

May 7, 1940.

M. GARLAND ET AL

2,199,723

SNOWFLOW STRUCTURE

Filed Dec. 27, 1938

4 Sheets-Sheet 1

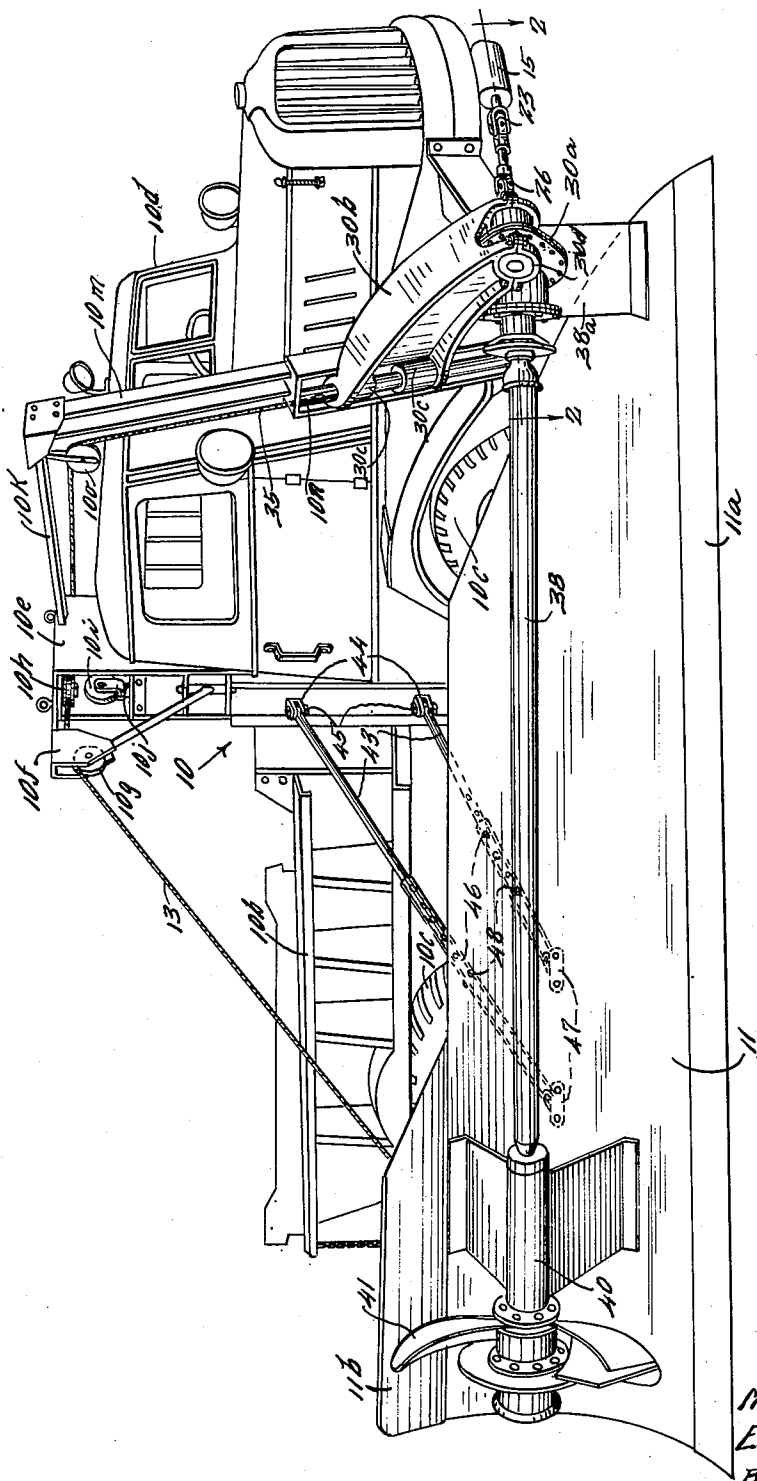


Fig. 1.

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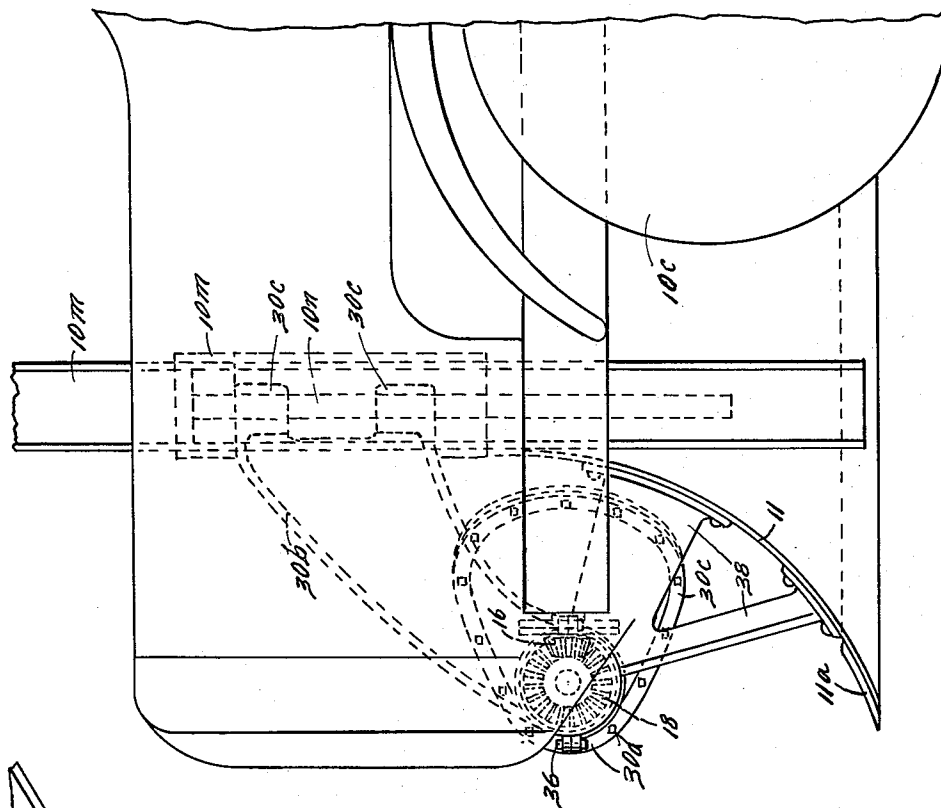


Fig. 3.

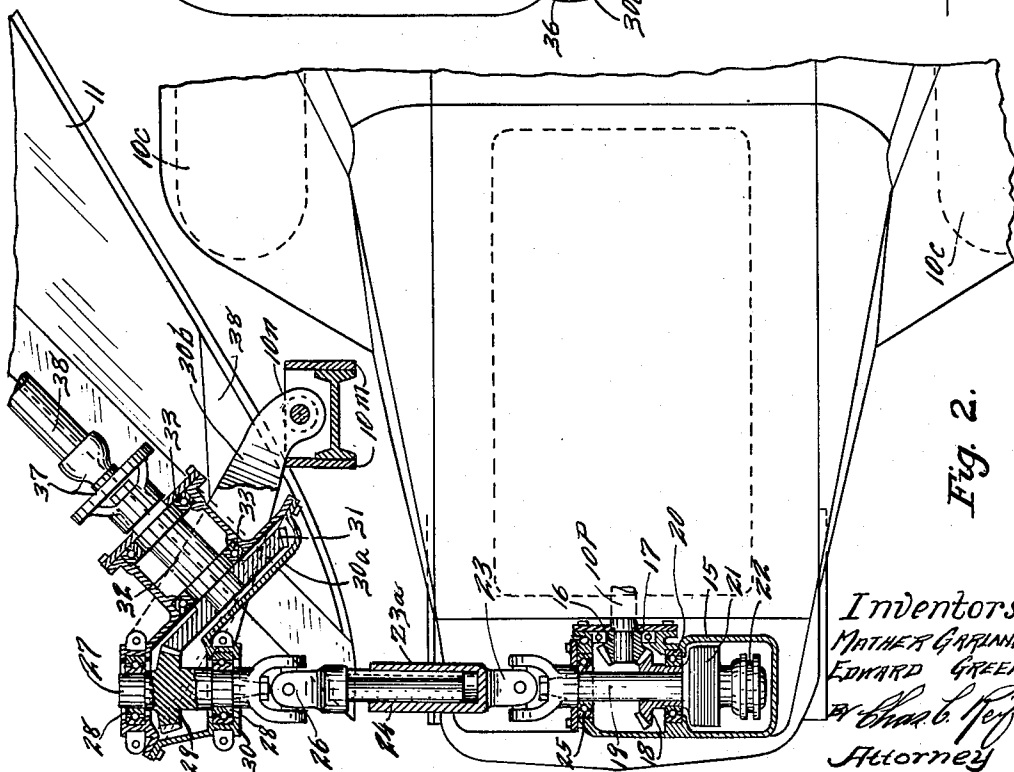


Fig. 2.

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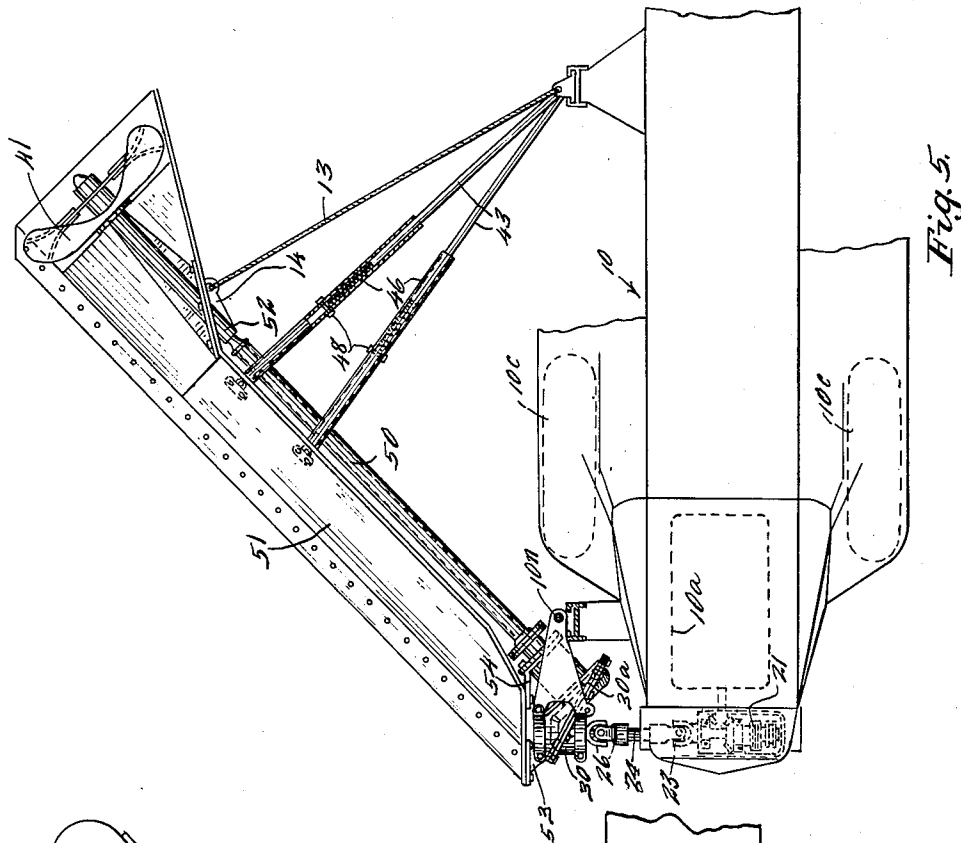
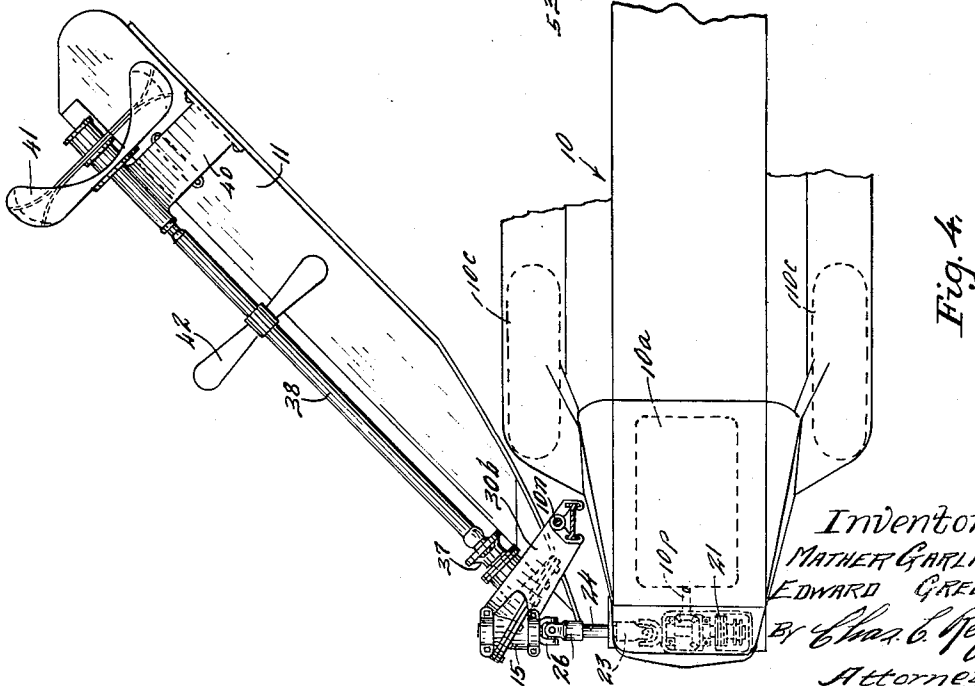
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4 Sheets-Sheet 3



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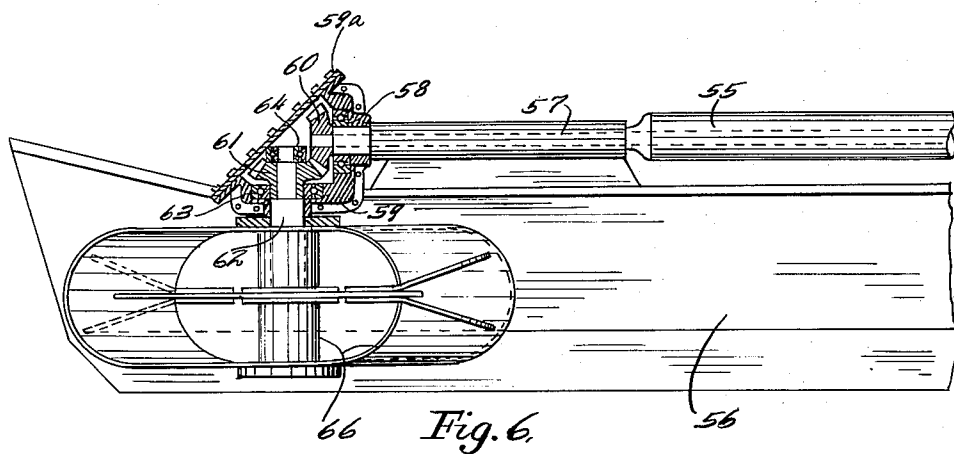
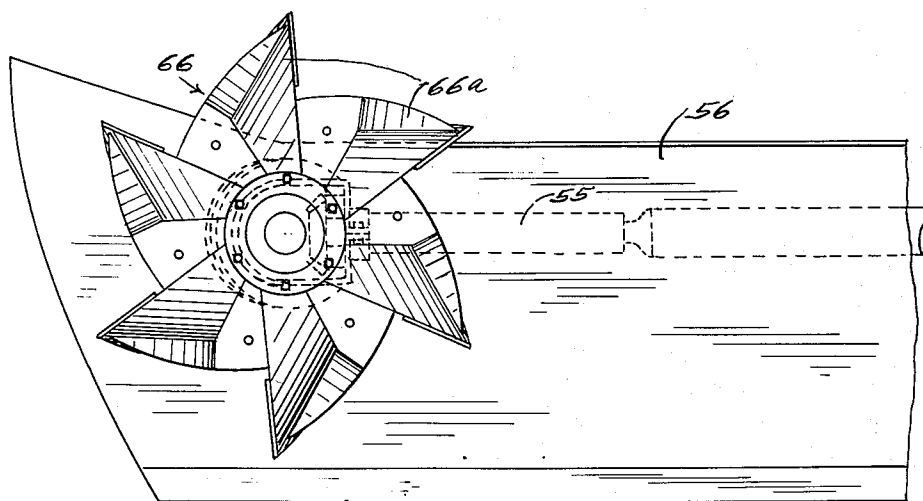
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SNOWFLOW STRUCTURE

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4 Sheets-Sheet 4



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SNOWFLOW STRUCTURE

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12 Claims. (Cl. 37-43)

This invention relates to a snowplow. While the plow embodying the invention might be used for clearing all portions of a road, it particularly is designed for clearing the sides of the road. This is often done after a plow has passed along the central part of the road and removed the snow therefrom and results in widening the cleared path on the road.

It is an object of the present invention therefore, to provide a plow which might be called a levelling wing supported at one side of a propelling vehicle, which wing embodies a discharging rotor or fan.

It is another object of the invention to provide a snow plow comprising a levelling wing in the form of a blade adapted to extend along the side of the road and out over a ditch at one side of the road.

It is a further object of the invention to provide a snow plow comprising a levelling wing in the form of a blade propelled by and supported at one side of a vehicle so that the blade can be given different angles to the horizontal to level off a bank at various angles or which can be given an angle sloping downwardly toward its outer end so that snow or ice can be removed from a ditch along the side of the road.

It is also an object of the invention to provide a snow plow comprising a levelling wing in the form of a blade which can be supported at various angles to the side of the road or to the side of the propelling vehicle.

It is still further an object of the invention to provide a snow plow comprising a blade supported from and extending at one side of a propelling vehicle, the same having a rotor operating in cooperation therewith, which rotor may be driven from the same motor which propels the said vehicle.

It is also one of the objects of the invention to provide a snow plow in the form of a blade or wing extending at one side of a propelling vehicle, said blade having a discharging rotor or blower which cooperates therewith and driven by a shaft disposed in front of said blade on which may be disposed a series of fins or blades adapted to break up and increase the travel of snow passing along said blade to the rotor or blower.

It is another object of the invention to provide a snow plow comprising a blade or wing extending at one side of a propelling vehicle, the same being so constructed that the operation and position thereof can be controlled from within said vehicle.

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 somewhat in perspective of one side of the vehicle and plow attached thereto;

Fig. 2 is a top plan view of a portion of the vehicle and blade of the plow with the driving parts in horizontal section taken substantially on line 2-2 of Fig. 1 as indicated by the arrows;

Fig. 3 is a view in side elevation looking from the side of the vehicle opposite that seen in Fig. 1;

Fig. 4 is a top plan view of the plow and the front portion of the vehicle;

Fig. 5 is a view similar to Fig. 4 showing a modification;

Fig. 6 is a view partly in plan and partly in horizontal section showing a further modification; and

Fig. 7 is a view in front elevation of the structure shown in Fig. 6.

Referring to the drawings, particularly to Figs. 1 to 4 inclusive, an assembly is shown comprising a vehicle designated generally as 10. This vehicle is in the form of a truck having the usual internal combustion motor 10a. The truck comprises the usual body 10b, the wheels 10c and the operator's cab 10d. Said truck also has therein a post 10e having a projecting bracket 10f in which is journaled a sheave 10g. Another sheave 10h is journaled in the top of post 10e and a sheave 10i is shown below the sheave 10b mounted in a fork 10j supported in post 10e. A bracing bar 10k extends from the post 10e to another post 10m shown as comprising spaced bars, the lower ends of which are secured to and rigid with a rectangular portion of said post open at its side. A cylindrical rod 10n extends longitudinally between the sides of said rectangular portion. The post 10m has mounted thereon in a depending bracket a sheave 10o.

The plow proper comprises a blade 11. While said blade may be variously formed, in the embodiment of the invention illustrated it is shown as having a concave forward surface to the lower portion of which is fixed a wearing shoe 11a. The shoe 11a can be made of hard steel or similar material. The blade 11 may have suitable strengthening ribs not shown on its rear side. Blade 11 is supported from the vehicle 10. For this purpose a steel cable 13 runs over the sheaves 10h and 10g and has its end attached to a bracket

secured to the outer end of blade 11 at its rear side, such as the bracket 14 shown on the similar blade in Fig. 5. The cable 13 extends into the post 10e and downward over the sheave 10f to a suitable drum of a hoist forming part of the truck equipment, which hoist and drum are preferably operated from the motor 10a of the truck. The outer end of blade 11 can therefore, be raised and lowered as desired by the cable 13 as said cable is wound upon or unwound from the drum of the hoist which is under the control of the operator. The crank shaft 10p of motor 10a projects at the forward portion of the motor. Shaft 10p extends into a gear casing 15 into and has a reduced end to which is secured a bevelled gear 16. Bevelled gear 16 has a hub running in suitable bearings 17 and said gear meshes with another bevelled gear 18 secured to a shaft 19. Gear 18 has a hub journaled in bearing 20. A clutch 21 is provided for shaft 19 and an operating clutch collar 22 is shown therefor. Shaft 19 is connected by a universal joint 23 comprising the usual forks connected by journaled cross pins to a coupling shaft 24. The joint member 23 has a sleeve 23a into which shaft 24 projects. Shaft 24 is splined in sleeve 23a and is longitudinally moved therein. It will be noted that shaft 19 is journaled in bearings 25 and projects outwardly of the gear casing 15 so that the universal joint section connected thereto is without said casing. Shaft 24 is connected at its outer end by a universal joint 26 to another shaft 27. Shaft 27 has spaced portions journaled in the bearings 28 and has formed thereon or secured thereto a bevelled gear 29. Bearings 28 and gear 29 are disposed in a gear casing 30. This gear casing has an extension 30a in which is journaled a larger bevelled gear 31 secured to a shaft 32 having portions journaled in spaced bearings 33. Gear casing 30 receiving the bearings 28 is rotatable in a cap bearing one portion of which at its ends is connected to a bracket 30b. This bracket extends upwardly and rearwardly and has secured thereto cylindrical portions 30c which are slidable on the rod 10n. From the described construction it will be seen that gear case 30 can rotate about the axis of shaft 27 and in the housing surrounding bearings 28 as shown in Fig. 2. The outer end of blade 11 can thus be raised and lowered. Movement of said blade relative to bracket 30b is thus possible and said movement is a rotative movement about shaft 27. The gear case 30 really rotates in bracket 30b and as stated concentric with bearings 28. Shaft 27 can, of course, swing about the universal joints 26 and 23. A cable 35 is secured to the upper portion 30c and runs over the sheave 10g and then rearwardly to post 10e and to the drum of a hoist operated by motor 10a. It may be stated that the hoist for operating cables 13 and 35 could be operated by a motor separate from the motor which propels the truck 10 if desired. The lower portion of the gear casing 30 receiving shaft 27 is separable and shown as 30d. The two portions of the casing are connected by the headed and nutted bolts 36. The shaft 32 extends through the end of the casing portion 30a and has secured thereto a coupling member 37 to which is secured a shaft 38. The gear case portion 30a is connected to bracket 38a which extends to and is connected to blade 11. It will thus be seen that by raising and lowering cable 35 by means of the hoist to which it extends, the inner end of shaft 38 and blade 11 can be raised and lowered as desired. It will also be apparent

that the blade 11 and shaft 38 can be swung about the axis of rod 10n so that the blade can occupy different positions relatively to the side of the vehicle 10. Shaft 38 extends to and is journaled in a bearing bracket 40 secured to the front of blade 11 adjacent its outer end and a propeller 41 is secured to the outer end of shaft 38. Propeller 41 forms a discharge rotor for snow which is moved to the outer end of blade 11 and it will discharge the snow outwardly of said blade. As shown in Fig. 4, one or more auxiliary rotors or bladed members 42 can be secured to shaft 38 to act upon and break up the snow and assist in moving it longitudinally of blade 11.

A pair of rods 43 are pivotally secured to brackets 44 on the outer side of post 10e by the headed and nutted bolts 45. Rods 43 telescope into pipes or tubes 46 which are in turn at their outer ends pivotally secured to brackets 47 secured to the rear side of blade 11. Rods 43 and tubes 46 may be relatively adjusted and held in adjusted position by pins or bolts 48 adapted to pass through any one of a plurality of holes in said rods and tubes. The rods 43 and tubes 46 hold the blade against rearward movement in operation and maintain it at the desired angle.

The blade 11 has at its upper edge adjacent its outer end a deflector 11b hinged along an axis parallel to the top of blade 11 so that it can be moved to and held in different positions to properly deflect the snow.

In operation of the structure shown in Figs. 1 to 4, the truck 10 will be propelled along the highway and the blade 11 will extend outwardly at one side thereof toward the side of the road. The blade or wing 11 being supported from the truck 10 can extend beyond the side of the road or over the edge of the pavement, if it is used on pavement, so that it will overhang a ditch at the side of the road. The blade can be given any desired angle relatively to the horizontal. By sloping the blade upwardly toward its outer end it can be positioned so that the snow bank formed along the side of the road may be levelled off or brought to the desired angle. When it is desired to operate the device, shaft 19 will be driven from the motor 10a by operation of clutch 21. This will be operated through clutch collar 22 by the operator from any suitable control means (not shown). Shaft 19 will drive shaft 24 and this through shaft 27 and gears 29 and 31, will drive shaft 38. It will be seen that owing to the universal joints 26 and 23, shaft 24 can assume different angles to shafts 19 and 27. The snow will be moved along blade 11 toward its outer end and will be discharged outwardly from the outer end of the blade by the rotary discharge member 41. The snow will be broken up by the members 42 when these are used. It will be apparent that the blade can be given quite an inclination downwardly toward its outer end so that it will extend into a ditch or depression along the side of the road and the ditch or depression thus cleared of snow or ice. The blade can be positioned at different angles to the side of the vehicle depending on the condition of the snow to be moved. It will be understood that shaft 24 will move longitudinally in sleeve 23a to accommodate the lengthening or shortening of the distance between bearings 25 and 30 as bracket 30b swings about shaft 10n. It is believed that applicant is the first to provide a levelling wing or blade having a discharge rotor thereon and one which can extend beyond the side of the road. When the blade or wing is

not in use and the plow is to be transported, the blade will be swung alongside of the vehicle 10 and the inner end thereof raised up. The outer end will then be raised so that the blade slopes upwardly at its outer end at quite an angle. The blade will then be well out of contact with the road and is in convenient position for being moved. If necessary, the coupling shaft 24 can be removed at this time.

10 In Fig. 5 a modification is shown in which the shaft 50 which takes the place of the shaft 28 is disposed at the rear of the blade 51. Shaft 50 extends through the blade 51 adjacent the outer end of the latter, which blade is widened at its outer end and provided with a bearing 52 from which bracket 14 projects. Brackets 53 and 54 are connected to a flange 51a at the inner end of blade 51 and support gear casings 30 and 30a. The structure otherwise is the same as that already described. In Figs. 6 and 7 a modification is shown in which a shaft 55 corresponding to the shaft 50 shown in Fig. 5 is used which extends along the side of the blade 56. Said shaft is journaled in a bearing 57 secured to the rear of the blade and this shaft has a reduced portion journaled in bearings 58 in a gear casing 59 secured to the blade 56. A bevelled gear 60 is secured to the end of shaft 55 and meshes with another bevelled gear 61 secured to the reduced end of a shaft 62. Shaft 55 is journaled in bearings 63 and in the gear casing 59 while shaft 62 is journaled in bearing 64 in said gear case. Gear 61 is also journaled in bearings 63 in gear case 59. It will be noted that gear case 59 is provided with a removable cover 59a. A rotor 66 is secured to the outer end of shaft 62, which shaft extends to the blade 56 from gear case 59. Rotor 60 has a plurality of blades 66a of the spoon-shaped type. The rotor and its carrying shaft have a structure substantially like that shown in applicant's co-pending application S. N. 184,234 filed January 10, 1938.

The operation of the structure shown in Fig. 5 is substantially like that already described, except that there will be no members 42 for breaking up the snow and there will be no shaft in front of the blade 51 at its inner portion.

In the operation of the structure shown in Figs. 6 and 7 the snow will be moved outwardly by the blade 56 and will be discharged in a direction outwardly of the blade by the rotor 66. The rotor is of a different type having the blades moving in a plane parallel to the direction of the snow instead of being of the propeller type shown in Fig. 1 where the blades rotate in a plane at right angles to the movement of the snow.

From the above description it will be seen that I have provided a novel, compact and efficient structure of snowplow and one which will have a high degree of utility. There has long been a need of a plow having a levelling wing or blade which could clear the sides of the road and extend out beyond the side of the road. As stated, by the present structure the road can be cleared beyond the ditch or depressions at the side thereof and snow or ice can be removed from the ditch or depression. The snowbank which is formed at the side of the road where the snow is deep or drifted can be cut down and brought to the desired angle. It is obvious that the rotor and its shaft might be driven from a motor on a vehicle separate from the motor which drives the vehicle.

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 snowplow for working on the side of a road having in combination with a propelling vehicle, a blade extending at one side of and supported from said vehicle so as to be propelled thereby, said blade being swingable about a vertical axis at one side of said vehicle, a shaft extending to adjacent the outer portion of said blade, a rotor mounted on said shaft for discharging snow and means for driving said shaft and rotor from a source of power supported by said vehicle, said rotor being mounted and related with said blade to forcibly discharge material substantially axially thereof and longitudinally of the blade.

2. A snowplow comprising a blade extending at one side of a propelling vehicle, said blade being mounted to swing about substantially vertical and horizontal axes adjacent the side of said vehicle, means for varying the forward and rearward inclination and the vertical inclination of said blade, a shaft extending longitudinally of said blade, a rotor secured to said shaft at the outer end of said blade for discharging snow moved by said blade, one or more members secured to said shaft and spaced therefrom inwardly of said rotor for breaking up snow, a motor on said vehicle and means for driving said shaft and rotor from said motor.

3. A snowplow for working on the side of a road having in combination with a propelling vehicle, a blade extending at one side of and supported from said vehicle so as to be propelled thereby, said blade being swingable about a vertical axis at one side of said vehicle, a shaft extending to adjacent the outer portion of said blade, means for driving said shaft from said vehicle, a shaft mounted adjacent the outer end of said blade extending at an angle to said shaft and a propeller mounted on said last mentioned shaft and coaxial therewith for discharging snow in a direction outwardly of said blade.

4. A snowplow for working on the side of a road having in combination with a propelling vehicle, a blade extending at one side of said vehicle, means for swingingly connecting the front end of said blade to said vehicle for movement about a substantially vertical axis, a shaft extending across the front of said vehicle, a motor on said vehicle, means for driving said shaft from said motor, a second shaft extending longitudinally of said blade, a discharging rotor for snow at the outer end of said blade secured to said last mentioned shaft and means comprising a coupling shaft with universal joints at its ends for connecting said first and second shafts.

5. A snowplow for working on the side of a road having in combination with a propelling vehicle, a blade extending at one side of said vehicle, a vertical shaft fixedly mounted at one side of said vehicle, a bracket swingable about said shaft, a pair of meshing beveled gears carried in said bracket, a motor on said vehicle, a shaft driven by said motor including universal joints secured to one of said beveled gears, a shaft extending longitudinally of said blade secured to the other of said beveled gears, means on said vehicle for raising and lowering the inner

and outer ends of said blade and a discharge rotor at the outer end of said blade secured to said last mentioned shaft, said blade and last mentioned shaft being swingable with said bracket about said vertical shaft.

6. A widening device for moving snow and other material beyond the shoulders and ditches of a roadway having in combination with a propelling vehicle, a moldboard mounted outwardly of one side of said vehicle for swinging movement about a horizontal axis and supported therefrom at an angle to cause snow to be moved therealong and a relatively short discharge rotor mounted in the outer portion of said moldboard and constructed to forcibly discharge material moved thereto by said mold board longitudinally from the outer end of said moldboard, a source of driving power and driving connections including a shaft extending through said moldboard for driving said discharge rotor, said rotor being related with said moldboard to receive and forcibly discharge material substantially axially of said rotor and longitudinally from the outer end of said moldboard.

7. A widening device for moving snow and other material beyond the shoulders and ditches of a roadway, having in combination with a propelling vehicle, a moldboard mounted outwardly of one side of said vehicle and supported therefrom at an acute angle to the longitudinal center line of the vehicle, said moldboard having its outer portion diverging from the adjacent portion thereof and disposed at a lesser acute angle to the longitudinal center line of said vehicle than said adjacent portion, a discharge rotor mounted in said diverging outer portion and constructed to forcibly discharge material longitudinally from the outer end of said moldboard, and means for driving said discharge rotor.

8. A plow for moving snow or other material from the side of a road having in combination with a propelling vehicle, a mold board carried by said vehicle and extending outwardly at one side of said vehicle and being disposed at an angle to the longitudinal center line of said vehicle so as to incline rearwardly to cause material to be moved outwardly therealong said moldboard having its outer portion diverging from the adjacent portion thereof and disposed at a lesser acute angle to the longitudinal center line of said vehicle than said adjacent portion and a power discharge means disposed at the outer diverging end of said mold board so as to be effective only at the outer end of said mold board to forcibly project said material moved outwardly to it by said mold board substantially longitudinally and outwardly away from said mold board.

9. A plow for moving snow or other material from the side of a road having in combination with a propelling vehicle, a blade carried by said vehicle extending outwardly at one side thereof and inclining rearwardly toward its outer end

so as to move said snow or other material therealong as said vehicle moves forward, said blade being mounted for swinging movement about a substantially vertical axis adjacent the side of said vehicle and being mounted for vertical swinging movement about a substantially horizontal axis adjacent the side of said vehicle, means for securing said blade in different positions of adjustment about said substantially vertical axis, means for swinging said blade about said substantially horizontal axis to change its inclination to the horizontal, a discharge means at the outer end of said blade for receiving snow moved to it by said blade and projecting it outwardly from said blade, a motor and means for driving said discharge means from said motor.

10. A device for moving snow or other material from the side of a road having in combination with a propelling vehicle, a power driven discharge means disposed at one side of said vehicle, a motor, means for driving said discharge means from said motor and means supporting said discharge means mounted for movement about substantially vertical and horizontal axes adjacent said side of said vehicle, said discharge means being disposed so as to project said snow or other material in a rearwardly and outwardly direction so that there is a reactive forward component tending to propel said means and said vehicle forwardly.

11. A plow for moving snow or other material from the side of a road having in combination with a propelling vehicle, a blade carried by said vehicle and extending outwardly at one side of said vehicle, said blade being disposed at an angle to the longitudinal center line of said vehicle so as to incline rearwardly to cause material to be moved outwardly therealong, a power rotary discharge means constructed and related with the outer portion of said blade to forcibly project material moved outwardly to it by said blade in an outwardly diverging truncated conical form axially thereof and longitudinally of the outer end of said blade and means extending to said discharge means for driving the same.

12. A widening device for moving snow and other material beyond the shoulders and ditches of a roadway having in combination with a propelling vehicle, a moldboard mounted outwardly of one side of said vehicle at an angle to the longitudinal center line of said vehicle so as to incline rearwardly to cause material to be moved outwardly therealong, means for supporting said moldboard from said vehicle, said supporting means including means for selectively adjusting the elevation of the forward and rear ends of said moldboard, and power discharge means mounted at the outer portion of said moldboard and effective to forcibly project material outwardly longitudinally of said moldboard.

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