2 Sheets--Sheet 1.

J. W. ARNOLD.

Railway Snow-Plows.

No. 138,836. Patented May 13, 1873.

Fig. 1.

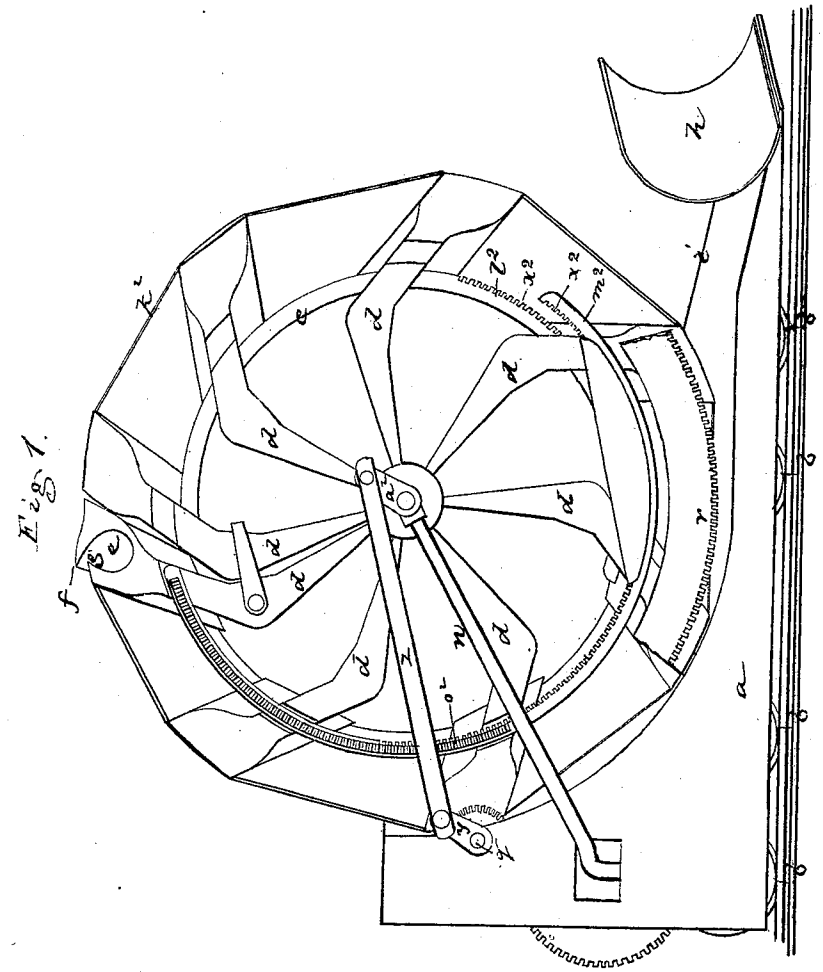
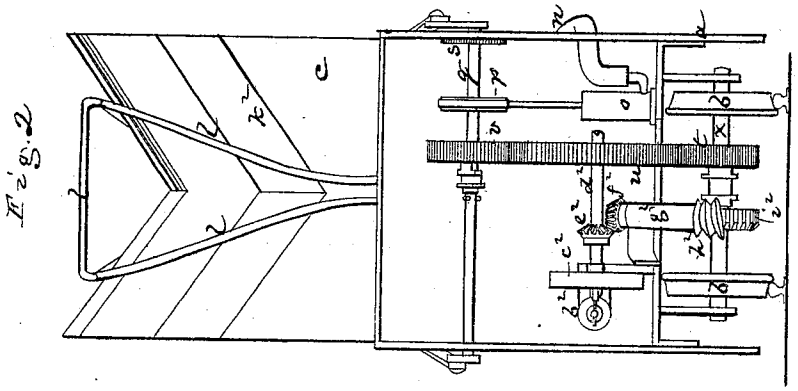


Fig. 2.



Witnesses.
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L. H. Latimer.

Inventor
James W. Arnold,
By his Attys.
Crosby & Gould.

2 Sheets--Sheet 2.

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Fig. 4.

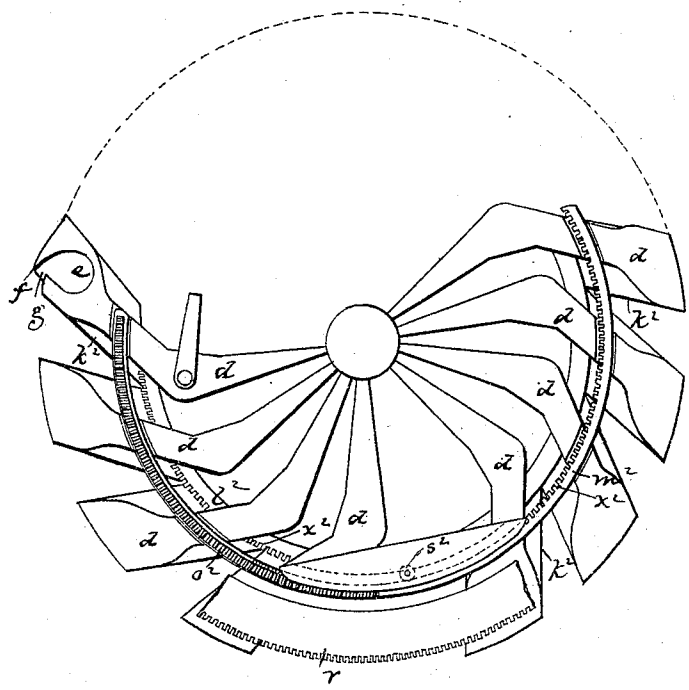
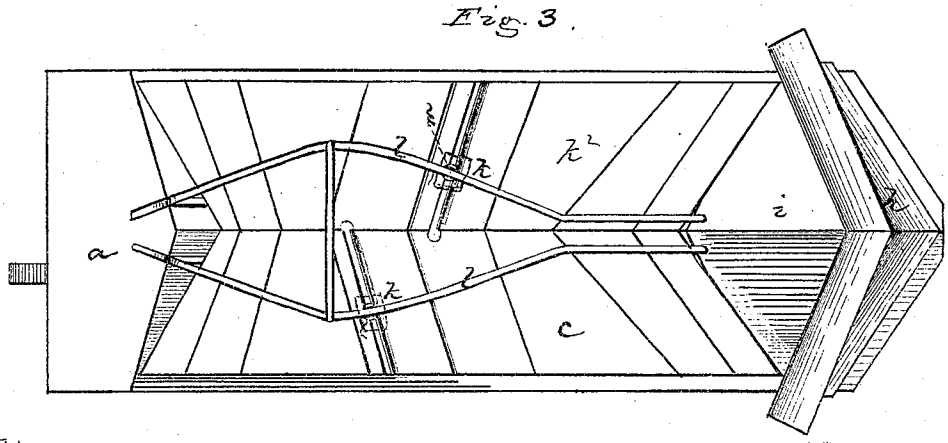


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES W. ARNOLD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN RAILWAY SNOW-PLOWS.

Specification forming part of Letters Patent No. **138,836**, dated May 13, 1873; application filed February 27, 1873.

To all whom it may concern:

Be it known that I, JAMES W. ARNOLD, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Snow-Plow; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The invention relates to the construction of a snow plow or clearer to be used upon railways for the removal of obstructing snows.

In my invention I use a large wheel of sufficient width to clear a track for passage of a train, in the perimeter of which wheel is arranged a series of blades or shovels extending from throats leading inward into tubes, these tubes having pistons that are driven inward and outward. The wheel is mounted upon a truck mechanism to run upon the track, and has gudgeons turning in suitable bearings, and by movement of the truck-wheels or by special mechanism operated by an engine the wheel is rotated. As the blades or shovels strike the snow they force it through the throats and the tubes become filled therewith. Then, as the movement of the wheel carries each tube of the wheel above the snow the pistons of said tube (which, as the tube fills, are at the center thereof) are thrown outward or toward the outer ends of the tubes, and by their outward movement they eject from the tubes the snow thrown into them by the movement of the blades or shovels against the snow. It is in this snow plow or wheel thus generally organized that my invention primarily consists.

The drawing represents a snow-plow embodying my construction, or sufficient of such construction to enable my invention to be clearly understood.

Figure 1 shows the plow in side elevation. Fig. 2 is an end view of it. Fig. 3 is a plan of the wheel.

a denotes the truck or frame having wheels *b* for running upon the track. *c* denotes the wheel, having an axle turning in suitable boxes. The hub and perimeter of the wheel are connected by a double series of spokes, *d*, said perimeter being shaped as seen in Fig. 3, and at the end of each two opposite spokes are tubes *e*, from each of which extends a blade or shovel, *f*, the blade standing in front of a throat, *g*, leading to the tube, as seen in Fig. 1. The snow near the level of the track may be cleared by a share, *h*, and back of this is an incline, *i*, upon which the snow is presented to the action of the wheel. As the wheel is rotated the blades *f*, by an angular presentation, take up the snow and lodge it in the tubes *e*, from which tubes it is thrown as follows: In each tube is a piston, *k*, and by any suitable mechanism the piston is drawn to the inner end of the tube, (or to the center of the tube, treating each two tubes in line as one,) before the blades emerge above the incline *i*. The tubes are then filled with snow, and as they rise, by the rotative movement of the wheel, the pistons are forced out by any suitable mechanism, thereby driving out the snow lodged in them by the action of the shovels, the pistons being again thrown in as the wheel continues to rotate or before they next rise above the incline *i*.

The pistons may be operated as follows: A cam-wire, *l*, extends around the wheel, and to this wire each piston is connected by a fork, *m*, that straddles the wire. The wire is stationary with relation to the truck, and it is so formed as to impart to the pistons the requisite inward and outward movements. The pistons may, however, be operated by pressure of steam or compressed air, each piston having a rod extending into a cylinder, which is connected to a boiler or tank by suitable pipes. For this purpose the axle of the wheel may be encompassed by a chamber supplied with steam or compressed air by a connecting-pipe, *n*, extending from the boiler or from a pump, *o*, suitable supply and cut-off valvular mechanism being applied, so that the steam or compressed air will be thrown into the cylinder at the proper times to drive the ejecting-pistons outward, and the exhaust-passages will be opened at proper times to permit the pistons to be thrown back. The piston of the air-pump *o* may be operated by an eccentric, *p*, on a shaft, *q*.

To drive the wheel *c* connections may be made between the truck-wheel axles and a gear, *r*, forming part of the wheel *c*, and for this purpose the truck-axle *x* may carry a gear, *t*, meshing into and driving a gear, *u*, that engages with and drives a gear, *v*, on the shaft *q*, such

shaft carrying the gear s that drives the gear r; or the shaft q may have crank-arms y connected by links z with crank-arms a^2 on the journals of the wheel c.

The truck-wheels may be driven by a special engine, b^2, the piston-rod of the cylinder of such engine being connected with a crank-pin extending from a wheel, c^2, on the shaft d^2, and this shaft, by suitable gears e^2 f^2, shaft g^2, and worm-wheels h^2 i^2, with the truck-shaft x, the shaft q being driven by direct connection with the shaft d^2, or by the gear connection with the axle x. Suitable clutch mechanism may be connected with the gear mechanism to regulate the movements of the truck and of the wheel c. The wheel c may be made of any suitable diameter as may prove most effective, but will sometimes need to stand too high to permit it to run under railroad bridges where the railroad runs under the grade of the highway. For such roads the wheel may be made collapsible or in sections, the parts of which close together. In such case the perimeter of the wheel is made flexible or with a flexible band, k^2, so that each spoke d and the blade carried by it may close back upon the one next to it. For this purpose the wheel is made in two parts, each having a half-ring, l^2 or m^2, upon which are gear-teeth x^2, two adjacent spokes being fastened to the ends of the opposite half-rings of each half of the wheel, and the rings passing through grooves in the sides of the other spokes. One half-ring is made smaller than the other, so that as the parts are closed together the half-ring l^2 will run inside of the larger half-ring m^2.

The half-rings may be operated as follows: On the face of each or either of the two rings for one-half of the wheel gear-teeth o^2 may be formed, into which teeth a gear-pinion meshes, said pinion being fast on a shaft to be driven by any suitable connection with the engine or the truck, so that as the shaft is turned in one direction the half-rings l^2 m^2 will be turned.

The half-rings m^2 also have gear-teeth x^2 on their inner edges, into which teeth mesh pinions s^2 that also engage with similar teeth a^2 on the other half-ring l^2, and as the rings m^2 are turned to carry them down the half-rings b^2 will also be drawn down in the opposite direction, thereby closing the two sets, the spokes coming together as the half-rings fall and the flexible band doubling or folding between the spokes. With such arrangement some other means than the cam-wire l will be used for operating the pistons to clear the tubes. The pistons k are faced with leather or other suitable material, to prevent adhesion of snow thereto.

I claim—

1. In combination with a car-truck, the wheel c made with blades f, tubes e, and throats or openings g, substantially as described.

2. In combination with the tubes, the ejector-pistons k, substantially as described.

3. In combination with the wheel c, tubes e, and pistons k, the cam-wire for operating the pistons.

4. In combination with the wheel, tubes, and pistons, the steam or compressed-air tube o, substantially as described.

5. In combination with the tube, the pump o having a piston operated by an eccentric, p, on the shaft q, substantially as shown and described.

6. For driving the wheel c, the cranks a^2 y, connecting-rod z, shaft q, and the gears v u t, for connecting the shaft q with the truck-wheel axle.

7. The combination of the engine b^2, shaft d^2, gears e^2 f^2, and shaft g^2, for operating the truck-axle, substantially as described.

8. The construction of the wheel with a collapsible series of tube-supporting spokes and a flexible band, k^2, and the combination therewith of the movable half-rings l^2 m^2 for opening and closing the wheel, all substantially as described.

JAMES W. ARNOLD.

Witnesses:

FRANCIS GOULD,

M. W. FROTHINGHAM.