

No. 609,824.

Patented Aug. 30, 1898.

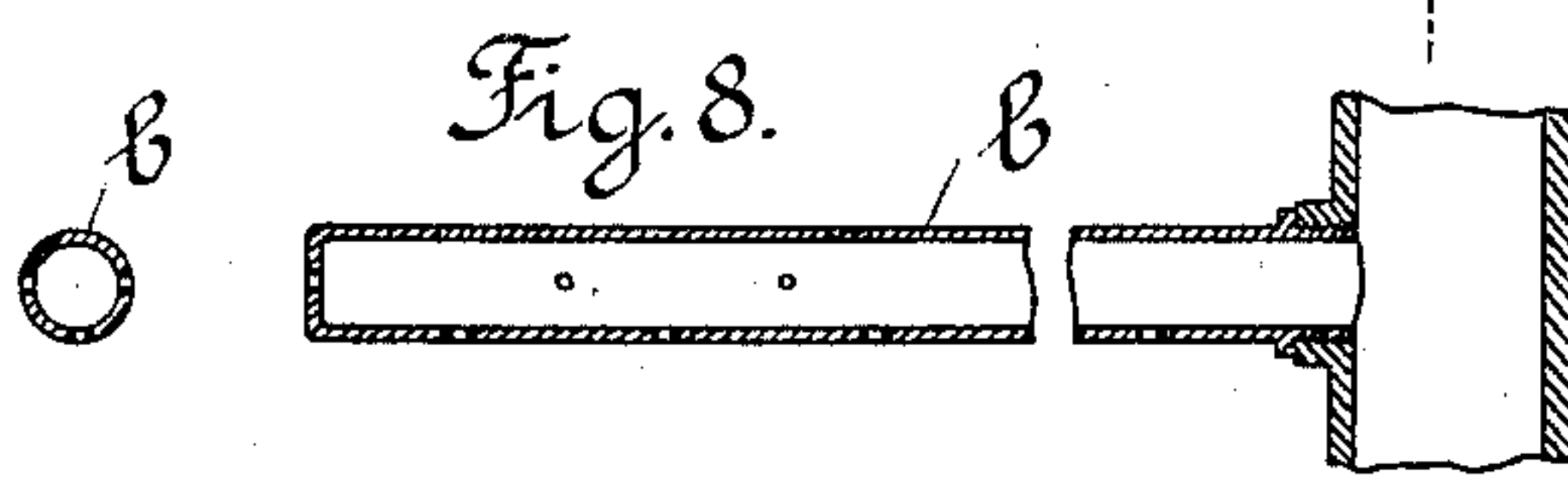
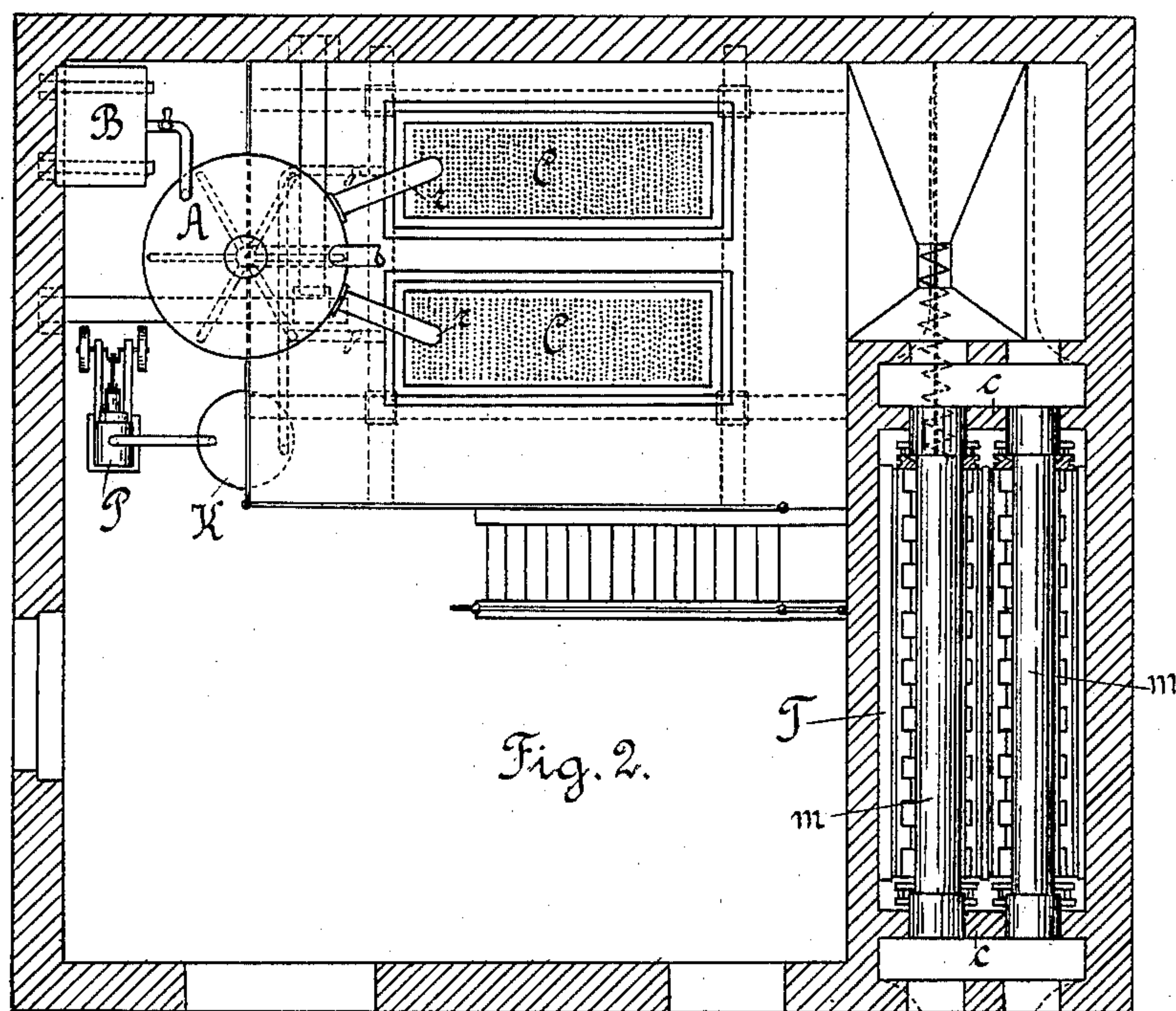
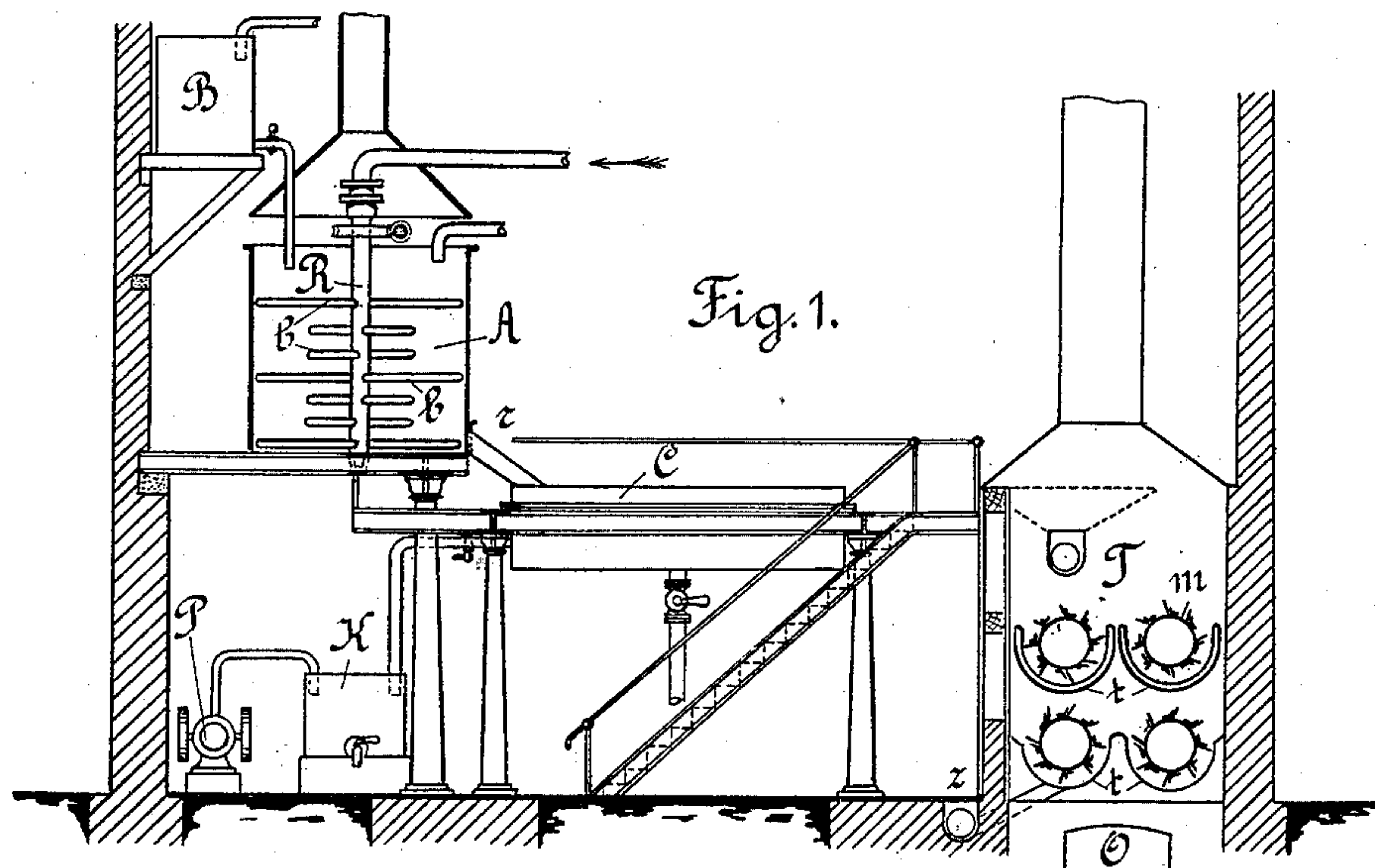
E. LÖWI.

METHOD OF OBTAINING CATTLE FOOD.

(Application filed Dec. 9, 1895.)

(No Model.)

2 Sheets—Sheet 1.



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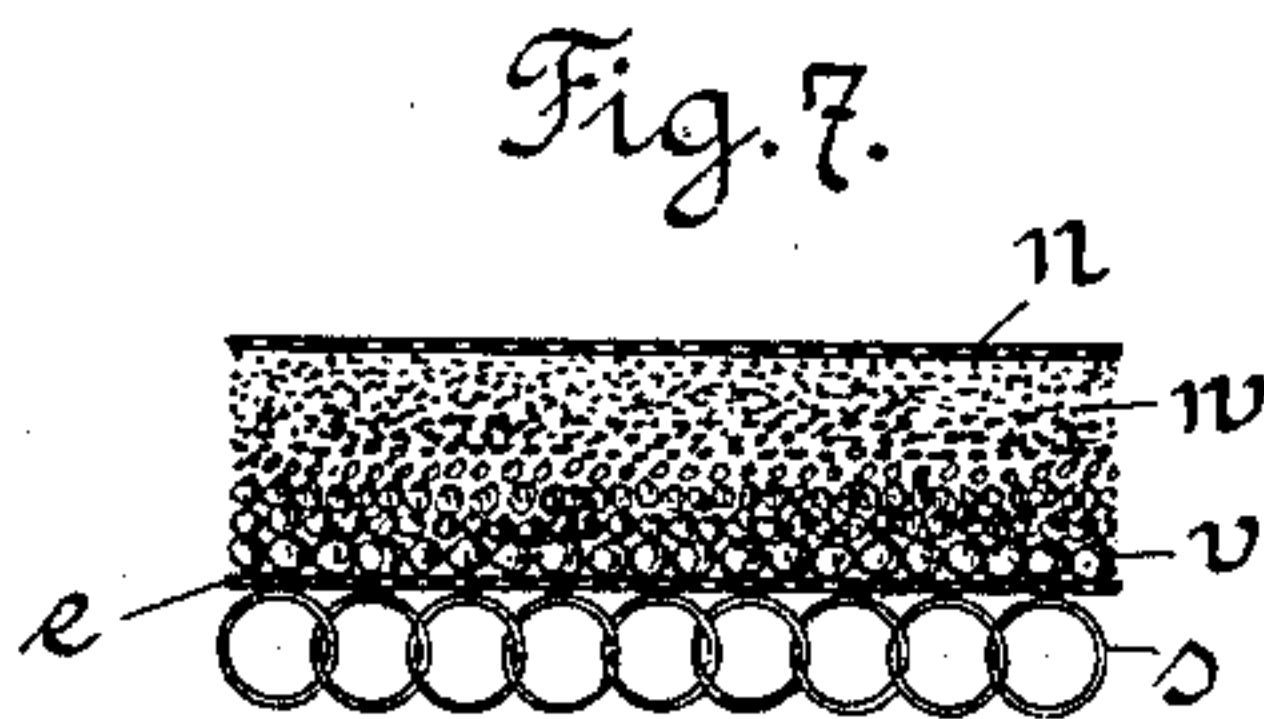
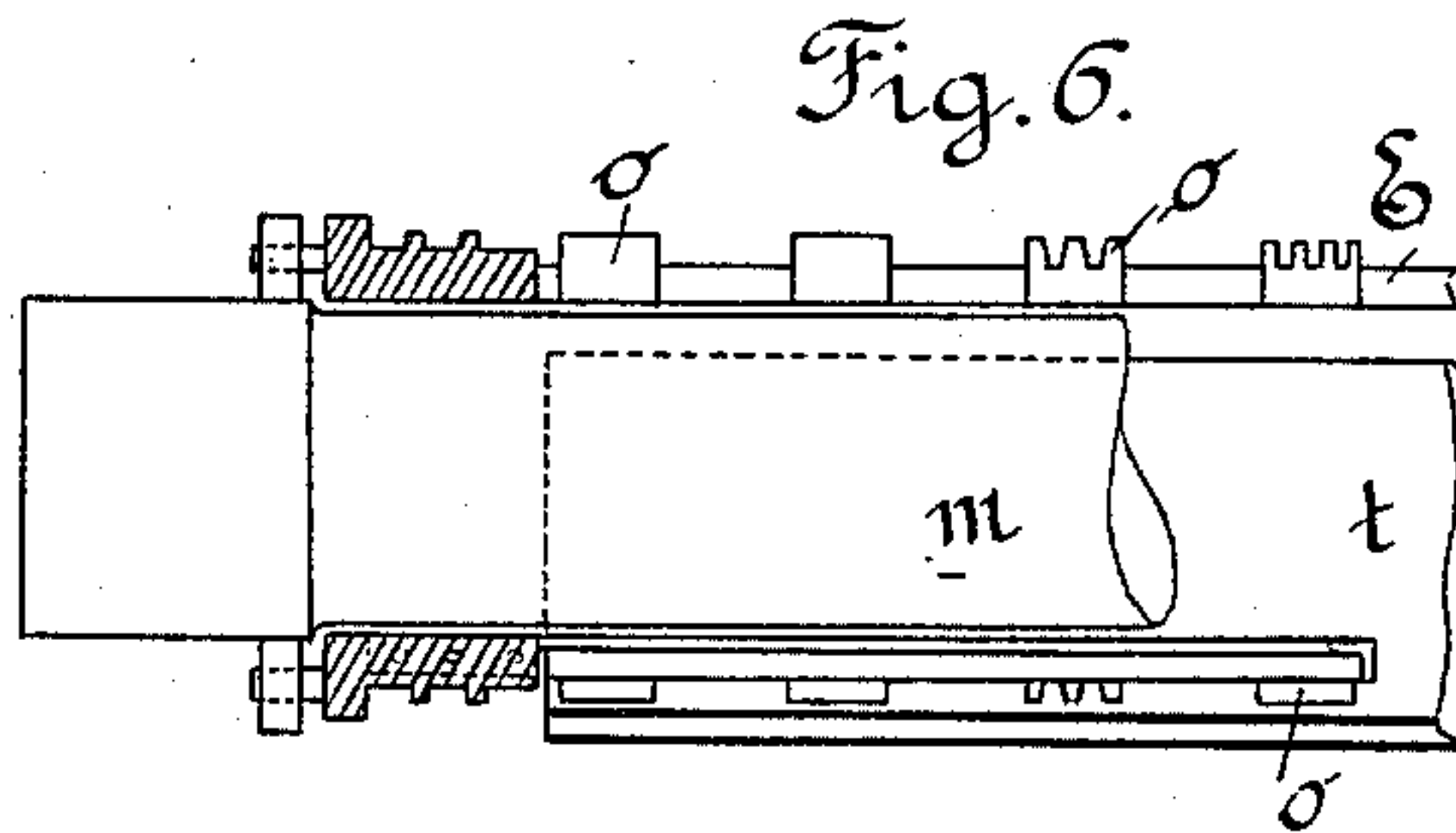
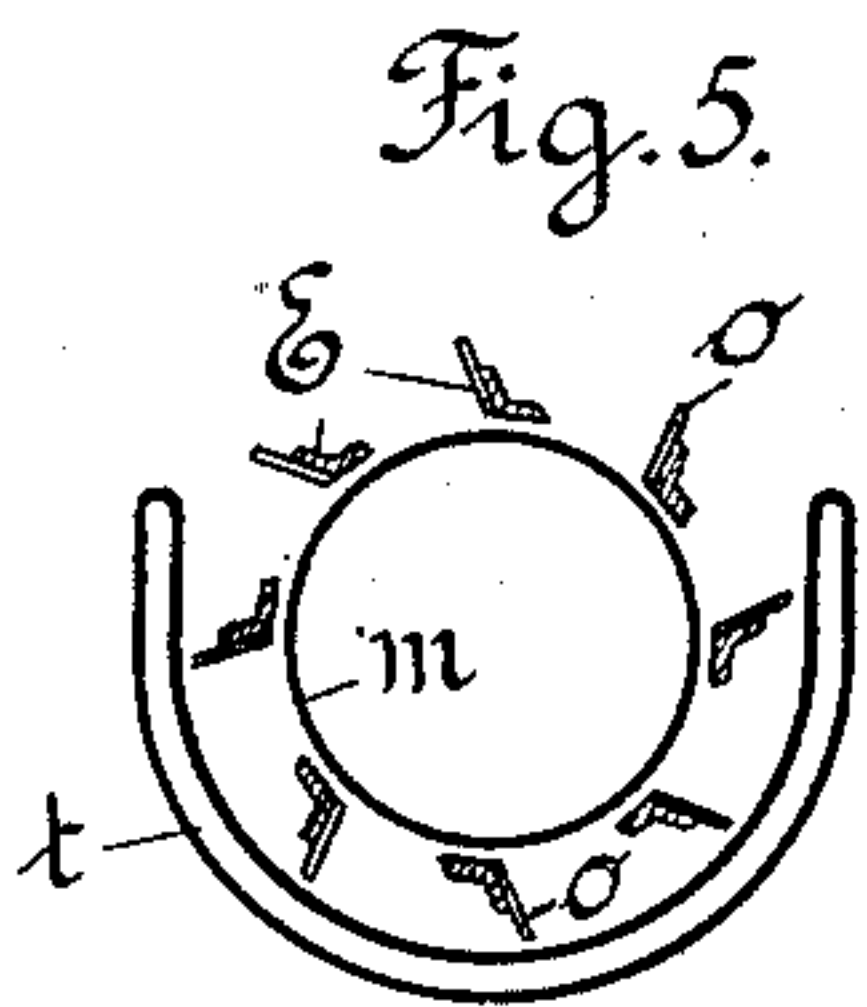
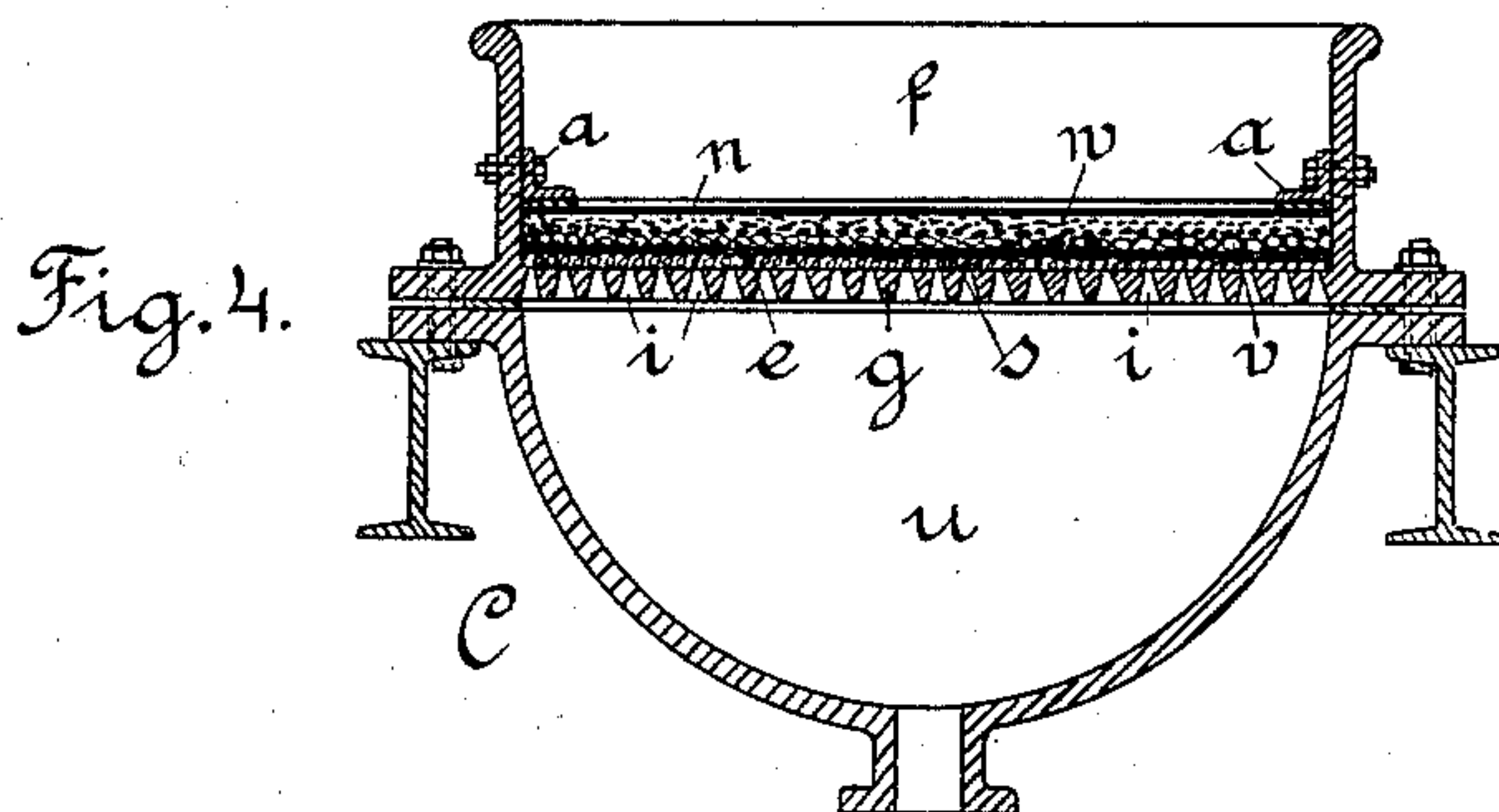
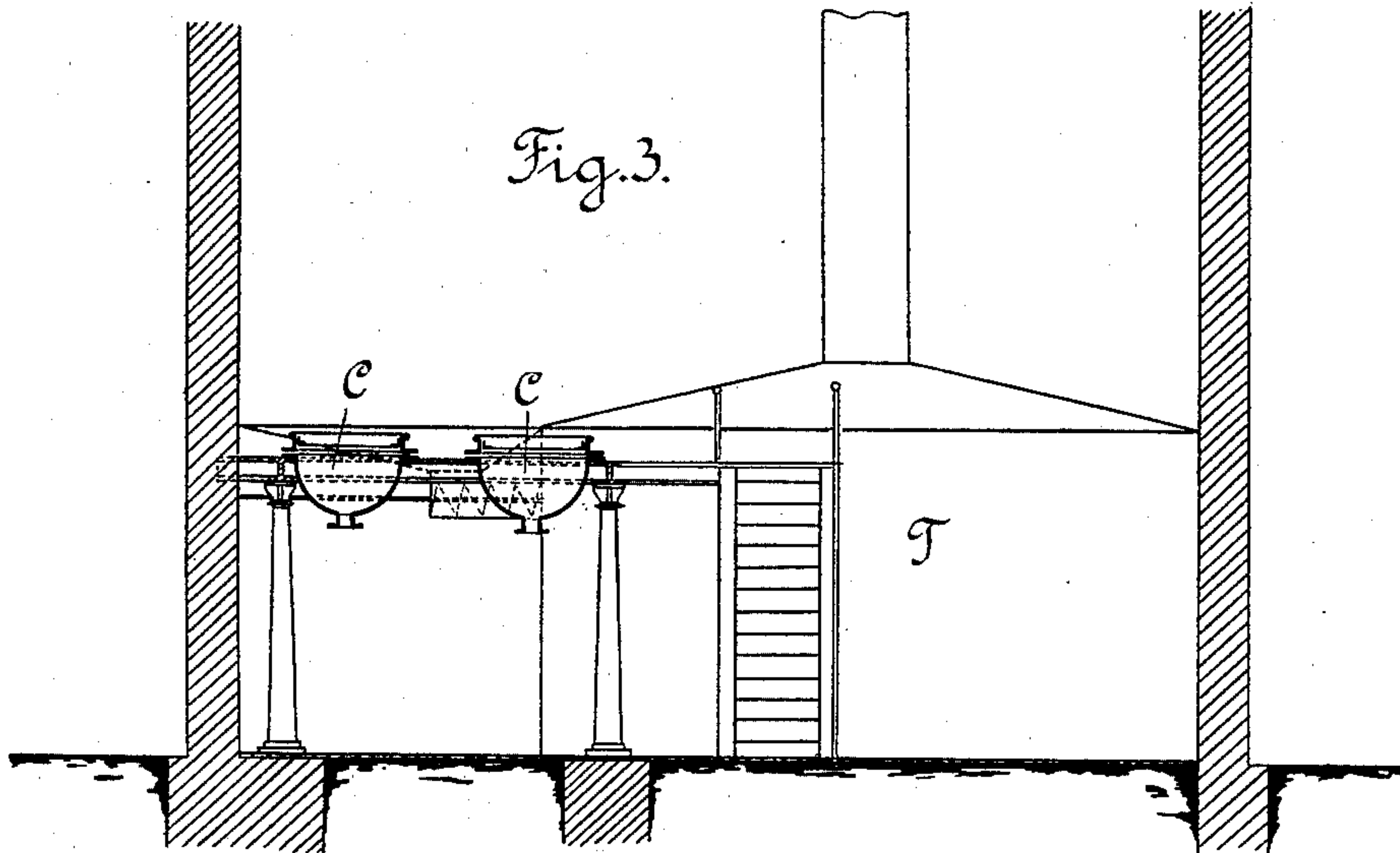
E. LÖWI.

METHOD OF OBTAINING CATTLE FOOD.

(Application filed Dec. 9, 1895.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

EDMUND LÖWI, OF PRAGUE, AUSTRIA-HUNGARY.

METHOD OF OBTAINING CATTLE-FOOD.

SPECIFICATION forming part of Letters Patent No. 609,824, dated August 30, 1898.

Application filed December 9, 1895. Serial No. 571,570. (No specimens.) Patented in Belgium October 15, 1894, No. 112,137; in Austria December 29, 1894, No. 44/6,536; in France January 18, 1895, No. 241,959, and in Hungary August 22, 1895, No. 3,454.

To all whom it may concern:

Be it known that I, EDMUND LÖWI, manufacturer, of Prague, in the Kingdom of Bohemia, Empire of Austria, have invented new and useful improvements in the method of treating all kinds of residuary liquors from the fabrication of spirits, dry yeast, and the like, (for which I have obtained a patent in Belgium, No. 112,137, bearing date October 15, 1894; in Austria, No. 44/6,536, bearing date December 29, 1894; in France, No. 241,959, bearing date January 18, 1895, and in Hungary, No. 3,454, bearing date August 22, 1895,) of which the following is a specification.

The conventional methods hitherto adopted to obtain a new and dry food product from liquid dregs possessed the one great defect of costliness, as it was found necessary to remove about eighty to ninety per cent. of water from the fluid mass and to insure the simplest and speediest manipulation of the great quantities of residuary liquors created in the manufactories in question. The cost of coal for evaporating and inspissation was often as much as the value of the dregs themselves. Where filter-presses were used for draining, the method was found to be highly troublesome, slow, and dear, the most valuable ingredients, such as the protein and fatty stuffs, being at the same time partly wasted. In the same way the apparatus based upon this method are so dear and so quickly worn out that it will never be possible to find a general adoption for them.

The method does not aim at a clarification and purification of the residues; but consists in the employment only of such means as will rapidly precipitate the albuminous and fatty ingredients of the residuary liquors, thus enriching the food product in protein and fatty substances without rendering it dearer or proving in any way pernicious. By this method the amorphous ingredients of the food products present in the solution are precipitated with the crystals (which are very minute) of regenerated carbonate of lime, (*saturationskalk*, *scheideschlamm*,) by which means they lose their slimy character and increase the dimensions of the lime-crystals, so that they cannot stop up the filter. It has been already tried to

concentrate the residues by means of caustic lime; but exact experiments with which Professor Maercker, of Halle, has been charged by me have proved that the action of the regenerated carbonate of lime (*saturationskalk*, *scheideschlamm*) being used in this process is quite different from the one brought about by the caustic lime.

First. By means of the regenerated carbonate of lime considerably larger quantities of protein and also a little more fat were brought into the residue.

Second. By the application of larger quantities of regenerated carbonate of lime in comparison to smaller quantities the loss of protein is not increased, while through the employment of equal quantities of chalk in form of caustic lime the employment of larger quantities of caustic lime caused a considerably greater loss of protein than smaller ones. The cause of the latter fact is that caustic alkalis and caustic lime decompose the protein bodies even in a short time, in the cold as well as in the heat, in such a manner that from the insoluble protein bodies soluble ammonium salts are separated into amids, whereby the stock of the useful protein is of course diminished, this not being the case if regenerated carbonate of lime is employed.

The method in question is described in the following, reference being had to the accompanying drawings, of which—

Figure 1 is a front elevation showing diagrammatically the plant. Fig. 2 is a plan view showing diagrammatically the plant. Fig. 3 shows diagrammatically two suction apparatus. Fig. 4 is a transverse section representing one suction apparatus. Figs. 5 and 6 are details of the drying apparatus. Fig. 7 shows details of the suction apparatus of Fig. 4. Fig. 8 shows the arms of the stirring contrivance of the boiling apparatus.

The residuary liquors are first placed in a boiling and stirring apparatus A, Figs. 1 and 2, in which they are mixed with one-half per cent. of well-dissolved acetate of alumina and sulfate of magnesia. Inside the boiling apparatus is a copper stirring contrivance R with perforated arms *b b*, Fig. 8. Steam is admitted into R after the boiling apparatus

has been completely filled, with the result that the arms *b b* mix and warm the residues. When the residuary liquors have reached a temperature of 100° Celcius, one per cent. of a mixture prepared by adding water to regenerated carbonate of lime out of the reservoir B is thrown in and both are thoroughly boiled, the lime combining at once with the acids present in the residuary liquors and sinking to the bottom, while the carbonic acid escapes with an audible noise. The amorphous particles of the residuary liquors are united with the particles of the carbonate of lime and precipitated. They thus lose their slimy property, and there is no possibility of the filter becoming choked up. The function of the solution of acetate of alumina and sulfate of magnesium is to coagulate the protein and fatty substances contained in the liquid residues.

By the acid present in the residuary liquor it is further possible to attain a special action of the regenerated carbonate of lime afterward added. The proportion of the added acetate of alumina and sulfate of magnesium is based upon the acids contained in the residuary liquors, but must not exceed one-half per cent., while at least double the quantity—i. e., one per cent.—of regenerated carbonate of lime should be added.

By "regenerated" carbonate of lime is meant the carbonate of lime (*saturationskalk*, *scheideschlamm*) produced in the sugar-works as by-product. It possesses, in contrast to the caustic lime, the advantages hereinbefore explained.

When the residuary liquors in the vat A have been thoroughly boiled, they are conveyed to the suction apparatus C through the pipe *r*. These peculiarly-constructed suction apparatus, Fig. 4, consist of a sieve *g*, a trough *u* to receive the sucked-off water, and a receiver *f*. The sieve has numerous conic perforations *i*. Upon this is stretched a spiral wire-gauze *s*, Figs. 4 and 7, (net of spiral wires,) and upon the latter an ordinary close-wire gauze *e*. This in its turn is coated with a layer of boneblack or charcoal *v*, and then comes a coating of sand *w* of varying grains, and finally, surmounting the whole filtering material, a wire net *n*, which is fastened tight onto the receiver *f* by means of angle-irons *a* and screws.

The receiver of the suction apparatus having been completely filled with the residuary liquors, the vacuum-pump P, Figs. 1 and 2, is set slowly in motion. Between the pump and the suction apparatus is the vessel K. Pipes from both pass into K, which serves to catch up the water carried along out of the suction apparatus. After a space of ten minutes a vacuum of about seventy-five per cent. is attained in the suction apparatus and the whole mass has been so far sucked up that the remaining residues scarcely contain forty per

cent. of water. Thence they are conveyed to the drying apparatus proper, T, which is heated by the escaping smoke-gases and dried. This drying apparatus T consists of a number of cylinders *m*, built into the walls *c c*, and through which are conducted the smoke-gases out of the flue O. Underneath the cylinders are the troughs *t*, which can be heated either by return steam or by the escaping smoke-gases, while surrounding them are peculiar stirring and transport contrivances E, Figs. 5 and 6, consisting of angle-irons revolving around the cylinders, and which, with their shovels O, throw the residues onto the cylinders and at the same time convey them farther. By degrees the residues pass one cylinder after the other until they come out below at *z* thoroughly dry. The residues contain no lumps, but have the same consistency as clay, while in the usual steaming process hard lumps were formed, which could not be reduced afterward in the drying process and therefore mold internally.

In the well-known filter apparatus hitherto used the sucking-off process was impossible, particularly with the working of large quantities. Years were occupied with tests and experiments and a special form of filter apparatus with suitable filtering contrivance had to be constructed.

It is only in the present process, which allows of a draining to the extent of forty per cent., that the two-fold purpose is attained—viz., first, that the water sucked off contains no food particles, and, second, that the residues remaining can be dried in the drying apparatus by the smoke-gases almost free of cost. Finally, by the quick working up of the residuary liquors at a comparatively low temperature the quality of the dry products obtained is considerably better in every respect than was the case with drying processes hitherto, the digestibility at the same time a very much higher percentage, and the smell and taste being equal to those of fresh residuary liquors.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

The method of treating all kinds of residuary liquors from the fabrication of spirits, dry yeast, and the like herein set out, which method consists in mixing the residuary liquor with a solution of acetate of alumina and sulfate of magnesia and bringing them to a temperature of 100° Celsius, and then throwing in regenerated carbonate of lime, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EDMUND LÖWL.

Witnesses:

JOSEF TOMISKA,
MILOSLAU HRUBY.