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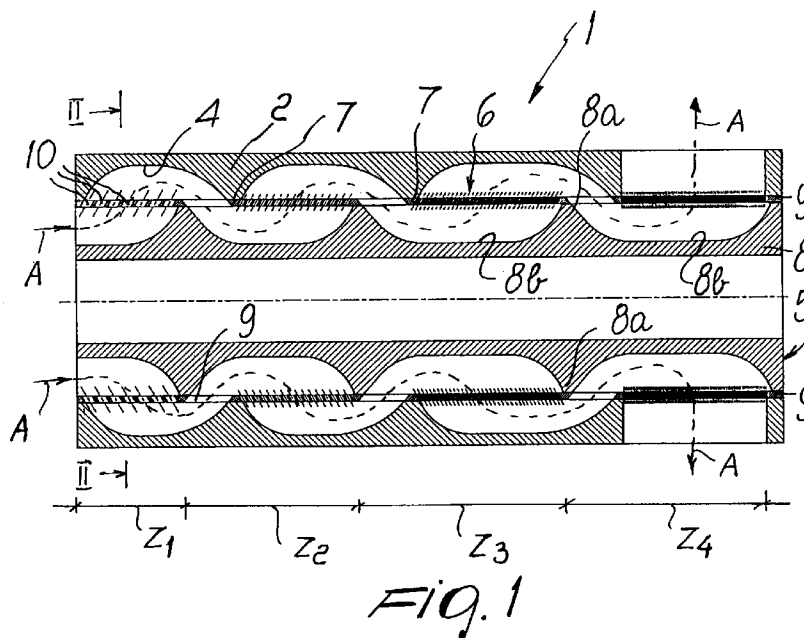
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(54) Cutting assembly for food grinding machines

(57) A cutting assembly for food grinding machines comprising a static outer jacket (2) provided with conventional elements (3) for coupling to a loading inlet of a grinding machine; annular recesses (4) are formed in the internal thickness of the jacket (2), have preset volumes and are mutually separated; a food pusher and

cutter element (5) is mounted inside the jacket (2) so that it rotates coaxially, and a screening element (6) with differentiated passage regions is interposed between the pusher (5) and the jacket (2); each region can be crossed at the annular recesses (4).



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Description

[0001] The present invention relates to a cutting assembly for food grinding machines.

[0002] Conventional grinding machines used in the alimentary field are essentially constituted by a screw feeder, which is inserted in a specifically provided cylindrical seat arranged downstream of an inlet, is turned by a specifically provided motor and conveys the food towards a plurality of blades which rotate coaxially thereto, are fitted on the same driving shaft as the screw feeder, are grouped in a pack and are alternated with perforated screening diaphragms.

[0003] The diaphragms are arranged in a gradually decreasing sequence as regards both the density of the holes that affect each diaphragm and the diameter of the holes, so as to gradually provide, as the food advances outwards, a progressively finer reduction of the particle size of the mass.

[0004] However, especially in the processing of very dense food or of food having a fleshy pulp, the resistance that occurs when the mass passes between the diaphragms generates a very intense pressure, which is transmitted and distributed to said diaphragms, to the rotating blades and to the screw feeder.

[0005] Accordingly, this entails, especially in the industrial use of grinding machines, the use of motors with a high power rating, even as high as 70 HP, in order to overcome the resistance opposed by the mass being processed.

[0006] As a further consequence, there is provided a gradual deterioration not only of the sharpness of the blades but also of their structure, which by wearing very quickly require their replacement on the average every 4-5 working hours in addition to releasing microscopic fragments into the food.

[0007] Another problem of the known art in this field is the fact that in the diaphragms, the perforations that allow passage through them are distributed on each diaphragm with a decreasing density with respect to their surfaces, and this worsens the problem of the pressure applied by the food mass.

[0008] The principal aim of the present invention is to solve the above problems of the known art by providing an improved cutting assembly for food grinding machines which substantially reduces the pressure produced during processing, eliminates the possibility of releasing structural particles into the food and maintains a constant density of the distribution of the holes as the screening capacity gradually becomes finer.

[0009] This aim, these objects and others are achieved by an improved cutting assembly for food grinding machines, characterized in that it comprises a static outer jacket provided with conventional means for coupling to the loading inlet of a grinding machine, annular recesses being formed in the internal thickness of said jacket, said recesses having preset volumes and being mutually separated, a food pusher element being

mounted inside said jacket so that it rotates coaxially, a screening means with differentiated passage regions being interposed between said pusher and said jacket, each region acting at said annular recesses.

[0010] Further characteristics and advantages will become apparent from the description of a preferred embodiment of a cutting assembly for food grinding machines, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a longitudinal sectional view of the invention according to a first embodiment of the present invention;

figure 2 is a transverse sectional view, taken along the plane II-II of figure 1;

figure 3 is a sectional view of a second embodiment of the present invention;

figure 4 is a transverse sectional view, taken along the plane IV-IV of figure 3.

[0011] With particular reference to the above figures, the reference numeral 1 generally designates the cutting assembly for food grinding machines, which comprises a static outer jacket 2 provided with conventional means 3 for coupling to a loading inlet of a grinding machine, which is not illustrated since it is of a conventional kind.

[0012] A plurality of annular recesses 4 is formed in the internal thickness of the jacket 2; the recesses have preset volumes and are mutually separated.

[0013] A food cutter and pusher element 5 is mounted inside the jacket 2 so as to rotate coaxially and is supported in the grinding machine through conventional means which are adapted to keep it constantly centered; a screening means 6 is interposed between the cutter and pusher element 5 and the jacket 2 and is divided into differentiated passage regions Z_1 , Z_2 , Z_3 and Z_4 , each of which can be crossed at each annular recess 4.

[0014] All of the recesses have a transverse cross-section with rounded edges which are blended with the concurrent ones by means of a respective convex profile 7, so as to define a forced path for the food, on which the screening means 6 rests and is locked.

[0015] The cutter and pusher element 5 is constituted, in detail, by a screw-shaped blade 8, the spiral edge 8a of which is advantageously sharp and rotates so as to skim the internal surface of the screening means 6.

[0016] The screening means is constituted by a thin cylindrical body 9, the surface of which is affected by contiguous bands of sets of through holes 10 which constitute the differentiated passage regions Z_1 , Z_2 , Z_3 , Z_4 in which the ratio between the continuous surface and the perforated surface is constant throughout.

[0017] In a possible alternative embodiment, the static outer jacket 2 can flare outwards, as shown in figure 2; accordingly, the screw-shaped blade 8 also has the game shape, and so does the interposed cylindrical

body 9 that constitutes the screening means 6, which in this case is constituted by the coaxial and sequential joining of a plurality of cylinders 9a, 9b, 9c, 9d whose diameters gradually increase outwards; each cylinder defines one of the regions Z_1 , Z_2 , Z_3 , Z_4 , and the cylinders are mutually joined by means of corresponding perforated collars 11.

[0018] In this case, too, each one of the cylinders 9a, 9b, 9c, 9d has lateral surfaces affected by the corresponding 9c, 9d has lateral surfaces affected by the corresponding sets of through holes 10 whose diameters decrease for each cylinder, so that the ratio between the perforated surface and the continuous surface is constant for each cylinder.

[0019] In order to better facilitate the advancement of the mass of processed food, the axis A' of the holes 10 is directed towards the outlet.

[0020] The operation of the present invention can be easily deduced from the above description: the food to be ground is introduced normally in the grinding machine through a hopper and passes from there into the seat in which the conventional screw feeder rotates; the cutting assembly 1 is installed coaxially at the head of said screw feeder.

[0021] The food, after the action of said screw feeder, is pushed further by the blade 8, which is also screw-shaped, and the spiral edge 8a of said blade rotates so as to skim the cylindrical body 9 and is kept centered therein with conventional means for supporting it on the machine; at the same time, the food is engaged and cut by said spiral edge 8a, which is conveniently sharp.

[0022] The conveyance motion forces the food to pass through the various regions Z_1 , Z_2 , Z_3 , Z_4 , following the forced path defined between the annular recesses 4 and the grooves 8b which are alternated with the spiral edge 8a, as shown in figure 1 by the arrows "A"; in following this path, the mass of food passes through the holes 10, whose diameters gradually decrease along the path, thus providing a gradually finer shredding action.

[0023] It should also be noted that the number of the holes 10 for each region Z is such as to maintain a constant ratio between the continuous surfaces of the regions Z and the perforated ones, so as to considerably reduce the pressure applied by the mass of food in passing through them.

[0024] Moreover, since the cylindrical body 9 is static, tangential stress, and therefore also abrasion, between the spiral edge 8a of the screw-shaped blade 8 and the cylindrical body 9, in which the regions Z are formed, are also eliminated, and the blade is always centered as it rotates.

[0025] It has thus been shown that the described invention achieves the intended aim and objects.

[0026] The present invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0027] All the details may also be replaced with other

technically equivalent elements.

[0028] In the practical embodiment of the present invention, the materials used, as well as the shapes and the dimensions, may be any according to the requirements without thereby abandoning the scope of the protection of the appended claims.

[0029] Where technical features mentioned in any claim are followed by reference signs, those reference signs, have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A cutting assembly for food grinding machines, characterized in that it comprises a static outer jacket provided with conventional means for coupling to the loading inlet of a grinding machine, annular recesses being formed in the internal thickness of said jacket, said recesses having preset volumes and being mutually separated, a food pusher and cutter element being mounted inside said jacket so that it rotates coaxially, a screening means with differentiated passage regions, each of which can be crossed at said annular recesses, being interposed between said pusher and said jacket.
2. A cutting assembly according to claim 1, characterized in that said annular recesses have a transverse cross-section with rounded edges which are blended with concurrent edges with a convex profile and are adapted to define a forced path for the food, each convex profile furthermore acting as supporting and locking element for said screening means.
3. A cutting assembly according to claim 1, characterized in that said cutter and pusher element is constituted by a screw-shaped blade, a sharp spiral edge of which rotates so as to skim an internal surface of said screening means.
4. A cutting assembly according to claim 1, characterized in that said screening means is constituted by a thin hollow cylindrical body, the surface of which is affected by contiguous bands of sets of through holes, which constitute said differentiated passage regions.
5. A cutting assembly according to claim 4, characterized in that the ratio between the surface with said through holes and the remaining portion of surface of said regions is constant for each region.
6. A cutting assembly according to claim 1, characterized in that said static outer jacket flares outwards.

7. A cutting assembly according to claim 6, characterized in that said screening means with differentiated through regions is constituted by a hollow body which is formed by the coaxial and sequential joining of a plurality of cylinders whose diameters increase gradually outwards, each one of said cylinders defining a region, said cylinders being mutually joined by means of corresponding perforated collar, each one of said cylinders having corresponding sets of through holes whose diameters decrease for each cylinder.
8. A cutting assembly according to claim 7, characterized in that the ratio between the surface with said through holes and the remaining portion of the surface is constant for each cylinder.
9. A cutting assembly according to claim 7, characterized in that the axis of said holes is orientated along the food advancement direction.

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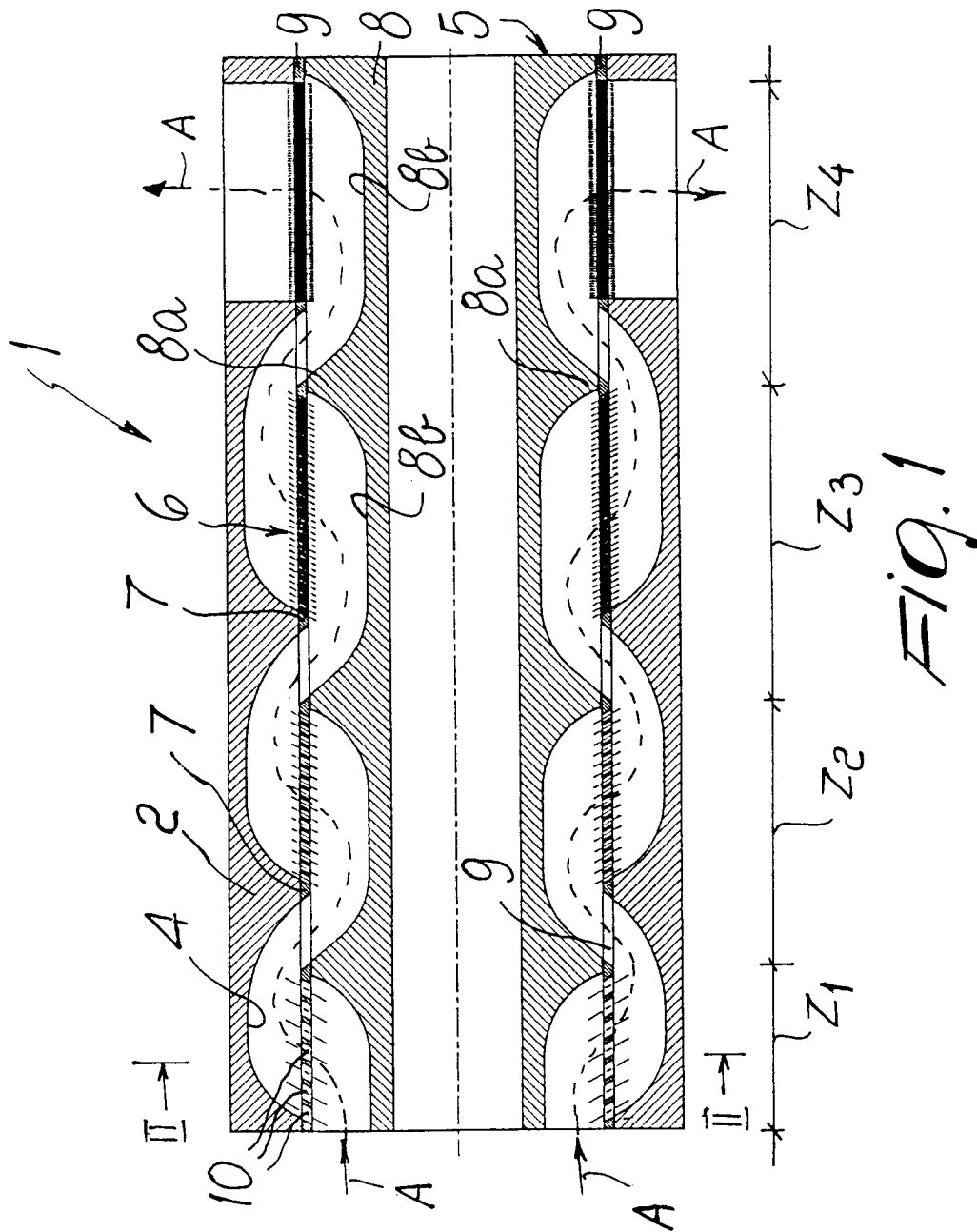


Fig. 1

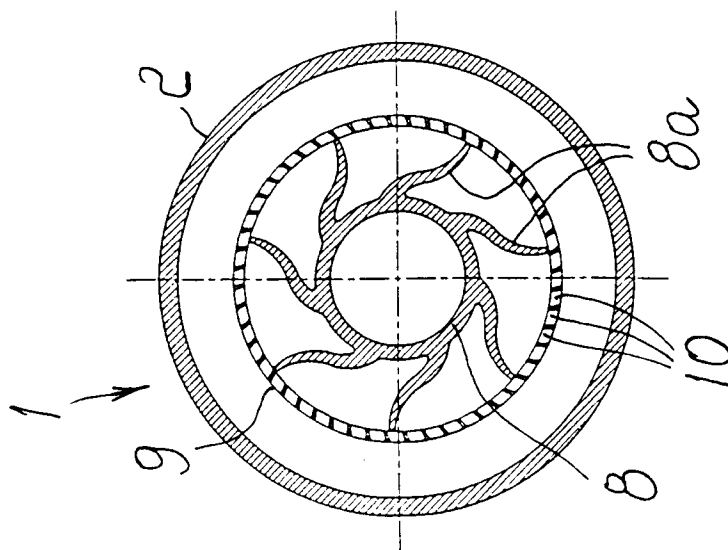
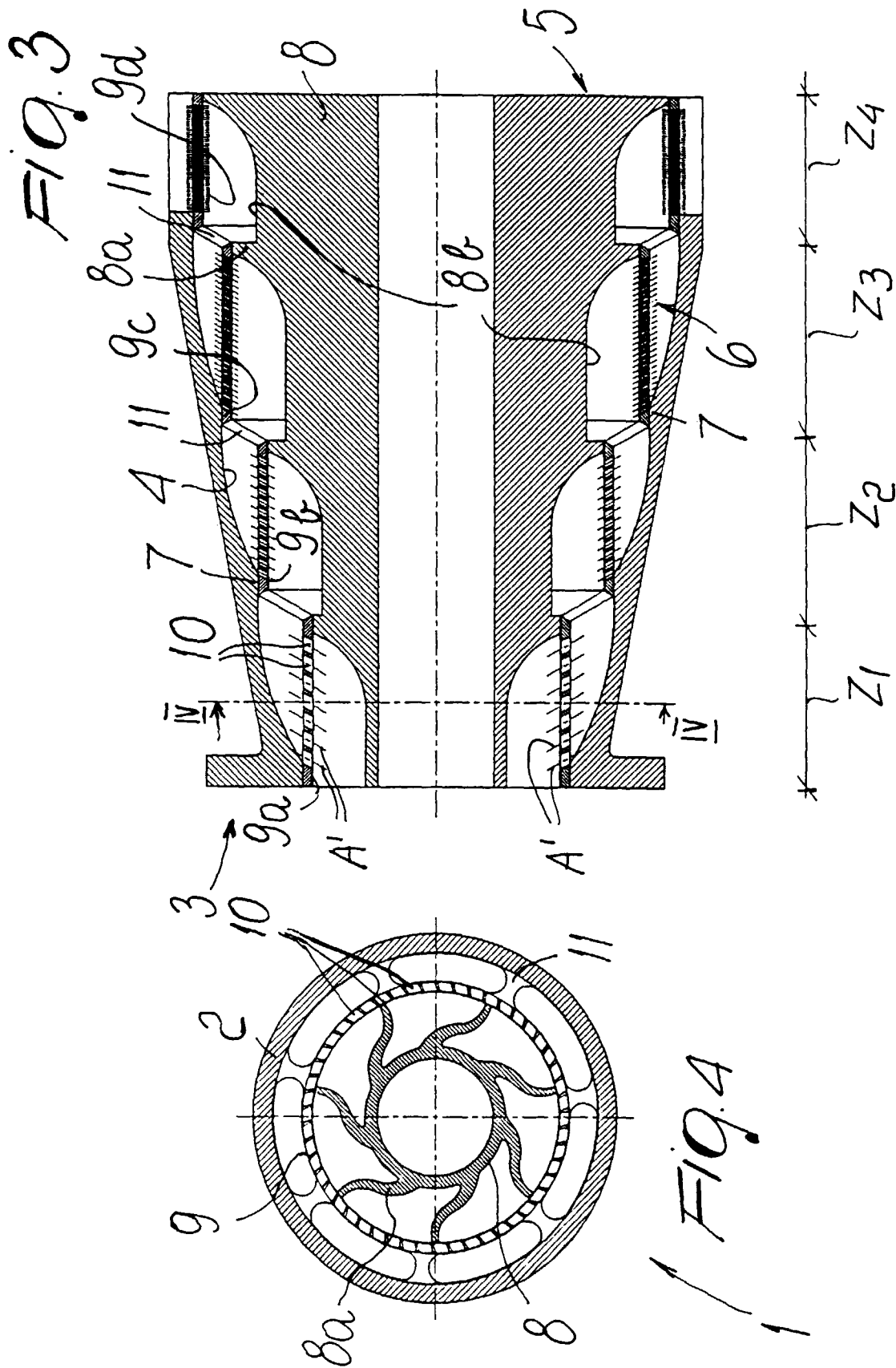


Fig. 2





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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 8342

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 195 16 716 A (INOFEX GMBH ;BESTEHORN REINHARD (DE); BESTEHORN HARTMUT (DE)) * claim 1; figure 1 * ---	1	B02C18/30
A	US 2 582 244 A (L.J. FAITH-ELL) * claim 1; figures 1-11 * ---	1	
A	DE 603 536 C (J. SCHOLTES) * claims 1-8; figure 1 * ---	1	
A	US 4 997 137 A (TOLONEN ERIC O) * claim 1; figure 3 * ---	1	
A	DE 16 32 132 A (J.P. PONKA) * claims 1,2; figures 1-11 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B02C
Place of search THE HAGUE		Date of completion of the search 10 March 1998	Examiner Verdonck, J
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