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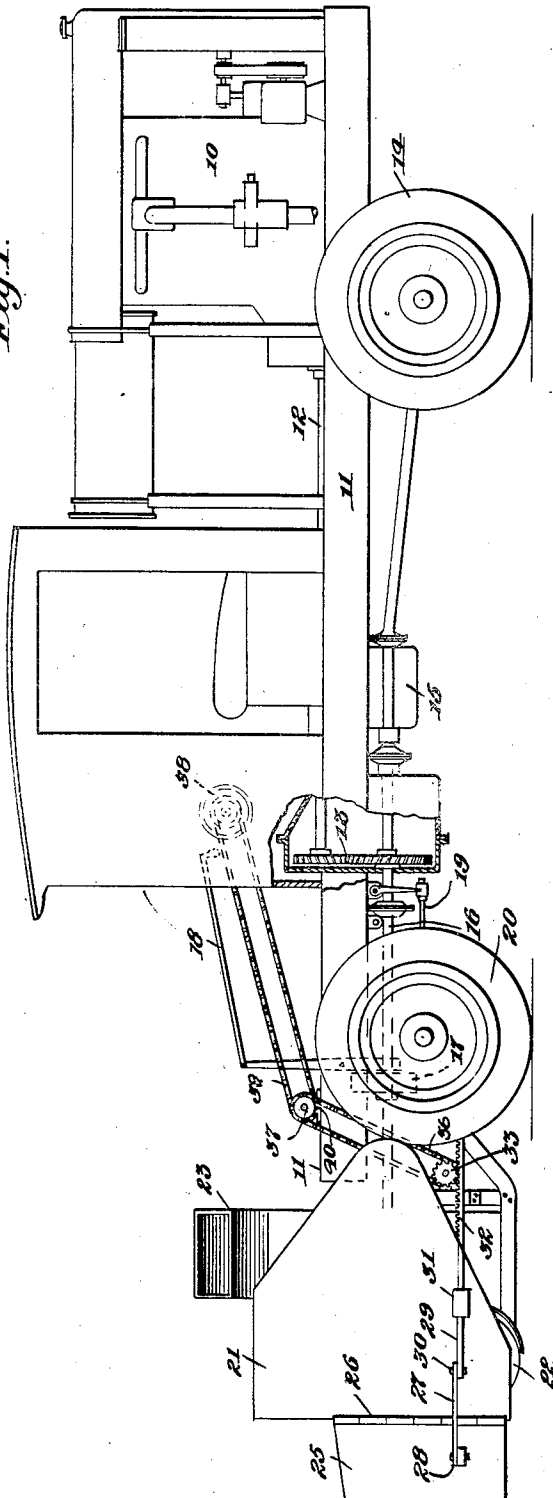
1,889,667

STEERING MEANS FOR SNOWPLOWS

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3 Sheets-Sheet 1

Fig. 1.



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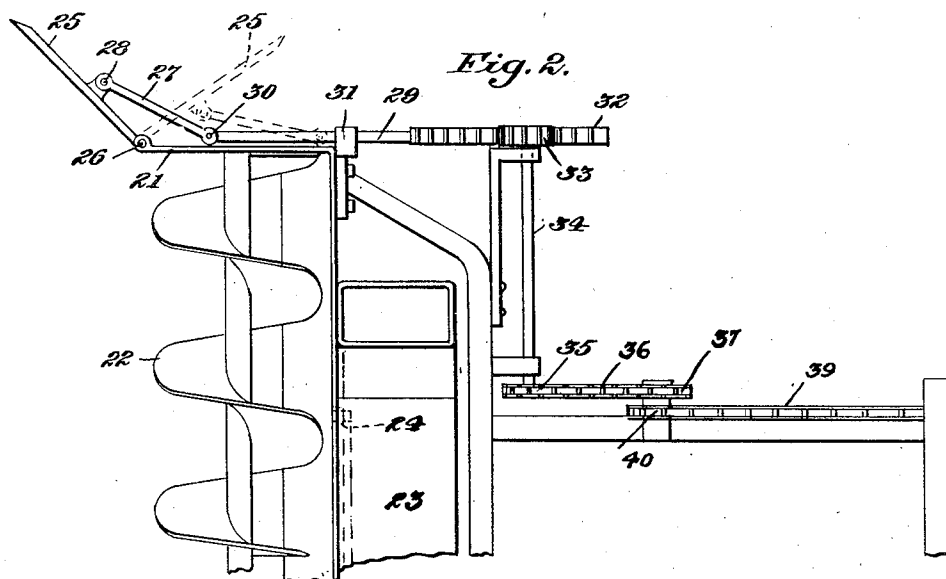
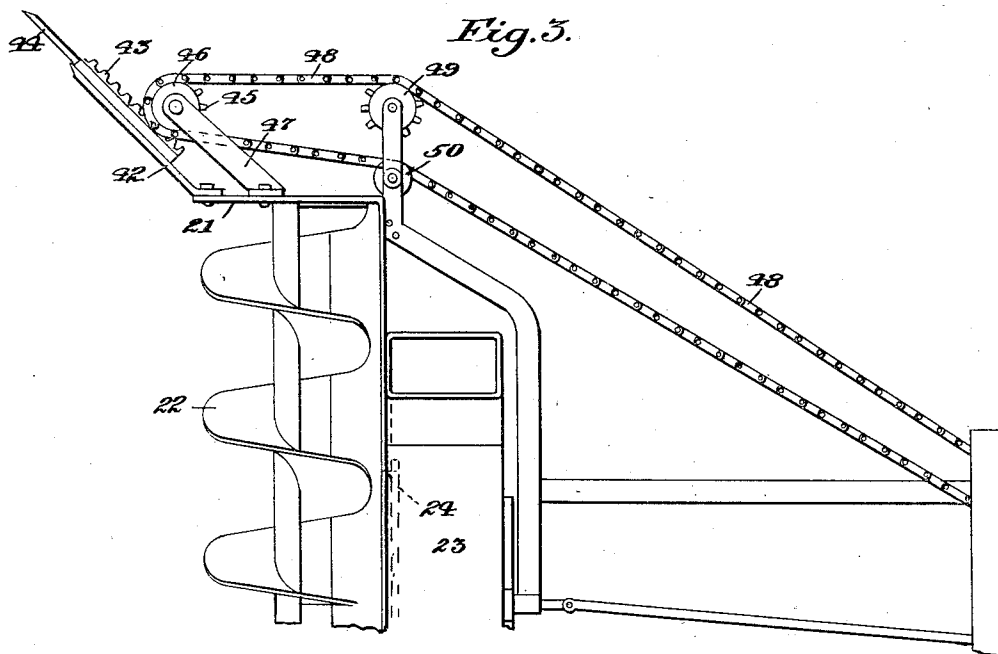
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STEERING MEANS FOR SNOWPLOWS

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3 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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STEERING MEANS FOR SNOWPLOWES

Application filed August 20, 1928. Serial No. 300,365.

This invention relates to steering means for snow plows of the types which are used to remove snow from streets and highways.

More particularly, this invention relates to means for steering snow removers of the type wherein either a plow of the V type or the rotary type is mounted forwardly of a power vehicle, said steering means being independent of or auxiliary to that commonly employed for guiding a vehicle in a chosen path.

It has been found that, when attempting to open up a road over which the snow has drifted unevenly, say, from a depth of five feet on one side to a depth of two feet on the other, it is almost impossible to keep a snow plow of the V type in a chosen path, due to the fact that one side of the V must handle a much greater volume of snow than the other. The difference in pressure, which is proportional to the number of cubic feet to be moved, causes the machine to be forced away from the side on which the snow is deeper. The same difficulty arises when snow drifts unevenly into a previously cleared path between old banks of snow, and continuous forcing of the equipment away from the deeper side eventually results in a path between banks which may be so far out of alignment with the road as to pass directly over the ditch at the roadside.

It has further been found that, when plowing through deep snow with any type of remover, and especially when making the first cut or swath, the wheels or caterpillar tread of a motor truck or tractor respectively have a tendency toward side-slipping and that complete control of the vehicle cannot therefore be effected by the usual methods. Modern highways are built with many sloping surfaces to permit traffic over them at high speeds and to facilitate drainage, and these sloping surfaces materially add to the tendency toward side-slipping.

It is the object of the present invention to overcome these difficulties by providing

steering means auxiliary to the usual control systems, such, for example, as the steering wheel and radius rod connected to the front wheels of a vehicle, which auxiliary steering means may in many instances be used to guide the snow remover entirely independently of the said usual control systems.

More specifically, it is the object of this invention to provide rudder-like plates which encounter the snow at adjustable angles of incidence, which blades may be built into a snow plow as elements thereof or which may be attached either to the plow or the vehicle on which it is mounted.

Other objects will become apparent from a study of the following description when taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of one embodiment of the invention, the steering plates being mounted at the sides of a snow plow, and the snow plow being mounted forwardly of a powered truck;

Fig. 2 is a partial half-plan view of the snow remover shown in Fig. 1, certain parts having been removed for purposes of clarification;

Fig. 3 is a half-plan view similar to Fig. 2, but showing a modification of the steering mechanism;

Fig. 4 is a diagrammatic plan view of the invention as applied to a snow plow of the V type, the sides of the V element being adjustable to steer the plow;

Fig. 5 is a view similar to Fig. 4 but disclosing a modification thereof;

Fig. 6 shows, in diagrammatic plan, a plow of the V type in which the V elements are preferably rigid and in which a single steering plate is provided forwardly of the plow; and

Fig. 7 represents a modification of the device shown in Fig. 6, the single forward plate being replaced by a pair of rearwardly disposed adjustable plates.

In Fig. 1 there is shown a snow remover of the type disclosed in Patent #1,587,449 in which a snow plow is mounted forwardly of a truck. A motor 10 is mounted at the rear of the truck upon the main frame or sill 11 of the chassis. A drive shaft 12 extends forwardly to a set of gears 13 by means of which a driving torque is transmitted rearwardly to wheels 14 in the conventional manner by way of transmission casing 15, and forwardly to the snow removing mechanism by way of shaft 16 and clutch 17. A lever 18 is provided for controlling the clutch from the cab. The front wheels 20 are turned in the usual manner by means of a radius rod 19. The steering wheel and the controls for the transmission 15 are not shown as they form no part of the invention and are well known in the art.

Mounted forwardly of the vehicle upon the sills 11 is a snow remover of the type disclosed in said Patent #1,587,449, which comprises a casing 21, rotating augers 22 (see also Fig. 2) for removing the snow and passing it toward the center of the casing, and a second casing 23 for receiving and disposing of the snow removed by said augers. An opening, one edge of which is indicated in dotted lines at 24, is provided between the two casings.

The structure so far described is old. The present invention contemplates the provision of substantially vertical plates 25 upon the sides of the auger casing for steering the snow remover in the manner already set forth. Each plate 25 may be hinged to the casing at any position between the forward and rear edge thereof, for example, as at 26, and its angle of inclination to the side of the casing varied by means of a link 27 which is pivotally attached to the plate at 28 and pivotally connected to a rack bar 29 as at 30. The rack bar is mounted to reciprocate in a fixed supporting guide 31 and upon its rear end is provided with teeth 32 which mesh with those of a driving pinion 33 secured upon a horizontal shaft 34. A sprocket wheel 35 is fixed upon the inner end of shaft 34 and is driven by means of a sprocket chain 36. The chain passes over a sprocket wheel 37, the latter being driven by a laterally offset chain 39 and sprocket wheel 40. Chain 39 is connected to a drum and ratchet wheel mechanism within the cab, indicated generally at 38. The latter mechanism is of the conventional type and need not be shown in detail and described. The drum may be rotated manually or by power to drive the chain and thence reciprocate the rack bar in either direction at will to adjust the position of the steering plate 25.

The adjustable plate 25 has two functions. As previously mentioned, there may be a tendency for the forward end of the vehicle to side-slip and it may be impossible to steer the

device by means of the steering wheel. As indicated in Figure 2, when the plate 25 is folded backward into the dotted line position it acts as a rudder. The operator may change its angle of inclination with the side of the casing to vary within the range of zero to ninety degrees, and he may adjust one or the other or both of the plates in a manner to secure best results. It is apparent that the lateral component of the thrust between the unremoved snow and the plate will vary with the changes in the said angle of inclination, thus providing means for keeping the plow precisely in a chosen path. The second function of the plate 25 is dependent upon its full line position (anywhere between 90° and 180° inclination with the casing). After cutting the first swath through the snow with both plates folded backward to act as rudders, the plates are thrown forwardly to the full line position. Upon cutting the next and each succeeding swath, the plate, extending laterally into the previously cleared space, catches any snow that may have slid or tumbled into the clearing, there- after guiding it into the auger casing. The plate upon the opposite side of the casing, which is in contact with the snow yet to be removed, may be adjusted to act as a rudder and at the same time to cut the snow in such manner that it is left with a smooth vertical surface after the vehicle has passed, the plate being given a sharp vertical edge for this purpose. However, if desired, this plate need not be moved from its folded or dotted line position. The plates 25 may be of any desired height and shape.

Fig. 3 discloses a modification of the steering mechanism of Fig. 2 as applied to the same type of plow. In this instance, a plate 42 of much of the same shape as plate 25, is rigidly mounted at the side of the auger casing. This plate serves to scoop up any snow out of an already cleared path and to slidably support a rack bar 43. The rack bar is adapted to move toward and away from the casing to steer the plow and a sharp leading edge 44 is provided for making a clean cut in the fallen snow. A pinion 45 is mounted below a sprocket wheel 46, both being fixed upon the same shaft and spaced from the casing 21 by means of a shaft-supporting bracket 47. The pinion meshes with the teeth of the rack bar and the sprocket wheel is driven by a sprocket chain 48. The chain, guided by means of an idling sprocket 49 and an idling pulley wheel 50, passes back to the cab and is driven in the same manner as the chain of Figs. 1 and 2.

In Figs. 4 and 5 are shown, diagrammatically, plows of the V type in which the wing elements or side plates 51 instead of being rigid with respect to the remaining plow structure, are foldably pivoted as at 52 at the forward or snow-entering end of a rigid

frame member 53. Nose caps 54 are provided for preventing the snow from interfering with the operation of the hinged construction at 52. The plates 51 may be oscillated about the hinges to vary their angles with respect to the central frame member 53 and thereby steer the plow. The means for effecting such oscillation consists, in Fig. 4, of two rigid members 55, each of which is pivotally attached at one end to a wing of the plow as at 56 and which receives a roller 57 at its opposite end. On each side of the central frame an endless chain passes from the cab (not shown) to and over a pulley wheel 59, and the roller end of each member 55 is securely fastened to the chain by means of a clip 60. It is readily apparent that, as the chain passes over the pulley wheel, the roller 57 will ride along the face of the central plate 53 to vary the angles between plate 51 and members 53 and 55 respectively.

The control mechanism used in Fig. 5 differs from that of Fig. 4 in that toggle levers 61, which are pivotally secured to the folding wings 51 and central rigid frame 53 at 62 and 63 respectively, are opened and closed by means of push-and-pull rods 64.

The plows shown in Figs. 6 and 7 are also of the V type but they differ from those of Figs. 4 and 5 in that the wings or V elements are rigid and that auxiliary plates are provided for steering control.

In Fig. 6 two plates 65 are rigidly spaced from a rigid central frame member 66 by means of braces 67. A rudder plate 68 projects from the nose of the plow to the front thereof whereby it enters the snow in advance of the plow. It is pivoted to the plow about a vertical pin 69, and is provided with a rigid rearwardly extending rod 68'. A worm wheel 70 provided with a radial slot 71 is mounted for rotation in the central frame 66. A pin 72 passes downwardly through the enlarged rear end 73 of the rod 68' and into the slot 71. A worm 75 upon a worm shaft 74 is in engagement with the worm wheel 70. It is obvious that rotation of the shaft will cause a shifting of the rudder 68.

In Fig. 7, two rigid wings or plates 76 are rigidly spaced from the central frame 77 by means of braces 78. A rudder-like plate 79 is pivoted as at 80 to the rear of each side of the V-shaped plow portion. The plates 79 are oscillated by means of worms 81, worm wheels 82, crank arms 83 which are fast on the worm wheel shafts, and links 84, the latter being pivotally connected to the rudders and the crank arms as at 85 and 86 respectively.

The steering means just described in connection with Figs. 1 to 7 are readily adapted for use in the snow plow constructions shown in Patents 775,293; 617,830; 1,413,007; and 1,419,263. The modifications shown in Figs. 4, 5, and 6 are particularly efficacious when

applied to plows of the type disclosed in the Patent to Johnson, 1,419,263.

It is to be understood that the drawings are only illustrative of my invention and that various changes in the arrangement and combination of parts may be made, subject only to the limitations of the appended claims.

What I claim is:

1. In a snow plow, a casing having forwardly extending sides, and means mounted on each of said sides for movement into trailing relation thereto to contact with the snow to stabilize the path of said plow.

2. In a snow plow, a casing having forwardly extending sides, and means mounted on each of said sides for movement into trailing relation thereto to contact with the snow to stabilize the path of said plow, said means being adjustable.

3. In a snow plow, a casing having forwardly extending sides, and means mounted on each of said sides for movement into trailing relation thereto to contact with the snow to stabilize the path of said plow, said means being independently adjustable.

4. In a snow plow, a casing having forwardly extending sides, and means mounted for movement into trailing relation to the front edge of each of said sides to contact with the snow to stabilize the path of the plow.

5. In a snow plow, a casing having forwardly extending sides, and means mounted for movement into trailing relation to the front edge of each of said sides to contact with the snow to stabilize the path of the plow, said means being adjustable.

6. In a snow plow, a casing having forwardly extending sides, and means mounted for movement into trailing relation to the front edge of each of said sides to contact with the snow to stabilize the path of the plow, said means being independently adjustable.

7. In a snow plow, a casing having forwardly extending sides, and means mounted on said sides adapted to lie forwardly and to the side thereof to increase the swath of the casing and to lie rearwardly and to the side thereof to contact with the snow to stabilize the path of the plow.

8. In a snow plow, a casing having a forwardly extending side, and a plate mounted to swing on a vertical axis on said side from a position in front of said vertical axis to a position in rear thereof.

9. In a snow plow, a casing having a forwardly extending side, a plate mounted to swing on a vertical axis on said side from a position in front of said vertical axis to a position in rear thereof, and means for adjusting the position of said plate from a distance.

10. In a snow plow mounted on the front of a vehicle, a casing, a horizontally mounted

auger in said casing, the sides of said casing extending forwardly, and means mounted for movement into trailing relation to the sides of said casing to engage the snow to stabilize the path of the plow.

5 11. In a snow plow, a casing having forwardly extending sides, means mounted on each side of the casing to contact with the snow, and means to vary the distance of the
10 outer edges of said contacting means from the longitudinal axis of the plow to stabilize the path of the plow.

In testimony whereof, I have hereunto affixed my signature.

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WALTER E. KLAUER.

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