(No Model.)

J. HOWE.

SPARK AND SMOKE CONDUCTOR.

No. 360,883. Patented Apr. 12, 1887.

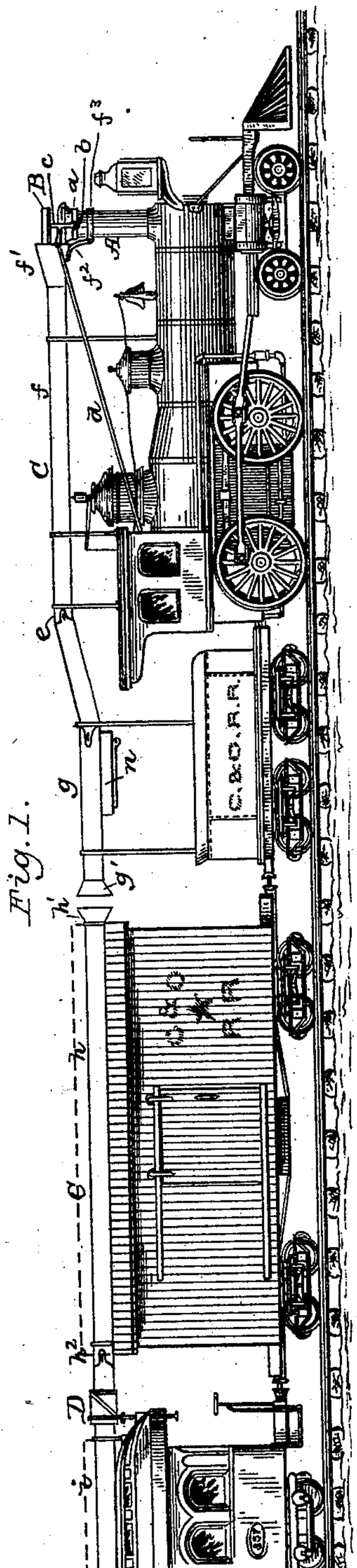

Fig. 1.

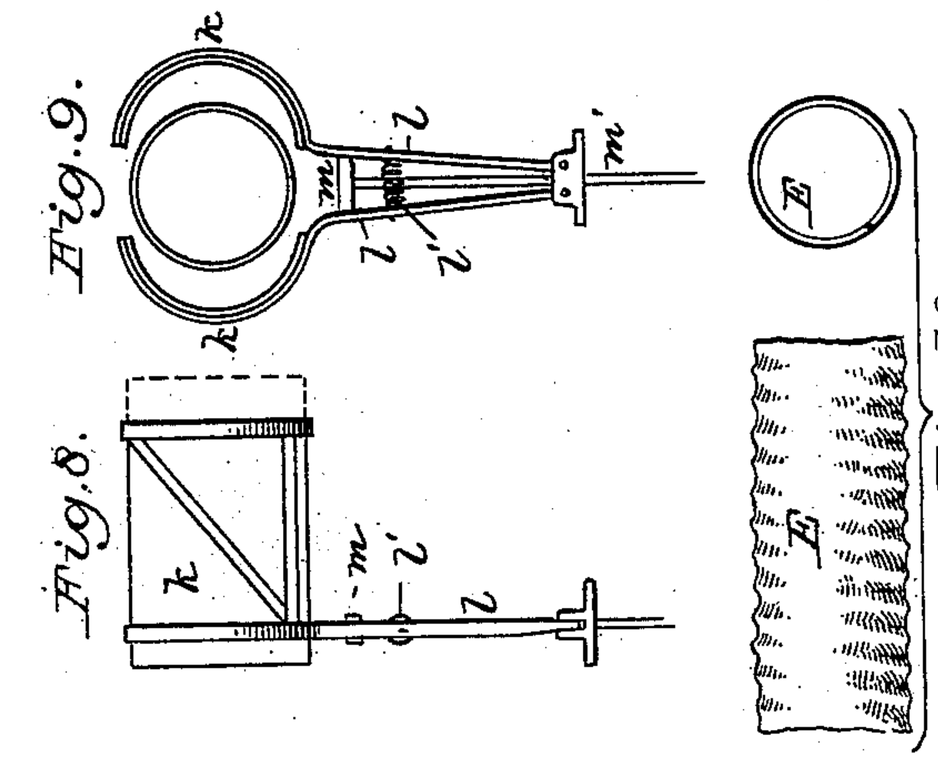

Fig. 9.

Fig. 8.

Fig. 10.

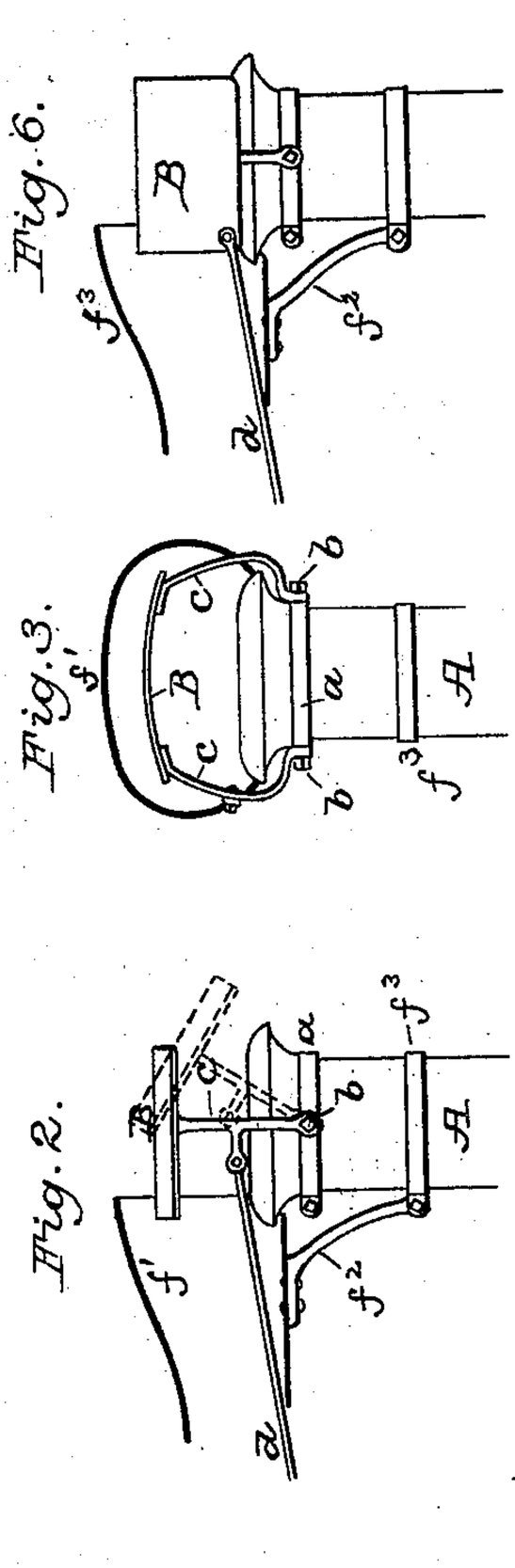

Fig. 6.

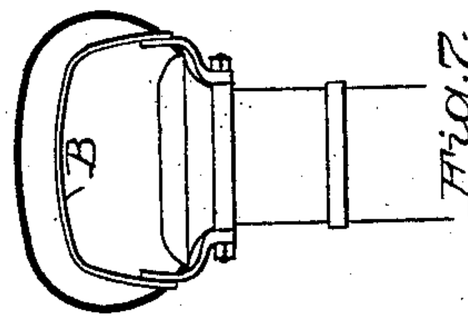

Fig. 7.

Fig. 3.

Fig. 5.

Fig. 2.

Fig. 4.

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SPARK AND SMOKE CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 360,883, dated April 12, 1887.

Application filed February 9, 1886. Serial No. 191,328. (No model.)

To all whom it may concern:

Be it known that I, JOHN HOWE, of the city and county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Locomotive Spark and Smoke Conductors; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

My said improvements pertain to that class of spark and smoke conductors or controllers for passenger-trains which involve the use of tubular conductors extending from the smoke-stack of a locomotive along or beneath the roofs of cars to the rear of a train.

The main object of my invention is to provide for a reliable delivery of objectionable products of combustion from the smoke-stack to the conductor without practically impairing the exhausting or relieving capacity of the locomotive while in motion.

Another object is to provide for a practical disconnection of the stack from said conductor, for enabling the locomotive while at rest or moving slowly under low steam to exhaust or relieve itself as freely as if no rearward conductor were employed; also, to provide for reliable connections between or at the coincident ends of the several sections of the conductor, and to enable said connections to be readily controlled by persons standing upon the platforms of cars.

Another important object of my invention is to accomplish these ends by means of contrivances which can be readily applied to use under existing conditions, thus obviating all necessity for radical variations from the usual construction and arrangement of locomotives and other rolling-stock.

After fully describing my invention in connection with the drawings, the features deemed novel will be duly specified in the several clauses of claims hereunto annexed.

Figure 1 illustrates in side view a locomotive, a tender, and cars with my improvements applied thereto. Figs. 2 and 3, in enlarged side and end views, illustrate the top of the locomotive smoke-stack and a portion of the tubular conductor, the two being arranged as when in full service. Figs. 4 and 5, in similar views, illustrate the same as when the locomotive is at rest, for instance. Figs. 6 and 7, in similar views, illustrate a modification of the same. Fig. 8 is an enlarged side view of the couplings at the joints of the tubular conductor. Fig. 9 is an enlarged end view of one of the couplings. Fig. 10 is a side and end view of a detachable flexible coupling-section.

The locomotive is provided with a smoke-stack, A, in any of the usual forms, and just below the top thereof it is provided with a clamping ring or band, *a*, which may be readily detachable, if desired, and which has at each side a projecting stud or pivot, *b*. A spark-deflecting hood, B, is mounted on said stack by means of arms *c*, hinged upon said pivots *b*, so that said hood can be swung to and fro from a horizontal position over the stack to a vertical position in front, as clearly indicated. The control of this hood by an engineer or fireman in the cab is conveniently effected by means of the long rod *d*; but if no such rod be used the hood can be set by manipulation, in which case the arms *c* should be arranged to be firmly locked while in a vertical position, and this can be done by providing the pivots *b* with screw-threads and with suitable clamping-nuts.

A movable or swinging hood has heretofore been employed above a screen-netting, forming a part of a head for the reception of sparks, and from which, by means of vertical pipes, the sparks were conducted to chambers below the boiler. In said prior organization the swinging hood, being wholly outside of the head and above the netting, could not operate to deflect anything which came in contact with it into the head, whereas in my apparatus the hinged hood, when operating as a deflector, enables whatever may impinge against it to be driven into the bell-mouth conductor, because there is nothing interposed between the top of the smoke-stack and the hood, and also because said hood projects into the bell-mouth, as clearly indicated in Figs. 2, 3, and 6.

The tubular conductor C is constructed in sections of about the same length as the locomotive or tender or car on or within which they are to be carried as a permanent or detachable fixture thereon. At the coupling *e*,

between the locomotive and the tender sections *f* and *g*, provision need only be made for such variations in movement as are common at that point, although the more complex couplings, hereinafter described, may be there used, if desired. Baggage-cars usually next follow the tender, and, as here shown, the baggage-car conductor-section *h*, at its front end, is provided with a bell-mouth, *h'*, and that the rear end of the tender-section *g* is provided with a similar mouth, *g'*. As I deem it advisable that air be freely admitted into the conductor at least at one or more points other than at the front or open end of the locomotive-section *f*, I so proportion the length of the sections *g* and *h* that their coincident bell-mouths shall be separated, as shown; but this arrangement of bell-mouths may be located at the junction of the locomotive and tender sections with correspondingly desirable results. At the front end of the locomotive-section *f* it has a large bell-mouth, *f'*, into which the hood B may partially enter, and this section is coupled to the stack by means of a vertical standard, f^2, firmly secured at its foot to a clamping-ring, f^3, which embraces the stack, and additional fastenings may be used, if desired.

At the union of the rear end of the baggage-car section *h* with the front end of a passenger-car section, *i*, and at all the unions of passenger-car sections, is a coupling D, of novel construction. Said coupling D has a cylindrical head, *k*, divided centrally on a vertical line, and it may be composed of wire-work covered with flexible material, or wholly of sheet metal, if desired. Each semi-cylindrical half of said head is mounted upon the upper end of a swinging vertical standard or arm, *l*, flexibly mounted at its foot upon a suitable base on top of the car. As shown, said standards are hinged, so that the two parts of the head may be vibrated toward and from each other. When hinged and controlled, as shown, a retractile spring, *l'*, is preferably coupled to both standards, so as to normally hold them close together and maintain the two parts of the head in a closed position. Between the standards *l* there is a cam, *m*, on a vertical rotative rod, *m'*, this latter extending downward through the hood of a car so as to be accessible from the platform. By semi-rotating said rod and cam the standards *l* will be separated or permitted to close together, as the case may be. In lieu of the rotating rod and the resulting rotating wedge action of the cam it is obvious that whatever may be the form of said cam it will serve as a wedge if vertically moved, as by a sliding rod, in which case the spring *l'* would be located above the wedge instead of below it, as shown, and the two arms *l* would be both hinged upon one pivot or rod, to provide for their proper inclination with reference to each other, and if said wedge be employed it may be slotted so as to loosely embrace both standards and render a spring unnecessary. If the standards be composed of light spring-steel, they can obviously be rigidly mounted at their bases and operate as springs. When said novel couplings D are to be employed in connection with a car having a tubular conductor without a coupling of this kind, then the coincident end of said conductor should have a hinged end, as shown at h^2, to provide for proper flexibility; but when two cars having the novel couplings at both ends are to be coupled, then an auxiliary flexible tubular section, E, can be employed. As indicated in Fig. 9, this auxiliary section is a short length of tube of about the same diameter as the coupling, and rendered non-collapsible, but specially flexible, by means of a spiral-wire foundation, covered seamlessly with leather or other suitable fabric capable of withstanding heat, and rendering it strong but light, and readily carried by any one of the coupling-heads when in a closed or clamped position, and as readily entered into any other coupling when opened to receive it, and as readily embraced thereby when closed. The use of these auxiliary tubular sections obviates the necessity for specially making up a train, which would be required were the car-sections provided at only one end with the novel jaw-couplings and at the other end with a hinged part, h^2, for union with the jaw-coupling. It is, however, not absolutely essential that this auxiliary section E be used, it being obvious that if the heads of the novel couplings be elongated, as indicated in dotted lines in Fig. 8, that any one head when closed can enter any other head when opened, and be properly clamped whenever this latter head has thereafter been closed.

At the under side of the tender-section *g*, I have provided a receptacle, *n*, which serves as a cinder-trap, and, although such traps in such conductors are not broadly new, I have for the first time provided the tender-section with such a trap, and have furnished this trap with a door, whereby its contents may from time to time be discharged into the tender. The combustible character of the solid matter usually discharged from locomotive smoke-stacks is well known, and with this arrangement of the trap its contents can be delivered into the tender, and conveniently utilized as fuel when mixed with fresh fuel.

In describing the operation of the apparatus it will be assumed, first, that the train is either at rest, and the usual blower is at work for raising the fire in the fire-box, or that the train is slowly moving under low steam. Under these circumstances it is obvious that the locomotive should "breathe" as freely as possible; or, in other words, that it should have its exhaust as free as possible, and therefore the hood should then be thrown forward, as indicated in Figs. 4 and 5, so as to leave the upward exit from the stack wholly unobstructed. If the train were in motion, more or less of the smoke, gases, and solid matter would pass into the adjacent bell-mouth of the tubu-

lar conductor C and be delivered therefrom at the rear of the train. If the train be moving under full steam and at speed, then the hood should be raised, so that it will stand horizontally, or practically so, above the stack, as shown in Figs. 2 and 3, and then the blast from the stack will be horizontally deflected, and by the impact of air in front the smoke, &c., will be forced into the tubular conductor. If the hood should be set in an inclined position above the stack, as indicated in dotted lines in Fig. 2, then an upward relief will be afforded, in that more or less of the exhaust-steam and the smoke and gases would be freely discharged upwardly, while other portions thereof, with most of the solid matter, would be driven into the tubular conductor.

The connections of the tubular conductor and of the hood with the smoke-stack being detachable enables them to be easily applied to or removed from a locomotive, which is obviously a matter of practical consequence for not only obviating the necessity for special construction of smoke-stacks, but also enabling freight engines to be temporarily used in lieu of regular passenger-engines.

In some cases it will be found desirable to locate the conductors C within the cars—as, for instance, beneath an arched roof—as indicated in dotted lines, thus utilizing the heat radiated from said conductor for passenger-cars, or for protecting produce from freezing in freight-cars.

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

1. The combination, with a locomotive smoke-stack, of a bell-mouthed tubular conductor extending horizontally rearward from the top of said stack, and a hinged deflecting-hood coupled to said stack, and adapted to swing toward and into and also from said bell-mouthed conductor, substantially as described, whereby said hood can be made to occupy either a substantially horizontal position above the stack, and partially within the bell-mouth or a substantially vertical position in front of it, as and for the purposes set forth.

2. The combination, with a locomotive smoke-stack, of a clamping-ring embracing the stack, and an adjustable hood provided with arms hinged to said ring, substantially as described.

3. The combination, with a tubular smoke and spark conductor mounted above or on a car, of a tubular coupling having a head constructed in two semi-cylindrical parts mounted on hinged or flexible standards, substantially as described, whereby said heads may be opened laterally to receive the end of an adjacent tubular conductor and closed thereon, as set forth.

4. The combination, substantially as hereinbefore described, of a tubular smoke and spark conductor mounted above or on a car, the sectional coupling composed of two semi-cylindrical parts, each mounted on a swinging standard, and an adjusting-rod accessible from the platform of the car for controlling said coupling.

5. The combination, with the tubular spark-conductor, of the sectional coupling composed of two parts, each mounted on a swinging standard, a rotative rod, and cam for separating the parts of said coupling, substantially as described.

6. The combination, with the smoke-stack, of a tubular conductor extending rearward from the top of the stack, and a cinder-trap in said conductor above the tender, provided with a discharge-door, substantially as described, whereby solid matter collected in said trap may from time to time be discharged into the tender for use as fuel.

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Witnesses:
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WILLIAM O. WHIPPLE.