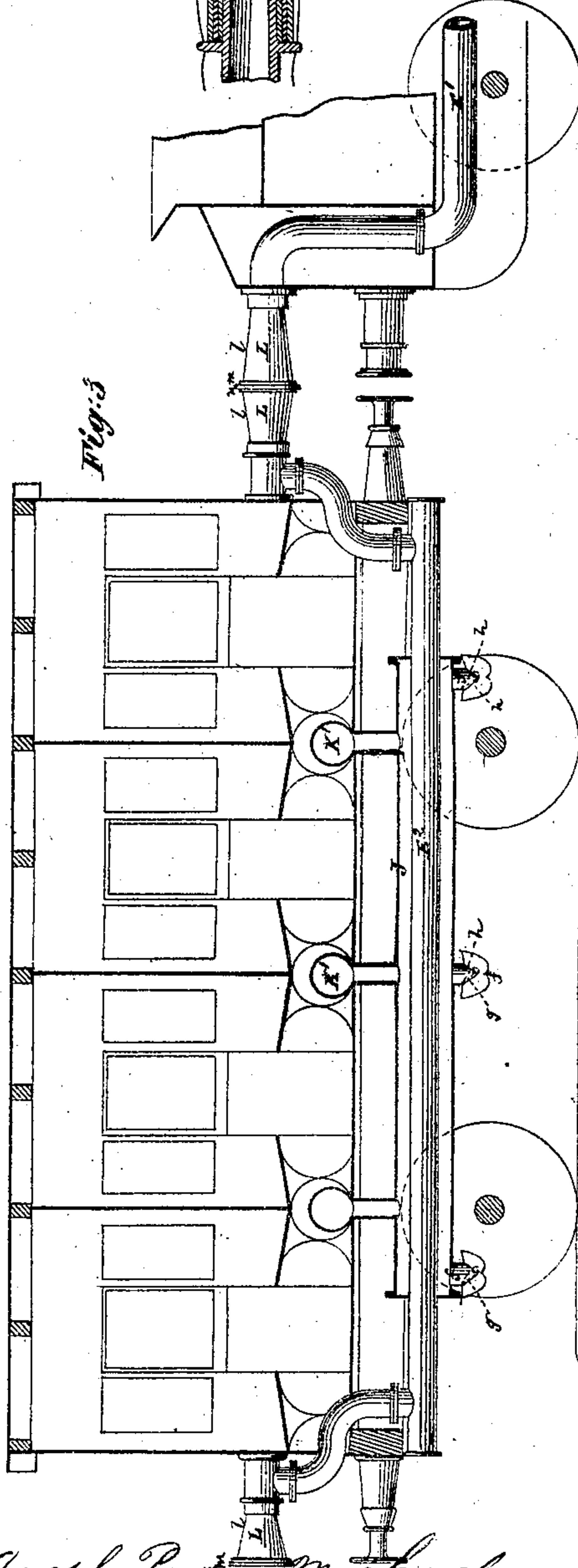
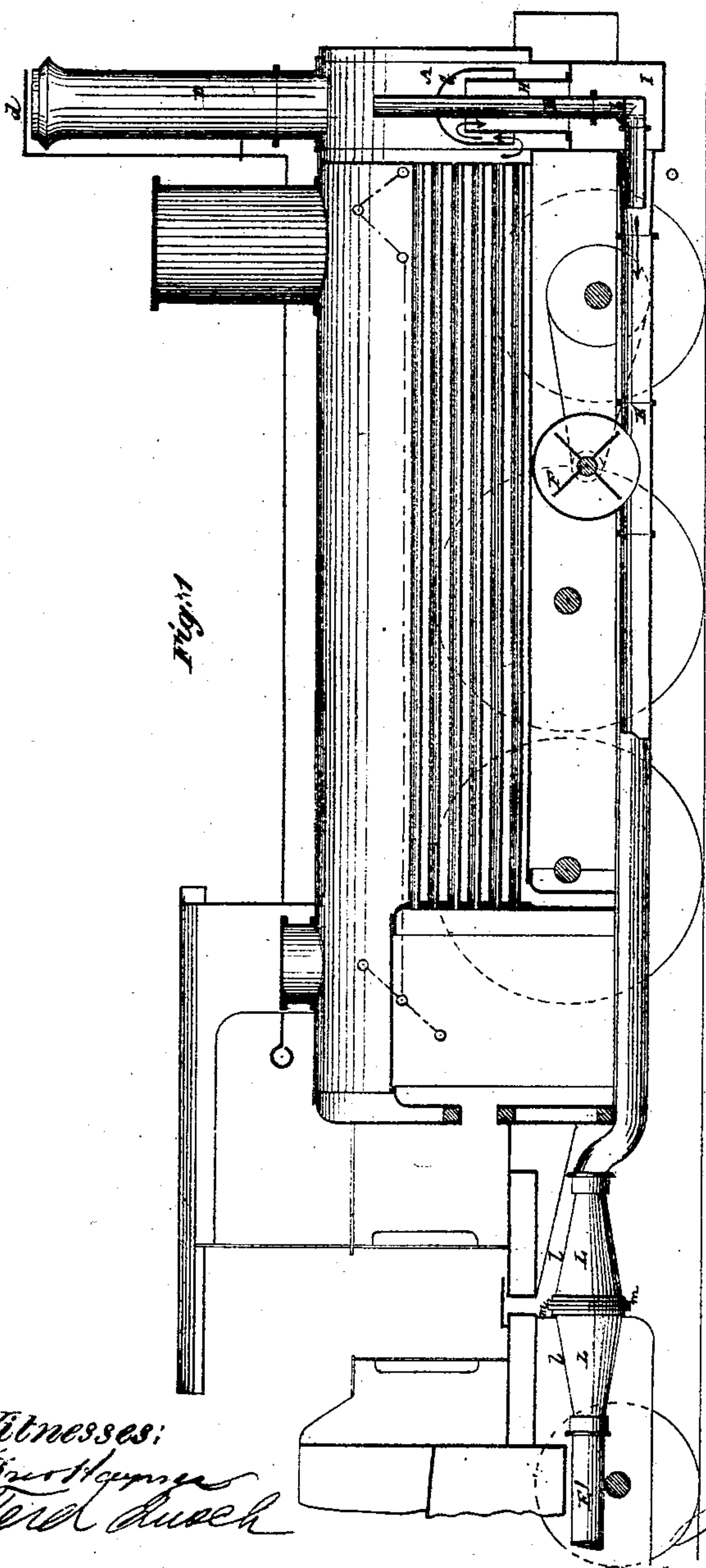
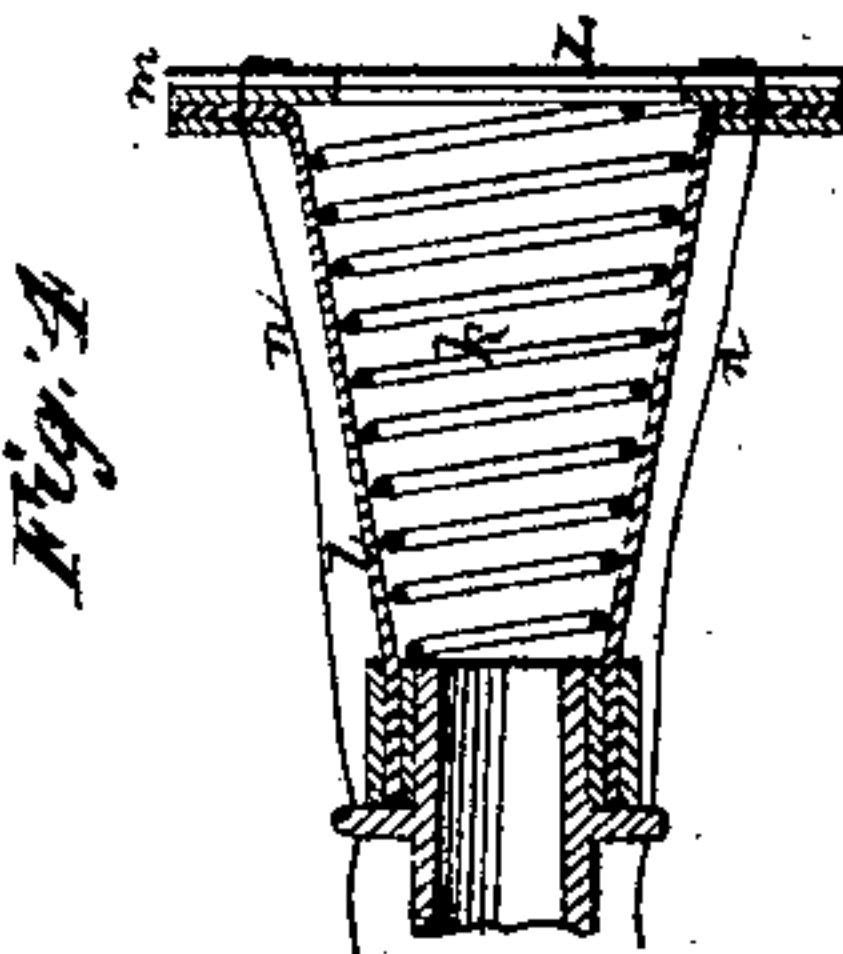
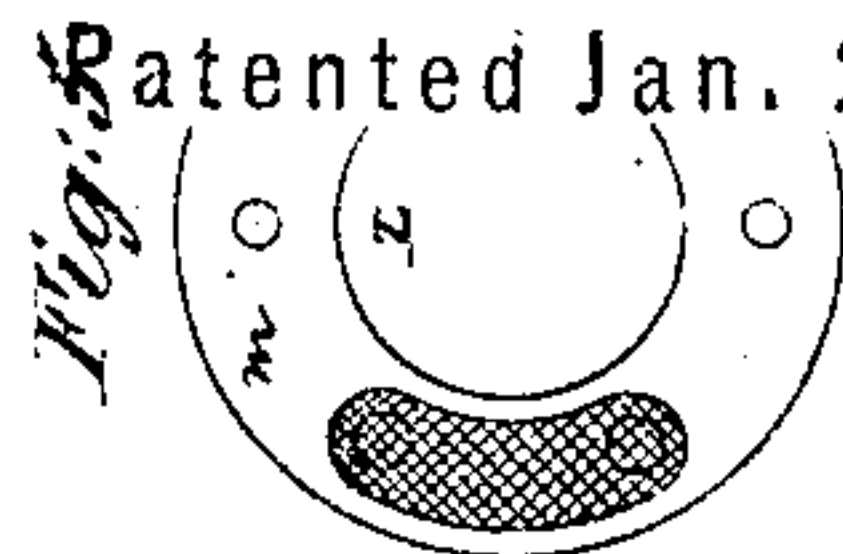
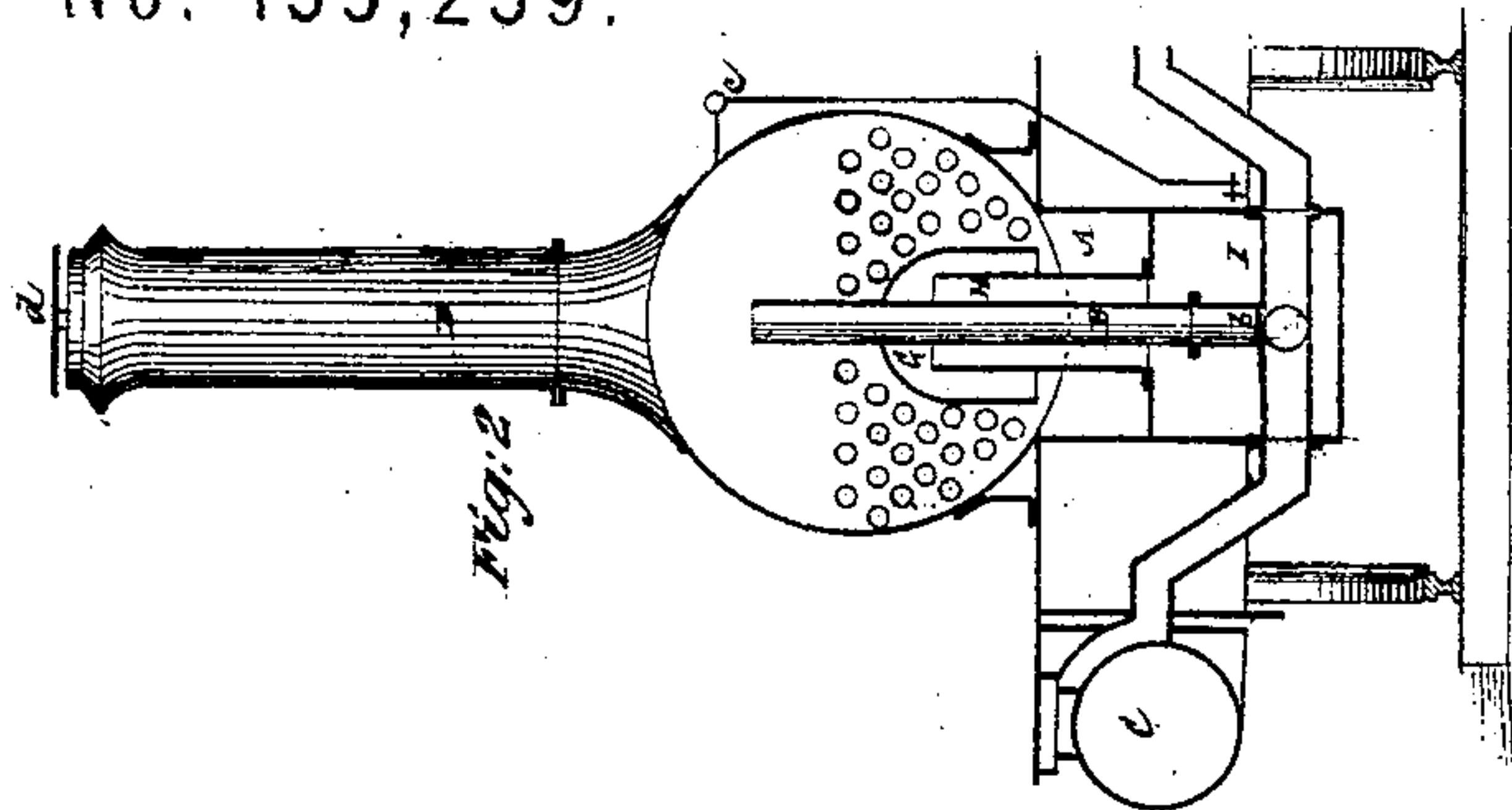


J. P. MICHAELS & L. W. BROADWELL.

Railroad Car-Heaters.

No. 135,239.

Patented Jan. 28, 1873.



Witnesses:
Geo. H. Hays
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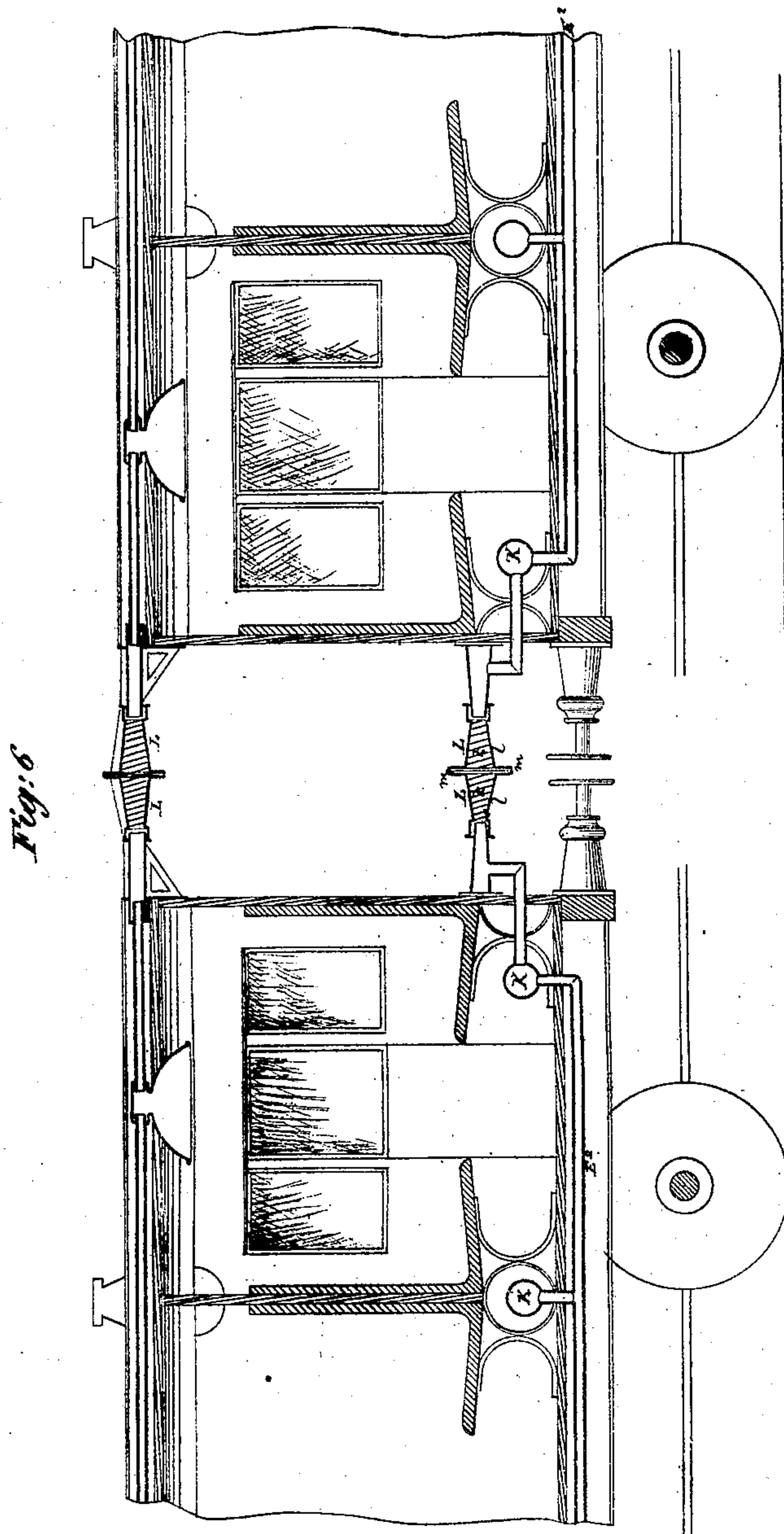
Joseph Porter Michaels
Lewis Wells Broadwell
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UNITED STATES PATENT OFFICE.

JOSEPH PORTER MICHAELS AND LEWIS WELLS BROADWELL, OF VIENNA, AUSTRIA, ASSIGNORS TO THEMSELVES AND PHILIP SIDNEY POST, OF SAME PLACE.

IMPROVEMENT IN RAILROAD-CAR HEATERS.

Specification forming part of Letters Patent No. 135,239, dated January 28, 1873.

To all whom it may concern:

Be it known that we, JOSEPH PORTER MICHAELS and LEWIS WELLS BROADWELL, both citizens of the United States, but now residing in Vienna, Austria, have invented certain new and useful Improvements in Heating and Ventilating Apparatus for Railway Trains—also applicable to other purposes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a vertical longitudinal section of a locomotive-engine and its tender, in part, with our invention applied; Fig. 2, a transverse vertical section through the smoke-box of the engine; Fig. 3, a vertical longitudinal section of the first car of the train as connected with the tender with our invention applied; Figs. 4 and 5, a longitudinal section and partial face view, respectively, of an automatic joint used to establish tubular connection between the several vehicles of the train. Fig. 6 is a vertical longitudinal section of the adjacent ends of two cars in the train having our invention applied.

Similar letters of reference indicate corresponding parts.

Our invention consists in novel means; substantially as hereinafter described, for warming and ventilating railway cars, and for transmitting power from the engine applicable, if desired, to working the brakes of the train. One object of the invention is to utilize the waste heat and exhaust steam from the locomotive for warming the cars in the train by passing the products of combustion, along with the exhaust steam, through tubes to the rear of the train, and whereby the annoyance to travelers from smoke and sparks is avoided. An automatic joint to establish such tubular connections constitutes also an important feature of this invention.

Referring to the accompanying drawing, A represents the smoke-box of a locomotive-engine. Said smoke-box is extended downward, as shown, as is also the exhaust-steam blast-pipe B, which latter is formed with an angular portion running backward, and provided

at the angle or bend with a valve, *b*, which is operated by the engine-driver by means of a crank and connecting-rod *c*, or otherwise. The escape steam from both cylinders C C is passed by branches to the pipe B below the valve *b* of the latter. When the valve *b* is down or in a vertical position and a valve, *d*, on top of the smoke-pipe D is open, then the heat or escaping products of combustion and exhaust steam will pass off or up through the smoke pipe or chimney D in the usual manner. This may be the disposition of said parts when getting up steam, or at other times, as required. When, however, the valve *b* is up or in a horizontal position and the valve *d* of the smoke-pipe is closed, as shown in Figs. 1 and 2, then the escaping steam will be passed to the rear through the lower or horizontal part of the escape-pipe B into or through the lower or horizontal pipe E, Fig. 1, and, the valve *d* on top of the smoke-pipe D being closed, all the waste heat and escaping products of combustion from the furnace will be drawn downward by the action of the escaping steam, and be driven to the rear through the series of tubes E E¹ E² to warm the cars, as required. In case the forcing power of the escaping steam is not sufficient to drive the escaping products of combustion through the whole length of the heating-tubes E E¹ E², then a fan or blower, F, driven by strap from a drum on the front axle of the locomotive, may be used. Within the smoke-box A is arranged a dome, G, having a cylinder, H, within it and around the upright portion of the exhaust-steam pipe B. The object of these devices is to compel the smoke and products of combustion to travel in an angular course, so that the heavier particles of coal and ashes will be arrested and caused to fall into a receiving-chamber, I, below.

The utilization of the waste heat and products of combustion passing through the tubes E E¹ E² for warming the interior of the cars may be variously accomplished—as, for instance, in either of the two following ways: First, by conducting the escaping products of combustion from the main tubes E² directly into distributing-pipes K within the interior of the cars, as shown in Fig. 6; or said main

tubes E^2 may be surrounded, as represented in Fig. 3, by air-heating tubes J, covered with any suitable non-conductor of heat, and into which the external atmosphere is admitted through branch openings f , Fig. 3, and, becoming heated by the main tubes E^2 , passes up into the cars by pipes K' , which may be perforated or provided with screens. The openings f into the tubes J are so constructed and provided with flap-valves g that the air will pass equally well into the tubes J in both directions of the travel of the train, said valves being thrown to opposite sides of lateral openings $h h$ according to the direction in which the train is running. These openings may be protected by wire-gauze to exclude dust. The sections of heating-tubes $E E^1 E^2$ being for the most part straight, terminating, or only as regards certain of them, in turned-up branches at their ends, and the ends thereof being closed, either by movable caps or by the automatic joint or coupling hereinafter described, said tubes may be easily and quickly cleaned in case deposits of smoke or ashes should render it necessary.

Each car has its independent heating devices, consisting of the main tube E^2 , with or without its surrounding tube J and heat-distributing pipes K or K' . To each connecting-end of the tubes $E E^1 E^2$ is attached the one-half L, of an automatic coupling-joint, L L, the construction and action of which is as follows: Surrounding either around or flat spiral conical spring, k , is a strong flexible covering, l , secured by a screw-band at its smallest end to the tube with which such half-coupling connects, and connected with a flange, m , at its largest end. This flange is covered with some elastic substance, such as felt, rubber, or other suitable material, to act as a packing to the joint formed by contact of the two contiguous flanges $m m$ of the automatic joint or coupling L L. These half-couplings L, being all exactly similar, and being arranged in like longitudinal centers or lines, and equally distant from the tops of the rails, it necessarily follows that they cannot fail to come into proper contact when trains

are made up in the ordinary manner, and regardless of which ends of the cars come together.

The springs k of the half-couplings L project somewhat further than the buffer-heads, so that when the train is made up the flanges m come in contact, and the springs k are sufficiently compressed to form a tight joint, yet so that they will have sufficient longitudinal play to accommodate themselves to the continually varying distances which the cars necessarily assume toward each other when traveling; likewise enough lateral play to prevent the contact of the flanges m from being broken by the vibrating motion of the cars when traveling over an uneven track.

Tubes thus automatically connected may also be used for ventilating purposes, or advantageously employed for the transmission of steam, hydraulic, or pneumatic power, for operating brakes and other purposes.

To warm the cars when the locomotive is at rest by the means or apparatus hereinbefore described steam may be blown through the cylinders, or through a small pipe leading from the boiler to the apparatus, through which the necessary quantity of steam could be allowed to escape into the horizontal heating-pipes until the locomotive is put in motion, when the temporary heating supply may be shut off.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the bent escape-steam pipe B, the valve b , the smoke-box A, the valve d , and the pipe E.

2. The conical hollow buffer-coupling L L, composed of springs k , flexible covering l , and padded flanges m , for automatically making connection between the vehicles, essentially as described.

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Witnesses:

JOSEF TAKOWETZ,
WILLIAM HINNING.