

JACKSON RICHARDS & J. MEEHL.

Spark-Arresters.

No. 143,931.

Patented Oct. 21, 1873.

FIG. 1

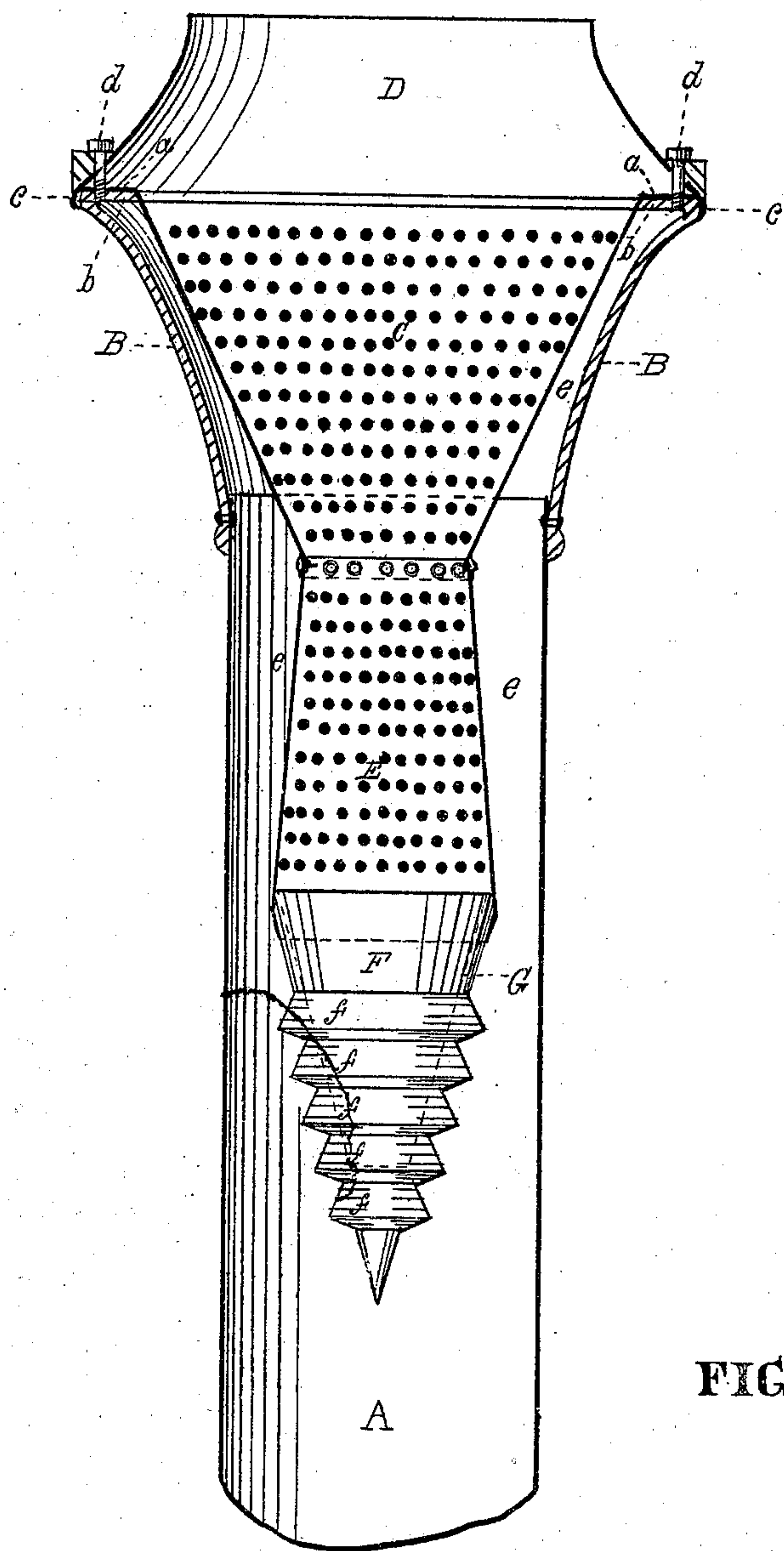


FIG. 2

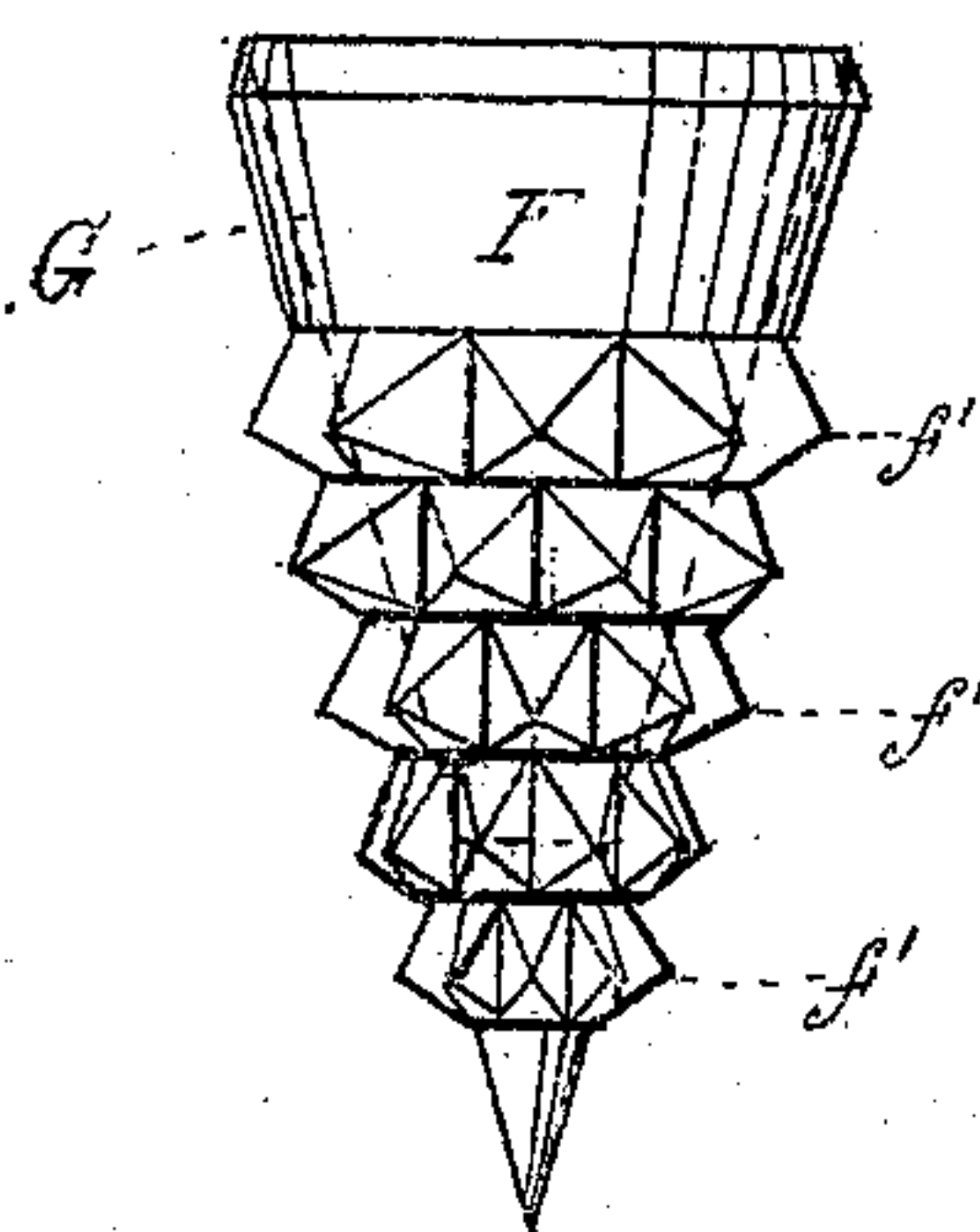
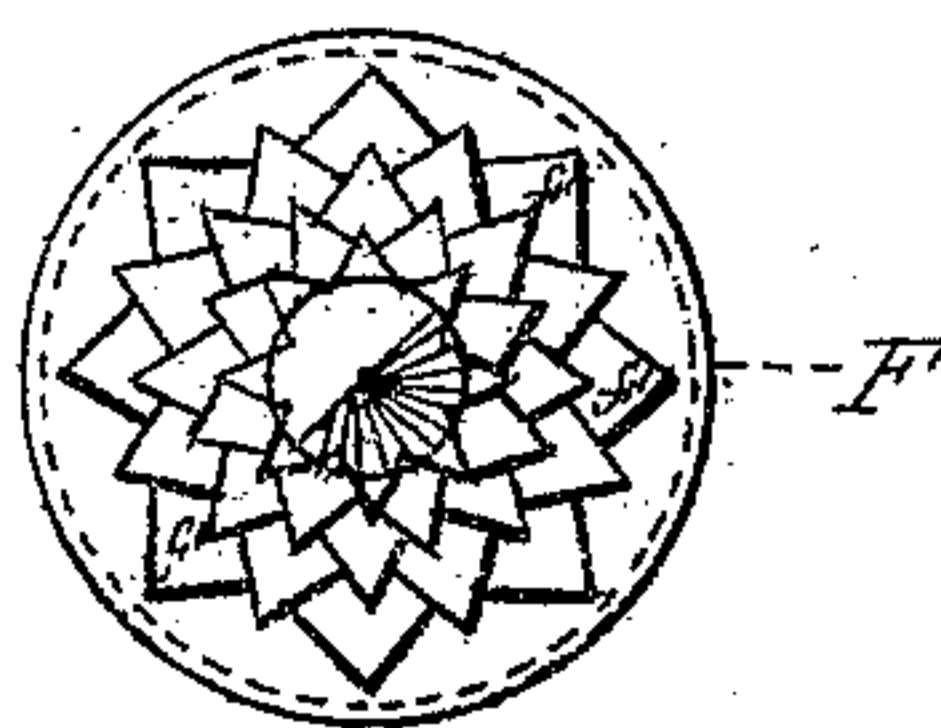


FIG. 3



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# UNITED STATES PATENT OFFICE.

JACKSON RICHARDS AND JACOB MEEHL, OF PHILADELPHIA, PA.

## IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. 143,931, dated October 21, 1873; application filed September 20, 1873.

*To all whom it may concern:*

Be it known that we, JACKSON RICHARDS and JACOB MEEHL, of the city of Philadelphia and State of Pennsylvania, have invented certain Improvements in Smoke-Stacks, of which the following is a specification:

Our invention mainly relates to the combination of a tapered perforated pipe, smaller at its upper than at its lower end, with the vertical casing of a smoke-stack, forming an annular space between it and the casing, and with a funnel-shaped perforated pipe at the upper end of the stack, and a conical cinder and spark breaker at the lower end of the same, in such a manner that, as the cinders and sparks are forced upward through said annular space by jets of steam from the exhaust, they are broken up as they pass between the teeth or projections of the breaker, and, in their upward course in the annular space, pass through the perforations of the tapered and funnel-shaped pipes into their interior, whence they pass out of the mouth of the stack. Those sparks or cinders that are not reduced fine enough fall down the annular space, and are carried up again by the next jet of steam. We have a triplicate object in the use of the tapered pipe: First, enlarging the area of the annular space between it and the casing, at its upper end, so as to admit of an expansion of the steam to increase the draft; second, to admit of as large a surface to the funnel-shaped perforated pipe as practicable for the more efficient breaking up of the sparks and discharge of the same; and, third, to form an inclined annular surface to the pipe, to cause the sparks and cinders that fall down the annular space after each exhaust to slide off against the inner surface of the casing, and thus prevent their falling into the exhaust-pipe.

Figure 1 is a vertical section of the smoke-stack, having in connection the funnel-shaped pipe C, tapered pipe E, and conical breaker F. Fig. 2 is a side elevation of the inverted conical breaker F, provided with pyramidal teeth  $f'$ , instead of the annular ridges  $d$ , as represented in Fig. 1. Fig. 3 is an end view of the same.

Like letters of reference in all the figures indicate the same parts.

We dispense with the ordinary inside pipe of the smoke-stack.

In our improved smoke-stack, A is the lower part of the casing, made in the usual manner. B is the base part of the upper end of the casing; it is made of cast-iron, and connected by means of rivets to the upper end of the piece A. C is a perforated funnel-shaped pipe, having an annular flange,  $a$ , which rests upon the interior annular flange  $b$  of the piece B of the casing. D is the cap-piece of the casing; it has a vertical flange,  $c$ , which fits over the top edge of the piece B, and is secured thereon by a suitable number of screw-bolts,  $d$ , confining also the flange  $a$  of the funnel-shaped pipe C upon the flange  $b$  of the piece B. The making the upper part of the casing in two pieces is for the purpose of putting in, or the removal of, the funnel-shaped pipe C. E is a perforated pipe, made of sheet-iron, and confined to the lower end of the said pipe C by means of rivets. It is made as small in diameter at its upper end as practicable, so as to admit of a large area of the funnel-shaped pipe C, for the complete breaking up of the cinders and sparks as they pass through the perforations. It is enlarged at its lower end, so that, when the steam is shut off, the sparks which pass up the annular space  $e$  and fall down during the back-stroke of the engine strike the taper, run down it, and glance off against the inner periphery of the casing A, to prevent their falling down into the exhaust-pipe E. The pipe is larger at its lower end than at its upper end, to decrease the space  $e$  between it and the casing A, so as to have a larger area in the space at the upper end of the pipe, to allow an expansion of steam for the purpose of increasing the draft immediately after each exhaust of the steam. F is an inverted hollow cone (which I make of cast-iron) for breaking up the cinders that are drawn up from the fire-box. It is fastened by means of rivets to the lower end of the tapered pipe E. It is provided with annular ridges  $f$ , as seen in Fig. 1, or the ridges have open spaces across them, so as to form pyramidal teeth  $f'$ , as shown in Figs. 2 and 3. They are arranged, as shown, with the teeth of each annular row between those of the contiguous rows, as represented, so as to compel the cinders or sparks



to take a zigzag course as they pass up the annular space *e*, whereby they are broken up, so as to be drawn through the perforations in the pipes C and E. In passing up the annular space *e*, the cinders or sparks, when they reach the top of the space, strike against the annular flange *b* of the part B of the casing, and drop down upon the sides of the tapered pipe E and glance off against the casing, and are again passed through the breaker by the next jet of steam, and so on, until they are reduced fine enough to pass through the perforations of the pipe. The conical breaker has a closed chamber, G, which receives the sparks and cinders that fall down through the pipes C and E in the cut-off of the exhaust, to prevent their falling down into the exhaust-pipe.

We claim as our invention—

1. The combination and arrangement of the pipes C and E and conical breaker F with the casing of a smoke-stack, substantially as and for the purpose set forth.

2. In combination with the casing A, a breaker and the perforated pipe E, larger at the bottom than at the upper end, for regulating the draft through the space *e*, and also for turning the sparks to the casing A in their descent, to prevent their falling down into the exhaust, substantially as specified.

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Witnesses:

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