

(No Model.)

3 Sheets—Sheet 1.

L. N. CHISOLM.
SMOKE CONDUCTOR FOR RAILWAY TRAINS.

No. 432,862.

Patented July 22, 1890.

Fig. 1.

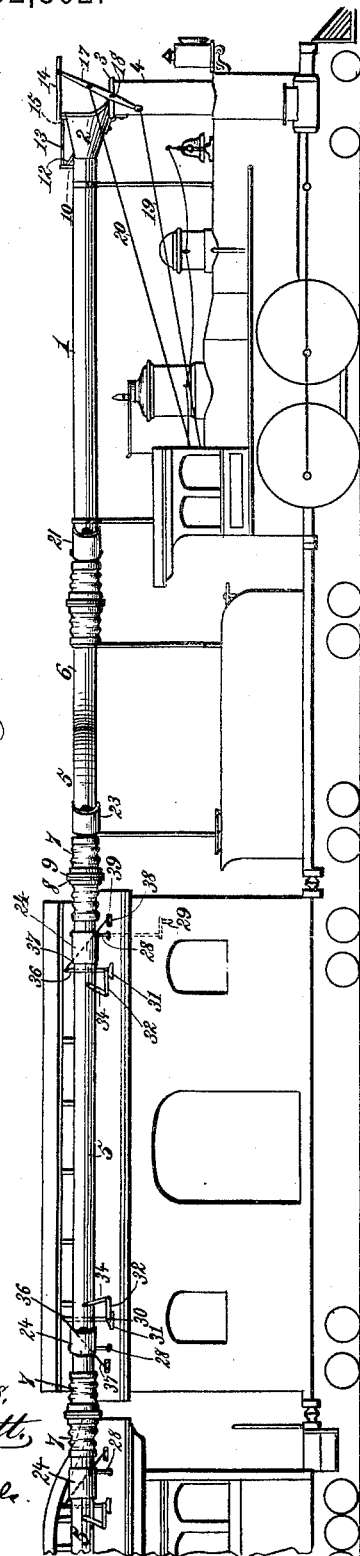
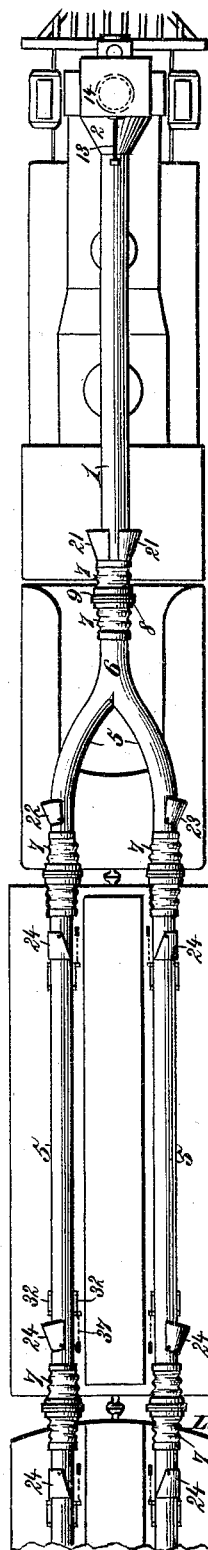


Fig. 2.



Witnesses,
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By

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(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

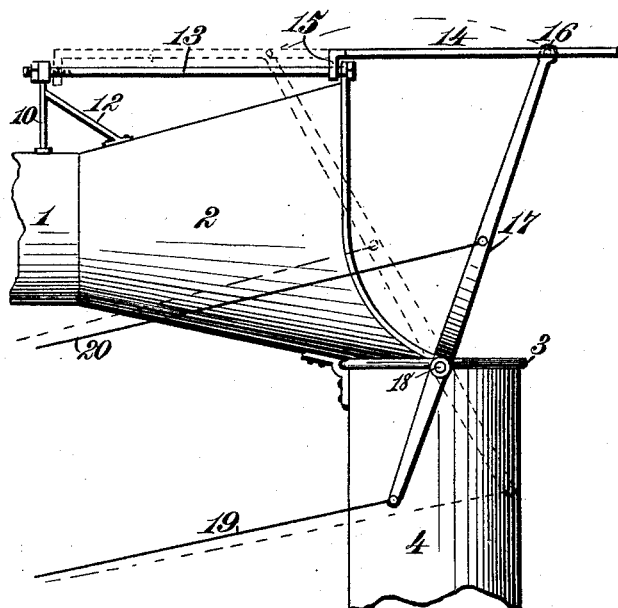


Fig. 4.

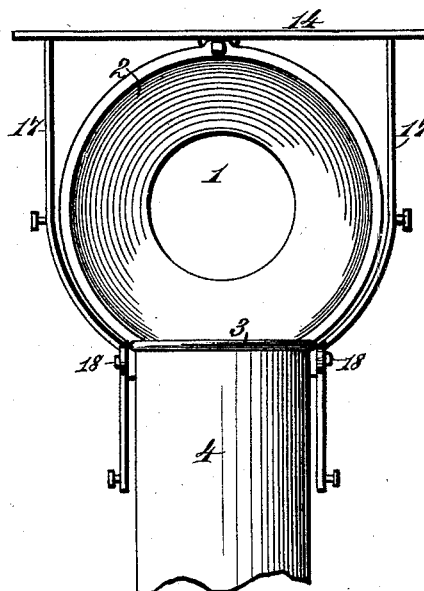
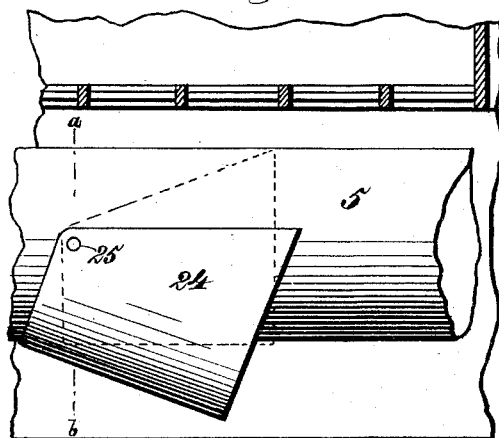
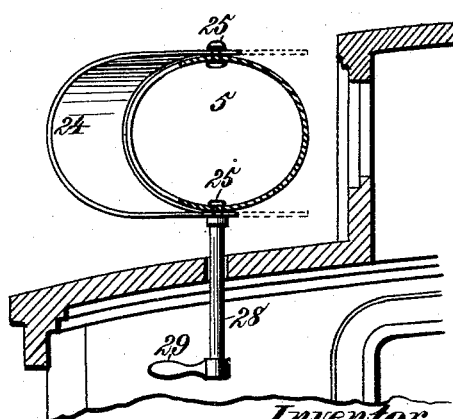


Fig. 5.



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Fig. 6.



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Fig. 7.

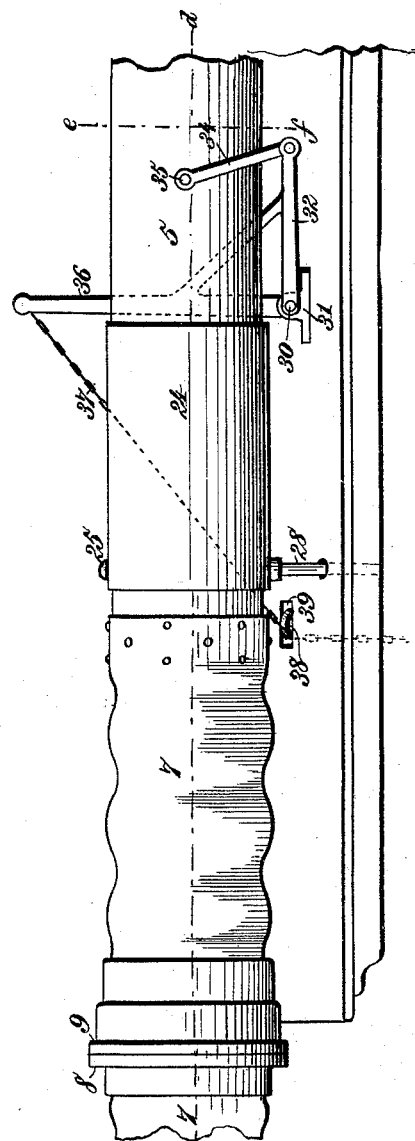


Fig. 8.

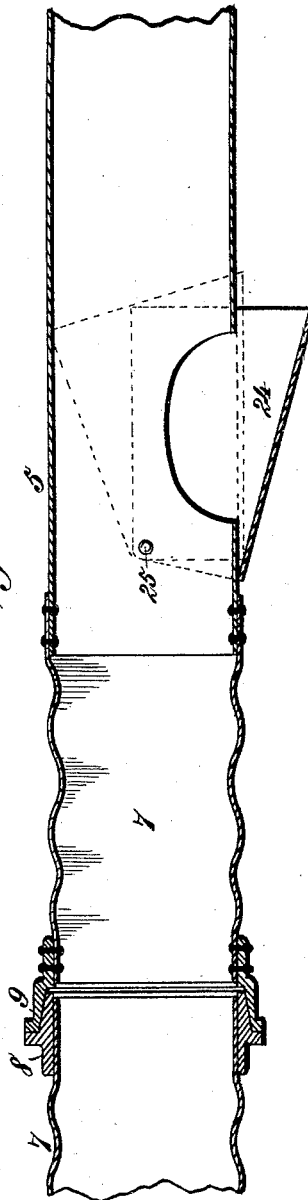
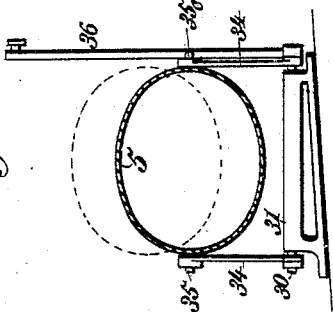


Fig. 9.



Witnesses.
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Lucy B. Hills.

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UNITED STATES PATENT OFFICE.

LAURENS N. CHISOLM, OF CHARLESTON, SOUTH CAROLINA.

SMOKE-CONDUCTOR FOR RAILWAY-TRAINS.

SPECIFICATION forming part of Letters Patent No. 432,862, dated July 22, 1890.

Application filed April 10, 1890. Serial No. 347,376. (No model.)

To all whom it may concern:

Be it known that I, LAURENS N. CHISOLM, a citizen of the United States, residing at Charleston, in the county of Charleston and State of South Carolina, have invented new and useful Improvements in Smoke-Conductors for Railway-Trains, of which the following is a specification.

This invention relates to that type of smoke-conductors for vestibule and other railway-trains wherein the smoke-tubes have auxiliary draft-valves and an adjustable spark-arresting hood is movable over the smoke-stack to arrest the upward flight of the sparks, cinders, and other products of combustion and direct the same into the funnel-mouth of the smoke-conductor.

The objects of my invention are to provide a novel, simple, and efficient spark-arrester for obstructing the upward flight of the products of combustion from the smoke-stack; to provide novel means for supporting the spark-arrester from the rim or upper end of the smoke-stack; to provide novel and simple means for adjusting and placing the spark-arrester under perfect control of the engineer; to provide novel means for adjusting the tube-sections in a vertical plane, to place the conductor in either a horizontal or inclined plane relatively to the car-roof, and to raise or lower either end of the tube-sections, whereby each section is adapted to connect with cars of varying height; to provide novel valves and operating devices therefor to secure an auxiliary draft, and to otherwise improve and simplify this type of apparatus to render it more useful and adapt it for general and practicable application in equipping railway-trains.

To accomplish all these objects, my invention involves the features of construction, the combination or arrangement of devices, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of sufficient of a train to exhibit my invention on a small scale. Fig. 2 is a top plan view of the same. Fig. 3 is a detail side view on a larger scale, showing the upper end of the smoke-stack, the forward end of the smoke-conductor, and

the spark-arrester mechanism. Fig. 4 is a front elevation of the same. Fig. 5 is a top plan view of portions of the car-roof and one of the tube-sections to show one of the auxiliary draft-valves. Fig. 6 is a vertical sectional view on the line *a b*, Fig. 5. Fig. 7 is a side elevation of portions of a car-roof and one of the tube-sections, showing one of the hoisting mechanisms for vertically adjusting a part of the smoke-conductor. Fig. 8 is a longitudinal sectional view on the line *c d*, Fig. 7. Fig. 9 is a transverse sectional view on the line *e f*, Fig. 7.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates the locomotive tube-section, which is stationary and provided with a funnel-mouth 2, resting upon or secured by a bracket to the rim 3 or upper end of the smoke-stack 4. The car tube-sections 5 diverge from the part 6 above the locomotive-tender, and the two longitudinal branches run at opposite sides of the car-ventilators on the car-roof, thereby preserving the symmetrical appearance of the train and avoiding an unsightly and objectionable pipe-line above the ventilators. The respective tube-sections are flexibly connected above the car-vestibules by elastic rubber tubes 7 and male and female socket-couplings 8 and 9, held in engagement by the expansive force of the rubber tubes, to provide a perfect smoke-conducting passage, the continuity of which is unbroken from end to end of the train, while the construction is such as to permit the convenient disengagement of the socket-couplings for the separation of the cars when occasion demands. A standard 10 rises from the locomotive tube-section directly in rear of the funnel-mouth and is braced to the latter, as at 12, while its upper extremity supports the rear end portion of a horizontal guide-bar 13, secured at its front end to the rim of the funnel-mouth. A spark-arrester 14, preferably composed of a horizontal flattened plate, is provided with a socket or bearing 15 to slide rectilinearly back and forth on the guide-bar, and the opposite side edges of the plate are pivotally attached, as at 16, to the

upper ends of the lever-arms 17, pivoted intermediate their ends to opposite sides of the smoke-stack rim 3 by the pivot-pins 18, so that the lever-arms support the spark-arrester from the upper end of the smoke-stack, and by their oscillatory motion serve to reciprocate the spark-arrester to move it over the smoke-stack, and thereby obstruct the upward flight of the sparks, cinders, and other products of combustion and direct the same into the funnel-mouth. The lever-arms are connected at their extremities below the pivot-pins 18 with a cable 19, which runs to the locomotive-cab, and these lever-arms connect above their pivot-pins with a similar cable 20, also running to the locomotive-cab, in such manner that the engineer can adjust the spark-arrester back and forth by manipulating its cables, as will be quite obvious. These cables may be made of wire rope of small gage, or they may be composed of simple wires, rods, chains, or other devices suitable for the conditions required to positively move the spark-arrester both forward and rearward. The lever mechanism for adjusting the spark-arrester to and from a position over the smoke-stack is very desirable and more perfect than those constructions wherein gravity and the vibrations of the train are depended upon for the backward movement of the spark-arrester as the train approaches or enters a depot.

At the point where the locomotive tube-section joins the shank or part 6 of the diverging or duplex smoke-conductor I arrange two opposite air-inlet hoods 21 to aid in producing the auxiliary draft, and the diverging tube-sections, which join the shank or part 6 above the locomotive-tender, are provided with similar air-inlet hoods 22 and 23. The hoods are not necessarily adjustable or adapted to be opened and closed, in that the draft through the locomotive and tender tube-sections must always be rearward from the smoke-stack. The tube-sections running beside the car-ventilators are provided at each end portion with an air-draft valve 24, comprising a shell conforming transversely to the general shape of the tube and mounted at one end on upper and lower vertically-arranged pivots 25, located at the median line of the tube, Figs. 5 and 6. A vertical shaft 28 is connected with the valve at the lowermost pivot in line therewith and extends loosely through and has a bearing in the car-roof at the vestibule or end of the car, where the shaft is furnished with a crank-handle 29, so that a trainman can operate the valve from the car-platform to secure the auxiliary draft. The object of this draft is to facilitate the rearward flow of the products of combustion, and also to cool the latter, and thereby avoid undue heating of and consequent injury to the elastic connections between the tube-sections.

In smoke-conductors for railway cars it is desirable to adjust the tube-sections verti-

cally in relation to the car-roof to place the line of tubes in a horizontal or in an inclined plane to descend gradually from front to rear, and it is also desirable to adjust the height of the tube-sections at their ends relatively to the car-roof to adapt the parts to cars which vary in height without employing long elastic connections. To accomplish these objects, I provide a simple but effective hoisting mechanism at each end of every tube-section on a car, whereby one or both ends of the tube can be raised or lowered from the vestibule or car-platform. The mechanisms, as here shown, each comprises a transverse rock-shaft 30, journaled in a bearing 31 on the car-roof beneath the end portion of a tube-section, Figs. 7 and 9, and rigidly attached at its ends to arms 32, which are pivotally connected at their forward ends 33 to the lower extremities of links 34, having their upper extremities pivotally connected with lugs or bearings 35 at the opposite sides of the tube-section. A lever 36 is rigidly secured to the rock-shaft, so that by oscillating the lever the shaft is rocked and the end of the tube-section is raised or lowered.

To oscillate the lever, I provide a cable 37, attached to the upper end thereof and passing around a sheave or pulley 38, journaled in or on the car-roof in relation to an orifice 39, through which the cable passes to be convenient for the trainman or brakeman. By this means the entire conductor can be placed either in an inclined or horizontal plane, while either end of a tube-section can be vertically adjusted, as may be desirable or as occasion demands, while the tube-sections at one side of the car-ventilators can be adjusted, any or all, independent of those at the opposite side of the car-ventilators.

I am aware that it has been proposed to employ auxiliary draft-valves in a smoke-conductor for railway-trains, and also that it has been proposed to diverge a smoke-conductor along opposite sides of the cars; but these have never come into practicable operation, owing to the existence of serious objections in their mechanical construction which render them inefficient and undesirable.

It will be understood by those familiar with this type of apparatus that the auxiliary air-draft valves on the tube-sections of the cars should be so relatively disposed or arranged that a draft-valve at either end of a tube-section will be effective in the movement of the train in one of two directions.

Having thus described my invention, what I claim is—

1. The combination, with a smoke-conductor having a funnel-mouth, of a guide-bar, a spark-arrester having a sliding connection with the guide-bar, and lever mechanism for positively moving the spark-arrester on the guide-bar to and from a position over the smoke-stack of a train-locomotive, substantially as described.

2. The combination, with a smoke-conductor having a funnel-mouth, of a horizontal guide-

bar over the funnel-mouth, a spark-arrester having a sliding bearing on the guide-bar, and lever mechanism pivotally connected to the smoke-stack of a train-locomotive and supporting the spark-arrester and serving to positively move the latter to and from a position over the smoke-stack, substantially as described.

3. The combination, with a smoke-conductor having a funnel-mouth, of an adjustable spark-arrester, a guide for the spark-arrester, oscillating lever-arms pivoted to the smoke-stack and supporting the spark-arrester therefrom, and cables for connecting the levers with the locomotive-cab to oscillate the levers and positively move the spark-arrester to and from a position over the smoke-stack, substantially as described.

4. The combination, with a smoke-conductor having a funnel-mouth, of an adjustable spark-arrester, oscillating levers pivoted intermediate their ends on the smoke-stack and supporting the spark-arrester therefrom, and cables connecting the levers above and below their pivots with the locomotive-cab to positively move the spark-arrester to and from a position over the smoke-stack, substantially as described.

5. The combination, with the tube-section of a smoke-conductor, of an auxiliary draft-valve pivoted to the tube by a vertical pivot, and a vertical shaft located in line with said pivot extended through and having a bearing in the car-roof at the vestibule or end of the car and provided with a handle for operating the valve from the car-platform, substantially as described.

6. The combination, with a vertically-adjustable tube-section forming a part of a smoke-conductor, of an auxiliary air-draft valve mounted on a vertical pivot, and a vertically-movable shaft connected with the valve extending through and rising and falling in an orifice in the roof of the car at the vestibule or end of the car and provided with a

handle for operating the valve from the car-platform, substantially as described.

7. The combination, with a vertically-movable smoke-conductor for a railway-car, of hoisting mechanism supporting the conductor from the car-roof, substantially as described.

8. The combination, with a smoke-conductor composed of a series of flexibly-connected tube-sections, of hoisting devices for independently raising and lowering either end of the tube-sections, substantially as described.

9. The combination, with the smoke-conductor tube-section of a railway-car, of hoisting devices supporting each end of the tube-section from the car-roof to raise and lower either end of the tube-section, substantially as described.

10. The combination, with the smoke-conductor tube-section of a railway-car, of a rock-shaft having arms, links connecting the arms with the tube-section, and means for rocking the shaft to raise and lower the tube-section, substantially as described.

11. The combination, with the smoke-conductor tube-section of a railway-car, of a rock-shaft having arms, links connecting the arms with the tube-section, a lever for rocking the shaft, and a cable for oscillating the lever, substantially as described.

12. The combination, with the smoke-conductor tube-section of a railway-car, of a rock-shaft journaled in a bearing on the car-roof and having arms, links for connecting the arms to the tube-section and supporting the latter, a lever on the rock-shaft, a sheave or pulley on the car-roof, and a cable connected with the lever passing round the pulley and extending through the car-roof, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

LAURENS N. CHISOLM.

Witnesses:

EUGENE P. JERVEY,
O. E. JOHNSON, Jr.