April 12, 1927. 1,624,839

S. W. LOMBARD

SNOWPLOW

Filed March 18, 1926 3 Sheets-Sheet 1

Fig. 1.

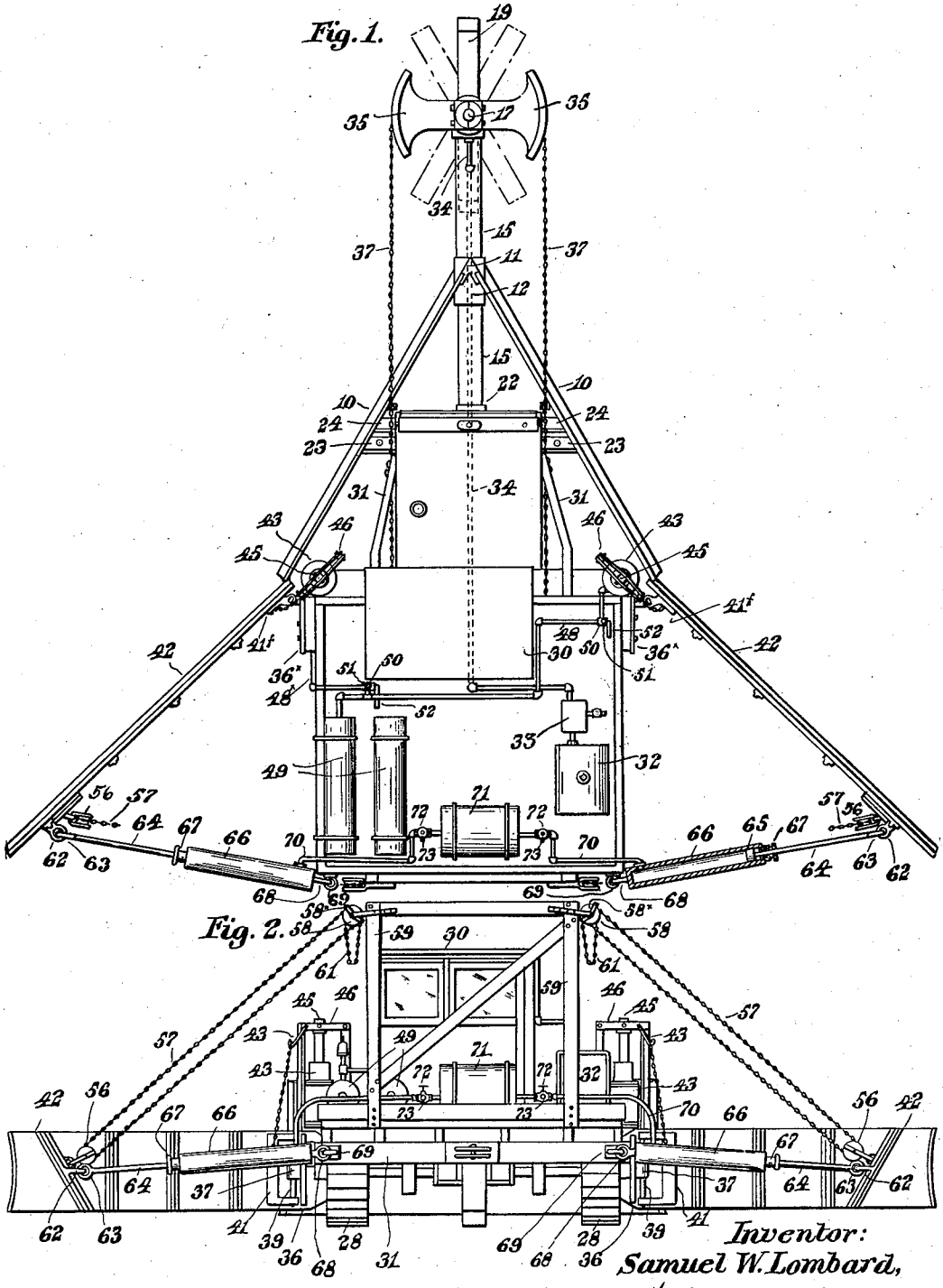


Fig. 2.

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Fig. 3.

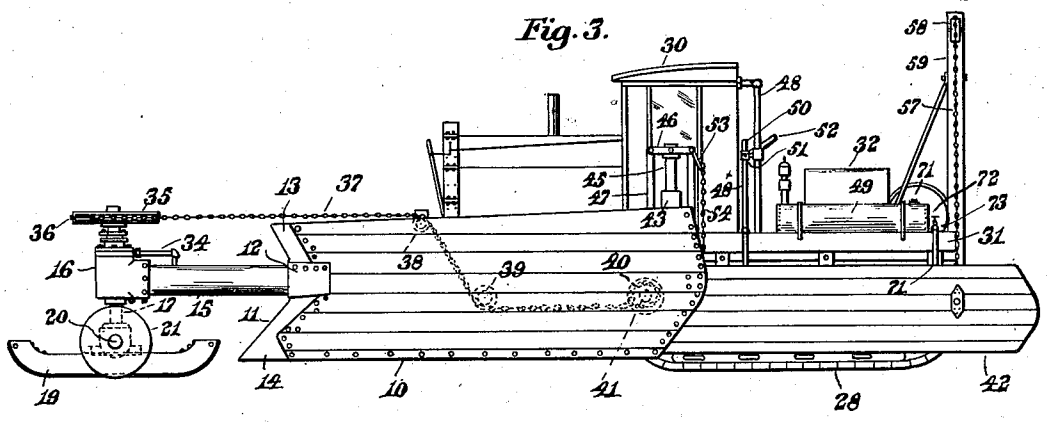


Fig. 4.

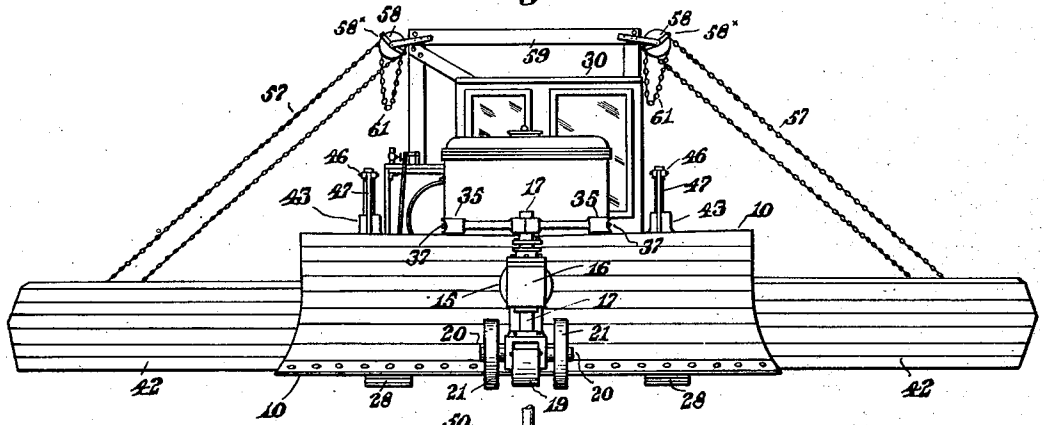
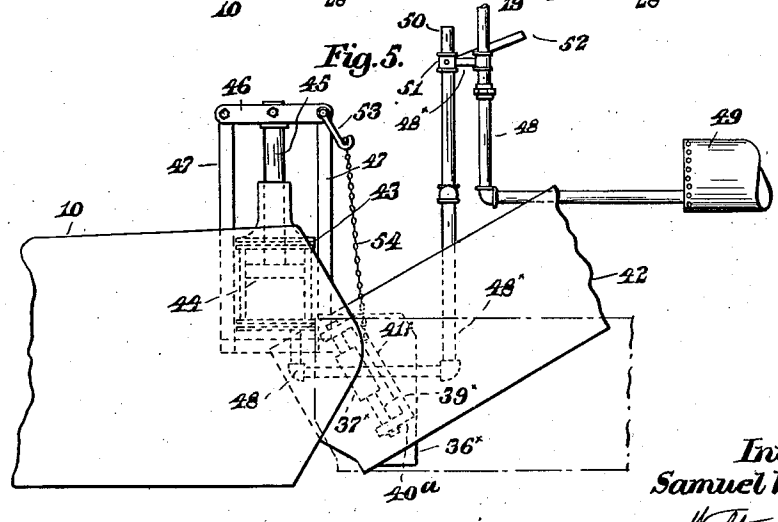


Fig. 5.



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Fig. 6.

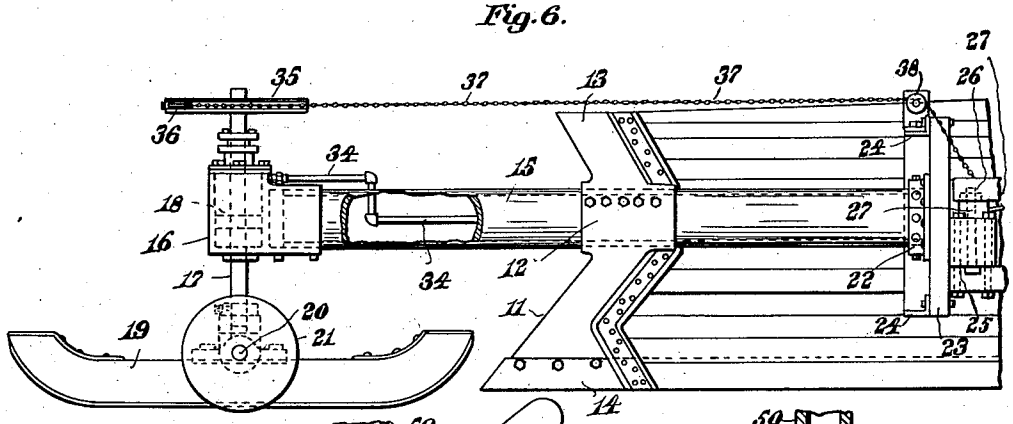


Fig. 10.

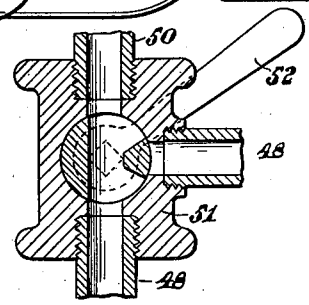


Fig. 11.

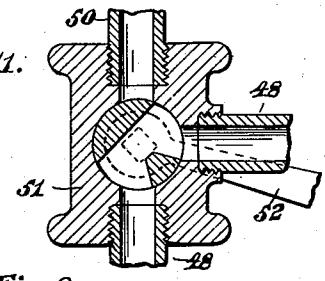


Fig. 7.

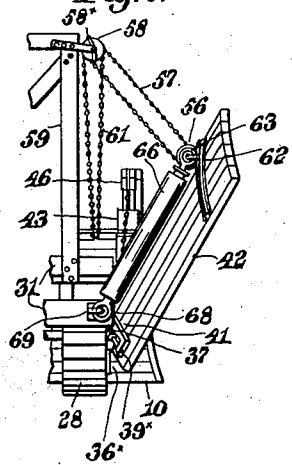


Fig. 8.

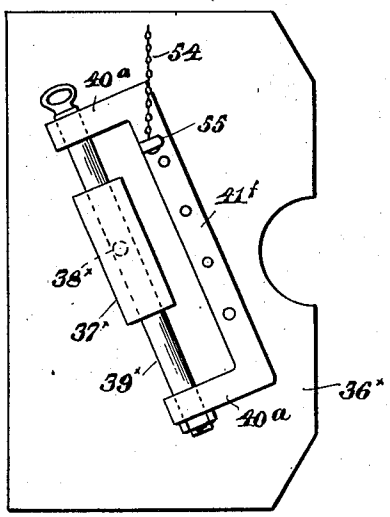
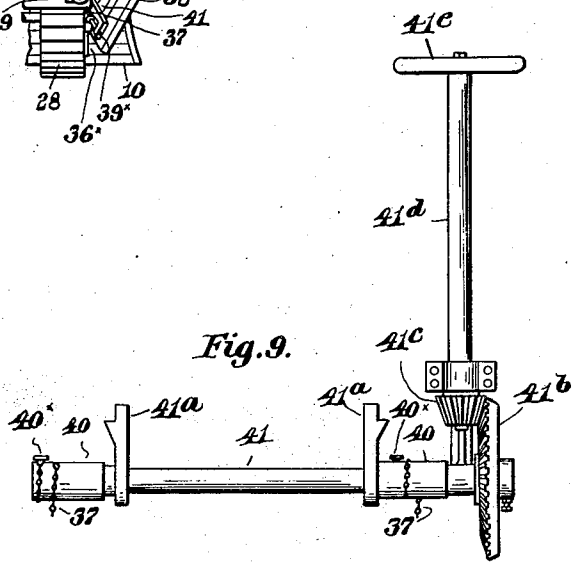


Fig. 9.



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Patented Apr. 12, 1927. 1,624,839

UNITED STATES PATENT OFFICE.

SAMUEL W. LOMBARD, OF WATERVILLE, MAINE, ASSIGNOR TO LOMBARD TRACTION ENGINE CO., OF WATERVILLE, MAINE, A CORPORATION OF MAINE.

SNOWPLOW.

Application filed March 18, 1926. Serial No. 95,798.

This invention relates to snow plows and has for its object the production of a machine of this character adapted to be driven through the snow by a tractor, the forward end of which rests upon the plow, the rear end of which is supported by said tractor.

This object is attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described except as required by the scope of the appended claims.

Of the drawings:

Fig. 1 represents a plan of a snow plow embodying the principles of the present invention.

Fig. 2 represents a rear elevation of the same.

Fig. 3 represents a side elevation of the same.

Fig. 4 represents a front elevation of the same.

Fig. 5 represents a partial side elevation showing the devices used for raising the plow.

Fig. 6 represents a side elevation of the forward part of the plow with the share on one side removed from the prow thereof, and

Figures 7 to 11 inclusive represent details to be hereinafter described.

Similar characters indicate like parts throughout the several figures of the drawings.

In the drawings, 10 is a snow plow the prow 11 of which is a solid metal casting provided with a cylindrical portion 12.

This prow 11 is V-shaped in cross section and has a forwardly inclined projection 13 at the top and another forward projection 14 at the bottom, the inclination of the front edge being to the rear and just the reverse of the inclination of the front edge of the projection 13.

Extending through the cylindrical portion 12 is a tubular member 15 to the forward end of which is secured a vertical cylinder 16 through which extends a shaft 17 having a piston 18 secured thereto within the cylinder 16.

To the lower end of the shaft 17 is pivotally secured a runner 19, the pivot pin 20 of which has revolubly mounted thereon the wheels 21, the peripheries of which are further from the axis of pin 20 than is the under face of the runner 19.

These wheels 21 rest upon the ground and keep the runner 19 slightly above the ground when the plow is moving over bare ground.

The wheels 21 may be removed when the plow is moving through snow.

The rear end of the tubular member 15 is secured in a collar 22 which is fastened to the front face of a transom 23 extending transversely of the plow between its shares or sides, the top and bottom of said transom being secured to angle irons 24, also interposed between the plow shares and secured thereto.

The transom is backed up by a heavy beam 25 interposed between the shares of the plow.

The plow 10 is connected by a bolt 26 to a projection 27 on the front of a tractor which may be of any well known construction, said tractor being provided with a power plant for driving the lag chains 28 and having a cab 30 and platform 31.

The pin 26 is loosely mounted in its bearings in the beam 25 and projection 27, thereby forming practically a universal joint which permits the plow 10 to turn and tilt relatively to the tractor which is the propelling agent for said plow.

On the platform 31 is an oil tank 32 and pump 33 adapted to force oil through the pipe 34 extending through the tubular member 15 to a point adjacent the cylinder 16 at which point it extends outwardly and outside the member 15 into the top of the cylinder 16.

When the pump 33 is placed in commission and oil is forced into the cylinder 16 against the piston 18, the forward end of the plow will be raised in an obvious manner.

Radiating from the upper end of shaft 17 are the oppositely disposed sectors 35 each having a chain groove in the peripheral portion thereof.

To each sector 35 is secured at 36 a chain 37 which extends rearwardly over a sheave 38 and then downwardly to and under another sheave 39 to a drum 40 on a shaft 41 mounted in suitable bearings 41^a depending from the chassis of the tractor 27.

The shaft 41 has secured thereto a bevel gear 41^b the teeth of which mesh with a bevel pinion 41^c on the lower end of a steering rod 41^d which has a steering wheel 41^e on its upper end, said wheel 41^e preferably being located in the cab 30.

One chain 37 is wound in one direction on a drum 40 while the other chain 37 is wound in the opposite direction on the other drum 40, the ends of both chains 37 being secured to their respective drums 40 at 40^x.

When the shaft 41 is rotated in either direction by the wheel 41^e and the gears 43, 44, one chain 37 will be wound onto a drum 40 and the other chain will pay out from its drum 40.

This action on the chains 37 will cause, through the sectors 35, an oscillation of the shaft 17 and the turning of the runner 19 in the direction it is desired to have the plow move.

To the sides of the tractor 27 are secured vertical plates 36^x, each having a block 37^x pivotally mounted thereon at 38^x, this block having a hinge pin 39^x extending through and beyond the ends thereof.

This hinge pin 39^x is mounted in arms 40^a of a frame 41^x secured to inner face of the front end of a wing 42.

The front ends of the wings 42 are positioned between the rear ends of the shares of the plow 10.

It is obvious that by means of the construction shown in Fig. 8, the wings 42 may be moved in and out about the axis of the pin 39^x, may be moved bodily up and down by the pin 39^x sliding through the block 37^x, and their rear ends may be moved up and down about the axis of the pivot 38^x.

To the chassis of the tractor and on opposite sides thereof are secured the cylinders 43 each having a piston 44 therein from which extends upwardly a rod 45 to the upper end of which is secured a cross bar 46 from the opposite ends of which depend the straps 47, the lower ends of which are secured to the inner face of a share of the plow 10.

From the lower end of each cylinder 43 extends a pipe 48 to a tank 49 containing air under pressure.

The line of pipe 48 has an exhaust 50 and a valve 51 actuated by a lever 52.

Normally the exhaust 50 is open with no pressure beneath the piston 44 and consequently the plow 10 rests upon the ground with the weight of the forward end of tractor 27 resting thereon.

When the valve 51 is moved to close the exhaust 50 and admit air therethrough to the bottom of chamber 43, the pressure will force the piston 44 upwardly and through the straps 47 the rear end of the plow 10 will be lifted from the ground.

The cross bars 46 have secured to one end thereof the hooks 53 from each of which a chain 54 extends to an eye 55 secured to the framework 41 on the front end of one of the wings 42.

Consequently when the piston 44 is raised in the cylinder 43 it will lift said front ends of the wings above the level of the ground.

To the inner face of the rear end of each wing 42 is secured a sheave 56 over which extends an endless chain 57 which also passes over a sheave 58 secured to a framework 59 extending upwardly from the rear of the platform 31 of tractor 27.

The sheave 58 is provided with the usual brake member 58^x which locks the chain 57 in any position in which it may be positioned.

As this brake mechanism 58^x forms no part of the present invention and is of well known construction it is deemed unnecessary to illustrate the same in detail.

A part 61 of the chain 57 depends from each sheave 58 in position for the operator to grasp the chain 57 and pull it in a direction to raise the rear end of the wing 42, said wing moving about the axis of pivot 38^x.

By moving the chain 57 in the opposite direction the rear end of the wing 42 may be again lowered.

As the chains 57 are independent of each other it is obvious that either of both wings 42 may be raised and lowered as desired.

The rear end of each wing 42 has on its inner face an eye 62 connected to an eye 63 on the outer end of a piston rod 64, the opposite end of which is provided with a piston 65 reciprocable within a cylinder 66, which has a stuffing box 67 for rod 64 at one end, and is provided at the opposite end with an eye 68 connected to an eye 69 secured to the rear end of platform 31.

The connections 62, 63 and 68, 69 are shown as a simple form of making a universal joint but it is obvious that these connections may be of any desired construction without departing from invention.

The inner end of each cylinder 66 is connected by a pipe 70 to an air tank 71 containing air under pressure and each pipe 70 has a controlling valve 72 therein.

Each valve 72 is constructed in such a manner that when opened compressed air will be admitted through the pipe 70 to the inner end of cylinder 66 behind the piston 65 and force said piston toward the outer end of the cylinder, thereby causing the rear end of the wing 42 to be moved outwardly about the axis of the hinge pin 39^x.

When the valve 72 is in position to prevent discharge of air from the tank 71 it will permit the escape of air from the cylinder 66 and pipe 70 through the exhaust port 73 in order to permit the wing 42 to be returned from the outward position shown in Figs. 1 and 2 to the position shown in Fig. 1.

The same air tank 49 supplies the compressed air for both cylinders 43 the pipe 48 leading therefrom to the cylinder 43 on the right of Fig. 1 being continuous and having a branch pipe 48× extending therefrom to the valve 51 controlling the admission of compressed air to the cylinder 43 on the left of said Fig. 1.

A conventional form of valve 51 is shown in Figs. 10 and 11 and the same form may be used for the valve 72.

It is self evident, however, that any well known form of valve may be utilized which is capable of permitting the passage of compressed air as desired, and which will permit the exhaust of air from cylinders 43, 66 when the inlet passage of the valve is closed.

By the use of a tractor 27 as a propelling agent for the plow 10, a firm grip is secured upon the road by the lag chains 28 and consequently sufficient propelling power is obtained to force the plow through very heavy snow of any ordinary depth.

By placing the steering mechanism well in advance of the prow 11 of the plow 10, it is possible to make short turns when moving into a side street.

By making the connection 26 between the plow 10 and tractor 27 more or less flexible the plow 10 in its forward movement is capable of conforming to irregularities in the surface of the road.

When both wings 42 are in use the plow is capable of removing the snow from almost the entire width of an ordinary street or road.

When, however, it is desired to permit the passage of other vehicles, one or both of the wings 42 may be raised and held in raised position.

When it is desired to remove the snow from one side of the road at a time, a single wing may be placed in commission, the other wing being locked in raised position.

By regulating the admission of compressed air to the cylinders 66 the wings may be retained at any desired angle to the tractor 27, being spread apart to the fullest extent or locked in an intermediate position.

It is perfectly obvious that one wing 42 may be locked at one angle and the other wing at an entirely different angle to suit different conditions which may arise and must be met.

When moving over bare ground the plow may be raised from the ground and the entire machine move on the wheels 21 and lag chains 28.

In fact, by the flexibility of the entire structure and the adjustments provided therefor, every possible contingency which may arise in the use of the plow can be met at once.

From the foregoing explanation it is believed that the operation and many advantages of the invention will be fully understood.

Having thus described my invention, I claim—

1. A snow plow provided with a transom extending transversely thereof at the rear of the prow; a member extending forwardly from said transom and through said prow; an oscillating vertical shaft in the outer end thereof; means for oscillating said shaft; and a steering device secured to the lower end of said shaft.

2. A snow plow provided with a transom extending transversely thereof at the rear of the prow; a member extending forwardly from said transom and through said prow; an oscillating vertical shaft in the outer end thereof; means for oscillating said shaft; a steering member at the lower end of said shaft; and means for moving said shaft endwise.

3. A snow plow provided with a member extending forwardly from the prow thereof; an oscillating vertical shaft in the outer end thereof; means for oscillating said shaft; and a steering device secured to the lower end of said shaft consisting of a runner with wheels on opposite sides thereof the peripheries of which extend below the tread surface of said runner.

4. A snow plow provided with a member extending forwardly from the prow thereof; a vertical cylinder secured to the forward end thereof; a shaft extending through said cylinder; a piston thereon within said cylinder; a steering member secured to the lower end of said shaft below said cylinder; means at the upper end of said shaft for imparting oscillatory movement thereto; and means for admitting oil under pressure to said cylinder above said piston.

5. A snow plow provided with a member extending forwardly from the prow thereof; a vertical cylinder secured to the forward end thereof; a shaft extending through said cylinder; a piston thereon within said cylinder; a steering member secured to the lower end of said shaft below said cylinder; means at the upper end of said shaft for imparting oscillatory movement thereto; an oil pump; and a pipe extending therefrom to the upper part of said cylinder above said piston.

6. A snow plow having a transom substantially midway of its length; a tractor the forward end of which is connected to

said transom by a vertical pivot; and means on said tractor for supporting and raising the rear ends of the shares of said plow.

7. A snow plow having as a propelling agent a tractor the forward end of which is secured thereto by a vertical pivot midway between the sides thereof; cylinders on opposite sides of said tractor; pistons therein; means for reciprocating said pistons; and mechanism between said pistons and the rear ends of the shares of said plow for raising and lowering said rear ends relatively to its forward end by the movement of said pistons.

8. A snow plow having as a propelling agent a tractor the forward end of which is secured thereto by a vertical pivot midway between the sides thereof; cylinders on opposite sides of said tractor; pistons therein; an air tank; a pipe leading therefrom to the bottom of said cylinders; a rod extending upwardly from each piston; a cross bar thereon; and straps depending from said cross bar and secured at their lower ends to the rear ends of the shares of said plow.

9. A snow plow having as a propelling agent a tractor the forward end of which is secured thereto by a vertical pivot midway between the sides thereof; cylinders on opposite sides of said tractor; pistons therein; an air tank; a pipe leading therefrom to the bottom of said cylinders; a rod extending upwardly from each piston; a cross bar thereon; straps depending from said cross bar and secured at their lower ends to the rear end of the plow; a valve in said air pipe; and an exhaust therefrom.

10. A snow plow having as a propelling agent the forward end of which extends inwardly between the shares thereof and is secured thereto by a vertical pivot; plates secured to the sides of said tractor; wings on opposite sides of said tractor; a block pivoted to each plate by a horizontally disposed pivot member; a rod slidable in said block; and a support for said rod secured to a wing and having ears to which the opposite ends of said rod are fixedly secured.

11. A snow plow having as a propelling agent a tractor the forward end of which extends inwardly between the shares thereof and is secured thereto; plates secured to the sides of said tractor; wings on opposite sides of said tractor; a block pivoted to each plate; a rod slidable therein; a support for said rod secured to a wing; a chain extending from said support; cylinders secured to the tractor; pistons therein; rods extending upwardly therefrom each connected to the opposite end of one of said chains; and means connected to the bottom of said cylinders whereby said pistons may be forced upwardly in said cylinders.

12. A snow plow having as a propelling agent a tractor the forward end of which extends inwardly between the shares thereof and is pivotally secured to a transom on said plow; flat faced plates secured to the sides of said tractor; wings on opposite sides of said tractor; means connected to said plates by horizontally disposed pivots permitting said wings to swing laterally and vertically; cylinders pivoted at one end to the rear of the tractor and extending laterally therefrom; pistons therein; piston rods extending from the other end of said cylinders and connected directly to the rear ends of said wings; and means for admitting pressure to said cylinders behind said pistons.

13. A snow plow having as a propelling agent a tractor the forward end of which extends inwardly between the shares thereof and is pivotally secured to a transom on said plow; flat faced plates secured to the sides of said tractor; wings on opposite sides of said tractor; means connected to said plates by horizontally disposed pivots permitting said wings to swing laterally and vertically; cylinders pivoted at one end to the rear of the tractor and extending laterally therefrom; pistons therein; piston rods extending from the other end of said cylinders and connected directly to the rear ends of said wings; means for admitting pressure to said cylinders behind said pistons; and manually actuated means for raising the rear ends of said wings.

14. A snow plow having as a propelling agent a tractor the forward end of which extends inwardly between the shares thereof and is pivotally secured to a transom on said plow; flat faced plates secured to the opposite sides of said tractor; a wing provided on its inner face and at its front end with a U-shaped member; a rod supported thereby; a block having a bearing in which said rod is slidably mounted, said block having a horizontal trunnion adapted to oscillate in a bearing in one of said plates; chain mechanism connected to a frame secured to said tractor for raising the rear end of said wings; cylinders pivotally mounted on the rear of the tractor and movable about their pivots into either a vertical or horizontal position; pistons therein provided with rods connected to eyes at their outer ends to the inner faces of the rear ends of said wings; a tank containing air under pressure; and a valved pipe leading from said tank to the inner ends of each of said cylinders.

15. A snow plow provided with a tubular member extending forwardly from the prow thereof; an oscillating vertical shaft in the outer end thereof; means for oscillating said shaft; a steering device secured to the lower end of said shaft; a transom between the shares of said plow; and means for securing the rear end of said member to said transom.

16. A snow plow provided with a metal prow and shares extending rearwardly therefrom, said prow having a cylindrical opening therein; a tubular member extending through said opening; a transom between the plow shares; an anchoring device on said transom for said member; and a steering mechanism on the forward end of said tubular member.

17. A snow plow provided with a metal prow and shares extending rearwardly therefrom, said prow having a cylindrical opening therein; a tubular member extending through said opening; a transom between the shares of the plow to which the rear end of said tubular member is secured; a vertical cylinder secured to the forward end of said tubular member; a piston therein; a piston rod extending through said cylinder; a runner on the lower end thereof; steering means on the upper end of said rod; an oil pump; and a pipe from the upper end of said cylinder extending through said tubular member to said pump.

18. A snow plow provided with a member extending forwardly from the prow thereof and provided at its forward end with steering means; a transom between the plow shares forming a support for the rear end of said member; a tractor behind said transom and pivotally connected thereto; and mechanism on said tractor for controlling the steering means.

19. A snow plow provided with steering mechanism in advance of the prow thereof and having a transom between the plow shares; a tractor in the rear of the transom and pivotally connected thereto; and means on the tractor for controlling the steering mechanism.

20. A snow plow adapted to be propelled by a tractor the forward end of which is secured thereto between the sides thereof substantially midway thereof; and mechanism on opposite sides of said traction engine including reciprocating pistons actuated by compressed air, adapted to raise and lower the rear ends of the shares of said plow relatively to its forward end.

21. A snow plow adapted to be propelled by a tractor the forward end of which extends inwardly between the shares thereof and is secured thereto by a vertical pivot; wings pivotally connected to the opposite sides of said tractor; cylinders supported by said tractor; pistons therein connected to the forward end of said wings; and means for admitting compressed air to said cylinders beneath said pistons to raise said forward ends.

22. A snow plow adapted to be propelled by a tractor the forward end of which extends inwardly between the shares thereof and is secured thereto; mechanism actuated by compressed air and supported by said tractor for raising the rear ends of the shares of said plow; and independent means for raising and lowering its forward end.

Signed by me at Waterville, Maine, this 25th day of February, 1926.

SAMUEL W. LOMBARD.