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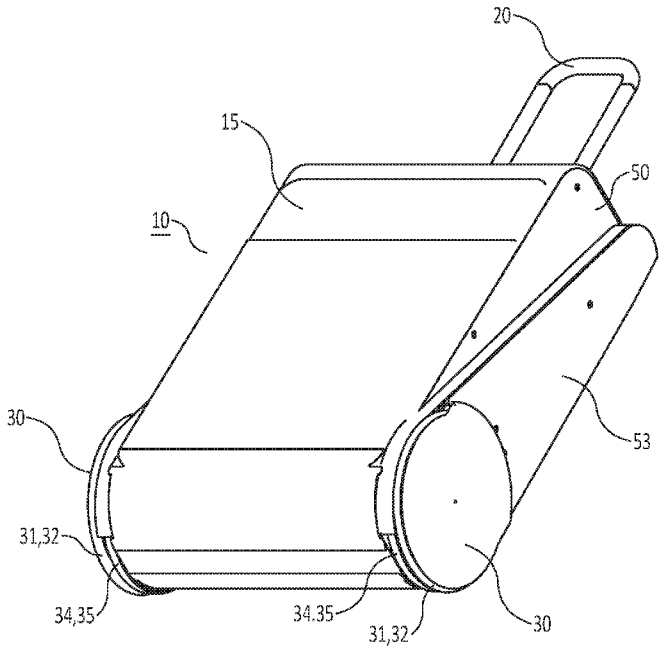
(54) **Title:** LUGGAGE HOLDER AND CASSETTE

Fig.1



(57) **Abstract:** A luggage holder (10), such as for instance a suitcase or a travel bag, comprises a chamber (15) which is bounded by an optionally hard shell and which is intended and configured to receive luggage. The holder is provided with rolling means in the form of a set of wheels (30) on opposite longitudinal sides. The holder is hereby movable over a ground surface, for which purpose each of the wheels comprises a running surface. On each of the longitudinal sides the running surface extends from a belt which follows an elongate path (35) from the wheel (30) which extends at least substantially linearly over at least a part of a length of this longitudinal side. The running surface of the belt extends at least in said path beyond a back side of the holder so that it is also possible to support with this surface on a staircase.

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Luggage holder and cassette

The present invention relates to a luggage holder comprising at least one chamber which is bounded by an optionally hard shell and which is intended and configured to receive luggage, which holder is provided with rolling means comprising at least a first set of wheels on opposite longitudinal sides of the holder with which the holder is movable over a ground surface, which wheels each comprise a running surface.

Luggage holders are used on large scale in diverse forms, sizes and materials by travellers to carry luggage. These include suitcases with a hard or soft shell and travel bags. Suitcases and travel bags used to be simply carried, optionally by a porter; nowadays many suitcases and larger travel bags are often embodied with a set of wheels so that the suitcase or travel bag is also rollable. The suitcase or travel bag can thus be pulled or pushed over a flat ground surface by the traveller. This considerably alleviates the use of especially a full suitcase or travel bag and larger sizes when the traveller is carrying luggage. This immediately accounts for the great popularity of suitcases and travel bags embodied with such rolling means. The traveller nevertheless still has to rely on muscle power when stairs have to be negotiated with the suitcase or heavy travel bag, since the conventional rolling means are usually of no help in such a situation.

The present invention has for its object, among others, to provide a suitcase and/or travel bag which provides assistance not only on a flat ground surface but also in the case of stairs.

In order to achieve the stated object a luggage holder of the type described in the preamble has the feature according to the invention that the rolling means comprise on each of the longitudinal sides a running surface which extends from a belt which follows an elongate path over at least a part of a length of this longitudinal side and extends at least substantially linearly, wherein the running surface of the belt extends at least in said path beyond a back side of the holder. The rolling means thus provide an elongate running

surface which is able to span the steps of a staircase, while said wheels also provide assistance on a flat ground surface.

A particularly practical embodiment of the luggage holder according to the invention has the feature that the rolling means comprise opposite each of the first set of wheels a second wheel over which the belt with the running surface is received and guided back in an endless path to the corresponding wheel of the first set of wheels. Thus implemented in an exceptionally practical manner is a running surface which, as well as extending over the second wheel, also extends over an elongate path.

The running surface with the wheels per se provide a support on which the luggage holder can support under all said conditions in order to thus reduce a load for the user. A preferred embodiment of the luggage holder according to the invention has the feature however that the rolling means comprise energizing means which at least assist a rotation of at least one of the wheels in at least one direction of rotation. The rolling means and the running surface thus not only provide support for the luggage holder, but active assistance is moreover provided which helps a traveller to alleviate the load of carrying the luggage holder.

The energizing means can be of diverse nature. In a particular embodiment the luggage holder according to the invention is characterized for this purpose in that the energizing means comprise spring means which tighten in a first direction of rotation of the at least one wheel and loosen in a second direction of rotation of the at least one wheel. The potential energy needed to energize the wheels when ascending a staircase is thus derived from the kinetic energy generated by the user when the luggage holder is pulled forward over a flat ground surface. The energizing thus has a wholly mechanical origin.

The potential energy needed to drive the wheels can be drawn instead from an energy source provided for the purpose in or close to the luggage holder. A further particular embodiment of the luggage holder according to the invention has for this purpose the

feature that the energizing means comprise an electric motor with an independent electric power source, which electric motor drives the belt in at least one direction of rotation. Energizing of the wheels and the running surface can thus be provided not only over a staircase ascent but also over a flat ground surface, to the extent at least the electric power source remains active. This relates particularly to a rechargeable power source which, in addition to being recharged from for instance mains electricity, can also be recharged by a dynamo when the luggage holder is moved forward.

The rolling means can be provided integrally per se with the luggage holder. In an important preferred embodiment the luggage holder according to the invention is however characterized in that the rolling means are received in an independent cassette which is connected on the relevant longitudinal side to the holder, and in particular is coupled releasably thereto. The rolling means can thus be coupled to a luggage holder so as to provide rolling assistance to this luggage holder. Said cassette can also be easily uncoupled and, if desired, replaced in the case of repair or maintenance. The invention therefore also relates to a cassette comprising a form-retaining shell with a cavity which provides space for the rolling means as applied in the luggage holder according to the invention.

The invention will now be further elucidated on the basis of an exemplary embodiment and an accompanying drawing. In the drawing:

figure 1 is a perspective view of a luggage holder according to the invention;

figure 2 is a front view of the luggage holder of figure 1;

figure 3 is a cut-away side view of the luggage holder of figure 1; and

figure 4 is an exploded view of the rolling means as applied in the luggage holder of figure 1.

It is otherwise noted here that the figures are purely schematic and not always drawn to (the same) scale. Some dimensions in particular may be exaggerated to greater or lesser extent for the sake of clarity. Corresponding parts are designated in the figures with the same reference numeral.

The luggage holder of figures 1-3 comprises a luggage case 10 having therein a chamber 15 for receiving luggage with a volume of about 125 litres which is bounded by a hard shell. For easy handling a telescopically extendable handgrip 20 is provided on the case and the case comprises rolling means with a first set of silent-running wheels 30, one on each longitudinal side. Case 10 can thus be pulled over a flat ground surface with handgrip 20 in order to assist the user.

Wheels 30 are provided with a belt 31 of rubber or an elastomer plastic and thereby provide a silent-running and comfortable running surface 32. By applying relatively large and silent-running wheels not only is the user provided with comfort, acoustic mitigation is also provided for the surrounding area.

Figure 4 shows an exploded view of the rolling means as applied in the luggage holder of figures 1-3. In this example the rolling means also comprise, in addition to the first set of wheels 30, a second set of wheels 33,40 on each of the longitudinal sides of the luggage holder. This second set of wheels comprises a further wheel 33 on the same wheel axle as first wheel 30 in combination with a second wheel 40 which is largely concealed from view in figures 1 and 2. Over this second set of wheels 33,40 runs an endless belt 34 with a further running surface 35 which is guided back in a continuous path. According to the invention this further running surface 35 not only runs around wheels 33 but also extends over at least a part of the associated longitudinal side.

The belt 34 with running surface 35 follows an at least substantially linear path here along at least a part of this length. Running surface 35 extends beyond a back side 11 of holder 10 so that it makes contact with the steps of a staircase. This elongate belt 34 spans a distance between successive steps of a staircase so that at least the same form of assistance is provided on a staircase as on a flat ground surface. Additional assistance can optionally be given by providing at least one of the wheels 30, 33, 40 with an energizing means. The luggage holder thus also provides an optionally energized rolling assistance when ascending a staircase.

In a specific embodiment wheels 30 are coupled for energizing purposes to a spiral spring which tightens while the case is pulled over a flat ground surface. By means of an operating means (not further shown) provided for this purpose on for instance handgrip 20 this spring tension can be utilized when it is necessary to ascend a stairway with the case. The built-up spring tension is released here in order to convert the potential energy accumulated therein to a kinetic driving of wheels 30.

Instead of such a mechanical assistance, an electrical energy source can if desired also be provided in combination with an electric motor for each of the wheels. The energy source is particularly a rechargeable battery here which is provided individually at each of the wheels 30 or is for instance accommodated in holder 15 itself jointly for both wheels. In this case also handgrip 20 preferably provides operating means with which the electric motors can be set into operation. An effective assistance is thus provided on a flat ground surface as well as on an inclining staircase.

Figure 4 shows in the form of an exploded view a separate cassette 50 which provides for such an optionally energized rolling assistance. The cassette provides space for wheels 30,33,40 for belts 31,34 and can be coupled in simple manner by means of connecting means 55 provided thereon to a luggage holder 10,15 adapted for the purpose. In the case of a suitcase or travel bag not prepared herefor the cassette can if desired be secured thereto by means of a set of tensioning straps or in other manner. In addition to providing space for wheels 30,33,40 and belts 31,34, the cassette 50 also provides an attractive hard shell 53 as protective casing.

A rechargeable battery can also be accommodated in cassette 50 which powers an electric motor (not shown) which is coupled via an appropriate gear transmission 56 to at least one of the wheels 33. This wheel 33 comprises internally a toothing for engaging gear transmission 56. A toothing is also arranged externally on wheel 33 for non-slip driving of second belt 34, which is embodied here as a toothed belt with running surface 35 on an

outer side and a toothing on an opposite inner side which engages on the outer toothing of wheel 33. An electronic control provides for a constant rotation speed of the motor, wherein transmitter and receiver means are also provided for synchronization with a corresponding cassette on the other side of the case. Provided between first wheels 30 and the gear transmission is a controllable coupling which, if desired, disengages and sets wheels 30 into free-running mode or couples them to further wheel 33 and/or only to drive 56. In the latter case kinetic energy can be recovered from the rolling wheel 30 and be fed back via the electric motor or separate dynamo to the power source. Especially in the case of a descent the operating duration of the power source can be increased in particularly efficient manner.

The rolling means are thus accommodated in an integral extension on either side of the suitcase in the form of an independently connectable and removable individual cassette. The invention also relates to such an individual cassette which can be provided on an existing suitcase and/or a suitcase optionally modified for the purpose. Use can be made particularly here of an exchange system, wherein a standard suitcase can be provided at a distribution point with a set of such cassettes with a fully charged battery and electric drive and subsequently go on its way in silent-running and assisted manner. On a return journey the cassettes are taken in again in order to be recharged and distributed once again. Such a distribution point could for instance be provided at an airport or (railway) station.

Although the invention has been further elucidated above with reference to only a single exemplary embodiment, it will be apparent that the invention is by no means limited thereto. On the contrary, many variations and embodiments are still possible within the scope of the invention for a person with ordinary skill in the art.

The starting point in the shown exemplary embodiment is a suitcase with a hard shell. The invention can also be applied instead to a suitcase with a soft deformable shell, and also to travel bags provided with a rolling assistance. A dynamo can if desired be provided in the suitcase at the wheels in order to recharge a battery accommodated therein when the case is

being pulled or descending a staircase. A hybrid implementation of this part of the invention is thus achieved.

Use is made in the example of two separate wheels on a shared wheel axle from which the respective first and further running surfaces extend. Use can instead be made of separate wheels on separate wheel axles, and it is also possible to make use of a shared wheel from which both running surfaces extend, i.e. only an endless belt is applied which provides for the rolling running surface for a rolling assistance as well as the elongate running surface for assistance when ascending a staircase.

In many cities much irritation is caused in that during the day, but also in the evening and at night, millions of tourists walk with their wheeled suitcases through the centre and produce a great deal of deafening noise while doing so. Many cities wish to bring an end to this but have so far been unable to find a solution. The present invention provides a solution here. If all these suitcases are equipped at an airport or station upon arrival with a mandatory set of wheeled cassettes according to the invention, this will undeniably result in advantages both for the user and the surrounding area. The cassettes are for instance attached to a suitcase with tensioning straps if the suitcase has not already been prepared for coupling to the cassettes. The silent-running elastomer wheels result in a dramatic reduction in the rolling sound to practically zero. The user acquires a rolling assistance, which will come in useful particularly when covering greater distances. And when a staircase or other ascent is being negotiated, this assistance is continued by the elongate belt running over the wheels. When leaving the city the cassettes are returned and recharged and checked by/via the distribution station.

The sizes of the shown wheeled suitcase are given solely by way of illustration. The invention can however be applied irrespective of the specific size and shape of the luggage holder, although the larger the luggage holder, the more significant the resulting contribution of the rolling and staircase assistance provided thereby toward the convenience of use.

Claims

1. Luggage holder comprising at least one chamber which is bounded by an optionally hard shell and which is intended and configured to receive luggage, which holder is provided with rolling means comprising at least a first set of wheels on opposite longitudinal sides of the holder with which the holder is movable over a ground surface, which wheels each comprise a running surface, characterized in that the rolling means comprise on each of the longitudinal sides a running surface which extends from a belt which follows an elongate path over at least a part of a length of this longitudinal side and extends at least substantially linearly, wherein the running surface of the belt extends at least in said path beyond a back side of the holder.

2. Luggage holder as claimed in claim 1, characterized in that the rolling means comprise opposite each of the first set of wheels a second wheel over which the belt with the running surface is received and guided back in an endless path to the corresponding wheel of the first set of wheels.

3. Luggage holder as claimed in claim 1 or 2, characterized in that the rolling means comprise energizing means which at least assist a rotation of at least one of the wheels in at least one direction of rotation.

4. Luggage holder as claimed in claim 3, characterized in that the energizing means comprise spring means which tighten in a first direction of rotation of the at least one wheel and loosen in a second direction of rotation of the at least one wheel.

5. Luggage holder as claimed in claim 3 or 4, characterized in that the energizing means comprise an electric motor with an independent electric power source, which electric motor drives the at least one wheel in at least one direction of rotation.

6. Luggage holder as claimed in one or more of the foregoing claims, characterized in

that the rolling means are received in an independent cassette which is connected on the relevant longitudinal side to the holder, and in particular is coupled releasably thereto.

7. Luggage holder as claimed in one or more of the foregoing claims, characterized in that a first running surface extends from a first belt over one of the first set of wheels and that a second running surface extends from an endless belt which is guided over a set of further wheels and in doing so follows the elongate path over at least a part of the longitudinal side of the holder.

8. Cassette comprising a form-retaining shell with a cavity which provides space for the rolling means as applied in the luggage holder as claimed in one or more of the foregoing claims.

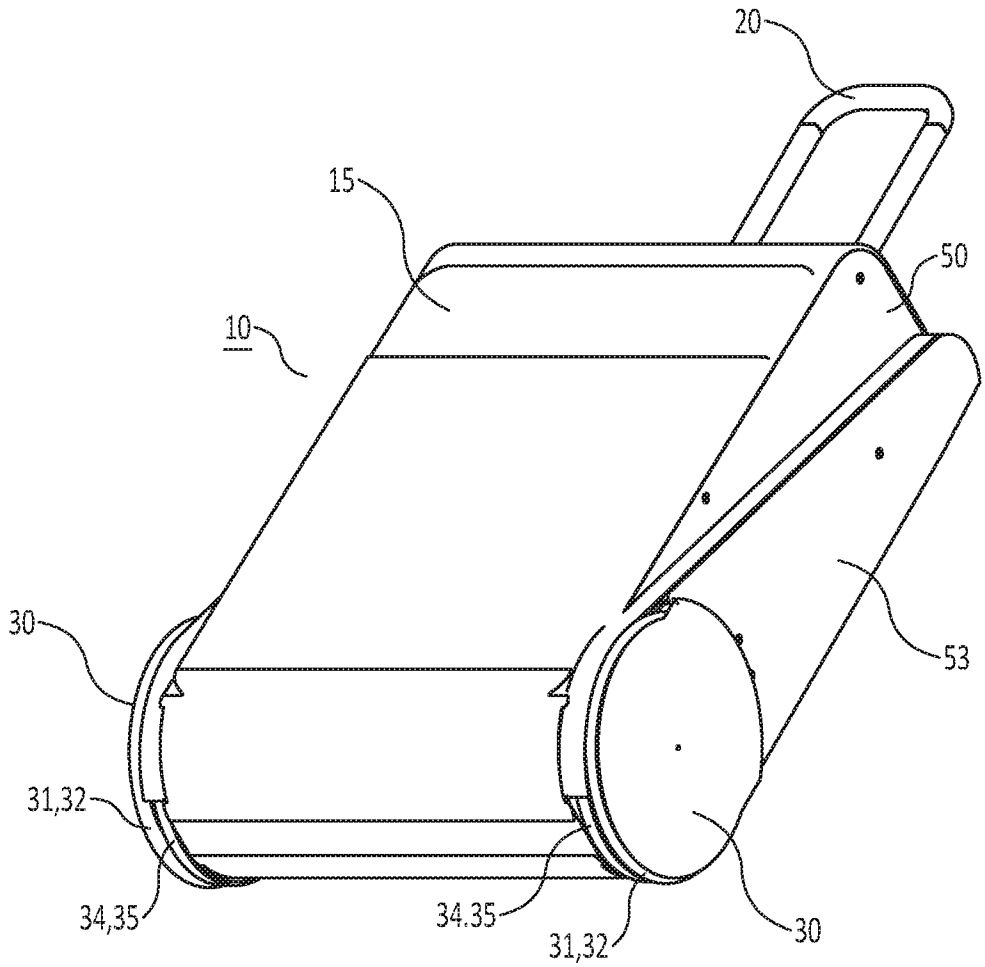

Fig.1

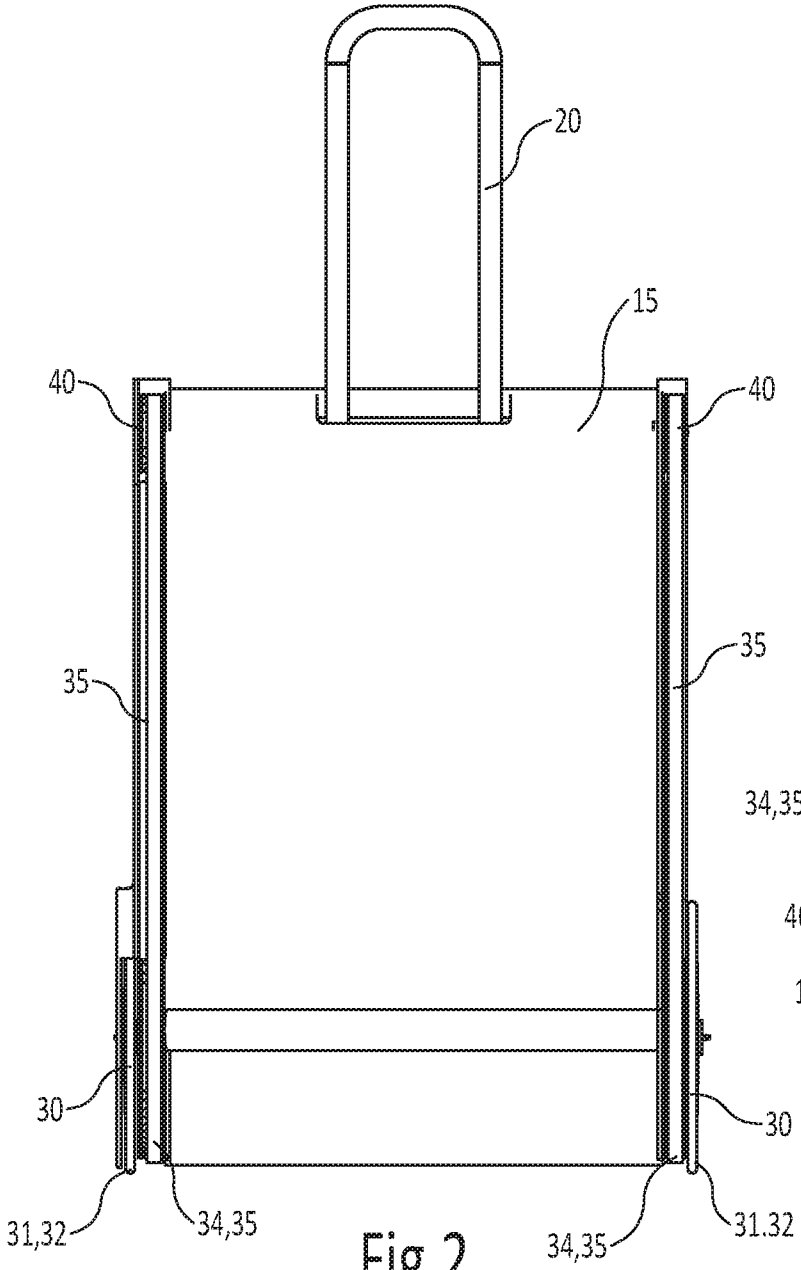
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Fig.2

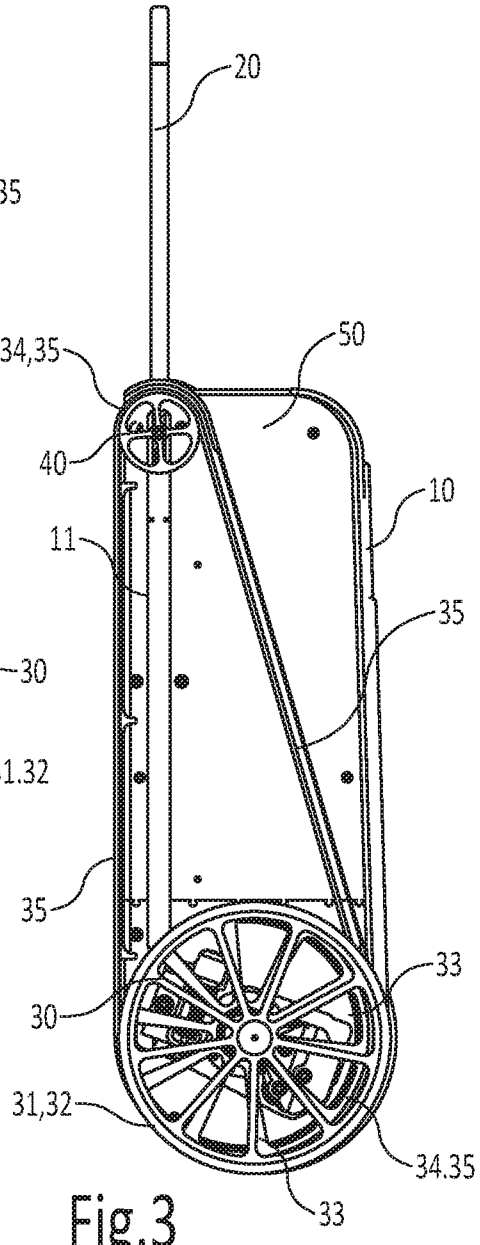
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Fig.3

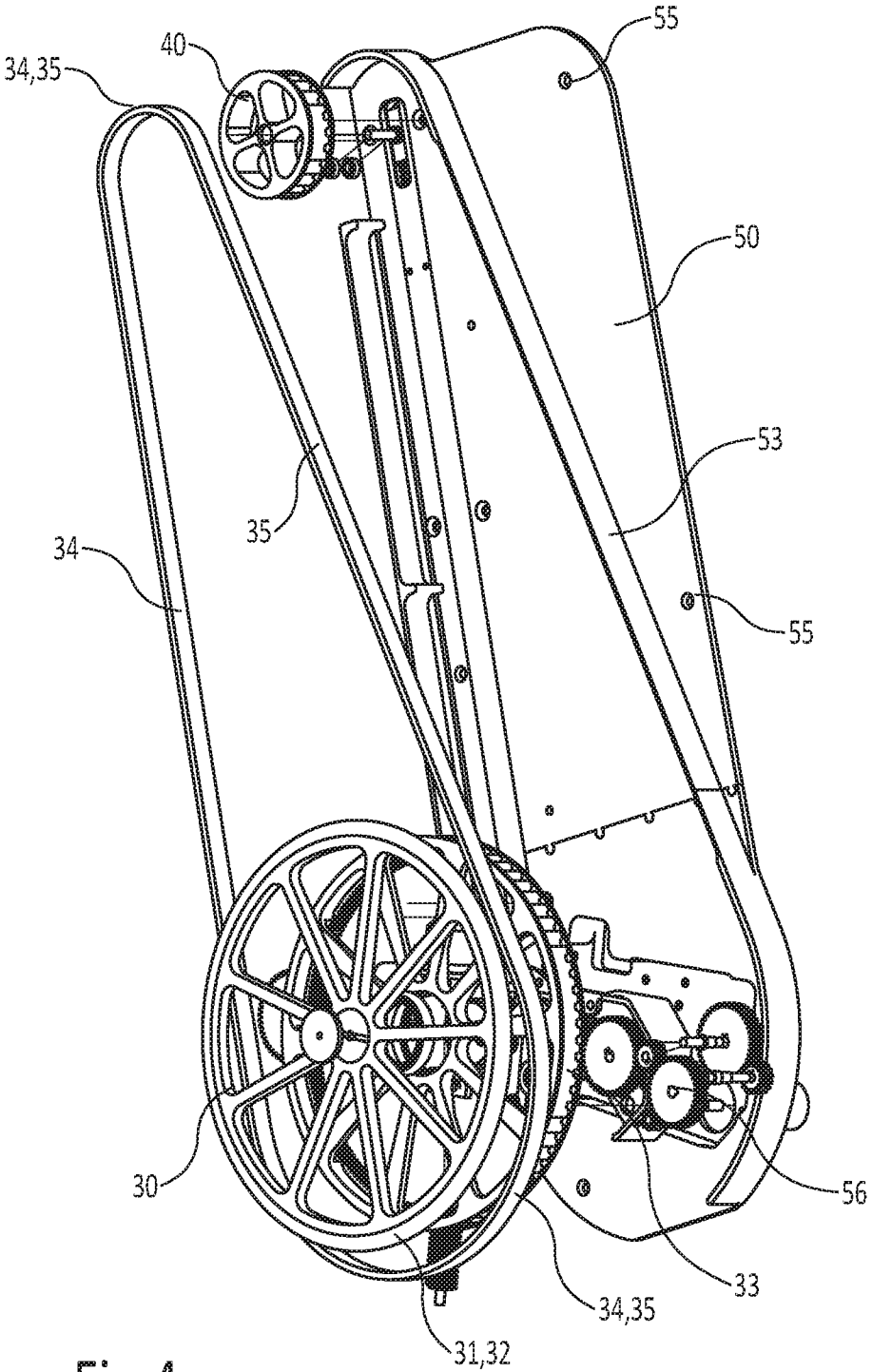

Fig.4

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2018/050474

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45C5/14 A45C13/38
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A45C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 298 80 021 U1 (DORNIER TECH GMBH & CO [DE]) 23 March 2000 (2000-03-23) page 8, paragraph 7 - page 12, paragraph 6; figures 1-3,9	1-3,5
X	EP 3 028 924 A1 (COLLIBAULT JOSEPH [BE]) 8 June 2016 (2016-06-08) paragraph [0049] - paragraph [0055]; figure 3	1-3,5-7
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X	CN 103 976 537 A (JIANG JINSHAN) 13 August 2014 (2014-08-13) paragraphs [0010], [0011]; figures 1,2	1,6,8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2018/050474

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