(No Model.) 4 Sheets—Sheet 1.

A. A. SMITH.

MACHINE FOR FORMING ROADS AND PATHS UPON BODIES OF SNOW.

No. 286,969. Patented Oct. 16, 1883.

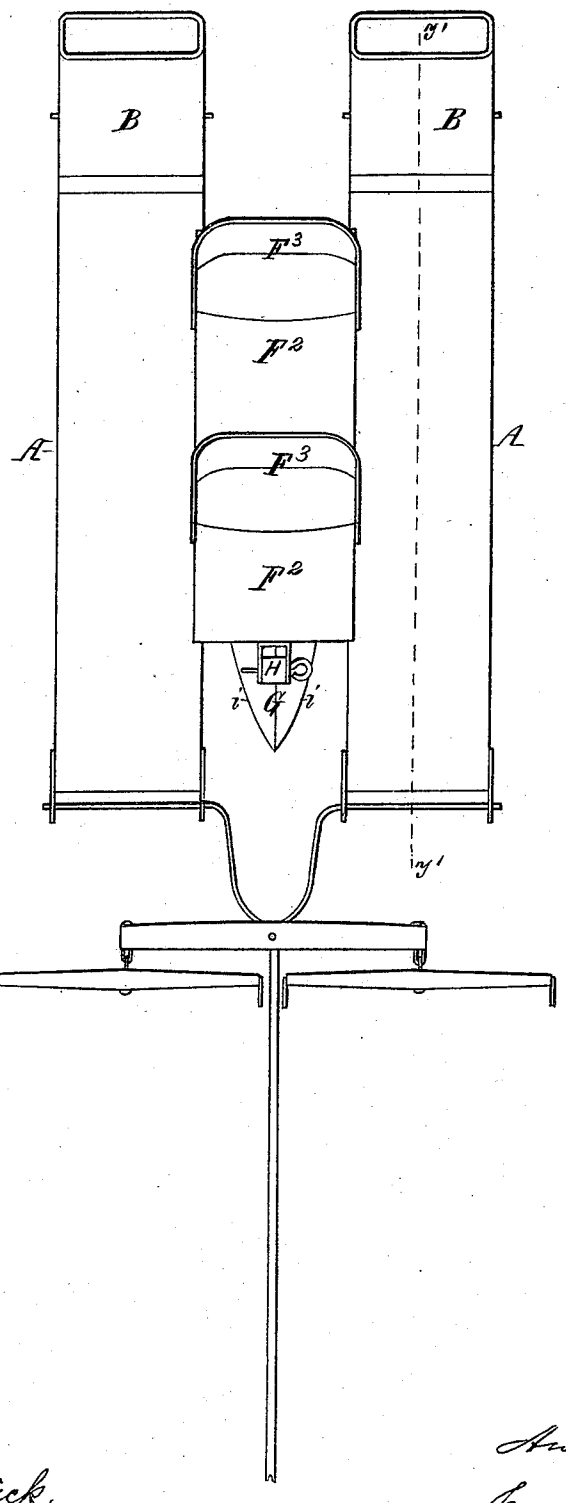


Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

A. A. SMITH.

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Fig. 2.

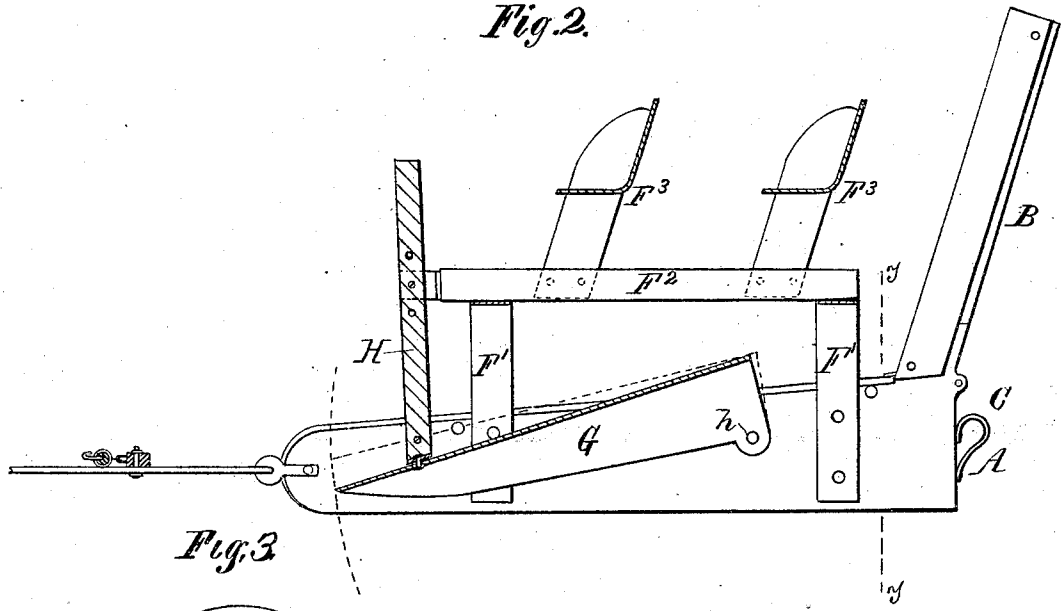


Fig. 3

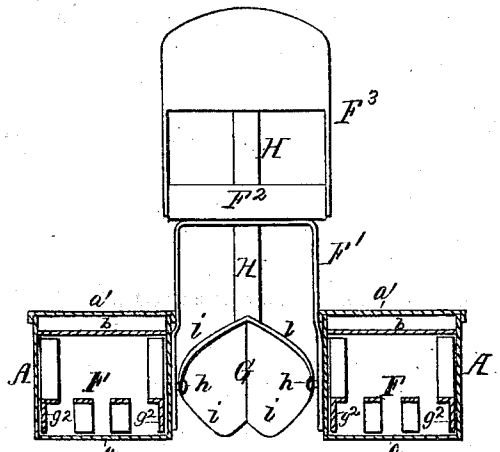


Fig. 4.

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A. A. SMITH.

MACHINE FOR FORMING ROADS AND PATHS UPON BODIES OF SNOW.

No. 286,969. Patented Oct. 16, 1883.

Fig 6.

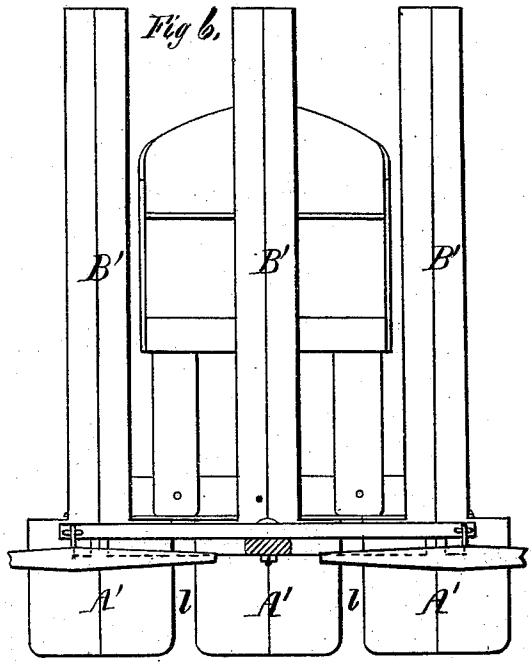


Fig 7.

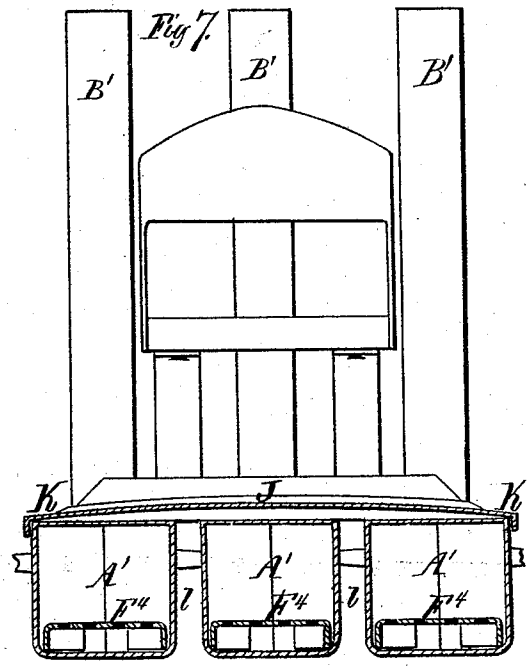
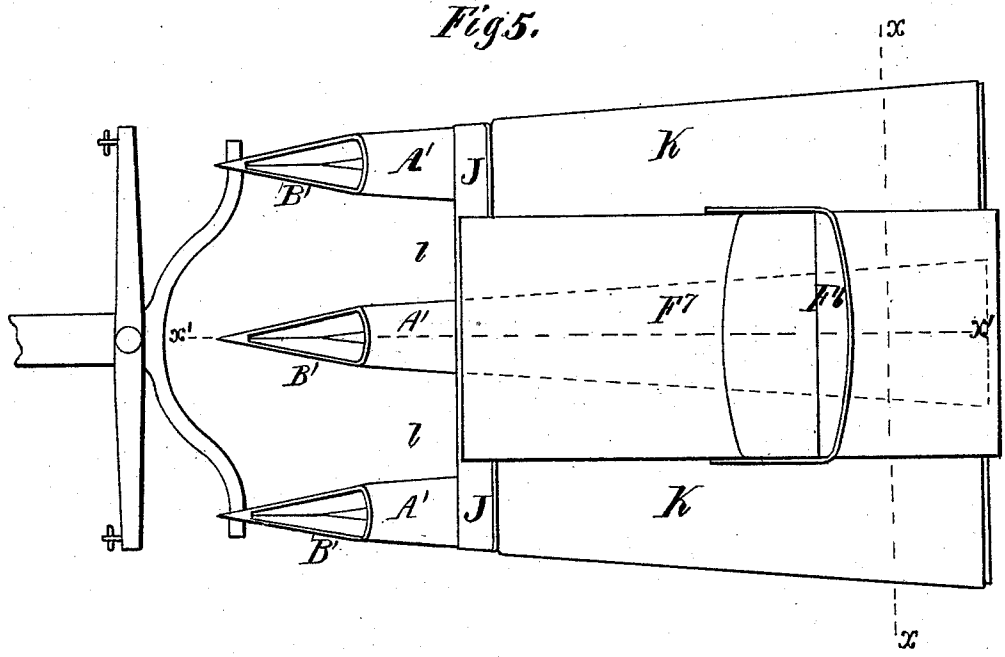


Fig 5.



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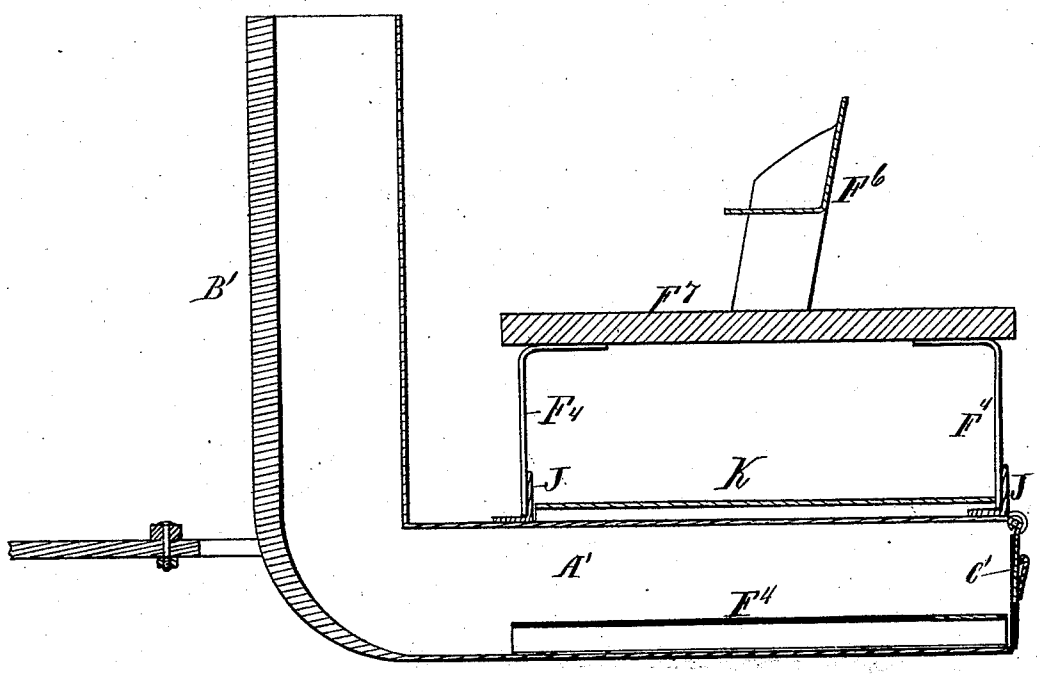
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A. A. SMITH.

MACHINE FOR FORMING ROADS AND PATHS UPON BODIES OF SNOW.

No. 286,969. Patented Oct. 16, 1883.

Fig 8.



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UNITED STATES PATENT OFFICE.

ANDREW A. SMITH, OF CRESTED BUTTE, COLORADO.

MACHINE FOR FORMING ROADS AND PATHS UPON BODIES OF SNOW.

SPECIFICATION forming part of Letters Patent No. 286,969, dated October 16, 1883.

Application filed October 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, ANDREW A. SMITH, a citizen of the United States, residing at Crested Butte, in the county of Gunnison and State of Colorado, have invented a new and improved machine for use in the formation of iced sled-roads, wagon-ways, and paths on bodies of snow of great depth; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, in which—

Figure 1 is a plan view of my improved machine for forming iced wagon ways or roads and paths on bodies of snow having great depth. Fig. 2 is a vertical longitudinal central section of the body portion of Fig. 1. Fig. 3 is a cross-section in the line *y y* of Fig. 2, and Fig. 4 is a vertical longitudinal section in the line *y' y'* of Fig. 1. Fig. 5 is a plan view, showing a modification of the machine represented in Figs. 1, 2, 3, and 4. Fig. 6 is a front view of Fig. 5; Fig. 7, a cross-section on the line *x x* of Fig. 5, and Fig. 8 a vertical longitudinal section on line *x' x'* of Fig. 5.

The object of my invention is the production of a machine with the use of which wagon roads and paths having a bed or foundation of ice may be made on bodies of snow having great depth—as, for example, in that region of the United States known as the Rocky Mountains, and also in regions where wagon ways and paths, owing to the depth of the snow, cannot be made by the ordinary means employed for such purpose.

Having reference to Figs. 1, 2, 3, and 4 of the drawings, A indicates the main or body portion of my furnace sled-runner, the same being made hollow and preferably of plate metal, and in general outline in the likeness of a sled-runner, its bottom portion, *a*, being rounded at its front end, as at a^4, to facilitate its travel when in use. At its rear end a draft-flue, as at B, is made to communicate with said body portion through a smoke and combustion passage, *b*, this passage being formed by the top portion, *a'*, and a plate, a^2, extending from side to side of the body portion A, but open at a^3 for the entrance of products of combustion on their passage from the combustion-chamber *f* to the draft-flue B. In the combustion-chamber *f*, which extends interiorly from the front to the rear end of the machine, I provide a suitable fire-bed, F, which, for economy, may be made of sheet metal slotted longitudinally and with forward portions, as *g*, turned up to prevent the fuel from passing over the front end of the grate, and with turned-down portions, as *g'*, to serve as supports for the front end, while longitudinal side portions, as g^2, serve as the main support of the grate upon the bottom *a* of the chamber *f*, as shown. I do not confine myself to this form of fire-bed, nor, indeed, to the use of any grated fire-bed, since a fire might with good effect be built directly upon the bottom *a* of the combustion-chamber *f*. I however preferably employ a grated fire-bed within the chamber *f* for the fuel to rest upon.

C indicates a fuel-supply and draft door, hinged at top to the body portion A, as shown, and provided with one or more openings, *f'*, for the admission of air into the chamber *f*, to promote combustion.

I have thus far, in the main, described one form or construction of my "furnace sled-runners," which in practice are made from four feet up to ten feet in length, and from two to four feet in width, and which, when used singly for constructing pathways in snow, may be drawn by hand by any proper draft appliance attached to a forward portion, *d*, as shown in Fig. 4; but when a roadway is to be made two of the furnace sled-runners may be employed, as represented in Figs. 1 and 3, the same being connected together by standards F', upon which is secured a platform, F^2, provided with seats F^3, as shown. In this case I employ an adjustable snow-plow, G, between the two furnace sled-runners, which, at its rear end, is pivotally attached to the respective furnace sled-runners, as indicated at *h*, while the forward end, as shown, is properly connected to an adjusting-beam, H, so connected with the platform F^2, as signified in Figs. 1 and 2, that the forward end of the plow may be elevated or depressed at pleasure for the purpose of plowing up more or less snow, as may be desired, which, by the advancing movement of the machine, is forced up the inclined sides *i i* of the plow, and thence is delivered against the adjacent sides and upon the top of the two furnace sled-runners to which the plow G is attached. When two furnace sled-runners are thus employed, appliances for drawing the same by a team are connected therewith, as signified in Figs. 1 and 2. In operation, a fire

having been built upon the fire-bed F, the walls of the metal furnace sled runner or runners become heated more or less, as desired, and when a single runner is employed and drawn along upon the snow the track made in the snow will be of a width suitable for "pathways," the heat melting the snow beneath and at the sides of the furnace sled-runner, and the water thus produced saturating the snow beneath the machine and at its sides, so that when the saturated snow along the track of the machine freezes, as it soon will in rigorous climate, an ice-bed will be formed at the bottom of the track sufficient to sustain travel thereupon, and thus form a solid and suitable pathway on top of a body of snow, which could not be made as expeditiously and cheaply by any of the means heretofore employed for making pathways in snow. When a roadway is to be made, I then employ two furnace sled-runners having a snow-plow interposed between them, as represented in Figs. 2 and 3, the plow serving to form a portion of the roadway as well as deliver the snow upon and against the furnace-runners, thereby quickly melting large quantities of the snow, and as the water thus produced runs down into the track, thereby saturating the snow beneath the machine and soon thereafter becoming frozen, a solid roadway for wagons and heavy teams may be formed on top of bodies of snow of great depth, which heretofore it has been impracticable to form.

In Figs. 5, 6, 7, and 8, I have shown a modified form of machine for utilizing my said invention, and in this case I employ three furnace sled-runners, made hollow and provided inside with a fire-bed upon which to build fires, and with draft-doors and draft-flues. As shown in said figures, A′ indicates the furnace sled-runners; F^4, the fire-beds; C′, the fuel-supply and draft doors, and B′ the draft-flues. In this instance the draft-flues are at the forward ends of the furnace-runners, and are made of V form, as signified in the figures, so as to adapt them to cut into the snow as the machine advances, and are also made of wedging form bodily, as indicated by dotted lines in Fig. 5, so as to crowd or wedge the snow between and against the heated runners as the machine moves forward, thereby dispensing with the snow-plow G. (Shown in Figs. 1, 2, and 3.) The bottoms of the furnace-runners A′ are flat, so as to have a broad bearing upon the snow in the act of use, and are held in juxtaposition by cross tie-plates J in front and rear, as shown in the figures. To these plates standards F^4 are applied, as shown, which support a driver's seat, F^6, upon a platform, F^7, which in length and width is sufficient to cover the main portion of the central furnace-runner, the platform thus serving not only for the driver's seat, but to protect the driver from the heat of the furnace-runner over which the seat is located. Beneath this platform, and over the entire set of furnace-runners A′ A′ A′, I apply, as indicated in Figs. 5, 7, and 8, a jacket, K, the office of which is to prevent under escape of heat from said furnace-runners, as well as to confine the heat in the spaces *l* between the furnace-runners, and thus more effectively melt the snow which is forced into said spaces as the machine moves forward.

I am aware of Letters Patent Nos. 197,905, 145,822, and 229,936, and therefore do not claim a fire-chamber which is mounted either upon ordinary side sleigh-runners or upon carriage-wheels, as my invention comprises a fire-chamber the bottom, sides, and ends of which constitute a sleigh-runner which is hollow, and serves both as a sleigh-runner and furnace, which furnace sleigh-runner rests directly upon the snow and has the snow forced against its sides and top, and by such contact therewith melts the snow and forms an ice roadway or path upon deep beds of snow; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The sleigh-runner furnace, comprising a base, sides, ends, and top, and a fire-bed, draft-flue, and doors, in combination with the supporting-frame of an ice road or path making machine, whereby the highly-heated base of the runner-furnace is placed in direct contact with snow beneath it, and thus the bottom as well as the sides and top of the runner-furnace made to melt the snow, substantially as and for the purpose described.

2. The combination of a snow-plow with furnace sleigh-runners which are hollow and provided with fire-beds on their inside, and with a fuel-supply and draft door and a draft-flue, whereby the ice road or pathway making machine can be supported directly by the furnace sleigh-runners, and the snow melted beneath the runners by direct contact of the furnace sleigh-runners therewith, while the snow between the furnace sleigh-runners is forced by the snow-plow against the sides and top of the furnace sleigh-runners and melted by contact therewith, substantially as and for the purpose described.

3. The sleigh provided with the snow-plow, and having the supporting-runners formed with fire-chambers having suitable fire-beds, draft-passages, flues, and fuel-supply doors, whereby ice roads and paths may be formed on beds of deep snow as follows, to wit: by forcing the snow against the outside surfaces of the heated hollow moving sleigh-runners and subjecting the snow beneath the runners to the direct contact of the heat of the runners, this operation causing the snow to be melted and formed into water, which, by becoming frozen, forms a solid ice surface upon a deep bed of snow beneath, substantially as described.

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