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(54) **SNOWBLOWER RESTRICTION PLATE**

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(2013.01)

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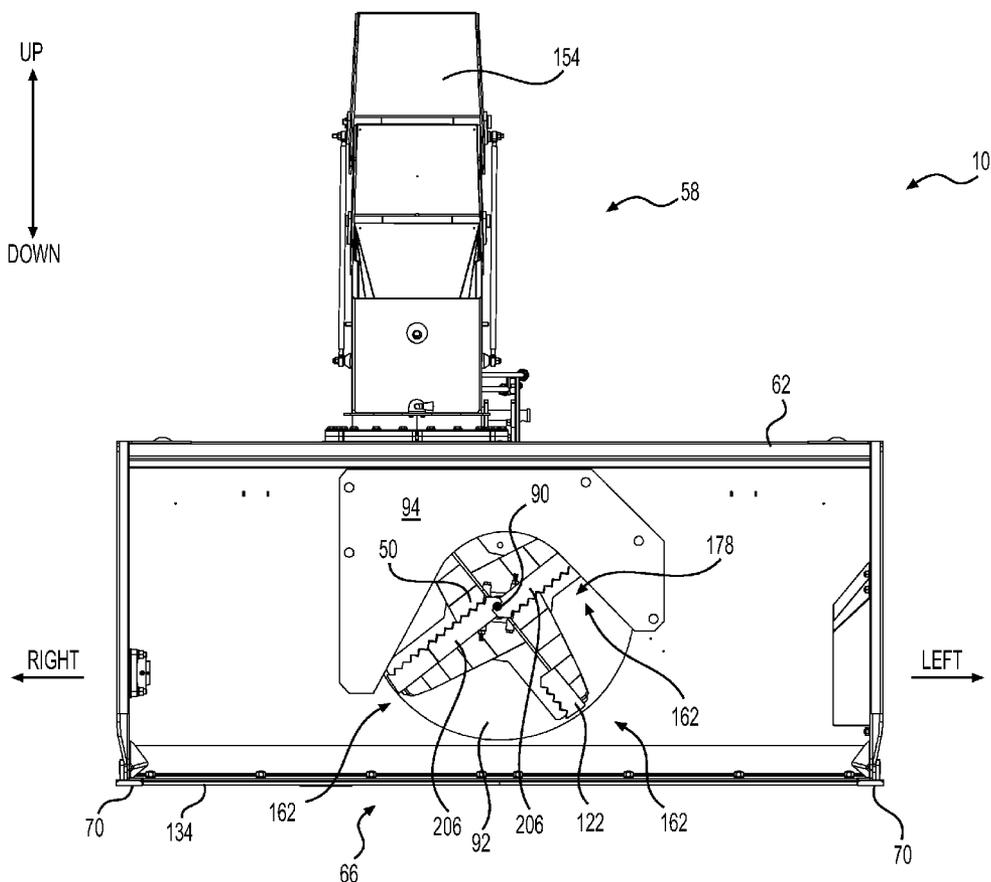
(57) **ABSTRACT**

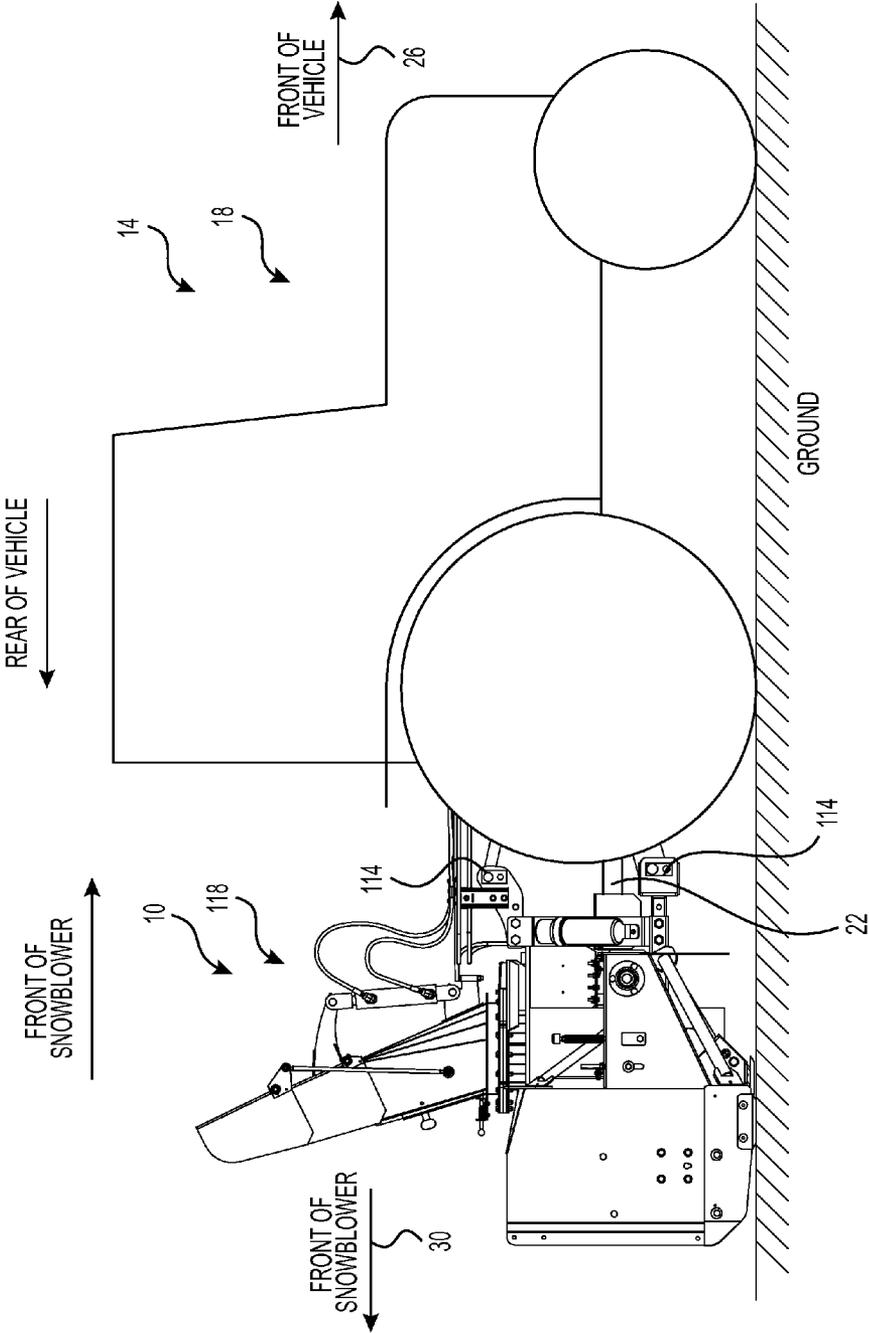
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A restriction member for a snowblower is herein described, the restriction member comprising an attack edge and a release edge and is adapted to cover at least 20% of a propeller housing opening of the snow-blowing mechanism. The radial length of the restriction member is substantially covering the radial length of a cooperating impeller snow-engaging portion to improve the vacuum of the snow-blowing mechanism. An adjustable restriction member and a kit thereof are also presented therein.

**Related U.S. Application Data**

(60) Provisional application No. 61/988,959, filed on May 6, 2014, provisional application No. 61/948,911, filed on Mar. 6, 2014.





**FIG. 1**

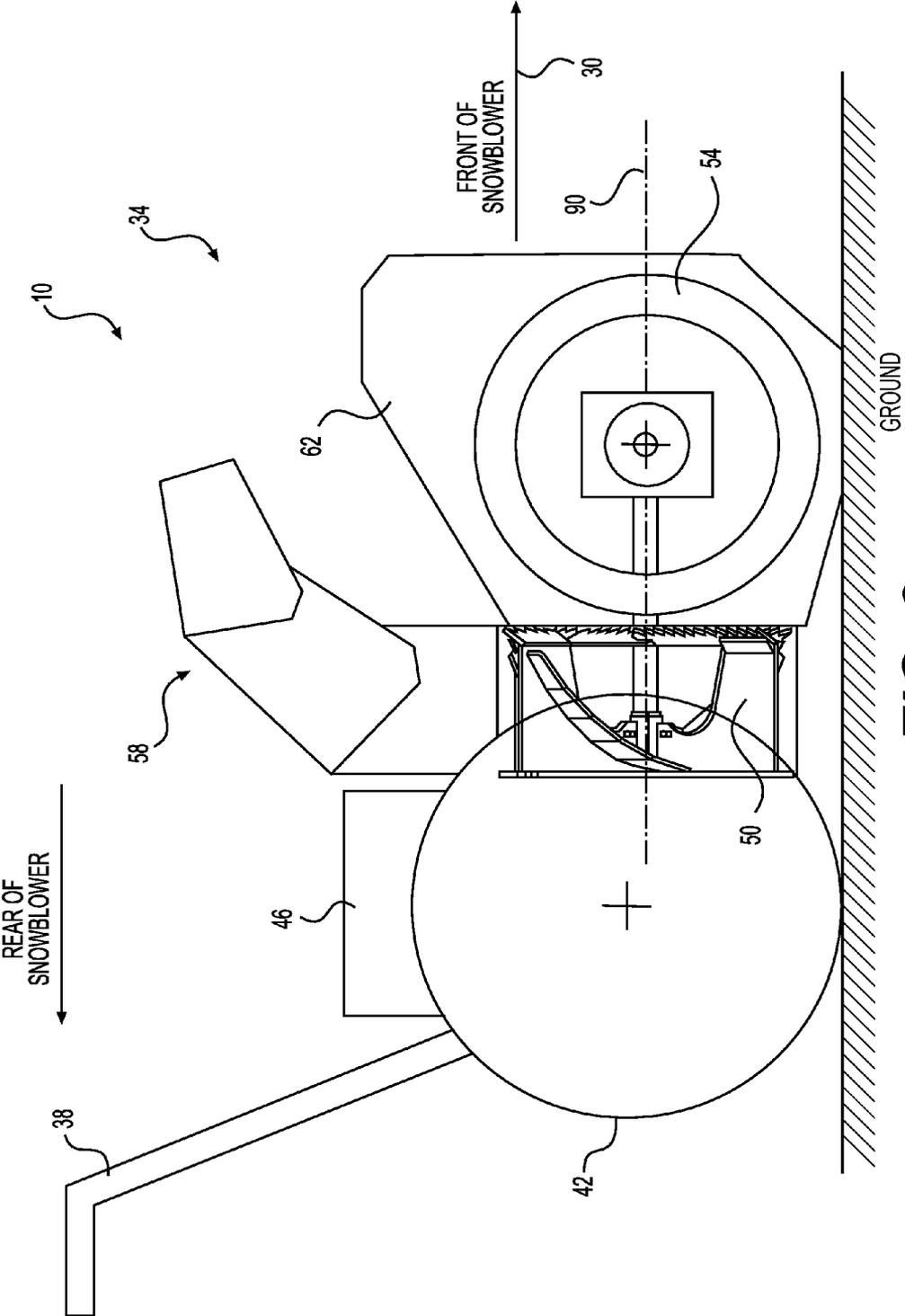


FIG. 2

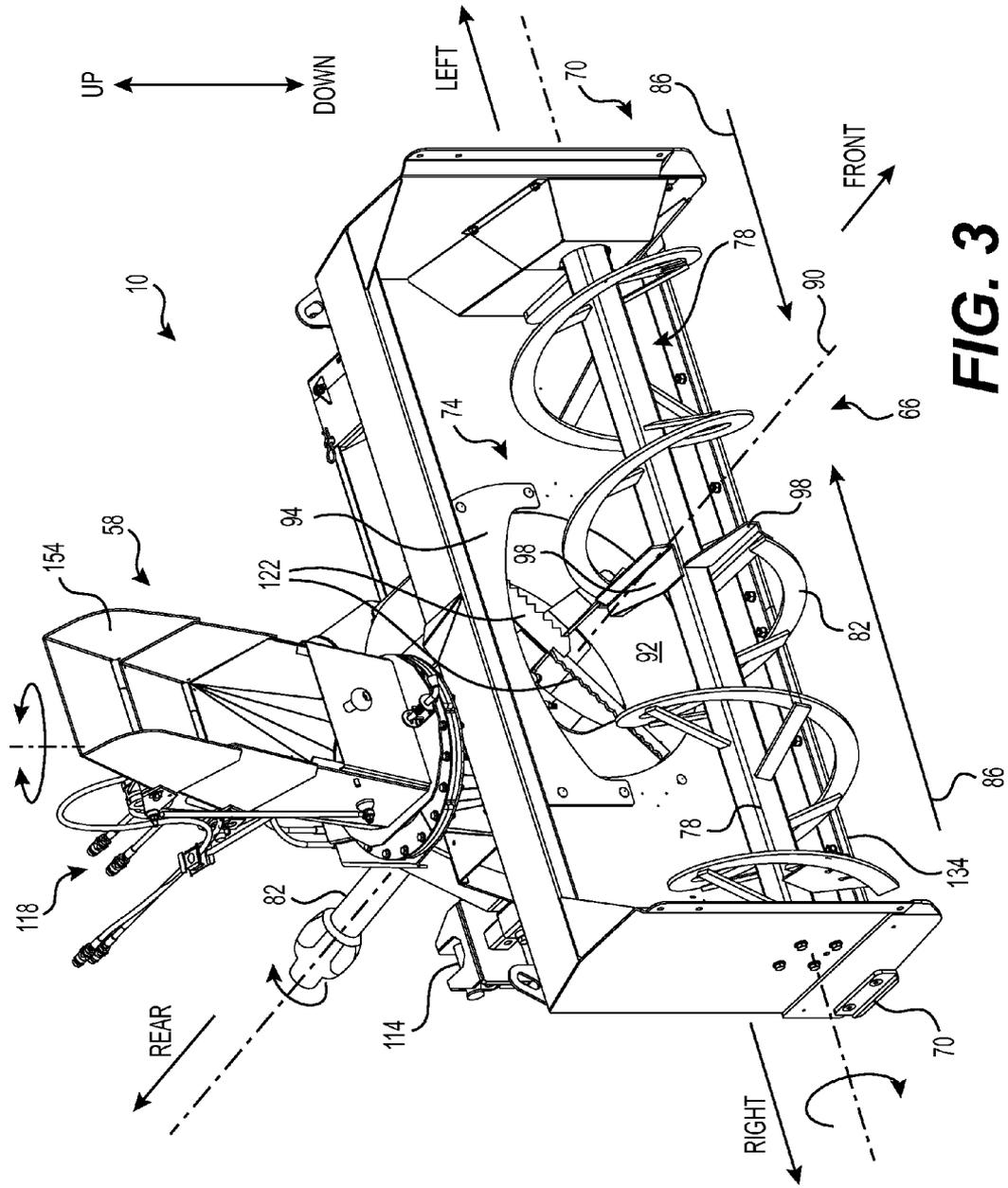


FIG. 3

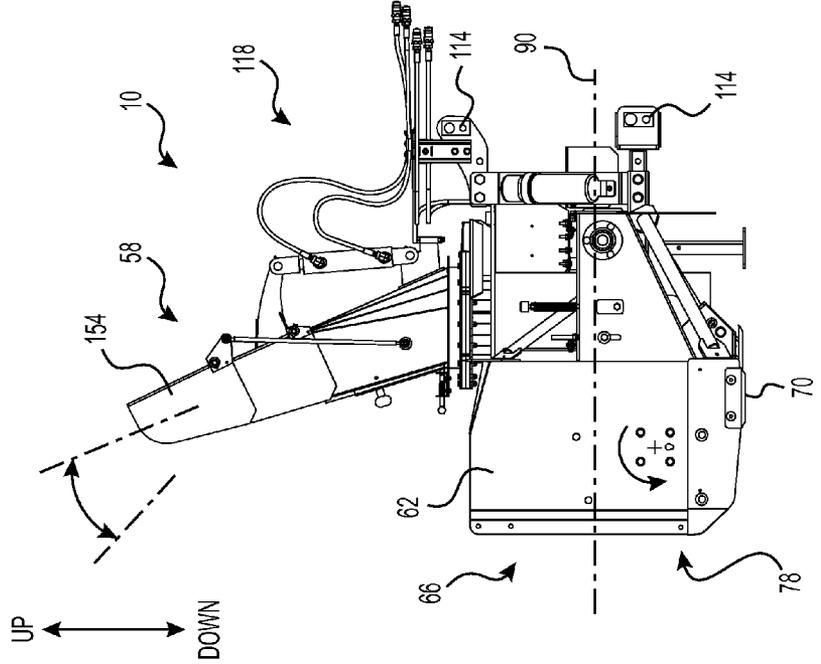


FIG. 5

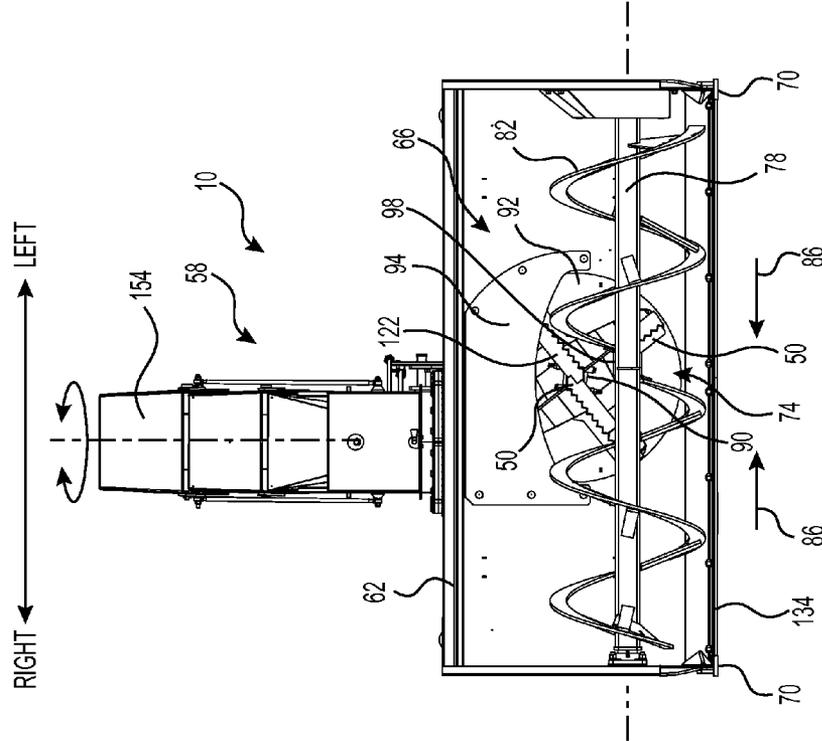


FIG. 4

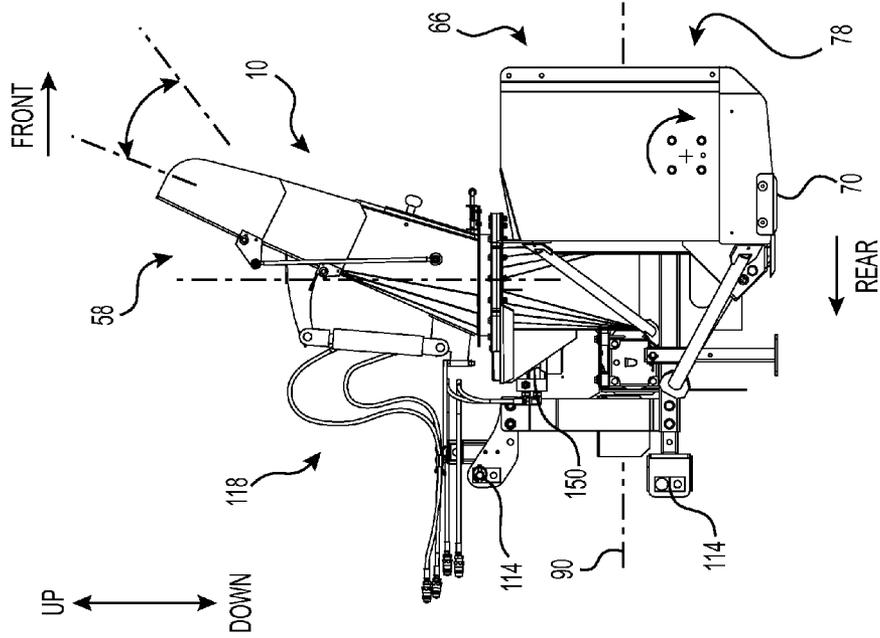


FIG. 7

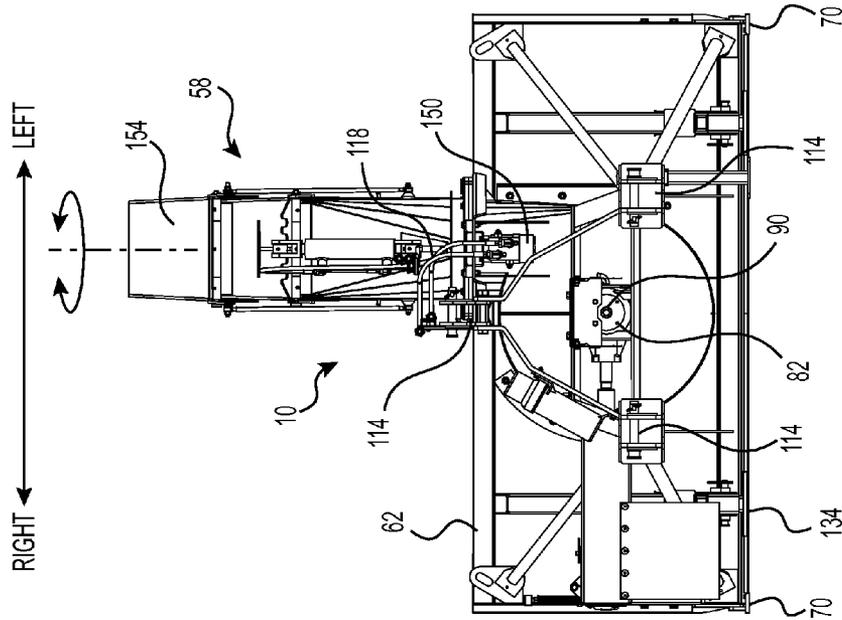
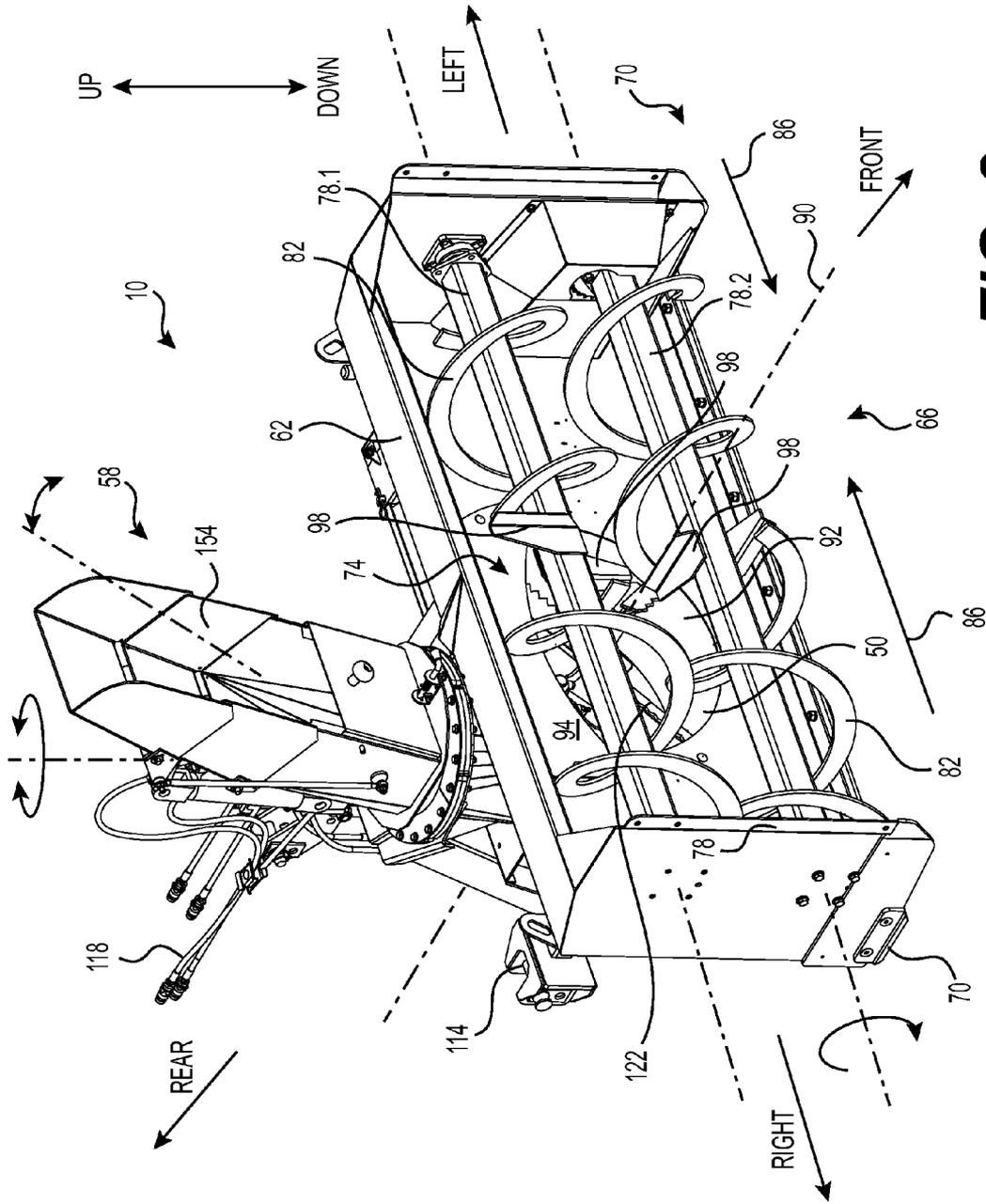


FIG. 6



**FIG. 8**

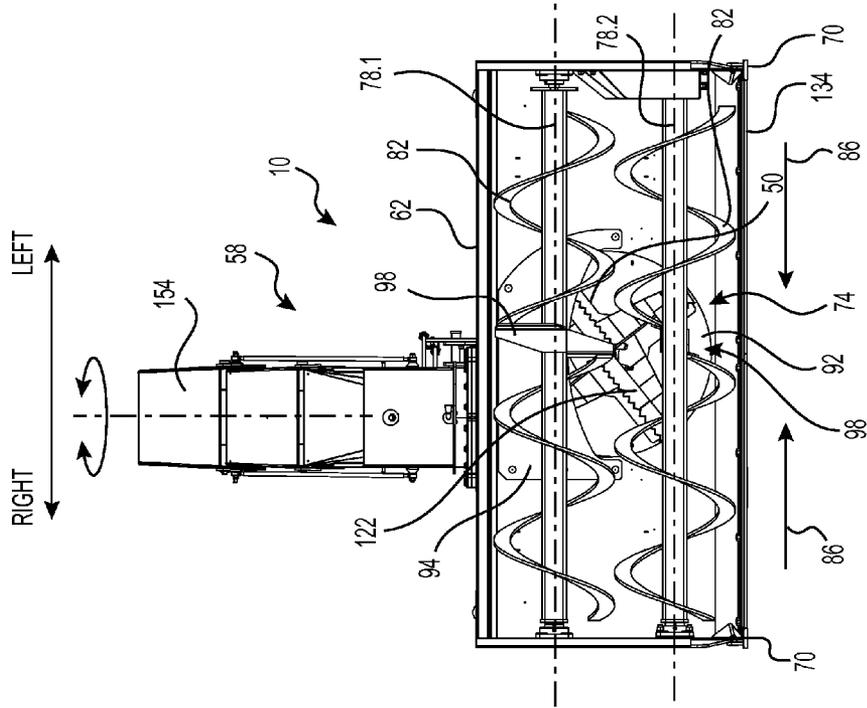


FIG. 9

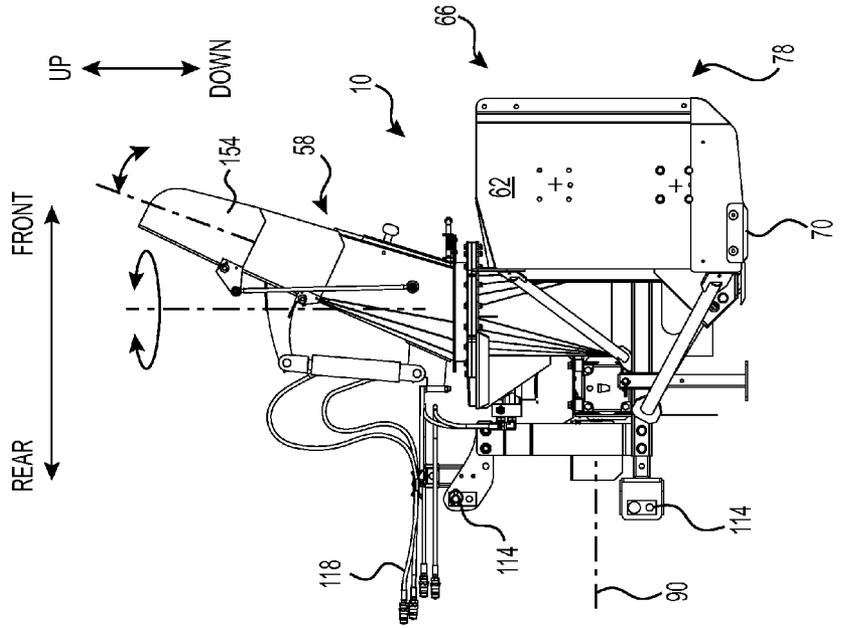


FIG. 10

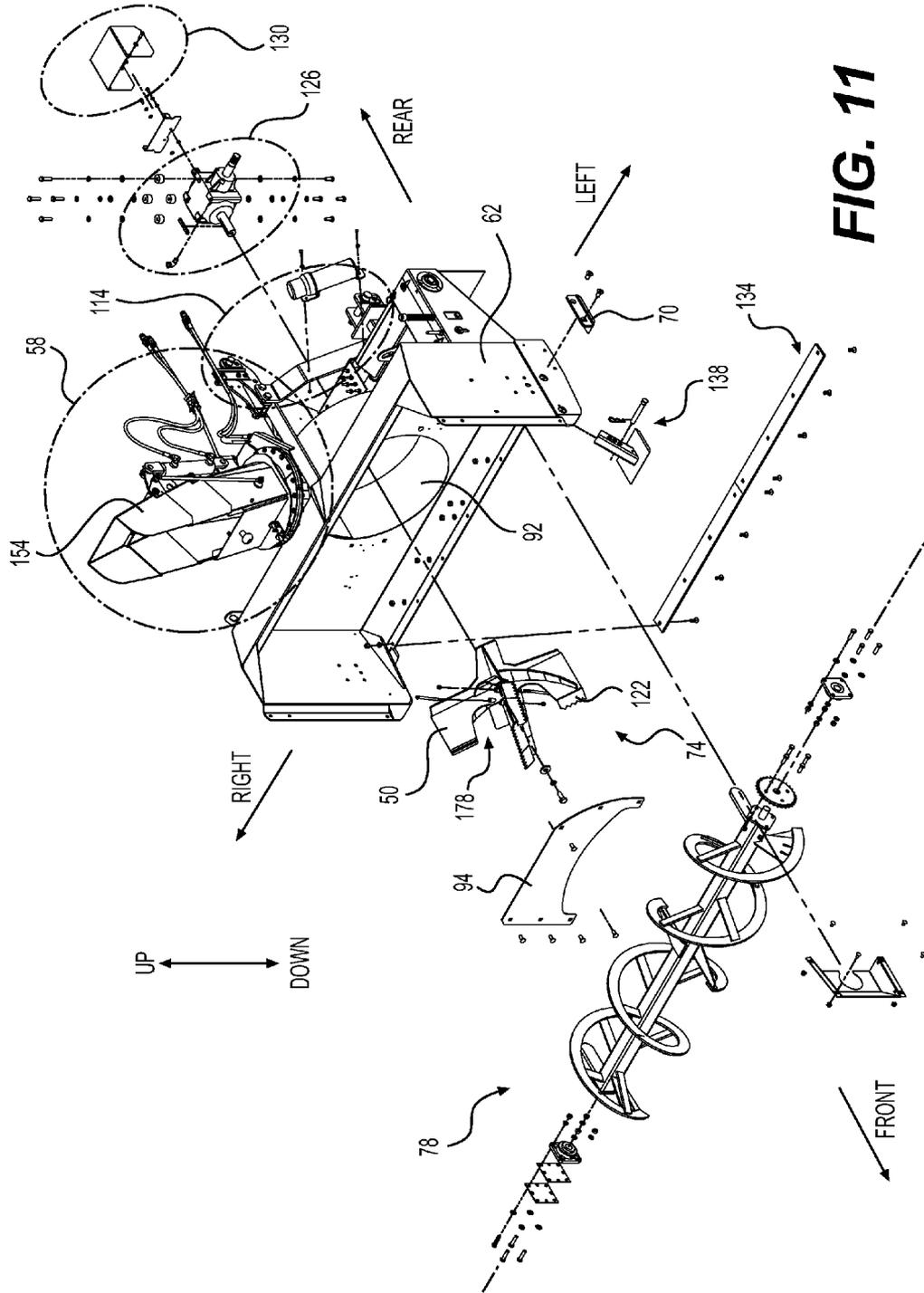


FIG. 11

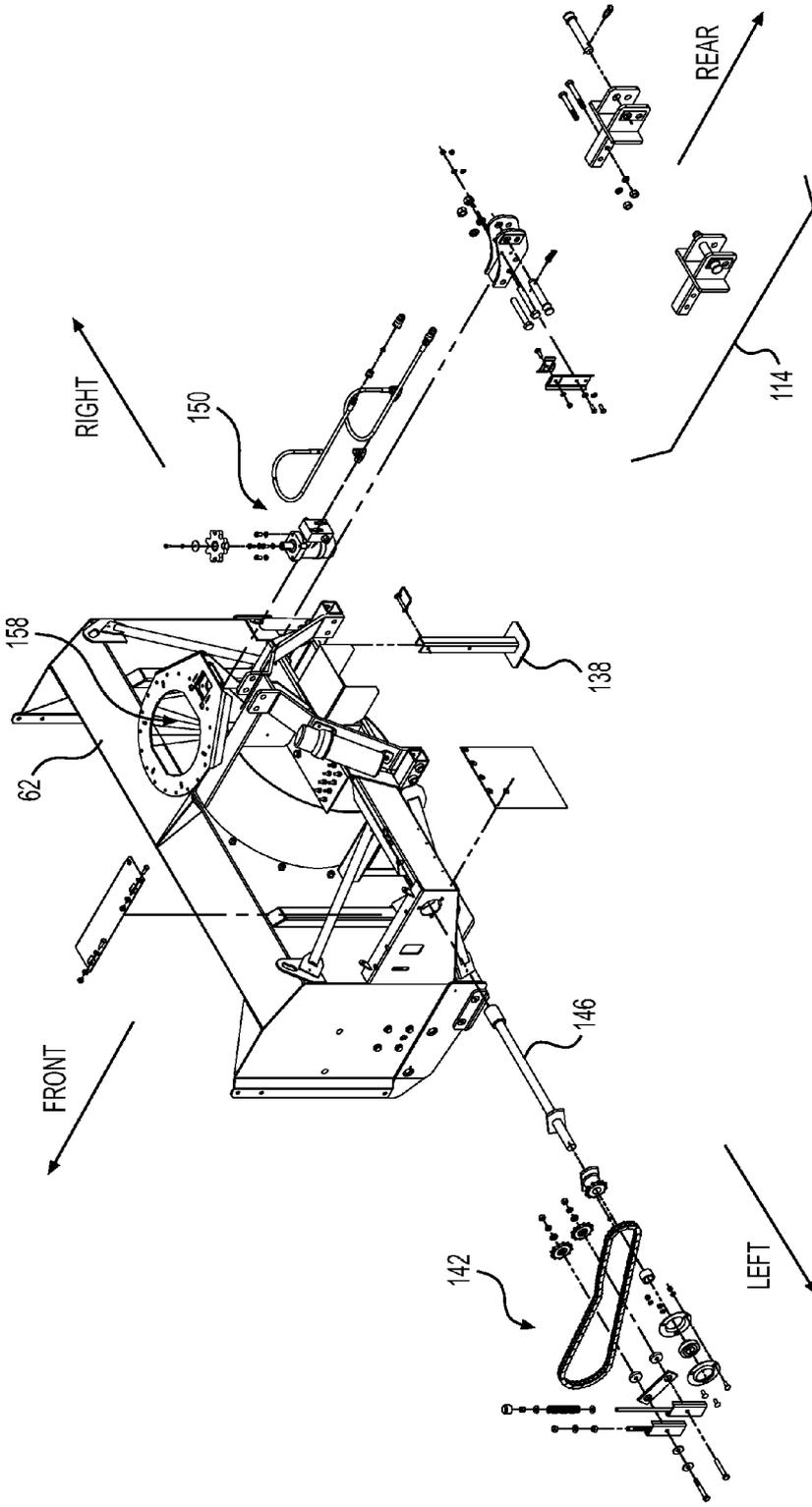
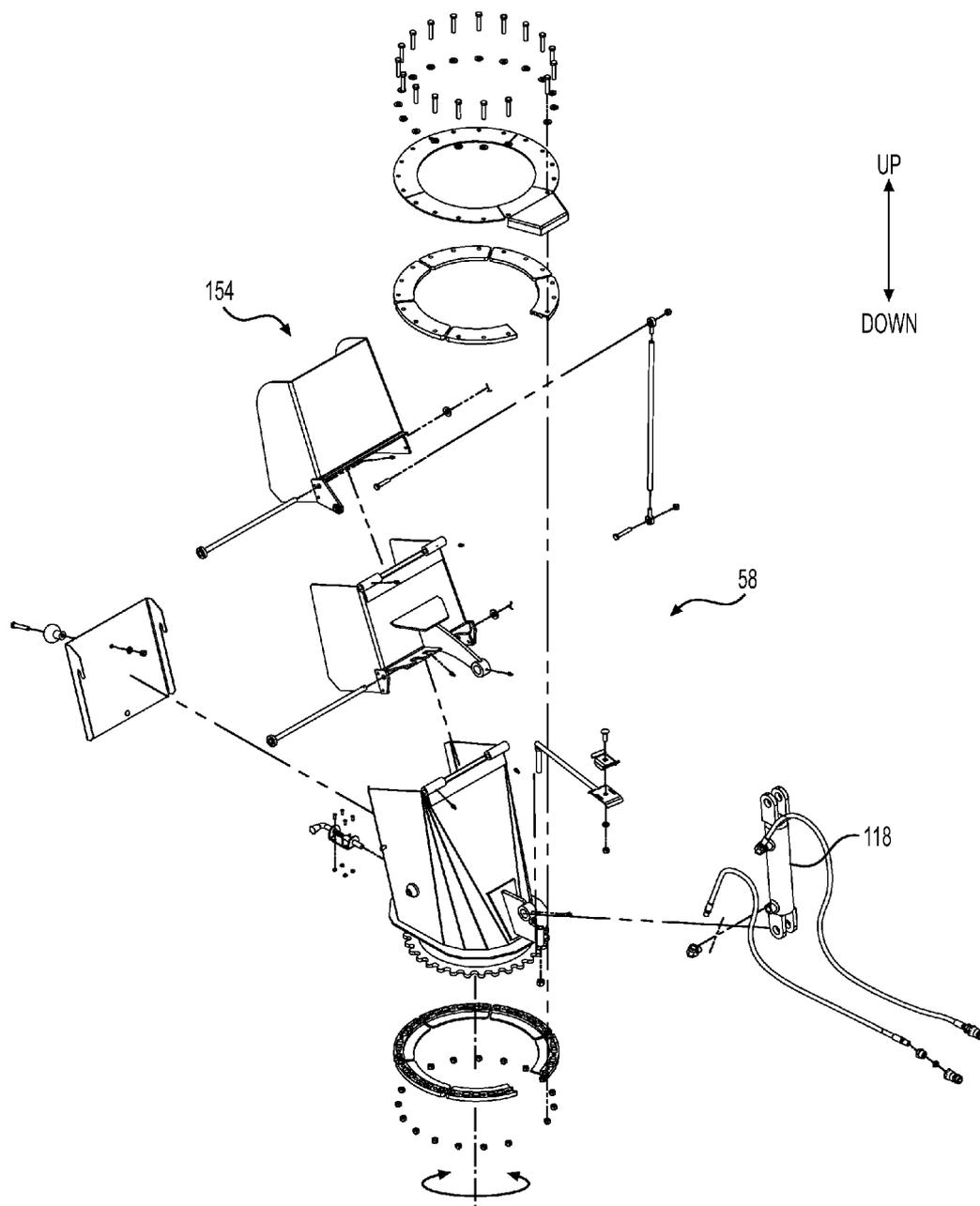
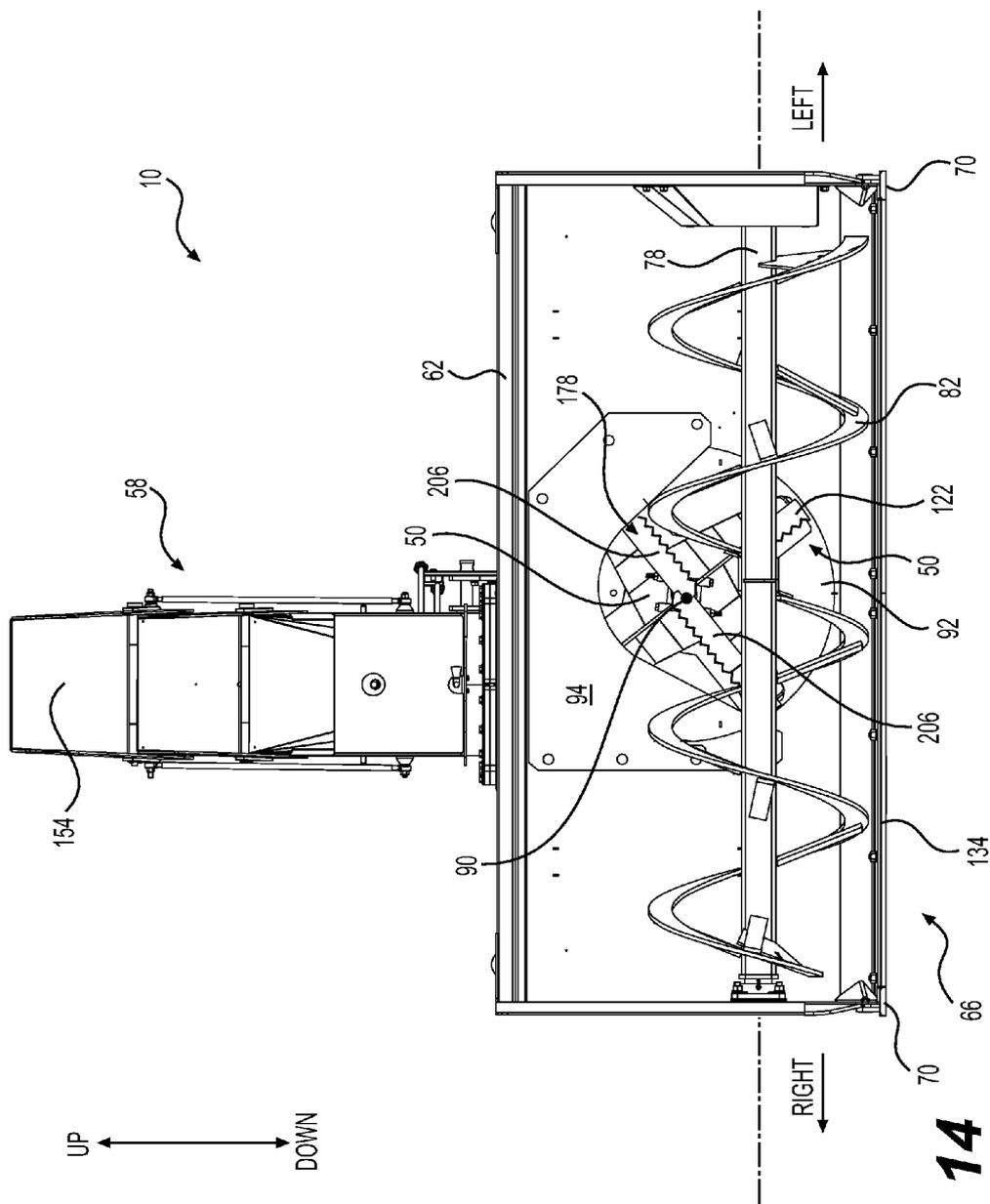


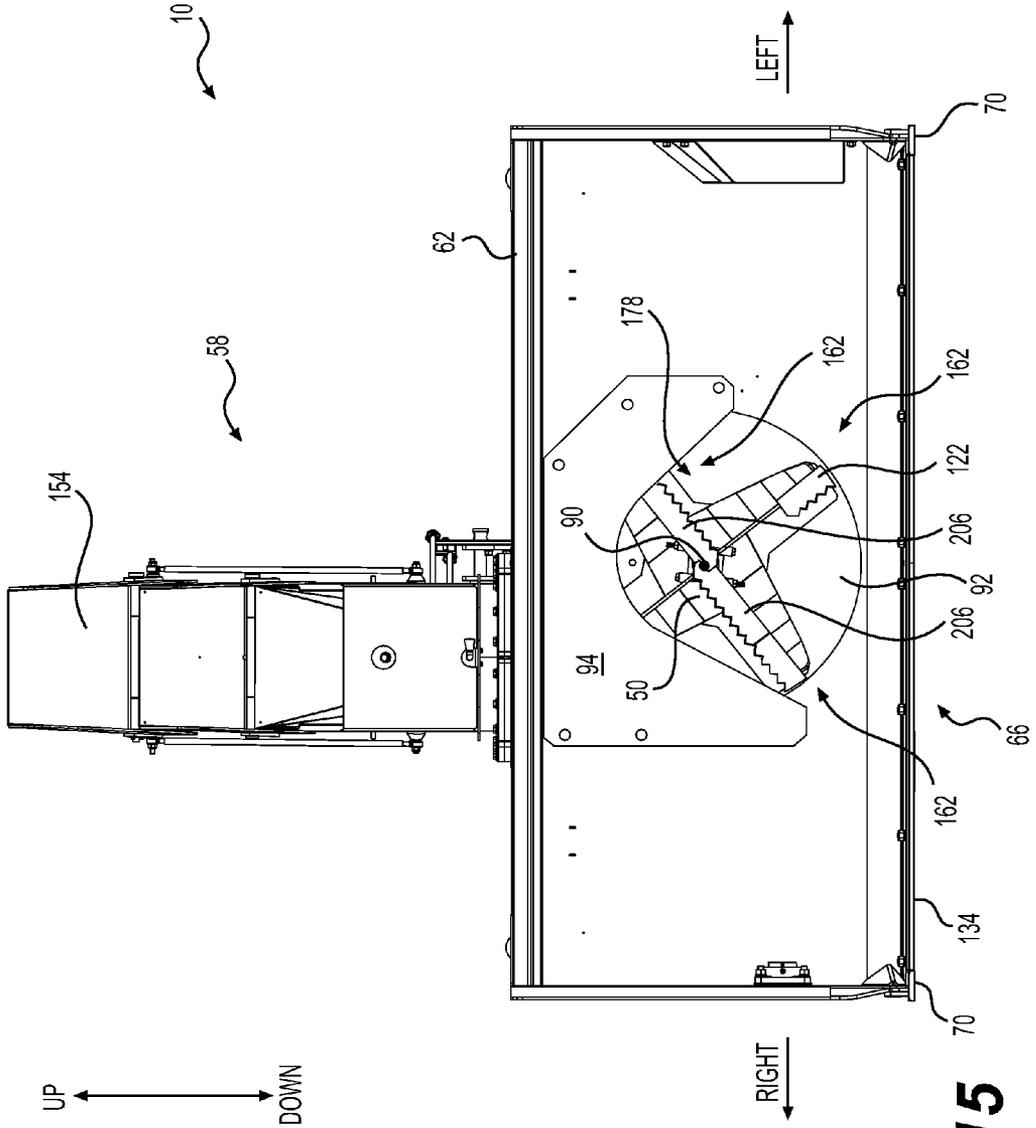
FIG. 12



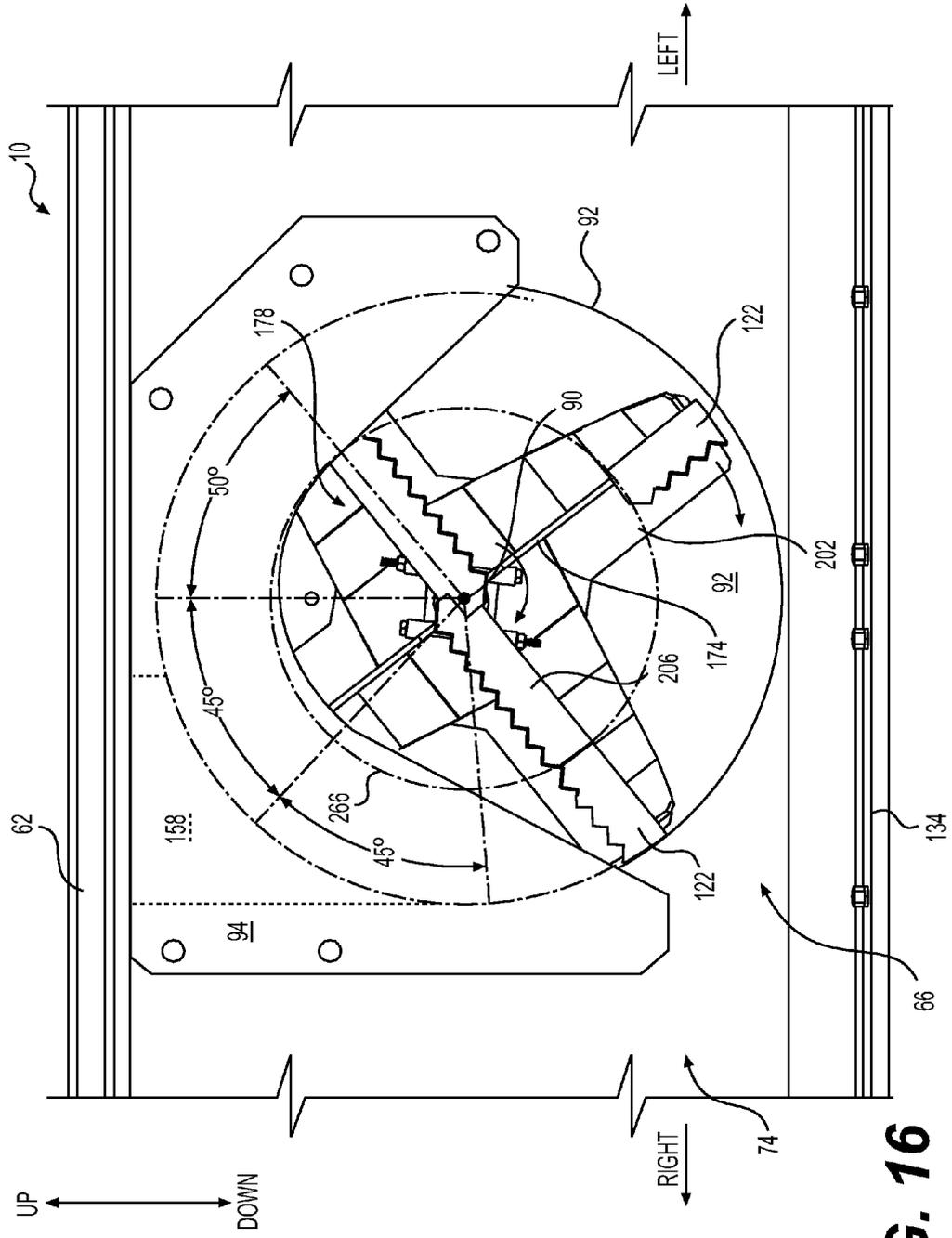
**FIG. 13**



**FIG. 14**



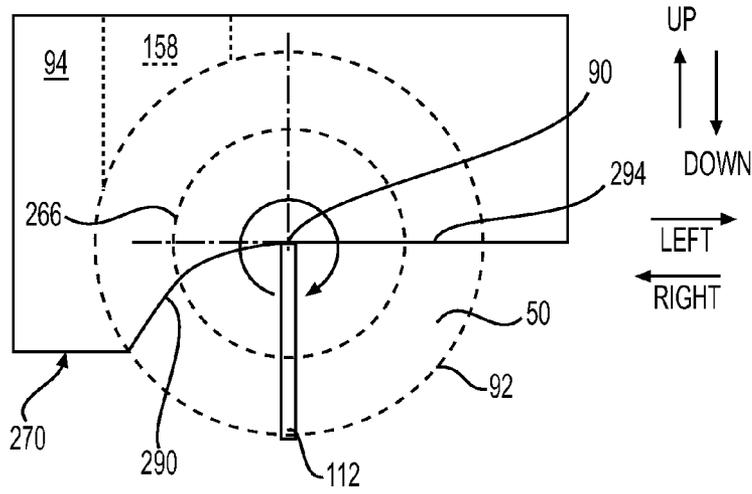
**FIG. 15**



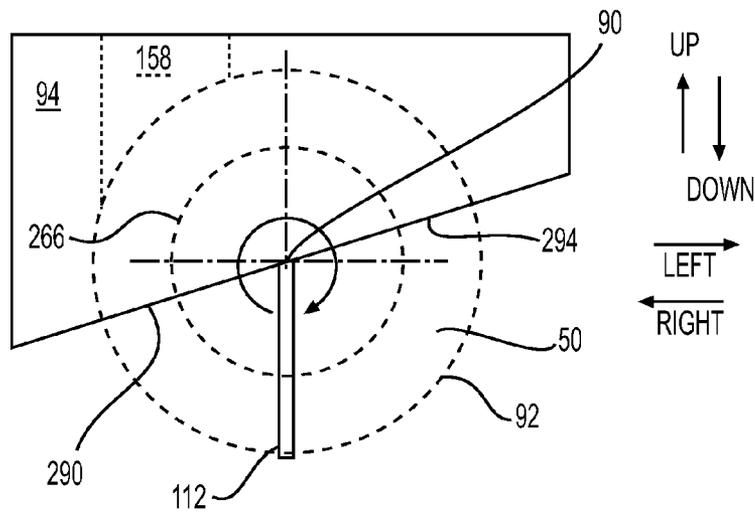
**FIG. 16**



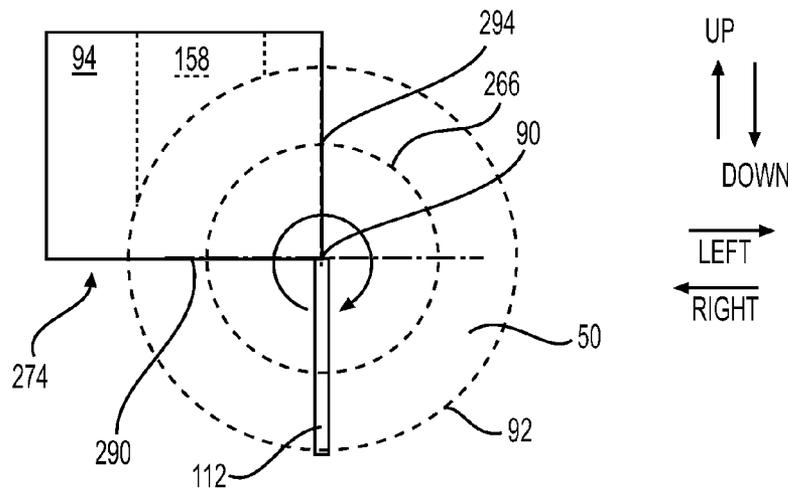




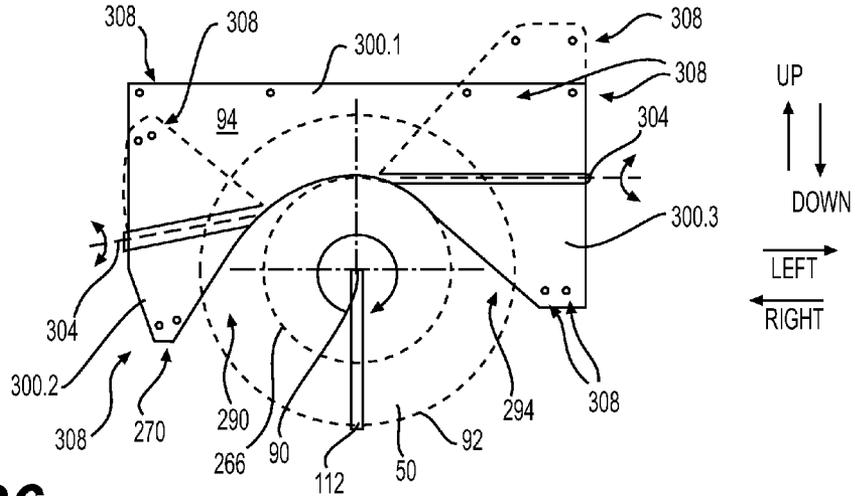
**FIG. 23**



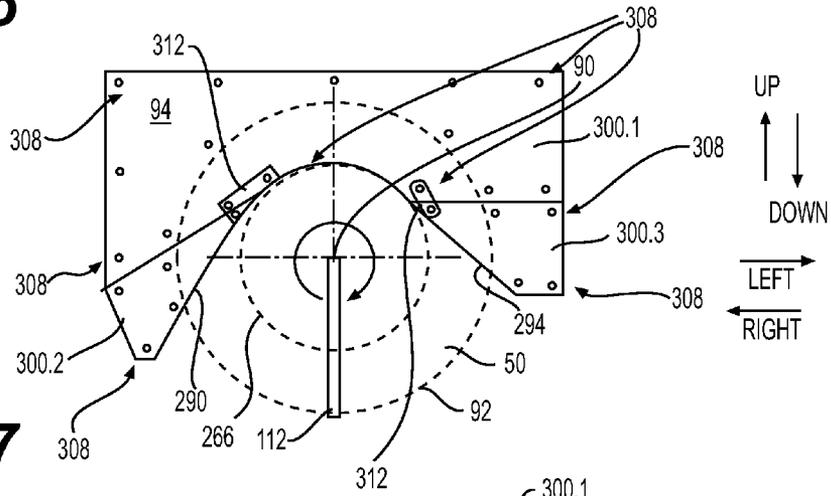
**FIG. 24**



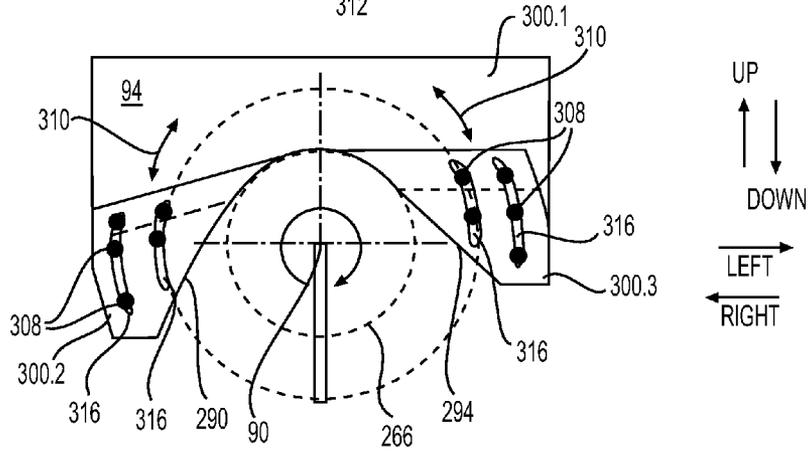
**FIG. 25**



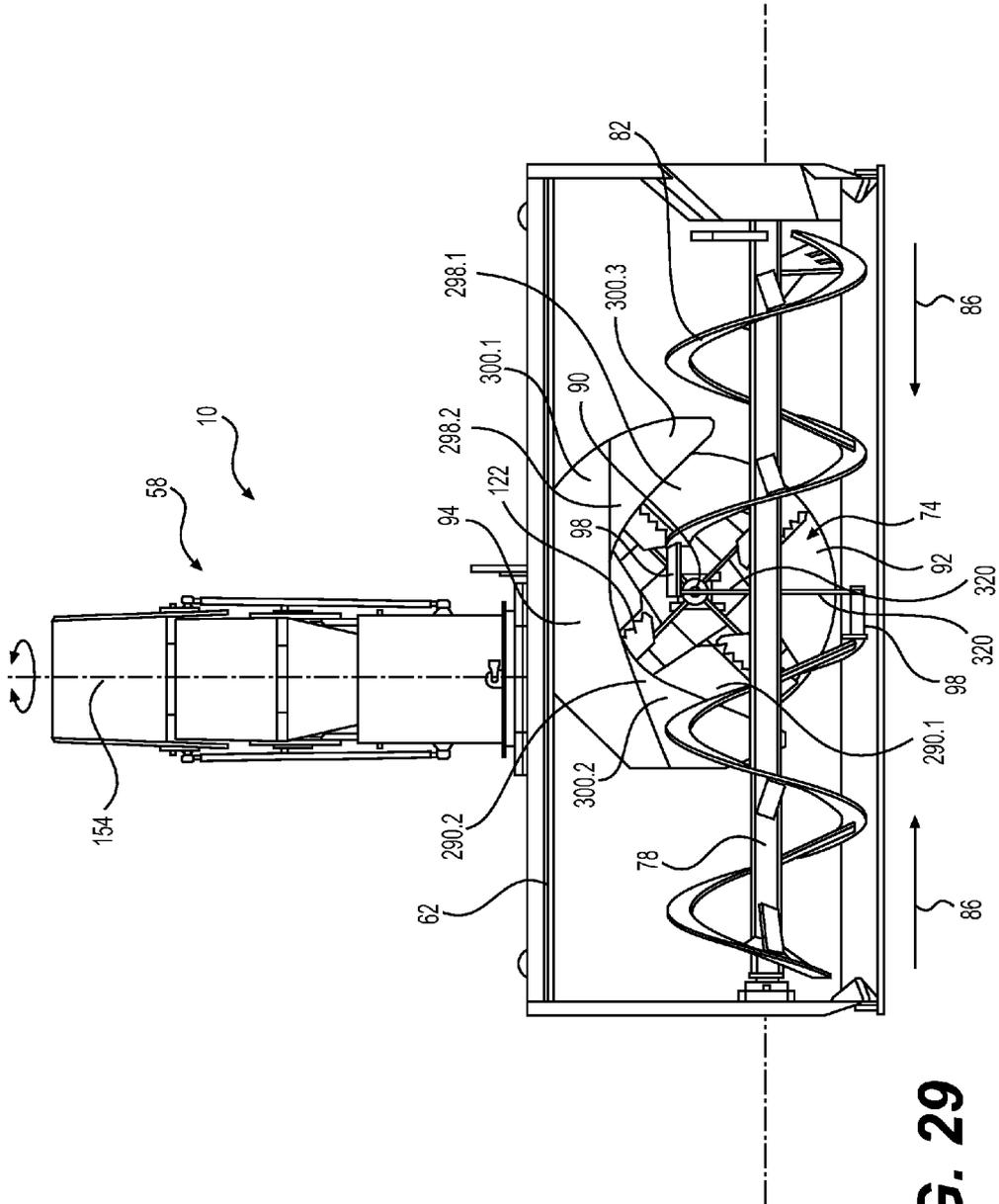
**FIG. 26**



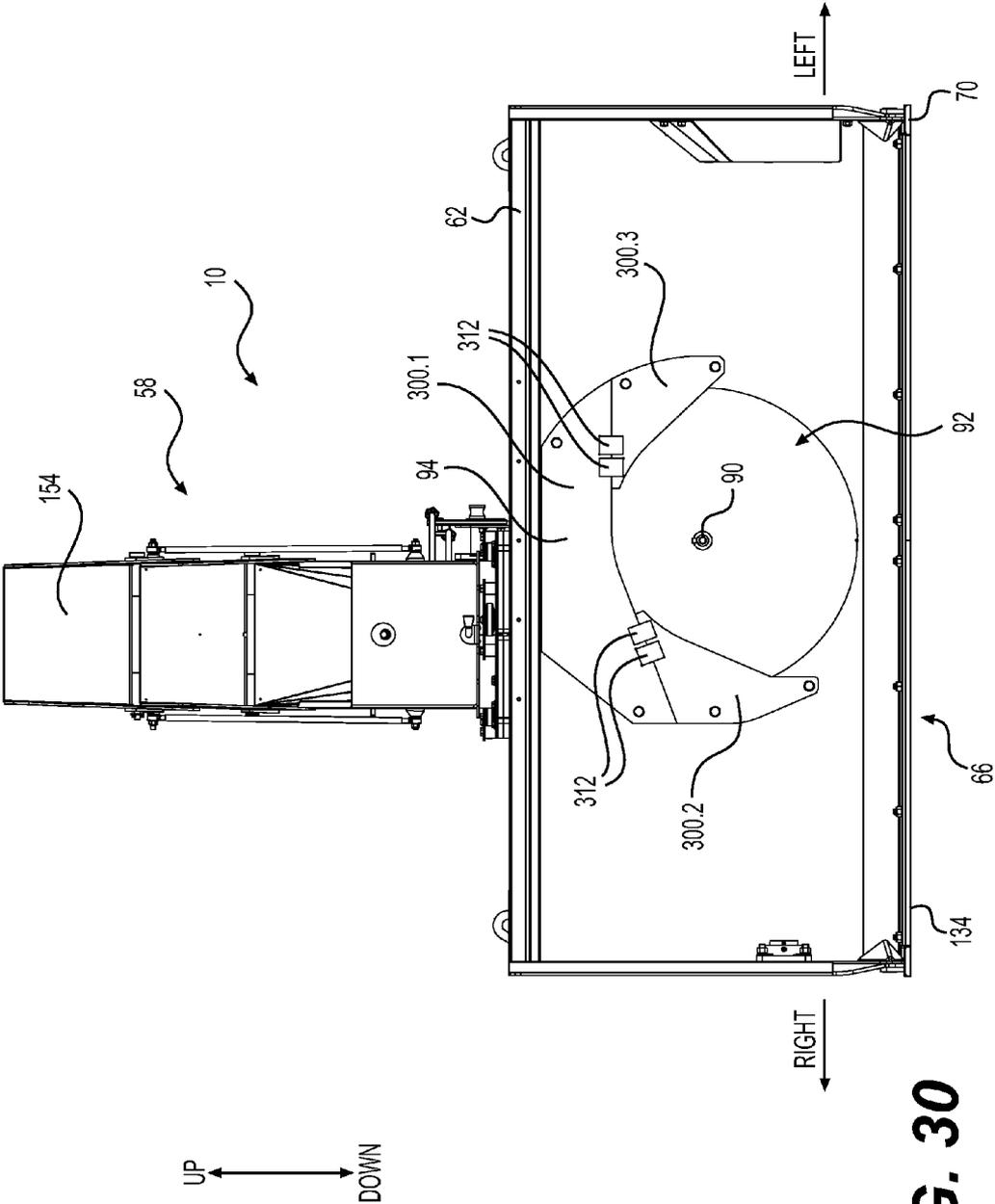
**FIG. 27**



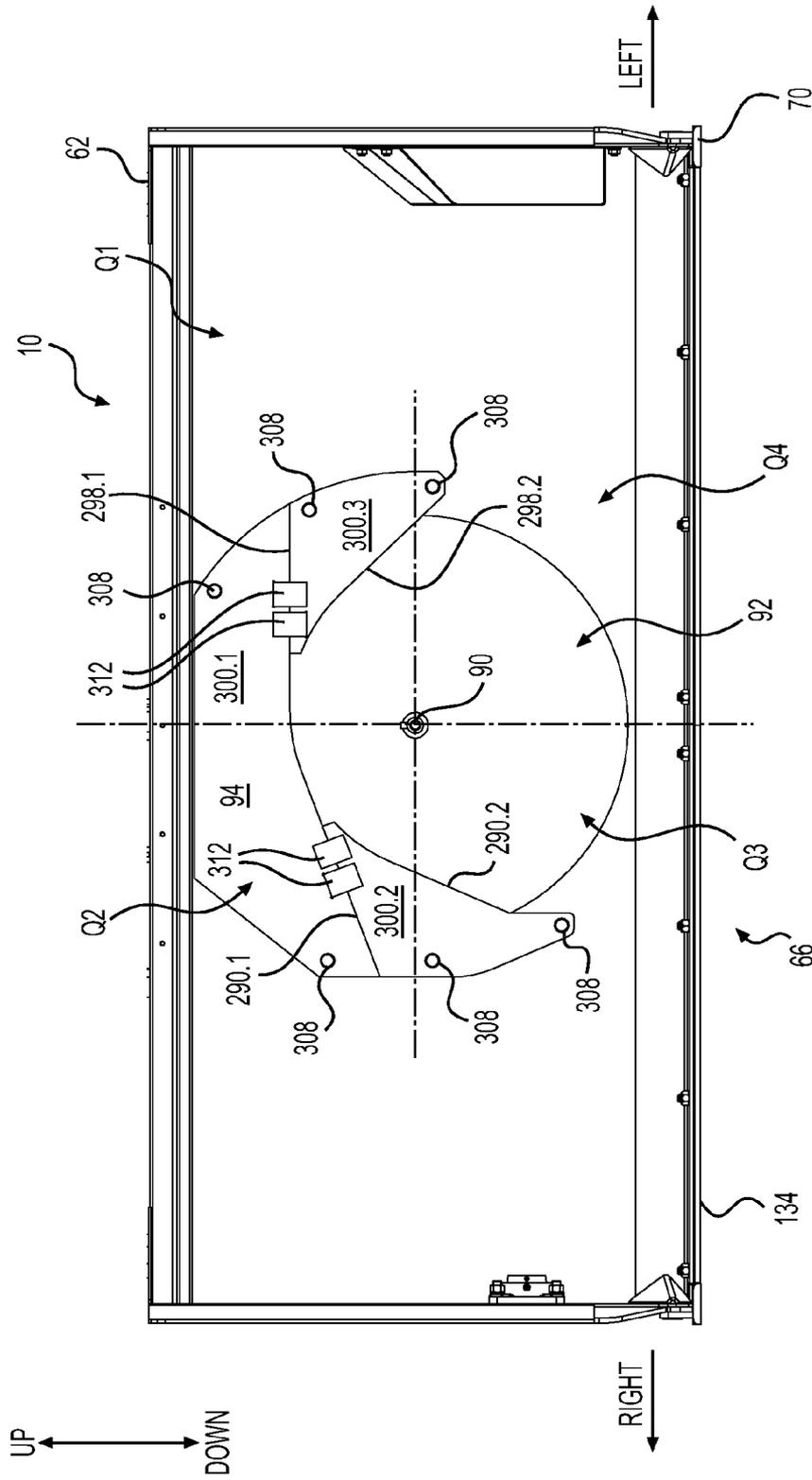
**FIG. 28**



**FIG. 29**



**FIG. 30**



**FIG. 31**

**SNOWBLOWER RESTRICTION PLATE**

**CROSS-REFERENCES**

**[0001]** The present application is a nonprovisional of, and claims priority under 35 U.S.C. 119(e) to, U.S. provisional patent application No. 61/948,911, filed Mar. 6, 2014, entitled SNOWBLOWER, and to U.S. provisional patent application No. 61/988,959, filed May 6, 2014, entitled SNOWBLOWER, which are both incorporated herein by reference in their entireties. Any publication of and any patent issuing from the foregoing U.S. patent applications is hereby incorporated herein by reference.

**BACKGROUND OF THE INVENTION**

**[0002]** 1. Field of the Invention

**[0003]** This invention generally relates to an apparatus for blowing snow. The present invention more specifically relates to a portion of a snowblower that is adapted to restrict a snowblowing mechanism. The present invention also relates to other features adapted to improve the efficiency of a snowblower.

**[0004]** 2. Description of the Related Art

**[0005]** Apparatuses for removing snow come in various configurations. They come in small size for personal snowblowers and they reach significant sizes in industrial applications. Generally, snowblowers are designed to remove snow, ice, and sometimes other debris, from the ground and propel the snow and ice at a distance to clear the ground.

**[0006]** Snowblowers can use different mechanical configurations to perform the required task. Some snowblowers are using an endless screw, an auger, in front of the apparatus to break the snow and the ice in smaller portions, in a first stage, and then use a rotatable impeller to propel the snow and the ice at a distance from the snowblower, in a second stage. The distance and the direction are managed with a directional nozzle. The snowblower can be powered in different ways, generally with an engine via a drive member. The engine can be part of the snowblower in some configurations. A vehicle carrying the snowblower can alternatively provide power to the snowblower in other configurations.

**[0007]** The rotatable impeller generally includes a series of vanes or blades sized and designed to receive thereon snow and ice. Rotation of the blades is propelling the snow and the ice. The blades are generally equipped with a knife portion to cut through snow and ice. The blades are generally disposed on the snow contacting edge of the impeller to propel the snow. The snow is generally pushed toward the exterior diameter of the impeller when propelled by the rotating impeller, subjected to centrifugal forces.

**[0008]** To some extent, the impeller can be compared to a turbine that is pumping air and snow. The blades of the impeller are thus designed to ingest snow, a solid material, and are also pumping air, a fluid with lesser density. The vanes that are generally flat to prevent solid material to squeeze between the vanes and the impeller housing. The design of the impeller could be improved to increase the efficiency of the snowblower and reduce the required amount of power to perform the same work.

**[0009]** Snow shovel members disposed on the screw-lime tooth member are shoveling snow toward the snow-blowing mechanism. Their design, however, also shovel snow in the opposite direction thus producing remaining snow in front of the snowblower. This is undesirable since it prevents remov-

ing all the snow by the snowblower and some snow remains on the ground in front of the snowblower.

**[0010]** The restriction member of the snowblower is used to restrict the size of the opening of the snow-blowing mechanism. Prior art restriction members have a shape that is less than optimal and prevents maximizing the efficiency of the snowblower. The size and the design of the restriction member might also be different for different types and size of snowblower. It is also desirable that the restriction member size and design could be adjustable.

**[0011]** It is therefore desirable to provide an improved snowblower over the existing art that is requiring less power to propel a same amount of snow and ice.

**[0012]** It is also desirable to provide an improved impeller over the existing art that is adapted to ingest and propel more snow.

**[0013]** It is equally desirable to provide an improved restrictor member design over the existing art.

**[0014]** It is desirable to provide a restriction member covering a wider portion of the snow-blowing mechanism over the existing art.

**[0015]** It is equally desirable to provide an adjustable restriction member over the existing art.

**[0016]** Other deficiencies will become apparent to one skilled in the art to which the invention pertains in view of the following summary and detailed description with its appended figures.

**SUMMARY OF THE INVENTION**

**[0017]** One aspect of the present invention is to alleviate one or more of the shortcomings of the background art by addressing one or more of the existing needs in the art.

**[0018]** The following presents a simplified summary of the invention in order to provide a basic understanding of some aspects of the invention. This summary is not an extensive overview of the invention. It is not intended to identify key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some concepts of the invention in a simplified form as a prelude to the more detailed description that is presented later.

**[0019]** The invention is generally described as an improved snow-blowing mechanism for a snowblower having improved snow-blowing capability and other improvements thereof as described below.

**[0020]** The invention is generally described as a self-powered snowblower having improved snow-blowing capability and other improvements thereof caused, at least in part, by an improved design of the restriction member as described below.

**[0021]** The invention is generally described as a vehicle including a snowblower having improved snow-blowing capability and other improvements thereof caused, at least in part, by an improved design of the restriction member as described below.

**[0022]** The invention is generally described as a method of propelling snow and other materials by a snow blower having improved snow blowing capability and other improvements thereof caused, at least in part, by an improved design of the restriction member as described below.

**[0023]** The invention is generally described as a method of propelling snow and other materials carried on by a vehicle including a snowblower having improved snow blowing

capability and other improvements thereof caused, at least in part, by an improved design of the restriction member as described therein.

**[0024]** The invention is generally described as a replacement restriction member for existing snowblowers, the replacement restriction member having improved snow-blowing capability and other improvements thereof caused, at least in part, by an improved design of the restriction member as described below.

**[0025]** Aspects of our work, in accordance with at least one embodiment of the invention, provide an adjustable snow-blowing mechanism over the existing art.

**[0026]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member that covers a larger area of the snow-blowing mechanism opening.

**[0027]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member sized and designed to cover, over at least a portion of the rotation area of the impeller's radially elongated snow-engaging portions, the radial length of the snow-engaging portions.

**[0028]** Aspects of our work, in accordance with at least one embodiment of the invention, provide restriction member covering more than 50% of the upper section of the snow blowing mechanism's opening.

**[0029]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a modular restriction member.

**[0030]** Aspects of our work, in accordance with at least one embodiment of the invention, provide an adjustable restriction member.

**[0031]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member adapted to extend in more than two quadrant of the opening housing the impeller.

**[0032]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member extending over more than two quadrants of the snow-blowing mechanism opening.

**[0033]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member extending over more than three quadrants of the snow-blowing mechanism opening.

**[0034]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member adapted to cover a larger area of quadrant 2 (Q2) of the opening that is housing the impeller.

**[0035]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member including a progressive attack edge and a progressive release edge.

**[0036]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member adapted to cover a larger area of Q2 of the opening housing the impeller.

**[0037]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member adapted to cover about half of the opening housing the impeller.

**[0038]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member that is covering the snow-blowing mechanism opening on more than about 15% of the opening.

**[0039]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member that is covering the snow-blowing mechanism opening on more than about 25% of the opening of at least two angular quadrants.

**[0040]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member that is covering the snow-blowing mechanism opening on more than about 35% of the opening of at least three angular quadrants.

**[0041]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member that is covering the snow-blowing mechanism opening on more than about 40% of the opening of at least three angular quadrants.

**[0042]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a modular restriction member that is selectively covering the snow-blowing mechanism opening and adapted to adjust the covered area of the opening.

**[0043]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a modular restriction member that is covering the snow-blowing mechanism opening and that is adapted to be adjustable to select a desired coverage of the snow-blowing mechanism opening.

**[0044]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a progressive restriction member that is adjustably covering the snow-blowing mechanism without removing the restriction member from the snowblower.

**[0045]** Aspects of our work, in accordance with at least one embodiment of the invention, provide a restriction member for a snow-blowing mechanism, the restriction member comprising an attack edge and a release edge, the restriction member being adapted to cover at least 20% of a propeller housing opening of the snow-blowing mechanism.

**[0046]** Additional and/or alternative features, aspects, and advantages of embodiments of the present invention will become apparent from the following description, the accompanying drawings, and the appended claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0047]** FIG. 1 is an illustration of an exemplary snowblower operatively attached at the back of a vehicle;

**[0048]** FIG. 2 is a side elevational view of a manually operated snowblower, in accordance with at least one embodiment thereof;

**[0049]** FIG. 3 is a perspective illustration of the front-right side of an exemplary snowblower, in accordance with at least one embodiment thereof;

**[0050]** FIG. 4 is a of the an exemplary snowblower wherein the impeller is displayed;

**[0051]** FIG. 5 is a left side elevational view of an exemplary snowblower, in accordance with at least one embodiment thereof;

**[0052]** FIG. 6 is a rear elevational view of an exemplary snowblower, in accordance with at least one embodiment thereof;

**[0053]** FIG. 7 is a left elevational view of an exemplary snowblower, in accordance with at least one embodiment thereof;

**[0054]** FIG. 8 is a rear-right perspective view of an exemplary snowblower with two screw-like tooth member, in accordance with at least one embodiment thereof;

- [0055] FIG. 9 is a right side elevational view of an exemplary snowblower, in accordance with at least one embodiment thereof;
- [0056] FIG. 10 is a front side elevational view of an exemplary snowblower, in accordance with at least one embodiment thereof;
- [0057] FIG. 11 is an exploded perspective view of an exemplary snowblower assembly, in accordance with at least one embodiment thereof;
- [0058] FIG. 12 is an exploded perspective view of an exemplary snowblower assembly, in accordance with at least one embodiment thereof;
- [0059] FIG. 13 is an exploded perspective view of an exemplary snowblower assembly, in accordance with at least one embodiment thereof;
- [0060] FIG. 14 is a front elevational view of a snowblower and an embodiment of the restriction member thereon;
- [0061] FIG. 15 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0062] FIG. 16 is a magnified front elevational view of a portion of a snowblower with an embodiment of a restriction member thereon;
- [0063] FIG. 17 is a front elevational view of a snowblower and an embodiment of the restriction member thereon;
- [0064] FIG. 18 is a front elevational view of a snowblower and an embodiment of the restriction member thereon;
- [0065] FIG. 19 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0066] FIG. 20 is a magnified front elevational view of a portion of a snowblower with an embodiment of a restriction member thereon;
- [0067] FIG. 21 is a front elevational view of a snowblower and an embodiment of the restriction member thereon;
- [0068] FIG. 22 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0069] FIG. 23 is a magnified front elevational view of a portion of a snowblower with an embodiment of a restriction member thereon;
- [0070] FIG. 24 is a front elevational view of a snowblower and an embodiment of the restriction member thereon;
- [0071] FIG. 25 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0072] FIG. 26 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0073] FIG. 27 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0074] FIG. 28 is a front elevational view of a snowblower and an embodiment of a restriction member thereon;
- [0075] FIG. 29 is a front elevational view of a snowblower and an embodiment of the screw-like tooth member and its snow shovel members;
- [0076] FIG. 30 is a front elevational view of a snowblower and an embodiment of a restriction member thereon; and
- [0077] FIG. 31 is a magnified front elevational view of a portion of a snowblower with an embodiment of a restriction member thereon.

DESCRIPTION OF EMBODIMENT(S) OF THE INVENTION

[0078] Our work is now described with reference to the figures. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention by

way of embodiment(s). It may be evident, however, that the present invention may be practiced without these specific details.

[0079] A snowblower 10 driven and powered by a vehicle 14 is illustrated in FIG. 1. In the present situation, the vehicle 14 is a schematically illustrated tractor 18 that is powering the snowblower 10 with its power take off (PTO) 22. The tractor 18 has a front side 26 and is driven in reverse to remove snow from the ground with the snowblower 10. The snowblower 10 thus has a front side 30 that is opposed to the tractor's front side 26 in the illustrated configuration. The snowblower 10 could alternatively be secured to the tractor 18 in the opposite direction causing the snowblower's front side 30 to be in the same direction as the tractor's front side 26 without departing from the scope of the present invention. The snowblower 10 could also alternatively be located in front of the tractor 18 without further departing from the scope of the invention. In the latter configuration, the front of the snowblower 10 would be in the same direction as the front of the tractor 18. The snowblower 10 could also be located in front of the tractor 18 with the snowblower's 10 front toward the rear of the tractor 18 (however this would be a bit unusual).

[0080] A snowblower 10 of a different configuration is illustrated in FIG. 2. The self-powered snowblower 34 illustrated in FIG. 2 generally refers to personal snowblowers 10. The snowblower 34 generally includes a pair of handles 38 for a user to grasp to operate the snowblower 10, a pair of wheels 42, an engine 46 driving the wheels 42, an impeller 50 and a screw 54 located in front of the snowblower 34 to manage the snow introduced in the impeller 50. A snow-directing mechanism 58 operatively associated with the impeller 50 is located above the impeller 50.

[0081] The text that follows is going to describe a snowblower in the configuration illustrated in FIG. 1 to facilitate the reading of the text. The focus put on the snowblower in the configuration illustrated in FIG. 1 is not intended to disclaim any rights associated with snowblowers 10, 34 of different configurations even if not expressly described therein.

[0082] Moving now to FIG. 3 throughout FIG. 7, illustrating a snowblower 10 with a snow-directing mechanism 58 capable of directing the snow propelled by the snowblower 10. The snow-directing mechanism 58 is configured to manage the direction and the height of the flow of snow when blown by the snowblower 10. The snowblower 10 includes a body 62 to which the snow-directing mechanism 58 is attached. The body 62 includes a snow-collecting portion 66 generally made of steel and generally having a rectangular section that is equipped with a pair of ground-contacting members 70 adapted to set the height of the snowblower 10 and facilitate the movement of the snowblower 10 on the ground. The body 62 also a snow-blowing mechanism 74 taking the snow from the snow collecting portion 66 to the snow-directing mechanism 68 and propel the snow at a distance from the snowblower 10.

[0083] The snow-collecting portion 66 is used to collect the snow on the ground and for other purposes. One of the other purposes is to make sure to limit the size of the pieces of snow to prevent blocking the snowblower 10 with blocks of snow and ice and therefore ensures proper functioning of the snow blowing mechanism 74. An exemplary embodiment of a mechanism adapted to do so is illustrated in FIG. 3 throughout FIG. 8. A front horizontal rotating axle 78 is equipped with a screw-like tooth member 82 to grind the snow in front of the snowblower 10. The axle 78 is rotated by a drive taking

power from the engine's PTO (not shown) of the tractor 18. The screw-like tooth member 82 is designed in such a way that the snow is going to be moved 86 toward the center of the snowblower 10. In so doing, the direction of rotation of the screw-like tooth member 82 is opposed on each of the right side and the left side of the snowblower 10. A snowblower 10 with a pair of superposed rotating axles 78 is illustrated in FIG. 8 throughout FIG. 10.

[0084] The rotating axle 78 illustrated in FIG. 3 throughout FIG. 10 include a screw-like tooth member 82 with an additional snow shovel member 98 disposed in the middle of the screw-like tooth member 82. The snow shovel members 98 rotate with the rotating axle 78 and push the snow facing the middle portion of the screw-like tooth member 82 in the snowblower 10.

[0085] Still in FIG. 1 throughout FIG. 10, one can appreciate the typical three-point fastening mechanism 114 adapted to connect the snowblower 10 to the tractor 18. Other systems like the hydraulic system 118 for managing the direction of the snow can be appreciated.

[0086] The snowblower 10 has a snow-blowing mechanism 74 between the snow-collecting portion 66 and the snow-directing mechanism 58. The snow-blowing mechanism 74 is generally housed within the body 62 in a shape of an impeller 50 rotating about a rotational axis 90 as it is illustrated in FIG. 2 throughout FIG. 12. One can appreciate that the opening 92 of the snow-blowing mechanism 74 is managed with a restriction member 94. The restriction member 94 is embodied as a steel plate in the Figures and could be embodied differently, like a plastic plate, an aluminum plate or a composite plate, to serve a comparable function. The restriction member 94 is preferably covering the upper portion of the impeller's housing opening 92 in the body 62 to allow easy movement of the snow on the ground in the impeller's housing opening 92. The restriction member 94 restricts the opening 92 that is accelerating the flow of air and snow in the impeller's housing opening 92 inside the snow-blowing mechanism 74 given the smaller opening 92 of the impeller's housing opening 92. The restriction member 94 can be adjustable and covers a desired portion of the opening 92. The restriction member 94 of an embodiment is preferably applied on the upper portion of the opening 92 and can cover a small portion of the opening 92 to about half of the opening 92. The restriction member 94 also interacts with the impeller 50 to optimize the vacuum created by the rotative impeller 50. More precise interaction between the restriction member 94 and a snow-engaging portion 122 of the impeller 50 that is going to be discussed in more details below is increasing the efficiency of the snowblower 10.

[0087] FIG. 11 throughout FIG. 13 are illustrating various exploded views of the snowblower 10 for further understanding of the assembly. A gearbox 126 is secured to the body 62 to receive rotative motive power from the engine (tractor's PTO), protected with guard 130, and transmit power to the impeller 50 and the rotative axle 78 assembly. One can also appreciate the lower portion of the body 62 includes a blade 134 and optional supporting legs 138. A drive system 142 is used to transmit power to the rotating axle 78 via a drive axle 146. A hydraulic actuator 150 is also depicted in FIG. 12. The hydraulic actuator 150 is used to rotate a nozzle 154 of the snow-directing mechanism 58. An opening 158 in the body 62 is also illustrated in FIG. 12 to allow passage of the snow from the impeller 50 to the snow-directing mechanism 58.

[0088] Turning now to FIG. 14 throughout FIG. 16 illustrating an embodiment of the restriction member 94 in coop-

eration with the body 62 and the impeller 50. The restriction member 94 is optionally secured to the body 62, because it could alternatively be constructed in the body 62 of the snowblower 10, and is configured to restrict the opening 92 of the snow-blowing mechanism 74. Generally, a blowing apparatus using a rotating impeller to generate a vacuum has an impeller's eye 178 in the region of the center of rotation of the impeller 50. This implies covering the radial and distal portion of the opening 92, about the rotation axis 90. Covering the radial and distal portion of the opening 92 ensures to create a vacuum through the impeller's eye 178 given the centrifugal force created by the rotating turbine 50.

[0089] In the present situation, the impeller 50 creates a vacuum when rotating and is required to propel ice and snow as well (solid materials). The complete distal portion of the impeller's eye 178 is preferably not covered because the snow and the ice are more prone to engage with the impeller 50 at the lower portion of the opening 92.

[0090] The restriction member 94 is thus designed to cover a significant portion of the opening 92 keeping the lowermost portion thereof open to allow ice and snow to enter the opening 92 more easily without having to pile up to reach the impeller's eye 178 should the periphery of the lower portion of the opening 92 be restricted. The impeller's eye 178 of at least one embodiment is thus extending to a portion of the periphery of the opening 92 of the impeller 50 housing. The restriction member 94 can, in embodiments thereof, be used to selectively restrict the opening 92 to improve vacuum and allow passage of snow and ice in the snow-blowing mechanism 74.

[0091] The opening 92 can be separated in quadrants as depicted in FIG. 17. The four quadrants are disposed in their recognized mathematical positions locating quadrant #1 (hereinafter referred to as Q1) 250 in the top-right corner, Q2 254 in the top-left corner, Q3 258 in the bottom-left corner and Q4 262 in the bottom-right corner. The impeller 50 includes a plurality of radial portions to propel snow 174. The radial portions to propel snow 174 are generally embodied as radial plates that are not covering the center portion of the impeller 50, the impeller's eye 178 to allow entry of the snow in the impeller 50. The radial portions to propel snow 174 are equipped at their distal portions with snow-engaging portion 122 extending from the distalmost radial portion of the impeller 50 toward the center of the impeller 50 hence covering a determined radial distance. A circle identified with reference number 266 identifies an exemplary impeller's eye 178 boundary 266 that can also be material in the determination of the radial identification of the junction between the snow-engaging portion 122 of the impeller 50 and the extension 206 thereof. A schematic impeller 50 is illustrated with one snow-engaging portion 122 and optional extensions 206 thereof. The boundary 266 is used as a radial reference in the description of the restriction member 94 embodiments. The boundary 266 is used to define the radial distance of the restriction member 94 toward the center of rotation of the impeller 50. In embodiments, the restriction member 94 covers the snow-engaging portion 122 and the distal portion of the radial portions to propel snow 174 to create vacuum with the rotation of the impeller 50. The boundary 266 is used to determine the shape of the restriction member 94 and the covered area therewith.

[0092] FIG. 18 illustrates different portions of the restriction member 94. A right portion 270, an intake portion 274, a covering portion 278, an outtake portion 282 and a left portion

**286.** The intake portion **274** is a portion of the restriction member **94** configured to begin covering the vanes **162**, or the snow-engaging portion **122** of the impeller **50** and the extension **206** thereof, when the vanes **162** are rotating and is generally located in Q2 **254** and/or Q3 **258**. The intake portion **274** includes an attack edge **290**, which can be straight or curved, that generally goes from the distal edge of the opening **92** to a location toward the center of the impeller **50**. The covering portion **278** is configured to restrict the opening **92** over a determined angular rotation of the impeller **50**, the covering portion **278** is located between the intake portion **274** and the outtake portion **282** and is generally found in Q1 **250** and Q2 **254**. The outtake portion **282** is generally found in Q1 **250** and/or Q4 **262** and is reopening the opening **92** from the covering portion **278** to the edge of the opening **92**. The outtake portion **282** includes a release edge **294**, which can be straight or curved, that generally goes from the proximal edge of the covering portion **278** and the distal edge of the opening **92**. The attack edge **290** extends and reaches the periphery of the opening **92** at about 120 degrees from vertical in an embodiment. The release edge **294** extends and reaches the periphery of the opening **92** at about 90 degrees from vertical in an embodiment.

**[0093]** The identification of the sections and portions are dependent of the side of rotation of the impeller **50** and the location of the opening **158** in the body **62**. The level of vacuum is going to be improved if Q2 **254** of the opening **92**, aligned with the opening **158**, is restricted. The level of vacuum of the snowblower **10** also benefits of covering Q1 **250**. Q4 **262** preferably remains substantially open to allow snow and ice to engage the impeller **50** and be blown through the opening **158**. In embodiments thereof, the restriction member **94** substantially covers the opening **92** when the vane **162** reaches the opening **158** when rotating to prevent loss of pressure from the opening **92** in favor of flowing the snow inside the opening **158** toward the snow-directing system **58**.

**[0094]** FIG. **19** illustrates an embodiment where the attack edge **290** provides a progressive and linear engagement of the rotating vanes **162** and remains above the lower 45 degree of Q3. The covering portion **278** is extended toward the axis of rotation **90** to cover more radial area in Q3 to ensure increased pressure in the opening **158**. A curved continuation of the covering portion **278** edge extends over Q2 and Q3 before it gets to the release edge **298**. The release edge **298** progressively and linearly disengages the vane **162** and remains above the lower 45 degree of Q4.

**[0095]** Moving now to FIG. **20** showing possible locations of the intake portion **274** attack edge **290**, illustrated radial from the axis of rotation **90**, from above the axis of rotation **90** to below the axis of rotation **90** and the same for the release edge **294**. In contrast, FIG. **21** illustrates possible location variations of angled intake portion **274** attack edge **290** from above the axis of rotation **90** to below the axis of rotation **90** and the same for the release edge **294**. FIG. **22** illustrates a trapezoidal design of the restriction member **94** with possible variations of position for the edges **290**, **294** thereof. FIG. **23** throughout FIG. **25** illustrate other possible embodiments. For instance, FIG. **23** depicts a curved attack edge **290** followed by a straight release edge **298** substantially aligned between Q1 and Q4. An inclined linear edge combining the attack edge **290** and the release edge **298** is exemplified in FIG. **24**. FIG. **25** illustrates an embodiment where only one quadrant, in the present situation Q2, is covered by the restriction member **94**. All the variations of the restriction members

**94** depicted in the various embodiments therein can be combined without departing from the scope of the present invention.

**[0096]** FIG. **26** throughout FIG. **28** are directed to another embodiment of a modular restriction member **94**. The modular restriction member **94** is generally a restriction member **94** of which the surface of the opening **92** it covers can be reduced or extended. The change in covering area can be made in different fashions. The restriction member **94** can be provided with a plurality of parts **300** that can be used individually or collectively. The number of parts forming the restriction member **94** can vary depending of the area of impeller's housing opening **92** to be covered and the specifics of the task to be achieved without departing from the scope of the present application. Indeed, it can be desirable to adapt the shape of the restriction member **94** and/or area covered thereof on a basis of the strength of the tractor and the nature of the snow (wet, light, . . .).

**[0097]** A first embodiment of the modular restriction member **94** is illustrated in FIG. **26**. The exemplified modular restriction member **94** includes three restriction member portions **300.1**, **300.2** and **300.3**. The portions **300.2** and **300.1** are illustratively pivotally connected to the upper portion **300.1**. The pivotal connection can be embodied as a hinge **304**. One or more of the portions **300** can be secured in either of their respective two positions to produce the desired covered area of the opening **92**. An advantage of this embodiment is that the portions **300.2** and **300.3** remains connected to the upper portion **300.1** and can be modified quickly if a different restriction member **94** is desirable. A set of proper fasteners **308** or means for fastening the portions **300.2** and **300.3** in place are provided and should be used in accordance with the selected restriction member **94** configuration.

**[0098]** Another embodiment is illustrated in FIG. **27**. This time, the restriction member's **94** portions **300.2** and **300.3** are embodied in a fashion they can be individually removed. This embodiment provides three distinct configurations, just like the embodiment illustrated in FIG. **26**. Additional securing brackets **312** can be added to ensure securing further the assembly against vibrations and shocks that can be experienced while using the snowblower **10**.

**[0099]** The restriction member **94** can include slidable portions **300.2**, **300.3** as illustrated in the embodiment in FIG. **28**. The slidable portions **300.2**, **300.3** can provide a progressive adjustment of the restriction member **94** because they can be slid and positioned at the exact location for optimal performance of the impeller **50** in the snow blowing mechanism **74**. The slidable portions **300.2**, **300.3** are illustrated with slots **316** therein with intervening securing fasteners **308**. The slidable portions **300.2**, **300.3** can be further secured to the part **300.1** with their respective sides held by channels (not illustrated) allowing the slidable portions **300.2**, **300.3** to slide therein while maintaining their edges next to portion **300.1**.

**[0100]** Another inventive aspect is presented in FIG. **29**. Indeed a modular restriction member **94** providing two distinct attack edges **290.1**, **290.2**, and two distinct release edges **298.1**, **298.2**. Desired attack edge **290** and release edge **298** can be selected by removing or adding modular parts **300.1**, **300.2**.

**[0101]** Another embodiment is presented in FIG. **30** and FIG. **31**. The modular portion **300.2** comprises an attack edge **290.2** secured at its lower portion with a fastener **308** and securing brackets **312** at its upper portion. The modular portion

tion **300.3** comprises a release edge **298.2** secured at its lower portion with a fastener **308**, in **Q4**, and securing brackets **312** at its upper portion.

**[0102]** The description and the drawings that are presented above are meant to be illustrative of the present invention. They are not meant to be limiting of the scope of the present invention. Modifications to the embodiments described may be made without departing from the present invention, the scope of which is defined by the following claims:

What is claimed is:

**1.** A restriction member for a snow-blowing mechanism, the restriction member comprising an attack edge and a release edge, the restriction member being adapted to cover at least 20% of a propeller housing opening of the snow-blowing mechanism.

**2.** The restriction member for a snow-blowing mechanism of claim **1**, wherein a radial length of the restriction member is substantially covering the radial length of a cooperating impeller snow-engaging portion

**3.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the restriction member is made of a plurality of parts.

**4.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the restriction member is angularly adjustable about a rotation axis of a cooperating impeller.

**5.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the attack edge is substantially straight and providing a progressive engagement with cooperating impeller snow-engaging portions.

**6.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the release edge is substantially straight.

**7.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the attack edge of the restriction member is generally angularly located in **Q3** and the release edge is generally angularly located in **Q1** in respect with the rotation axis of a cooperating impeller.

**8.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the restriction member is angularly extending over **Q1** and **Q2** at a periphery of a cooperating impeller housing.

**9.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the restriction member is covering at least 50% of **Q2** of a cooperating impeller housing opening.

**10.** A snowblower including a restriction member for a snow-blowing mechanism, the restriction member comprising an attack edge and a release edge, the restriction member being adapted to cover at least 20% of a propeller housing opening of the snow-blowing mechanism.

**11.** The snowblower of claim **10**, wherein a radial length of the restriction member is substantially covering the radial length of a cooperating impeller snow-engaging portion

**12.** The snowblower of claim **10**, wherein the restriction member is made of a plurality of parts.

**13.** The snowblower of claim **10**, wherein the restriction member is angularly adjustable about a rotation axis of a cooperating impeller.

**14.** The snowblower of claim **10**, wherein the attack edge is substantially straight and providing a progressive engagement with cooperating impeller snow-engaging portions.

**15.** The snowblower of claim **10**, wherein the release edge is substantially straight.

**16.** The restriction member for a snow-blowing mechanism of claim **1**, wherein the attack edge of the restriction member is generally angularly located in **Q3** and the release edge is generally angularly located in **Q1** in respect with the rotation axis of a cooperating impeller.

**17.** The snowblower of claim **10**, wherein the restriction member is angularly extending over **Q1** and **Q2** at a periphery of a cooperating impeller housing.

**18.** The snowblower of claim **10**, wherein the restriction member is covering at least 50% of **Q2** of a cooperating impeller housing opening.

**19.** A restriction member kit for a snowblower, the kit comprising:

a restriction member comprising an attack edge and a release edge, the restriction member being adapted to cover at least 20% of a propeller housing opening of the snow-blowing mechanism.

**20.** The restriction member kit of claim **19**, further comprising

a restriction member extension adapted to increase the coverage of the propeller housing.

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