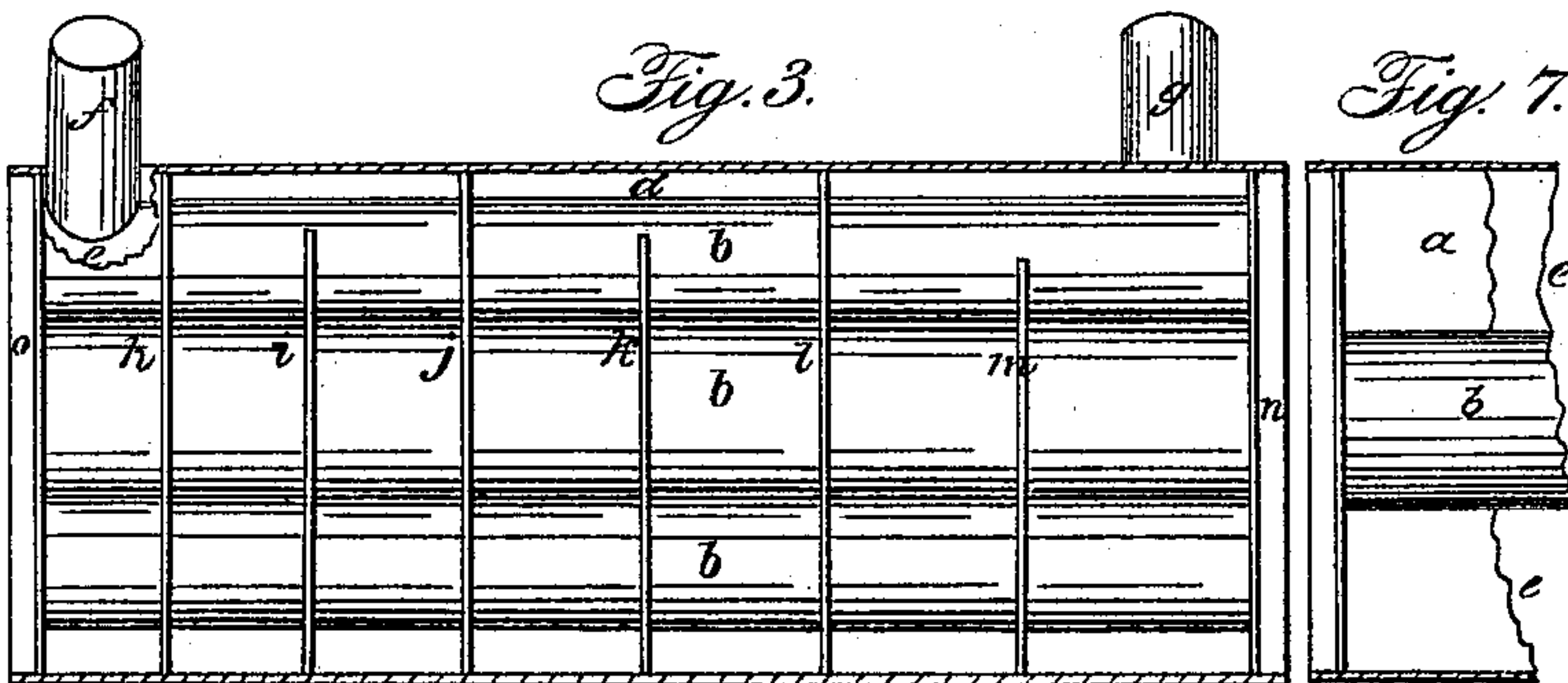
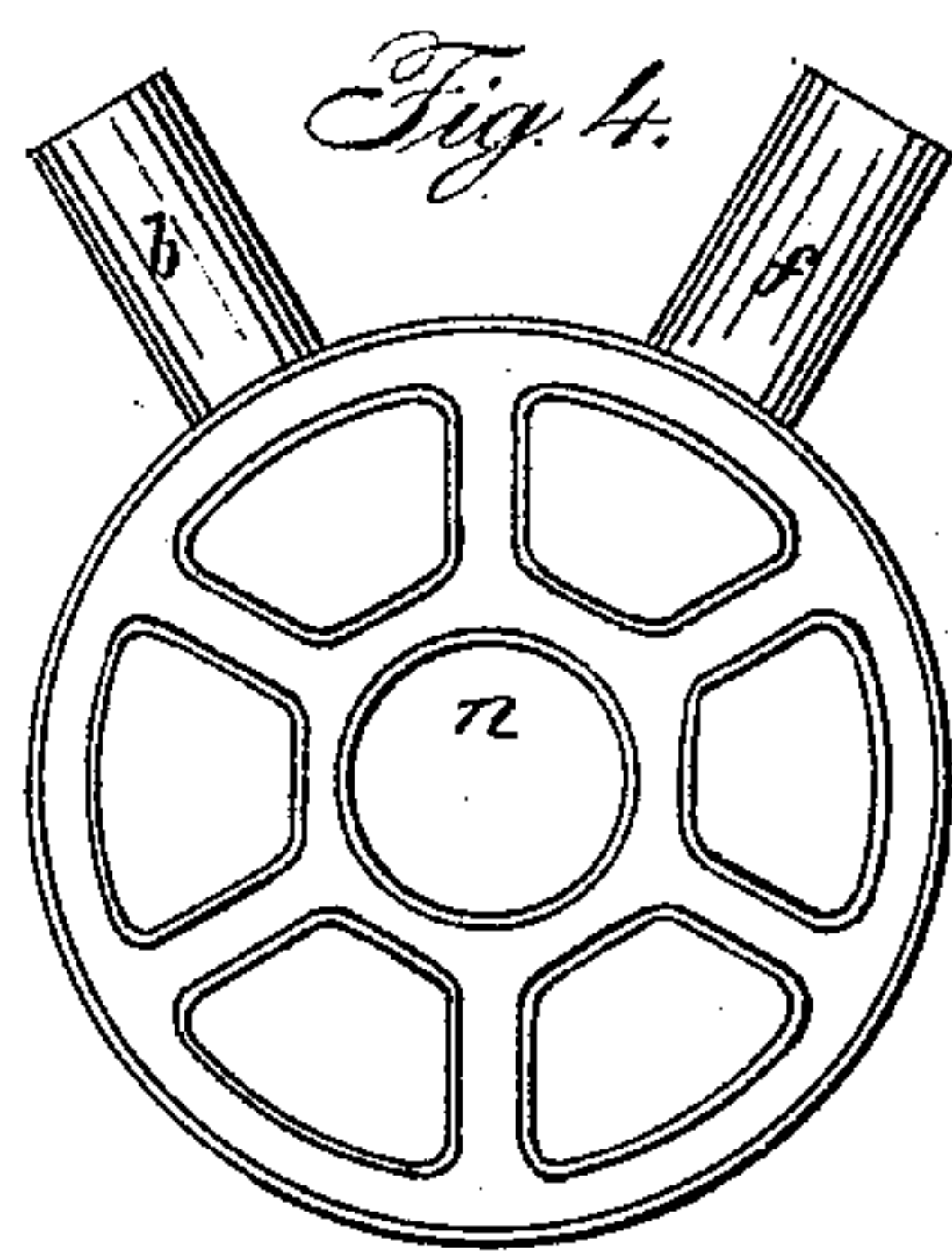
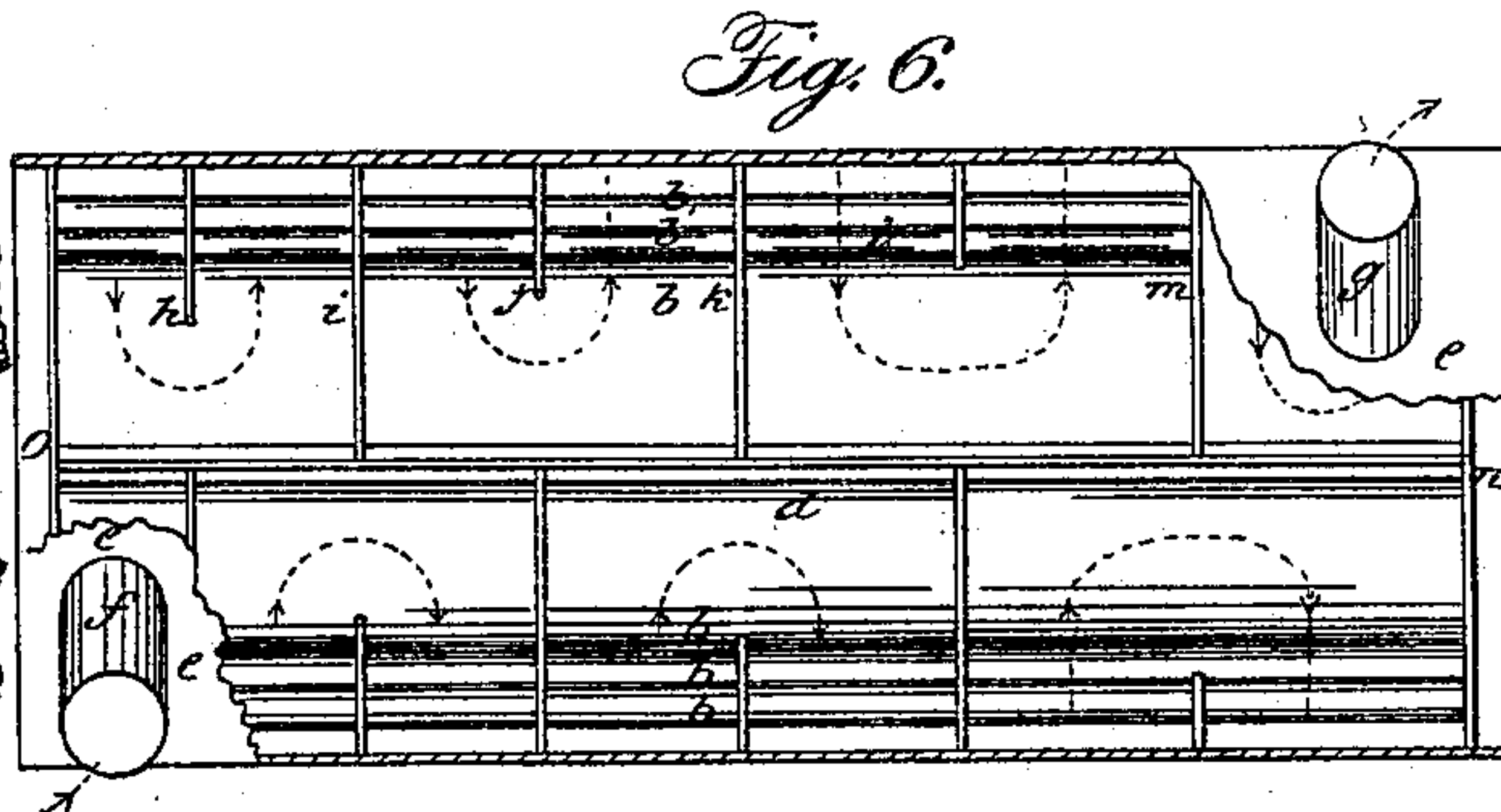
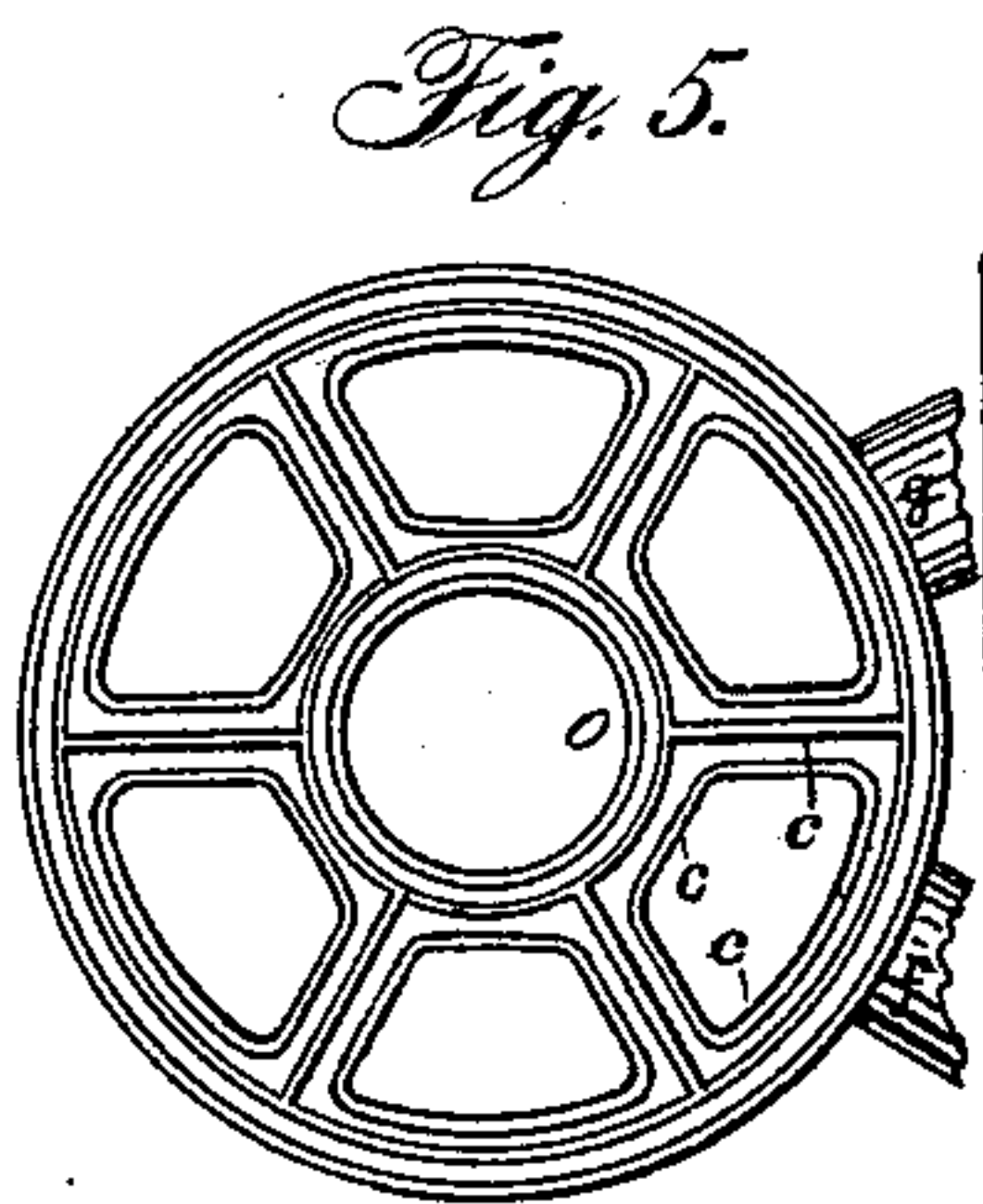
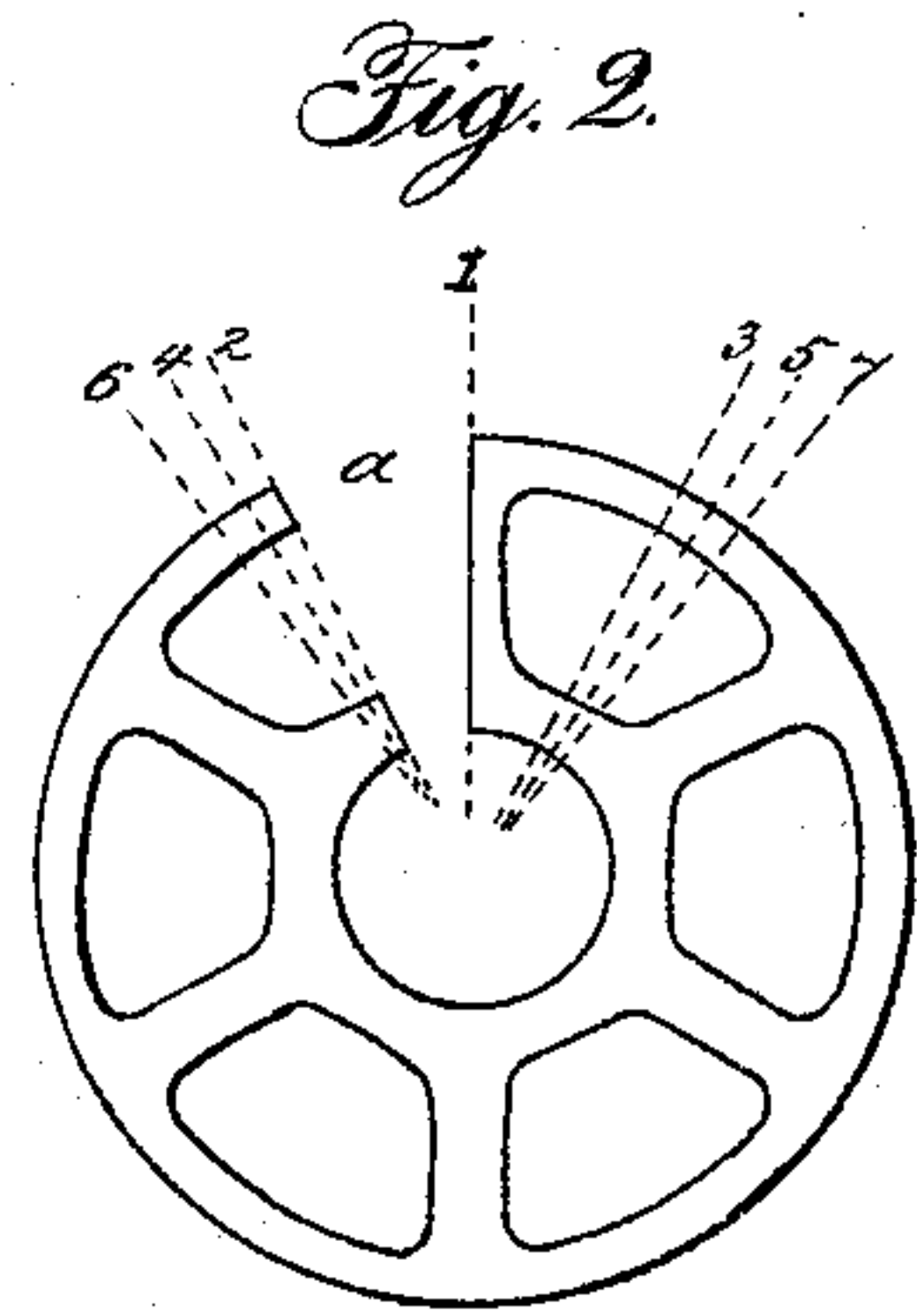
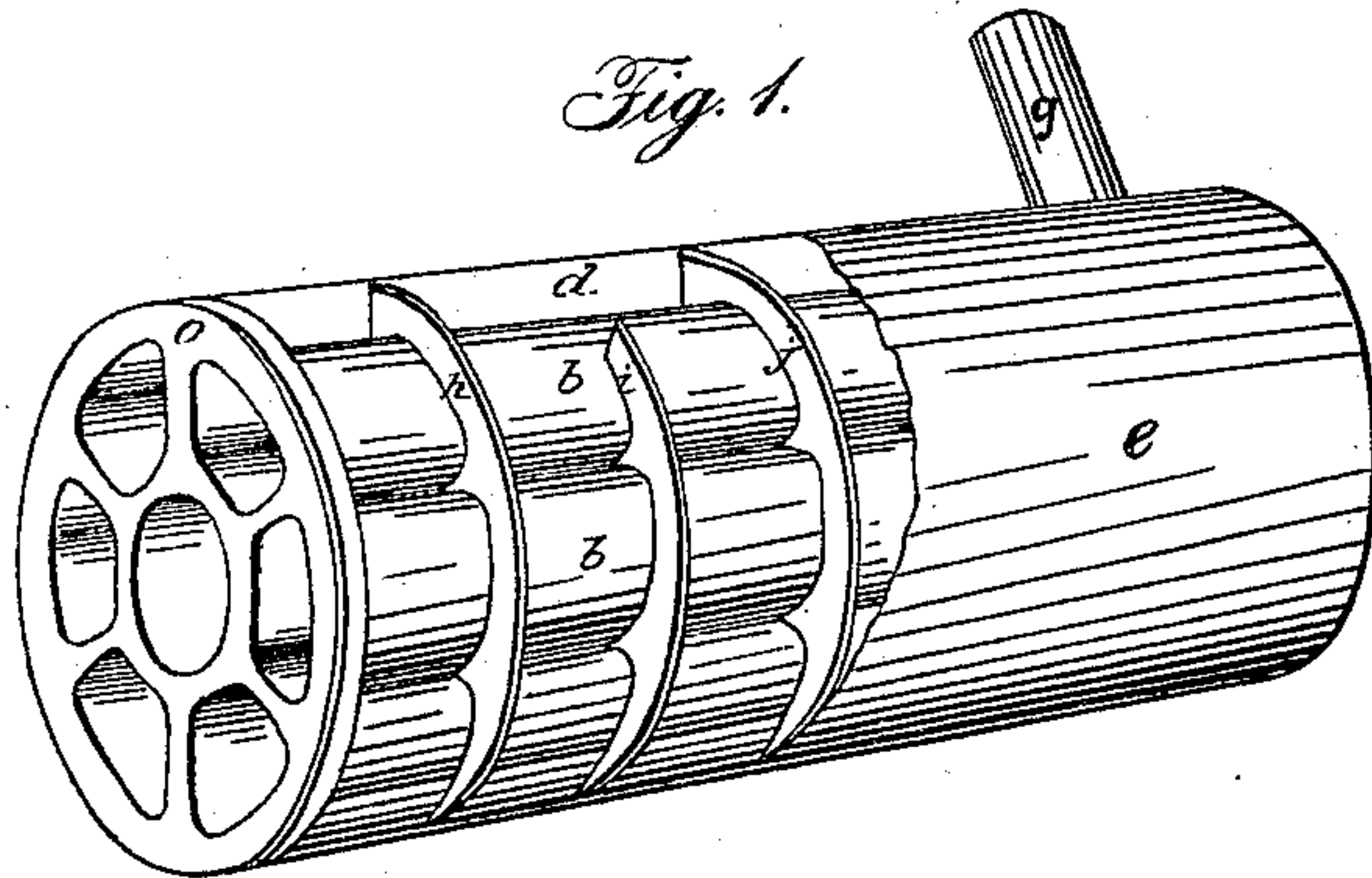


L. BLAIR.
Hot-Blast Oven.

No. 14,386.

Patented Mar. 11, 1856.



Witnesses:

C. M. Hutton
H. L. Hutton

UNITED STATES PATENT OFFICE.

LA FAYETTE BLAIR, OF PAINESVILLE, OHIO.

IMPROVED HOT-BLAST APPARATUS.

Specification forming part of Letters Patent No. 14,386, dated March 11, 1856.

To all whom it may concern:

Be it known that I, LA FAYETTE BLAIR, of Painesville, in the county of Lake and State of Ohio, have invented a new and useful Improvement in Hot-Blast Machines; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my improved hot-blast apparatus; Fig. 2, an elevation of a diaphragm-plate; Fig. 3, a side elevation; Figs. 4 and 5, end elevations; Fig. 6, a top view, and Fig 7 a partial side elevation. (Portions of the outer casing are removed in Figs. 1, 3, 6, and 7, to exhibit internal parts.)

Similar letters refer to like parts in all the figures.

The nature of my invention consists in the peculiar arrangement of parts employed to secure three important features in relation to hot-blast machines: first, ease and dispatch in removing the dust and soot which collect in the fire-channels; second, equalization of heat, and third, unlimited heating-surface. These objects I accomplish by the employment of a number of long and straight hollow trunks or tunnels intersected and supported by diaphragm-plates separated by a longitudinal division-plate, and the whole inclosed in a shell or casing.

To enable others skilled in the art to make and use my said invention, I will proceed to describe its construction and operation.

Fig. 2 exhibits one of the diaphragm-plates with its seven apertures, the center one circular and the others polygonal. A part is dissected or cut away from 1 to 2, as seen at *a*. A requisite number of these diaphragm-plates are provided; but, it will be observed, each plate has this dissected part progressively wider and on adverse sides. Thus in the first the opening *a* is on the left side, and of a given width, as from 1 to 2. The second has this opening on the right side, and is widened from 1 to 3, and so on through the whole number to be used in the construction of the machine.

b b b, Fig. 3, are three of the hollow trunks or tunnels employed in the structure of the apparatus. These are straight and of any de-

sirable length, and correspond in number and shape to the apertures of the diaphragm.

Figs. 4 and 5 represent the closing or end plates of the apparatus. These are provided on the outside face with flanges *c*, as seen in Fig. 5.

d, Fig. 6, is a longitudinal division-plate. Said plate is made wide enough to reach the center tunnel, on which it rests, as shown in Fig. 7.

e, Fig. 6, is part of the shell or outer casing. *f* is a tube, to which is attached the blowing apparatus. *g* is another tube connecting with the tuyere-pipe.

In putting the above-described parts together the tunnels are inserted through the apertures of the diaphragms, fitting them as tight as can conveniently be done. The diaphragms are placed so that they stand progressively wider apart as they approach the escape end of the apparatus. This is explained by reference to Fig. 6. The first, *h*, is placed at a given distance from the end plate; the second, *i*, at a distance farther removed; the third, *j*, farther still, and so on for the others, *k*, *l*, and *m*. The first diaphragm, having the opening or dissected part opposite to the cold-blast tube *g*, is divided therefrom by the division-plate *d*. The said tube can be placed so as to convey the air on either side of the division-plate, as will be most convenient; but in either case the opening of the diaphragm must stand opposite to it. The whole of the diaphragms are so located as to have their dissected parts on adverse sides of the division-plate *d*, which said plate is placed longitudinally through the machine, as shown in Fig. 6. It will be observed that the spaces between each diaphragm, and the dissected or open parts of them increase as they recede from the cold-blast end. These spaces form an important feature in the apparatus, and should be regulated so as to retain the passing current sufficiently long to enable it to be properly heated before it escapes from the tuyere-pipe. The tunnels being in their proper locations, and the diaphragms and division-plate adjusted, as explained, the whole is inclosed within the casing. The ends of the casing are closed by the end plates, *n* and *o*, Figs. 4 and 5, which are placed so far into them as to allow the casing, and also the ends

of the tunnels, to project a suitable distance for the purpose of filling in cement. The flanges on the said end plates will allow of a smaller quantity of cement being used, so as to obviate the possibility of its cracking or becoming loose.

The above apparatus is to be surrounded and sustained by the usual masonry, and provided with suitable channels for conveying the heated gases from the trunnel-head of the stack, or from other sources, together with the chimney for the escape of the waste gases. For the convenience of cleaning or repairing, doors are to be provided in the walls opposite to the ends of the apparatus.

In describing the use or operation of my machine it will be understood that the heated gases are received into the tunnels *b*, and the cold-blast through the tube *f*.

From the peculiar form and arrangement of the heating-chamber it will be perceived that the heat is equally distributed on all parts alike, and the danger of overheating any particular part avoided. The cold-blast received through the pipe or tube *f* will be diverted in its course by the division-plate *d* in the direction of the arrows, as seen in Fig. 6, the current passing around and between all the tunnels. From the straight form of the tunnels the cleaning of them is easily accomplished, the workman opening one of the doors and using any convenient implement—

such as a scraper—fitting the whole or part of the orifice of the tunnel, and placed on an extended handle. The dust, &c., are thus removed without occasioning much delay or suffering the apparatus to cool.

I am aware that inclosed chambers having pipes and partition or division plates within them have heretofore been used for hot-blast purposes. Such, therefore, I do not claim. These contrivances have been usually arranged so that the chamber or space between the pipes, &c., and casing is made to receive the heated gases, thereby creating, from the tortuous form of the said chamber, a serious difficulty and delay in removing from time to time the dust and soot which collect and adhere to all parts of the chamber; and in many machines now in use liability is incurred, from the uneven play of the fire, to cause the heat to act on particular parts, thereby creating uneven wear. In my arrangement these evils are materially, if not wholly, prevented.

What I claim as new, and desire to secure by Letters Patent, is—

The tunnels *b*, diaphragms *h*, *i*, *j*, *k*, *l*, and *m*, division-plate *d*, and casing *e*, arranged and combined as herein described, and for the purpose specified.

LA FAYETTE BLAIR.

Witnesses:

C. W. PATTERSON,
H. STUTO, Jr.