

(No Model.)

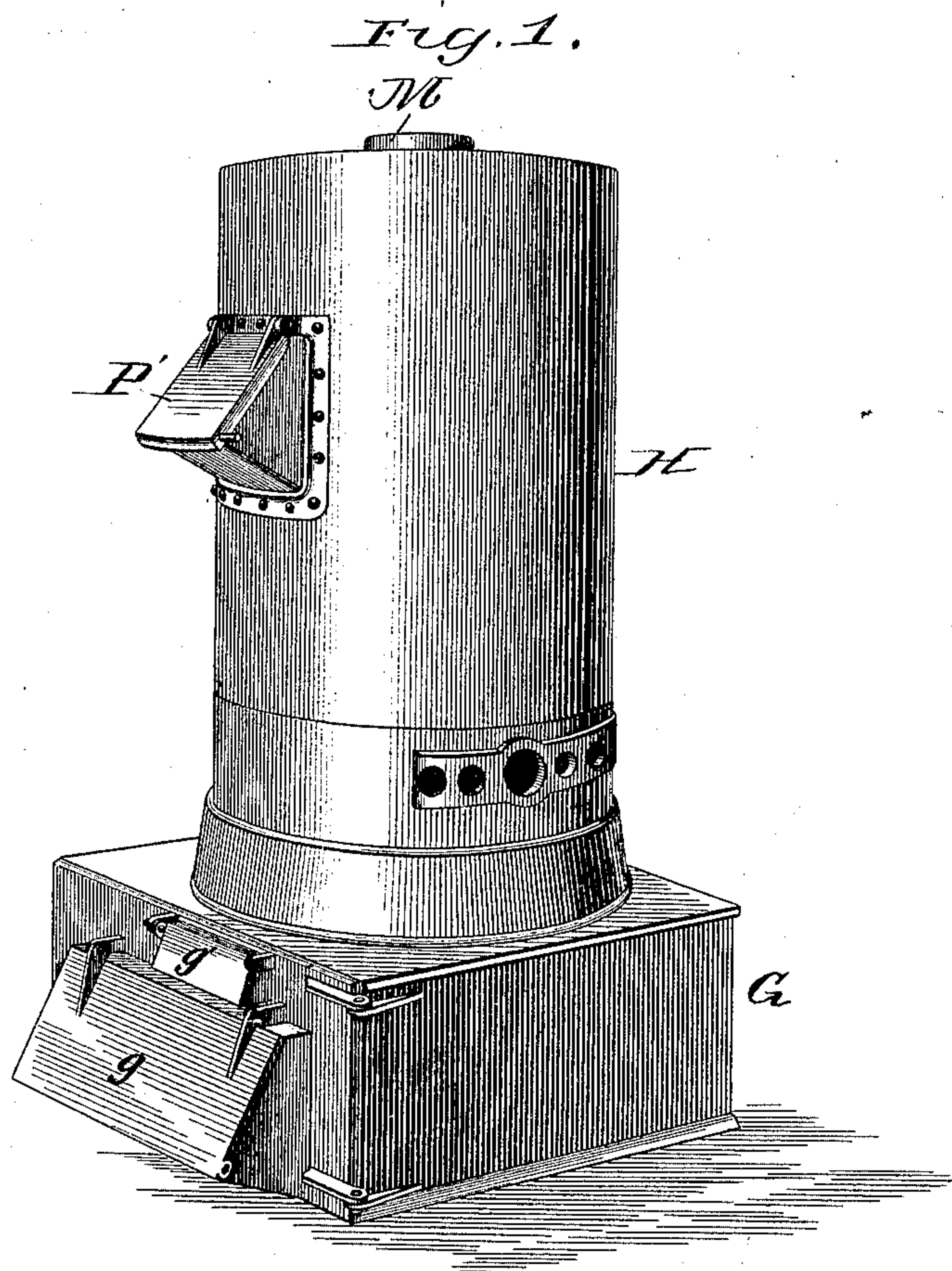
2 Sheets—Sheet 1.

C. A. WINSOR.

WATER HEATER.

No. 387,196.

Patented July 31, 1888.



Witnesses

W. Fossett.
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Inventor

Chancy A. Winsor
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Atty.

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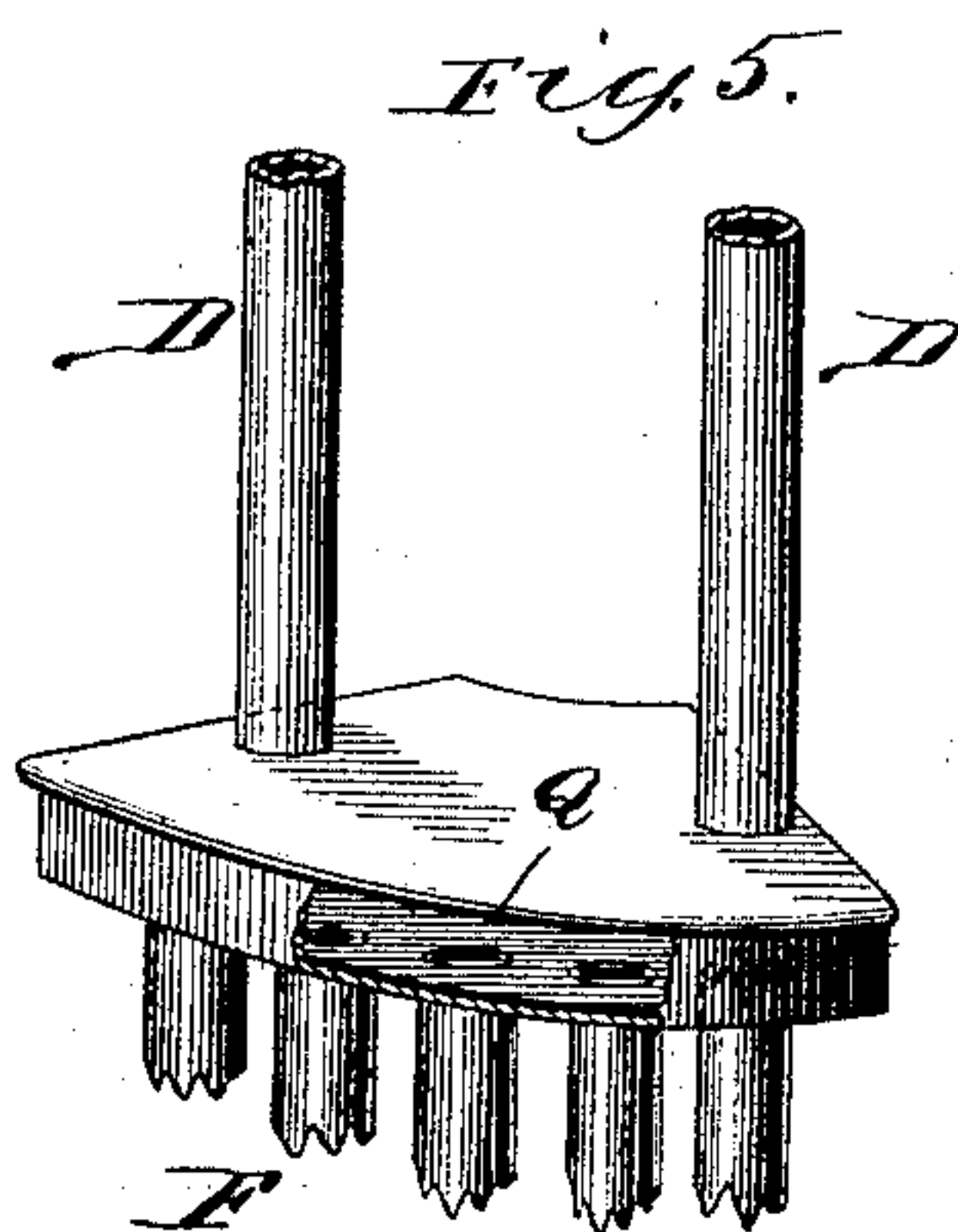
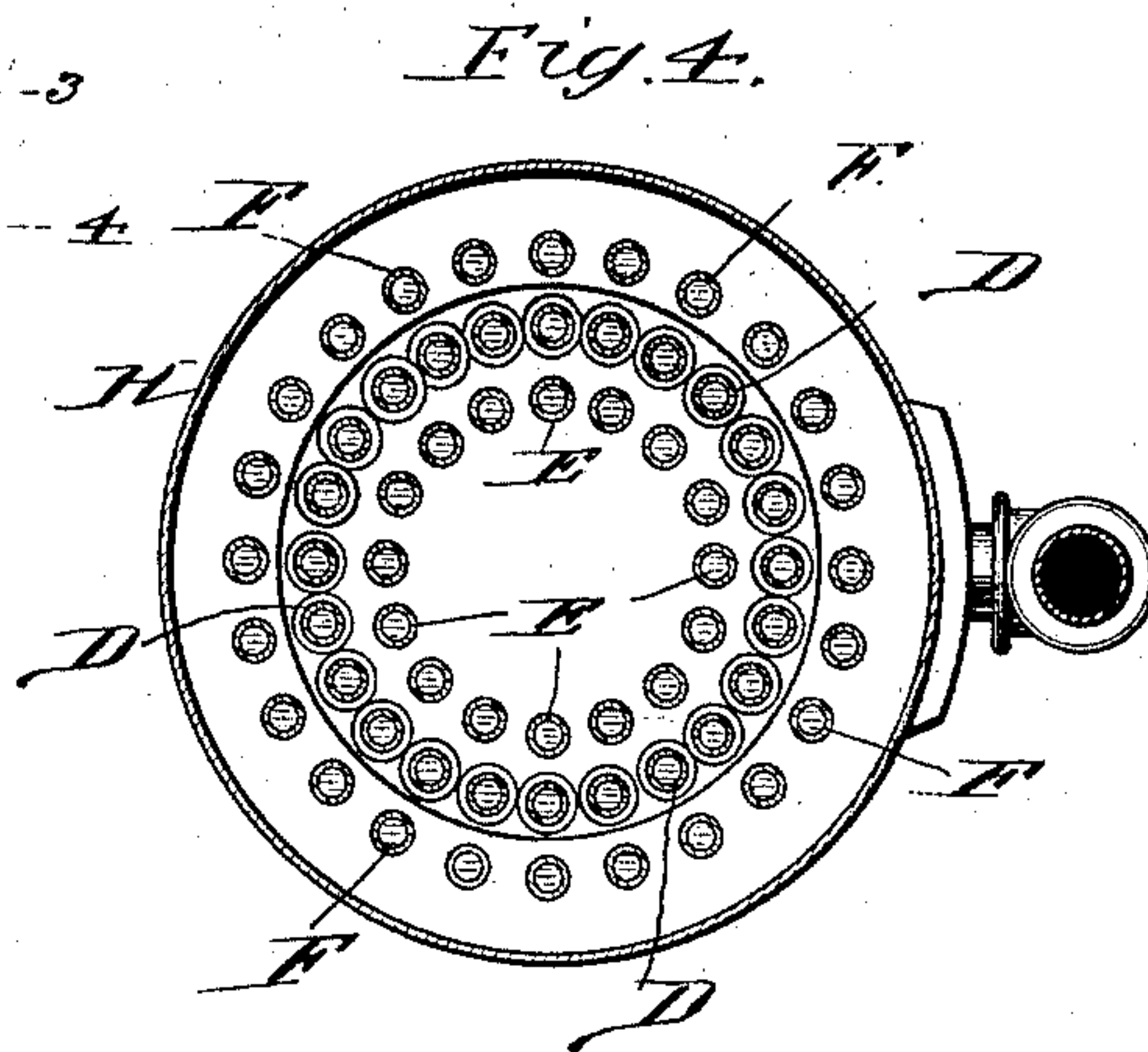
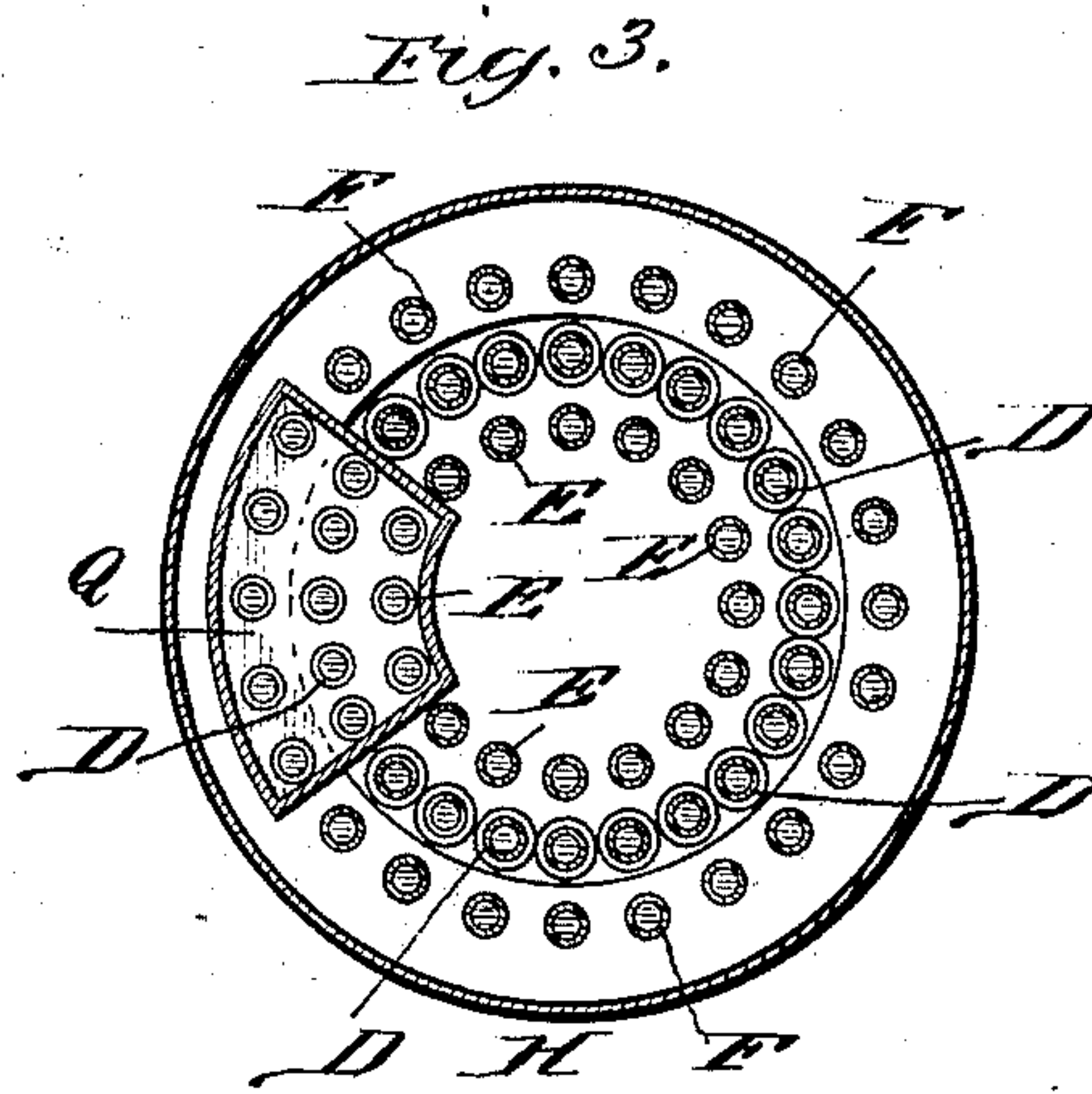
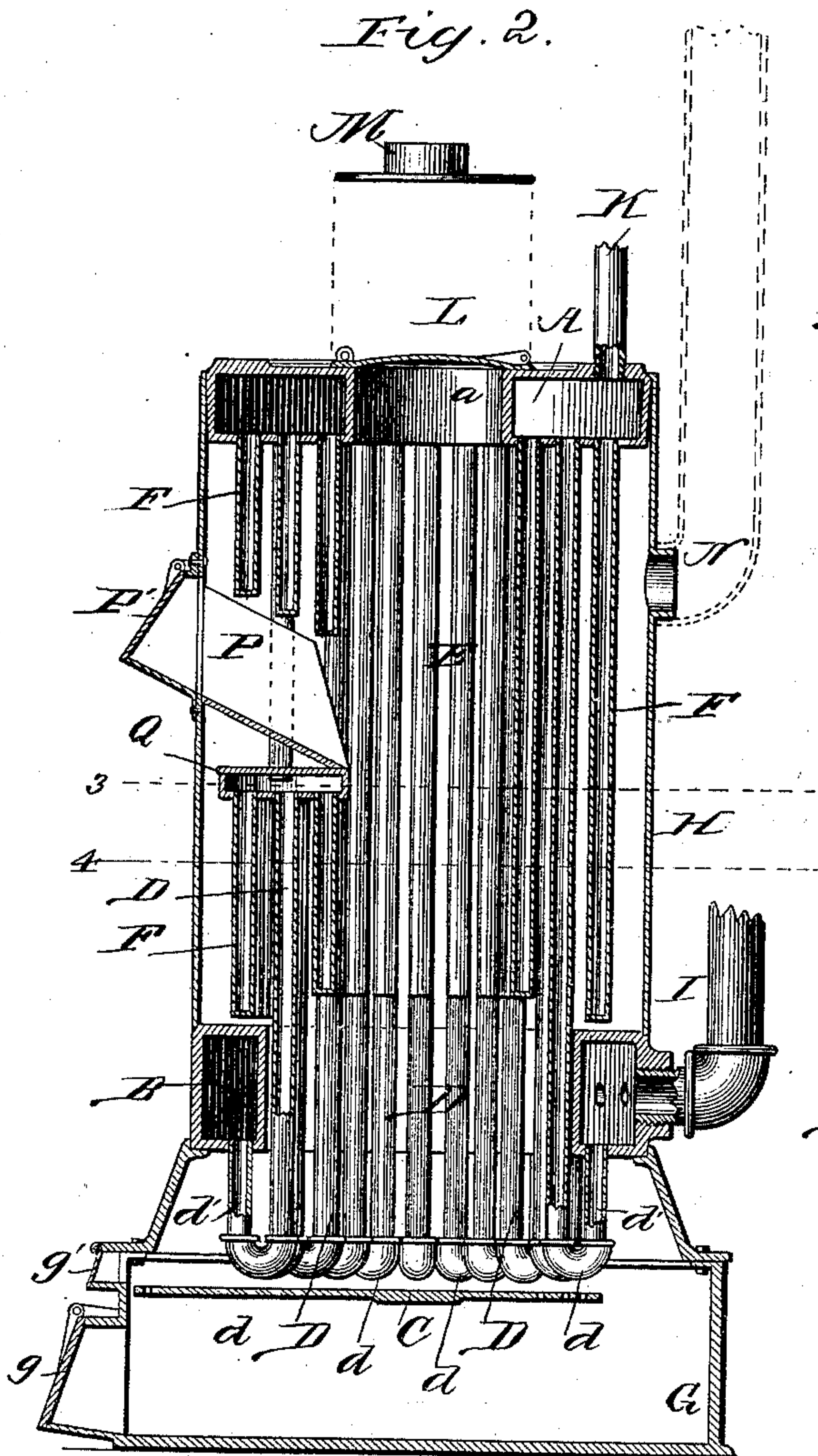
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UNITED STATES PATENT OFFICE.

CHANCY A. WINSOR, OF GALESBURG, ILLINOIS.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 387,196, dated July 31, 1888.

Application filed May 12, 1888. Serial No. 273,744. (No model.)

To all whom it may concern:

Be it known that I, CHANCY A. WINSOR, a citizen of the United States, residing at Galesburg, in the county of Knox and State of Illinois, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to heaters particularly adapted for service in systems of heating by the circulation of hot water through pipes arranged to lead from the main heating apparatus or generator to the points that are to be supplied with heat and thence returned to the heating apparatus.

The objects of my invention are to provide a highly-efficient and economical construction of heating apparatus; to bring within a comparatively small space a large area of heating-surface; to render the apparatus compact and commercially practicable; to economize fuel; to avoid clogging up or fouling of the apparatus; to permit a deep bed of fuel to be employed; to utilize the heat in a simple and economical way, and to provide certain improved details, all serving to promote the general efficiency and serviceability of the apparatus.

To the attainment of the foregoing and other useful ends my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents in perspective a heating apparatus embodying my invention. Fig. 2 is a vertical central section through the same. Fig. 3 represents a horizontal section on line 3 3, Fig. 2. Fig. 4 is a like section on line 4 4, Fig. 2. Fig. 5 is a detail representing the casing of the small chamber Q.

In said drawings, A indicates a water-chamber arranged at the upper portion of the apparatus and preferably made of annular form, for purposes hereinafter set forth.

At a suitable distance below the upper water-chamber, A, is an annular water-chamber, B, and at a point below the lower water-chamber, B, is a grate, C, for supporting such fuel as may be used in the apparatus.

The upper and lower water-chambers, A and B, are connected together by a set of vertically-arranged pipes or tubes, D, which drop

or extend downwardly from the bottom of the upper water-chamber, and which are arranged in annular series. These tubes, which thus depend from the upper water-chamber, extend downwardly through the passage or opening that is bounded by the lower annular water-chamber, B, and are provided at their lower portions with return-bends *d*, so that the upturned lower terminals, *d'*, of said pipes may connect with the bottom of the lower water-chamber. By this arrangement the lower portion of a substantially cylindric fire-pot wall formed by the tubes D extends below the lower annular water-chamber, B, and is continued downwardly to the grate, which may therefore be considerably below the said lower chamber. The prolongation of the tubes D below the lower water-chamber serves to provide an increased area of heating-surface that is exposed to the fire, and, while permitting the employment of a deep bed of fuel where desired, allows the grate to be arranged at such distance below the lower water-chamber as will avoid fouling. The upturned lower end portions, *d'*, of the tubes D also prolong such tubes to an extent to cause water passing through the same to pass over a more extended heating-surface than if the tubes D were made straight throughout their length and simply extended from the top of the lower water-chamber to the bottom of the upper water-chamber. For convenience in putting up or taking apart the apparatus, the return-bends *d* can be formed by bent pipe joints or couplings, although if desired the pipes D can be simply bent at suitable points to provide such bends and the terminals of their lower upturned ends connected in any suitable way with the lower water-chamber.

The inner wall of the cylindric or substantially cylindric fire-pot or fire-chamber can be formed from top to bottom by the annular series of tubes D; but as a preferred arrangement the area of heating-surface is further increased by the presence of a second annular series of tubes, E, arranged within the space that is surrounded by the annular series of tubes D. The tubes E of said inner set drop from the upper water-chamber, A, but preferably terminate short of the highest level of the lower water-chamber, in which way the

lower portion of the fire-pot is formed by the annular series of tubes D, while its succeeding upper portion is formed by the annular series of tubes E, which, by thus terminating
 5 some distance above the grate, permit such enlargement of the lower portion of the fire-pot as may be desirable for a considerable body of fuel. Where the inner set of drop-tubes E are thus arranged, they will be closed
 10 at their lower ends, but at their upper ends formed to open into the upper water-chamber. As a means for still further increasing the area of heating-surface, I may employ a third set of tubes, F, herein arranged in annular series
 15 around the middle series of tubes D. The tubes F of said outer set drop from the upper water-chamber, and, like the tubes E of the inner set, are closed at their lower ends. The foregoing set or sets of tubes are inclosed by a
 20 shell or casing, in which way, while hot air may circulate freely through the spaces between the tubes, the entire collection of tubes will be surrounded by hot air, which will necessarily circulate within the annular space be-
 25 tween the outer series of tubes and the inner wall of the casing.

As a preferred construction of casing, the lower water-chamber, B, is supported upon a hollow base, G, wherein the grate can be suitably supported. This base may serve, there-
 30 fore, to inclose such portions of tubes D as drop below the lower water-chamber, which latter may be either detachably secured to or permanently connected with the base.

35 The portion of the casing above the lower water-chamber desirably consists of a drum, H, removably seated upon the lower water-chamber and preferably adapted in diameter to receive the upper water-chamber, which lat-
 40 ter, being upheld by the stand-pipes D, need not be attached to the drum. In this way the drum can be raised clear of the apparatus when so desired. The lower water-chamber is adapted to connect with one or more water-
 45 supply pipes, I, which said pipes can be either of uniform or different sectional area, as may be desired. In like manner one or more pipes, K, for the outgoing heated water can be con-
 50 nected with the upper water-chamber, and these pipes can also be made of uniform or different sectional area according to the service required.

The upper water-chamber may for certain purposes of this invention consist of an annu-
 55 lar water-chamber, while for other purposes it can consist simply of a cylindric or like chamber of suitable depth. With regard to the service of constructing it in the form of an annular chamber, it may be observed that such
 60 arrangement permits the central opening or passage, *a*, that is surrounded by the inner vertical wall of the annular chamber, to serve either as a passage leading to the smoke-flue or as a passage through which fuel can be fed
 65 into the fire-pot. Where it is desired to feed at the top, the passage *a* can be closed by a lid, L, as in Fig. 2, while, on the other hand, when

it is preferred to feed at the side the lid can be omitted, and a flanged collar, M, adapted for connection with a flue-pipe, can be at-
 70 tached to the top of the upper chamber. In case it should be preferred to feed at the side (as where the apparatus is made of such height as to render feeding at the top inconvenient) the fuel can be fed through a side doorway,
 75 and the smoke conducted off through a flue-pipe attached to the side pipe, N. In furtherance of such arrangement the apparatus is provided at one side with a chute, P, arranged
 80 to discharge into the fire-pot, and at its outer end provided with a suitably-hung door, P'. The drum H is in such case provided with a suitable opening for the chute, which may be fitted within such opening and be, if desired,
 85 made in sections bolted to the inner and outer sides of the drum; or, in place of such construction, the sides and bottom of the chute can each be of a single length. The tubes are
 90 of course interrupted at the point where the chute penetrates the collection of tubing, as herein illustrated. The formation of this side passage-way necessitates a gap through the
 95 series of long tubes D, that connect with the upper and the lower water-chambers. As a means, however, for preserving the circulation of water through all of the pipes that con-
 100 nect with the lower water-chamber, regardless of the fact that some of such pipes are interrupted by the lateral passage-way, I provide at the bottom of the gap a compara-
 105 tively small water-chamber, Q, which, through the medium of certain of the interrupted tubes D, is connected with the upper and lower water-chambers. This will be understood by re-
 110 ferring to Figs. 2, 3, and 5, wherein it will be seen that the upper portions of certain of the tubes D, that are broken by the gap or passage-way, are connected at their lower ends with the
 115 small chamber Q, and that the upper end of the lower portions of all of such pipes as are broken by the gap or passage may connect with the bottom of said small chamber. The
 120 chamber Q can also be utilized as a support for the inner end of the chute P; but, if desired, the chute could be dispensed with and the door hung so as to close the opening
 125 through the drum H, with which arrangement fuel could be shoveled in through the gap. In practice, however, I prefer the employment of the chute, since in such case fuel is not liable
 130 to get in between the sets of tubes in feeding.

It is understood that the pipes K could be led off from the upper chamber for service and then returned to the lower chamber, whereat
 125 the pipes I would in such case represent the return ends of the pipes K. The base of the apparatus is provided with a suitable door, *g*, whereby access can be had to the ash-pit, and likewise said base can be provided with a small
 130 door, *g'*, substantially on a level with the grate.

In conclusion, it will be observed that the foregoing apparatus, while particularly adapted for use in a system of heating by inducing a circulation of hot water through a series of

pipes leading from and returning to the apparatus, could also be used for generating steam.

What I claim as my invention is—

1. The combination, substantially as herein-
5 before set forth, with an upper and a lower water-chamber, of the series of tubes D, extending from the upper water-chamber downwardly to and below the lower water-chamber and thence upwardly to said lower water-chamber,
10 for the purpose described.

2. The combination, substantially as herein-
before set forth, with an upper water-chamber and the lower annular water-chamber, B, of the tubes D, extending from the upper water-
15 chamber downwardly to and through the space surrounded by the lower annular water-chamber and thence up to said lower chamber, for the purpose described.

3. The combination, substantially as herein-
20 before set forth, with an upper water-chamber

and the lower water-chamber, B, of the grate C, arranged below the lower chamber, and the pipes D, extending from the upper water-chamber down to the grate, and at their lower ends provided with return-bends whereof the
25 terminals are connected with the lower water-chamber.

4. The combination, with the upper annular water-chamber, A, and the lower annular water-chamber, B, of the annular series of tubes
30 D, connected with the upper water-chamber and extending below the lower water-chamber, to which latter said tubes are connected by means of return-bends, substantially as set forth.

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Witnesses:

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