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CIRCULAR ROTATING GRIZZLY

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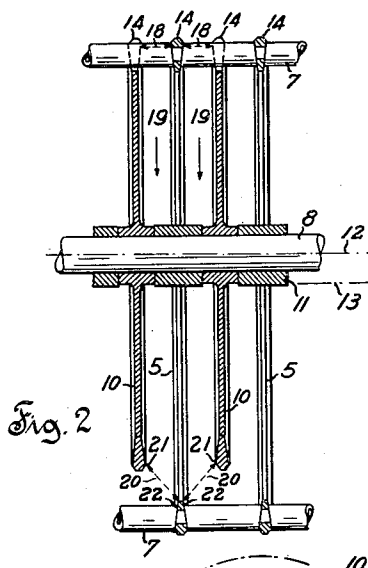


Fig. 2

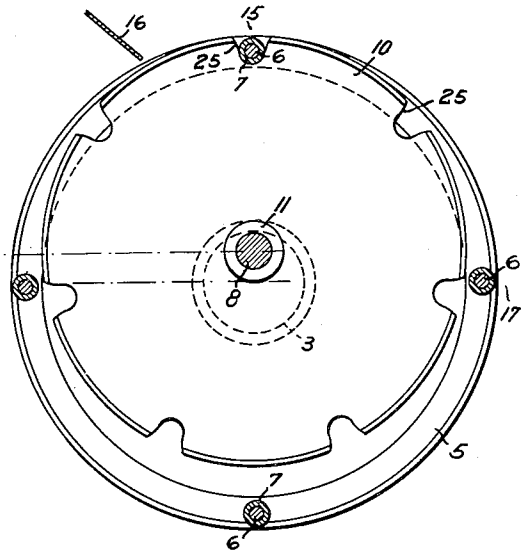


Fig. 3

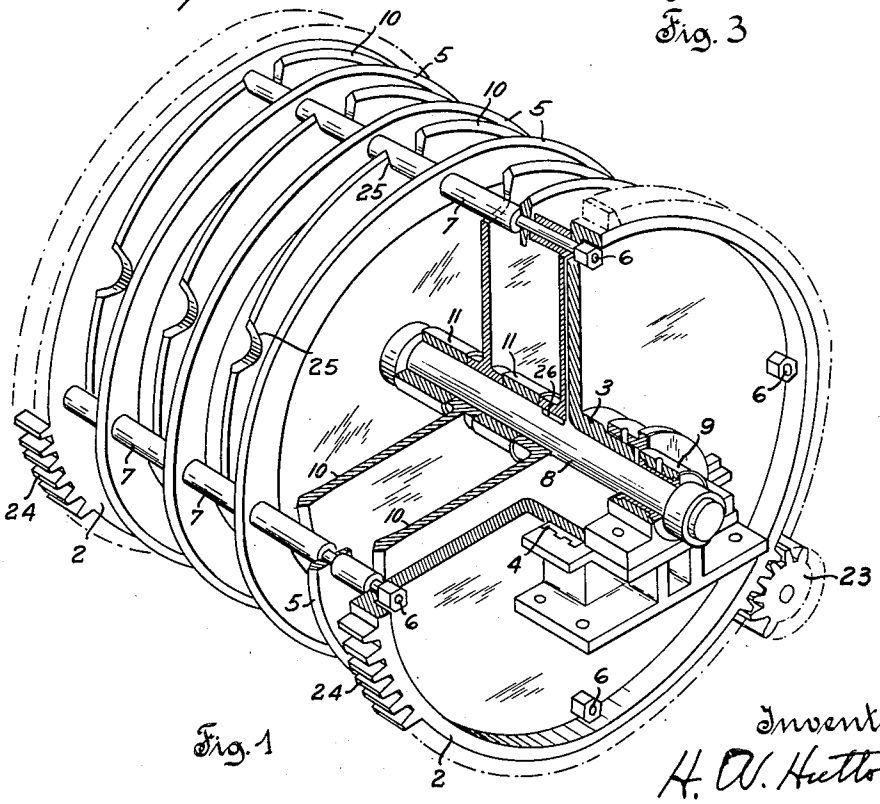


Fig. 1

Inventor
H. A. Hutton
by G. J. O'Brien
Attorney

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CIRCULAR ROTATING GRIZZLY

Henry Andrew Hutton, Johannesburg, Transvaal, Union of South Africa

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8 Claims. (Cl. 209—393)

This invention relates to grizzlies for screening rock, of the kind wherein the members which function as the grizzly bars are circular discs or rings disposed in vertical planes; facing, and spaced axially apart from, one another so as to form a structure of generally cylindrical form. Their upwardly presented edges are substantially in line axially and constitute the grizzling surface; and the members are rotated for rapidly disposing of the broken rock. Undersize which falls between said upwardly presented edges has again to fall between the members at their lowermost parts; and in order to insure free discharge of the undersize at the latter point, the spacing between the members at the lowermost parts is increased by making the members alternately of large and small diameter.

In the form in which such grizzlies have hitherto been constructed, the large diameter members, in the form of rings, were loosely hung from the bars of a squirrel cage; such cage being composed of the small diameter members, also in the form of rings, and bars arranged parallel with the axis, onto which said small diameter members were threaded. The desired spacing of the small diameter members was obtained by distance pieces placed on said bars and between the small diameter members as in an ordinary stationary grizzly, while the spacing of the loose large diameter members was dependent on a series of lugs projecting on each side of the small diameter members; which method owing to necessary clearances, did not entirely prevent lateral swinging movements of the large diameter members. Moreover the loosely hung large diameter members did not rotate truly, but were lifted and dropped by the successive bars of the squirrel cage, thus causing undesirable noise and shock during operation. It is the purpose of the present invention to overcome these drawbacks.

According to the present invention each set of circular members, viz., those of large diameter and those of small diameter, is formed as a rigid unit rotatable about its own axis; the two axes being parallel and so displaced from one another as to bring the outer edges of the two sets substantially into line in the grizzling zone.

The large diameter unit may for instance consist of end discs, extending between which are several longitudinal rods whereon rings constituting the large diameter members are slipped and spaced apart by thimbles. Said end discs are rotatably mounted by means of hollow trunnions of sufficient diameter to accommodate the eccentrically positioned shaft of the small diameter unit.

The latter consists of the aforesaid shaft and the small diameter members mounted thereon and spaced apart as by means of thickened hubs or distance pieces between them. The small diameter members may be in the form of solid discs.

The small diameter unit may be rotated by forming its discs with peripheral notches into which the longitudinal rods of the large diameter ring unit engage as the two units come to the upper part of their revolutions.

One embodiment of the invention is shown in the accompanying drawing in which:

Fig. 1 is a perspective view with parts broken away.

Fig. 2 is a longitudinal section.

Fig. 3 is a transverse section.

The large diameter unit comprises the two ring members or end plates 2 formed with the hollow trunnions 3 which are rotatably supported in fixed bearings 4. The large diameter grizzly bar members are rings 5 assembled on through bolts 6 extending between the end plates 2 and spaced apart by thimbles 7.

The small diameter unit comprises the shaft 8 extending through the hollow trunnions 3 and mounted to rotate in fixed bearings 9. On said shaft are mounted circular discs 10 forming the small diameter grizzly bar members. They are spaced apart by thimbles 11 and alternated with the rings 5.

The axis 12 of the small diameter unit is above the axis 13 of the large diameter unit, whereby the upper edges 14 (Fig. 2) of the rings 5 and the discs 10 are brought substantially into line and form the grizzling zone 15 (Fig. 3) to which the rock to be separated is fed from a chute 16. Oversize rock passes around the periphery of the structure and is delivered at 17; while material capable of passing through the spaces 18 constitutes the undersize and falls between the members 5 and 10 as indicated by the arrows 19 (Fig. 2); finally passing out through the spaces 20 between the lower outer edges 21 of the discs 10 and the lower inner edges 22 of the rings 5. Said edges 21 and 22 are arranged to be out of line so that the spaces 20 are greater than the spaces 18, thus insuring free discharge of the undersize.

It is desirable that the structure should be rotated from an external source of power in order

that it may attain its maximum capacity; and it is also desirable that the two units should have substantially equal peripheral speed in the grizzling zone 15. For accomplishing these objects it is convenient to rotate the large diameter unit by means of driving pinions 23 engaging the toothed rims 24 of the ring members or end plates 2; and to utilize the bolts 6 for driving the small diameter unit. Said bolts being spaced equally in a circumferential direction and being positioned at such a radial distance from the axis 13 as to intersect the discs 10 at the upper periphery of the latter, constitute in effect the teeth of an internally toothed wheel. The discs 10, being correspondingly provided with notches 25, form in effect an externally toothed wheel meshing with such internally toothed wheel at the grizzling zone, so that in said zone both units move with substantially equal peripheral speed. It is preferable to shape the sides of the notches 25 to the proper tooth form as indicated in Fig. 3.

Since the diameters are unequal, the angular speeds of the two units are unequal; and the bolts 6 and notches 25 are circumferentially pitched accordingly. In the example shown there are seven notches but only four bolts, spaced at twice the circumferential pitch corresponding to that of the notches in order to minimize obstruction of the grizzling surface. So arranged, one bolt is always in engagement with the notches.

The end discs 10 are keyed to the shaft 8 as at 26 to avoid relative rotation between said shaft and the discs. The intermediate discs 10 may be loose on the shaft, since they are rotated at the same angular speed as the shaft by the bolts 6.

It should be understood that it is not desired to limit the invention to the exact details of construction shown and described, for various modifications may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. A grizzly comprising a plurality of spaced, vertically disposed rings, a plurality of vertically disposed disks alternated with and spaced axially from the rings, the diameters of said disks being smaller than the external diameters of said rings, means connecting the rings in the described relation, means connecting the disks in the described relation, to provide two rigid rotary units, a small diameter unit and a large diameter unit, each rotatable about a definite and fixed axis, said units having parallel axes and the axis of the small diameter unit being above the axis of the large diameter unit, to bring the upper edges of all the rings and disks substantially into axial registration to provide thereat a grizzling zone, said means connecting the rings coacting with peripheral notches in the disks to effect in said grizzling zone movements of both units with substantially equal peripheral speeds.

2. Apparatus as claimed in claim 1 in which the large diameter unit comprises outer ring members provided with central bearing portions and with means adapted for connection to an outside source of power, to drive the large diameter unit.

3. A grizzly comprising a plurality of spaced, vertically disposed rings, a plurality of vertically disposed disks alternated with and spaced axially from the rings, the diameters of said disks being smaller than the external diameters of said rings, means connecting the rings in the described relation, means connecting the disks in the described relation, to provide two rigid rotary units a small diameter unit and a large diameter unit, each rotatable about a definite and fixed axis, said units having parallel axes and the axis of the small diameter unit being above the axis of the large diameter unit, to bring the upper edges of all the rings and disks substantially into axial registration, to provide thereat a grizzling zone, the large diameter unit further comprising outer ring members provided with central bearing portions and with means adapted for connection to an outside source of power to drive the large diameter unit, said means connecting the disks of the small diameter unit including a central shaft mounted in fixed bearings, and the means connecting the rings coacting with peripheral notches in the disks to effect in said grizzling zone movements of both units with substantially equal peripheral speeds.

4. A grizzly, comprising a plurality of spaced, vertically disposed rings; a plurality of vertically disposed externally circular members alternated with and spaced axially from said rings, the external diameters of said members being smaller than the external diameters of said rings; means connecting said rings, including hollow trunnions through which they are rotatably mounted in fixed bearings; and further means connecting said externally circular members, including a shaft positioned within said hollow trunnions and rotatably mounted in fixed bearings; whereby two rigid units are formed, a small diameter unit and a large diameter unit, each rotatable about a definite, fixed axis, said units being arranged with their axes parallel and with that of the small diameter unit above that of the large diameter unit, so as to bring the upper edges of all the rings and members substantially into longitudinal alinement to provide a grizzling zone and the lower edges of the circular members out of line with the lower internal edges of the rings to form a discharge zone for undersize.

5. A grizzly, comprising a plurality of spaced, vertically disposed rings; a plurality of vertically disposed discs alternated with and spaced axially from said rings, the diameters of said discs being smaller than the external diameters of said rings; means connecting said rings in the described relation, including central hollow trunnions rotatably mounted in fixed bearings; and means connecting said discs in the described relation, including a shaft positioned within said hollow trunnions and rotatably mounted in fixed bearings; whereby two rigid rotary units are provided, a small diameter unit and a large diameter unit, each rotatable about a definite and fixed axis, said units being arranged with their axes parallel and with the axis of the small diameter unit above the axis of the large diameter unit, to bring the upper edges of all the rings and discs substantially into longitudinal alinement to provide thereat a grizzling zone.

6. A rotary grizzly comprising a plurality of discs disposed in spaced relation, means including a shaft supporting said discs to constitute them a rigid cylindrical unit, a cooperating rigid cylindrical unit including rings disposed in spaced relation to and between said discs and having hollow supporting trunnions encircling said shaft, and means for supporting said trunnions in such position that the peripheries of said cylindrical units are in tangential relation along a longi-

tudinal line providing a separating zone, said rings extending radially relative to said discs at other points to provide openings between the inner surfaces of said rings and the outer surfaces of said discs in the region diametrically opposite from said tangent line that are substantially larger than the openings between said rings and said discs along said line of tangency and that constitute a discharge zone.

7. A rotary grizzly comprising a plurality of discs disposed in spaced relation, means including a shaft supporting said discs to constitute them a rigid cylindrical unit, a cooperating rigid cylindrical unit including rings disposed in spaced relation to and between said discs and having hollow supporting trunnions encircling said shaft, means for supporting said trunnions in such position that the peripheries of said cylindrical units are in tangential relation along a longitudinal line providing a separating zone, said rings extending radially relative to said discs at other points to provide openings between the inner surfaces of said rings and the outer surfaces of said discs in the region diametrically opposite from said tangent line that are substantially larger than the openings between said rings and said discs along said line of tangency and that constitute a discharge zone, and means interconnecting said cooperating rigid cylindrical units to constrain them to rotate with substantially equal peripheral speeds.

8. A rotary grizzly comprising a plurality of discs disposed in spaced relation, means including a shaft supporting said discs to constitute them a rigid cylindrical unit, a cooperating rigid cylindrical unit including rings disposed in spaced relation to and between said discs and having hollow supporting trunnions encircling said shaft, means for supporting said trunnions in such position that the peripheries of said cylindrical units are in tangential relation along a longitudinal line providing a separating zone, said rings extending radially relative to said discs at other points to provide openings between the inner surfaces of said rings and the outer surfaces of said discs in the region diametrically opposite from said tangent line that are substantially larger than the openings between said rings and said discs along said line of tangency and that constitute a discharge zone, and means on the periphery of said disc unit disposed to engage said ring unit substantially at its periphery to rotate it.

HENRY ANDREW HUTTON.