Newton & Crever,

Car Ventilator,

No. 10,626, Patented Mar. 14, 1854.

Fig. 1.

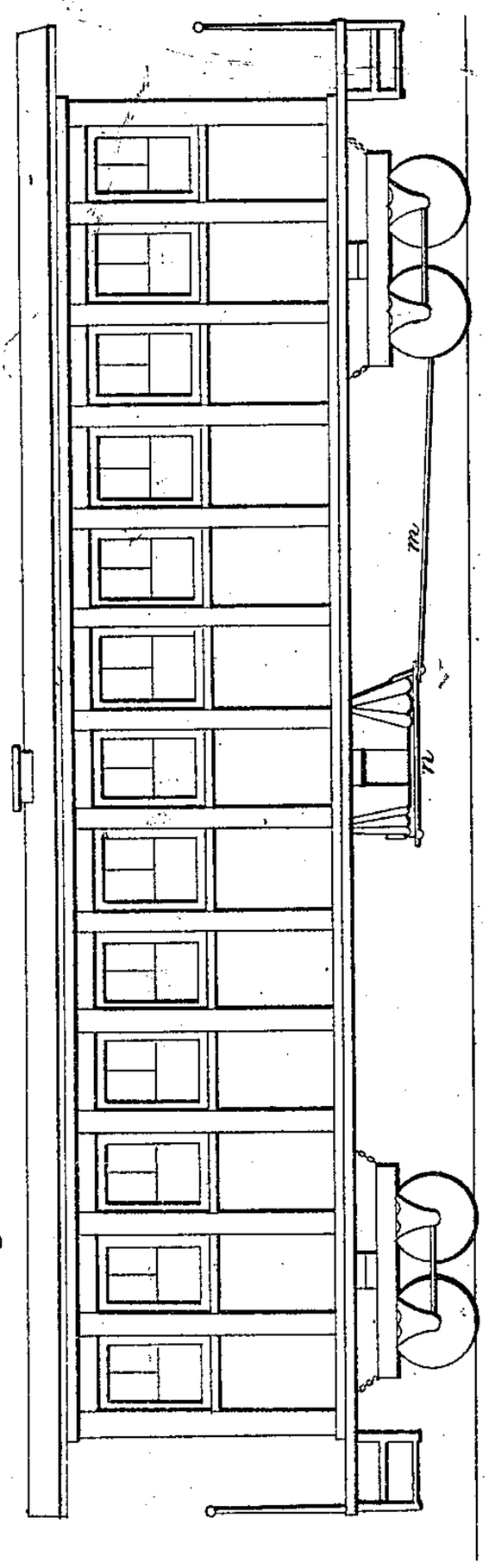

Fig. 2.

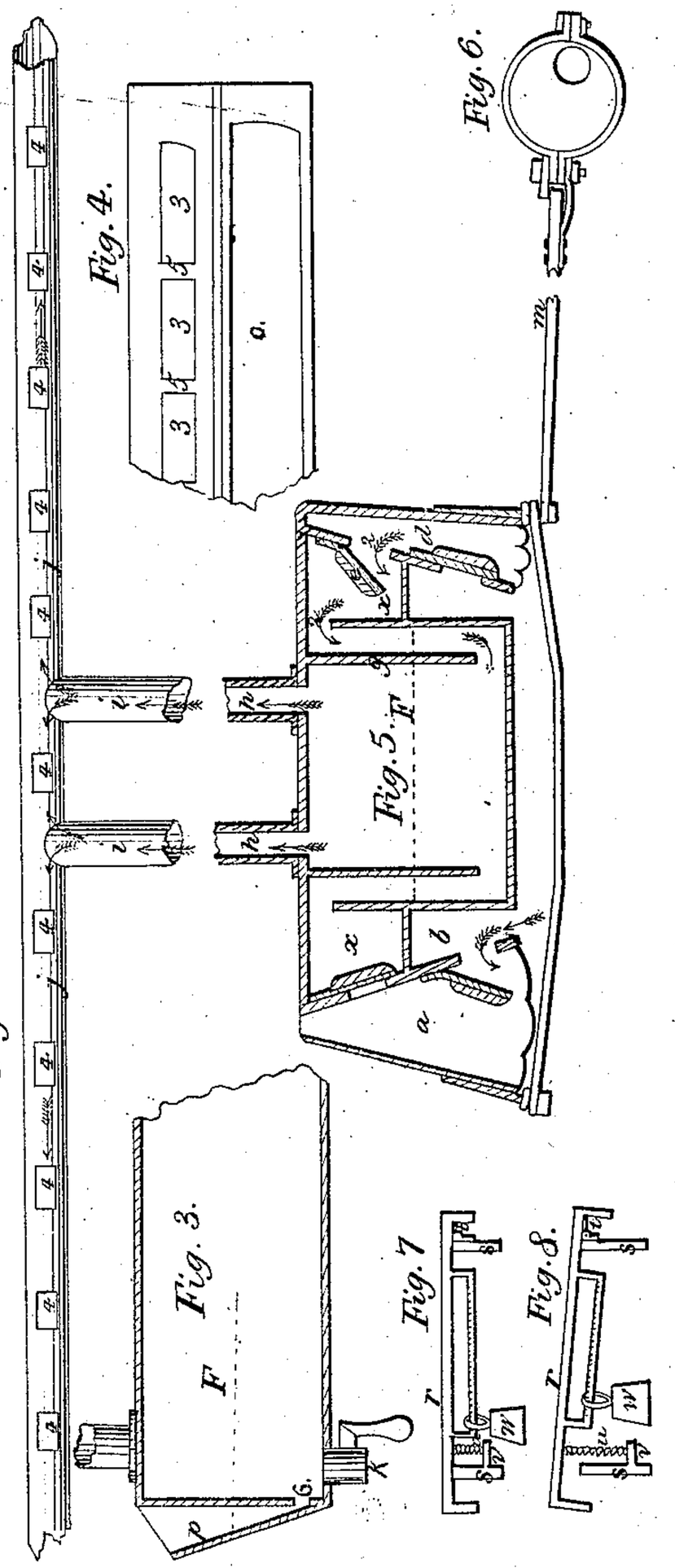

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7

Fig. 8.

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O. NEWTON AND J. A. CREVER, OF PITTSBURGH, PENNSYLVANIA.

EXCLUDING DUST FROM RAILROAD-CARS.

Specification of Letters Patent No. 10,626, dated March 14, 1854.

To all whom it may concern:

Be it known that we, ORRIN NEWTON and J. A. CREVER, of the city of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Mode of Ventilating and Excluding Dust from Railroad-Cars; and we do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon.

Our invention consists chiefly in ventilating rail road cars by supplying them when in motion with a continual current of atmospheric air previously purified from dust or other foreign matter, whereby not only is the car thoroughly ventilated, but the ingress, through windows and crevices in the cars of dust, sparks, insects, &c., from outside is prevented, by the current of air which is thus caused to rush constantly out of the cars; the reverse of which is the case, when the cars are not thus artificially supplied with air.

In describing the mode in which we propose to accomplish the objects indicated, we do not design to confine ourselves to the use of exactly the same mode of putting our invention into practical operation, but we desire to include the use of the contrivances hereinafter described, or any mechanical equivalents for producing the same results.

Before proceeding to describe our invention in detail, we will premise that we do not deem it essential that the supply of purified air, by mechanical means should be continued when the cars are not in motion, because at such times the annoyances of dust, &c., caused chiefly by the swift motion of the cars, does not exist, and the supply of air from outside is sufficient.

To enable others skilled in the art, to make and use our invention, we will now proceed to describe its construction and operation.

In the drawings, Figure 1 is a side elevation of a railroad car showing the blowing and purifying apparatus underneath the body of the car, and about equidistant from either end. Fig. 5 is a cross section of the blowers and the purifying cistern, showing the internal arrangement of the valve and airways. Fig. 4 is a view showing the face of the plate upon which the valves are fastened and operate and the vents through which the air passes by the upper valve and also the lower valve on its seat. Fig. 3 is a cross section of the end of the water cistern showing the tunnel by which water is supplied to the cistern. Fig. 6 represents the eccentric intended to be fastened upon one of the car axles, the design of which is to give motion to the blowers when it revolves, by means of a connecting rod. Fig. 2 represents a detached portion of the pipes by means of which the purified air is conveyed into and distributed through the interior of the car.

In the cross section of the blowers and purifying cistern, Fig. 5, the course or direction of the air is indicated by the arrows. Presuming the blower *a* to be taking in a supply of air from the external atmosphere, the arrows 1, 1, 1, indicate the course of the current, first, into a chamber *b* communicating with the external air, and thence through the vent under the valve *c*, into the chamber *a*. At *d* the reverse action or collapsing of the blower is indicated; the air passing out of the chamber *d* under the valve *e* through the valve chamber *x* over the upper edge of the side of the water cistern *f* and down between the side and a partition *g* to near the bottom of the cistern forcing the water (indicated by the dotted line) before it until it passes the lower edge of the partition as indicated by the arrows 2, 2, 2, it then rises through the water into the body of the cistern above the water, whence it passes into the pipes *h*, *h*, and thence through the detached continuations *i*, *i*, Fig. 2, into the horizontal pipe *j*, *j*. The pipe *j*, *j*, runs along the car close in the upper corner at the junction of the sides and roof. Along the pipe *j*, *j*, at intervals are a number of holes 4, 4, 4, to vent the air into the car, this pipe extends the whole length of the car so that the air may be supplied to all parts thereof and at the same time prevent an unpleasantly strong current at any one place. The reverse action of the blowers *a* and *d* is in all particulars the same as the action just described.

Here it is well to remark that it may not be required in all cases to use two blowers if a sufficient supply of air can be supplied from one, in which case one blower can be detached from the action of the eccentric or entirely dispensed with in the arrangement.

The level of the water must not be kept

so high in the cistern as to be in danger of being forced back by the action of the blowers into the valve chambers *x*. The proper depth can be known and maintained by a gage faucet in the end of the water cistern. When it is desired to renew the supply of water—the foul water in the cistern may be withdrawn by means of a large faucet in the bottom of the cistern as shown at *k* Fig. 3.

The pipes *h*, *i*, *h*, *i*, may pass on the inside or outside of the car as taste or convenience may dictate; or in the building of a car intended to have this ventilating and purifying apparatus attached, flues may be formed in the construction thereof for the purpose. The system of pipes may be continued on one or both sides of the car.

The holes or vents 4, 4, 4, in the horizontal pipe *j*, *j*, are formed in the side of the pipe inclining upward and not continued down to the lower side of the pipe—so that any water that may be carried up with the air, may be conducted back to and down the pipes *h*, *i*, *h*, *i*, into the cistern *f*, Fig. 5.

Fig. 4 shows the side of one of the plates upon which the valves *c* and *e* Fig. 5 and their corresponding valves are fastened and have their seat over their respective vents. It also shows a portion of the vent 3, 3, 3, under one of the valves and a portion of a valve *o* on its seat over the other vent in the same plate.

It may be observed here that on account of the rapid motion of the blowers, when the car is traveling at the rate of twenty or thirty miles an hour, it is requisite that the motion of the blowers should be short and that the vents under the valves should be large to permit the free passage of the air through them without being retarded sufficiently in its passage to present a resisting force, either by vacuum or condensation, that would endanger the strength of the blowers or connections. To accomplish this purpose the blowers are or may be increased in width so as to extend from one side of the car to the other and the valves and vents may be carried thereby nearly the whole length of the bellows; at the same time being made as wide as the depth of the blowers will permit. Not to weaken the plate upon which the valves operate a portion of the substance of the plate is left remaining at intervals crossing the vents as shown *a* 5, 5, Fig. 4.

Fig. 6 is an eccentric intended to be fastened on one of the car axles. The use of an eccentric is a well known, simple, and efficient means of obtaining a reciprocating motion from the rotary motion of a shaft in positions where a crank is inapplicable. Any further description of an eccentric and the mode of applying it is not deemed requisite in this place. The motion is communicated from the eccentric to the blowers by means of connecting rods shown in full connection at *m* and *n* Fig. 1, *m* connecting the eccentric to the near blower and *n* connecting the two blowers together, so that both derive an alternate motion from the eccentric. The connection is also shown by the same letters (*m* and *n*) at Figs. 5 and 6.

In the sectional view, Fig. 3, of the end of the water cistern through the tunnel *p*, the level of the water is indicated by the dotted line. The tunnel *p* by which water is supplied to the cistern *f*, is attached to the end of the cistern and near the bottom are a number of holes *b* communicating with the cistern, whereby the water thrown into the tunnel finds its way into the cistern. The holes *b* are thus arranged near the bottom of the cistern so that the surface of the water may stand considerably above them and thereby prevent the escape of the air in that direction.

In railroad cars there are innumerable crevices, occurring chiefly around the windows and doors, through which smoke and sparks from the locomotive, with fine particles of dust with which the air is loaded in dry weather, find admission into the cars to the great annoyance of the passengers. These are introduced constantly by the currents of air rushing into the cars. This cannot be avoided in cars of ordinary construction as the admission of air from the outside is essential for ventilation. It is manifest however that if pure air is supplied to the cars by mechanical means, on the plan proposed by us, in quantities greater than is necessary to supply the demand, the rushing of air through these chinks and crevices into the cars will be stopped, and in as much as the excess of air thus supplied must have some egress, it will find its way out of the cars into the open air through these same crevices, if no other exit be provided for it. Thus the current of air will be reversed, passing now out from the car, instead of into it, and no air can, under this state of things, now enter the car at these crevices. This will, it is clear, entirely prevent the entrance of any sparks, dust, smoke, or insects from outside through these holes and crevices, and it is in this way that our improved mode of ventilation, accomplishes the secondary but scarcely less important object of the exclusion of dust &c. from the inside of the cars. In order to secure this effect in cars constructed on our plan, we do not provide any other airholes, or passages for the egress of the purified air, which we force into the cars as before described (excepting the ventilating hatch, hereinafter mentioned) for the purpose of compelling it to escape through those chinks and crevices through

which the dust &c. would otherwise enter. When, however, the cars are moving rapidly and a large volume of purified air is forced into the cars by our apparatus these crevices would prove insufficient (unless some of the windows were opened) to allow of the escape of the excess of air, and an unnatural pressure of air would be the consequence. In order to provide for this emergency, we employ an adjustable hatch or balance valve, fixed in the roof of the car which is so constructed as to exclude the rain, and to be entirely under the control of the conductor of the cars and may be kept opened or closed at pleasure. It is also designed to be self acting so that it will open of itself, when there is too great a pressure of air in the cars, and close so soon as the pressure is relieved, repeating this operation as often as circumstances require. The external view of this hatch is seen on top of the car in Fig. 1. Its internal arrangement is seen in Figs. 7 and 8 where one side is removed to shew the means by which the hatch is regulated. At Fig. 7 the hatch *r* is down on its seat upon the sides *s*, *s*. In Fig. 8 it is shown as thrown up on one side, being made to open and shut on the hinge *t*. The mode of balancing the hatch is shown in both figures, *u* being a spiral spring, having a seat *v* permanently attached to the side *s* of the box: upon this seat *v*, rests the one end of the spring *u* permanently; the other end of the spring operates against the hatch *r*, the spring being strong enough to throw the hatch up readily. On the under side of the hatch there is attached a beam from which is suspended a weight *w;* the weight is heavy enough that when entirely out to the end of the beam nearest the spring, it shall entirely overcome the power of the spring and draw the hatch shut, retaining it there permanently; but when the weight is thrown to the opposite end of the beam it will present but little resistance to the spring which will then have sufficient independent power to throw the hatch up and retain it there. By having the weight and spring properly adjusted with regard to each other, the hatch may be regulated inside of the car to operate as may be desired. If required it may be retained shut or kept open or so adjusted that the least impulse from the inside will open it and when the force is removed it will close by its own action thereby allowing the air when it cannot find sufficient vent by the crevices in the car to throw the hatch up and escape through it by its own action.

What we claim as our invention and desire to secure by Letters Patent is—

The combination of the bellows and water cistern, connected with each other and with the cars by pipes, for the purpose of ventilating rail road cars constructed and operating in the manner hereinbefore described.

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