No. 670,103. Patented Mar. 19, 1901.

A. W. HAM.

SAND BOX FOR CARS.

(Application filed Jan. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

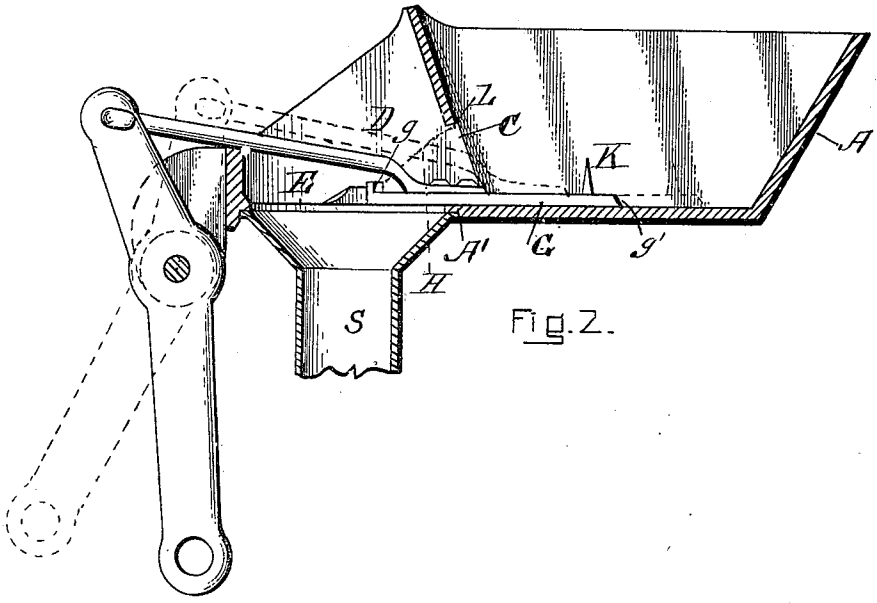


Fig. 2.

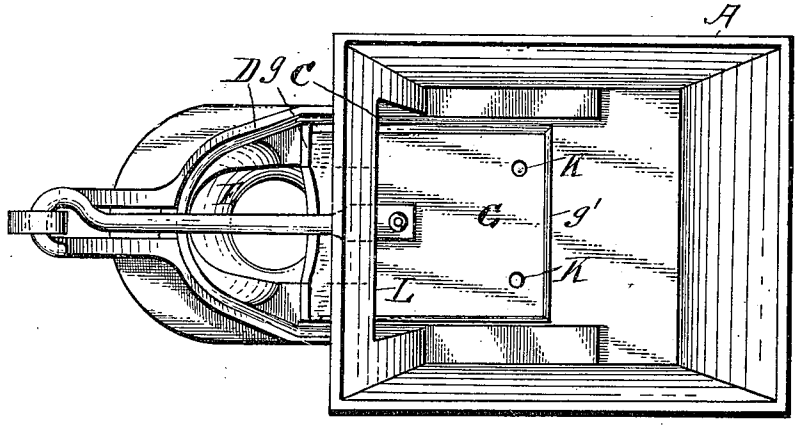


Fig. 1.

Witnesses:
E. F. Grell
Frank S. Hartnett.

Inventor
Albert W. Ham,
by Roberts & Cushman,
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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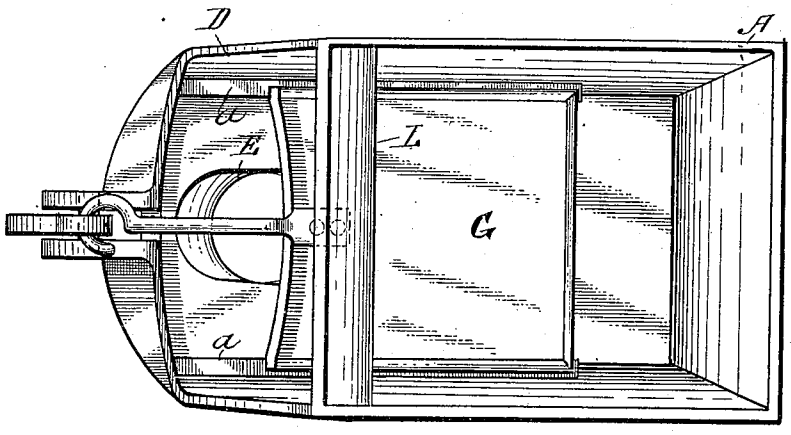


Fig. 3.

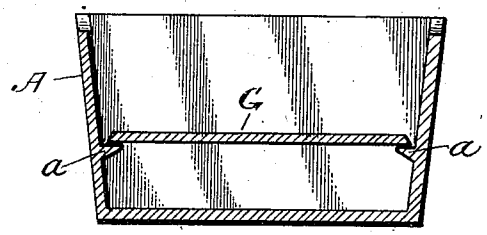


Fig. 5.

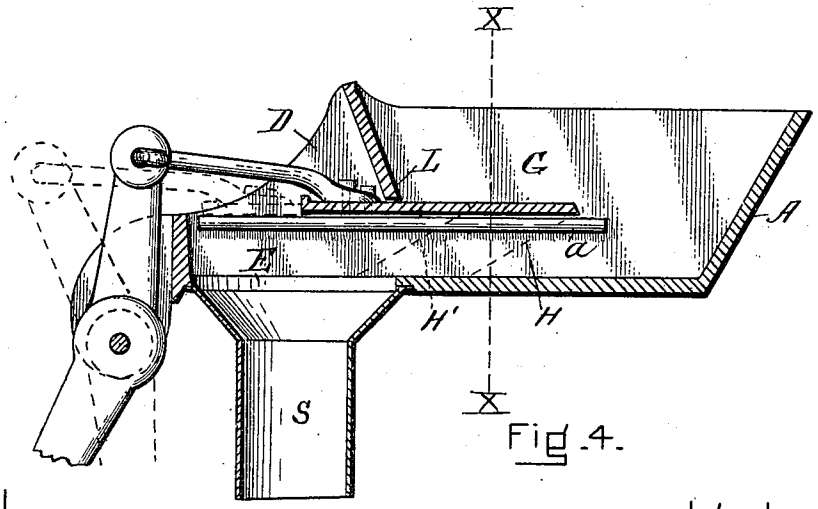


Fig. 4.

WITNESSES:

E. W. Croll

Frank S. Hartnett

INVENTOR:

Albert W. Ham,

by Roberts & Cushman,

Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT W. HAM, OF LANSINGBURG, NEW YORK, ASSIGNOR TO THE TROJAN BUTTON FASTENER COMPANY, INCORPORATED, OF TROY, NEW YORK.

SAND-BOX FOR CARS.

SPECIFICATION forming part of Letters Patent No. 670,103, dated March 19, 1901.

Application filed January 14, 1901. Serial No. 43,109. (No model.)

To all whom it may concern:

Be it known that I, ALBERT W. HAM, a citizen of the United States, residing in Lansingburg, in the county of Rensselaer and State of New York, have invented a new and useful Improvement in Sand-Boxes for Cars, of which the following is a specification.

My invention relates to sand-boxes for cars, and is especially serviceable upon street-railway cars. Its object is to provide a track-sanding device to be borne by the car which will deliver sand from a hopper or similar sand-receptacle through a spout upon the track either in a continuous stream or in small quantities at the will of the operator.

In the continuous-flow sand-boxes now in use having a centrally-located spout in the bottom of the hopper controlled by a valve the wedging of a stick or stone between the valve and the valve-seat prevents their proper operation, and the valve failing to close the box is emptied and the sand is wasted. Moreover, such a spout not being ventilated gathers dampness from the ground—such as mud, snow, or rain—and wets the sand coming through the spout, and the spout frequently becomes clogged and impassable. In order to ventilate the spout and keep it dry, it is desirable to have the opening of the spout outside the hopper and open to the air. The device for checking the flow of sand must not when so acting also close the spout. To accomplish these results, I have constructed a sand-box illustrated in the accompanying drawings, taking advantage of the well-known principle that the surface of a mass of any disintegrated material capable of lying in heaps, such as sand, will of itself by gravity assume a certain angle called the "angle of repose," and if the heap is given a steeper angle the sand or whatever substance it may be will immediately flow downward until the surface of the heap has again assumed its angle of repose.

Figure 1 is a plan view of one embodiment of my improved sand-box. Fig. 2 is a vertical longitudinal section of the box shown in Fig. 1. Fig. 3 is a plan view of a modified form of sand-box embodying my invention. Fig. 4 is a vertical longitudinal section of the box shown in Fig. 3. Fig. 5 is a vertical cross-section of the box shown in Fig. 4, taken on the line X X.

The same parts are indicated by the same letters of reference in all the figures.

A represents the hopper, in which the sand is stored. At the bottom of one of the side walls of the hopper A is the sand-outlet C, the edge of the side wall adjacent to the top of said sand-outlet forming a lip L. The floor of the hopper is extended beyond the hopper on the side adjacent to the sand-outlet C, as at A′, and the extension A′ of the floor is inclosed by the wall D, which prevents any sand deposited on said extension A′ from escaping except through the spout S. Said walls D are not covered, but are open to the atmosphere. Formed in said extension A′ is the aperture E, of elongated or any suitable form, which constitutes the delivery-opening for the sand and from which the spout S conducts the sand to the track. The height of the lip L and the proximity of the delivery-opening E to the hopper are so proportioned that a stream of sand passing under the lip L from the hopper will, in seeking its angle of repose, flow continuously into the delivery-opening E and thence be discharged through the spout S upon the track.

The angle of repose of the sand intended commonly to be used may be ascertained with sufficient accuracy by experiment. The lip L and delivery-opening E must be so located that a line drawn from the edge of the delivery-opening nearest the sand-outlet C at an angle corresponding to the angle of repose of the sand will pass underneath the lip L. Also the lip L should be low enough when the construction shown in Figs. 1 and 2 is used so that a line passing from the lip L at the same angle will enter the delivery-opening E and not pass over it. Otherwise the gate, to be hereinafter described, which checks the flow of sand would have to be made to close the spout as well and prevent its proper ventilation.

G is a gate adapted to move or slide into and out of intersection with the stream of sand passing under the lip L and flowing into the spout S. It consists of a flat plate of sufficient width to extend across the delivery-opening E and may rest upon the floor of the hop-

per, as shown in Figs. 1 and 2, or upon the horizontal ledges *a a*, as shown in Figs. 3, 4, and 5. When resting on the floor, it should when in its normal position (shown in the solid lines in Figs. 1 and 2) extend rearwardly far enough to intersect the stream of sand flowing from the hopper to the delivery-opening, but not far enough to close the delivery-opening. By providing the narrow flange *g* it is possible to make the gate G cover less of the spout and so secure better ventilation than would be the case if the gate were perfectly flat, since if flat it would have to extend rearwardly farther in order to intersect the stream of sand. When the construction shown in Figs. 3 and 4 is used, no such flange is necessary, as the sand flows under the front edge instead of over the rear edge of the gate, and the gate when in its normal position and intercepting the flow of sand, as shown in solid lines in Figs. 3 and 4, leaves the spout quite open. The gate G may be oscillated forward and backward by the same mechanism shown in my Patent No. 621,815, issued March 28, 1899, or in my Patent No. 655,863, issued August 14, 1900, or by any well-known means. It is normally held in the position shown in the solid lines in Figs. 1 to 4 by a tension-spring suitably disposed, such as that shown in my said patents, Nos. 621,815 or 655,863. When moved longitudinally out of intersection with the stream of sand coming from the hopper, the gate permits the sand to flow into the delivery-opening E and thence through spout S and upon the track. In the construction shown in Figs. 1 and 2 the movement of the gate is forward into the position shown in the dotted lines in Fig. 2, the gate underrunning the sand in the hopper. Such underrunning is facilitated by the bevel *g'*. If desired, the top of the gate may be provided with the fingers or agitators K K to break up the sand and prevent it from packing. In the construction shown in Figs. 3, 4, and 5 the movement of the gate G is backward and out of the hopper, as shown in the dotted lines in Fig. 4. In either case the essential thing is that the gate should be movable out of the path of the sand stream.

Figs. 2 and 4 best illustrate the operation of my box. H represents the surface of the sand, which would flow into the delivery-opening E unless checked by the gate G. The gate G is movable out of the path of the sand, as above described, forward into the position shown in the dotted lines in Fig. 2 if the gate is at the bottom of the sand-outlet, as in Fig. 2, and backward into the position shown in the dotted lines in Fig. 4 if it is at the top of the sand-outlet, as in Fig. 4. When the gate is closed in the latter construction, the sand lies at its angle of repose under the front edge of the gate C, as indicated at H, Fig. 4, and when the gate is open or in the dotted-line position in Fig. 4 a stream of sand will flow into the delivery-opening, the surface of which is indicated by H'. It is obvious from the foregoing description that the sand will continue to flow so long as the gate G is held in the dotted-line position in either of the said figures. If but a small measure of sand is desired, the gate G may be opened and immediately closed.

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

1. In a sand-box for cars, a hopper having a sand-outlet, a lip for said outlet, and a delivery-opening, said lip being so disposed with relation to the delivery-opening that a stream of sand seeking its angle of repose will flow continuously from the hopper into the delivery-opening, and a longitudinally-sliding gate adapted to be moved into and out of intersection with said stream of sand.

2. In a sand-box for cars, a hopper having a sand-outlet, a lip for said outlet, and a delivery-opening, said lip being so disposed with relation to the delivery-opening that a stream of sand seeking its angle of repose will flow continuously from the hopper into the delivery-opening, and a longitudinally-sliding gate resting upon the floor of the hopper and adapted to be moved into and out of intersection with said stream of sand.

3. In a sand-box for cars, a hopper having a sand-outlet, a lip for said outlet, and a delivery-opening, said lip being so disposed with relation to the delivery-opening that a stream of sand seeking its angle of repose will flow continuously from the hopper into the delivery-opening, and a longitudinally-sliding gate adapted to be moved into and out of intersection with said stream of sand without closing said delivery-opening to the air.

4. In a sand-box for cars a hopper having a sand-outlet and a floor which is extended outside of said hopper on the side adjacent to the sand-outlet, a lip for said outlet formed by the said wall of said hopper, and a delivery-opening in the extension of the floor, said sand-outlet and delivery-opening being so related that a stream of sand seeking its angle of repose will flow continuously from the hopper into the delivery-opening, and a sliding gate resting upon said floor and normally intersecting said stream of sand, and movable inwardly with relation to said hopper and out of intersection with said stream of sand.

Signed by me at Troy, New York, this 9th day of January, 1901.

ALBERT W. HAM.

Witnesses:
ARTHUR M. WIGHT,
M. H. SIMMONS.