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(71) Applicant: **FAMI S.p.A.**
36027 Rosà, VI (IT)

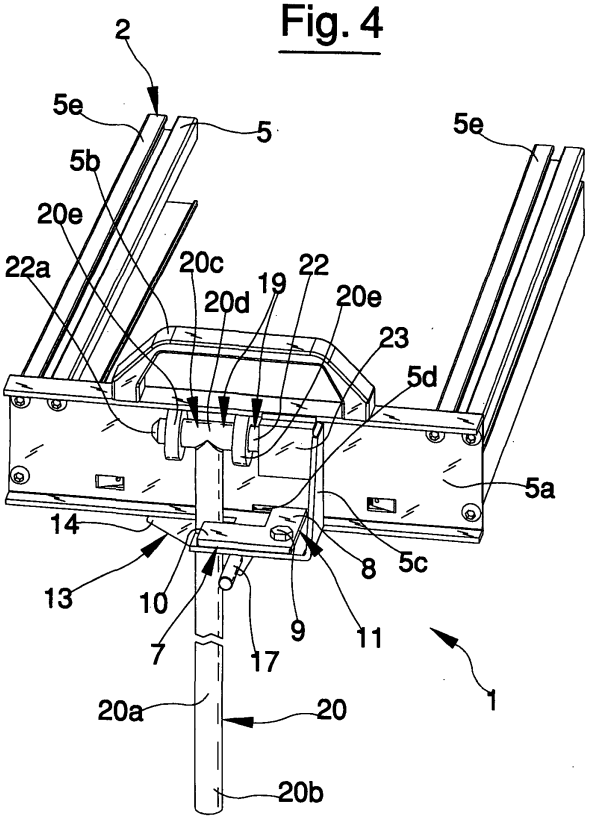
(72) Inventor: **Camellini, Giancarlo**
41014 Castelvetro (IT)

(74) Representative: **Gotra, Stefano**
BUGNION S.p.A.
Via Vellani Marchi, 20
41100 Modena (IT)

(54) **A blocking mechanism for an object carrying device and an object carrying device provided with the blocking mechanism**

(57) The mechanism for blocking an object-carrying device comprises a fixed frame (4) mounted on a vehicle (3) and a mobile frame (5) predisposed to support at least an object to be transported. The blocking mechanism (1) comprises means for engaging (7) for reciprocally engaging the fixed frame (4) and the mobile frame (5). A safety device (13) is operatively associated to the means for engaging (7) in order to guarantee the engaged position of the means for engaging (7). Both the means for engaging (7) and the safety device (13) can be manoeuvred by means of a special command rod (20).

Fig. 4



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Description

[0001] The invention relates to a mechanism for blocking an object-carrying device, of a type comprising a fixed frame mounted on a vehicle and a mobile frame predisposed to support at least an object to be transported.

[0002] The present invention also relates to an object-carrying device provided with the blocking mechanism of the invention.

[0003] The invention is particularly applicable in the sector of accessories and equipment for work vehicles, such as vans, trucks and the like.

[0004] In particular, the invention relates to a blocking mechanism for object-carrying devices which is associable to the roof of vehicles for transport of unwieldy objects, such as for example ladders, trestles and/or similar work equipment.

[0005] As is known, object-carrying devices are generally constituted by a fixed frame, associable to the roof of a respective work vehicle by special connecting organs, and a mobile frame, slidably engaged on the fixed frame and supporting an object to be transported.

[0006] Usually the mobile frame can be activated to move from a rest condition, in which it lies on a plane overlying the lie plane of the fixed frame, and a work condition, in which it is easily accessible by the operator who can remove and/or replace the transported object.

[0007] Normally, object-carrying devices are provided with special blocking mechanisms which keep the mobile frame and the fixed frame together when the mobile frame is in the rest position. In this way the mobile frame is immobilised in the rest position during the movements of the vehicle to which it is associated.

[0008] The blocking mechanism is associated to the fixed frame and comprises a hook element destined to engage the mobile frame in order to keep the mobile frame in the rest position.

[0009] The blocking mechanism further comprises a safety device provided with a bolt which is slidable on the fixed frame between a stop position, in which it is arranged below the hook element which is maintained in the engaged position, and a released position, in which it is distanced from the hook element which can be disengaged from the mobile frame in order to free the mobile frame.

[0010] The safety device is further provided with suitable blocking elements predisposed to maintain the bolt in the stop position or the release position. In particular the blocking elements include a sphere, housed in a seating afforded in the fixed frame, which is engageable by action of a spring in two seatings afforded in the bolt. To move the bolt from one position to the other a sufficient force must be exerted to disengage the sphere from the seating in which it is engaged.

[0011] The blocking mechanism further includes a command rod for controlling the movement of the bolt of the safety device and the blocking element. The command rod exhibits an arrow-shaped end which can be inserted between the bolt and a suitable striker element for blocking the hook element in the position in which it is engaged in the mobile frame. The command rod can also be inserted between the bolt and the hook element to free the hook element and consequently the mobile frame.

[0012] An example of the above blocking mechanism is described and illustrated in patent application no. IT-MO2004A000198.

[0013] In relation to the above-described prior art, the applicant has noted that although the blocking mechanisms of the known object-carrying devices are able to maintain the mobile frame in a solidly engaged condition to the fixed frame, they are subject to certain drawbacks, mainly in relation to the practicalness of the activating of the hook element and the bolt of the safety device, as well as the structural simplicity of the mechanism itself.

[0014] In particular, it has been found that despite the presence of the command rod, the complex structure of the mechanism requires the direct intervention of the operator to unblock the safety device bolt which inhibits the movement of the hook element. The operator's direct intervention leads to the performing of one or more movements that differ from the usual manoeuvring operations for displacing the bolt from one position to the other or the movement of the blocking element. Consequently the activating of the blocking mechanism requires a high number of manoeuvring operations which lengthen the time needed to unblock the mobile frame from the fixed frame.

[0015] Further, owing to the height of work vehicles, the fixed frame for object-carrying devices is not easily reachable by the operator who must reach the level of the safety device in order to unblock it by operating directly on the blocking mechanism.

[0016] The aim of the present invention is to obviate the above-mentioned drawbacks by providing a blocking mechanism which is easily manoeuvrable.

[0017] In particular, the aim of the present invention is to simplify the unblocking operation of the mobile frame with respect to the fixed frame and to facilitate the operator in the execution of the manoeuvre.

[0018] The precise technical task and the specified aims are substantially attained by a blocking mechanism for object-carrying device and an object-carrying device provided with the blocking mechanism according to what is set out in the appended claims.

[0019] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of an embodiment of the invention, illustrated purely by way of non-limiting example in the accompanying figures of the drawings, in which:

Figure 1 is a front perspective view of the blocking mechanism of the present invention, associated to a mobile frame, partially illustrated, of an object-carrying device which is omitted for reasons of clarity;

Figure 2 is a perspective view from behind of the

mechanism of the preceding figure;

Figure 3 is a further perspective view from the front of the mechanism of the preceding figures, illustrated in a first use condition of a command rod associated thereto;

Figure 4 is a further perspective view of the mechanism of the preceding figures, illustrated in a second use condition of the command rod;

Figure 5 is a perspective view from behind of the mechanism, illustrated in the use condition of the command rod as illustrated in figures 3 and 4;

Figure 6 is a front perspective view of the mechanism of the preceding figures, illustrated in a third use condition of the command rod;

Figure 7 is a perspective view from behind of the mechanism of the preceding figures, illustrated in the condition illustrated in figure 6;

Figure 8 is an elevation of an object-carrying device provided with the blocking mechanism of the preceding figures and suitably mounted on a work vehicle.

[0020] With reference to the figures of the drawings, 1 denotes in its entirety the blocking mechanism of the present invention.

[0021] The mechanism 1 is operatively associated to an object-carrying device 2 (figure 8) predisposed to support at least a large object (not illustrated), such as a ladder, a trestle and/or a similar object.

[0022] As can be seen in figure 8, the object-carrying device 2 is mounted on the roof 3a of a work vehicle 3, such as for example a van, a truck and/or a like means of transport.

[0023] In particular, the object-carrying device 2 comprises a fixed frame 4, fixed on the roof 3a of the vehicle 3 by means of suitable attachment flanges 4a.

[0024] The object-carrying device 2 further comprises at least a mobile frame 5 operatively associated to the fixed frame 4. In detail, the mobile frame 5 is slidably engaged to the mobile frame 4 by means of suitable connecting organs 6. The mobile frame 5 is free to slide from a non-use position (figure 8) in which it lies on at least a plane which is substantially parallel to the lie plane of the fixed frame 4, and a use position (not illustrated as known) in which the mobile frame 5 lies on a plane which is transversal to the lie plane of the fixed frame 4, in a position by the side of the back part 3b of the vehicle. When the mobile frame 5 is in the non-use position, it exhibits a terminal portion 5 a, provided with a special gripping handle 5b, facing the opposite side with respect to the back part 3b of the vehicle 3.

[0025] As illustrated in figures from 1 to 7, the mechanism 1 comprises means for engaging 7 operatively associated to the object-carrying device 2 for reciprocal engaging of the fixed frame 4 and the mobile frame 5.

[0026] The mechanism 1 is advantageously arranged on the mobile frame 5 so that the means for engaging 7 are operatively active on the fixed frame 4 in order to guarantee the reciprocal engagement between the fixed frame 4 and the mobile frame 5.

[0027] The means for engaging 7 preferably comprise at least a hook element 8 operatively connected to the mobile frame 5. The hook element 8 is mobile between an engaged position (figures 1-5) in which it engages the fixed frame 4 to maintain the fixed frame 4 united to the mobile frame 5, and a disengaged position (figure 6 and 7) in which it does not engage the fixed frame 4. When the hook element 8 is in the disengaged position (figures 6 and 7), the mobile frame 5 is free of the fixed frame 4 so that the mobile frame 5 can easily be displaced from the non-use position (figure 8) into the use position.

[0028] The hook element 8 is preferably rotatably engaged to the mobile frame 5 in order to rotate between the engaged position and the disengaged position. In particular, the hook element 8 is rotatably engaged to the mobile frame 5 by means of a first connecting pin 9 and a support flange 5c projecting from the terminal portion 5a of the mobile frame 5.

[0029] As can be seen in figures from 1 to 7, the hook element 8 exhibits at least a constrast portion 8a predisposed to interact with the fixed frame 4 to hold the hook element 8 in the engaged position. The hook element 8 further exhibits at least a pushing portion 8b, inclined with respect to the contrast portion 8a to bring the hook element 8 towards the disengaged position when the mobile frame 5 is united with the fixed frame 4. In particular, the pushing portion 8b is predisposed to interact with the fixed frame 4 in such a way that, following a displacement of the hook element 8 along a substantially parallel direction to the longitudinal development of the object-carrying device 2, the pushing portion 8b intercepts the fixed frame 4, determining a displacement of the hook element 8 along a transversal direction to the longitudinal development of the object-carrying device.

[0030] The means for engaging 7 further comprise a manoeuvring appendage 10 engaged to the hook element 8 for activating a movement of the hook element 8 at least from the engaged position (figure 1-5) to the disengaged position (figures 6 and 7).

[0031] The hook element 8 and the manoeuvring appendage 10 are made in a single piece to form a plate structure 11, substantially L-shaped and lying on a substantially parallel plane to the lie plane of the mobile frame 5. The hook element 8 preferably develops through an opening 5d afforded in the terminal portion 5a in such a way that the contrast portion 8a and the pushing portion 8b are arranged on opposite sides with respect to the manoeuvring appendage 10 and the first connecting pin 9.

[0032] More specifically, the contrast portion 8a and the pushing portion 8b of the hook element 8 are arranged internally of the structure of the mobile frame 5, while the first connecting pin 9 and the manoeuvring appendage 10 are arranged externally of the structure of the mobile frame 5.

[0033] The means for engagement 7 are further provided with at least an elastic recall element 12, preferably

a helix spring 12a, for displacing the hook element 8 towards the engaged position. In detail, the elastic recall element 8 is operatively interposed between the terminal portion 5a and the hook element 8 to stretch when the hook element 8 distances from the engaged position towards the-disengagement position.

[0034] As illustrated in figures 2, 5 and 7, the elastic recall element 12 operates internally of the structure of the mobile frame 5 between the hook element 8 and one of the lateral crossbars 5e of the mobile frame 5.

[0035] The mechanism 1 advantageously further comprises at least a safety device 13 which is operatively associated to the means for engaging 7 to inhibit the movement of the hook element 8 from the engaged position (figures 1-5) to the disengaged position (figures 6 and 7). In particular, the safety device 13 can be switched between a stop condition, in which it interferes with the hook element 8 to keep the hook element 8 in the engaged position, and a release position, in which it does not interfere with the hook element 8, enabling movement from the engaged position to the disengaged position.

[0036] The safety device 13 exhibits a substantially L-shaped plate structure 14. The structure 14 develops on a transversal lie plane, preferably perpendicular, to the lie plane of the hook element 8 and the manoeuvring appendage 10 thereof. Further, the plate structure 14 is preferably rotatably engaged to the terminal portion 5a by means of a second connecting pin 15. As can be seen in figures 2, 5 and 7, the structure 14 of the safety device 13 exhibits a striker portion 16 predisposed to engage the hook element 8 to keep the hook element 8 in the engaged position (figures 1-5) when the safety device 13 is in the stop condition.

[0037] The striker portion 16 is advantageously complementarily countershaped to a side 8c of the hook element 8 in order correctly to engage the hook element 8 when the safety device 13 is in the stop condition 13.

[0038] A manoeuvring appendage 17 is further associated to the structure 14 (figures 1, 3, 4, 6), which manoeuvring appendage 17 is destined to switch the safety device 13 at least from the stop condition (figure 2) to the release condition (figures 5 and 7).

[0039] The manoeuvring appendage 17 exhibits a substantially cylindrical conformation and develops transversally, preferably perpendicular, to the lie plane of the structure 14 and substantially parallel with respect to the lie plane of the hook element 8.

[0040] As can be seen in figures 2, 5 and 7, the safety device 13 is advantageously provided with an elastic movement organ 18, operatively interposed between the structure 14 and the terminal portion 5a to assist the switching of the safety device 13 from the stop condition (figure 2) to the release condition (figures 5 and 7). In particular, the elastic movement organ 18 preferably comprises a helix spring 18a. The helix spring 18a is preferably pre-tensioned and ready to shift sharply to free the hook element 18 from the safety device 13.

[0041] With reference to figures from 3 to 8, the mechanism 1 further comprises means for commanding 19 which are operatively associable to the mobile frame 5 to switch the safety device 13 at least from the stop condition to the release condition. The means for commanding 19 are advantageously able to switch the safety device 13 from the release condition to the stop condition.

[0042] Preferably the means for commanding 19 are realised in such a way as also to act on the hook element 8 to displace the hook element 8 at least from the engaged position to the release position.

[0043] In the illustrated embodiment, the means for commanding 19 comprise at least a command rod 20 exhibiting an elongate tubular structure 20a which defines at least a gripping end 20b for an operator 21 to grip. On the opposite side to the gripping end 20b, the command rod 20 exhibits an operative end 20c predisposed to intercept the manoeuvring appendage 17 of the safety device 13 in order to switch the safety device 13 between the stop condition and the release condition and/or the manoeuvring device 10 of the means for engaging 7 in order to displace the hook element 8 from the engaged position to the disengaged position.

[0044] In particular, the operative end 20c is defined by a tubular portion 20d perpendicular to the structure 20a of the command rod 20. The tubular portion 20d exhibits, at the opposite terminal edges thereof, respective annular portions 20e each exhibiting a larger diameter than the diameter of the tubular portion 20d.

[0045] The means for commanding 19 advantageously exhibit at least a grip 22 engaged to the terminal portion 5a of the mobile frame 5. The grip 22 exhibits a substantially cylindrical conformation and develops, parallel to the terminal portion 5a, from a block 23 projecting externally from the terminal portion 5a above the manoeuvring appendage 10 of the means for engaging 7, towards the manoeuvring appendage 17 of the safety device 13.

[0046] The grip 22 exhibits and end 22a which is tapered to facilitate engagement of the operative end 20c of the command rod 20. In particular, a cavity 20f, defined by the tubular portion 20d of the operative end 20c, can be fitted on the grip 22 to enable the command rod 20 to act on the manoeuvring appendage 10 and move the gripping element 8 from the engaged position to the disengaged position.

[0047] The blocking mechanism 1, described herein above prevalently structurally, functions as follows.

[0048] When the operator 21 needs to displace the mobile frame 5 from the non-use position to the use position in order to access the transported object, he grips the command rod 20, as illustrated in figure 8, to arrange the operative end of the command rod 20 at the terminal portion 5a of the mobile frame 5. Thereafter the operator 21 manoeuvres the command rod 20 in such a way as to fit the operative end 20c on the grip 22 located on the terminal portion 5a. The operative end -20c engages the grip 22 which inserts axially in the cavity 20f.

[0049] By sliding the command rod 20 towards the block 23, the structure 20a of the command rod 20 inter-

cepts the manoeuvring appendage 17 of the safety device 13, switching the safety device 13 from the stop condition (figure 2) to the release condition (figures 5 and 7). In this situation, the manoeuvring appendage 17 is displaced towards the means for engaging 7, causing a rotation of the plate structure 14 of the safety device 13 about the second connecting pin 15. The rotation of the safety device 13 from the stop condition to the release condition is assisted by the elastic movement organ 18 which activates immediately following the action of the command rod 20 on the manoeuvring appendage 17.

[0050] The switching of the safety device 13 from the stop condition to the release condition determines a disengagement of the striker portion 16 from the side 8c of the hook element 8.

[0051] Subsequently, the command rod 20 is displaced towards the block 23 up until the structure 20a thereof interposes between the terminal portion 5a and the manoeuvring appendage 10.

[0052] In this position, the operator can pull the command rod 20 towards himself, by rotating the command rod 20 about the grip 22. The structure 20a of the command rod 20 intercepts the manoeuvring appendage 10 of the means for engaging 7 by rotating the plate structure 11 about the first connecting pin 9. The rotation causes the displacement of the hook element 5 from the engaged position (figures 1-5) to the disengaged position (figures 6 and 7). The contrast portion 8a disengages the fixed frame 4, enabling the mobile frame 5 to displace from the non-use position thereof.

[0053] If the operator continues to pull the command rod 20-towards himself, he advantageously draws the mobile frame 5 from the non-use position to the use position at which he can grip the gripping handle 5b and disengage the command rod 20 from the terminal portion 5a of the mobile frame 5.

[0054] Once the command rod 20 is disengaged, the elastic recall element 12 brings the hook element 8 back into the original position thereof.

[0055] The command rod 20 can be advantageously re-used to displace the mobile frame 5 from the non-use position into the use position. In this case, the operator can push the command rod 20 in the direction of the terminal portion 5a of the mobile frame 5. When the mobile frame 5 reaches the non-use position, the pushing portion 8b of the hook element 8 intercepts the fixed frame 4. During this displacement the hook element 8 displaces from the engaged position to the disengaged position up until by effect of the elastic recall element 12 it clicks into the hooking position, in which the contrast portion 8a blocks the mobile frame 5 with respect to the fixed frame 4.

[0056] Finally, the operator can switch the safety device 13 from the release position to the stop position in which the portion of striker 16 engages the side 8c of the hook element 8, preventing the hook element 8 from moving into the hooking position.

[0057] The blocking mechanism of the present invention solves the problems encountered in the prior art and attains the set aims.

[0058] Primarily the arrangement of the blocking mechanism directly on the mobile frame enables the mobile frame to be moved by an operator from the ground. In particular, by use of the command rod, the mobile frame can be unblocked and moved from the non-use position into the use position, and vice-versa. In other words, the operator is not obliged to intervene directly on the blocking mechanism, which speeds up the movement operation of the mobile frame.

Claims

1. A mechanism for blocking an object-carrying device, comprising a fixed frame (4) mounted on a vehicle (3) and a mobile frame (5) predisposed to support at least an object to be transported, the blocking mechanism (1) comprising means for engaging (7) operatively associated to the object-carrying device (2) for reciprocally engaging the fixed frame (4) and the mobile frame (5), **characterised in that** the blocking mechanism

   (1) is arranged on the mobile frame (5) and the means for engaging (7) are operatively active on the fixed frame (4).

2. The mechanism of claim 1, **characterised in that** the means for engaging (7) comprise: at least a hook element (8) operatively engaged to the mobile frame (5) of the object-carrying device (2), the hook element (8) being mobile between an engaged position, in which it engages the fixed frame (4) to maintain the fixed frame (4) coupled to the mobile frame (5), and a disengaged position, in which it does not engage the fixed frame (4) and the mobile frame (5) is free with respect to the fixed frame (4); at least a manoeuvring appendage (10) engaged to the hook element (8) in order for the hook element (8) to be moved at least from the engaged position to the disengaged position.

3. The mechanism of claim 2, **characterised in that** the hook element (8) is rotatably engaged to the mobile frame (5) in order to rotate between the engaged position and the disengaged position.

4. The mechanism of claim 2 or 3, **characterised in that** the hook element (8) exhibits: at least a contrast portion (8a) predisposed to interact with the fixed frame (4) to keep the hook element (8) in the engaged position; at least a pushing position (8b) inclined with respect to the contrast portion (8a), the pushing position (8b) interacting with the fixed frame (4) to bring the hook element (8) towards the disengaged position when the mobile frame (5) is coupled

to the fixed frame (4).

5. The mechanism of claim 4, **characterised in that** the means for engaging (7) are provided with at least an elastic recall element (12) to displace the hook element (8) towards the engaged position thereof.

6. The mechanism of claim 5, **characterised in that** the elastic recall element (12), preferably a helix spring (12a), is operatively interposed between the mobile frame (5) and the hook element (8).

7. The mechanism of one or more of the preceding claims, **characterised in that** the hook element (8) and the manoeuvring appendage (10) are made in a single piece and define together a plate structure (11) having a substantially L-shaped conformation.

8. The mechanism of one or more of claims from 4 to 7, **characterised in that** the hook element (8) develops through a terminal portion (5a) of the mobile frame (5), the contrast portion (8a) and the pushing portion (8b) being arranged on an opposite side to the manoeuvring appendage (10).

9. The mechanism of any one of the preceding claims, **characterised in that** it further comprises at least a safety device (13) which is operatively associated to the means for engaging (7) in order to inhibit a movement of the hook element (8) from the engaged position to the disengaged position, the safety device (13) being switchable between a stop position, in which stop position the safety device (13) interferes with the hook element (8) to maintain the hook element (8) in the engaged position, and a release condition, in which the safety device (13) does not interfere with the hook element (8) and enables movement of the hook element (8) from the engaged position to the disengaged position.

10. The mechanism of claim 9, **characterised in that** the safety device (13) exhibits: a striker portion (16) predisposed to engage the hook element (8) to maintain the hook element (8) in the engaged position when the safety device (13) is in the stop condition; a manoeuvring appendage (17) for switching the safety device (13) at least from the stop condition to the release condition.

11. The mechanism of claim 9 or 10, **characterised in that** the striker portion (16) at least partly defines a substantially L-shaped plate structure (14), the manoeuvring appendage (17) being associated to the plate structure (14).

12. The mechanism of claim 11, **characterised in that** the plate structure (14) is rotatably engaged to the mobile frame (5).

13. The mechanism of claim 11 or 12, **characterised in that** the plate structure (14) of the safety device (13) develops on a transversal lie plane, preferably perpendicular, to a lie plane of the hook element-(8).

14. The mechanism of any one of claims from 10 to 13, **characterised in that** the striker portion (16) is complementarily shaped with respect to a side (8c) of the hook element (8).

15. The mechanism of any one of claims from 11 to 14, **characterised in that** the manoeuvring appendage (17) of the safety device (13) extends transversally, preferably perpendicularly, with respect to the lie plane of the plate structure (14), and substantially parallel with respect to the lie plane of the hook element (8).

16. The mechanism of any one of claims from 11 to 15, **characterised in that** the safety device (13) is provided with an elastic movement organ (18), preferably a helix spring (18a), operatively interposed between the plate structure (14) and the mobile frame (5) to assist the switching of the safety device (13) from the stop condition to the release condition.

17. The mechanism of any one of claims from 9 to 16, **characterised in that** it further comprises means for commanding (19), operatively associable to the mobile frame (15) in order to switch the safety device (13) at least from the stop condition to the release condition and/or displace the hook element (8) at least from the engaged position to the disengaged position.

18. The mechanism of claim 17, **characterised in that** the means for commanding (19) are operatively associable to the mobile frame (5) in order to switch the safety device (13) from the release condition to the stop condition.

19. The mechanism of claim 17 or 18, **characterised in that** the means for commanding (19) comprise at least a command rod (20) exhibiting an operative end (20c) predisposed to intercept the manoeuvring appendage (17) of the safety device (13) to switch the safety device (13) between the stop condition and the release condition and/or the manoeuvring appendage (19) of the means for engagement (7) in order to displace the hook element (8) from the disengaged position.

20. The mechanism of any one of claims from 17 to 19, **characterised in that** the means for commanding (19) comprise at least a grip (22) constrained to the mobile frame (5), the grip (22) being engageable by the command rod (20) in order to act on the manoeuvring appendage (10) of the means for engaging (7)

and to active the hook element (8).

21. The mechanism of claim 20, **characterised in that** the grip (22) exhibits a substantially cylindrical conformation and develops substantially parallel to the terminal portion (5a) of the mobile frame (5), the operative end (20c) of the command rod (20) exhibiting a cavity (20f) engageable to the grip (22) to act on the manoeuvring appendage (10) of the means for engaging (7) and to move the hook element (8) from the engaged position to the disengaged position.

22. An object-carrying device (2) comprising:

a fixed frame (4) engageable on a vehicle (3);
a mobile frame (5), operatively associated to the fixed frame (4) and slidable thereon between a non-use position, in which the mobile frame (5) lies on at least a plane which is substantially parallel to the lie plane of the fixed frame (4), and a use position in which the mobile frame (5) lies on a transversal plane to the lie plane of the fixed frame (4); **characterised in that** it further comprises at least a blocking mechanism as in one or more of the preceding claims.

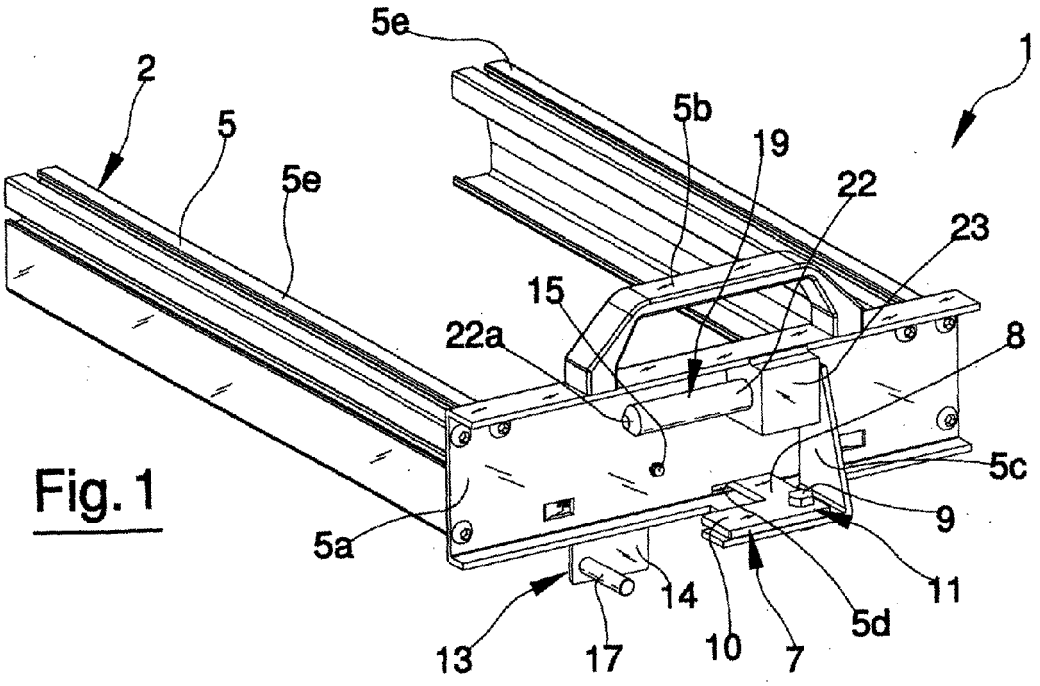
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Fig. 1

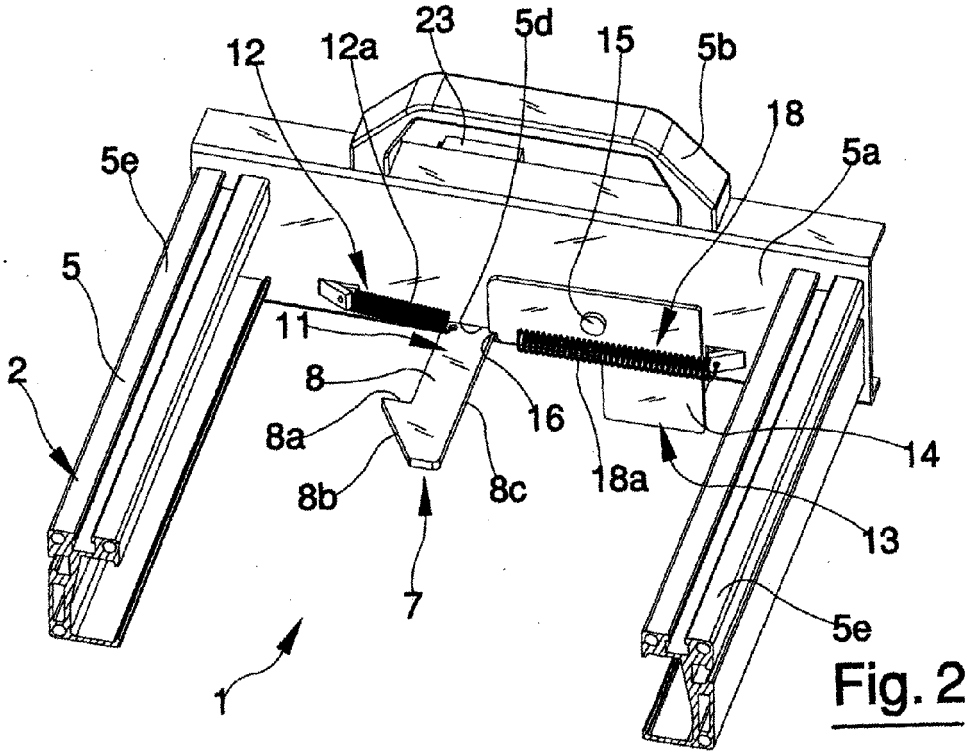
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Fig. 2

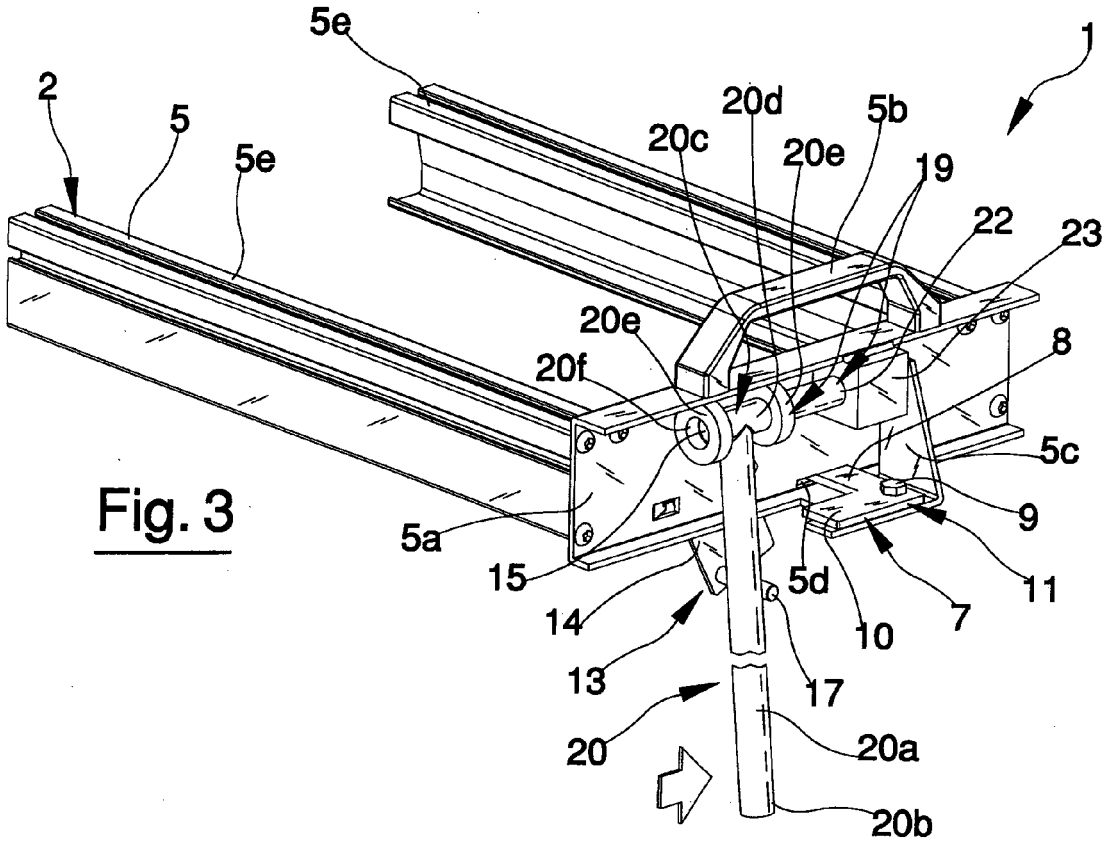
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Fig. 3

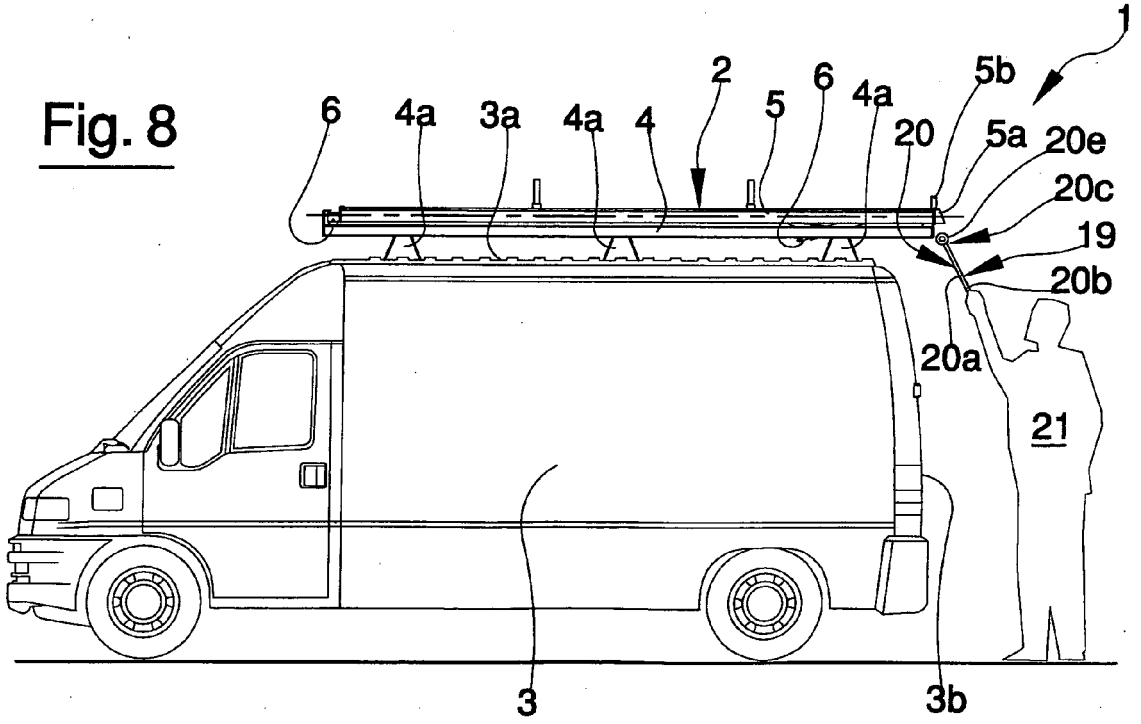
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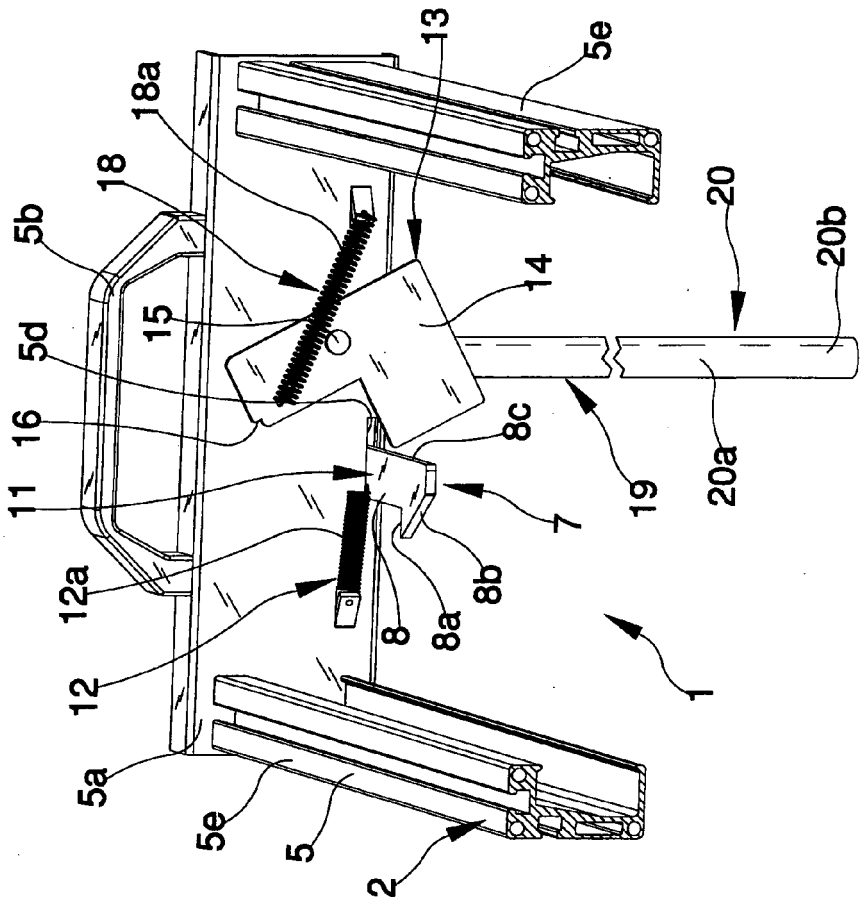
Fig. 8

Fig. 5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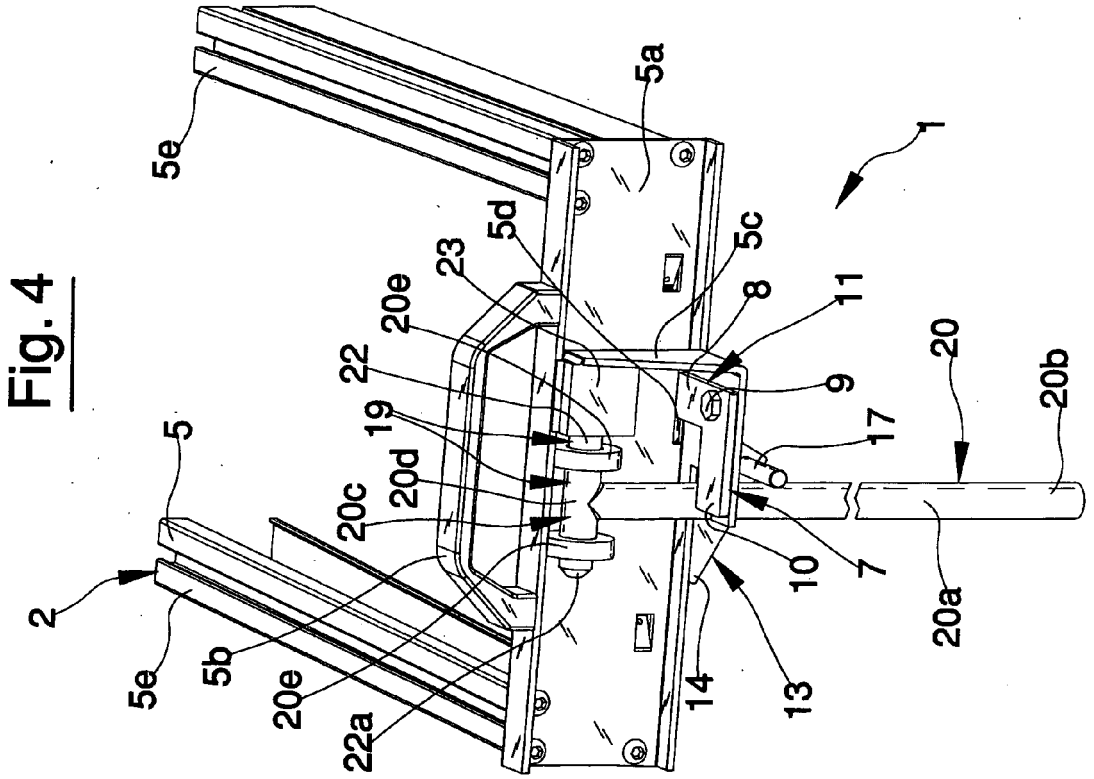
18
5b
20
20b
14
15
5d
16
8c
11
7
19
20a
8b
12a
8
8a
1
12
5a
5e
5
2

Fig. 4


5e
5a
1
5d
5c
23
8
11
20e
9
20
22
17
20b
19
5
20d
20c
10
7
2
20a
5e
5b
14
13
20e
22a

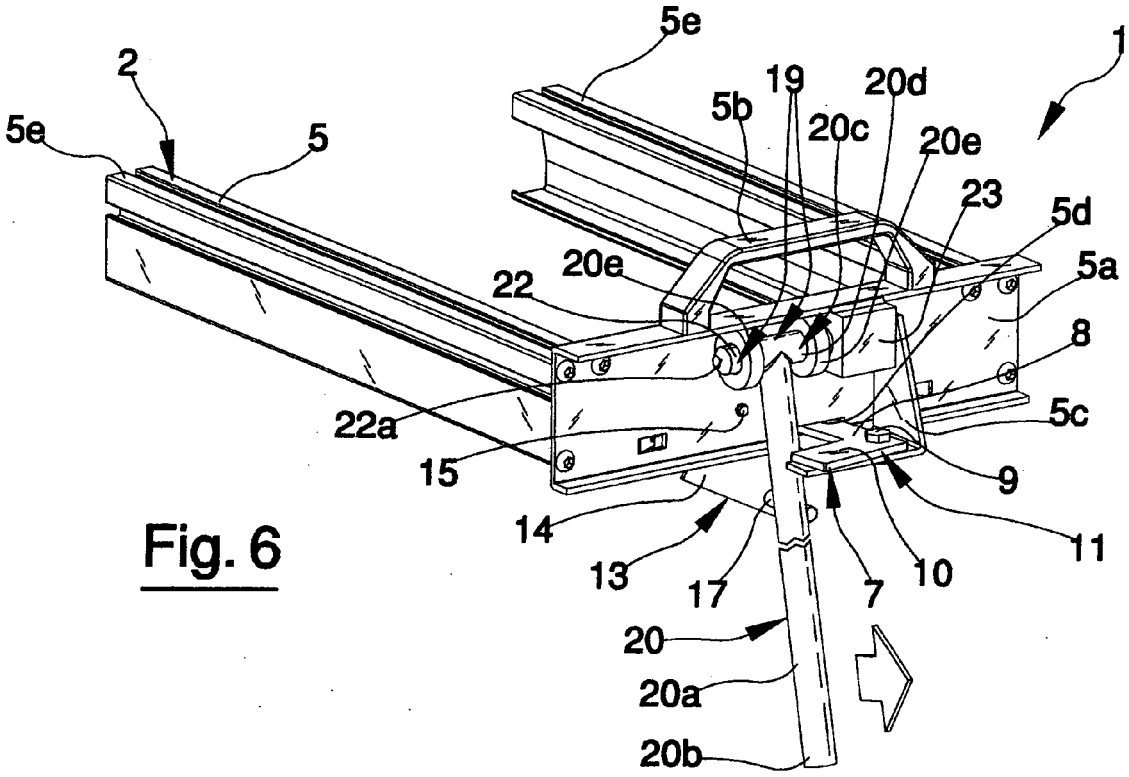

5e
2
1
19
20d
5e
5
5b
20c
20e
23
5d
20e
22
5a
8
22a
5c
15
9
14
11
13
17
7
10
20
20a
20b

Fig. 6

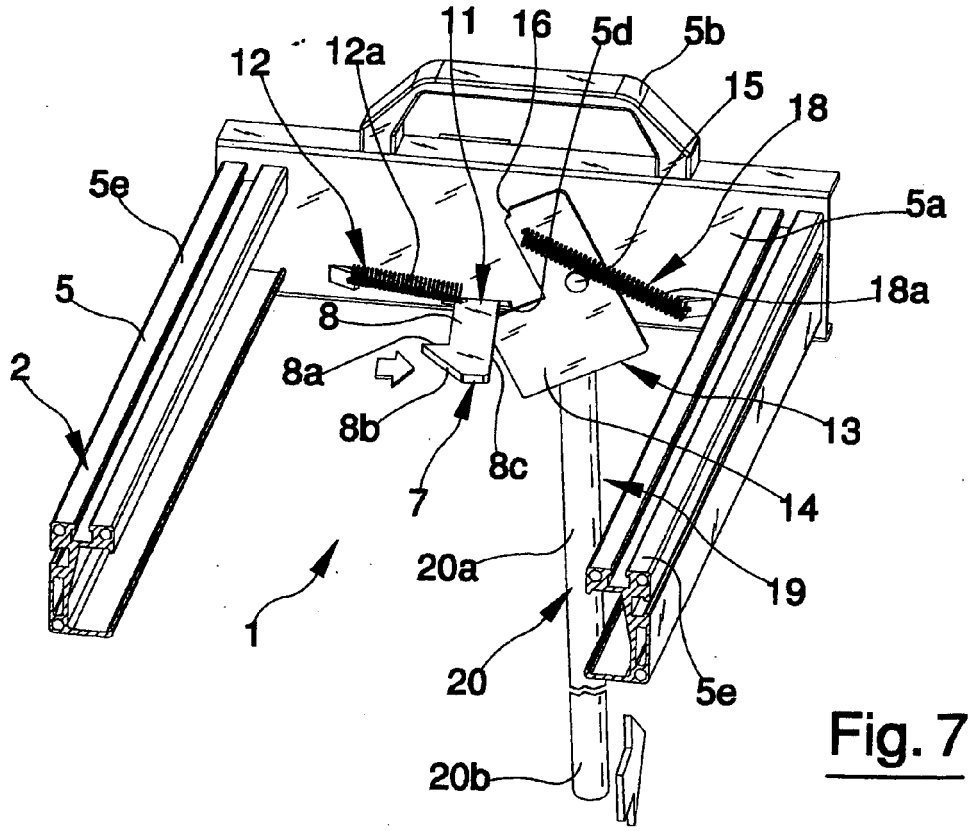

11
16
5d
5b
12
12a
15
18
5e
5a
5
18a
8
2
8a
13
8b
8c
14
7
20a
19
1
20
5e
20b

Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 07 5132

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 411 626 A (BUTLER KENT [GB]) 7 September 2005 (2005-09-07) * the whole document * -----	1	INV. B60R9/042
X	DE 31 07 196 A1 (SCHACH ALFRED DR) 9 September 1982 (1982-09-09) * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

B60R
B60P

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	8 May 2007	Busuiocescu, Bogdan

CATEGORY OF CITED DOCUMENTS

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1

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