May 16, 1950 V. M. DAVID 2,507,891

APPARATUS FOR TREATING FISH AND MEAT

Original Filed Sept. 7, 1943

Fig. 1.

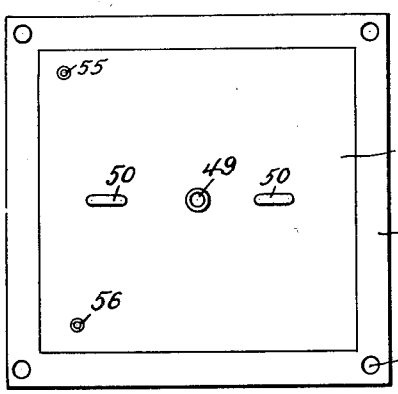


Fig. 2.

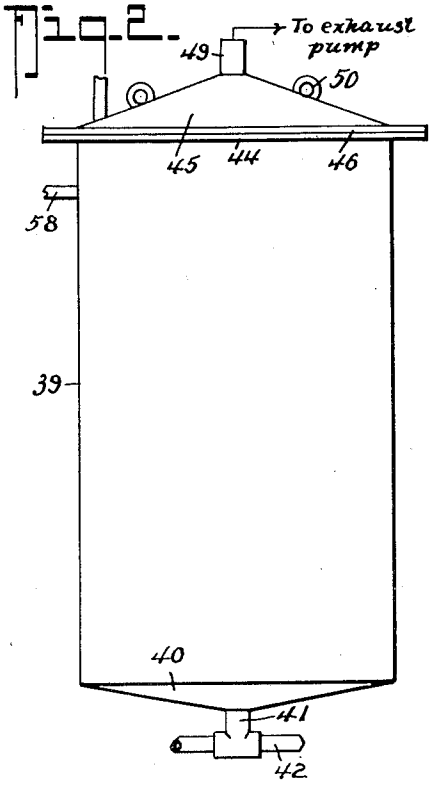


Fig. 3.

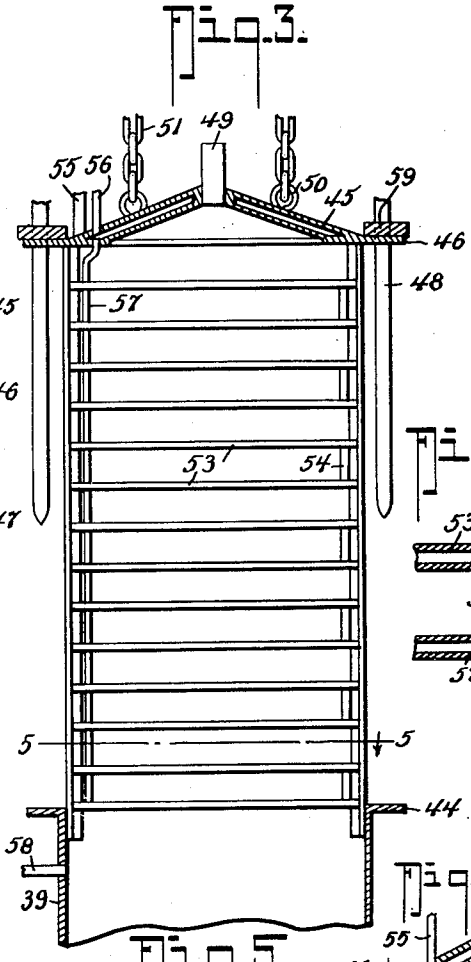


Fig. 4.

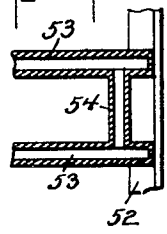


Fig. 5.

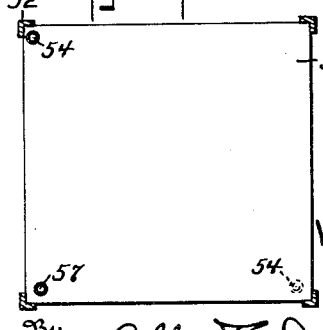
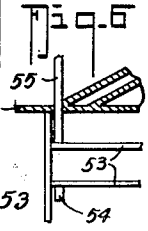


Fig. 6.



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2,507,891

APPARATUS FOR TREATING FISH AND MEAT

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Original application September 7, 1943, Serial No. 501,471. Divided and this application May 27, 1944, Serial No. 537,649

3 Claims. (Cl. 126—369)

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My invention relates to apparatus for use in the preparation and preservation of fish and meat for shipment to distant places.

It is an object to provide an improved apparatus for use in connection with the process disclosed in my abandoned application Ser. No. 501,471, filed September 7, 1943, of which application this application is a division.

Other objects of the invention will in part be obvious and in part will be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention also resides in the novel steps, sequence of operations and apparatus combinations, all of which will hereinafter be first described in the detailed description to follow and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Fig. 1 is a top plan view of the retort constituting my present invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is a detail vertical section of the same, parts being broken away, and the shelf unit being shown in its farthest lifted position.

Fig. 4 is an enlarged detail section of one of the shelves.

Fig. 5 is a detail section on the line 5—5 of Fig 3.

Fig. 6 is a detail view showing the connection of pipe 55 to the top shelf 53.

In the drawing, in which like numerals and letters of reference indicate like parts in all the figures, it will be seen that 39 indicates a—preferably—square case or body having a hopper-like bottom 40 provided with a drain outlet 41 that may be connected with a common drain duct 42 having suitable shut-off valves (not shown). The body 39 has a top flange 44 on which the flange 46 of the shelf unit rests hermetically when the retort is in operation.

The shelf unit comprises the retort top or cover 45, the corner angles 52, the tier of shelves 53, the outlet 49 which is adapted for connection to the vacuum pumps (not shown), the steam inlet pipe or nipple 56, the pipe 57 which conveys steam from the hollow top 45 down to the lowermost shelf 53, the steam outlet pipe or nipple 55 that conducts the steam from the top shelf, and the pipes 54 which connect the shelves in series. It should, of course, be understood that the shelves are hollow and the pipes 54 are staggered and located at diagonally opposite corners of the shelves so that the steam from the lowest shelf passes into and through the series of shelves

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above, seriatim. The unit also includes means by which the chains 51 from cranes (not shown) may be attached, as, for instance, eye-bolts or the like, 50.

In order to steady the unit when it is being raised, I provide rigid rods 48 which enter guide holes 47 in the flange 46 and their supports 59 serve to limit the upward movement of the unit to a position where the lower ends of the angle irons 52 of the unit will still remain in the vessel 39 when the lowest shelf is just above the top of the flange 44 (see Fig. 3). A nipple 58 may be provided for connection to a test apparatus (not shown) by which the degree of vacuum and humidity within the retort can be ascertained when desired.

The fish, after the preliminary treatment necessary to remove as much as possible of the glue substance in the fish, are carried on suitable sheet metal plates or trays and are placed on the shelves of the retort unit, and the unit (composed of the cover of the retort and the vertical framework carrying the shelves), is lowered to close the retort. These shelves are in themselves steam-jackets or heating elements to supply conducted heat directly to the product.

Transmitted or radiant heat cannot be so effective under such high vacuum as is required to result in rapid dehydration. Therefore the heat is applied directly to each shelf, thereby delivering a constant heat to the product during the entire process. The framework is attached to the outside of the heated shelves to afford clear space on the shelf for the placing or removing of the metal trays of fish. This enables easy filling and removal of the trays.

The filling of the shelves takes place from the lower shelf and as each shelf is filled the unit is lowered into the evacuating chamber or retort and when completely filled, the cover is securely fastened and the evacuating pipes and steam pipes are coupled and the processing commenced. If the fish is of the type to be pre-cooked, the vacuum pumps are not actuated at this stage of the operation, but the heat is applied—either by injecting steam into the chamber directly in contact with the product or by applying heat through the jacketed shelves. Either process will raise the pressure rapidly, which should be held at the required pressure (20 lb.) for the required time (10 to 30 minutes, depending on the kind of fish being processed). For example, the fibrous type of fish heretofore considered second grade so far as marketability is concerned (due to its toughness) may be considered first grade for

marketing and is very palatable after the same has been treated by my process, since by that process the tough, fibrous, coarse grains are softened and become separated from each other and remain separated and flaky and are therefore easily masticated.

At the end of this process the source of heat is discontinued and a discharge valve at the bottom of the retort is opened and the pressure from within forces the moisture, which has condensed in the said retort, out of the retort. When the pressure has been lowered to that of atmospheric pressure, the outlet valve is closed and the vacuum apparatus is put into operation at the same time heat is applied to the shelves within the retort. The high temperature (212° and over) and high vacuum (29 inches and over) forces the moisture in the product to boil rapidly. With efficient ejection apparatus in operation, the moisture is removed as quickly as it expands into vapor. As the process nears completion, a moisture check-up can be made, which determines whether there is still any moisture being given off in the vapor by observation through a glass tube line connected to an efficient vacuum pump having on this assembly a direct hook-up to the receptacle part of the retort for the purpose of testing the moisture content of the products by observing the condensation in the glass trap or line. If no moisture condenses, it is an indication that the product is bone dry. It should be said that the observation test could also be made on the main evacuating line, but from a commercial standpoint the main connections should be of rigid, heavy-duty material and not obstructed by traps or small apertures that may tend to retard the rapid dehydration, whereas the small efficient vacuum pump unit could be of the portable type and moved alongside the retort at the required time and tapped into a suitable small outlet so that the test could be made within an appreciably short period of time. The dome of the retort cover should be comprised of a heated or steam-jacket type.

The heating method found best to use in heating the shelves is the application of steam. The pipes, for easy connection to the shelves, should enter through the cover, the inlet extending to the most distant shelf and returning in a staggered or offset fashion to permit the steam in its return journey to enter alternate corners of the shelves, the inlet at the bottom corner of the shelf, and the outlet at the upper opposite corner, to assure an even distribution within the jacketed shelves. This method does not complicate the operation and eliminates any internal connections. The cover may be removed with the whole shelf assembly attached and only requires the union on the steam pipe and vacuum pipe connection to be discontinued on the exterior of the cover.

The cover and assembly can be smoothly hoisted and as the shelves are raised above the edge of the receptacle part of the retort, the sheet metal trays with their contents can be removed and the products placed in cartons or other containers. For a more detailed description of the process, reference is made to my abandoned application Ser. No. 501,471 aforesaid.

From the foregoing description, taken in connection with the accompanying drawing, it is thought that the apparatus and its advantages will be clear to those skilled in the art.

What I claim is:

1. A retort comprising an open top case and a shelf unit constructed to fit within the case and including a closure for the case, a frame extending from said closure within the case, hollow shelves carried by said frame in superposed series, pipe connections between the several shelves, a pipe to convey steam to the lowest shelf and a pipe to convey steam from the highest shelf, and an outlet in said closure adapted for connection to a vacuum pump, said closure being peaked and jacketed.

2. A retort comprising an open top case and a shelf unit constructed to fit the case with a sliding fit so as to be capable of being raised and lowered through said open top and including a closure for the case, a frame extending from said closure within the case, hollow shelves carried by said frame in superposed series, pipe connections between the several shelves, a pipe to convey steam to the lowest shelf and a pipe to convey steam from the highest shelf, and an outlet in said closure adapted for connection to a vacuum pump, said closure being peaked and jacketed.

3. A retort comprising an open top case and a shelf unit constructed to fit the case with a sliding fit so as to be capable of being raised and lowered through said open top and including a closure for the case, a frame extending from said closure within the case, hollow shelves carried by said frame in superposed series, pipe connections between the several shelves, a pipe to convey steam to the lowest shelf and a pipe to convey steam from the highest shelf, and an outlet in said closure adapted for connection to a vacuum pump, said case having a depressed bottom provided with a drain.

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