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(54) **Rolling plant for flake formation**

(57) A rolling plant for flake formation comprises a screw feeder (2) for feeding powder or atomized material in powder form between two overlying motorized rolls (3,4) of adjustable distance apart, they being arranged to form a uniform strip of compacted material which is broken into flakes by a usual rotary means (5),

downstream of which there is positioned a cutter (71,81) to reduce the dimensions of said flakes; said rolls (3,4) have a central annular recess (16) in which a layer (16) of elastomer is contained and retained by suitable locking elements (160,1410).

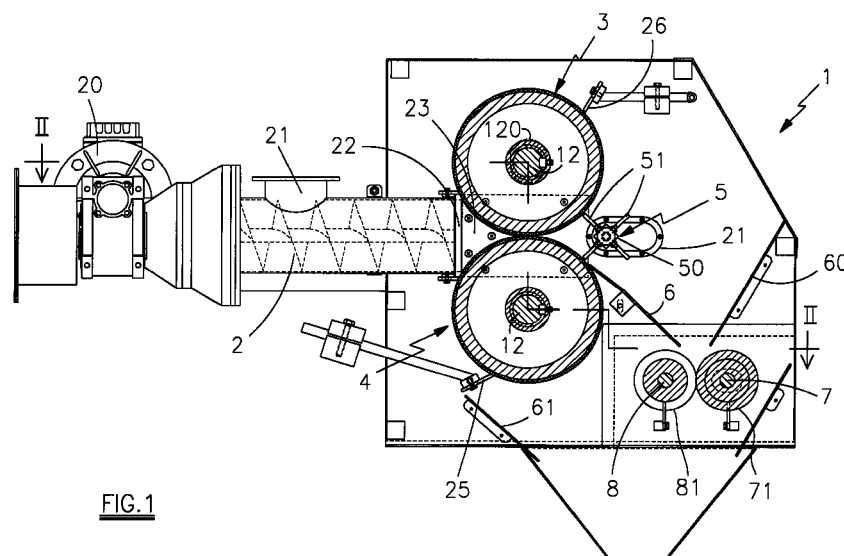


FIG. 1

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Description

[0001] This invention relates to rolling plants used in the ceramics industry for forming flakes from fine granular or atomized powder.

[0002] In processing raw materials for tile production it is known, starting from granular or atomized powder, to form flakes with which special colour effects are obtained in the finished product.

[0003] For this purpose, plants known as roller mills are available in which a screw feeder feeds the powder to two overlying motorized rolls, the rolling surfaces of which are slightly spaced apart to an extent depending on the thickness of the compacted material strip to be obtained.

[0004] At the roll exit, suitable means break said strip into flakes.

[0005] The lateral surface of said rolls is generally covered with a layer of vulcanized rubber extending along the entire roll length.

[0006] Plants of the described type suffer from the drawback that the rubber roll coverings tend to withdraw from the respective roll during operation, or to undergo damage in proximity to their edges. This compels the operator to interrupt plant operation to reposition or repair the covering.

[0007] The object of the invention is to overcome the aforesaid drawback within the framework of a rational and reliable solution.

[0008] The invention attains said object by providing a rolling plant comprising a screw feeder for feeding the powder or atomized coloured material between two overlying motorized rolls having their rolling surfaces in contact. In detail, each of said rolls comprises in a central position an annular recess carrying, fixed therein, an elastomeric covering which by virtue of the pressure which the material exerts thereagainst by the action of the screw feeder, deforms to form a uniform strip of the material.

[0009] Said elastomeric covering is maintained fixed in position within the annular recess, aided by a series of elastomeric teeth which project from the circumferential edges thereof and are inserted into a like number of equidistant holes provided in the inner walls of said annular recess.

[0010] Although preferred, the presence of the teeth is not however essential.

[0011] The characteristics of the invention are defined in the claims.

[0012] The constructional and operational characteristics of the invention will be more apparent from the ensuing description of a preferred embodiment thereof given by way of non-limiting example and illustrated on the accompanying drawings.

Figure 1 is a partly sectional view of the invention taken on a vertical plane.

Figure 2 is a partly sectional plan view of the invention.

Figure 3 is a front view of the roll used by the invention.

Figure 4 is a section on the line IV-IV of Figure 3.

Figure 5 shows the detail V of Figure 4.

[0013] Said figures show the rolling plant 1, comprising a screw feeder 2 feeding powder or atomized material between two identical facing rolls 3 and 4 arranged to form a uniform material strip which is then broken into flakes by a cross element 5 of horizontal axis. By means of a chute 6, the flakes are then fed between blades 71 and 81, which are positioned in mutual contact to form a cutter and are supported by two shafts 7 and 8 respectively.

[0014] The screw feeder 2, which is of usual type, is driven by a geared motor 20 and is fed with material in powder form through the port 21.

[0015] The screw feeder exit port 22 is of rectangular section, and is positioned at the contact surface between the rolls 3 and 4. To the vertical sides of said port 22 there are fixed two identical angular plates 23, one of which is visible in Figure 1, for retaining the material fed between the rolls, each of said plates having two curved sides of the same radius of curvature as the rolls 3 and 4, so that the entire material is channelled between said rolls.

[0016] With particular reference to Figures 3, 4 and 5, each roll 3 and 4 comprises a central hub 10 provided with a usual spline 100 for receiving a key 11 for keying the hub onto the shaft 12. A hollow cylinder 14 is rigidly joined to said hub 10 by three identical rings 13. The outer surface of said cylinder 14 comprises a central annular recess 15 defining two circumferential edges 140 and 141 provided with a series of equidistant through holes 1410, the function of which will be clarified hereinafter.

[0017] Within the annular recess 15 there is created a layer 16 of vulcanized rubber having its outer surface coplanar with the outer surface of the edges 141, and comprising a series of gripping teeth 160 which project from its circumferential edges and are inserted into the holes 1410.

[0018] The holes 1410 are flared at 1420 to improve the grip of the teeth 160 against the edges 140 and 141.

[0019] During plant operation, the teeth 160 prevent the ends of the vulcanized rubber layer 16 from emerging from the annular recess 15.

[0020] Preferably, said rubber layer is formed, together with its teeth, by moulding and vulcanization in-situ.

[0021] One end of the shaft 12 of the upper roll 3 (see Figure 2) carries a step-down gear unit 18 coupled to the shaft (not shown) of a motor 19, to the opposite

end of said shaft 12 there being fixed a sprocket 200 which transmits motion to the sprocket (not shown) keyed onto the shaft of the underlying roll 4. As shown in Figure 1, the shaft 12 of the roll 3 can be adjusted in height by being mounted on a vertical slot 120, shown as a dashed line in said figure. This enables the roll 3 to be positioned in contact with the underlying roll 4 or slightly spaced from it, depending on the thickness of the flakes to be produced.

[0022] The cross element 5, which is rotated by means of usual type, not shown, consists of a central block 50 from which there extend four equidistant identical blades perpendicular to each other and of length equal to that of the rolls 3 and 4. Said cross element 5 can traverse horizontally by being supported in two slots 21, to enable it to be positioned at the desired distance based on the size of the flakes to be obtained.

[0023] By means of the chute 6, the flakes broken off by the cross element are fed between the two shafts 7 and 8, of which the shaft 7 is rotated by the geared motor 22 and transmits motion to the shaft 8 via a pair of sprockets 24 and 25.

[0024] The shafts 7 and 8 carry the circular blades 71 and 81 respectively, which make mutual contact to act as cutters. With reference to Figure 1, at the exit of the blades 71 and 81 the material flakes fall either into an underlying collection container, not shown, or onto a usual conveyor belt.

[0025] In front of the chute 6 there is provided a similar chute 60, a usual scraper 25 and 26 being associated with each roll 3 and 4. A further chute 61 is provided below the scraper 25 to collect any powder falling by the action of the scraper 25.

cumferential edges of said layer and received in a like number of holes provided in the walls of said annular recess.

- 5 5. A roll for rolling plants, characterised by comprising a central annular recess in which a layer of elastomer is contained and retained by suitable locking elements.
- 10 6. A roll for rolling plants as claimed in claim 5, characterised in that the outer surface of said elastomer is coplanar with the outer surface of said roll.
- 15 7. A roll for rolling plants as claimed in claim 5, characterised in that said locking elements for the elastomer layer comprise a series of teeth extending from the circumferential edges of said layer and received in a like number of holes provided in the walls of said annular recess.
- 20 8. A roll for rolling plants as claimed in claim 5, characterised in that said elastomer is vulcanized rubber.

Claims

- 35 1. A rolling plant comprising a screw feeder for feeding powder or atomized material in powder form between two overlying motorized rolls of adjustable distance apart, they being arranged to form a uniform strip of compacted material which is broken into flakes by a usual rotary means, downstream of which there is positioned a cutter to reduce the dimensions of said flakes, characterised in that said rolls have a central annular recess in which a layer of elastomer is contained and retained by suitable locking elements.
- 40 2. A rolling plant as claimed in claim 1, characterised in that said elastomer is vulcanized rubber.
- 45 3. A rolling plant as claimed in claim 1, characterised in that the outer surface of said elastomer is coplanar with the outer surface of said rolls.
- 50 4. A rolling plant as claimed in claim 1, characterised in that said locking elements for the elastomer layer comprise a series of teeth extending from the cir-
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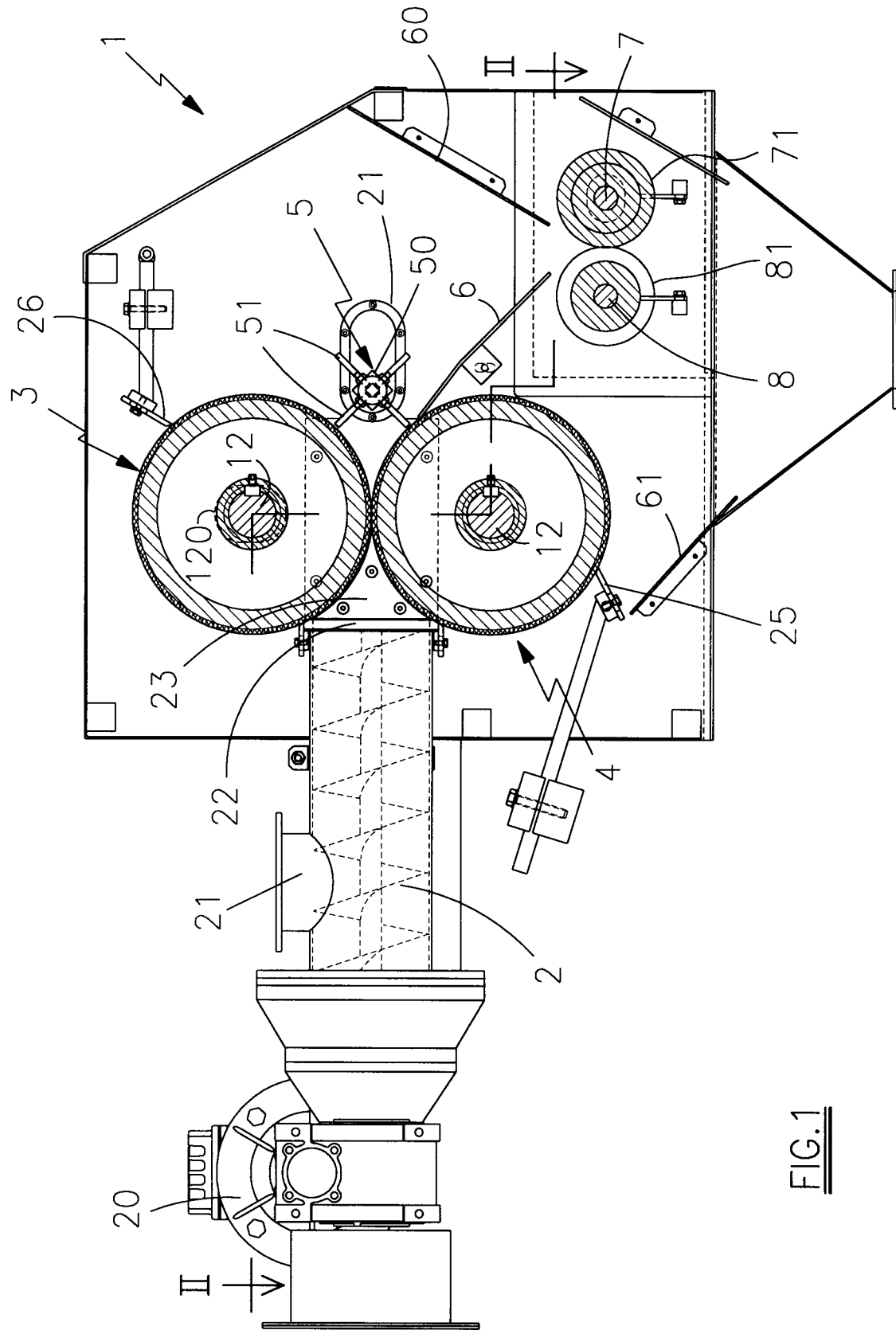


FIG. 1

