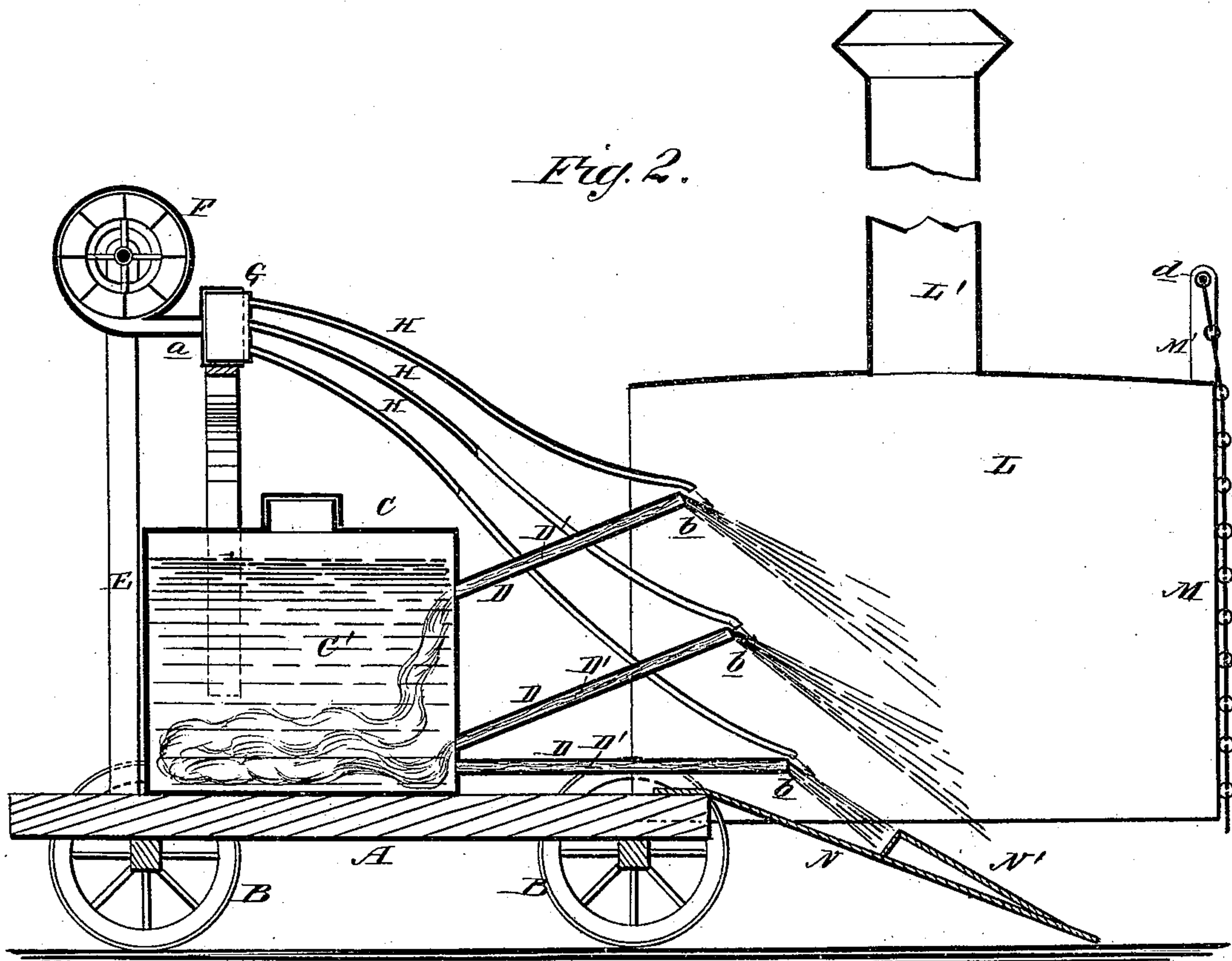
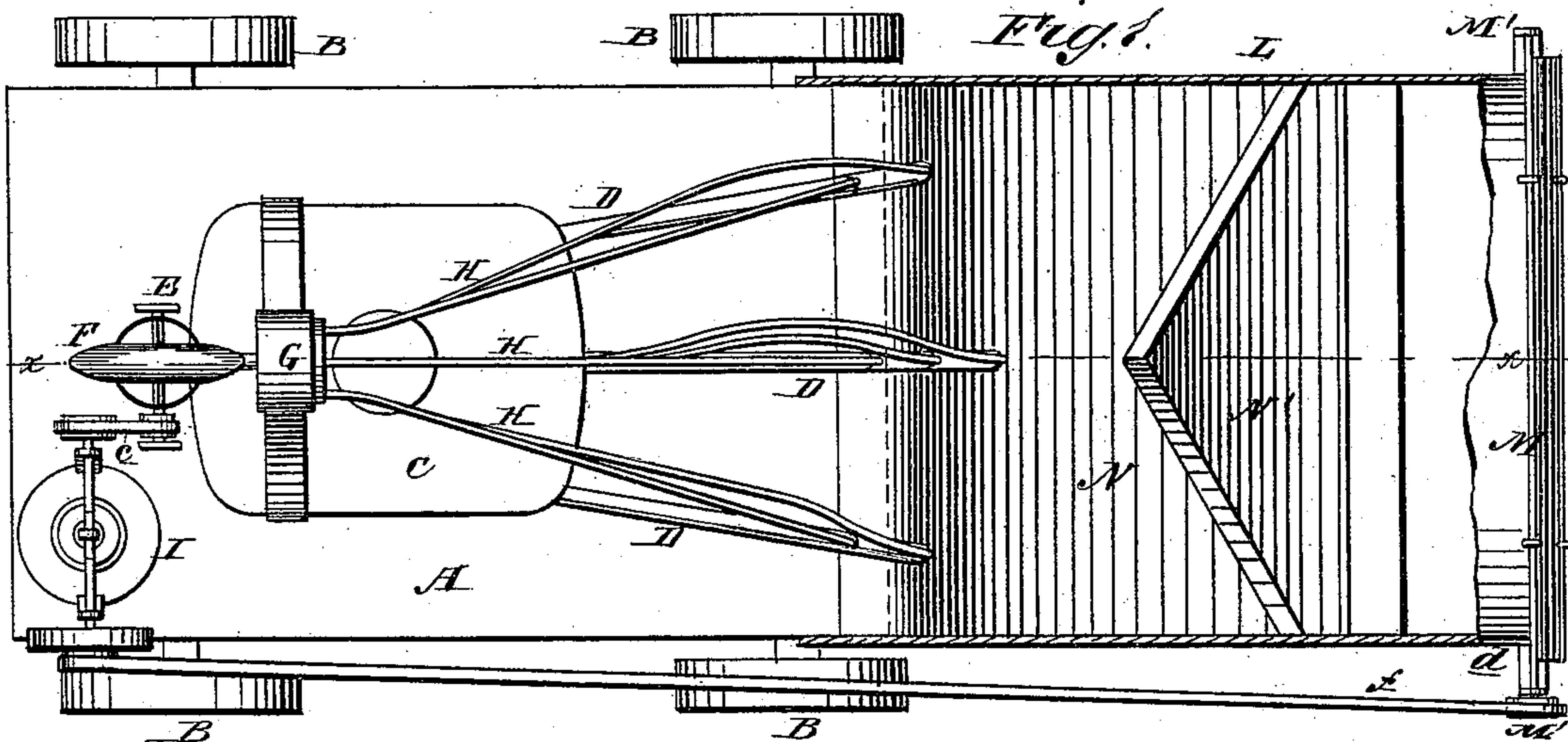


(No Model.)

F. F. BIOREN.

Apparatus for Removing Snow from Streets.
No. 236,534.

Patented Jan. 11, 1881.



WITNESSES:

Francis M. Corliss.
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INVENTOR:

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UNITED STATES PATENT OFFICE.

FREDERICK F. BIOREN, OF NEWARK, NEW JERSEY.

APPARATUS FOR REMOVING SNOW FROM STREETS.

SPECIFICATION forming part of Letters Patent No. 236,534, dated January 11, 1881.

Application filed November 17, 1880. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK F. BIOREN, of Newark, in the county of Essex and State of New Jersey, have invented a new and Improved Apparatus for Removing Snow and Ice from Streets and Railroads, of which the following is a specification.

This invention relates to an apparatus for melting snow and ice from streets and railroads; and it consists of an oil-tank provided with a series of wick-tubes, and a fan or blower provided with corresponding pipes, that operate as blow-pipes, to direct the air from the blower forcibly upon the flames issuing from the wick-tubes, thereby forming blow-pipe flames that are directed upon the ice or snow to be removed. The tank and blower are fixed on a platform that is suitably mounted on wheels, and have, in combination with them, a combustion-chamber, that is designed to protect, concentrate, and direct the flames, said chamber having a vertically-adjustable front, that may be raised or lowered, as circumstances may require, all of which will be hereinafter fully explained.

Figure 1 is a plan view of the device with top of combustion-chamber broken away to exhibit other parts. Fig. 2 is a sectional side elevation of the same on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings, A represents a platform supported on wheels B B. C is a tank or reservoir, provided with forward-extending tubes D D, securely fixed upon said platform A, said tubes D being arranged at any desired angles and in any required numbers. Said tank or reservoir C is designed to be filled with oil, as indicated at C', and to have wicks D' extending outward through the tubes D.

Fixed on the platform A, in rear of the reservoir C, is a standard, E, supporting a fan or blower, F, the exit-pipe *a* of which is entered into a box or air-receiver, G, from which the blow-pipes H H are projected forward and downward, with their free ends just above the outer ends of the tubes D, in order that the blast of air forced by the fan F through the blow-pipes H shall strike the flames at the ends of the tubes D and project said flames

downward, as indicated at *b*, Fig. 2, upon the ice or snow to be melted. The said blow-pipes H H are designed to be so arranged that they may be adjusted to direct the flames at any desired angle.

The fan or blower F is operated by means of an engine, I, that is secured upon the platform A, a belt, *c*, connecting the said engine I with the fan F; or any other convenient method of operating said fan F may be adopted without departing from my invention.

Secured upon the forward part of the platform A, and projecting in front of it, and covering the end of the wick-tubes D and blow-pipes H, is a sheet-metal case, L, open at both ends and bottom, and provided with a smoke-stack, L'. The forward end of this case L may be partly or wholly closed by a rolling metal shutter or apron, M, that is suspended on a shaft, *d*, between standards M', which are fixed on the top of said case L, and said apron M may be operated by the engine I through a belt, *f*, or by any other convenient means. This case L serves to protect the flames from the wind, and to concentrate and direct them by preventing their escape laterally or upward, and at the same time serves to retain them in contact with or exposed to the air from the blow-pipes H, in order to secure a more complete combustion of the solid and gaseous components of said flames *b*. The apron M may be raised, that the flames *b* may be projected farther forward, or it may be lowered, as shown in Fig. 2, that the flames *b* may be concentrated upon the space beneath the combustion chamber or case L.

To the forward end of the platform A a sloping shovel or plow, N, is secured, provided with a V-shaped mold-board, N', for the purpose of clearing from the track the slush created by the action of the flames *b* and throwing it on either side.

Among the advantages of this process and apparatus over those in which steam-jets are used are that the temperature of the blow-pipe flames is very far in excess of the possible operating temperature of the steam-jets, and consequently will dissolve the snow and ice much more rapidly, and the blow-pipe flames projected upon the snow and ice create a warm vapor or steam that essentially as-

sists in the dissolution of the snow and ice, while steam-jets impinging on snow and ice produce no such desirable effect, the steam being condensed on contact therewith.

5 It is evident also that for producing like effects there is much greater economy in applying the flames—the products of combustion—directly to the snow and ice than through the medium of steam.

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

15 1. An apparatus for removing snow and ice from streets and railroads, constructed substantially as herein shown and described, consisting of oil-tank C, provided with wick-tubes and wicks D D' and blower F, provided with blow-pipes H H, arranged and operated as set forth.

2. In an apparatus for removing snow and ice from streets, the combination, with the wick-tubes D and blow-pipes H, of the combustion-chamber L, substantially as and for the purpose described.

3. In an apparatus for removing snow and ice from streets, the combination, with the chamber L, of the adjustable apron M, substantially as and for the purpose described.

4. In an apparatus for removing snow and ice from streets, the combination, with the platform A, of the shovel N, provided with mold-board N', substantially as herein shown and described, whereby the slush is thrown to either side of the track, as set forth.

FREDERICK F. BIOREN.

Witnesses:

I. I. STORER,
C. SEDGWICK.