Jan. 7, 1930. R. A. POLAK 1,742,968

SNOW REMOVING MACHINE

Filed Oct. 20, 1928 2 Sheets-Sheet 1

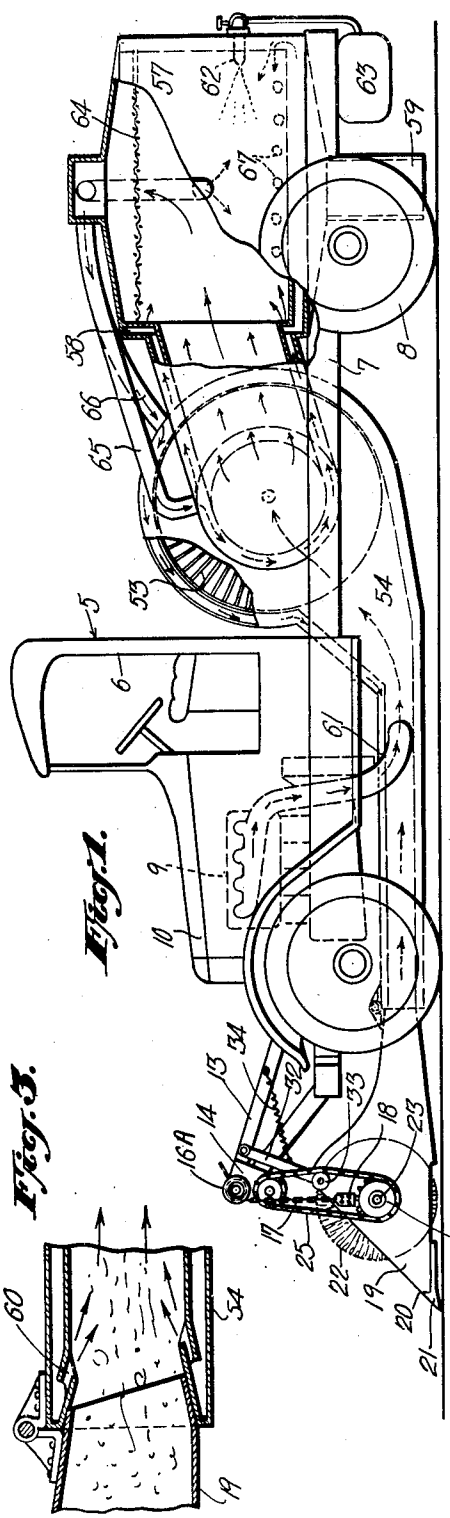


Fig. 1.

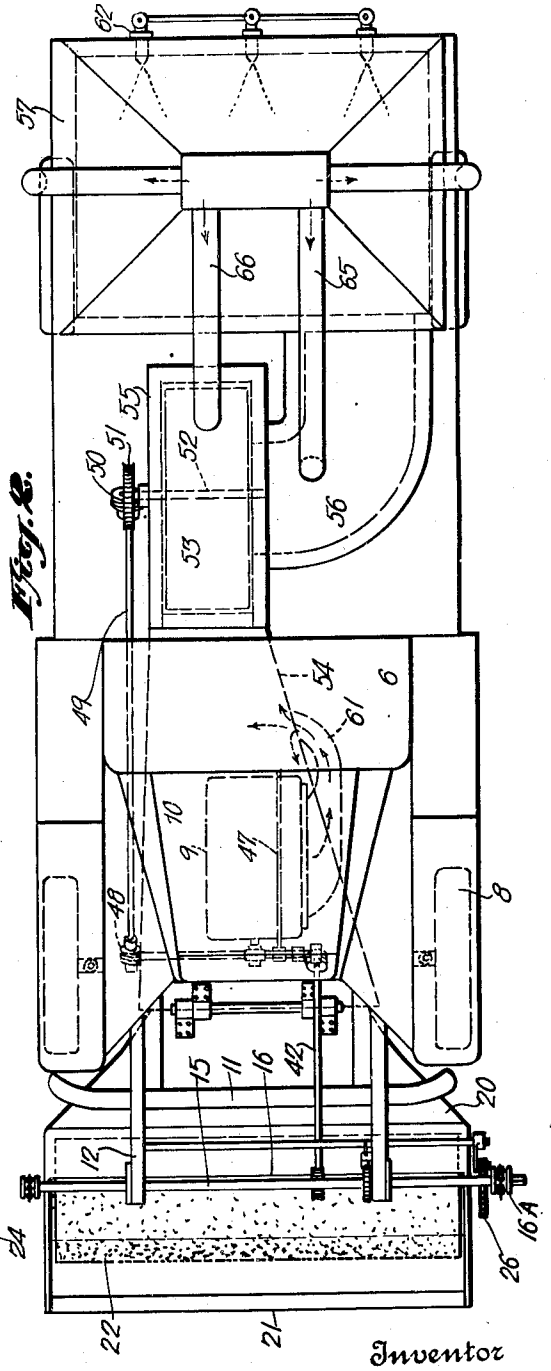


Fig. 2.

Fig. 3.

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Fig. 4.

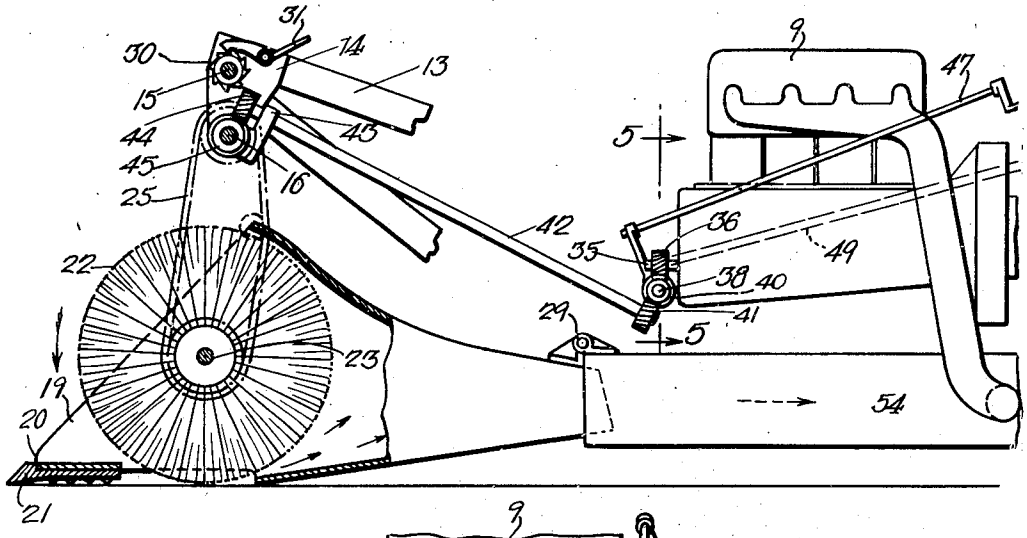


Fig. 5.

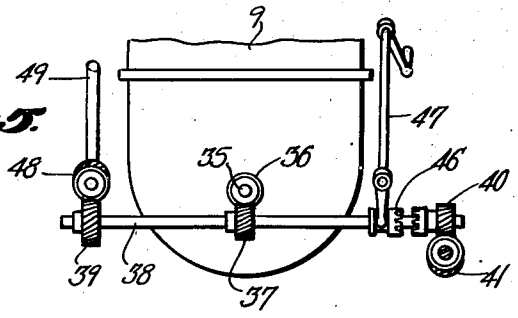
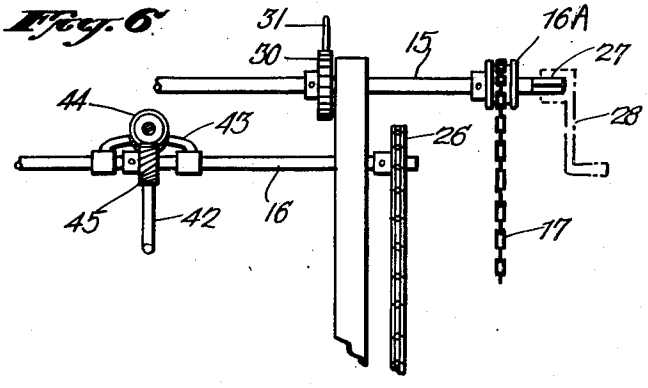


Fig. 6.



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UNITED STATES PATENT OFFICE

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SNOW-REMOVING MACHINE

Application filed October 20, 1928. Serial No. 313,808.

This invention relates to snow removing machinery and particularly to an automotive vehicle upon which the snow removing device is mounted.

A particular object of the invention is to provide in combination with a motor vehicle, a snow removing and melting machine, the parts of which are arranged to be operated directly by the motive power present in the vehicle itself and the melting operation being assisted by the exhaust gases from the engine.

A still further object of the invention is to provide a device in which the snow is loosened and forced through a passageway by a draft into a melting chamber where it is converted into water and, of course, runs off through the bottom of the chamber.

A still further object of the invention is to provide a means for operating the various parts of the device from the engine of the motor vehicle, means being provided for the raising of the forward scoop and brush and other means being provided for the operation of the blower fan employed in creating a suction draft.

To enable others skilled in the art to fully comprehend the underlying features of my invention that they may embody the same in the various modifications in structure and relation contemplated, a drawing depicting a preferred form has been annexed as a part of this disclosure and in such drawing, similar reference characters denote corresponding parts throughout all the views, of which,

Figure 1 is a view in side elevation of my improved snow removing and melting apparatus, a part thereof being shown in section to illustrate the interior construction.

Figure 2 is a top plan view of the machine as illustrated in Figure 1, the top plan view showing the relative arrangement of the blower and its connecting passageways.

Figure 3 is an enlarged fragmentary section of the connecting point of the scoop and the blower passage or intake section of the machine, this view illustrating the use of a jacketed intake member, whose jacketed gases are arranged to pass back through the passageway itself.

Figure 4 is an enlarged, diagrammatic view of the forward end of the vehicle illustrating the engine and showing its connecting parts which are arranged to operate the brush and raise and lower the scoop.

Figure 5 is a section taken on the line 5—5 of Figure 4 and illustrates the use of a clutch member controlling the operation of the brush, and

Figure 6 is a fragmentary detail showing the brush operating and raising mechanism.

Referring to the drawings in detail, 5 indicates a motor vehicle consisting of a suitable driver housing 6, chassis 7 and wheels 8, an engine 9 being mounted upon the chassis 7 and enclosed by the hood 10 after the usual manner of motor vehicle construction.

The chassis has secured thereto in any suitable manner and forward of the bumper 11, the overhanging frame 12, the frame consisting at each side of the pieces 13 which are secured together at their meeting end by a suitable cast plate 14. In this plate is journalled, the scoop raising shaft 15 and the brush operating shaft 16, the former of which at its outer end, carries the drums 16—A about which are wound the chains 17, which are secured through the medium of suitable plates 18 to the side walls 19 of the ice breaking scoop 20. The forward end of the scoop is provided with an ice breaking edge 21 which is arranged to loosen up the snow and ice in front of the brush 22, which is journalled in the sides 19 of the scoop 20 and whose shaft 23 at one end is provided with a sprocket wheel 24, this wheel being operated through the medium of a suitable sprocket chain 25 which is driven by the sprocket pinion 26 carried on the end of the shaft 16.

As will be noted in Figure 6, the end of the shaft 15 is squared as at 27 to receive an operating handle 28 through the medium of which the shaft 15 may be revolved to wind the chains 17 about the drums 16—A. This winding movement, will, of course, raise the scoop about its pivot point 29 so that the vehicle may be quickly moved from place to place. The shaft 15 carries a ratchet wheel 30 over which a pawl 31 slides to prevent unwinding of the chains 17 when the scoop has been raised to any desired position.

One of the frame pieces 13 has pivoted thereto, the idler arm 32 which, at its lower end, carries the idler wheel 33 which bears against the chain under the tension of the spring 34 to take up the slack in the chain when the scoop 20 has been raised. The motor shaft 35 is provided with a worm 36 which is arranged to engage a similar worm gear 37 carried by the countershaft 38. This countershaft is of course journalled in the chassis in any suitable manner and at its outer end carriers worm gears 39 and 40, the latter of which meshes with a worm wheel 41 carried on a shaft 42 which extends upwardly toward the shaft 16 and whose end is journalled in a suitable bearing 43 carried on said shaft 16, the outer end of the shaft 42 carrying a suitable worm 44 which meshes with and drives the worm 45 of the shaft 16 which revolves the brush 22. The shaft 38 is of course divided and use is made of a suitable sliding clutch 46 in order that the driving worms 39 and 40 may be set in motion. The operation of this clutch is controlled from a suitable handle 47 which extends rearwardly to a point adjacent the driver's cabin.

In mesh with the worm 39, I have provided another worm 48 which is secured to the lower end of a shaft 49, whose upper end carries a worm pinion 50, which is arranged to operate the gear 51 carried on the blower shaft 52. This blower shaft is, of course, provided with the usual blower vanes 53 through the medium of which the snow and ice may be drawn into the conveyor funnel 54. This conveyor funnel 54 is made of sheet metal and is formed to provide the fan housing 55 within which the fan 53 operates, the fan being of the peripheral intake type and center discharge and being arranged at the discharge mouth of the funnel 54 so that snow and ice coming in through the funnel will be drawn into the fan and will be discharged through the center thereof into the flue 56 which connects one side of the fan housing 55 with the melting chamber 57. This melting chamber 57 is of any particular shape desired and is jacketed as at 58 on its four sides and bottom, the latter being provided with a pipe outlet 59 through which the melted snow passes.

If desired, a conveyor or hose may be secured to the outlet 59 which, in turn, may be of any dimension so that the melted snow may be discharged directly into a sewer whereby the possibility of subsequent freezing thereof on the street is avoided.

The flue 56 is also jacketed as is the fan housing 55 and the funnel 54, the latter being jacketed up to its forward end wherein it is provided with an outlet 60 from the jacketed portion into the interior of the funnel. This jacketing provides for the heating of the snow and ice drawn in to the machine, it being quite evident, of course, that the snow and ice is broken up by the ice breaker 21 and by the brush 22 and projected toward the intake end of the funnel 54 at which end, it is drawn further into the funnel through the action of the fan 53. Intermingling with the snow and ice drawn in, are the hot gasses from the engine exhaust which are led into the funnel through the medium of a suitable pipe 61 which conveys the exhaust gases from the engine to the funnel. These gases, as indicated by the arrows in Figure 1, travel through the center of the fan and through the flue 56 into the melting chamber 57 where they intermingle with the fumes and hot gases given off by the burners 62 which are disposed along the rear wall of the melting chamber 57, these burners, by the way, being supplied with a suitable combustible material from a reserve tank 63 carried under the chassis 7.

These burners 62 not only melt the unmelted snow and ice that has been drawn into the melting chamber 57 but they increase the heat of the exhaust gases coming into the chamber with the result that they rise and passing through the screen 64 are rid of their impurities, such as dirt and dust and are returned through the pipes 65 and 66 to the flue jacket 56 and fan housing 55 respectively. The gases that have been returned to the flue 56 pass through the jacket portion thereof and again enter the melting chamber through the openings 67, provided in the inner wall thereof for that purpose and after they have again entered the melting chamber 57, they circulate again through the pipes 65 or 66. The gases that have passed through the pipe 66, pass through the jacket of the fan housing 55 and through the jacket of the conveying funnel 54 to the forward end thereof, where they pass out through the openings 60 into the fan funnel to intermingle with the snow and ice being drawn thereinto by the fan.

In an arrangement of this character, therefore, the exhaust gases from the engine are not only used over and over again to provide a heating agent from the time the snow is drawn into the machine until it is thoroughly melted, but the longer the machine is in use, the higher becomes the temperature of the gases and the faster the snow and ice is melted because the gases are continuously heated in their circuit about the jacketed portion of the machine by the heaters 62, which themselves, have a tendency to melt the unmelted snow and ice drawn into the melting chamber 57.

It will be noted in Figure 3 that the inner end of the scoop 20 is shaped to fit snugly into the intake end of the funnel 54, it being supported therein when the scoop and brush are raised for convenient travel of the vehicle.

It is evident therefore, that I have provided a snow removing vehicle which breaks

up the ice and brushes the loose snow together with the ice into a conveying funnel from which it is drawn into a melting chamber so that the snow and ice can be converted into water which will readily pass into the sewer in a street cleaning operation.

It is further evident that in a construction of this character the snow will be quickly removed and as the whole apparatus may be mounted upon a truck, it may be readily moved from place to place.

While I have illustrated and described my invention with some degree of particularity, I realize that in practice various alterations therein may be made. I therefore reserve the right and privilege of changing the form of the details of construction or otherwise altering the arrangement of the correlated parts without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by United States Letters Patent is:—

1. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, means for operating the blower from the power plant, a funnel providing an intake to the blower, a snow melting chamber connected with the discharge side of said blower and an exhaust gas pipe connecting the power plant with said funnel, a scoop pivoted at the mouth of the funnel, a brush in the scoop and means for operating the brush from the power plant.

2. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, means for operating the blower from the power plant, flues leading forwardly and rearwardly away from the blower, the forward flue constituting a snow intake, a melting chamber, said rearward flue connecting the blower and the melting chamber, a scoop pivoted in the end of the intake flue, and means for adjustably positioning said scoop relatively to the ground.

3. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, a funnel providing an intake to the blower, a snow melting chamber connected with the discharge side of said blower, a scoop at the intake end of the funnel, a brush in the scoop, means for operating the blower, means for operating the brush and both of said means being driven from the power plant, a conduit for leading the exhaust gases from the power plant to the snow melting chamber, and means for recirculating the gases after initial passage thereof through said chamber.

4. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, a funnel providing an intake too the blower, a snow melting chamber connected with the discharge side of said blower, jackets on the funnel, the blower and the melting chamber, and means for leading the exhaust gases from the power plant to the funnel jacket.

5. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, a funnel providing an intake to the blower, a snow melting chamber connected with the discharge side of said blower, jackets on the funnel, the blower and the melting chamber, means for leading the exhaust gases from the power plant to the funnel jacket and a connection between the melting chamber interior and the jacket of the blower whereby recirculation of the gases is permitted.

6. The combination with a motor vehicle including a power plant, of a snow removal apparatus comprising a suction blower, a funnel providing an intake to the blower, a snow melting chamber connected with the discharge side of said blower, jackets on the funnel, the blower and the melting chamber, means for leading the exhaust gases from the power plant to the funnel jacket and a connection between the melting chamber interior and the jacket of the blower whereby recirculation of the gases is permitted, burners in the melting chamber, a screen therein and means for introducing the gases of the intake funnel jacket into the funnel for return to the melting chamber.

7. The combination with a motor vehicle including a propelling power plant, of a snow removal apparatus comprising a suction blower, a funnel providing an intake to the blower, a brush at the entrance end of said intake, means for operating the blower and the brush from said power plant, a snow melting chamber connected with the discharge side of the blower, jackets on the funnel, the blower and the melting chamber, means for leading the exhaust gases from the power plant to the funnel jacket and a connection between the melting chamber interior and the jacket of the blower whereby recirculation of gases is permitted.

In testimony whereof I affix my signature.

RICHARD A. POLAK. [L. S.]