 10, for example, along which a pair of cam elements 16, kept apart by a helical spring 17 or the like, can run against a pair of travel limit elements 18 built into the vehicle chassis.

A pair of adjustable retainers 19 limits the movements of the cams along shaft 15.

Two microswitches 20 connected to the vehicle control panel or to devices able to stop the vehicle are placed between cam elements 16 and at a distance from them.

In operation, telescopic support 4 is regulated to bring bumper 5 to the desired distance from the load on the forks; the bumper width is also adjusted in relation to the size of both the load and the vehicle.

In the event of collision with an obstacle while the vehicle is moving, the telescopic support assembly retracts or rotates slightly in relation to guides 11 to which it is fitted, moving with it shaft 15 which causes one of cams 16 to engage the corresponding microswitch 20, thereby stopping the movement of the vehicle or signalling the presence of the obstacle to the driver.

Microswitches 20 will not be placed directly in contact with cams 16 but at a distance from them to prevent the safety devices from being activated, for example, by vibrations transmitted to the structure while the vehicle is moving as a result of uneven flooring and the like.

The cam device shown in fig. 4 can also be configured differently, for example as illustrated in fig. 5, where a cam element 21, kept mid-way between two fixed supports 23 by a pair of springs 22, can run along shaft 15.

The cam presents a flat section of a certain length to allow the telescopic support a minimum of free travel without the microswitch's being engaged, to prevent small movements caused by vibrations from activating the device.

The size and materials used can obviously vary in accordance with operational requirements.

Claims

1. Safety device for fork-lift trucks, comprising a bumper (5) fixed to the pistons of a telescopic support (4) whose cylinders (9) are fitted to the vehicle chassis, characterised in that said bumper can be extended in use further forward than the load on the fork, and in that the cylinders (9) are so fitted to the chassis of the fork lift that they are able to traverse and rotate to a limited extent in relation to the said chassis, and they are connected to equipment designed to activate devices (14) which stop the vehicle if the movements and/or rotations of the said cylinders exceed a preset value.
2. Safety device in accordance with claim 1, characterised by the fact that the said telescopic support (4) consists of a pair of hydraulic pistons sliding in cylinders (9) which run inside C-shaped guides (11), idle rollers (12) being fitted to the said guides and projecting slightly from them so as to keep the said cylinders slightly apart from the sides of the guide and allow them to traverse and/or rotate to a limited extent.
3. Safety device in accordance with the preceding claims, in which the said support (4), during its movements, moves a cam (16, 21) designed to engage microswitches (20) connected to the vehicle control devices.
4. Safety device in accordance with claim 3, in which the said cam (16, 21) can travel freely to some extent before the microswitches (20) are engaged.
5. Safety device in accordance with claims 3 and 4 in which the said devices (14) include a shaft (15) on which a pair of cams (16) kept apart by elastic elements (17) can run, travel limit elements (18) designed to engage the said cams being built into the vehicle chassis and microswitches (20) connected to the vehicle control devices being located in the gap between the said cams.
6. Safety device in accordance with claims 3 and 4, characterised by the fact that the said cam devices (14) include a shaft, built into the telescopic support, to which is fitted a cam (21) with a flat central section, a microswitch (20) being connected to the vehicle control devices which engages the flat central section of the said cam (21) when the said telescopic support (4) of the upright is aligned with the vehicle.

Patentansprüche

1. Sicherheitsvorrichtung für Gabelstapler, umfassend einen Stoßfänger (5), der an den Kolben eines teleskopartigen Trägers (4) angebracht ist, dessen Zylinder (9) im Fahrzeugchassis untergebracht sind, **dadurch gekennzeichnet**, daß der Stoßfänger sich im Einsatz weiter nach vorne erstreckt als die auf der Gabel befindliche Last, und daß die Zylinder (9) derart im Chassis der Hubgabel untergebracht sind, daß sie bis zu einem begrenzten Ausmaß relativ zu dem Chassis sich verschieben und drehen können, wobei sie mit einer Einrichtung verbunden sind, die dazu ausgelegt ist, Vorrichtungen (14) zu aktivieren, die das Fahrzeug anhalten, wenn die Bewegungen und/oder Verdrehungen der Zylinder einen vorbestimmten Wert überschreiten.
2. Sicherheitsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der teleskopartige Träger (4) aus einem Paar von hydraulischen Kolben besteht, die in Zylindern (9) gleiten, die innerhalb von C-förmigen Führungen (11) angeordnet sind, wobei leerlaufende Rollen (12) in den Führungen angebracht sind, und etwas aus diesen vorstehen, so daß sie die Zylinder in einem geringen Abstand von den Seiten der Führung halten und ermöglichen, daß diese sich bis zu einem begrenzten Ausmaß verschieben und/oder drehen können.
3. Sicherheitsvorrichtung nach den vorhergehenden Ansprüchen,

wobei der Träger (4) während seiner Bewegungen einen Nocken (16,28) beaufschlagt, der dazu ausgelegt ist, Mikroschalter (20) zu betätigen, die an die Fahrzeugsteuervorrichtungen angeschlossen sind.

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4. Sicherheitsvorrichtung nach Anspruch 3, wobei der Nocken (16,21) sich frei bis zu einem gewissen Ausmaß bewegen kann, bevor die Mikroschalter (20) beaufschlagt werden.

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5. Sicherheitsvorrichtung nach Anspruch 3 und 4, wobei die Vorrichtungen (14) einen Schaft (15) aufweisen, an dem ein Paar von Nocken (16), die durch elastische Elemente (17) in einem Abstand voneinander gehalten werden, sich bewegen kann, wobei Wegbegrenzungselemente (18), die mit den Nocken in Eingriff treten, in das Fahrzeugchassis eingebaut sind und Mikroschalter (20), die mit den Fahrzeugsteuereinrichtungen in Verbindung stehen, in dem Abstand zwischen diesen Nocken angeordnet sind.

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6. Sicherheitsvorrichtung nach Anspruch 3 und 4, dadurch gekennzeichnet, daß diese Nockeneinrichtungen (14) einen in den teleskopartigen Träger eingebauten Schaft aufweisen, an dem ein mit einem flachen mittigen Abschnitt versehener Nocken (21) angebracht ist, wobei ein Mikroschalter 20, der mit den Fahrzeugsteuereinrichtungen verbunden ist, mit dem flachen mittigen Abschnitt dieses Nockens (21) in Eingriff tritt, wenn der teleskopartige Träger (4) mit dem Fahrzeug ausgerichtet ist.

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Revendications

1. Dispositif de sécurité pour chariots-élévateurs à fourches, comprenant un pare-chocs (5) fixé aux pistons d'un support télescopique (4) dont les cylindres (9) sont assemblés au châssis du véhicule, caractérisé en ce que ledit pare-chocs peut être étendu, en fonctionnement, plus en avant que la charge sur la fourche et en ce que les cylindres (9) sont assemblés au châssis du chariot-élévateur à fourches pour qu'ils soient capables de se déplacer et de tourner jusqu'à un certain point par rapport audit châssis et qu'ils soient connectés à l'équipement conçu pour activer des dispositifs (14) qui arrêtent le véhicule si les mouvements et/ou les rotations desdits cylindres dépassent une valeur préétablie.
2. Dispositif de sécurité selon la revendication 1, caractérisé par le fait que ledit support télescopique (4) comprend deux pistons hydrauliques glissant dans les cylindres (9) qui courent à l'intérieur de guides en forme de C (11), des cylindres libres (12) étant assemblés auxdits guides et s'étendant légè-

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rement à partir de ceux-ci afin de garder lesdits cylindres légèrement écartés des côtés du guide et de leur permettre de se déplacer et/ou de tourner jusqu'à un certain point.

3. Dispositif de sécurité selon les revendications précédentes, dans lequel ledit support (4), pendant, ses mouvements, déplace une came (16, 21) conçue pour se mettre en prise avec des commutateurs miniatures (20) connectés aux dispositifs de contrôle du véhicule.

4. Dispositif de sécurité selon la revendication 3, dans lequel ladite came (16, 21) peut se déplacer librement dans une certaine mesure avant d'être en prise avec les commutateurs miniatures (20).

5. Dispositif de sécurité selon les revendications 3 et 4, dans lequel lesdits dispositifs (14) comprennent un arbre (15) sur lequel deux cames (16) maintenues espacées par des éléments élastiques (17) peuvent courir, les éléments de limite de déplacement (18) conçus pour se mettre en prise avec lesdites cames étant construits dans le châssis du véhicule et les commutateurs miniatures (20) connectés aux dispositifs de contrôle du véhicule étant placés dans l'espace entre lesdites cames.

6. Dispositif de sécurité selon les revendications 3 et 4, caractérisé par le fait que lesdits dispositifs à cames (14) comprennent un arbre, construit dans le support télescopique, auquel est assemblée une came (21) avec une section centrale plate, un commutateur miniature (20) étant connecté aux dispositifs de contrôle du véhicule qui se met en prise avec la section centrale plate de ladite came (21) quand ledit support télescopique (4) du montant est aligné avec le véhicule.

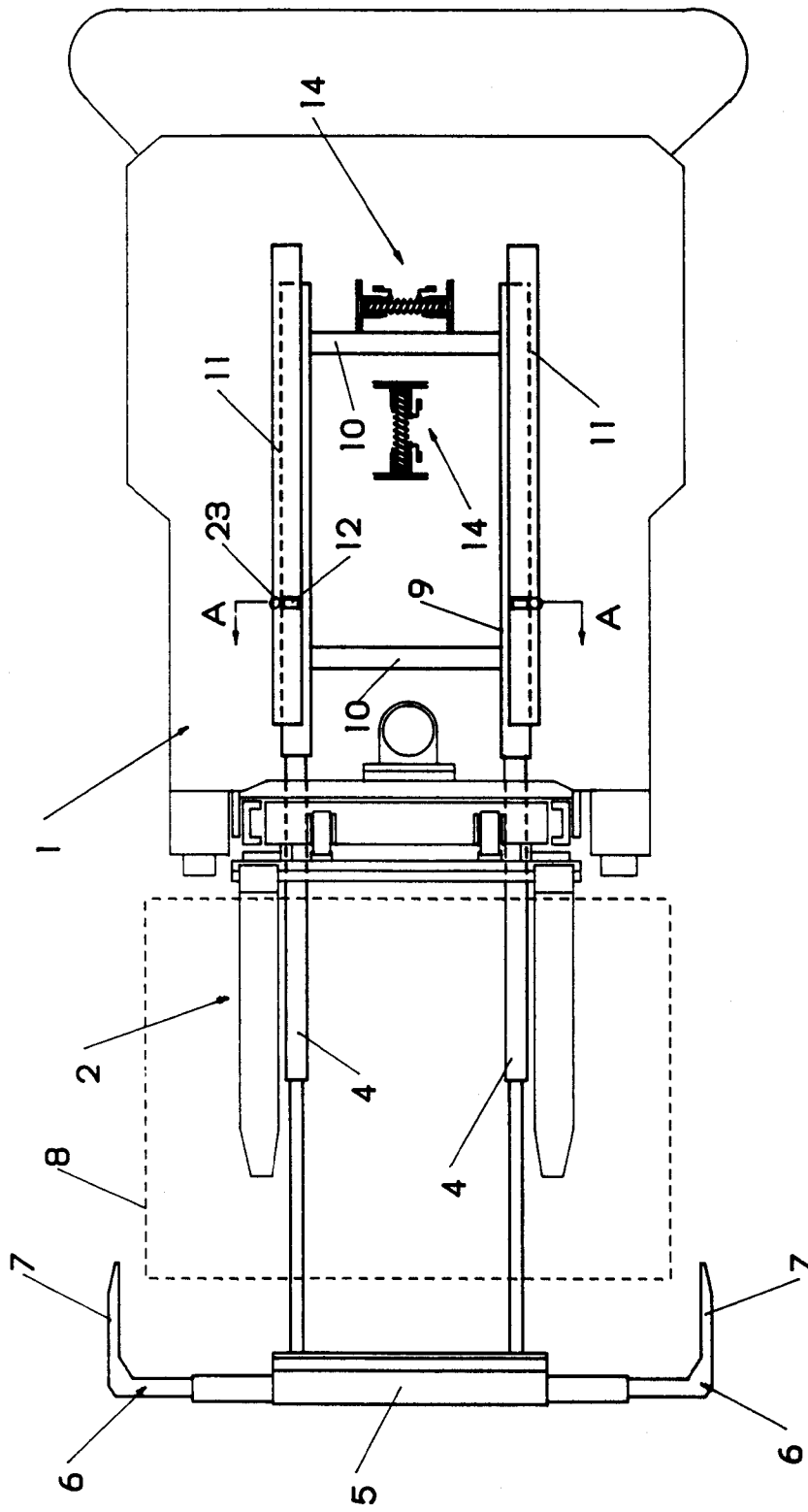


FIG.3

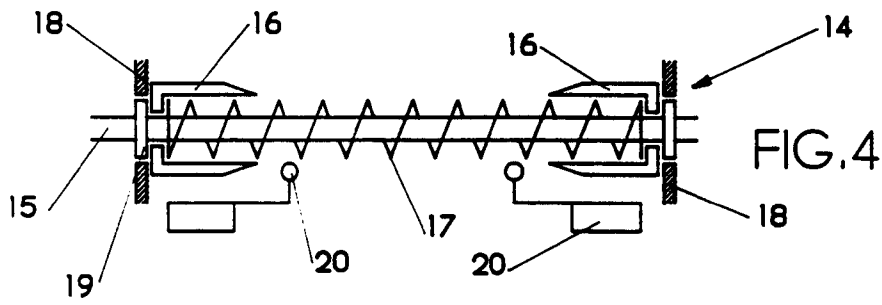
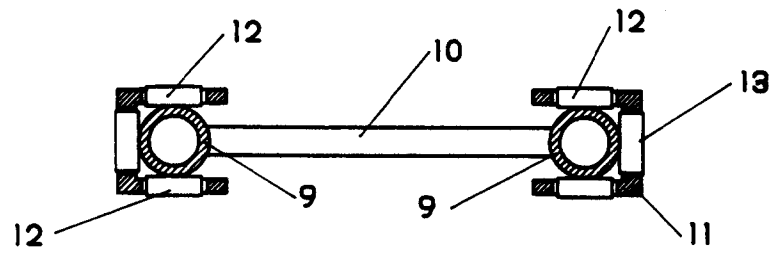


FIG.5

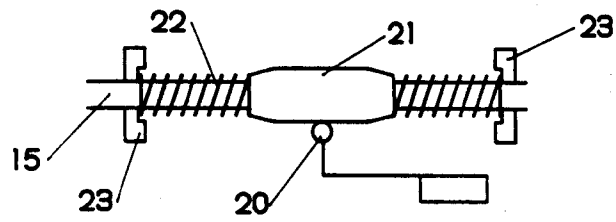


FIG.1

