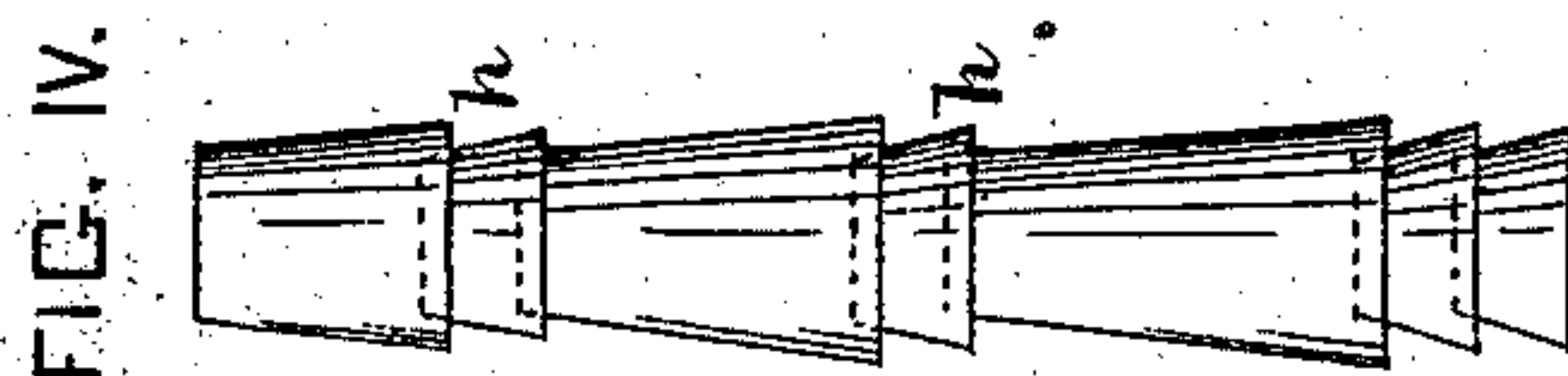
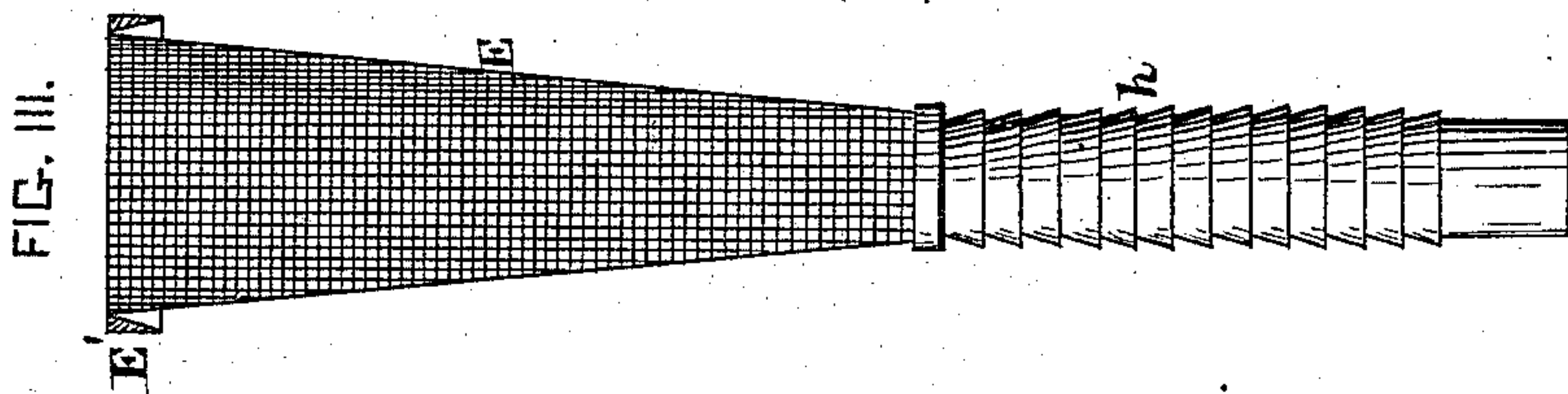
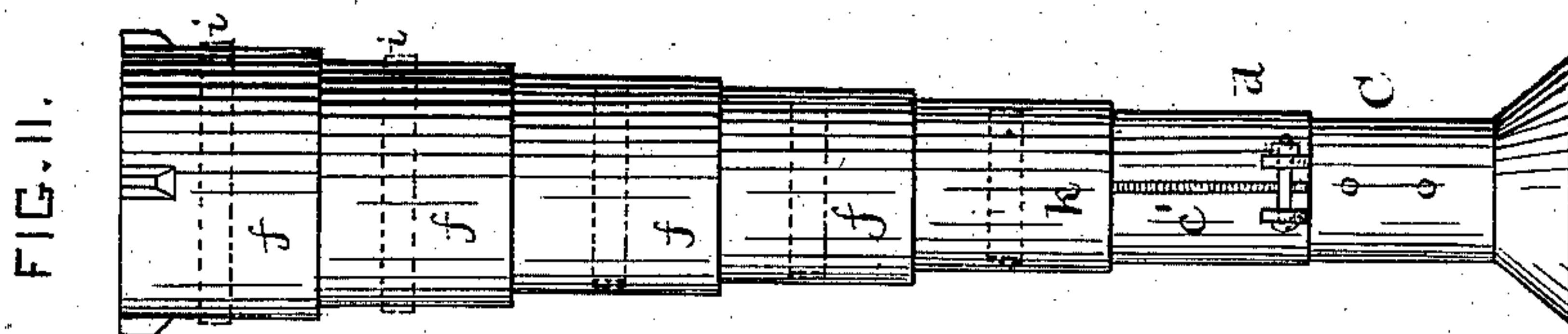
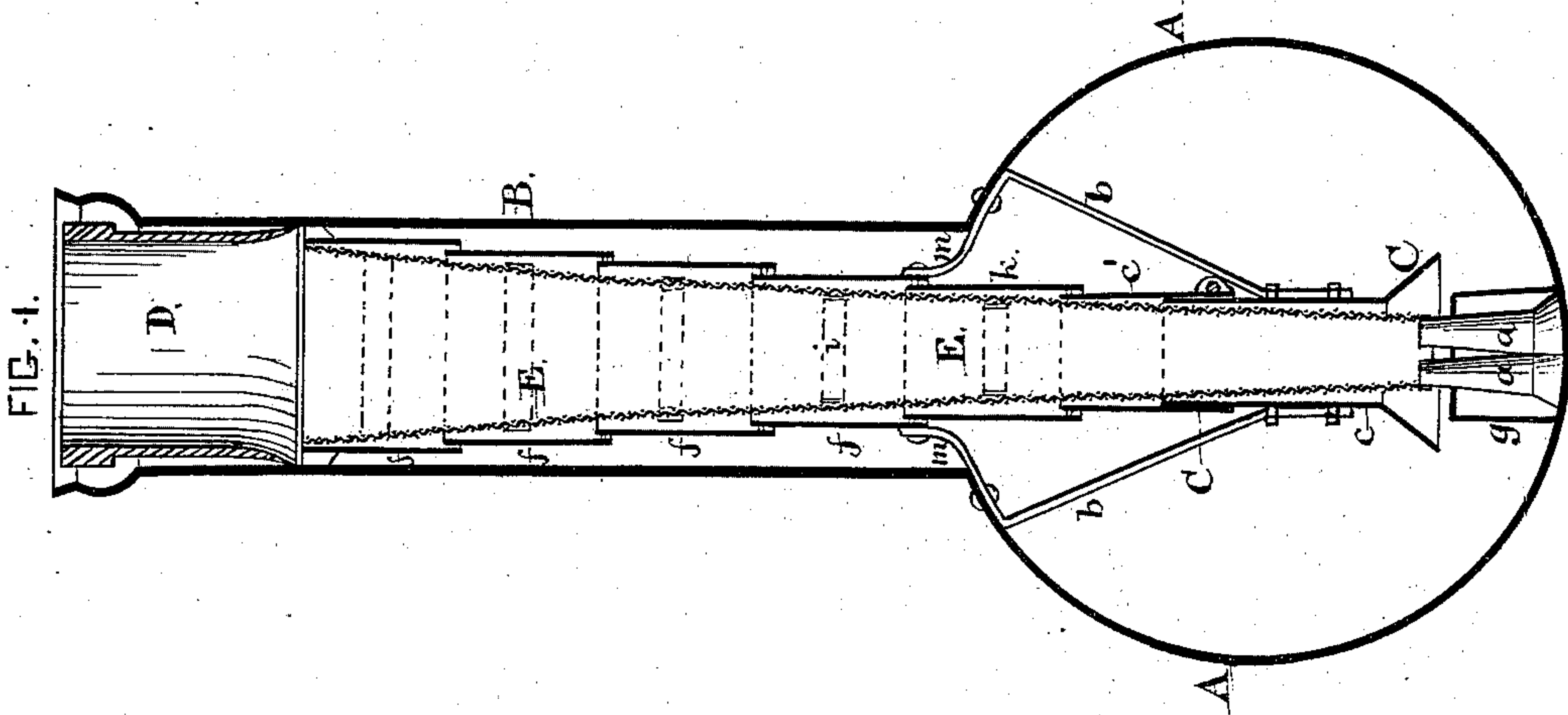


R. S. CRAIG & G. G. WYMAN.
Spark-Arrester.

No. 225,209.

Patented Mar. 9, 1880.



WITNESSES:

Robert A. M^r. Glasson.
Arthur E Baugs.

INVENTORS:

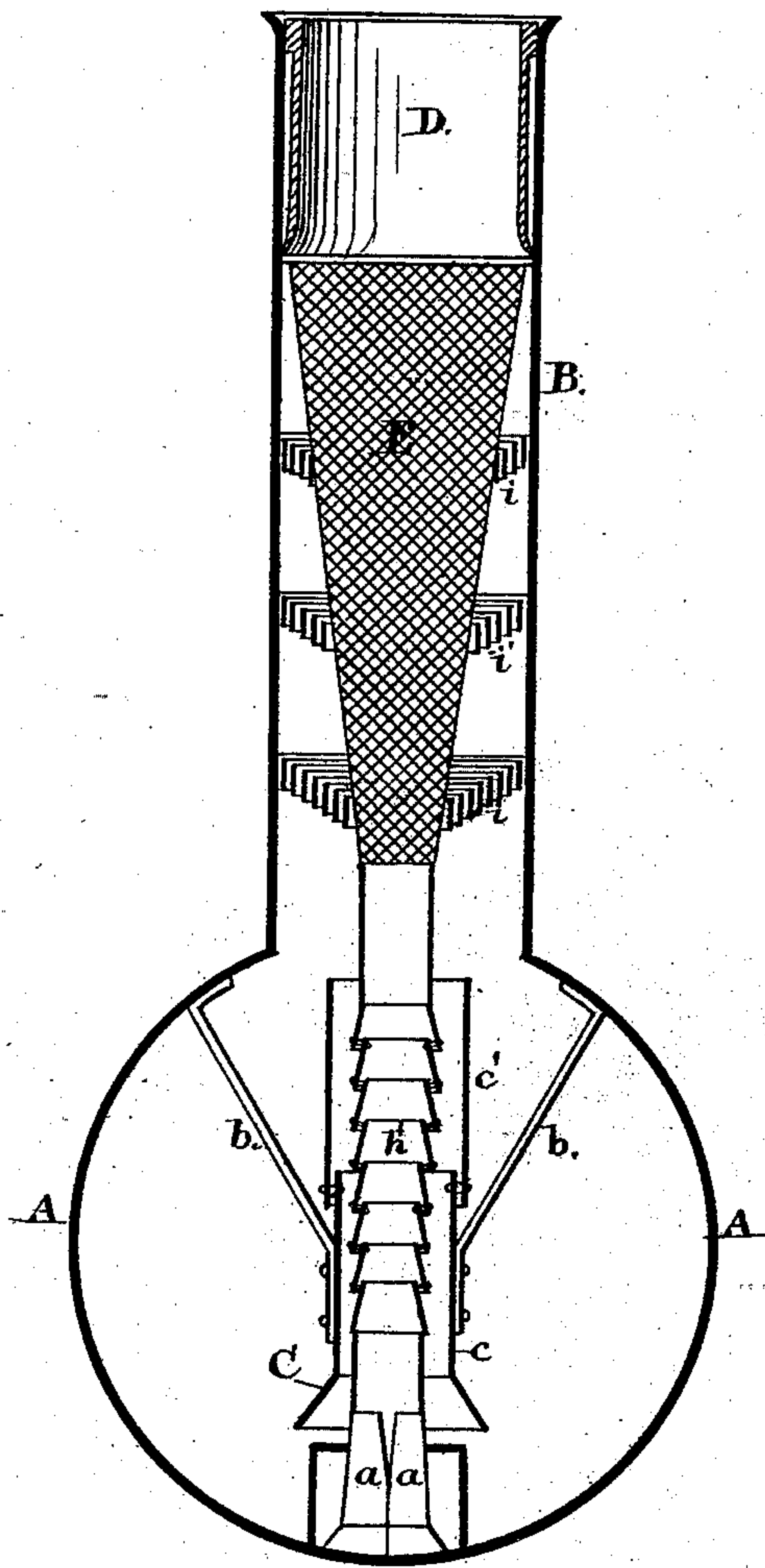
Rufus S. Craig
Greenleaf L. Wyman

R. S. CRAIG & G. G. WYMAN.
Spark-Arrester.

No. 225,209.

Patented Mar. 9, 1880.

FIG. V.



WITNESSES:

Robert A. McGlasson.
Arthur E. Bangs.

INVENTORS:

Rufus S. Craig
Granlief G. Wyman

UNITED STATES PATENT OFFICE.

RUFUS S. CRAIG AND GREENLIEF G. WYMAN, OF DOVER PLAINS, N. Y.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 225,209, dated March 9, 1880.

Application filed January 31, 1880.

To all whom it may concern:

Be it known that we, RUFUS S. CRAIG and GREENLIEF G. WYMAN, both of Dover Plains, Dutchess county, New York, have invented a new and useful Spark-Arrester, of which the following is a specification.

Our invention relates to improvements in spark-arresters in which the sparks are arrested and disintegrated before leaving the stack.

The object of our invention is to improve the construction of spark-arresters used on locomotive and other engines; and the invention consists in the construction and arrangement of the parts of a spark-arrester in such manner that the sparks shall be entirely disintegrated and pulverized as well as extinguished before leaving the smoke-stack, all of which will be more fully described hereinafter, reference being had to the accompanying drawings and the letters of reference marked thereon.

In the accompanying drawings, Figure 1 is a vertical cross-section of our spark-arrester in position in the smoke-stack. Fig. 2 is a side view of the disintegrating and blast pipe section, to be straight or tapering. Fig. 3 is a side view of the netting-pipe with the disintegrating-cones attached thereto. Fig. 4 is a modification of the disintegrating-pipe. Fig. 5 is a modification of Fig. 1.

In the drawings, A represents the end of the smoke-arch of a locomotive, provided with the usual exhaust-tips *a a*. Above the tips *a* is arranged the blast-pipe C, held in position by braces *b*. The blast-pipe consists of a pipe, *c*, having a flaring mouth at its lower end, and pipe *c'*, adjustably fitted to the pipe *c*, having lugs *d*, by which and the bolts *e* this pipe *c'* is clamped and held in position on the draft-pipe *c*, either higher or lower, as desired.

To the pipe *c'* is secured a short pipe or cutter, *k*, which can be raised or lowered with pipe *c'* in the lower pipe or cutter *f* of the upper series of cutters, *f*. The pipe *f* is held in place by suitable lugs *m* in the top of the smoke-arch. By this means the draft upon the fire in the furnace can also be regulated.

To the pipe *k* are secured a number of cone pipes or cutters, *f*, extending nearly to the top of the smoke-stack. Each pipe *f* is slightly

larger than the preceding one, so as to leave a small space around them, and the lower edges of the pipes may be sharpened, if desired, so as to thoroughly break up and disintegrate the sparks as they are lifted up by the exhaust. The sparks will be again and again lifted and thrown against the edges of the pipes *f*, and thus thoroughly pulverized. Immediately above the pipes *f* is arranged a reducing-pipe, D, by which the smoke, exhaust-steam, and pulverized sparks are carried to a considerable extent into the air.

Inside of the cone-pipes *f*, and fitted to the mouths of the exhaust-tips or around the exhaust-pot *g*, is arranged a tapering tube, E, of wire-netting, and extending to the top of the stack. This tube prevents any sparks that may have escaped through the spaces around the pipe C from passing out of the smoke-stack.

The upper end of the tube E may be secured to the smoke-stack in any suitable manner by bolts or rivets.

On the outside of the tube E are arranged any desired number of clusters of rings *i*, which are also sharpened at their lower edges, so as to break up and disintegrate any sparks that may have passed between the spaces of the pipes. They also tend to strengthen the tube E.

Rings or cutters *i* of a similar character may be arranged on the outside or inside of the pipe E.

In the modification shown in Fig. 3 the tube E does not extend the entire distance to the exhaust-tips; but the lower part is composed of a series of narrow cones or cutters, *h*, preferably made of steel and sharpened at their lower edges, and having a narrow space around them for the smoke and disintegrated sparks to pass through. At the upper end is arranged a band, E', whose lower edge is preferably made sharp, and by this band the netting may be secured to the smoke-stack or in the reducing-pipe.

Another modification of the cone pipes or cutters *h* is shown in Fig. 4, in which, instead of being all of one width, some are made wide and some narrow, and these may be extended the entire distance to the top of the stack, or as far as desired.

h, Fig. 5, shows a part of draft-pipe C, form-

ing a double draft-pipe or blast-pipe, extending from the nozzle-pot upward to any desired height, and to connect with pipe E.

Instead of single bands *i*, a series of rings or cutters are secured between the pipe E and smoke-stack, each ring being raised slightly above the preceding one, and thus forming cutters, against which the cinders are disintegrated.

10 The operation is as follows: The tube *c'* having been first adjusted on tube *c* to suit the draft desired, the sparks coming from the furnace are forced against the lower edges of the pipes *k* and the bands *i* by the force of the
15 exhaust-blast, and, falling toward the bottom, are again and again thrown violently against the lower edges of said pipes and rings or cutters until they are completely pulverized and disintegrated, when they pass between the
20 spaces of the pipes *k*, and unless fine enough to pass through the meshes of the wire-netting tube they are thrown against the bands *i*, made of iron or steel, to be placed between the blast-pipe *c* and wire-netting tube E, and are still
25 further pulverized until they can pass with the smoke and exhaust-steam out of the smoke-stack. The exhaust-steam has a free and independent passage out of the stack by being entirely unobstructed to the very outlet thereof,
30 and thereby any back-pressure is entirely obviated.

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

1. In a spark-arrester, the combination of a 35 blast-pipe, C, consisting of a series of short pipes or cutters increasing in diameter toward the top and having an intervening space between them, with the tube E, made of wire-netting or sectional cones, all arranged substantially as shown and specified. 40

2. In a spark-arrester, the combination of a blast-pipe, C, and wire-netting tube E, extending from the exhaust-tips to the top of the stack, with a vertical series of cutters arranged 45 on the outside of the tube E, as shown, and for the purpose specified.

3. In a spark-arrester, the combination of a blast-pipe, C, and tube E with a series of cutters, a reducing-pipe, D, and exhaust-tips *a*, 50 all arranged substantially as set forth.

4. In a spark-arrester, the combination of a blast-pipe, C, wire-netting E, rings *i*, and exhaust-tips *a* with the adjustable pipes *c c'*, all constructed and arranged as shown, and for 55 the purpose set forth.

5. In a spark-arrester, the combination of a blast-pipe, C, consisting of a series of short pipes or cutters extending nearly the entire distance to the top of the smoke-stack, as desired, when constructed and arranged substantially as specified. 60

RUFUS S. CRAIG.
GREENLIEF G. WYMAN.

Witnesses:

ROBERT A. MCGLOSSON,
ARTHUR E. BANGS.