E. BRAUNINGER.

SNOW MELTING MACHINE.

APPLICATION FILED FEB. 26, 1915

1,204,400.

Patented Nov. 14, 1916.

2 SHEETS—SHEET 1.

Fig. 1

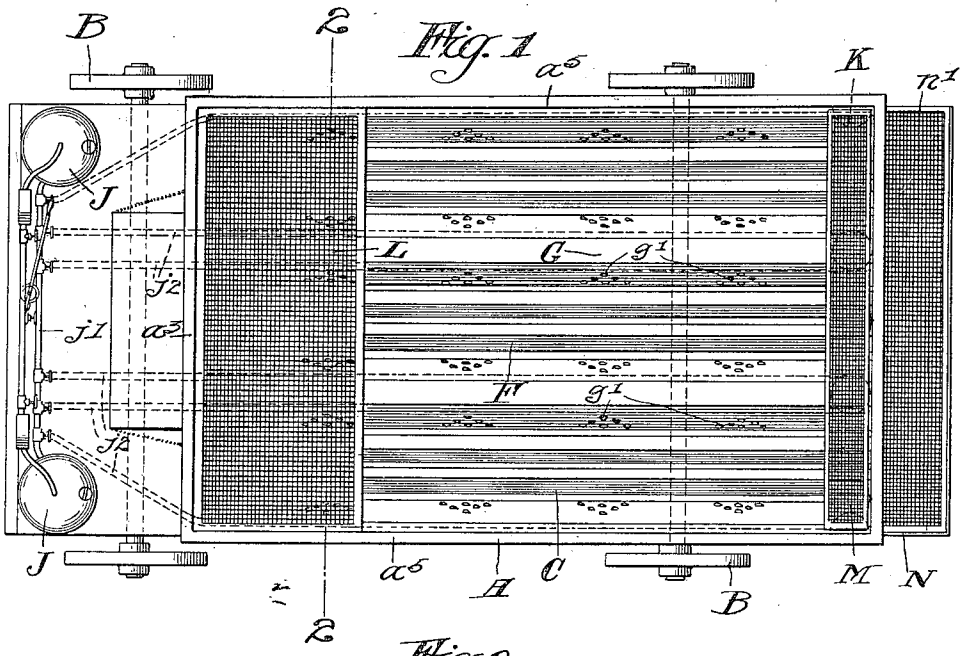
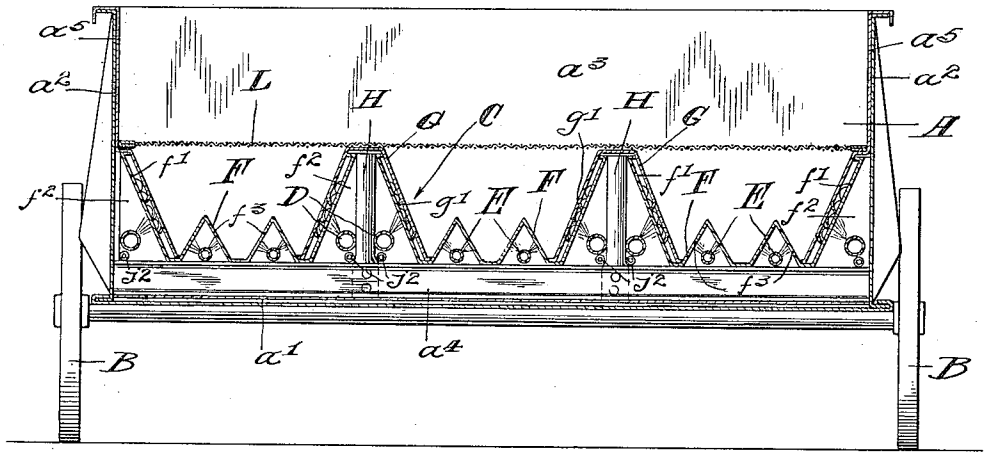


Fig. 2



Witnesses:

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Inventor:

Emil Brauninger

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Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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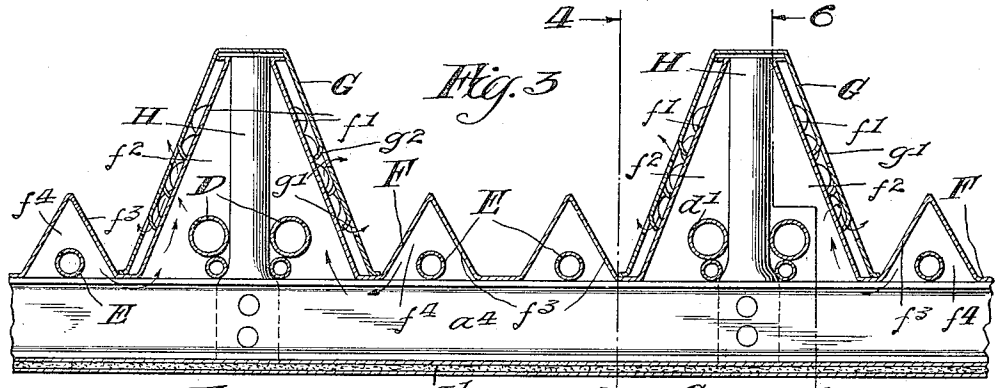


Fig. 3

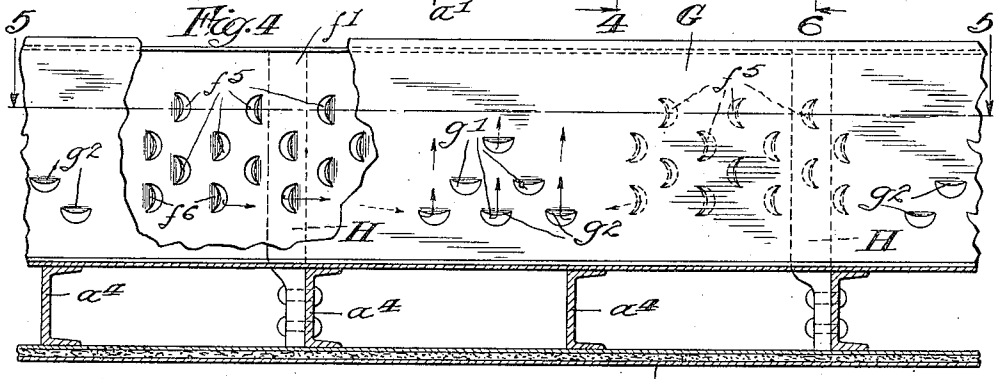


Fig. 4

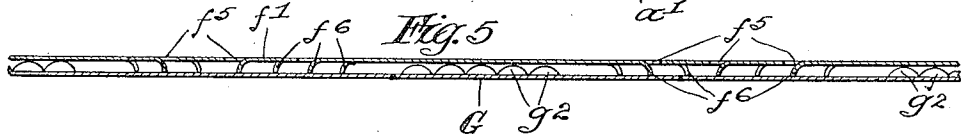


Fig. 5

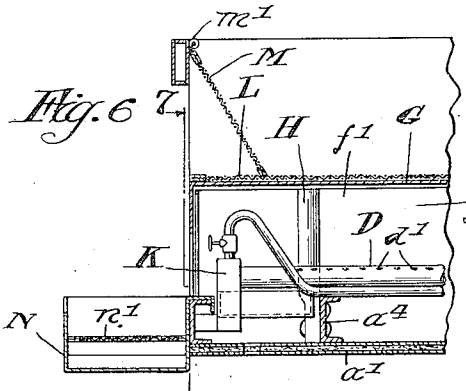


Fig. 6

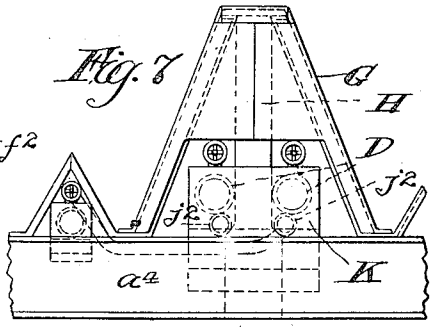


Fig. 7

Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

EMIL BRAUNINGER, OF CHICAGO, ILLINOIS.

SNOW-MELTING MACHINE.

1,204,400. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed February 26, 1915. Serial No. 10,864.

To all whom it may concern:

Be it known that I, EMIL BRAUNINGER, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Snow-Melting Machines, of which the following is a specification.

My invention relates to improvements in snow melting machines and has special reference to improvements in machines particularly adapted for the removal of snow from streets and thoroughfares.

The object of my invention is to provide a machine which shall rapidly reduce snow to water; and which shall effectively and economically transmit the heat produced to the snow to be melted.

A further object of my invention is to provide a machine adapted to be used upon the streets to rapidly and economically reduce a large quantity of snow to the form of water so that it will quickly drain away into the sewers.

A further object of my invention is to provide a snow melting machine adapted for the use of gaseous or liquid fuel by which large quantities of hot gases of combustion can be produced, and so constructed that these hot gases can rise through the snow in the machine and thereby impart or give up their heat to the snow in a most efficient manner.

My invention consists in a snow melting machine provided with a closed bottom, a false bottom therein, burners arranged below the false bottom, and protected gas passages leading upward through the false bottom, whereby the false bottom upon which the snow rests is heated and the heated gases are caused to pass upwardly through the body of the snow thereon.

My invention also consists in the several features of construction and in the arrangements and combinations of parts by which I am enabled to attain the above mentioned and other objects and all as hereinafter described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming part of this specification and in which;

Figure 1 is a top plan view of a snow melting machine constructed in accordance with my invention; Fig. 2 is an enlarged vertical transverse section of the machine on the line 2—2 of Fig. 1; Fig. 3 is a further enlarged, fragmentary, transverse section on the line 2—2 of Fig. 1; Fig. 4 is a longitudinal section on the line 4—4 of Fig. 3; Fig. 5 is a detailed longitudinal section of the double baffle plates on the line 5—5 of Fig. 4; Fig. 6 is a fragmentary, vertical, longitudinal section on the line 6—6 of Fig. 3; and Fig. 7 is a fragmentary rear elevation of the floor of the machine illustrating the generators and the controlling valves.

My improved snow melting apparatus is particularly adapted for melting snow by the heat produced by the combustion of a combustible fluid, either gas or oil. By means of my invention I am able to conserve substantially all of the heat produced by the combustion of the fuel by causing this heat to be transmitted into the snow to be melted and making use of both direct and indirect transfer of the heat to and through the snow.

My improved machine consists of a large box A suitably mounted on wheels B for transportation from place to place. The box A is open at its top and at its rear end. The box consists of a floor or bottom a^1, sides a^2 and a front wall a^3.

The bottom a^1 may be constructed of two layers of sheet metal inclosing a material such as asbestos, but this is not essential being a detail of construction which may be added to increase the economy of the device and prevent the radiation of the heat downwardly. The floor a^1 is secured to and connected with a plurality of cross beams a^4 which together form the frame work of the box. Above these cross beams a^4 I provide a false bottom C constructed in a peculiar manner to provide suitable spaces beneath the false bottom for the burners D and E and to provide passageways leading upwardly through the false bottom through which the hot gases of combustion can ascend to be impinged directly into and against the body of the snow contained within the box. The false bottom is composed of U-shaped sheet metal members F extending longitudinally of the box and reaching from the rear end to the forward end. In the form of the device illustrated there are three of these U-shaped sheet metal members, preferably made of copper on account of its great heat transmitting qualities. The side edges f^1 thereof extend upwardly from the cross beams a^4 nearly half the height of the sides

of the box and are outwardly inclined, thus providing spaces f^2 between these side edges and the sides of the box and between the adjacent side edges of the adjacent members F. In these spaces f^2 I mount the longitudinally extending burners D. To strengthen the horizontal portion of the U-shaped members I form the floor thereof into two upwardly projecting V-shaped ribs f^3 providing spaces f^4 extending longitudinally therebeneath in which spaces I mount the burners E which also extend the length of the box.

I provide the side edges f^1 of the U-shaped members with groups of openings f^5 through which the gases of combustion can rise upwardly from the spaces f^2 beneath the side members, and to prevent the water, which results from the melting of the snow, from passing downwardly through these openings f^5 I cover these upwardly inclined side edges with sheet metal baffle plates G spaced from the side members to provide passages for the rising gases. I provide holes g^1 in these baffle plates G arranged between the groups of holes f^5, that are horizontally offset therefrom, to allow the gas which rises through the holes f^4 and passes along between the plates to escape into and through the body of the snow resting upon the false floor of the box. The openings g^1 are provided with inwardly extending guards g^2 at their upper sides which prevent the water, resulting from the melting snow from rising between the plates G and f^1 and to prevent any water which might enter the holes g^1 splashing through and entering the holes f^5 I provide these holes f^5 with guards f^6 at their outer edges. These guards also serve as spacers for the plates G and f^1. The plates G which cover the edges of the adjacent trough members F are V-shaped for the purpose of making them continuous from the lower edge of one inclined edge f^1 to the lower edge of the next adjacent side edge f^1 and thereby inclose and cover these adjacent edges and prevent the water from falling through upon the burners D. To maintain these adjacent edges of the troughs F in position I provide standards H which are rigidly secured to the cross bars a^4 and rise therefrom. These standards are of sufficient width to space the upper parts of the edges f^1 a suitable distance apart.

For supplying fuel to the burners D and E I preferably provide fuel tanks J mounted upon the forward end of the machine and provided with suitable pressure indicating and producing devices and connected by means of a main distributing pipe j^1 and secondary pipes j^2 to the rear ends of the burners. I also provide at the rear ends of the burners suitable generators K to which the pipes j^2 lead and which are adapted to deliver the fuel in suitable form to the burners D and E. These burners are elongated pipes provided with suitable burner openings d^1 and are adapted to burn the fuel delivered thereto and project the flames and the hot gases against the under sides of the inclined side edges f^1 and the under sides of the V-shaped ridges f^3, as clearly indicated in Fig. 2. The rear ends of the spaces f^2 and the spaces beneath the ridges f^3 are sufficiently open to permit the entrance of air for proper combustion purposes. These openings are the only places through which air can enter to effect the burning of the fuel. The heated air which results from the burning of the fuel rises upwardly through the spaces f^2 and rises upwardly through the baffle plates f^1 and G into and through the snow which may be resting upon the false bottom and consequently all of the heat units developed by the burning of the fuel are forced directly into the snow which is to be melted.

In several figures of the drawings I have illustrated a wire netting L arranged in a horizontal position and resting upon the upper edges of the several baffle plates. I make this wire netting in several panels for the convenience of easily removing them and in Fig. 1 I have shown one of these panels in position, the others being removed so that the false bottom can be more clearly illustrated. This netting is of use where the snow may contain articles which can not be melted, these articles, stones or pieces of wood, etc., are caught upon the netting and do not descend upon the floor and can be removed from this netting from time to time. Under ordinary conditions the netting is not used, the snow being thrown directly into the box on to the false bottom in the best position to receive the heat from the burning fuel. To retain the snow in this position at the rear end of the box I arrange an inclined netting door M hinged to the rear upper edge m^1 of the box. The lower edge of the door M rests upon the several upper edges of the baffle plates and prevents any snow dropping out of the back end of the box. All the rear ends of the U-shaped members F are open and from these ends the water, which results from the melting snow, flows out of the box. I have arranged at the rear end of the box a transverse trough N adapted to receive this water and discharge it at one end thereof, and in practice this discharged water is usually directed into the manhole of the sewer system. Preferably I provide a grating or netting n^1 in the upper part of the delivery trough N to prevent any clogging thereof by extraneous articles.

It is to be noted that the U-shaped members F and the guard members G are all easily removable from the box. I retain them in position, having once been placed therein, by removable side plates a^5 which

are hooked at their upper edges to the side edges of the box and a similar plate at the forward end of the box. This false bottom and these plates are made removable for the reason that after the device has been in use it is necessary to thoroughly dry all the plates and thus prevent their rusting and consequently it is desirable to have the device constructed in such a manner that it may easily be taken apart. It is common practice to remove the false sectional bottom, after the season's work is over, thoroughly dry all the parts and paint them and the box with some preservative paint.

The V-shaped ridges which I provide in the bottom of the U-shaped members F not only provide spaces in which to mount the small burners E but also strengthen the U-shaped members and provide a strongly braced floor upon which an operator can stand without distorting the U-shaped members of the machine.

It will be understood, of course, that my machine is not limited in its use to being arranged to discharge the water directly into a man hole but it can be drawn along the street, the snow being shoveled into the box as the device progresses and continuously discharging the melted snow water into the gutter. It, of course, will be understood that it would not be advisable to use the device in this manner except in mild weather.

It will be understood that the generators K may be arranged to produce considerable pressure in the burners D and E and thus force the gases of combustion upwardly through the false bottom and into the snow and while I may, under some circumstances, entirely close the rear ends of the spaces in which the burners lie and provide the air for the burners under pressure, thereby increasing the force with which the gases will be discharged upwardly through the false bottom I prefer the construction shown.

My device is exceedingly economical and efficient for the reason that every heat unit which is produced results in its quota of melted snow water and no heat is allowed to pass off or be discharged without being passed into or through the body of the snow to be melted.

As many modifications of my invention will readily suggest themselves to one skilled in the art I do not limit or confine my invention to the specific construction herein shown and described.

Having thus fully described my invention I claim as new and desire to secure by Letters Patent:—

1. In a snow melting machine an open-topped box adapted to receive snow to be melted, means for draining the melted snow from the box, a false bottom therein, fluid burners extending below the false bottom, said bottom being provided with upwardly inclined portions having openings therein to permit the passage of the gases of combustion from the burners, deflecting plates arranged above said inclined portions provided with gas passage openings horizontally offset from the openings in the inclined portions and through which the heated gases are adapted to rise to the body of snow upon the false bottom.

2. In a snow melting machine an open-topped box adapted to receive the snow to be melted, means for draining the melted snow from the box, a false bottom therein, fluid burners extending beneath the false bottom, said bottom being provided with upwardly extending inclined portions having openings therein to permit the passage of the gases of combustion from the burners, deflecting plates arranged adjacent to said upwardly extending portions provided with gas passage openings horizontally offset from the opening in the upwardly extending portions and through which the heated gases may rise into contact with the body of snow upon the false bottom.

3. In a snow melting machine having a box to receive the snow, a sectional false bottom having V-shaped longitudinally extending ridges therein providing openings beneath the false bottom, fluid burners extending in said openings adapted to produce large volumes of heated gases and to heat the said false bottom, the inclined sides of said ridges being provided with gas passage openings, deflector plates arranged above said openings to prevent the descending water from entering thereinto, said plates being provided with gas passage openings horizontally offset from the openings in the false bottom to permit the rise of the heated gases into contact with the body of snow resting upon the false bottom and means for draining the water from said false bottom.

4. In a snow melting machine having a box to receive the snow, a false bottom consisting of trough-like members of sheet metal having upwardly inclined side edges, V-shaped protecting plates spanning the adjacent edges of two of the said trough-like members and spaced therefrom to provide gas passages, burners arranged beneath said inclined edges, and said protecting plates being provided with horizontally offset gas passage openings permitting the rise of the gases of combustion from the burners through said plates and preventing the downward passage of the snow water.

5. In a snow melting machine a false bottom having V-shaped longitudinally extending ridges therein providing longitudinally extending spaces beneath the false bottom, fluid burners arranged in said spaces, said ridges being provided with groups of gas passage openings the several openings

in each group being provided with vertically extending guards at their outer sides, deflecting plates arranged above said ridges having gas passage openings arranged between said groups, said openings having horizontally disposed guards at their upper sides, said guards being adapted to prevent the downward passage of water through said plates to said burners.

6. In a snow melting machine a false bottom having V-shaped longitudinally extending ridges therein providing longitudinally extending spaces beneath the false bottom, fluid burners arranged in said spaces, said inclined sides of said ridges being provided with groups of gas passage openings, the several openings in each group being provided with vertically extending guards at their outer sides, deflecting plates arranged over said ridges spaced therefrom and having gas passage openings arranged between said groups, said openings having horizontally disposed guards at their upper sides, said guards being adapted to prevent the downward passage of water through said plates to said burners, and means for constantly draining the water from said false bottom.

In testimony whereof, I have hereunto set my hand, this 20th day of February, 1915, in the presence of two subscribing witnesses.

EMIL BRAUNINGER.

Witnesses:

EDWARD FAY WILSON,

JOHN R. LEFEVRE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."