

No. 618,787.

Patented Jan. 31, 1899.

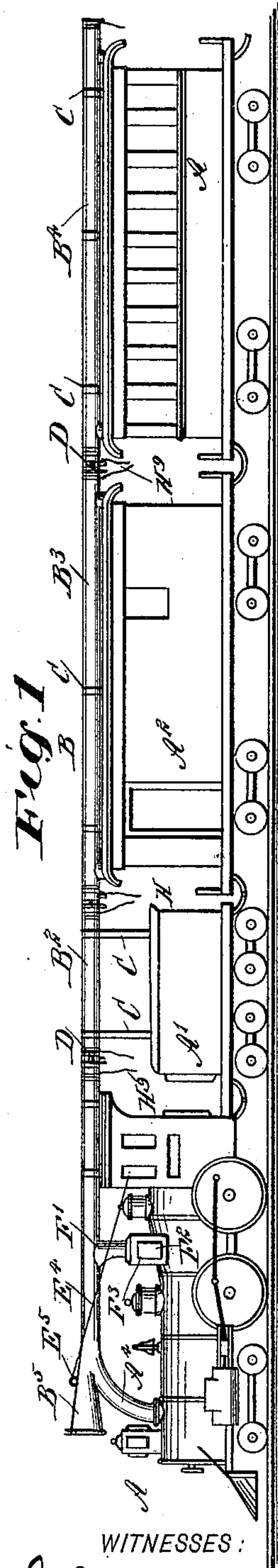
W. H. DANA.

SMOKE CONVEYER AND SPARK ARRESTER.

(Application filed Jan. 7, 1898.)

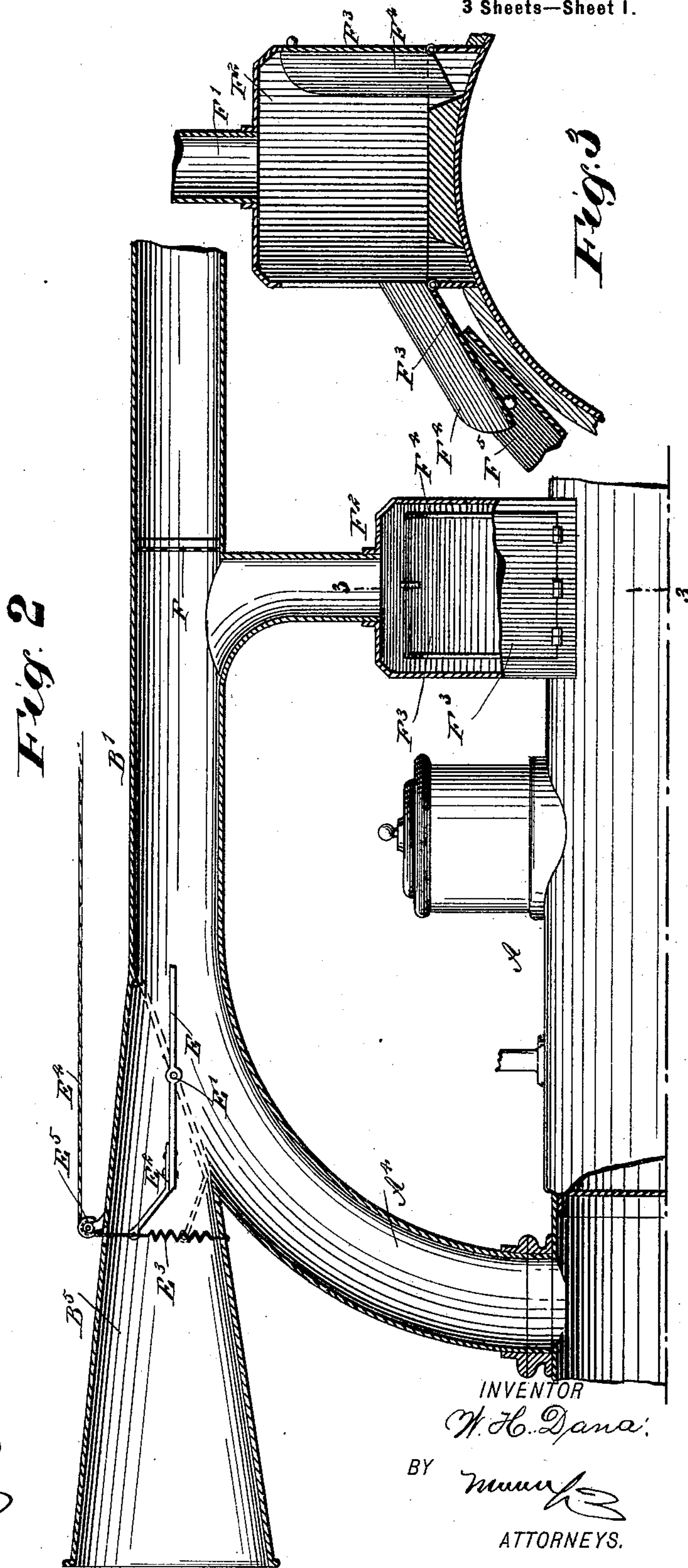
(No Model.)

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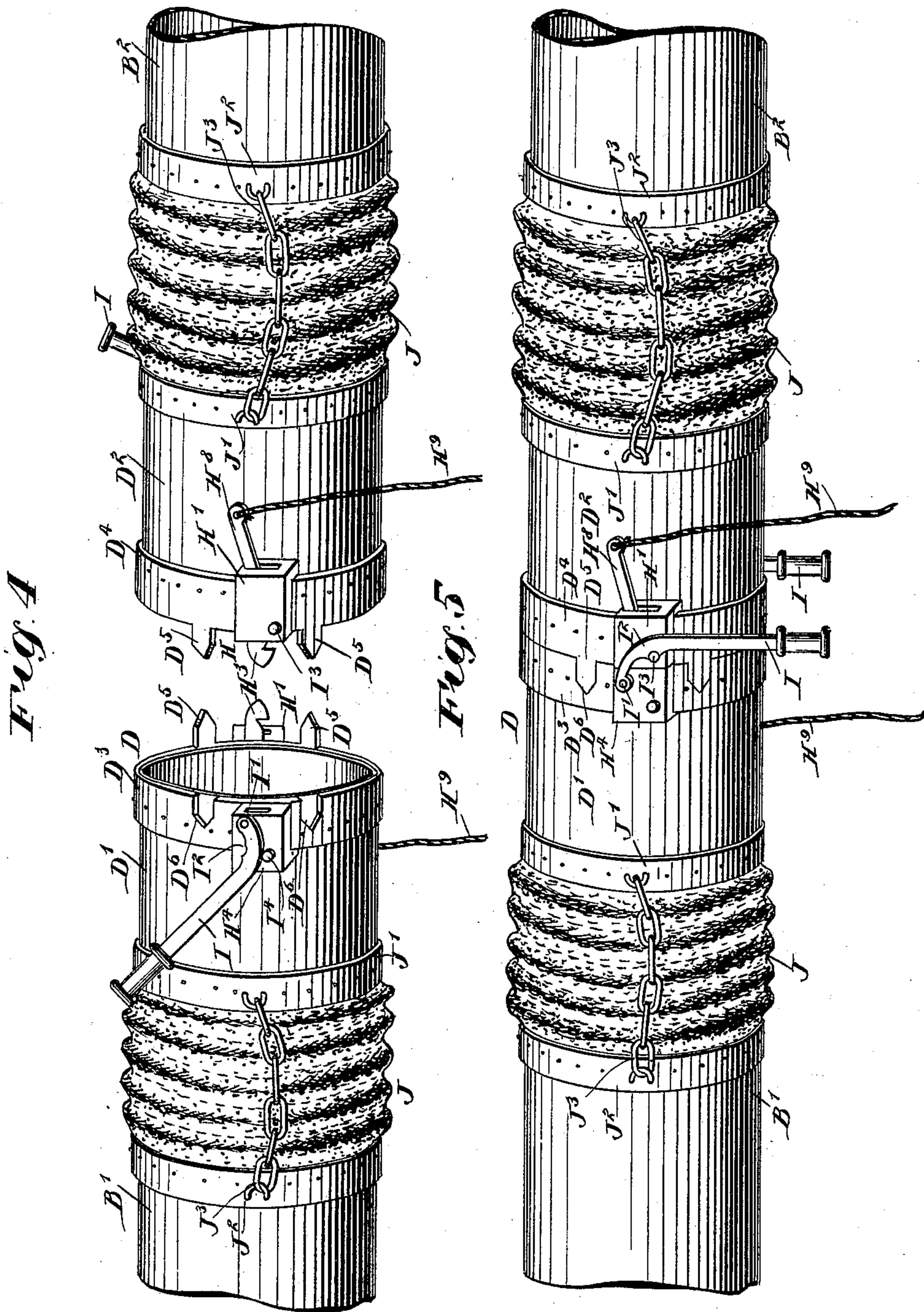
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(Application filed Jan. 7, 1898.)

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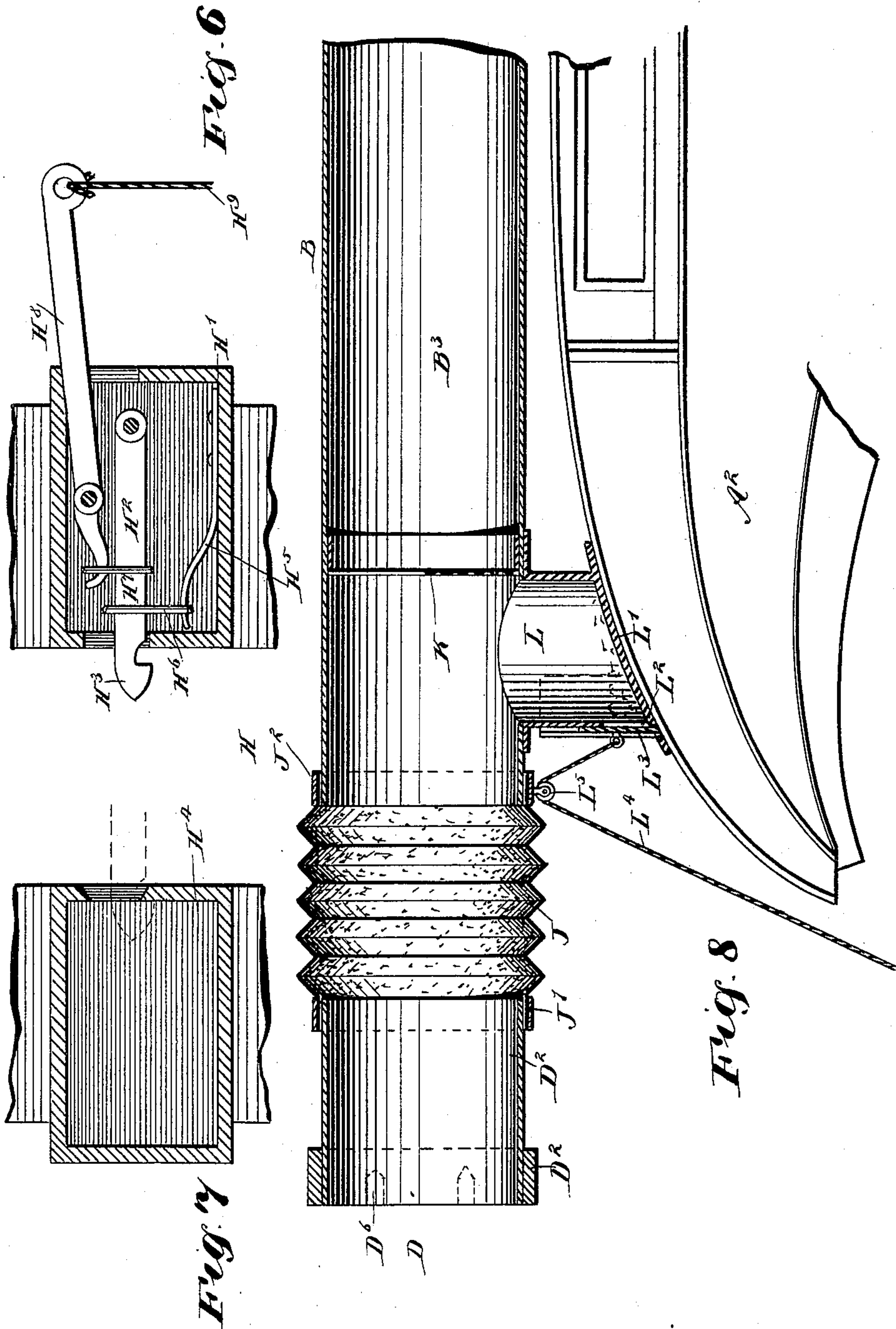
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3 Sheets—Sheet 3.



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SMOKE-CONVEYER AND SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 618,787, dated January 31, 1899.

Application filed January 7, 1898. Serial No. 665,967. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DANA, of Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Smoke-Conveyers and Spark and Cinder Arresters, of which the following is a full, clear, and exact description.

The invention relates to railroad-trains drawn by locomotives using coal, wood, or like material as fuel.

The object of the invention is to provide a new and improved smoke-conveyer and spark and cinder arrester arranged to completely arrest the sparks and cinders issuing from the locomotive smoke-stack and to convey the smoke and gases generated by the combustion of the burning fuel in the locomotive to the rear end of the train, so that the passengers in the cars do not inhale the obnoxious smoke and gases and are not annoyed by sparks and cinders, as heretofore experienced in railway traveling.

The invention consists of novel features and parts and combinations of the same, as will be described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied. Fig. 2 is an enlarged sectional side elevation of the front end of the improvement. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2. Fig. 4 is an enlarged perspective view of the coupling between adjacent flue-sections and with the coupling open. Fig. 5 is a similar view of the same closed. Fig. 6 is an enlarged sectional side elevation of the coupling-lock. Fig. 7 is a like view of the lock-keeper, and Fig. 8 is an enlarged sectional side elevation of part of a conveyer-tube on a car.

As illustrated in Fig. 1, the improvement is shown applied to a train consisting of the locomotive A, the tender A', and the cars A² A³; but it is evident that the conveyer may be applied to a train of any desired number of cars. The conveyer is in the form of a tube B, made in sections B' B² B³ B⁴, extending over the several parts A' A² A³, respectively, of the train, and the said sections are secured

to the said parts by suitable bands or fastening devices C, with suitable flexible couplings D between adjacent sections to render the conveyer-tube continuous and at the same time provide for the usual independent movement of adjacent parts of the train. The conveyer-section B' of the conveyer-tube B is continuous with the upwardly and rearwardly curved smoke-stack A⁴ of the locomotive A, so that the smoke and gases and sparks and cinders incident to the burning of the fuel in the locomotive pass up through the said smoke-stack and into and through the tube B. The cinders and sparks are arrested in the tube B shortly after entering the same from the smoke-stack, while the smoke and gases pass on through the several sections of the tube to finally leave the same at the rear end of the train. If desired, air may be admitted to the front end of the tube B to insure a proper draft for the smoke and gases to carry the same rapidly rearwardly through the tube and discharge the gases at the rear end of the train. For this purpose I provide the forward end of the section B' of the tube B at its junction with the smoke-stack A⁴ with a funnel-shaped air-inlet B⁵, normally closed at its inner end by a valve E, having its fulcrum at the middle of the valve in the form of a transversely-extending shaft E', journaled in suitable bearings in the sides of the funnel. The forward end of the valve E is provided with an arm E², drawn on by a spring E³, attached to the funnel-bottom to hold the valve normally in a closed position. The arm E² is also connected with one end of a rope E⁴, extending upwardly through an opening in the top of the funnel and passing over a pulley E⁵, journaled on the funnel at the outside thereof, the rope then extending into the cab of the locomotive to be under the control of the engineer, so that when it is desired to create an extra draft in the tube B by the outside air then the engineer pulls the rope E⁴ and swings the valve E into an open horizontal position, as indicated in Fig. 2. It is evident that as the train moves forward air readily passes through the funnel B⁵ into the section B' of the tube B and through the remaining sections to assist in carrying the smoke and gases to the rear end of the train. The rearward flight of the heavier sparks

and cinders is interrupted in the section B' of the tube B by a transverse screen F', disposed vertically adjacent to the mouth of a downwardly-extending pipe F', opening at its lower end into a cinder-box F², secured to the top of the locomotive, as is plainly indicated in Figs. 1, 2, and 3.

The cinder-box F² is provided at opposite sides with doors F³, hung at their lower ends on hinges and having inwardly-extending flanges F⁴ at their side edges, so that when the door is opened it forms a chute, as shown at the left in Fig. 3, for conveying the cinders and sparks into a chute F⁵ and delivering the sparks and cinders at the side of the locomotive. The cinder-box F² is located in close proximity to the cab of the locomotive, and the doors F³ are opened from time to time by the engineer to discharge the cinders, as above described.

The couplings D for the sections of the tube B are shown in detail in Figs 4 and 5 and are constructed as follows: Each coupling D is provided with two coupling members D' D², made tubular and preferably of sheet metal, with bands D³ and D⁴ at their outer or adjacent ends, and the bands are provided at opposite sides with lugs D⁵, adapted to pass into correspondingly-shaped recesses D⁶ in the opposite band D⁴ or D³. On the opposite sides of the bands D³ D⁴ are also arranged locks H, each having a locking-casing H', in which is mounted to swing a latch H², projecting with its hook end H³ through an opening in the casing to engage a keeper H⁴ on the opposite band. Thus when the coupling members come together the lugs D⁵ engage the corresponding recesses D⁶ and the latch H² hooks with its head H³ into the corresponding keeper H⁴ to securely lock the two coupling members together. The latch H² is pressed in a downward direction by a spring H⁵, attached to the inside of the casing H', and engaged at its free end with a link H⁶ on the latch H². The spring serves to hold the hook H³ in engagement with the keeper to prevent accidental disconnection of the hook and keeper. The latch H² is also connected by a link H⁷ with a lever H⁸, fulcrumed in the casing H' and extending through an opening in the rear end thereof, the outer end of the lever carrying a rope H⁹, extending downward to be within convenient reach of a train-hand on the platform of a car, so that in uncoupling the cars the operator can pull the rope H⁹ and impart a swinging motion to the lever H⁸, so as to swing the latch H² upward to move the hook H³ out of engagement with the keeper. The coupling members can then readily separate upon separating the cars.

In order to clamp the casing H' to the keeper H⁴, I provide a lever I, fulcrumed at I' to the outside of the keeper H⁴ and slightly curved near the fulcrum end, as is plainly indicated in Figs. 4 and 5. The lever I at the curved end is formed with a recess I², adapted to engage a lug I³, projecting from

the front of the casing H', so that when the coupling members D' D² are locked together, as before described, and the lever I is swung downward into the position shown in Fig. 5 then the recess I² engages the lug I³ and keeps the casing H' clamped to the keeper H⁴. The lever is manually operated by a train-hand standing on the platform of a car, and when said lever is swung into an uppermost position it rests against a stop I⁴, projecting from the keeper H⁴. (See Fig. 4.)

Each of the coupling members D' D² is connected with its respective pipe-section by a flexible accordion-plaited tube J, made of a suitable material and secured at its ends to bands J' and J², riveted or otherwise fastened to the corresponding coupling member and the pipe-section. The bands J' J² are also connected with each other by a chain J³, normally hanging slack, as indicated in Fig. 4, to prevent the expansible tubes J from being torn in case the coupling members D' D² are not unlocked by the train-hand when trying to separate the cars.

The screen F, previously mentioned, at the locomotive-section B' of the tube B is of comparatively large mesh, so that fine cinders can pass through the said screen; but the flight of such cinders is interrupted by additional screens K, secured in the following tube-sections in close proximity to the couplings, as indicated in Fig. 8. The screen K extends, preferably, about half-way up in the tube-section over or at the end of the collecting-tube L, secured with its inclined bottom L' to the end of a car, as shown. In the lower side of the collecting-tube L is arranged an opening L², normally closed by a gate L³, connected with a rope L⁴, passing over a pulley L⁵, journaled at the band J², the rope being under the control of the train-hand to pull the rope and cause the gate L³ to slide upward to open the tube L and allow the cinders collected in said tube to slide out of the tube over the inclined end of the roof of the car. By making the screen K of less height than the tube-section a more perfect continuous draft is obtained, and still the cinders are arrested by the screens, as the said cinders, owing to their specific gravity, will travel more in the lower portion of the tube.

It is generally known that numerous objections arise from the discharge of the smoke, sparks, and cinders in the ordinary way from steam-locomotives, and the most serious one is that such smoke and cinders interfere with the comfort of passengers on passenger-trains. Besides the cinders become destructive to the rich upholstery and other furnishings of the railway-coaches, and there is great loss entailed by the cinders setting fire to buildings and fields. By the use of my device the smoke is conveyed out of reach of the passengers and all sparks and cinders are arrested.

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

1. A device of the class described, provided with a locomotive smoke-stack curved upwardly and rearwardly from the top of the boiler-shell, a horizontally-disposed conveying-tube into which merges the upper, rear end of the said stack, the tube extending rearwardly over the locomotive, tender and cars of the train, the said conveying-tube being made in sections, with couplings for connecting the sections with each other, screens in the sections of the tube, for arresting sparks and cinders, and collecting-boxes in front of the screens, and into which pass the arrested sparks and cinders, substantially as shown and described.

2. A device of the class described, provided with a cinder-box for receiving the sparks and cinders, and provided with a door hinged at its lower end, and adapted to form a chute for the discharge of the accumulated sparks and cinders from the box, substantially as shown and described.

3. A device of the class described, provided with a cinder-box for receiving the sparks and cinders, and provided with a door hinged at its lower end, and adapted to form a chute for the discharge of the accumulated sparks and cinders from the box, and a fixed chute into which opens the free end of the said door, when opened and forming a chute, substantially as shown and described.

4. A device of the class described, provided with a conveying-tube made in sections, couplings for the sections, each coupling comprising two tubular coupling members having projecting lugs, of which the lugs of one member fit into recesses in the other member, and flexible accordion-plaited tubes for connect-

ing the coupling members with the tube-sections, substantially as shown and described.

5. A device of the class described, provided with a conveying-tube made in sections, couplings for the sections, each coupling comprising two tubular coupling members having recesses and projecting lugs, of which the lugs of one member fit into recesses in the other member, flexible accordion-plaited tubes for connecting the coupling members with the tube-sections, and locking devices for the members, each locking device having a casing and latch on one member, for engaging a keeper on the other member, substantially as shown and described.

6. A device of the class described, provided with a conveying-tube made in sections, couplings for connecting the sections with each other, locking devices for locking the coupling members together, and a clamping device for each locking device, substantially as shown and described.

7. A device of the class described, provided with a conveying-tube made in sections, couplings for connecting the sections with each other, locking devices for locking the coupling members together, a clamping device for each locking device, the clamping device comprising a lever having a recess and pivoted on the lock-keeper, and a lug on the lock-casing to enter the said recess in the keeper, substantially as shown and described.

To the above I herewith sign my hand in the presence of two witnesses.

WILLIAM H. DANA.

Attest:

T. C. ATCHISON,
BENNETT HILL.