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SNOW BLOWERS

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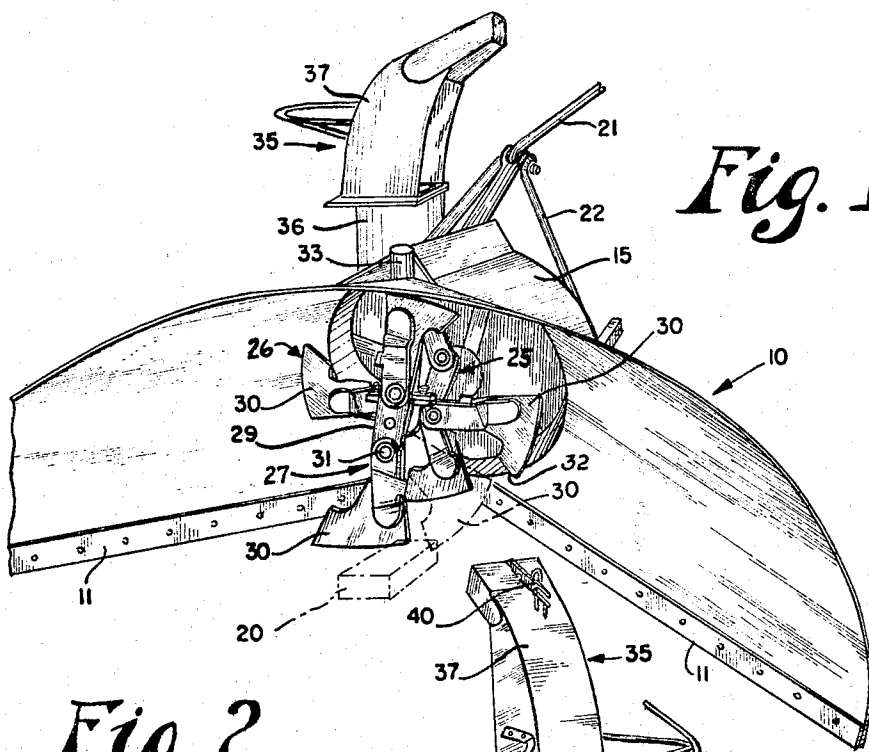


Fig. 1

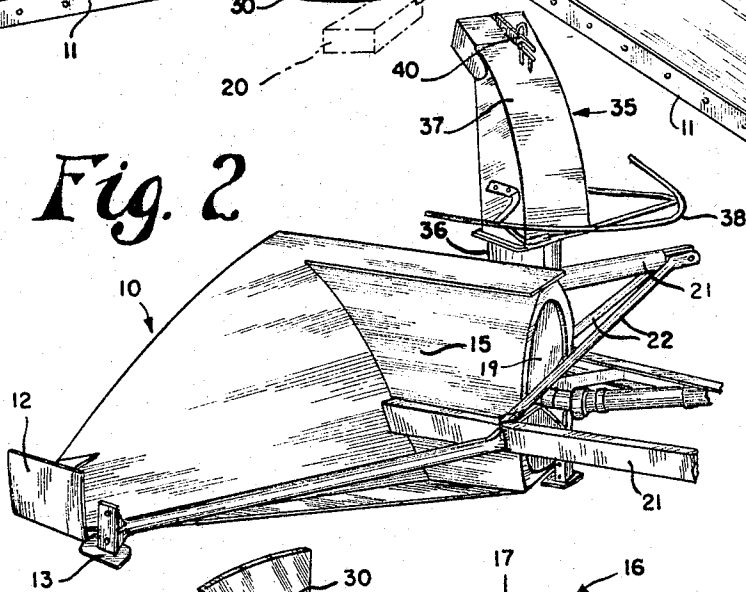


Fig. 2

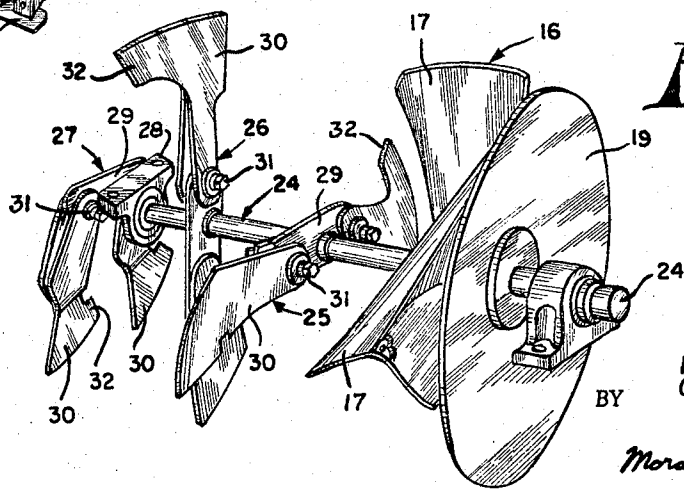


Fig. 3

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SNOW BLOWERS

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1 Claim. (Cl. 37-43)

This invention relates to improvements in snow blowers, and more particularly to a snow blower having a novel and improved rotor unit therein.

The principal objects of the present invention are to provide an improved snow blower having a novel rotor apparatus therein which is adapted to handle heavy or hard-packed snow and ice much more effectively than the rotors employed in conventional snow blowers, and which novel rotor unit is so designed that the possibility of said rotor being broken or damaged by rocks or other obstructions is minimized.

A more specific object of the present invention is to provide a snow blower having pivotal, centrifugal chopping blades which are adapted to pulverize the hardest packed snow and ice, and which pivotal mounting permits said blades to yield and pass over rocks or other unbreakable objects, thus avoiding damage to the machine.

A further object of the present invention is to provide an improved snow blower which is so designed that snow and ice cannot become compacted in and clog or jam the machine.

Still further objects of the present invention are to provide an improved snow blower which is rugged and durable, which is efficient, which is relatively inexpensive both in construction and operation, and which improved machine is otherwise particularly well adapted for its intended purposes.

With the above and other objects in view, which other objects and advantages of the present apparatus will become apparent hereinafter, the invention comprises the improved snow blower described in the following specification, and all equivalents or modifications thereof which come within the spirit of said invention and within the scope of the claim.

In the accompanying drawing, illustrating one preferred form of the invention, and wherein the same reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view looking at the forward end of the novel snow blower comprising the present invention;

FIG. 2 is a perspective side view of the machine; and

FIG. 3 is a perspective view of the novel rotor unit incorporated in the invention.

Referring now more particularly to the drawing, the general assembly of the improved snow blower comprising the present invention includes a rearwardly-tapered, semi-circular curved hood 10 forming a funnel-like housing, a snow-engaging rotor unit 25-27 within said housing, a snow-ejecting impeller 16, and a discharge chute 35. In the use of the invention, the machine is mounted on either the front or rear of a tractor or other vehicle (not shown), being operatively connected to the vehicle power take off, and is designed to be pushed forwardly through the snow by said vehicle. As the machine advances, the funnel-like design of the hood 10 directs snow entering its enlarged open end rearwardly against the rotor assembly 25-27 which functions to break up said packed snow mass and convey it rearwardly to the impeller 16, as will be hereinafter described in greater detail. The snow is then thrown centrifugally by said im-

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peller through the discharge chute 35, and clear of the area being plowed.

In the preferred form of the invention the hood 10 is formed of heavy gauge steel, and the lower, longitudinal edges 11 thereof are formed of hard steel alloy, and are reversible and replaceable in the event they become worn. The rearward, apex end of said hood 10 has a cylindrical impeller housing 15 integral thereon, and projecting rearwardly therefrom are coupling shafts 21 and stabilizing bars 22 for removably mounting the unit on the tractor or other pushing vehicle. As will be seen in FIG. 2, side plates 12 are welded or otherwise permanently secured on each side of said hood adjacent its forward end, to minimize gouging in deep snow banks, and adjustable skid shoes 13 are mounted therebehind. The positioning of said skid shoes rearwardly of the cutting edge prevents the same from riding upwardly in hard, crusty snow.

With more particular reference now to the improved rotor unit characterizing the present invention, it will be seen in FIG. 3 that said rotor assembly includes an elongated horizontal drive shaft 24, the rearward end of which rotatable shaft is projected through and journaled in the back wall 19 of the impeller housing 15. Said shaft is suitably drivably connected to the power take-off of the pushing vehicle, or, alternatively, a separate engine or other actuating means could be employed. Mounted fast on said rotor shaft 24 within the housing 15 is the snow-ejecting impeller 16 utilized in the present invention, and which will be hereinafter described in greater detail, and projecting from said drive shaft forwardly of said impeller are the novel snow-chopping members, or flails featured in the invention.

As best appears in FIG. 3, three sets 25, 26 and 27 of chopping units are spaced axially and circumferentially on the rotor drive shaft 24, and each unit includes a short cross arm or bar 29 having apertures adjacent its outer ends, and loosely pivotally connected thereto are ax-like blades 30, the inner ends of said blades being clevised and secured to said arms 29 by means of pivot pins 31. When the machine is not in operation said blade members 30 hang downwardly in the manner illustrated by the forwardmost unit 27 in FIG. 3, and in this respect it is to be understood that the blade units shown in FIG. 1, and the two rearward units 26 and 25 in FIG. 3, are shown in radially-projecting condition merely for the purpose of illustration, as that is the position they assume when the machine is in operation.

Said blade members 30 are generally L-shaped in shape, having heat-treated and hardened, knife-like leading edges 32 which are relatively small to promote deep penetration and to facilitate the chopping of ice or hard-packed snow. Said blades are preferably twisted or deflected to provide a rearward pitch adapted to convey snow engaged thereby rearwardly toward the impeller 16. The forwardmost set 27 of said chopping blades 30 is mounted at the extreme forward end of the drive shaft 24 to prevent the advancing snow from forming around the shaft and bearings before it is acted upon by said blade members, which could jam or impede the operation of the machine. In the illustrated machine the forward end of said horizontal drive shaft is supported by a strut 33 (the upper end of which may be seen in FIG. 1) suspended from the top of the hood 10, and connected to a bearing bracket 28 (FIG. 3) on said shaft. The entire rotor unit is mounted on heavy-duty, sealed bearings, and is accurately balanced to ensure vibration-free operation.

As mentioned, when the novel blower comprising the present invention is in use it is pushed forwardly through the snow, and the tapered design of the hood 10 funnels the snow engaged thereby rearwardly against the rotor

blades 30. Although said blades normally hang downwardly, as described, when the rotor is actuated centrifugal force causes the blades to assume a radially-outwardly extending position (FIG. 1), and to deliver a rapid-fire succession of ax-like blows, which flailing action functions to chop the mass of incoming snow into small, easily-handled pieces. It has been found in actual practice that the unique flailing action of said blades 30 can effectively break up chunks of solid ice, and the present machine is capable of handling hard-packed or heavy snow much more effectively than conventional snow blowers wherein rigid, rotatable augers or blades are employed.

Due to the axial and circumferential spacing of the multiple blade units 25, 26 and 27 in the present invention, complete pulverization of the snow chunks is obtained before the snow reaches the impeller 16. It is to be understood, however, that although the use of three, spaced sets of chopping blades has been found to provide excellent results, the invention is by no means to be limited in this respect. It is contemplated that additional, or fewer, blade units might be preferred for some purposes, and it is intended to include herein not only the illustrated arrangement, but also any and all modifications as come within the spirit of the invention.

With reference again to FIG. 1 of the drawing, it will be noted that there is illustrated therein, in dot and dash lines, a brick 20, which is intended to represent any comparable unbreakable objects such as are frequently encountered in the course of a snow removal operation. As hereinabove described, the novel chopping blades 30 characterizing the present invention are freely pivotal about their connections 31, said blades being caused to assume a radial position during operation by centrifugal force, and in the event one of said members strikes an unbreakable obstruction such as the brick 20, said blade will yield in a counter-rotational direction, and will pass over the object, as illustrated in dot and dash lines. Thus the possibility of said rotor blades being broken is minimized, as compared to the rigid, unyielding blades utilized in conventional blower assemblies. When the pivotal blades of the present invention strike a rock or other obstruction, the operator is warned of its presence and he may stop the machine and remove the obstacle before it can damage the impeller.

The impeller 16 in the present machine is mounted on the rearward end portion of the drive shaft 24 within the housing 15, as described, and said rotatable impeller is designed to receive snow engaged by the machine after the ax-like members 30 have acted upon said incoming snow to pulverize the same. In the illustrated assembly, said impeller comprises a plurality of radially-projecting, curved blades 17 which rotate at a high rate of speed and which are designed to throw the snow outwardly through the discharge chute 35 by centrifugal force. The planar surfaces of said impeller blades are contoured to maintain the snow in a compact mass as it is discharged, thus permitting the throwing of said snow a substantial distance, and also minimizing the possibility of said discharge freezing at critical temperatures. Heavy gussets may be welded to the extreme outer end of said impeller blades to add strength thereto and to give maximum resistance to wear and bending. Because of the unitary design of the entire rotor assembly in the present invention, wherein the chopping units, or flails 25-27, and the snow-ejecting impeller 16 are mounted in axially-spaced relation on the shaft 24, said rotor unit can be quickly and easily disassembled and removed from the machine for servicing and repair.

The discharge chute 35 is mounted on and communicates with the interior of the impeller housing 15, as described, and includes a tubular base portion 36 and an upwardly and outwardly curved, hood-like deflector member 37 which is swivelly mounted on said base. Said deflector is preferably rotatable about at least a 230°

arc. On and partially surrounding said deflector hood 37, and spaced substantially outwardly thereof, is a hand ring 38 which may be conveniently reached by the operator from his seat on the tractor or other pushing vehicle to turn said deflector in any desired direction. Thus the blower can be readily adjusted to compensate for the wind, and to prevent the ejected snow from being blown back onto areas already cleared, or from blowing against the operator. Suitable spring-tensioned clamps are preferably provided on said hand ring 38 to yieldably maintain the deflector in any set position. In addition to said swivel mounting, said deflector 37 is also tiltable in a vertical plane, thus allowing the snow to be deposited as nearby or as far away as desired. Adjustment and setting means 40 (FIG. 2) are provided for positioning and releasably locking said deflector at a desired angle.

From the foregoing detailed description it will be seen that the present invention provides a novel snow blower which has several important advantages over conventional machines. Principally, of course, the present apparatus is characterized by the unique, pivotal chopping blades which are designed to pulverize even hard-packed snow and ice, and which pivotal blade mounting minimizes the possibility of damage when rocks or the like are encountered. Moreover, the machine is so designed that snow cannot become compacted in and clog the machine. Still further important features of the present machine are that it is rugged and durable, it may be readily disassembled for service or repair, and it is relatively inexpensive both in construction and operation.

It is to be understood, of course, that various changes and modifications may be made in the structure illustrated and hereinabove described without departing from the spirit of the invention, and all of such changes or modifications are contemplated as may come within the scope of the following claim.

What we claim is:

A snow blower, comprising: a rearwardly tapered hood having an enlarged, open forward end; a horizontal, rotatable drive shaft extending longitudinally within said hood; impeller means mounted on said drive shaft adjacent the rearward portion of said hood; a discharge chute on said snow blower positioned to receive and discharge snow directed therein by said impeller; and a plurality of freely-pivotal flail blades mounted fast on said drive shaft forwardly of said impeller, said blades normally hanging downwardly from said shaft but being adapted to assume a radially projecting position when said rotatable drive shaft is actuated, each of said flail blades being substantially L-shaped and provided with an enlarged free outer end portion forming a head having a relatively small leading cutting edge which is sharpened to promote the chopping action of said blade, said rotating blades being designed to engage and chop incoming snow during operation, and each of said flail blades having a planar surface which is pitched rearwardly relative to the direction of rotation of said blade to urge snow engaged thereby rearwardly toward said impeller.

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