

M. ZECK.
Spark-Arrester.

No. 223,427.

Patented Jan. 6, 1880.

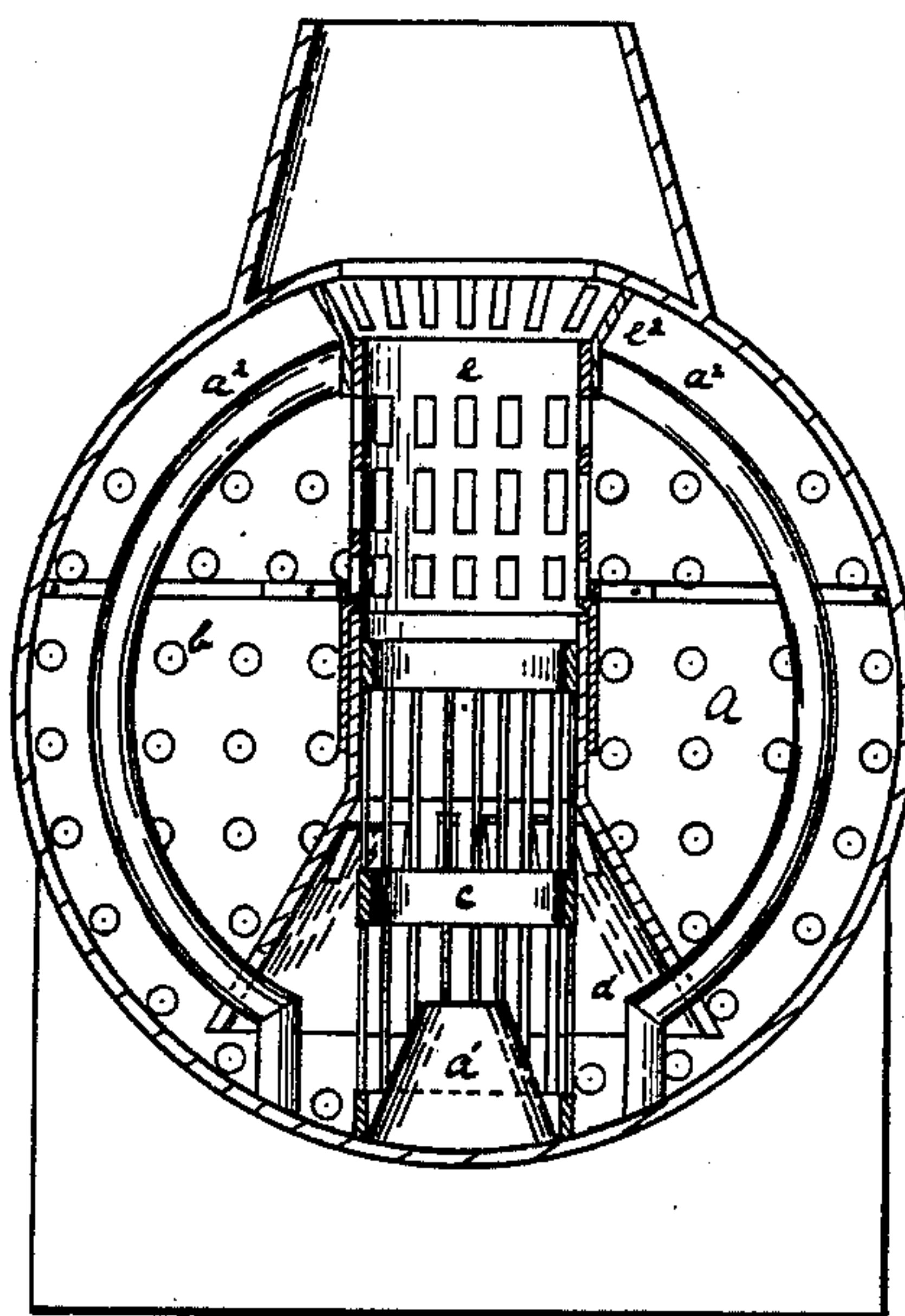


Fig. 1.

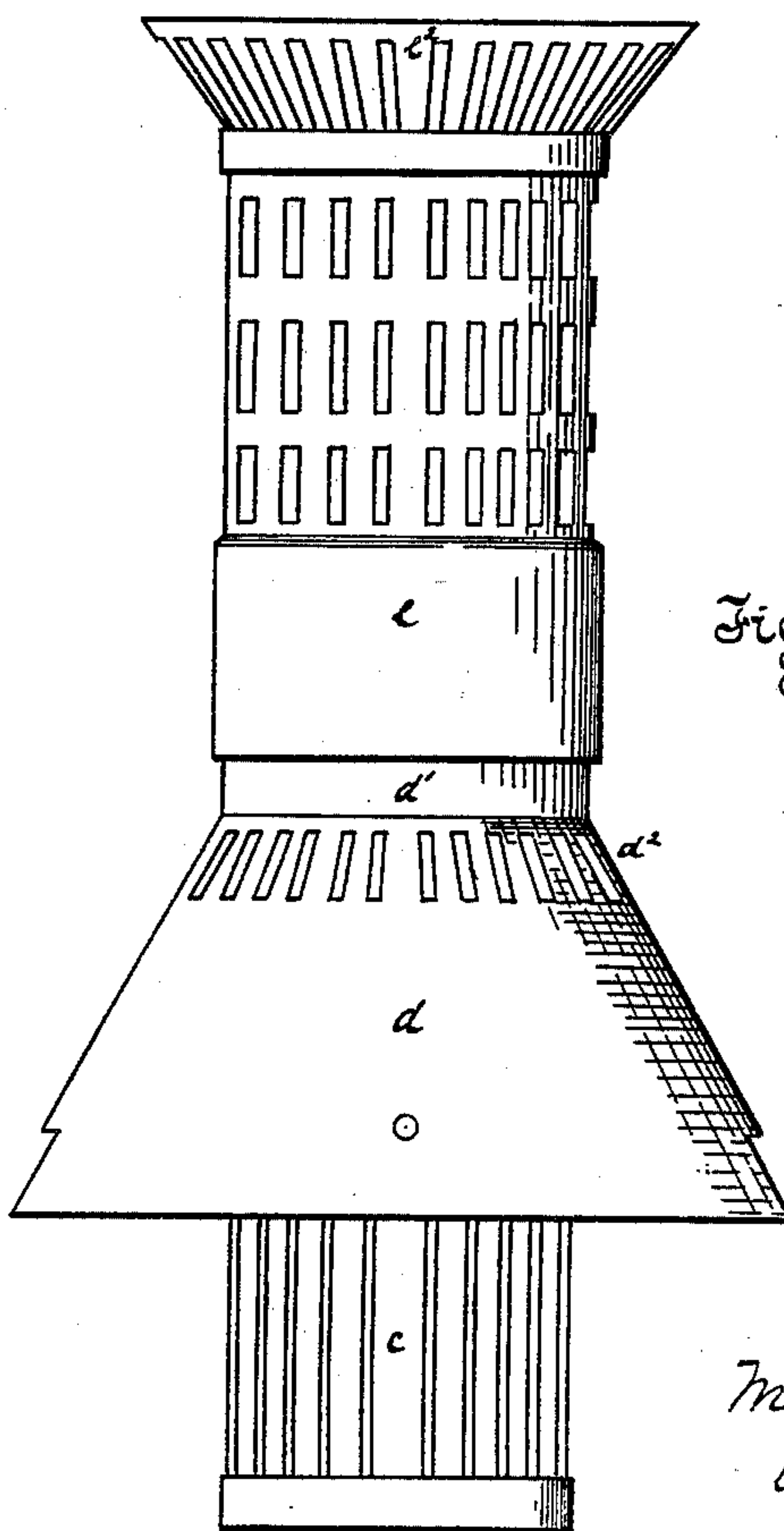


Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

MICHAEL ZECK, OF PITTSBURG, ASSIGNOR OF ONE-FOURTH OF HIS RIGHT
TO WM. LOGAN FOX, OF FOXBURG, PENNSYLVANIA.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 223,427, dated January 6, 1880.

Application filed November 12, 1879.

To all whom it may concern :

Be it known that I, MICHAEL ZECK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful
5 Improvement in Spark-Arresters; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, forming part of this specification, in
10 which—

Figure 1 is a vertical section of the smoke-box of a locomotive-engine, showing my invention. Fig. 2 is a detached view of my devices.

15 Like letters refer to like parts wherever they occur.

My invention relates to a spark-arrester and smoke-consumer for locomotive-engines; and it consists in substituting for the cinder-lift-
20 ing pipe in the smoke-chamber now in common use a perforated or basket-work cylinder or series of cylinders fitting together telescopically, and a hood or hoods fitting over and around said cylinders, so that the draft
25 through the smoke-chamber may be regulated, combustion of the smoke facilitated, and the cinder pulverized and driven out through the smoke-stack.

It is usual in locomotive-engines to conduct
30 the exhaust-steam from the cylinders into the smoke box or chamber in front of the boiler and discharge it upward from the bottom of the smoke-chamber, so as to cause a draft through the smoke-stack, and thereby not only
35 increase combustion in the fire-box or furnace, but also drive out the cinder, which would otherwise fill and choke the flues and smoke-chamber. In order to effect the cleaning of the smoke-chamber, it has been customary to place over the steam-discharge in the
40 smoke-box a cylinder or pipe, open at both ends, extending from the bottom of the smoke-chamber about two-thirds the distance to the smoke-stack, sufficient space, however, being
45 left between the bottom of the smoke-chamber and the end of the cylinder to allow the cinder from the bottom of the smoke-chamber to be drawn up through the cylinder or lifting-pipe and discharged into and through the
50 smoke-stack by the action of the steam ex-

haust or discharge. This device or method, however, if used alone, would cause sparks and large hot cinders to be discharged in considerable quantities from the smoke-stack; and to obviate this objectionable feature numerous devices have been placed in the smoke-
55 stack to pulverize the cinder and to prevent the escape of sparks, so that all the dirt and cinder will be discharged from the stack in the shape of fine dust. 60

These devices have been more or less successful; but none of them has fully prevented the escape of cinders and sparks without at the same time interfering with a perfect draft through the smoke-chamber. It is a great de-
65 sideratum, therefore, to prevent the escape of sparks and cinders, and at the same time to allow a thorough draft through the smoke chamber and stack.

These are the special objects of my invention, which I will now describe, so that others skilled in the art may manufacture and use the same.

The smoke-chamber *a* is constructed after the usual plan, having a steam-discharge orifice, *a'*, at the bottom, which is in the shape of the frustum of a cone open at the top, so as to concentrate the jet of steam when discharged into the smoke-chamber. 75

The steam-pipes *a*², leading from the boiler 80 to the cylinders, and the flues *b*, leading from the fire-box to the rear of the smoke-chamber, are all constructed and arranged in the usual manner.

Instead of placing the usual lift-pipe or im-
85 perforate cylinder over the discharge-orifice *a'*, I place there a cylinder, *c*, composed of vertical wire rods, wire basket-work, or perforated metal, which also differs from the usual lift-pipe in that it fits down closely to the bot-
90 tom of the smoke-chamber. This cylinder *c* extends about two-thirds of the distance from the bottom to the top of the smoke-chamber.

Around and at the top of the cylinder *c* is placed a hood, *d*, which is preferably made of
95 plate or sheet metal in a conical form, extending at its upper portion into a cylindrical sleeve. This hood *d* extends down outward and around about half the length of the cylinder *c*. This cylindrical sleeve *d'*, which is 100

fastened to the top of and forms part of the hood d , fits telescopically over the cylinder c , so that it may slide up and down over the cylinder and can be readily adjusted by bolts, screws, or other device.

Around the hood d , at its junction with the sleeve d' , are perforations d^2 . On the sleeve d' is placed a perforated cylinder, e , which fits telescopically around the sleeve d' , so as to slide vertically up and down. This cylinder e is perforated all over, excepting for a short distance at its lower end, and extends upward to about the top of the smoke-box a .

At the top of the perforated cylinder e is a circular crown-piece or flaring flange, e^2 , made of perforated metal, fitting telescopically around the upper end of the cylinder e , so that it can be moved up or down and adjusted according to the draft which is desired through the smoke-chamber. This crown-piece is made so as to fit closely against the top of the smoke-chamber when at the top of the cylinder e , but, being arranged telescopically over the cylinder e , it can be lowered, if desired.

If desired, the hood d , sleeve d' , cylinder e , and crown-piece e^2 may be made in one piece, so arranged as to slide up and down over the cylinder c .

The operation of my devices is as follows:
The exhaust-steam coming through the orifice a' passes up through the cylinder c and e into the smoke-stack. This causes a draft through the boiler, flues b , and smoke-chamber a , and the fine cinder and dust, with the smoke, are drawn up under the hood d , through the basket-work or perforations of the cylinder e , and also through the perforations of the cylinder e and crown-piece e^2 , into the smoke-stack, and is thence discharged into the open air. The large cinders, being unable to pass through the various perforations, fall back to the bottom of the smoke-chamber, again to be carried up by the draft, until they are sufficiently pulverized to pass through the perforations into the smoke-stack.

The draft may be regulated as follows: By lowering the hood d the draft from the lower flues, extending from the fire-box, is increased, and is also caused to sweep closer to the bottom of the smoke-chamber, thereby more effectually carrying away and pulverizing the cinder which accumulates at that point; and

by raising the cylinder e on the sleeve d' a greater extent of imperforate surface is presented, against which the pieces of cinder strike as they are carried upward by the draft. This decreases the draft at that point (which is about the middle of the smoke-chamber) and increases the draft at the bottom. By lowering the crown-piece e^2 and the cylinder e the draft is increased at the upper portion of the smoke-chamber and from the other flues leading from the fire-box.

The perforations d^2 in the hood d help to disintegrate the cinder and prevent the clogging of the perforations or openings in the cylinder c , as it allows some of the cinder to escape into the smoke-chamber, which is carried off through the other perforations or falls to the bottom of the smoke-chamber a .

The advantages of my invention are that the spark-arresting device, being placed in the smoke-chamber instead of the stack, is easy of access in order to clean it or make necessary adjustment. It is not liable to be clogged by the cinder and dirt. The draft can be regulated so as to promote combustion in the smoke-chamber, thereby causing much of the smoke and dirt to be consumed.

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

1. In a spark-arrester, the combination, with the exhaust-jet, of a perforated lift-pipe and a flaring hood adjustable on the lift-pipe, substantially as and for the purpose specified.

2. In a spark-arrester, the combination, with the exhaust-jet, of a perforated lift-pipe, a flaring hood adjustable on the lift-pipe, and an adjustable perforated upper section of the lift-pipe, the whole constructed and arranged to operate substantially as specified.

3. In the smoke-chamber of a locomotive-engine, the combination of the perforated or basket-work cylinder c , the hood d , cylinder e , and crown-piece e^2 , fitting together telescopically over the steam-exhaust pipe a' , substantially as and for the purpose described.

In testimony whereof I, the said MICHAEL ZECK, have hereunto set my hand this 29th day of October, A. D. 1879.

Witnesses: MICHAEL ZECK.

A. C. JOHNSTON,
J. K. SMITH.