

April 23, 1940.

C. DE BRUN

2,198,407

SNOW PLOW DEVICE OR THE LIKE

Filed June 22, 1936

3 Sheets-Sheet 1

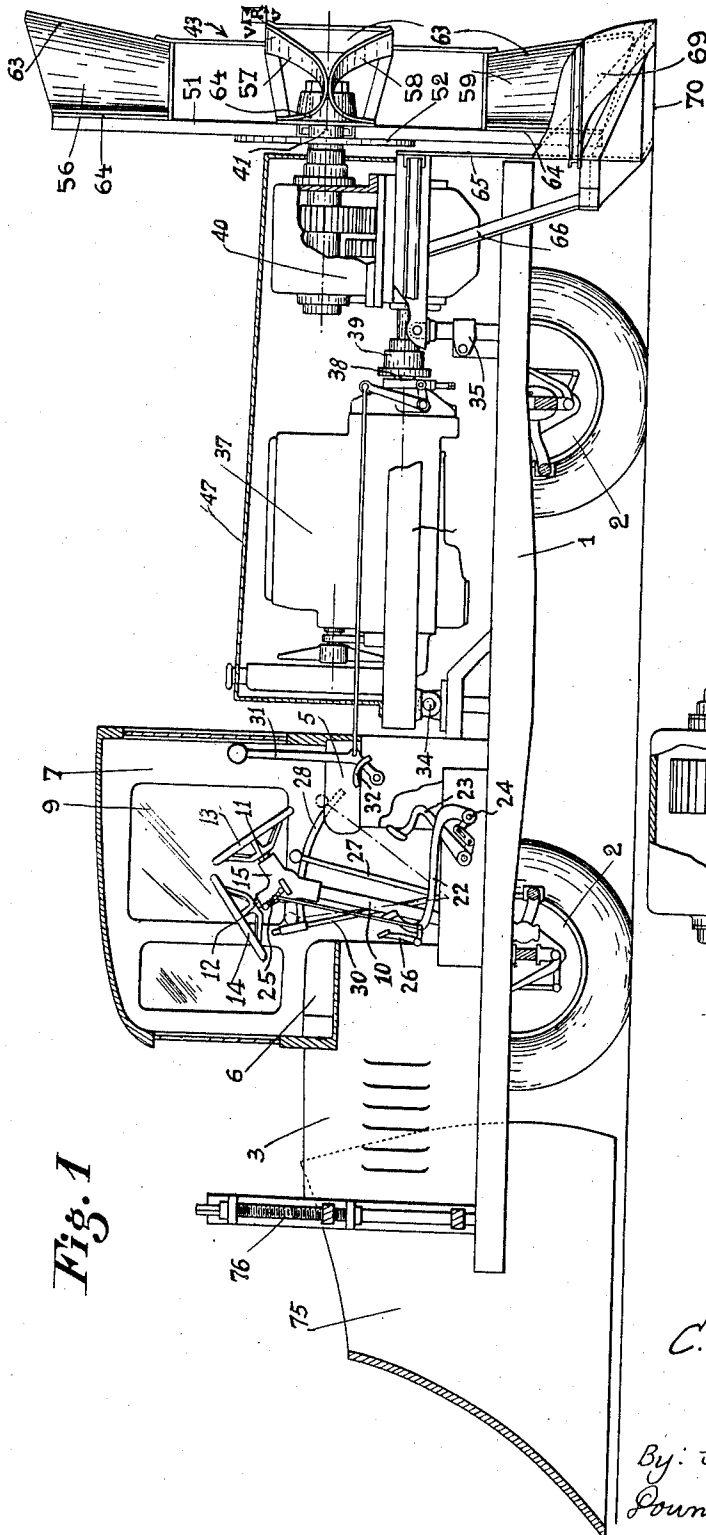


Fig. 1

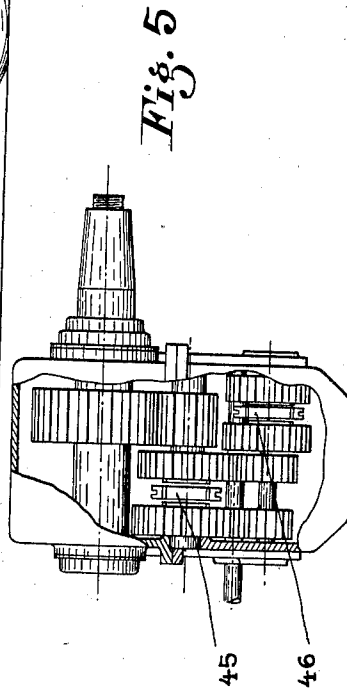


Fig. 5

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3 Sheets-Sheet 2

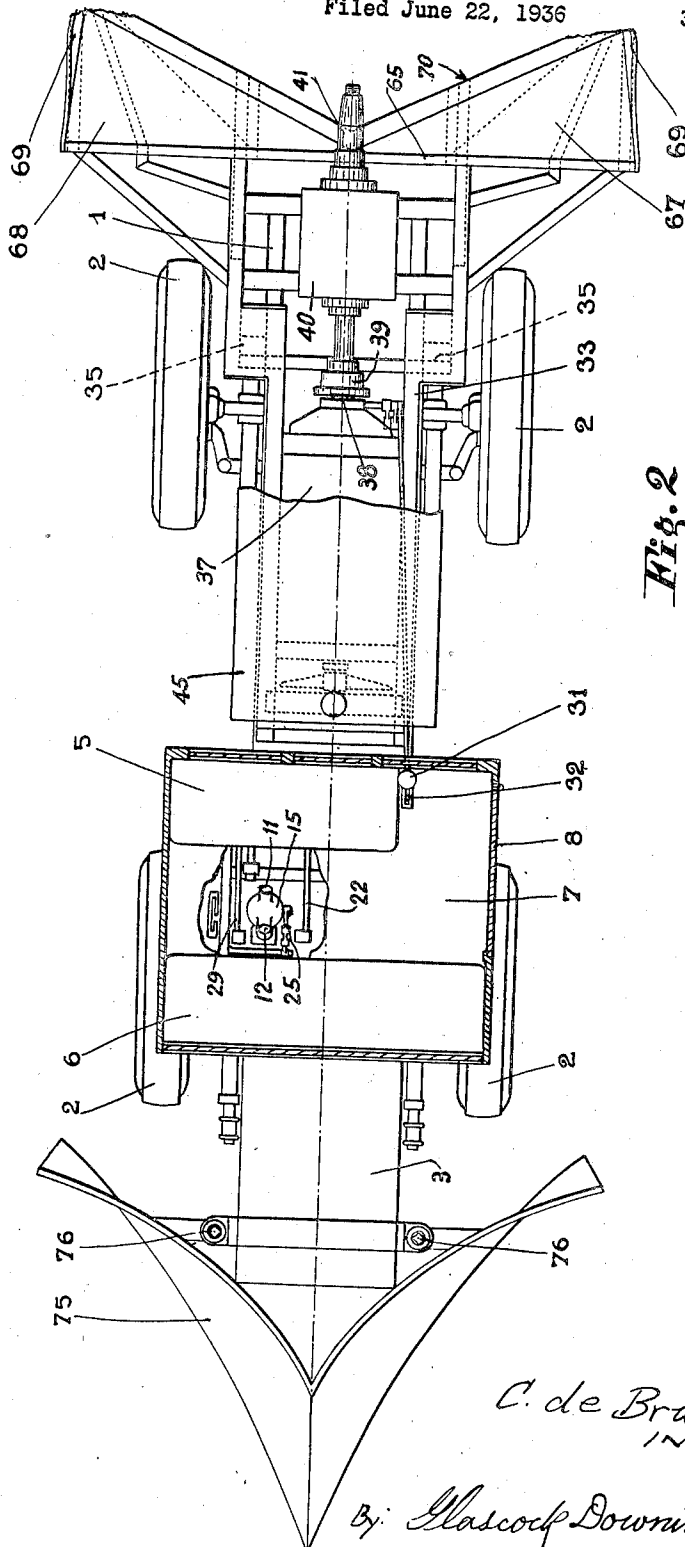


Fig. 2

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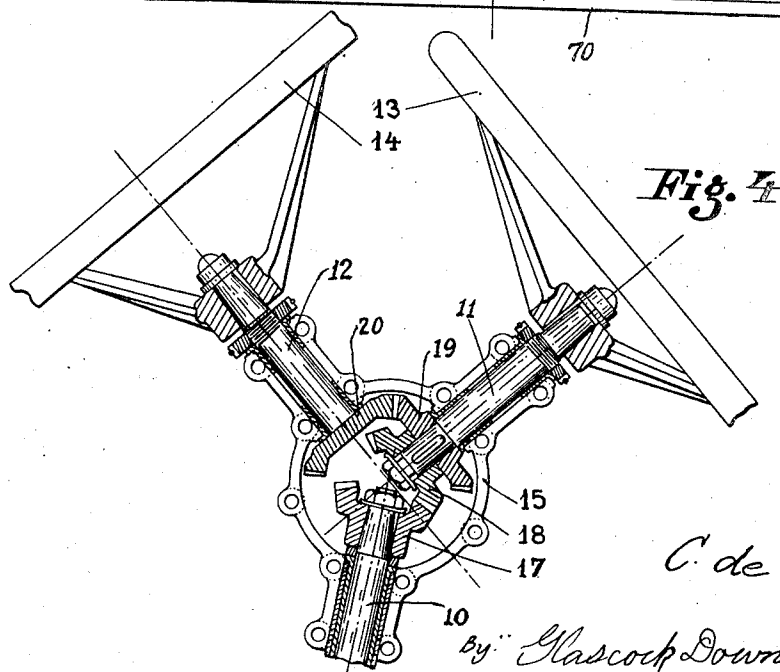
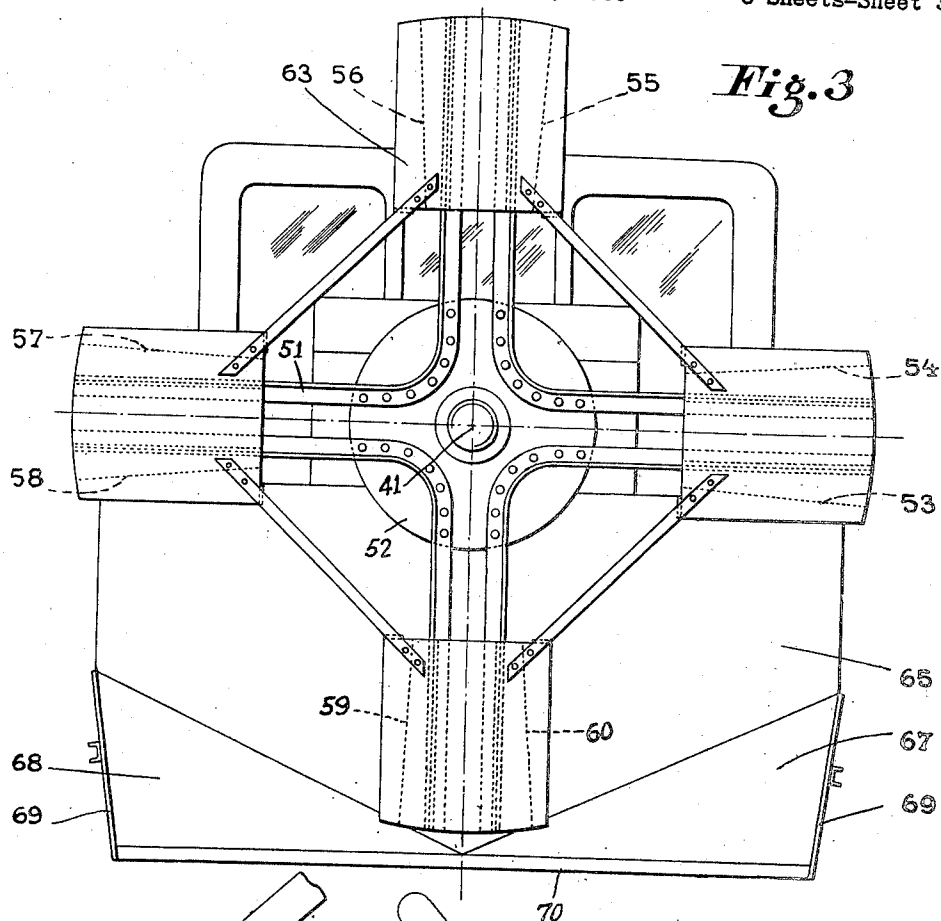
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SNOW PLOW DEVICE OR THE LIKE

Filed June 22, 1936

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,198,407

SNOW PLOW DEVICE OR THE LIKE

Charles de Brun, Lons-le-Saunier, France

Application June 22, 1936, Serial No. 86,677

In France February 25, 1936

5 Claims. (Cl. 37-43)

My invention relates to an improved snow plow device or the like adapted to be displaced on a road from which it clears away the snow or part of the snow covering same, and has for its object a number of characteristic arrangements which can be applied to such a device to make it very economical, rapid and perfect in operation and easy to use.

Said characteristic arrangements are preferably all used in combination, but some of them can be used separately, as will be explained hereinafter, even in a device of a different type from that which will be described by way of example, without exceeding the scope of the invention.

A first particular characteristic arrangement concerns the main snow plow member which comprises at least one shovel, carried by an arm or the like which an engine of any type rotates about a horizontal axis at an adjustable reduced speed, between 40 R. P. M. at least and 150 R. P. M. at most. Said shovel cuts into the snow without difficulty; its cutting edge is in a plane which, at every point, contains the resultant of the speed of rotation about the aforesaid axis and of the forward speed of the snow plow.

Preferably, said shovel, which is of trough-like shape, is of increasing width from its end nearest the axis of rotation to its end farthest away from said axis.

The snow is cut up into pieces by said shovel, falls to the bottom of the latter and, the pieces of snow are projected—without breaking up—in a practically horizontal direction along the sides of the road or the like owing to the kinetic energy which is imparted to them by the rotation at reduced speed.

Preferably said shovel is placed against another shovel, carried by the same arm or the like, and symmetrical with the first shovel relatively to a plane passing through said axis of rotation, one shovel or the other of the group thus formed operating according to whether the rotation about said axis is in one direction or the other and the snow being then projected on one side of the road or on the other.

According to a preferred embodiment of the invention, a plurality of identical shovels or groups of shovels are provided, placed symmetrically with respect to the aforesaid axis of rotation and rotating in unison about said axis, said shovels or groups of shovels being carried by arms fixed on a common plate rotating about the aforesaid axis and forming a unit which will be called shovelling device.

Said shovel or shovelling device co-operates

with a shield having at its ends two shares which are substantially symmetrical with respect to the vertical plane passing through the aforesaid axis of rotation and consist of one or a plurality of surfaces which are inclined so as to guide the snow from the outside towards the centre while raising same. The extreme side edge of each of said shares is substantially parallel to the aforesaid plane and its distance from said plane is preferably a little less than the radius of the circle swept through by the shovel or shovelling device. The latter thus leaves a clean track behind it in the snow and a vertical-walled passage. Furthermore, each of said shares has at its lower end a horizontal edge arranged in front of the wheels, caterpillars or the like, in the direction of movement of the chassis corresponding to the operation of the shovel or shovelling device, so as to sweep the rolling surface. The two horizontal edges thus arranged define the position of the vehicle relatively to the road (the depth of penetration of the wheels or the like into the snow being known) and, consequently, the thickness of snow which is affected by the apparatus and which is adjusted as will be hereinafter explained so as to be appropriate to the power of the engine actuating the shovel or shovelling device.

The unit formed by the shovel or shovelling device, the engine driving the latter, whether independent or not, and the shield, is advantageously mounted on an independent frame carried by the chassis of the snow plow so as to enable it to rock about an axis perpendicular to the axis of said chassis under the action of a controlling member permitting the height to be adjusted and the shovel or shovelling device to be held out of contact with the snow, even during the working of the apparatus.

A second series of particular characteristic arrangements of the snow plow according to the invention, consists in arranging at the other end of the chassis relatively to the shovel or shovelling device, a snow plow member consisting for example of a stem-shaped member or scraper which is adjustable in height, and which enables the return of the apparatus in the opposite direction to that corresponding to the operation of the shovel, shovelling device or the like, to be readily and usefully effected in that it thereby removes a layer of snow from the road.

A third series of particular characteristic arrangements of the apparatus concerns the chassis carrying the group of snow plow members and which can advantageously consist of an ordinary

motor car chassis, provided with a sufficiently powerful engine to drive the vehicle up slopes which may attain 1 in 10, and having in a single cab or the like two seats for the driver, arranged opposite each other and corresponding to the two directions of travel respectively, the controlling and operating members being arranged so that they are within hand-reach of the driver when seated on either seat.

This arrangement is extremely advantageous when it is used at the same time as the above described characteristics, but use can be found for it, without exceeding the scope of the invention, in motor chassis which are not intended to serve as supports for snow plows.

An important characteristic of this latter arrangement consists in the fact that there are two steering wheels co-operating with the same steering shaft and actuating it through the instrumentality of gears arranged so that the reflexes of the driver are the same for either direction of travel.

Furthermore, there are advantageously provided two clutch pedals mounted on the same shaft, and the gear change lever preferably has an extension enabling the driver to operate the apparatus from either of his two seats.

Other characteristics and advantages of the invention will moreover result from the ensuing description taken in conjunction with the accompanying drawings, which are given merely by way of example and in which:

Fig. 1 is an elevation, partly broken away of an embodiment of the snow plow, it being supposed that the wheels, the chassis and the scraper are removed from one side;

Fig. 2 is a corresponding general plan view, partly broken away, the shovelling device being removed;

Fig. 3 is a front view of the part of the vehicle carrying the shovelling device;

Fig. 4 is an elevation on a larger scale showing the steering control;

Fig. 5 shows the reducing device on a larger scale, partly broken away.

According to the embodiment shown, the snow plow assembly is carried by a motor car chassis 1 which has been assumed to be mounted on four driving and guiding wheels 2, equipped with single pneumatic tires of large cross-section, and actuated by an engine arranged in a bonnet 3 and sufficiently powerful to move the chassis with its load up a slope of 1 in 10.

Said chassis is controlled by a driver seated on either of two seats 5 and 6 arranged in a cab 7 provided with a door 8 and closed on all sides by wide windows 9 provided with glass. Said seats 5 and 6 correspond to the forward and backward travel of the snow plow relatively to the engine and enabling the driver to always face the road over which he is travelling and to watch the operation of the apparatus.

The steering and controlling members are arranged in said cab 7 in such a manner that the control can be effected by a driver seated on either of the seats 5 and 6. Two steering wheels 13 and 14 are provided, arranged respectively opposite both driving seats and carried by shafts 11 and 12 respectively transmitting their movement to the steering shaft 10 through the instrumentality of gears arranged in a housing 15. As shown in Figure 4, the steering shaft 10 carries at its end a gear 17 meshing with a gear 18 keyed on the shaft 11. Another gear 19 is keyed on this same shaft 11 and meshes with a gear

20 keyed on the shaft 12. Owing to this arrangement the reflexes of the driver remain, for driving, normal for both directions of travel.

Similarly, two pedals 22 and 23 control the clutch shaft 24 and correspond to the positions of the driver seated on either of the two seats 5 and 6. The supply of gas is regulated by means of a lever 25 acting on the accelerator pedal 26; said lever as the gear change lever 27 which has a segmental extension 28 provided with three handles, is always accessible to the driver. Only a single brake pedal 29 has been provided which can only be operated from the seat 5, since a second pedal did not appear to be necessary owing to the reduced speed of the machine. There exists, moreover, a hand brake lever 30 which can be actuated when the driver is on the seats 5 and 6.

The cab 7 also contains the control members for the main snow plow and consisting of levers 31 which can be moved on segments 32.

On the chassis 1 is mounted a rigid frame 33 pivotally mounted on a transverse shaft 34, carried by the chassis 1 directly behind the cab 7. Said frame 33 can rock under the effect of oil-driven pistons 35 brought into action by means of a power take-off provided on the engine driving the vehicle.

The frame 33 carries an engine 37 secured at three points to the latter, driven by petrol, gas-oil or the like, and placed along the centre line of the chassis. The shaft 38 of said engine drives, through the instrumentality of a coupling 39 a reducer 40 fixed to said frame 33 and actuating, at a speed varying from 40 to 150 R. P. M. according to the state of the snow, a shaft 41 arranged at the back of the vehicle and supporting at its end the main snow plow 43 or shovelling device.

The reducer 40, as shown in Figure 5, is of known type having gears enclosed in an oil-tight case and comprises two speeds controlled by the displacement of the claw 45, and a reversing gear controlled by the claw 46.

The group comprising the engine 37, the coupling 39, the reducer 40, carried by the frame 33, is covered by a bonnet 47.

The snow plow member 43 consists of four identical groups of two shovels 53-54, 55-56, 57-58, 59-60, containing about 100 to 150 litres, placed symmetrically on four arms 51 arranged at right angles and fixed to a forged steel plate 52 of large diameter. The two shovels forming each group, and which are arranged between two metal plates 63 and 64, are symmetrical relatively to a plane passing through the centre line of the shaft 41, either of said two shovels operating according to the direction of rotation of the shovelling device.

Said shovels, two of which, 57 and 58, are seen in end view in Figure 1, are of trough-like shape widening from the part nearest the shaft 41 to the part which is farthest from the latter, and their cutting edge 61 is turned in a direction, which coincides with the resultant R (Fig. 1) of the speed V of rotation of the shovel and the speed v of travel of the chassis, and which enables them to penetrate into the snow without difficulty.

The snow is conveyed to the snow plow member by means of a shield 65, fixed to the end of the frame 33, directly and by means of struts 66. The width of the shield is a little less than the diameter of the snow plow member. The shield 65 is provided with symmetrical shares 67 and

68 guiding the snow towards the centre and progressively raising it. Each of said shares has a substantially vertical edge 69, leaving a clean track in the snow, and a horizontal edge 70, clearing the wheel track.

As shown in the drawings, each share consists of an inclined surface disposed below said snow plow member and in its major part between the two vertical transversal planes perpendicular to the axis of said member and passing respectively through the front and rear ends of said member. Said inclined surface slopes both in the direction of said axis and in the direction of the vertical plane containing said axis. Further, as clearly shown on Fig. 2, each share 67 and 68 terminates by a rearwardly inclined edge so that a wedge shaped space is formed between them.

The apparatus is completed by a snow plow stem-member 75 or scraper arranged at the front of the chassis 1 and of which the height can be adjusted by means of the screws 76.

The operation is as follows:

The machine is working in reverse. The width of its tires enables it to mount on the layer of snow into which it sinks to a certain depth. The height of the frame 33 carrying the shield 65 is adjusted by means of the pistons 35, so that, allowing for said depth of sinking, the layer of snow to be engaged by the shovelling device corresponds to the power of the engine 37. If the snow is not very thick, the shield is lowered to 5 cm. from the ground and the apparatus only leaves on the ground a layer of snow which can at most attain 10 to 15 cm.

The speed of travel of the chassis is regulated according to the height of the snow and its weight; it can vary from 400 to 4000 meters per hour.

To complete the clearing operation, the frame 33 carrying the engine 37, the shovel or shovelling device 43 and its shield 65, is raised by means of the pistons 35. The rear part of the vehicle being thus raised above the ground, the front stem-member 75 is lowered by means of the screws 76. The apparatus is then ready for use as a snow plow for forward travel, removing a layer of snow which can attain 50 cm. and which is thrown onto the side.

During a further backward journey, the shield 65 being again lowered, the passage can be widened from 50 to 80 cm.

Thus, by further forward and backward journeys, the necessary width can be cleared.

Of course, the invention is in no way limited to the embodiment illustrated and described herein, which has only been chosen by way of example.

What I claim is:

1. In a snow plow device including a vehicle, means for propelling said carriage and a rotatable snow plow member supported at one end of said carriage, a snow plow member including a plate member, rotatable about a substantially horizontal axis, radially disposed arms fixed on said plate member, a group of two shovels carried by each of said arms symmetrically disposed with reference to a plane passing through said axis, each of said shovels being of trough-like shape with its concave face directed in a transversal direction with reference to said axis and provided with a cutting edge, two sheet metal plates associated with each group of two shovels, perpendicular to said axis and leaving said cutting edges free, means for rotating the whole

formed by said plate member, arms and shovels at a reduced speed, said cutting edge having substantially the direction of the resultant of the speed of rotation about the aforesaid axis and the forward speed of the snow plow device.

2. A snow removing device comprising a vehicle, a snow plow member mounted in the front part of said vehicle, said snow plow member including four radially disposed arms rigid together, equally angularly spaced and rotatably mounted upon an axis, a group of two shovels being carried by each of said arms, each of said shovels being of trough-like shape and the openings of the two shovels of each group being directed in the opposite directions corresponding to the two directions of rotation of said member, the facing section of the two shovels of a group being opposite the openings, a supporting plate carried at the rear of said member, two shares fixed to said supporting plate below said axis and substantially symmetrical with reference to the vertical plane containing the same, each share including an inclined surface portion at least a part of which is disposed between the two vertical transversal planes, perpendicular to said axis, and passing respectively through the front and rear end of said member, said inclined surface sloping both in the direction of the travel of the vehicle and in the direction of said vertical plane containing said axis in such a way as to raise the snow situated on the road on either side of the rotatable snow plow member and to convey it, while resting upon said shares in the working zone of said rotating member.

3. A snow plow member adapted to be rotatably mounted upon a shaft rotating at a reduced speed and including four arms equally spaced about said axis and rigid together, a group of two shovels carried by each of said arms, each of said shovels being of trough-like shape and the opening of the two shovels of each group being directed in the opposite directions corresponding to the two directions of rotation of said member, the facing sections of the two shovels of a group being opposite the openings.

4. A snow plow member adapted to be rotatably mounted upon a shaft rotating at a reduced speed and including a plate member, at least one radially disposed arm fixed on said plate member, a group of two shovels carried by said arm, each of said shovels being of trough-like shape and the opening of said two shovels being directed in the opposite directions corresponding to the two directions of rotation of said member, the facing sections of the two shovels of a group being opposite the openings, two sheet metal plates rigid with said group of shovels and connecting said shovels back to back along their whole length.

5. In the combination of a vehicle and a snow-plow member which is mounted at the front part of said vehicle, is rotatable about a horizontal axis parallel with the direction of the movement of the vehicle and includes at least one radially arranged trough-shaped shovel having its concave face directed in the direction of rotation of said member, a supporting plate carried at the rear of said member, two shares fixed to said plate below said snow plow member so that their extreme rear edge is behind said member, said plowshares being substantially symmetrically arranged relatively to the vertical plane containing the aforesaid horizontal axis, and each being formed by a surface that is inclined both in

the direction of the forward movement of the vehicle and in the direction of said vertical plane and each terminating by a rearwardly inclined edge so that a wedge-shaped space is left between them and below the lowest part of the circles described by the points of the snow plow member which are farthest from said axis, the

distance of each of said shares from said axis being only slightly greater than the maximum radius of said circles so that the rotary member sweeps the snow lying on said inclined surfaces.

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