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T. ROBINS

REVOLVING GRIZZLY

Filed April 6, 1927

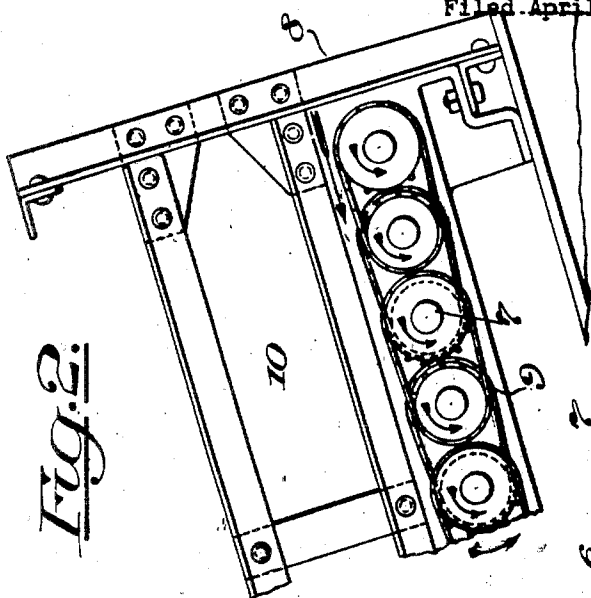


Fig. 2.

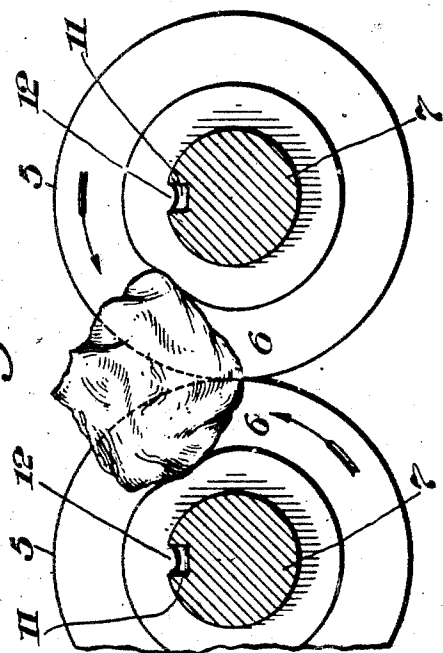


Fig. 3.

Fig. 4.

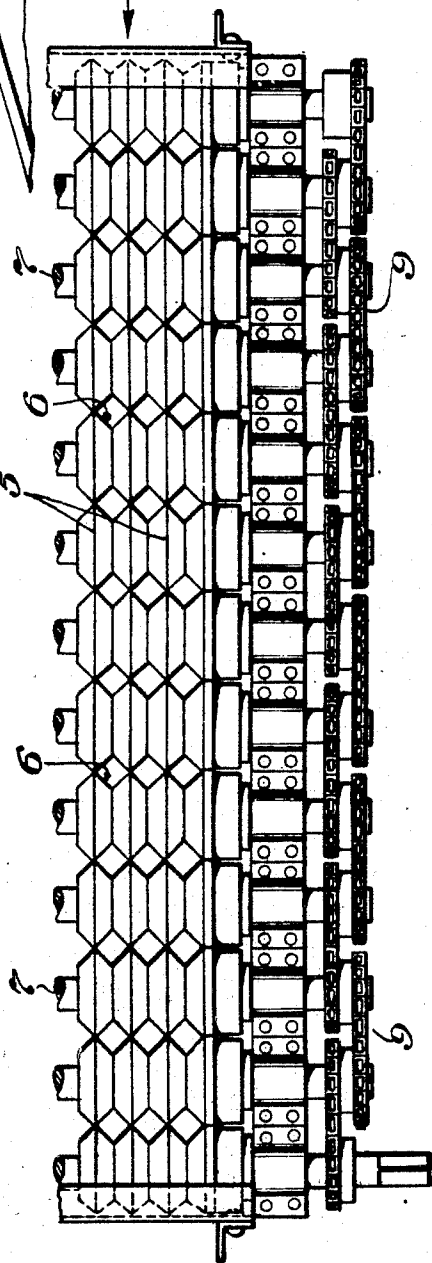
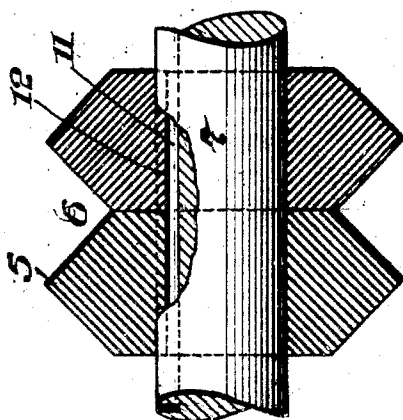


Fig. 1.

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## UNITED STATES PATENT OFFICE.

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## REVOLVING GRIZZLY.

Application filed April 6, 1927. Serial No. 181,367.

This invention relates to revolving grizzlies wherein a succession of separating rolls are supported in close parallel relation; having reference to grizzlies designed for screening hard irregular material, such, for example, as stone, ore and the like. The said rolls, which are usually supported in an inclined plane, are provided with circumferential grooves arranged to present separating openings between adjacent rolls, the shafts of the rolls being mechanically connected in such manner as to effect the rotation of all the rolls in the same direction but with progressively increasing speeds from the uppermost to the lowermost roll. The direction of rotation of the rolls is such as to advance the material down the inclined plane of the grizzly, which stream impinges first upon the uppermost set of rolls that travel at the slowest speed, and is then carried down the plane at an increasing speed from roll to roll, the last roll rotating at the highest speed.

In its travel from roll to roll material smaller than the size of the openings between adjacent rolls falls through the openings, while the oversize material travels over the rolls to and is rejected at the foot of the screen. Jogging or agitating of the mass of travelling material and the removal of the oversize and undersize units therefrom are effected by the passage of the material into and over the successive valleys and ridges afforded by the series of rolls, this action causing the smaller to free themselves from the larger sizes and rapidly to screen themselves through the mass of coarse material.

The oversize material in its travel down the rotating grizzly rolls, momentarily rests in the valleys between the adjacent rolls, and by reason of the opposite motion of the opposing surfaces of the rolls in frictional contact with such material, the downwardly moving surface tends to drag the material through the openings while the upwardly moving surface tends to drag the material out of the openings, that is to say, the combined action of the frictional forces upon the interposed material seated in the openings tends to rotate the material in directions opposite to those of the respective surfaces of the rolls in contact with the material. Since the upward surface speed of the lower roll is greater than the downward surface speed of the adjacent upper roll, the resultant frictional

action on the material tends to eject it from the openings.

The purpose of the speed differential of the rolls is to keep the openings between the adjacent rolls free from clogging pieces. However, in the case of stone, ore and the like the irregularities of the revolving oversize lumps which are lodged between the rigid cylindrical surfaces of the rotating rolls, exert on the rolls a powerful spreading force which is transmitted to the shafts, bearings, gearing and frame of the grizzly. It has therefore been necessary heretofore in grizzlies employing hard surface rolls to make the rolls sufficiently strong and rigid to crush the interposed lumps of hard irregular material. This necessitated a relatively large and heavy structure requiring enormous operating power.

I have discovered that rubber possesses all the attributes for grizzly rolls employed in the operation of screening, since rubber not only has the requisite strength and wear-resisting quality for the screening of hard materials, but it also has sufficient inherent elasticity to absorb the crushing reactions set up by the revolving hard irregular lumps which tend to lodge in the openings between adjacent rolls, thus preventing the transmission of the destructive stresses to the shafts, or to the bearings, or to the frame of the grizzly. Moreover, such stresses cannot react upon the chains or gears which are used to transmit the power to the machine. By virtue of rubber's greater coefficient of friction, as compared with metal, the ore or stone being screened is propelled along a rubber roll grizzly more positively than it is on the metal roll grizzly. In fact, with the latter type of grizzly it is necessary to set the machine at a considerable inclination, generally about 20° from the horizontal, whereas with the rubber roll construction the machine efficiently performs its function when in a horizontal position. The provision of rolls of rubber, or equivalent material, enables the construction of a grizzly of considerably less weight and size than heretofore for a given capacity of production, and also materially reduces the operating horse-power requirements as compared with a metal roll grizzly, thus economizing in the initial cost, cost of maintenance, power consumption, etc.

Therefore, in pursuance of my invention, I construct the rolls in whole or in part of rubber.

ber or other suitable material having substantial wear-resisting quality and a high coefficient of friction, and possessing sufficient inherent elasticity to absorb the crushing reactions set up by irregular objects which become lodged between adjacent rolls; as will be hereinafter described and claimed.

In the drawings—

Figure 1 is a plan of a portion of a grizzly equipped with separating rolls embodying my invention.

Fig. 2 is a side elevation of the upper or receiving end portion of the apparatus.

Fig. 3 is a section through the adjacent shafts of a pair of rolls showing an oversize lump of material as lodged in an opening between the rolls.

Fig. 4 is a section through a portion of a sectional roll and its shaft.

Referring to the drawings, 5 designates a series of juxtaposed separating rolls having formed therein at spaced intervals throughout their length annular grooves 6, which are so disposed that the grooves of adjacent rolls are oppositely related to each other to present appropriate screening openings. These rolls are carried by parallel shafts 7 which are mounted in a suitable frame structure 8 and which shafts are successively connected, as, for example, by sprocket gearing 9 at one side of the structure, so as to be simultaneously and continuously driven in the same direction when one of the shafts is actuated from a suitable source of power, as usual. The gearing between the succeeding shafts is such as to increase their speed progressively from the receiving to the delivery end of the apparatus, as previously mentioned.

Supported on the frame structure are longitudinal skirt boards 10 for the guidance of the material on the rolls.

According to my invention each of the rolls 5 is composed of a series of counterpart sections of rubber or equivalent material having the characteristics described, which sections are arranged side by side and are keyed or otherwise fixed upon the supporting shaft; although if desired each roll may be an integral body fixed on the shaft. In the present instance the shaft is formed with a longitudinal keyway 11 and the centrally perforated sections are forced on the shaft, the rubber thus entering the keyway, as indicated at 12, and ensuring a reliable connection.

While my invention has been especially designed for use in connection with a grizzly for the screening of hard irregular material, such as stone and ore, yet it is manifest that a grizzly embodying my invention may be utilized with advantage for the screening of friable material, such as coke, since the resilient surfaces of the separating rolls will perform the function of protecting the material as well as the machine from breakage.

It is to be understood that the term "rub-

ber" as used in the appended claims is intended to include any other material having characteristics similar to rubber and adapted to the same use, that is, any suitable wear-resisting material having a resilient cushioning surface which absorbs the crushing reactions set up by objects which may become lodged in the separating openings between the adjacent rolls of a grizzly, and which surface by its high coefficient of friction also positively propels the material superposed thereon.

I claim—

1. In a revolving grizzly, a succession of rolls mounted in parallel relation and having co-related circumferential grooves which provide separating openings between adjacent rolls, said rolls each comprising a shaft and a circumferentially-grooved body of rubber thereon affording a solid resilient backing between the grooves and the shaft, said rubber possessing substantial wear-resisting quality and a high coefficient of friction effective to propel hard material across the periphery of the roll, and having also sufficient inherent elasticity to absorb the crushing reactions set up by irregular objects which may become lodged in the openings between adjacent rolls, and means for simultaneously rotating the said rolls in the same direction.

2. In a revolving grizzly, a succession of rolls mounted in parallel relation and having co-related circumferential grooves which provide separating openings between adjacent rolls, said rolls each comprising a shaft and a circumferentially-grooved body of rubber thereon affording a solid resilient backing between the grooves and the shaft, said rubber possessing substantial wear-resisting quality and a high coefficient of friction effective to propel hard material across the periphery of the roll, and having also sufficient inherent elasticity to absorb the crushing reactions set up by hard irregular objects which may become lodged in the openings between adjacent rolls, and means for simultaneously rotating the said rolls in the same direction, and with progressively increasing speeds from the receiving to the discharging end of the grizzly.

3. A revolving grizzly comprising a supporting frame, a plurality of spaced-apart parallel shafts, separating rolls mounted on said shafts in close proximity to each other, each of said rolls comprising a series of centrally perforated sections of rubber having resilient walls integral with a resilient shock absorbing backing, and means for rotating the said shafts in the same direction.

4. A revolving grizzly comprising a supporting frame, a plurality of spaced-apart parallel shafts whereof each shaft is provided with a longitudinal keyway, separating rolls mounted on said shafts in close prox-

imity to each other, each of said rolls composed of a series of centrally perforated sections of rubber forced on the shaft and interlocked with the keyway of the shaft, said  
5 sections being peripherally shaped to provide a series of circumferential grooves having resilient walls integral with a resilient shock absorbing backing.

10 5. A grizzly roll comprising a circumferentially grooved body of rubber possessing substantial wear-resisting quality and a high coefficient of friction together with sufficient inherent elasticity to absorb crushing reactions.

15 6. A revolving grizzly embodying a series of screening rolls having circumferential

screening openings between adjacent rolls, and means for rotating said rolls in the same direction to effect the propulsion of hard material across the succeeding rolls, said  
20 rolls comprising thick rubber bodies having circumferential screening openings formed therein, and being of such character that the crushing stresses set up by the counter-  
25 revolution of irregular lumps of hard material lodged between adjacent rolls are absorbed.

Signed at New York in the county and State of New York this 31st day of March, A. D. 1927.

THOMAS ROBINS.