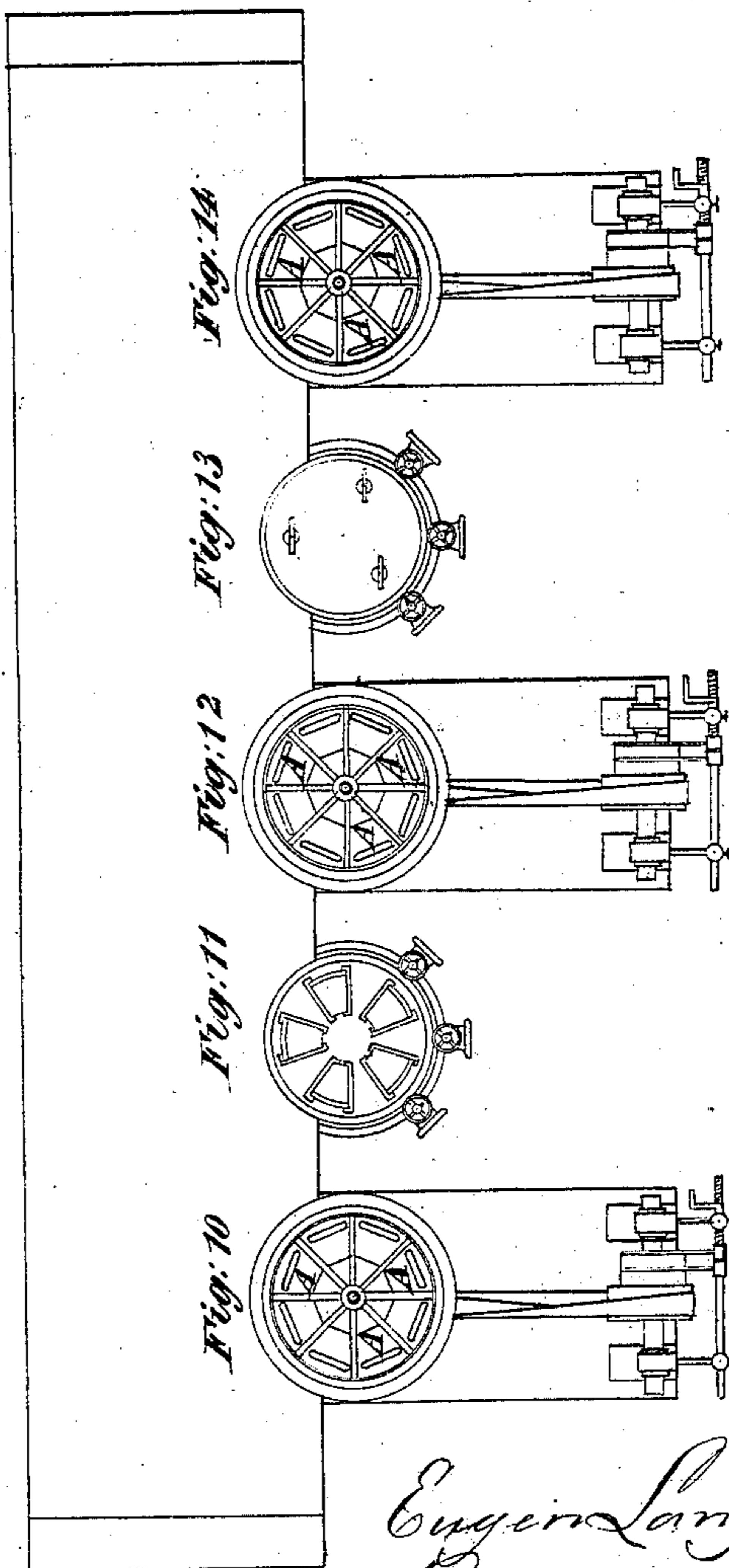
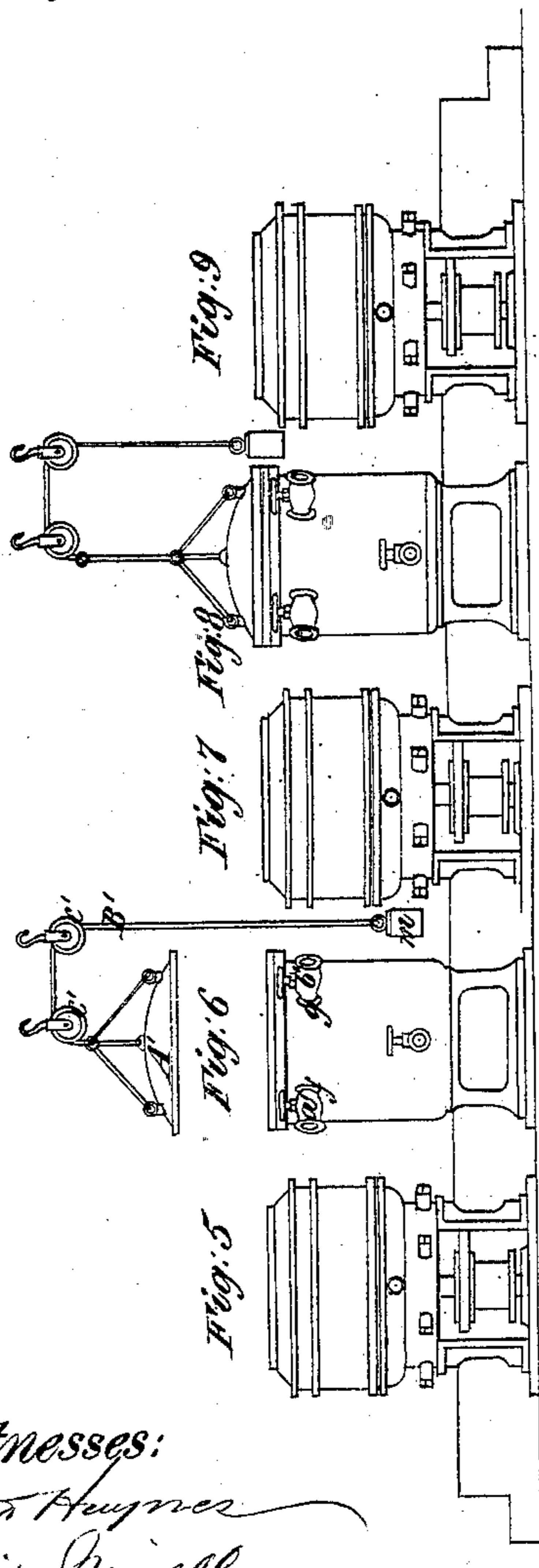
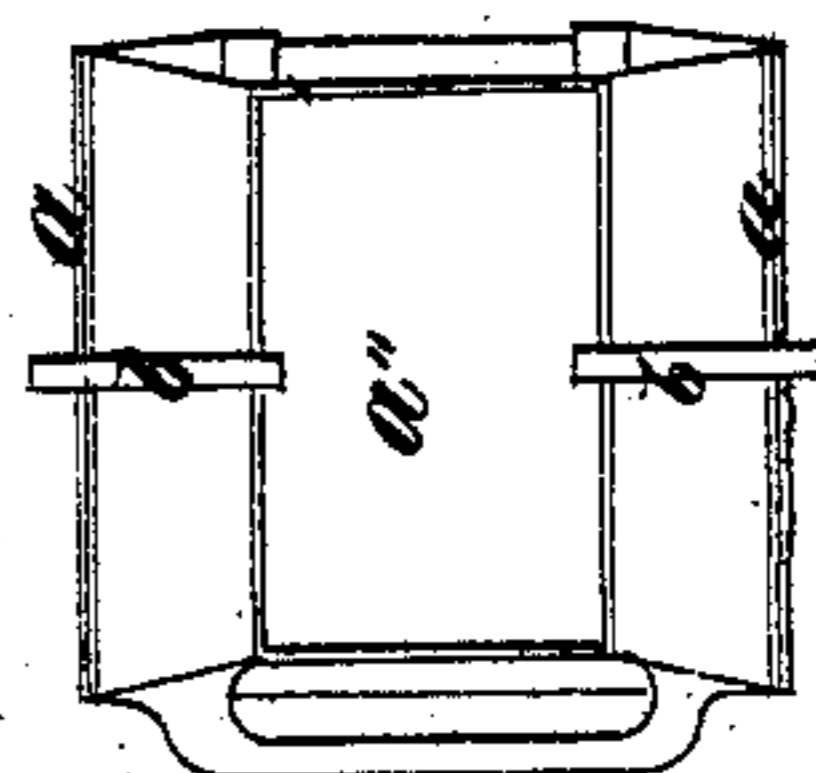
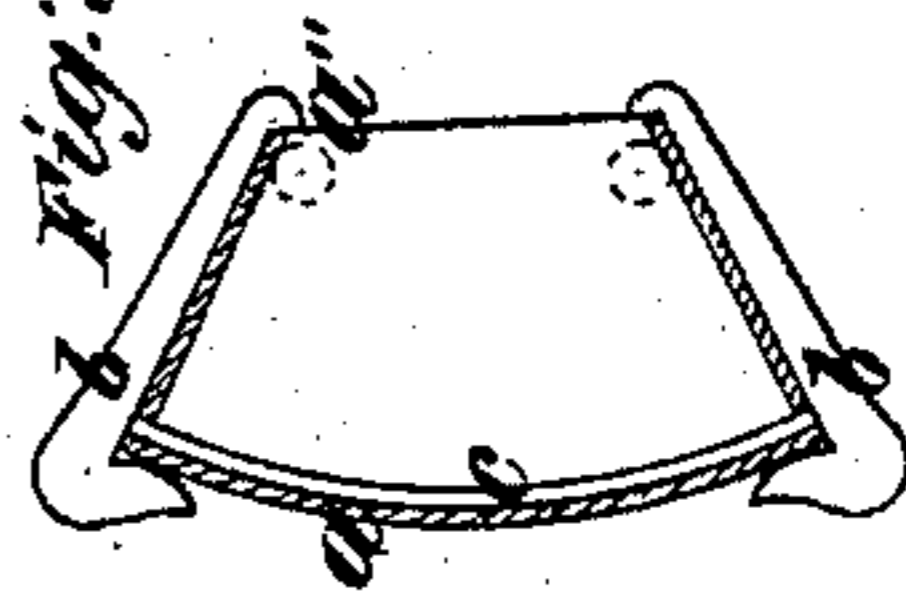
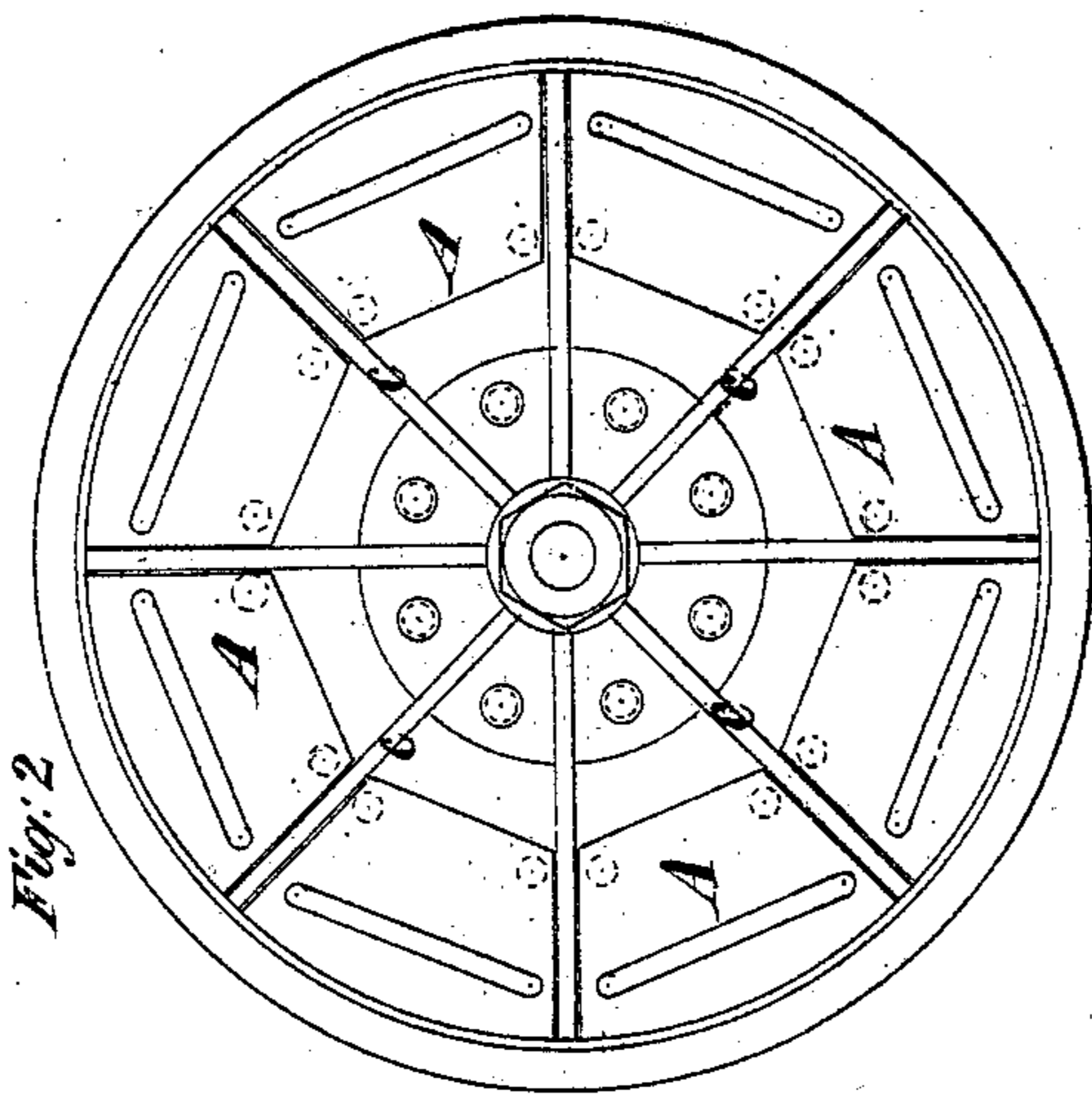
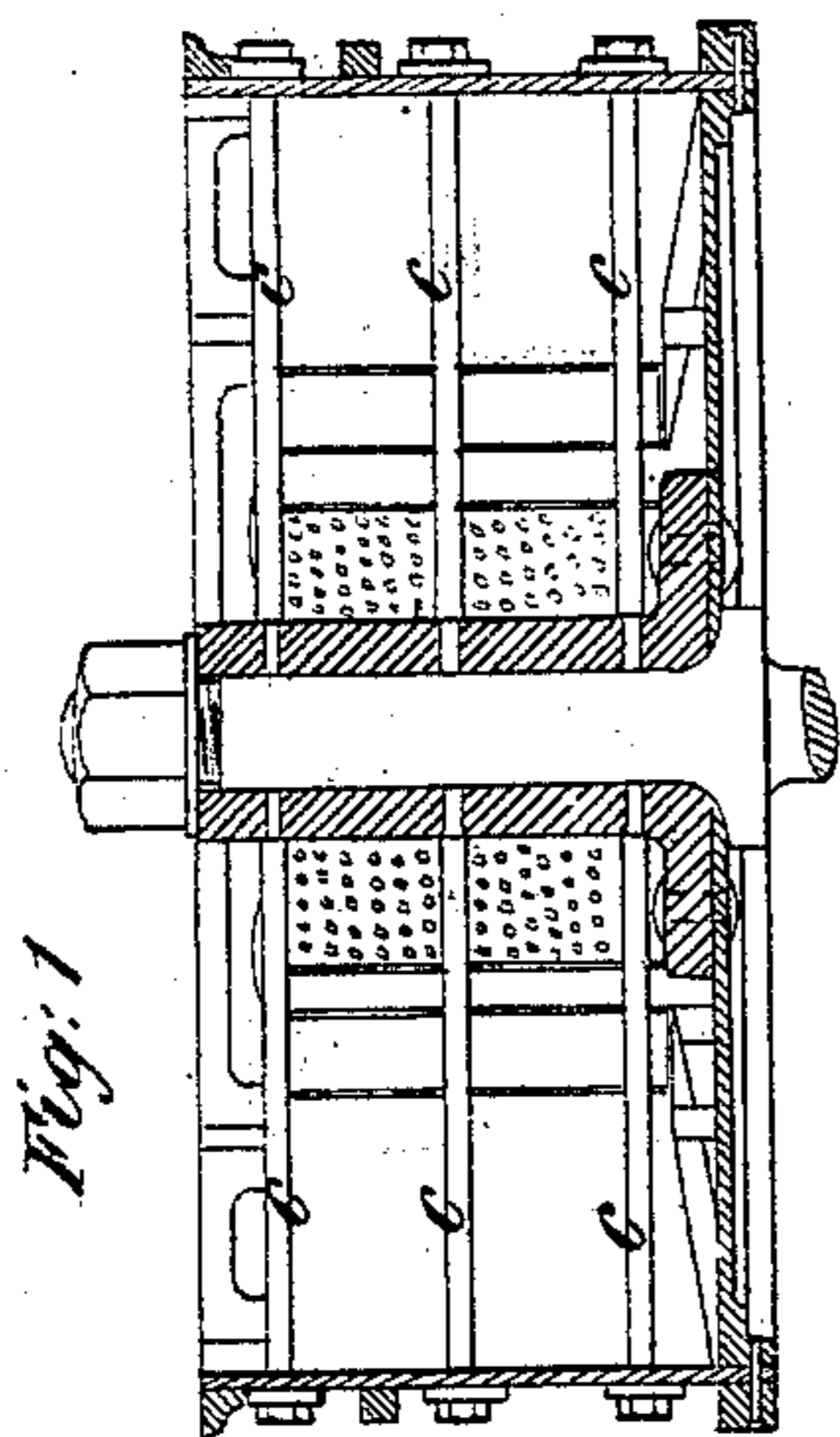


**E. LANGEN.**  
**Manufacture of Loaf-Sugar.**

No. 134,682.

Patented Jan. 7, 1873.



*Witnesses:*  
*John Hughes*  
*David Mirell*

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*Attorneys*

# UNITED STATES PATENT OFFICE.

EUGEN LANGEN, OF COLOGNE, PRUSSIA.

## IMPROVEMENT IN THE MANUFACTURE OF LOAF-SUGAR.

Specification forming part of Letters Patent No. 134,682, dated January 7, 1873.

*To all whom it may concern:*

Be it known that I, EUGEN LANGEN, of Cologne, in the Kingdom of Prussia, have invented certain Improvements in the Manufacture of Loaf-Sugar, of which the following is a specification:

This invention is designed to substitute for the usual slow method of purifying loaf-sugar the use of the centrifugal machine and vacuum-tank; and it consists in certain novel means of so doing, whereby the time required in the production of refined loaf-sugar may be reduced from fourteen days to two or three, whereby a very great saving may be effected in the quantity of white sugar ordinarily employed in the claying process, and whereby the loss of sugar from the formation of acids during the long period, hitherto necessary, is effectually avoided.

Figure 1 is a vertical transverse section of a centrifugal machine employed in carrying into practice my method of purifying loaf-sugar. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section of one of the molds employed in my process of refining loaf-sugar. Fig. 4 is a perspective view of the same. Figs. 5, 7, and 9 are elevations of centrifugal machines used in carrying my improved process into practice. Figs. 6 and 8 are elevations of the vacuum-tanks also employed in the same. Figs. 10 and 12 and 14 are plan views of the centrifugal machines aforesaid. Figs. 11 and 13 are plan views of the vacuum-tanks aforesaid.

In my improved process the sirup is evaporated to the condition in which the sugar is ordinarily placed in the molds, and in this state is transferred to the molds of peculiar construction represented in Fig. 3. Each mold is transversely of segmental form, and is provided with a movable bottom, *a*, held in place by clamps *b*, and furnished on its inner side with a thickness or layer, *c*, of India rubber or equivalent material, which constitutes a packing for the joint between the bottom and the adjacent other portions of the mold. The mouth or top *a''* of the mold is open, and the bottom is arc-shaped, as represented in the Fig. 3 just referred to. The sugar being left in the molds for a sufficient length of time, becomes sufficiently solid to be subjected to the subsequent operation designed to effect the removal of

the sirup contained in its interstices. This is done by removing the bottoms from a number of molds, and placing the latter in a centrifugal machine, subjecting the material to the action of the same.

The centrifugal machine shown in Figs. 1 and 2 is constructed with radial stays *c*, which strengthen its external cylinder, and divide it into a number, say, eight compartments, *A*, each of a size and shape to receive one of the segmental molds, the curved contour given by the bottom *a* to the corresponding part of each loaf enabling the loaf to approximately correspond with the circular sides of the centrifugal machine. Each compartment of the centrifugal machine being filled, a rapid rotation of the same expels the sirup from the loaves in a manner analogous to the expulsion of the liquid or semi-liquid components of the granulated sugar ordinarily subjected to its action. This operation being completed, the molds with their contained loaves are removed, the bottoms *a* and packing *c* replaced with care, and the molds, together with their contents, are placed in the tank shown in Fig. 6. This tank is furnished with a pipe at *f*, connecting with an air-pump, and another at *g*, designed simply for the admission of air, both pipes being furnished with suitable valves or stop-cocks, indicated, respectively, at *a'* and *b'*. The tank is also furnished with a tightly-fitting cover, *A'*, which, in order that it may be easily lifted to afford access to the tank, is attached to one end of a rope, *B'*, passing over pulleys *c'*, and furnished with a counterpoise, *m*, at its opposite extremity. Within the tank are suitable devices for supporting the molds during the succeeding operation.

The molds being properly arranged within the tank, and the latter filled half full with the claying liquor, which requires a much less quantity of white sugar than that ordinarily required, the cover of the tank is firmly secured in place to render the said tank air-tight. This done the stop-cock *a'* of the pipe *f* is opened, and a vacuum is produced in the tank by the action of the air-pump, with which the said pipe *f* connects. The air is, of course, exhausted from the interstices of the loaf in each mold, and the claying liquor penetrating such interstices drains the sirup, which coats the grains or crystals of sugar, and gives the yel-

low color thereto, inward toward the bottom *a* of each mold, thereby purifying the loaf, except for a little thickness adjacent to the said bottom.

The importance of the bottom applied to close the one end or side of the mold, as hereinbefore explained, is here apparent, for were the two opposite sides of the loaf exposed to the entrance of the claying liquid the impurities would be driven toward the center of the loaf, and the proper purification of the latter be rendered impossible.

The treatment of the loaves in the tank, as specified, being completed, air is admitted to the tank through the pipe *g*, and the molds are removed from the latter, and their bottoms *a* are taken off. The molds with their contents are again placed in a suitable centrifugal machine, and the claying liquor is expelled in the same manner as, in the first instance, the green sirup was eliminated.

Should the first claying not prove sufficient the process may be repeated until the requisite whiteness and purity of the product is obtained—for instance, the process from first to last may, briefly sketched, be as follows: The loaves first treated in the centrifugal machine, say, Fig. 5; then in the vacuum-tank, Fig. 6;

then in the second centrifugal machine, Fig. 7; then in the second vacuum-tank, Fig. 8; and then, for completion, in the third centrifugal machine, Fig. 9, these several apparatus being arranged in such relation that the operations may succeed each other with a minimum of labor in removing the sugar from one to another.

The process described being completed, the loaf-sugar requires only to be dried at a suitable heat in an appropriate room to be fitted for market or consumption.

What I claim as my invention is—

1. The process herein described of purifying loaf-sugar by subjecting it alternately to the action of a centrifugal machine and to that of the claying liquor in a vacuum-tank, substantially as herein set forth.

2. The combination, with the molds and their bottoms *a*, of the layer or packing *c* of India rubber or its equivalent, whereby a tight joint is formed to the mold, and the latter fitted for use in the vacuum-tank, substantially as herein set forth.

EUGEN LANGEN.

Witnesses:

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