US 20170058472A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0058472 A1**

YOU (43) **Pub. Date: Mar. 2, 2017**

(54) **SNOW BLOWER**

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(21) Appl. No.: **14/973,483**

(22) Filed: **Dec. 17, 2015**

(30) **Foreign Application Priority Data**

Sep. 1, 2015 (KR) 10-2015-0123765

Publication Classification

(51) **Int. Cl.**

E01H 5/09 (2006.01)

E01H 5/04 (2006.01)

(52) **U.S. Cl.**

CPC ***E01H 5/098*** (2013.01); ***E01H 5/045*** (2013.01)

(57) **ABSTRACT**

The present invention generally relates to a snow blower that removes snow from an area by blowing the snow away. More particularly, the present invention relates to a snow blower configured in such a manner that snow is introduced into a blade via transmission by an augur, and is then discharged through a discharge chute by the operation of an impeller. The snow blower including: a blower body including a blade, an augur, and an impeller; and a coupler including a mount and multiple links, wherein the blower body includes vertical mount panels, the mount panels provided at a rear end of the blower body and spaced apart from each other in parallel, and the mount of the coupler includes dual plates provided at the front end parts of the links such that each of the mount panels is fitted between and mounted to the dual plates of the coupler.

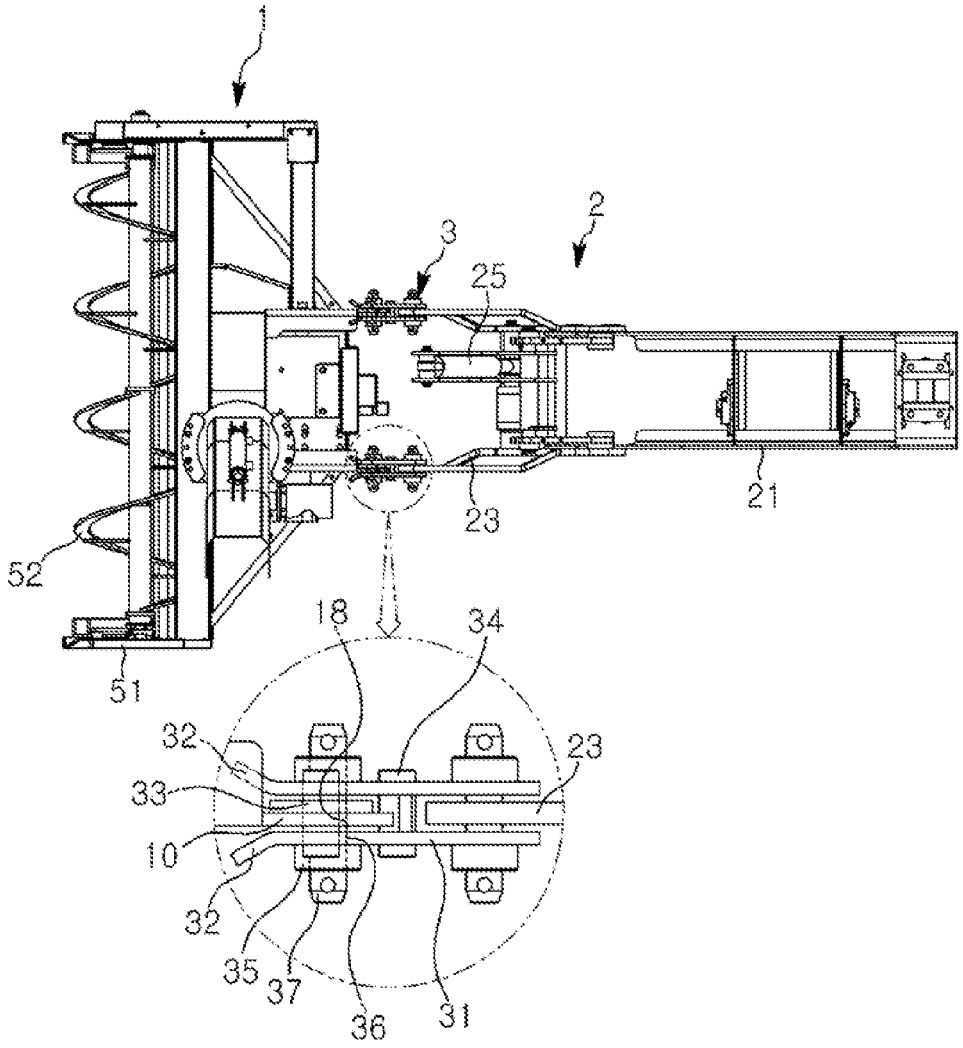


FIG. 1

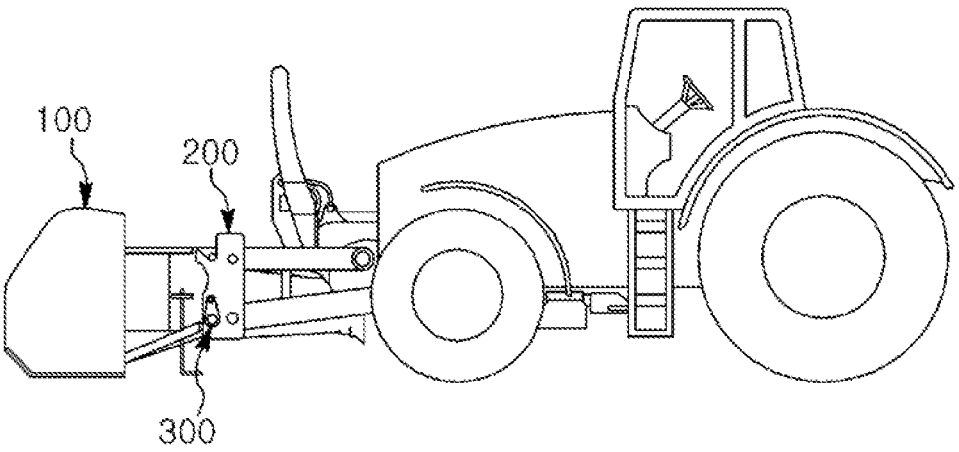


FIG. 2

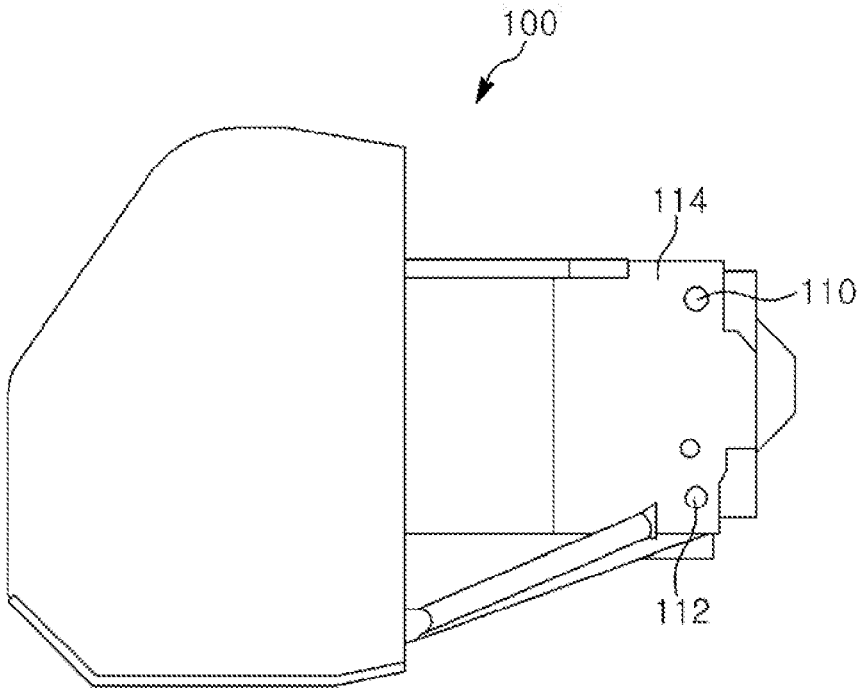


FIG. 3

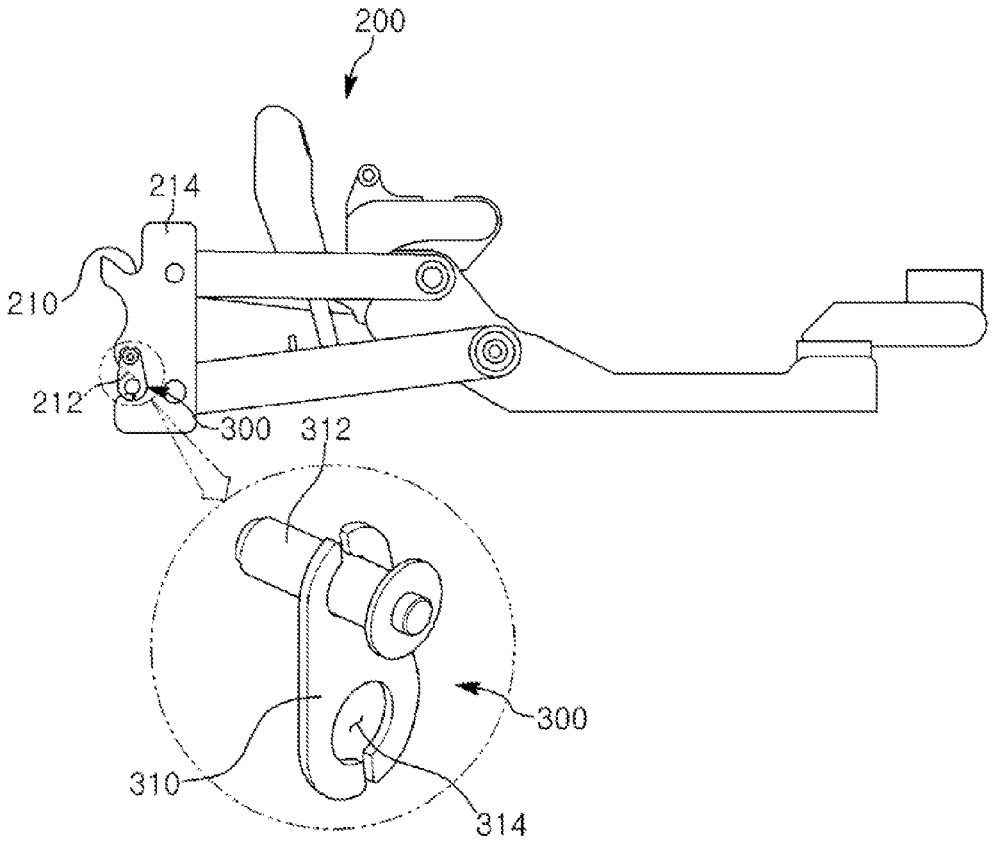


FIG. 4

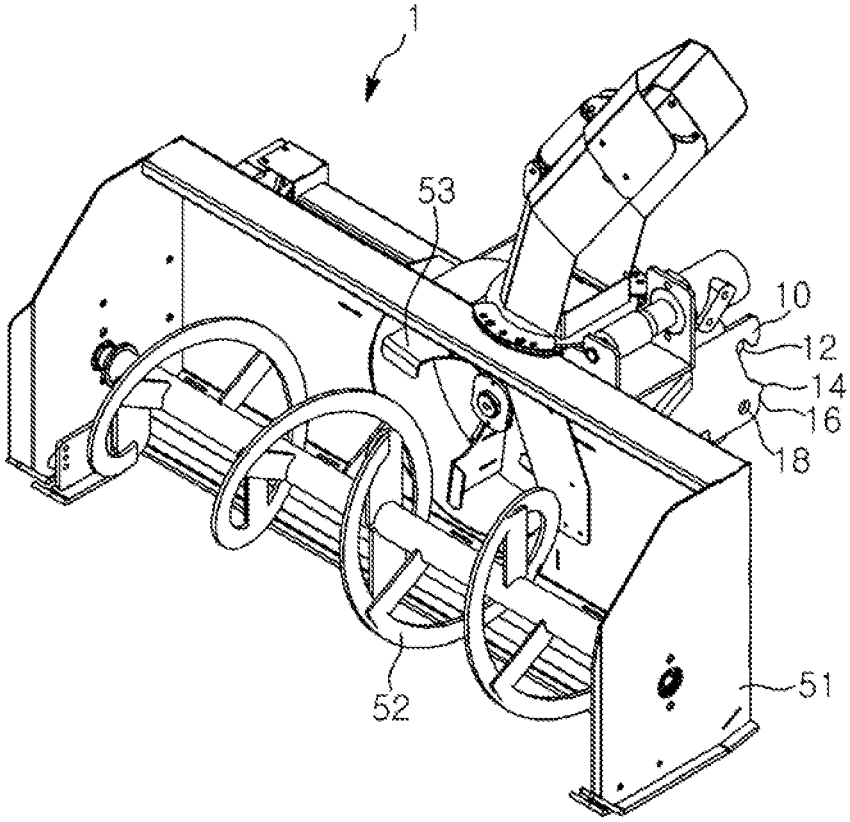


FIG. 5

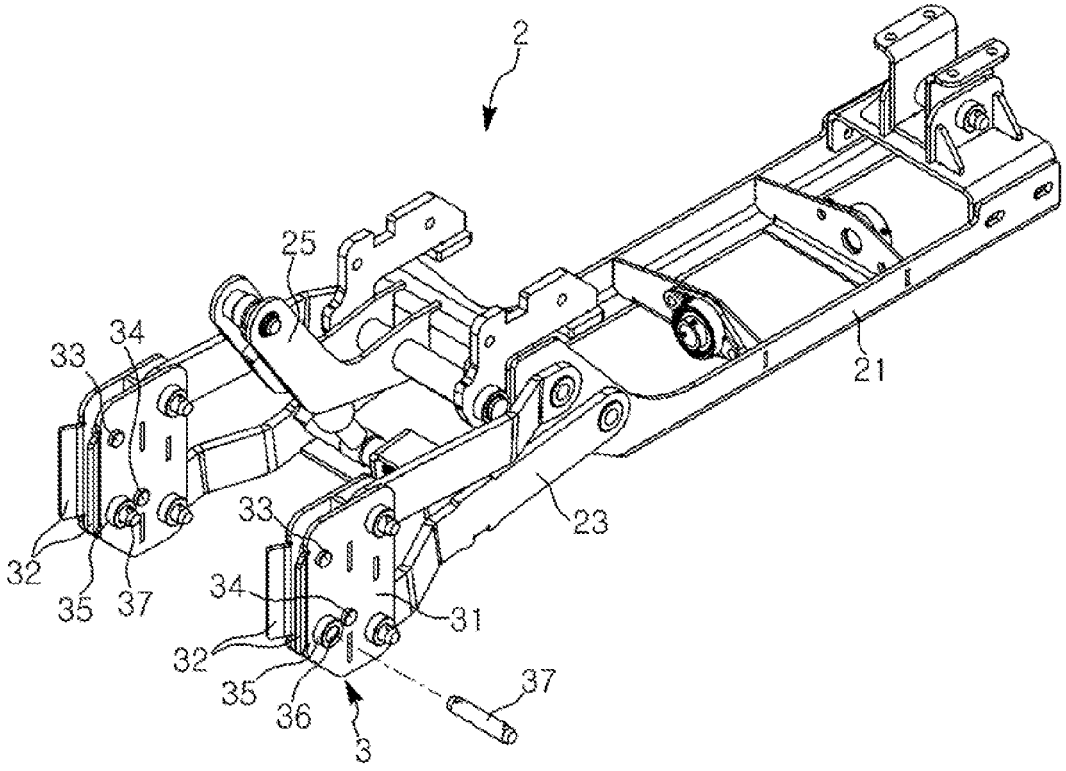


FIG. 6

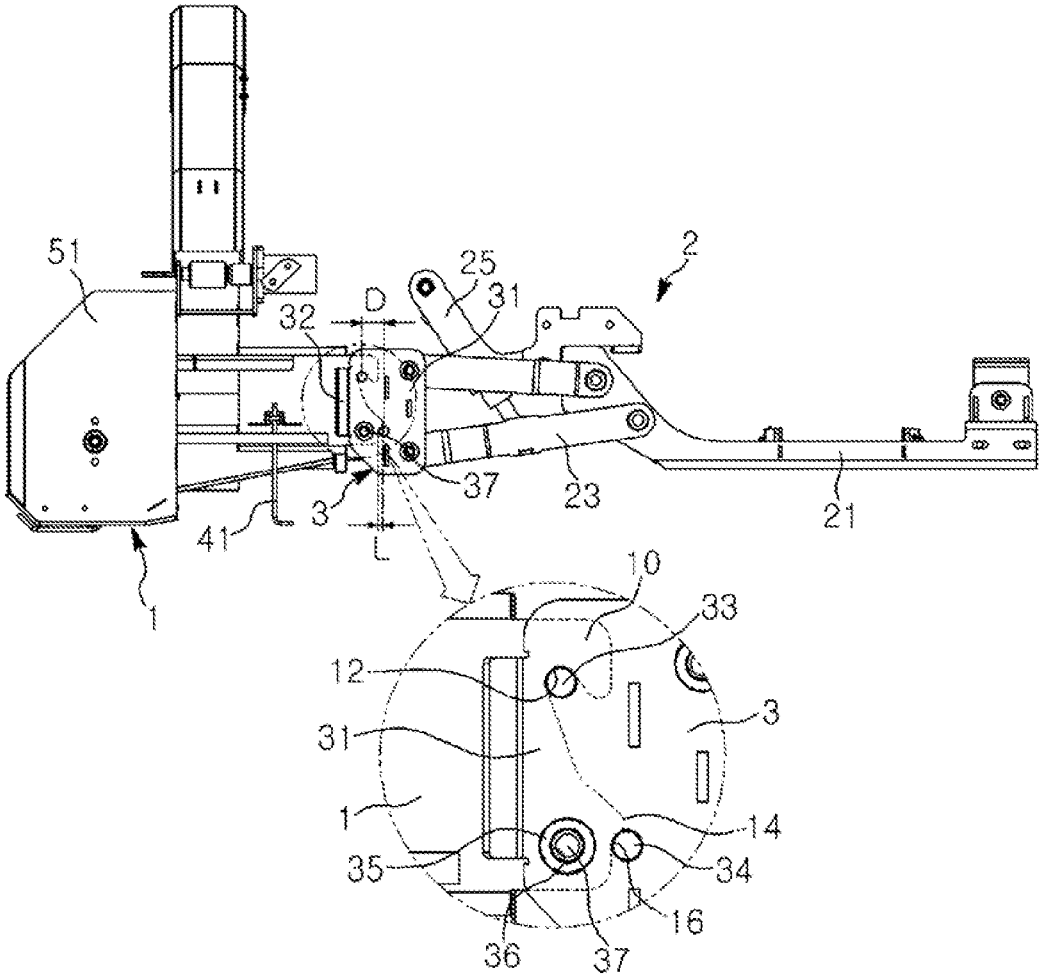


FIG. 7

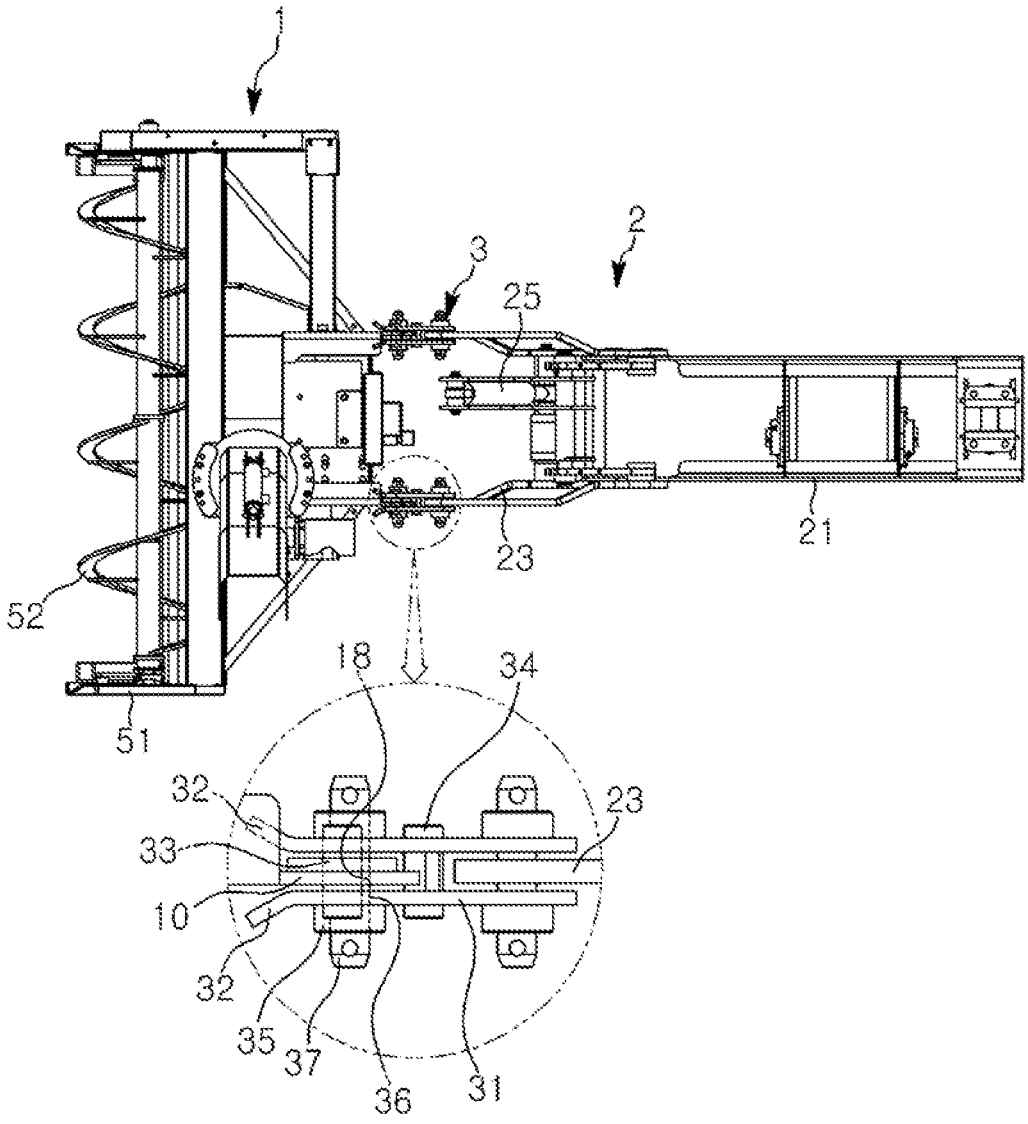


FIG. 8

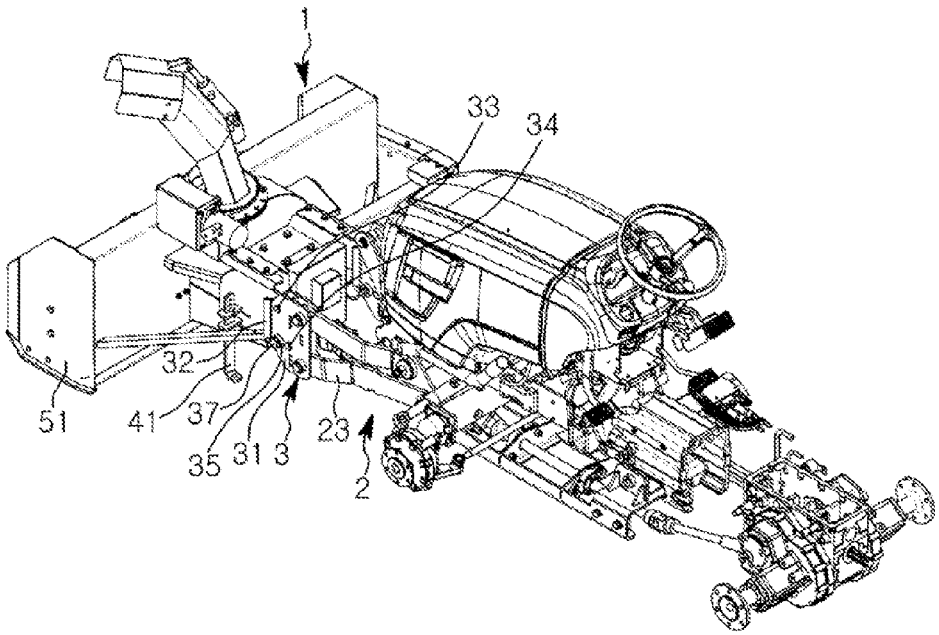


FIG. 9

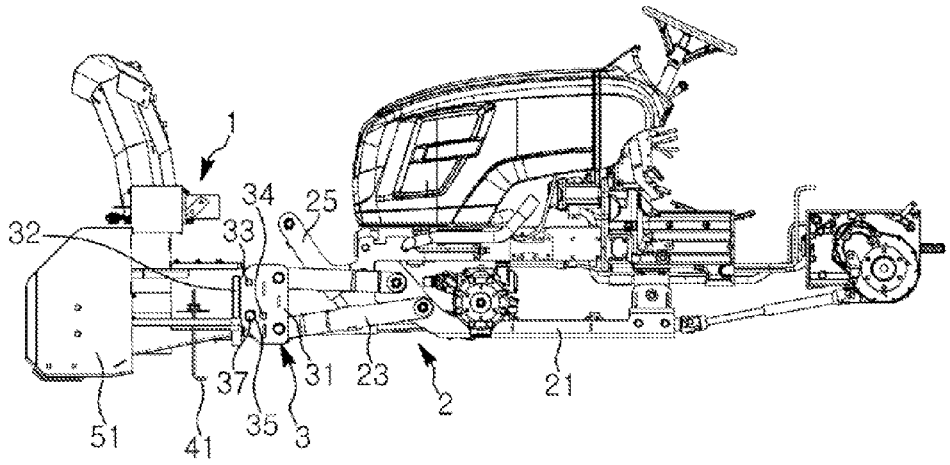


FIG. 10

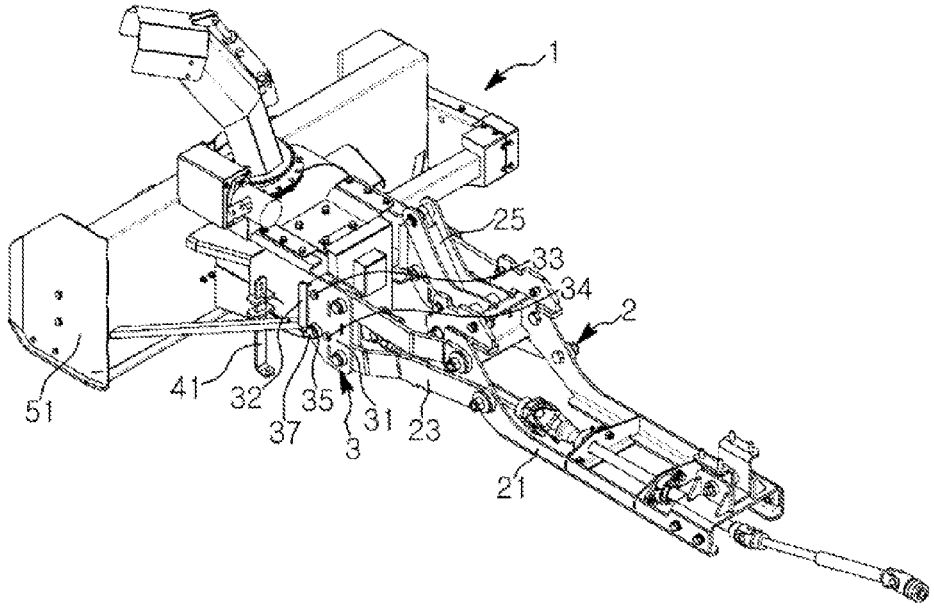
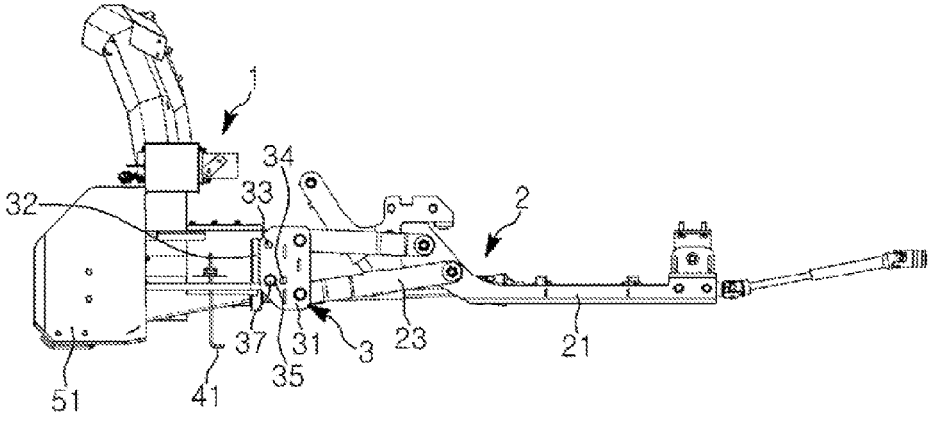


FIG. 11



SNOW BLOWER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority under 35 U.S.C. §119 to Korean Patent Application Mo. 10-2015-0123765 filed on Sep. 1, 2015 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] Field of the Invention

[0003] The present invention generally relates to a snow blower that removes snow from an area by blowing the snow away. More particularly, the present invention relates to a snow blower configured in such a manner that snow is introduced into a blade via transmission by an augur, and is then discharged through a discharge chute by the operation of an impeller.

[0004] Description of the Related Art

[0005] Generally, various methods are being used to remove snow when snow accumulates on roads or wide grassy areas.

[0006] According to conventional snow removal methods, people or machines remove snow by using snow removal chemicals such as calcium chloride.

[0007] When snow removal work is performed using chemicals, spraying the chemicals is easy, but it is difficult to handle remaining unfrozen snow and snowmelt water after the chemicals are sprayed. Additionally, snow removal work using chemicals is more expensive than simply physically removing the snow because chemicals are required to be purchased and a step of spraying the chemicals is required. Further, chemicals used in snow removal cause environmental problems and corrosion of equipment of vehicles driving on the roads where the chemicals have been applied.

[0008] Though snow removal vehicles equipped with a snow removal device are commonly used, the vehicles are generally multi-purpose rather than specialized vehicles. Therefore it is impossible to effectively remove snow accumulated on a highway where it is difficult to use a general-purpose snow removal device, or there is an insufficient number of snow removal devices to perform a required workload. Accordingly, when it is required to remove snow accumulated in areas such as farmsteads, farm roads, and village roads, it is efficient to remove snow by using tractors, which are commonly owned by farmers or other residents who live in such areas.

[0009] For the reason mentioned above, a snow removal device using a conventional tractor has come into wide use, and as shown in "Snowplow coupling device of tractor" disclosed in Korean Patent No. 10-0436986, and "Snowplow for tractor" disclosed in Korean Utility Model No. 20-0243322, there is widely provided a snow removal device to remove snow in such, a manner that a plow of a tractor, the plow equipped with a snow removal plate, pushes snow piled on a road to the roadside using the driving force of the tractor.

[0010] As described above, though the snow removal device using a conventional tractor requires that the tractor be equipped with the plow, the snow removal device can be easily mounted to or easily removed from the tractor, and thus the snow removal device can efficiently use the driving force of the tractor.

[0011] However, the snow removal work using the snow removal plate is performed by pushing snow plied on a road or a sidewalk to a roadside, and since there is great difference in temperature in the afternoon and at night in winter, snow piled in the afternoon starts to melt before night, and the road surface starts to freeze at night, which makes the state of the road surface worse. Furthermore, since snow piled on the roadside is left behind, it is not good in terms of beauty, and it also requires many efforts to keep the roadside clean.

[0012] Meanwhile, as disclosed in Korean Patent Registration Publication No. 10-1996-0009728, U.S. Pat. No. 4,385,457, and U.S. Pat. No. 4,391,052, a snow blower as a snow removal dedicated device collects snow accumulated on a road by using an auger blade, an auger unit, and an impeller, and blows the snow away to the roadside, and thus after the snow removal work, a road surface is exposed.

[0013] The snow blower mentioned above includes: a body equipped with a mounting means so as to be mounted to a tractor or a dedicated vehicle; a blade formed in a semi-circle structure, the blade collecting snow while contacting a road surface; an auger provided in the blade, the auger compressing and transferring the snow introduced into the blade to an intake path of the impeller provided at the center of the blade; and the impeller taking the snow introduced by the augur and discharging the snow through the discharge chute to the outside.

[0014] The snow blower mentioned above uses hydraulic pressure to drive the augur and the impeller, and thus the configuration of the snow blower is simple. Since a tractor dedicated to the snow removal work or a multi-purpose vehicle for removing snow is capable of sufficiently producing hydraulic pressure, supply of the hydraulic pressure required to drive the snow blower is not problematic.

[0015] As disclosed in U.S. Pat. No. 4,391,052, the snow blower is configured in such manner that the discharge chute is rot at ably mounted to a discharge path of the impeller, and a rack is provided at a flanger located under the discharge chute, the rack engaging with a pinion that is combined with the shaft of a hydraulic cylinder. Additionally, the snow blower is configured in such a manner that the rotation of the hydraulic cylinder is controlled by the manipulation of a lever in a driver's compartment, which controls the direction of the discharge chute.

[0016] In addition, as disclosed in U.S. Pat. No. 8,696,024, there are provided a coupler for a vehicle and a vehicle comprising same that includes a snow blower body, the snow blower body mounted to the vehicle (a tractor) in a forward direction thereof such that a driver removes snow in a direction in which the vehicle advances.

[0017] As shown in FIGS. **1** to **3**, the snow blower includes an accessory **100** including the augur and the impeller and the coupler **200** mounted to the vehicle, the accessory pin-coupled to the coupler.

[0018] The structure of the two constituting members **100**, **200** will be described herein below. The accessory **100** includes: support pins **110**, **112**, and a coupler attachment plate **114**, wherein the support pins **110**, **112** are provided on the coupler attachment plate **114** of the accessory **100**, the support pins **110**, **112** being male members. The coupler **200** includes: two female grooves **210**, **212**, and an attachment

plate **214**, wherein the two female grooves **210**, **212** are formed at one end of the attachment plate **214**, and the attachment plate **214** is located in front of the coupler **200**, the coupler **200** being mounted to the vehicle. In this case, the support pins **110**, **112** of the accessory are arranged at locations corresponding to the female grooves **210**, **212** such that the support pins **110**, **112** are fitted to the grooves **210**, **212**. After the support pins are fitted to the grooves, the support pins are locked by a locking device **300**.

[0019] The locking device **300** includes: a connecting pin **312** passing through and engaging with a portion of a body **310** of the locking device **300**, the body **310** being plate-shaped, and a through hole **314** through which the support pin **112** passes another portion of the body **310** and is coupled thereto.

[0020] The locking device **300** is coupled to the attachment plate **214** by the connecting pin **312** and the through hole **314**, the connecting pin **312** passing through the attachment plate **214** and the coupler attachment plate **114** sequentially and the through hole **314** receiving the support pin **112**.

[0021] According to the related art, the coupler **200** has the attachment plates **214** provided in upstanding positions at two opposite positions of the coupler **200**, and has a rectangular frame defined by members, the menders crossing and engaging with the attachment plate **214**.

[0022] Since the coupler attachment plate **114** of the accessory **100** is inserted into the frame, it is difficult to initially arrange the two constituting members **100**, **200**.

[0023] Additionally, according to the related art, after the support pins **110**, **112** are placed at locations corresponding to the grooves **210**, **212** of the coupler so as to engage therewith, the support pin **112** is fitted into and engages with the through hole **32 4** of the locking device **300**. Further, the connecting pin **312** of the locking device **300** requires passing through two holes that are formed on the attachment plate **214** of the coupler **200** and on the coupler attachment plate **114** of the accessory **100** sequentially such that the locking device **300** is mounted to the attachment plate **214**, which causes trouble and difficulty in performing mounting work.

[0024] In addition, according to the related art, since the support pins **110**, **112** are bonded on the coupler attachment plate **114** by welding and the support pins **110**, **112** protrude from the plate, welded portions and the protruding support pins **110**, **112** are easily deformed due to external impacts. Such deformations make it difficult to perform correct bonding.

[0025] Such a problem is attributed to the support pins **110**, **112** provided as male members on the surface of the accessory **100**.

SUMMARY OF THE INVENTION

[0026] Accordingly, the present invention has been made keeping in mind the above problems occurring in the related art.

[0027] The present invention is intended to propose a snow blower including: a blower body having a blade, an augur, and an impeller; and a coupler constructed so as to mount the blower body to a vehicle, and to transmit a driving force of the vehicle to the blower body, wherein a mount of the coupler is improved to achieve a better coupling of the blower body with the coupler and to prevent deformation of the mount caused by external impacts.

[0028] The present invention is also intended to propose a snow blower that is configured to easily complete mounting of the blower body to the coupler by using one fixing pin.

[0029] The present invention is intended to propose a snow blower that has mounts including the dual plates, the mounts provided at opposite sides of a front part of the coupler, and has a vertical mount panel fitted between and mounted to the dual plates such that the snow blower is more stable and resistant against external impacts applied during snow removal work.

[0030] In order to achieve the above object, according to one aspect of the present invention, there is provided a snow blower including: a blower body including a blade, an augur, and an impeller; and a coupler including a mount and multiple links, the links provided at each side of a front end part of a connector arm, and the mount provided at front end parts of the links such that the blower body is mounted to the coupler, wherein the blower body includes vertical mount panels, the mount panels provided at a rear end of the blower body and spaced apart from each other in parallel, and the mount of the coupler includes dual plates provided at the front end parts of the links such that each of the mount panels is fitted between and mounted to the dual plates of the coupler.

[0031] Each of the mount panels of the blower body may include: a groove provided in an upper part of the mount panel by being indented upwardly so that a first support pin of the mount is inserted, into the groove; a protruding part formed by protruding from a vertical end surface of the mount panel to a predetermined length such that the first support pin and a second support pin of the mount are supported by the groove and the vertical end surface at a location under the protruding part of the mount panel, respectively, while contacting with the groove and the vertical end surface.

[0032] The mount panel of the blower body may include a locking hole formed through the mount panel so that the first and second support pins keep supported by the groove and the vertical end surface of the mount panel

[0033] Each of the vertical mount panels may be multiple vertical mount panels spaced apart from each other in parallel.

[0034] The mount of the coupler may include the dual plates, the dual plates being provided at opposite sides of the links such that the front end parts of the links are placed between the dual plates.

[0035] The dual plates may have a space defined therebetween such that the front end parts of the links are fitted into the space, and thus the front end parts of the links are hinged to the dual plates.

[0036] The dual plates may further include guides that are provided at front ends of the dual plates such that the guides extend outward from the front ends of the dual plates in diagonally opposite directions.

[0037] The dual plates may be combined with an associated mount panel by first and second support pins and by a fixing pin, wherein the first and second support pins pass through the dual plates at respective locations offset from each other at a predetermined interval so that the dual plates are pin-coupled to a groove and a vertical end surface of the mount panel by the first and second support pins.

[0038] The fixing pin may pass through pin holes that are formed in the dual plates at locations corresponding to a locking hole of the mount panel.

[0039] The mount including the dual plates may include multiple vertical mounts that are spaced apart from each other in parallel and are combined with the mount panels.

[0040] According to the snow blower of the present invention, the vertical mount panel of the blower body is fitted between the dual plates, and the first and second support pins pass through the dual plates and are fitted into the groove and the vertical end surface of the mount panel with contacting the groove and the vertical end surface of the mount panel, which enables the mount panel to be engaged with the dual plates. The fixing pin passes through the pin holes of the dual plates and the locking hole of the mount panel sequentially, which enables the dual plates to foe engaged with the mount panel.

[0041] As mentioned above, the snow blower of the present invention is advantageous in that the snow blower includes: a blower body having a blade, an augur, and an impeller; and a coupler constructed so as to mount the blower body to a vehicle, and to transmit the driving force of the vehicle to the blower body, wherein a mount of the coupler is improved to achieve a better coupling of the blower body with the coupler and to prevent deformation of the mount caused by external impacts.

[0042] That is, each of the mount panels of the blower body includes: a groove provided in an upper part of the mount panel by being indented upwardly; a protruding part formed by protruding from a vertical end surface of the mount panel to a predetermined length L such that the first support pin and the second support pin of the mount are supported by the groove and the vertical end surface at a location under the protruding part of the mount panel respectively, while contacting with the groove and the vertical end surface, which prevents the first and second support pins from being deformed by an impact applied from outside.

[0043] At the same time, the mount of the coupler facing the mount panel of the blower body include the dual plates, and the mount panel is fitted between and tightly mounted to the dual plates, wherein the support pins supported by the groove and the vertical end surface pass through the dual plates and the mount panel sequentially, which prevents the mount panel from being deformed due to external forces, and increases durability of the mount panel.

[0044] In addition, according to the snow blower of the present invention, just one fixing pin enables the mount panel of the blower body to be easily mounted to the dual plates of the coupler, and it is easy to perform an initial mounting of the mount panel to the dual plates since the mount panel is inserted between the dual plates while the mount panel is guided by guides formed extending outward from the front ends of the dual plates in diagonally opposite directions.

[0045] According to the snow blower of the present invention mentioned above, it is efficient to mount or remove the blower body from the coupler when the coupler is mounted to a snow removal tractor or a vehicle dedicated to snow removal.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

[0047] FIG. **1** is a view of showing a conventional snow blower coupled to a vehicle;

[0048] FIG. **2** is a side view showing an accessory of the related art equivalent HO blower body;

[0049] FIG. **3** is a side view including a partially enlarged perspective view showing a coupler of the related art;

[0050] FIG. **4** is a perspective view showing a blower body of the present invention;

[0051] FIG. **5** is a perspective view showing a coupler of the present invention;

[0052] FIG. **6** is a side view showing the blower body and the coupler mounted to each other according to the present invention;

[0053] FIG. **7** is a top plan view showing the blower body and the coupler mounted to each other according to the present invention;

[0054] FIG. **8** is reference perspective view showing a vehicle of the present invention with a snow blower mounted thereto;

[0055] FIG. **9** is a side view of the perspective view of FIG. **8**;

[0056] FIG. **10** is a reference perspective view showing combined main elements of the snow blower of the present invention; and

[0057] FIG. **11** is a side view of a perspective view of FIG. **10**.

DETAILED DESCRIPTION OF THE INVENTION

[0058] Hereinbelow, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. Throughout the drawings, the same reference numerals will refer to the same or like parts.

[0059] A snow blower of the present invention includes: a blower body **1** including a blade **51**, an augur **52**, and an impeller **53**; and a coupler **2** including a mount **3** and multiple links **23**, the links **23** provided at each side of a front end part of a connector arm **21** and the mount **3** provided at front end parts of the links **23** such that the blower body **1** is mounted to the coupler **2**, wherein the blower body **1** includes vertical mount panels **10**, the mount panels provided at a rear end of the blower body and spaced apart from each other in parallel, and the mount **3** of the coupler includes dual plates **31** provided at the front end parts of the links **23**.

[0060] Each of the mount panels **10** of the blower body **1** includes: a groove **12** provided in an upper part of the mount panel by being indented upwardly so that a first support pin of the mount is inserted into the groove; a protruding part **14** formed by protruding from a vertical end surface of the mount panel **10** to a predetermined length L such that the first support pin and a second support pin of the mount are supported by the groove **12** and the vertical end surface **16** at a location under the protruding part **14** of the mount panel **10** respectively, while contacting with the groove **12** and the vertical end surface; and a locking hole **18** formed in an inner portion of the mount panel **10** at a location spaced apart from the vertical end surface under the protruding part **14**.

[0061] Each of the vertical mount panels **10** may be multiple vertical mount panels spaced apart from each other in parallel.

[0062] The mount **3** of the coupler **2** includes the dual plates **31**, the dual plates **31** being provided at opposite sides

of the links **23** such that the front end parts of the links **23** are placed between the dual plates **31**.

[0063] The dual plates **31** have a space defined therebetween such that the front end parts of the links are fitted into the space, and thus the front end parts of the links **23** are hinged to the dual plates **31**.

[0064] The dual plates **31** further include guides **32** that are provided at front ends of the dual plates such that the guides **32** extend outward from the front ends of the dual plates in diagonally opposite directions.

[0065] The dual plates **31** are combined with an associated mount panel by first and second support pins **33**, **34** and by a fixing pin **37**, wherein the first and second support pins **33**, **34** pass through the dual plates **31** at respective locations offset from each other at a predetermined interval D so that the dual plates **31** are pin-coupled to a groove **12** and a vertical end surface **16** of the mount panel **10** by the first and second support pins **33**, **34**.

[0066] The fixing pin **37** passes through pin holes **36** that are formed in the dual plates **31** at locations corresponding to a locking hole **18** of the mount panel **10**.

[0067] The mount **3** including the dual plates **31** includes multiple vertical mounts that are spaced apart from each other in parallel and are combined with the mount panels **10**.

[0068] The mounting of the slow blower of the present invention described above will be further described in detail.

[0069] The blower body **1** of the present invention is kept in an upstanding position on the ground without falling over due to a height-adjustable support **41**.

[0070] When a vehicle such as a tractor equipped with the coupler **2** approaches the blower body **1** such that the mount panel **10** of the blower body **1** is fitted between the dual plates **31** of the mount **3**, the mount panel **10** is arranged between the dual plates **31**, and is fitted into the space defined therebetween while guided by the guides **32**.

[0071] With the mount panel **10** closely fitted into the space, the mount **3** is lifted by the links **23** when a tilt cylinder **25** is driven. The first and second support pins **33**, **34** of the mount **3** are fitted to the groove **12** and the vertical end surface **16** of the mount panel **10** respectively while contacting the groove **12** and the vertical end surface **16**. The first support pin **33** and the second support pin **34** of the mount **3** are supported by the groove **12** and the vertical end surface at a location under the protruding part **14** of the mount panel respectively, and in this case, the pin holes **36** of the mount **3** and the locking hole **18** of the mount panel **10** are arranged to correspond to each other, and the fixing pin **37** passes through the corresponding holes, so that the dual plates **31** are mounted to the mount panel **10**.

[0072] Since the mount panel **10** fitted into the space defined between the dual plates **31** is in the space, the mount panel **10** can avoid being deformed by an external force during use of the snow blower.

[0073] At the same tine, since the mount panel **10** of the blower body **1** is fitted between and tightly mounted to the dual plates, the mount panel **10** can prevent the loosening of the mount panel **10** from the dual plates due to external motions or impacts.

[0074] After snow blowing is completed, the fixing pin **37** is removed, and when the mount **3** is lowered to the ground by manipulating the tilt cylinder **25**, the first and second support pins **33**, **34** from the mount panel **10** are removed, and the blower body **1** is seated on the ground. Finally, the vehicle is moved backward, and the blower body **1** is efficiently removed from the coupler **2**.

[0075] The protruding part **14** of the mount panel **10** is provided so as to position the second support pin **34**, and though it is described that the protruding part **14** is formed by protruding from a vertical end surface of the mount panel to the predetermined length L, the length L is not limited to the length L described above.

[0076] When the groove **12** is under a concentrated vertical load, the protruding part **14** is required to have a length that serves to distribute the concentrated vertical load.

[0077] In addition, the snow blower of the present invention is configured in such a manner that the first and second support pins are not in the same axis, but are located at respective locations offset from each other in forward and rearward directions such that coupling and removal of the elements described above can be efficiently realized.

[0078] Reference numbers **25**, **35**, and **41** not shown denote the tilt cylinder, a rib for reinforcing a plate, and the support respectively.

[0079] Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A snow blower comprising:

a blower body including a blade, an augur, and an impeller; and

a coupler including a mount and multiple links, the links provided at each side of a front end part of a connector arm, and the mount provided at front end parts of the links such that the blower body is mounted to the coupler,

wherein the blower body includes vertical mount panels, the mount panels provided at a rear end of the blower body and spaced apart from each other in parallel, and the mount of the coupler includes dual plates provided at the front end parts of the links such that each of the mount panels is fitted between and mounted to the dual plates of the coupler.

2. The snow blower of claim **1**, wherein each of the mount panels of the blower body includes: a groove provided in an upper part of the mount panel by being indented upwardly so that a first support pin of the mount is inserted into the groove; a protruding part formed by protruding from a vertical end surface of the mount panel to a predetermined length such that the first support pin and a second support pin of the mount are supported by the groove and the vertical end surface at a location under the protruding part of the mount panel, respectively, while contacting with the groove and the vertical end surface; and a locking hole formed in an inner portion of the mount panel at a location spaced apart from the vertical end surface under the protruding part.

3. The snow blower of claim **2**, wherein each of the vertical mount panels is multiple vertical mount panels spaced apart from each other in parallel.

4. The snow blower of claim. **1**, wherein the mount of the coupler includes the dual plates the dual plates being provided at opposite sides of the links and having a space defined between the dual plates such that the front end parts of the links are fitted into the space and are hinged to the dual plates.

5. The snow blower of claim **4**, wherein the dual plates further include guides that are provided at front ends of the dual plates such that the guides extend outward from the front, ends of the dual plates in diagonally opposite directions.

6. The snow blower of claim **4**, wherein the dual plates are combined with an associated mount panel by first and second support pins and by a fixing pin, wherein the first and second support pins pass through the dual plates at respective locations offset from each other at a predetermined interval so that the dual plates are pin-coupled to a groove and a vertical end surface of the mount panel by the first and second support pins, and the fixing pin passes through pin holes that are formed in the dual plates at locations corresponding to a locking hole of the mount panel.

7. The snow blower of claim **4**, wherein the mount including the dual plates comprises multiple vertical mounts that are spaced apart from each other in parallel and are combined with the mount panels.

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