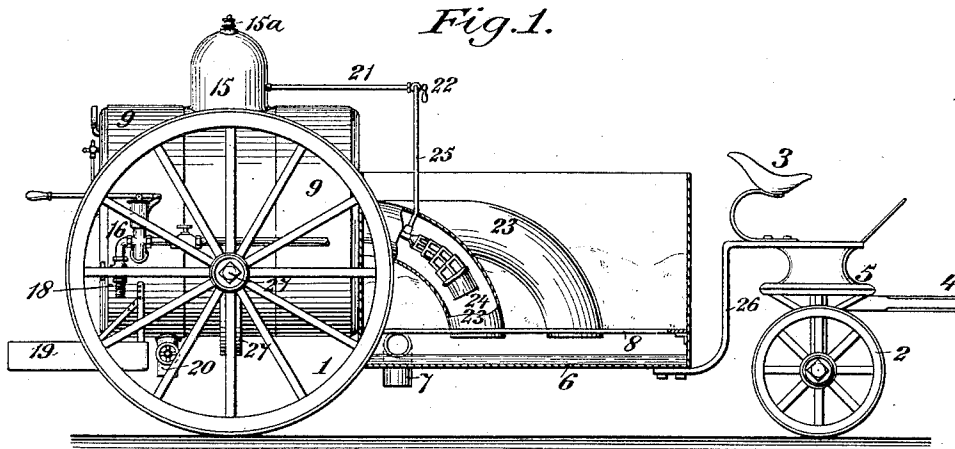
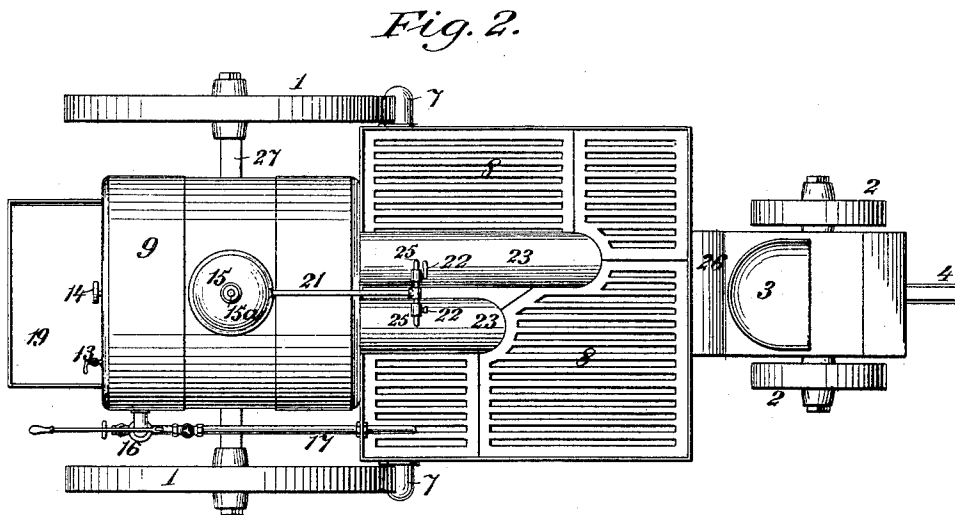
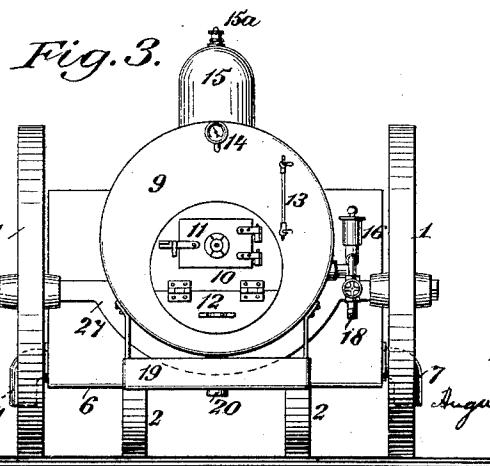


(No Model.)

A. P. SMITH.
SNOW MELTING MACHINE.

No. 595,072

Patented Dec. 7, 1897.



Witnesses:—

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UNITED STATES PATENT OFFICE.

AUGUSTUS PARKER SMITH, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM M. SPEER, OF SAME PLACE.

SNOW-MELTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 595,072, dated December 7, 1897.

Application filed April 4, 1894. Serial No. 506,267. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS PARKER SMITH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Snow-Melting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of apparatus which is constructed and operated for the purpose of melting snow and ice in the streets of large cities. The removal of snow from the streets of large cities by the usual method of carting is absolutely inadequate for the reason that even if the supply of money is unlimited the supply of carts is extremely limited.

My invention is designed to economically remove the snow as fast as it is shoveled up by a gang of men employed for that purpose or otherwise, and it effects this removal by melting said snow and allowing the water to run away through the ordinary system of sewerage. Various kinds of apparatus have been designed and experimented with for this purpose which have been more or less unsuccessful on account of their wastefulness of the heat generated, their costly and complicated construction and consequent frequent getting out of repair, their unwieldiness and uncertainty of action. My invention is designed to avoid these difficulties by presenting a cheap and simple construction which can be operated by a single fireman and which will utilize nearly every particle of heat generated by the combustion of the coal and will not get out of order or employ any highly-explosive and dangerous material, such as naphtha.

Referring to the three sheets of drawings, Figure 1 is a side view and partial section of my preferred form of apparatus. Fig. 2 is a plan view. Fig. 3 is a rear end elevation. Throughout the drawings like reference-figures refer to like parts.

11 represent the main carrying-wheels, and 2 2 the forward truck-wheels, which together support the apparatus.

3 is the driver's seat, mounted upon the swivel connection 5 to the forward truck, and 4 is the draft-pole, by which a team of horses can draw the machine through the streets.

6 is the melting-chamber, which in this form of the machine is in the shape of a sheet-iron tank. 7 7 are outlets from the bottom of said tank, through which the water formed by the melting snow may be run to waste and to which hose connection may be made leading to the nearest sewer-opening. Preferably these outlets 7 connect with the sides of the tank at a distance of an inch or so above the bottom thereof, so that a small quantity of water will remain in the bottom of the tank and protect it from the direct action of fierce heat of the blast, which would otherwise be delivered onto it.

8 is a grating arranged in the melting-chamber at a short distance from the bottom thereof, on which grating the snow and ice shoveled into the melting chamber or tank 6 will rest, as shown in Fig. 1. This grating is of course made in sections when necessary, so as to render it easily removable, as is best shown in Fig. 2.

9 is a plain cylindrical boiler of what is known as the "Cornish" type, with an internal fire-box 10. This fire-box has the ordinary door 11, and the ash-pit below the grate has the door 12. The boiler has the usual fittings—such as the water-gage 13, steam-gage 14, dome 15, pop safety-valve 15^a, and feed-pump 16. The supply-ports of this feed-pump 16 are provided with connections 17 and 18, with their controlling-valves, which connect, respectively, with the melting-chamber 6 or with any independent feed-water supply, such as a hydrant. By having the connection 17 to the bottom of the melting-tank 6 the water formed by the melting snow can be used to supply the boiler, and so to this extent the operation of the machine is self-supporting.

19 is an ash-pin for catching any ashes which may be raked out of the ash-pit, thus avoiding the depositing of them in the street, and 20 is a blow-off cock for the boiler 9, by which the sediment that is accumulated during a run may be discharged.

21 is a steam-pipe leading from the dome

15 and having one or more branches 25, controlled by valves 22, which branches conduct the steam to the interior of the smoke-flues 23, which lead from the forward end of the fire-box 10 and discharge into the melting-tank 6, preferably below the grating 8. Within the smoke-flues 23 may be arranged a series of concentric circular castings 24, as shown in Fig. 1, which are of a type well known and for sale in open market, and the action of which is to increase the effect of the steam-jet, producing a draft within the flues 23, and utilizing to the utmost the power of said steam in producing such a draft.

26 is a bracket extending from the forward truck to support the forward end of the melting-tank 6, and 27 is the curved main axle, which supports the weight of the boiler 9 and a portion of the weight of the melting-tank 6.

The operation of my invention consists, briefly stated, of the placing of the snow to be melted in the melting-chamber and discharging upon it, under it, and through it the hot gases from the furnace and the steam from the boiler, said steam first acting to create a draft in said furnace, and thereby performing a double function, while the hot gases also operate in the first instance to generate the steam, and so perform a double function in a similar manner. Referring to the first form of the invention, water being fed into the boiler 9 a fire is started in the furnace 10 and, proceeding under natural draft or by means of a hand-blower, generates steam in the boiler 9. This steam is discharged into the flues 23 through the pipes 21 and 25, and by reason of the aspirator or steam-jet reinforcing apparatus 24 creates a lively draft in the furnace 10. This creates more rapid combustion and generates more steam, which in turn creates a greater draft, and so in a short time intense combustion is the result. The enormous volumes of hot gases and steam thus generated and reacting upon each other are discharged into the melting-tank 6 below the grating 8 and force their way up through the snow and ice which has been shoveled into the tank, rapidly melting the same, and allow the water thus formed to run off through the outlets 7. The water trapped in the bottom of the tank protects said bottom from the too fierce action of the hot gases issuing from the flues 23. The fireman shovels in coal from a tender or from a coal-box on the machine, and thus replenishes the fire, while the feed-water is forced into the boiler by the pump 16, said feed-water being taken from the tank 6, as above described, or from a hydrant or water-cart. Of course a steam-injector could be used in place of the pump 16 if clean feed-water were employed. When the feed-water is taken from the tank 6, however, it would be so dirty that the pump instead of the injector would have to be used. Such dirty feed-water could be used with the pump, however, because the consequent foaming of the boiler would not interfere with the operation

of the steam-blast in the flues, and the accumulated sediment in the boiler could be blown off after each run. The foaming of boilers is only objectionable where the steam is used for the purpose of running an engine. A team of horses would be hitched to the draft-pole 4 and controlled by the driver on his seat 3.

The machine could be drawn through the streets from one pile of snow to another, a gang of men shoveling the snow into the machine, or it could be shoveled up from a wind-row formed by a plow.

The features of advantage in this snow-melter are—

First. Small amount of first cost.

Second. Simplicity of construction, there being no mechanism to get out of order.

Third. Consequent durability.

Fourth. Economy of attendance, one man who knows enough to rake a fire and watch a steam-gage and a water-gage being all that is necessary to manage it.

Fifth. Economy of coal consumption, every particle of the heat evolved being employed in melting the snow. In other machines the fuel that is burned under the boiler to furnish power is lost and the steam which is generated to drive blowers, &c., is lost, as far as snow-melting goes. In this machine the hot gases from the furnace which would otherwise go up the smoke-stack are all discharged into the melting-chamber, and the steam used in creating a blast similarly performs a second function by discharging into the melting-chamber. The furnace is inside of the boiler, and the only possible loss of heat is by radiation from the outer surface of the boiler, and this can almost entirely be done away with by proper lagging with non-conducting material.

Sixth. Safety, there being no tanks of naphtha or other inflammable gases and fluids to explode.

Seventh. The machine having no engine the steam furnished can be foamy without interfering with its working. Consequently the feed-water can be taken from the melting-tank, which will do away with the important question of a sufficient supply of clean feed-water, which is always a difficult one when working in the streets.

Eighth. The discharging of the hot gases and vapors beneath the horizontal grating distributes them over the entire area of the melting-tank, so that in their forward ascent they permeate every portion of the tank.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a snow-melting machine, the combination of the steam-boiler, the furnace for said steam-boiler, the melting-chamber, the smoke-flues which lead from the furnace to said melting-chamber, and the steam-pipe which discharges the steam from said boiler directly into said flues for the double purpose of creating a draft in the furnace and

also of raising the temperature of the melting-chamber into which said steam is ultimately discharged, substantially as described.

2. In a snow-melting machine, the combination of the steam-boiler, the furnace for said steam-boiler, the melting-chamber, the smoke-flues which lead from the furnace to said melting-chamber, and the steam-pipe which discharges the steam from said boiler directly into said flues for the double purpose of creating a draft in the furnace and also of raising the temperature of the melting-chamber into which said steam is ultimately discharged, together with means for controlling the force of said steam whereby the greatest possible amount of draft may be obtained and the same modified at will, substantially as described.

3. In a snow-melting machine the combination of the steam-boiler, the furnace for said steam-boiler, the melting-chamber, the grating arranged in said melting-chamber at a short distance from the lower portion thereof, the smoke-flues which lead from the furnace to said melting-chamber and which discharge beneath the aforesaid grating and the steam-pipe which discharges the steam from said boiler directly into said flues for the double purpose of creating a draft in the furnace and also of raising the temperature of the melting-chamber into which said steam is ultimately discharged, substantially as described.

4. In a snow-melting machine the combination of the steam-boiler, the furnace for

said steam-boiler arranged internally of said boiler, the melting-chamber, the smoke-flues which lead from the furnace to said melting-chamber, and the steam-pipe which discharges the steam from said boiler directly into the said flues for the double purpose of creating a draft in the furnace and also of raising the temperature of the melting-chamber into which said steam is ultimately discharged, substantially as described.

5. In a snow-melting machine the combination of the steam-boiler, the furnace for said steam-boiler, the melting-chamber, the flues which deliver the hot gases and vapors from said boiler or furnace into the melting-chamber and the boiler-feed apparatus which draws its supply from the bottom of the melting-chamber thereby employing the water formed by the melting snow, all substantially as described.

6. In a snow-melting machine the combination of the steam-boiler, the furnace for said steam-boiler, the melting-chamber, the flues which deliver the hot gases and vapors from said boiler or furnace to the melting-chamber and the boiler-feed apparatus supplied by water formed by melting snow with heat furnished by the snow-melting machine itself substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTUS PARKER SMITH.

Witnesses:

WARREN W. FOSTER,
HERBERT L. LUQUES.