



12

②¹ Application number: 91201237.4

⑤ Int. Cl.⁵: **B02C 18/30**

②② Date of filing: 24.05.91

③ Priority: 13.07.90 IT 2148590 U

④3 Date of publication of application:
22.01.92 Bulletin 92/04

⑧ Designated Contracting States:
DE ES FR GB IT

(71) Applicant: **RISCO BREVETTI S.P.A.**
Via della Statistica, 2
I-36016 Thiene (Vicenza)(IT)

(72) Inventor: Righele, Giovanni Battista
Via Tiziano, 5
I-36010 Zane' (Vicenza)(IT)

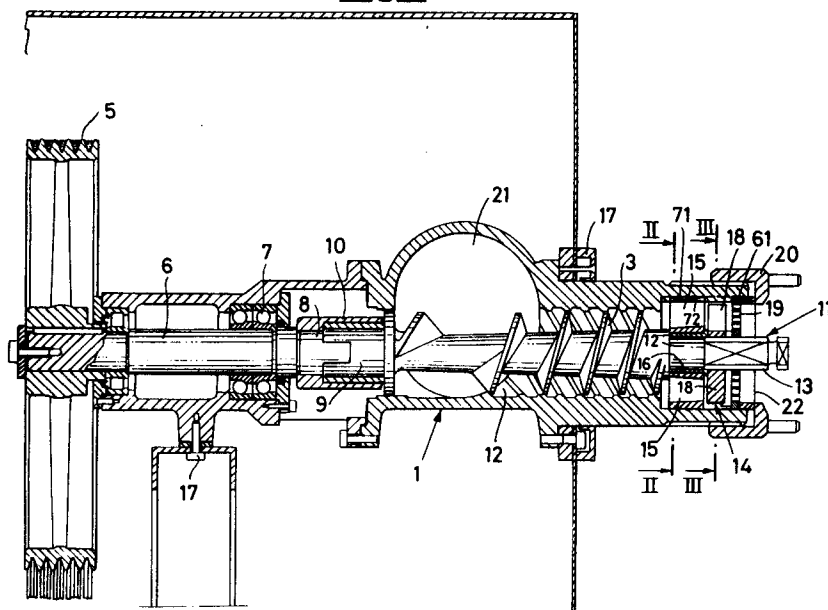
⁽⁷⁴⁾ Representative: **Mittler, Enrico et al**
c/o Marchi & Mittler s.r.l. Viale Lombardia, 20
I-20131 Milano(IT)

54 Screw meat-grinder with an improved system for supporting the screw.

57 The meat-grinder has a screw (3) for moving the meat forward from the front extremity of which there extends a tang (11) that in a rear part (12) has a circular cross-section for the rotatable engagement with a fixed support (15, 16) and in a front part (13)

has a milled cross-section for the support in rotation of a knife (14) for cutting the meat. There is also a plate (19) with holes for the ejection of the ground meat in the form of linear filaments.

Fig. 1



The present invention relates to a screw meat-grinder with an improved system for supporting the screw.

According to the known art meat-grinders comprise a main casing having a space in which the meat is housed and introduced inside it through a loading mouth placed essentially at a rear extremities of the space and ejected through a delivery mouth placed at a front extremities of the space itself.

In the housing space there is made to rotate a screw to move the meat forward toward the delivery mouth. The screw's rotation is accomplished by motorization means such as, say, a pulley and flywheel unit. The latter is fastened to one extremity of a shaft supported by bearings, at whose other extremity there is a male coupling from which the screw derives its motion with a female coupling at its corresponding rear extremity. The screw, in addition to coupling itself in the shaft, also centres itself onto it by means of a bush, in which it is inserted with a small clearance to allow it to be dismantled for reasons of cleanliness.

At the front extremity the screw has a terminal appendix constituted by a milled tang suitable for supporting a knife with several blades for cutting the meat and for passing rotatably through a plate with holes for the ejection of the meat in the form of continuous filaments. There is also the possibility of inserting several knives and several packed plates by placing them close to one another. A terminal ring nut closes the housing space in the front and its removal allows the extraction of the screw from its space with an axial translation for cleaning the screw itself as well as the space.

Considering also the substantial length of the screw and the substantial unbalanced stresses in the extrusion zone, it is obvious that the screw must also be supported at its front end.

It must at this stage be pointed out that there are essentially two different types of systems for the formation and ejection of the ground meat.

According to a first system, called Italian, the plate with holes has a small key that protrudes radially from it and engages a corresponding recess obtained in the lateral wall of the meat-grinder's casing. Such a system also has the possibility of having different speeds of rotation between the screw and the knife. In such case the tang is transformed into a passing shaft guided through a hole obtained in the screw with a central motion take-off independent from it. In any case the guide and support of the screw are assured by a terminal spider having an axial bush, through which the tang holding the knife is made to pass rotatably.

According to a second system, known as Unger, the plate with holes has a radial recess, into which there is engaged a corresponding key that

protrudes from the lateral wall of the meat-grinder's casing. The knife's blades, still according to this system, have a lateral hub which goes to centre itself with clearance in a corresponding hole obtained in the plate. This centering is used theoretically to create the screw's front support. The presence of clearances between the plate with holes and the wall of the space, between the knife's blades and the holes in the plate and between the knife and the milled tang make this system somewhat unstable. It is thus necessary, for this system as well, to provide guide bushes for the milled tang.

Both in the Italian and in the Unger system the tang has parallel millings which extend along its entire length right up to the screw so as to drive the knife in rotation. Thus any guide bush downstream from the screw gets to work with a supporting surface that is greatly reduced due to the milling of the tang, with which it is in contact only at two small arcs of the circumference. This type of support is clearly irrational and determines high possibilities of wear. Due to the milling of the tang there is also created an empty space between the latter and the circular bush in which quantities of product are held which is minced and then introduced into the ground product.

The object of the present invention is to overcome the drawbacks mentioned above by accomplishing a meat-grinder wherein the screw's front support is obtained in a wear-resistant manner and with no stagnation of product at the terminal tang.

According to the present invention such object is attained through a meat-grinder comprising a main casing in which there is obtained a space for holding the meat provided with a loading mouth and a delivery mouth, a screw made to rotate in it for moving the meat forward, means of motorization and support of the screw at one of its rear extremities, means of support of a front extremity of the screw, at least one delivery plate with holes at said delivery mouth and at least one knife for cutting the meat located immediately upstream from said plate with holes and constrained for rotation to an axial support tang extending from said front extremity of the screw, characterized in that said tang has a front portion having a milled cross-section for the support of said knife and a rear portion having a circular cross-section fastened to the screw and said means for the support of the front extremity of the screw are arranged upstream from said knife and from said plate and engaged with said part of the tang having a circular cross-section for the rotatable support of the same and of the front extremity of the screw.

In this way a meat-grinder has been accomplished wherein the tang in its rotation works along its entire circumference with the corresponding

support (say, a spider with a bush) thus accomplishing an optimum guiding effect and a uniform distribution of wear over its entire wall. In addition, the coincidence of the tang's external wall with the support's internal wall does not allow any product to stagnate.

The features of the present invention shall be made more evident by an embodiment illustrated as a non-limiting example in the enclosed drawings, wherein:

Fig. 1 illustrates the meat-grinder in an axial sectional view;

Fig. 2 is a sectional transversal view taken along the line II-II of Fig 1;

Fig. 3 is a sectional transversal view taken along the line III-III of Fig 1.

With reference to Fig. 1 the meat-grinder comprises a main casing 1 defining a space 2 for housing the meat, in which an screw 3 suitable for producing the forward movement of the meat is made to rotate. The space 2 has a loading mouth 21 at a rear extremity of the space 2 and a delivery mouth 22 at a front extremity of the space itself.

At the rear extremity of the casing 1 there are means suitable for transmitting the motion of rotation to the screw. The latter comprise a pulley-flywheel unit 5 fastened to the rear extremity of a shaft 6 supported by bearings 7. At the other extremity the shaft 6 has a male coupling 8 suitable for connecting with a corresponding female coupling 9 integral with the rear extremity of the screw 3. The screw 3 in addition to connecting with the shaft 6 centers itself on it, with a slight clearance, by means of a bush 10.

At the other extremity the screw 3 has a terminal appendix constituted by a tang 11 which at one of its rear parts 12 against the screw 3 has a circular cross-section, while in a front part of it 13 it is milled for driving in rotation a knife 14, illustrated in Fig. 3, provided with radial blades 18 distributed circumferentially. Such tang 11 passes rotatably through a plate 19 with holes for the extrusion of the product shredded into continuous filaments, which plate is clamped to prevent rotation by the engagement of an internal radial protrusion 61 of the casing 1 in a radial slot 62 of the plate 19. At its rear part 12 the tang 11 is provided with a support spider 15, visible in Fig. 2, with an interposed guide bush 16 which, due to the circular cross-section of the tang 11 in this rear part 12, adheres perfectly to it during rotation. The support spider 15 is also clamped to prevent rotation by the engagement of a radial protrusion 71 of the casing 1 in a radial groove 72 of the spider 15.

A clamping ring nut 20 is screwed up at the front extremity of the casing 1 and can be unscrewed for the extraction of the screw 3 for cleaning it and for cleaning the inside of the space 2.

Suitable fastening means 17 are finally provided to prevent any displacement of the meat-grinder with respect to the working top during the operating stage.

If desired, to execute fine grinding several knives 14 and several plates with holes 19 may be used alternated with the knives themselves; in this case the guide bush 16 may also be installed in the hole of the first plate downstream from the screw 3, which plate shall in such case have only a few very large roughing holes.

The operation of the meat-grinder according to the invention is as follows.

The rotating motion imparted by the pulley 5 is transmitted by the shaft 6 to the screw 3 and thus to the terminal tang 11 which in its rear portion 12 portion is supported in rotation by the spider 15 and guided by the bush 16, while at its front portion 13 it transmits rotation to the knife 14. The product introduced through the loading mouth 21 is made to move forward by the screw 3 toward the knife 14, it is shredded by the blades 18, and then made to pass through the holes of the plate 19 to issue in continuous filaments at the delivery mouth 22.

It should be noted that thanks to circular cross-section of its rear portion 12 the tang 11 is particularly resistant to wear and, moreover, since it connects perfectly with its external wall to the internal wall of the bush 16 it prevents any stagnation of the product.

Claims

1. Meat-grinder comprising a main casing (1) in which there is obtained a space (2) for holding the meat provided with a loading mouth (21) and a delivery mouth (22), a screw (3) made to rotate in it for moving the meat forward, means of motorization (5 - 9) and support (10) of the screw (3) at one of its rear extremities, means of support (15, 16) of a front extremity of the screw (3), at least one delivery plate (19) with holes at said delivery mouth (22) and at least one knife (14) for cutting the meat located immediately upstream from said plate (19) with holes and constrained for rotation to an axial support tang (11) extending from said front extremity of the screw (3), characterized in that said tang (11) has a front portion (13) having a milled cross-section for the support of said knife (14) and a rear portion (12) having a circular cross-section fastened to the screw (3) and said means (15, 16) for the support of the front extremity of the screw (3) are arranged upstream from said knife (14) and from said plate (19) and engaged with said part of the tang (11) having a circular cross-section for the

rotatable support of the same and of the front extremity of the screw (3).

2. Meat-grinder according to claim 1, characterised in that said means (15, 16) for the support of the front extremity of the screw (3) comprise a spider (15) and a guide bush (16) co-operating with said rear portion (12) of the tang (11). 5
3. Meat-grinder according to claim 1, characterised in that it comprises a plurality of knives (14) and plates (19) with holes alternated with said knives (14). 10
4. Meat-grinder according to claim 3, characterised in that said means (15, 16) for the support of the front extremity of the screw (3) comprise the plate (19) with holes that is closer to the screw (3) and a guide bush housed inside said plate with holes and in engagement with said rear portion (12) of the tang (11). 15 20

25

30

35

40

45

50

55

Fig.1

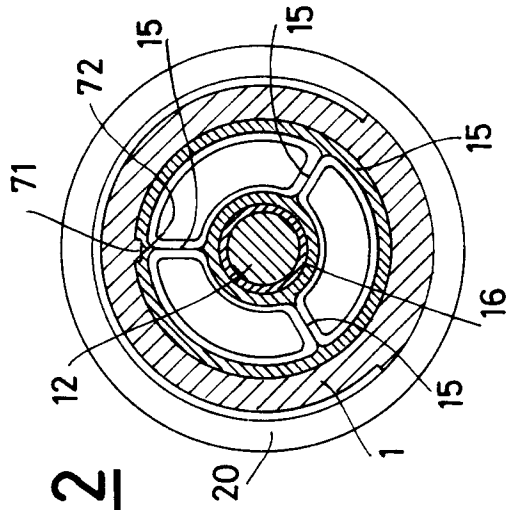
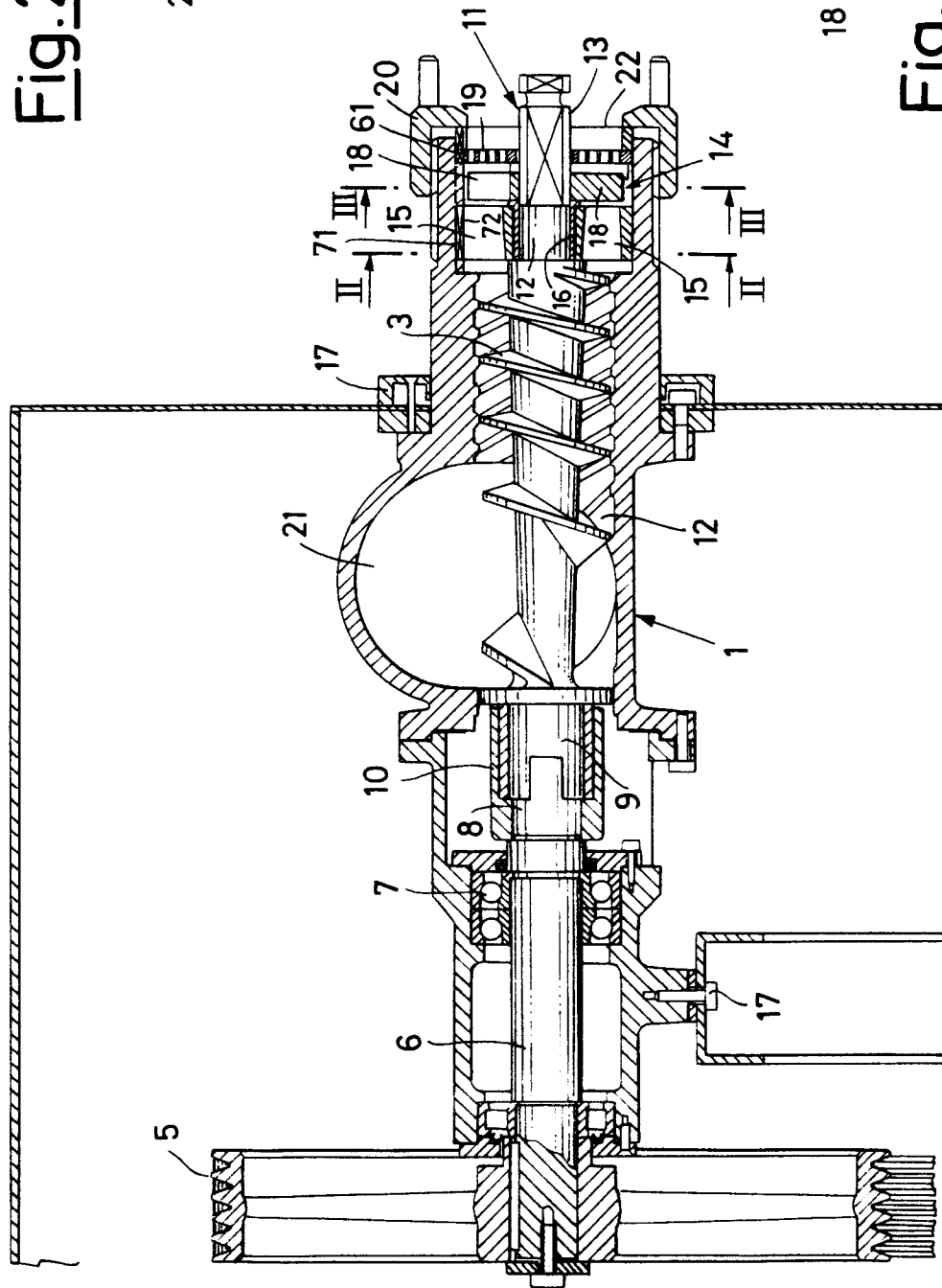


Fig.2

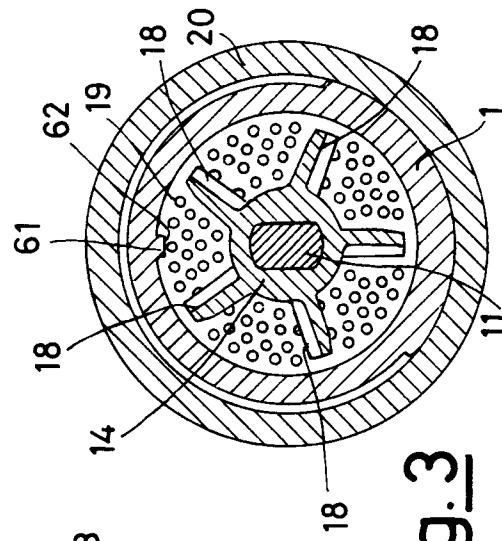


Fig.3



European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 20 1237

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.5)
X	US-A-2 869 602 (T.N. RATHJEN) * the whole document * * - - -	1,2,4	B 02 C 18/30
X	DE-C-590 335 (E. PUMP) * the whole document * * - - -	1-4	
X	DE-C-332 985 (M. RUHL) * the whole document * * - - -	1	
A	US-A-2 090 650 (I. VANT) * page 1, right column, line 32 - line 36 * * - - - - -	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 02 C
Place of search		Date of completion of search	Examiner
The Hague		21 October 91	VERDONCK J.C.M.J.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		E : earlier patent document, but published on, or after the filing date	
Y : particularly relevant if combined with another document of the same category		D : document cited in the application	
A : technological background		L : document cited for other reasons	
O : non-written disclosure			
P : intermediate document		& : member of the same patent family, corresponding document	
T : theory or principle underlying the invention			