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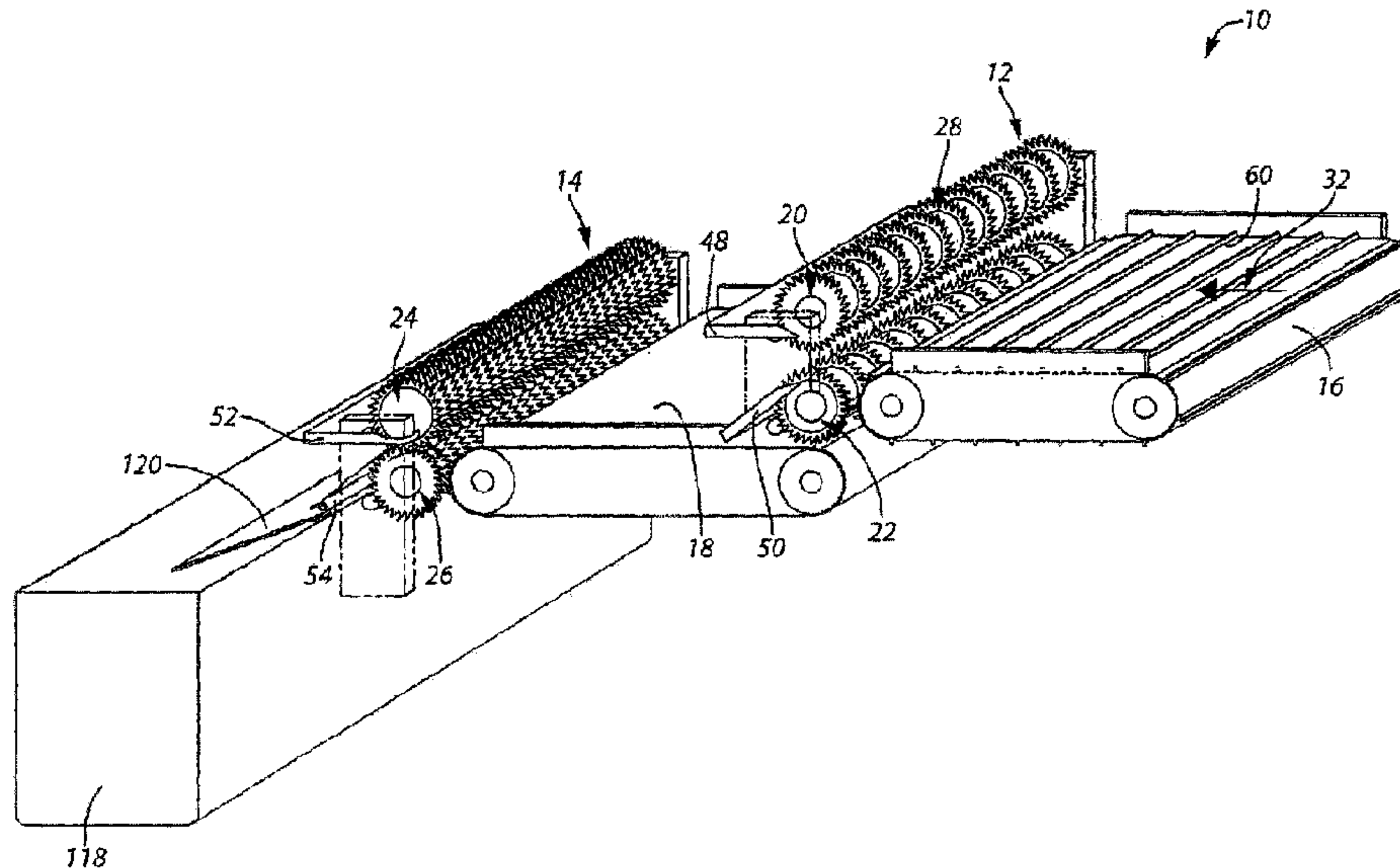
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(54) Titre : APPAREIL ET METHODE DE MACERATION DE PRODUITS DE VIANDE

(54) Title: APPARATUS AND METHOD FOR MACERATING MEAT-TYPE PRODUCTS



(57) Abrégé/Abstract:

An apparatus and method for macerating raw meat pieces includes two sets of rotating arbors, each having a different primary function. More particularly, the first arbor set is primarily configured to flatten and roughly tenderize the meat. The second arbor set is primarily configured to increase the surface area and tenderness of the meat without breaking the meat apart, though the second arbor set may also further reduce the thickness of the meat pieces. The second arbor set is positioned downstream of the first arbor set by a conveyor such that the meat pieces advancing through the macerator are only macerated by one of the arbor sets at any give time. Each arbor set has a pair of counter rotating shafts.

Abstract of the Disclosure

An apparatus and method for macerating raw meat pieces includes two sets of rotating arbors, each having a different primary function. More particularly, the first arbor set is primarily configured to flatten and roughly tenderize the meat. The second arbor set is primarily configured to increase the surface area and tenderness of the meat without breaking the meat apart, though the second arbor set may also further reduce the thickness of the meat pieces. The second arbor set is positioned downstream of the first arbor set by a conveyor such that the meat pieces advancing through the macerator are only macerated by one of the arbor sets at any give time. Each arbor set has a pair of counter rotating shafts.

APPARATUS AND METHOD FOR MACERATING MEAT-TYPE PRODUCTS

Technical Field

[0001] This invention relates generally to meat processing, specifically to an apparatus and method for macerating meat or meat-type products prior to further processing.

Background

[0002] Macerating raw whole muscle meat pieces prior to further processing can improve the water holding capacity and the texture of the final meat product. Further, maceration increases the surface area of whole muscle meat pieces and may increase the rate of absorption of non-meat ingredients such as salt and flavorings. To increase the surface area, macerators use implements such as rotating blades, spiked teeth, or other protrusions to produce slight cuts, ruptures, or tears, or to stretch the surface. The protrusions may open up or stretch the whole muscle meat pieces merely by protruding into the muscle without aggressively working the meat or otherwise causing significant structural degradation to the whole muscle meat. The increase in surface area is, nonetheless, a physical action that results in increased protein solubility and improves the water holding capacity by exposing more binding sites for water molecules. As used herein, the term "raw whole muscle meat" describes meat that has not undergone significant processing and includes not only whole muscles but also smaller pieces or chunks. Some pieces are about the size of a fist, for example. The term "raw whole muscle meat" does not include ground meat or other meat of which the structural integrity has been substantially compromised by mechanical action.

[0003] It is well known to flatten meat, such as through pressing or pounding operations. In addition to macerating the meat by tenderizing and increasing the surface area, such flattening operations also resize the meat to provide a relatively uniform and consistent thickness, which helps ensure proper cooking of the meat. In other operations, meat pieces may be fed between a pair of counter-rotating shafts that have projections that press into the meat as the meat passes through the space between the shafts.

[0004] While the counter-rotating shafts are suited for processing meats of a similar size, such equipment is not typically suited to process meat pieces having a wide variety of sizes and configurations. Meat pieces are often divided among their relative sizes and then processed with similarly sized meats. This processing is done after the maceration equipment is calibrated to the size of meat pieces in a batch by adjusting the counter-rotating shafts. Alternatively differently sized meat pieces are sometimes processed together, then meat pieces requiring additional maceration are run through the counter-rotating shafts again. These approaches can be time consuming, inefficient, and impractical when working with certain large batches of meat.

Summary

[0005] The illustrated apparatus provides a more efficient system for macerating raw meat pieces to increase surface area and absorption of ingredients such as salts and flavorings, while avoiding excessive tearing. The illustrated apparatus includes two sets of rotating arbors, each having a different primary function. The first arbor set is primarily configured to flatten and roughly tenderize the meat. The first arbor set also may reduce the thickness of the meat pieces, crush or squeeze the meat pieces and/or create or puncture holes or openings in the meat pieces. The second arbor set is primarily configured to increase the surface area and tenderness of the meat without breaking the meat apart, though the second arbor set may also further reduce the thickness of the meat pieces. For example, the second arbor set may crush the meat muscle cells while retaining the overall appearance of the whole muscle meat. Each arbor set has a pair of counter rotating shafts and, therefore, the macerator has at least four arbor shafts. The raw meat is passed between the counter-rotating arbors at the first and second maceration stations.

[0006] The maceration apparatus has a first conveyor positioned to receive raw meat and deliver the meat to a first arbor set. The first arbor set has upper and lower rotatable arbors and is positioned upstream of the second arbor set. The first upper and lower rotatable arbors have a first distance between them. A second conveyor is positioned at the exit of the first arbor set and receives the raw meat pieces as they exit the first arbor set. The second conveyor then delivers or transports the raw meat pieces to the second arbor set. The second arbor set has upper and lower rotatable arbors that have a second distance between them. The second distance is smaller

than the first distance. The distance between the first and second maceration stations is preferably long enough that the meat advancing through the apparatus is not engaged by the first and second stations simultaneously.

[0007] Each arbor is preferably an integral one-piece sleeve or shaft that has projections formed thereon. The integral sleeve may have a central cavity extending therethrough. By another approach, the integral sleeve may have central cavities that extend through portions of the arbor adjacent the ends thereof. The central cavities at the ends of the arbor may receive respective drive shafts and other mounting elements such as idler gears. In another embodiment, the arbor may include individual projection elements that can be individually mounted onto a drive shaft. Individual discs having projections and recesses thereon may be secured together to form an arbor. By one approach, the axial dimension of each individual disc is about equal to the axial dimension of one recess or projection. Alternatively, one disc may include a projection and a recess, or possibly several projections or recesses.

[0008] So configured, the illustrated apparatus provides a desired degree of maceration for whole muscle meat pieces having a wide range of dimensions without requiring the meat pieces to be divided based on size or to be processed through the macerator a second time with differently calibrated settings, and without the excessive tearing or breakdown of muscle fibers that can occur under certain circumstances, such as where large pieces are drawn through a very small gap. This apparatus, is useful where meat pieces are more varied in size, e.g., due to increases in animal muscle mass.

[0008a] In accordance with an aspect, there is provided an apparatus for macerating raw meat pieces, the apparatus comprising:

a first arbor set having upper and lower rotatable arbors defining a first distance between the upper and lower rotatable arbors, the first arbor set being configured to receive a large variety of sizes and configurations of raw meat pieces, to advance the raw meat pieces therethrough, and to reduce the thickness of at least some of the raw meat pieces advancing therethrough thereby reducing variations in thickness among the meat pieces;

a second arbor set having upper and lower rotatable arbors defining a second distance between the upper and lower rotatable arbors, the second distance being smaller than the first

