(No Model.)

F. BEALL.

ROLLS FOR GRINDING MILLS.

No. 383,852. Patented June 5, 1888.

Fig. 1.

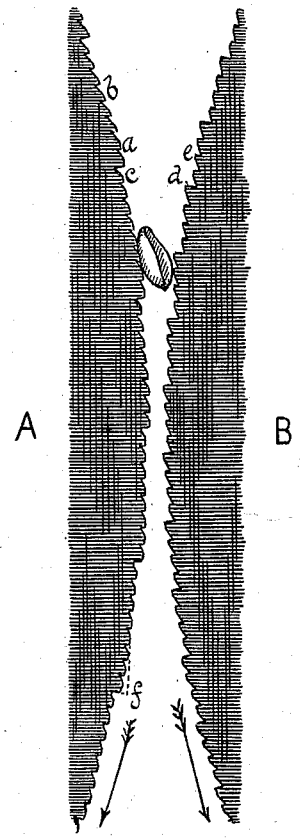
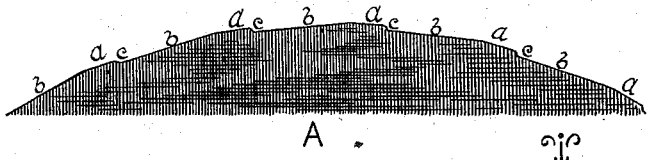


Fig. 2.



ATTEST.

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UNITED STATES PATENT OFFICE.

FRANK BEALL, OF DECATUR, ILLINOIS.

ROLLS FOR GRINDING-MILLS.

SPECIFICATION forming part of Letters Patent No. 383,852, dated June 5, 1888.

Application filed March 21, 1887. Serial No. 231,702. (No model.)

To all whom it may concern:

Be it known that I, FRANK BEALL, of the city of Decatur, county of Macon, and State of Illinois, have invented certain new and useful Improvements in Rolls for Grinding-Mills, of which the following is a specification.

The object of my invention is to improve the efficiency of rolls for grinding wheat, and I attain my object by means of the peculiar construction hereinafter set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 represents sections of portions of opposing rolls embodying my invention, and Fig. 2 is a section of a portion of a partly-completed roll intended to illustrate my invention more clearly.

The rolls have differential rotation in opposite directions, as indicated by their respective arrows, the fast roll B having a speed of rotation approximating two and one-half times the speed of the slow roll A. The slow roll has furrows composed each of a long surface, *b*, approximately tangential to the periphery of the roll, and a short abrupt surface, *c*, more nearly radial in general direction. Interposed between the furrows are peripheral surfaces *a*, and both the long surfaces of the furrows and the intermediate peripheral surfaces are suitably corrugated. The fast roll has furrows formed of long surfaces *d* and abrupt surfaces *e*, the long surfaces being suitably corrugated, as indicated in the drawings. The abrupt surfaces of the slow roll are presented in the direction of the rotation of the roll. The abrupt surfaces of the fast roll are presented in a contrary direction. The fast roll may or may not have the peripheral surfaces shown on the slow roll.

In operation, the wheat is fed from above, is carried downward by the force of gravity and the abrupt surfaces of the slow roll, is subjected in each furrow of the slow roll to the successive action of, say, five furrows of the fast roll, and is discharged by the action of the rolls in the customary manner.

My invention is designed for use as a second or third break in a system of rolls, and it is relied on to lessen the percentage of "break flour" and red dust. Owing to the smallness of the grains and furrows and the rapid motion of the rolls the precise manner in which the different surfaces act on the grains is with difficulty ascertained; but it is stated with confidence that the utility of the peripheral surfaces lies in the fact that through their use the wheat is carried in contact with the fast roll in a more gradual manner, and that the abrupt angles that would tend to break the grains injuriously are dispensed with.

The invention is based on the practicably demonstrable theory that wheat may be reduced with best results through a compound of pressure and rolling friction, and that concussion, cutting action, and dead pressure are to be avoided. With this end in view the furrows of the opposing rolls are so constructed proportionately and with relation to the speed of the rolls that the long surfaces of said furrows shall maintain a very nearly approximate parallelism throughout their co-operative approach and recession in order to provide the necessary pressure. The differential motion is provided to impart the rolling friction, the corrugations assisting, and the cutting and injurious concussion are avoided by means of the peripheral surfaces *a*.

The effect of the peripheral surfaces will be more readily understood by supposing them not to exist, in which case the two surfaces of each furrow would form comparatively sharp and prominent angles, as indicated by dots at *f* in Fig. 1, against which the wheat would be dashed with sufficient force to cut the bran and break the berry by concussion to the production of break flour and the injury of middlings and germ.

I claim as new and desire to secure by Letters Patent—

1. A roll for grinding-mills, having corrugated longitudinal furrows and intermediate peripheral surfaces, the furrows being composed each of an abrupt terminal surface and a comparatively long surface approximately tangential to the periphery of the roll.

2. In a roller-mill, a pair of opposing rolls having differential rotation in opposite directions, the slow roll having longitudinal furrows longitudinally corrugated, and interme-

diate peripheral surfaces, also corrugated longitudinally, the fast roll having longitudinal furrows longitudinally corrugated, the furrows of each roll being formed each of an abrupt terminal surface and a comparatively long surface approximately tangential to the periphery of the roll, the abrupt surfaces of the furrows of the slow roll being presented in the direction of the rotation of the roll, and the abrupt surfaces of the furrows of the fast roll being presented in a contrary direction.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

FRANK BEALL.

Attest:
C. C. CLARK,
L. P. GRAHAM.