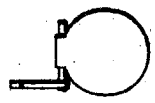
J. W. BUEL.

Spark-Arrester.

No. 159,017. Patented Jan. 26, 1875.



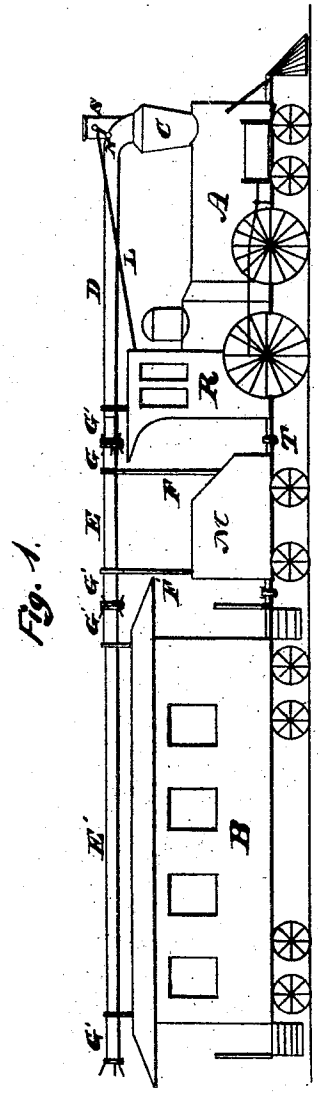


Fig. 1.

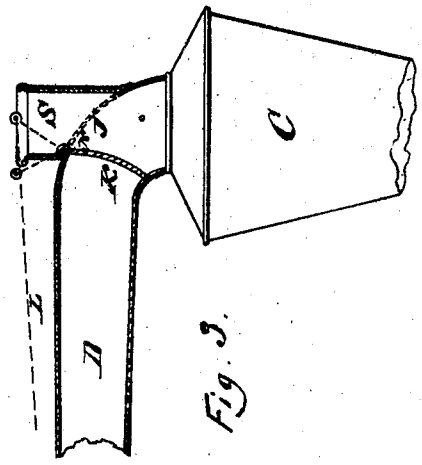


Fig. 3.

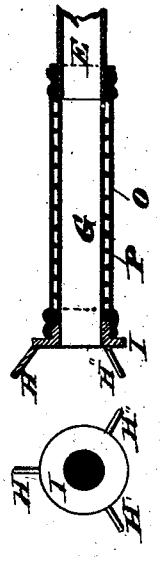


Fig. 2.

Witnesses:

Samuel S. Boyd

Thos S. Bowman.

Inventor:

Jas. W. Buel

By Chas D Moody

atty.

UNITED STATES PATENT OFFICE.

JAMES W. BUEL, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **159,017**, dated January 26, 1875; application filed September 16, 1874.

To all whom it may concern:

Be it known that I, JAMES W. BUEL, a resident of St. Louis, Missouri, have invented a new and useful Improvement in Devices for Conducting Smoke and Cinders from Locomotives, of which the following is a full, clear, and exact description, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 shows the invention in position on a train of cars; Fig. 2, a longitudinal section and end view of the joint in the conductor; and Fig. 3, a view showing the manner of connecting the conductor with the stack.

Like letters indicate like parts.

The present invention relates to the protection of railway-trains from the smoke and cinders issuing from the locomotive. It consists in the peculiar construction of a device whereby the products of combustion are conducted from the stack of the locomotive to the rear end of the train before being allowed to escape to the open air. A horizontal flue leading backward from the locomotive and over the cars, and composed of sections of tubing arranged, respectively, above each car, has previously been used; but the method of uniting the various sections in the construction referred to is extremely objectionable. The end of a forward section fitted loosely in the section in rear of it, leaving an annular space between the two parts—I have found in practice that, by reason of the steam-blast in the flue, the outward pressure therefrom is so great as to cause the smoke to escape freely from the least opening in the tube. When, therefore, the joints are constructed as described, the issue of the products of combustion is so great as to render the device a positive injury. To obviate this difficulty, and to provide a suitable construction, is mainly the object of this invention.

The general form of the device is a conductor-pipe leading from the top of the locomotive-stack backward over the locomotive, tender, and cars to the end of the train. The details of its construction appear in the accompanying drawing, in which—

A represents a locomotive of ordinary construction, and M and B B′, &c., the usual tender and cars. C represents the stack, and D that part of the conductor above the locomotive. E E′, &c., represent the sections of the conductor, respectively, above the tender and the several cars composing the train. The various sections of pipe are, respectively, supported by suitable supports F F′, &c., and are arranged opposite each other, so as, when joined together, to form a continuous tube. It is readily apparent that, in the construction of the joints which occur in the conductor between the sections, provision must be made for easily and surely coupling and uncoupling them as the cars are brought together or are separated. The joint also must be such as to readily accommodate itself to the various movements of the cars without straining any part or opening in the least degree, or collapsing. To secure a joint which will answer these requirements is a principal object of this invention. Accordingly, each section is, preferably, made somewhat shorter than the car beneath, and is (the section D at its rear end only and the sections E E′, &c., at both ends) furnished with an elastic extension, G G′, whose general shape conforms to the remainder of the tube, and which, in length, is sufficient to bring its outer end beyond the end of the car—that is, when provided with its elastic extensions, each section is longer than its supporting-car. Referring to Fig. 2, the particular construction of the joint is seen more distinctly. O represents an elastic tube, fastened permanently to the main section E. Its outer end is provided with a flange, I, made of suitable material. To provide for an elastic movement of the extension in a longitudinal direction, and also to enable the extension to preserve its form when turned from a straight line, and when the joint is compressed, the tube O has either within it, as shown, or inside of it, a spring, P.

I do not desire to be limited to the particular kind of spring shown, but claim any spring in that connection which is suitable for the purposes above set forth. Projecting outward in a flaring manner from the flange I are guide-rods H H′ H″. They are made and arranged so that when any two extensions come together to form a joint their points will not interfere, but the rods of one extension will deflect those of the other. The flange I is provided

on its face with an elastic facing to insure a tight joint when the extensions come together.

In Fig. 3 is shown the manner of connecting the conductor with the stack of the locomotive. At its forward end the conductor-pipe is curved downward, forming a close connection with the mouth of the stack. In the upper side of the conductor, over the stack, there is an opening, J, which can be closed by a valve, K. This valve is operated by a cord, L, extending to the cab R. The valve and also the conductor are so made and operated as to close the passage backward into the conductor when the opening J is open; and when the opening J is closed the passage into the conductor is open. To lengthen the stack I preferably attach an extension, S, to the top of the conductor. When opening J is closed by the valve K the latter and the immediately-surrounding surface form a condensing-surface, N, where the exhaust steam from the locomotive is condensed.

In operation, as the train is made up, the flanges of opposing extensions come against each other before the cars are coupled below at T. This causes the extensions to be compressed longitudinally, when the cars are finally coupled. This compression insures a proper joint, because the outward pressure of the extensions is sufficient to keep the flanges close together in all the positions to which the extensions are liable. In addition to the outward thrust of the spring P the latter aids materially in preventing the collapse of the extensions when pressed together, or when they are thrown out of a straight line. Should, for any cause, the flanges of opposing extensions not be exactly opposite each other as the cars come together, the guides H H′ H″ will insure a proper meeting. As the joint is formed by compression, it is broken as soon as the compression is relieved, and this is done by separating the cars.

It is sometimes desirable, as when the train is backing, or when the locomotive is standing just outside the depot, to have the products of combustion pass directly to the open air. The valve K is then moved to open the opening J. When the train is in motion, and the exhaust blast is passing off, the steam strikes against the condensing-surface N, condensing it sufficiently to thoroughly extinguish the sparks, so that nothing in a state of combustion escapes from the conductor, thus providing a protection from fire.

If desired, the supports F F′, &c., can be made somewhat elastic, to enable the joints to be more readily formed and preserved.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the locomotive A, tender M, stack C, sections D E, provided with the extensions G G′, consisting of the tube O, spring P, and flange I, provided with an elastic facing and supports, F F′, substantially as described and shown.

2. The combination of the locomotive A, tender M, stack C, sections D E, provided with the extensions G G′, consisting of the tube O, spring P, and flange I, provided with an elastic facing, guides H H′ H″, and supports F F′, substantially as described and shown.

JAMES W. BUEL.

Witnesses:

THOS. M. BRAWNER,

CHAS. A. MOON.