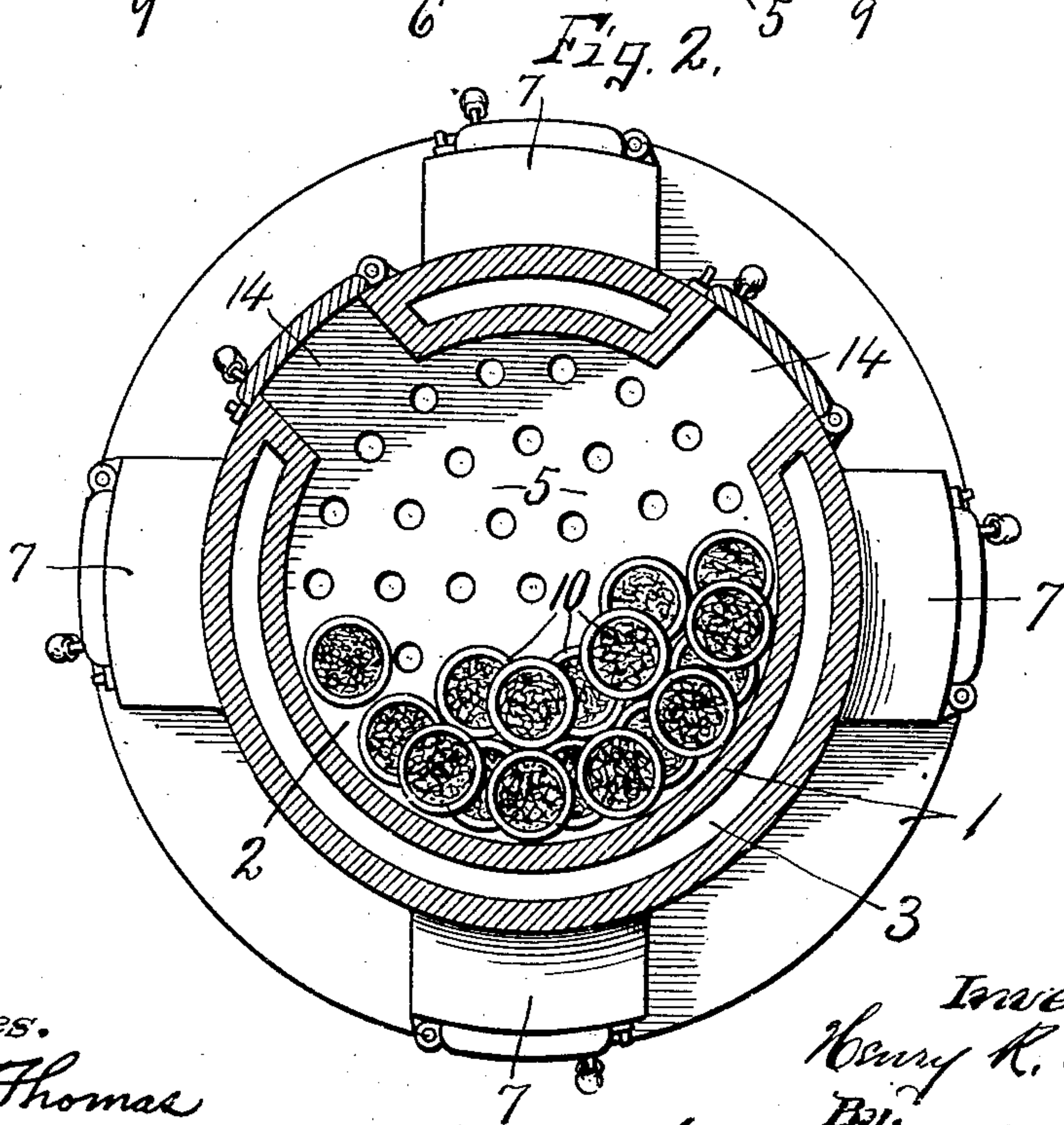
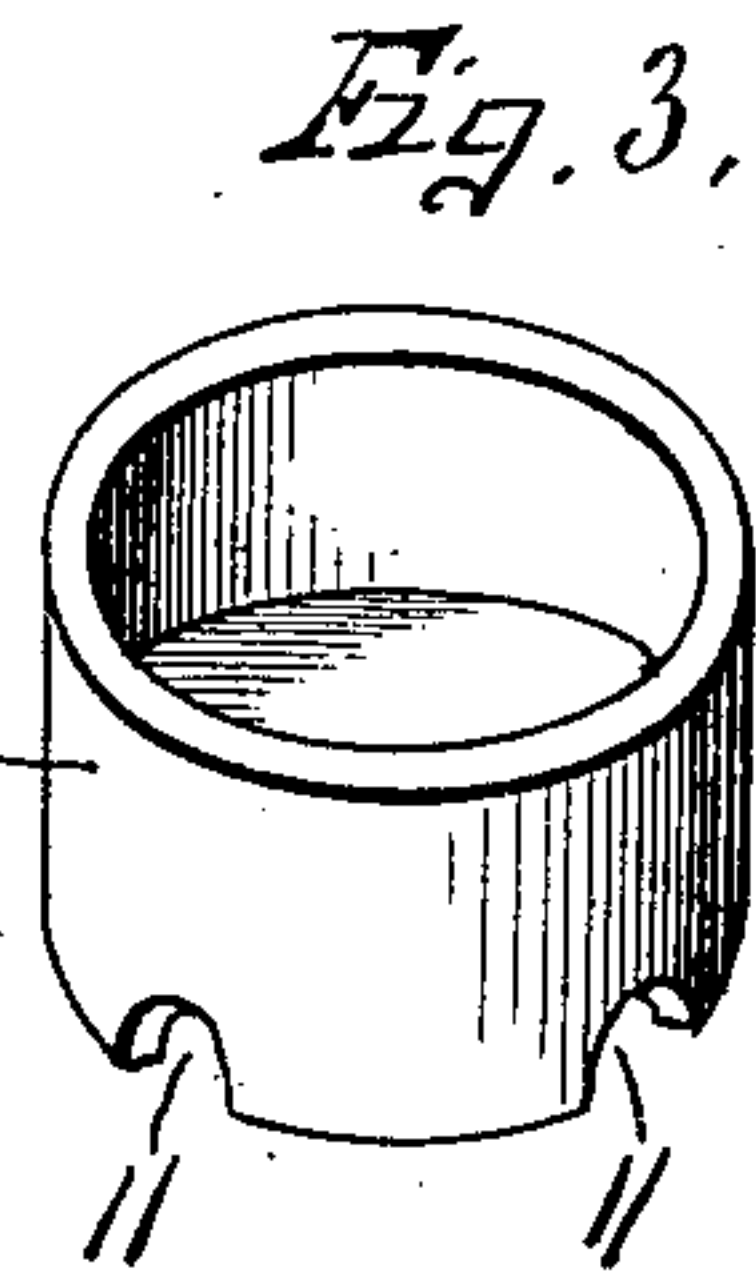
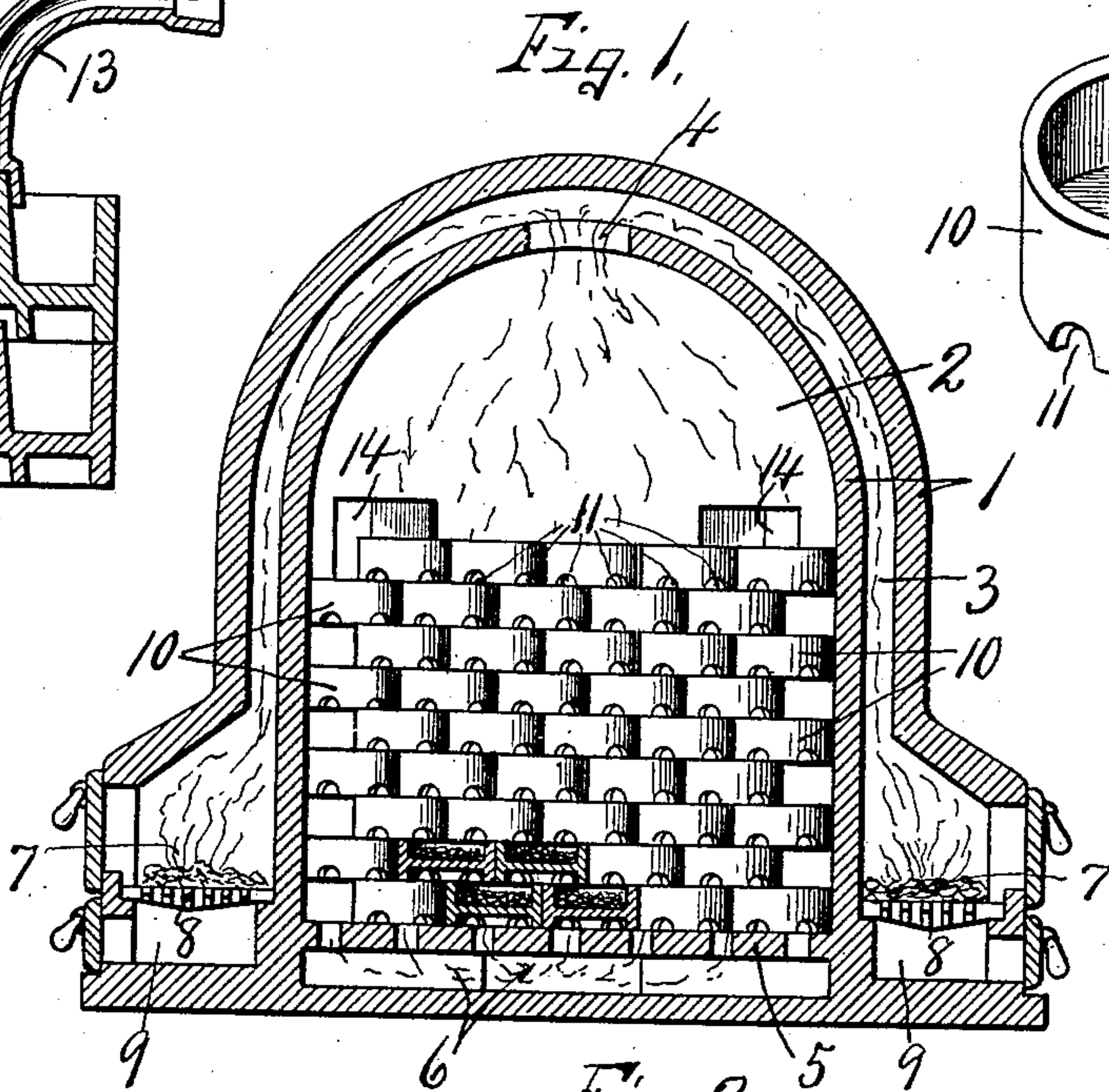
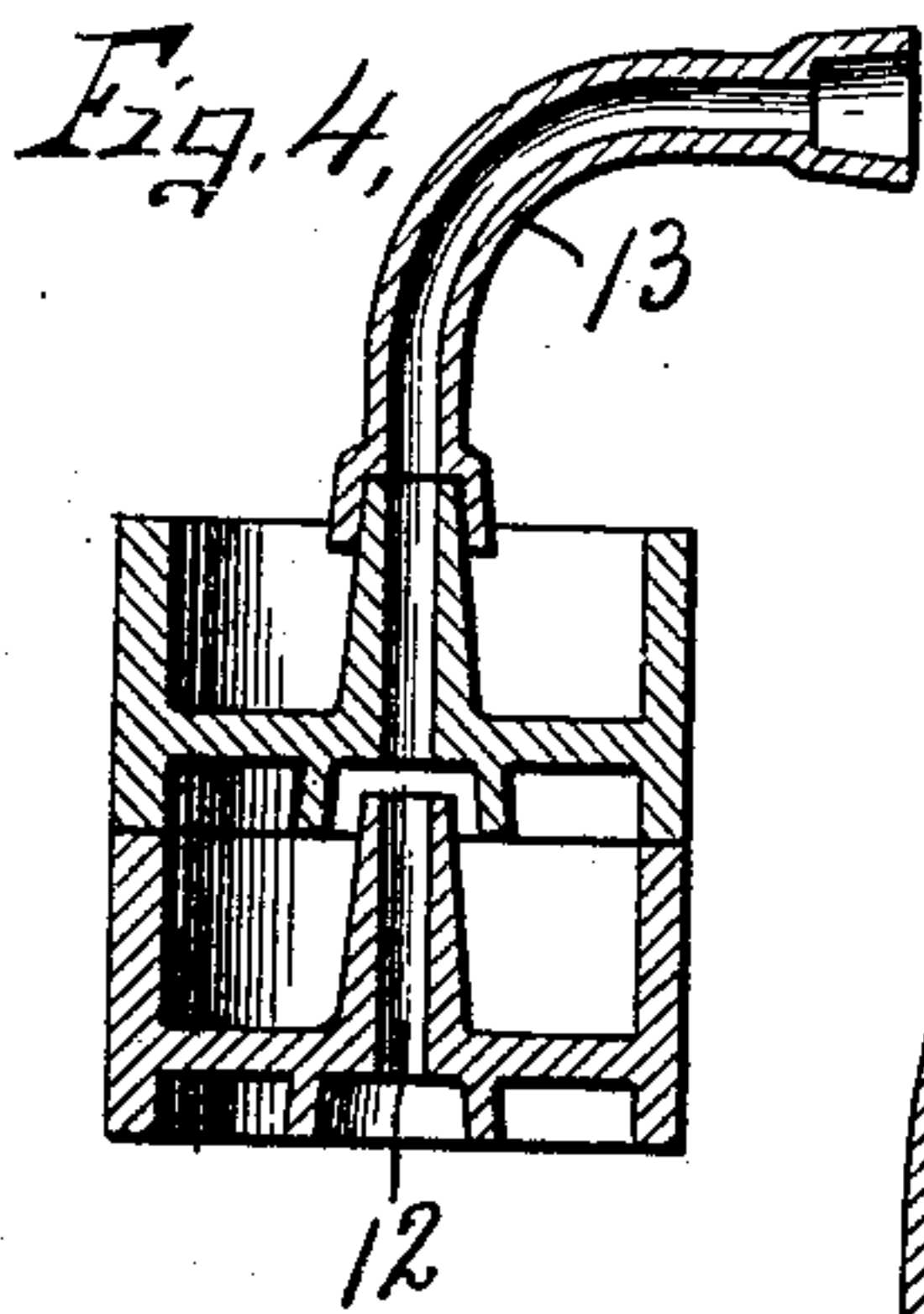


H. K. HESS.
METHOD OF ROASTING ORES.
APPLICATION FILED JUNE 4, 1908.

912,568.

Patented Feb. 16, 1909.



Witnesses.
A. C. Thomas
W. C. Chase

Inventor.
Henry K. Hess.
By
Howard P. Hudson
Attorney.

UNITED STATES PATENT OFFICE.

HENRY K. HESS, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF ROASTING ORES.

No. 912,568.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed June 4, 1908. Serial No. 436,663.

To all whom it may concern:

Be it known that I, HENRY K. HESS, of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented 5 new and useful Improvements in Methods of Roasting Ores, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to an improved 10 method of roasting ores by which the pulverized or comminuted ore is suspended or supported in shallow bodies or comparatively thin layers within a suitable roasting furnace in such manner that the entire charge or 15 quantity of comminuted ore is subjected to a uniform degree of heat for driving off the sulfur, and other volatile matter preparatory to the separation of metallic portions of the ore from the gangue to obtain a more expeditious roasting of the ore. 20

This object more specifically stated is to support the pulverized or comminuted ore in comparatively shallow receptacles arranged in horizontal tiers or layers one above the 25 other preferably in staggered relation with the furnace where the subdivided shallow bodies of ore will be subjected to the direct action of a uniform degree of heat and the volatile matter driven off within a comparatively short space of time. 30

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a transverse vertical sectional view of a furnace showing a 35 number of ore containing receptacles arranged in horizontal tiers one above the other within the heating chamber. Fig. 2 is a horizontal section through the same furnace showing the staggered relation of the 40 ore pots or receptacles. Fig. 3 is a perspective view of one of the ore receiving pots. Fig. 4 is a sectional view of a plurality of pots arranged one above the other with central openings therethrough, each communicating with the interior of the underlying 45 pot and also with a superposed conduit for carrying off the sulfurous fumes.

Any suitable furnace such as a potter's or brick furnace may be used to receive the ore 50 containing pots or receptacles and in Figs. 1 and 2 of the drawings, I have shown a furnace comprising a hollow wall —1— enclosing a heating chamber —2— and having therein a flue or fire passage —3— extending 55 entirely around the sides and top of the com-

bustion chamber and communicating therewith through a suitable opening —4— in the top at the inner side of the flue. The base of the furnace is provided with a perforated bottom —5— and underlying flue or outlet 60 —6—. The heat is generated in one or more, usually a plurality, of fire boxes —7— arranged at intervals around the base of the furnace and communicating with the base or flue of the fire passage —3—, said fire 65 boxes being provided with suitable fire supporting grates —8— and underlying ash pits —9—.

The comminuted or pulverized ore is placed in comparatively small portable pots or receptacles —10— which may be made of fire 70 clay or any other heat resisting material capable of withstanding the heat to which they are subjected when placed in the chamber or furnace —2—. These pots or receptacles are of 75 uniform size and comparatively shallow and are arranged in horizontal tiers, one upon the other within the heating chamber —2— of the furnace, the lower tier resting upon the perforate bottom —5— while the remain- 80 ing tiers are arranged one upon the other, those of each tier breaking joints with those of the adjacent tier or in other words, the pots or receptacles of the several tiers are arranged in staggered relation, the pots being 85 usually round or circular thereby leaving ample intervening space for the passage of the fire or products of combustion from the top downward through the perforated body and out through the outlet —6—. The stag- 90 gered relation of the pots or receptacles is clearly shown in Figs. 1 and 2 in which it will be seen that those of each tier are arranged with their peripheries in close contact filling practically the entire horizontal area of the 95 interior of the furnace except for the intervening spaces which constitute fire passages and causes the heated products of combustion or flame to distribute itself more evenly over the entire series of pots or receptacles of 100 each tier in its transit from the top downwardly through the perforated bottom. Each pot or receptacle is provided with a base flange projecting downwardly some distance 105 below the bottom upon which the ore rests and this base flange is formed with one or more, preferably a plurality, of radial openings —11— arranged uniform distances apart to permit a freer circulation of the fire and 110 also to permit a freer escape of the volatile

gases which may be carried off by the escaping products of combustion or as shown in Fig. 4, these pots or receptacles may be arranged coaxially one above the other and provided with central passages —12— communicating with the underlying receptacle for conducting the sulfurous fumes upwardly and outwardly through a suitable collecting tube or pipe —13— which surrounds the central opening of each pot or receptacle of the upper tier to recover the sulfurous fumes for the manufacture of acids. The pots or receptacles with the comminuted or pulverized ore therein are brought into the furnace and stacked therein through one or more openings —14— and the roasted ore may be removed in the same manner.

The method of roasting ores, briefly described, consists in supporting the comminuted or pulverized ore in comparatively shallow portable receptacles arranged in horizontal tiers one above the other and preferably in staggered relation, that is, those of one tier breaking joints with those of the adjacent tier to allow the passage of the products of combustion and escape of fumes through the intervening spaces preferably from the top downwardly although the entrance and exit of the heat to the chamber in which the ore containing pots or receptacles are stacked may be varied without departing from the spirit of my invention.

What I claim is:

1. The herein described method of roasting ores consisting in placing the ores in a series of comparatively shallow receptacles of heat resisting material and arranging said ore containing receptacles in horizontal tiers one upon the other within a heating chamber, the receptacles of each tier breaking joints with those of the adjacent tiers, and heating the ore containing receptacles in said chamber.

2. The herein described method of roasting ores consisting in providing a series of circular portable pots of heat resisting material, placing the ore in said pots and arranging the pots in horizontal tiers, one upon the other within a heating chamber and heating the ore containing pots in said chamber.

3. The herein described method of roasting ore consisting in supporting pulverized or comminuted ore in a series of comparatively shallow receptacles of heat resisting material and arranging said ore containing receptacles in horizontal tiers one upon the other in staggered relation within a heating chamber in such manner as to expose the ore of each receptacle to the action of the heated products of combustion.

In witness whereof I have hereunto set my hand this 14th day of May, 1908.

HENRY K. HESS.

Witnesses:

H. E. CHASE,
CAROLINE McCORMACK.