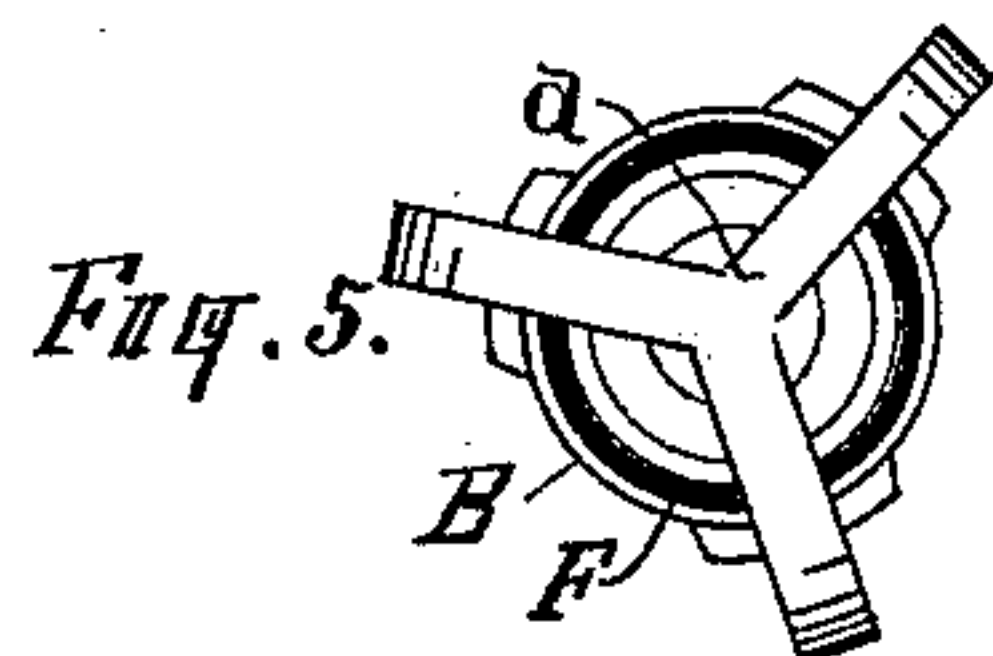
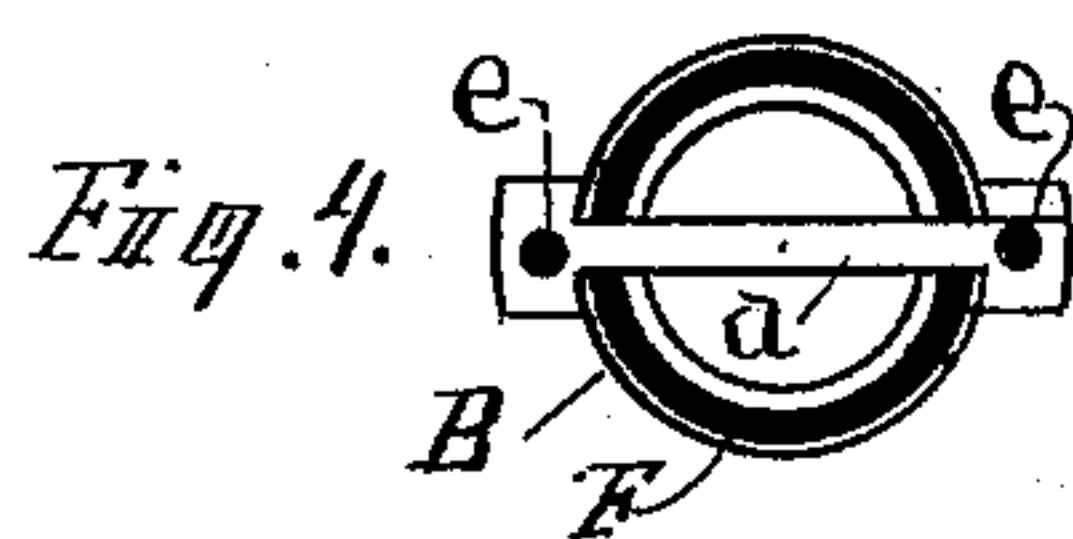
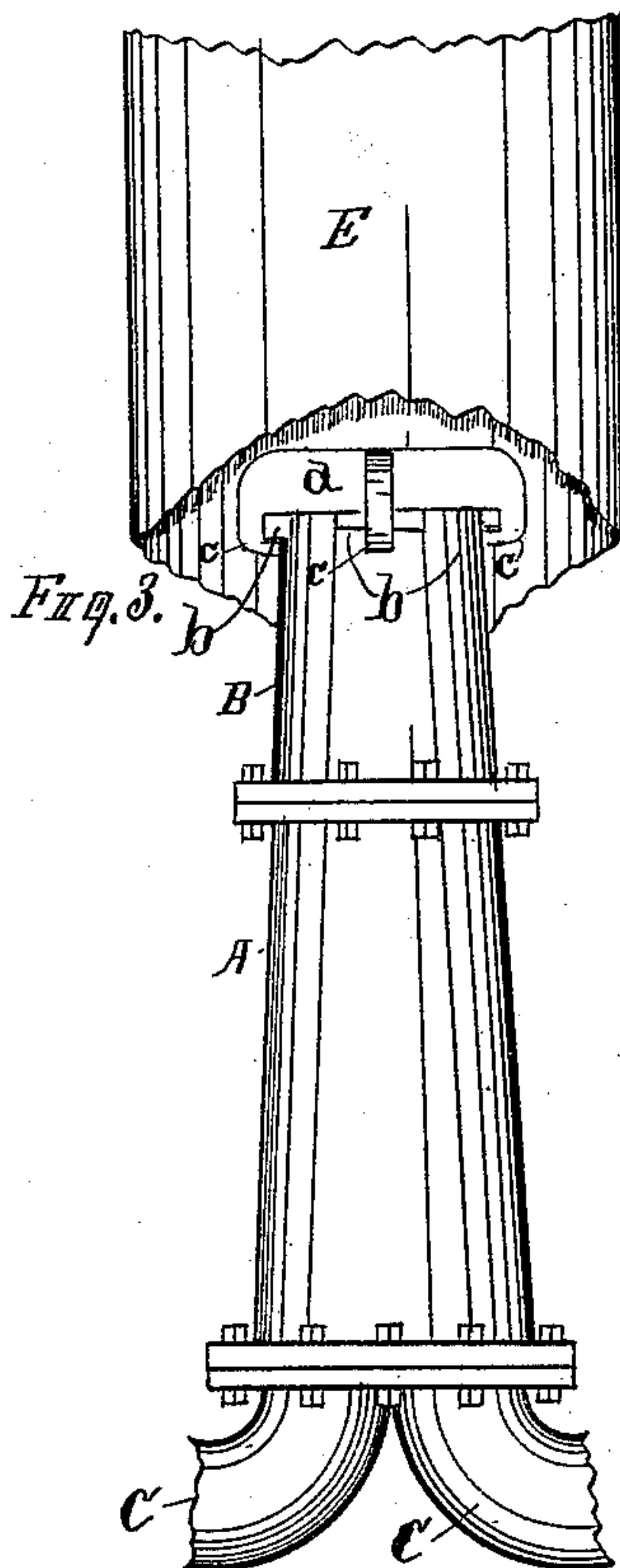
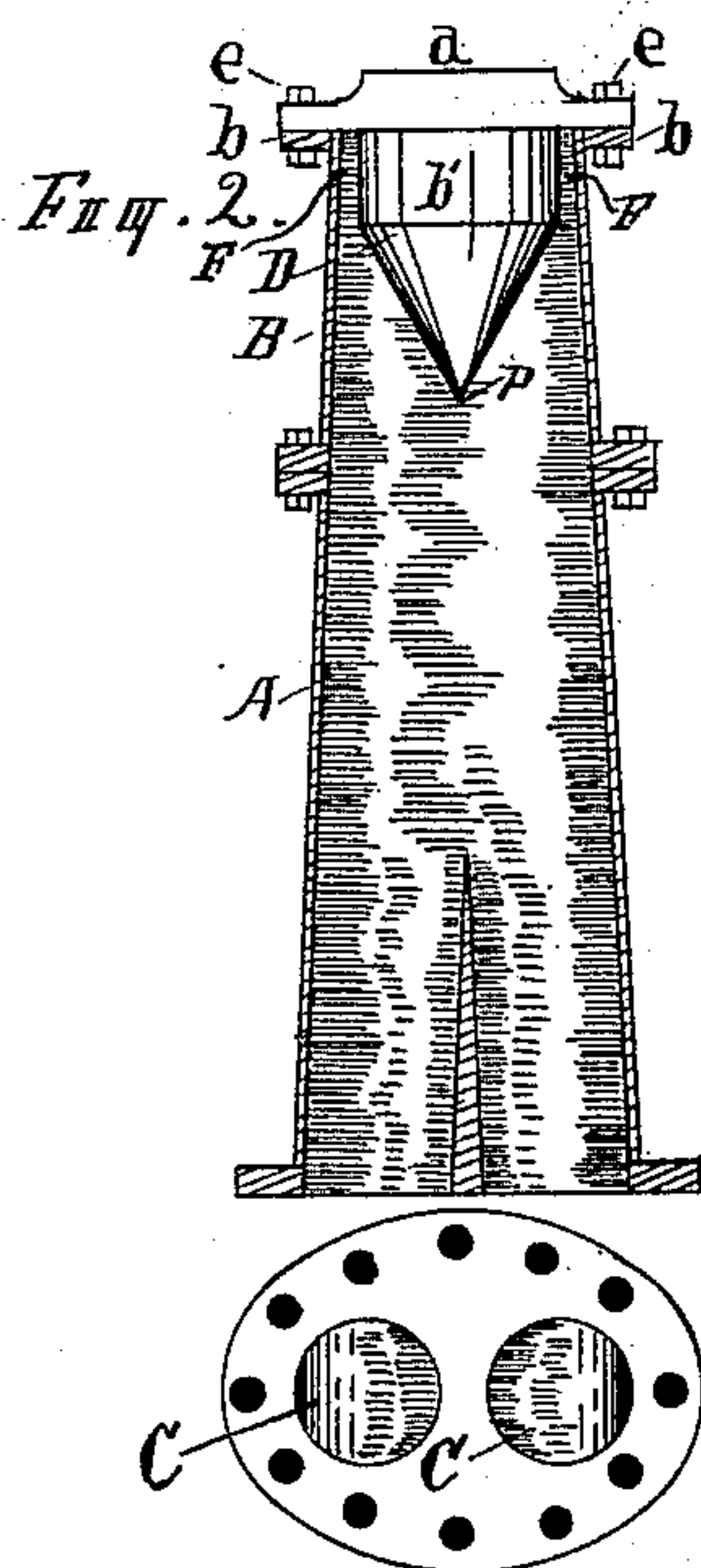
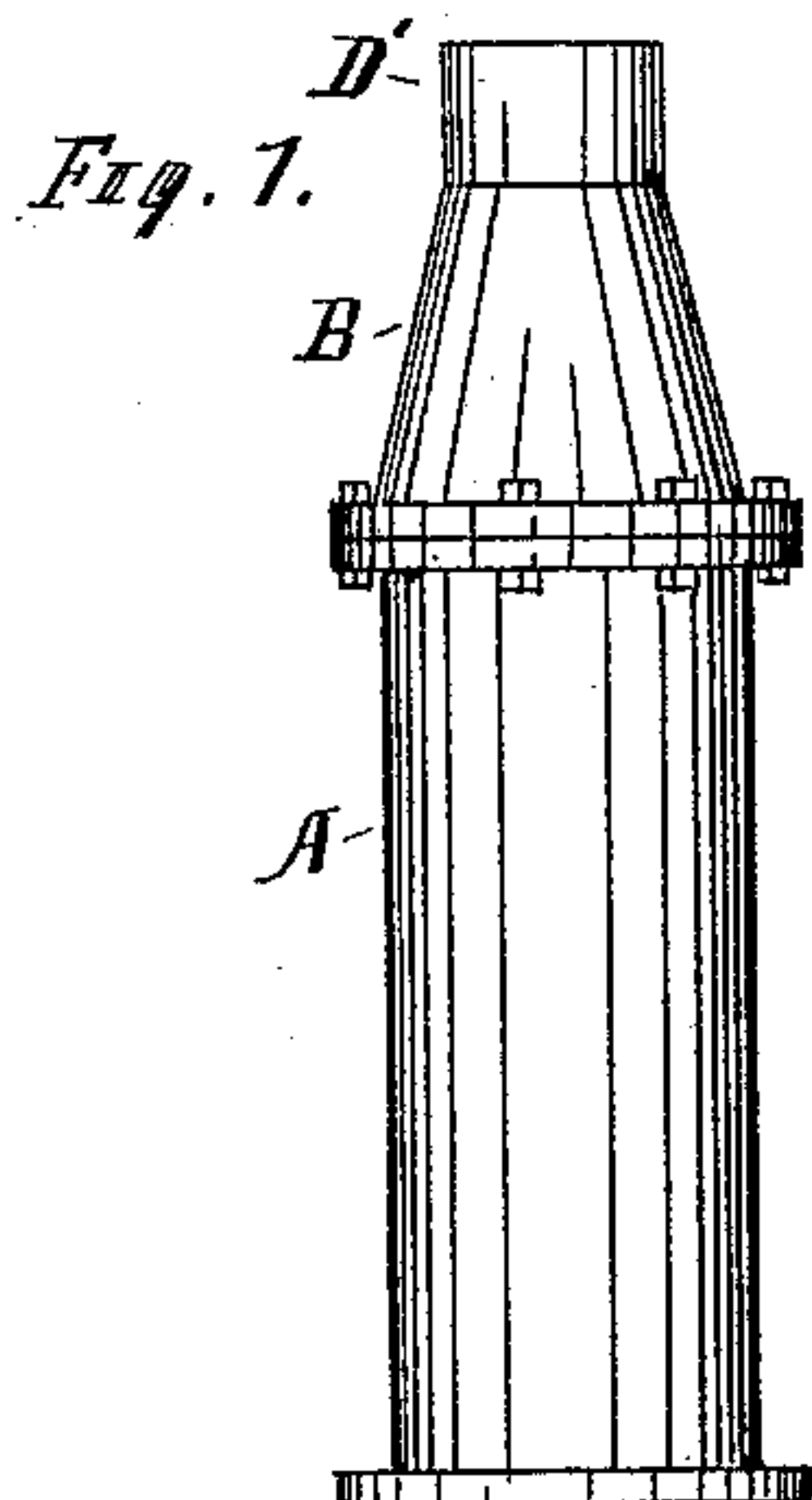


(No Model.)

C. E. HUNTLEY.
LOCOMOTIVE EXHAUST PIPE.

No. 420,643.

Patented Feb. 4, 1890.



WITNESSES:

George H. White.

E. L. Brewen.

INVENTOR

Charles E. Huntley

BY

Ethel J. Gilley

ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES E. HUNTLEY, OF IONIA, MICHIGAN, ASSIGNOR OF ONE-HALF TO
ALLAN F. HERBERT, OF SAME PLACE.

LOCOMOTIVE EXHAUST-PIPE.

SPECIFICATION forming part of Letters Patent No. 420,643, dated February 4, 1890.

Application filed April 21, 1888. Serial No. 271,433. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HUNTLEY, a citizen of the United States, residing at Ionia, in the county of Ionia and State of Michigan, have invented a new and useful Improvement in Steam-Exhaust Pipes, of which the following is a specification.

My invention relates to an improvement in steam-exhaust pipes in use upon locomotive steam-engines and other steam-engines where it is necessary or desirable to exhaust the dead-steam from the engine-cylinders into the smoke-stack for the purpose of increasing the draft of the furnace to facilitate the combustion of fuel for raising and sustaining the pressure of steam in steam-boilers. The present method of producing this result is to increase the velocity of the exhausting steam by reducing the size of the exhaust-pipe at the open end, as shown at D' in Figure 1 of the accompanying drawings, thus diminishing the volume of steam sufficiently to require an amount of force in ejecting the steam from the cylinder to the open air that will produce the desired draft of air in the furnace. This form of exhaust-pipe diminishes the volume of steam and forces it directly upward in a solid column from the mouth of the exhaust-pipe with such force that it can diverge but slightly in its passage to the open air at the top of the smoke-stack, thus forming a current or draft in the center of the smoke-stack only, and requires a much greater amount of force to eject the exhaust-steam from the cylinder, and causing a correspondingly greater amount of back-pressure upon the piston to produce the desired amount of draft than would be necessary if the volume of steam could be increased at the mouth of the exhaust-pipe and the column be made to gradually diverge as it passes upward until it covers the entire diametrical area of the smoke-stack before it reaches the open air.

The objects of my invention are, first, to diminish the back-pressure of the exhaust-steam upon the piston of a steam-engine, and more particularly upon locomotive-engines, by increasing the area of the exhaust in such a manner that it will not diminish the draft

of the furnace; second, to cause the column of steam upon leaving the mouth of the exhaust-pipe to diverge sufficiently to fill the entire diametrical area of the smoke-stack before escaping to the open air. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Fig. 1 is an elevation of an exhaust-pipe as commonly used upon locomotives and other engines where it is necessary to throw the exhaust-steam into or through the smoke-stack for the purpose of increasing the draft of air through the furnace. Fig. 2 is a sectional view of an exhaust-pipe with the upper section B of the pipe of uniform size for the reception of the cone D, which forms the main feature of my invention. Fig. 3 is an elevation of the same, showing the relative positions of the exhaust-pipe and the smoke-stack upon locomotives. Fig. 4 is an end view of my device and an exhaust-pipe, showing the manner of attaching my device with bolts; and Fig. 5 shows form of same where they are attached by means of inclines, as shown in Fig. 3.

Similar letters refer to similar parts throughout the several views.

A is the lower section of a locomotive exhaust-pipe.

B is the upper section.

C C are steamways leading from the engine-cylinders.

D is my appliance, and D' the usual form of the upper section of an exhaust-pipe as arranged to produce a greater draft.

E is the bottom of a locomotive smoke-stack, and F is an annular steam-port formed in the upper end of the exhaust-pipe by inserting the cone D.

To attain the objects of my invention, I make the upper portion B of the exhaust-pipe of a uniform size with the lower portion A, and insert in the top of the upper portion of pipe a short sharp cone of iron or other suitable material, which holds its conical form from the point at P, diverging upward and outward to the base at b', which is left straight about two inches, and is firmly attached to the arm or bar a level with the top of the exhaust-pipe. A plain cylindrical

form is given to this portion of the cone for the purpose, first, of steadying the column of steam after having received its outward impetus by passing along the expanding surface of the cone, and, second, to regulate the diverging tendency of the column of steam caused by its action upon the cone, so that its diameter will gradually increase as it passes upward through the smoke-stack until it fills the entire area of the stack at a point a short distance below the top.

The cone D is made somewhat smaller at its base than the inside diameter of the exhaust-pipe and is inserted into the top of the exhaust-pipe, as shown in Fig. 2, for the purpose, first, of reducing the mouth of the exhaust-pipe sufficiently to create a given amount of force in the expulsion of steam from the cylinders; second, of forming a thin annular column of steam above the mouth of the exhaust-pipe instead of a solid column of steam, such as is the result of the form of pipe illustrated in Fig. 1, now in common use, and, third, to give to the annular column of exhaust-steam a slightly-diverging tendency, which enables me to utilize the force of the exhaust-steam, so as to produce the greatest possible amount of draft through the furnace with the least possible amount of back-pressure upon the engine-pistons. To the base of this cone I attach an arm or arms *a*, to which it is firmly secured, and which extends over the top of the exhaust-pipe at each side, and is secured firmly thereto by means of bolts *e'*, passing through the ends of these arms and through corresponding lugs *b* at the top of the exhaust-pipe, as shown in Figs. 2 and 4, or by means of inclines *b* on the sides of the exhaust-pipe, which interlock with corre-

sponding lugs *c*, formed at the ends of the arms, as shown in Figs. 3 and 5, or in any other suitable manner, so that the cone D will stand exactly in the center of the exhaust-pipe, with the upper end of the base *b'* level with the top of the pipe and the cone projecting downward inside of the pipe and forming a narrow annular port *F* between the cone and the walls of the exhaust-pipe for the escape of the exhaust-steam.

I am aware that inverted cones have been used upon locomotive exhaust-pipes for the purpose of diverging the column of exhaust-steam. I therefore do not claim this, broadly, as my invention; but

What I do claim as new, and desire to secure by Letters Patent of the United States, is—

The combination, in a locomotive exhaust-pipe, of an exhaust-pipe of uniform size, provided at its upper end with lugs for securing a cone, a cone having a cylindrical body forming an annular flue or steam-port of uniform size for some distance down into the mouth of the exhaust-pipe, an arm extending across the mouth of the exhaust-pipe and attached to the base of the cone, so that the top of the base will come level with the top of the exhaust-pipe, and engaging with the lugs on the upper end of the exhaust-pipe for supporting the cone, substantially as and for the purpose set forth.

Signed at Ionia, in Ionia county, and State of Michigan, this 11th day of April, 1888.

CHARLES E. HUNTLEY.

In presence of—

ALLAN F. HERBERT,
FRANK A. SEALY.