Nov. 13, 1928. 1,691,210

B. SCHERBAUM

GRINDING AND PULVERIZING MILL

Filed Dec. 23, 1925 2 Sheets-Sheet 1

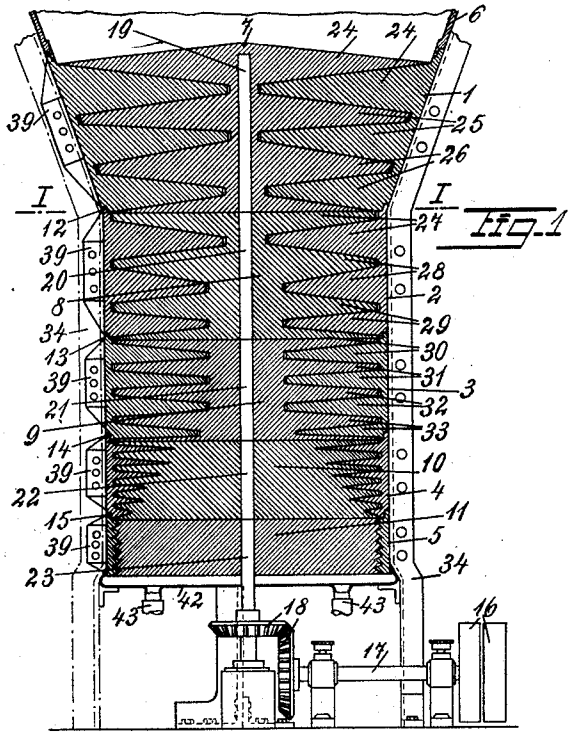
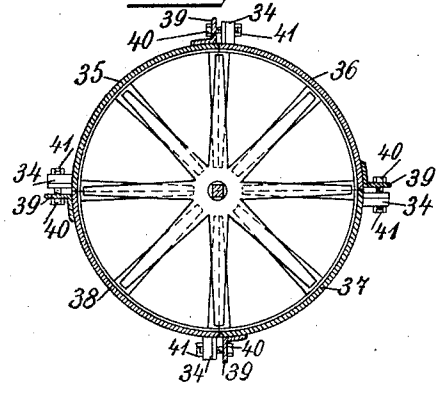


Fig. 1

Fig. 4



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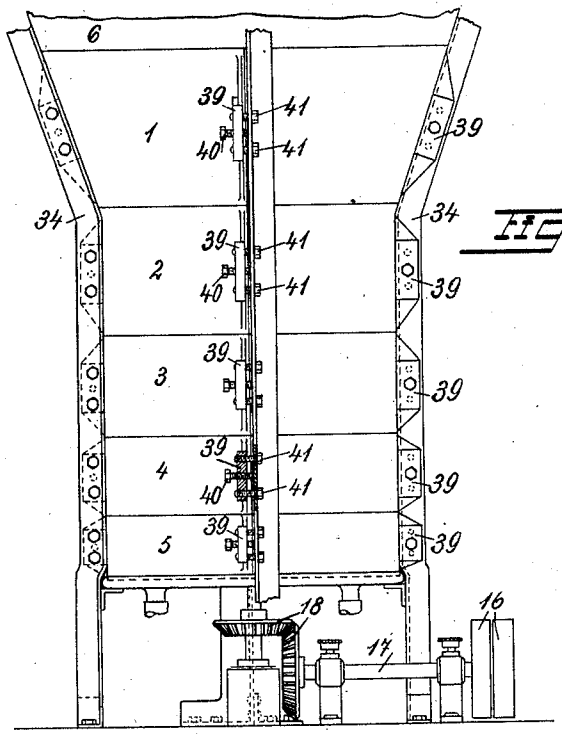
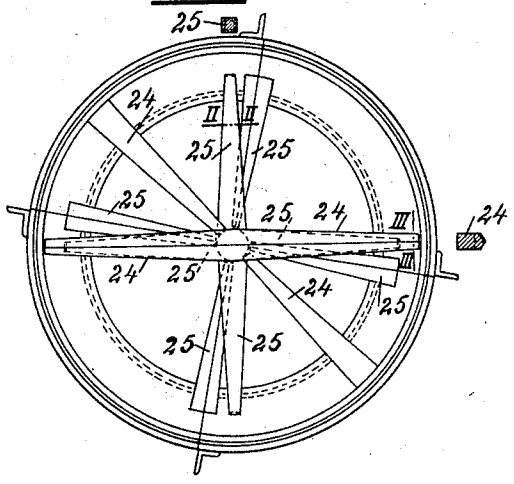


Fig. 2

Fig. 3



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UNITED STATES PATENT OFFICE.

BERNHARD SCHERBAUM, OF WEDEL, GERMANY.

GRINDING AND PULVERIZING MILL.

Application filed December 23, 1925, Serial No. 77,355, and in Germany December 31, 1924.

The subject of the present invention is a grinding and pulverizing device by which the breaking and grinding at the same time of the softest or the hardest materials can be effectively performed, and by which at will various of these operations can be carried out in suitable succession and number.

The accompanying drawing shows by way of example one embodiment of the invention.

Fig. 1 is a vertical section through the mill.

Fig. 2 is an elevation.

Fig. 3 is a plan view.

Fig. 4 is a section on the line I—I of Fig. 1.

Above and at the side of Fig. 3 are shown the teeth cross-sections taken on the lines II—II and III—III of Fig. 3.

The new mill consists of an outer cylinder or shell which is formed in superposed cross-sections on its periphery with teeth decreasing in height and increasing in number continuously or in stages and co-operating with a co-axial solid rotatable body, the outer periphery of which is correspondingly shaped and carries teeth entering the axial spaces between the rows of teeth of the outer body. Thus in separate superposed cross sections the number of the teeth increases but their height is not reduced. Both the outer and the inner solid body consist of several parts subdivided in planes at right angles to the longitudinal axis and each removable or interchangeable.

In the embodiment illustrated the outer body consists of five rings, 1, 2, 3, 4 and 5, which serve in succession for breaking up, coarse grinding, fine grinding and pulverizing the material fed to the mill through the hopper 6. The solid inner body which in the embodiment illustrated is rotatable consists also of five parts, 7, 8, 9, 10 and 11. The portions 1 to 5 of the outer body are provided with inter-engaging projections 12, 13, 14 and 15. The rotatable spindle of the sub-divided solid inner body 7 to 11 is driven through the medium of the intermediate shaft 17, and the bevel pinion gearing 18 is also sub-divided into a number of parts 19, 20, 21, 22 and 23, which inter-engage by means of squared extensions. The spindle 19—23 is either keyed in its separate portions to the corresponding portions of the solid body 7—11, or is formed with a plurality of edges by which to transmit the drive to the solid body.

As shown the toothed rings of the solid body 7—11 engage in the axial inter-dental spaces of the toothed rings of the outer body 1—5, and both kinds of teeth taper downwardly more or less continuously or in steps. The number of the teeth increases in the downward direction so that, for example, two co-operating teeth 24 on the solid and on the outer body are provided; four of the teeth 25; six of the teeth 26; eight of the teeth 27; ten of the teeth 28; twelve of the teeth 29; fourteen of the teeth 30; sixteen of the teeth 31; eighteen of the teeth 32 and twenty of the teeth 33 co-operate. The number of teeth of the succeeding fine grinder 4—10 from its upper to its lower end amounts for example to forty, fifty, sixty, seventy, eighty and ninety, the lowermost of the pulverizing rings 5, 11, being provided with teeth of equal height and of greater number.

The mill can also be arranged in such manner that for example the preliminary breaker 1, 7, may be omitted and only the coarse grinder 2, 8, the fine grinder 3, 9, the meal grinder 4, 10 and the pulverizer 5, 11, remain. In addition all sorts of variations are possible.

The parts of the outer body are held together by four U-shaped rails 34, distributed around the periphery. In addition the parts 1 to 5 of the outer body are each formed in four or more axially sub-divided segments 35, 36, 37 and 38, Fig. 4. On each of these segments is provided a cheek 39 which is held by bolts 40 and two pressure screws 41 to the frame rails 34. By adjustment of the screws 40 and 41 each ring segment 35, 36, 37, 38, can be so displaced that the inner periphery of the corresponding ring is reduced or expanded, or is given a form different from the rotating body. The consequence of this adjustment is the variation of the distance apart of the teeth and when it is large enough the cutting out of this part of the mill.

The meal passing from the pulverizer 5, 11 enters a casing 42, which is maintained under vacuum by means of branches 43, the suction pipe connected at 44 drawing off the meal. All the teeth are contacted by a current of air which cools them. The outer sides of all the grinding bodies remain cool, as they are exposed to the air.

I claim:

1. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed

sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, and a solid inner body coaxial with said outer body, said solid body being formed with corresponding teeth entering the inter-dental spaces of the teeth of the outer body into grinding relation therewith.

2. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, and a solid inner body coaxial with said outer body, said solid body being formed with corresponding teeth entering the inter-dental spaces of the teeth of the outer body, said inner and outer bodies consisting of interchangeable parts and subdivided in planes at right angles to their longitudinal axis.

3. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, and a solid inner body coaxial with said outer body, said solid body being formed with teeth entering the inter-dental spaces of the teeth of the outer body, the said sections of said inner body engaging with one another for rotation as a whole.

4. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, a solid inner body coaxial with said outer body, said solid inner body being formed with corresponding teeth entering the inter-dental spaces of the teeth of the outer body, the sections of said solid body engaging with one another for rotation as a whole, and a driving shaft also subdivided into parts coupled together.

5. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, a solid inner body coaxial with said outer body, said solid inner body being formed with teeth entering the inter-dental spaces of the teeth of the outer body, the sections of said outer body consisting of axially sub-divided segments, means for holding said segments together normally and means for adjusting the segments, substantially as and for the purpose set forth.

6. A grinding and pulverizing mill comprising an outer body arranged axially vertically, said body being formed of superposed sections, said sections being formed with peripheral teeth, said teeth being of varying size and depth, a solid inner body coaxial with said outer body, said solid inner body being formed with teeth entering the inter-dental spaces of the teeth of the outer body, a casing connected with the lower of the superposed sections and means for subjecting said casing to a negative pressure.

In testimony whereof I have signed my name to this specification.

BERNHARD SCHERBAUM