

UNITED STATES PATENT OFFICE.

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SNOW-MELTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 770,169, dated September 13, 1904.

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To all whom it may concern:

Be it known that I, HENRY CORNMAN DAVIS, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Snow-Melting Apparatus, of which the following is a full, clear, and exact description.

This invention relates to means for removing snow from the streets of cities or large towns without requiring transportation of the snow any considerable distance, and has for its object to provide novel details of construction for a snow-melting apparatus that afford convenient practical means for the speedy conversion of snow into water during or after a fall of snow and by provision of similar apparatus at suitable points in streets or in ground areas convenient to streets enable the fall of snow on a large area of public streets to be removed before it obstructs travel and effect such a removal at a moderate cost.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a transverse sectional view in part of a walled pit formed in the ground at a suitable point and a side view of the improved snow-melting apparatus held in place within the pit, showing the operative position by full lines and its inoperative adjustment by dotted lines. Fig. 2 is a partly-sectional plan view of the melting apparatus and the heat-radiator plate of the device broken away to expose details below it, and Fig. 3 is an enlarged longitudinal sectional view of a steam or gas pipe coupling-joint employed.

The pit 5 is preferably quadrangular and in complete form is deep enough to insure a proper operation of the device, and it may be here explained that any desired number of pits may be employed and respectively located at points along streets for the quick transfer of snow from the streets to the pits, the ag-

gregate number of snow-melting apparatus 50 to be employed depending upon the extent of public thoroughfares from which snow must be expeditiously removed to avoid obstruction of traffic and travel.

The excavations or pits 5 may be respectively formed at a convenient side of a street or transversely in the road-bed, or the excavations may be respectively in vacant lots at suitable points along roads from which snow is to be removed.

While the invention is applicable for the removal of snowfall in small towns as well as large ones, it is particularly well adapted for service in large cities, in which the exigencies of business travel of all kinds over many miles of roads or streets necessitate the removal of snowfall from the streets in the shortest possible period of time.

The streets of cities are of course provided with subterranean sewers of proper area and descent toward their point of discharge to effect a speedy conveyance of the sewage to said point.

A sufficient depth is given to the pit 5, which in completed condition should tap the wall of a near sewer for the transfer by gravity of water that results from melting the snow, as will presently be described.

Near one side of the walled pit 5 a flat plate-metal heat-radiator 6 is held to rock by means of a tubular border-frame 6^a, that is firmly secured upon the side edges and the forward edge of the radiator-plate, said frame having straight limbs 6^b extended parallel with each other at the rear edge of the radiator-plate.

A hinge-joint *a* is formed in each frame extension 6^b near the rear edge of the plate 6, and at a suitable distance from each joint the extended arms 6^b are embedded in the side wall 5^a of the pit 5 in the same plane, so that the radiator-plate 6 may be rocked upward to near a horizontal position or be permitted to hang pendent.

A burner-frame, that may with advantage be rectangular in contour, is provided to convey a fuel agent to burners for heating the radiator-plate 6, and, as is indicated in Fig. 2, the burner-frame is somewhat smaller than the

border-frame 6^a, leaving a margin of the radiator-plate 6 projecting exterior of the burner-frame.

Two like pipes 7 7^a are side members of the tubular burner-frame, these being held spaced apart in parallel planes by the front transverse frame member 7^c, which may be integral with or joined upon the front ends of the side members mentioned, so as to have free communication.

Upon the rear end of one side member of the tubular frame, that in this case is the tubular frame member 7^a, at the right side thereof, an elbow hinge-joint 7^d is secured, that joins the burner-frame with an anchor-bar 7^e, the latter having a suitable length for an anchored location in the side wall 5^a and spaced from an adjacent arm 6^b, that anchors a rear portion of the border-frame 6^a in the wall 5^a, as before explained. A hollow hinge-joint 7^f is secured upon the rear end of the burner-frame member 7 directly opposite the joint 7^d, and from a member of the hollow elbow hinge-joint 7^f is extended a gas-supply pipe 7^g, which passes through the wall 5^a and extends to a source of gas under pressure of a quality adapted for use as a hydrocarbon fuel.

The joints 7^d and 7^f have their pivot centers opposite each other, thus permitting the burner-frame to receive upward rocking movement simultaneously with such a movement of the radiator-plate 6. The side member 7^a is sealed at the hinge-joint 7^d, but is freely fed with gas under pressure that traverses the opposite frame member 7 and circulates in the front burner-frame member 7^c.

At spaced intervals a plurality of transverse feeding-pipes 7^h and 7ⁱ are secured by their ends in open communication with the sides of the frame members 7 and 7^a. Two of the intermediate burner-pipes are shown; but it is to be understood that the number and length of the several members of the burner-frame may be increased to afford any desired extent of heating area for the plate 6, that may be correspondingly increased in area.

The burner feed-pipes of the described burner-frame, which are fed under a uniform pressure by gas passing through the main gas-supply pipe 7^g, are each provided with a plurality of similar burners *b*, that are suitably spaced apart and project toward the radiator-plate 6, from which they are spaced a suitable degree.

The burners *b* may be of the ordinary jet form indicated, or for the creation of greater heat and effecting greater economy in consumption of gas an equal number of aerohydrocarbon burners, such as the common Bunsen burner, may be substituted for the jet-burners shown.

A comparatively few burners only are shown as projecting from each gas-supply pipe to receive gas therefrom; but in prac-

tice the pipes for feeding the burners will be so increased in length that many more burners may be mounted thereon for use.

The side frame members 7 7^a of the burner feed-pipes, along with all the other coacting burner feed-pipes which have been described, are located in the same plane, and the side members mentioned are each held spaced from and parallel with a corresponding side edge portion of the heat-radiator plate 6 by a suitable number of rock-arms *c*. The upper ends of the rock-arms *c* are pivoted upon the lower side of the heat-radiator plate 6 at suitable points, as indicated at *c'* in Fig. 1.

Upon the burner-frame side members 7 7^a a looped keeper *c''* is secured opposite the lower end of a respective rock-arm *c*, and the keepers, that are in the form of flat staples, afford guideways for the lower ends of the rock-arms, which are each furnished with a coupling-eye *c''*, that loosely embraces a respective guideway or keeper, as indicated in Fig. 1.

Below the hinge-joint for each side of the burner-frame which has been described an eyebolt *d* is inserted into the pit-wall 5^a, and upon the projecting eye of each bolt one end of a link-bar *e* is pivoted, and the other ends of these similar bars, which extend forwardly at the outer sides of the burner-frame side bars 7 7^a, are pivoted upon lapped ends of similar link-bars *e'*. The link-bars *e'* are extended from their pivot-joints on the link-bars *e* toward the lower surfaces of the frame side bars 7 7^a and are pivoted thereto by their ends *e''*.

At the pivot-joints between the ends of the link-bars *e* and *e'* an arm *e''* is extended outward from each joint, so as to project beyond the planes traversed by the side members of the border-frame on the radiator-plate 6. There may be a pivot-shaft *e'''* employed, which extends between the lapped ends of the two sets of link-bars *e e'*, passing therethrough as pivots for connection of said lapped ends and also extended to form the arms *e''*.

From the outer ends of the arms *e''* flexible connections *g* are upwardly extended to a point near the upper edge of the walled pit 5 and are there supported by engagement with hooks *h*, so that the chains or the like may be conveniently reached, and by applied draft strain the previously-pendent burner-frame and radiator-plate may be raised into an inclined position near the pit-opening, as shown by full lines in Fig. 1, and be thus held by engagement of the chains *g* with the hooks *h*. The pit 5 may be normally closed with a strong cover (not shown) to render the road-bed safe to travel over when the melting apparatus is not in use.

Upon commencement of and during a snow-fall the streets having the improved means for melting snow located in or near them may be swept toward the pits 5 and the snow accumu-

lations be melted by the apparatus, to start which the pit-cover is first removed. Then the radiator-plate 6 and the tubular burner-frame are together rocked upward far enough 5 to permit the free ignition of the burners 7, it being understood that the flow of gas into the burner-frame has been started. As the heat-radiating plate 6 is of thin plate metal, it will be evident that the application to the 10 lower surface of heat thrown off by the large number of heat-evolving burners will very quickly render the radiator-plate 6 red-hot. The plate 6 may with advantage have a flange 6° formed or secured on the lower or forward 15 transverse edge thereof, as represented in Fig. 1.

The position of the inclined radiator-plate 6 near the top of the pit 5 permits the free and convenient spreading of snow over the 20 incandescent plate by means of shovels, and as the snow will by contact with the highly-heated plate be almost instantly converted into water, which will run from the plate at its side edges, it will be seen that a large volume of snow may be quickly converted into 25 liquid that will be carried off by the sewers.

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

1. A snow-melting apparatus, comprising a 30 plate-metal radiator supported to rock on a stationary object, a burner-frame held to rock on said object below and near to the radiator-plate, means carried by the burner-frame for supporting said radiator-plate, and means en- 35 gaging the burner-frame for its rocking adjustment.

2. A snow-melting apparatus, comprising a plate-metal radiator hinged upon a support at one edge, means for rocking the plate and hold- 40 ing it at a desired incline, a supported tubular burner-frame loosely connected with the lower side of the radiator-plate, a hinged connection for the burner-frame with a stable support, said frame being rocked by the means rocking 45 the radiator-plate, a plurality of burners on the tubular frame, adapted to consume gaseous fuel for heating the radiator-plate, and

means for supplying gaseous fuel to the tubular frame and burners thereon.

3. The combination with a walled excava- 50 tion, of a snow-melting apparatus, comprising a plate-metal radiator, means for hinging the plate at one edge upon a side of the excavation, a burner-frame held to rock on the same 55 side of the excavation with the radiator-plate, means for rocking the plate and burner-frame together and holding them rocked at a desired incline, a plurality of burners adapted to con- 60 sume gaseous fuel for heating the radiator-plate, said burners projecting from the upper side of the burner-frame at intervals through- out its extent, and means for supplying gaseous fuel to the burner-frame and the burners 65 thereon.

4. The combination with a walled pit or ex- 65 cavation, of a snow-melting apparatus, comprising a plate-metal radiator, a border-frame secured on three edges thereof and projecting as parallel members past the remaining side 70 edge of said radiator-plate, said members being secured in an upright wall of the pit, a tubular burner-frame formed of intercommu- 75 nicating side members and cross members, a hollow hinge-joint on each side member at like ends thereof, a gaseous-fuel-supply pipe connected with one of said hinge-joints, means 80 to connect and loosely space the burner-frame and the radiator-plate, means to rock the plate and burner-frame together and hold them at a desired inclination, and a plurality of gaseous-fuel burners distributed over the upper 85 surface of the burner-frame and projecting therefrom so as to adapt said burners for throwing heat upon the radiator-plate, when fuel-gas is transferred through the supply-pipe to the burner-frame and burners thereon.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY CORNMAN DAVIS.

Witnesses:

W. H. BALL,

HENRY L. WOODLAND.