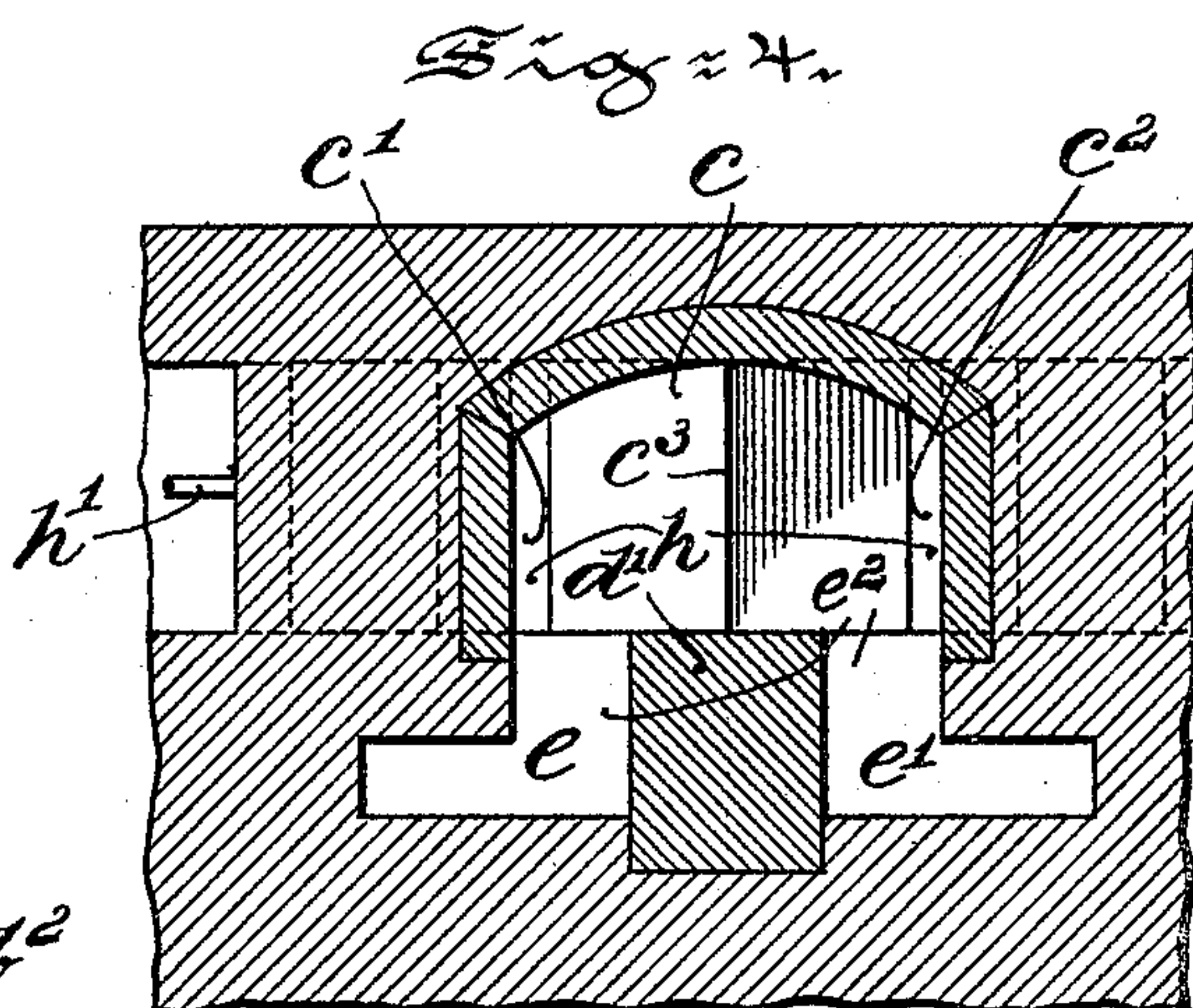
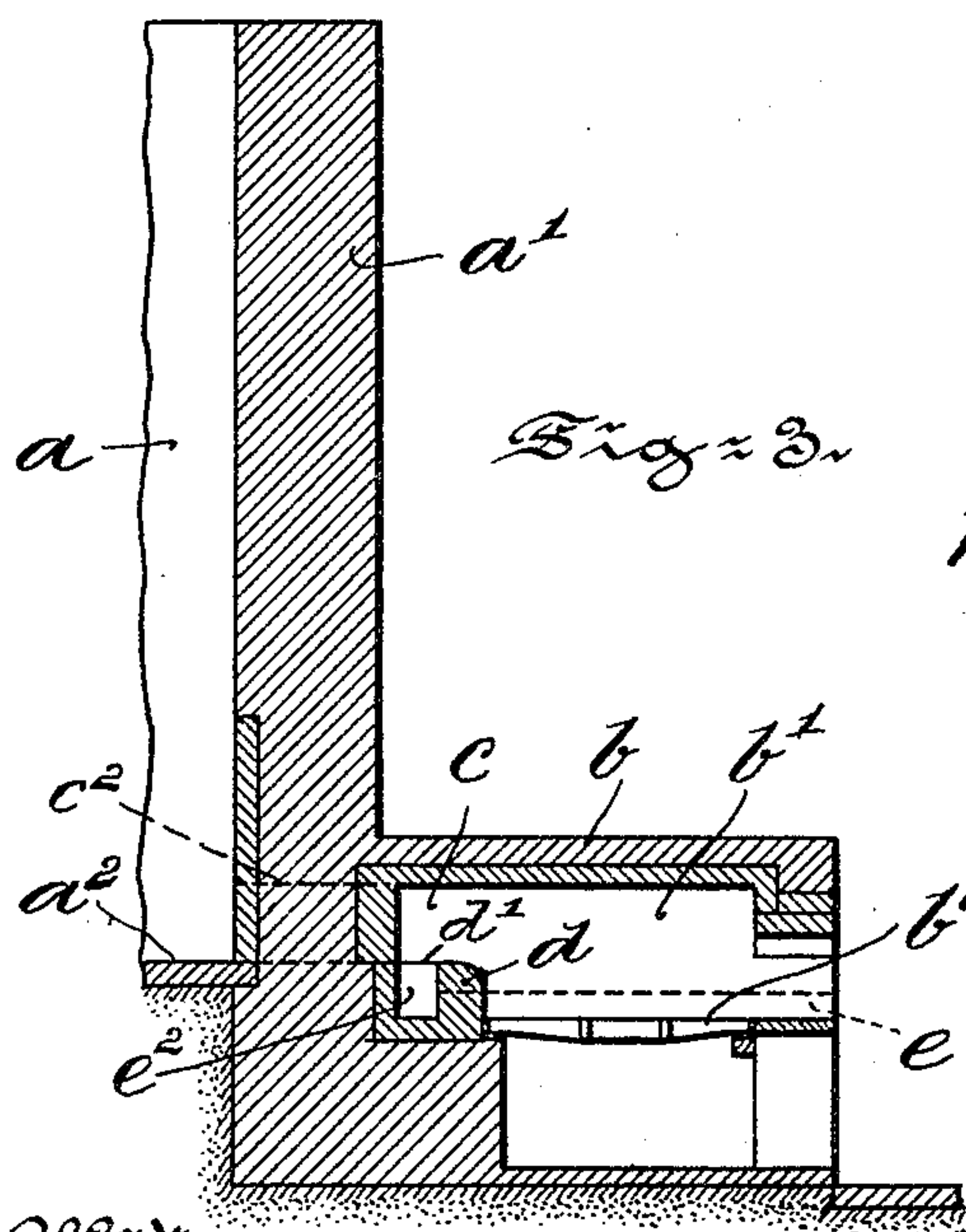
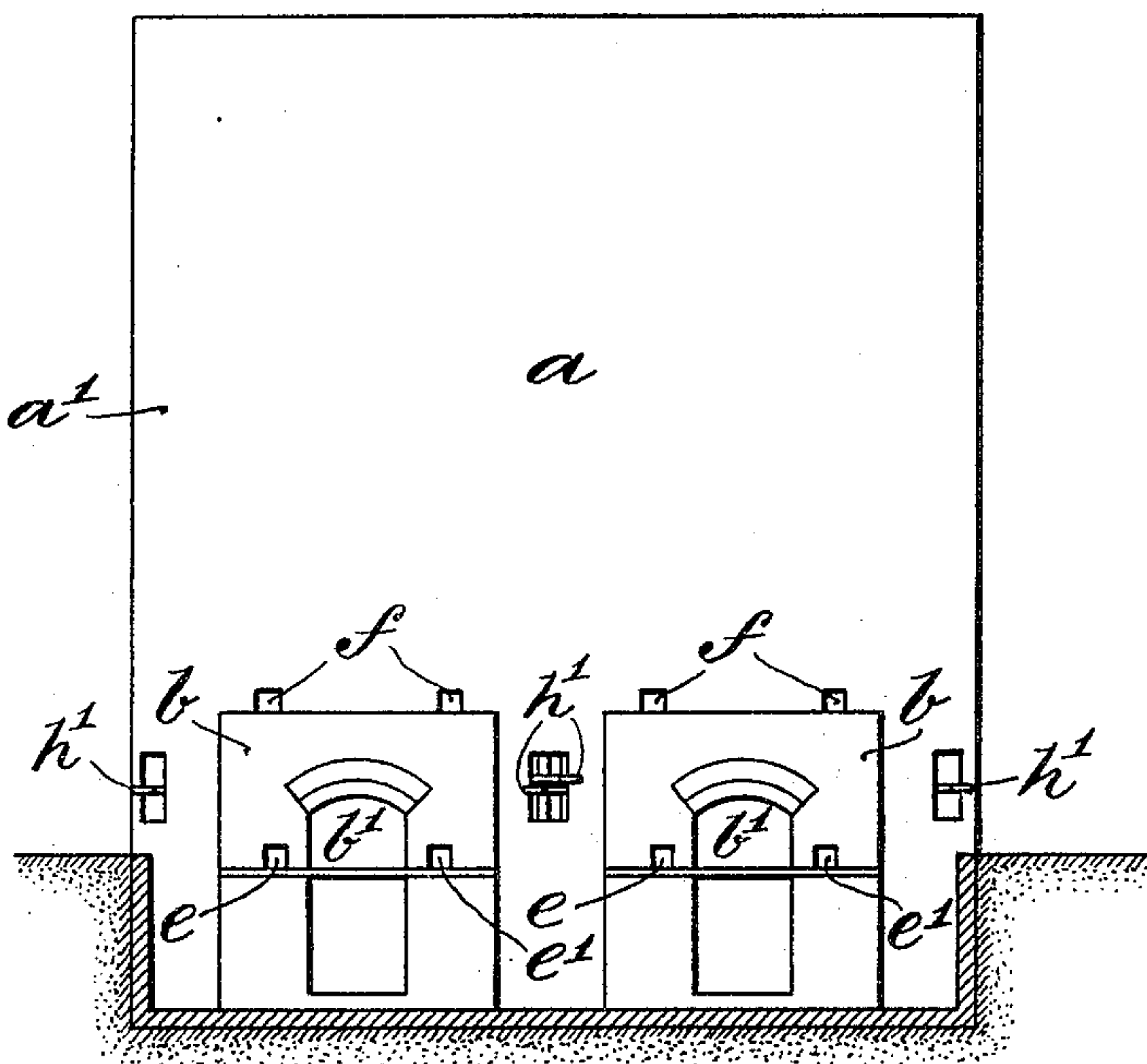


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CALORIFIC KILN.
APPLICATION FILED JUNE 3, 1905.

2 SHEETS—SHEET 2.

Fig. 2.



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EDWIN A. KING, OF PHILADELPHIA, PENNSYLVANIA.

CALORIFIC KILN.

No. 803,236.

Specification of Letters Patent.

Patented Oct. 31, 1905.

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To all whom it may concern:

Be it known that I, EDWIN A. KING, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Calorific Kilns, of which the following is a specification.

My invention has relation to calorific kilns, and in such connection it relates more particularly to the construction and arrangement of flues connecting the furnace of the same with the interior of the kiln and with the arches of brick placed therein.

The principal objects of my invention are, first, to provide each furnace of a calorific kiln with a flue, preferably of the same width as the furnace-chamber, which terminates in two partially triangular-shaped branches, the apex or meeting-point of the inner walls of which branches is located in the vertical central axis of the furnace, so as to equally divide and to evenly distribute the heat and products of combustion of the furnace into the branch flues and from the same into two arches of brick arranged within the kiln; second, to provide the main flue of each of the furnaces of the kiln with a base elevated above the grate of the furnace, which by forming a bridge-wall prevents the fuel from entering the main flue and its branches; third, to provide each of the branch flues with a damper to partially or completely close one of said branch flues and to conduct all the heat of a furnace or the greater proportion of the same into one of the branch flues, and, fourth, to provide each of the furnaces with air-flues arranged parallel to the furnace-chamber and entering the main flue through the bridge-wall and terminating opposite the central portion of the inner flaring walls of the branch flues, so as to supply highly-heated air to the flame and products of combustion passing over the bridge-wall and to effect a complete combustion of the unconsumed products of combustion prior to the entering of the same into the arches of brick arranged within the kiln.

The nature and scope of my present invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a view, partly in elevation and partly in horizontal section, of a kiln and illustrating at the left-hand end the fire-chamber and the main flue of the furnaces termi-

nating in two partially triangular-shaped branch flues and at the right-hand end the main and branch flues and two air-flues terminating in the main flue opposite the branch flues and dampers arranged in the branch flues embodying main features of my invention. Fig. 2 is a front elevational view of the kiln and the furnaces thereof, partly sectioned, and illustrating the air-flues arranged at each side of the furnace-chamber. Fig. 3 is a vertical sectional view on the line xx of Fig. 1; and Fig. 4 is a detail view, enlarged, illustrating in vertical section the main flue and the ends of the air-flues terminating therein and also illustrating in elevation a portion of the branch flues forming the continuation of the main flue and the dampers arranged in the branch flues.

Referring to the drawings, a represents an updraft kiln of usual construction, from each of the front walls a' of which extend in the present instance two furnaces b . As shown at the left-hand end in Figs. 1 and 3, the fire-chamber b' of the furnace b terminates at a grate b^2 and communicates with an elevated flue c , which at a certain distance from the grate b^2 branches into two partially triangular-shaped flues c' and c^2 . The apex or meeting portions c^3 of the inner walls of these branch flues c' and c^2 are arranged directly in the vertical central axis of the main flue c and the fire-chamber b' of the furnace b , and the purpose of the same is to equally divide and to evenly distribute the heat and products of combustion coming from the fire-chamber b' through the main flue c by parting the same in striking the apex c^3 and conducting a uniform portion of the same into each of the branch flues c' and c^2 . The branch flues at their inner ends are deflected into straight portions c^4 , so as to be in alinement with the arches of brick (not shown) which are built in the brick to be burned in the interior of the kiln a . By the even distribution of the heat of each of the furnaces b of the kiln a to two arches of brick each arch in the kiln will be supplied with an equal quantity of heat, and consequently the brick in the kiln will be uniformly burned throughout, as each arch will diffuse an equal amount of heat through the mass of brick built upon and surrounding the same. The elevation d , separating the main flue c at its lower end from the fire-chamber b' , forms a bridge-wall which prevents the fuel from entering the main flue c and the branches c' and c^2 thereof.

In order to insure a complete combustion of the products of combustion in the end of the main flue c , serving as the combustion-chamber of the kiln, and prior to the introduction of the same into the brick arches in the kiln a , there are provided air-flues e and e' , which conduct highly-heated air into the end of the main flue c at points opposite and centrally arranged to the inner outwardly-flaring walls of the branch flues c' and c'' . The highly-heated air rising from the combined base and bridge-wall d will commingle with the flame and products of combustion and produce a complete combustion of the unconsumed products of combustion before the same have passed the branch flues c' and c'' . Furthermore, each of the highly-heated currents of air will supply each of the branch flues with the necessary quantity of hot air to make the combustion perfect, and the location of the outlets e'' of the air-flues midway of the flaring inner walls of the branch flues c' and c'' will prevent the currents from being deflected either wholly or partially into one or the other of the branch flues. The heating of the air to a temperature equal to that generated in the furnace-chamber b' is accomplished by arranging the air-flues e and e' alongside the furnace-chamber b' , from which the same are separated by a comparatively thin wall b'' , of fire-brick, and then deflected inward beyond the end of the chamber b' into the highly-heated bridgework d and upwardly in the same. In this manner the air entering the flues e and e' at the front wall of the furnace b is gradually conducted from the coldest to the hottest portions of the furnace, and hence when the same issues from the outlets e'' within the main flue c by rising in the bridge-wall d thereof will impart to the air a temperature corresponding with that generated in the fire-chamber b' . The portion d' of the bridge-wall d separating the outlets e'' of the air-flues e and e' from each other terminates at the base of the apex e'' of the branch flues c' and c'' , and thus serves to strengthen the bridge-wall d . As shown in Fig. 3, the bases of the branch flues c' and c'' and the main flue c are arranged in alinement with the floor a'' of the kiln a , and hence the arches built in the brick to be burned will be located at the same level as the base of the flues c , c' , and c'' . The straight ends c^4 of the branch flues c' and c'' of each of the furnaces b are located an equal distance apart from each other, as shown in Fig. 1. In order to observe the burning of the brick in the kiln a , the front ends a' thereof are provided with so-called "peep-holes" f , by means of which the action of the heat on the brick or other articles in the kiln can be readily ascertained at all times. If the brick in the kiln a for one reason or the other is or are found to be burning unevenly, dampers h , arranged in each of the branch flues c' and c'' , may partially or wholly close one of these branch flues, so that all or

the greater portion of the heat coming from the fire-chamber b' of each of the furnaces b may be conducted to certain portions of the brick in the kiln, which require a greater amount of heat for the proper burning of the same. The dampers h are slidable in a horizontal plane, so that the same will remain in any position given. Rods h' , connected with the dampers h , permit of the operation of the damper from the outside of the kiln a .

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a kiln, a fire-chamber formed by an extension of the front walls having a grate, flues arranged in the front walls, a combustion-chamber forming a main flue interposed between said fire-chamber and the flues in said wall extension having a floor elevated above said grate, said combustion-chamber adapted to permit of the complete combustion of the products of combustion prior to their entrance into said flues, and said flues adapted to equally divide the heat coming from said combustion-chamber prior to their entrance into said kiln.

2. In a kiln, a fire-chamber formed by an extension of the front walls having a grate, flues arranged in the front walls, a combustion-chamber arranged in said wall extension forming a main flue interposed between said fire-chamber and said flues having a floor elevated above said grate, said combustion-chamber adapted to permit of the complete combustion of the products of combustion prior to their entrance into said flues, and said flues adapted to equally divide the heat of said combustion-chamber prior to their entrance into two arches of brick arranged in said kiln.

3. In a kiln, a fire-chamber formed by an extension of the front walls, flues arranged in the front walls, a combustion-chamber forming a main flue interposed between said fire-chamber and said flues in the wall extension, air-flues arranged alongside of said fire-chamber and deflected into the floor of said combustion-chamber, said flues adapted to heat the air and to conduct the same into said combustion-chamber to permit of a complete combustion of the products of combustion therein prior to their entrance into said flues, and said flues adapted to equally divide the heat prior to their entrance into said kiln.

4. In a kiln, a fire-chamber formed by an extension of the front walls and having a grate, flues arranged in the front walls, a combustion-chamber arranged in said wall extension and forming a main flue interposed between said fire-chamber and flues and having a floor elevated above said grate to form a bridge-wall for the same, air-flues arranged alongside of said fire-chamber and deflected into said bridge-wall to heat air and to conduct the same into said combustion-chamber to permit of a complete combustion of the products of

combustion by rising therein and commingling with said products before the same enter said flues, and said flues adapted to equally divide the heat of said chambers prior to their entrance into said kiln.

5 5. In a kiln, a fire-chamber formed by an extension of the front walls and having a grate, flues arranged in the front walls, a combustion-chamber arranged in said wall extension and
10 forming a main flue interposed between said fire-chamber and flues and having a floor elevated above said grate to form a bridge-wall for the same, air-flues arranged alongside said
15 fire-chamber and below said bridge-wall and deflected into and rising in said wall centrally, opposite the flaring wall portions of said flues, said flues adapted to heat the air by conducting the same into and through the bridge-wall to permit of a complete combustion of the
20 products of combustion by rising in said chamber and commingling with the products of combustion therein, and said flues adapted to equally divide the heat of said chambers prior to their entrance into said kiln.

25 6. In a kiln, a fire-chamber formed by an extension of the front walls and having a grate, flues arranged in the front walls, a combustion-

chamber arranged in said wall extension and forming a main flue interposed between said fire-chamber and flues and having a floor elevated above said grate to form a bridge-wall for the same, air-flues arranged alongside said fire-chamber and below said bridge-wall and deflected into and rising in said wall centrally, opposite the flaring wall portions of said flues, said flues adapted to heat the air by conducting the same into and through the bridge-wall to permit of a complete combustion of the products of combustion by rising in said chamber and commingling with the products of combustion therein, and dampers arranged in said flues and adapted when actuated to permit of the unequal distribution of the heat of said chambers to two arches of brick in said kiln or all the heat into one of the arches of said brick.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

EDWIN A. KING.

Witnesses:

J. WALTER DOUGLASS,
THOMAS M. SMITH.