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(71) Applicant: **ROBERT BOSCH GMBH**
**70442 Stuttgart (DE)**

(72) Inventors:
- **Dockner, Daniel**
  **70327, Stuttgart (DE)**
- **Beadman, Robert**
  **Stowmarket, Suffolk, IP14 2AU (GB)**
- **Simpson, Peter**
  **Lower Cambourne, Cambridgeshire, CB3 6EX (GB)**
- **Paine, Graham**
  **Lower Cambourne, Cambridgeshire, CB3 6EX (GB)**
- **Aglassinger, Hans-Peter**
  **73732, Esslingen (DE)**
- **Fowles, Andrew**
  **Essex, CO4 3FG (GB)**
- **Heywood, Peter**
  **Norton, IP31 3LE (GB)**
- **Kressin, Lennard**
  **Stowmarket, Suffolk, IP14 2AU (GB)**

## (54) Vegetation shredder

(57) The present invention relates to shredders of the type used for shredding branches and other vegetation, typically garden waste. We describe a vegetation shredder comprising a shredding cutter; a cutter housing (10) for said shredder cutter; the cutter housing (10) having an inlet (14) and an outlet (15); a shredder inlet assembly (20) and a frame (11, 12) supporting the cutter housing. The present invention is **characterised in that** the shredder inlet assembly (20) is pivotally mounted upon the cutter housing (10).

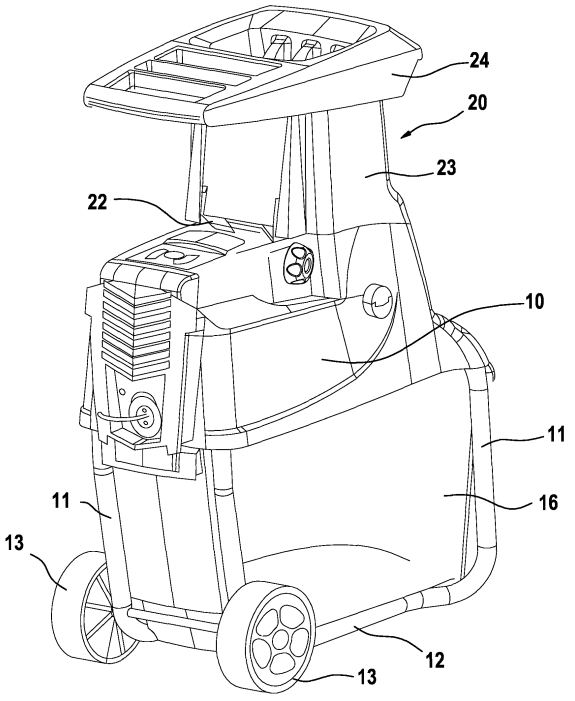


Fig. 1

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## Description

**[0001]** The present invention relates to shredders of the type used for shredding branches and other vegetation, typically garden waste.

**[0002]** Garden shredders are typically bulky devices. Their overall height is determined by the space required underneath the application for collection of the shredded material; the dimensions and location of the outlet chute; the volume of the cutter and the cutting cavity; and the length of the inlet chute and hopper, which must be of a length sufficient to prevent contact between a user and the cutter. Most shredders occupy the same three-dimensional space when being stored as they do in use. This means that providing adequate storage can be difficult and this detracts from their overall utility from the viewpoint of the end user.

**[0003]** Husqvarna manufactures a shredder under the trade mark Flymo Pac-a-Shred. This consists of a shredder apparatus supported above the ground upon a frame. The shredder is pivotally mounted on the frame such that it can be pivoted into the space occupied by the frame, in the same manner as an old-fashioned sewing machine mounted in a sewing table would have been. The shredder also includes a demountable collection box which runs under the frame like a drawer. The shredder apparatus can pivot into the collection box for storage. This device suffers from the disadvantage that pivoting of the heavy apparatus requires considerable effort, although gas struts are provided to ease the movement.

**[0004]** Accordingly, there is a need to provide an alternative solution to overcome the problem of the bulk of vegetation shredders.

**[0005]** In its broadest sense, the present invention provides a vegetation shredder comprising a shredder cutter unit; a cutter housing for said shredder cutter unit; the cutter housing having an inlet and an outlet; a shredder inlet assembly and a frame supporting the cutter housing in an elevated configuration and defining a space thereunder. The present invention is characterised in that the shredder inlet assembly is detachably mounted upon the cutter housing.

**[0006]** Preferably, the vegetation further comprises a collection bin mountable in the space under the cutter housing.

**[0007]** Preferably, the vegetation shredder further comprises a movable safety flap adapted to prevent inadvertent access to exposed cutters when the shredder inlet assembly is detached from the cutter housing. More preferably, the flap is biased into a closed position, suitably by means of a spring bias.

**[0008]** Preferably, the vegetation shredder further comprises an electrical interlock to prevent operation when the shredder inlet assembly is detached from the cutter housing.

**[0009]** Preferably, the interlock comprises an engagement element on the shredder inlet assembly wherein the engagement element is adapted to be engagable by a movable locking plate provided on the cutter housing; wherein the locking plate includes a locking plate body adapted to engage an actuation member of an electrical rocker switch. More preferably, the locking plate is moveable between a non-locking position and a locking position, by means of being mounted on a threaded rod rotatable by means of an operator control, enabling electrical operation of the device when in the locking position.

**[0010]** Preferably, the interlock comprises or further comprises a magnetic interlock arrangement comprising at least one magnet provided in or on shredder inlet assembly and a correspondingly located magnetic sensor, preferably a reed switch, mounted within the cutter housing.

**[0011]** Preferably, the shredder inlet assembly comprises an elongate shredder inlet chute and a shredder inlet hopper.

**[0012]** Preferably, the shredder inlet assembly is locatable for storage in the collection bin. More preferably, the shredder inlet assembly is locatable into the collection bin in the space below the cutter housing and is wholly enclosed thereby, when the shredder is not in use.

**[0013]** Preferably, the frame includes runners upon which the collection bin is adapted, in use, to sit and to be supported thereby.

**[0014]** Preferably, the collection bin has a lower edge and sides formed with recessed portions adapted to engage, in use, the runners.

**[0015]** Preferably, the collection bin is adapted to be invertable over the cutter housing to provide a cover thereto when the vegetation cutter is not in use.

**[0016]** The above and other aspects of the present invention will now be described in greater detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an embodiment of a shredder in accordance with the present invention, in an operative configuration;

Figure 2 is a perspective view of the embodiment of Figure 1 in a first intermediate configuration;

Figure 3 is a perspective view of the embodiment of Figure 1 in a second intermediate configuration;

Figure 4 is a perspective view of the embodiment of Figure 1 in a third intermediate configuration;

Figure 5 is a perspective view of the embodiment of Figure 1 in a first stowed configuration;

Figure 6 is a perspective view of the embodiment of Figure 1 in a second stowed configuration;

Figure 7 is a detailed partial view of the shredder inlet assembly and cutter housing interlock ar-

rangement in an inoperative configuration; and

Figure 8 is a detailed partial view of the interlock arrangement of Figure 7 in an operative configuration.

**[0017]** The figures show an embodiment of a shredder in accordance with the present invention. The shredder includes a shredder cutter housing 10 having a cutter assembly including a cutter element (obscured), suitably of conventional construction. The cutter housing 10 is supported by legs 11 which, together with horizontal frame elements 12, form a frame upon which a pair of wheels 13 are also carried for ease of manoeuvrability.

**[0018]** Cutter housing 10 includes an inlet 14 (Figures 2 and 3) and an outlet 15. The shredder further includes a collection box or bin 16 for receipt, in use, of shredded vegetation.

**[0019]** The shredder further includes a shredder inlet assembly 20 detachably mounted upon cutter housing 10 by means of engagement lugs 21 and secured in place against the cutter housing by a catch 22, preferably including an interlock assembly. Shredder inlet assembly 20 comprises an elongate inlet chute 23 and an inlet hopper 24. The inlet chute 23 acts to space hopper 24 from the cutter assembly to prevent user access to the cutter element.

**[0020]** When the product is not in use, the shredder inlet assembly can be detached from the housing and located for storage in the collection box which is then placed in its usual position underneath the product. This action is shown sequentially in Figures 2 to 5. When the inlet assembly is removed, spring-biased movable safety flap 25 automatically positions itself to protect the user from inadvertent access to the cutter, which would otherwise be exposed near the top of the machine. This is preferably achieved by means of a pivoting action. When replacing the inlet assembly the safety flap is held open while the locations 21 are re-engaged and the assembly swung back into its operative position. The safety flap is then held open by the inlet assembly.

**[0021]** As shown in Figure 6, alternatively to storing collection bin 16 underneath the product, collection bin 16 can be placed over the top of the cutter housing 10 with the shredder inlet assembly 20 removed. This arrangement provides a cover to the apparatus to prevent ingress of stray matter into the cutter cavity during storage.

**[0022]** The inlet assembly is also suitably fitted with interlocks to prevent operation of the product without it correctly in place. Such interlocks should not rely on spring actions but be directly operated by positive mechanical action. In preferred embodiments, this is achieved by means of a moveable element which simultaneously locks the inlet assembly in place and directly actuates an electrical rocker switch. Figures 7 and 8 illustrate one suitable embodiment. Catch 22 comprises an engagement element in the form of a projection 30 on shredder inlet assembly 20, projection 30 being adapted to be engaged by a locking plate 31 provided on the cutter housing 10. Locking plate 31 is moveable between a non-locking position shown in Figure 7 and a locking position shown in Figure 8, by means of being mounted on a threaded rod 32. Threaded rod 32 can be rotated by means of operator control 33. Locking plate 31 includes a locking plate body 34 which is adapted to engage the actuation member 35 of an electrical rocker switch 40 enabling electrical operation of the device when in the locking position (Figure 8). Alternative catch arrangements, in particular, engagement elements, will be apparent to the skilled person, including combinations of projections, apertures or slots.

**[0023]** A cover (omitted for clarity) prevents access to the interlock assembly and the electrical switch. A further feature of this design is that the number of turns of the operator control 33 between the point of electrically disabling the device and the point at which the inlet assembly is released can be selected to ensure that the cutters will have come to a complete stop before the user will have been able to disengage the catch and remove the shredder inlet assembly 20. For example, requiring the user to complete three or more complete turns of control 33 ensures that the cutters will have come to complete stop before access is possible.

**[0024]** In preferred embodiments, further security is provided by additional electrically detectable identification means being included in the inlet assembly. In one embodiment, this is provided by one or more magnets suitably located in or on the shredder inlet assembly 20 detectable by correspondingly located reed switches on the main body. Similar arrangements can be provided between the collection bin 16 and the main body of the apparatus. Preferably, these arrangements are integrated with the interlock circuitry, such that operation of the cutter element is prevented in the event that the correct shredder inlet assembly 20 and collection bin 16 are not in their operative positions.

**[0025]** As shown perhaps most clearly in Figure 3, advantageously, each horizontal frame member 12 to which legs 11 are connected includes a dog-leg portion and the collection bin 16 includes corresponding recessed portions 30 set into its operatively lower edges. In use, the collection bin can be slid into position below the cutter housing 10 and is supported by the frame, rather than suspended below the housing as in the Flymo prior art apparatus. This means that the bin 16 is more easily mounted to and demounted from the apparatus and reduces strain upon the rim of the collection bin.

## Claims

1. A vegetation shredder comprising a shredder cutter assembly; a cutter housing (10) for said shredder cutter assembly, the cutter housing having an inlet

(14) and an outlet (15); a shredder inlet assembly (20) adapted for communication, in use, with the cutter housing inlet (14) and a frame (11,12) supporting the cutter housing (10) in an elevated configuration and defining a space thereunder; **characterised in that** the shredder inlet assembly (20) is detachable from the cutter housing (10).

**2.** A vegetation shredder as claimed in claim 1 further comprising a movable safety flap (25) adapted to prevent inadvertent access to exposed cutters when the shredder inlet assembly (20) is detached from the cutter housing (10).

**3.** A vegetation shredder as claimed in claim 2 wherein the safety flap (25) is biased into a closed position, preferably by means of spring biasing.

**4.** A vegetation shredder as claimed in claim 2 or claim 3 further comprising an electrical interlock to prevent operation when the shredder inlet assembly (20) is detached from the cutter housing (10).

**5.** A vegetation shredder as claimed in claim 4 wherein the interlock comprises an engagement element (30) on shredder inlet assembly (20) wherein engagement element (30) is adapted to be engagable by a movable locking plate (31) provided within the cutter housing; wherein the locking plate (31) includes a locking plate body (34) adapted to engage an actuation member (35) of an electrical rocker switch (40).

**6.** A vegetation shredder as claimed in claim 5 wherein locking plate (31) is moveable between a non-locking position and a locking position, by means of a threaded rod rotatable by means of an operator control (33).

**7.** A vegetation cutter as claimed in anyone of claims 4 to 6 wherein the interlock comprises or further comprises a magnetic interlock arrangement comprising at least one magnet provided in or on shredder inlet assembly (20) and a correspondingly located magnetic sensor, preferably a reed switch, mounted within the cutter housing.

**8.** A vegetation shredder as claimed in any one of claims 1 to 7 wherein the shredder inlet assembly (20) comprises an elongate shredder inlet chute (23) and a shredder inlet hopper (24).

**9.** A vegetation shredder as claimed in any preceding claim further comprising a collection bin (16) mountable in the space under the cutter housing (10).

**10.** A vegetation shredder as claimed in claim 9 wherein the shredder inlet assembly (20) is locatable for storage in the collection bin (16).

**11.** A vegetation shredder as claimed in claim 9 or claim 10 wherein the frame includes runners (12) upon which the collection bin (16) is adapted, in use, to sit and to be supported thereby.

**12.** A vegetation shredder as claimed in claim 11 wherein the collection bin (16) has a lower edge and sides formed with recessed portions (30) adapted to engage, in use, the runners (12).

**13.** A vegetation shredder as claimed in any one of claims 9 to 12 wherein the collection bin (16) is adapted to be invertable over the cutter housing to provide a cover thereto when the vegetation cutter is not in use.

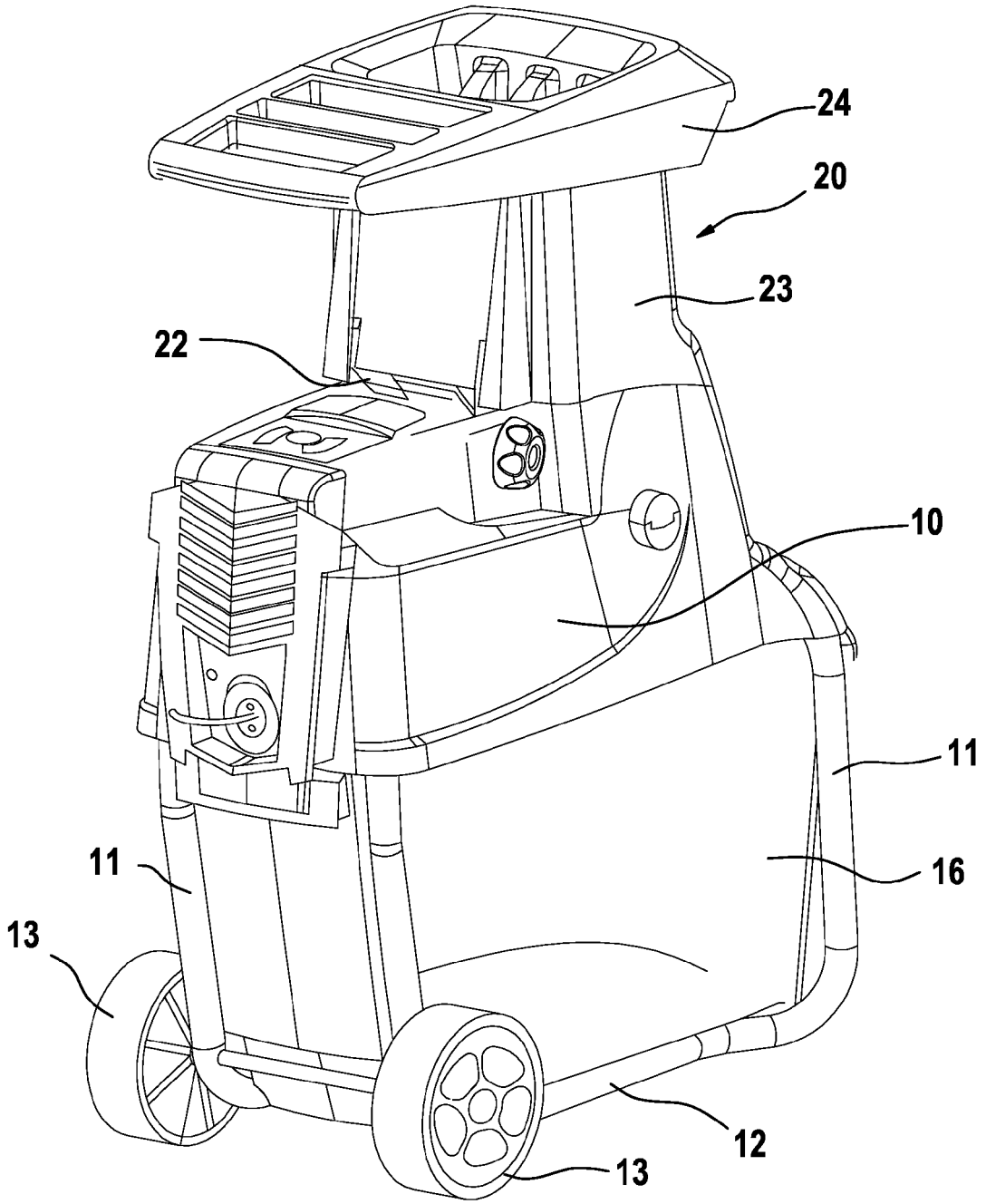
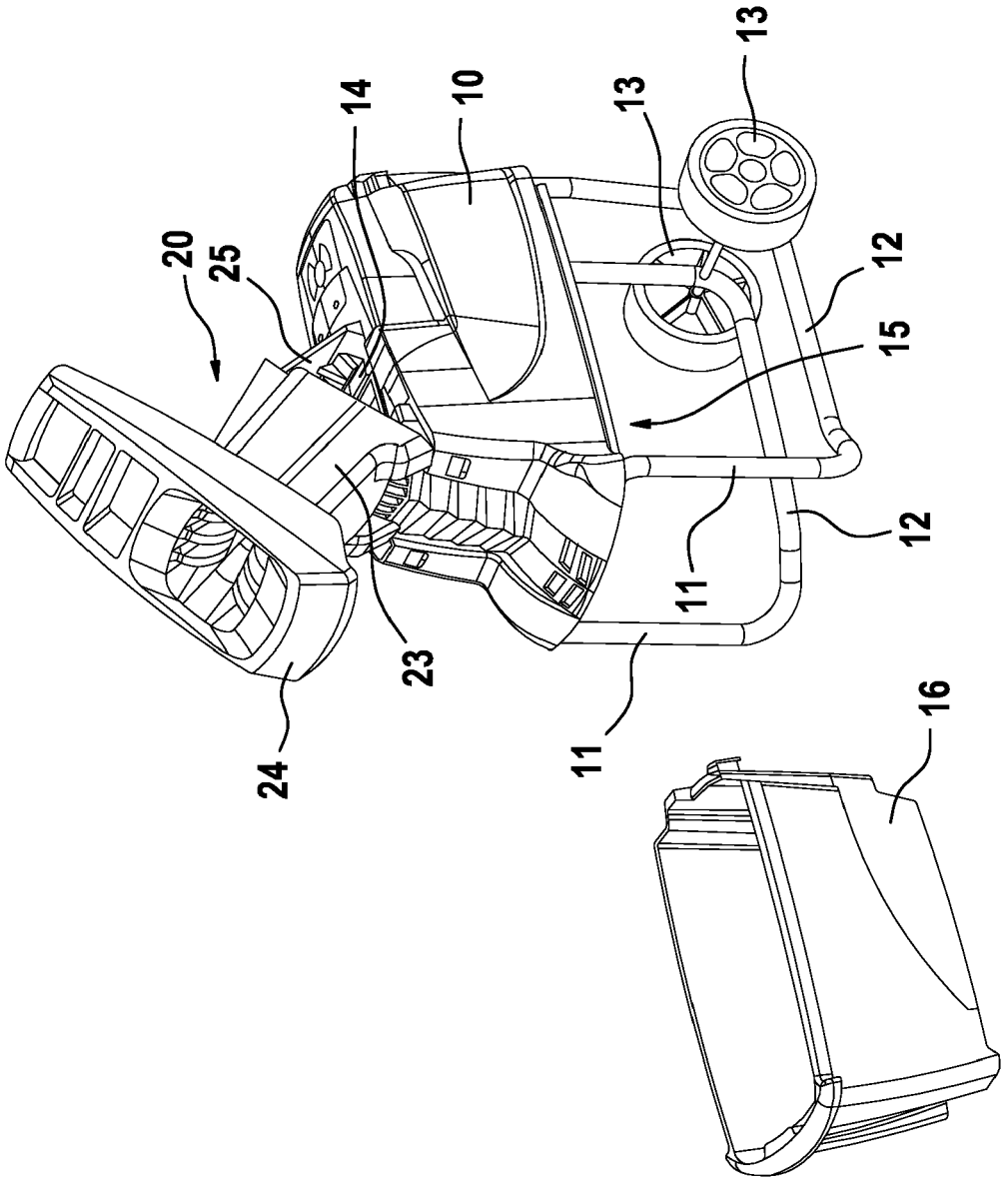



Fig. 1

Fig. 2



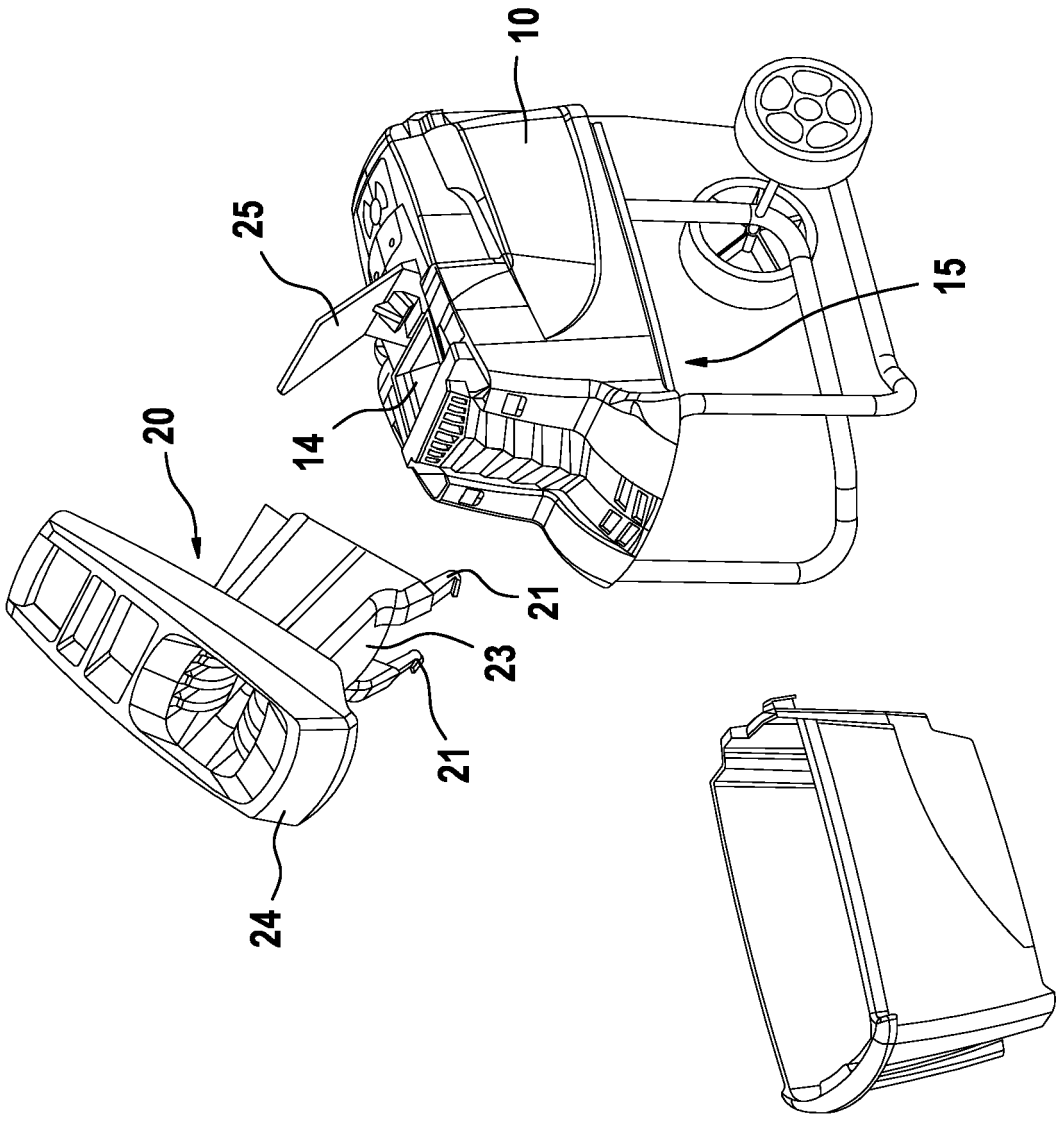



Fig. 3

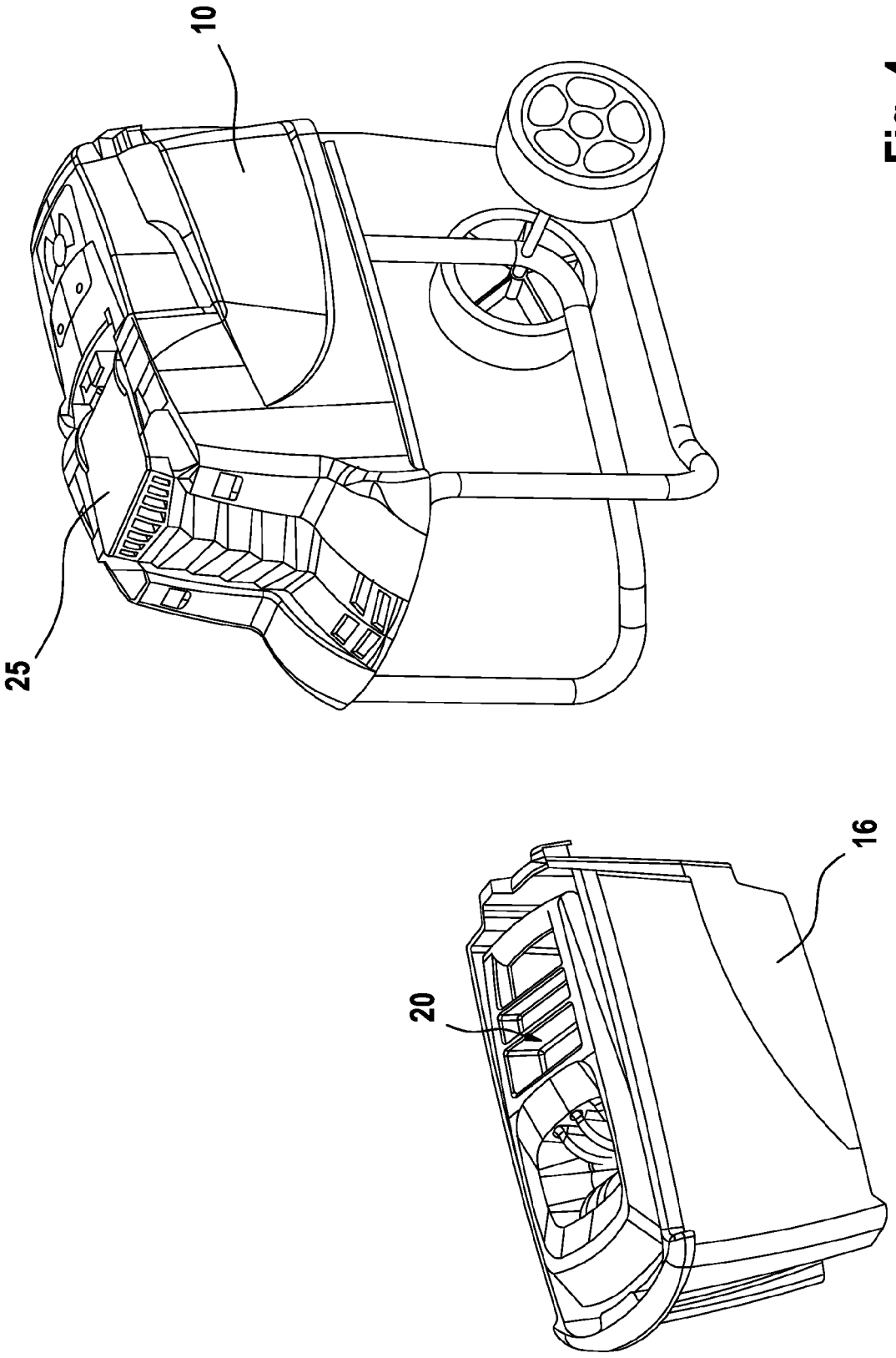



Fig. 4

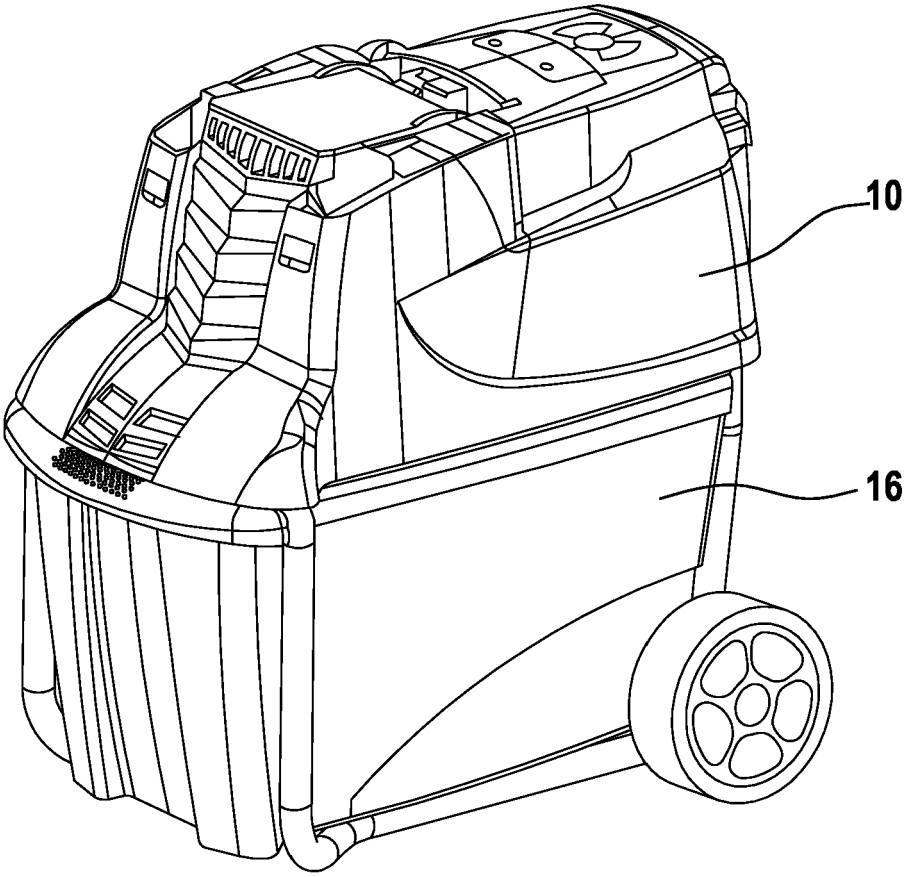



Fig. 5

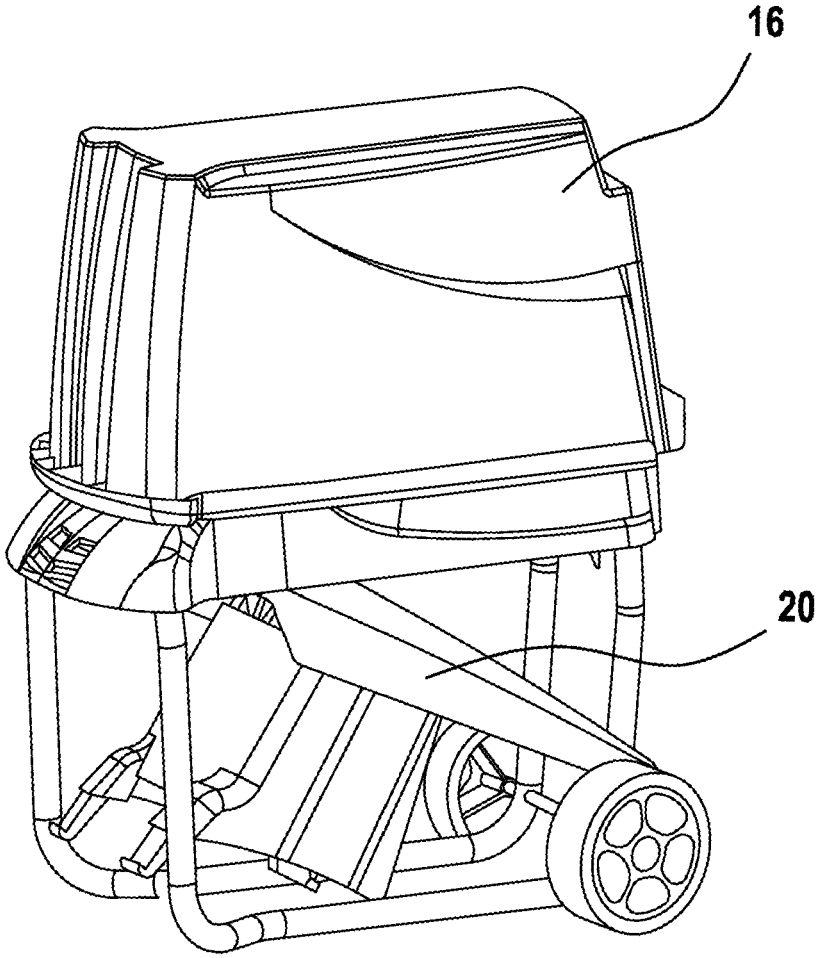



Fig. 6

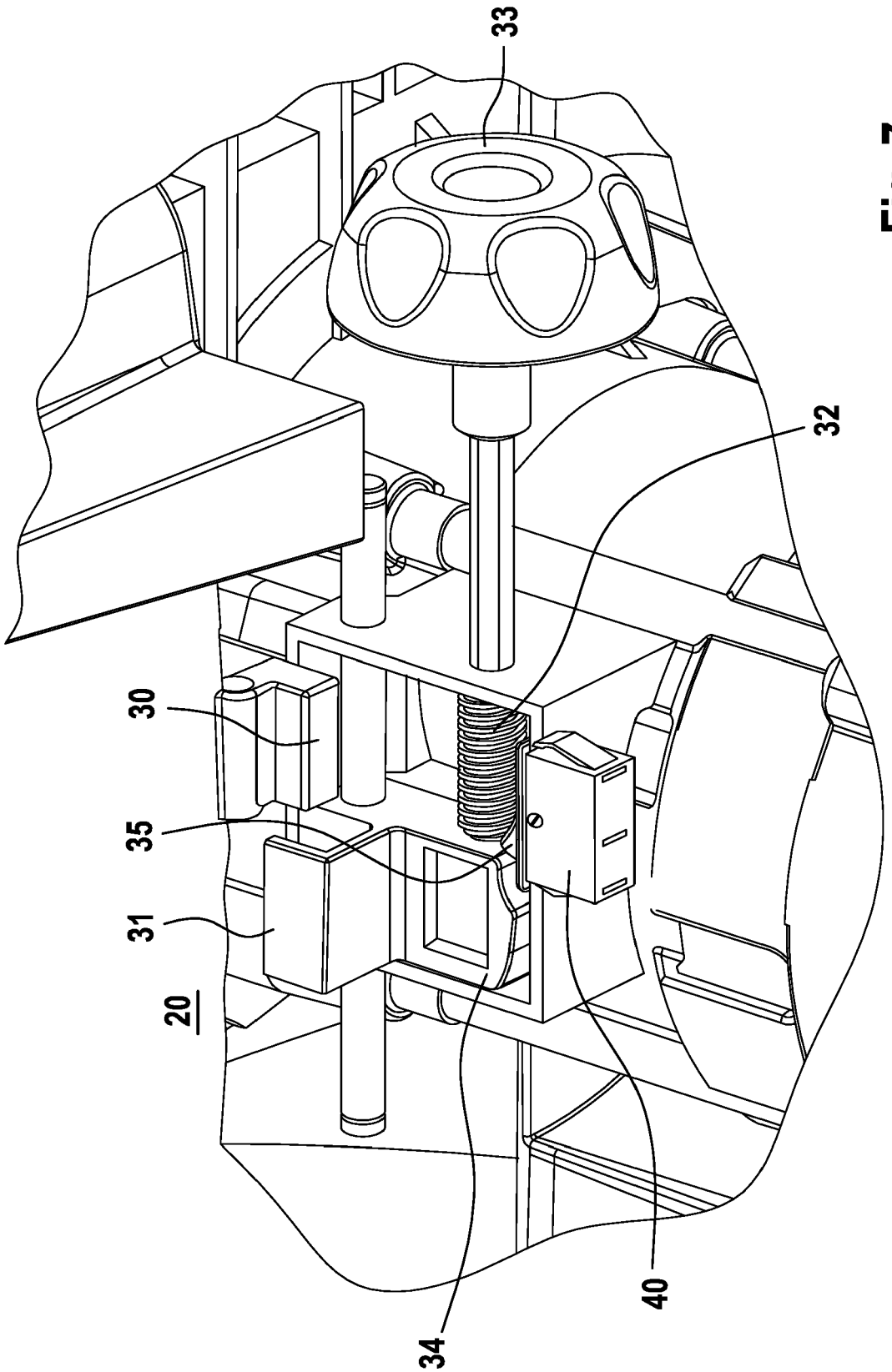
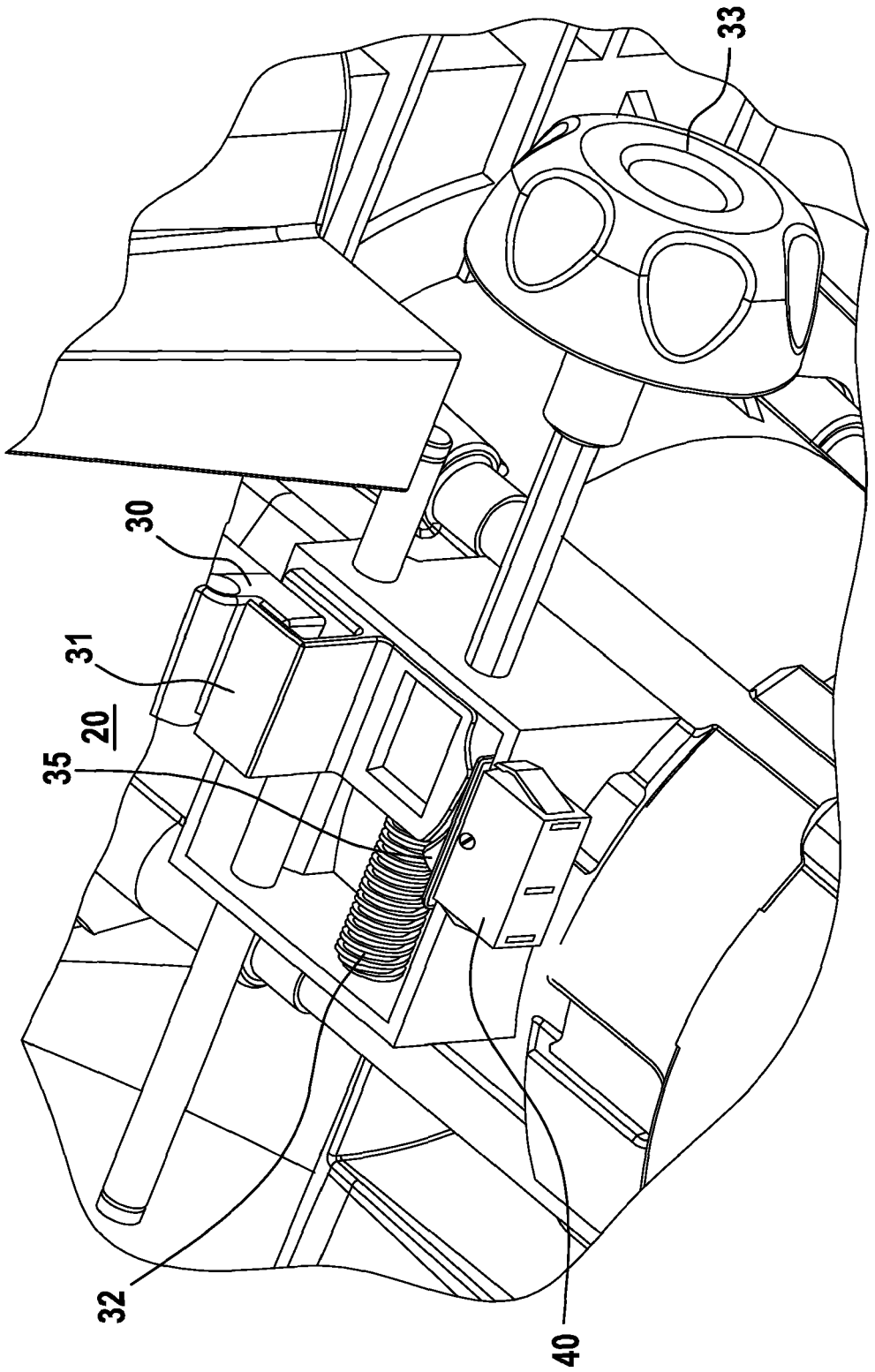



Fig. 7

Fig. 8



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# EUROPEAN SEARCH REPORT

Application Number
EP 07 12 3893

## 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 | AU 543 000 B2 (ROVER SCOTT BONNAR LTD) 28 March 1985 (1985-03-28) * figure 2 * | 1,8 | INV. B02C18/22 B02C18/12 |
| X | EP 0 698 414 A (GLORIA WERKE SCHULTE H KG [DE]) 28 February 1996 (1996-02-28) * figure 1 * | 1,8 | |
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TECHNICAL FIELDS SEARCHED (IPC)

B02C

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 19 June 2008 | Kopacz, Ireneusz |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 12 3893

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