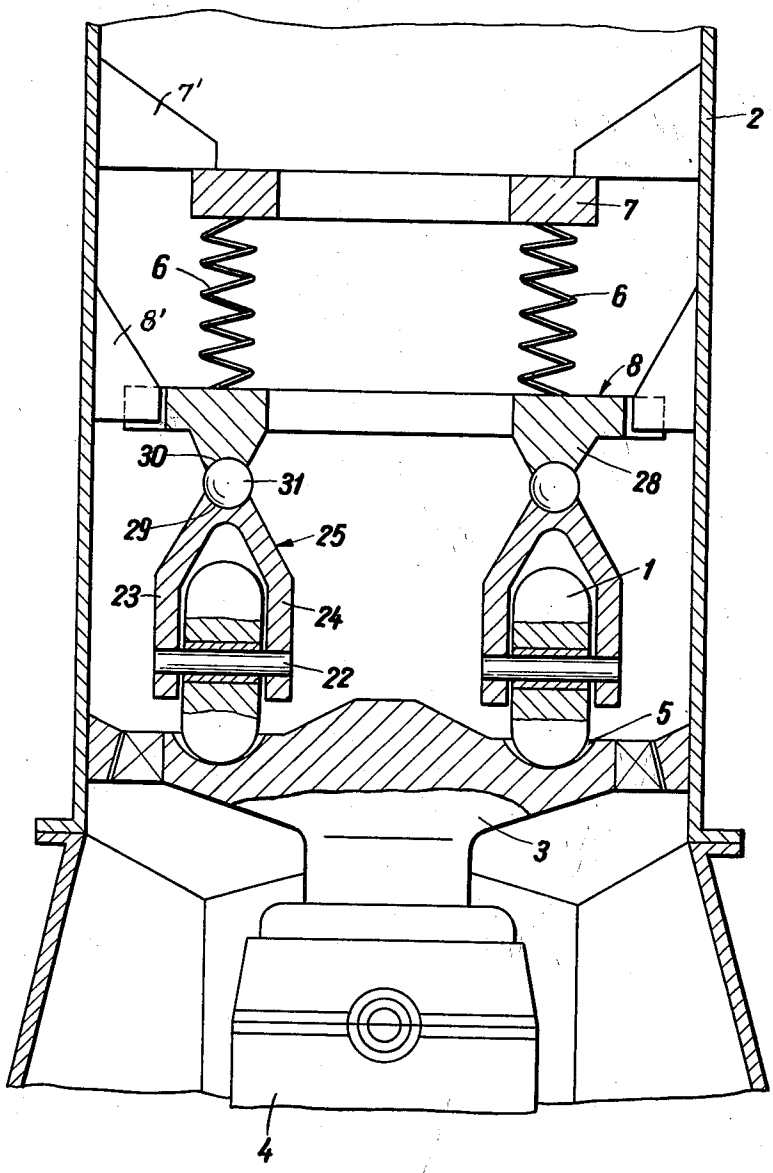
April 2, 1963 S. SCHAUER 3,083,920

GRINDING MILL

Filed May 17, 1962 2 Sheets-Sheet 1

Fig.1



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April 2, 1963 S. SCHAUER 3,083,920

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Filed May 17, 1962 2 Sheets-Sheet 2

Fig.2

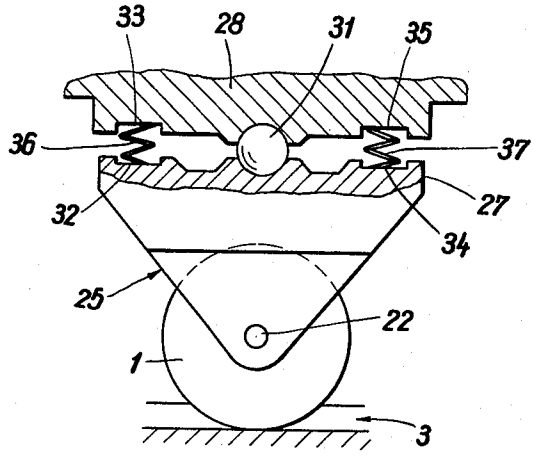
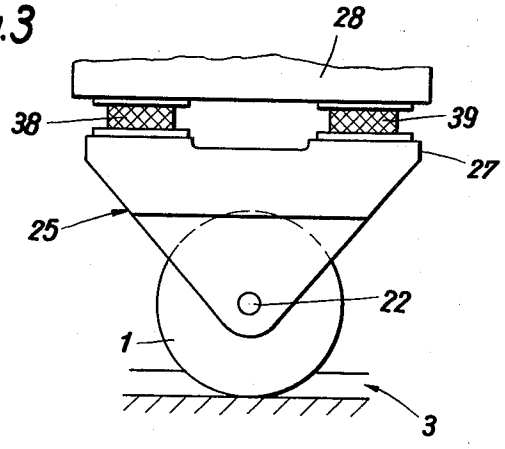


Fig.3



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GRINDING MILL

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6 Claims. (Cl. 241—114)

The invention relates to a roller-type crushing mill, especially a mill of the type in which a plurality of rolls engage rollingly the surface of a rotating crushing disc, being carried by a carrier which is non-rotatable but is movable towards and away from the disc and is spring pressed towards the disc. It constitutes an improvement on the construction shown in prior application S.N. 826,731, filed July 13, 1959.

In that application, there is disclosed an arrangement of three stationary rolls journalled on the pressure plate or carrier to swing in a radial direction with respect to the axis of rotation of the grinding disc, a special feature being that the mounting is accomplished by means of socket-like supporting surfaces. For bracing the rollers in the circumferential direction, the socket-like supporting surfaces are formed as cylindrical segments with sufficient lineal extent or sufficient spacing between two supporting surfaces to guide each roll in the direction of rotation of the disc.

In both these cases, the journalling of the rolls in the circumferential direction is effectively rigid, so that circumferentially directed shocks caused by contact of the rolls with particles of the material to be ground on one roller are transmitted to the the carrier, and, since this is a ring connected with all the rollers, to the other rolls, so that the supporting surfaces are required to take up the shocks which are perpendicular to the direction of swinging of the rolls.

The primary object of the present invention is to provide an improved mounting for the grounding rolls on the carrier or pressure ring in which the effect of circumferentially directed shocks on the mountings for the rolls is avoided.

A further object of the invention is to provide a frame in which each wheel is journalled and means universally mounting the frame on the carrier or pressure ring, such mounting means including resilient means for resisting swinging of the carrier about an axis radial to the axis of rotation of the disc so as to absorb circumferential shocks.

According to one form of the invention, this mounting includes the mounting of the frame on the carrier by a ball-and-socket arrangement and the provision of springs spaced apart circumferentially on opposite sides of the ball-and-socket.

Another form uses two mounting blocks of resilient material positively secured to the frame and carrier and located on opposite sides of a vertical radial plane through the roller axis.

Further objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawings which form a part thereof:

In the drawings:

FIGURE 1 shows in vertical cross-section a grounding mill embodying the invention;

FIGURE 2 is a side view of the mounting of one of the rollers of FIGURE 1; and

FIGURE 3 is a similar view of a modification.

The device of FIGURES 1 and 2 has a cylindrical housing 2 in which is rotatably mounted a grinding disc 3 driven by a motor 4; disc 3 has in its upper face an

annular groove 5, in which grinding rollers 1 rollingly engage. These rollers are mounted, in a manner to be described below, on a pressure ring or carrier 8 which is non-rotatably held by lugs 8' engaging in slots in the periphery of the carrier, these lugs being fixed on the inside of the wall of casing 2. The carrier is movable towards and from the disc 3, and is urged towards it by coil springs 6 engaged between ring 7 and carrier 8, and prevented from upward movement by lugs 7'.

The mounting of the rollers on the carrier is by a fork-shaped frame 25 having downwardly extending legs 23 and 24 with the axle 22 of roller 1 mounted in these legs and running radially to the axis of rotation of the disc. The upper part of frame 25 is formed as a supporting member 27 extending parallel to the plane of the grinding disc a substantial distance in the circumferential direction on opposite sides of a vertical radial plane through the roller axis. Opposite member 27 on the pressure ring 8 is a downward extension 28. A ball 31 is engaged in sockets 29 and 30 in the parts 27 and 28 in the radial vertical plane through the roller axis. The width of the legs 23, 24 in the circumferential direction tapers down continuously from part 27 to axle 22.

At a distance from the ball and socket joint, and on opposite sides of the vertical radial plane through the roller axis, parts 27 and 28 have cylindrical sockets 32, 34O and 33, 35 respectively, in which are seated coil springs 36, 37.

Such an arrangement not only permits radial movement of the rollers, but also permits resiliently resisted swing of the rollers in a circumferential direction to take up shocks exerted on the rollers in the direction of rotation.

In the form of FIGURE 3, similar movement is provided for by resilient mounting blocks 38, 39 of rubber or the like positively secured to seats on the downward extension 28' of ring 8 and the upper section 27' of frame 25. These are spaced apart on opposite sides of the vertical radial plane through the roller axis.

The flexibility of the blocks 38, 39 is sufficient to allow radial swinging movement of the rollers through a small angle, and the elasticity under compression and tension allows the desired displacement of the roller in the direction of rotation to take up the shocks.

While I have described herein one embodiment of my invention, I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claims hereto or hereinafter appended.

I claim:

1. In a grinding mill having a grinding disc, a plurality of rollers rollingly engaging the surface of the disc and circumferentially spaced around an axis and means mounting the rollers and the disc for relative rotation therebetween about said axis, mounting means for said rollers comprising a common carrier for all the rollers, a frame for each roller, means journalling each roller in one of said frames for rotation about an axis radial to said relative axis of rotation, and means mounting each frame for universal movement on the carrier, said mounting means including resilient means between the frame and the carrier spaced apart on either side of a perpendicular plane through the axis of rotation of the roller.

2. In a device as claimed in claim 1 in which said disc rotates; means mounting the carrier for movement towards and from the disc while preventing rotation of the carrier, and means resiliently urging the carrier towards the disc.

3. In a grinding mill having a grinding disc, a plurality of rollers rollingly engaging the surface of the disc and circumferentially spaced around an axis, and means mounting the rollers and the disc for relative rotation therebetween about said axis, mounting means for said

rollers comprising a common carrier for all the rollers, a frame for each roller, means journalling each roller in one of said frames for rotation about an axis radial to said relative axis of rotation, a ball-and-socket mounting between each frame and the carrier, and springs between the frame and the carrier spaced apart on either side of a perpendicular plane through the axis of rotation of the roller.

4. In a device as claimed in claim 3 in which said disc rotates; means mounting the carrier for movement towards and from the disc while preventing rotation of the carrier and means resiliently urging the carrier towards the disc.

5. In a grinding mill having a grinding disc, a plurality of rollers rollingly engaging the surface of the disc and circumferentially spaced around an axis and means mounting the rollers and the disc for relative rotation therebetween about said axis, mounting means for said rollers comprising a common carrier for all the rollers, a frame for each roller, means journalling each

roller in one of said frames for rotation about an axis radial to said relative axis of rotation, two bodies of resilient material between and positively secured to the frame and carrier, said bodies being spaced apart on either side of a perpendicular plane through the axis of rotation of the roller.

6. In a device as claimed in claim 5 in which said disc rotates; means mounting the carrier for movement towards and from the disc while preventing rotation of the carrier, and means resiliently urging the carrier towards the disc.

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