March 15, 1955 M. MACEK, SR 2,704,189

STONE DISC GRINDING MILLS, WITH UNITARY MATERIAL IMPELLER SECURED TO RUNNER STONE

Filed June 12, 1952

FIG. 2

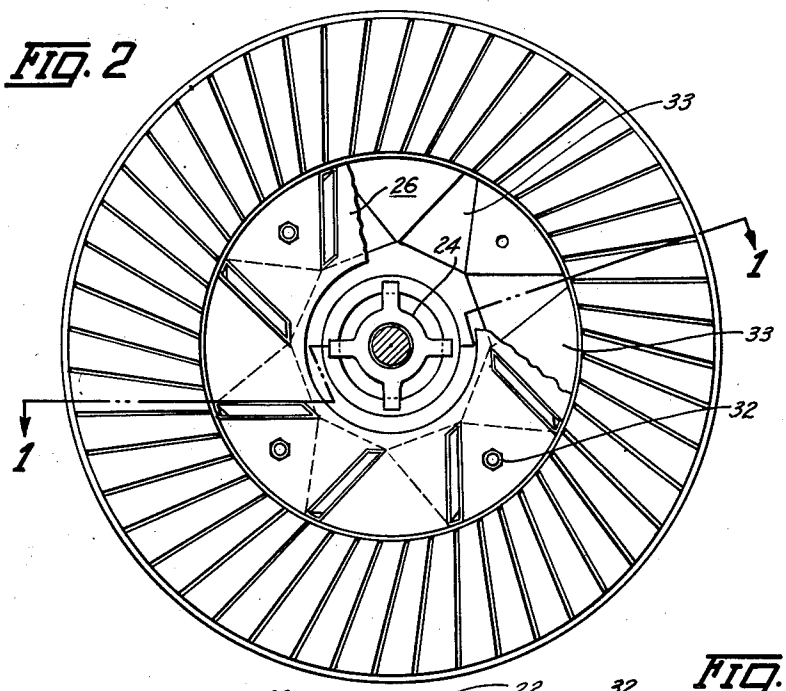
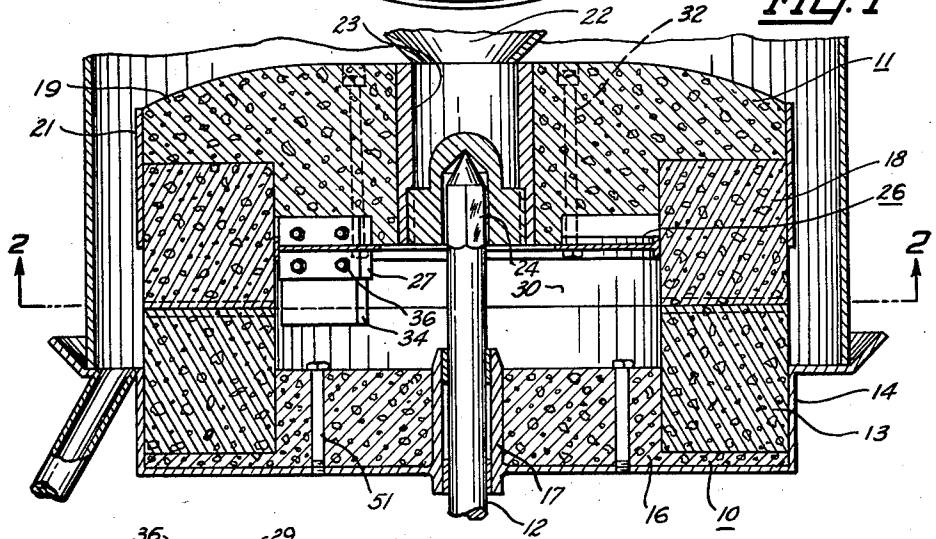


FIG. 1



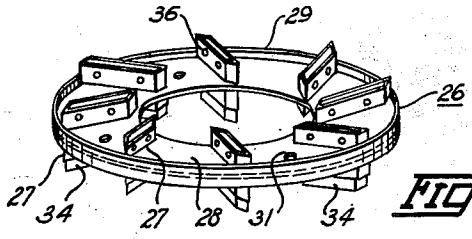


FIG. 3

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STONE DISC GRINDING MILLS, WITH UNITARY MATERIAL IMPELLER SECURED TO RUNNER STONE

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3 Claims. (Cl. 241—245)

This invention relates to grinding mills and particularly to improvements in such devices, such as will facilitate service and maintenance operations and increase the grinding efficiency in such mills.

Grinding mills of the type with which this invention is concerned, usually employ a circular, hollow center runner or rotatable mill stone disposed above and rotatable on a circular bed or lower mill stone, the annular faces of the milling stones in contact with one another being notched or grooved so as to increase the milling efficiency and the milling capacity of the stones.

Grinding mills of this type are, of necessity, quite large and cumbersome and very heavy. In normal operation, the grinding slots or cracks wear quite rapidly and, further, as a natural result of the stone's rotating in one direction only, one edge of each grinding crack only is effective in grinding. It has, therefore, been necessary in the past to dismantle such mills quite frequently, often every few days in order to redress the milling surfaces of the stones.

This is naturally a slow and expensive operation, and particularly expensive in view of the enforced shut-down of the mill which, in normal usage, may have a capacity of hundreds of bushels of grain a day.

It is therefore a primary object of my invention to provide improvements in such grinding mills as will reduce the frequency at which the milling stones need redressing, and thus ultimately result in an increase in the life of the mill stones themselves.

Still another object of my invention is the provision of improved means for pumping or forcing the material to be ground outwardly between the milling faces of the stones.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specifications, wherein are disclosed several exemplary embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a view generally in vertical section taken through a grinding mill constructed in accordance with my invention.

Figure 2 is a plan view of the under side of the runner stone, and as taken generally along the lines 2—2 of Figure 1, and

Figure 3 is a view in perspective of a removable pump or feeder vane holder.

Referring now to the drawings, and particularly to Figures 1 and 2 thereof, in which is illustrated a mill having a bed stone, indicated generally at **10**, and a runner stone indicated generally at **11**, the latter being driven by and pivotally supported upon a vertically adjustable drive shaft **12**. A bed stone, as usually constructed, consists of a hollow-center cylinder of stone or other abrasive material **13**, mounted in a steel ring or shell **14** on a cylindrical slab **16** of concrete or the like. The drive shaft **12** passes upwardly through an axially positioned gland or bearing **17**.

The runner stone **11** is similarly constructed, with a hollow-center, cylindrically-shaped milling stone **18** set into a circular cap stone **19** of concrete or the like, both being encircled by means of a steel band **21**. Material to be milled is fed downwardly from the hopper **22** through the hollow center of the runner stone, the material passing through an axially aligned opening **23** in the cap stone within which the driving dog or spider **24** is engaged.

Various devices have been employed for pumping or feeding material outwardly between the milling surfaces of the grinding stones. One of said methods is illustrated in Patent No. 2,330,067 issued September 1, 1943, to Matt Macek, Sr., et al. It is a purpose of the present invention to provide a material pumping assembly or impeller which may be readily and quickly removed as a unit, so as to eliminate interference with the tools used in redressing the stones when redressing becomes necessary and, further, to permit ready reversal of the impeller blades.

This impeller assembly, which I have indicated generally at **26**, is best illustrated in Figure 3, and comprises a plurality of open ended, generally rectangular sleeves or paddle holders **27** radially spaced about an annular mounting plate **28**. These impeller holders may be welded to the annular mounting plate **28** and encircled by a reinforcing ring **29**. Several holes **31** may be provided in the circular plate **28** for the reception of bolts **32**, best shown in Figure 2 and by means of which the entire impeller assembly is secured within the hollow center well **30** of the runner stone.

The concrete cap **19** is provided with an annular recess to receive the edge of the ring **29**, and is also provided with triangular shaped recesses **33**, best shown in Figure 2, for the reception of the impeller boxes **27**. It will be noted that the impeller boxes **27** extend equal distances on opposite sides of the circular plate **28**, and by turning this plate upside down, the impellers, indicated at **34** and preferably constructed of wood or the like, may be caused to feed material outwardly to the stones when the direction of rotation of the runner stone is reversed.

The impeller blades themselves may be adjusted vertically in the sleeves **27** and secured in position by means of bolts or the like, as indicated at **36**.

The impeller assembly **26** has been partially broken away in Figure 2 so as to better show the structure thereof and the relationship of the impellers with the stone and with the recesses therein.

In normal use, one side of each groove takes the wear, and so long as the groove remains deep enough, the other side of the groove is, for all practical purposes, self sharpening. Therefore by reversing the direction of rotation of the runner stone, it is possible to utilize this inherent characteristic of mill stones. The applicant's improved impeller structure permits the paddles **34** to be reversed. To accomplish this, the runner stone must of course be lifted and the four anchor bolts **32** removed. The impeller plate **28** may now be removed and the wooden paddles **34** moved so as to extend from the opposite ends of the sleeves **27**. The impeller assembly may now be replaced within the runner stone but in inverted position. Thus the pumping device will function properly to feed material outwardly between the milling stones when the rotation of the runner stone is reversed.

Although I have shown and described a specific embodiment of my invention, it is apparent that modifications thereof may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In a grinding milling mill of the disc type having a stationary bed stone and a rotatable runner stone mounted in a cap stone for rotation thereabove and each of said stones having generally cylindrical cavities in their adjoining faces and spaced from their outer edges, a unitary impeller mounting member comprising a generally circular plate, a plurality of equally circumferentially spaced paddle holders attached thereto and extending generally at right angles to said circular plate, impeller blades detachably attached to said holders, means for detachably securing the unitary impeller to the runner stone within its cavity, and triangular-shaped recesses positioned within said cap stone to receive said holders and impeller blades.

2. In a grinding mill of the disc type having a sta-

tionary mill stone and a rotatable mill stone having a cap stone, the said mill stones being provided with cavities in their adjoining faces, a unitary impeller comprising a generally circular plate having a reinforcing ring on the outer edge thereof, said impeller being receivable within the cavity of the runner stone and detachably attached to the cap stone, a plurality of paddle sleeves equally circumferentially spaced about the said circular plate and extending generally at right angles to the surface thereof, paddle members detachably secured in and extending outwardly from said sleeve members, said cap stone being provided with an annular recess, and a plurality of triangular recesses to receive said reinforcing ring and said paddle members.

3. In a grinding mill of the disc type, a cap stone, a stationary mill stone, a rotatable mill stone fixedly mounted in the cap stone, each of said mill stones having axially disposed, generally cylindrical cavities in the opposed faces thereof, a pumping member adapted to be mounted within and removed as a unit from the cavity of the runner stone, the pumping member comprising a generally circular plate having paddle holders secured thereto at equally circumferentially spaced distances and extending outwardly from the face thereof, pumping paddles detachably secured within said paddle sockets, and means for bolting the pumping member to the cap stone within the cavity of the rotatable stone, triangular recesses being positioned within the cap stone to receive said paddle sockets.

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