Fig. 1

Fig. 2

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ROLLING MILLS FOR METAL POWDER ROLLING

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This invention relates to rolling mills for metal powder rolling and in particular to a device for the closure of the pass gap at the ends of the rolls.

Sheet and strip are made from metal powder by feeding the powder between two smooth cylindrical rolls, the powder being compressed on its passage through the rolls. The forces act on the powder not only in a direction perpendicular to the roll axes but also in the axial direction, so that the powder is spread out laterally. This results in unsatisfactory strip in which the powder is less compacted at the edges than the centre and which has an uneven boundary due to powder losses.

The invention aims to overcome this difficulty.

In a rolling mill according to the invention the gap between the rolls at their ends is closed thereby preventing spread of the rolled material beyond the ends of the rolls. This is achieved by means of a cover member at each end of the rolls which bridges the gap between the rolls, which is pressed against the end faces of both rolls and which moves in the direction of rolling.

The pressing force on the cover member must, of course, be greater than the forces exerted by the metal powder in the axial direction.

It has been found that with the device of the invention rolled metal powder strip can be produced with firm and sharp edges, powder losses are avoided and the strips may have the same width as the rolls. In addition, for further processing, such as sintering, hot and cold rolling, the rolled strips do not have to be trimmed, since edge cracks no longer occur.

The movable or cover member may be an endless steel band carried round deflecting rollers. Preferably, the band is made of hardened steel strip which expediently has a thickness of about 0.5 to 0.8 mm.

The application pressure of the steel bands against the end faces of the rolls may be produced through a number of adjacent pressure rollers of small diameter. In the compression zone of the metal powder, these rollers transmit the application pressure force, for example, a spring system, to the steel band on which they roll.

Alternatively, the application pressure may also be produced by means of a rotating wheel of large diameter, the peripheral running surface of which corresponds to the width of the steel band and has a resilient contact surface in the form of a covering of rubber or the like.

In yet another alternative construction the pass gap at the ends of the rolls may be closed by pressing the peripheral running surface of a wheel of large diameter against the ends of the rolls, the peripheral running surface of the wheels being wider than the pass gap and having a rubber covering which, if desired, may also be covered by a steel band of the same width.

So that the invention will be better understood some examples in accordance with it will now be described with reference to the accompanying drawings, in which:

FIGURE 1 shows in plan view a device in accordance with the invention applied at one end of a pair of rolls;

FIGURE 2 shows in plan view another device in accordance with the invention applied at one end of a pair of rolls;

FIGURE 3 is an elevation partly in section of the device of FIGURE 1;

FIGURE 4 is an elevation, partly in section of the device of FIGURE 2; and

FIGURE 5 is another elevation, looking onto the ends of the roll, of the device of FIGURES 2 and 4.

Referring now to FIGURES 1 and 3, an endless steel band 1 is carried round deflecting rollers 2 and is pressed by means of a wheel 3 laterally against the ends of the rolls 6 and 7 so as to bridge the gap 4 between the rolls. The peripheral running surface of the wheel 3 is provided with a resilient rubber covering 5. The application pressure of the wheel is produced by a spring mounted in a housing 12.

In the embodiment shown in FIGURES 2, 4 and 5 a roller cage 8 has a number of non-driven pressure rollers 9, which are arranged close together and which roll on a guide 10. The pressure rollers 9 are pressed against the endless steel band 3 which is thus pressed against the rolls 6 and 7 thereby bridging the roll gap. The pressure on the rollers 9 is produced by a spring 11 acting against the roller cage 8.

We claim:

1. In a metal powder rolling mill having smooth cylindrical rolls and end faces thereon, a device to bridge the roll pass gap, comprising endless steel bands as cover members which bridge the pass gap laterally and in the plane formed by the axes of the rolls which are wider than the pass gap, and deflecting rollers to guide the steel bands as they bridge the pass gap.

2. A device in accordance with claim 1 and a plurality of rollers disposed closely together as pressure exerting means for the steel bands.

3. A device in accordance with claim 1 and wheels whose peripheral running surfaces match the width of the steel bands, as pressure exerting means for the steel bands, and in which resilient material covers the peripheral running surfaces.

4. In a metal powder rolling mill having smooth cylindrical rolls and end faces thereon, a device to bridge the roll pass gap, comprising wheels as cover members which bridge the roll pass gap laterally and the peripheral running surfaces of which wheels are wider than the pass gap, rubber covering on the peripheral running surfaces, and a steel band facing for each rubber running surface, which band matches the surface in width.

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