No. 748,550. PATENTED DEC. 29, 1903.

J. WHITEHOUSE.

SPARK ARRESTER.

APPLICATION FILED MAY 18, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

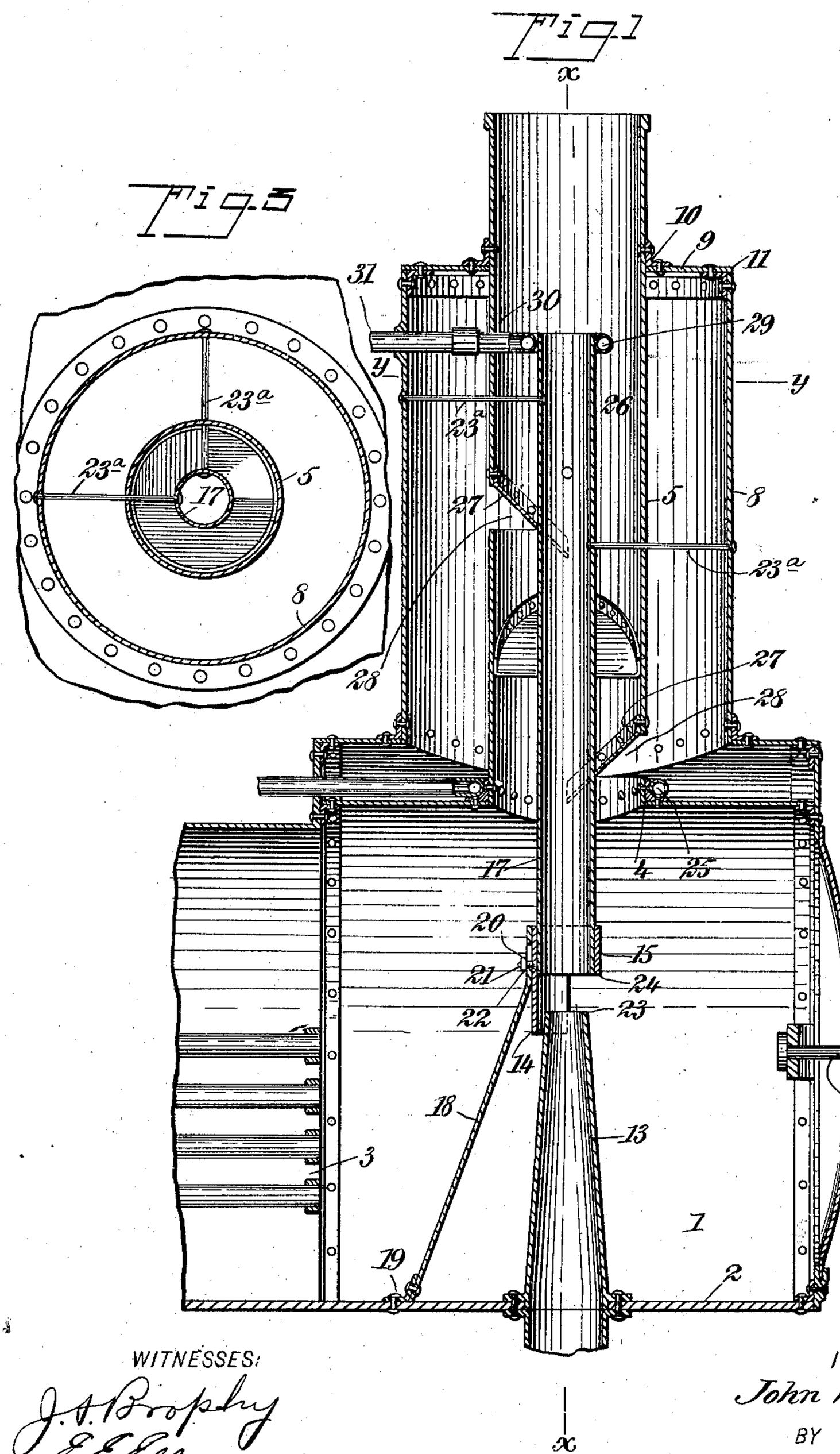

Fig. 3

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2

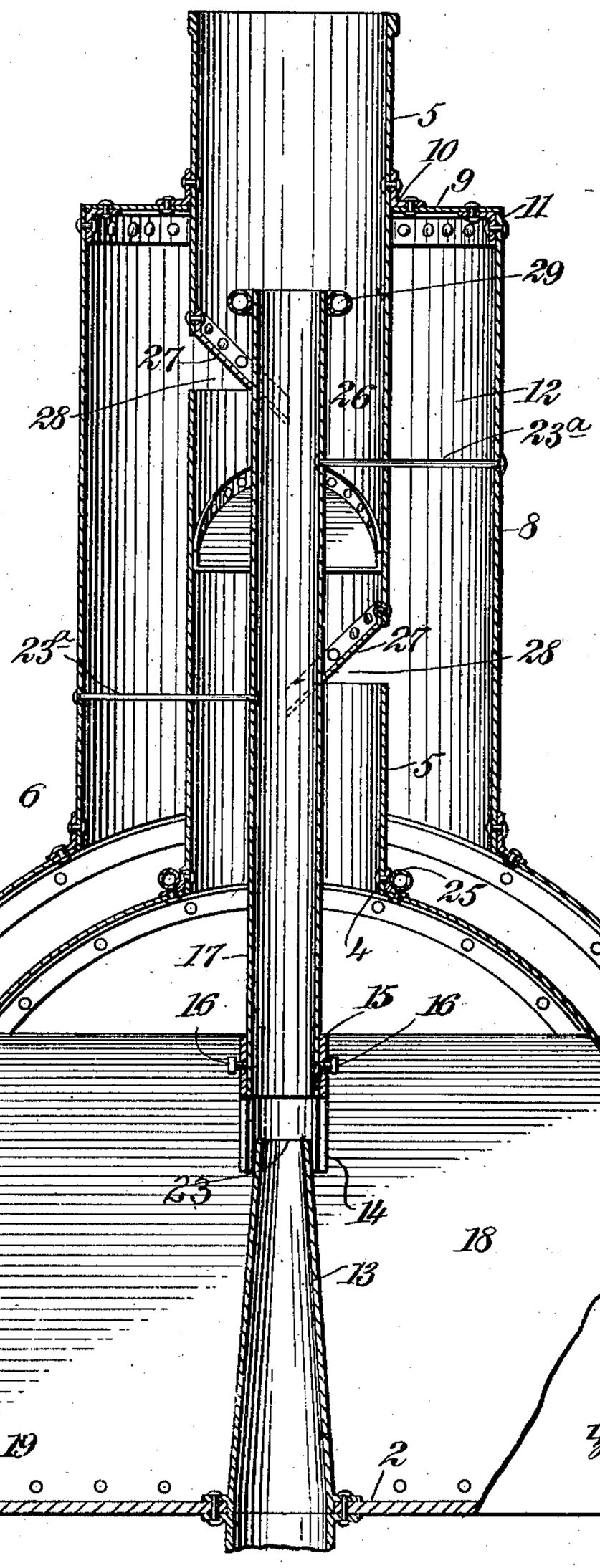
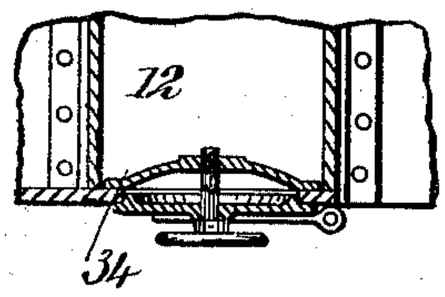


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN WHITEHOUSE, OF WAIHI, AUCKLAND, NEW ZEALAND.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 748,550, dated December 29, 1903.

Application filed May 18, 1903. Serial No. 157,618. (No model.)

To all whom it may concern:

Be it known that I, JOHN WHITEHOUSE, locomotive engineer, a subject of the King of Great Britain, and a resident of Waihi, Upper Thames, Auckland, New Zealand, have invented a new and Improved Spark-Arrester, of which the following is a full, clear, and exact description.

This invention relates to spark-arresters; and it consists, substantially, in the construction, organization, and combinations of parts hereinafter particularly described, and pointed out in the appended claims.

The invention has for its principal object to provide improved means for arresting or preventing the escape of sparks or live cinders from locomotive and other stacks or chimneys and also to provide a contrivance of this character which is thoroughly effective under varying conditions of use and which performs its intended functions without interfering with the draft or exhaust operations of the locomotive or other engine in connection with which the same may be employed.

A further object is to overcome some of the disadvantages and objections common to many contrivances hitherto devised for a similar purpose and to provide a spark-arrester which is simple in construction and reliable in operation, besides possessing the capacity for long and continued service.

A still further object of the invention is to provide means of the character referred to which are readily accessible either for the purposes of cleaning or repair and also to lessen the cost of construction of the contrivance as well as to reduce the number of elements or parts thereof as compared with other contrivances of a similar nature at present in use.

The above and additional objects are obtained by means substantially such as are illustrated in the accompanying drawings, in which—

Figure 1 is a vertical transverse sectional elevation of a spark-arrester constructed and operating in accordance with my invention. Fig. 2 is a vertical transverse sectional elevation on the line *x x* of Fig. 1. Fig. 3 is a horizontal sectional view on the line *y y* of Fig. 1, and Fig. 4 is a horizontal sectional view on the line *z z* of Fig. 2.

Before proceeding with a more detailed description it may be stated that I employ the usual smoke box or chamber into which the spark-laden products of combustion may pass from any source—as, for instance, the spaces intermediate of or surrounding the boiler-tubes of a locomotive—and surmounting said smoke box or chamber is a stack or chimney, the said two elements or parts of the contrivance being inclosed all around in an air-tight jacket, the latter being of considerably greater dimensions than the said elements or parts inclosed thereby, as and for the purpose more fully hereinafter explained.

Mounted upon the base or foot plate of the smoke box or chamber is the usual exhaust-pipe, and practically telescoping with the upper end of said pipe is an adjustable connection to which is fastened the lower end of a central tube upwardly through which the exhaust is carried or continued, said tube extending upwardly within the stack or chimney and being provided at its upper end with an annular tube leading to which is a pipe connection from a blower, whereby the exhaust operations may be effectually carried out. I employ intermediate the adjacent surfaces of the said chimney and central tube a series of baffle-plates of special construction and organization, and I also employ a spray device for facilitating extinguishment of the sparks and preventing overheating of the sides of the smoke box or chamber, all as will presently appear.

Reference being had to the drawings by the designating characters marked thereon, 1 represents a smoke box or chamber having the base or foot plate 2 and the sides or walls of which are preferably circular and dome-shaped, as shown, the said chamber being in communication at 3 with the exit of the products of combustion from any source—as, for instance, the spaces surrounding the tubes of a locomotive or other boiler. Secured in any suitable manner to the edges 4 of the said smoke box or chamber 1 is a chimney 5 of suitable height and diameter, while inclos-

ing both the smoke-box and chimney in an air-tight manner is a casing or jacket 6, comprising a lower section 7, conforming in its general shape to that of the said smoke box or chamber, and an upper section 8, conforming in like manner to the general shape of the chimney 5, but being preferably less in height, as shown, a ring-plate 9 and circular angle-irons 10 and 11 being employed between the upper end of said upper section and sides of the chimney to close the enlarged annular space or ash-chamber 12, formed by the jacket, which, as heretofore mentioned, is of increased dimensions over the dimensions of the smoke-box and chimney. The lower end of the said upper section 8 of the jacket is secured to the lower section 7 in any suitable manner.

Standing upwardly from the base or foot plate 2 substantially centrally of the smoke box or chamber 1 is the exhaust-pipe 13, to the upper end of which is slidably fitted the approximately semicircular appendage or extension 14 of a sleeve 15, which is adjustably or telescopically fastened or secured by bolts 16 to the lower end of a central tube or pipe 17, which is of smaller diameter than the chimney 5 and extends upwardly within the latter to a proper height, as shown, it being this tube through which the exhaust is continued from the pipe 13 in an upward direction. The said sleeve 15 is supported in position at the upper part of a plate or guard 18, fastened to the base or foot plate 2 by means of a stay 19, the said plate or guard being located before the exit 3 for the products of combustion and serving to prevent the passing of sparks to any part of the vicinity of the line of draft or exhaust. This plate or guard is inclined upwardly in the direction of the sleeve 15 and is formed at 20 with a notch or slot, in which is fitted a bolt 21, projecting from said sleeve, said construction permitting the sleeve to be raised or lowered (by loosening the bolts 16) relatively to the exhaust-pipe 13 and central tube 17, after which the connection may be again made secure by tightening said bolts 16 and screwing up the nut 22 on the said bolt 21. In this way the distance or size of the space or opening between the edge 23 of the exhaust-pipe and the edge 24 of said sleeve may be altered at will, and thus may the force of the draft or exhaust be regulated or varied, as is apparent.

The central tube 17 is maintained in its position relatively to the chimney 5 by means of stay rods or bolts 23^a, as shown, and surrounding the lower end of the chimney 5 and resting upon the lower section 7 of the jacket 6 is a spray-pipe 25, which may be connected in any suitable way to a pump or injector (not shown) or other supply of water or other cooling medium. By means of a spray of cold water, which may be made to issue from the openings in said pipe, the surrounding parts may always be maintained sufficiently cool to prevent firing of the ashes, which are caused to descend into the ash-chamber 12, as will be understood. It should be added, also, that this spray of water flows down around the sides of the smoke-box and the hot ashes or live sparks are also extinguished and cooled by precipitation therein, any suitable means (not shown) being employed for conveying off the water as it may accumulate within the chamber.

Located in the annular space 26, between the adjacent surfaces of the chimney 5 and central tube 17, are a plurality of baffle-plates 27 for arresting or preventing the escape of the sparks or live cinders, said baffle-plates being disposed one above the other a suitable distance and being of special construction and alternating in position one with the other, each of the same also being preferably inclined substantially at an angle of forty-five degrees, as shown. Said baffle-plates are each constructed to extend about half-way around the central tube 17, so that in virtue of the alternating organization of the series thereof no open passage is left for the escape of the cinder or sparks to the atmosphere. Formed in the sides of the chimney 5 directly beneath each of said baffle-plates 27 is an opening or port 28, which is of substantially equal length with and follows the general direction of the said plate, said opening or ports forming communication between the ash-chamber 12 and space 26, whereby the ascending sparks or live cinders are deflected by the baffle-plates and compelled to pass into said ash-chamber during the operation of my improved contrivance, the description of the function of the said baffle-plates and the said openings or ports being thought to be sufficient for a full understanding thereof.

Fitted around the upper end of the central tube 17 is a hollow annular perforated tube 29, (see Fig. 1,) connected with which at 30 is the upper end of a pipe 31, leading from a suitable blower, (not shown,) by which operations may be facilitated, and it will be noted that the front of the smoke box or chamber 1 is provided with a suitable door or closure 32, provided with any suitable means at 33 whereby the same may be secured in place. The ash-chamber 12 is also provided at the front on either side of the said door or closure 32 with suitable openings closed by doors 34 and through which openings the ashes may be removed from said chamber from time to time as they collect. Instead of this latter embodiment, however, it is apparent that similar means may be provided at any suitable part of the sides or bottom of said ash-chamber for the same purpose.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the construction, organization, and operation of the parts contributing to my invention will be fully understood, and while

I have herein represented my improvements in a certain preferred embodiment it will be understood, of course, that I am not limited thereto in precise detail, since departures therefrom may be made coming within the scope of my invention.

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

1. A spark-arrester comprising a smoke-box having a chimney provided with ports, a jacket inclosing said smoke-box and chimney and forming therewith an annular ash-chamber, an exhaust-pipe within the smoke-box, a central tube within the chimney and communicating with said exhaust-pipe, and baffle-plates located between said chimney and tube directly above the ports in the former.

2. A spark-arrester comprising a smoke-box having a chimney provided with diagonal or inclined ports in its sides, a jacket inclosing said smoke-box and chimney and forming therewith an annular ash-chamber, an exhaust-pipe within the smoke-box, a central tube within the chimney and having communication with said exhaust-pipe, and a plurality of superimposed baffle-plates located above said ports and inclined in correspondence with the inclinaton of the latter.

3. A spark-arrester comprising a smoke-box having a chimney provided in the sides thereof with diagonal or inclined ports arranged one above the other and alternating with each other in vertical position, a jacket inclosing said smoke-box and chimney and forming therewith an annular ash-chamber, an exhaust-pipe within the smoke-box, a central tube within the chimney having communication with the exhaust-pipe, and a plurality of baffle-plates in the space between the chimney and tube, said baffle-plates being located above said ports and inclined in correspondence therewith, and each plate extending partly around the said tube.

4. A spark-arrester comprising a smoke-box and chimney, an annular ash-chamber, an exhaust-pipe, a central tube having communication with the latter, said chimney having ports or openings in different vertical alinement with each other, and baffle-plates between the chimney and tube located directly above said ports or openings.

5. A spark-arrester comprising a smoke-box and chimney, an annular ash-chamber, an exhaust-pipe, a central tube, an adjustable semitubular connection between said pipe and tube, whereby the extent of exhaust through the latter may be varied, said chimney having ports or openings in different vertical alinement with each other, and baffle-plates between the chimney and tube, located directly above said ports or openings.

6. A spark-arrester comprising a smoke-box and chimney, an annular ash-chamber, an exhaust-pipe, a central tube within the chimney, an adjustable semitubular connection between said pipe and tube, said chimney having inclined ports in its sides, disposed in different vertical alinement with each other, and inclined baffle-plates between the chimney and tube and disposed directly above the ports in the former.

7. A spark-arrester comprising a smoke-box and chimney, the latter having inclined ports in its sides, an annular ash-chamber, an exhaust-pipe, a central tube within the chimney, a sleeve adjustably fitted to the lower end of said tube and having a semitubular extension slidably fitting the sides of the exhaust-pipe at the outlet of the latter, and a series of baffle-plates between the chimney and tube, disposed above and inclined in the direction of said ports.

8. A spark-arrester comprising a smoke-box and chimney, and an annular ash-chamber, said chimney having communication with said chamber at different points, an exhaust-pipe, a central tube within the chimney, having an adjustable connection forming communication between the same and said pipe, and baffle-plates between the chimney and tube.

9. A spark-arrester comprising a smoke-box and chimney, and an annular ash-chamber, said chimney having communication with said chamber at different points, an exhaust-pipe, a central tube within the chimney, having communication with said exhaust-pipe, and baffle-plates located between the chimney and tube, in positions corresponding with the said points of communication between said chimney and ash-chamber.

10. A spark-arrester comprising a smoke-box and chimney, and an annular ash-chamber, said chimney having communication with said chamber at different points, an exhaust-pipe, a central tube within the chimney, having communication with said exhaust-pipe, baffle-plates between the chimney and tube, a spray-pipe within the ash-chamber, and a pipe at the upper end of said central tube, adapted for connection with a blower.

11. A spark-arrester comprising a smoke-box and chimney, and an annular ash-chamber, said chimney having communication with said chamber at different points, an exhaust-pipe, a central tube within the chimney, a sleeve fitting the lower end of said tube and having a semitubular extension fitting the rear side of said exhaust-pipe, and a guard fastened to the base of the smoke-box and extending upwardly in contact with said sleeve, the upper edge of the guard being notched, and the sleeve being provided with a bolt working in the notch and having means for tightening the said sleeve in place upon said tube.

12. A spark-arrester comprising a smoke-box having the front thereof closed by a suitable door, a chimney surmounting said box

and having ports, an annular ash-chamber having doors on either side of said first-named door, an exhaust-pipe within the box, a central tube within the chimney, having adjustable means of communication with said exhaust-pipe, and baffle-plates between said chimney and tube, disposed above said ports.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN WHITEHOUSE.

Witnesses:

WALTER H. PHILLIPS,

A. H. CLARK.