(No Model.)

E. P. CALDWELL.

ROTARY SNOW PLOW.

No. 405,300. Patented June 18, 1889.

Fig. 1

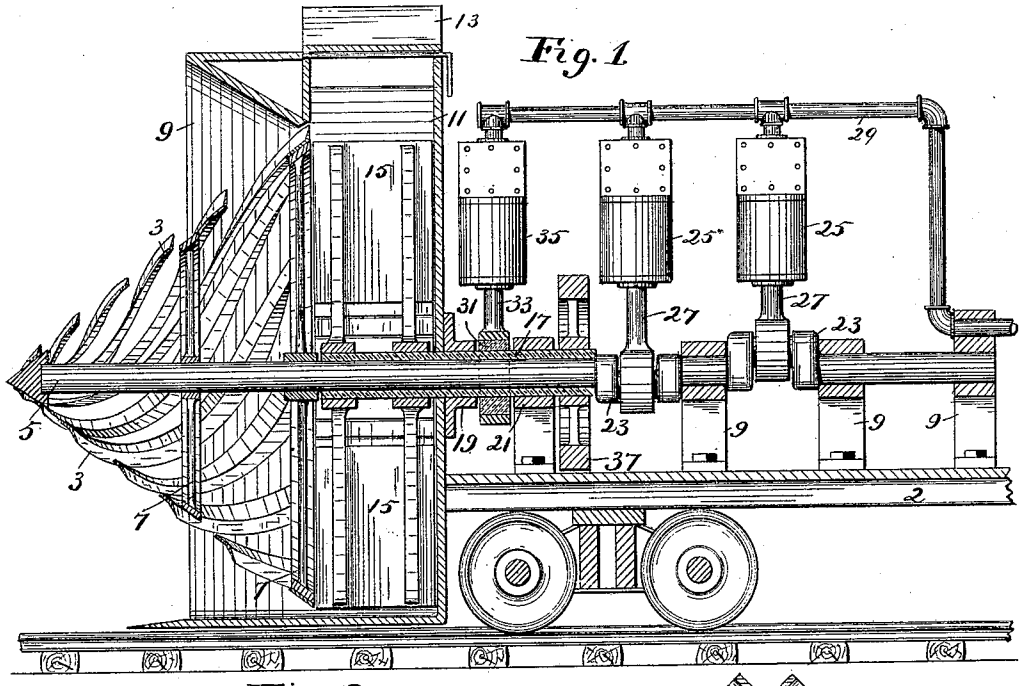


Fig. 2.

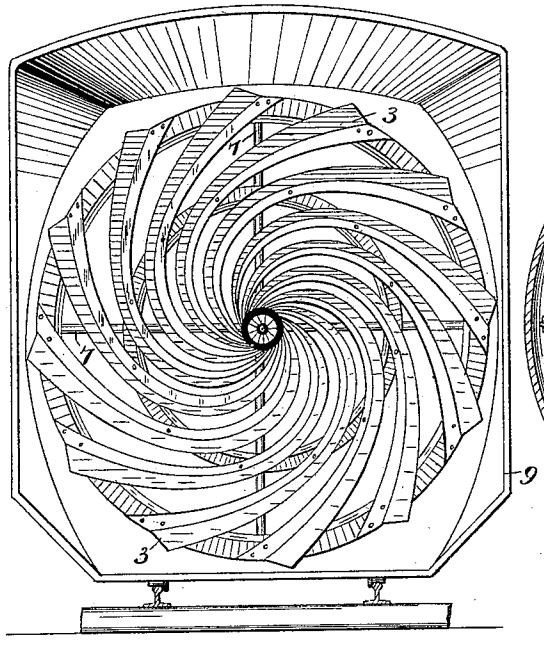
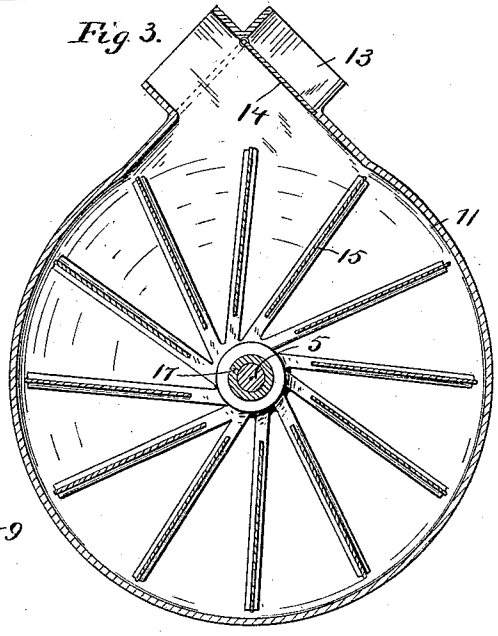


Fig. 3.



Witnesses.
J. Jessen
A. M. Gaskill

Inventor.
Edward P. Caldwell
By Paul & Sherwin Attys

UNITED STATES PATENT OFFICE.

EDWARD P. CALDWELL, OF MINNEAPOLIS, MINNESOTA.

ROTARY SNOW-PLOW.

SPECIFICATION forming part of Letters Patent No. 405,300, dated June 18, 1889.

Application filed November 19, 1888. Serial No. 291,235. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. CALDWELL, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Rotary Snow-Plows, of which the following is a specification.

The object of my invention is to provide a rotary snow-plow with means for discharging the snow, which will be operated independently of the rotating plow, and will therefore not become clogged, even though the plow itself should be slowed up or stopped entirely by the snow in which it is working.

The invention further consists in certain features in the construction and combination, hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a longitudinal vertical section of a snow-plow constructed in accordance with my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a transverse section through the fan and its casing.

In the drawings, 2 represents a portion of a car upon which the devices constituting the snow-plow are supported.

The plow itself, as here shown, consists of a series of spiral knives 3, arranged in the form of a hollow cone, and secured to suitable shafts 5, by suitable spiders 7. A suitable hood 9 preferably surrounds the cone-shaped plow and aids in directing the snow through the spaces between the knives. The plow itself forms no part of my present invention, having been described and claimed in a prior application for Letters Patent, Serial No. 267,684, filed March 19, 1888. The shaft 5 of the plow is supported in suitable bearings 9, upon the car 2. Arranged in the rear of the conical plow is a fan-casing 11, of suitable construction, and having arranged, preferably at its top, the discharge-spout 13. The front of this casing is open, so that the snow which passes to the interior of the conical plow passes directly into the casing 11. In this casing is arranged a suitable fan 15, which is preferably secured to a hollow shaft 17, surrounding the shaft 5, and being mounted in suitable boxes 19 and 21. The fan 15 and the rotating plow are independently driven, and any suitable means may be used for this purpose. I have shown what I consider preferable means for this purpose. The shaft 5, as here shown, is provided with cranks 23, arranged at an angle to each other. Steam-cylinders 25 have their piston-rods 27 connected with these cranks.

A pipe 29 may be arranged to provide the cylinders with steam, which may be taken either directly from the boiler of the locomotive or from an independent boiler. The fan-shaft 17 is provided with an eccentric 31, operated by the piston-rod 33 of a steam cylinder 35. The pipe 29 may also be arranged to supply steam to the steam-cylinder 35, as well as to the others. The fan-shaft 17 may be provided with the fly-wheel 37.

It will be seen that with this mechanism the fan may be driven at any desired speed, and that this speed may be maintained independently of the speed of the rotary plow. This is of great importance, as it often occurs in operating rotary snow-plows that the plow will become slowed up in going through heavy drifts, and sometimes will be entirely stopped, in which case the fan, if mounted upon the main shaft of the plow, becomes clogged up, and it is necessary to clear it out before the plow can be operated.

With my device the fan can always be kept at a uniform rate of speed, no matter at what speed the plow may be running, or whether it is running at all. Any snow that reaches the fan will be thrown out of the casing, and the fan may be run at sufficient speed to throw the snow entirely clear of the track. The rapidly-rotating fan will also tend to draw the snow into the fan-casing, and thus aid in keeping the plow clear.

It sometimes occurs that the snow cannot always be discharged at the same side of the track. I prefer, therefore, to construct my machine so that the snow can be discharged at will at either side of the track. For this purpose I prefer to provide a double discharge-spout 13, as shown in Fig. 3, one part extending toward the right and the other toward the left of the machine. A pivoted valve or cut-off 14 is arranged in the spout 13, and is adapted to close either part of the spout. With this arrangement the fan may be rotated

in either direction and the snow discharged from either side of the machine. This is of especial advantage in the use of a rotary snow-plow, and one which could not be secured except by the use of an independent fan, while the plow itself is preferably always rotated in either direction.

I do not confine myself to the form of rotary snow-plow herein shown, as my improvement may be applied to other forms of rotary snow-plows.

I claim as my invention—

1. The combination, with a casing having an open front, of a shaft extending through said casing, a conical cutter secured upon said shaft and having an open rear end in front of said casing, and a rotating fan located in said casing in the rear of said cutter, substantially as described.

2. The combination, in a rotary snow-plow, with a casing having an open front, of a conical cutter formed of a series of spirally-arranged knives located in front of said casing, and a revolving fan located in said casing in the rear of said cutter, substantially as described.

3. The combination, in a rotary snow-plow, with a casing having an open front, of a revolving conical cutter formed of a series of spirally-arranged knives located in front of said casing, and an independently-revolving fan located in said casing in the rear of said cutter, substantially as described.

4. The combination of the rotating plow, the shaft 5, upon which said plow is secured, provided with the cranks 23, the steam-cylinders 25, having the piston-rods 27, connected with said cranks, the hollow shaft 17, surrounding said shaft 5, the fan 15, secured upon said shaft 17 and arranged in the rear of said plow, the eccentric 31 upon said shaft 17, and the steam-cylinder 35, having the piston-rod 23, engaging said eccentric 31, all substantially as described.

5. The combination, with the independently-rotating plow, of the rotating fan adapted to be driven in either direction, the double discharge-spout extending in opposite directions, and the pivoted cut-off arranged in said spout, substantially as described.

6. The combination, with the rotating plow, of the independently-rotating fan adapted to be driven in either direction, a fan-casing inclosing said fan, discharge-spouts extending in opposite directions from said casing, and a cut-off whereby either of said spouts may be closed, substantially as described.

7. The combination, with the rotating plow provided with the spiral knives, of the independently-rotating fan adapted to be driven in either direction, the fan-casing provided with the oppositely-extending discharge-spouts, and the cut-off adapted to close either of said spouts, all substantially as described.

In testimony whereof I have hereunto set my hand this 12th day of November, 1888.

EDWARD P. CALDWELL.

In presence of—

A. M. GASKILL,

T. D. MERWIN.

(No Model.) 2 Sheets—Sheet 1.

E. P. CALDWELL.

FLANGER FOR SNOW PLOWS.

No. 454,109. Patented June 16, 1891.

Fig. 1

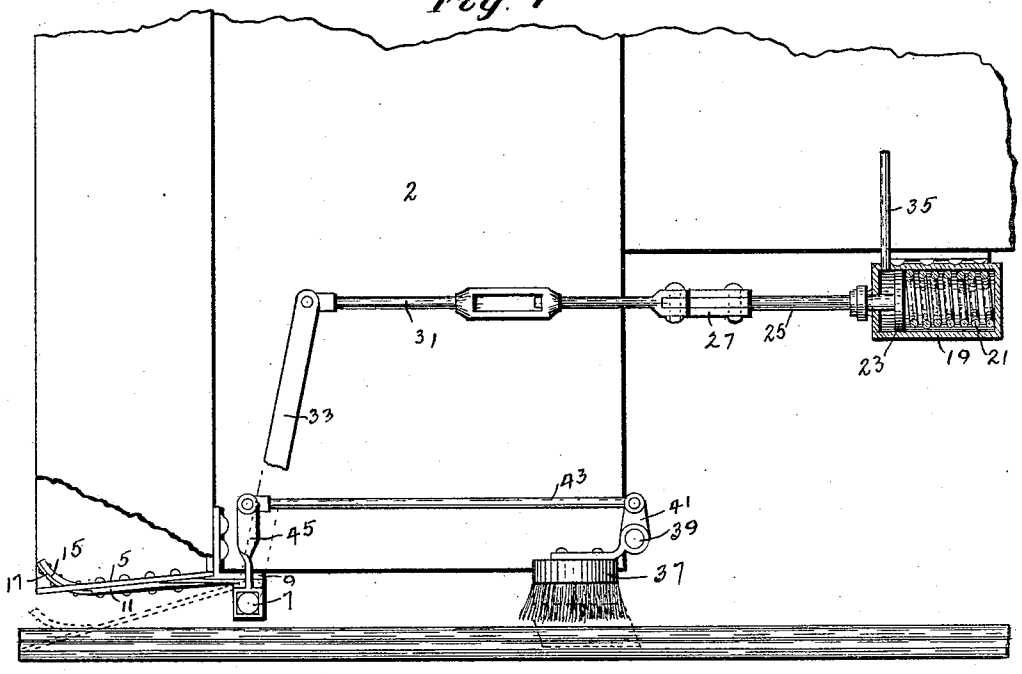
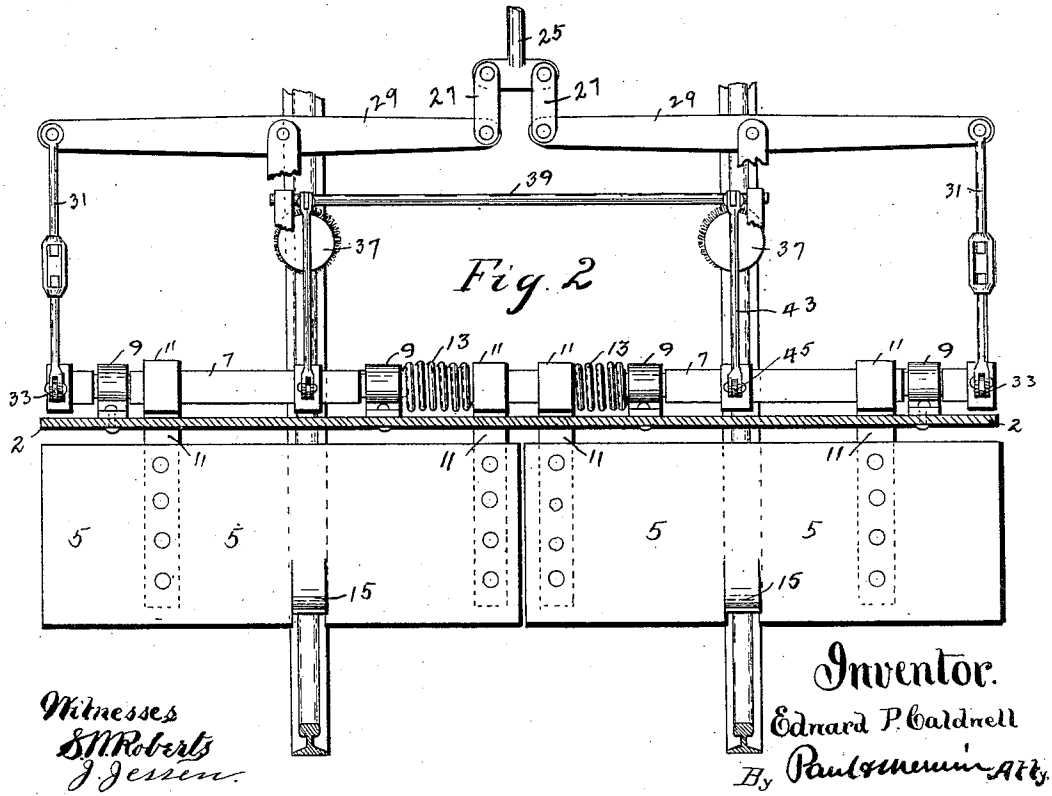


Fig. 2



Witnesses
S. M. Roberts
J. Jessen.

Inventor.
Edward P. Caldwell
By Paul Synnestvedt Atty.

(No Model.) 2 Sheets—Sheet 2.

E. P. CALDWELL.

FLANGER FOR SNOW PLOWS.

No. 454,109. Patented June 16, 1891.

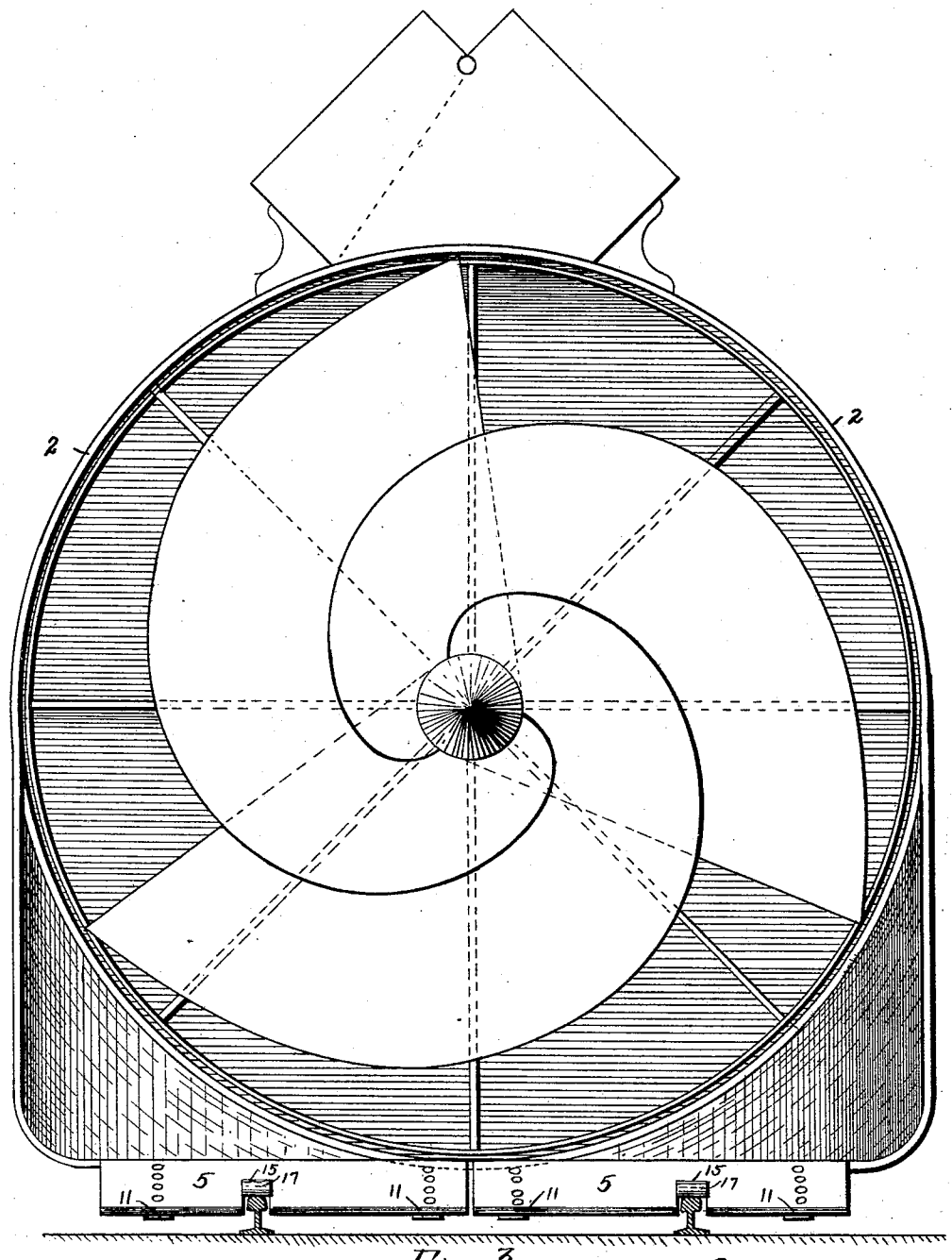


Fig. 3.

Witnesses
S. M. Roberts
J. Jessen

Inventor
Edward P. Caldwell.
By Paul & Wenn Attys

UNITED STATES PATENT OFFICE.

EDWARD P. CALDWELL, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE CYCLONE STEAM SNOW PLOW COMPANY, OF SAME PLACE.

FLANGER FOR SNOW-PLOWS.

SPECIFICATION forming part of Letters Patent No. 454,109, dated June 16, 1891.

Application filed March 10, 1890. Serial No. 343,241. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. CALDWELL, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Flangers for Snow-Plows, of which the following is a specification.

This invention relates to improvements in mechanism designed particularly to clearing snow from railway-tracks; and the invention is particularly applicable to that class of snow-plows in which a rotary fan is used, arranged in a suitable casing, for throwing the snow to the side of the track. As such plows have heretofore been constructed, while they would cut out deep drifts of snow, they left considerable snow on the track and between the rails, and this snow seriously impeded the movement of trains, even after the plow had removed the main body of the snow, and it also made it difficult to move the plow, as it got under the wheels of the plow, and also interfered with the engine or engines by which the plow was driven. I obviate these objections by providing a movable plate that is arranged preferably at the front of the plow, and is preferably secured directly to or at the front of the fan-casing, so that it takes up the snow that lies close to and between the rails and directs it into this casing, so that it is thrown out by the plow.

Other objects of the invention will appear from the accompanying drawings, taken in connection with the following detailed description.

In the drawings, Figure 1 is a side elevation of a portion of a snow-plow having my invention applied thereto. Fig. 2 is a detail plan showing the preferred means of supporting the plates. Fig. 3 is a front elevation of a plow of the type generally known as the "Cyclone," showing the manner of applying this invention thereto.

In the drawings, 2 represents a casing, within which is arranged a suitable fan or other device by which the snow is taken up and thrown to the side of the track. This casing is at a sufficient distance above the rails so as not to interfere therewith. A movable plate 5 is arranged at the front of the casing capable of being lowered, so as to be close to or rest upon the rails, and having preferably a portion that projects into the space between the rails. I prefer to form the plate in two sections, as shown in Fig. 2, though obviously it may be formed in more than two sections or as one piece. This plate is preferably arranged so as to be raised and lowered to bring it nearer to or farther from the track. It may be supported in any suitable manner and moved by any suitable means. I have shown means for supporting and moving the plate which I consider preferable for that purpose. This consists of a shaft 7, mounted in bearings 9, suitably secured to a support, as to the casing. Each section of the plate is secured to this shaft by bars or plates 11. The bars 11 are arranged on the shaft 7 so as to slide thereon, thus permitting a lateral movement of the plates. Springs 13 are arranged on the shaft, one for each section, and tend to hold them in position, while permitting a lateral movement of the plate when going around curves. Each section of the plate is preferably provided with an upturned shoe 15, that rests upon the top of the rail and slides thereon and forms a guide for the plate. These shoes may be formed by slotting the plate and turning up the portion of the metal between the slots, as shown. Each of these shoes may also be provided with a facing 17 of steel to rest on the rail. For moving the plate I prefer to employ a cylinder 19, having therein a spring 21 and a piston 23. The piston-rod 25 is connected to the shaft by means of links 27, levers 29, rods 31, and arms 33. The spring 21 tends to hold the plate in an elevated position. A pipe 35 is connected to the cylinder, so that steam or air under pressure may be forced into the cylinder for the purpose of moving the piston against the tension of the spring and thereby moving the plate downward and holding it. The snow lying upon and between the rails will thereby be directed into the casing, from which it may be thrown out by the fan or other device. I also prefer to provide brushes 37, that are adapted to brush the tops of the rails and remove any snow that may remain thereon. These brushes are preferably secured upon a shaft 39, having arms 41, and connected by rods 43 with arms

45 on the shaft 7. As the shaft 7 is turned to depress the plate, the brushes are also depressed and brought upon the rail, and as the plates are raised the brushes are raised.

I do not confine myself to the use of this invention in connection with a fan-casing, as shown, as it may be used advantageously in connection with many other devices.

I claim as my invention—

1. In a snow-plow, the combination, with a fan-casing having an open forward end, of a plate pivotally supported at a point near the lower portion of the casing, a spring for holding said plate normally in an elevated position, and means for depressing said plate, substantially as described.

2. In a snow-plow, the combination of the pivotally-supported plates, the spring for raising said plates, the cylinder, and the piston arranged in said cylinder and connected with said plates and adapted to depress them, for the purpose set forth.

3. In a snow-plow, the combination, with the fan-casing 2, of the sectional movable plate 5, pivotally supported in front of the lower portion of said casing, each section being capable of yielding laterally, and means for raising and lowering said plates, substantially as described.

4. In a snow-plow, the combination of the plate 5, formed of independent laterally-yielding sections, each provided with a shoe adapted to rest upon the top of the rail, for the purpose specified.

5. The combination, with the shaft 7, of the plate 5, secured thereto, the cylinder having the spring 21 for holding said plates normally in a raised position, and the piston arranged in said cylinder and connected with said shaft for depressing said plates, for the purpose specified.

6. The combination, with the shaft 7 and the plate 5, secured thereto, of the pivotally-supported brush connected with said shaft, and means for turning said shaft, for the purpose set forth.

7. The combination, with the fan-casing 2, of the fan arranged therein and adapted to throw the snow through the opening in said casing, a movable plate arranged on a pivotal support provided at the forward lower edge of said casing, said pivotal support consisting in the shaft 7, the upturned portions 15 in said plate, whereby the plate is adapted to rest on the tops of the rails, said plate being adapted to yield laterally with respect to the forward edge of the casing, and means for raising said plate, substantially as described.

8. The combination of the casing 2 with the fan adapted to revolve therein, the plate 5, having the shoes 15, the shaft 7, the springs 13, whereby said plate is made laterally self-adjustable on said shaft, and means for raising said plate, substantially as described.

In testimony whereof I have hereunto set my hand this 10th day of January, 1890.

EDWARD P. CALDWELL.

In presence of—

A. M. GASKILL,

S. W. ROBERTS.