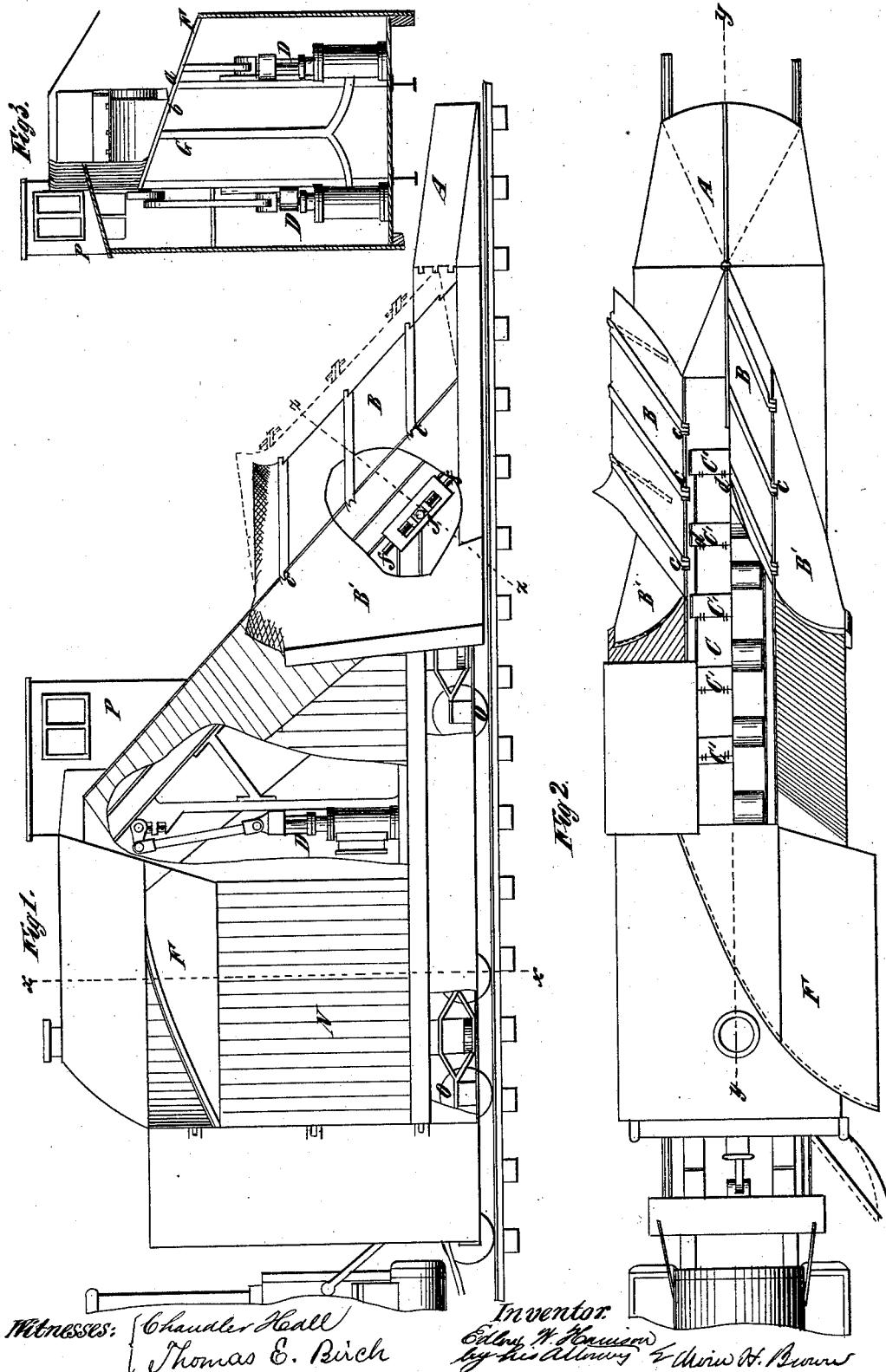


E. W. HARRISON.

## Snow-Plow.

No. 216,272.

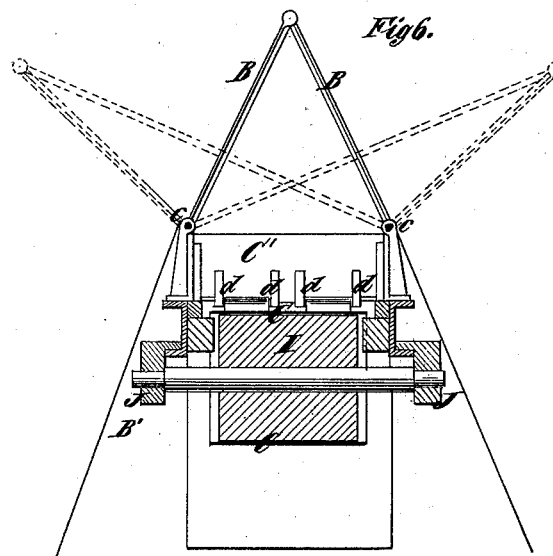
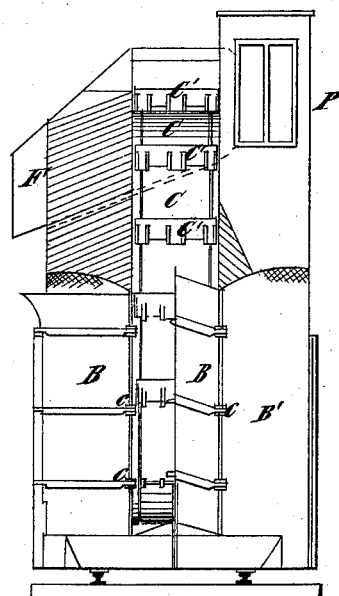
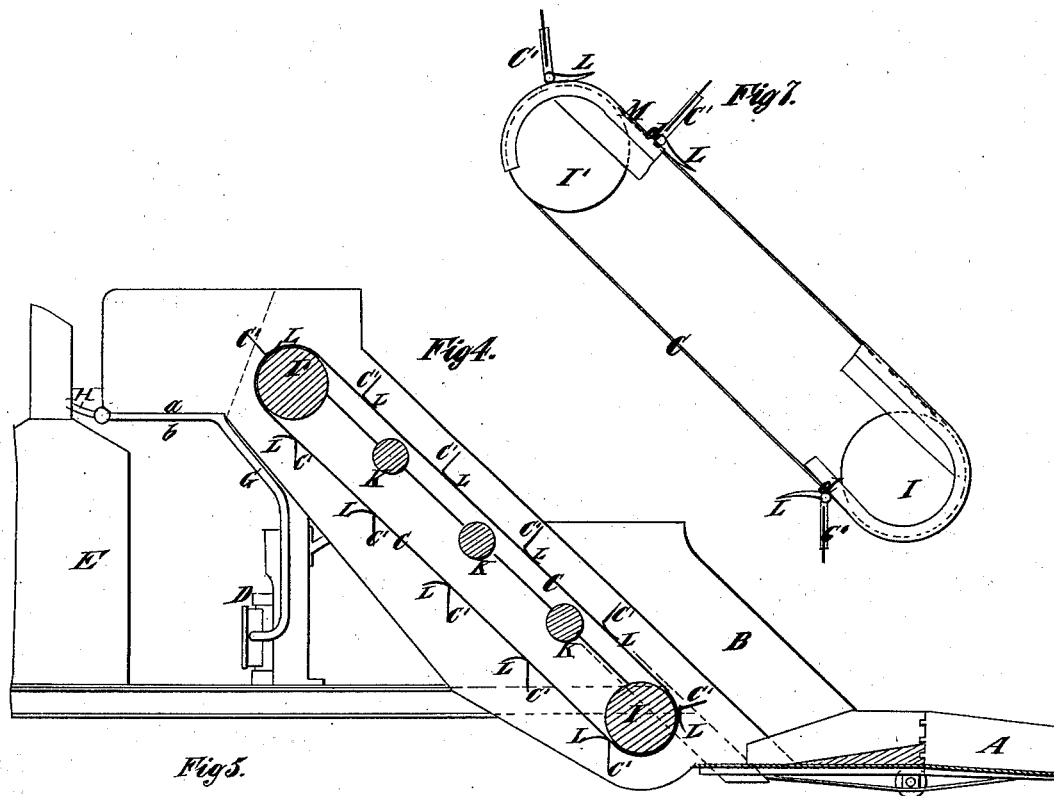
**Patented June 10, 1879.**



E. W. HARRISON.  
Snow-Plow.

No. 216,272.

Patented June 10, 1879.



Witnesses  
Chauncer Hall,  
Thomas C. Birch.

Inventor  
Edwin W. Harrison  
by his Attorney  
Lewis H. Brown

# UNITED STATES PATENT OFFICE.

EDLOW W. HARRISON, OF JERSEY CITY, NEW JERSEY.

## IMPROVEMENT IN SNOW-PLOWS.

Specification forming part of Letters Patent No. **216,272**, dated June 10, 1879; application filed April 23, 1878.

*To all whom it may concern:*

Be it known that I, EDLOW W. HARRISON, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Snow-Plows, of which the following is a specification.

One of my improvements consists in the combination, in a snow-plow, of a share, hinged wings or covers, forming part of a mold-board, and an excavator and elevator, to which access may be obtained on the opening of such wings or covers, whereby I provide a snow-plow which, when used to clear away snow which is too deep to be removed by the forcing of the plow through it, can have the wings or covers swung back, so that the elevator may carry off the snow and deliver it in any suitable receptacle or at the side of the track.

Another improvement consists in the combination, in a snow-plow, with an elevator and a steam-engine for operating such elevator, of a chute or receptacle for receiving the snow from said elevator, having a vibratory surface and means for conducting steam exhausted from the steam-engine under the vibratory surface of said receptacle, so that it may heat the same, and as it puffs out impart to it a tremulous or jarring motion, whereby the snow may be readily discharged from the said receptacle at the side of the plow.

Another improvement consists in the combination, with an excavator and elevator composed of an endless band or belt and buckets, blades, or shovels thereon, of means for supporting said buckets, blades, or shovels independently of the band or belt, whereby the latter is relieved from much of the strain usually exerted upon it, and has only to draw the buckets, blades, or shovels along.

Other improvements consist in details of construction, to be hereinafter explained.

In the accompanying drawings, Figure 1 is a side elevation of a plow embodying my invention, and having a portion of the side framework or casing and part of the mold-board of the plow removed to show the interior. Fig. 2 is a plan or top view of the same, with one-half of the belt removed to show the interior, one of the hinged wings or covers in position to do the work of an ordinary plow, and the

other open and in position for using the machine as an excavator. Fig. 3 is a transverse section, looking forward from the line *xx*, Fig. 1. Fig. 4 is a longitudinal section through the line *yy*, Fig. 2. Fig. 5 is a front view of the plow, with one wing or cover in position for use as an ordinary snow-plow, and the other open to admit of the use of the excavator. Fig. 6 is a section through the line *zz*, Fig. 1. Fig. 7 is a side view of portions of the excavator, showing the construction of its buckets, blades, or shovels, the slides or wings upon which they travel, and the manner in which the buckets, blades, or shovels turn around the upper and lower drums.

Similar letters of reference designate corresponding parts in all the figures.

A designates a plowshare suitably shaped to turn a light body of snow aside from a railroad-track. B B designate two wings or covers, which may be formed of boiler-iron or other suitable material, and constitute a part of what may be termed a "double mold-board," adapted, on entering a body of snow, to turn it on each side of a track. They are shown as being hinged at *c* to the mold-board proper, B', so that they may be brought together, as shown in bold outline in Fig. 6, and bolted or locked by suitable fastenings in order to form the point of a snow-plow similar in general form to those in common use, or so that they may be swung open, as shown by dotted lines in Fig. 6, and as one is shown in Figs. 2 and 5, and held in place by iron rods or other suitable braces in order to form a scoop for the collection of the snow.

C is an excavator and elevator. D D are steam-engines, by which it is operated, and E is a steam generator or boiler for supplying said engines with steam. F is a discharging-chute, formed with a double bottom, *a b*, (see Figs. 3 and 4,) into the space left between which the exhaust-pipes of the engines D discharge, as shown at G, Figs. 3 and 4. The upper bottom, *a*, is made of sheet metal, or its equivalent, so as to form a flexible surface, and the exhaust-steam, passing in puffs from the steam-engines into the space under this bottom *a*, is hot and imparts to it a tremulous vibratory movement, so that the snow will, as

it melts, glance or slide off the chute with facility. After leaving the chute the steam is discharged into a funnel or stack by the pipe H. (See Fig. 4.)

The excavator and elevator consists of an endless belt of india-rubber or other suitable material, C, provided with buckets, blades, or shovels C', and running over revolving drums I I', motion being transmitted to the belt, in this example of my invention, through the upper drum, I'.

J (see Figs. 1 and 6) are adjustable boxes fitting in slides and receiving the journal-boxes of the lower drum, I, screws f' being employed in connection with said boxes to provide for adjusting them, and the drum supported by them in the direction of the length of the belt, so that the belt can be properly tightened.

In addition to the drums I I', I preferably employ friction-rollers K, (see Fig. 4,) to support the endless belt of the excavator and elevator.

The buckets, blades, or shovels C' of the excavator and elevator (see particularly Figs. 6 and 7) are shown as flat, and may be formed of wood or metal. They are attached to the belt C by hinges, (shown at d,) and in order to prevent them falling or pressing back against the belt when at work they are provided with supports independent of the belt, such as elbow-like runners L, bearing upon slideways M, arranged at the sides of the said belt, or at the sides of the upper portions thereof, and at the sides of the drums therefor. (See particularly Fig. 7.) By this means the belt is relieved of the weight of the buckets, blades, or shovels, and supported at short distances. Moreover, as the buckets, blades, or shovels may thus be kept upright when connected only along a single line to the belt, the danger of the shovels ripping the belt in its passage over the drums is very materially lessened.

N designates a casing inclosing the upper portion of the excavator, the engines, and generator or boiler. O designates wheels upon which the plow is to run, and P designates the cab and lookout of the plow.

The manner in which I prefer to operate the machine is as follows: When a line of railway is blocked with snow the plow is to be placed in front of a propelling-engine, with the wings or covers B closed. The plow on being propelled into the snow will push it aside with the same facility as an ordinary large-sized snow-plow. On getting into a drift where the propelling force of the engine will not suffice to force the plow onward, and the ordinary method of plowing fails, the wings or covers are to be thrown open and the en-

gine D started, so as to set the excavator and the elevator C in motion. The plow being then pushed forward into the snow with a proper speed, the excavator and elevator is forced into the snow, and its buckets, blades, or shovels carry the snow up, and, on turning the upper drum, throw it into the chute F, whence, owing to the steam-heating and vibrating of the upper surface it slips off quickly and falls to the outside of the track.

It is obvious that the form of the plow-share, mold-board, and chute may be such that snow may be delivered on either one or both sides of a track.

It will be seen that by my invention I provide a snow-plow that has the functions both of an ordinary snow-plow and an excavator-plow, and is very useful and convenient, because it can be readily converted into form for serving as either.

The excavator and elevator, or certain features thereof, may advantageously be employed in various apparatus, as, for instance, grain conveyers, ore-breaking apparatus, &c.

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

1. The combination, in a snow-plow, of a share, hinged wings or covers, and an excavator and elevator, to which access may be obtained on the opening of such wings or covers, substantially as and for the purpose specified.

2. The combination, in a snow-plow, of a share, an excavator and elevator, and wings or covers forming part of the mold-board, and adapted, on being opened, to afford access to the excavator and elevator, to form a scoop for guiding snow to the excavator and elevator, substantially as specified.

3. The combination, in a snow-plow, with an excavator and elevator and a steam-engine for operating the latter, of a chute or receptacle for receiving the snow therefrom, having a surface and means for conducting the steam exhausted from the engine under the surface of the chute or receptacle, substantially as and for the purpose specified.

4. The combination, in an excavator and elevator, of a belt or band, buckets, blades, or shovels attached thereto, and elbow-like runners extending from the buckets, blades, or shovels, and bearing against slideways at the sides of the belt or band, substantially as and for the purpose specified.

EDLOW W. HARRISON.

Witnesses:

CHANDLER HALL,  
EDWIN H. BROWN.