

No. 704,922.

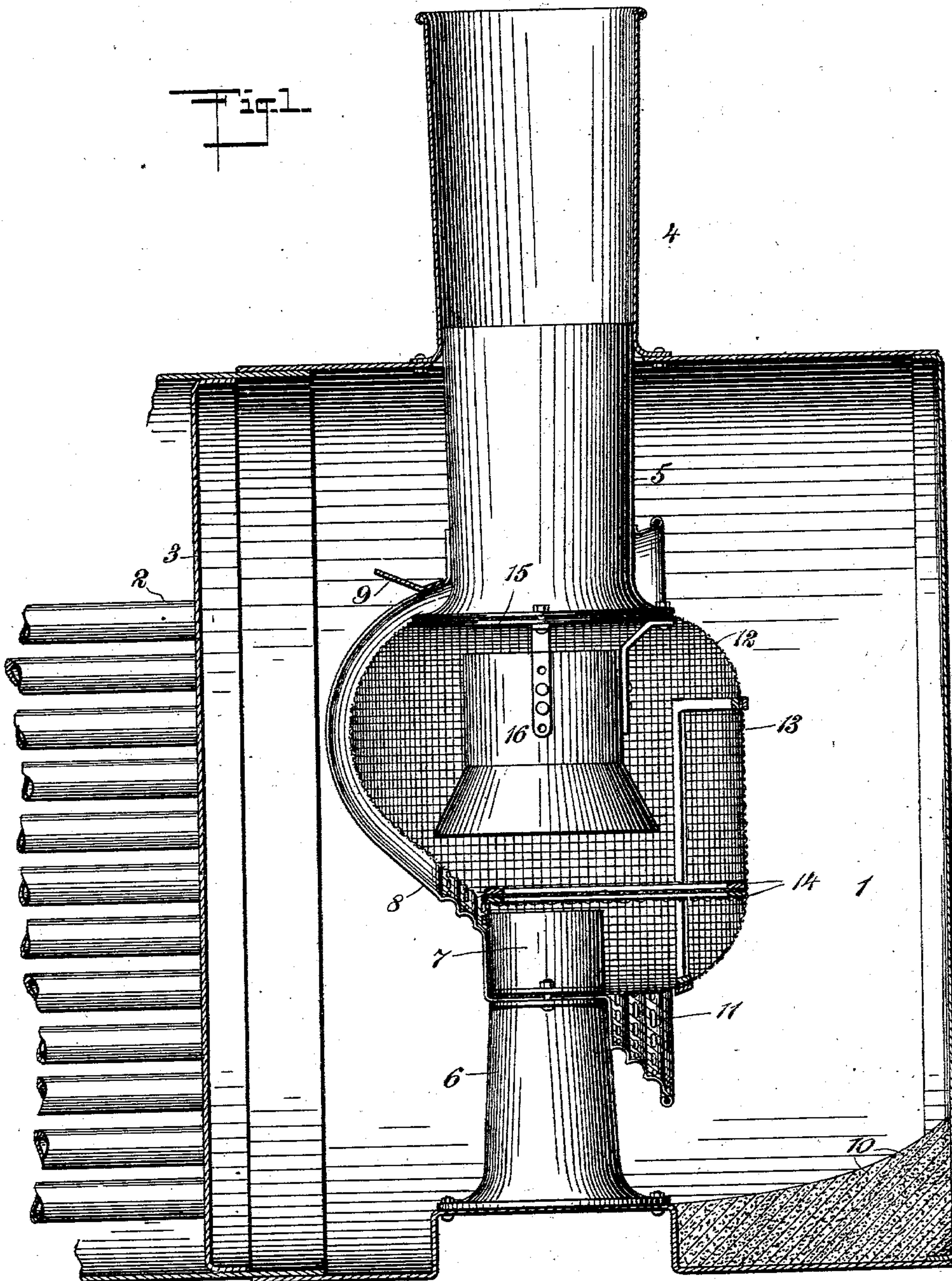
Patented July 15, 1902.

G. B. RAIT.
DRAFT DEVICE AND SPARK ARRESTER.

(Application filed Sept. 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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C. R. Ferguson

INVENTOR
George B. Rait

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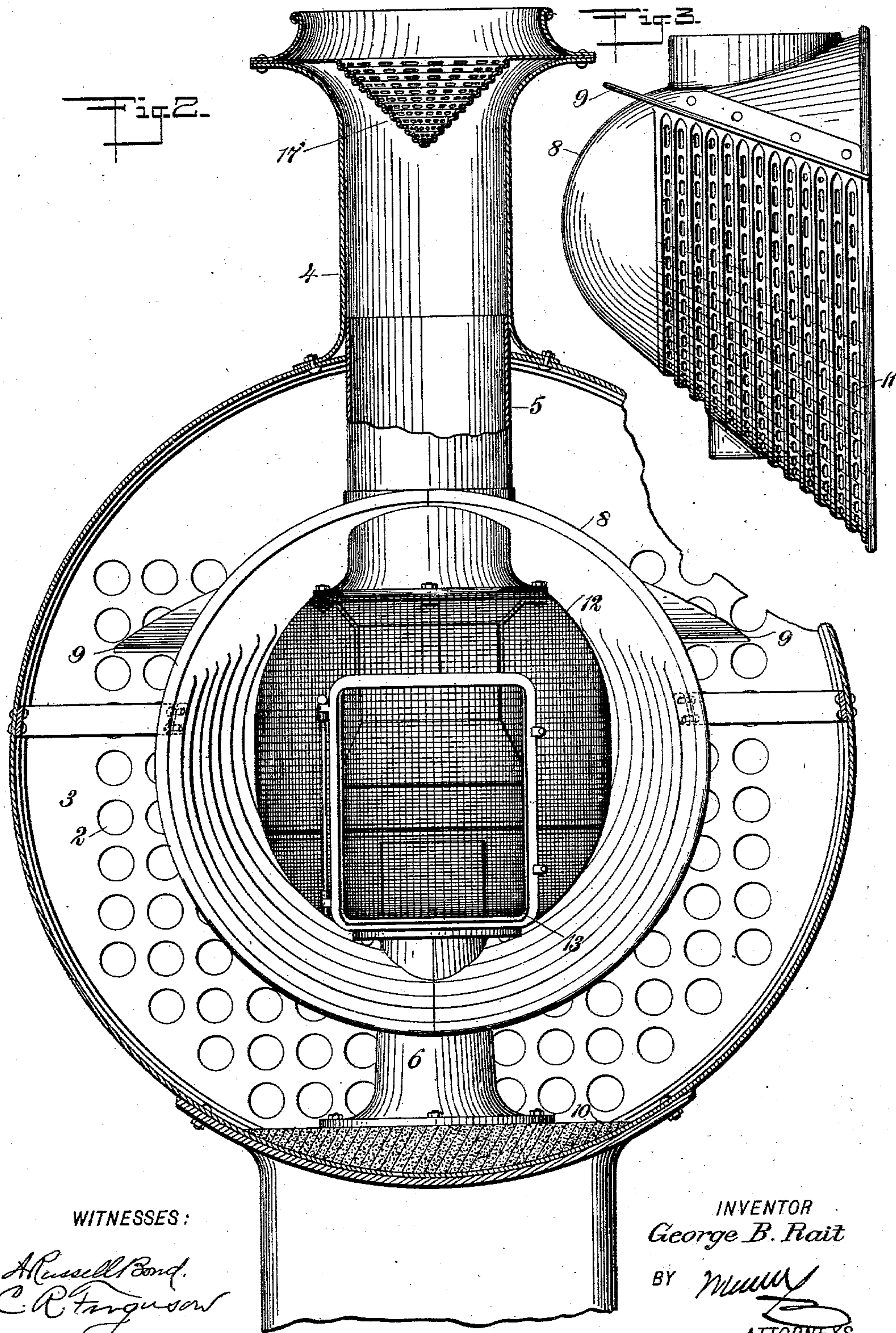
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A. Russell Bond.
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UNITED STATES PATENT OFFICE.

GEORGE B. RAIT, OF SHELDON, IOWA.

DRAFT DEVICE AND SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 704,922, dated July 15, 1902.

Application filed September 20, 1901. Serial No. 75,670. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. RAIT, a citizen of the United States, and a resident of Sheldon, in the county of O'Brien and State of Iowa, have invented a new and Improved Draft Device and Spark-Arrester, of which the following is a full, clear, and exact description.

This invention relates to improvements in draft devices and spark-arresters, particularly for locomotive-engines; and the object is to provide a spark-arrester of this character by means of which the draft will be equalized through all of the boiler-tubes and the cinders be thoroughly broken up, arresting the sparks or preventing them from passing out of the smoke-stack until extinguished. Other objects will appear in the general description.

I will describe a draft device and spark-arrester embodying my invention, and then point out the novel features in the appended 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 sectional elevation of a draft device and spark-arrester embodying my invention. Fig. 2 is a front elevation with the smoke-box and a portion of the smoke-stack in section, and Fig. 3 is a side view of a deflector bell or cone employed.

Referring to the drawings, 1 designates the smoke-box of a locomotive, with which the flues 2 communicate through the flue-sheet 3. The smoke-stack 4 has an extension 5 into the smoke-box, and extending upward in the smoke-box is an exhaust-pipe 6, to which the exhaust-nozzle 7 is attached.

Arranged between the smoke-pipe extension and the exhaust device is a deflector 8, made of suitable sheet metal and of bell-like or cone form. The mouth or open end of the deflector is directed toward the front of the smoke-box, and it will be noted that the deflector is arranged somewhat above the longitudinal center of the smoke-box, so as to catch and deflect downward and to the sides the sparks and cinders discharged from the flues. As a further means for causing this downward deflection of the sparks and cin-

ders I may provide wing-like deflectors 9, which extend outward at opposite sides of the deflector 8 at the top and above the plane of the top flues 2. The extension 5 of the smoke-stack projects into the bell-like deflector and is suitably riveted thereto, while the lower portion of the deflector is bolted between the exhaust-pipe 6 and its nozzle 7. From the front end of the deflector to a point slightly rearward of the exhaust-nozzle the said deflector is circumferentially corrugated, these corrugations extending from the wing-deflector 9 at one side to the wing-deflector 9 at the opposite side. These corrugations will serve to effectually break up the cinders as they pass downward. It may be here stated that fire-clay or similar material 10 may be placed in the lower part of the fire-box to make a path for the cinders to follow. The inward extensions of the corrugations are provided with perforations 11. It is to be understood, however, that the device may be constructed without the perforations without departing from the spirit of my invention.

Arranged within the deflector is a ball-like screen 12, or, in other words, this screen conforms substantially to the lines of the deflector. Its rear and side portions, however, are spaced from the deflector, so that sparks may circulate freely around the screen within the deflector. The front portion of the screen, preferably as shown in the drawings, extends somewhat forward of the mouth of the deflector. By this construction a larger area of screen-surface is provided, and in its front portion a door 13 is arranged, whereby access may be had to the screen when it is desired to make any repairs or to attach the screen in place. For convenience in manufacture the screen may be made in two parts, the adjacent edges of the upper and lower parts being secured between rings 14, which are bolted together. The upper portion of the screen is secured between the lower end of the extension 5 and a ring 15, these parts being secured together by any desired number of bolts, and the lower portion of said screen, as also the lower portion of the deflector 8, is secured between the exhaust-pipe 6 and its nozzle. While this screen 12 may perform all the required service, I may desire to place a screen over the mouth of the deflector.

Placed within the ball-like screen and supported by the bolts securing the ring 15 in place is a lift-pipe 16, having an outwardly-flaring lower end over the exhaust-nozzle. In some instances the screen 12 may be used in connection with the smoke-stack and the exhaust without employing the bell-shaped deflector, as the draft created by the exhaust will cause the sparks and cinders to be drawn through the screen and forced up through the lift-pipe and smoke-stack.

In operation the sparks and cinders passing into the smoke-box will strike against the rounded outer surface of the deflector and be forced downward to the front and sides and then by the draft will be drawn into the open mouth of the deflector and passed around the screen 12 and be thoroughly broken up, so as to pass through the meshes and out through the smoke-stack. However, before passing through the smoke-stack the sparks will be entirely extinguished. In passing downward along the outer surface of the deflector the smaller particles will be drawn through the perforations 11 and immediately set in motion around the screen.

If desired, an inverted-cone-shaped spark-arrester 17 may be placed in the upper portion of the smoke-stack. This arrester is shown as circumferentially corrugated, and the depressions are provided with perforations. This cone-shaped spark-arrester 17 is located between the upper and lower parts of the flaring smoke-stack top, as shown in Fig. 2, and securely riveted in place.

In present practice it is found difficult to obtain a good draft through the side flues, while this device throws the draft to the sides and makes a good draft through the side flues.

It will be noticed that there are two side braces leading from the cone deflector to the sides of the smoke-box and firmly bolted to both, making a secure fastening for the entire device.

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

1. In an engine, a substantially bell-shaped deflector arranged in the smoke-box of the engine and having its open end forward, the said deflector having communication at its upper portion with the smoke-stack and at its lower portion with the exhaust-pipe, and the

said deflector having circumferential corrugations extending in vertical plane, substantially as specified. 55

2. In an engine, a substantially bell-shaped deflector arranged in the smoke-box and having its open end forward, the said deflector being provided with circumferentially-disposed corrugations extending in vertical plane, perforations being formed in the depressions of said corrugations, a smoke-stack extension communicating with the upper portion of the deflector, and an exhaust communicating with the lower portion of the deflector, substantially as specified. 60 65

3. In an engine, a substantially bell-shaped deflector arranged between the exhaust-pipe and the smoke-stack, and wing-like deflectors extended outward from the upper portion of said bell-shaped deflector, substantially as specified. 70

4. In a locomotive-engine, the combination with a smoke-pipe and an exhaust pipe or nozzle, of a substantially ball-shaped screen connected at its upper portion to the smoke-stack and at its lower portion to the exhaust, and a deflector in which the screen is arranged, the said deflector being open at the front and spaced from the screen, substantially as specified. 80

5. In a locomotive-engine, a substantially bell-shaped deflector supported by the smoke-stack and by the exhaust-pipe of the engine and having its mouth or open end forward, and a bulbous screen arranged in the deflector and spaced therefrom and projecting beyond the forward end thereof, substantially as specified. 90

6. In a locomotive-engine, a substantially bell-shaped deflector supported by the smoke-stack and by the exhaust-pipe of the engine and having its mouth or open end forward, and a bulbous screen arranged in the deflector and spaced therefrom and projecting beyond the forward end thereof, the said projection having a door, substantially as specified. 95

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 100

GEORGE B. RAIT.

Witnesses:

JOE MORTON,

CHAS. F. BUTTERFIELD.