May 31, 1938. S. E. DIESCHER 2,118,970

GUIDE DISK

Filed Aug. 15, 1935

Fig. 1.

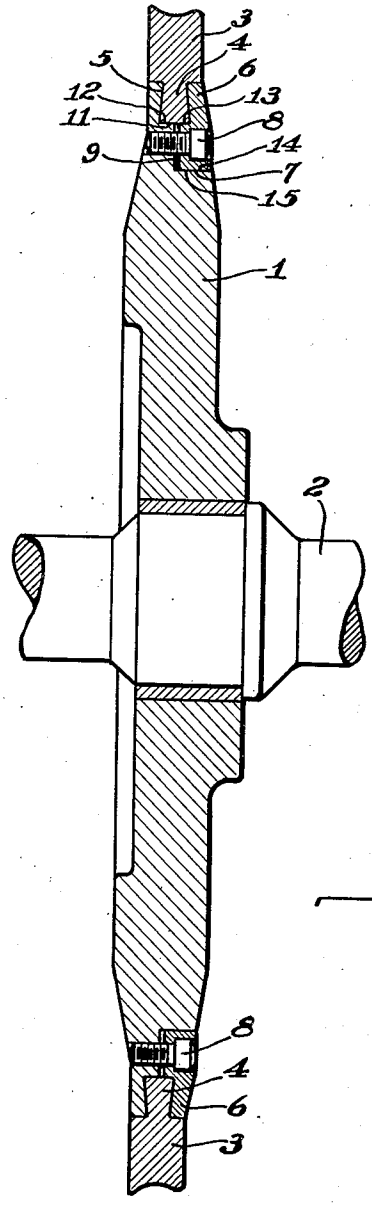


Fig. 2.

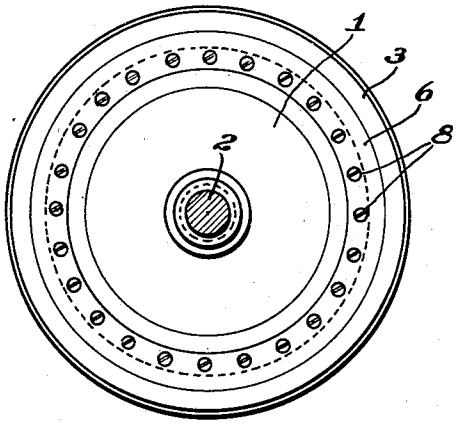


Fig. 5.

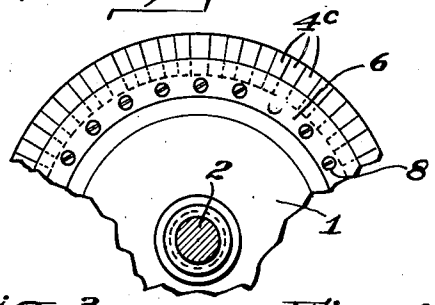


Fig. 3.

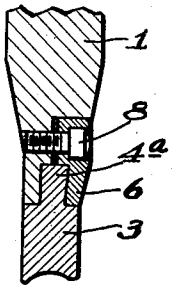
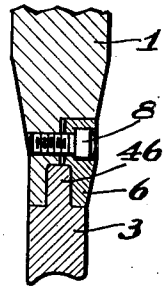


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE

2,118,970

GUIDE DISK

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Application August 15, 1935, Serial No. 36,316

4 Claims. (Cl. 80—13)

This invention pertains to cross-roll mills of the type disclosed in United States Patent No. 1,870,209 granted to the present inventor August 2, 1932 but relates more particularly to an improvement in the guide disks used in mills of this type.

As described in such patent, these guide disks are power driven and so disposed that they, in addition to guiding the work pieces, also control the outside diameter and assist in the elongation of the products produced by the mill. In order to so operate, the guide disks are mounted in properly spaced relation between the cross rolls of the mill on axes disposed at right angles to the pass-line of the cross rolls and are driven at peripheral speeds in excess of the longitudinal travel of the work pieces. As a result they are subjected to very strenuous and destructive conditions and strains in operation. Among these are the shocks encountered when the work pieces first enter the mill, the frictional effects resulting from the relative movement between the work pieces and the contacting surfaces of the guide disks and the strains produced by heating occasioned by the contact of the disks with the work pieces.

To cope with these conditions and increase the useful life of the disks it has been found desirable for economical and mechanical reasons to form the rim portions thereof out of a different and more durable material than the disc proper, and to detachably mount them on the disks so that they can be replaced and thereby avoid the necessity of replacing the whole assembly whenever a groove face becomes damaged. The securing and retaining of such rims on the disks, however, has heretofore presented many difficulties and it is towards an improvement in the construction and retention of these rims to the disk that this invention is more particularly directed, the primary object of the invention being to provide a simple and efficient connection for overcoming the last-mentioned difficulty.

Another and more particular object is to provide a guide disk of this character in which it is unnecessary to replace the entire rim when only a limited portion thereof is damaged.

A further object is to provide a disk in which the distortion of the rim due to expansion caused by heating is greatly minimized.

These and various other objects, as well as the various other novel features and advantages of the invention, will be apparent when the following detailed description is read in conjunction with the accompanying drawing, of which Fig. 1 is a sectional view taken on the diameter of a guide disk constructed in accordance with the invention; Fig. 2 an elevational view on a reduced scale of the same disk; Figs 3. and 4 fragmentary sectional views of two different modifications of the invention; and Fig. 5 a view similar to Fig. 2 of a disk embodying a still further modification of the invention.

As illustrated in the drawing, guide disks of this type comprise chiefly a disk 1 proper which is suitably secured to a supporting and power-supplying shaft 2 and a wear-resisting and work-engaging rim 3 which is preferably made of a harder and more heat-resistant material and one having a higher coefficient of expansion than the disk proper and replaceable to facilitate the maintenance and increase the life of the disk.

According to this invention the attachment of the rim 3 to the disk 1 is accomplished by providing a centrally disposed rib 4 on the inner surface of the rim and frictionally clamping this rib against a shoulder 5 provided for such purpose on one side of the disk body at its periphery, the clamping being by means of a ring 6 which is detachably and adjustably secured in a groove 7 to the disk body by a plurality of uniformly spaced bolts 8. These may be either ordinary bolts or screw bolts, which, as shown, are disposed to extend through the ring and threadably engage the disk body inside of the inner extremity of the rib. In this way the rib is firmly held in place without the clamping bolts being subjected to any shearing action and without the use of keys or any other members which are disposed to rigidly engage the rim in order to prevent relative movement between the rims and disk bodies.

In effect, the shoulder 5 and the groove 7 form inner and outer stepped offsets at the periphery of the disk, the rib 4 being seated in the outer, and the inner end of clamp 6 being seated in the inner, of these offsets. This affords a secure attachment of the rim to the disk, and at the same time has the advantage that the connecting members lie substantially flush with the face of the disk and clear of the faces of the cross-rolls with which the disk is associated in a mill.

To insure the rib 4 being firmly and rigidly held in place by the ring 6, the inner face of the shoulder 5 on the disk and that of the clamping ring opposite thereto are adapted to conform in shape to the abutting faces of the rib, and the ring is made to clear the inner face 9 of the groove 7 sufficiently to permit the necessary

clamping pressure being exerted upon the rib by the clamping rim when the screw bolts 8 are tightened. To hold the ring 6 in proper alignment when the screw bolts 8 are being tightened against rib 4 the inner surface 11 of such rib 4 is adapted to fit smoothly against the abutting surfaces 12 and 13 of the disk and ring, and the inner surface 14 of the ring similarly fitted against the surface 15 of the groove 7.

As shown in Fig. 1, the rib 4 is also provided with a cross section which is dovetail in shape to enhance the resistance of the connection against radial displacement of the ring when the latter is subject to expansion, this tending to keep the rim surface concentric with the disk body. This, however, may be modified as shown in the embodiment of the invention illustrated in Figs. 3 and 4 wherein the ribs 4*a* and 4*b*, respectively, are provided with one side parallel to a plane through the center of the disk and one inclined thereto, and the other with both sides parallel to such a plane, the style of rib 4*b* being intended for those cases where, due to an abundance of water cooling, or other special conditions, little or no expansive departure takes place between the rim and body of the disk.

As a further improvement, the invention also contemplates, as illustrated by the embodiment thereof shown in Fig. 5, the rim 4*c* being made up of a plurality of similar abutting segmental sectors all held in place by a rib and clamping-ring arrangement of the form described in connection with Fig. 1 or 3. In the assembly of such a rim the abutting surfaces of the segmental sectors are preferably separated by liners, of paper for instance, or by some suitable coating, such as lamp black which will burn away at the groove surfaces where the highest temperatures occur and still allow them to be firmly held in place while at the same time permit them to expand to some extent as a result of heating without producing any undue distortion of the rim. Another advantage of this type of rim is that it makes it possible to recondition the disk for service after a portion of the rim thereof has been damaged by merely replacing only such numbers of the rim segments as may have been damaged.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A guide disk for cross-roll mills and which is subjected to high working temperatures, comprising a single metal mounting-disk provided at one side of its periphery with a shoulder, a work-engaging rim formed of wear-resisting metal having a higher coefficient of thermal expansion than that of said disk and having a radial thickness materially less than that of said disk and being of substantially uniform width, said rim being provided with an inwardly extending rib having one of its sides bearing against said shoulder, and a clamping ring removably mounted on the side of said disk opposite to said shoulder and engaging said rib, the planes of engagement of said rib by said disk and clamp being substantially transverse to the axis of the disk, and said rim being held upon said disk solely by frictional engagement of the rib by the disk and said clamp.

2. A guide disk for cross-roll mills and which is subjected to high working temperatures, comprising a single metal mounting-disk provided at one side of its periphery with inner and outer stepped offsets, a work-engaging rim formed of wear-resisting metal having a higher coefficient of thermal expansion than that of said disk and having a radial thickness materially less than that of said disk and being of substantially uniform width, said rim being provided with an inwardly extending rib seated in said outer disk offset, and a clamping ring removably mounted in said inner disk offset and engaging said rib, the planes of engagement of said rib by said disk and clamp being substantially transverse to the axis of the disk, and said rim being held upon said disk solely by frictional engagement of the rib by the disk and said clamp.

3. A guide disk for cross-roll mills and which is subjected to high working temperatures, comprising a single metal mounting-disk provided at one side of its periphery with inner and outer stepped offsets, a work-engaging rim formed of wear-resisting metal having a higher coefficient of thermal expansion than that of said disk and having a radial thickness materially less than that of said disk and being of substantially uniform width, said rim being provided with an inwardly extending rib seated in said outer disk offset, a clamping ring having its inner portion seated in said inner disk offset and having its outer portion engaging said rib, and bolts extending through the inner portion of said clamping ring and engaging said disk, the planes of engagement of said rib by said disk and clamp being substantially transverse to the axis of the disk, and the outer face of said clamping ring and the outer ends of said bolts being substantially flush with a face of said disk.

4. A guide disk for cross-roll mills and which is subjected to high working temperatures, comprising a single metal mounting-disk provided at one side of its periphery with a shoulder, a work-engaging segmental rim formed of wear-resisting metal having a higher coefficient of thermal expansion than that of said disk and having a radial thickness materially less than that of said disk and being of substantially uniform width, said rim being provided with an inwardly extending rib having one of its sides bearing against said shoulder, a clamping ring removably mounted on the side of said disk opposite to said shoulder and engaging said rib, the planes of engagement of said rib by said disk and clamp being substantially transverse to the axis of the disk, and said rim being held upon said disk solely by frictional engagement of the rib by the disk and said clamp.

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