

No. 725,060.

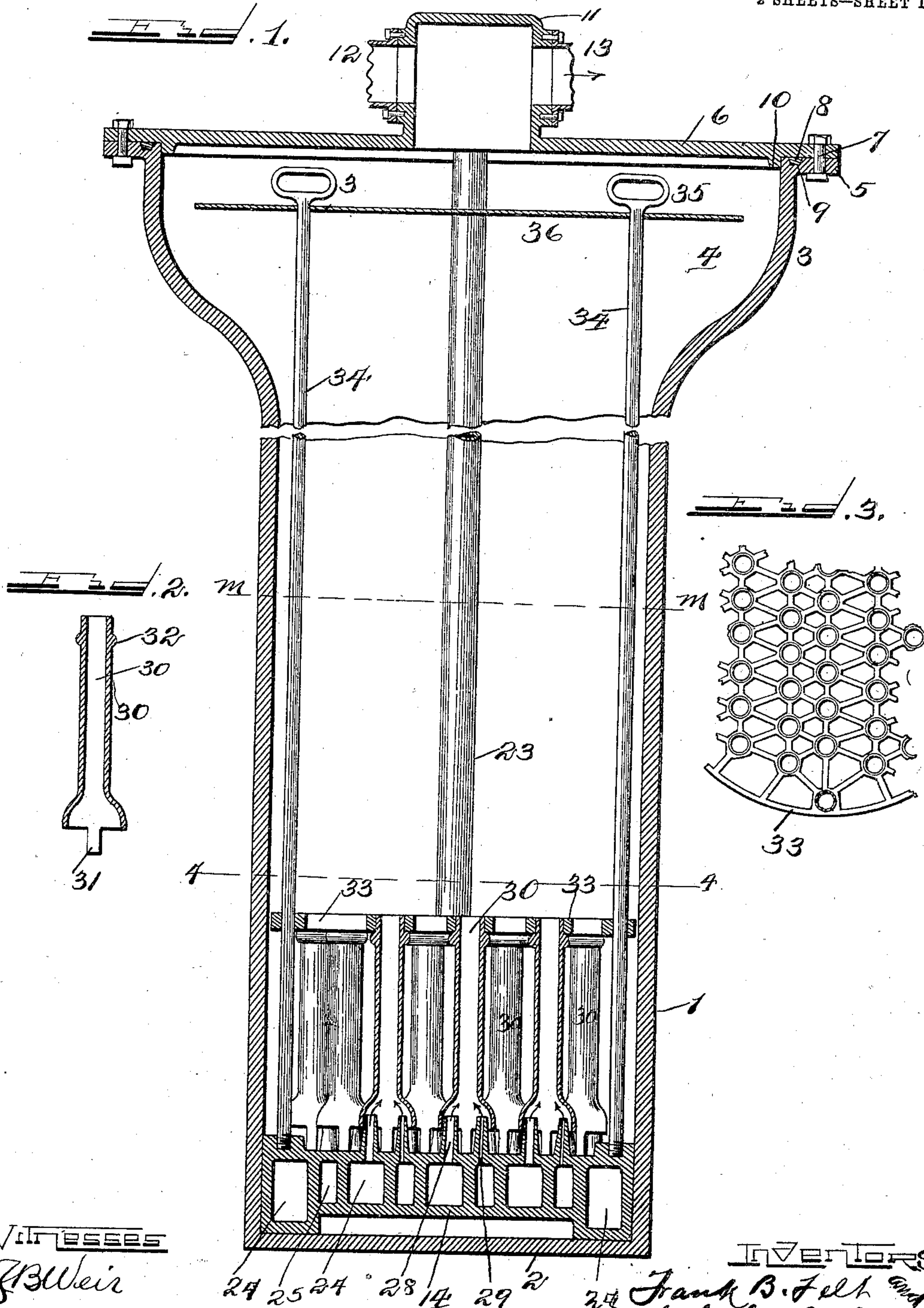
PATENTED APR. 14, 1903.

F. B. & C. E. FELT.  
RETORT.

APPLICATION FILED AUG. 4, 1900.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES

J. B. Weir  
Robert Keir.

INVENTORS

Frank B. Felt and  
Charles E. Felt  
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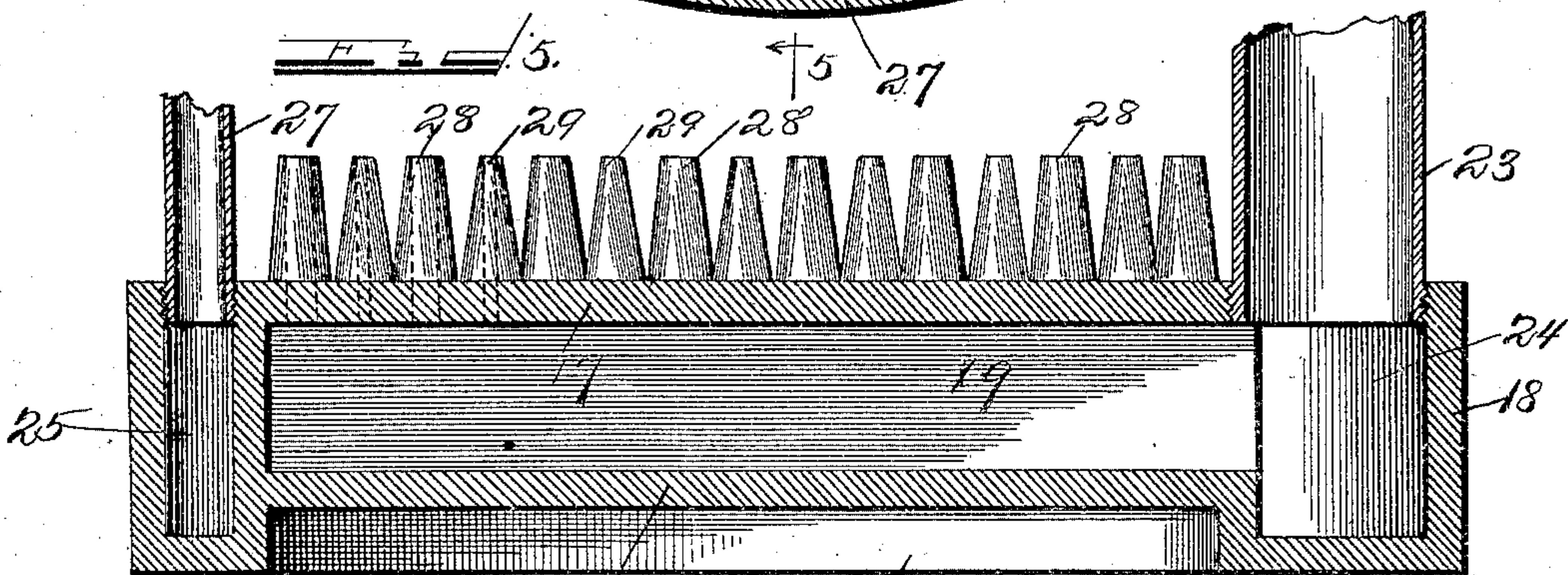
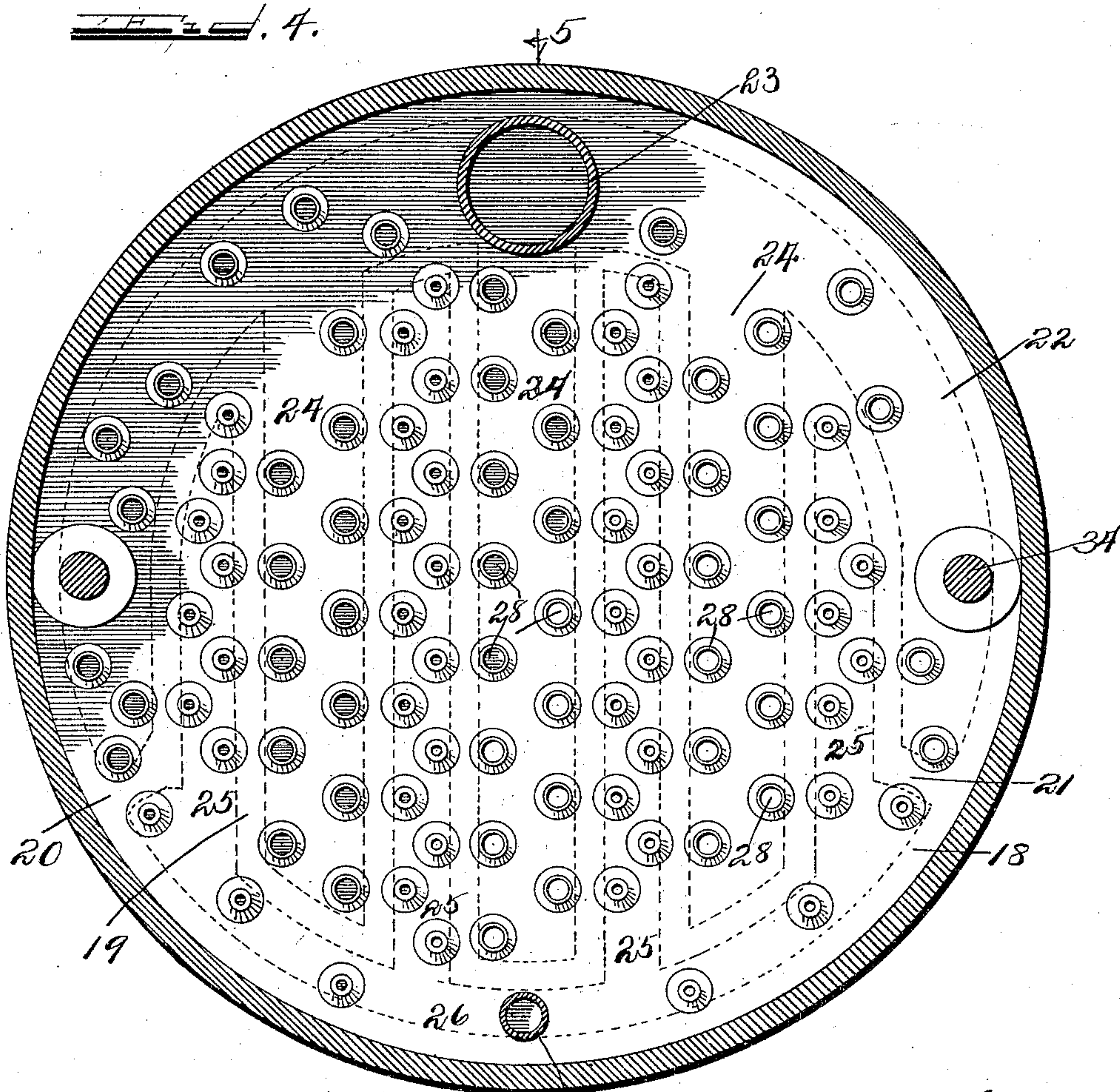
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# UNITED STATES PATENT OFFICE.

FRANK B. FELT AND CHARLES E. FELT, OF CHICAGO, ILLINOIS, ASSIGNORS,  
BY DIRECT AND MESNE ASSIGNMENTS, TO THE OXYGEN LIGHT AND  
FUEL COMPANY, A CORPORATION OF DELAWARE.

## RETORT.

SPECIFICATION forming part of Letters Patent No. 725,060, dated April 14, 1903.

Application filed August 4, 1900. Serial No. 25,921. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK B. FELT and CHARLES E. FELT, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Retorts, of which the following is a full, clear, and exact specification.

This invention relates to improvements in retorts in which open-end tubes are suspended or supported and have projecting into their lower ends jets for alternately discharging differing reagents therein, and particularly to retorts heretofore used in the production of oxygen from a manganate of soda which is oxidized by exposure to air under pressure and deoxidized by the action of steam.

The objects of our invention are to simplify the construction of such retorts and correspondingly reduce their cost of production and facilitate the removal of the internal structure thereof for inspection and repair.

With these ends in view our invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 illustrates a vertical longitudinal section of a retort embracing our invention; Fig. 2, a detail of one of the series of open-end tubes employed therein; Fig. 3, a detail of the grating employed for supporting the upper ends of the tubes; Fig. 4, a transverse horizontal section of Fig. 1 on the line 4 4 with the grating and tubes removed; and Fig. 5 a transverse section through Fig. 4 on the line 5 5, but showing the nipples in elevation with dotted lines but open, a portion of them indicating the passage therethrough to the chambers with which they communicate.

1 indicates a retort, which may be of any form in cross-section, but is preferably circular for convenience in casting, which retort has a closed bottom 2, preferably cast therewith, and is enlarged by flaring at its upper

end, as indicated at 3, to form an expansion-chamber 4, said flaring portion terminating in a flange 5, to which is removably secured a cover 6 by means of a bolt 7 passing through said cover and flange, with the joint formed thereby tightened by metallic, asbestos, or other packing 8 in an annular groove 9, formed partly in the upper edge of the side of the retort and the flange 5, said cover being also provided with an annular flange or bead 10, embracing the inner wall of the retort. The cover 6 has a central opening surrounded by a dome 11, provided at each side, respectively, with outlets 12 13, to which pipes may be joined leading to any desired destination.

In the bottom of the retort but separately cast and detached therefrom is a circular casting 14 of peculiar form in that it has any novel arrangement separate and distinct passages, which when our retort is used for containing a manganate of soda for the production of oxygen and nitrogen therefrom constitute chambers supplied, respectively, with air and steam, in turn supplied therefrom to numerous nipples discharging into the liquid manganate. More specifically described, this steam and air box, which as a whole is designated 15, comprises a bottom 16 and a separated parallel top 17, inclosed by a circular side 18, and is partly divided into alternating steam and air chambers by a convolute partition 19, which, as indicated in Fig. 4, joins the side 18 at two different points 20 and 21, thereby forming upon one side and a little more than half of the circumference of its side 18 a semi-annular chamber 22, into which air is discharged by a pipe 23 passing up one side of and out the top of the retort to some suitable source of supply, and preferably an air-compressor of any ordinary construction capable of forcing air therethrough under pressure. The convolute partition 19 is so constructed as to form a number of air-chambers 24 in open communication with a semi-circular passage 22, but isolated from other and narrower passages 25, which communicate with a semicircular passage 26, opposing the semicircular passage 24—that is to say,



at the other side of the casting—which passage 26 when a manganate is employed is supplied with steam through a pipe 27, (shown in Fig. 4,) passing down through the retort in the same relative position as does the air-pipe 23. Arranged in pairs in the top of this casting are steam and air jets, respectively communicating with the steam or air passages or chambers in the casting, the air-jets 28, as shown in Fig. 1, having larger passages than the steam-jets 29, the number of which nipples corresponds with the number of tubes 30, suspended above and in which each pair of nipples project, the tubes being flaring at their bottom ends for this purpose and to promote the flow of liquids therethrough, as hereinafter described. The tubes 30 (see Fig. 2) are provided with a leg 31, which rests upon the upper wall 17 of the casting 15, the upper ends of the tubes being provided with shoulders 32 below their upper ends, which stop the tubes against a grating 33, and thereby prevent the rising of the tubes as might be if the shoulder were omitted, the grating by reason of its weight being sufficient when resting upon the tubes to hold them down against any tendency to rise from the force of the currents projected through the tubes. In this connection it is proper to observe that the lower ends of the tubes 30 are quite near the bottom of the liquid contents, an important feature in the manipulation of a manganate, for the reason that owing to its proximity to the bottom and the bell-mouths of the tubes a current is created along the bottom, preventing the settling of the manganese at any time and particularly during and after deoxidation.

Projecting down into the retort from below the cap or cover thereof and at opposing sides are two rods 34 34, terminating at their upper ends in handles 35, which rods pass through corresponding perforations in the grating and are screwed into the steam-chambered casting at the bottom, and thus provide means for taking out said casting, tubes, grating, &c., for the purposes of repair or for removing obstructions from the tubes, this removability being quite necessary in retorts of this character when employed for manipulating a manganate of soda.

Just below the top of the retort and secured upon and supported by the rods 34 is a baffle-plate 36, which is a disk-like imperforate plate of less diameter than the retort at this point and which prevents liquids in spray or other form thrown up by the force of the air and action of the steam from entering the dome and clogging the discharge-passages thereof, and which furthermore serves to break up the mass both in oxidizing and deoxidizing, while at the same time the gases are free to escape between the circumference thereof and the walls of the retort entirely around said baffle-plate.

The dotted line M M indicates the liquid-level of a manganate when used in our retort

and that the tubes 30 are substantially shorter than in prior constructions in which these tubes have been employed and wherein the liquid-level of a manganate at or below the upper edges of the tubes, which shortening of the tubes is for this reason an important feature of our invention, because providing for maintaining the liquid above them and which when so maintained is productive of important results in that the oxidation and deoxidation, and particularly the former, are substantially promoted thereby. This, however, involves a method reserved for another application, which will probably be filed of even date herewith, and is referred to herein solely for the purpose of indicating the relation of the tubes to such a liquid-level. It is also proper to state that the flaring of the upper portion of the retort is an important feature when using this retort for the purposes of producing oxygen from a manganate, in that said enlarged chamber provides for the expansion of the foamy mass containing oxygen during the process of deoxidation and promotes the release of the oxygen therefrom, and while ordinarily the flanging of the retort in its broad sense might not involve invention, yet in combination with other elements herein, and that it is the only practical means for providing an expansion-chamber in a retort within the radius of the high degree of heat at which such a chamber must be maintained, it has required more than ordinary mechanical skill to devise an expansion-chamber which would be practical and operative for the special purposes for which our retort is designed.

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

1. In apparatus of the class described, the combination with a retort having a body portion to contain a liquid mass to be treated and an upper portion or expansion-space of much greater diameter, said upper portion being provided with a discharge-passages above, of a series of nipples arranged in the retort to discharge upwardly near the bottom of said body and means for supplying a fluid reagent to discharge through said nipples; whereby said reagent introduced in the lower part of the mass to be treated rises through the same and collects as a foamy mass in the greatly-enlarged upper portion, substantially as set forth.

2. The combination with a retort of a receptacle in the bottom thereof provided with alternating convolute passages, the one isolated from the other and communicating with the interior of the retort and means for supplying different reagents to each of said isolated passages, substantially as described.

3. The combination with a retort and with a receptacle arranged in the bottom thereof and provided with alternating convolute passages isolated from each other, of a series of jets or nipples arranged in pairs projecting



from said receptacle, each nipple of which pair communicates with a different passage in the receptacle, substantially as described.

4. In apparatus of the class described, the combination with a retort having a body portion to contain a liquid mass to be treated and an upper portion of much greater diameter provided with a discharge-opening above, of a series of nipples arranged in the body portion to discharge upwardly near the bottom of the same, means for supplying a gaseous reagent to said nipples, and a transverse plate of less diameter than the space within said upper portion and supported in that portion below its discharge-opening; whereby the reagent supplied to the bottom of the mass to be treated rises therethrough, forming within the enlarged upper portion of the retort a constantly-renewed bubbly mass which is kept from the discharge-opening by said plate.

5. In apparatus of the class described, the combination with a retort, of a series of short, vertical, loose tubes open above and below,

supported in the lower portion of the retort near the bottom of the same and provided with external shoulders near their upper ends, of a grating resting upon said shoulders and holding each tube in place, substantially as set forth.

6. The combination with a retort, having arranged in its bottom a casting provided with two sets of passages therein the one isolated from the other and with nipples arranged in pairs communicating with said isolated passages, open-end tubes supported on said casting, a grating supported by said tubes and rods secured to the casting and connected with the grating and projecting upwardly to near the top of the retort whereby said casting, tubes and grating may be simultaneously and entirely removed from the retort, substantially as described.

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Witnesses:

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