2 Sheets—Sheet 1.

R. F. HILL.

Smoke and Spark Conveyor.

No. 209,260. Patented Oct. 22, 1878.

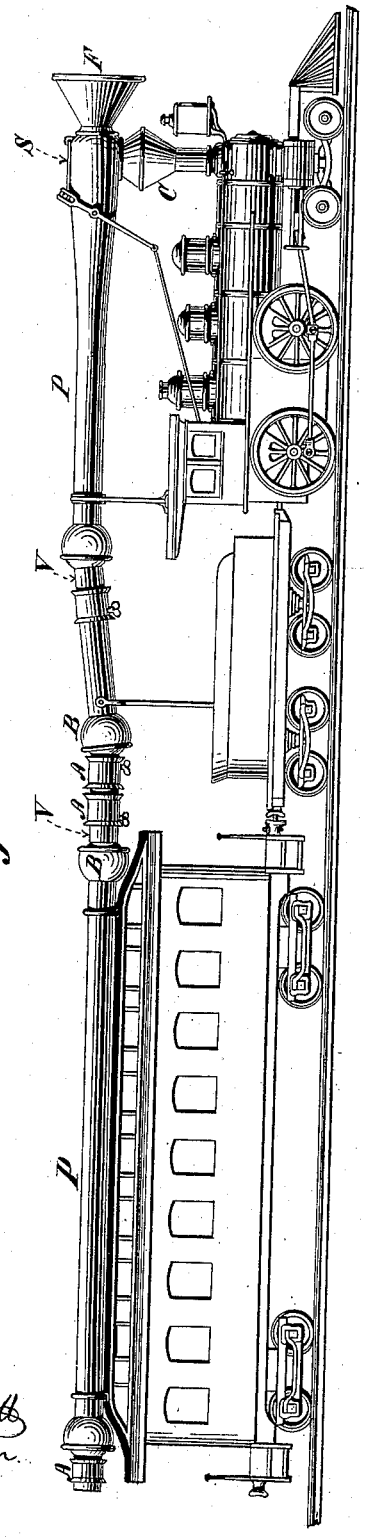


Figure 1.

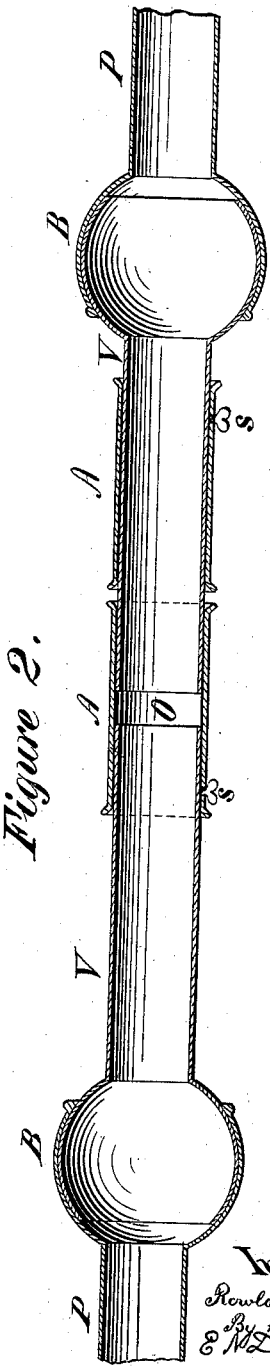


Figure 2.

Witnesses:
Geo. W. Miatt
S. T. Sullivan.

Inventor:
Rowland F. Hill
By his Attorney
E. N. Dickerson

R. F. HILL.

Smoke and Spark Conveyor.

No. 209,260. Patented Oct. 22, 1878.

Figure 3.

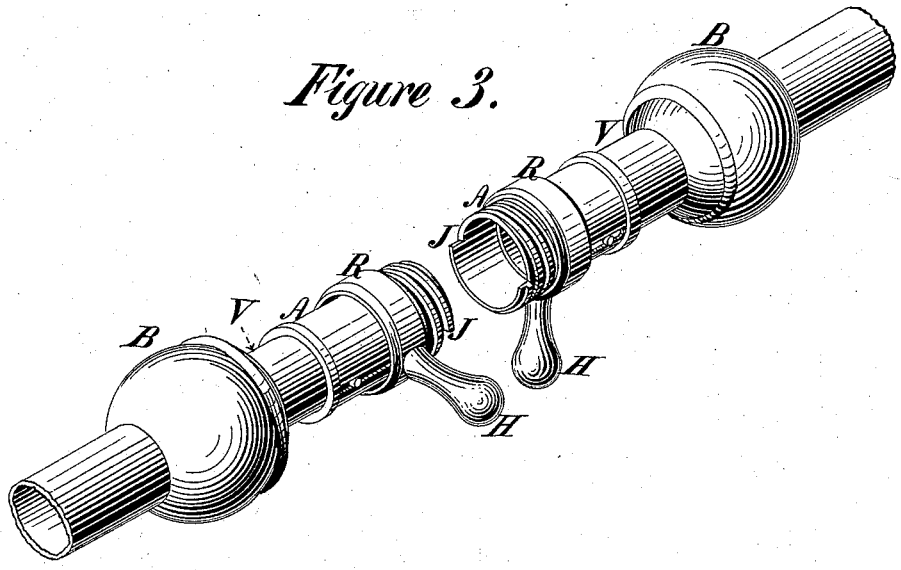
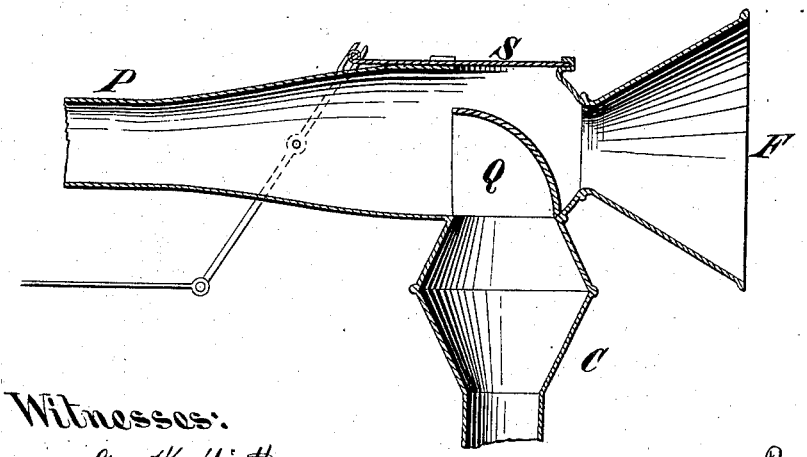


Figure 4.



Witnesses:
Geo. W. Miatt
S. H. Sullivan.

Inventor:
Rowland F. Hill
By his attorney,
E. N. Dickerson Jr.

UNITED STATES PATENT OFFICE.

ROWLAND F. HILL, OF NEW YORK, N. Y.

IMPROVEMENT IN SMOKE AND SPARK CONVEYERS.

Specification forming part of Letters Patent No. **209,260**, dated October 22, 1878; application filed November 10, 1877.

To all whom it may concern:

Be it known that I, ROWLAND F. HILL, of the city of New York, county of New York, State of New York, have invented a new and useful Improvement in Smoke and Cinder Conveyers for Locomotives, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

My invention relates to an improved mechanism for passing back over the train the smoke and cinders produced by a locomotive, and delivering them at the end of the train, out of the way of the passengers.

Two elements are essential to the success of an apparatus of this kind—in the first place, that the natural draft due to the advance of the train shall not be practically interfered with, and, secondly, that the connections of the pipes which convey the smoke to the rear of the train shall allow the movement of the ends of the cars past each other and toward each other; or, in other words, such connections must have a certain amount of lost motion, allowing for the lateral and longitudinal motion of the cars.

The couplings should also be readily attachable and detachable, so that no unnecessary time be consumed in coupling the train; and they also should be so constructed that if a train should break the pipes will slide apart without injuring themselves.

I accomplish the first object by providing the end of the pipe with a funnel or flaring mouth, whereby a current of air is forced by the advancing movement of the train through the pipe, thereby increasing the draft. I allow of the free movement of the cars past and toward each other by providing each end of the pipe, which is fastened upon the top of each car, with a universal ball-joint, and with a sliding sleeve adapted to fit over the end of the corresponding pipe attached to the other car.

My invention will be clearly understood from the accompanying drawings, in which—

Figure 1 is a general view of my invention as applied to a train. Fig. 2 represents a cross-section of my improved coupling. Fig. 3 is a perspective view of another kind of coupling. Fig. 4 represents a cross-section through the smoke-stack and funnel, showing an improved slide, for a purpose to be hereinafter explained.

The smoke-conveyer consists of a pipe, P, which commences at the smoke-stack of the engine and delivers at the rear of the train. Each car is provided with a section of this pipe, and two sections are attached, one to the engine and one to the tender, as shown, which are supported by the smoke-stack and by supporting-frames. At each end of the sections P are shown universal ball-joints B. Attached to the contained hollow balls are the short pipes V. These pipes V are made of such a length that they will not quite touch when the cars are as close together as the buffers will allow.

Sliding on the short pipes V are the sleeves A, which are fastened by set-screws *s*. When the train is being coupled the pipes V are caused to correspond. One of the sleeves A is slid over, thereby covering the opening O between the ends of the pipes V, when it is set by the set-screw *s*, as shown clearly in Fig. 2. The opening O allows the free end of the sleeve A to slide over and support the opposite contained pipe V within it, and the ball-joint B allows of the lateral movement of the cars. Only one ball-joint and slide is required between the locomotive and the tender, the pipe section on the tender being pivoted in its support. The pipe P terminates at its forward end in a funnel, F, having a flaring mouth, in which the air is forced as the train advances, thereby increasing the natural draft of the locomotive and sweeping back the cinders through the pipes.

Over the end of the smoke-stack is the slide S, controlled by a hand-lever. This slide should be open when the locomotive is at rest, thereby allowing of the escape upward of the smoke and cinders, but it should be closed when the train is in motion. The smoke-stack C might be provided with a hood opening in the pipe P toward the rear of the train, thereby insuring a better draft, as shown at Q, Fig. 4.

In Fig. 3 another form of coupling is shown. The ends of the sleeves have a screw-thread cut upon them, as shown. A section is then cut from the pipe, leaving a semi-cylindrical

jog, J, so that when the ends of the pipes are brought together the jogs J coincide, and a continuous cylinder, with a continuous thread on its surface, is thus formed. Revolving on the screw-threads so cut on the end of the sleeves A are the collars R, revolved by handles H. After the ends of the sleeves A have been brought together one of these collars is screwed over the joint, thereby firmly fastening the ends of the sleeves together. The slides are provided with slots and pins, as shown, to prevent their drawing off of the pipes V. This form of connector is not so desirable as the other, since it would be injured in case the train were to break while in motion. In both kinds of couplings the parts are duplicated on each car, so that either end can be connected to either end of any other car.

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

1. In combination with a smoke-conveying pipe extending longitudinally over the top of each car, two ball-joints, attached to and forming part of such pipe, and two sliding sleeve-pipes, one attached to each of said ball-joints, all adapted and arranged to allow of the lateral and longitudinal movement of the cars and of the ready coupling of either end of any car to either end of any other car, substantially as described.

2. My improved pipe-coupling, consisting of ball-joints B, corresponding half-screws, and locking-collars, substantially as described.

ROWLAND F. HILL.

Witnesses:

E. N. DICKERSON, Jr.,

WM. S. BEAMAN.