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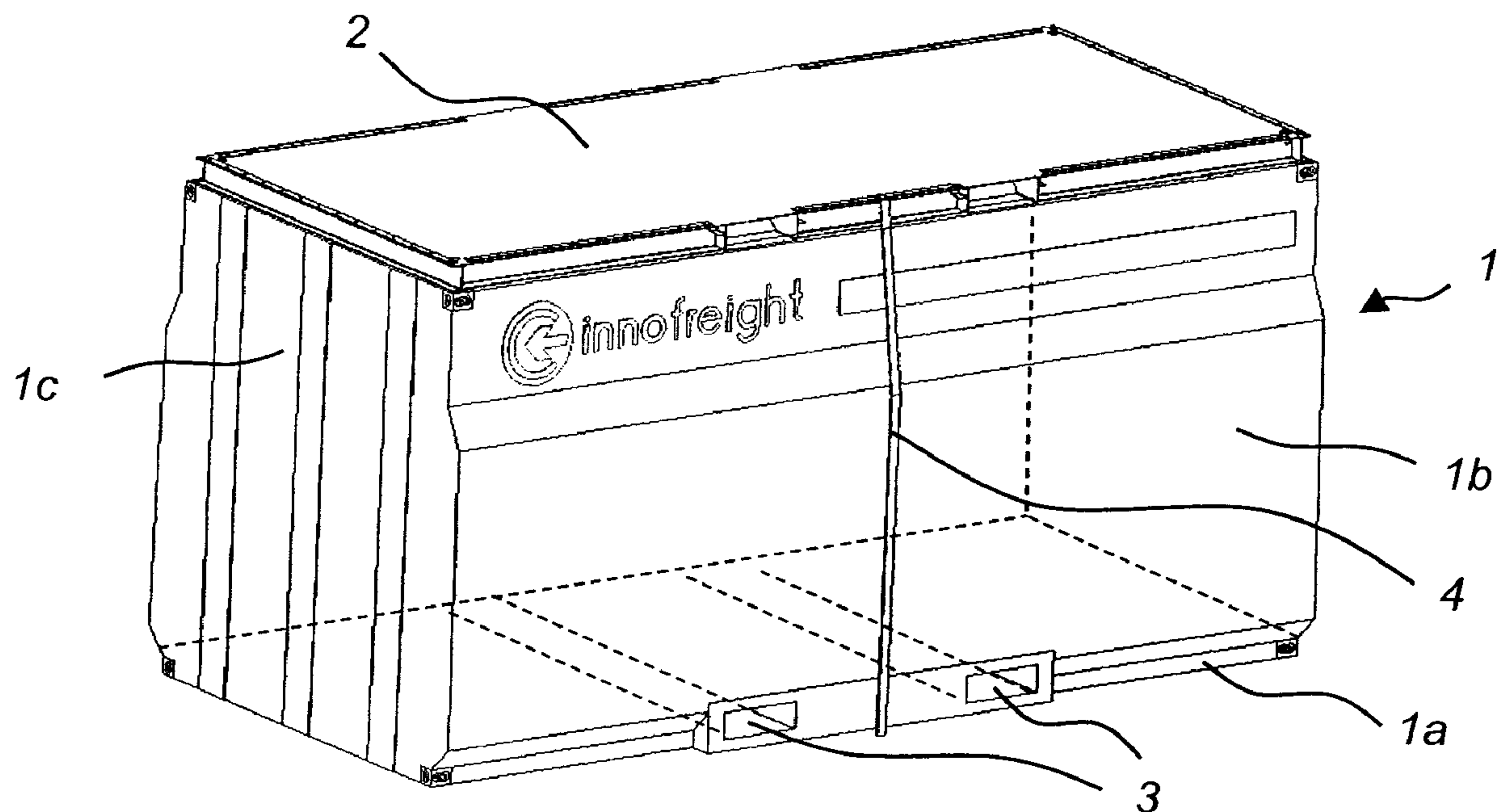
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(54) Titre : VEHICULE DE DECHARGEMENT ET COMBINAISON D'UN CONTENEUR ET D'UN VEHICULE DE  
DECHARGEMENT

(54) Title: UNLOADING VEHICLE AND COMBINATION OF AN UNLOADING VEHICLE WITH A CONTAINER



(57) Abrégé/Abstract:

The invention relates to an unloading vehicle for the rotary unloading of a container (1), able to be covered by a fixed cover (2), which has a container base (1a) with two fork pockets (3), with a frame (15) on which a carrier (16), provided with a pair of fork prongs (17), is mounted so as to be rotatable about an axis running horizontally and parallel to the fork prongs (17). In order to be able to handle not only the container but also its cover by an unloading vehicle, a further carrier (18, 23) is provided above the rotatably arranged carrier (16), which is provided with a receiving arrangement for taking hold of the cover (2) of the container (1), and is vertically adjustable and/or able to be swivelled up and down with respect to the frame (15).

## 5 ABSTRACT

10 The invention relates to an unloading vehicle for the rotary unloading of a container (1), able to be covered by a fixed cover (2), which has a container base (1a) with two fork pockets (3), with a frame (15) on which a carrier (16), provided with a pair of fork prongs (17), is mounted so as to be rotatable about an axis running horizontally and parallel to the fork prongs (17).

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In order to be able to handle not only the container but also its cover by an unloading vehicle, a further carrier (18, 23) is provided above the rotatably arranged carrier (16), which is provided with a receiving arrangement for taking hold of the cover (2) of the container (1), and is vertically adjustable and/or able to be swivelled  
20 up and down with respect to the frame (15).

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5      **Unloading vehicle and combination of an unloading vehicle with a container**

10      The invention relates to an unloading vehicle for the rotary unloading of a container which is able to be covered by a fixed cover, which has a container base with two fork pockets, with a frame on which a carrier, provided with a pair of fork prongs, is rotatably mounted about an axis running horizontally and parallel to the fork prongs. The invention further relates to a combination of an unloading vehicle with a container cover.

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From EP-A-1 690 809 a container is known for the transporting of bulk goods in railway freight transportation or on lorries. The container can be unloaded by rotating or tipping. Moisture-sensitive bulk goods or bulk goods which could be blown off during the journey must be covered during transportation; usually tarpaulin systems are used for this. A disadvantage in this solution is the considerable effort in handling.

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The invention is based on the problem of simplifying the handling for emptying a container filled with bulk goods, which is provided with a cover for transportation.

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The problem which is posed is solved according to the invention in that above the rotatably arranged carrier, a further carrier is provided which is provided with a receiving arrangement to take hold of the cover of the container and is vertically adjustable and/or swivellable up and down with respect to the frame.

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The invention therefore allows not only the container to be handled with an unloading vehicle, but also its cover, so that it is no longer necessary to remove the latter in advance. A device designed according to the invention therefore distinctly



shortens the expenditure of time for the handling of the container for emptying and therefore also simplifies the procedure for emptying the container.

5 The unloading vehicle is to have an expedient and, at the same time, stable construction, which allows the desired handling of the container and its cover. It is therefore advantageous if the frame has an upper and a lower frame part, wherein the upper frame part carries the carrier which is provided with the receiving arrangement.

10 In order to carry out the movement sequences necessary for taking hold of and lifting the cover in an expedient manner, the upper frame part is vertically displaceable or adjustable with respect to the lower frame part.

15 In a preferred embodiment of the invention, the receiving arrangement for taking hold of the cover of the container is a further pair of fork prongs. In an alternative variant embodiment, the receiving arrangement can be provided with electromagnets, in particular on its underside.

20 An unloading vehicle constructed according to the invention allows either a removal of the cover of the container by lifting, by the upper frame part with the receiving arrangement and the cover taken hold of thereby being moved up, or by a swivelling up of a further carrier which for this purpose is arranged so as to be swivelled up and down on the upper frame part.

25 The invention further relates to combinations of unloading vehicles with container covers. In a particularly preferred such combination, a container cover is provided which is provided with a pair of fork receiving locations. The further pair of fork prongs can be moved into these fork mountings for the handling of the container cover. In a further combination according to the invention, the container cover is  
30 provided with at least one metallic part which is able to be engaged by the electromagnets.

Further features, advantages and details of the invention are now described in further detail by means of the drawings, illustrating example embodiments diagrammatically, in which are shown

5 Fig. 1 an oblique view of a container with cover and lashing strap,

Fig. 1a a detail of Fig. 1,

Fig. 2 an embodiment of a framework construction of the cover,

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Fig. 3 a detail of Fig. 2 in enlarged illustration,

Fig. 4 a view of a cover with a net covering,

15 Fig. 5 a detail of Fig. 4 in enlarged illustration,

Fig. 6 a view of a cover with a fixed covering,

20 Fig. 7a to 7e, Fig. 8a to 8c and Fig. 9a to 9e different embodiment variants of unloading vehicles, in particular during their operation.

The container 1 illustrated by way of example in Fig. 1 is in particular a container constructed according to the standards in force in railway freight transportation, which is used for the conveying of bulk goods, chips and biomass, if applicable also on lorries. The container 1 has a rectangular base 1a, two side walls 1b and two walls 1c on the end side. The container 1 is upwardly open and is able to be closed by means of a separate cover 2. On the inner side of the base 1a, two fork pockets 3 are arranged transversely to the longitudinal extent of the container 1 and symmetrically to the central transverse axis of the container base 1a. The fork pockets 3, which are formed from corresponding steel profiles, have rectangular cavities in cross-section, which extend continuously from side wall 1b to side wall 1b and are respectively open here. The spacing and the cross-sectional dimensions of the fork pockets 3 are adapted to two fork prongs of an unloading vehicle, which is described further.

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The cover 2, which is merely resting in the embodiment which is shown, is secured by a lashing strap 4, mounted for example on reinforcement plates. As Fig. 1a shows, the cover 2 is secured on each container corner against slipping by pins 5a which engage in depressions 5b on corner fittings.

Fig. 2 and Fig. 3 show the stable self-supporting basic frame of the cover 2 of a rectangular framework 6 of U-shaped steel profiles 6a welded together. The framework 6, adapted to the rectangular shape of the upper opening of the container 1, has two long sides which are connected with each other by two short transverse sides. The framework construction is reinforced by struts 8 running diagonally. Parallel to the transverse sides and symmetrically to the central transverse axis of the framework 6, two fork receiving locations 7 are formed from steel profiles 7a, 7b (Fig. 3) and are welded to the U-profiles 6a on the longitudinal sides of the framework 6. The fork receiving locations 7 have rectangular openings on the longitudinal sides of the framework 6, their dimensions and their reciprocal spacing are adapted to the reciprocal spacing and the dimensions of fork prongs of an unloading vehicle, as will be described further.

On the frame 6, a rectangular cover element is fastened, which according to Fig. 4 and Fig. 5 is a metallic net 9 or, according to Fig. 6, a solid metallic plate 10. The net 9 can be screwed to the framework 6 by means of strips 11, as shown in Fig. 5. Openings 6b, aligned with each other, on the frame 6 (Fig. 3) and on the cover element 9, 10 (see openings 9a, 10a) allow a stacking of several covers 2, by the pins 5a of covers 2, stacked on each other, engaging into the openings 6b and 9a or 10a of the respectively other cover 2.

Fig. 7a shows a variant embodiment of an unloading vehicle 12 with a chassis 13 with four wheels 13a and a driver's cab 14 and with a lifting frame 14 arranged on the chassis 13. The lifting frame 15, standing vertically, has a lower frame part 15a and an upper frame part 15b which is displaceable with respect thereto in vertical direction. On the lower frame part 15a a carrier 16, which has two parallel fork prongs 17 running horizontally, is arranged displaceably in vertical direction. The lower carrier 16 is mounted here on a rotary arrangement 16b and is rotatable in

such a way relative to the lifting frame about an axis running parallel to the fork prongs 17. On the upper frame part 15b a further carrier 18 is fastened, which is likewise provided with two fork prongs 19 running horizontally and parallel to each other. The frame part 15b can be connected with the rotary arrangement, in order to couple vertical movements. In addition, provision can be made to arrange the lifting frame 15 so as to be displaceable with respect to the chassis 13 in lateral direction. The fork prongs 17 on the lower carrier 16 are constructed to be longer than the fork prongs 19 on the upper carrier 18.

- 10 Fig. 7b to 7e show stages in the handling and emptying of a container 1 with the loading vehicle 12. Fig. 7b shows a container carrier wagon 26 with three containers 1 laden with bulk goods. The lashing straps have already been removed. The loading vehicle 12 is moved up to one of the containers 1, the fork prongs 19 are brought into position opposite the fork receiving locations 7 of the cover 2, the fork prongs 17 opposite the fork pockets 3 on the base 1a of the container 1. Firstly, the lower, longer fork prongs 17 move in, then the fork prongs 19. The container 1 which is received by the loading vehicle and is still provided with the cover 2 (Fig. 7c) is moved to the unloading point. At the start of the unloading process, the upper frame part 15b is raised, so that the cover 2 is lifted from the container 1. In the upper final position of the upper frame part 15b, the distance between the container 1 and the cover 2 is large enough to introduce the rotary movement. Fig. 7e shows the container 1, rotated for emptying, with the cover 2 raised. The empty container 1 is turned back into its starting position again and the cover 2 is positioned by lowering the upper frame part 15b on the container 1. The unloading vehicle 12 can then transfer the container 1 to the container carrier wagon.

An alternative embodiment of an unloading vehicle 12' and the container handling therewith is shown by Fig. 8a to Fig. 8c. The loading vehicle 12' has a chassis 13, wheels 13a, a cab 14, a lifting frame 15 with an upper frame part 15b and a lower frame part 15a. On the lower frame part 15a a carrier 16 with fork prongs 17, rotatably mounted by means of a rotary arrangement 16a, is arranged, on the upper frame part 15b, which is vertically displaceable with respect to the lower frame part 15a in vertical direction, a carrier 18 with fork prongs 19 is arranged. On the undersides of the fork prongs 19, electromagnets 20 are arranged. Here, instead of



the two prongs 19, a plate, in a single piece, can be provided with electromagnets 20 on its underside. The container 1, filled with bulk goods, is lifted by means of the lower, longer fork prongs 17 from the transport arrangement, for example a container carrier wagon, wherein firstly the upper frame part 15b is positioned at a distance from the container 1 (Fig. 8b). Now, the carrier 18 is lowered, so that the cover 2 is taken hold of on its upper side by the electromagnet 20 and by a raising of the upper frame part 15b is removed from the container 1 (Fig. 8c). The unloading of the container 1 by rotation takes place in an analogous manner to that described above, likewise the subsequent return transfer of the container 1 to the container carrier wagon.

Figures 9a to 9f show a further embodiment of an unloading vehicle 12" and stages of the handling of a container 1. The unloading vehicle 12" has a chassis 13, wheels 13a, a driver's cab 14 and a lifting frame 15. The lifting frame 15, standing vertically, has a lower frame part 15a and an upper frame part 15b, displaceable or adjustable in vertical direction with respect thereto. On the lower frame part 15a, a carrier 16, which has two parallel fork prongs 17 running horizontally, is arranged so as to be displaceable in vertical direction. The carrier 16 is mounted here on a rotary arrangement 16a and is rotatable in such a way relative to the lifting frame about an axis running parallel to the fork prongs 17. On the frame part 15b a carrier 23, having fork prongs 19, is rotatably arranged about an axis running horizontally and transversely to the fork prongs 19. The reciprocal distance between the carriers 16, 23 or their fork prongs 17, 19 is adapted or able to be adapted to the distance of the fork pockets 3 of the container 1 to the fork mountings 7 in the cover 2 which is positioned thereon. The longer fork prongs 17 on the carrier 23 move firstly into the fork pockets 3 on the container 1, then the fork prongs 19 into the cover 2. The container 1 received by the unloading vehicle 12" (Fig. 9c) is moved to the unloading position. The cover 2 is opened by a rotary movement of the carrier 23, as shown in Fig. 9d. When the cover 2 is fully opened, the latter is aligned perpendicularly (Fig. 9e), so that now the container 1 can be turned about the rotation arrangement 16a, until the bulk goods situated in it are emptied out of the container (Fig. 9f). The container 1 is then turned back into its starting position, the cover 2 is positioned again and the empty container 1 is brought back to the container carrier wagon.



The unloading vehicles 12, 12' and 12" constructed according to the invention can be additionally used to close containers 1, filled with bulk goods and positioned on the transport vehicle, with covers 2.

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## LIST OF REFERENCE NUMBERS

10

1.....container

1a.....base

1b.....side wall

1c.....end-side wall

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1d.....corner fitting

2.....cover

3.....fork pockets

4.....lashing strap

5a.....bolt, pin

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5b.....depression

6.....framework

6b.....openings

7.....fork receiving locations

7a.....steel profile

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7b.....steel profile

8.....struts

9.....metallic net

9a.....opening

10.....solid plate

30

10a.....opening

11.....strips

12.....unloading vehicle

12' .....unloading vehicle

12" .....unloading vehicle

- 13.....chassis
- 13a.....wheels
- 14.....cab
- 15.....lifting frame
- 5 15a.....frame part
- 15b.....frame part
- 16.....carrier
- 16a.....rotary arrangement
- 17.....fork prongs
- 10 18.....carrier
- 19.....fork prongs
- 20.....electromagnet
- 23.....carrier
- 26.....wagon



## 5 CLAIMS

- 10        1. Unloading vehicle for the rotary unloading of a container, able to be covered  
by a fixed cover, which has a container base with two fork pockets, with a  
frame on which a carrier, provided with a pair of fork prongs, is mounted  
rotatably about an axis running horizontally and parallel to the fork prongs,  
c h a r a c t e r i z e d i n t h a t  
15        above the rotatably arranged carrier a further carrier is provided, which is  
provided with a receiving arrangement for taking hold of the cover of the  
container and is vertically adjustable and/or able to be swivelled up and  
down with respect to the frame.
- 20        2. Unloading vehicle according to Claim 1, characterized in that the frame has  
an upper and a lower frame part, wherein the upper frame part carries the  
further carrier provided with the receiving arrangement.
- 25        3. Unloading vehicle according to Claim 1 or 2, characterized in that the upper  
frame part is vertically displaceable or adjustable with respect to the lower  
frame part.
- 30        4. Unloading vehicle according to any of Claims 1 to 3, characterized in that the  
receiving arrangement is a further pair of fork prongs.
5. Unloading vehicle according to any of Claims 1 to 4, characterized in that the  
receiving arrangement has electromagnets on its underside.

6. Unloading vehicle according to any of Claims 1 to 5, characterized in that the further carrier is arranged to as to be swivellable up and down on the upper frame part.
- 5 7. Combination of an unloading vehicle according to any of Claims 1 to 4 or 6 with a container comprising a container cover, characterized in that the container cover is provided with a pair of fork receiving locations.
- 10 8. Combination of an unloading vehicle according to any of Claims 1 to 5 with a container comprising a container cover, characterized in that the container cover has a metallic part, able to be engaged by the electromagnets.



FIG. 1

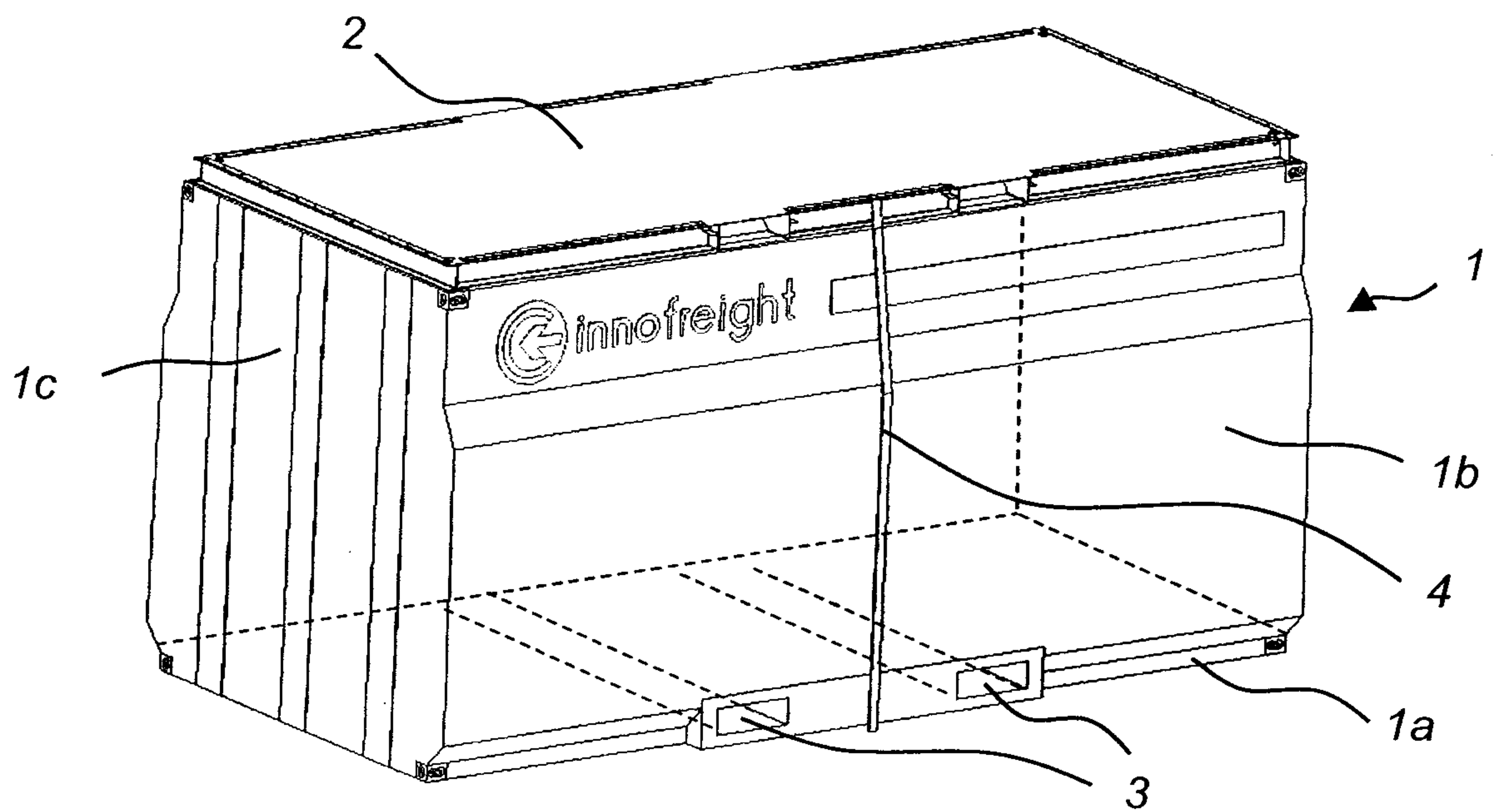


FIG. 1a

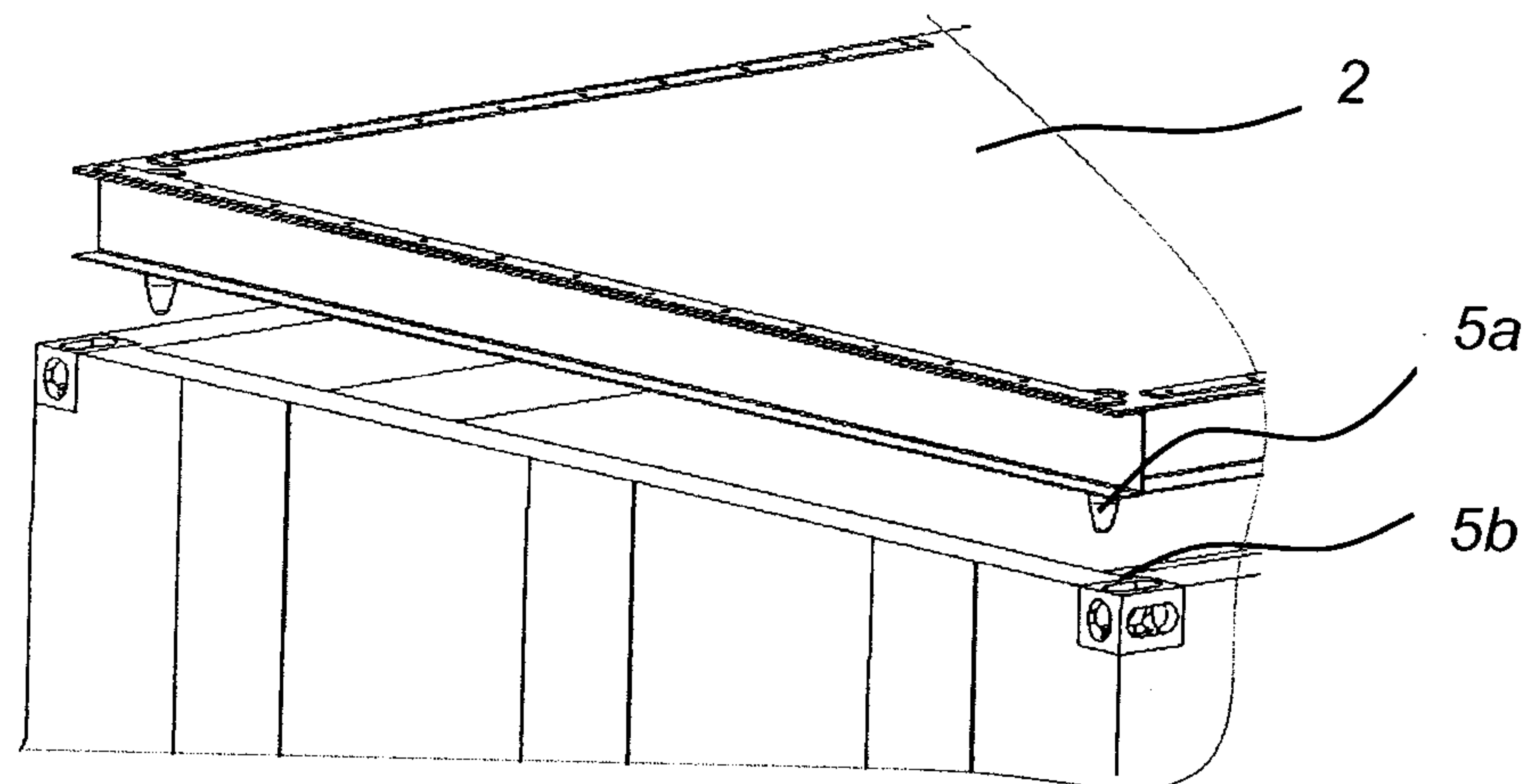


FIG. 2

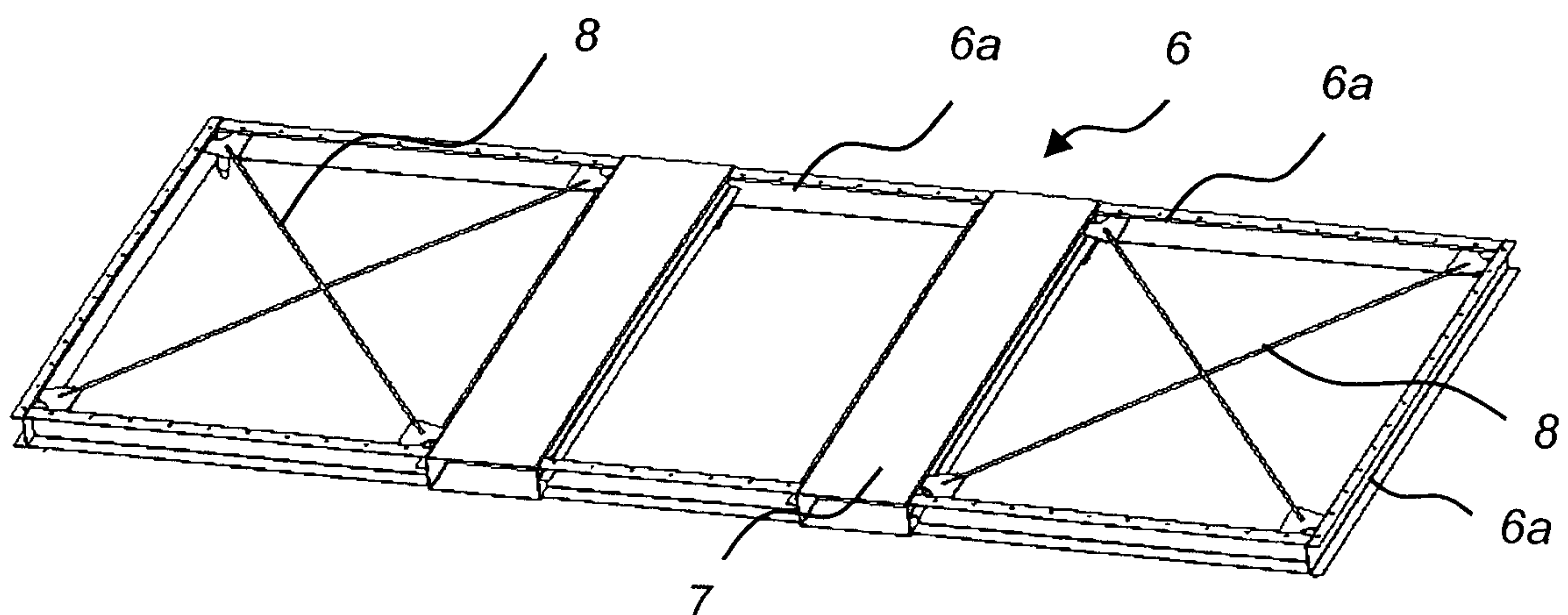


FIG. 3

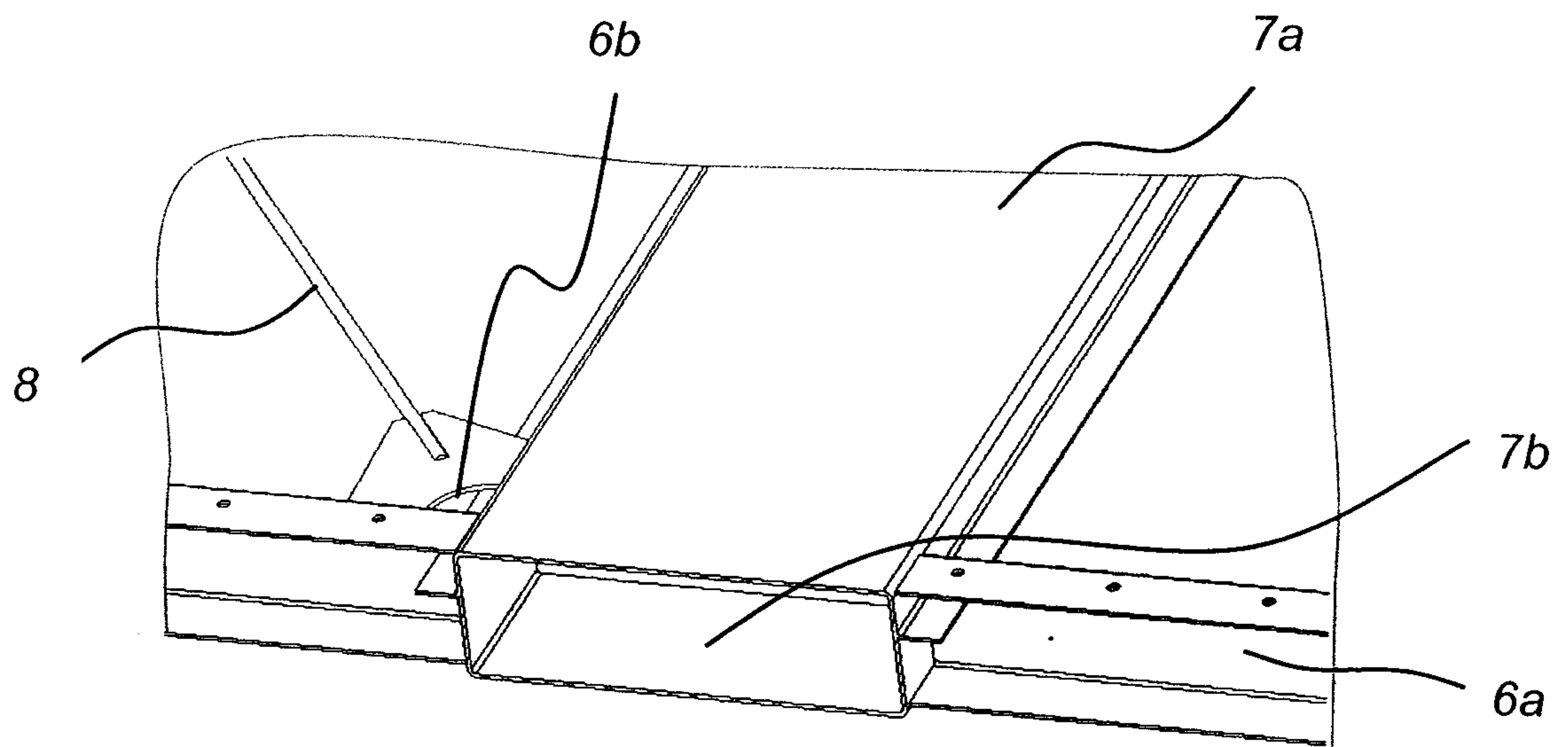


FIG. 4

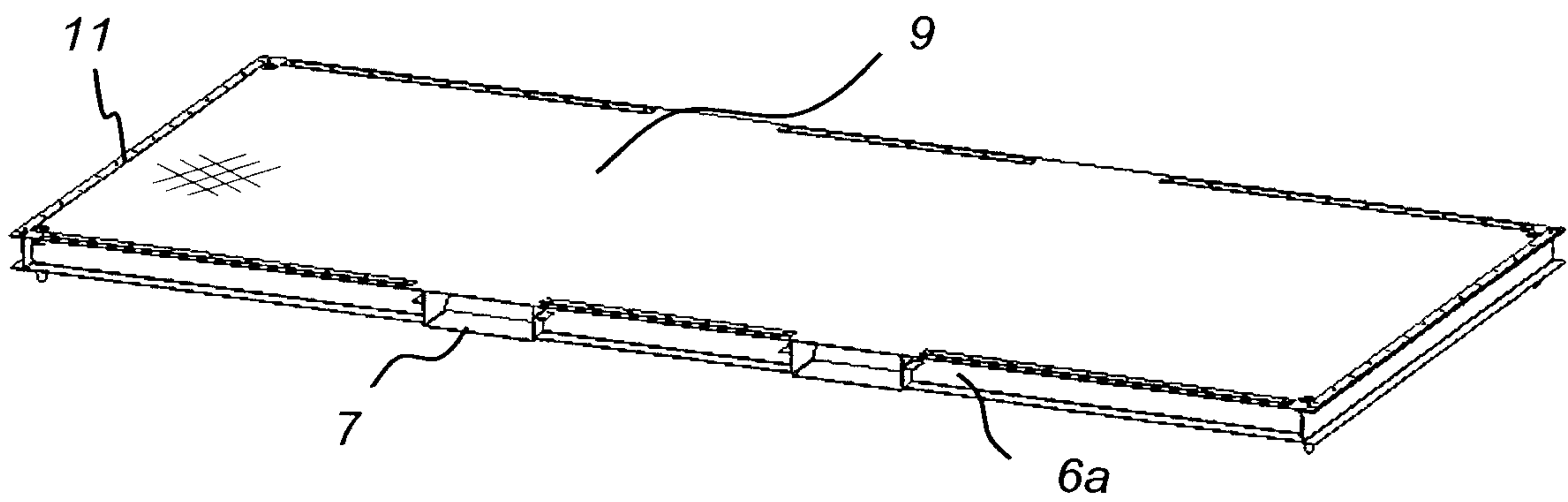


FIG. 5

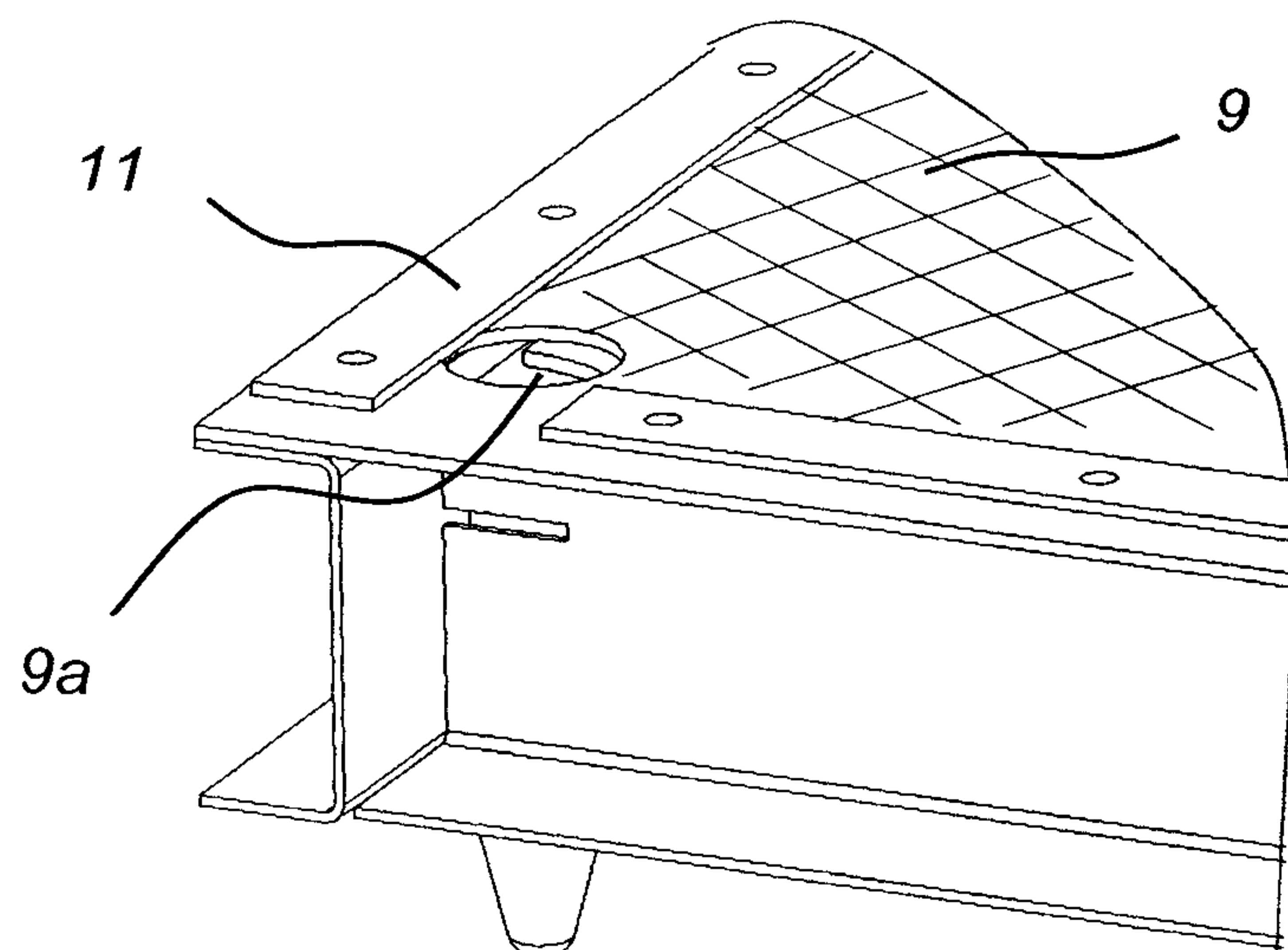




FIG. 6

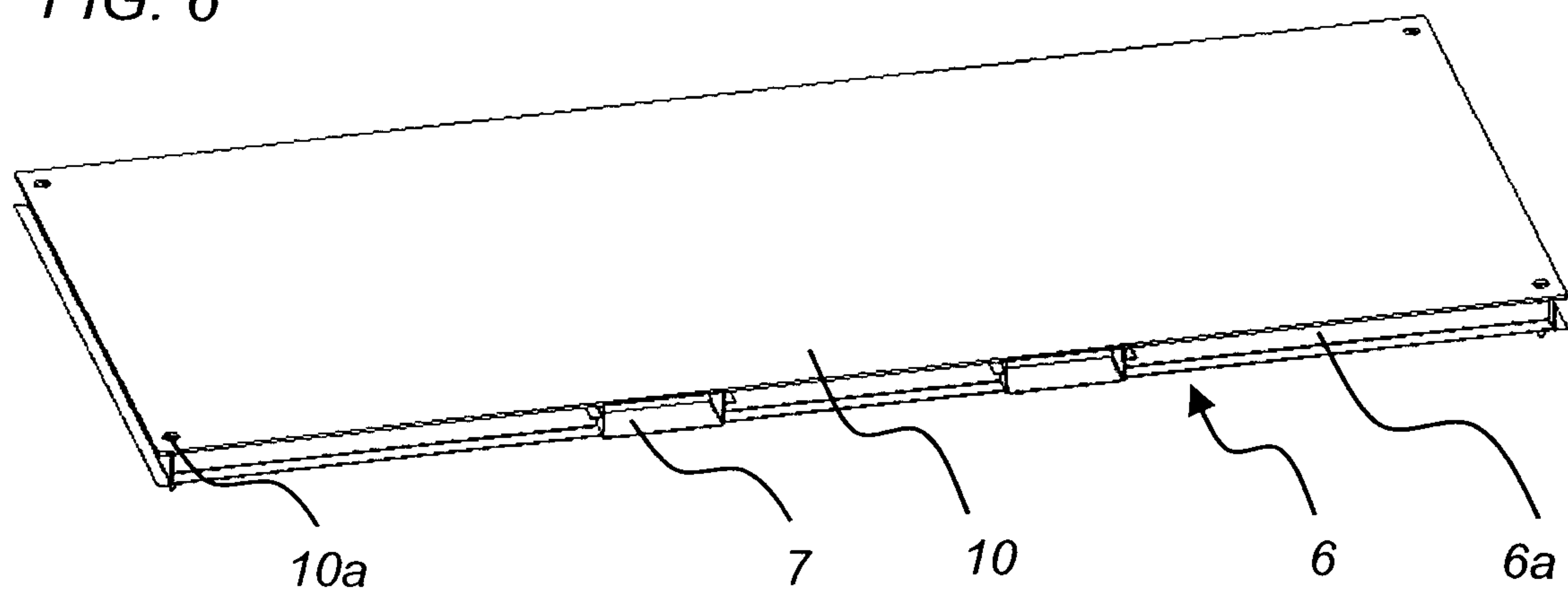


FIG. 7a

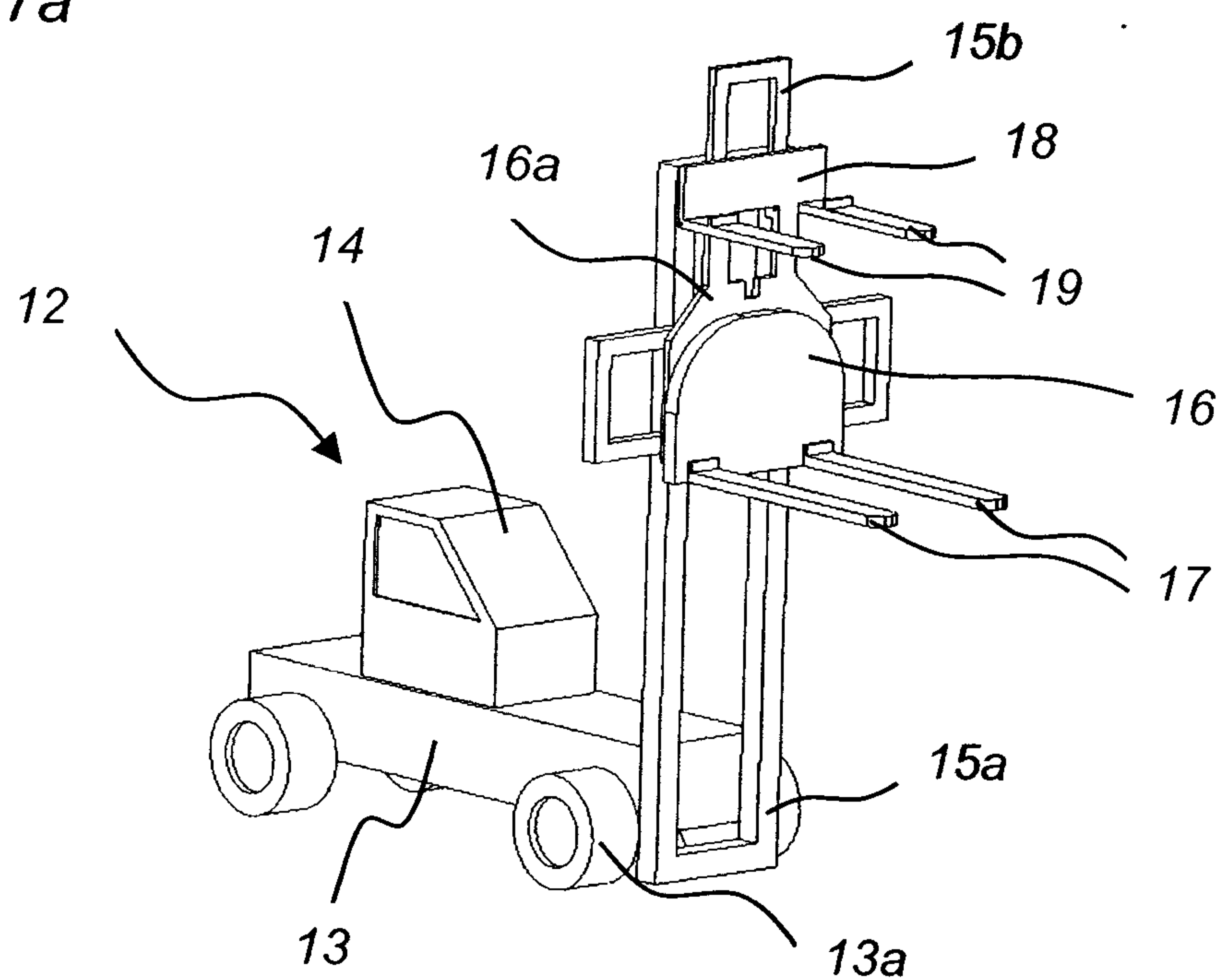


FIG. 7b

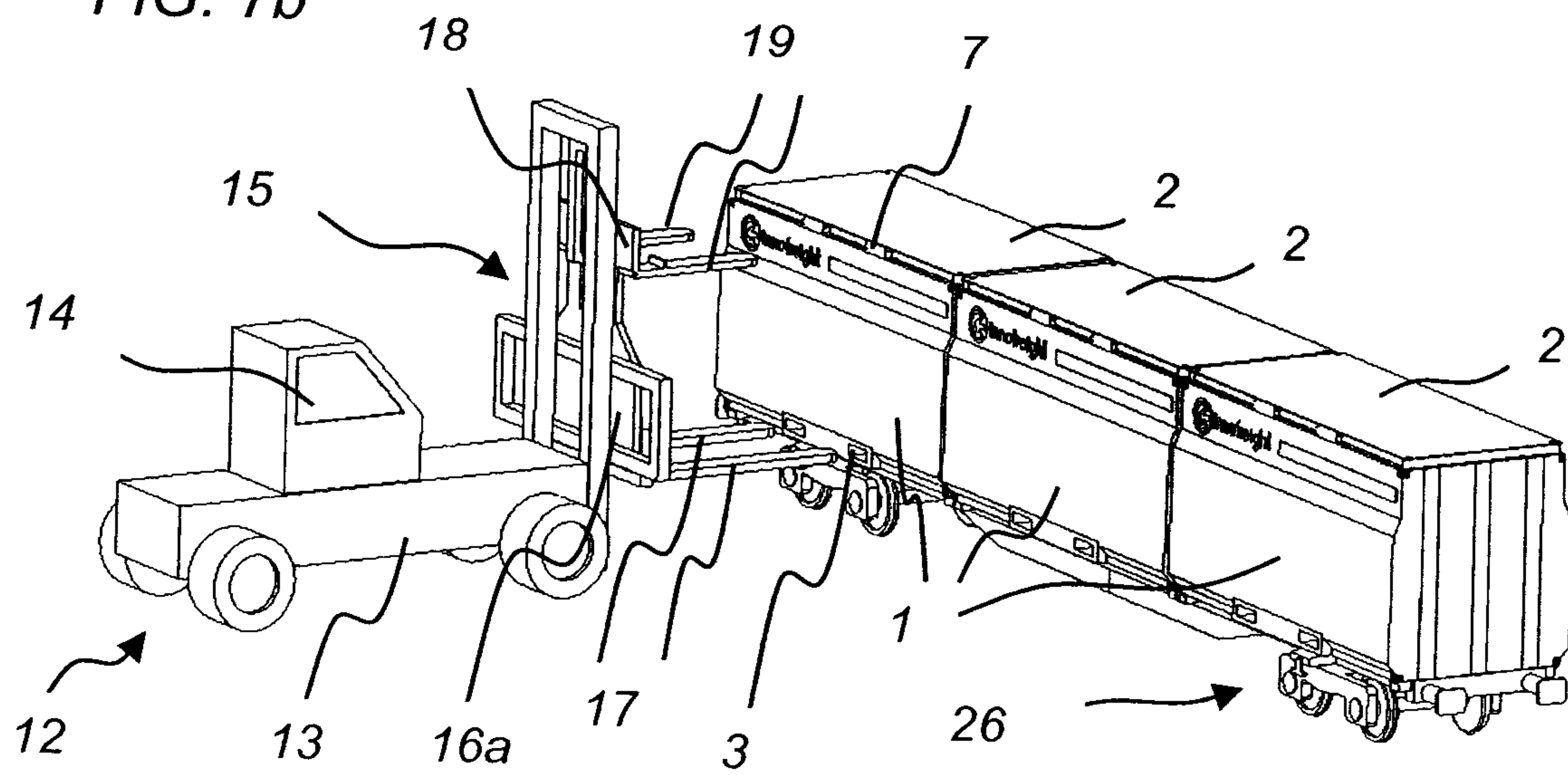


FIG. 7c

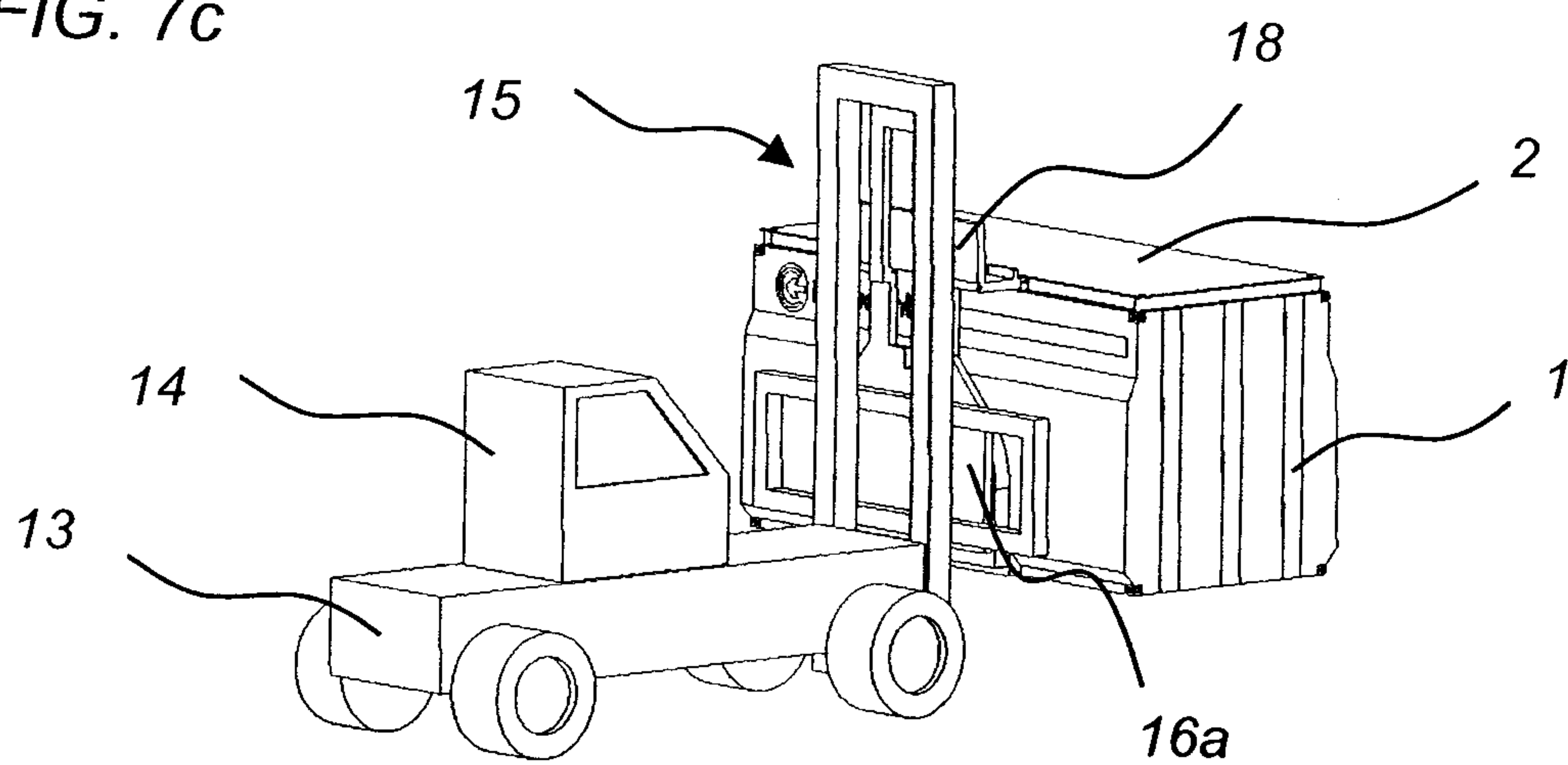


FIG. 7d

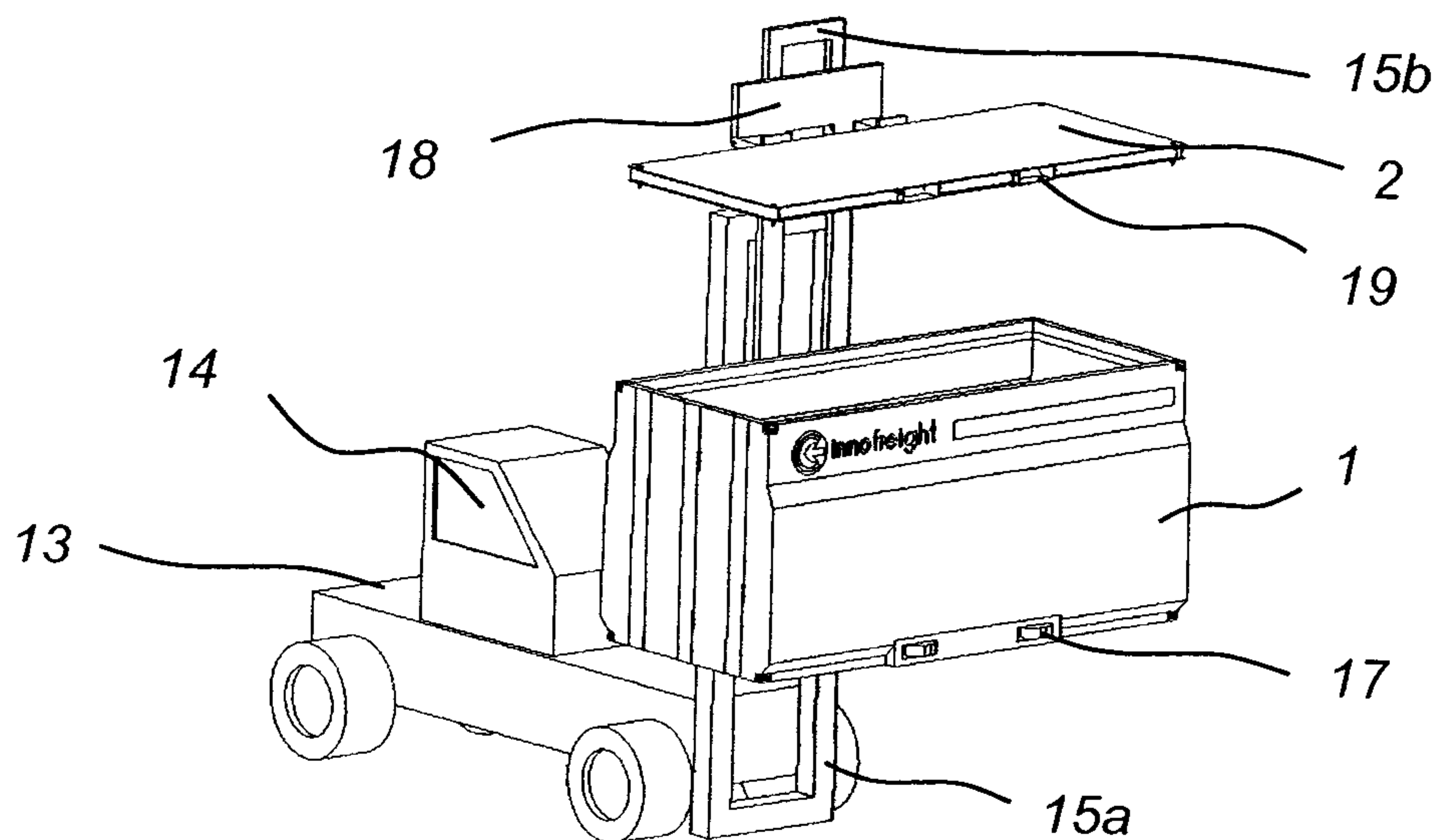


FIG. 7e

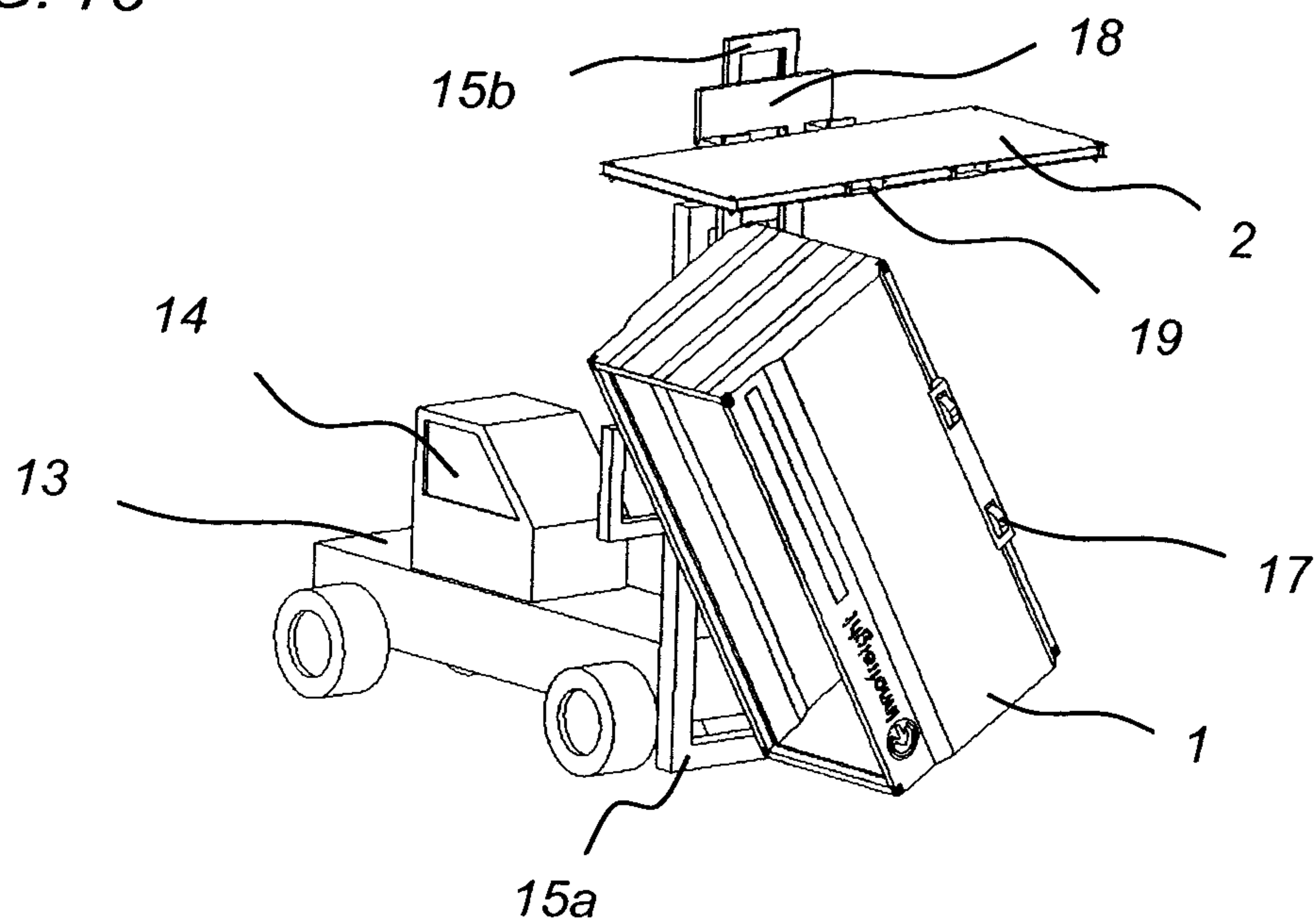




FIG. 8a

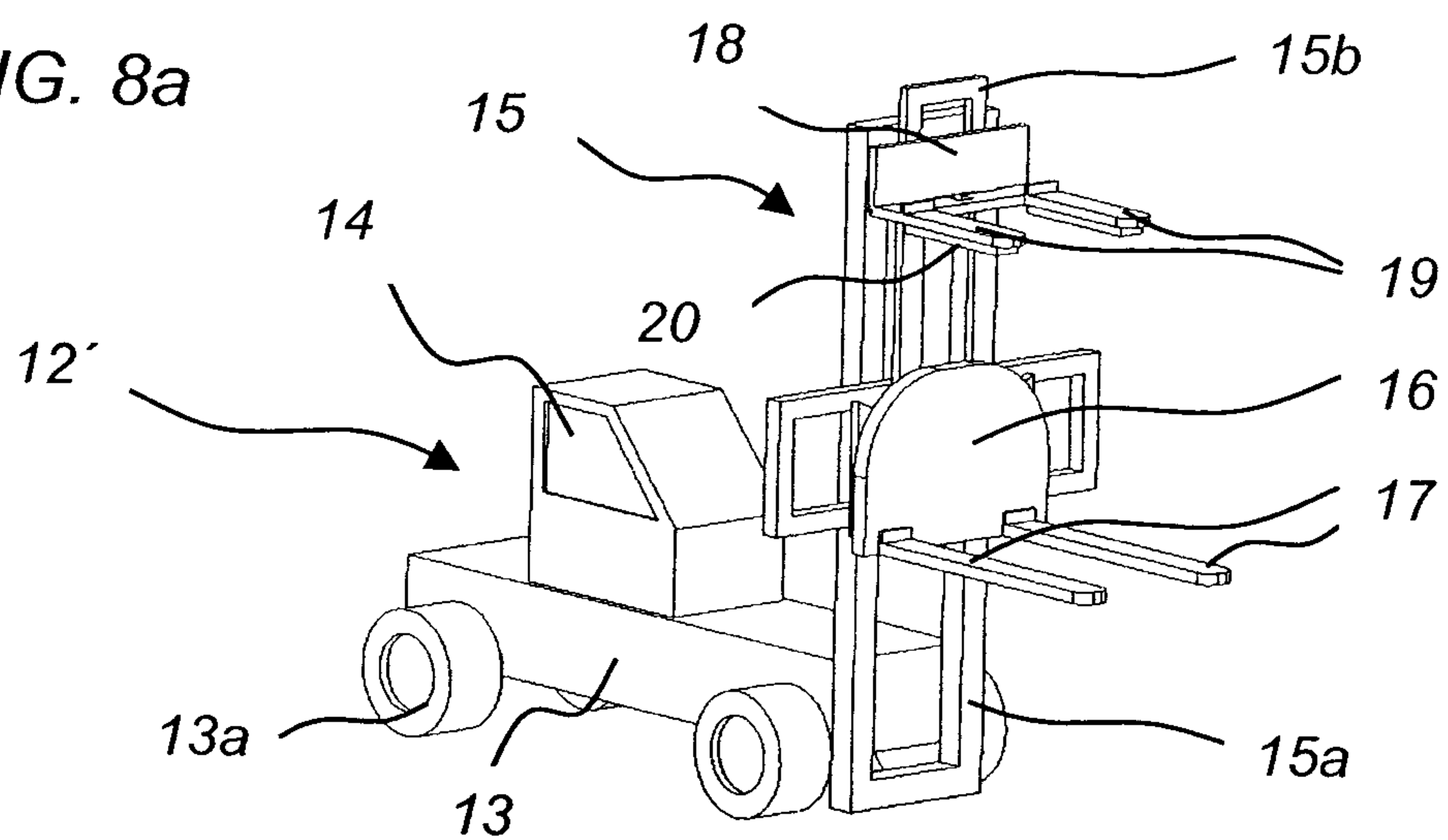


FIG. 8b

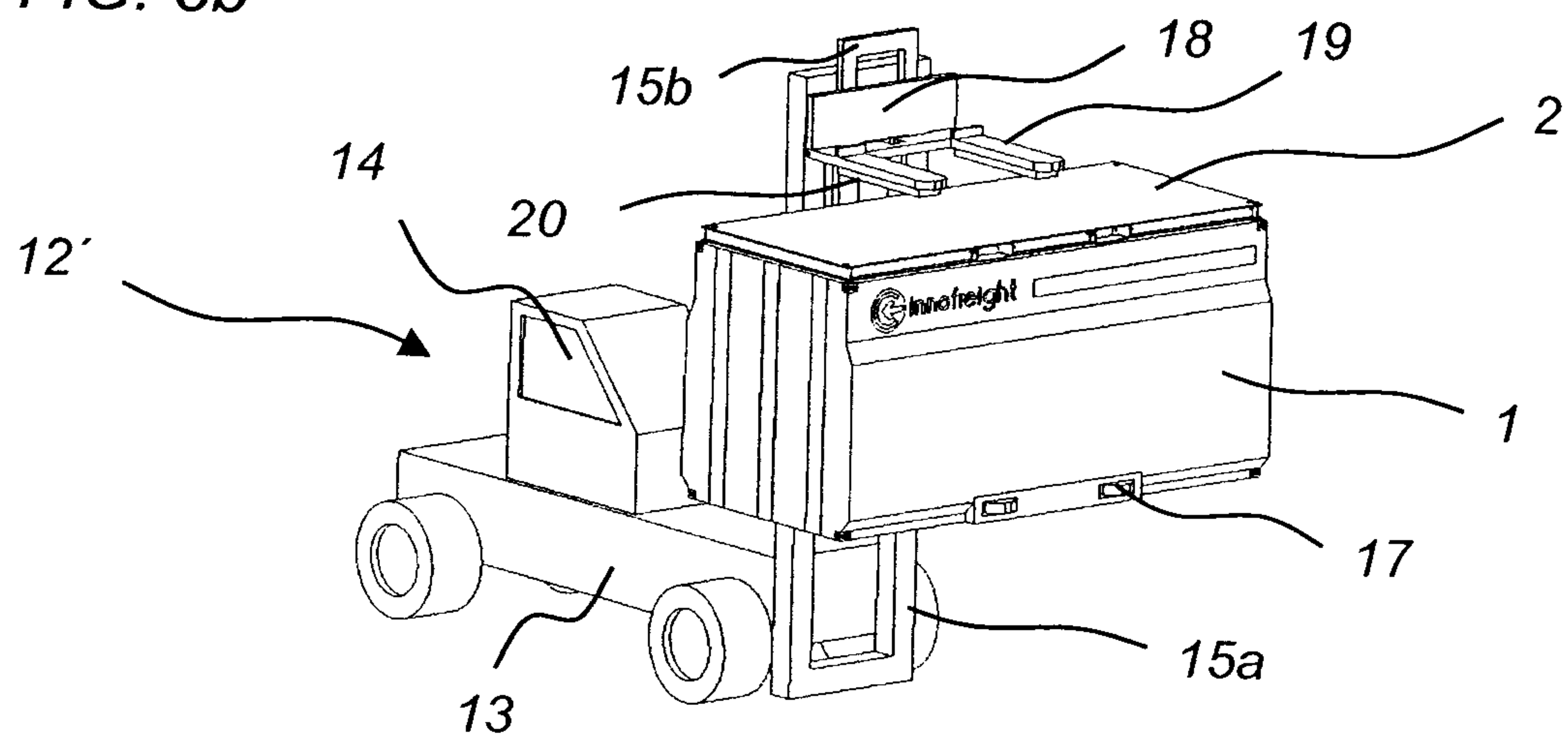


FIG. 8c

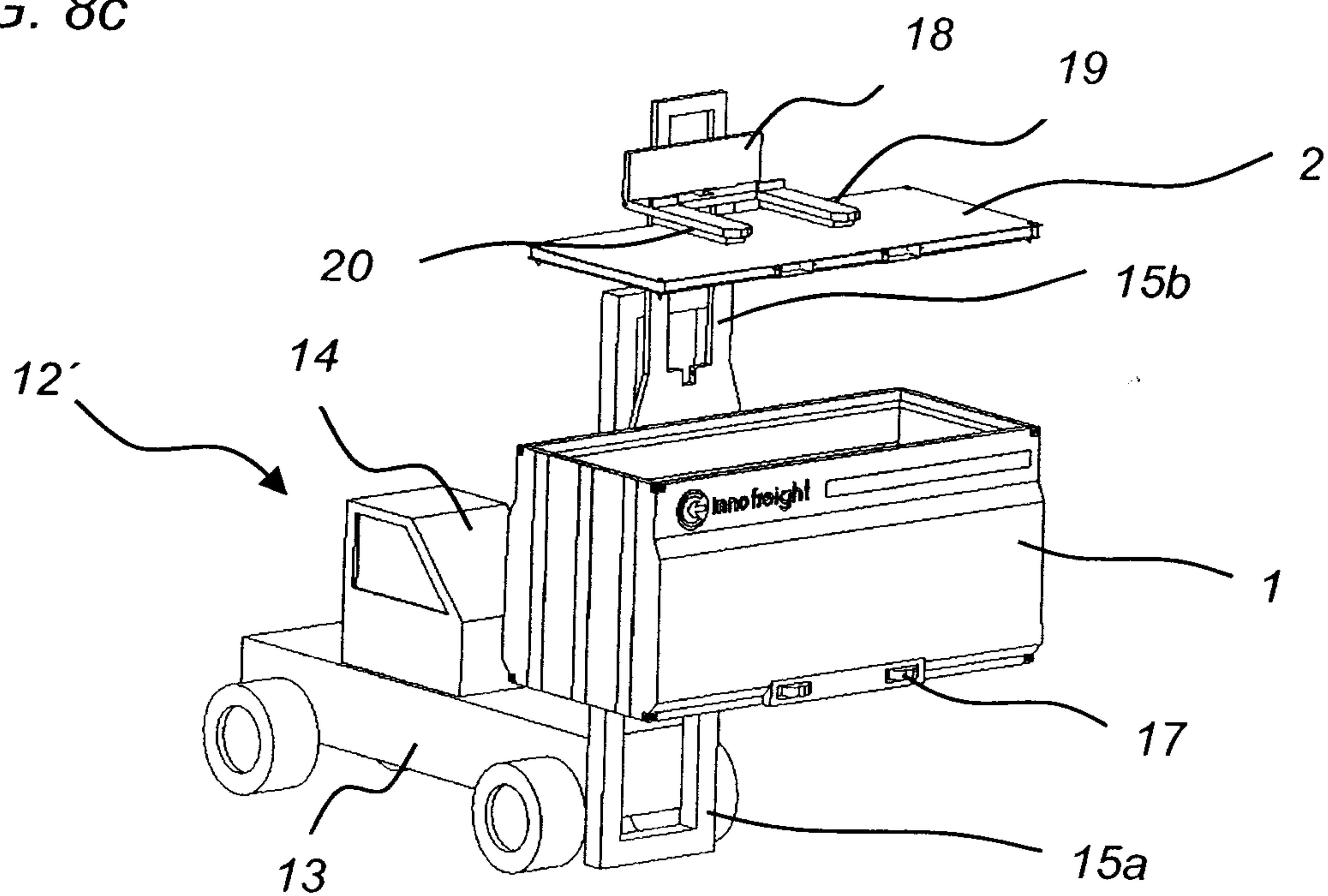


FIG. 9a

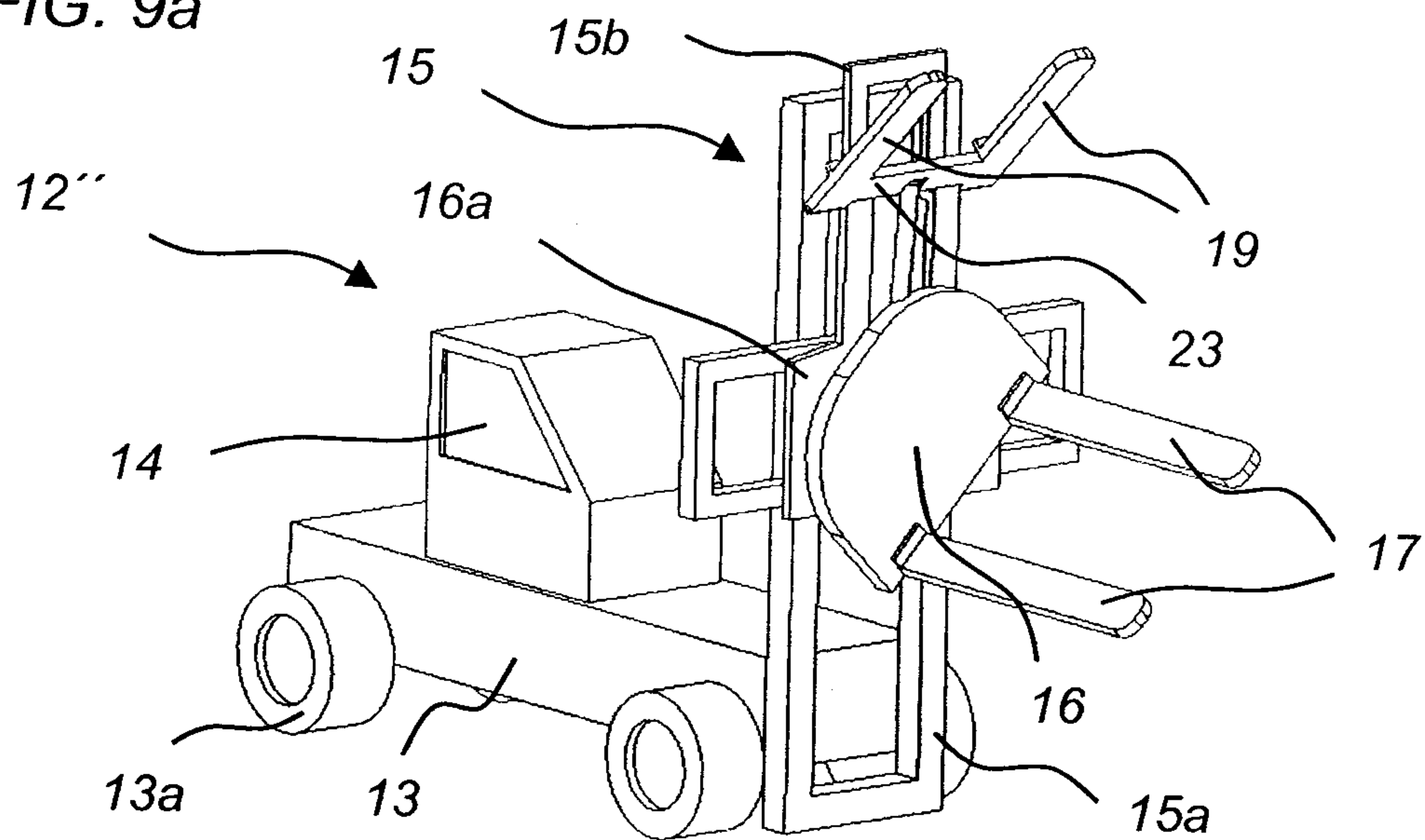


FIG. 9b

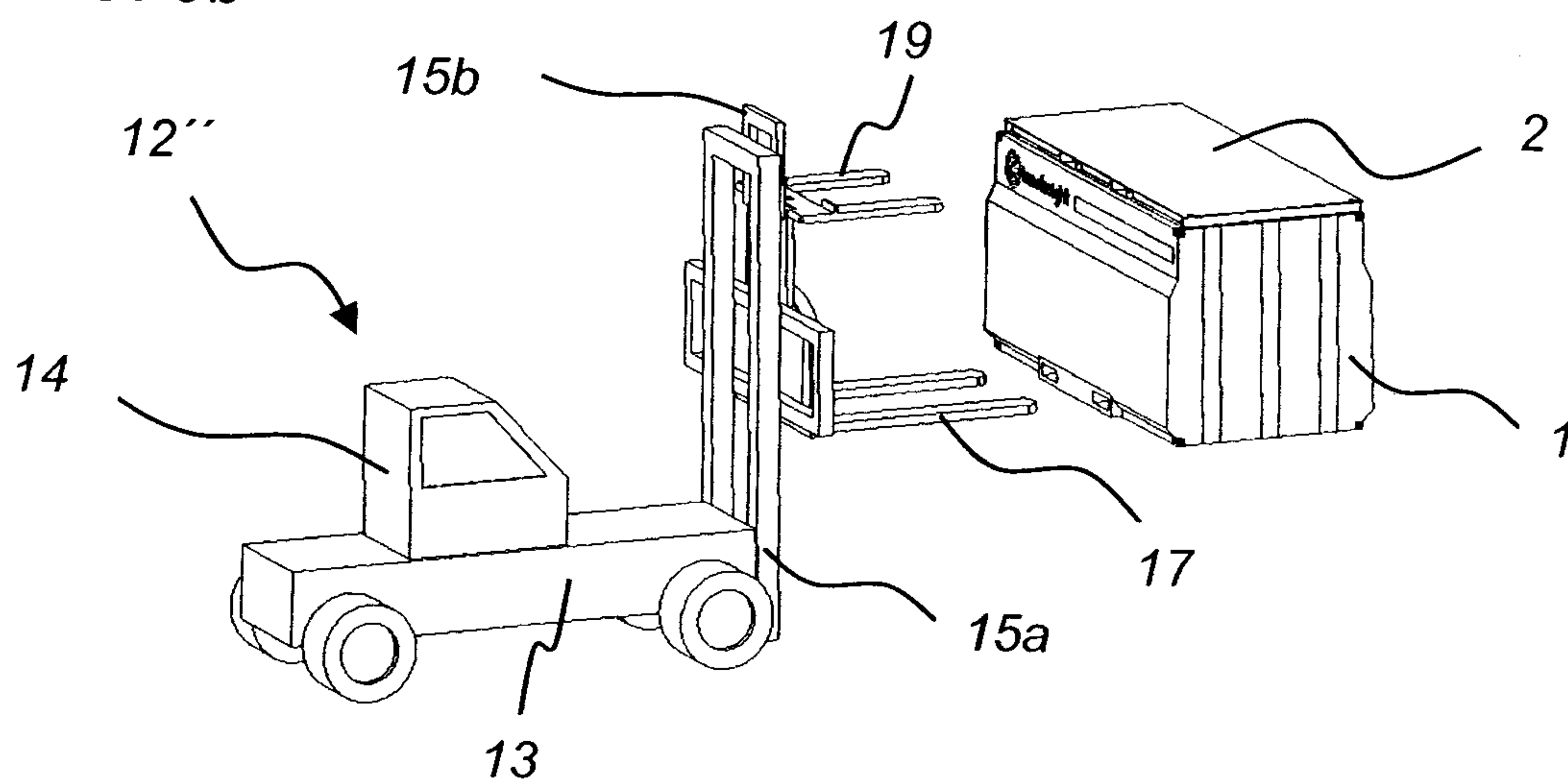


FIG. 9c

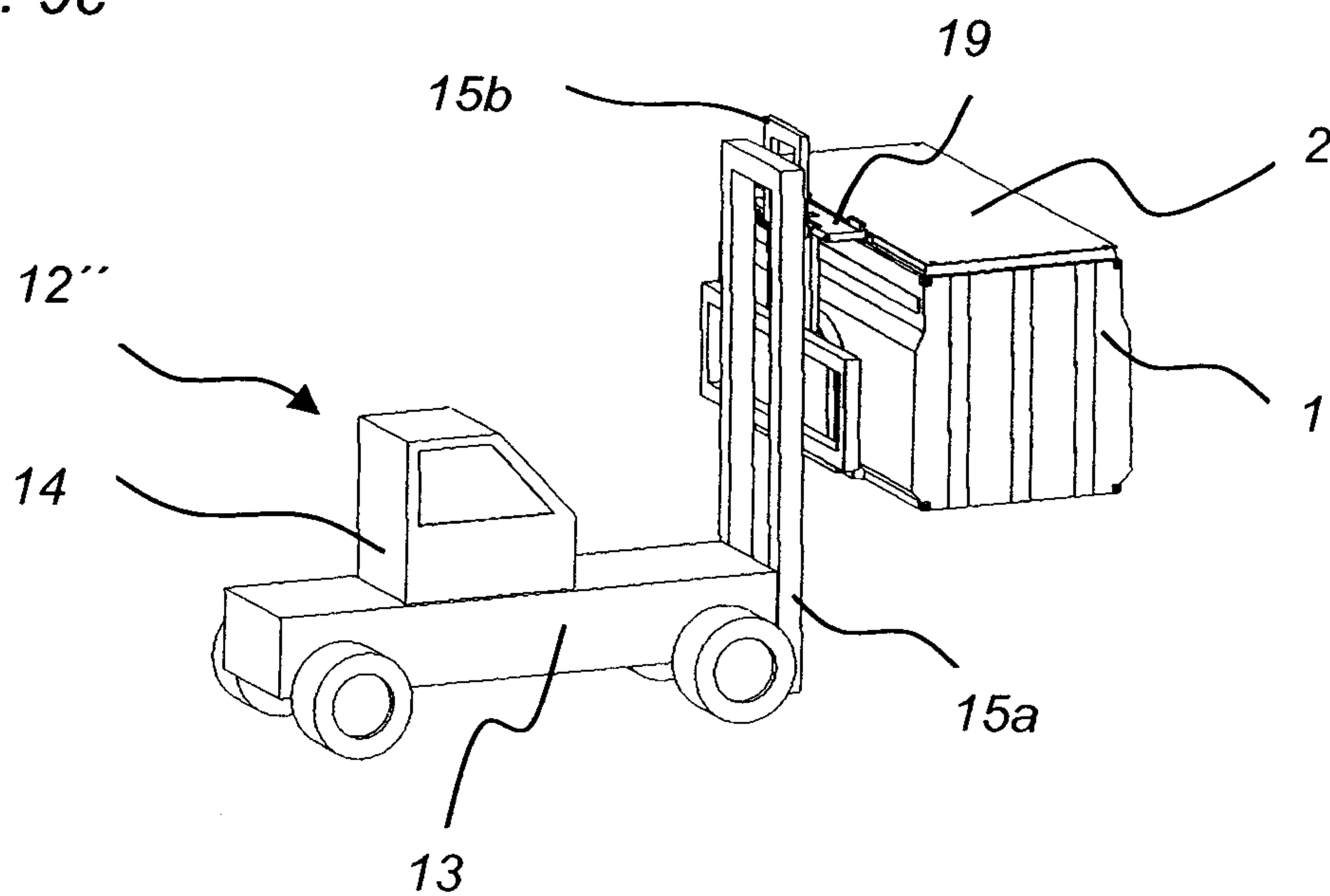


FIG. 9d

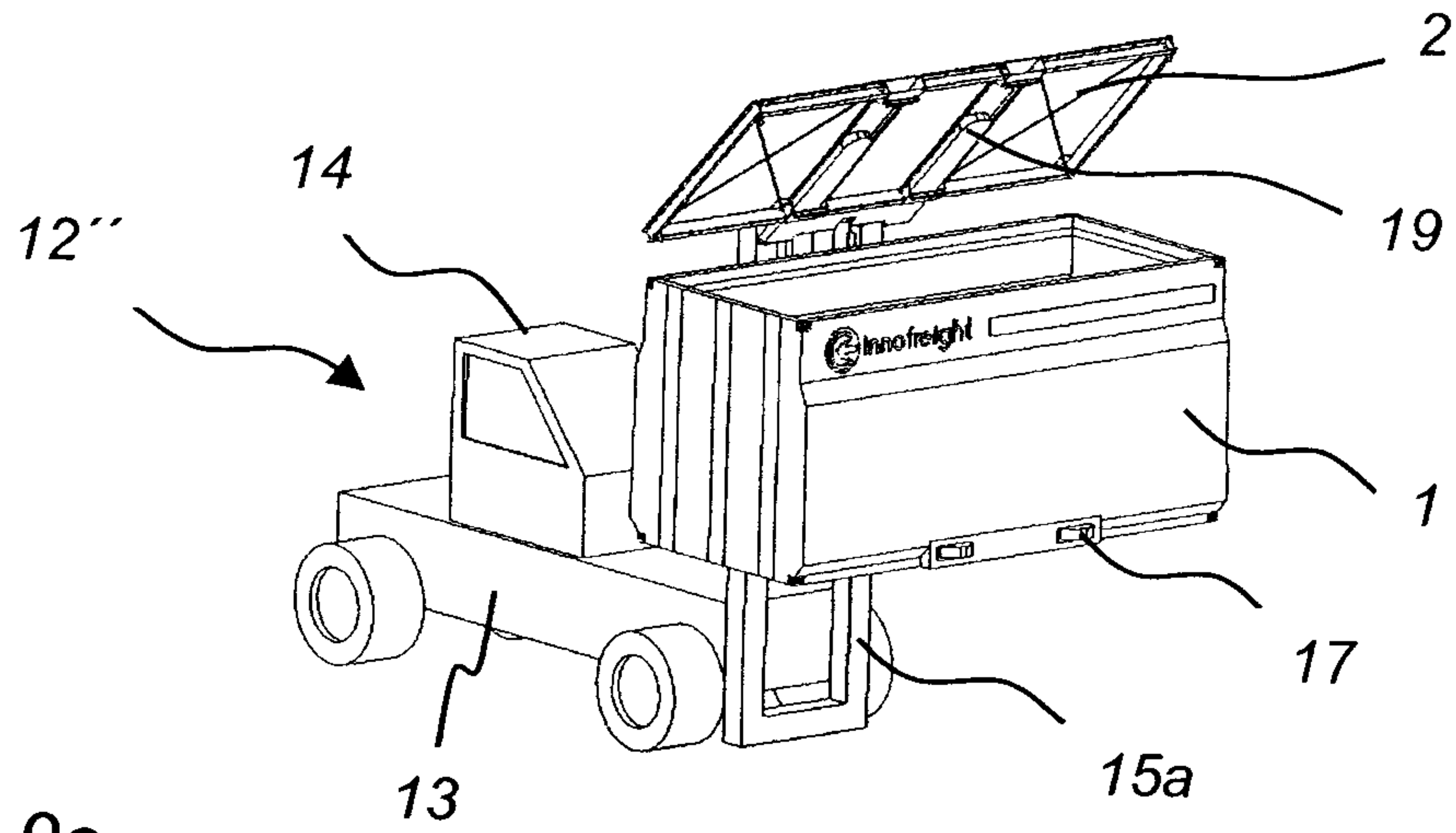


FIG. 9e

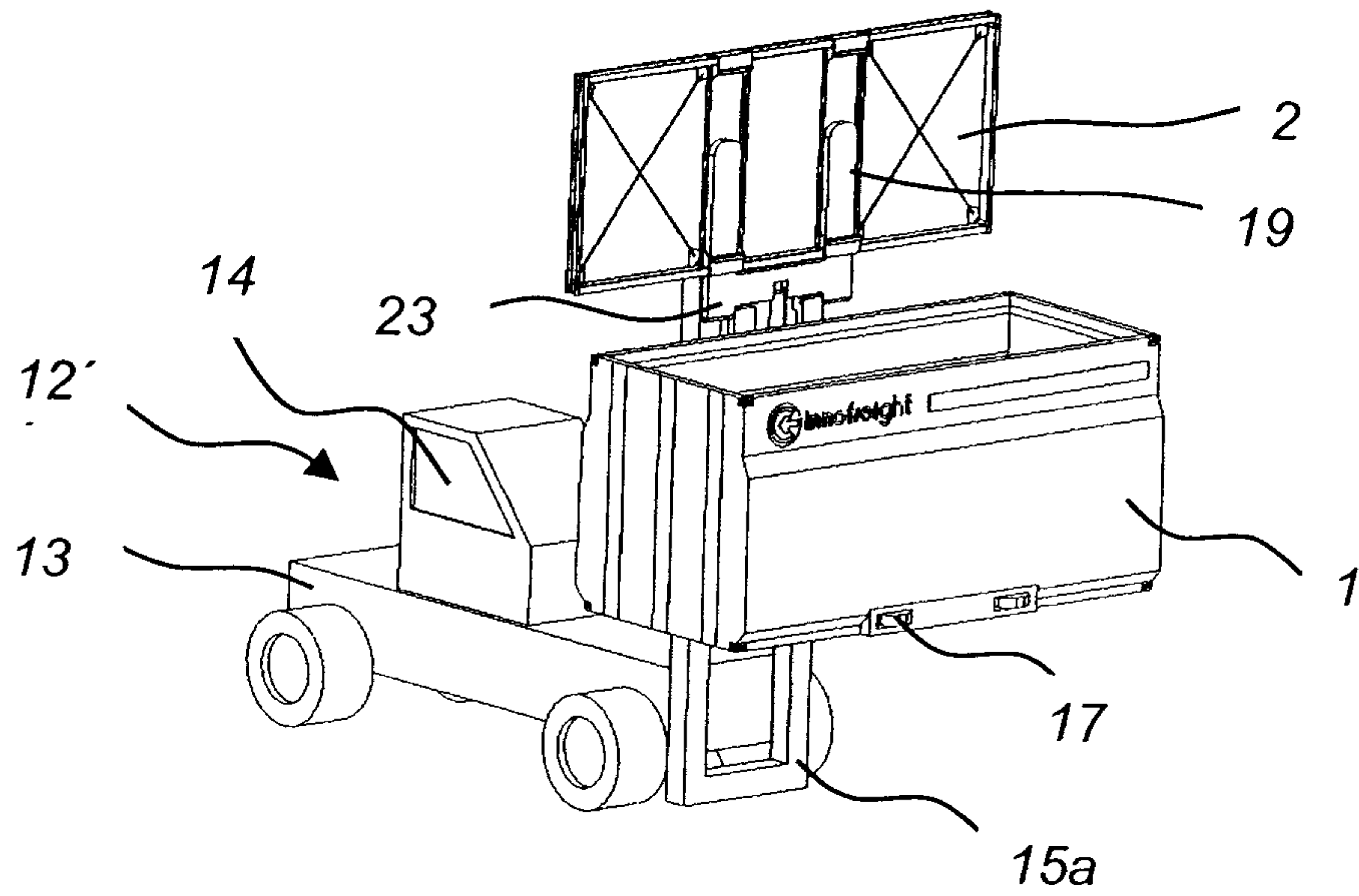


FIG. 9f

