(No Model.)

2 Sheets—Sheet 1.

J. FORSTER.

SNOW CLEARER.

No. 295,995. Patented Apr. 1, 1884.

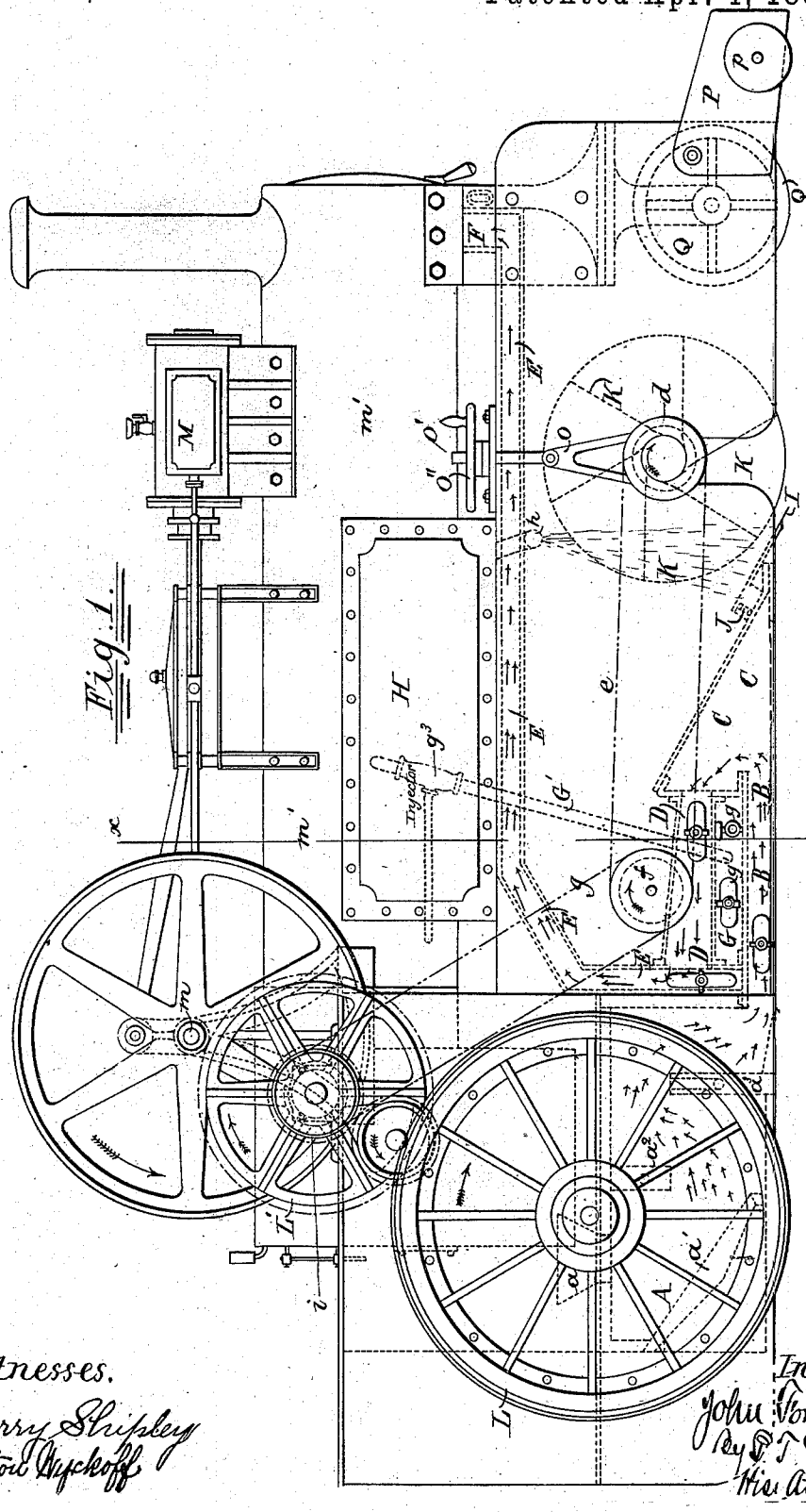

Fig. 1.

Witnesses.
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Newton Wyckoff

Inventor.
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By P. J. Dodge
His Attorney

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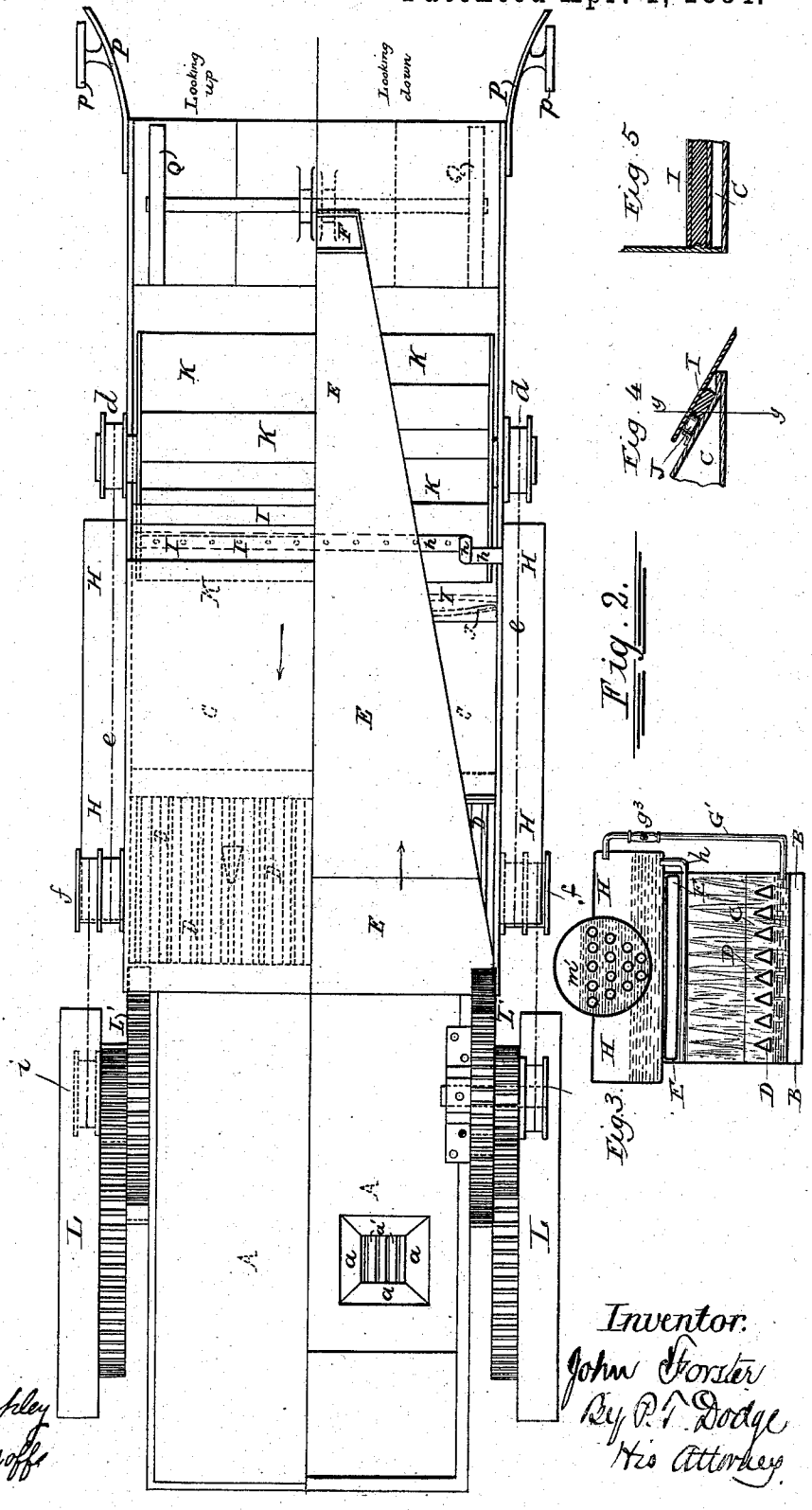

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Harry Shipley
Newton Wyckoff

Inventor:
John Forster
By P. T. Dodge
His Attorney

UNITED STATES PATENT OFFICE.

JOHN FORSTER, OF ST. HELEN'S, COUNTY OF LANCASTER, ENGLAND.

SNOW-CLEARER.

SPECIFICATION forming part of Letters Patent No. 295,995, dated April 1, 1884.

Application filed December 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN FORSTER, of St. Helen's, in the county of Lancaster, Kingdom of England, have invented certain new and useful Improvements in Track-Clearers, of which the following is a specification.

The object of this invention is to provide a machine whereby the snow may be removed from a roadway, melted, and the resulting water carried with the apparatus, to be discharged at such points and places as circumstances may require.

To this end it relates to a plowing mechanism to loosen the snow and throw the same into the path of the apparatus; to a revolving drum or beater whereby the snow is thrown backward; to a furnace provided with a peculiar arrangement of flues whereby the snow is melted; to a tank to receive the water, and to means for delivering the water to said tank; and the invention consists in the peculiar construction and arrangement of said parts hereinafter specified.

My invention may be embodied in traction-engines which are commonly employed on ordinary roads, or it may be used in an apparatus to be propelled by a locomotive for use on railways.

In the accompanying drawings I have illustrated the invention as embodied in a self-propelling road-engine of the same general construction as the so-called "traction-engines" now in common use.

Referring to the accompanying drawings, Figure 1 represents a side elevation of the complete machine, the arrangement of the internal flues and furnace being indicated by dotted lines. Fig. 2 is a plan view, the lower half of the figure presenting the parts as they appear upon looking downward from a point immediately above the boiler, while the upper half of the figure presents the parts as they appear on looking upward against them from the upper surface of the roadway. Fig. 3 is a vertical cross-section on the line $x\ x$ of Fig. 1. Fig. 4 is a vertical section lengthwise of the machine through the knife or scraper by which the snow is loosened from the roadway. Fig. 5 is a vertical cross-section of the same on the line $x'\ x'$, illustrating the guides by which the scraper is sustained.

Referring to the drawings, it will be seen that the machine is of the ordinary locomotive type, consisting, essentially, of a horizontal boiler having the fire-box at the rear end, and sustained by means of driving-wheels L at the rear and the steering-wheels Q at the front. On top of the boiler there is located a cylinder, M, of an ordinary steam-engine, which will contain the piston, valves, and other appliances commonly employed.

As represented in Fig. 1, the pitman of the engine is connected with a horizontal crank-shaft, *m*, provided with a fly-wheel and with a pinion engaging in a gear-wheel, L′, which is in turn connected, through intermediate gearing, with the driving-wheel L. This arrangement of parts, which is well understood in the art, and which constitutes no part of my invention, serves to transmit motion to the driving-wheels L, and thus to propel the machine.

At the rear end of the machine, near the ground, I provide two furnaces, A, of any approved construction, each extending half the width of the machine. A single furnace of full width may be employed; but it is preferred to use two narrow furnaces, as better results are secured. Each furnace is provided, as plainly represented in Fig. 1, with a fire-grate, a', with a depending bridge-wall, a^2, and with an uprising bridge-wall, a^3, this arrangement of parts compelling the products of combustion to pursue a serpentine course during their forward movement. From the forward side of each fire-box A, at a point as near the ground as it can be safely placed, I arrange a horizontal flue, B, through which the products of combustion are conducted into a forward chamber, C, the upper side of which is formed by a plate having a downward inclination toward the front, in order that the snow may be readily delivered upon and over the same. The products of combustion entering the chamber C keep the top plate in a highly-heated condition. The rear side of the chamber C is extended above the flue B, as shown, to receive the forward ends of the flues D, which extend backward therefrom, these flues being made preferably of a triangular form in cross-section. The after ends of these flues D, through which the products of combustion return from

the chamber C toward the rear of the machine, are connected at their rear extremities with a flue, E, which is carried thence upward to the under side of the boiler and forward in a horizontal direction to the stack or chimney at the front. It will be observed that there exists between the chamber C and flues D, on the one hand, and the upper flue, E, on the other hand, a horizontal space or chamber into which the snow may be delivered. It will be further observed that when the snow is delivered into this space or chamber it is subjected to the heating action on the top and on the bottom simultaneously. The space above the flue D and between the flue E and the rear end of the chamber C is closed at the sides, and serves as a tank or receptacle to receive and retain the water which results from the melting of the snow. Inasmuch as it is necessary to make this chamber of small capacity in order to reduce the height to which it is necessary to lift the snow, and inasmuch as it is necessary to carry the water until a large quantity has accumulated, so that it may be discharged at a convenient point, I provide a second tank or reservior, H, located above the upper flue, E, and connected with the lower reservoir by a pipe, G′. To this pipe, at a suitable point in its length, I connect a steam ejector or pump, g^3, adapted to elevate the water from the lower tank and deliver it into the upper. This feeding device, which in itself constitutes no part of my invention, may be of any suitable construction, many devices adapted for the purpose being familiar to those skilled in the art.

Having described the means by which the melting of the snow is effected, I will now describe the means by which the snow is delivered to the melting-surfaces. At the front of the machine there are two plates or deflectors, P, one on each side. Each of these plates is connected at its heel end by a horizontal pivot to the outside of the frame, in order that it may rise and fall freely at the forward end, to follow the surface of the roadway. In order to prevent the plates from encountering the surface, each one is provided on the outer side with a carrying-wheel, *p*, which projects slightly below the edge of the plate, to travel on the surface of the road. Each plate has its forward end curved outward, as represented in Fig. 2, whereby the two plates are caused to open a wide path in advance of the supporting-wheels of the machine, and to throw the snow inward centrally, that it may be delivered to the melting devices.

Between the deflectors P and the heating-chamber C, I mount a transverse rotary drum or scoop, K, arranged to drive the snow backward and upward over the heating-chamber C and beneath the upper heating-flue, E, and the melting-flues D. This drum or scoop consists of a horizontal shaft or hub having a series of blades applied tangentially thereto, as plainly represented in Figs. 1 and 2. The journals of this scoop are supported in plates or brackets O, the upper ends of which are connected to vertical screws O′, sustained by hand nuts or wheels O″, mounted on the frame, so that by turning said wheels the drum may be raised and lowered, in order that the edge of its blades may travel at a greater or less distance from the surface of the road, as circumstances may require. Motion may be communicated to the rotary drum or scoop in any suitable manner. A simple arrangement is that represented in the drawings, in which it will be seen that the ends of the drum-shaft are provided with pulleys *d*, which are connected by backwardly-extending chains *e* to pulleys *f*, which are in turn driven by chains *g* from the pulleys *i*, applied to the shaft of driving-gear L, before mentioned.

For the purpose of loosening the snow and assisting in the delivery of the same to the rotary drum, I arrange at the front end of the chamber C a downwardly and forwardly projecting shovel or scraper, I, which may consist of a single blade extending entirely across the machine or a series of narrow blades arranged side by side. These plates are arranged to slide forward and backward in guides of any suitable character, and are urged forward by a spring, J, by which they are held normally in their forward position, but permitted to yield in the event of obstructions being encountered.

To assist in the melting of the snow, I provide immediately beneath the upper flue, E, a transverse pipe, *h*, provided with a series of perforations, and connect it with a reservoir, H. By means of this pipe the water will be sprayed upon the snow from above. It is found that the water thus applied is efficacious not only by reason of its temperature and of its direct melting action, but also because of its assisting to compact and condense the snow, that it may be advantageously delivered to the melting-surfaces.

The operation of the machine is as follows: The fire being started in the furnace or furnaces A and the engine set in motion in the ordinary manner, the machine moves steadily forward. The products of combustion from the furnace A pass through the flue B into the chamber C, thence backward through the flue D into the flue E, through which they rise and pass to the front. The deflectors P open a roadway, throwing the snow inward in line with the center of the machine. The advance of the machine causes the blades I to loosen the snow, and the blades of the rapidly-revolving drum to act upon the same and throw it rapidly back between the upper and lower heating-surfaces. The snow resting on the flues D is rapidly melted and the resulting water accumulated in the chamber G, from which it is elevated to the reservoir H.

Having thus described my invention, what I claim is—

1. In a snow-plow, a chamber located near

the surface of the road, and having its upper surface inclined in a forward and downward direction, a rotary drum whereby the snow is delivered directly from the road over said surface, and means, substantially as described, for heating said chamber internally.

2. In combination with a wheeled frame, a furnace, a forward chamber, through which the heated products of combustion are conducted from the furnace, and a rotary drum, whereby snow is delivered from the road directly to the top of said chamber.

3. A wheeled frame, in combination with the furnace A, the chamber C, communicating with said furnace by the passage B, the returning-flue D, and the flue E, extending forward above the snow-passage.

4. In a snow-plow, a heated under flue or chamber, a heated upper flue, and means, substantially as described, for delivering the snow backward between said flues.

5. In combination with the wheeled frame, its furnace, the passage B, chamber C, flues D, water-receptacle G, elevated reservoir H, and means, substantially as described, for elevating the water thereto.

6. In combination with the heating-chamber C, having the inclined top, the yielding scraper in advance thereof, and the rotary drum.

7. In combination with the wheeled frame, provided with means, substantially as described, for melting the snow, the forward plows, P, pivoted to the arm, and provided with the sustaining-wheels *p*, as described.

8. In a track-clearer, the combination of the artificial means, substantially as described, for heating and melting the snow, with means for spraying the snow with water.

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

JOHN FORSTER.

Witnesses:
WM. P. THOMPSON,
I. OWDEN O'BRIEN.