

The invention relates to a mechanism for the extrusion of foodstuffs, with an extrusion auger delivering the material to be extruded, a nozzle head, and a cutter mechanism for the processing of the extruded material, there being a rotary cutter blade on the nozzle head and passing across the nozzle opening.

Extruded foodstuffs, which emerge in bar form with any contour from the extruder nozzle head, are widely in use. After emerging from the nozzle, the extrusion is cut up into the desired lengths by a cutter mechanism, for packing and typically sale as snacks.

A machine producing such extruded and cut-up foodstuffs is known from US Patent Specification No 4 240 779. In this a strip of dough is extruded, and cut up by knives rotating on the nozzle head into pieces of greater or lesser length dependent on the extrusion and knife-rotation speeds.

From US Patent Specification No 3 387 069 a machine is known in which an extruded plastic hose is provided with screwthread patterns on the inside and outside by scoring.

The object of the invention is to produce an extruding machine by which an extrusion can be produced and cut up into short pieces, shaping of the extrusion being possible at the same time.

This object is achieved by the invention in that a further cutter blade turning on the nozzle head passes over the nozzle opening only at the periphery.

With the machine constructed in accordance with the invention it is possible to cut the extrusion up into small pieces, cutting away by scoring at particular points before

parting off to allow shaping of the extrusion, so that for example figures can be produced in three dimensions. Thus it is, for example, possible to score an extrusion having the cross-section of an animal body at the head and legs so that after final expansion of the product an animal figure is formed with four separate protruding legs and protruding ears.

In a preferred version of the invention four cutter blades are provided, arranged in a cruciform pattern, with sprockets on the blade spindles coupled together by toothed belts. There is a further sprocket on the spindle of one blade, coupled by a toothed belt to a driving motor. By this arrangement synchronous movement of the cutter blade is guaranteed, so that the extrusion emerging from the nozzle is always cut away or cut off at predetermined time intervals.

In a further preferred version a rotary ring is mounted on the nozzle head and to which a radial cutter blade is fixed, protruding towards the nozzle opening. Under this arrangement there can be several cutter blades at intervals round the ring periphery. With this arrangement it is for example possible to cut into a bar-shaped extrusion so as to form a screwthread with one or more starts.

A bearing is preferably mounted between the rotary ring and the nozzle head, while on the outside the ring has a peripheral groove to accommodate a driving belt.

In order for example to form two spiral lines in opposite directions on a bar-shaped extrusion, preferably two contra-rotating rings with cutter blades can be provided.

In a further development of the invention the cutter blades

can be radially and/or axially adjustable in relation to the nozzle head, so as to allow control in particular of the depth to which the blades cut into the material without cutting through it.

Examples of the invention are explained in more detail with the aid of the drawing attached. This shows:

Fig. 1 in front view a first version of a cutter mechanism,

Fig. 2 a section on the line II-II of Fig. 1,

Fig. 3 a front view of a second version of a cutter mechanism, and

Fig. 4 a section on the line IV-IV of Fig. 3.

Fig. 1 shows a front view of a nozzle head 10 of a foodstuffs extruder. The nozzle head 10 has an annular nozzle 12 formed between the internal drilling in the plate 14 and the periphery of a boss 16. At intervals along the outer periphery of the nozzle head 10 are bearings 18, 20, 24, 26 for cutter blades 36, 38, 40, 42 fixed to rotary spindles 28, 30, 32, 34. On the spindle 28 is a sprocket 44, on the spindle 30 a sprocket 46, on the spindle 32 a sprocket 48 and on the spindle 34 a sprocket 50, rotating together. A toothed belt 52 is passed round the sprockets 44, 46, 48, 50, so that the sprockets with their spindles and cutter blades rotate in synchronism. The drive to the cutter blades is via a toothed belt 54, running between a sprocket 56 turning with the spindle 32 and a power unit which is not shown.

From Fig. 2 it can be seen that each bearing 18, 20, 24, 26 comprises two bearing plates 60, 62, 64, 66 fixed to the outside of the nozzle head 10. The spindle 28 is accommodated in the bearing plate 20 by means of a ball- or

roller-bearing 68 and in the bearing plate 62 by means of a ball- or roller-bearing 70. The same mounting system is provided in the other bearings. In Fig. 2 the forward end is shown of extrusion auger 72, with aid of which the material to be extruded is forced out of the nozzle head.

From Fig. 1 it can be seen that the cutter blade 36 is guided over the entire nozzle opening 12, so that the extruded strip emerging is cut off when this cutter blade passes over the opening. The cutter blades 38, 40, 42 are shorter so that when the blade 38 swings through 90°, the blade 40 through 180° and the blade 42 through 270°, all in the clockwise direction, the extruded material emerging from the nozzle opening is only cut away on the outside. Due to the expansion occurring on emergence of the extruded material, the desired surface shaping of the material can then be carried out.

Fig. 3 shows a plan view of a nozzle head 80 with an annular nozzle 82, in the centre of which a boss 84 is mounted. On the outside 86 of the nozzle head 80 a rotary ring 88 is mounted via a ball- or roller-bearing 90. On the front of the rotary ring 88 two cutter blades 92, 94 are accommodated. For this pins 96, 98 are fixed to the rotary ring 88, and on which there are lugs 100, 102 between which the shank 104 or 106, of the respective blade 92 or 94, is clamped. After loosening the screws 108, 110 the blades 92, 94 can respectively be slid in the radial direction of the nozzle opening 82. As can be seen from Fig. 2, the shanks 96, 98 can be adjusted axially on the rotary ring 88, so that the clearance between the blades 92 and 94 and the nozzle opening 82 is adjustable. From Fig. 4 by way of suggestion the forward end of an extrusion auger 112 can be seen. Two blades are mounted on the rotary ring 88, although it would be possible to provide more blades.

Likewise it would be possible to mount a second rotary ring on the outside of the nozzle head and to drive this ring in the opposite direction to the rotary ring 88, so that screwthreads of opposite pitch could be formed by cutting into the outside of the extruded strip.

The rotary ring 88 has in its outer periphery a divergent U-section peripheral groove 113, in which a driving belt 114 engages. This driving belt 114 runs to a power unit, which is not shown, and by which the rotary ring 88 is caused to turn.

Patent Claims

1. Mechanism for the extrusion of foodstuffs, with an extrusion auger (72,112) delivering the material to be extruded, with a nozzle head (10,80) and with a cutter mechanism processing the extruded material, there being a cutter blade (36,92) rotating in bearings on the nozzle head (10,80) and passing over the nozzle opening, characterized in that at least one further cutter blade (38,40,42,94) rotating in bearings on the nozzle head (10) passes over the nozzle openings (12,82) only at the periphery.
2. Mechanism in accordance with claim 1, characterized in that there are four cutter blades (36,38,40,42) in a cruciform pattern, that the sprockets (44,46,48,50) are coupled together by a toothed belt (52), and that on the spindle (32) of one cutter blade (40) a second sprocket (56) is mounted, driven by a toothed belt (54) from a power unit.
3. Mechanism in accordance with claim 1, characterized in that a rotary ring (88) is mounted on the nozzle head (80) and that several cutter blades (92,94) are mounted on the rotary ring (88) at intervals around the periphery.
4. Mechanism in accordance with claim 3, characterized in that two contra-rotating rotary rings with cutter blades are provided.
5. Mechanism in accordance with one of claims 1 to 4, characterized in that the cutter blades (36,38,40,42) are radially and/or axially adjustable in relation to the nozzle head (10).

