

This invention relates to a method of cutting sausage or sausage-shaped meat products into slices, wherein the piece of product to be cut is displaced in the longitudinal direction by an axial force exerted on it. The piece of product crosses the cutting plane of a rotating cutter by means of which a number of slices corresponding to the number of cutting edges of the cutter is severed from the piece of product per revolution of the cutter.

The invention also relates to a cutting apparatus for carrying out the method, with a rotating cutter and a guide channel aligned parallel to the axis of rotation of the cutter and by means of which a forward feed plate aligned with its plane perpendicular to the longitudinal axis of the channel is displaceably mounted.

It is generally known that a rotating cutter with a cutting edge running in the form of a spiral can be used for cutting resilient sausages and similar non-rigid meat products.

The spiral course of the cutting edge is preferably selected so that the rate of forward feed of the cutting edge reaches a minimum when the cutter starts to penetrate the piece of product and also when cutting through the residual cross-section, in order to keep the specific surface pressure between the cutting edge and the piece of product as low as possible in these critical regions. In particular, the piece of product is deformed to a greater or lesser extent when it is cut, as a result of the aforementioned surface pressure. Slices cut from the piece of product in its deformed state are of non-uniform thickness, corresponding the degree of deformation. A sufficient reduction in the rate of forward feed when the cutter penetrates the piece of product and when cutting off the residual cross-section, in relation to the desired high rate of forward feed between these two sections, necessitates cutters of relatively large dimensions in order to permit pronounced differences in radii in the spiral course of the cutting edge, and makes it practically impossible to provide cutters with a plurality of successive cutting edges in order to be able to sever a number of slices from the piece of product corresponding to the number of cutting edges per revolution of the cutter.

The underlying object of the present invention is to provide a method of cutting by means of which sausage or sausage-shaped meat products can be cut into geometrically accurate slices with a thickness which is uniform, particularly over the cut surface, at a high cutting output and substantially independently of the rate of forward feed of the cutting edge of a cutter.

This object is achieved starting from a method of the generic type cited in the precharacterising clause of claim 1, wherein the proposed procedure according to the invention is the procedure according to the features cited in the characterising clause of claim 1.

The application according to the invention of axially and radially aligned pressure forces which are tuned to each other imbues the piece of product, which is intrinsically non-rigid, with a three-dimensional stability of shape, at least within the region which is subjected to the surface pressure of a cutter, so that lateral yielding of the piece of product can be prevented, and in particular this can also be prevented immediately prior to the entry of the cutter into the piece of product. If the piece of product is compressed by the axial pressure which is necessary for its forward feed, the diameter of the piece of product increases, due to which a pressure force directed radially outwards is exerted by the piece of product. This force can be opposed by a radially inwardly directed pressure acting in a ring around the piece of product, so that lateral yielding beyond a predeterminable extent of even portions of the piece of product is prevented. This predetermined extent is substantially determined by the increase in diameter of the piece of product as a result of its compression, which leads to a proportional increase in radial pressure. When the radial pressure has reached a predetermined maximum, no further compression component results from the axial pressure. The axial pressure then solely serves to overcome the frictional forces of the piece of product which has been thickened by compression and to displace the piece of product in the direction of forward feed.

The method according to the invention can be carried out in a simple manner by means of a cutting apparatus of the type described initially, wherein at least one collar which resiliently

encloses a piece of product is disposed at the end region of the guide channel facing the rotating cutter.

It is to be understood that the free initial cross-section of the collar and its resilience are to be matched to each other so that on the one hand the collar encloses the piece of product which is still in its uncompressed state with a force which is great enough to exert a frictional resistance in opposition to the forward feed movement of the piece of product as soon as an axial pressure which initiates the compression operation is exerted by the forward feed plate on the piece of product, and on the other hand the collar encloses the piece of product in its compressed state with a force which still permits the forward feed movement of the piece of product due to the axial force exerted by the forward feed plate on the piece of product.

A collar which satisfies the aforementioned requirements and which can be adapted within comparatively wide limits to pieces of products of different diameters is constructed according to one embodiment of the invention in the manner of a pipe clamp, wherein two radially outwardly projecting clamp end pieces are resiliently attached by a screw bolt placed under tension by means of a pressure spring, wherein the initial stress of the pressure spring can be adjusted depending on the depth of penetration of the screw bolt in a screw thread provided on one clamp end piece.

However, according to another embodiment of the invention, the collar may consist of a sleeve having an inner and an outer shell, wherein a cylindrical cavity which can be subjected to an overpressure is provided between the inner and the outer shell and at least the inner shell is manufactured from a resilient material.

Both these forms of collar can be individually adapted to the piece of product to be cut in each case and can be adjusted in a simple manner as regards the radial pressure to be exerted by them on the piece of product to be cut, by varying the initial stress of the pressure spring for the collar constructed in the manner of a pipe clamp and by varying the overpressure in the cylindrical cavity of the collar formed from a double-walled sleeve, respectively.

Finally, one embodiment of the invention also provides for the guide channel to have an angled or U-shaped cross-section and to be equipped with a plurality of collars disposed side by side and/or one above another.

Depending on the number of collars associated with a guide channel, a corresponding number of pieces of product can be received by the apparatus, so that the cutting output can be significantly increased compared with conventional cutting apparatuses with individual feeding.

Since no particular consideration of the course of the cutting edge of the cutter is required, a multi-blade cutter can also be used, so that a number of slices can be cut off for each revolution of the cutter which corresponds to the product of the number of collars associated with a guide channel and the number of blades of the cutter.

An example of an embodiment of an apparatus for carrying out the method according to the invention is illustrated in perspective in the drawing.

The apparatus essentially consists of a disc-shaped cutter 1, only part of which is illustrated, which is mounted so that it can rotate about an axis 2 in the direction of the arrow 3, wherein a cutting edge 4 acts over a cutting plane 5. In addition, the apparatus consists of a guide channel 6 which is aligned with its longitudinal axis parallel to the axis 2.

A forward feed plate 7 can be moved in the guide channel 6, along the longitudinal axis of the latter, by a drive, which is not shown. During the cutting operation the forward feed plate moves in the direction of the arrow 8 towards the cutting plane 5. An axial pressure is exerted on the end faces of two sausages 10 which are each remote from the cutting plane 5 by means of the forward feed plate 7, which is equipped with hook points pointing towards the base of the guide channel 6,. The ends of the sausages 10 facing the cutting plane 5 are guided through collars 11 which are constructed in the manner of pipe clamps.

The collars 11 are attached to the base of the guide channel 6 and are arranged so that their end faces remote from the forward feed plate 7 are aligned with the cutting plane 5. Clamp

end pieces 12, 13, which are bent radially outwards, are held at a variable distance apart by the pressure of a spring 14, since the spring 14 is supported at one end against the clamp end piece 12 and at the other end against the head 15 of a screw bolt 16, which can be screwed a greater or lesser extent into a thread, which is not shown, in the other clamp end piece 13.

When the sausages 10 are pushed by the pressure of the forward feed plate 7 into the region of the clamps 11, the latter expand but oppose the further forward feed with a certain frictional resistance. The sausages 10 are thereby compressed, which results in an increase in the radial pressure exerted by the clamps on the sausages. The driving force of the forward feed plate 7 is designed so that the forward feed is continued and the sausages 10 continuously pass through the cutting plane 5 under an optimum initial stress which is directed radially towards the inside of the sausages 10 and are thereby cut into geometric slices.



Claims:

1. A method of cutting sausage or sausage-shaped meat products into slices, wherein the cylindrical piece of product (10) to be cut is displaced in the longitudinal direction by an axial force exerted on it and crosses the cutting plane of a rotating cutter (1) by means of which a number of slices corresponding to the number of cutting edges of the cutter is severed from the piece of product (10) per revolution of the cutter, characterised in that a radial pressure which is uniform over the entire periphery of the piece of product is exerted on the piece of product (10) in the vicinity of the cutting plane synchronously with the axial pressure, which radial pressure is increased depending on an increase in diameter caused by the axial pressure as a result of the compression of the piece of product (10) only to such an extent that the forward feed of the piece of product (10) remains ensured by the axial pressure.
2. A cutting apparatus, with a rotating cutter (1) and a guide channel (6) aligned parallel to the axis of rotation of the cutter (1) and by means of which a forward feed plate (8) aligned with its plane perpendicular to the longitudinal axis of the channel is displaceably mounted, for carrying out the method according to claim 1, characterised in that at least one collar (11) which resiliently encloses the piece of product (10) is disposed on the end region of the guide channel (6) facing the rotating cutter (1).
3. A cutting apparatus according to claim 2, characterised in that the collar (11) is constructed in the manner of a pipe clamp, wherein two radially outwardly projecting clamp end pieces (12, 13) are resiliently attached by a screw bolt (16) placed under tension by means of a pressure spring (14) and the initial stress of the pressure spring (14) can be adjusted depending on the depth of penetration of the screw bolt (16) in a screw thread provided on one clamp end piece (13).
4. A cutting apparatus according to claim 2, characterised in that the collar (11) consists of a sleeve having an inner and an outer shell, wherein a cylindrical cavity which can



be subjected to an overpressure is provided between the inner and the outer shell and at least the inner shell is manufactured from a resilient material.

5. A cutting apparatus according to at least one of claims 2 to 4, characterised in that the guide channel (6) has an angled or U-shaped cross-section and is equipped with a plurality of collars (11) disposed side by side and/or one above another.