Jan. 13, 1925.

1,523,012

F. GETTELMAN

SNOWPLOW

Filed Oct. 1, 1921

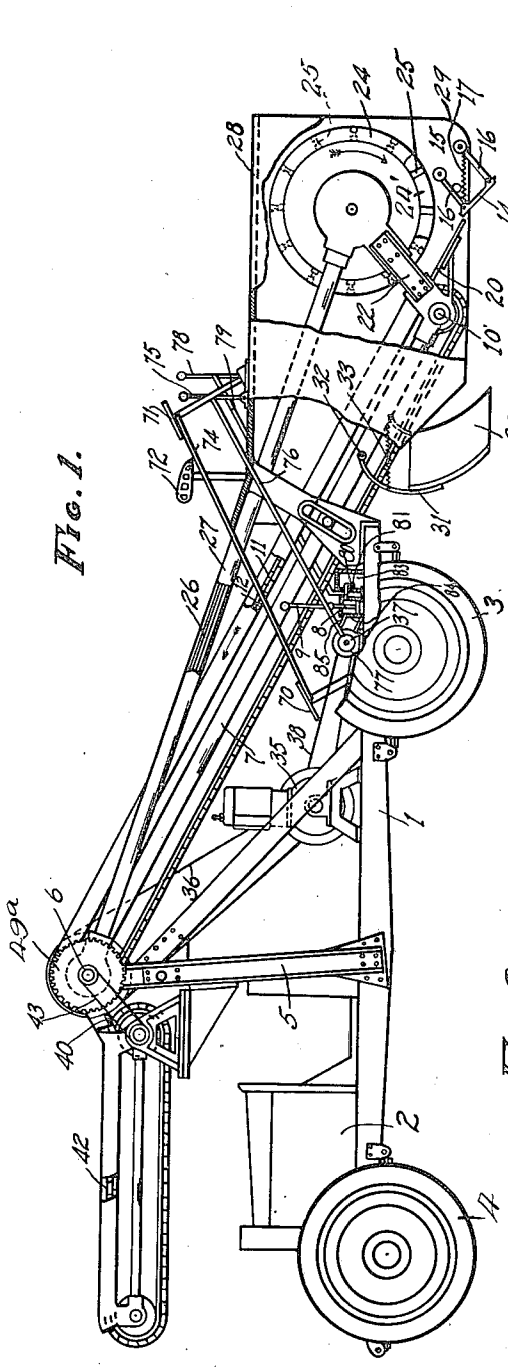


Fig. 1.

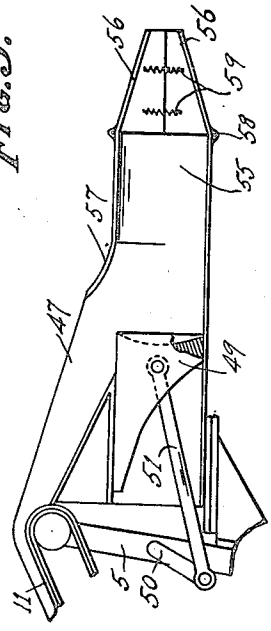


Fig. 3.

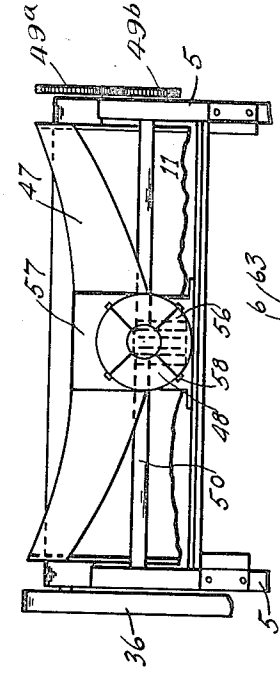


Fig. 2.

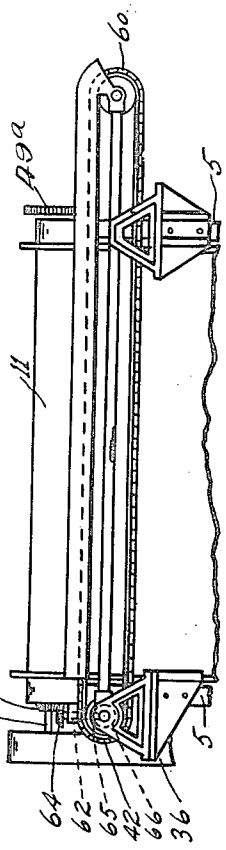


Fig. 4.

INVENTOR

Frederick Gettelman

BY

Ernest Schuler & Woodard

ATTORNEYS

Patented Jan. 13, 1925. 1,523,012

UNITED STATES PATENT OFFICE.

FREDERICK GETTELMAN, OF MILWAUKEE, WISCONSIN.

SNOWPLOW.

Application filed October 1, 1921. Serial No. 504,725.

To all whom it may concern:

Be it known that I, FREDERICK GETTELMAN, a citizen of the United States, residing at Milwaukee, county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Snowplows, of which the following is a specification.

My invention relates to improvements in snow plows, with particular reference to plows of that class in which the snow is lifted from the surface of a street and delivered either at the side of the street or into vehicles which convey it to a suitable dumping point.

Objects of my invention are to provide more effective means for removing the snow from the surface of the street and elevating it preparatory to its delivery; to provide means adapted to cooperate with the plow and elevator for breaking up encrusted or packed snow, and pushing it from the plow to the elevator, said means being of such character as to avoid clogging when handling wet or heavy snow or moist snow in freezing weather; to provide means for packing dry snow preparatory to its delivery; and to provide means for substituting an ordinary conveyor for the snow packer when the latter is not required; also to provide motor driven means subject to the control of an operator for quickly lifting the plow and lower end of the conveyor to clear unyielding obstructions in the roadway, and cooperating means for allowing the plow to yield resiliently when such obstructions are initially encountered.

In the drawings:—

Figure 1 is a side elevation of a snow plow and elevating apparatus embodying my invention.

Figure 2 is a detail view showing the snow packer associated with driving mechanism illustrated in Figure 1.

Figure 3 is a cross sectional view of the packer showing the latter in its relation to the upper or rear end of the main conveyor.

Figure 4 is a detail view of a cross conveyor and associated parts adapted to be substituted for the delivery conveyor in Figure 1.

Like parts are identified by the same reference characters thruout the several views.

My improved plow is mounted upon a truck 1, which may be of ordinary construction, but preferably has its driving engine 2 located on the rear end of the main frame. Details of the truck construction are omitted, but it is to be understood that the wheels 3 are the front or steering wheels and the wheels 4 are the driving or traction wheels.

The main frame is provided with raised standards 5 which support the driving shaft 6 of the main conveyor, the frame 7 of which is pivoted to the shaft 6 and supported at an intermediate point by hydraulic jacks, the plungers 8 of which are connected with the frame 7, (one on each side), by links 9 adapted to support the frame in a forwardly and downwardly inclined position with the forward conveyor shaft 10 adjacent to the ground. The conveyor proper is an ordinary belt conveyor formed of any suitable material, such for example, as a series of cross slats 11 having their respective ends secured to the links of side chains 12.

A scraper plow 14 is supported from forwardly projecting frame members 15 by arms 16, which are preferably pivoted to the members 15, tension springs 17 being employed to resist backward movements of the arms or parallel links 16. The plow 14 may, therefore, yield backwardly and upwardly without change of pitch and it will continue to operate with substantially the same efficiency in any raised position within the limits permitted by the drum. It will, therefore, yield sufficiently to pass over any ordinary obstruction in the roadway. A platform 20 is adapted to receive the snow from the scraper plow 14, whereby the snow may be pushed upwardly and delivered upon the apron of the conveyor.

A breaker drum is supported from the conveyor frame 7 by suitable brackets 22, between which the drum is adapted to rotate. The drum is provided with end rings 24 and 24′ between which bars or blades 25 are located, these blades extending from one end of the drum to the other, and being secured at their respective ends to the rings 24 and 24′. The ring 24 is broken away adjacent the plow 14 to expose two of the blades and a portion of the ring 24′. The flat surfaces of the blades lie substantially in radial planes. The blades are preferably but a few inches in width, and are of substantial thickness to withstand the strains imposed when breaking encrusted snow.

The blades or bars 25 are, of course, spaced apart, but they are in sufficient proximity to allow of a continuous action of two or more of them simultaneously upon encrusted snow, whereby the latter may be broken up into small pieces while passing over the platform 20. The pressure of the drum blades 25 is exerted upon the snow sufficiently to the rear of the plow to avoid interference with the plow movements and with the lifting movements of the snow due to the plow.

The breaker drum is rotatably driven from the shaft 6 by means of a transmission shaft 26 enclosing in the housing 27, suitable gearing, (not shown), being employed at the respective ends of said shaft 26. The drum will, of course, be driven in the direction indicated by the arrow in Figure 1. The blades 25 of the drum will effectively break encrusted snow, and will also assist in pushing the snow across the platform 20 rearwardly to the conveyor belt.

A housing 28 encloses the breaker drum at the sides and top, the front being open and the lower margin 29 being curved or inclined downwardly and rearwardly along the sides of the scraping or lifting blade 14.

I preferably employ an auxiliary curved scraper blade 30 which is disposed obliquely to the line of movement and supported by resiliently curved arms 31 pivoted to the conveyor frame at the respective sides thereof, as shown at 32, and also connected at an intermediate point with the conveyor frame by springs 33. The function of this auxiliary scraper is to more effectively clean the surface of the roadway than can be done by the single scraper blade 14. The residue left by the scraper blade 14 will, however, be comparatively small and may be pushed laterally by the blade 30 without delivering such material to the conveyor.

Shaft 6 is driven from an auxiliary motor 35 by a belt or chain 36. This motor is also utilized to drive a pump 37 for operating the jack 8, the pump being connected with the motor shaft by the belt or chain 38. Motor driven lifting jacks being in common use no further description of these parts is deemed necessary.

The conveyor is, of course, operated in the direction indicated by the arrow in Figure 1, and delivers the snow over its upper or rear end. An inclined shield 40 directs the delivered snow to an auxiliary conveyor, which in Figure 1 is illustrated as a belt conveyor 42, operating substantially along horizontal lines rearwardly from the point of delivery. This conveyor may be of ordinary construction, and may be conveniently driven from the shaft 6 by means of a belt or chain 43.

Where the snow is light and dry it is desirable to pack it preparatory to delivering it into a truck or other vehicle for transportation to a dumping point, in order that a sufficient weight of snow may be received by such vehicle to constitute a proper load. In such cases I prefer to substitute for the conveyor 42, shown in Figure 1, a snow packer, such as is disclosed in Figures 2 and 3. Where the snow packer is used the snow is delivered from the main conveyor into a trough 47 having a semi-cylindrically rounded bottom 48, within which a piston 49 is mounted. This piston is adapted to push the snow rearwardly, and is of sufficient length to receive the snow upon its upper surface during the rearward movement, without allowing the snow to drop into the trough at the rear of the piston. A reciprocating motion is transmitted to the piston from the shaft 6 thru the gears 49^a and 49^b, crank shaft 50, and connecting rod 51.

At the rear end of the trough 47 the curvature of its bottom portion continues upwardly and forms a cylindrical snow receiving portion 55, having a tapering extension 56 divided horizontally along its central axis, and having the upper and lower portions or sections hinged to the cylindrical portion of the trough, as indicated at 58, thereby allowing the tapered sections to separate under pressure. The sections, however, are connected at intervals by coiled springs 59 which resist the separating movement. A shield 57 guides the snow into the cylindrical portion 55.

The mode of operation of the packer will be readily understood from the foregoing description. The piston pushes the snow rearwardly thru the cylindrical extension of the trough into the tapered portion, within which it is compressed and packed to the extent of the pressure imposed by the springs 59. The snow is then driven outwardly thru the smaller end of the tapered portion under the pressure of the additional charges of snow which are being pushed rearwardly by the piston. The piston is preferably provided with a concave working face which tends to prevent adhesion of the snow thereto.

Referring to Figure 4, it will be observed that I have also provided means whereby snow may be delivered laterally instead of rearwardly. This is accomplished by the cross conveyor 60 illustrated in Figure 4. The latter may be driven from the shaft 6 by the transmission shaft 62 and beveled gearing 63, 64, 65, and 66, illustrated in Figure 4, all of which may be removed and replaced as a part of the conveyor unit, which includes the conveyor 60, except the gear wheel 63, which may be permanently attached to shaft 60. The cross conveyor will preferably be used when the snow is to be delivered at the side of the road, whereas

the conveyor 42 or the packer will be employed when the delivery is made to snow transporting vehicles.

The steering wheel 70 will preferably be operated from a hand wheel 71 located adjacent to the operator's seat 72, the wheel 71 being connected with the steering wheel 70 in any suitable manner, such, for example, as the link 74. A lever 75 is similarly connected by a link 76 with an ordinary clutch at 77, whereby the operation of the pump 37 is controlled.

A lever 78 is connected by a wire 79 with a valve 80 controlling liquid delivery thru a by-pass 81, whereby the jack may be lowered by opening the valve. By employing a self closing spring actuated valve, this by-pass will be closed automatically when it is not held open by the operator. The pump is, of course, employed to pump the liquid from the upper portion of the jack above the piston to the space below the piston. The by-pass 81 leads from the lower portion of a reservoir 83, the upper portion of which may contain air whereby the conveyor may be resiliently supported. The upper portion of the jack cylinder 84 above the pump connection 85 may also contain air.

It will be understood that the truck 1 may be of any ordinary construction except for the modifications therein described. The hydraulic jack, its operating pump and controlling clutch may be of any ordinary construction and detailed illustration and description are therefore deemed to be unnecessary.

I claim:

1. In a device of the class described, the combination with an elevating conveyor, of a lifting plow for lifting material to be deposited upon said conveyor, and a link connected with said plow and supported for pivotal movement about a point ahead of its connection with said plow, whereby said plow will be movable about said pivotal point in a rearward and upward direction.

2. In a machine of the class described, a lifting plow, and a pair of parallel plow supporting links at each end of said lifting plow, each of said links being pivotally connected with said machine and said plow.

3. In a machine of the class described, a lifting plow, and a pair of parallel plow supporting links at each end of said plow, each of said links being pivotally connected to said plow and with said machine forwardly of said plow.

4. In a machine of the class described, a lifting plow pivotally carried from said machine and having its pivotal connections therewith disposed forwardly of said plow.

5. In a machine of the class described, a lifting plow supported from said machine for movement rearwardly and upwardly through an arc without changing the angle of inclination of said plow.

6. The combination with a motor driven snow lifting plow, of an elevating conveyor and an open breaker drum having peripherally disposed longitudinal bars adapted to break encrusted snow and to push the snow from the plow to the conveyor, means for resiliently supporting the plow adapted to allow the plow to yield longitudinally of the conveyor without change of pitch, means for supporting the snow between the plow and the conveyor while it is being acted upon by the breaker drum, and manually controlled means for raising the lower end of the conveyor.

7. In a machine of the described class, the combination of a lifting plow having an inclined blade, and means for allowing said plow to move backwardly and upwardly from normal position without change of pitch.

8. The combination with a motor driven snow lifting plow, of means for normally supporting said plow in a forwardly and downwardly inclined position, said supporting means being adapted to allow the plow to yield resiliently backwardly and upwardly without change of pitch.

9. The combination with a snow lifting plow, an elevating conveyor adapted to receive snow therefrom, a snow packer provided with a lineally reciprocating piston adapted to compress snow received from said elevating conveyor.

10. The combination with a snow lifting plow and an elevating conveyor adapted to receive snow therefrom, of a snow packer having one portion provided with a reciprocating snow actuating piston and another portion provided with converging walls between which the snow may be forced by the piston, motor driven means for propelling the plow, and separate motor driven means for actuating the conveyor and packer.

11. The combination with a snow lifting plow, an elevating conveyor adapted to receive snow therefrom, and a snow packer adapted to receive snow from the elevating conveyor, motor driven means for propelling the plow, conveyor and packer, and separate motor driven means for actuating the conveyor and packer, said packer comprising a trough shaped member, a reciprocating piston therein and means for preventing snow from the elevator from falling to the rear of said piston, the trough shaped member being adapted to receive snow from the delivery end of the conveyor.

12. The combination with a snow lifting plow, an elevating conveyor, a snow receiving member at the delivery end of the conveyor provided with a semi-cylindrical bottom portion, a reciprocatory piston mounted in said semi-cylindrical bottom portion,

means for actuating the conveyor and piston, and a conically tapered member at the delivery end of the snow receiving member thru which the snow may be pushed by said piston.

13. The combination with a snow lifting plow, an elevating conveyor, a snow receiving member at the delivery end of the conveyor provided with a center cylindrical bottom portion, a reciprocatory piston mounted in said center cylindrical bottom portion, means for actuating the conveyor and piston, and a conically tapered member at the delivery end of the snow receiving member thru which the snow may be pushed by said piston, said conically tapered member being divided longitudinally into sections having resilient connection with each other.

14. In a machine for removing snow from streets, the combination with a snow lifting mechanism, of a snow packer adapted to receive snow from the snow lifting mechanism and provided with a tapering outlet, motor driven means for operating the snow lifting mechanism, and snow actuating means in said packer operatively connected with said motor driven means, said snow packer having its tapered portion subdivided longitudinally and provided with resilient connections between the subdivisions, whereby the latter will separate under excessive pressure.

15. In a snow handling mechanism, a snow packer having a trough-shaped portion, a reciprocating snow forcing portion therein, and a portion having converging walls normally held in converging position under resilient pressure, but adapted to separate under abnormal pressure.

FREDERICK GETTELMAN.