GULF STATES SHRIMP CANNING INDUSTRY

By F. Bruce Sanford*, Charles F. Lee**, and Travis D. Love***

Shrimp constitutes our most important fishery (table 1). This crustacean is sold frozen, canned, fresh, and dried. Frozen and canned shrimp bring the greatest revenue.

Table 1 - Value of the United States Catch, 1957-61

Year	Shrimp	Salmon	Tuna	Other	Total
	(Million $)				
1961	52	52	44	210	358
1960	67	45	37	204	353
1959	58	36	37	215	346
1958	73	46	45	210	373
1957	73	40	39	202	354

Table 2 - United States Canned Pack of Shrimp, 1961

States	Value of Pack
	Million $
Gulf:	
Louisiana	6.8
Mississippi	1.9
Alabama and Texas	1.0
Pacific:	
Alaska	1.8
Washington and Oregon	0.4
Total	12.0

The shrimp canning industry is located in the Gulf and Pacific states (table 2). Most of the production is in the Gulf states, with Louisiana being the principal source.

Although consumers are aware of the tastiness and convenience of the canned product, many are not aware of the ingenuity and care required in its manufacture. Home economists, restaurateurs, retailers, and others closely associated with consumers may also not be acquainted with those aspects.

The purpose of this article therefore is to report on the shrimp-canning industry in order to give an understanding of what is required to make canned shrimp available. Since the operations are somewhat complex for a verbal description, photographs are used to depict the various steps.

Fig. 1 - Small shrimp trawlers find use primarily in the day-boat fishery. (The water plants seen here are water hyacinths, which grow profusely in many waterways of the South.)

Fig. 2 - Shrimp trawlers vary not only in size but also in design. The vessel in the foreground is a Florida-type trawler with the house well forward. The vessel in back is of the Biloxi type.

Fig. 3 - Many of the larger trawlers are double-rigged so that they can drag two trawls simultaneously. Note the two pairs of trawl doors hanging from the rigging, one pair on each side of the vessel.

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Fig. 4 - Shrimp and ice are shoveled from the hold into a conveyor-hopper. Depending on the location of the plant and on circumstances, shrimp are brought to the plant by either vessel or truck.

Fig. 6 - The shrimp are passed over an inspection belt, where debris and cull shrimp are removed.

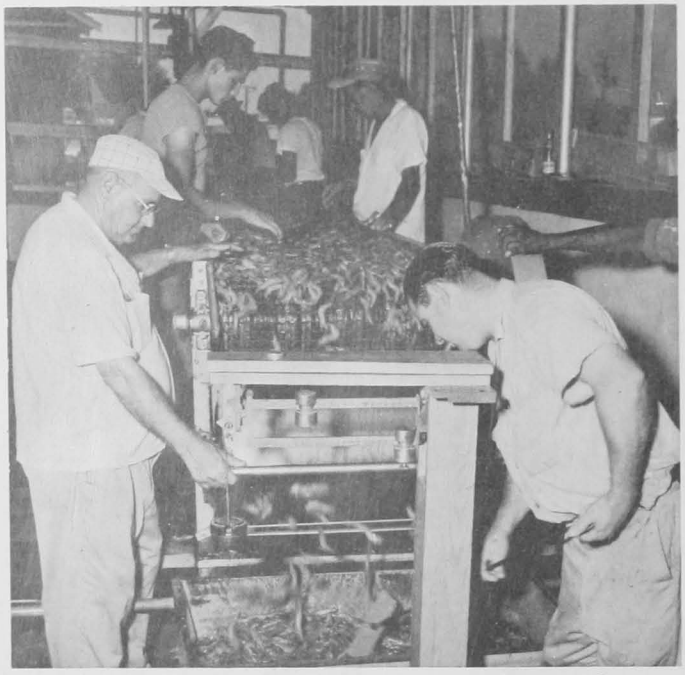

Fig. 8 - The inspected shrimp are conveyed to a weighing basket, which holds 105 pounds or a half barrel of shrimp.

Fig. 5 - Ice is separated from the shrimp, and the shrimp are washed prior to being conveyed into the plant.

Fig. 7 - Shrimp may grow to large size.

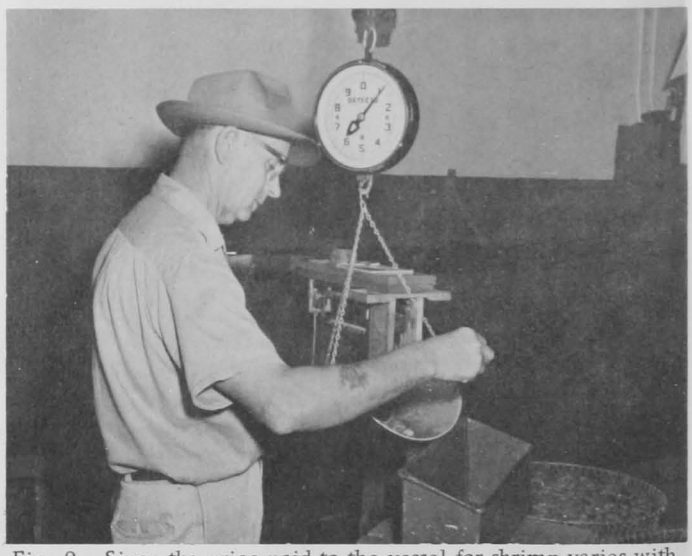

Fig. 9 - Since the price paid to the vessel for shrimp varies with the size, random samples are counted to determine the average number of shrimp per pound.

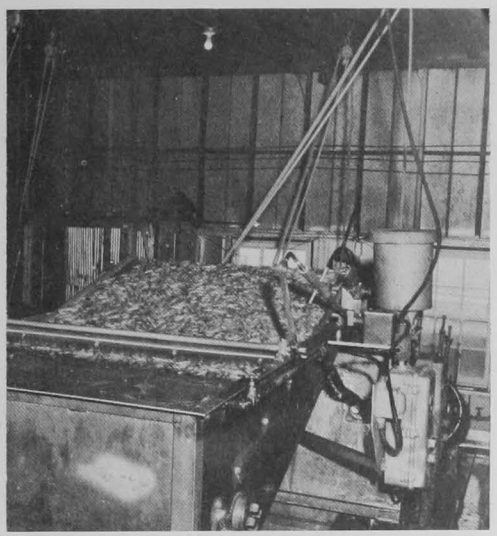

Fig. 10 - Shrimp are dumped into the hopper in the foreground and are carried by conveyor into a peeling machine.

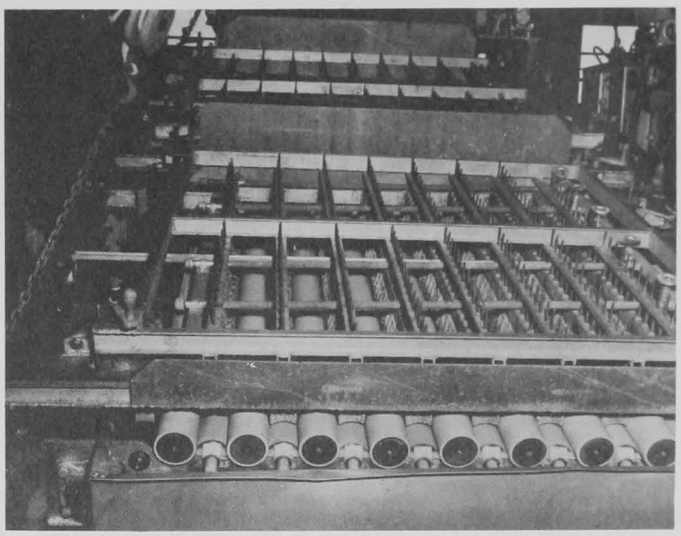

Fig. 11 - An oscillating motion of the rubber-covered rolls of this mechanical peeler assists in separating heads and shell from the softer meats of the shrimp.

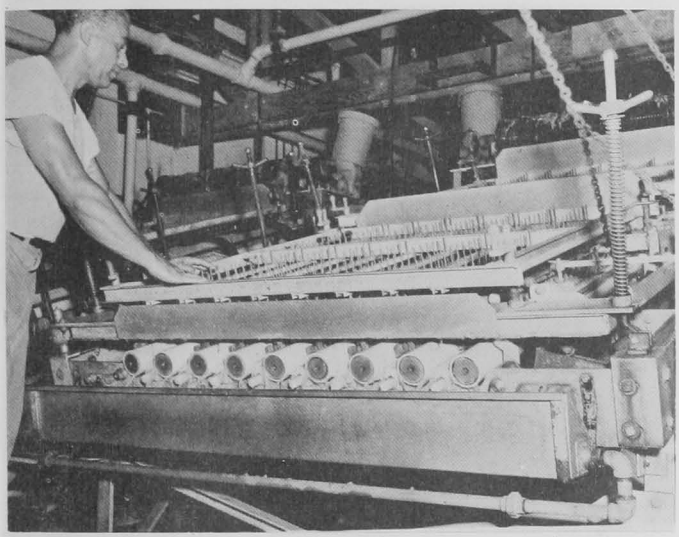

Fig. 12 - Alternately rising and falling mechanical fingers gently apply pressure to hold the shrimp against the soft rubber-covered rollers. A flow of water and the force of gravity carry the shrimp downward to the trough at the bottom end of the machine.

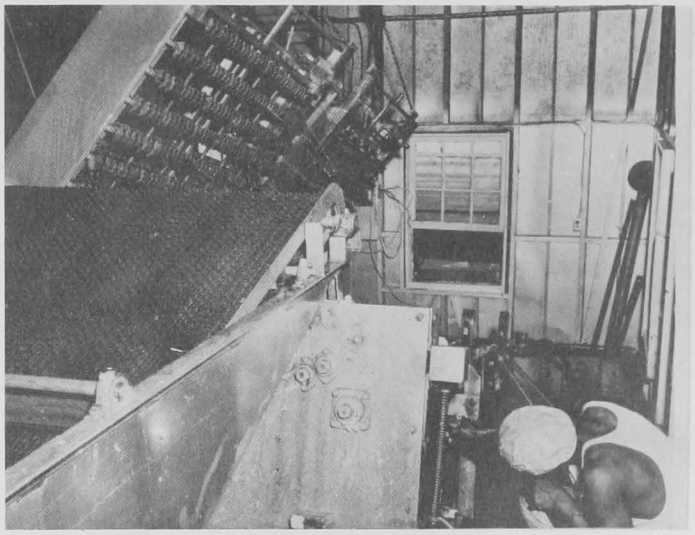

Fig. 13 - The opened machine shows the specially designed fingers that position the shrimp against the oscillating rollers for peeling.

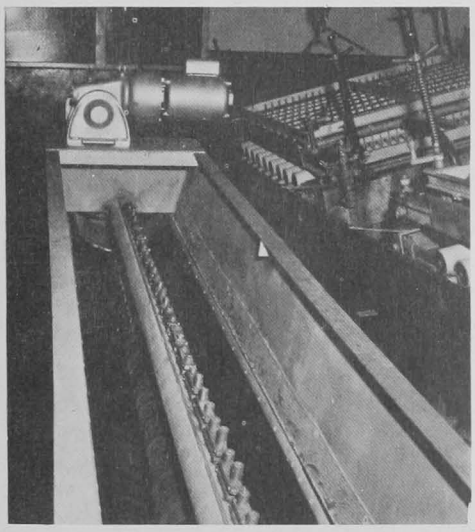

Fig. 14 - From the peeler, the shrimp pass to a scrubber, where an eccentric cam rotates rollers over the shrimp to loosen any material not removed in the peeler.

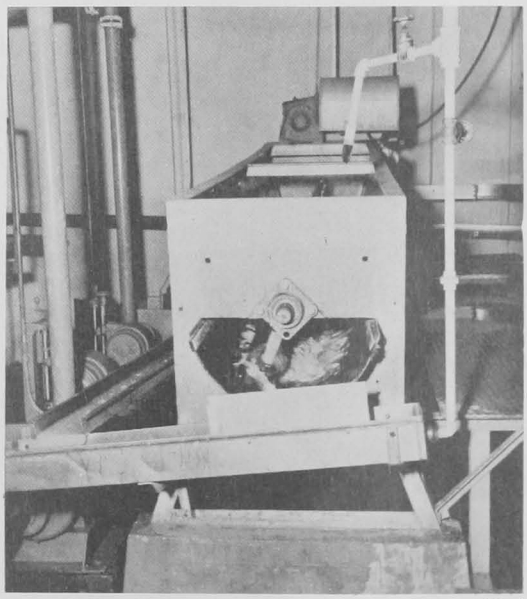

Fig. 15 - This view of the scrubber shows the rollers oscillating rapidly back and forth in a trough of running water.

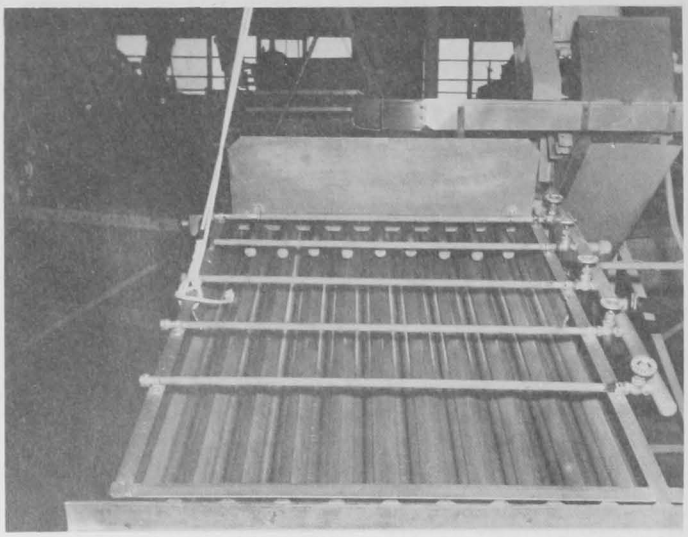

Fig. 16 - A separator removes the final bits of material loosened by the scrubber.

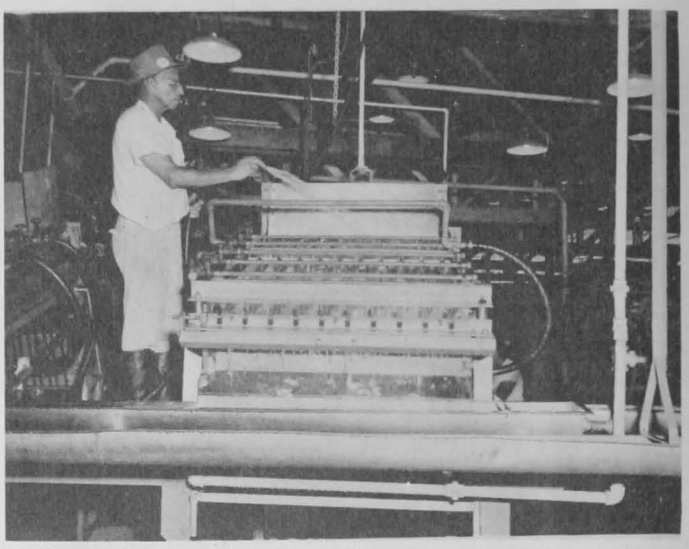

Fig. 17 - The shrimp drop from the end of the separator into a flume that transfers them to a deveining machine.

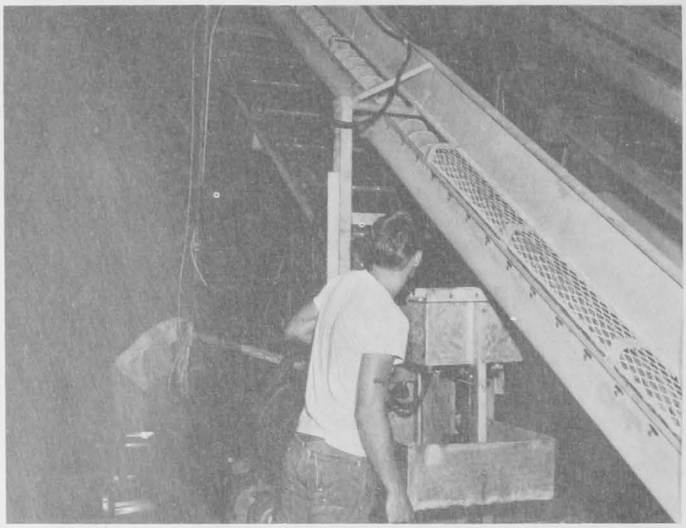

Fig. 18 - A screw conveyor elevates the shrimp to the top of the machine.

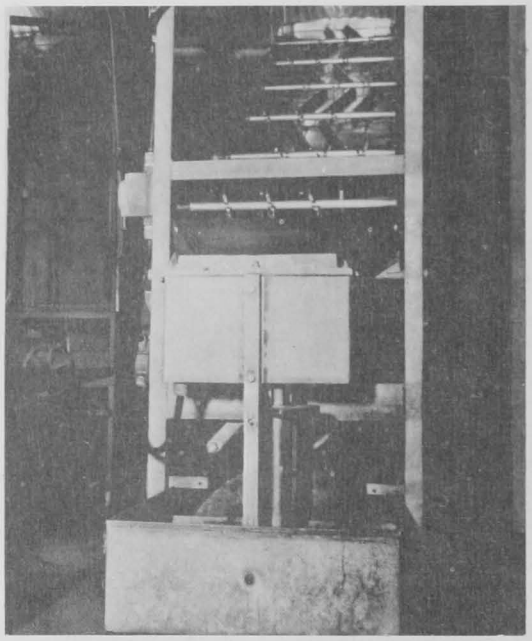

Fig. 19 - This machine removes the sand vein from the shrimp. The device has razor-sharp knife edges on the upper baffles to cut the back muscle of the shrimp in such a manner that the sand vein can be removed in the bottom rotating drum by sharp projections on its inner surface.

Fig. 20 - A special razor blade is used in the deveining machine.

Fig. 21 - The angle of descent on the deveiner is adjustable.

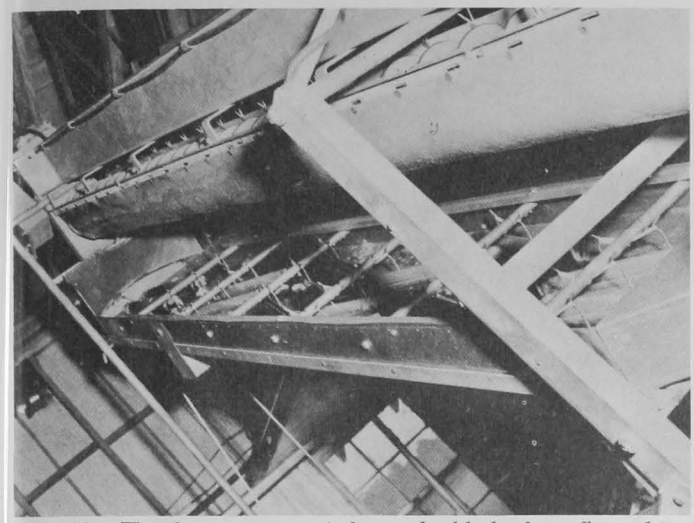

Fig. 22 - The shrimp are carried past the blades by a flow of water and the force of gravity.

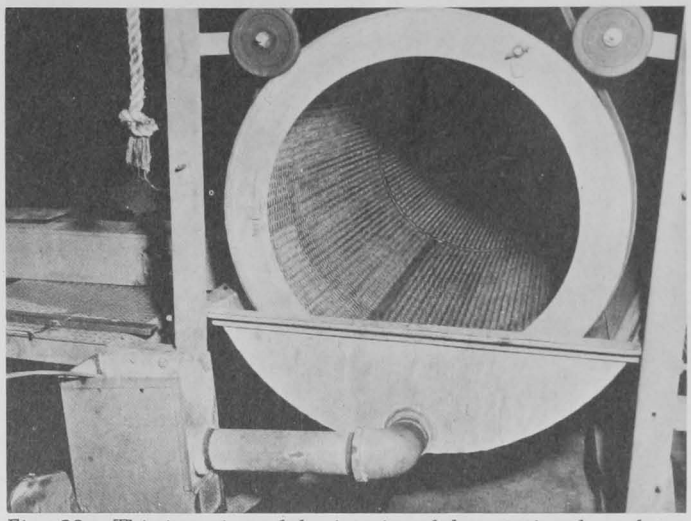

Fig. 23 - This is a view of the interior of the rotating drum for removing the sand vein.

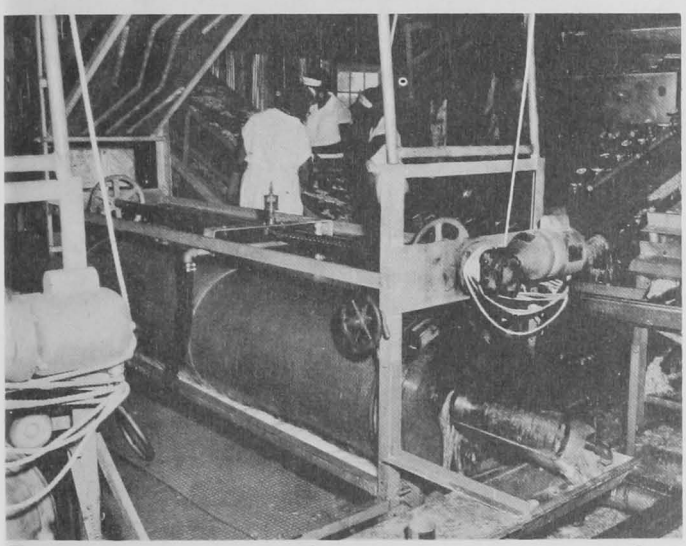

Fig. 24 - A carriage mounted on a screw supports a pressure hose that travels to an fro, washing the sand veins from the drum.

Fig. 25 - The shrimp are inspected prior to being cooked.

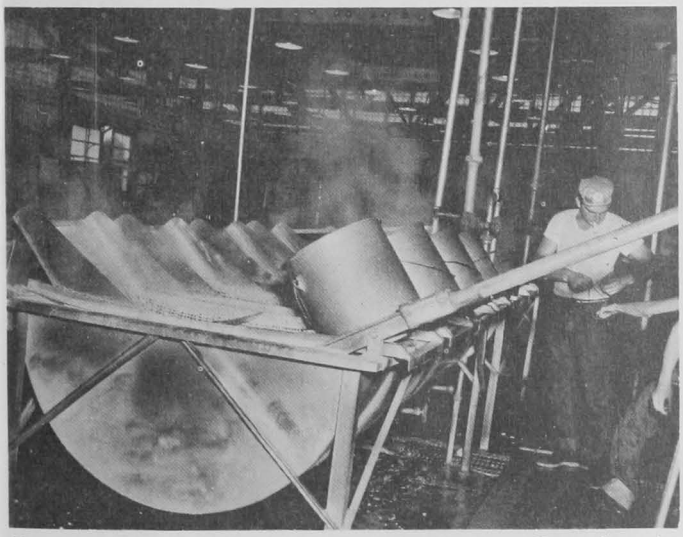

Fig. 26 - The cooking is done in a salt solution. Shown here is a batch cooker.

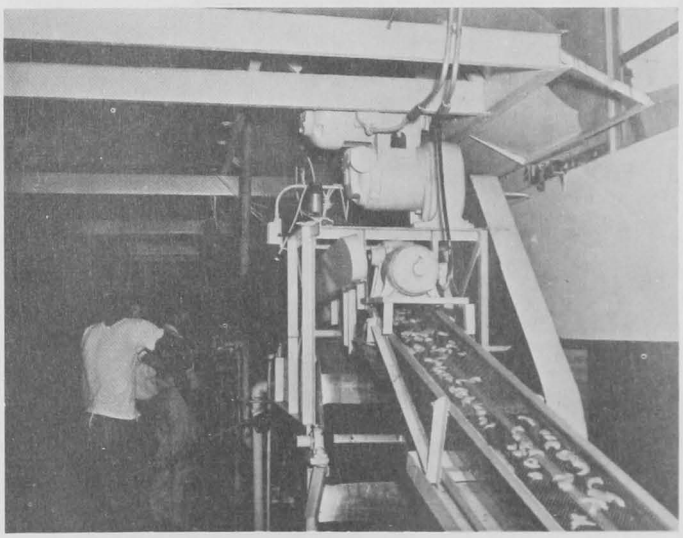

Fig. 27 - Alternately, a continuous cooker may be used.

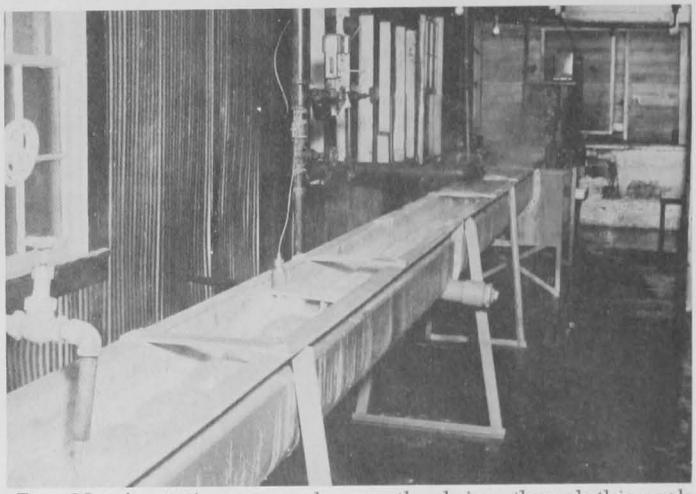

Fig. 28 - A rotating screw advances the shrimp through this cooker.

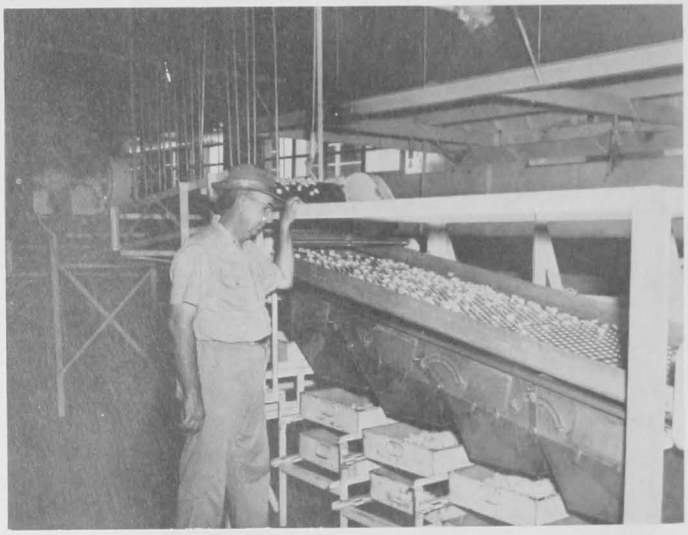

Fig. 30 - The shrimp are sized mechanically into the following groups: tiny, small, medium, large, jumbo, and colossal.

Fig. 32 - The cans are weighed by hand in order to meet the close tolerances required.

Fig. 29 - When the shrimp have been cooked, they are again inspected. After having passed through the cooker, they develop an attractive pink color and a characteristic curl. This curled shape not only is attractive, but use is made of it later in the mechanical grading of the shrimp for size. Also it is necessary to remove a portion of the moisture in order to get the proper amount in the can for required drained weight cut-out.

Fig. 31 - Broken shrimp are separated from the perfect ones.

Fig. 33 - The scales are designed for quick weighing.

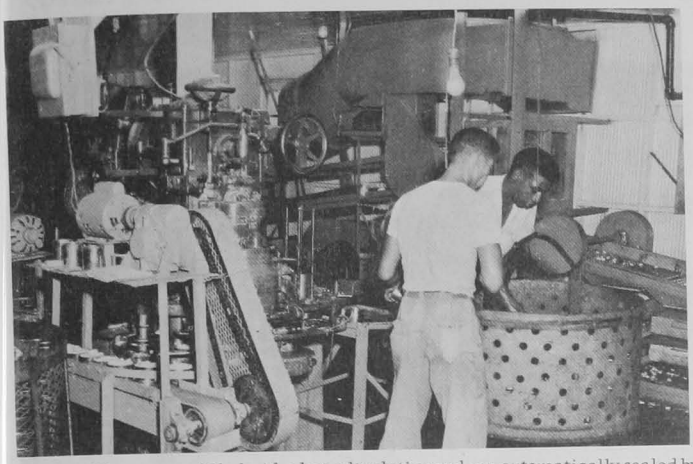

Fig. 34 - The cans are filled with a hot salt solution and are automatically sealed by machine. The salt solution, being hot, ensures a vacuum when the cans are cooled.

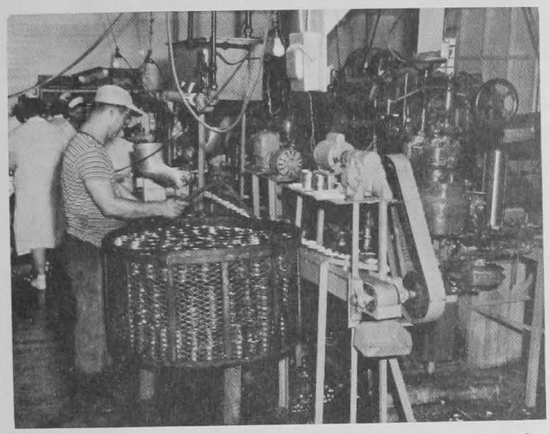

Fig. 36 - Use of a dolly permits the basket to be moved easily.

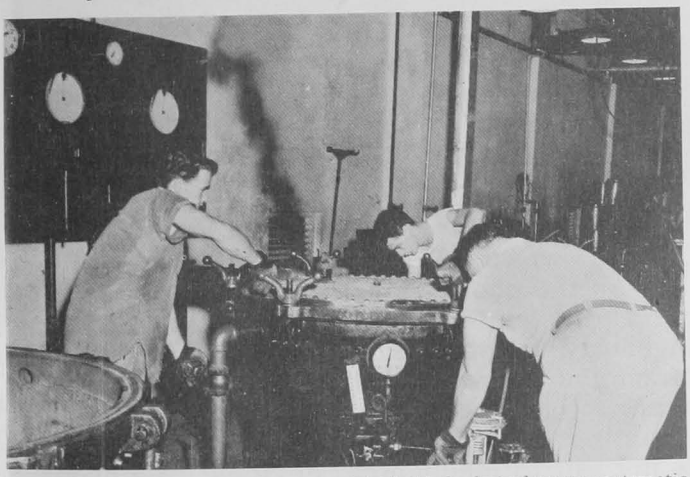

Fig. 38 - A cook is started in the retort, which holds the desired pressure automatically. Time, temperature, and pressure are recorded on the charts shown on the upper left.

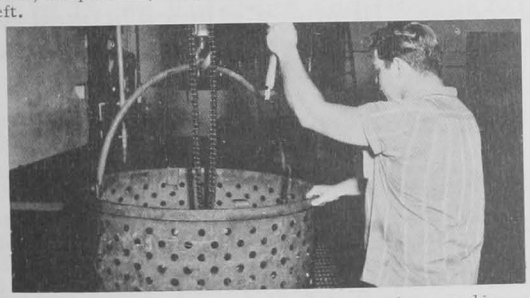

Fig. 40 - The cans of cooked shrimp are immersed in cooling water. Cooling prevents the shrimp from becoming overcooked.

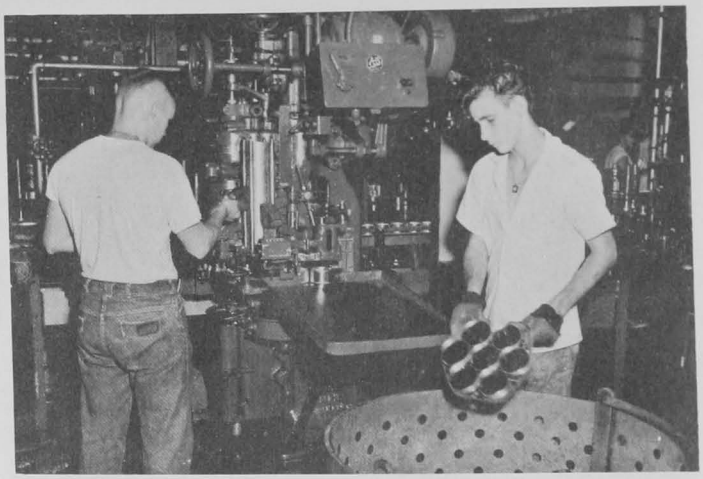

Fig. 35 - From the sealer, the cans go into a retort basket.

Fig. 37 - The basket is lifted into the retort with a power hoist.

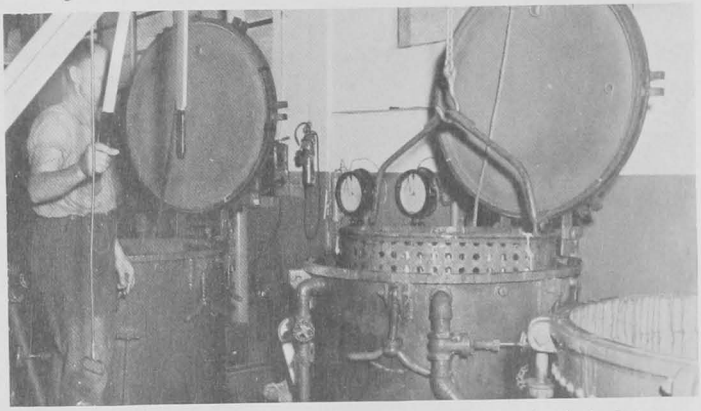

Fig. 39 - The power hoist again comes into use in removing the basket from the retort.

Fig. 41 - The processed cans are removed from the retort basket.

Fig. 42 - The unlabeled cans may be cased for storage, depending on the orders at hand.

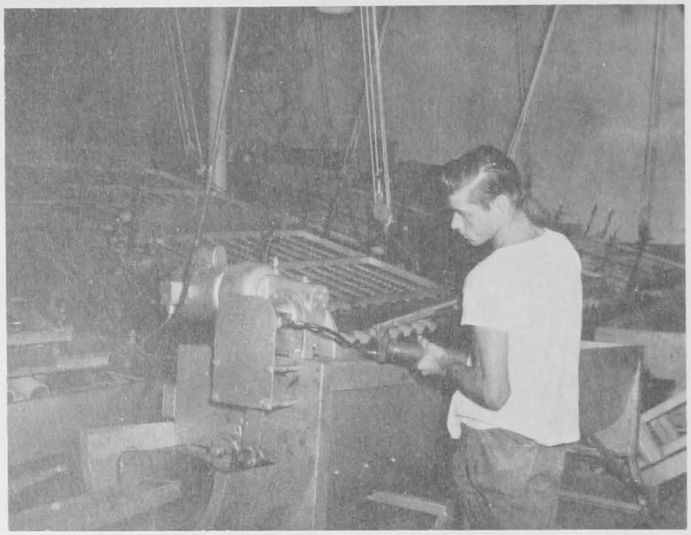

Fig. 44 - At the end of day, the machinery is carefully greased.

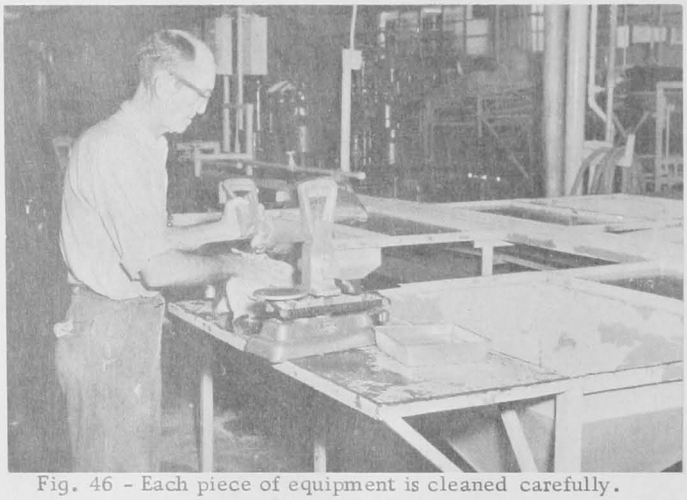

Fig. 46 - Each piece of equipment is cleaned carefully.

Fig. 43 - After the cans have passed through a labeling machine, they are packed into cartons ready for shipment to the consumer.

Fig. 45 - The equipment and the plant are thoroughly scrubbed with detergents and chlorine.

As the photographs show, the visitor to a plant for canning shrimp is impressed by the ingenuity and the care used in manufacture. Machines perform operations that persons unacquainted with American inventiveness would not think possible. Quality, however, is not left to mechanical devices: the product is inspected and reinspected in every step in the process. Utmost vigilance is used to ensure that every can of shrimp will be perfect.

LITERATURE CITED

POWER, E. A.
1961. Canned Fishery Products - 1961. Bureau of Commercial Fisheries, C. F. S. No. 2862, Annual Summary, 16 pp.

ROBINSON CANNING CO., INC. (Westwego, Louisiana).
1956. Shrimp Canning. (April), 5 pp.

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