

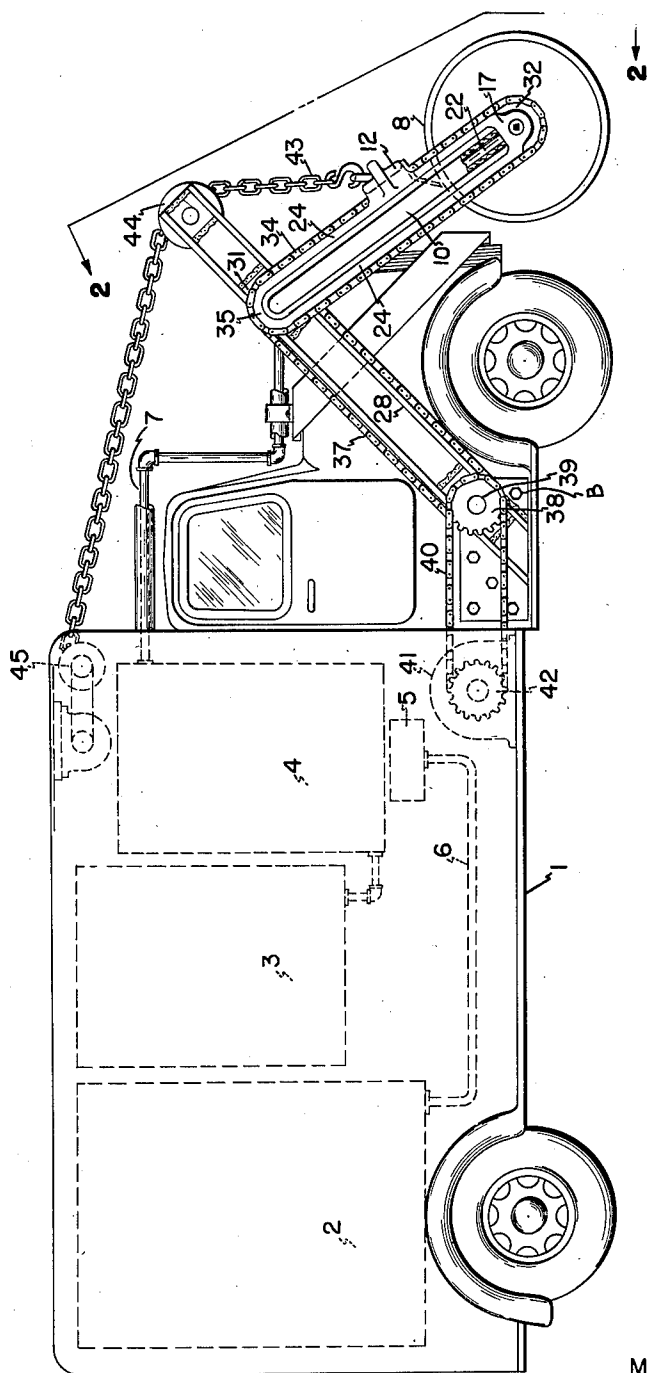
March 25, 1952

M. HOFFMAN
SNOW MELTING APPARATUS

2,590,701

Filed Jan. 16, 1946

3 Sheets-Sheet 1



INVENTOR.

MAX HOFFMAN

BY

Edith Hoff
his ATTORNEY

March 25, 1952

M. HOFFMAN
SNOW MELTING APPARATUS

2,590,701

Filed Jan. 16, 1946

3 Sheets-Sheet 2

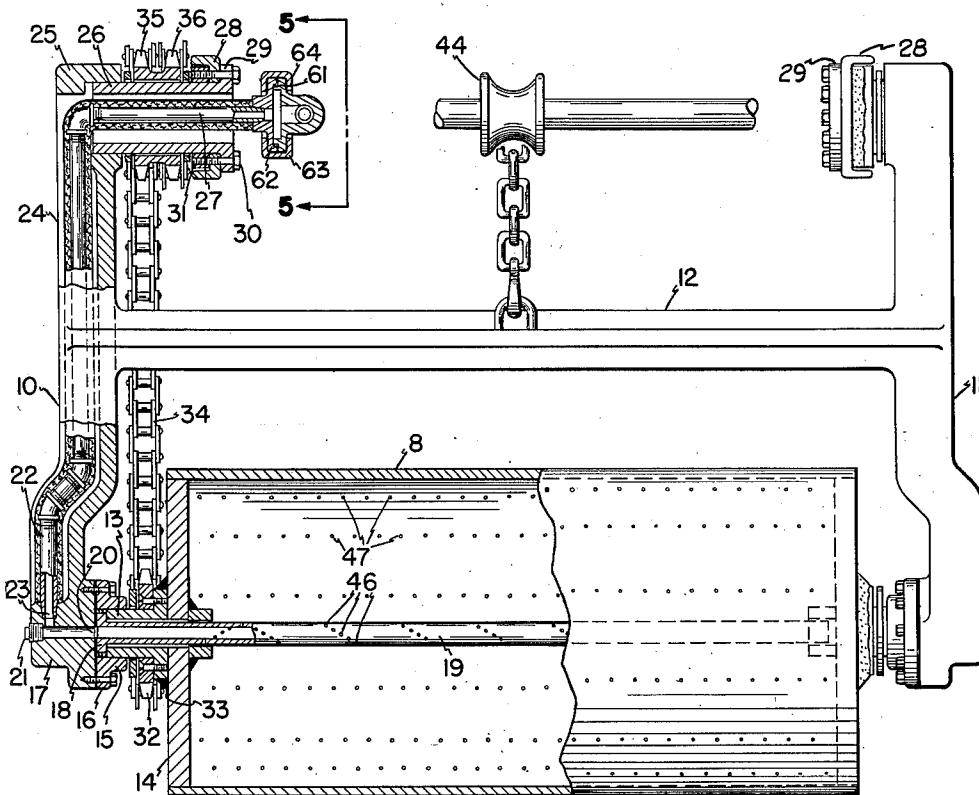


FIG. 2

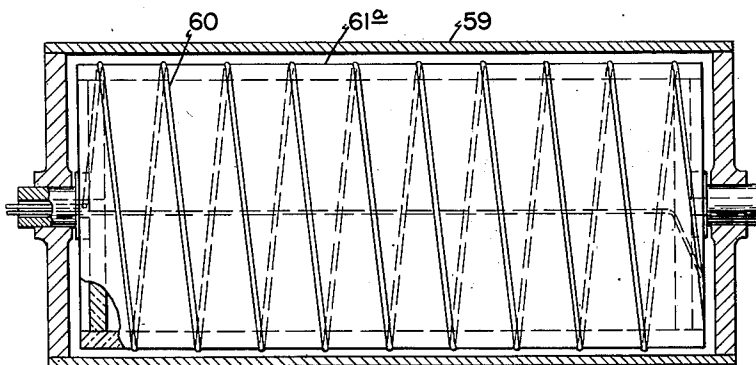


FIG. 6

INVENTOR.
MAX HOFFMAN
BY *E. J. Hall*
ATTORNEY

March 25, 1952

M. HOFFMAN
SNOW MELTING APPARATUS

2,590,701

Filed Jan. 16, 1946

3 Sheets-Sheet 3

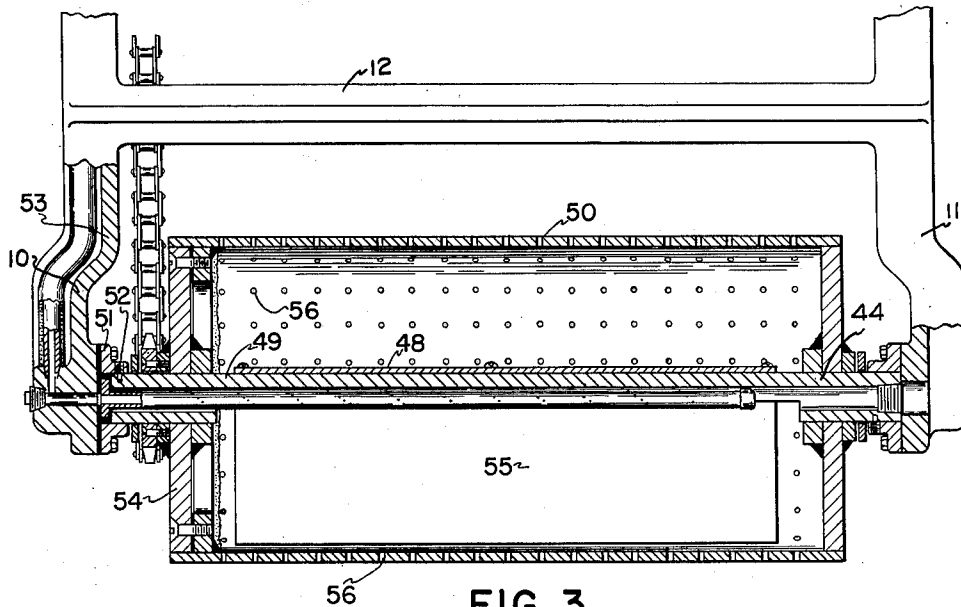


FIG. 3

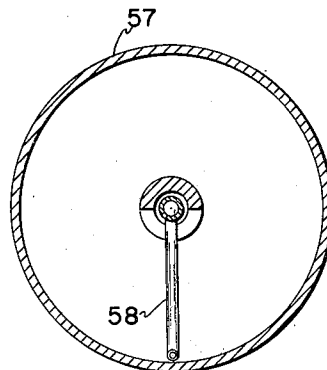


FIG. 4

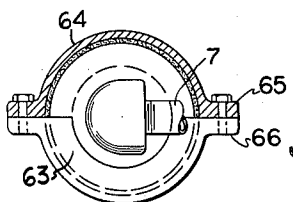


FIG. 5

INVENTOR.
MAX HOFFMAN
BY *Ernest Moll*
ATTORNEY

UNITED STATES PATENT OFFICE

2,590,701

SNOW-MELTING APPARATUS

Max Hoffman, Boston, Mass.

Application January 16, 1946, Serial No. 641,449

1 Claim. (Cl. 37-13)

1

The present invention relates to a means and method of removing snow from roads, walks and the like, by melting and permitting the water resulting therefrom to flow off.

The present common practice is to transfer the snow from one place to another as is accomplished with the ordinary snow plow. In such cases the road is cleared in a central section by piling the snow along the sides. Usually such snow piles remain for most of the winter season, becoming solidified into ice, gathering dirt and refuse, and becoming unsightly as well as becoming a menace to automobile travel. In congested areas or highways where there is a lot of traffic, the snow is often removed by trucks and dumped into rivers, lakes, ocean or in special dumping grounds.

In the present system the snow is melted by means of a roller which is rolled over the snow and which melts the snow as the roller comes in contact with it. The roller is kept hot by steam or electricity. The steam may be permitted to pass through the roller by perforating the roller with a great number of small holes distributed over the entire surface of the roll or the roller may have no perforations and the water that may gather within the roller may be drawn off.

In the use of a purely electrical system the roller may be heated by electrical induction, convection, or any other suitable means. The roller will be propelled over the snow by a truck on which it is adjustably mounted and which contains the equipment necessary for operation.

The invention will be more fully described in connection with the drawings showing an embodiment of the invention, in which:

Figure 1 shows a side elevation of the invention.

Figure 2 shows a view taken on the projection of the line 2-2 of Figure 1 with elements shown in fragmentary section.

Figure 3 shows a modification of a portion of the elements shown in Figure 2 in substantially the same position as in Figure 2.

Figure 4 shows a modification of a detail of Figure 3, taken on what would correspond to a transverse section through Figure 3.

Figure 5 shows a detail as viewed on a projection taken on the line 5-5 of Figure 2, and,

Figure 6 shows a modification of a detail of the roller corresponding to the view of Figure 3.

Figure 1 shows a motor truck 1 with a special fuel tank 2, a water tank 3 and a boiler 4, which is fired by the burner 5 fed from the fuel tank by the supply pipe 6. Any type of boiler and

2

burner may be used, the arrangement in the truck being more or less diagrammatic. The boiler and burner should be such as to transfer the greatest amount of heat of combustion possible to the water in creating steam in the boiler. The steam may be under any desired pressure by proper valve control and automatic feed may be such as to maintain a desired level in accordance with means and methods known in the art. The truck is provided, in accordance with the present invention, with an upwardly and forwardly inclined channel member 28 at each side of the truck body, each channel being rigidly attached at its rear, lower end to the truck chassis by bolts B (Fig. 1).

An outlet pipe 7 from the boiler, which pipe may be heat insulated, conveys the steam to the drum or roller 8 at the front of the truck. The drum 8 is supported by a forked frame comprising two end arms or brackets 10 and 11, which are joined by the cross support 12. The roller or drum is provided with trunnions 13 (Figure 2) which are welded to the drum ends 14. The trunnion 13 at the left in Figure 2 is supported by a collar or sleeve 15 (Fig. 2) which has a flange 16 through which the collar 15 is bolted to the hub 17 of the frame arm 10. The trunnion 13 has an axial bore through which the steam feed pipe 19 extends through the central axis of the drum. The steam feed pipe 19 has a flange 18 on its end which extends over the end of the trunnion 13 and faces flush against the face of the hub 17. The open end of the steam pipe abuts a port 20 in the hub 17 which port is aligned with the steam pipe 19 and goes to the outer end of the hub where it is capped with a plug 21.

A feed supply pipe 22 is fitted to a communicating port 23 in the hub 17, which port leads to the port 20. The pipe 22 is centrally located in a channel formed in the supporting bracket 10 between the side channel walls 24, 24 (Figure 1). The bracket or channel arm 10 at its top end is provided with a cylindrical bearing or collar 25, fitting over a hollow sleeve 26 through which the extension 27 of the feed pipe 22 passes. The hollow sleeve 26 serves as a pivot or journal bearing for the bracket or arm 10. This sleeve 26 is held tightly to the channel arm 28 (Figures 1 and 2) by means of a flange 29 at the end of the sleeve 26, which flange is bolted by bolts 30 to the channel 28. A flat plate 31 may fill out the channel where the flange 29 is attached. A generally similar pivotal or journal connection (not shown) is provided between the other fixed

channel 28 and the end 11 of the forked frame.

The drum or roller 8 is driven by a chain drive although any other type known drive may be used. For this purpose a spur gear 32 may be bolted to the flange of the trunnion 13 which is fixed rigidly to the end plate by the welding 33. A chain drive 34 passes over this spur gear and over one of a pair 35 and 36 of coupled spur gears free to move on the sleeve 26. The spur gear 36 is driven by the chain 37 which passes over the gear 36 and one of the double gears 38 which is journaled on a sleeve 39 supported by the channel 28 in the same way that the sleeve 26 is fastened to the channel 28. The other one of the double gears 38 is driven by chains 40 from the motor 41 through the motor drive gear 42. Suitable reduction gearing may be between the motor and the driving gear 42. The drive is such that the motor 41 will rotate the drum or roll 8 at the speed at which the truck is moved so that the drum will roll over the ground with substantially no slipping.

The drum may be raised or lowered by means of a chain hoist 43 which passes over the pulley 44 supported at the end of the channel bracket 28 and to the winch 45 mounted in the truck.

As shown in Figure 2, the supply pipe 19 may have a number of perforations 46 through which the steam escapes into the drum. This steam may be at high pressure and fill the inside of the drum, heating the drum wall 8 to a temperature of the steam. The drum wall 8 may have numerous small perforations 47 through which the steam may escape and come in direct contact with the snow to be melted. Where the drum is well down into the snow, all the perforations, even when at the upper position of the roll may be helpful in melting the snow. The latent heat of steam as is well known, has a high thermal value, and a pound of steam under normal pressure conditions will melt approximately more than ten pounds of snow. When it is desired to confine the steam to permit escape only on the lower section of the rotating drum, this may be accomplished by means shown in Figure 3. In Figure 3 this is accomplished by means of a hood 48 which is supported on a fixed sleeve 49 concentrically located within the drum 50. The sleeve 49 extends into the end support 51 which corresponds to the member 15 of Figure 2. The sleeve 49 is however pinned to the support 51 by set pins 52 threading through the wall of the support 51 into the sleeve 49. The support 51 is fixed to the side bracket 53 corresponding to the bracket 10 of Figure 2. The end plate 54 may be moveable so that the construction may be properly assembled. The hood 48 may have side walls 55 extending downward to the bottom of the drum, opening at an angle of 20° or more as may be desired. The drum 50 has perforations 56 on all its surface but the steam will escape outside only at the bottom.

In the modification of Figure 4 the drum 57 has no perforations and the steam simply heats the drum. The snow is melted by contact of the heated drum surface with it. Since water may gather at the base of the drum by steam condensation, this may be removed by the exhaust pipe 58 which may pass through the drum axis in the same way that the shaft 49 passes through it.

In the arrangement of Figure 6 the drum 59 is heated by the heating coil 60 wound on an inner drum 61a. The coil 60 is close to the inner surface of the drum 59. Electric current may

be supplied to the coil 60 in any suitable manner as for instance by a generator operated on the truck.

Figures 2 and 5 show a detail of the coupling of the terminal of the pipe 7 to the pipe 27. The pipe 7 has at its forward end a coupling comprising a radial flange 61 which abuts a corresponding radial flange 62 forming part of a coupling which is fixed to the inner end of the pipe 27. A shell or casing consisting of the two complementary parts 63 and 64 houses the flanges 61 and 62, the shell or housing having aligned openings through which the pipes 7 and 27 enter the shell, the complementary parts of the shell having flanges 65 and 66 (Fig. 5) which are united by bolts. Suitable packing may be used between the opposed faces of flanges 63 and 64. Each pipe, it will be noted is free to turn, so that as the drum is raised or lowered, the pipe 27 will be turned accordingly.

The truck may be driven over the ground in which the snow lies at a slow enough speed so that the heat of the drum or the escape of steam from the drum will melt the snow. For deeper snows the speed may be slower than when the snow is thin.

Other modifications of my invention may be made without departing from the spirit of the invention in which direct contact of the hot drum or steam from it reduces the snow so that it may flow off as water.

Having now described my invention, I claim:

A snow melting apparatus comprising a vehicle mounted on pneumatic-tired wheels, provided with conventional steering means and having a motor for driving it, a pair of parallel, rigid channel beams arranged at opposite sides respectively of the vehicle, each beam being rigidly fixed at its rear end to the vehicle body adjacent to the forward end of the vehicle body, the beams extending upwardly and forwardly, a rigid, forked frame whose rear end is pivotally connected to the channel beams so as to rock about a horizontal axis spaced from the upper ends of said channel beams, a shaft connecting the upper ends of said beams, a pulley on the shaft, a flexible connector secured at its lower end to the rigid frame at a point below and forward of the pivotal axis of the latter, said flexible connector extending over the pulley and being secured at its opposite end to a winch mounted on the vehicle, a snow melting drum journaled in the forward end of said pivoted, rigid frame to turn about a horizontal axis, a sprocket gear fixed to the drum coaxially with the latter, a second sprocket gear coaxial with the pivotal axis of the rigid frame, a sprocket chain embracing said sprocket gears, means extending along one of said channel beams for transmitting motion from the vehicle motor to the second-named of said sprocket gears thereby positively to turn the drum, the motion-transmitting means being so designed that the drum is turned at substantially the same angular velocity as the vehicle wheels, a steam generator mounted on the vehicle, means operative in all positions of the pivoted frame to conduct steam from the generator to the interior of the drum, the peripheral surface of the drum being perforated thereby to permit steam to escape from the drum, and a stationary shield within the drum operative to prevent escape of steam from the drum except at the lower part of the latter.

MAX HOFFMAN.

(References on following page)

2,590,701

5

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
136,853	Mullaly -----	Mar. 18, 1873
592,728	Glover -----	Oct. 26, 1897
859,356	Wilson -----	July 9, 1907

Number
1,190,521
1,369,745
1,512,596

5

6

Name	Date
Dahne -----	July 11, 1916
Jackson -----	Feb. 22, 1921
Hamshaw -----	Oct. 21, 1924

FOREIGN PATENTS

Number	Country	Date
4,539	Great Britain -----	of 1902