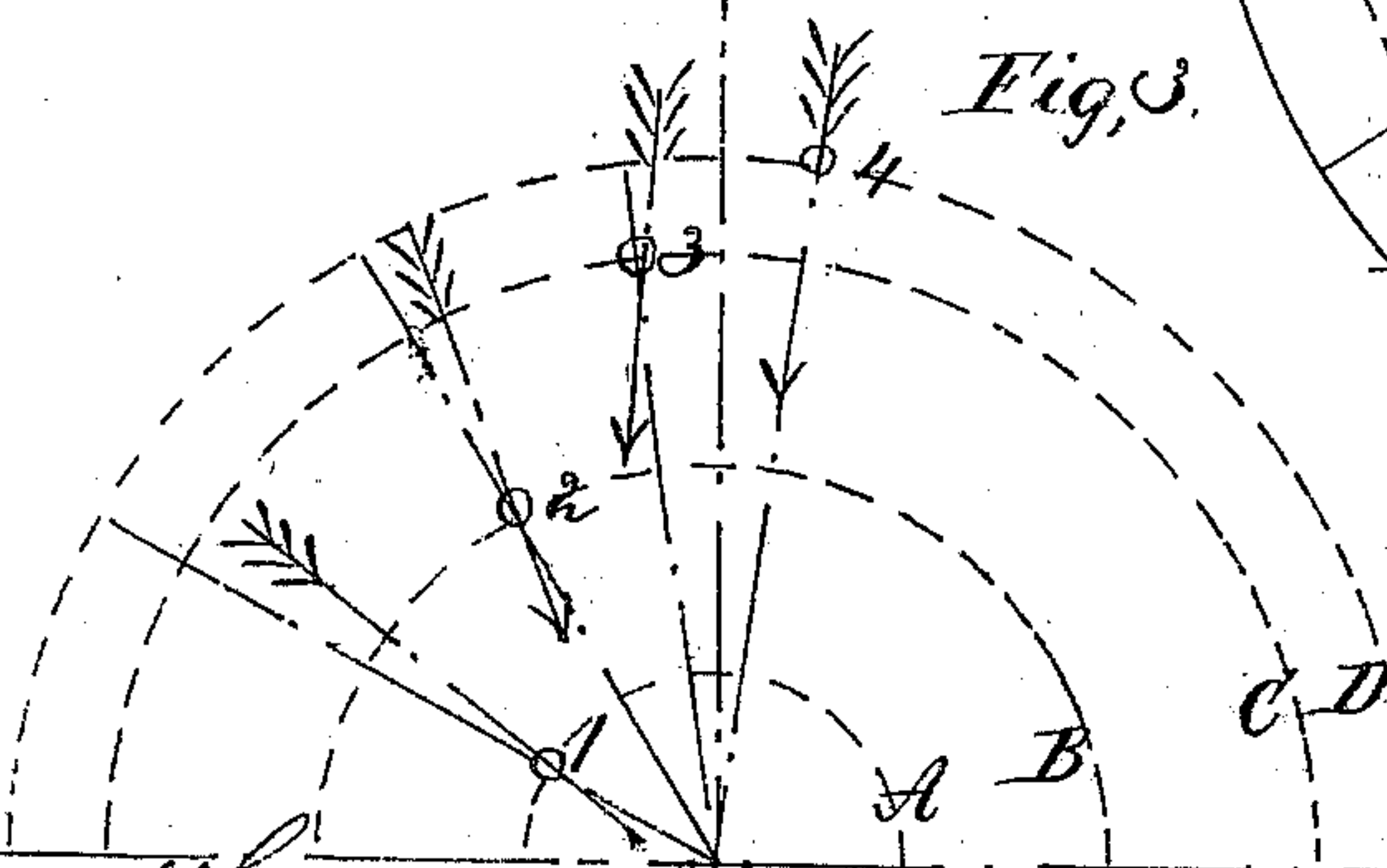
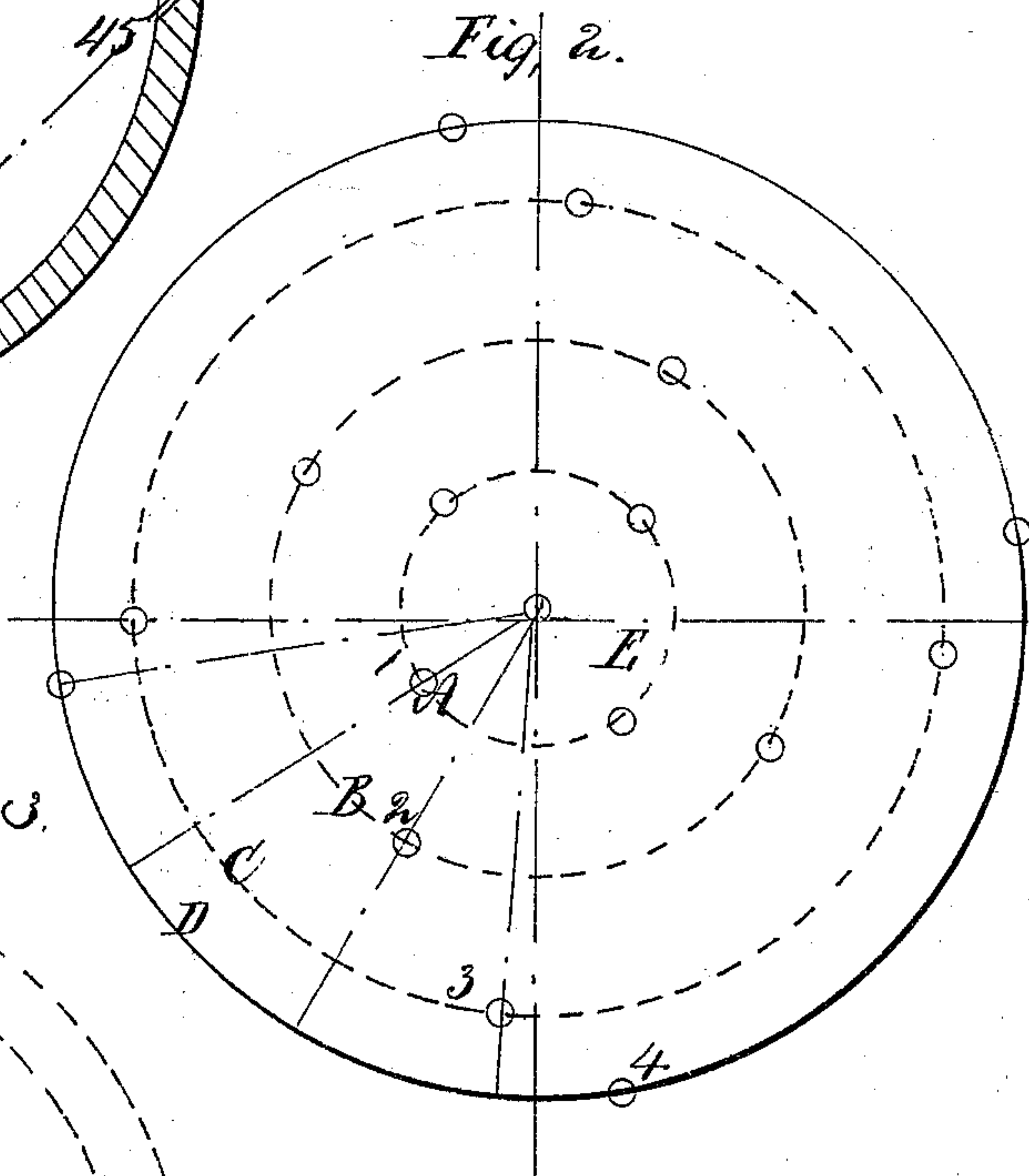
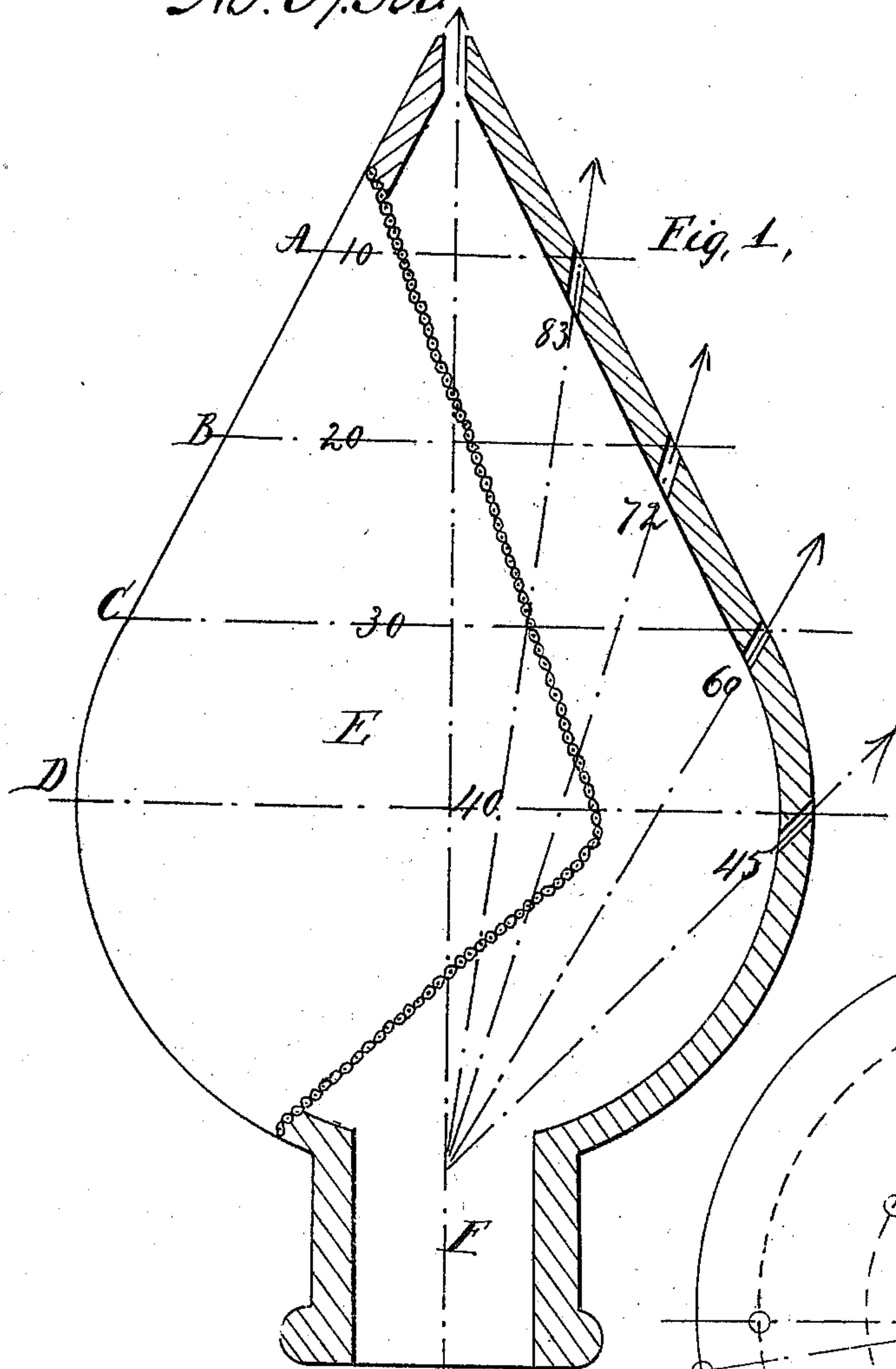


*Holdcraft & McLaughlin,*

*Smoke Stack.*

*No. 97,509*

*Patented Dec. 7. 1869.*



*Witnesses,*  
*Joseph L. Lumsden*  
*Elias Thomas*

*Inventors,*  
*William Holdcraft*  
*Sarah McLaughlin*

# United States Patent Office.

WILLIAM HOLDCRAFT AND DAVID McLAUGHLIN, OF PHILADELPHIA,  
PENNSYLVANIA.

*Letters Patent No. 97,509, dated December 7, 1869; antedated November 20, 1869.*

## IMPROVEMENT IN STEAM-GENERATOR SMOKE-STACKS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that we, WILLIAM HOLDCRAFT and DAVID McLAUGHLIN, of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Mode of Creating an Artificial Draught in a Smoke-Stack or Chimney; and we do hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, and to the letters of reference marked thereon.

The nature of our invention consists in locating in the centre of a smoke-stack or chimney, above the flues, a metallic shell, the form of which is that of a truncated cone and semispherical cup combined.

From this shell seventeen (17) jets of steam issue, in such a manner as to completely expel the air from the interior of the smoke-stack or chimney, upon the same principle that bodies are elevated by a natural whirlwind.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

Figure 1 is a full-size drawing of the perforated shell, through which steam issues into the smoke-stack or chimney.

Figure 2 is a top or bird's-eye view of the same.

Figure 3 is a view commencing at the semispherical line D, and looking toward the apex of the cone.

Similar figures and letters refer to like points in the several views.

The size of the shell here shown is intended for an eighteen-inch stack or chimney, and is designed to be attached to the upper end of a vertical steam-pipe, three-fourths of an inch in diameter, the pipe being connected with the boiler.

Fig. 1, therefore, represents the shell E in its working position.

Steam enters the shell E at F, and as the area of the three-fourth-inch pipe is about five times greater than the combined areas of the seventeen holes through the shell, the pressure of steam in the shell will be the same as that in the boiler. The sixteen holes in the shell E, one-sixteenth of an inch in diameter, are drilled as follows, viz:

The four holes on line D, on an angle of forty-five degrees.

The four holes on line C, on an angle of sixty degrees.

The four holes on line B, on an angle of seventy-two degrees.

The four holes on line A, on an angle of eighty-three degrees.

In addition to the angles above described, all of the holes on the lines A B C D are drilled tangential to circles on which they are started, as shown by the arrows in fig. 3, the angles being ten degrees from the radial lines, at their intersection with the several circles on which the holes are located.

The hole in the apex of the cone is one-eighth of an inch in diameter, and is drilled on a line with the centre of the cone, in relation to the centre of the shell F.

The other holes are located on spiral lines, as indicated by the figs. 1, 2, 3, 4, on the lines A B C D, in fig. 1.

The particular form of the shell, together with the radiating angles, on which the jets of steam issue therefrom, causes the air in the stack or chimney to be expelled by a less volume of steam than by any other means, as the entire area of the stack or chimney is acted upon by the jets, and all of the air expelled by the rotary motion imparted thereto, by the tangential issue of the steam from the holes on the lines A B C D, as described.

The action of the centre or one-eighth jet is to draw the steam that issues from the other jets toward the centre of the stack or chimney, which action takes place at the height of six feet above the shell.

What we claim as our invention, and desire to secure by Letters Patent, is—

The construction and arrangement of the shell E, in the manner and for the purpose herein set forth.

WILLIAM HOLDCRAFT.  
DAVID McLAUGHLIN.

Witnesses:

JOS. C. TITTERMARY,  
ELIAS THOMAS.