

May 2, 1933.

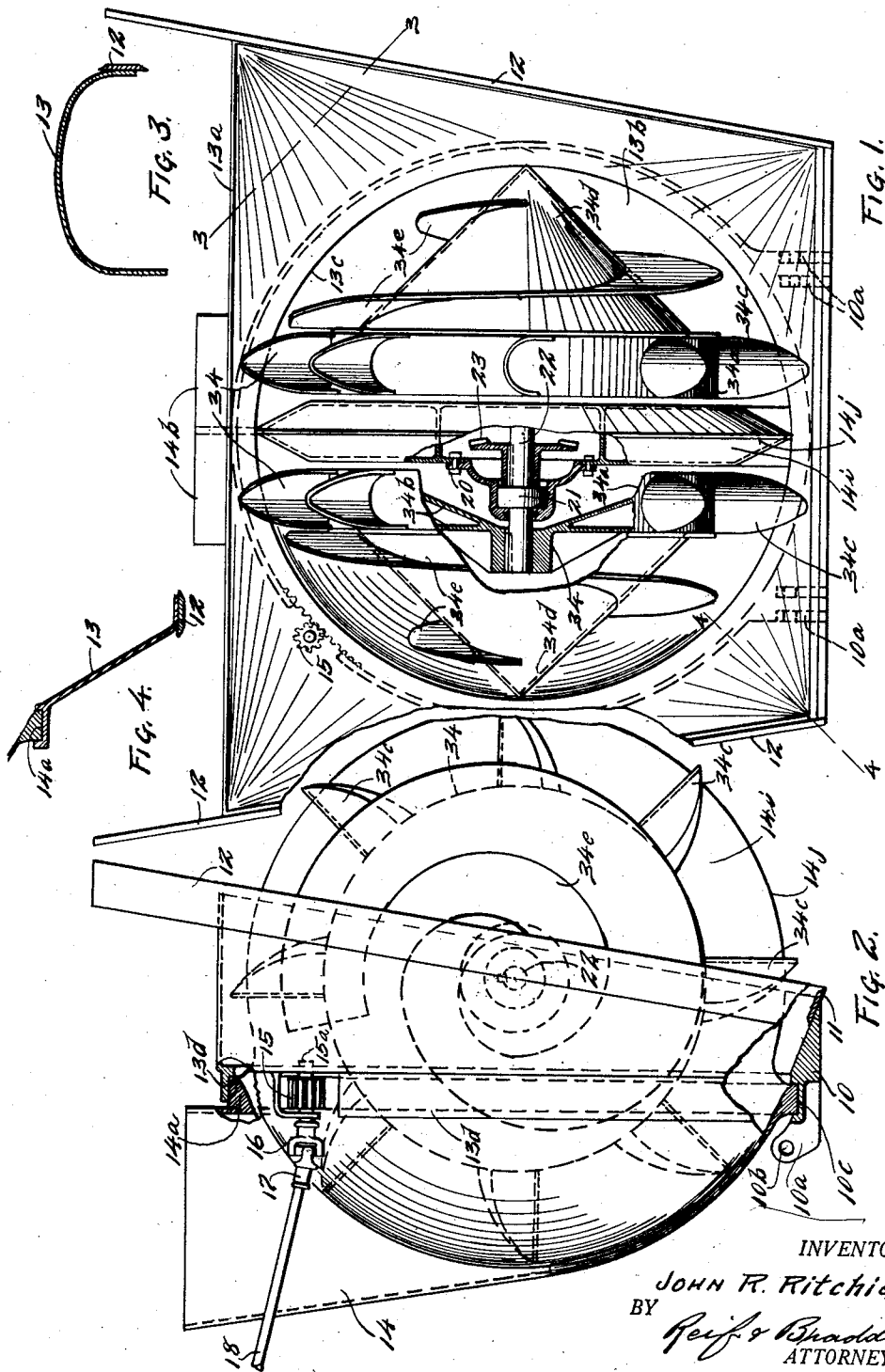
J. R. RITCHIE

1,906,718

SNOWPLOW

Filed May 2, 1931

2 Sheets-Sheet 1



May 2, 1933.

J. R. RITCHIE

1,906,718

SNOWFLOW

Filed May 2, 1931

2 Sheets-Sheet 2.

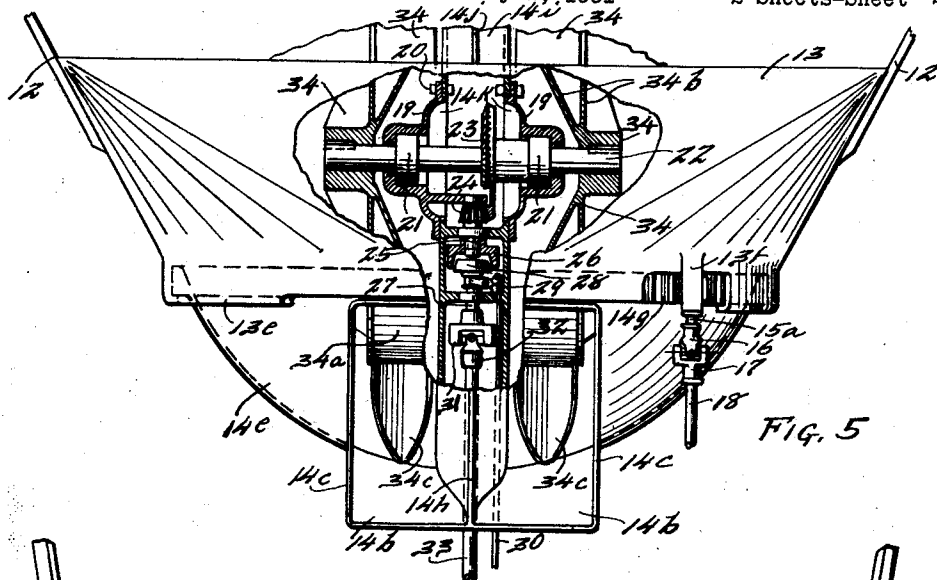


FIG. 5

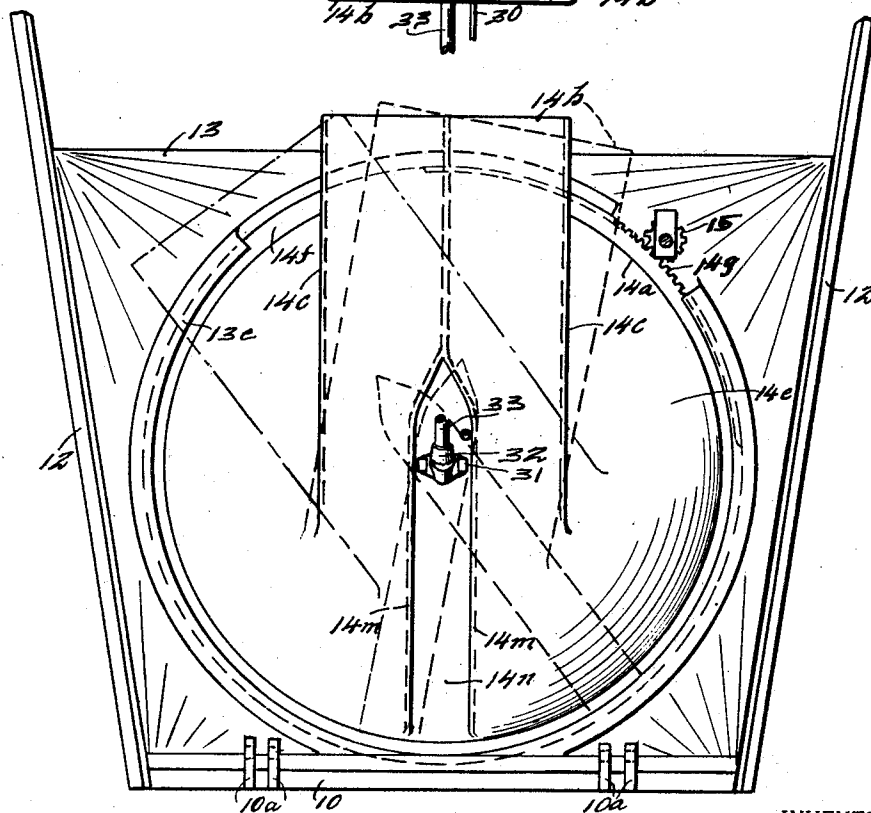


FIG. 6.

INVENTOR.
JOHN R. RITCHIE
BY *Reif & Ruppel*
ATTORNEYS.

UNITED STATES PATENT OFFICE

JOHN R. RITCHIE, OF MINNEAPOLIS, MINNESOTA

SNOWPLOW

Application filed May 2, 1931. Serial No. 534,509.

This invention relates to a snow plow, and while the plow may have various applications, it particularly is designed for a snow plow to work on streets or highways. It is desirable to keep the modern paved highways open at all seasons of the year and snow plows are now largely used to clear the highways of snow. The snow is usually discharged to one side or the other of the road by the plow. Such plows are now usually propelled by truck or tractor. It is desirable to have a plow which is easily operated and which will effectively handle the snow whether it is distributed uniformly or in drifts. It is also desirable to have a plow with means whereby the snow can be delivered to one side of the road or the other.

It is an object of this invention, therefore, to provide a snow plow having a discharge chute and effective means for engaging the snow and directing the same to the chute.

It is a further object of the invention to provide a plow which will include a chute, a mold board, and propelling means for directing snow to the chute; and wherein the chute will be oscillatable so as to direct the snow to one side or the other of the plow.

It is another object of the invention to provide a snow plow which will include a mold board, a chute in the rear of the mold board, propelling means for directing snow to the chute, and will also include means for oscillating the chute and propelling means, for directing the chute towards one side or the other of the plow.

It is a further object of the invention to provide a snow plow which will include a mold board, a chute in the rear of the mold board, spaced propellers for directing snow to the chute, and will also include conveying means at either side of the propellers for directing snow thereto.

It is also an object of the invention to provide a snow plow which will include a bottom blade, vertically extending blades at the ends of the bottom blade, a mold board extending rearwardly from said blades and having an opening therethrough, a chute in the rear of said opening, means in the rear of said opening for directing snow to the chute, the chute having a frame projecting through said opening, and a shaft journaled in said frame, and will also include propellers mounted on said shaft for directing snow to said chute.

It is still another object of the invention to provide a plow as set forth in the preceding paragraph, in which the chute together with said frame and propellers will be oscillatable about an axis extending forwardly and rearwardly of the plow.

It is still a further object of the invention to provide a snow plow which will include a rearwardly extending mold board, a chute in the rear of the mold board, propellers rotatable about a transverse axis in front of said chute, and a shaft on which said propellers are mounted, and will also include means for driving said shaft from the rear of said snow plow, and means for oscillating said chute and propellers extending to the rear of said plow.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views; and in which:—
Fig. 1 is a view in front elevation of the plow;

Fig. 2 is a view in side elevation, certain parts being broken away and others shown in vertical section;

Fig. 3 is a section taken on line 3—3 of Fig. 1, as indicated by the arrow;

Fig. 4 is a section taken on line 4—4 of Fig. 1 as indicated by the arrow;

Fig. 5 is a top plan view, certain parts being broken away and others shown in horizontal section; and

Fig. 6 is a view in rear elevation of the plow.

Referring to the drawings, a plow is shown having a bottom member 10 in the form of a bar which extends transversely of the plow at the bottom thereof and in engagement with the supporting surface. Member 10 is substantially horizontal at its bottom and has a downwardly inclined top surface, the front of said member thus tapering to an edge. A

blade 11 preferably of hard steel is secured to the top surface of member 10 at its front portion, extending somewhat beyond said edge. Member 11 is provided with a comparatively sharp front edge and its rear end is beveled toward the top surface of member 10. Member 10 at spaced points has upwardly and rearwardly projecting ears 10a having apertures 10b therethrough adapted to receive means for pushing said plow. Blades 12 extend upwardly and somewhat forwardly and outwardly as seen in Figs. 1 and 2, said blades being disposed at the ends of member 10 and having the form of flat bars having substantially sharp front edges as shown in Fig. 3, and also having beveled or tapered rear edges. The blades 12 are secured by bolting or otherwise at their inner sides to the outer side of a mold board or plate 13. The top edge 13a of the plate 13 extends between the blades 12 at a considerable height above member 10 and the blade or mold board 13 slopes rearwardly from its top edge, the blades 12 and member 10, being secured to member 10 at its bottom. The mold board 13 extends rearwardly to an opening 13b defined by the edge 13c, which opening is circular in form. A flange 13d extends about the opening 13b to points inside of the ears 10b as shown in Fig. 1, said flange being secured to bar 10. Flange 13d is cylindrical and the inner side thereof is disposed a short distance outwardly of the edge 13c to thus form a right-angled shoulder or recess in the rear of member 13. This recess forms a cylindrical guideway and the cylindrical portion 14a of a chute and frame member 14 is disposed therein. An arcuate groove 10c is formed in the member 10 forming a continuation of the guideway in flange 13d and portion 14a also extends into this groove. The chute member 14 comprises the substantially rectangular chute portion proper 14b which extends upwardly, and the rear side of which is inclined outwardly. The sides 14c of the chute portion 14b are substantially vertical and these, as well as the rear side 14d merge into a semi-spherical portion 14e which in turn extends to the portion 14a. The portion 14a at either side of the chute has a rear vertical edge 14f and this is partly embraced or overlapped by a flange portion 13e on the member 13, which flange portion is disposed at either side of the member 13 as shown in Fig. 6. The portion 14a for a portion of its circumference is provided with gear teeth 14g and a pinion 15 meshes with said teeth, the same having trunnions 15a journaled in the member 13 and in a flange bracket 13f, one of said trunnions or the shaft of pinion 15 having secured thereto one member 16 of a universal joint, the other member 17 of which is secured to a rearwardly extending shaft 18 which will extend to the truck or tractor driving the plow, and will be provided with a crank or hand wheel so as to be turned by the operator. Flange 13d is cut-away adjacent the pinion 15. The chute 14b has a central vertical partition 14h which divides some distance below the top of the chute into plates 14m forming a chamber 14n open at its rear. A frame 14i having sides substantially aligned with plates 14m extends forwardly from portion 14a through opening 13b in partly cylindrical form as shown in Fig. 2, said frame having its sides converging some distance from its edge to form a substantially sharp or V-shaped peripheral portion 14j. This frame portion 14i has openings 14k in its spaced sides. The brackets 19 are provided, each having a cylindrical flange extending into the openings 14k and having circumferential flanges overlying the sides of the frame 14i and secured thereto by the headed and nutted bolts 20. The brackets 19 extend outwardly at either side of the frame 14i and are provided with hubs in which are disposed "Timken" bearings 21 in which is journaled a shaft 22.

Shaft 22 has a beveled gear 23 secured thereto between said bearings, with which meshes a beveled pinion 24 secured to a shaft 25 journaled in a web extending across frame 14i and in a flange formed on one of the brackets 19. One member 26 of a friction cone clutch is secured to shaft 25 and projects rearwardly in frame portion 14i. Another shaft 27 is journaled in frame 14i and has splined thereto the cone member 28 of said friction cone clutch said member having a groove therein in which are disposed portions of a clutch lever 29 pivoted to lugs on the frame 14i and connected at its other end to a clutch operating rod 30 extending rearwardly through opening 14a. Shaft 27 at its rear end has secured thereto one member 31 of a universal joint, the other member 32 of which is secured to a shaft 33 also extending rearwardly through opening 14n and which will be connected to the motor of a driving vehicle.

The shaft 22 has secured thereto at each end the propeller or impeller members 34. Each of these members comprises a central hub keyed to shaft 22 and a cylindrical flange or drum portion 34a connected to the hub by the ribs and webs 34b. The propeller also comprises scoop-shaped radially extending blades 34c secured to the outer side of the frame portion 34a. As shown in Figs. 1, 2 and 5, these blades are formed from segment-shaped plates folded in curved form about the central axis and secured to the drum at their wider ends. A hollow conical member 34d extends outwardly from each of the members 34, the same terminating substantially in a point and each of these conical members has a helical blade 34e secured thereto, said blade tapering to a point adjacent the end of the cone and extending helically thereabout and having its other end terminating closely adjacent one of the propellers 34.

The blades 34e are oppositely arranged on the two conical members so that they tend to convey snow to the propellers or rotors 34.

In operation the plow will be propelled by bars connected to the lugs 10a. Shaft 33 will be connected to the motor of the propelling vehicle and the rod 30 and the shaft 18 will extend to said vehicle and be provided with operating means. Shaft 33 is rotated and when the clutch members 26 and 28 are connected by operation of the clutch rod 30, shaft 22 will be driven through the gears 23 and 24 so that the propellers 34 are rotated together with their portions 34d and 34e. The snow is engaged by the edge of the frame 14j and by the propellers, and is moved rearwardly by the blades 34c. The propellers are rotated at quite a high speed so that the snow moved back by the propellers 34c is directed into the sides of the chute 14b and discharged through the top of said chute at high velocity. As the plow progresses the snow is engaged by the front edges of the blades 12 and all of the snow inside of the blades 11 and 12 is guided inwardly by the mold board 13 so as to be directed toward the opening 13b. The snow is engaged by the helical blades 34e and these move the same inwardly toward the propellers 34. The snow is moved toward the chute 14b by the concave surface of the plate 14e so that as the plow moves forward, the snow is moved inwardly and eventually engaged by the blades 34c and discharged into and through the chute 14b. As the plow moves along the highway, it is desired to discharge the snow at the side. The chute 14b can be directed to one side or the other by the operator turning the shaft 18. This rotates the pinion 15 and rotates the member 14 carrying the frame 14i and the shaft 22 and the propellers 34. The chute 14b is thus directed toward one side of the road or the other and the snow is discharged at the desired side. The chute may sometimes be in a vertical position if there is a strong wind blowing, so that the snow will be carried off to the side of the road or when the snow is being loaded into a wagon, as when removing snow from the city streets. The shaft 22 and the propellers 34 as well as the conveyors formed by members 34d and 34e can be thrown out of operation when desired by operation of the clutch comprising members 26 and 28.

From the above description it is seen that applicant has provided a very efficient structure of snow plow. The snow is effectively engaged and discharged, and can be directed to either side of the road as desired. The discharge chute is quite short or of stub formation, so that there is little impedence of the snow due to friction with the sides of the chute. The device is designed to be propelled and operated by an automotive vehicle, such as a truck or tractor, and can be

readily attached thereto for operation. The parts of the device are quite rugged and the plow is capable of handling very deep snow or operating in deep drifts. It will be noted that the driving mechanism for the propellers, as well as the clutch mechanism, is all enclosed in the frame and protected from snow. The device is quite ruggedly made and intended for heavy duty. It will be apparent that the device has a high degree of utility for the purpose intended.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A snow plow having in combination, a substantially horizontal blade, upwardly extending blades at the ends of said blade, an upwardly extending chute in the rear of said blades, a rotatable impeller extending forwardly of said blades and arranged to propel snow to said chute, and helical means disposed axially of said impeller for delivering snow to said impeller and chute.

2. A snow plow having in combination, a substantially horizontal blade, upwardly extending blades at the ends of said blade, a mold board extending from said blades having a rearwardly extending surface, with an opening therein, a chute at the rear of said opening toward which said surface inclines, and a rotatable propeller projecting forwardly of said blades and arranged to deliver snow rearwardly into said chute, said surface acting to guide said snow to said propeller and chute.

3. A snow plow having in combination, a rearwardly slopping mold board, a chute to which snow is directed by said mold board, a propeller unit for directing snow through said chute, and means for oscillating said chute and propeller unit together about an axis extending forwardly and rearwardly of said plow.

4. A snow plow having in combination, a mold board, a chute in the rear of said mold board, a pair of spaced propellers rotatable about an axis extending transversely of said mold board, said chute and propellers being oscillatable about an axis extending forwardly and rearwardly of said mold board.

5. A snow plow having in combination, bottom and side blades, a mold board slopping rearwardly and having a central opening, a unit rotatable about said opening and including an upwardly directed chute, spaced propellers carried by said unit for delivering snow to said chute, and conveyors carried by said propellers.

6. A snow plow having in combination, a mold board, a substantially horizontal blade at the lower portion thereof, vertical blades at the ends of said blade, said mold board extending rearwardly from said blades and having a central opening, a chute in the rear of said opening, a plate having a concave surface leading from the edge of said opening to said chute, and a propeller disposed in said opening and arranged to discharge snow from said chute.
7. A snow plow having in combination, a substantially horizontal bottom blade, vertical blades at the ends of said bottom blade, a chute in the rear of said blades, a mold board having a surface extending rearwardly from said blades for guiding snow to said chute, a propeller rotatable about a substantially transverse axis for directing snow into said chute, and oscillatable about an axis extending forwardly and rearwardly of said plow.
8. A snow plow having in combination, a mold board having a rearwardly sloping surface, a chute in the rear of said mold board, a shaft extending transversely in front of said chute, a pair of spaced rotatable propellers secured to said shaft and oscillatable about an axis extending forwardly and rearwardly of said chute to direct snow to said chute.
9. A snow plow having in combination, a mold board, a chute in the rear of said mold board, a shaft extending transversely of said mold board in front of said chute, spaced propellers carried on said shaft and rotating in planes extending forwardly and rearwardly of said mold board, means for rotating said shaft and propellers, and means for swinging said shaft and propellers about an axis extending forwardly and rearwardly of said plow.
10. A snow plow having in combination, a bottom blade, side blades extending upwardly at the ends of said bottom blade, a mold board having a surface sloping rearwardly, said mold board having a central opening, a guideway surrounding said opening, a chute in the rear of said opening having a front opening to receive snow and having a cylindrical guide rotatable in said guideway, a frame carried by said chute, a shaft journaled in said frame, propellers secured to said shaft, means for driving said shaft, and means for oscillating said chute and frame.
11. A snow plow having in combination, an upwardly extending chute, spaced propellers in front of said chute rotatable about a transverse axis to direct snow through said chute, and means for oscillating said chute and propellers about an axis extending forwardly and rearwardly of said plow.
12. A snow plow having in combination, an upwardly extending chute, means in front of said chute for propelling snow there-through, and means for oscillating said chute and first mentioned means about an axis extending forwardly and rearwardly of said plow.
13. A snow plow having in combination, an upwardly extending chute, means mounted in its entirety on an axis arranged transversely of said plow for propelling snow through the chute, and means for oscillating said chute about an axis extending forwardly and rearwardly of said plow.
14. A snow plow having in combination, spaced propellers, means at the outer sides of said propellers and carried thereby, for moving snow to said propellers, a chute in the rear of said propellers, and means for rotating said propellers for propelling snow into said chute and discharging the same therefrom.
15. A snow plow having in combination, propellers having radially extending scoop-shaped blades thereon, conical members extending axially of said propellers at the outer sides thereof, vanes extending helically around said members for moving snow to said propellers, a transverse shaft on which said propellers and members are mounted, and means for rotating said shaft.
16. A snow plow having in combination, a means through which snow is discharged, a propeller for directing snow to said means, means for rotating said propeller, said propeller being oscillatable about an axis extending longitudinally of said plow.
17. A snow plow having in combination, a mold board having an opening therethrough, a discharge chute in the rear of said opening, a pair of propellers in front of said means, a shaft on which said propellers are mounted, means for rotating said shaft and propellers, said discharge means and propellers being oscillatable as a unit about an axis extending forwardly and rearwardly of said plow.
18. A snow plow having in combination, a mold board having an opening therethrough, a discharge chute in the rear of said opening, a frame carried by said chute projecting forwardly through said opening, a propeller carried by said frame, and means for rotating said propeller, said propeller directing snow through said chute.
19. A snow plow having in combination, a mold board having an opening therethrough, a frame having a portion rotatable about said opening, a discharge means carried on said frame in the rear of said opening, and means for propelling snow to said discharge means carried by said frame and extending through said opening.
20. A snow plow having in combination, a member including an opening therethrough, a propeller for causing snow to travel through said opening, means for rotating said pro-

20 peller, and means for oscillating said propeller about an axis extending forwardly and rearwardly of said plow.

21. A snow plow having in combination,
5 an upwardly extending chute, means in front of said chute and mounted on an axis arranged transversely of said plow for propelling snow through the chute, and means for oscillating said first mentioned means about
10 an axis extending longitudinally of said plow.

22. A snow plow including a propelling unit comprising a shaft, spaced propellers secured to said shaft, a conical member extending laterally from each propeller at their
15 remote sides, and helical vanes carried by said members.

JOHN R. RITCHIE.

20

25

30

35

40

45

50

55

60

65