May 14, 1940. N. L. JAMES 2,200,623

SNOW EXCAVATOR

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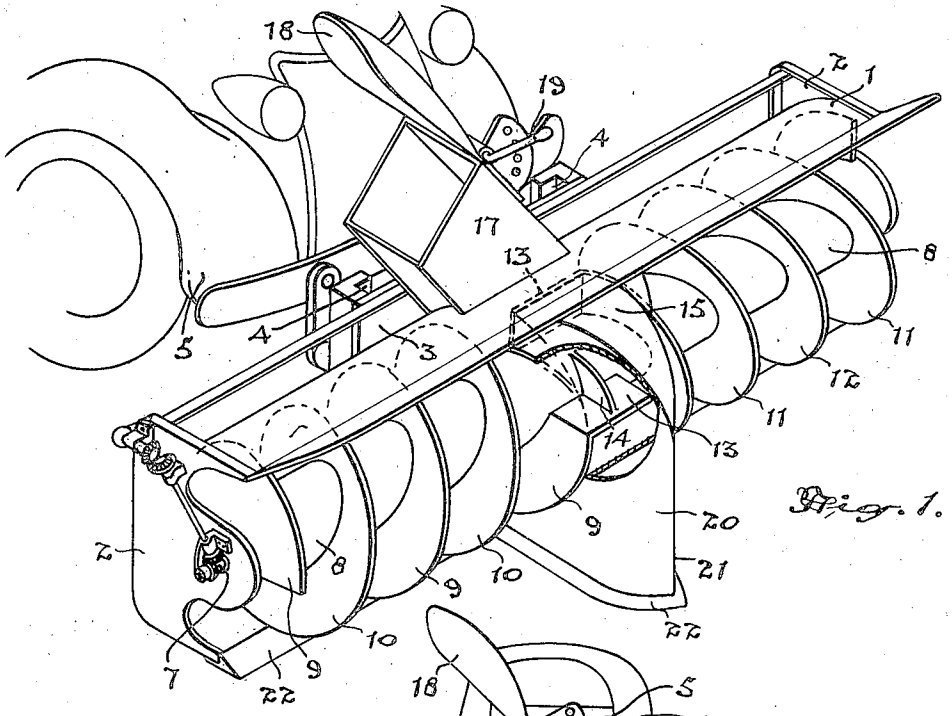


Fig. 1.

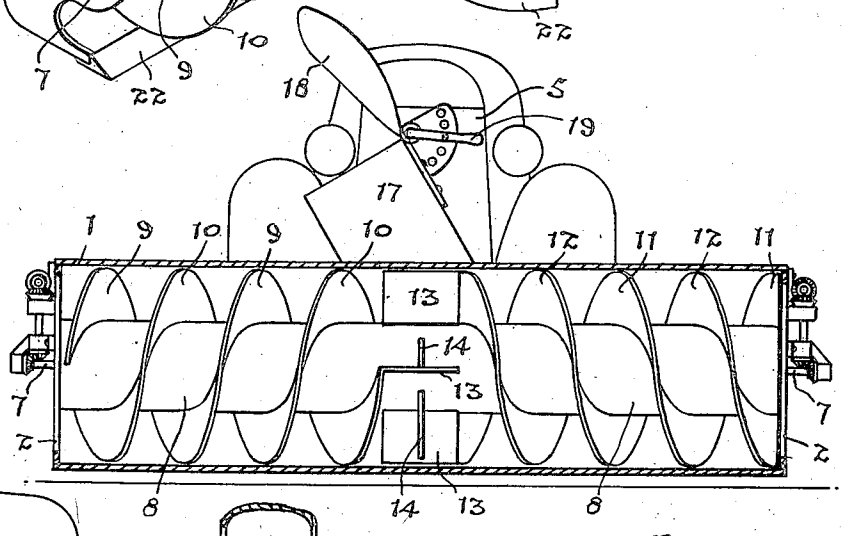


Fig. 2.

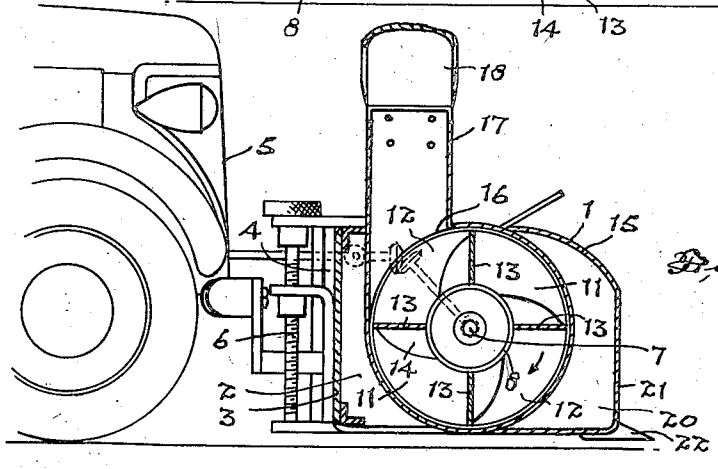


Fig. 3.

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SNOW EXCAVATOR

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4 Claims. (Cl. 37—43)

This invention relates to improvements in snow excavating devices particularly adapted for use in removing snow from highways or railways, and the principal objects of the invention are to provide a device of simple, strong and durable construction which will cut into the snow with an endwise slicing action and will carry the snow continuously as it is cut away to a central point from which it is directly ejected by the cutting member to clear the machine and the path cut away.

A further and important object is to devise a machine which will be very economical in the use of power and which will be capable of handling dry or wet snow without clogging.

The principal feature of the invention consists in the novel construction and arrangement of a horizontal revolving member having multiple right and left helical blades adapted to directly engage and cut into the snow, co-operating with a part cylindrical casing to convey the snow, as it is cut away, directly to radial sections of said blades formed at the inner terminal ends thereof, to be ejected through a chute opening from said casing.

In the accompanying drawing,

Figure 1 is a perspective view of my improved excavator arranged on the front end of a suitable power tractor.

Figure 2 is a front elevation of the device in part longitudinal section.

Figure 3 is an elevation and part vertical section taken through the centre of the device.

In the form of the invention herein shown, a part cylindrical casing 1 is horizontally mounted between the end plates 2 of a rigid frame 3 which is mounted for vertical adjustment in guides 4 supported on the forward portion of the frame of suitable tractor vehicle 5, vertical adjustment being here shown as effected by means of vertically mounted jack screws 6. The means of support and adjustment here shown is merely diagrammatic and may be readily substituted by any desirable construction.

A shaft 7 is journalled in suitable bearings in the end plates 2 and is driven from any suitable source of power by means of suitable shafts and gearing, preferably at variable speeds. The source of power and the details of the drive connections to the shaft may be varied within the scope of ordinary engineering practice.

Mounted upon the shaft 7, concentric therewith and extending between the end plates 2, is a cylinder 8 upon the periphery of which are mounted the helical vanes 9, 10, 11 and 12 which are respectively left and right helixes. The multiple arrangement of helical vanes is desired to enable the use of a long pitch and two or more vanes may be used at each end of the cylinder.

The inward ends of each of the helical vanes terminate in radial blades 13 which are preferably reinforced by angle brackets 14.

The casing 1 is provided at its central portion with a shield 15 of part cylindrical form which is substantially the width of the radial blades 13 and an opening 16 is provided in the upper portion of the casing 1 at its rearward side and in line with the shield 15. A chute 17 extends upwardly from the casing 1 and encloses the opening 16 and forms the delivery chute through which the snow is ejected by the rapidly rotating blades 13. The chute is preferably set at an angle to direct the ejected snow toward one end of the rotating cutter and a spoon-like guard 18 is hinged at the upper end of the chute and provided with a quadrant lever 19 or other form of adjustment by means of which the angle may be varied to direct the stream of snow ejected through the chute.

A guard 20 having a vertical forward cutting edge 21 is rigidly connected with the casing 1 in front of the shield 15 to divide the snow in front of the centre of the rotating cutter member.

The bottom edge of the casing 1 and the bottom of the guard 20 is preferably provided with a cutter shoe 22 which may present either a straight or a toothed horizontal cutting edge adaped to cut into packed snow or ice to dislodge same as the excavator is pushed forward by the tractor.

In the operation of this device, the helical bladed cutter is operated at whatever speed is found suitable for the condition of the snow encountered, and it will be understood that as the helical blades extend forward of the bottom edge of the casing 1, the helical blades cut into the snow as the device is pushed forward and the blades slice the snow with a slanting spiral cutting movement, and as the snow is cut, it fills in between the spiral blades and is carried longitudinally between said blades and the inner surface of the casing 1. The long spiral pitch of the blades ensures a rapid endwise movement of the snow toward the centre from both ends of the machine and as the snow is fed into the centre portion, it is carried by the radial blades 13 in a circular path and projected through the opening 16 in the casing and through the chute 17. The speed of rotation is such that the snow

is projected in a constant stream through the chute with sufficient velocity to clear the swath cut by the cutter member.

Numerous devices have proposed the use of spiral conveyers to carry the snow to a central point where it is fed into an axial opening of a centrifugal fan, but such devices have not been found successful.

The present invention differs materially from these previous proposals in that the spiral conveyer is in direct cutting contact with the snow and a single operating unit cuts into the snow and conveys it from the cutting area and directly discharges it, thereby operating with high efficiency and an effective saving in power.

What I claim as my invention is:

1. A snow excavator comprising a part cylindrical casing having a discharge orifice, and a single revolving member arranged in said casing having in combination left-hand and right-hand helical blades projecting from the casing to engage and cut the snow and to carry same toward a central vertical plane, and impeller blades extending from the adjacent ends of said left and right-hand helical blades to overlap in said central plane and eject the snow through said discharge orifice.

2. A snow excavator comprising a part cylindrical casing having a discharge orifice, arranged centrally thereof, and a single revolving member arranged in said casing having multiple right and left helical blades projecting from the casing to engage and cut the snow and to carry same inwardly toward a central vertical plane, the adjacent ends of said multiple left and right helical blades being turned in opposite axial directions to internest in overlapping peripherally spaced relation in said central plane to eject the snow from both of said left and right helical blades through said discharge orifice.

3. A snow excavator comprising a part cylindrical casing having an open forward side and a discharge opening in the top, a shaft journalled axially in the ends of said casing, a cylinder mounted on said shaft and rotating therewith, a plurality of spiral blades mounted on said cylinder and extending from the ends inwardly to near the centre, radial blades mounted centrally of said cylinder and each forming a continuation of one of said spiral vanes, a shield encircling the extremities of said radial blades, and a chute extending upwardly from said discharge opening in the top of said casing.

4. A snow excavator comprising a part cylindrical casing having an open forward side and a discharge opening in the top, a shaft journalled axially in the ends of said casing, a cylinder mounted on said shaft and rotating therewith, a pair of right hand spiral blades mounted on one end of said cylinder and extending inwardly to points near the centre thereof, radial blades forming continuations of the inner ends of each of said spiral blades, a pair of left hand spiral blades mounted on the other end of said cylinder and extending inwardly to points near the centre thereof, radial blades forming continuations of the inner ends of each of said left hand spiral blades and spaced equidistant between the aforesaid radial blades, a shield encircling the centrally arranged spiral blades in circumferential alignment with said discharge opening, and a chute extending upwardly from said opening.

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