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EP-A1- 0 514 355
EP-A1- 0 659 659
NL-A- 7 805 936
US-A- 5 015 144
US-A1- 2003 202 870

DESCRIPTION

Technical field

[0001] The present invention relates to a feeding arrangement furnished to a compactor, according to the preamble of patent claim 1.

[0002] The present invention also relates to a waste-feeding method using said arrangement according to the preamble of patent claim 9.

Prior art

[0003] The use of top-fed collection containers when emptying waste containers or bins is already known. However, in recent times, problems have arisen when compacting the waste from these containers. Problems particularly arise when the waste contains large cardboard packaging that easily gets jammed in the compacting compartment.

[0004] Solutions such as that in patent publication US 5,015,144 are already known. Said publication describes a waste collection container where a compactor is arranged to move waste from a compacting compartment to a container. The problem with the solution is as described above. Sticky waste collects on the compactor's pendulum device and eventually results in the compactor becoming blocked. Similar solutions are also shown in patent publications CN 104890279, EP 2 524 879, US 2007/0122258 and NL 7805936. Patent publication US 2003/0202870 discloses a refuse collection vehicle comprising feeding arrangement furnished to a compactor, according to the preamble of claim 1, and a feeding method using said feeding arrangement, according to the preamble of claim 9.

Presentation of the problem

[0005] Using the present invention, the problems afflicting known solutions may essentially be avoided. Thus the invention is to provide an easy-to-handle and operationally reliable feeding arrangement.

[0006] This role is fulfilled in the invention by a feeding arrangement according to the invention being given the characteristics stated in patent claim 1. Furthermore, this feeding arrangement is used in accordance with a method that, according to the invention, is given the characteristics stated in patent claim 9. The subsequent, dependent patent claims set out appropriate, further developments and variants of the invention that further improve its functionality.

[0007] With the arrangement and method described in the present invention, a plurality of significant advantages are achieved over the prior art. For example, rapid and safe handling of all forms of waste can be ensured. This makes waste collection more predictable and thus contributes to a streamlining of collection logistics.

[0008] Further advantages and details of the invention are set out more closely in the description below.

Summary of drawing figures

[0009] In the following, the invention is described more closely with reference to the drawings, in which:

Figure 1 shows, from the side, a refuse collection vehicle with a compactor arranged next to a collection container for waste.

Figure 2 schematically shows the function of a compactor that uses prior art technology.

Figure 3 schematically shows the function of a compactor furnished with a feeding arrangement according to the present invention, the feeding arrangement being in its rest position.

Figure 4 shows a compactor, according to figure 3, with the feeding arrangement in the extended position.

Figure 5 shows a compactor, according to figure 3, with the feeding arrangement at the start of an interaction.

Figure 6 shows a compactor, according to figure 3, with the feeding arrangement at the end of an interaction.

Figure 7 shows a compactor, according to figure 3, with the feeding arrangement on the way to its rest position.

Figure 8 shows, in a front view, the feeding arrangement in its rest position.

Figure 9 shows, in a rear view, the feeding arrangement in its extended position.

Figure 10 shows, from the side, an alternative refuse collection vehicle with a compactor arranged in front of a collection container for waste.

Figure 11 shows, from the side, a second alternative refuse collection vehicle with a compactor arranged in front of a collection container for waste.

Figure 12 shows, from the rear, a refuse collection vehicle as per figure 11.

Preferred embodiment

[0010] The above-mentioned figures are not a to-scale depiction of the feeding arrangement. Their sole purpose is to illustrate the preferred embodiments' construction solutions and the embodiments' function. In this connection, the individual design elements that are each shown and labelled with a reference number in the figures correspond to the design solutions presented in the description given below (in which said elements are also cited with a reference number).

[0011] In the following, the present feeding arrangement and its function are described in use with a top-fed refuse collection vehicle. However, this does not limit use of the feeding arrangement to only this embodiment. The feeding arrangement can be used in various waste handling solutions, mobile and stationary alike.

[0012] Thus, figure 1 is a schematic depiction of a refuse collection vehicle 1 comprising a chassis 2 and a driver's cab 3. The figure also shows a collection container 4 for carrying waste from a collection point to a processing plant. To feed the waste into the collection container, the refuse collection vehicle is furnished with a compactor 5 - see figure 2. This compactor has a compacting compartment (6), into which the waste is fed via a feeding aperture 7.

[0013] To feed waste into the collection container 4, the refuse collection vehicle 1 has a crane 8 with which a waste container 9 can be lifted above, and emptied via, the feeding aperture. The waste that drops from said container into the compacting compartment then moves along a track to a bottom part 10 of the compacting compartment.

[0014] The compactor 5 also has a pendulum device 11 that, with the help of one or more operating devices 12, executes a pendulum movement to move the waste from the compacting compartment 6 to the collection container 4. Figure 2 illustrates the pendulum device's movement more closely. Solid lines show the pendulum device swung, with an anticlockwise movement, to its upper position, this simultaneously freeing the compacting compartment's bottom. In a subsequent swinging movement, the pendulum device is moved clockwise to its lower compacting and rest position. At the same time, it moves the dropped waste, via a compacting aperture 13, from the compacting compartment into the collection container (where the waste is stored). This pendulum movement continues until the waste in the compacting compartment has essentially been moved into the container.

[0015] Both the collection container and the compactor are of a conventional design and are thus not described more closely in this context.

[0016] As problems sometimes arise with the waste not dropping as fully and quickly as desired to the bottom 10 of the compacting compartment 6, the present compactor 5 has been

furnished with a special feeding arrangement 14. This is shown more closely in figures 8 and 9. Such a feeding arrangement is advantageously arranged in the compacting compartment so that it is essentially opposite the waste track. The feeding arrangement's design includes a swing arm 15 that is telescopically extendable. This swing arm is arranged so that, in use, it can move back and forth in what is, in use, an essentially vertical plane. In this way, the tip 16 of the swing arm can also adopt a rotational movement in the same vertical plane. To effect this, the swing arm is turned around at least one shaft 17 that, in use, is essentially horizontal and is arranged perpendicularly to the working direction of the pendulum device 11 of the compactor 5. See figures 3 - 7.

[0017] By allowing the tip 16 of the swing arm 15 to be displaceable relative to said shaft 17, the tip can be manoeuvred towards the waste track. Here, the tip can be further manoeuvred in a movement back towards the shaft 17 while, at the same time, the tip essentially follows the track. Through this movement, the tip will interact with at least a part of the waste that is still on the track and move it towards the bottom 10 of the compacting compartment 6. This movement along the track is advantageously executed while the pendulum device 11 is in its upper position. To further improve the interaction between the waste and the tip, the latter can be furnished with one or more scraper or shovel devices 18 that can be brought into contact with the waste track - cf. figures 8 and 9.

[0018] Figures 8 and 9 show an advantageous embodiment of the feeding arrangement 14. Its swing arm is (e.g. as per figure 3) arranged, via a body 20, on a partition 19 that separates the collection container 4 and the compactor 5 from each other. A primary arm 21 is arranged to the body so that, via the shaft 17, it can be turned in relation to this body. A secondary arm 22 is mounted telescopically displaceable to the primary arm, the secondary arm's movement being regulated by an operating device built into the swing arm. In figure 8, the swing arm's scraper or shovel devices 18 can be seen on the front of the secondary arm. Here, the tip 16 of the swing arm is furnished with a scraping device that is wider than said tip. The turning of the primary arm is regulated by a control device 23, e.g. a hydraulic or pneumatic cylinder mounted between the body and the primary arm (well-protected at the primary arm's base). To stabilise the swing arm's movements and prevent waste jamming or collecting between the partition and the swing arm, the swing arm is advantageously furnished with an angle stay 24 mounted between the body and the primary arm.

[0019] The present compactor 5, with a feeding arrangement 14 mounted therein, works in the following way (cf. figures 3 - 7). The feeding arrangement is arranged on a partition 19 that separates the collection container 4 and the compactor 5. Said arrangement is thus in the compacting compartment 6, essentially opposite the track for the waste that drops into the compacting compartment. The feeding arrangement's swing arm can move back and forth in a plane that, in use, is essentially vertical. Thereby, the tip 16 of the swing arm can also adopt a rotational movement in the same vertical plane, said rotation being executed around an essentially horizontal axis arranged perpendicularly to the working direction of the pendulum device.

[0020] When waste is emptied from a container 9 into the compacting compartment 6, it drops towards the bottom 10 - see figure 3. To free the compacting aperture 13, the pendulum device 11 is manoeuvred anticlockwise to its upper position. From its upper position, the pendulum device is swung clockwise towards the compacting aperture so as to compact the waste and move it into the collection container 4 - see figures 4 to 7.

[0021] While the pendulum device 11 is moved to its upper position, the feeding arrangement's secondary arm is displaced to its outermost position and the swing arm takes up its furthest position with its tip 16 maximally extended away from the shaft 17 - see figure 4. Simultaneously with the pendulum device being moved to its uppermost position, the swing arm is manoeuvred rotationally around the shaft 17 to take up, while the pendulum device is reaching its uppermost position, a position next to the track - see figure 5. While the pendulum device is in this uppermost position, the secondary arm 22 drags. This results in the tip 16 of the swing arm, and any scraper or shovel devices 18, being displaced along the track to here interact with at least a part of the waste that is still on the track and move it towards the bottom 10 of the compacting compartment 6 - see figure 6. When the secondary arm reaches its bottom position, the swing arm is turned free from the track (see figure 7) to return to its rest position (as per figure 3). The pendulum device can now execute its next compaction cycle. The interaction between the feeding arrangement and the pendulum device continues until the waste has essentially been moved into the collection container.

[0022] The description above and the figures cited therein are solely intended to give an overview of the present solution for the design of a feeding arrangement. Thus, the solution is not limited solely to the embodiment described above or in the attached patent claims. Indeed, within the idea described in the attached patent claims, several variations or alternative embodiments are possible.

[0023] Thus, the refuse collection vehicle 1 could, for example, be furnished with a compactor 5 located between the driver's cab 3 and the collection container (as per figure 10). Like the embodiment that is described above and in figures 3 - 7, this compactor has a compacting compartment 6 into which the waste is fed via a feeding aperture 7.

[0024] To feed waste into the collection container 4, this alternative refuse collection vehicle 1 has a lifting fork 25 with which a waste container 9 can be lifted above, and emptied via, the feeding aperture 7. The waste that drops from said container into the compacting compartment then moves along a track to a bottom part 10 of the compacting compartment.

[0025] In a second alternative embodiment the refuse collection vehicle 1 is furnished with a compactor 5 between the driver's cab 3 and the collection container (as per figure 11). Like the embodiments that are described above and in figures 3 - 7, this compactor has a compacting compartment 6 into which, via a feeding aperture 7, the waste is fed (as per figure 12).

[0026] To feed waste into the collection container 4, this alternative refuse collection vehicle 1 has a lifting arm 26 with which a waste container 9 can be lifted above, and emptied via, the

feeding aperture. The waste that drops from said container into the compacting compartment then moves along a track to a bottom part 10 of the compacting compartment.

[0027] Like the preferred embodiment described above, the compactor 5 in these alternative solutions also has a pendulum device 11 that, with the help of one or more operating devices 12, executes a pendulum movement to move the waste from the compacting compartment 6 to the collection container 4. These solutions are also furnished with the special feeding arrangement 14. This latter is shown more closely in figures 8 and 9 and its function is described with references to figures 3 - 7.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US5015144A **[0004]**
- CN104890279 **[0004]**
- EP2524879A **[0004]**
- US20070122258A **[0004]**
- NL7805936 **[0004]**
- US20030202870A **[0004]**

Patentkrav

1. Tilførselsanordning (14) i kombination med en komprimator (5) beregnet til at blive anbragt ved siden af en opsamlingsbeholder (4) til affald, hvor nævnte komprimator (5) har et komprimeringsrum (6) med en tilførselsåbning (7) via hvilken det er indrettet til affaldet fra en beholder (9) som skal tømmes, hvorved affaldet bevæger sig langs et spor mod en bund (10) af komprimeringsrummet (6), og

en pendulindretning (11) er indrettet til at bevæge affaldet videre fra komprimeringsrummet (6), via en komprimeringsåbning (13), til opsamlingsbeholderen (4) til at lagre affaldet,

kendetegnet ved, at

tilførselsanordningen (14) er indrettet i alt væsentligt modstående til sporet i komprimeringsrummet (6), hvorved

tilførselsanordningen er forsynet med en svingarm (15) der kan drejes tilbage og frem omkring en aksel (17) der, i brug, er i alt væsentligt horisontal og er indrettet vinkelret på arbejdsretningen af pendulindretningen (11), og

svingarmen (15) er forsynet med en spids (16) forskydelig i forhold til nævnte aksel (17), hvorved

spidsen (16) er indrettet til at indtage en rotationsbevægelse i et vertikalt plan således, at nævnte spids, i sin bevægelse tilbage mod akslen (17), vil i alt væsentligt følge affaldssporet.

2. Tilførselsanordning (14) ifølge krav 1, **kendetegnet ved, at** svingarmen (15) er indrettet på en skillevæg (19) der separerer opsamlingsbeholderen (4) og komprimatoren (5) fra hinanden.

3. Tilførselsanordning (14) ifølge krav 1 eller 2, **kendetegnet ved, at** svingarmen (15) er teleskopisk forlængelig.

4. Tilførselsanordning (14) ifølge krav 3, **kendetegnet ved, at** svingarmen (15) omfatter en primær arm (21) drejeligt indrettet på et legeme (20) via akslen (17), og, en sekundær arm (22) teleskopisk forskydelig i forhold til den primære arm.

5. Tilførselsanordning (14) ifølge krav 4, **kendetegnet ved, at** bevægelser af den sekundære arm (22) er indrettet til at blive reguleret af en styreindretning indbygget i svingarmen (15).

6. Tilførselsanordning (14) ifølge krav 4 eller 5, **kendetegnet ved, at** drejningen af den primære arm (21) er indrettet til at blive reguleret af en styreindretning (23) monteret mellem legemet (20) og den primære arm (21).

7. Tilførselsanordning (14) ifølge krav 4, 5 eller 6, **kendetegnet ved, at** svingarmen (15) har en vinkelstøtte (24) monteret mellem legemet (20) og den primære arm (21).

8. Tilførselsanordning (14) ifølge et hvilket som helst af de foregående krav, **kendetegnet ved, at** svingarmen (15) har skrabeindretninger (18) der er til at blive bragt i kontakt med affaldssporet.

9. Tilførselsfremgangsmåde der anvender en tilførselsanordning (14) til at tilføre affald til en komprimator (5) indrettet ved siden en opsamlingsbeholder (4) til affald, hvorved

affaldet fra en affaldsbeholder (9) tømmes, via en tilførselsåbning (7), i et komprimeringsrum (6) af komprimatoren, hvorefter

nævnte affald bevæges langs et spor mod en bund (10) af komprimeringsrummet (6), og

en pendulindretning (11) bevæger affaldet videre fra komprimeringsrummet (6), via en komprimeringsåbning (13), til opsamlingsbeholderen (4) for at blive lagret, **kendetegnet ved, at**

tilførselsanordningen (14) er indrettet i alt væsentligt modstående til sporet i komprimeringsrummet (6), hvorved

nævnte tilførselsanordning er forsynet med en svingarm (15) og en svingarmsspids (16) deraf er indrettet under brug til at være drejbar omkring en i alt væsentligt horisontal aksel (17) indrettet vinkelret på arbejdsretningen af pendulindretningen (11), nævnte svingarmsspids (16) således at svingarmsspidsen (16) er indrettet til at være forskydelig i forhold nævnte aksel, hvorved

spidsen (16) er lavet til at rotere i et vertikalt plan således at nævnte spids, i sin bevægelse tilbage mod akslen (17), i alt væsentligt følger affaldssporet.

10. Fremgangsmåde ifølge krav 9, **kendetegnet ved, at** svingarmen (15), under sin rotation, justeres teleskopisk.

DRAWINGS

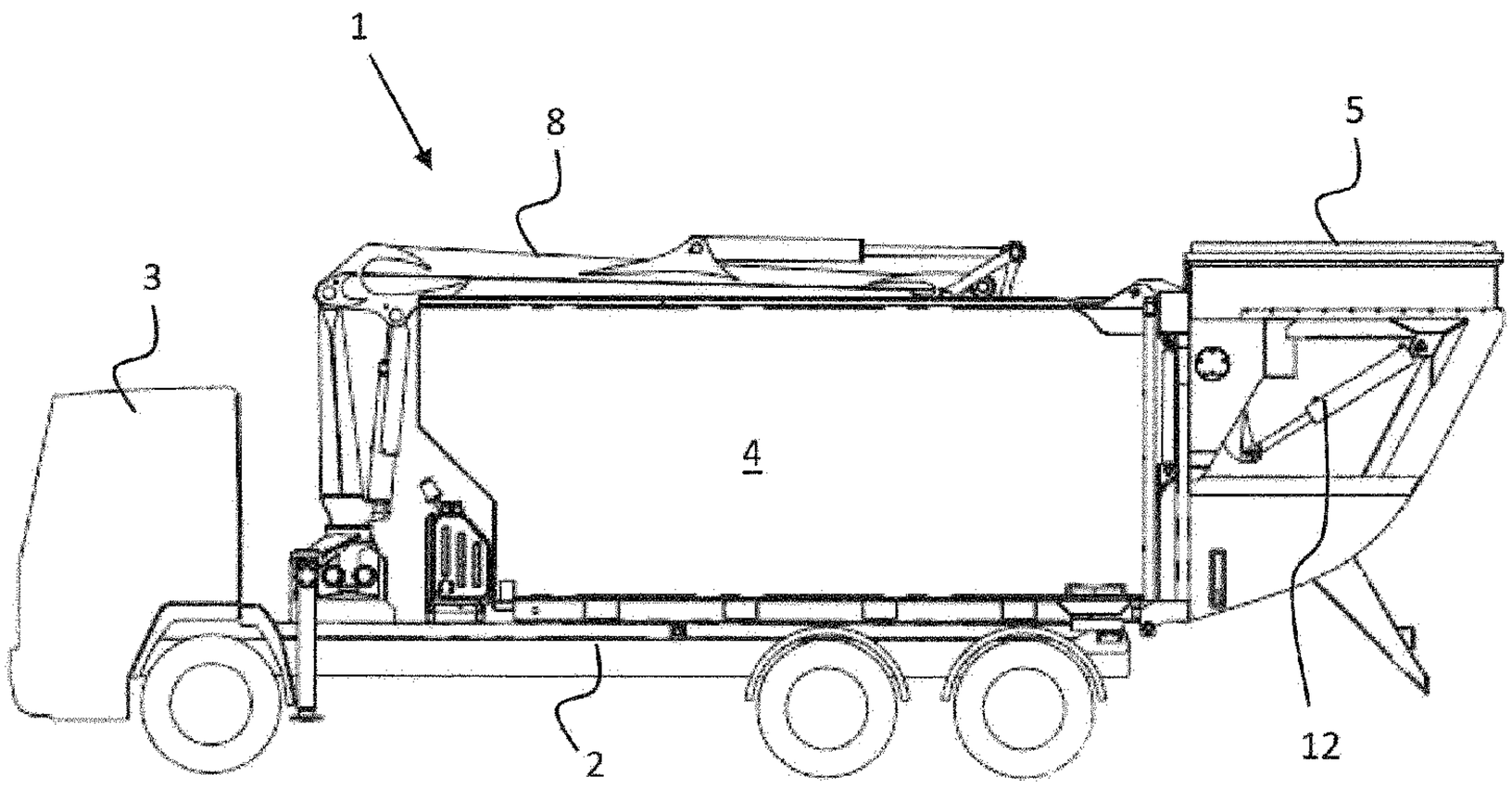


FIG. 1

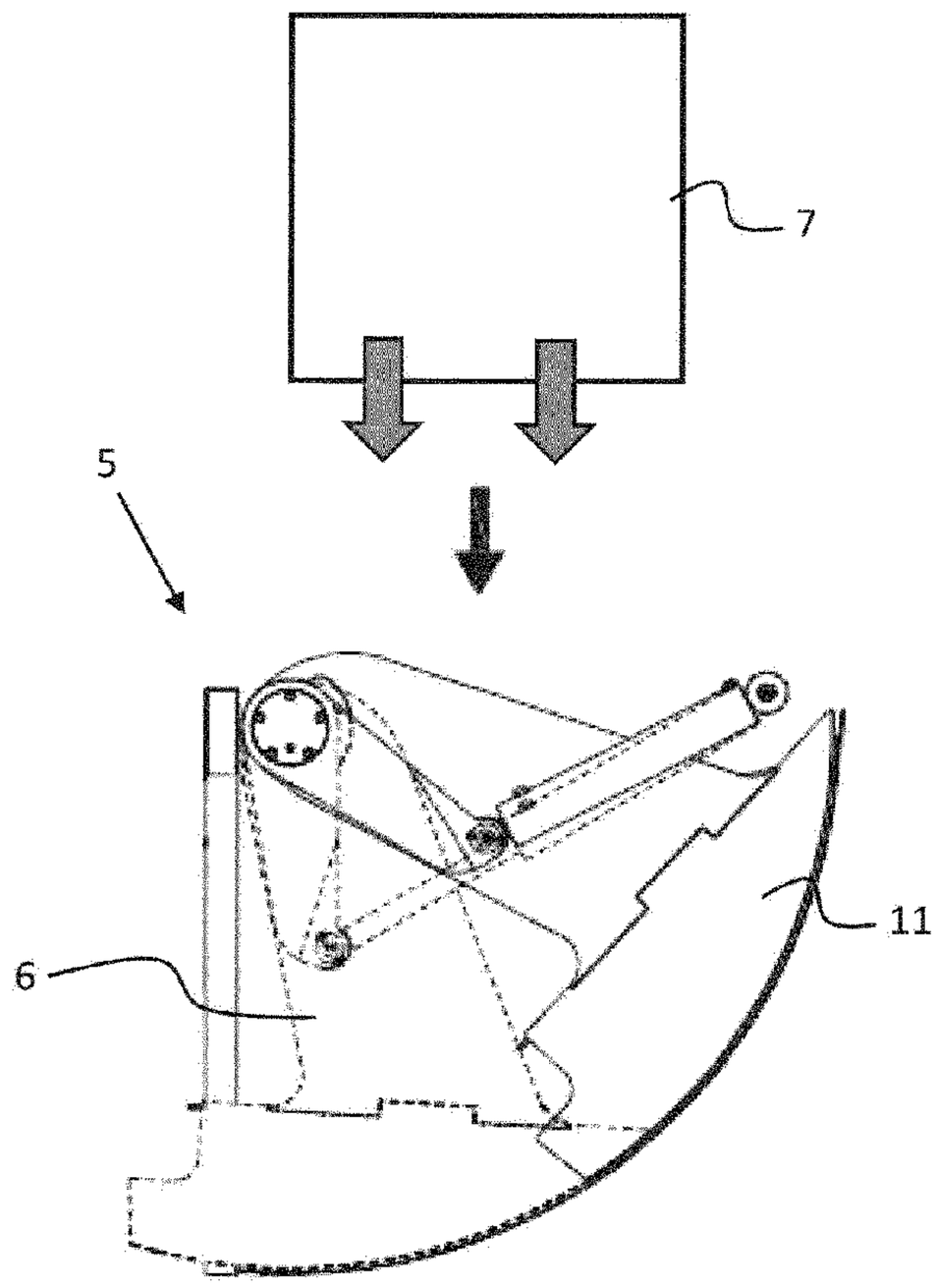


FIG. 2

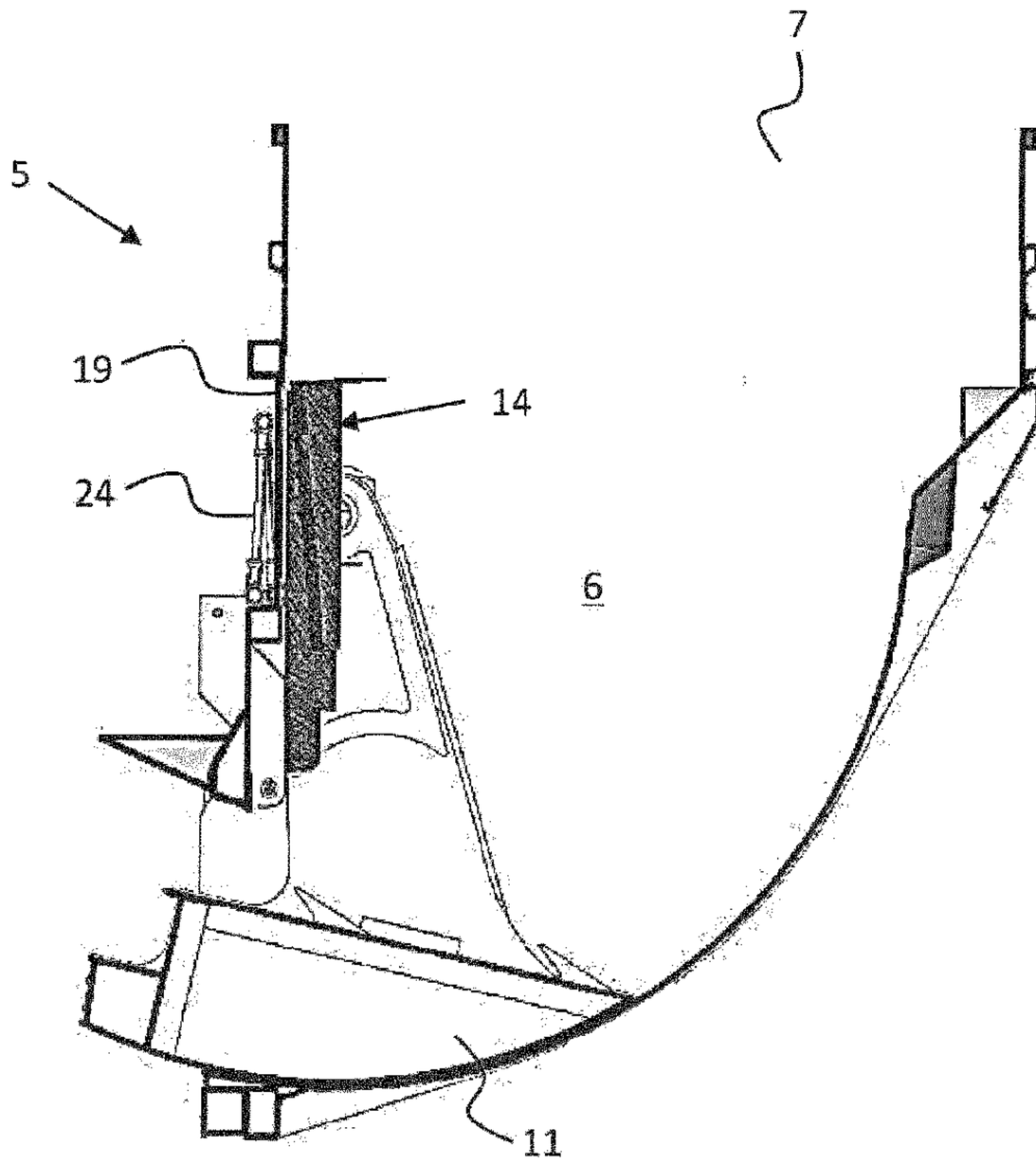


FIG. 3

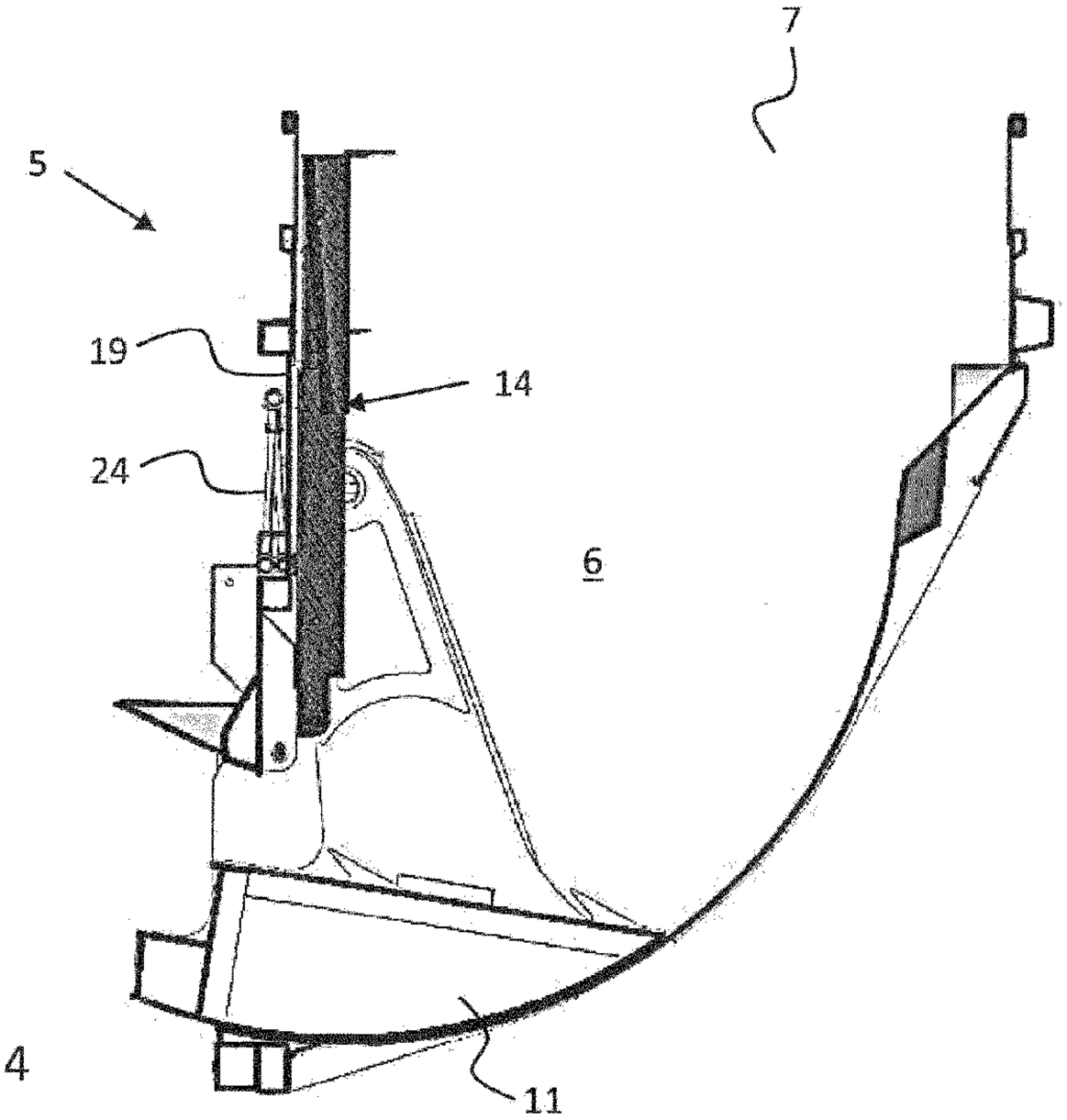


FIG. 4

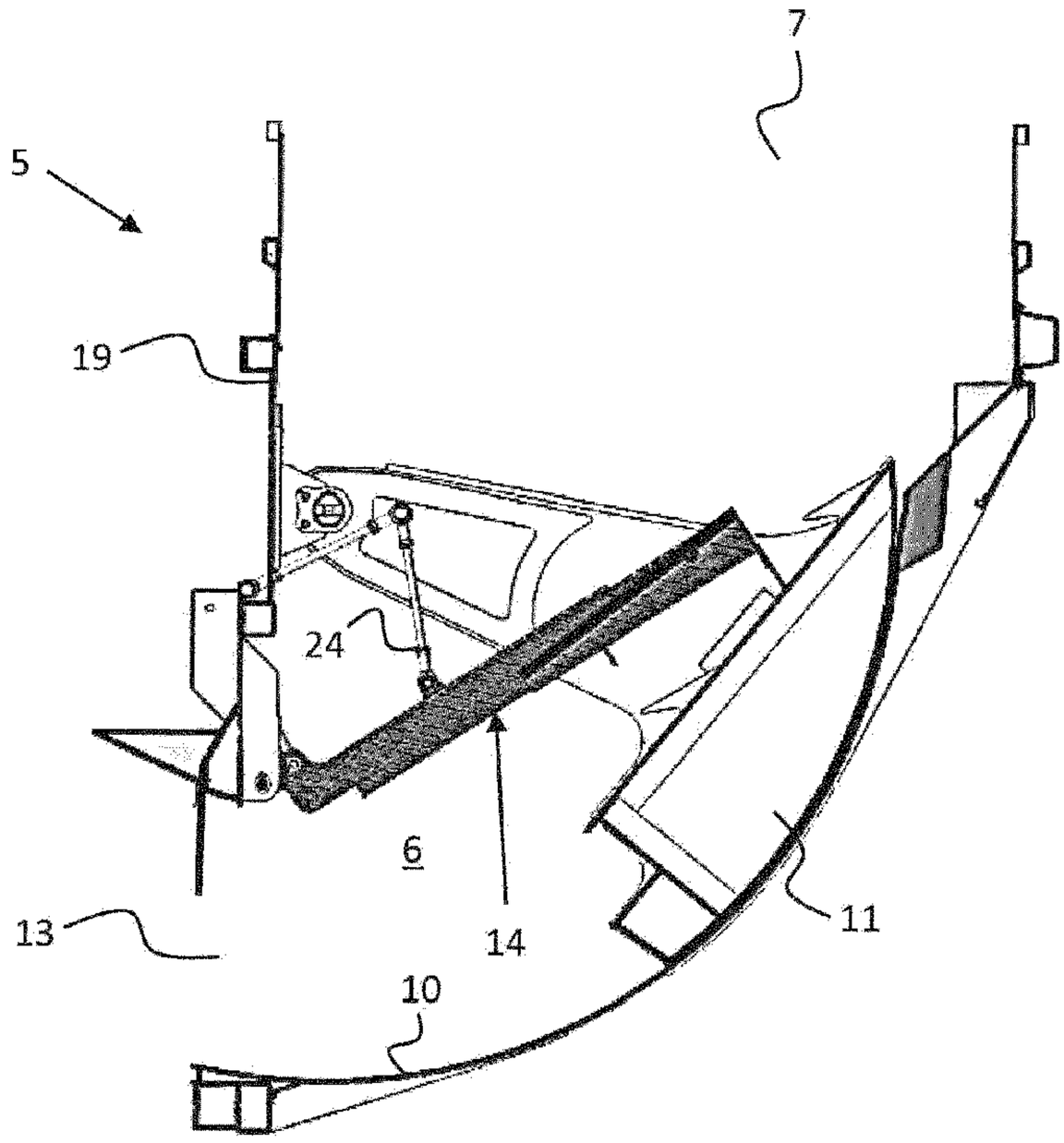


FIG. 5

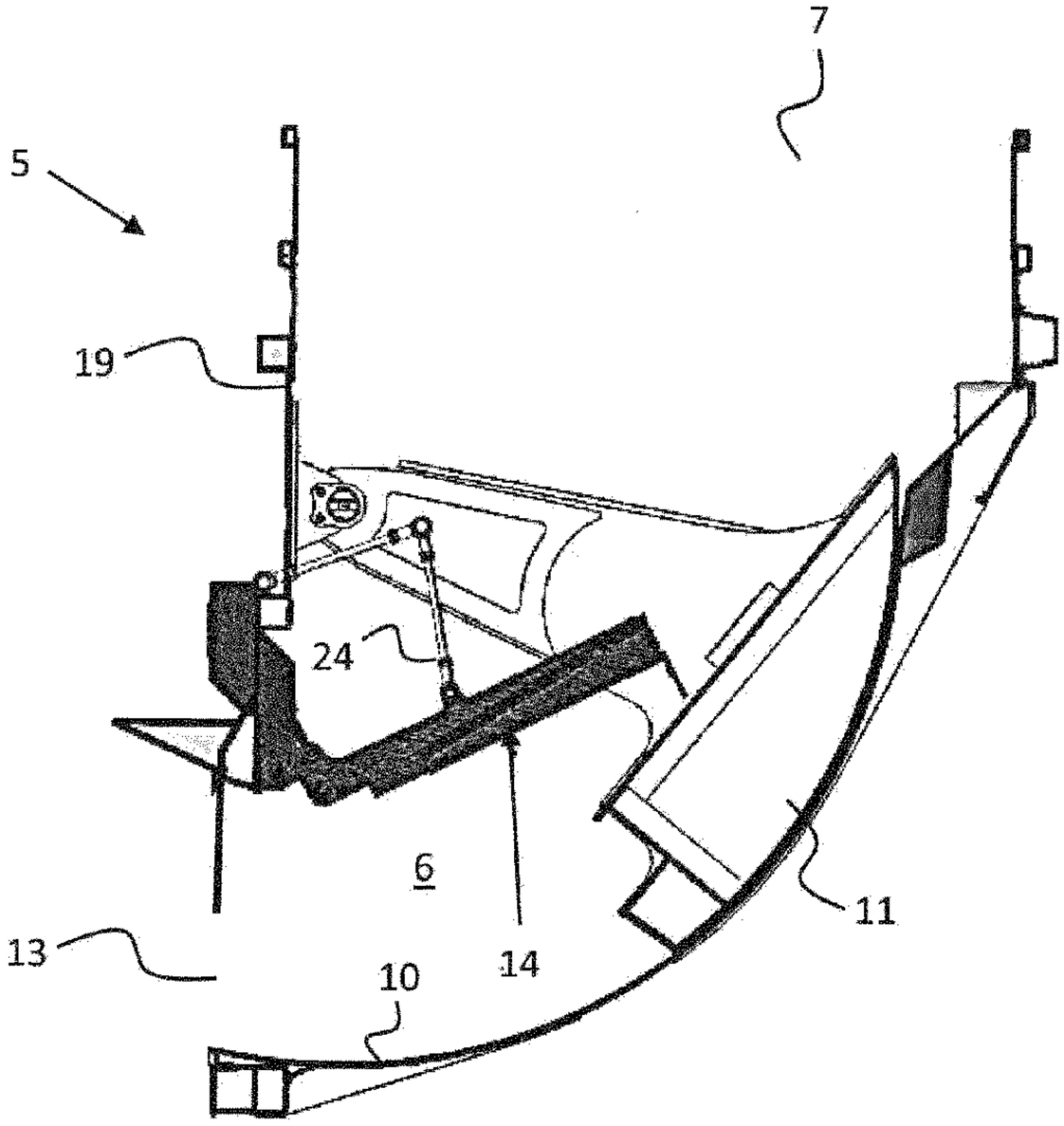


FIG. 6

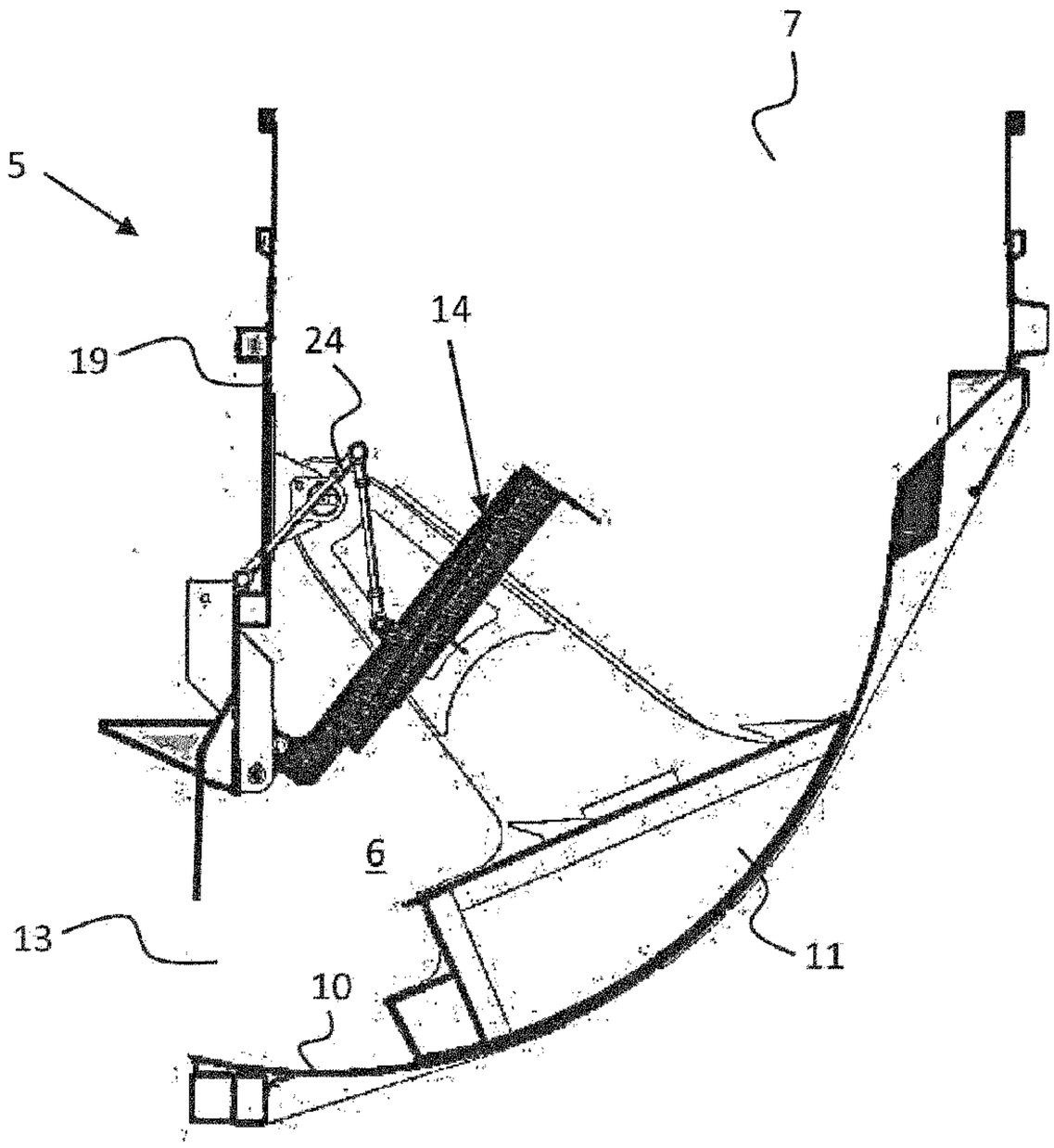


FIG. 7

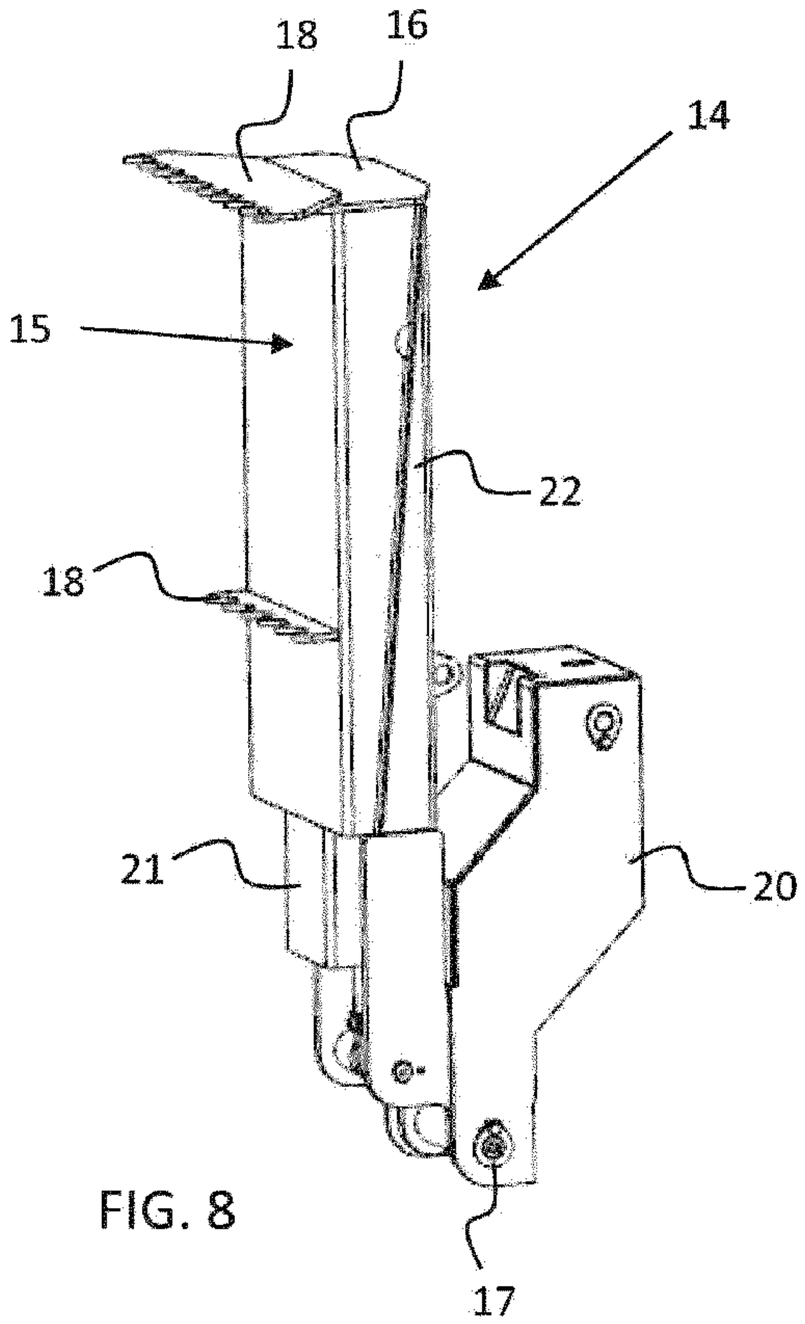


FIG. 8

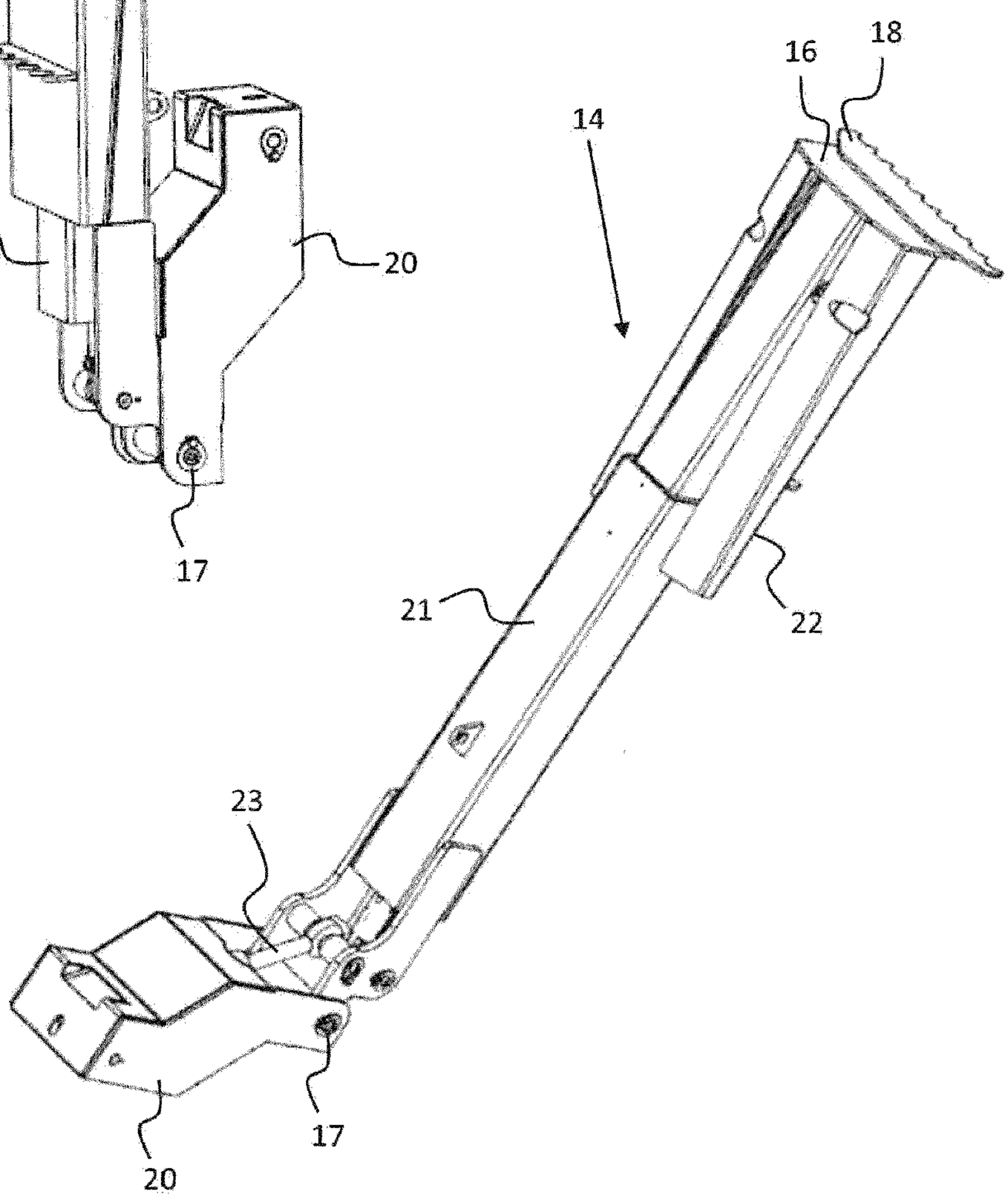


FIG. 9

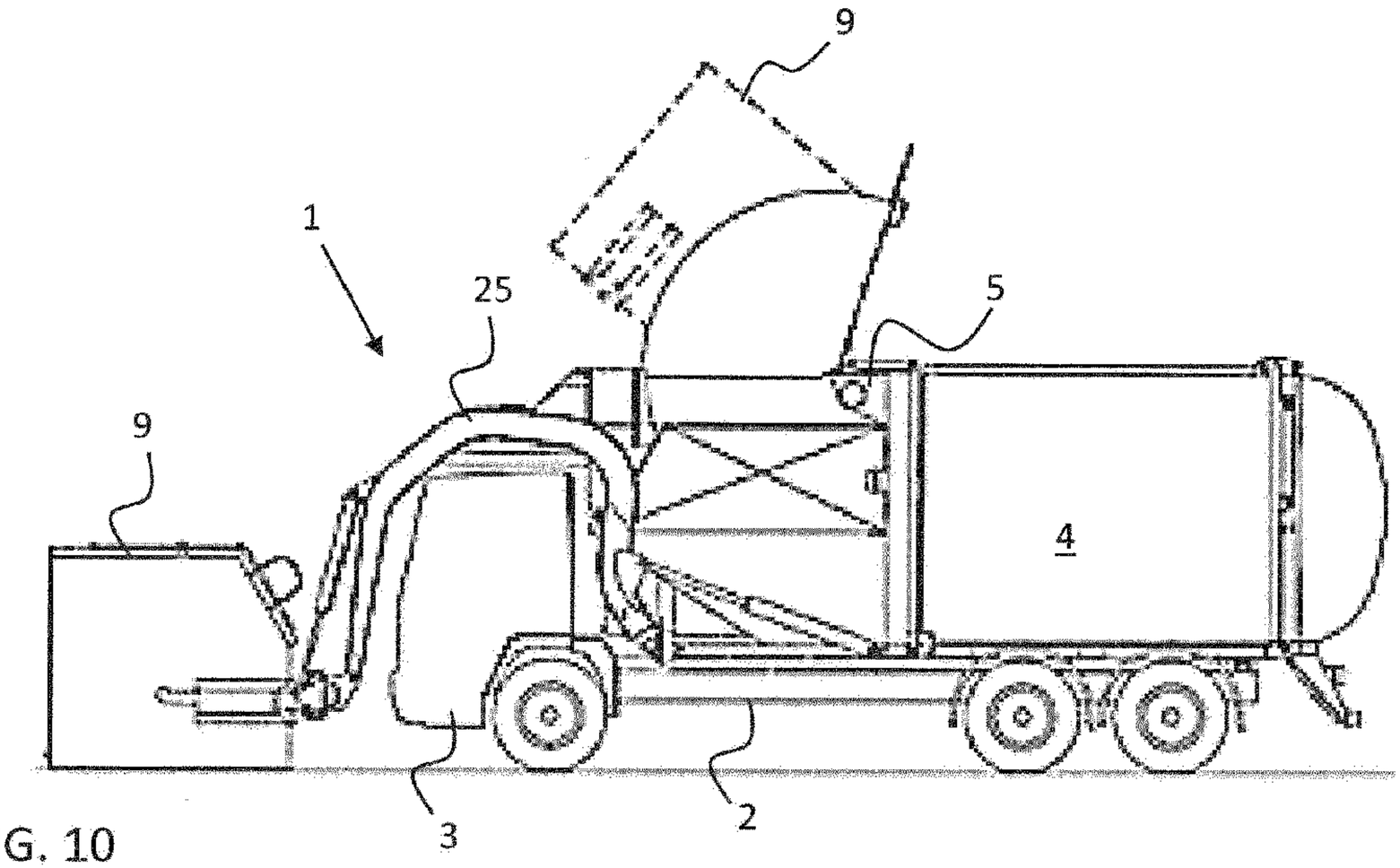


FIG. 10

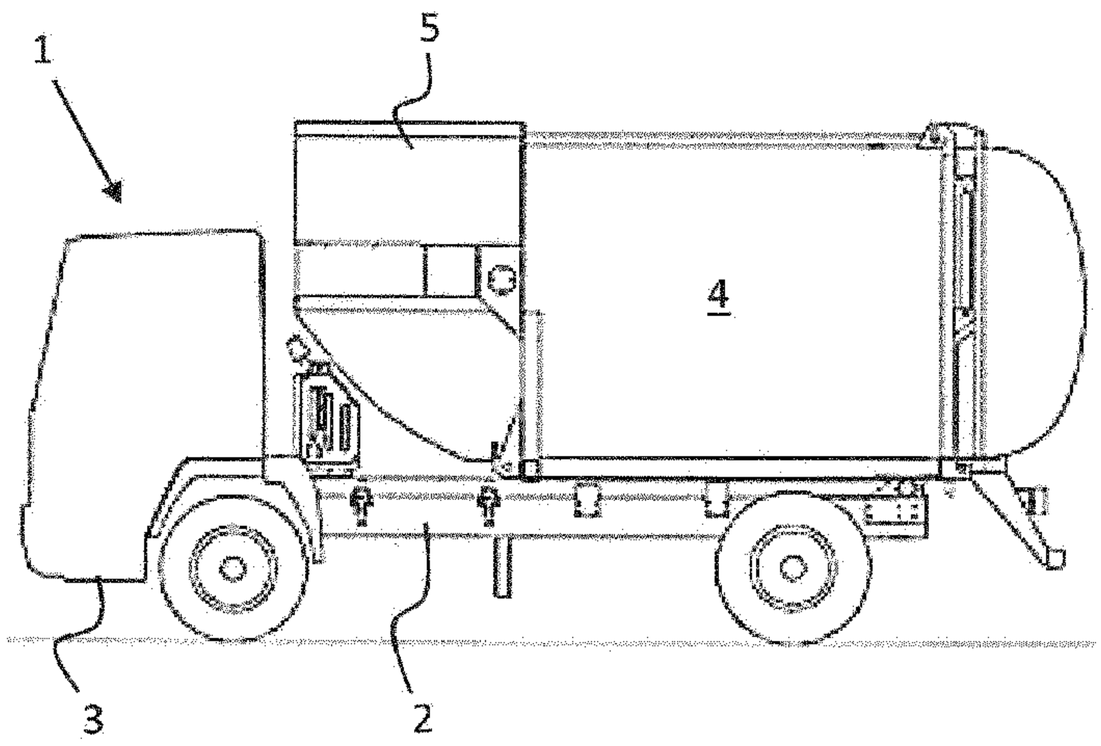


FIG. 11

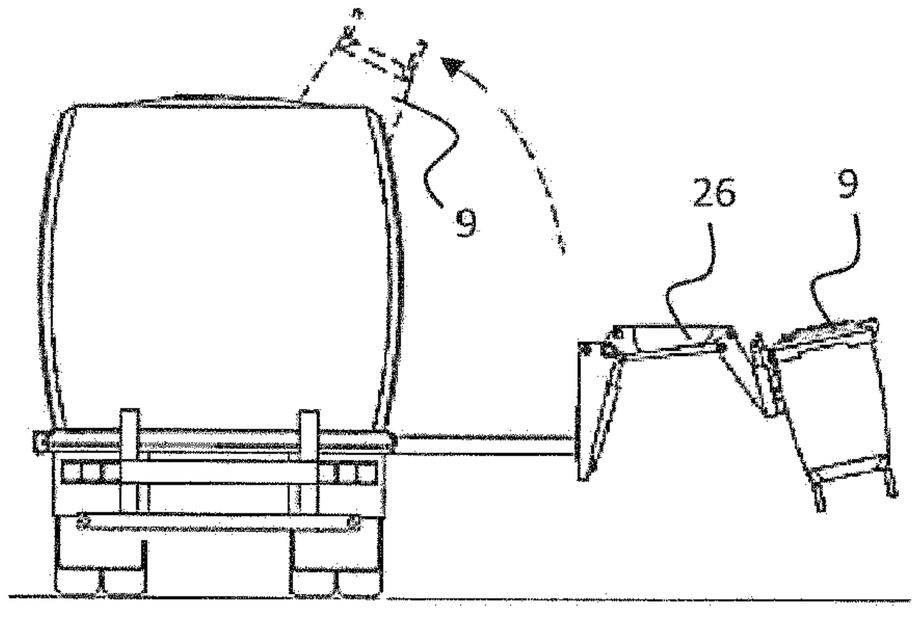


FIG.12