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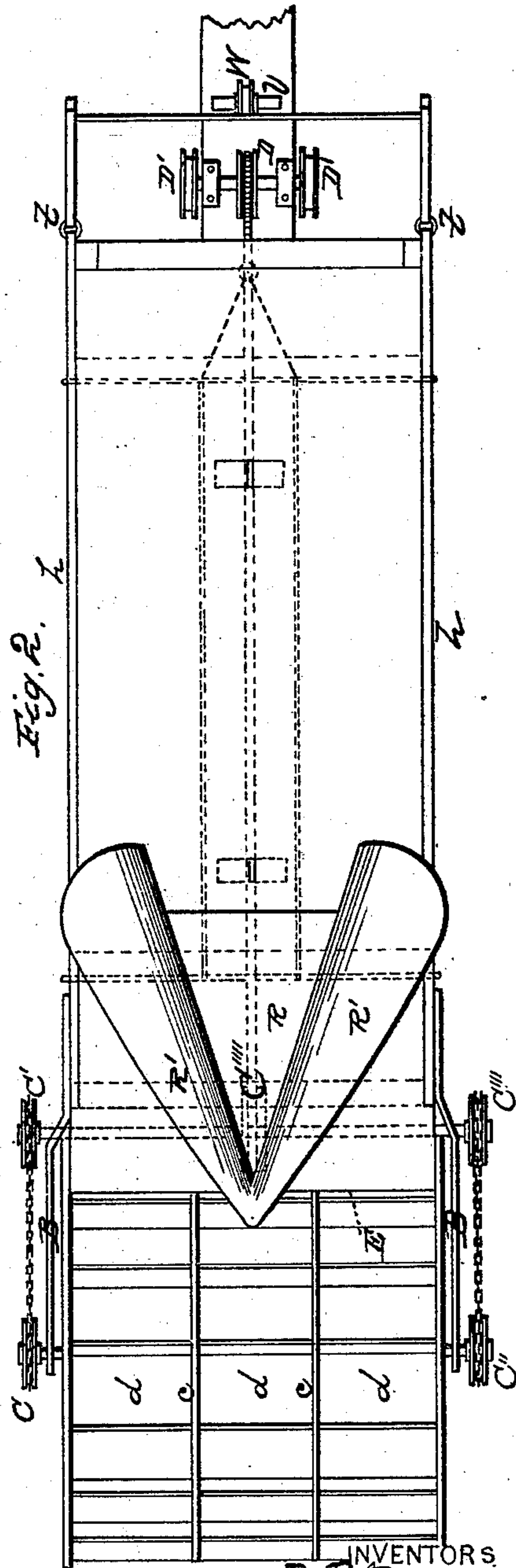
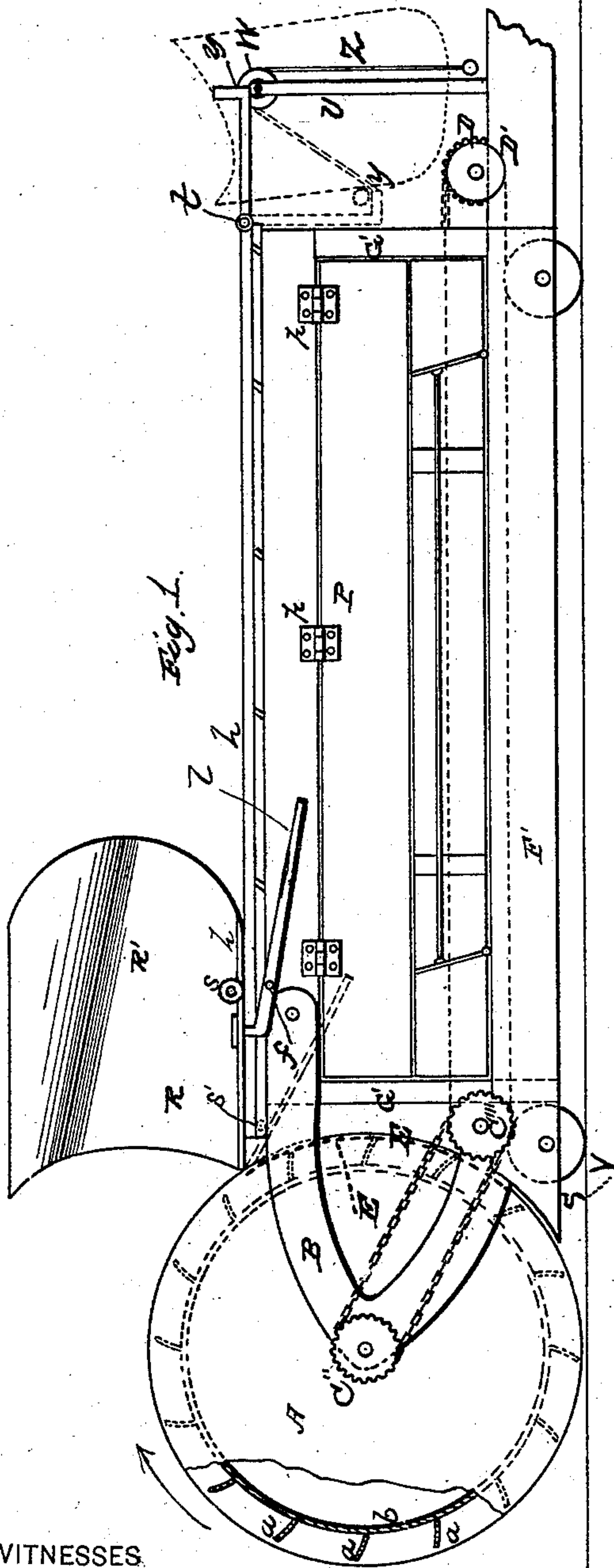
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D. P. BIER & H. E. ROLPH.

SNOW EXCAVATOR.

No. 286,895.

Patented Oct. 16, 1883.



WITNESSES

E. H. Bates

John Morrow

INVENTORS

D. P. Bier  
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their ATTORNEYS

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2 Sheets—Sheet 2.

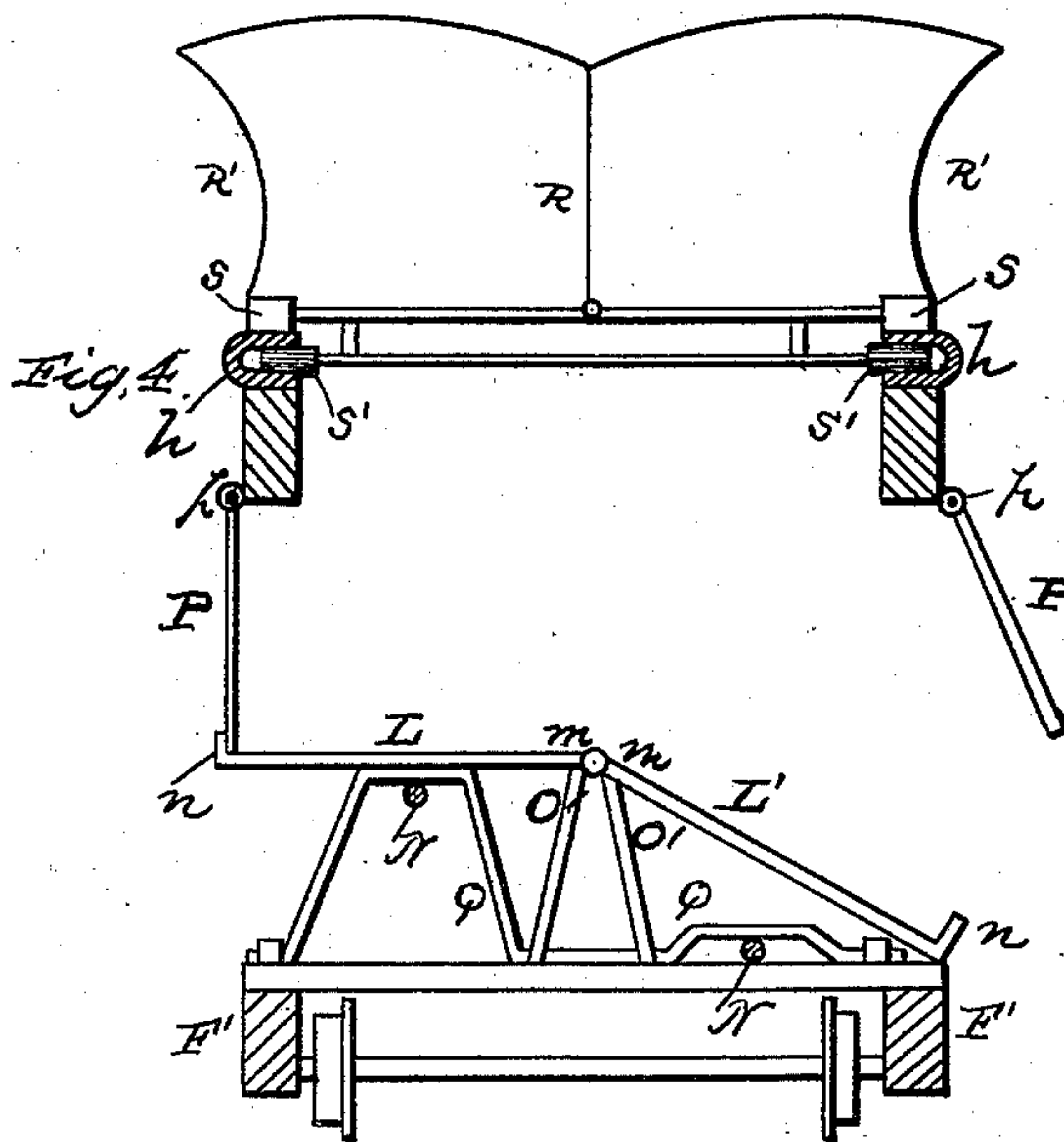
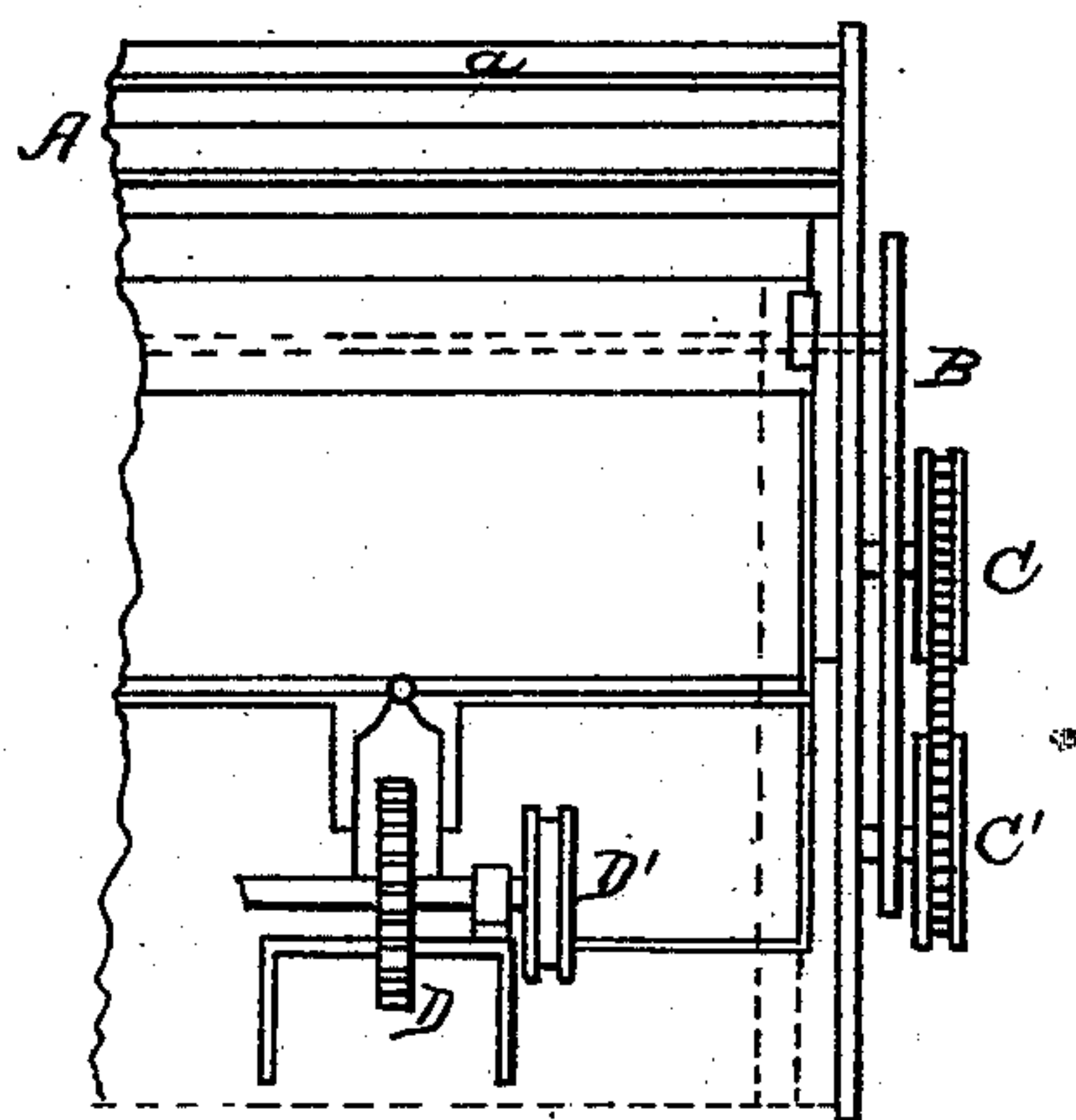
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Fig. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

DANTHUS P. BIER AND HENRY E. ROLPH, OF MARSHALL, MINNESOTA,  
ASSIGNORS OF ONE-THIRD TO HENRY M. BURCHARD, OF SAME PLACE.

## SNOW-EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 286,895, dated October 16, 1883.

Application filed June 11, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, DANTHUS P. BIER and HENRY E. ROLPH, citizens of the United States, residing at Marshall, in the county of Lyon and State of Minnesota, have invented certain new and useful Improvements in Excavating-Machines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a side view. Fig. 2 is a top view. Fig. 3 is a rear view, and Fig. 4 is a cross-sectional view.

The object of this invention is to provide a machine for cleaning snow from railway-tracks which will scatter the snow laterally from the track in a pulverized or fine and loose condition; and the invention consists in the construction and novel arrangement of devices, as hereinafter set forth, and particularly pointed out in the claims appended.

In the accompanying drawings, the letters F' F' designate the horizontal bars of the frame, and G' G' the uprights. The frame is designed to be supported upon suitable wheels, to enable it to be moved readily along the track.

A designates a large metallic drum flanged at each side, and having between the flanges the transverse cutters or scrapers *a a*, of curved shape, arranged somewhat like the buckets of a water-wheel. The wheel or drum is also provided with circumferential intermediate flanges, *c*, subdividing the pockets *d*. Around the outside frame-work of the wheel is arranged a shell or casing, *b*, preferably of boiler-iron. The buckets or pockets *d d* of the wheel form receptacles for the snow taken up by the cutters. The drum A is supported by the arms B B, which extend from the main frame. At the ends of the drum-shaft are the sprocket-wheels C and C'', driven from the sprocket-wheels C' and C''' by chains. On the shaft of the sprocket-wheels C' and C''' is secured a central sprocket-wheel, C''', which is driven by a chain from the sprocket-wheel D at the rear end of the machine. The wheel D and its shaft and the pulley D' thereon are driven by

an engine on a platform-car in rear of the machine.

E represents a shield or apron at the front end of the machine, between the frame and the drum A. Starting from a point near the track, this apron extends upward around the rear of the drum to the point or nose of the deflector R, and then is bent back at a sharp angle. It is designed to act as a guard to keep the snow from getting into the machine. The deflector R is of angular form, having two lateral wings, R' R', which extend rearwardly and outwardly, and are curved in concave form from above and below on their outer sides. It is arranged in elevated position back of the upper portion of the drum, and is designed to scatter the snow laterally as it is thrown against the deflecting sides thereof by the action of the drum. The deflector is supported on the longitudinal C-shaped rails *h h*, which are secured to the upper portions of the sides of the frame. The deflector is provided with friction-wheels *s s'*, whereof the wheels *s s* run on the top of the track-rails *h h*, and the wheels *s' s'* run under the flanges thereof. The sides P of the car are hinged at their upper edges, as at *p p*, to open outward at the bottom. The car is provided with a falling bottom consisting of two portions, L L', hinged centrally to a support, as at *m m*, so that the bottom sections open by falling downward and inward at their outer portions. The center standards, O' O', to which the bottom sections are hinged, are made centrally open, to provide for the passage of the long central operating-chain. The outer edges of the bottom sections, L L', are provided with catch-lugs or upwardly-turned ears *n*, which are designed to engage the lower edges of the hinged sides P, and serve to hold them securely in position when the bottom sections are raised in horizontal position. The bottom sections are held in horizontal position by means of crank-shafts Q Q and longitudinal rods N N, connected to a chain or chains and mechanism attached to the operative parts of the engine. These devices are controlled by means of a lever. When the tension on the crank-shafts is relieved, these supports fall into horizontal position, and the bottom sections are allowed to drop at each side, releasing the hinged sides P, so that they can swing outward, if necessary.



A lever, *l*, pivoted to the frame at *f*, is used to hold the deflector *R* securely to the track. The lever is held in its position by means of a ratchet and spring-catch.

At the end of the car is arranged a pair of upright posts, *U*, which support at their upper ends a pulley, *W*, over which runs a chain, *Z*, which is attached to the end of the track at *y*. This rear end portion of the track is hinged to the main track *h* at *t*, and is designed to be turned downward when the deflector is moved to the rear thereon, so that said deflector will be out of the way.

*V* indicates a small steel spring rail-clearer, which is secured to the lower portion of the frame of the machine on each side, just over the railway-rails.

The working of the machine is as follows: In order to clear the track of any ordinary drift, the machine is pushed into the bank or drift, the drum *A* being revolved in the direction indicated by the arrows at a high rate of speed. As the drum revolves, it cuts out the snow and throws it over backward against the deflector *R* with great force. The masses of snow are divided by the front angle of the deflector, and the sides of the latter cause it to be scattered to a considerable distance on each side of the track. When, however, the banks of snow at the sides of the track are so high that the snow cannot be thrown over them, then the deflector is moved to the rear of the car on the hinged portions *y* of the track-rails, by which it is supported. The deflector is then turned down by lowering the end portion, *y*, of the track. The bottom sections of the car are then raised in horizontal position, engaging the sides *P* thereof, and thereby a receptacle or box is formed,

into which the snow is thrown by the drum *A*. When the box is full, the machine is moved back to a place where there are no banks on either side of the track. Then the bottom sections of the box are allowed to fall, and the snow is discharged on either side of the track. The bottom of the car is then raised again, and the machine is pushed back into the bank for a fresh load.

This machine is designed to operate with facility in loose, dry, wet, or packed snow, its action being to break up and pulverize the snow, and by the means hereinbefore described either to throw it to a distance from the track on either side or to remove it to the rear.

Having described this invention, what we claim, and desire to secure by Letters Patent, is—

1. In a snow-clearing machine, the combination, with the rotating cutting-out drum *A*, in front, of the raised adjustable deflector in rear of the upper portion thereof, and supported on rails, of the car or receptacle having the centrally-hinged bottom sections, and the swinging sides, substantially as specified.

2. In a snow-clearing machine, an elevated adjustable deflector having roller-bearings engaging a C-shaped track having a hinged end portion in rear, and devices for lowering said end portion when the deflector is adjusted thereon, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

DANTHUS P. BIER.  
HENRY E. ROLPH.

Witnesses:

LOUIS LARSON,  
H. B. WATERMAN.