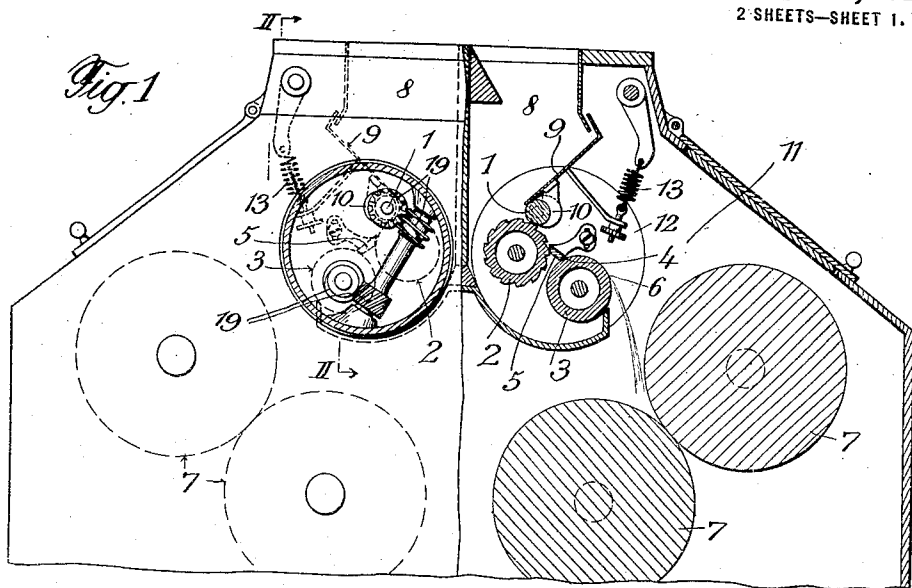
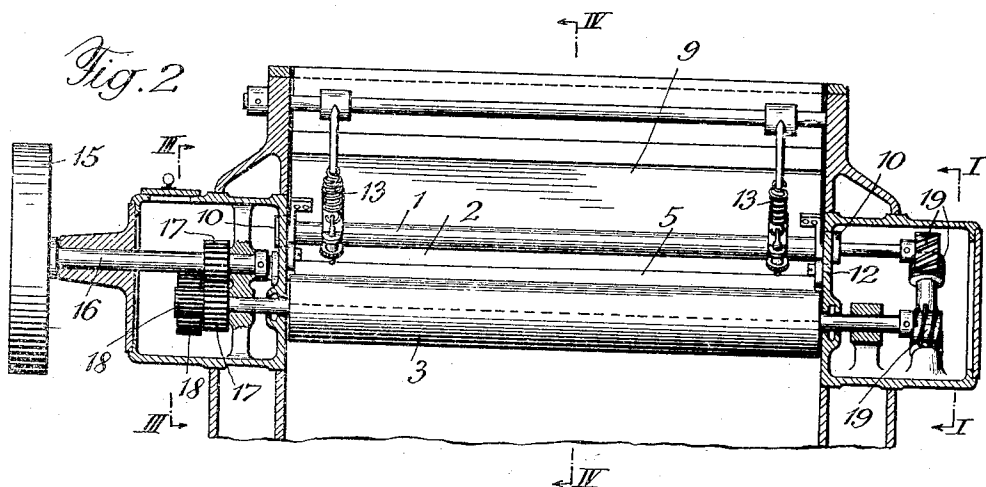
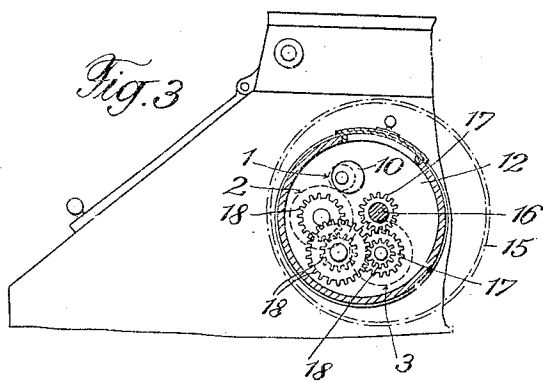


1,337,567.

2 SHEETS—SHEET 1.



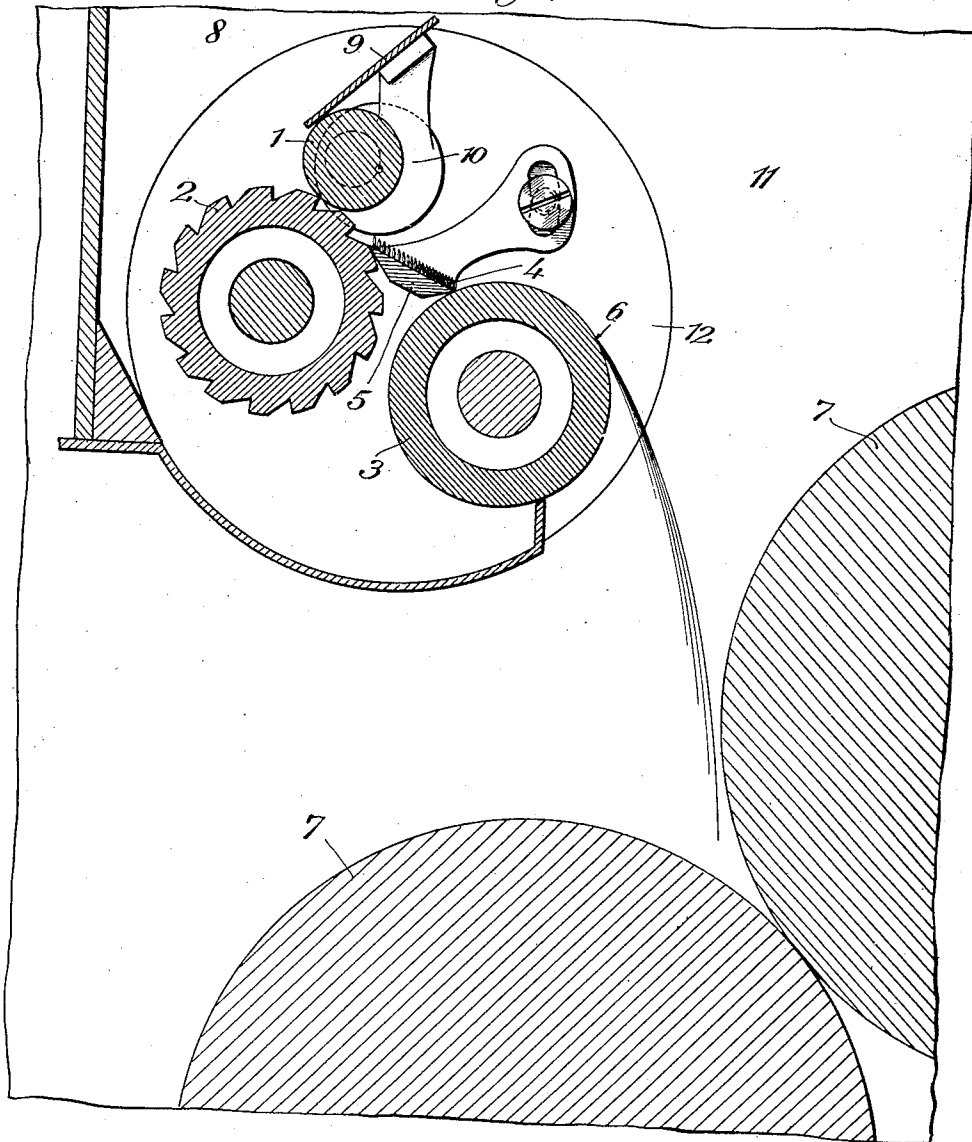
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E. ROTH.
FEEDING DEVICE FOR GRINDING CYLINDER MILLS.
APPLICATION FILED MAR. 4, 1919.

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Patented Apr. 20, 1920.
2 SHEETS—SHEET 2.

Fig. 4



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UNITED STATES PATENT OFFICE.

ERNST ROTH, OF NIEDER-UZWIL, SWITZERLAND.

FEEDING DEVICE FOR GRINDING CYLINDER-MILLS.

1,337,567.

Specification of Letters Patent.

Patented Apr. 20, 1920.

Application filed March 4, 1919. Serial No. 280,516.

To all whom it may concern:

Be it known that I, ERNST ROTH, a citizen of the Republic of Switzerland, residing at Nieder-Uzwil, Switzerland, have invented certain new and useful Improvements in Feeding Devices for Grinding Cylinder-Mills; and I do hereby declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

It is the general endeavor to design grinding cylinder mills so that the material is fed to the grinding stones in a very uniform manner. To this end there have been proposed a great number of very different constructions. According to one of these constructions already proposed, a feed-roll arranged below the feeding hopper supplies the material to a second feed-roll which then carries the material further into the entrance angle provided between the cylindrical millstones. In order to obtain in this construction a uniform feed, a sliding bridge is arranged between the two feed-rolls, so that the material passes from the first feed-roll over said bridge onto the second feed-roll. The latter conveys then continually a certain quantity of material from said bridge into the small passage provided between the two millstones. It has also been proposed to provide in combination with the first feed-roll a feed-plate adapted to be adjusted in accordance with the quantity of grinding material contained in the feeding hopper, in order to vary the feeding aperture provided between the lower end of the feed-plate and the first feed-roll. As this feeding aperture becomes however easily clogged, it has further been proposed to provide at the lower end of the feed-plate a small roll adapted to remove the clogging, thus preventing any irregular supply of the material to the cylindrical millstones. Said roll has the task to draw the material to be ground into the feeding aperture provided between said roll and the first feed-roll.

Although the first feed-roll is adapted to uniformly convey the material to be ground, the current of material leaving this feed-roll can usually not be supplied to the grinding stones, as the material has to be supplied to the millstone in the form of a very uni-

form veil-like, thin layer or sheet. In order to obtain such a thin layer, different constructions have also been proposed. Thus, for instance, it has been proposed to cause the first feed-roll to deliver the material to a sliding plate from which it falls onto a second sliding plate where it is reduced to dust; the latter is then thrown into the entrance space provided between the two grinding stones by the second feed-roll. This arrangement has however the drawback, that the material to be ground does not leave the sliding plate in small particles but in pieces having a certain size, as the small particles of the material to be supplied to the millstones have the tendency to stick together owing to their adhesion. In consequence of this, the feed is not uniform and this can not be remedied by the lower feed-roll; clouds will therefore appear in the feeding sheet on its way from the lower feed-roll to the millstones indicating that the feed is not uniform.

Any clogging occurring in the feeding aperture has the effect of producing tears or spaces in the thin feeding layer. Notwithstanding the most different experiments carried out, it has not yet been possible to design a feeding device for grinding cylinder mills adapted to produce under all circumstances a uniform, uninjured feeding sheet of material to be ground, and to supply it in this state to the millstones.

This invention relates now to a feeding device for grinding cylinder mills adapted to produce such a uniform, uninjured feeding sheet. The feeding device according to the present invention comprises a feed-roll coöperating with a slowly rotating auxiliary roll provided at the lower end of a feed-plate and conveying the material to an inclined bridge across which the grain slides and which coöperates at its lower end with a second feed-roll running at a greater speed than said first mentioned feed-roll. This second feed-roll takes off the material directly from the bridge and discharges it in the shape of a uniform, uninjured thin layer or film into the entrance space or nip between the millstones.

This invention will now be more particularly described with reference to the accompanying drawings illustrating by way of example one construction of carrying out the invention. In these drawings:

Figure 1 is a vertical cross-section partly

on the line I—I and partly on the line IV—IV of Fig. 2 through a grinding cylinder mill fitted with the new feeding device.

Fig. 2 is a section on the line II—II of Fig. 1 and

Fig. 3 a section on the line III—III of Fig. 2.

Fig. 4 shows details of the grinding cylinder mill on an enlarged scale.

Referring to the drawings, 8 denotes a feeding channel separated at its lower end by a feed-plate 9 from the space 11 in which are arranged the two millstones 7. The feed-plate 9 is connected to journals 10 pivotally mounted in the casing 12 forming a portion of the grinding cylinder mill. 13 denotes means for adjusting the plate 9 and consequently also the journals 10 connected to said plate 9. The lower end of the feed-plate 9 coöperates with an auxiliary roll 1 which coöperates also with a ribbed or toothed roll 2 and is spaced therefrom by the adjusting means 13 in accordance with the size of the grain to be fed. The roll 1 is supported in said journals 10, the bearings for said roll 1 in the journals 10 being arranged eccentrically with regard to the axis of rotation of the journals 10. Upon the roll 2 rests one end of an adjustable bridge 5 across which the grain is caused to slide the angle of inclination of which is less than the angle of repose of the material to be ground, so that the material having the form of a thin sheet is prevented from sliding down said bridge 5 in an irregular manner. The lower end of the bridge 5 rests upon a second discharge feed-roll 3 running at a higher speed than the feed-roll 2 and taking off the material to be ground directly from the lower end of the bridge 5 and discharging from the feeding mechanism to the grinding rolls. The plane passing through the axes of the two feed-rolls 2 and 3 is parallel to the upper surface of the bridge 5. 15 denotes the main driving pulley of the grinding mill fixed to a shaft 16. A toothed-wheel gearing 17 transmits the drive to the roll 3. The rotary motion of the latter is transmitted to the roll 2 by means of a toothed-wheel gearing 18 (Fig. 3) and also to the auxiliary roll 1 by means of a worm gearing 19 (Figs. 2 and 1).

The ribbed roll 2 rotates with a mean-velocity and conveys the material falling into the spaces provided between its ribs to the sliding bridge 5. Thus, it will be seen, that strips of material to be ground are successively delivered to said bridge 5. Owing to the sliding of the material occurring on the bridge 5, the rows of material transverse of the direction of movement of the material conveyed by the recesses provided between the ribs of the feed-roll 2 are caused to shift nearer together; at the end of the bridge 5 they are then situated so

near one another that any further variation in the feeding layer is entirely prevented. The feed is therefore a continuous one over the whole length of the feed-rolls until any foreign body that can not be drawn into the entrance angle by the feed-roll 2 alone, is jammed between the auxiliary roll 1 and the feed-roll 2.

Any foreign body conveyed into the entrance angle between the auxiliary roll 1 and the feed-roll 2 and jammed between these rolls will produce an interruption in the feed-layer so that a space or tear will appear in the sheet of material on the bridge 5. As the auxiliary roll 1 is caused to rotate slowly and is not kept stationary, said foreign body is seized by the auxiliary roll 1 and the feed-roll 2 and conveyed forward so that only a transitory interruption in the feed will occur, the feed becoming again normal as soon as the small jammed body has been conveyed past the rolls 1 and 2. The result of this is that the auxiliary roll 1 and the feed-roll 2 rotating at a higher speed than said roll 1 have the effect to cause any hiatus in the grain sheet that may appear in the direction in which the material is fed to disappear very soon. As the angle of inclination of the bridge 5 is less than the angle of repose of the material to be ground, said bridge 5 causes any uniformities that may appear in the feeding layer after it has been moved past the rolls 1 and 2 in the transversal direction relatively to the feeding direction of the material, to disappear, the portions of material discharged by the feed-roll 2 onto the bridge 5 being caused to slide gradually nearer one another while they move down said bridge, as this is clearly shown in Fig. 2. Thus, in the arrangement described comprising the auxiliary roll 1, the feed-roll 2 and the bridge 5, the feeding layer reaching the end 4 of the bridge 5 will be quite uniform. It will now be seen, that the uniform feeding layer is not spoiled and that the material is fed from the point 4 toward the entrance opening or nip between the millstones 7 as uniformly as possible. To this end the feed-roll 3 is provided which rotates at a still greater speed than the first feed-roll 2, the material passing at the point 4 in the form of a thin layer from the bridge 5 onto said roll 4 which conveys it further and then discharges it at the point 6 of its circumference into the entrance angle of the millstones. In such an arrangement, the material is fed in a wholly uniform and uninterrupted manner in the form of a thin layer of fleece to the millstones 7, so that the latter are adapted to engage each single particle of the material and to grind it in the most effective manner.

The bridge 5 being inclined at an angle less than the angle of repose, of the mate-

rial being ground, the grain will not of
itself slide across the bridge by gravity,
but requires a slight impulse, obtained by
its discharge from the rotating roll 2, to
5 send it across the bridge, so that the sepa-
rate grains will lie closer together toward
the lower edge of the bridge, being tem-
porarily arrested or retarded by the roll 3,
which is adjacent the lower end of the
10 bridge, or contacts with it at a point on its
circumference below the crest of the roll and
gives the grains a slight change of direc-
tion, lifting them and carrying them over
the crest of the roll in a uniform sheet, thus
15 positively taking the material from the end
of the bridge and discharging it into the
nip of the grinding rolls.

I am aware, that feeding devices compris-
ing the same elements in a different combi-

nation are already known, but these known 20
devices do not allow of attaining in any
way the same results as the feeding device
according to the present invention.

What I claim now as my invention is:

In a feed mechanism for grinding mills, a 25
ribbed roll, an auxiliary roll coöperating
therewith to permit the material to pass
between them, an adjustable bridge receiv-
ing material from said ribbed roll, a dis-
charge roll at the lower end of said bridge, 30
and driving mechanism for driving said
rolls, whereby the auxiliary roll will be
rotated slower and the discharge roll faster
than the ribbed roll.

In testimony that I claim the foregoing as 35
my invention I have signed my name.

ERNST ROTH.