Feb. 18, 1958 L. W. STRASBURGER ET AL 2,824,006

METHOD OF RECOVERING THE MEATS OF BIVALVES

Filed Oct. 2, 1956

FIG. 1

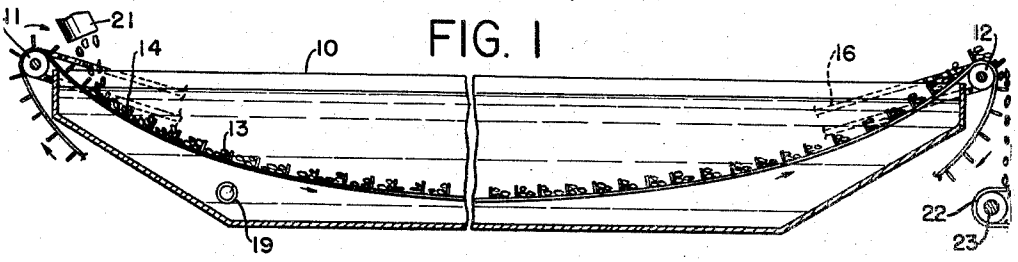


FIG. 2

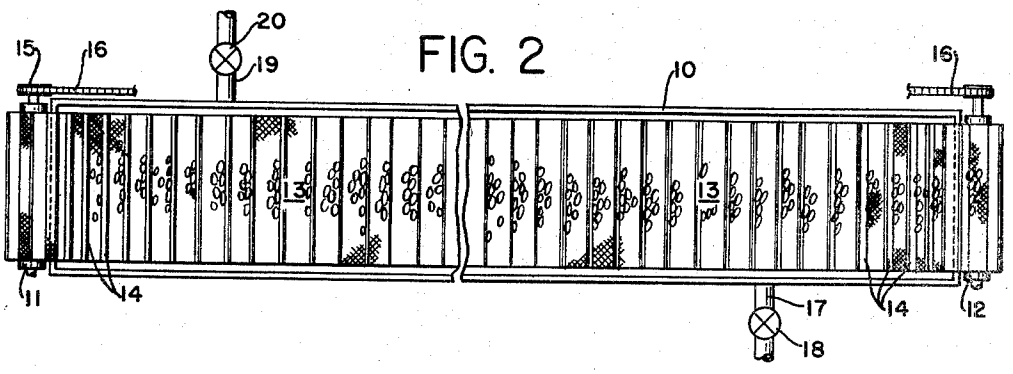


FIG. 3

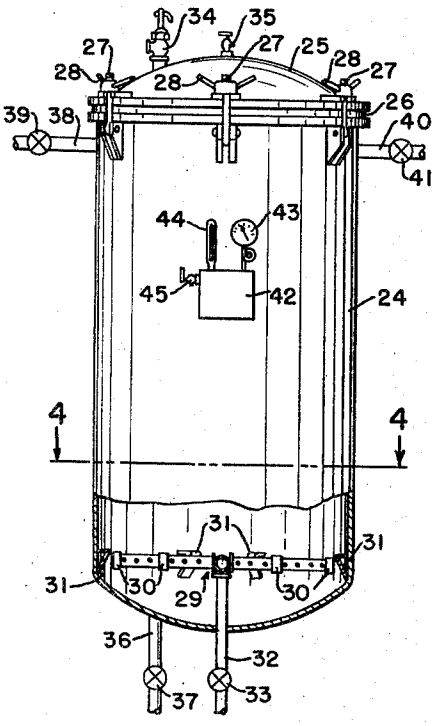
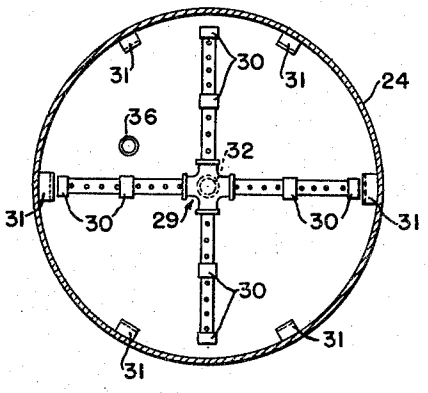


FIG. 4



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METHOD OF RECOVERING THE MEATS OF BIVALVES

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4 Claims. (Cl. 99—111)

This invention relates to the treatment of bivalve molluscs, of which oysters, clams, mussels, and scallops are examples, and is concerned more particularly with a novel method, by which the meats may be recovered from the shells of such bivalves rapidly and without damage to the meats. Although the invention may be utilized in the treatment of bivalves generally, all the advantages of the method are realized in its use in the treatment of oysters. Accordingly, a form of the method for the recovery of oyster meats will be illustrated and described in detail for purposes of explanation.

In the processing of oysters preparatory to canning as heretofore practiced, it has been customary to wash the oysters, when necessary, to remove foreign matter adherent to the shells, following which the oysters are cooked by steaming. For this purpose, the oysters may be loaded into crates, which are placed in steam heated retorts, or may be placed in cars, which are run into a steam box. The recovery of oyster meats from their shells requires that the adductor muscles of the oysters be freed from the inner surfaces of the valves and it had been found that the freeing of the muscles from the valves varies in difficulty according to the locality, in which the oysters are grown. As a consequence, the steaming of oysters as now practiced varies in duration and temperature within a considerable range determined by experience. At the conclusion of the heating operation properly carried on, the shells of the oysters are found to have opened and the adhesion of the muscles to the valves greatly weakened. The meats can then be recovered by manual operations or by the practice of the method described in Harris Patent 2,608,716, issued September 2, 1952.

Although the use of the Harris method effects a substantial reduction in cost of canning oysters, the muscles in oysters in beds from some localities, such as the Gulf of Mexico, adhere so tenaciously to the valves that it is not possible to obtain as complete recovery of the meats by the practice of the patented method as is desirable. The present invention is, accordingly, directed to a method of treating oysters and other bivalves, by which a substantially complete recovery of the meats from the shells can be easily obtained at low cost and with little or no damage to the meats, regardless of how tender they may be.

The method of the invention involves preliminarily subjecting the oysters to a freezing operation sufficient to freeze the meats solid, following which the oysters are cooked by subjecting them to a temperature in excess of 212° F. for a period varying in duration according to the source of the oysters. At the end of the cooking operation, the meats may be recovered from the shells by agitating the cooked oysters in bulk to free the meats from the shells, following which the meats are separated from the shells. The agitation may be carried out by tumbling the cooked oysters in bulk in the apparatus of Harris Patent 2,652,588, issued September 22, 1953. As a result of the preliminary freezing operation, the cooking of the oysters is made more efficacious in releasing the meats from the shells, so that a greatly improved recovery of the meats can be obtained by tumbling or agitation, even though the oysters have tender meats and highly tenacious muscles.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which:

Figs. 1 and 2 are longitudinal section and top plan views, respectively, of one form of apparatus, which may be employed for performing the freezing step of the method of the invention;

Fig. 3 is a view in elevation, with parts broken away, of a retort, which may be employed in the cooking step of the method of the invention; and

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

In the practice of the method, the shells of the oysters should be free of adhering foreign matter and the oysters obtained from some localities as landed at the dock require no cleaning, while oysters from other sources should be washed. For this purpose, the oysters may be passed through a conventional rotary drum washer, within which the oysters are subjected to water jets as they are rolled and tumbled in a mass. The oysters, when clean, are ready for the freezing step of the method and this operation can be carried on in any suitable freezing apparatus, such as that shown in Figs. 1 and 2.

The freezing apparatus illustrated comprises a tank **10** having rollers **11**, **12** mounted above its top at its opposite ends. A belt **13**, provided with crossbars **14**, is trained about the rollers and the shafts of the rollers are provided with sprocket wheels **15** driven in any suitable way, as by chains **16** trained about a sprocket wheel on a shaft driven by a motor, not shown. The tank is supported in such manner that the upper stretch of the belt passes into the tank and the lower stretch may extend beneath the tank. Near one end, the tank is provided with a pipe **17** with a valve **18** for the admission of cold brine, which is withdrawn from the tank near the other end through an outlet pipe **19** having a valve **20**.

In carrying on the freezing operation, the oysters may be deposited through a chute **21** upon the upper stretch of the belt near the point, where it enters the tank, and the oysters are then conveyed beneath the level of the brine in the tank to the opposite end of the tank, where they are discharged as the belt passes over the roller **12**. If desired, a conveyor belt **22** trained about a roller **23** may be placed to receive the oysters dropping from the belt **13**. The temperature of the brine and the rate at which the oysters pass through the tank **10** are such that the meats of the oysters issuing from the brine are frozen solid. The oysters are then ready for the cooking operation, which may be carried on by loading the oysters in cars and passing them into a steam box, as illustrated in the patent to Harris 2,608,716, issued September 2, 1952, or the oysters may be cooked by means of steam under pressure in a retort, such as is illustrated in Figs. 3 and 4.

The retort comprises a steel cylinder **24** having a cover **25** hinged to the upper end thereof. In closed position, the cover rests upon a gasket **26** and is held in place by bolts **27** pivoted on the cylinder and receivable between pairs of ears on the edge of the cover. The bolts have wing nuts **28**, by which the cover can be clamped tight against the gasket. A steam distributor in the form of a cross **29** of perforated pipes is mounted in the cylinder near the bottom and collars **30** on the pipes and brackets **31** on the inner surface of the cylinder provide supports for the oyster crates or baskets. Steam is supplied to the cross through a steam pipe **32** having a valve **33**.

The cover is provided with a safety valve **34** and a manually operated bleeder valve **35** and, at its lower end, the cylinder has a steam vent and bottom drain pipe **36**

with a valve 37. Near its upper end, the cylinder has a steam vent 38 with a valve 39 and may have a liquid inlet pipe 40 with a valve 41. A box 42 mounted on the cylinder is in communication with the interior thereof and carries a pressure gauge 43, a thermometer 44, and a manually operated bleeder valve 45. The bleeders are of small diameter, such as ¼" to 2" in diameter, and the steam vents may have a diameter of 1" to 2". If desired, the retort may be provided with automatic temperature means.

In the use of the retort, the crates or baskets of frozen oysters are loaded into the retort and the cover is swung shut and clamped tight. While the top and bottom vent valves 37 and 41 are partly opened, steam is introduced through the steam supply pipe 32 and, after a short time, the valves are closed and the steam is supplied at such a rate that the retort is heated to temperatures within the range of 220° F. to 260° F. at pressures from 2½ lbs. to 20 lbs. for a period from 4 to 25 min. The duration and temperature of the cooking depends upon the source of the oysters, the thickness of their shells and maturity, shell growth factors, the size of the adductor muscles of the oysters, etc. For cooking most oysters, the use of a temperature of 250° F. with a pressure of 15 lbs. and a cooking temperature of 6 to 8 min. is satisfactory.

At the completion of the cooking operation, the top steam vent valve 39 is opened and the steam supply is cut off. The crates or baskets are then removed from the retort and the separation of the meat from the shells may be completed by agitation of the oysters in bulk in a revolving drum, as disclosed in Harris Patent 2,652,588. In the drum, the oysters are lifted and dropped as the drum rotates and the separated meats escape from the openings in the drum wall, while the shells are discharged at the end of the drum. If preferred, the oysters may be carried on a belt traveling beneath the liquid and subjected from beneath to localized vibration. Preferably, the liquid through which the belt travels is a brine of such salinity that the oyster meats float while the shells sink. If necessary, the oysters may be passed through the liquid on the vibrating belt and then through the rotary drum.

Instead of cooking the oysters by steam under pressure, the cooking may be carried out while the oysters are immersed in brine. In practicing this form of the method, the retort shown in Figs. 3 and 4 may be employed, with the brine introduced through inlet 40 to fill the retort to such a level that, when the loaded crates are placed in the retort, the oysters in the crates are beneath the level of the liquid. The brine used is one having a salinity greater than that of the natural habitat of the

oysters and preferably of a salinity varying from 10° to 50° salinometer at about 60° F. For most oysters, a brine of a salinity of about 20° salinometer at 60° F. is satisfactory. The oysters are cooked in the brine by closing the upper steam vent valve 39 and supplying steam through pipe 32, until the temperature of the brine is at a point within the range of 220° F. to 260° F., with the pressure in the retort ranging from 2½ lbs. to 20 lbs. The oysters are cooked in the hot brine for a period of 4 to 20 min. and a cook of from 8 to 12 min. at about 250° F. is usually satisfactory.

At the completion of the cooking operation, the top steam vent valve 39 is opened to release the pressure and this causes turbulence within the saline solution within the retort. Such turbulence has a loosening effect upon the hinges of the oysters and the valves open, so that the meats are more readily accessible and more easily removed. In many instances, the muscles of the oysters are wholly released from the shells during cooking or, if not, the adherence of the muscles to the shells is so weakened that the turbulence causes the meats to be separated from the shells. Following the cooking in the hot brine, as described, the meats may be separated from the oysters by agitation in bulk, as by the use of the rotary drum of Harris Patent 2,652,588.

We claim:

1. A method of recovering the meats from bivalve molluscs, which comprises freezing the bivalves until the meats are solid, then cooking the bivalves by subjecting them to a temperature in the range from about 220° F. to about 260° F. for a period from about 4 to about 25 minutes, subjecting the cooked bivalves in bulk to agitation to free the meats from the shells, and separating the meats from the shells.

2. The method of claim 1, in which the bivalves are oysters.

3. The method of claim 1, in which the bivalves are cooked while immersed in a brine of a salinity in the range from about 10° to about 50° salinometer at about 60° F.

4. The method of claim 3, in which the salinity of the brine is about 20° salinometer at about 60° F., the brine temperature is about 250° F., and the duration of the cooking is from about 8 to about 12 minutes.

References Cited in the file of this patent

UNITED STATES PATENTS

2,155,308	Harris	Apr. 18, 1939
2,608,716	Harris	Sept. 2, 1952
2,765,236	Blaine	Oct. 2, 1956