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(54) **MATERIAL COLLECTION EQUIPMENT AND SPOILER**

(57) A material collection equipment (100) includes a handle (110) extending along a first axis (A-A') and connected to an implement compartment (120). The implement compartment (120) defines a lower front edge (132) along a second axis (B-B') away from the handle (110). The second axis (B-B') extends transversely relative to the first axis (A-A'). The material collection equipment (100) further includes a pair of wheels (124, 125) rotatably coupled to the implement compartment (120) through a respective axle (114, 115). Each wheel (124, 125) includes a running surface (126, 128). Each wheel

(124, 125) defines a spoiler direction (C) from a respective axle (114, 115) towards a mid (127, 129) of the respective running surface (126, 128). The material collection equipment (100) further includes a spoiler (140, 240, 340) coupled to the implement compartment (120) to extend the lower front edge (132) along the spoiler direction (C). The spoiler (140, 240, 340) is disposed adjacent to the lower front edge (132). The spoiler (140, 240, 340) is toollessly adjusted along the spoiler direction (C) relative to the implement compartment (120) in a form-fit manner to extend the lower front edge (132).

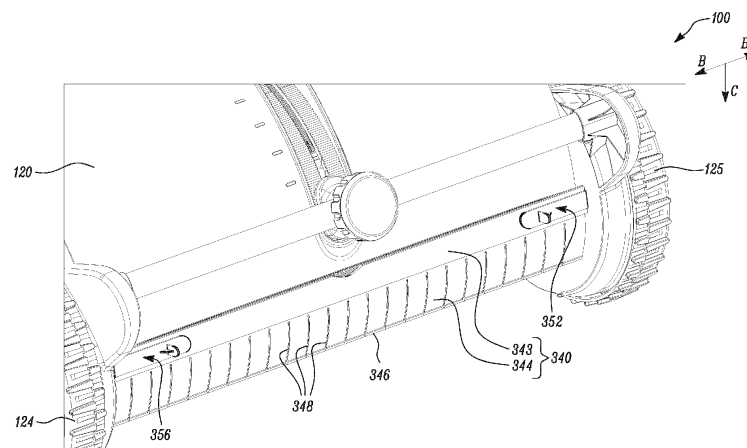


FIG. 11

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a material collection equipment, and more particularly, to a spoiler for the material collection equipment.

BACKGROUND OF THE INVENTION

[0002] Hand-held material collection equipment including, but not limited to, mobile garden tools, such as leaf collecting devices (e.g., lawn sweepers, leaf sweepers, etc.) and lawn movers have been well known in the art. Such tools typically include an implement portion, a storage compartment in communication with the implement portion, and a handle connected to the implement portion and/or the storage compartment. During operation, the implement portion may collect and transfer leaf or any other object from a ground surface on which the tool is working to the storage compartment.

[0003] Generally, a lower front edge of the implement portion may exhibit a free space towards the ground surface. Some tools may be designed to run on grass and collect the leaves lying on the surface of the grass. Thus, the free space can be large in such cases since wheels of the tool run on the ground surface while the leaves are on top of the surface of the grass. If such tools are utilized on surfaces such as paved surfaces or concrete to sweep away the leaves, the large free space may result in a lot of dirt and dust disappearing out of the implement department.

[0004] An example of such a tool is disclosed in EP 3 765 675 B 1. The '675 reference describes a material collection equipment that includes a handle, a storage compartment, an implement compartment, an axle, and a pair of wheels. The material collection equipment further includes an implement adapted to collect material from a ground surface and transfer the material into the storage compartment.

SUMMARY OF THE INVENTION

[0005] In view of the above, it is an objective of the present invention to solve or at least reduce the drawbacks discussed above. The objective is at least partially achieved by a material collection equipment that may allow a user to easily manipulate a free space between a front lower edge of the material collection equipment and a ground surface.

[0006] According to an aspect of the present invention, the material collection equipment includes a handle extending along a first axis. The material collection equipment further includes a connection element connecting the handle with an implement compartment. The implement compartment defines a lower front edge along a second axis away from the handle. The second axis extends transversely relative to the first axis. The material

collection equipment further includes an implement disposed within the implement compartment and adapted to collect a material from a ground surface and to transfer the material into a storage compartment. The material collection equipment further includes a pair of wheels. Each wheel from the pair of wheels is rotatably coupled to the implement compartment through a respective axle. Each wheel includes a running surface. Each wheel defines a spoiler direction from the respective axle towards a mid of the respective running surface. The material collection equipment is characterized in that a spoiler is coupled to the implement compartment to extend the lower front edge of the implement compartment along the spoiler direction. The spoiler is disposed adjacent to the lower front edge of the implement compartment. The spoiler is toollessly adjusted along the spoiler direction relative to the implement compartment in a form-fit manner to extend the lower front edge.

[0007] The material collection equipment of the present disclosure includes the spoiler coupled to the implement compartment and disposed adjacent to the front lower edge of the implement compartment. The spoiler may allow a user of the material collection equipment to extend the lower front edge of the implement compartment, thereby enabling easy manipulation of a free space between the front lower edge of the implement compartment and the ground surface. This may mitigate dirt and dust disappearing out of the implement department when working on surfaces such as paved surfaces, concrete, etc.

[0008] Additionally, the spoiler may operate as a flexible curtain that prevents the material (e.g., leaves, branches, etc.) from being thrown forward by the implement out of the range of the implement. Therefore, the material may be constrained by the spoiler and eventually picked up by the implement. Thus, the spoiler of the present disclosure may improve a collection performance of the material collection equipment even on ground surfaces such as paved surfaces, concrete, etc. as well as on low cut lawns. This may mitigate the need for multiple operational cycles with the material collection equipment on the same surface to collect the material.

[0009] The spoiler of the present disclosure may be toollessly adjusted along the spoiler direction relative to the implement compartment in the form-fit manner. Thus, the spoiler may not require any additional tools for adjusting the spoiler relative to the implement compartment, thereby promoting user-friendliness and ease of using the spoiler. Further, the lower front edge may be adjusted starting from a maximum distance from the running surface.

[0010] The spoiler of the present disclosure is disposed at a front of the implement compartment. Therefore, the spoiler may not negatively impact a performance of the material collection equipment on the regular working surfaces and in a parking position of the material collection equipment. Further, the spoiler of the present disclosure is light-weighted and flexible, thereby allowing the spoiler

to move over the material to be collected without pushing the material.

[0011] According to an exemplary embodiment of the invention, the spoiler is pivotally coupled to the implement compartment. Thus, the user may be able to manipulate the spoiler based on operational requirements and a type of the ground surface to be worked upon.

[0012] According to an exemplary embodiment of the invention, the spoiler includes a rigid holding member extending along the second axis and pivotally coupled to the implement compartment. The spoiler further includes a flexible member extending from the rigid holding member away from the implement compartment. The flexible member defines a proximal edge disposed adjacent to the rigid holding member and a distal edge spaced apart from the proximal edge away from the rigid holding member. The flexible member further defines an extending direction from the proximal edge of the flexible member towards the distal edge of the flexible member. The rigid holding member may allow the spoiler to be pivotally coupled to the implement compartment in a safe and reliable manner while the flexible member may allow the spoiler to move over the material to be collected without pushing or damaging it. Further, the rigid holding member may be pivotally coupled to the implement compartment in the form-fit manner.

[0013] According to an exemplary embodiment of the invention, the rigid holding member may be made of a plastic material that may be light weight. Further, the flexible member may be made of a polymeric material, such as rubber.

[0014] According to an exemplary embodiment of the invention, the spoiler is pivotable relative to the implement compartment between an operational position and a storage position. In the operational position, the extending direction of the flexible member is substantially along the spoiler direction, and in the storage position, the extending direction of the flexible member is substantially opposite to the spoiler direction.

[0015] Thus, the spoiler may be pivoted based on the operational requirements and the type of the ground surface to be worked upon. For example, the spoiler may be pivoted to the storage position in case the spoiler is no longer required, e.g., when working on long grass surfaces. Further, in the operational position, the distal edge of the flexible member may be disposed closer to the ground surface, thereby reducing any free space between the front lower edge of the implement compartment and the ground surface. According to an exemplary embodiment of the invention, the spoiler may be held at any intermediate position between the operational position and the storage position. Further, the spoiler may be toollessly adjusted (or moved between the operational position and the storage position) along the spoiler direction relative to the implement compartment in the form-fit manner, thereby retaining the spoiler at any of the intermediate positions.

[0016] According to an exemplary embodiment of the

invention, the spoiler may be pivotable to any position between the operational position and the storage position, thereby allowing the user to easily manipulate the free space between the front lower edge of the implement compartment and the ground surface.

[0017] According to an exemplary embodiment of the invention, the material collection equipment further includes at least one connecting member fixedly coupled to the implement compartment and defining a connecting surface facing the spoiler. The rigid holding member is pivotally coupled to the connecting surface of the at least one connecting member. The connecting member may allow the rigid holding member of the spoiler to be reliably secured to the implement compartment.

[0018] According to an exemplary embodiment of the invention, the at least one connecting member may be fixedly coupled to the implement compartment through any suitable coupling mechanisms, including, but not limited to, fasteners, adhesives, snap-fit connections, tongue and groove joints, etc.

[0019] According to an exemplary embodiment of the invention, the spoiler further includes at least one flexible locking member coupled to and extending from the rigid holding member adjacent to the at least one connecting member. In the storage position, the at least one flexible locking member is adapted to lockingly and releasably engage with the connecting surface of the at least one connecting member, such that the spoiler is restricted from pivoting relative to the implement compartment. In the operational position, the at least one flexible locking member is disengaged from the connecting surface of the at least one connecting member.

[0020] Thus, the at least one flexible locking member may allow the spoiler to be retained in the storage position when the spoiler is not required during operation of the material collection equipment. Further, the at least one flexible locking member may include a flexible shape that may be released from the connecting surface upon application of a force as the spoiler is pivoted to the operational position from the storage position. The at least one flexible locking member may be flexible to be able to be released from the connecting surface when required but stable enough to hold the spoiler in the storage position.

[0021] According to an exemplary embodiment of the invention, the at least one flexible locking member is in the form of a loop allowing the at least one flexible locking member to flex and get released from the connecting surface of the at least one connecting member upon movement of the spoiler from the storage position to the operational position. According to an exemplary embodiment of the invention, the at least one flexible locking member may be made of a polymeric material, such as plastic.

[0022] According to an exemplary embodiment of the invention, the spoiler further includes at least one slot. The at least one slot extends from the distal edge of the flexible member at least partially towards the proximal

edge of the flexible member. The at least one slot may divide the spoiler into a plurality of flexible latches, thereby enhancing the flexibility of the spoiler to slide over solid obstacles without getting damaged.

[0023] According to an exemplary embodiment of the invention, the at least one slot includes a plurality of slots. Each slot from the plurality of slots extends from the distal edge at least partially towards the proximal edge. The plurality of slots may divide the spoiler into multiple flexible latches, thereby further enhancing the flexibility of the spoiler.

[0024] According to an exemplary embodiment of the invention, some of the plurality of slots may have a varying length. Thus, the spoiler may have a variable stiffness at different locations.

[0025] According to an exemplary embodiment of the invention, the spoiler is removably coupled to the implement compartment. Thus, the spoiler may be easily removed when not required and in storage position. Further, the spoiler may be retrofitted to existing material collection equipment. Additionally, the spoiler may be sold as an aftermarket accessory. Moreover, the spoiler may be replaced upon wear and tear since the spoiler is removably coupled to the implement compartment.

[0026] According to an exemplary embodiment of the invention, the spoiler includes a rigid holding member extending along the second axis and removably coupled to the implement compartment. The spoiler further includes a flexible member extending from the rigid holding member away from the implement compartment. The flexible member defines a distal edge away from the rigid holding member. The rigid holding member may allow the spoiler to be pivotally coupled to the implement compartment in a safe and reliable manner while the flexible member may allow the spoiler to move over the material to be collected without pushing or damaging it.

[0027] According to an exemplary embodiment of the invention, the spoiler is removably coupled to the implement compartment between a first position and a second position. A distance between the distal edge of the flexible member and the running surface of each wheel along the spoiler direction in the first position is greater than a distance between the distal edge and the running surface of each wheel along the spoiler direction in the second position. Thus, the distance between the distal edge of the flexible member and the running surface of each wheel along the spoiler direction may be varied based on the type of ground surface and application requirements.

[0028] According to an exemplary embodiment of the invention, the spoiler may be toollessly removed from the first position and again coupled to the material collection equipment in the second position for varying the distance between the distal edge of the flexible member and the running surface of each wheel along the spoiler direction.

[0029] According to an exemplary embodiment of the invention, the material collection equipment further includes at least one securing member removably coupling

the spoiler to the implement compartment. According to an exemplary embodiment of the invention, the implement compartment includes at least one receiving portion disposed adjacent to the lower front edge. Further, the at least one securing member includes an elongated portion. The at least one securing member further includes a projection extending transversely from the elongated portion and adapted to engage with walls (e.g., a groove within the walls) of the corresponding receiving portion.

[0030] According to an exemplary embodiment, the elongated portion is adapted to be at least partially received through the corresponding receiving portion. According to an exemplary embodiment, the at least one securing member may be rotated after inserting the elongated portion into the corresponding receiving portion, thereby allowing the projection to engage with the walls of the corresponding receiving portion. Thus, the at least one securing member may secure the spoiler to the implement compartment in the form-fir manner.

[0031] According to an exemplary embodiment of the invention, the spoiler includes an elastic member extending along the second axis and removably coupled to the implement compartment. The spoiler further includes a flexible member extending from the elastic member away from the implement compartment. An elasticity of the flexible member is different from an elasticity of the elastic member. The flexible member defines a distal edge away from the elastic member. The elastic member may allow the spoiler to be removably coupled to the implement compartment in a safe and reliable manner. The elastic member may be coupled to the implement compartment at both its ends. The flexible member may allow the spoiler to move over the material to be collected without pushing or damaging it. According to an exemplary embodiment of the invention, the elastic member may be less elastic than the flexible member and may act as an expander.

[0032] According to an exemplary embodiment of the invention, the material collection equipment further includes at least one rib disposed along a side wall of the implement compartment. The material collection equipment further includes at least one engaging member corresponding to the at least one rib. The at least one engaging member is fixedly coupled to the elastic member. The at least one engaging member removably engages with the at least one rib, such that the spoiler is removably coupled to the implement compartment.

[0033] Thus, the at least one engaging member may allow the spoiler to be removably coupled to the implement compartment. Further, the at least one engaging member may allow the spoiler to be suitably positioned relative to the at least one rib of the implement compartment, thereby enabling varying positions for the spoiler. For example, the spoiler may be positioned away from the lower front edge of the implement compartment during storage of the material collection equipment.

[0034] According to an exemplary embodiment of the invention, the at least one rib may include an opening

adapted to receive at least a portion of the at least one engaging member for removably coupling the spoiler to the implement compartment. The opening may allow the at least one engaging member to be secured to the implement compartment in a reliable manner.

[0035] According to an exemplary embodiment of the invention, the at least one rib may include a plurality of indents spaced apart from each other. The plurality of indents may allow the spoiler to be correctly positioned relative to the implement compartment.

[0036] According to an exemplary embodiment of the invention, the at least one engaging member may be in the form of a hook or any other suitable holding means. The hook may allow the user to easily remove and attached the spoiler to the at least one rib of the implement compartment.

[0037] According to an exemplary embodiment of the invention, the spoiler further includes a holding member for allowing the user to secure the at least one engaging member to the at least one rib. According to an exemplary embodiment of the invention, the holding member is secured to the at least one engaging member via at least one protrusion extending from the holding member. According to an exemplary embodiment of the invention, the at least one protrusion is at least partially received through the elastic member and the at least one engaging member, thereby allowing the holding member to be secured to the at least one engaging member. Further, the holding member may allow the user to apply a force on the at least one engaging member for securing the at least one engaging member to the at least one rib.

[0038] According to an exemplary embodiment of the invention, the spoiler further includes at least one slot. The at least one slot extends from the distal edge of the flexible member at least partially towards the rigid holding member. The at least one slot may divide the spoiler into a plurality of flexible latches, thereby enhancing the flexibility of the spoiler to slide over solid obstacles without getting damaged.

[0039] Before discussing the invention with the help of the drawings, the invention will be briefly discussed in general. A material collection equipment is disclosed that includes a spoiler. The spoiler may allow a free space between a front lower edge of an implement compartment and a ground surface to be easily manipulated based on the application requirements. Additionally, a cleaning performance of the material collection equipment may be improved on surfaces such as paved surfaces, concrete, etc. as wells as on low cut lawns. The spoiler may operate as a flexible curtain that prevents a material to be collected from being thrown forward by an implement and out of a range of the implement. The spoiler may be attached at a front portion of the material collection equipment, thereby preventing any negative impact to the performance of the material collection equipment. The spoiler may be flexible enough to slide over solid obstacles without getting damaged. The spoiler may also be stored on the material collection equipment.

[0040] Other features and aspects of this invention will be apparent from the following description and the accompanying drawings.

5 BRIEF DESCRIPTION OF THE DRAWINGS

[0041] The invention will be described in more detail with reference to the enclosed drawings, wherein:

10 **FIG. 1** illustrates a perspective view of a material collection equipment, in accordance with an exemplary embodiment of the present disclosure;

15 **FIG. 2** illustrates a perspective view of a material collection equipment in a storage position of a spoiler, in accordance with an exemplary embodiment of the present disclosure;

20 **FIG. 3** illustrates a perspective view of an implement compartment in the storage position of the spoiler, with some components not shown, in accordance with an exemplary embodiment of the present disclosure;

25 **FIG. 4** illustrates a perspective view of the implement compartment in an operational position of the spoiler, with some components not shown, in accordance with an exemplary embodiment of the present disclosure;

30 **FIG. 5** illustrates a perspective view of the spoiler, in accordance with an exemplary embodiment of the present disclosure;

35 **FIG. 6** illustrates a perspective view of the spoiler and at least one connecting member in the storage position of the spoiler, in accordance with an exemplary embodiment of the present disclosure;

40 **FIG. 7** illustrates a perspective view of the spoiler and the at least one connecting member in the operational position of the spoiler, in accordance with an exemplary embodiment of the present disclosure;

45 **FIG. 8** illustrates a perspective view of the material collection equipment, with some components not shown, in accordance with another exemplary embodiment of the present disclosure;

50 **FIG. 9** illustrates a partial exploded perspective view of the material collection equipment of **FIG. 8**, with some components not shown, in accordance with an exemplary embodiment of the present disclosure;

55 **FIG. 10** illustrates a perspective view of the material collection equipment of **FIG. 8** in a second position of the spoiler, with some components not shown, in accordance with an exemplary embodiment of the

present disclosure;

FIG. 11 illustrates a perspective view of a portion of the material collection equipment, with some components not shown, in accordance with another exemplary embodiment of the present disclosure;

FIG. 12A illustrates a perspective view of a portion of the implement compartment and the spoiler of the material collection equipment of **FIG. 11**, in accordance with an exemplary embodiment of the present disclosure;

FIG. 12B illustrates a perspective view of a portion of the spoiler of the material collection equipment of **FIG. 11**, in accordance with an exemplary embodiment of the present disclosure;

FIG. 12C illustrates an exploded perspective view of a portion of the implement compartment and the spoiler of the material collection equipment of **FIG. 11**, in accordance with an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE DRAWINGS

[0042] The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which example embodiments of the invention incorporating one or more aspects of the present invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. For example, one or more aspects of the present invention may be utilized in other embodiments and even other types of structures and/or methods. In the drawings, like numbers refer to like elements.

[0043] Certain terminology is used herein for convenience only and is not to be taken as a limitation on the invention. For example, "upper", "lower", "front", "rear", "side", "longitudinal", "lateral", "transverse", "upwards", "downwards", "forward", "backward", "sideward", "left", "right", "horizontal", "vertical", "upward", "inner", "outer", "inward", "outward", "top", "bottom", "higher", "above", "below", "central", "middle", "intermediate", "between", "end", "adjacent", "proximate", "near", "distal", "remote", "radial", "circumferential", or the like, merely describe the configuration shown in the Figures. Indeed, the components may be oriented in any direction and the terminology, therefore, should be understood as encompassing such variations unless specified otherwise.

[0044] **FIG. 1** illustrates a perspective view of a material collection equipment **100**, in accordance with an exemplary embodiment of the present disclosure. The material collection equipment **100** is adapted to collect a

material **102** (e.g., leaves, branches, dirt, grass, foliage, etc.) present on a ground surface **104** and to store the material **102** therein.

[0045] In some embodiments, the material collection equipment **100** may be a walk-behind leaf collector adapted to collect leaves present on a lawn surface and store the leaves therein. In some other embodiments, the material collection equipment **100** may be a floor cleaner adapted to collect debris present on a floor surface and store the debris therein, and the like. In an embodiment as shown in **FIG. 1**, the material collection equipment **100** is illustrated as a leaf collecting device. However, in other embodiments of the present invention, the material collection equipment **100** may be a lawn mower, or other types of gardening equipment known to persons skilled in the art.

[0046] The material collection equipment **100** includes a handle **110** extending along a first axis **A-A'**. According to an exemplary embodiment, the handle **110** is adapted to provide a pushing force therethrough to the material collection equipment **100** in order to propel the material collection equipment **100** on the ground surface **104** during a work operation. According to an exemplary embodiment, the handle **110** may be any suitable handle known in the art, such as a fixed handle, a swivel handle, a pivot handle, a telescopic handle, and the like. According to an exemplary embodiment, the handle **110** includes a gripping portion **112** coupled thereto. The gripping portion **112** is adapted to hold the handle **110** during the work operation. According to an exemplary embodiment, the handle **110** further includes a coupling portion **116** coupled thereto. The coupling portion **116** is adapted to support and/or couple the handle **110** with respect to the material collection equipment **100**.

[0047] The material collection equipment **100** further includes a storage compartment **118** coupled to the handle **110** and adapted to store the material **102** therein. According to an exemplary embodiment, the coupling portion **116** of the handle **110** is coupled to the storage compartment **118**. The storage compartment **118** includes a substantially hollow configuration. In some embodiments, the storage compartment **118** may include a cover portion (not shown) provided thereon. The cover portion may be adapted to provide an enclosure on the storage compartment **118**.

[0048] The material collection equipment **100** further includes an implement compartment **120**. According to an exemplary embodiment, the storage compartment **118** is disposed adjacent to the implement compartment **120**. The material collection equipment **100** further includes a connection element **108** connecting the handle **110** with the implement compartment **120**.

[0049] The material collection equipment **100** further includes an implement **106** (shown in **FIG. 2**) disposed within the implement compartment **120**. The implement **106** is adapted to collect the material **102** from the ground surface **104** and to transfer the material **102** into the storage compartment **118**. The storage compartment **118** is

adapted to receive the material **102** therein during the work operation. Additionally, the storage compartment **118** is adapted to temporally store the material **102** therein, based on application requirements.

[0050] The material collection equipment **100** further includes a pair of wheels **124**, **125**. Each wheel **124**, **125** from the pair of wheels **124**, **125** is rotatably coupled to the implement compartment **120** through a respective axle **114**, **115**. According to an exemplary embodiment, the axles **114**, **115** may include any suitable cross-sectional configuration, including, but not limited to, square, rectangular, triangular, elliptical, and the like. Each of the pair of wheels **124**, **125** is adapted to movably support the implement compartment **120** on the ground surface **104**.

[0051] Each wheel **124**, **125** includes a running surface **126**, **128**. According to an exemplary embodiment, the running surface **126**, **128** of each wheel **124**, **125** may engage with the ground surface **104** during the work operation or when the pair of wheels **124**, **125** support the implement compartment **120** on the ground surface **104**. In **FIG. 1**, the running surface **126**, **128** is shown by projecting the running surface **126**, **128** from under the respective wheel **124**, **125**. Each wheel **124**, **125** defines a spoiler direction **C** from the respective axle **114**, **115** towards a mid **127**, **129** of the respective running surface **126**, **128**.

[0052] The implement compartment **120** includes a first side wall **121**, a second side wall **122** opposite to and spaced apart from the first side wall **121**, and a top wall **123** extending between the first side wall **121** and the second side wall **122**. The implement compartment **120** defines a lower front edge **132** (shown in **FIG. 3**) along a second axis **B-B'** away from the handle **110**. The second axis **B-B'** extends transversely relative to the first axis **A-A'**. According to an exemplary embodiment, the top wall **123** defines the lower front edge **132** (shown in **FIG. 3**) extending between the first side wall **121** and the second side wall **122** along the second axis **B-B'**.

[0053] According to an exemplary embodiment, the first axis **A-A'** and the second axis **B-B'** may be bidirectional while the spoiler direction **C** may be unidirectional.

[0054] According to an exemplary embodiment, the implement **106** may be coupled to an implement axle (not shown) rotatably disposed within the implement compartment. According to an exemplary embodiment, the implement axle may be directly or indirectly (e.g., via a transmission mechanism such as one or more gears, a belt pulley mechanism, contacting elements, and the like) coupled to the respective axle **114**, **115** of the pair of wheels **124**, **125**. Accordingly, based on a rotation of each of the pair of wheels **124**, **125**, the implement **106** is adapted to rotate relative to the implement compartment **120**. Thus, the implement **106** is adapted to collect the material **102** from the ground surface **104** upon rotation and to transfer the material **102** to the storage compartment **118**.

[0055] The material collection equipment **100** further

includes a spoiler **140** coupled to the implement compartment **120** to extend the lower front edge **132** (shown in **FIG. 3**) of the implement compartment **120** along the spoiler direction **C**. The spoiler **140** is disposed adjacent to the lower front edge **132** (shown in **FIG. 3**) of the implement compartment **120**. In the illustrated embodiment of **FIG. 1**, the spoiler **140** is shown in an operational position **S1**. According to an exemplary embodiment, the spoiler **140** is pivotable relative to the implement compartment **120**.

[0056] **FIG. 2** illustrates a perspective view of the material collection equipment **100** in a storage position **S2** of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, the spoiler **140** is pivotable relative to the implement compartment **120** between the operational position **S1** (shown in **FIG. 1**) and the storage position **S2** as shown by the arrow **F1**. According to an exemplary embodiment, the spoiler **140** may be pivoted based on operational requirements of the material collection equipment **100** and a type of the ground surface **104** (shown in **FIG. 1**) to be worked upon.

[0057] **FIG. 3** illustrates a perspective view of the implement compartment **120** in the storage position **S2** of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. Some components of the implement compartment **120** are not shown for the purpose of illustration.

[0058] According to an exemplary embodiment, the spoiler **140** includes a rigid holding member **142** extending at least partially along the second axis **B-B'** and pivotally coupled to the implement compartment **120**. According to an exemplary embodiment, the material collection equipment **100** (shown in **FIGS. 1-2**) further includes at least one connecting member **134** fixedly coupled to the implement compartment **120** and defining a connecting surface **136** facing the spoiler **140**. According to an exemplary embodiment, the rigid holding member **142** is pivotally coupled to the at least one connecting member **134**. Specifically, the rigid holding member **142** is pivotally coupled to the connecting surface **136** of the at least one connecting member **134** in a form-fit manner. Accordingly, the rigid holding member **142** is pivotable about an axis **X-X'**.

[0059] In an embodiment as shown in **FIG. 3**, the at least one connecting member **134** includes a pair of connecting members **134**. However, it should be understood that the material collection equipment **100** (shown in **FIGS. 1-2**) may include any number of the at least one connecting members **134**. Each of the pair of connecting members **134** includes a corresponding connecting surface **136** disposed in front of the spoiler **140**. Further, the rigid holding member **142** is pivotally coupled to the connecting surface of each of the pair of connecting members **134**.

[0060] According to an exemplary embodiment, the spoiler **140** further includes a flexible member **144** extending from the rigid holding member **142** away from

the implement compartment **120**. The flexible member **144** defines a proximal edge **147** disposed adjacent to the rigid holding member **142** and a distal edge **146** spaced apart from the proximal edge **147** away from the rigid holding member **142**.

[0061] According to an exemplary embodiment, the flexible member **144** further defines an extending direction **N** from the proximal edge **147** of the flexible member **144** towards the distal edge **146** of the flexible member **144**. According to an exemplary embodiment, in the storage position **S2**, the extending direction **N** of the flexible member **144** is substantially opposite to the spoiler direction **C**.

[0062] FIG. 4 illustrates a perspective view of the implement compartment **120** in the operational position **S1** of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, in the operational position **S1**, the extending direction **N** of the flexible member **144** is substantially along the spoiler direction **C**. According to an exemplary embodiment, the spoiler **140** may be pivoted (as shown by the arrow **F1**) about the axis **X-X'** with respect to the implement compartment **120** allowing the extending direction **N** of the flexible member **144** to move relative to the implement compartment **120**.

[0063] Thus, the spoiler **140** may be pivoted between the storage position **S2** (shown in FIGS. 2-3) and the operational position **S1** based on operational requirements. Further, the spoiler **140** is toollessly adjusted along the spoiler direction **C** relative to the implement compartment **120** in the form-fit manner to extend the lower front edge **132**. For example, the user may be able to toollessly adjust the spoiler **140** by pivoting the spoiler **140** about the axis **X-X'** relative to the implement compartment **120** based on the operational requirements. The spoiler **140** may be able to retain its position as the rigid holding member **142** is pivotally coupled to the at least one connecting member **134** in the form-fit manner. It should be understood that the spoiler **140** may be adjusted to any intermediate position between the operational position **S1** and the storage position **S2** (shown in FIGS. 2-3) in the form-fit manner.

[0064] FIG. 5 illustrates a perspective view of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, the spoiler **140** further includes at least one slot **148**. According to an exemplary embodiment, the at least one slot **148** extends from the distal edge **146** of the flexible member **144** at least partially towards the proximal edge **147** of the flexible member **144**.

[0065] According to an exemplary embodiment, the spoiler **140** further includes at least one flexible locking member **150** coupled to and extending from the rigid holding member **142** adjacent to the at least one connecting member **134** (shown in FIGS. 3-4). In an embodiment as shown in FIG. 5, the at least one flexible locking member **150** includes a pair of flexible locking members **150**. However, it should be understood that the spoiler **140** may

include any number of the flexible locking members **150**.

[0066] FIG. 6 illustrates a perspective view of the spoiler **140** and the at least one connecting member **134** in the storage position **S2** of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, in the storage position **S2**, the at least one flexible locking member **150** is adapted to lockingly and releasably engage with the connecting surface **136** of the at least one connecting member **134**, such that the spoiler **140** is restricted from pivoting about the axis **X-X'** relative to the implement compartment **120** (shown in FIGS. 1-4). In an embodiment as shown in FIG. 6, each of the pair of flexible locking members **150** (only one visible) is adapted to lockingly and releasably engage with the connecting surface **136** of the corresponding connecting member **134**.

[0067] According to an exemplary embodiment, as the spoiler **140** is pivoted relative to the implement compartment **120** (shown in FIGS. 1-4) about the axis **X-X'** from the operational position **S1** (shown in FIGS. 1 & 4) to the storage position **S2**, the at least one flexible locking member **150** of the spoiler **140** engages with the connecting surface **136** of the at least one connecting member **134**, thereby restricting the pivoting movement of the spoiler **140** and locking the spoiler **140** in the storage position **S2**.

[0068] FIG. 7 illustrates a perspective view of the spoiler **140** and the at least one connecting member **134** in the operational position **S2** of the spoiler **140**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, in the operational position **S1**, the at least one flexible locking member **150** is disengaged from the connecting surface **136** of the at least one connecting member **134**. According to an exemplary embodiment, as the spoiler **140** is pivoted about the axis **X-X'** relative to the implement compartment **120** (shown in FIGS. 1-4) from the storage position **S2** (shown in FIGS. 2, 3 & 6) to the operational position **S1**, the at least one flexible locking member **150** of the spoiler **140** may flex and disengage from the connecting surface **136** of the at least one connecting member **134**, thereby releasing the spoiler **140** and allowing pivoting movement of the spoiler **140**. According to an exemplary embodiment, the spoiler **140** may be held at any intermediate position between the operational position **S1** and the storage position **S2** (shown in FIGS. 2, 3 & 6).

[0069] FIG. 8 illustrates a perspective view of the material collection equipment **100**, in accordance with another exemplary embodiment of the present disclosure. Some components of the material collection equipment **100** are not shown for the purpose of illustration. The material collection equipment **100** includes a spoiler **240** coupled to the implement compartment **120**. The spoiler **240** may be similar to the spoiler **140** shown in FIGS. 1-7, and the same or equivalent elements or elements having the same or equivalent functionality are indicated by the same or equivalent reference numbers in the following description.

[0070] In an embodiment as shown in FIG. 8, the spoiler 240 is removably coupled to the implement compartment 120. According to an exemplary embodiment, material collection equipment 100 further includes at least one securing member 252 removably coupling the spoiler 240 to the implement compartment 120. In an embodiment as shown in FIG. 8, the at least one securing member 252 includes three securing members 252. However, it should be understood that the at least one securing member 252 may include any number of the securing member 252.

[0071] According to an exemplary embodiment, the spoiler 240 includes a rigid holding member 242 extending along the second axis B-B' and removably coupled to the implement compartment 120. According to an exemplary embodiment, the spoiler 240 further includes a flexible member 244 extending from the rigid holding member 242 away from the implement compartment 120. According to an exemplary embodiment, the flexible member 244 defines a distal edge 246 away from the rigid holding member 242.

[0072] According to an exemplary embodiment, the spoiler 240 further includes at least one slot 248. According to an exemplary embodiment, the at least one slot 248 extends from the distal edge 246 of the flexible member 244 at least partially towards the rigid holding member 242. In an embodiment as shown in FIG. 8, the at least one slot 248 includes a plurality of slots 248. Each of the plurality of slots 248 extends from the distal edge 246 at least partially towards the rigid holding member 242.

[0073] According to an exemplary embodiment, the spoiler 240 is removably coupled to the implement compartment 120 between a first position P1 and a second position P2 (shown in FIG. 10). A distance D1 exists between the distal edge 246 of the flexible member 244 and the running surface 126, 128 of each wheel 124, 125 along the spoiler direction C in the first position P1 of the spoiler 140.

[0074] FIG. 9 illustrates a partial exploded perspective view of the material collection equipment 100, in accordance with an exemplary embodiment of the present disclosure. In an embodiment as shown in FIG. 9, the implement compartment 120 includes at least one receiving portion 262 disposed adjacent to the lower front edge 132. According to an exemplary embodiment, the at least one securing member 252 includes an elongated portion 261. The at least one securing member 252 further includes a projection 264 extending transversely from the elongated portion 261 and configured to engage with walls (e.g., a groove within the walls) of the corresponding receiving portion 262.

[0075] According to an exemplary embodiment, the elongated portion 261 is adapted to be at least partially received through the corresponding receiving portion 262. According to an exemplary embodiment, the at least one securing member 252 may be rotated after inserting the elongated portion 261 into the corresponding receiving portion 262, thereby allowing the projection 264 to

engage with the walls of the corresponding receiving portion 262. Thus, the at least one securing member 252 may secure the spoiler 240 to the implement compartment 120 in the form-fit manner. It should be understood that the at least one securing member 252 may include any other suitable means for securing the spoiler 240 to the implement compartment 120 in the form-fit manner.

[0076] FIG. 10 illustrates a perspective view of the material collection equipment 100 in the second position P2 of the spoiler 240, in accordance with an exemplary embodiment of the present disclosure. Some components of the material collection equipment 100 are not shown for the purpose of illustration. According to an exemplary embodiment, a distance D2 exists between the distal edge 246 of the flexible member 244 and the running surface 126, 128 of each wheel 124, 125 along the spoiler direction C in the second position P2 of the spoiler 140. According to an exemplary embodiment, the distance D1 (shown in FIG. 8) in the first position P1 (shown in FIG. 8) of the spoiler 140 is greater than the distance D2 in the second position P2 of the spoiler 140.

[0077] According to an exemplary embodiment, the at least one securing member 252 may allow the spoiler 240 to be removed from the first position P1 (shown in FIG. 8) and coupled to the implement compartment 120 again in the second position P2. Thus, the at least one securing member 252 may allow the spoiler 240 to be toollessly adjusted along the spoiler direction C relative to the implement compartment 120 in the form-fit manner to extend the lower front edge 132 (shown in FIG. 9). Further, the lower front edge 132 may be adjusted starting from a maximum distance from the running surface 126, 128 (shown in FIG. 8). It should be understood that the spoiler 240 may be adjusted relative to the implement compartment 120 at any intermediate position between the first position P1 (shown in FIG. 8) and the second position P2.

[0078] FIG. 11 illustrates a perspective view of a portion of the material collection equipment 100, in accordance with another exemplary embodiment of the present disclosure. Some components of the material collection equipment 100 are not shown for the purpose of illustration. The material collection equipment 100 includes a spoiler 340 coupled to the implement compartment 120. The spoiler 340 may be similar to the spoiler 140 (shown in FIGS. 1-7) and the spoiler 240 (shown in FIGS. 8-10), and the same or equivalent elements or elements having the same or equivalent functionality are indicated by the same or equivalent reference numbers in the following description.

[0079] In an embodiment as shown in FIG. 11, the spoiler 340 is removably coupled to the implement compartment 120. According to an exemplary embodiment, the spoiler 340 includes at least one engaging member 356 for securing the spoiler 340 to the implement compartment 120. In an embodiment as shown in FIG. 11, the at least one engaging member 356 includes a pair of engaging members 356.

[0080] According to an exemplary embodiment, the spoiler **340** includes an elastic member **343** extending along the second axis **B-B'** and removably coupled to the implement compartment **120**. According to an exemplary embodiment, the spoiler **340** further includes a flexible member **344** extending from the elastic member **343** away from the implement compartment **120**. According to an exemplary embodiment, an elasticity of the flexible member **344** is different from an elasticity of the elastic member **343**. According to an exemplary embodiment, the flexible member **344** defines a distal edge **346** away from the elastic member **343**.

[0081] According to an exemplary embodiment, the spoiler **340** includes at least one slot **348**. According to an exemplary embodiment, the at least one slot **348** extends from the distal edge **346** of the flexible member **344** at least partially towards the elastic member **343**. In an embodiment as shown in **FIG. 11**, the at least one slot **348** includes a plurality of slots **348**. Each of the plurality of slots **348** extends from the distal edge **346** at least partially towards the elastic member **343**.

[0082] **FIG. 12A** illustrates a perspective view of a portion of the implement compartment **120** and the spoiler **340**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, the implement compartment **120** further includes at least one rib **354** disposed on the side wall **121** (i.e., the first side wall **121** shown in **FIGS. 1-4, 8-10**) of the implement compartment **120**. In an embodiment as shown in **FIG. 12A**, only one rib **354** is visible. However, it should be understood that the second side wall **122** (shown in **FIGS. 1-2**) may also include the at least one rib **354**.

[0083] According to an exemplary embodiment, the spoiler **340** further includes the at least one engaging member **356** corresponding to the at least one rib **354**. According to an exemplary embodiment, the at least one engaging member **356** is fixedly coupled to the elastic member **343**. According to an exemplary embodiment, the at least one engaging member **356** removably engages with the at least one rib **354**, such that the spoiler **340** is removably coupled to the implement compartment **120**. According to an exemplary embodiment, the at least one rib **354** may include an opening (not shown) adapted to receive at least a portion of the at least one engaging member **356** for removably coupling the spoiler **340** to the implement compartment **120**.

[0084] According to an exemplary embodiment, the at least one engaging member **356** may be manipulated for removing the spoiler **340** from the implement compartment **120**. According to an exemplary embodiment, the spoiler **340** further includes a holding member **358** adapted to allow the user to remove or attach the at least one engaging member **356** to the at least one rib **354** of the implement compartment **120**.

[0085] **FIG. 12B** illustrates a perspective view of a portion of the spoiler **340**, in accordance with an exemplary embodiment of the present disclosure. According to an

exemplary embodiment, the holding member **358** is secured to the at least one engaging member **356** via at least one protrusion **360** extending from the holding member **358**. According to an exemplary embodiment, the at least one protrusion **360** is at least partially received through the elastic member **343** and the at least one engaging member **356**.

[0086] **FIG. 12C** illustrates an exploded perspective view of a portion of the implement compartment **120** and the spoiler **340**, in accordance with an exemplary embodiment of the present disclosure. According to an exemplary embodiment, the at least one rib **354** may include a plurality of indents **366** spaced apart from each other. In an embodiment as shown in **FIG. 12C**, only two indents **366** are visible. However, the implement compartment **120** may include any number of the indents **166**. Specifically, the plurality of indents **366** are disposed at predetermined heights. The plurality of indents **366** may allow the spoiler **340** to be correctly positioned relative to the implement compartment **120** at the predetermined heights. The plurality of indents **366** may also be provided on the at least one rib disposed at the second side wall **122** (shown in **FIGS. 1-2**) of the implement compartment **120**, thereby allowing the spoiler **340** to be correctly positioned at both its ends.

[0087] Referring to **FIGS. 1 to 12C**, the present disclosure provides the material collection equipment **100** that includes the spoiler **140, 240, 340** coupled to the implement compartment **120** and disposed adjacent to the lower front edge **132** of the implement compartment **120**. The spoiler may allow the user of the material collection equipment **100** to easily manipulate a free space between the lower front edge **132** of the implement compartment **120** and the running surface **126, 128**, thereby mitigating dirt and dust disappearing out of the implement compartment **120** when working on surfaces such as paved surfaces, concrete, etc. The free space may be varied starting from a maximum free space.

[0088] The spoiler **140, 240, 340** of the present disclosure may be toollessly adjusted along the spoiler direction **C** relative to the implement compartment **120** in the form-fit manner. Thus, the spoiler **140, 240, 340** may not require any additional tools for adjusting the spoiler **140, 240, 340** relative to the implement compartment **120**, thereby promoting user-friendliness and ease of using the spoiler **140, 240, 340**.

[0089] Additionally, the spoiler **140, 240, 340** may operate as a flexible curtain that prevents the material **102** (e.g., leaves, branches, etc.) from being thrown forward by the implement **106** and out of the range of the implement **106**. Therefore, the material **102** may be constrained by the spoiler **140, 240, 340** and eventually picked up by the implement **106**. Thus, the spoiler **140, 240, 340** of the present disclosure may improve a collection performance of the material collection equipment **100** even on the ground surfaces **104** such as paved surfaces, concrete, etc. as well as on low cut lawns. This may mitigate the need for multiple operational cycles with

the material collection equipment **100** on the same surface to collect the material **102**.

[0090] Further, the spoiler **140, 240, 340** of the present disclosure is disposed at a front of the implement compartment **120**. Therefore, the spoiler **140, 240, 340** may not negatively impact a performance of the material collection equipment **100** on the regular working surfaces and in a parking position of the material collection equipment **100**. Moreover, the spoiler **140, 240, 340** of the present disclosure is light-weighted and flexible, thereby allowing the spoiler **140, 240, 340** to move over the material **102** to be collected without pushing the material **102**. The at least one slot **148, 248, 348** may divide the spoiler **140, 240, 340** into a plurality of flexible latches, thereby enhancing the flexibility of the spoiler **140, 240, 340** to slide over solid obstacles without getting damaged.

[0091] In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation of the scope of the invention being set forth in the following claims.

LIST OF ELEMENTS

[0092]

100	Material Collection Equipment
102	Material
104	Ground Surface
106	Implement
108	Connection Element
110	Handle
112	Gripping Portion
114	Axle
115	Axle
116	Coupling Portion
118	Storage Compartment
120	Implement Compartment
121	First Side Wall
122	Second Side Wall
123	Top Wall
124	Wheel
125	Wheel
126	Running Surface
127	Mid
128	Running Surface
129	Mid
132	Front Lower Edge
134	Connecting Member
136	Connecting Surface
140	Spoiler
142	Rigid Holding Member
144	Flexible Member
146	Distal Edge
147	Proximal Edge
148	Slot

150	Flexible Locking Member
240	Spoiler
242	Rigid Holding Member
244	Flexible Member
246	Distal Edge
248	Slot
252	Securing Member
261	Elongated Portion
262	Receiving Portion
264	Projection
340	Spoiler
343	Elastic Member
344	Flexible Member
346	Distal Edge
348	Slot
354	Rib
356	Engaging Member
358	Holding Member
360	Protrusion
366	Indent
A-A'	Axis
B-B'	Second Axis
C	Spoiler Direction
D1	Distance
D2	Distance
F1	Arrow
N	Extending Direction
P1	First Position
P2	Second Position
S1	Operational Position
S2	Storage Position
X-X'	Axis

35 Claims

1. A material collection equipment (100), comprising:

- a handle (**110**) extending along a first axis (**A-A'**);
- a connection element (**108**) connecting the handle (**110**) with an implement compartment (**120**), the implement compartment (**120**) defining a lower front edge (**132**) along a second axis (**B-B'**) away from the handle (**110**), wherein the second axis (**B-B'**) extends transversely relative to the first axis (**A-A'**);
- an implement (**106**) disposed within the implement compartment (**120**) and adapted to collect a material (**102**) from a ground surface (**104**) and to transfer the material (**102**) into a storage compartment (**118**);
- a pair of wheels (**124, 125**), wherein each wheel (**124, 125**) from the pair of wheels (**124, 125**) is rotatably coupled to the implement compartment (**120**) through a respective axle (**114, 115**), wherein each wheel (**124, 125**) comprises a running surface (**126, 128**), and wherein each wheel

(124, 125) defines a spoiler direction (C) from the respective axle (114, 115) towards a mid (127, 129) of the respective running surface (126, 128);

characterized in that:

- a spoiler (140, 240, 340) coupled to the implement compartment (120) to extend the lower front edge (132) of the implement compartment (120) along the spoiler direction (C), wherein the spoiler (140, 240, 340) is disposed adjacent to the lower front edge (132) of the implement compartment (120), and wherein the spoiler (140, 240, 340) is toollessly adjusted along the spoiler direction (C) relative to the implement compartment (120) in a form-fit manner to extend the lower front edge (132).
2. The material collection equipment (100) according to claim 1, wherein the spoiler (140) is pivotable relative to the implement compartment (120).
 3. The material collection equipment (100) according to claim 2, wherein the spoiler (140) comprises:

a rigid holding member (142) extending along the second axis (B-B') and pivotally coupled to the implement compartment (120); and

a flexible member (144) extending from the rigid holding member (142) away from the implement compartment (120), wherein the flexible member (144) defines a proximal edge (147) disposed adjacent to the rigid holding member and a distal edge (146) spaced apart from the proximal edge (147) away from the rigid holding member (142), and wherein the flexible member (144) further defines an extending direction (N) from the proximal edge (147) of the flexible member (144) towards the distal edge (146) of the flexible member (144).
 4. The material collection equipment (100) according to claim 3, wherein the spoiler (140) is pivotable relative to the implement compartment (120) between an operational position (S1) and a storage position (S2), wherein, in the operational position (S1), the extending direction (N) of the flexible member (144) is substantially along the spoiler direction (C), and wherein, in the storage position (S2), the extending direction (N) of the flexible member (144) is substantially opposite to the spoiler direction (C).
 5. The material collection equipment (100) according to claim 3 or claim 4, further comprising at least one connecting member (134) fixedly coupled to the implement compartment (120) and defining a connecting surface (136) facing the spoiler (140), wherein

the rigid holding member (142) is pivotally coupled to the at least one connecting member (134).

6. The material collection equipment (100) according to claim 5, wherein the spoiler (140) further comprises at least one flexible locking member (150) coupled to and extending from the rigid holding member (142) adjacent to the at least one connecting member (134), and wherein:

in the storage position (S2), the at least one flexible locking member (150) is adapted to lockingly and releasably engage with the connecting surface (136) of the at least one connecting member (134), such that the spoiler (140) is restricted from pivoting relative to the implement compartment (120); and

in the operational position (S1), the at least one flexible locking member (150) is disengaged from the connecting surface (136).
7. The material collection equipment (100) according to anyone of claims 3-6, wherein the spoiler (140) further comprises at least one slot (148), and wherein the at least one slot (148) extends from the distal edge (146) of the flexible member (144) at least partially towards the proximal edge (147) of the flexible member (144).
8. The material collection equipment (100) according to claim 1, wherein the spoiler (240, 340) is removably coupled to the implement compartment (120).
9. The material collection equipment (100) according to claim 8, wherein the spoiler (240) comprises:

a rigid holding member (242) extending along the second axis (B-B') and removably coupled to the implement compartment (120); and

a flexible member (244) extending from the rigid holding member (242) away from the implement compartment (120), wherein the flexible member (244) defines a distal edge (246) away from the rigid holding member (242).
10. The material collection equipment (100) according to claim 9, wherein the spoiler (240) is removably coupled to the implement compartment (120) between a first position (P1) and a second position (P2), and wherein a distance (D1) between the distal edge (246) of the flexible member (244) and the running surface (126, 128) of each wheel (124, 125) along the spoiler direction (C) in the first position (P1) of the spoiler (240) is greater than a distance (D2) between the distal edge (246) and the running surface (126, 128) of each wheel (124, 125) along the spoiler direction (C) in the second position (P2) of the spoiler (240).

11. The material collection equipment (100) according to anyone of claims 9-10, wherein the spoiler (240) further comprises at least one slot (248), and wherein the at least one slot (248) extends from the distal edge (246) of the flexible member (244) at least partially towards the rigid holding member (242). 5
12. The material collection equipment (100) according to claim 8, wherein the spoiler (340) comprises: 10
- an elastic member (343) extending along the second axis (B-B') and removably coupled to the implement compartment (120); and
- a flexible member (344) extending from the elastic member (343) away from the implement compartment (120), wherein an elasticity of the flexible member (344) is different from an elasticity of the elastic member (343), and wherein the flexible member (344) defines a distal edge (346) away from the elastic member (343). 15 20
13. The material collection equipment (100) according to claim 12, wherein: 25
- the implement compartment (120) further comprises at least one rib (354) disposed along a side wall (121) of the implement compartment (120); and
- the spoiler (340) further comprises at least one engaging member (356) corresponding to the at least one rib (354), wherein the at least one engaging member (356) is fixedly coupled to the elastic member (343), and wherein the at least one engaging member (356) removably engages with the at least one rib (354), such that the spoiler (340) is removably coupled to the implement compartment (120). 30 35
14. The material collection equipment (100) according to claim 12 or claim 13, wherein the spoiler (340) further comprises at least one slot (348), and wherein the at least one slot (348) extends from the distal edge (346) of the flexible member (344) at least partially towards the elastic member (343). 40 45
15. The material collection equipment (100) according to anyone of the preceding claims, wherein the storage compartment (118) is disposed adjacent to the implement compartment (120). 50

Amended claims in accordance with Rule 137(2) EPC.

1. A material collection equipment (100), comprising: 55
- a handle (110) extending along a first axis (A-A'); 60

a connection element (108) connecting the handle (110) with an implement compartment (120), the implement compartment (120) defining a lower front edge (132) along a second axis (B-B') away from the handle (110), wherein the second axis (B-B') extends transversely relative to the first axis (A-A'); 65

an implement (106) disposed within the implement compartment (120) and adapted to collect a material (102) from a ground surface (104) and to transfer the material (102) into a storage compartment (118); 70

a pair of wheels (124, 125), wherein each wheel (124, 125) from the pair of wheels (124, 125) is rotatably coupled to the implement compartment (120) through a respective axle (114, 115), wherein each wheel (124, 125) comprises a running surface (126, 128), and wherein each wheel (124, 125) defines a spoiler direction (C) from the respective axle (114, 115) towards a mid (127, 129) of the respective running surface (126, 128); 75

wherein a spoiler (140, 240, 340) coupled to the implement compartment (120) to extend the lower front edge (132) of the implement compartment (120) along the spoiler direction (C), wherein the spoiler (140, 240, 340) is disposed adjacent to the lower front edge (132) of the implement compartment (120), and wherein the spoiler (140, 240, 340) is toollessly adjusted along the spoiler direction (C) relative to the implement compartment (120) in a form-fit manner to extend the lower front edge (132), 80

characterized in that:

the spoiler (140) is pivotable relative to the implement compartment (120). 85

2. The material collection equipment (100) according to claim 1, wherein the spoiler (140) comprises: 90

a rigid holding member (142) extending along the second axis (B-B') and pivotally coupled to the implement compartment (120); and

a flexible member (144) extending from the rigid holding member (142) away from the implement compartment (120), wherein the flexible member (144) defines a proximal edge (147) disposed adjacent to the rigid holding member and a distal edge (146) spaced apart from the proximal edge (147) away from the rigid holding member (142), and wherein the flexible member (144) further defines an extending direction (N) from the proximal edge (147) of the flexible member (144) towards the distal edge (146) of the flexible member (144). 95

3. The material collection equipment (100) according to claim 2, wherein the spoiler (140) is pivotable rel- 100

ative to the implement compartment (120) between an operational position (S1) and a storage position (S2), wherein, in the operational position (S1), the extending direction (N) of the flexible member (144) is substantially along the spoiler direction (C), and wherein, in the storage position (S2), the extending direction (N) of the flexible member (144) is substantially opposite to the spoiler direction (C).

4. The material collection equipment (100) according to claim 2 or claim 3, further comprising at least one connecting member (134) fixedly coupled to the implement compartment (120) and defining a connecting surface (136) facing the spoiler (140), wherein the rigid holding member (142) is pivotally coupled to the at least one connecting member (134).

5. The material collection equipment (100) according to claim 4, wherein the spoiler (140) further comprises at least one flexible locking member (150) coupled to and extending from the rigid holding member (142) adjacent to the at least one connecting member (134), and wherein:

in the storage position (S2), the at least one flexible locking member (150) is adapted to lockingly and releasably engage with the connecting surface (136) of the at least one connecting member (134), such that the spoiler (140) is restricted from pivoting relative to the implement compartment (120); and

in the operational position (S1), the at least one flexible locking member (150) is disengaged from the connecting surface (136).

6. The material collection equipment (100) according to anyone of claims 2 to 5, wherein the spoiler (140) further comprises at least one slot (148), and wherein the at least one slot (148) extends from the distal edge (146) of the flexible member (144) at least partially towards the proximal edge (147) of the flexible member (144).

7. The material collection equipment (100) according to claim 1, wherein the spoiler (240, 340) is removably coupled to the implement compartment (120).

8. The material collection equipment (100) according to claim 7, wherein the spoiler (240) comprises:

a rigid holding member (242) extending along the second axis (B-B') and removably coupled to the implement compartment (120); and
a flexible member (244) extending from the rigid holding member (242) away from the implement compartment (120), wherein the flexible member (244) defines a distal edge (246) away from the rigid holding member (242).

9. The material collection equipment (100) according to claim 8, wherein the spoiler (240) is removably coupled to the implement compartment (120) between a first position (P1) and a second position (P2), and wherein a distance (D1) between the distal edge (246) of the flexible member (244) and the running surface (126, 128) of each wheel (124, 125) along the spoiler direction (C) in the first position (P1) of the spoiler (240) is greater than a distance (D2) between the distal edge (246) and the running surface (126, 128) of each wheel (124, 125) along the spoiler direction (C) in the second position (P2) of the spoiler (240).

10. The material collection equipment (100) according to anyone of claims 8 to 9, wherein the spoiler (240) further comprises at least one slot (248), and wherein the at least one slot (248) extends from the distal edge (246) of the flexible member (244) at least partially towards the rigid holding member (242).

11. The material collection equipment (100) according to claim 7, wherein the spoiler (340) comprises:

an elastic member (343) extending along the second axis (B-B') and removably coupled to the implement compartment (120); and
a flexible member (344) extending from the elastic member (343) away from the implement compartment (120), wherein an elasticity of the flexible member (344) is different from an elasticity of the elastic member (343), and wherein the flexible member (344) defines a distal edge (346) away from the elastic member (343).

12. The material collection equipment (100) according to claim 11, wherein:

the implement compartment (120) further comprises at least one rib (354) disposed along a side wall (121) of the implement compartment (120); and

the spoiler (340) further comprises at least one engaging member (356) corresponding to the at least one rib (354), wherein the at least one engaging member (356) is fixedly coupled to the elastic member (343), and wherein the at least one engaging member (356) removably engages with the at least one rib (354), such that the spoiler (340) is removably coupled to the implement compartment (120).

13. The material collection equipment (100) according to claim 11 or claim 12, wherein the spoiler (340) further comprises at least one slot (348), and wherein the at least one slot (348) extends from the distal edge (346) of the flexible member (344) at least partially towards the elastic member (343).

14. The material collection equipment **(100)** according to anyone of the preceding claims, wherein the storage compartment **(118)** is disposed adjacent to the implement compartment **(120)**.

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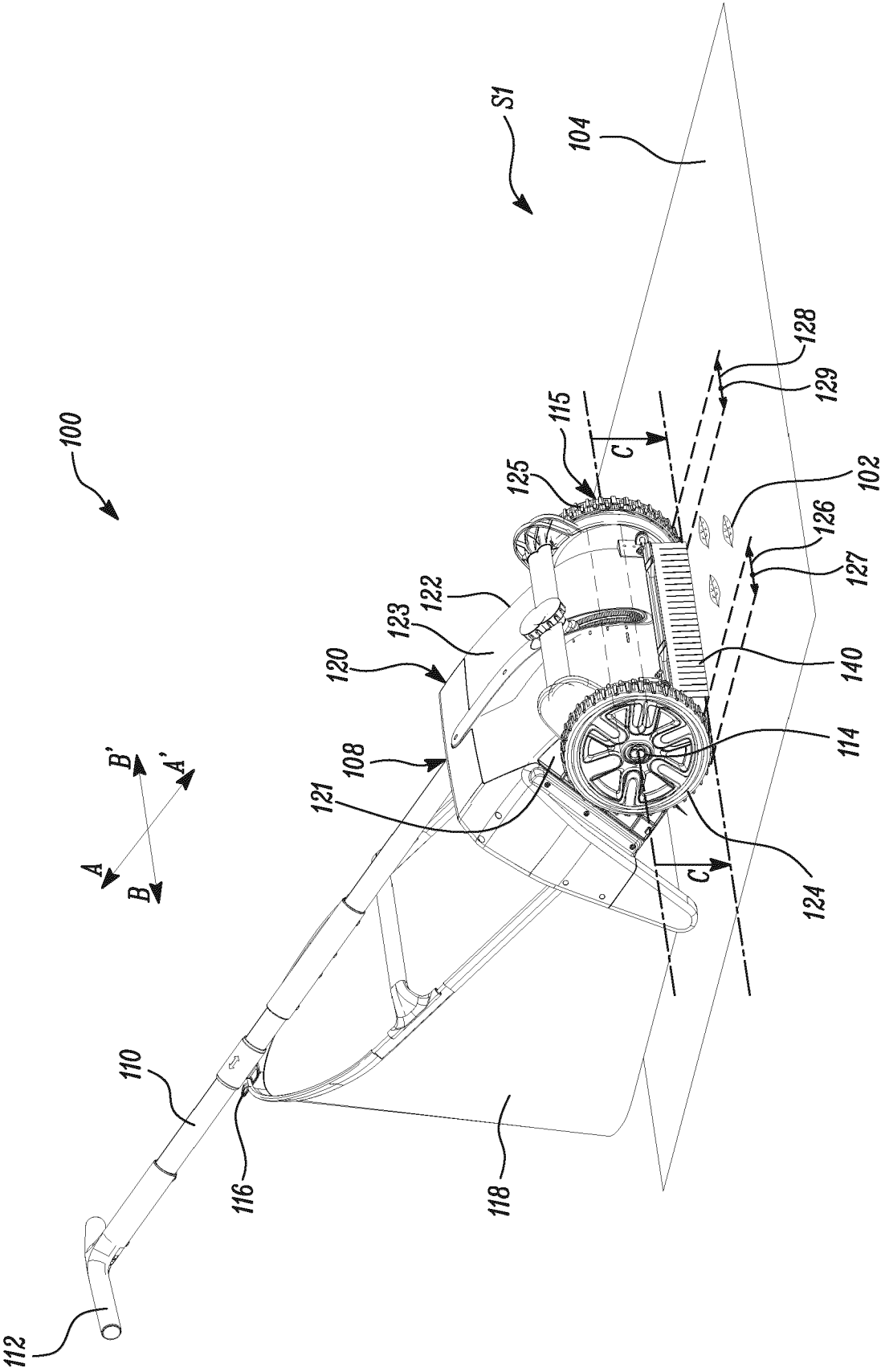


FIG. 1

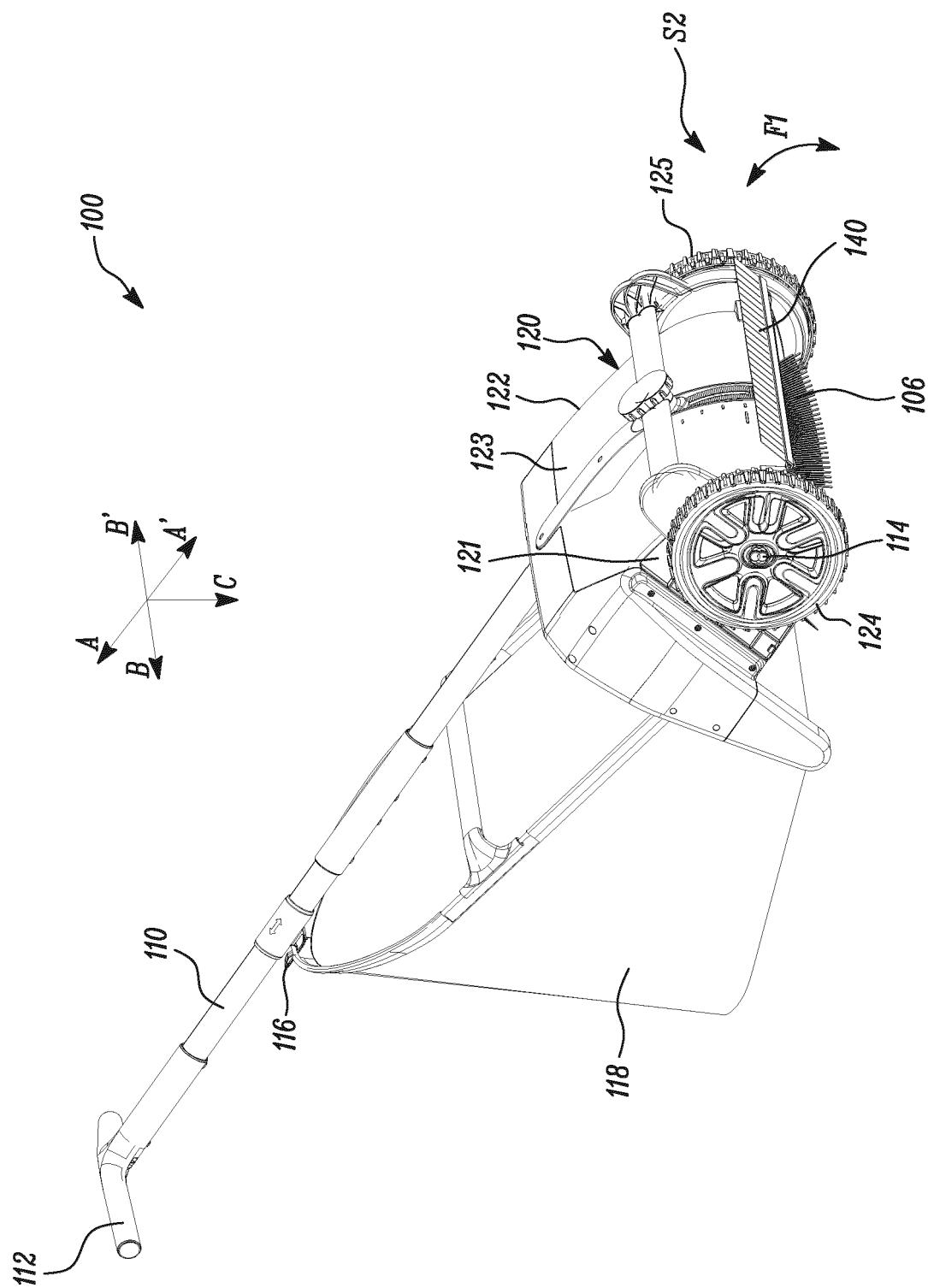


FIG. 2

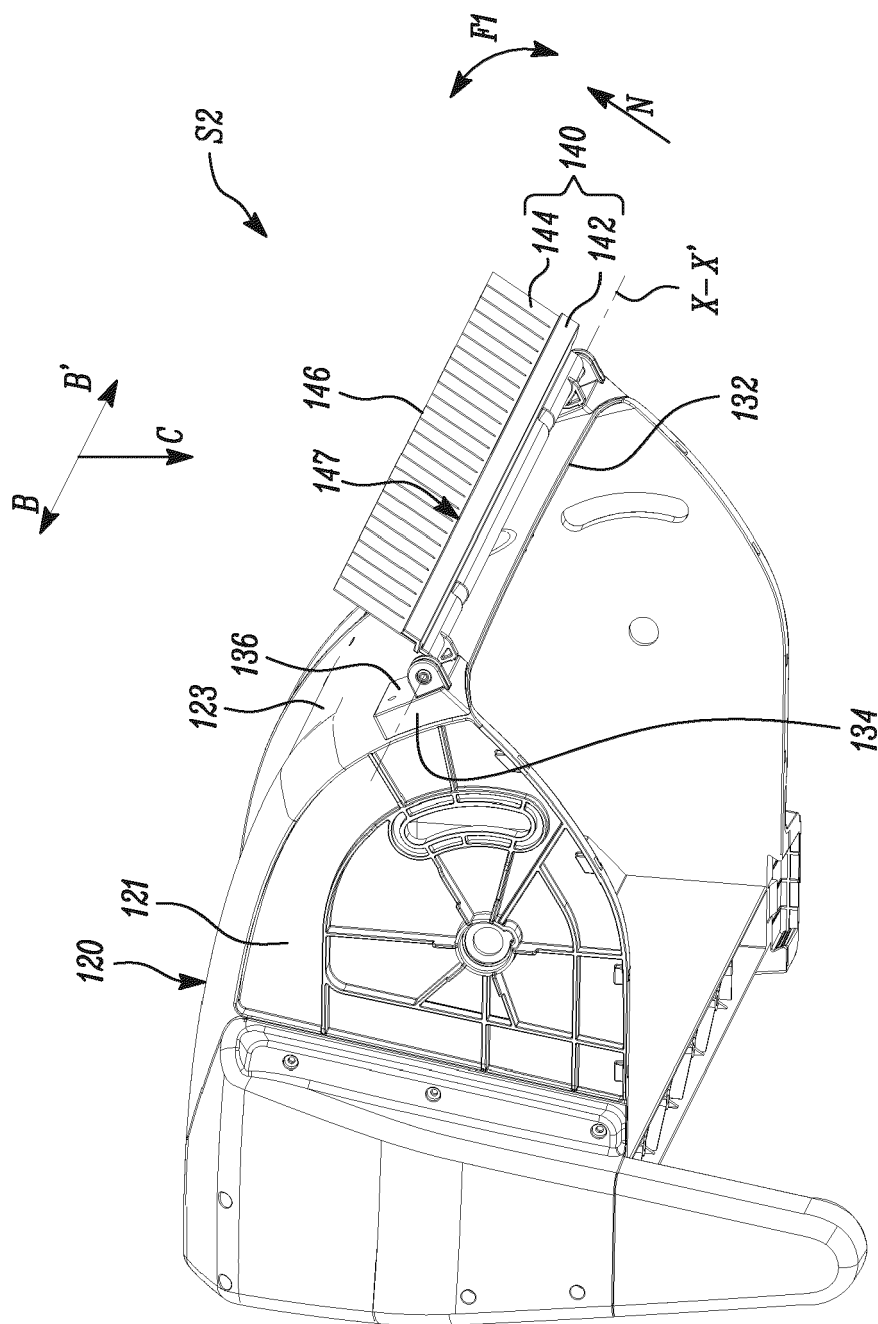


FIG. 3

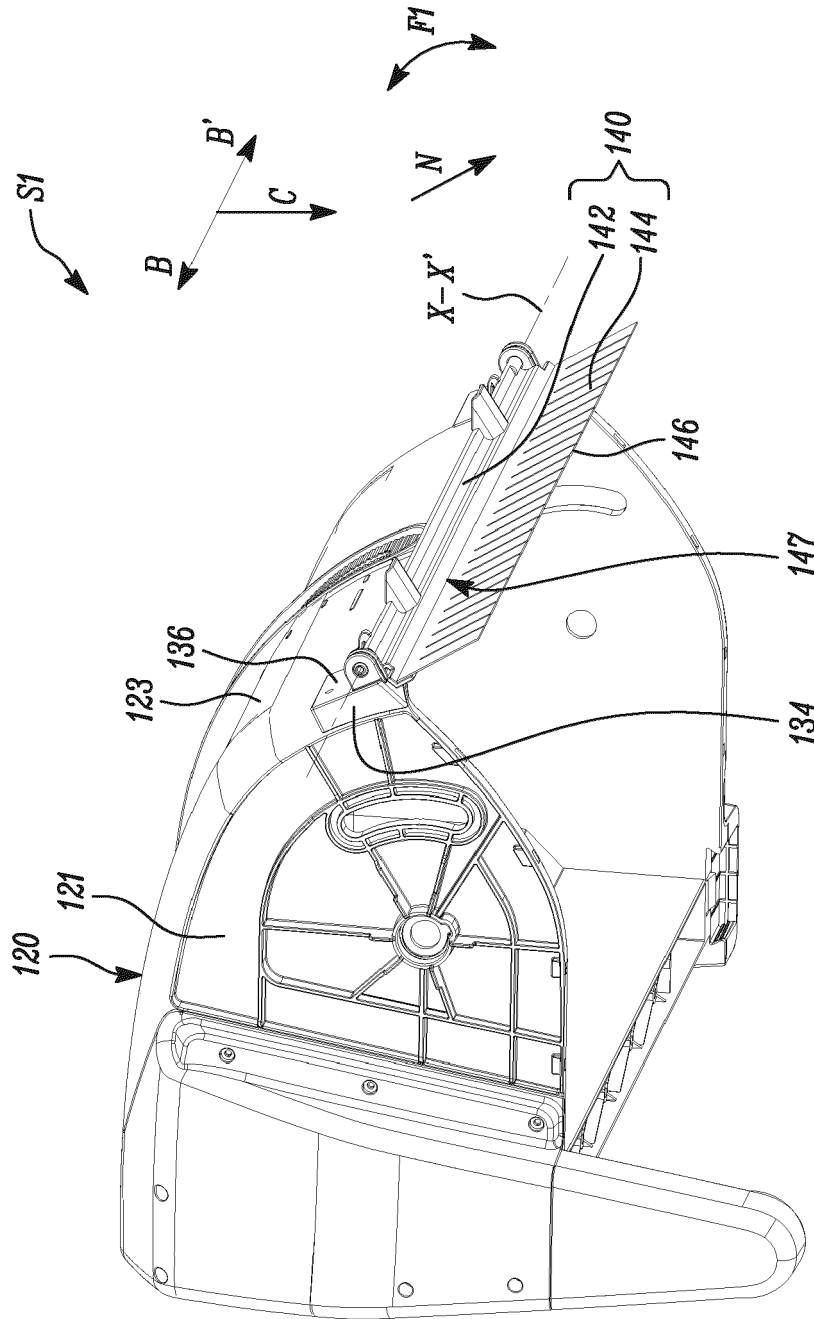


FIG. 4

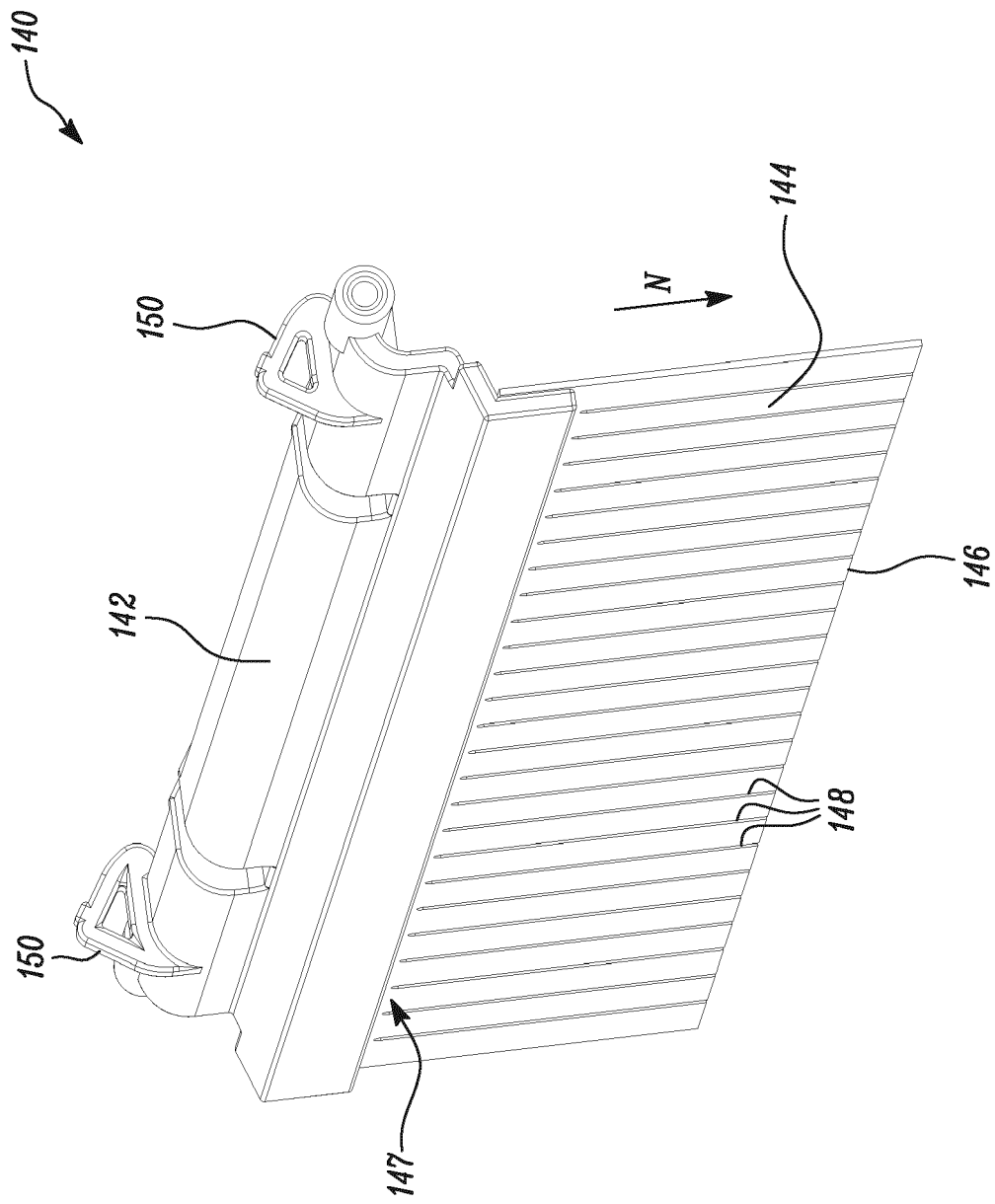


FIG. 5

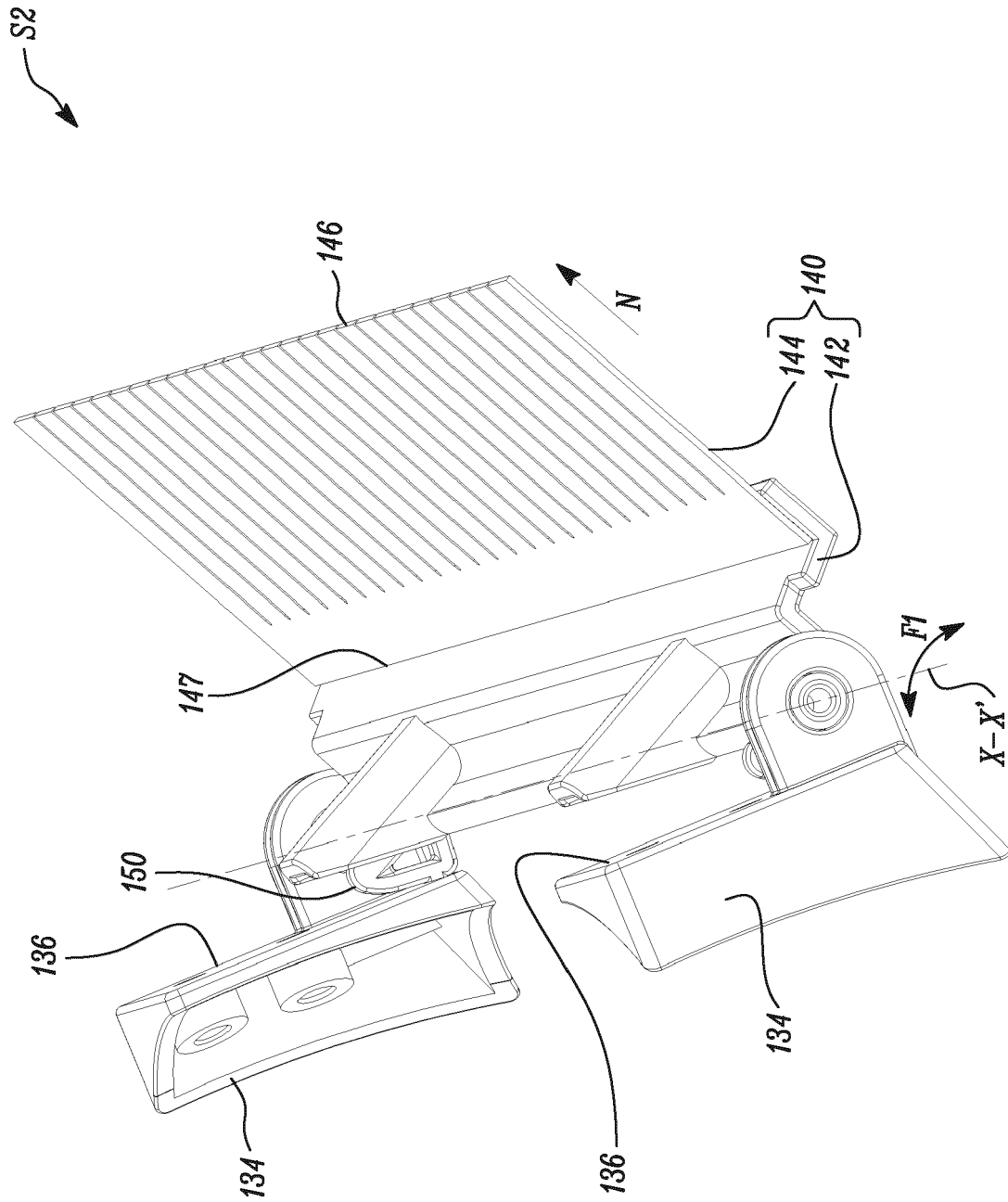


FIG. 6

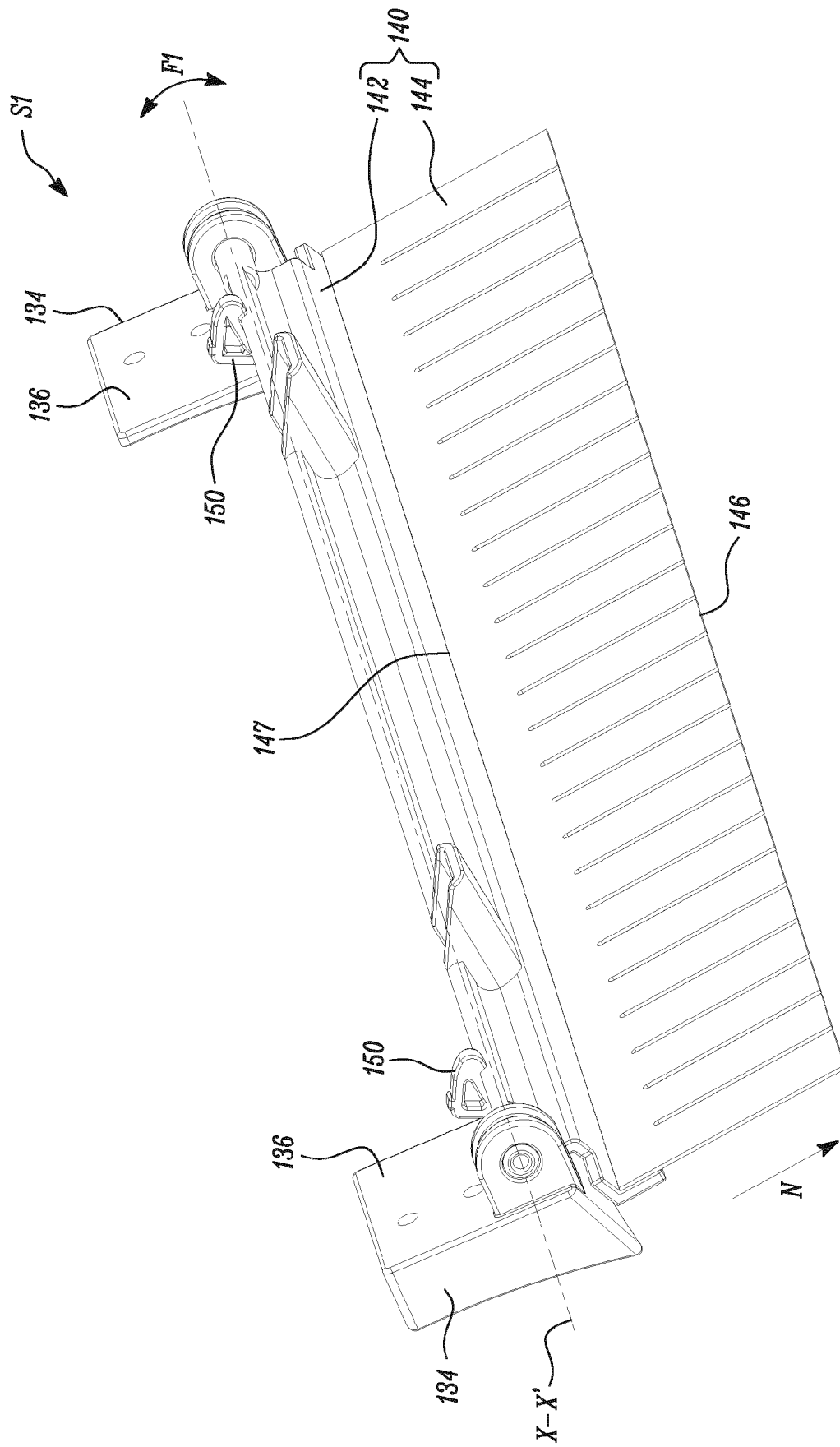


FIG. 7

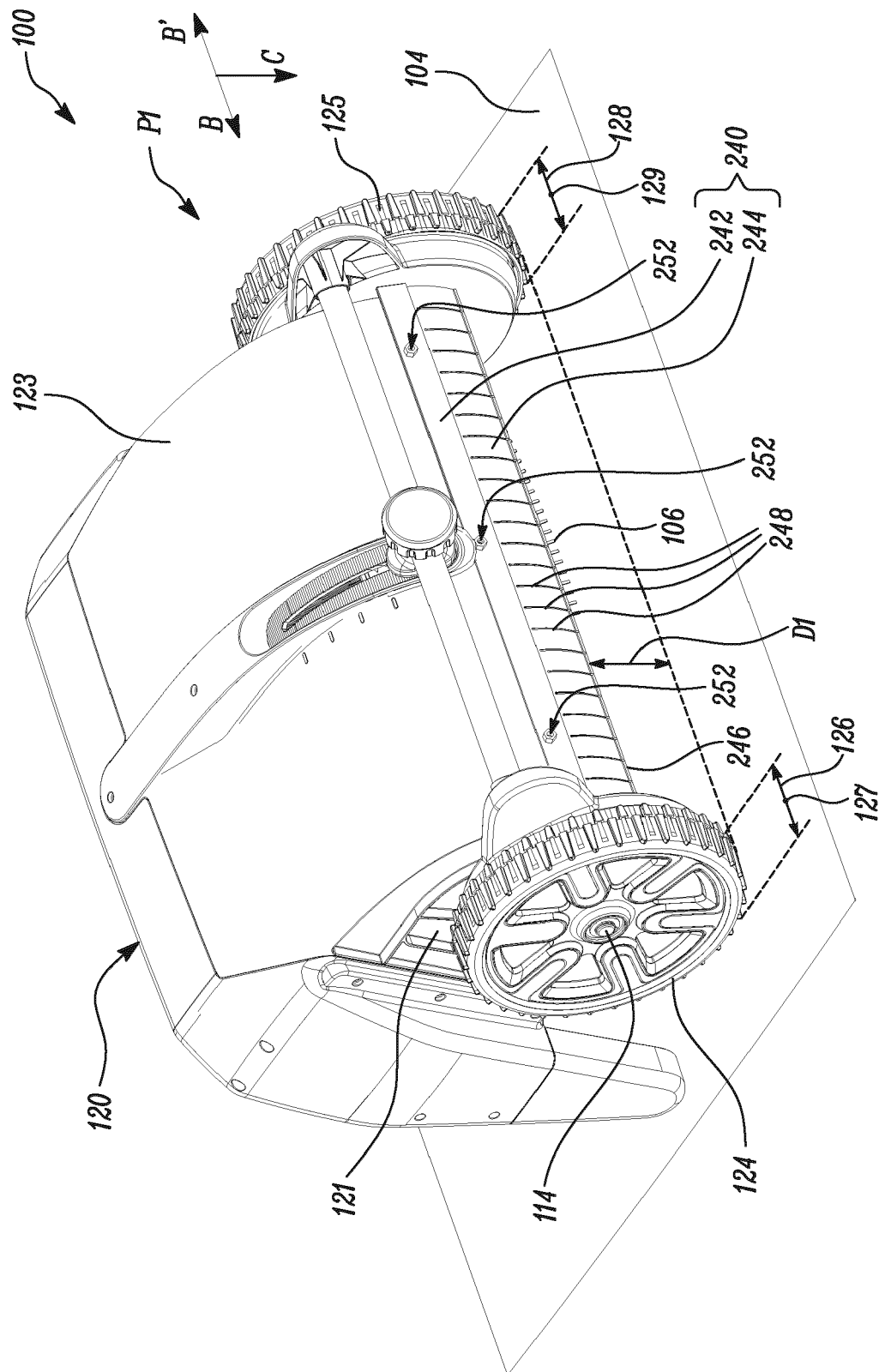


FIG. 8

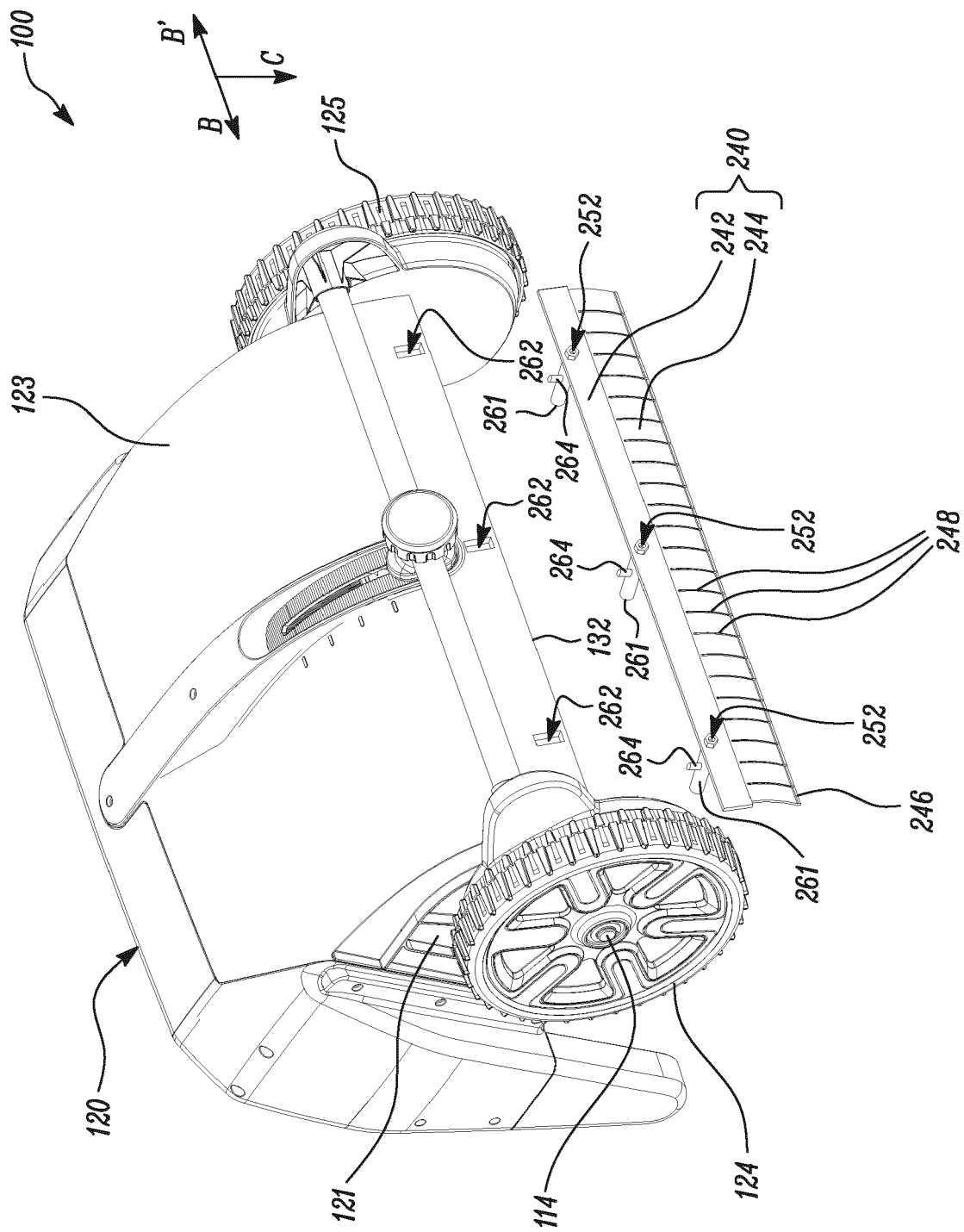


FIG. 9

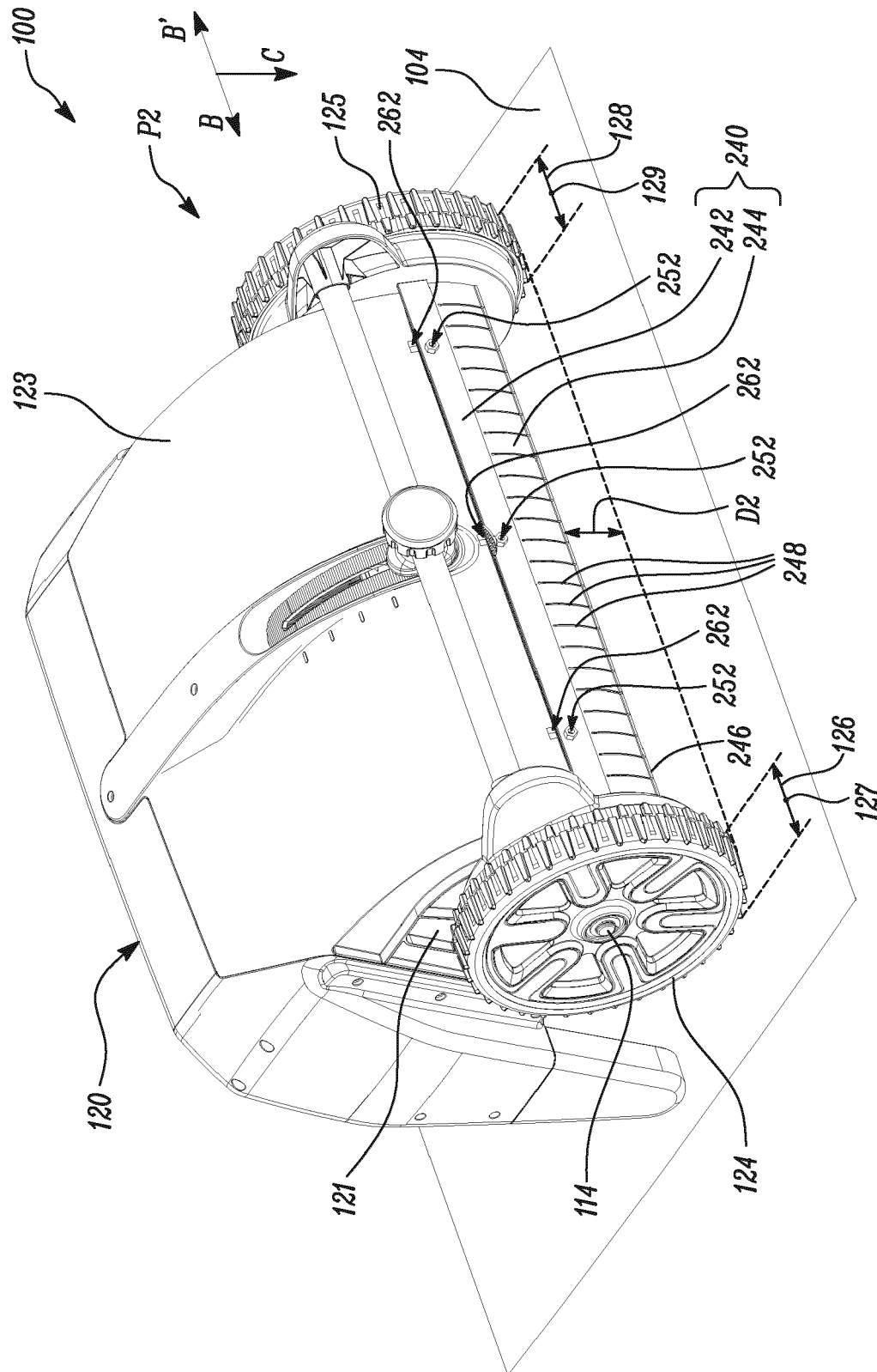


FIG. 10

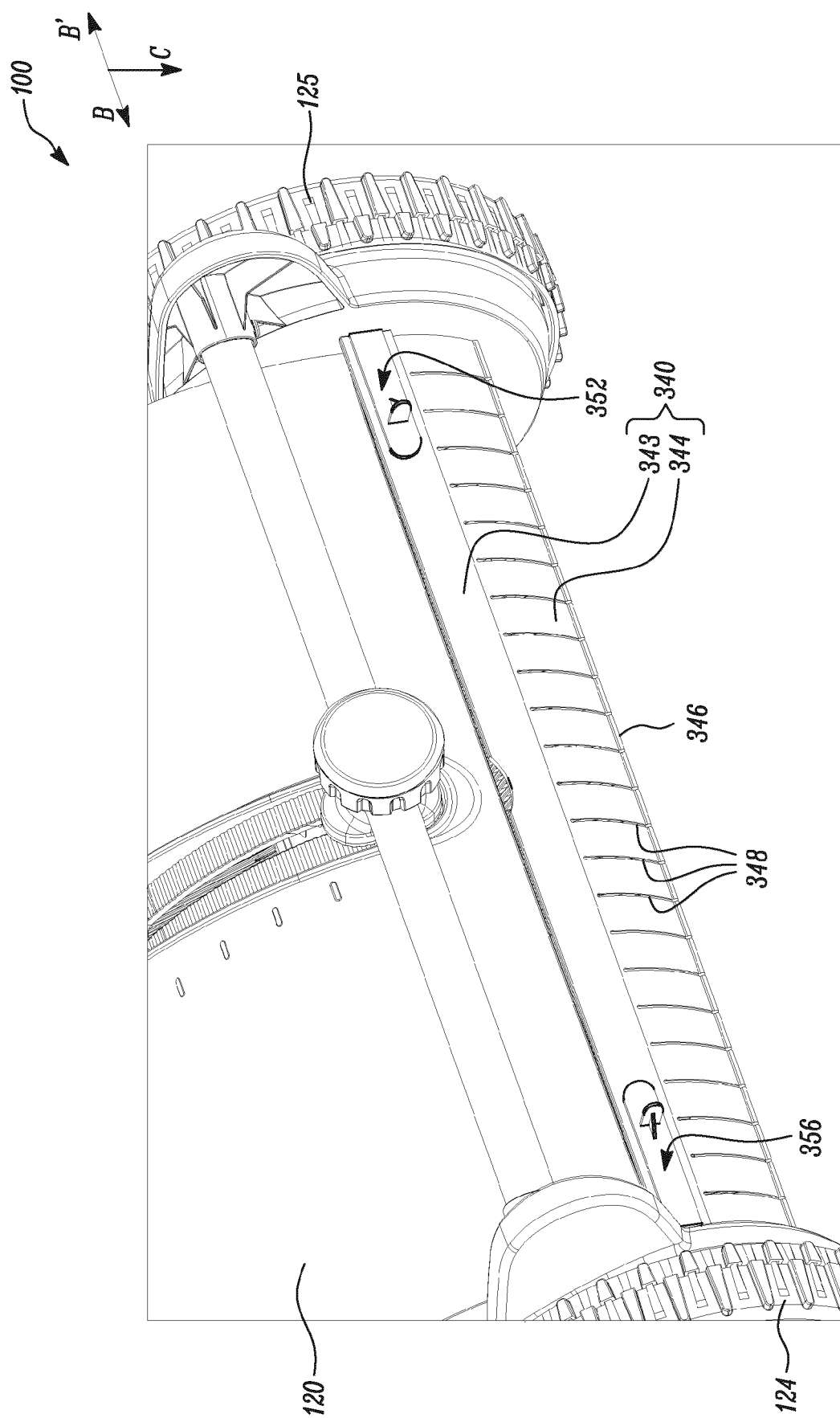


FIG. 11

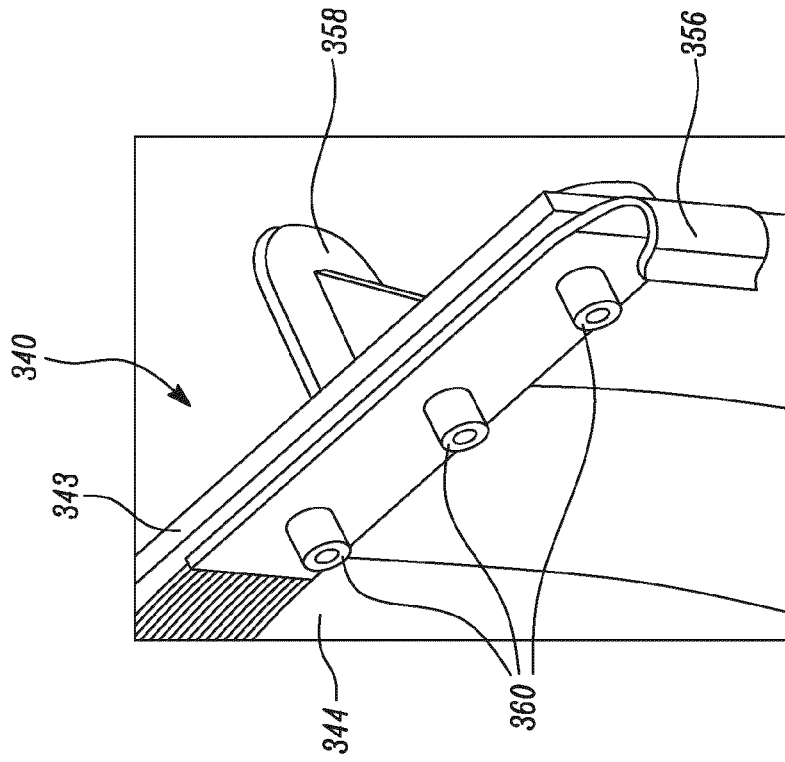


FIG. 12B

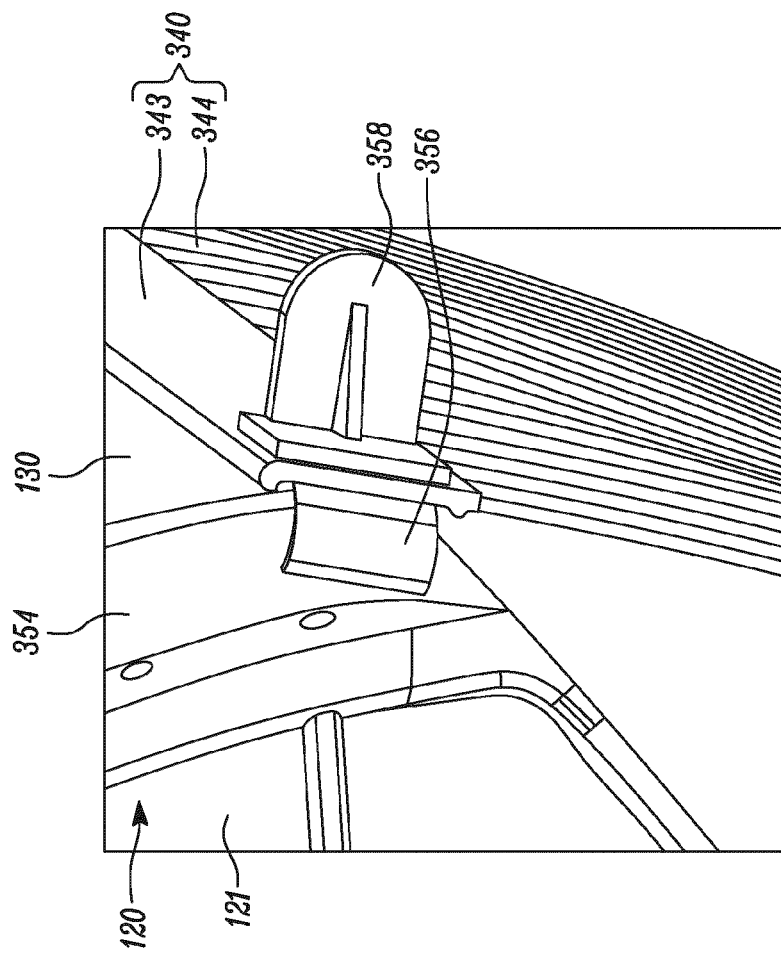


FIG. 12A

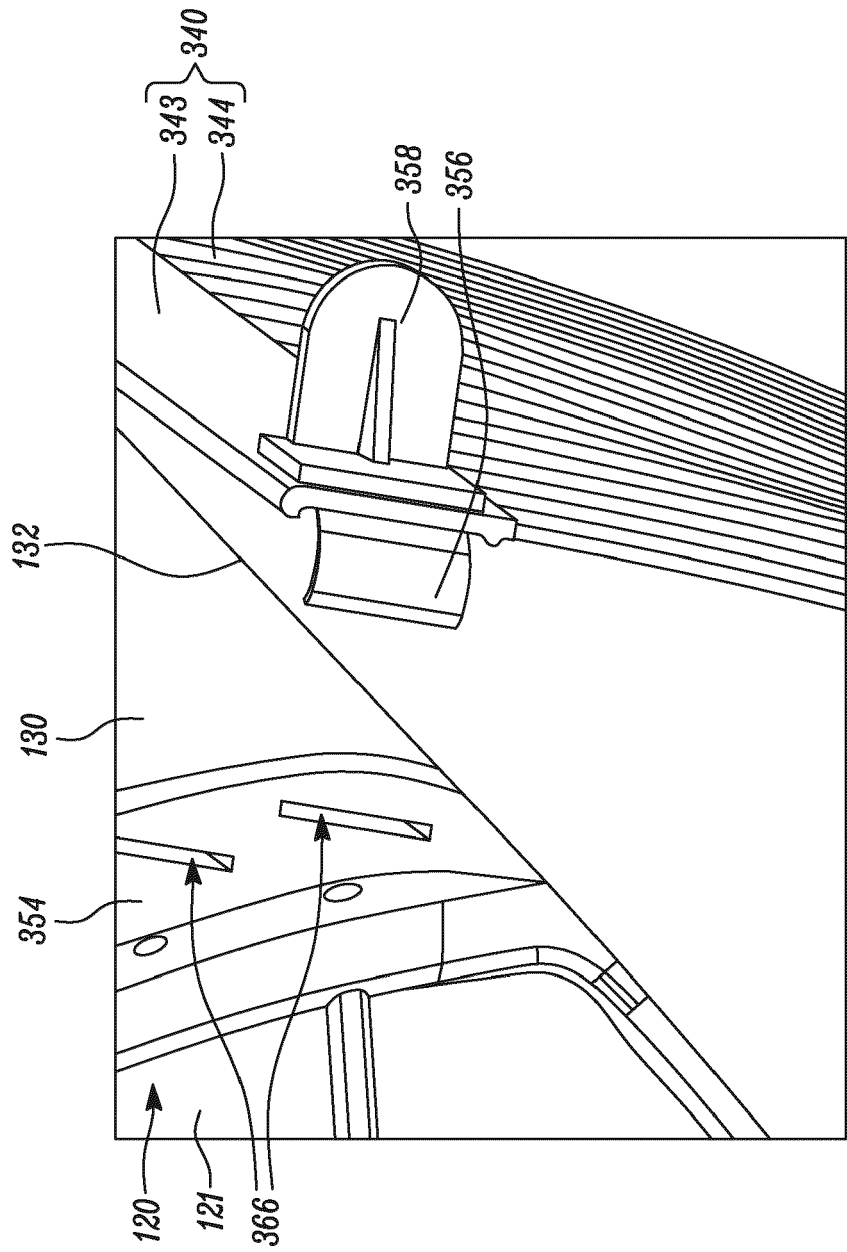


FIG. 12C



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 0465

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	DE 18 99 839 U (WOLF GERAET G M B H [DE]) 3 September 1964 (1964-09-03) * pages 4,5 *	1,8-11, 15	INV. E01H1/04
X	US 2 552 382 A (JOHN ROOT ARTHUR) 8 May 1951 (1951-05-08) * column 4 *	1,15	
X	US 2 700 783 A (PARKER EDWIN D ET AL) 1 February 1955 (1955-02-01) * columns 3,4 *	1,15	

TECHNICAL FIELDS
SEARCHED (IPC)

E01H

The present search report has been drawn up for all claims

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Place of search

Munich

Date of completion of the search

25 July 2023

Examiner

Saretta, Guido

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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25-07-2023

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15	US 2700783	A	01-02-1955	NONE
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