

(No Model.)

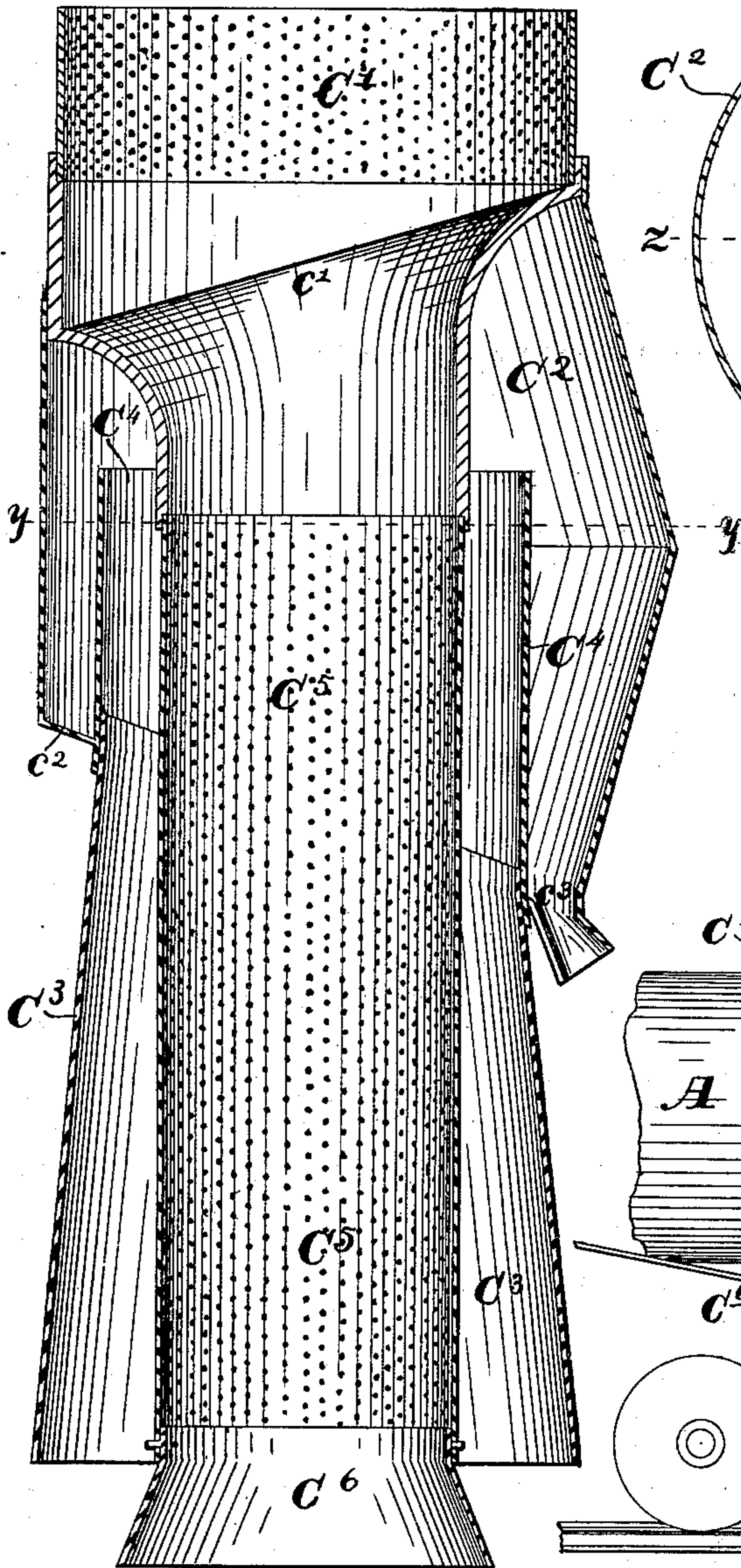
J. W. MALONEY.

SPARK ARRESTER.

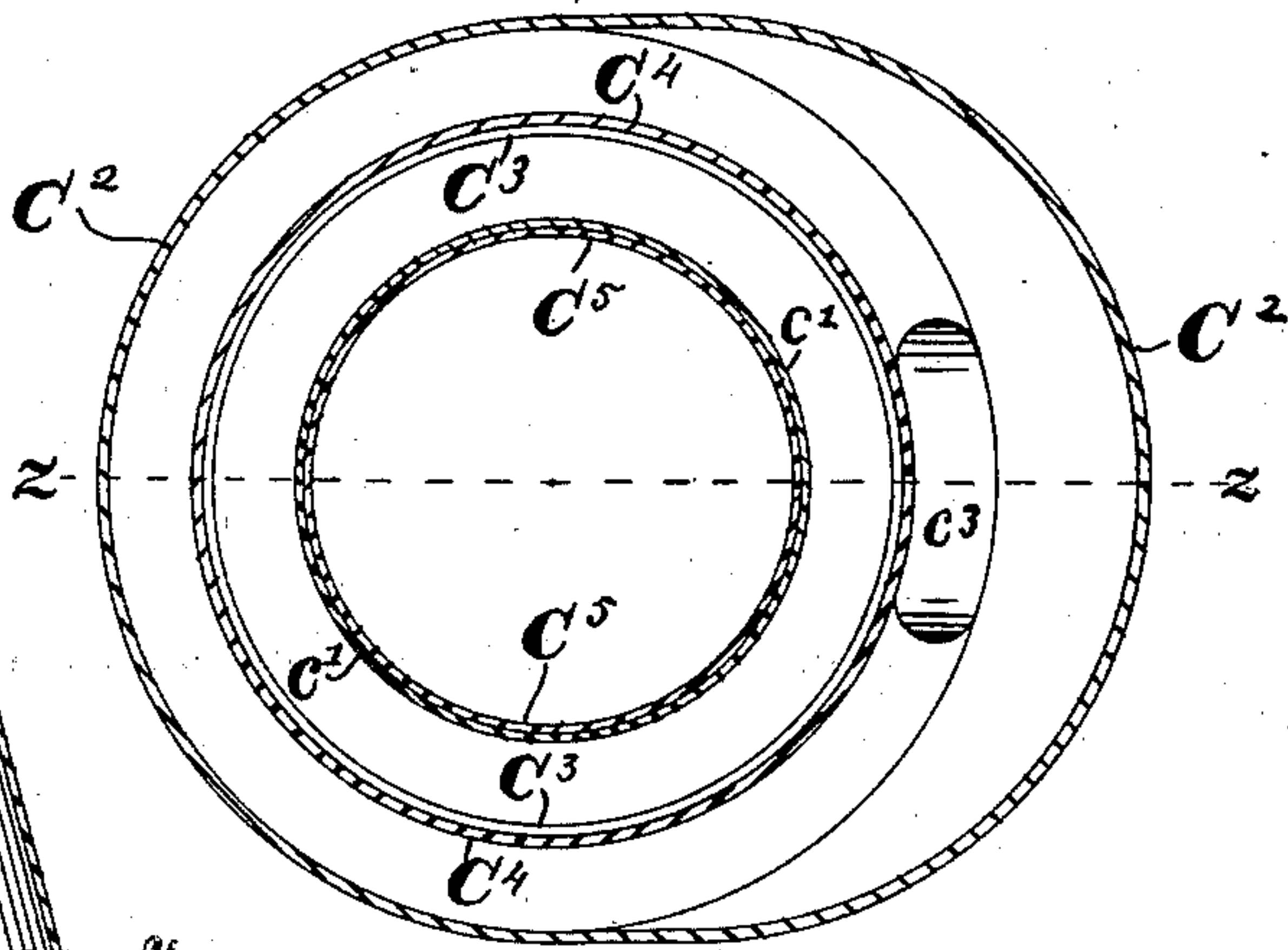
No. 314,254.

Patented Mar. 24, 1885.

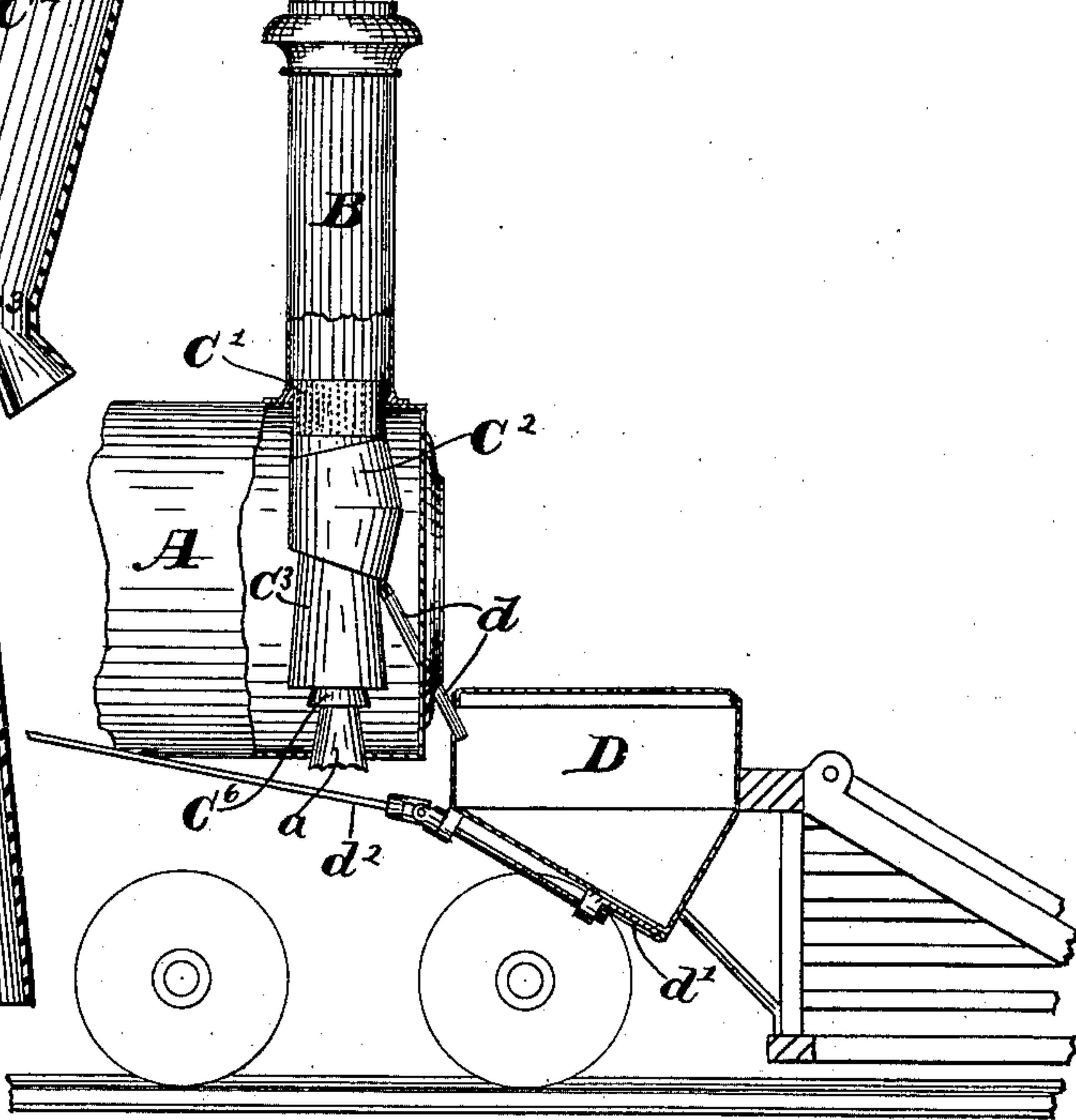
*Fig. 2.*



*Fig. 3.*



*Fig. 1.*



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 314,254, dated March 24, 1885.

Application filed September 21, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. MALONEY, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Spark-Arresters, of which the following is a specification.

The object of my said invention is to produce a spark-arresting apparatus for use on locomotives and in other similar places, which, while effectually preventing the discharge of sparks, shall not interfere with the draft. This object is accomplished by placing in the smoke-box in front of the boiler and extending down from the smoke-stack a device for catching and carrying off the sparks while permitting the smoke to freely escape, the construction and operation of which will be hereinafter more fully described.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a view of the front portion of a locomotive, one side of the smoke-box being broken away in order to show the location and arrangement of my improved device; Fig. 2, a central vertical section of said device on the dotted line  $z z$  in Fig. 3; and Fig. 3, a horizontal sectional view, looking downwardly from the dotted line  $y y$  in Fig. 2.

In said drawings, the portions marked A represent the boiler, B the smoke-stack, C' C<sup>2</sup> C<sup>3</sup> C<sup>4</sup> C<sup>5</sup> C<sup>6</sup> the various parts of my device, and D a receptacle for the sparks.

The boiler, smoke-stack, and surrounding portions are, or may be, of any ordinary or desired construction, and therefore need no special description. The screen and inverted cone commonly used in the smoke-stack are however omitted, leaving the smoke-stack entirely free from obstruction.

The body of the spark-arresting device is composed of several parts. The upper of these parts, C', is perforated and connected to the saddle or lower end of the smoke-stack. The second portion, C<sup>2</sup>, is connected to the first and extends downwardly some distance, as shown, surrounding some of the inner portions, and having an inclined top,  $c'$ , and bottom  $c^2$ , and terminates at the lower point in an orifice,  $c^3$ , connected with a spout,  $d$ , which leads to a spark-receptacle. The third portion, C<sup>3</sup>, is constructed tapering, and extends

downwardly from the lower end of the portion C<sup>2</sup> to a point about two-thirds the way from the top to the bottom of the smoke-box. A fourth portion, C<sup>4</sup>, extends from the top of the portion C<sup>3</sup> up within the portion C<sup>2</sup> about two-thirds of the way from its bottom to its top.

The top  $c'$  of the part C<sup>2</sup> is somewhat funnel-shaped, and curves inwardly and downwardly to a point just below the top of the part C<sup>4</sup>.

A perforated pipe, C<sup>5</sup>, is placed within the parts C<sup>3</sup> and C<sup>4</sup>, and extends from the bottom of said part C<sup>3</sup> up to and joins onto the lower end of this funnel-shaped top  $c'$ . Upon the lower end of this perforated pipe C<sup>5</sup> is preferably secured a flaring or funnel-shaped ring, C<sup>6</sup>, which extends downwardly somewhat below the lower end of the other portions of the apparatus to directly above the upper end of the exhaust-nozzle  $a$ .

As before stated, the top  $c'$  and bottom  $c^2$  of the part C<sup>2</sup> are preferably inclined. The inclination of the top  $c'$  serves to carry most of the sparks to one side of the apparatus as they come up from the parts C<sup>3</sup> and C<sup>4</sup>, and the bottom  $c^2$  being inclined guides what fall upon the other sides of the device across to the same side to the orifice  $c^3$ , whence they are discharged through the pipe  $d$  into the receptacle D, or elsewhere, as may be desired.

The receptacle D for the sparks and cinders is usually placed in front of the smoke-box upon or within the frame-work of the cow-catcher. It is of a size sufficient to carry the sparks and cinders of any ordinary trip of a locomotive, and is preferably hopper-shaped at the bottom, with a door,  $d'$ , (which may be operated by a rod,  $d^2$ , running back to the cab, as indicated, or otherwise,) in said bottom, through which the sparks and cinders in said receptacle may be removed at any time when desired—usually at the end of each trip.

The operation of my invention may be recapitulated as follows: The exhaust-steam from the pipe  $a$  creates a draft in the usual manner, drawing up the smoke and cinders from the smoke-box. The smoke is drawn in through the perforations in the upper part, C', of the device and into the pipe C<sup>5</sup>, and passes off up through the stack. The sparks and cinders being too large to pass through the perforations are drawn up inside of the de-



vice outside of the pipe  $C^5$  and strike the inclined top  $c'$ , whence they fall down onto the inclined bottom  $c^2$ , and pass off through the orifice  $c^3$ , as before described.

5 It will be observed that the exhaust has an unobstructed passage through this device and the smoke-stack from where it leaves the exhaust-pipe until it reaches the open air, with the advantages which are fully understood by those skilled in the art.

10 Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an engine and its stack, of a device for arresting and carrying off the sparks located in the smoke-box of said engine below said stack, and consisting of an internal perforated pipe, a surrounding pipe, and an enlarged portion surrounding the upper ends of these portions and provided with a top and a bottom with an orifice leading therefrom, the space between said internal perforated pipe and said pipe surrounding it leading into this portion below its top, substantially as set forth.

2. The combination, in a spark-arrester secured to the bottom of the smoke-stack, of a portion,  $C^2$ , having a top,  $c'$ , having a central opening for the pipe  $C^5$ , and a bottom,  $c^2$ , hav-

ing a central opening for the pipe  $C^4$ , a pipe,  $C^3$   $C^4$ , leading from below said bottom up into said portion, and a perforated pipe,  $C^5$ , leading from the bottom of said portion  $C^3$  up to the top  $c'$  of the portion  $C^2$ , to which it is connected, substantially as shown and described.

3. The combination, with a locomotive, of a spark-arresting device secured in the smoke-box to the bottom of the stack, a receptacle, D, and a pipe leading from said spark-arrester to said receptacle, substantially as set forth.

4. The combination, with a locomotive, of a spark-arrester consisting of a device located in the smoke-box and secured to the lower end of the stack, the upper portion being perforated and the lower portion provided with devices for arresting and carrying off the sparks, and an exhaust-pipe arranged to discharge centrally into said spark-arrester, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 13th day of September, A. D. 1884.

JOHN W. MALONEY. [L. S.]

In presence of—

C. BRADFORD,

E. W. BRADFORD.