

(No Model.)

F. BEALL.  
ROLLER MILL.

No. 420,507.

Patented Feb. 4, 1890.

Fig. 1.

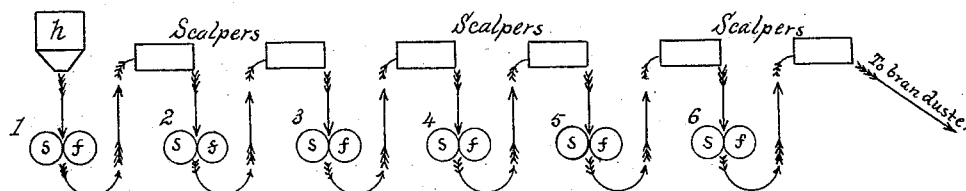
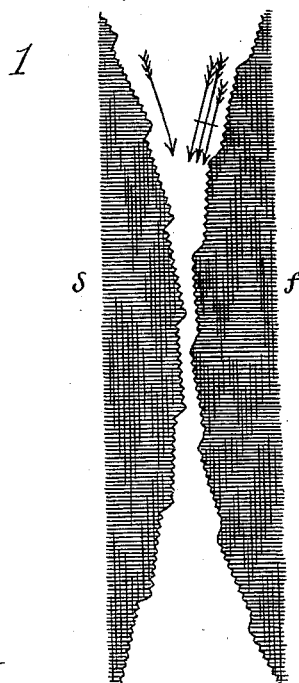


Fig. 2.



Fig. 3.



ATTEST

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*att'y*

# UNITED STATES PATENT OFFICE.

FRANK BEALL, OF DECATUR, ILLINOIS.

## ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 420,507, dated February 4, 1890.

Application filed July 10, 1889. Serial No. 317,040. (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 a certain new and Improved Roller-Mill, of which the following is a specification.

It is the object of my invention to effect the various reductions without breaking or wearing the bran or flouring the middlings; and I attain my object by means of the details of construction and relative arrangement of parts hereinafter set forth and claimed.

In the drawings accompanying and forming a part of this specification, Figure 1 shows a system of pairs of rolls arranged in the order of their use, the arrows indicating generally the direction of the motion of the chop through the system. Fig. 2 shows, approximately, the relative sizes of the furrows of the different pairs of rolls, each line indicating the width of the furrows of the rolls immediately above it. Fig. 3 represents fragments of opposing rolls, showing the construction and arrangement of the corrugated furrows, on which the efficiency of the device depends.

The adjacent arrows indicate the direction of motion and relative speed of the rolls of all the pairs of the system.

Each pair of rolls comprises a slow roll *s* and a fast roll *f*, having differential motion in opposite directions, as indicated by the arrows in Fig. 3. Each roll has longitudinal furrows longitudinally corrugated, each furrow being composed of a surface approximately tangential to the roll and a surface comparatively abrupt. The abrupt surfaces of the furrows of the slow rolls are presented in the direction in which such rolls rotate. The abrupt surfaces of the furrows of the fast rolls are presented in the contrary direction.

The furrows of rolls 1 are approximately as shown in Fig. 3, their width being the same as the length of the longest line in Fig. 2. The furrows of rolls 2 correspond in width to the next longest line in Fig. 2, are proportionately shallower, and the surfaces of the rolls are proportionately nearer together. So, in regular order, through pairs 3, 4, 5, and 6, or whatever number the system may em-

body, the furrows are proportionately reduced and the rolls of the pairs made to approach more nearly.

In operation grain is fed from hopper *h* to rolls 1, where the first reduction is effected by a compound of direct pressure and friction, which converts a portion of the stock into middlings, partly flattens the bran without wearing or injuriously breaking the same, and leaves other portions of the stock intact. After the customary scalping process the residue of chop passes to the next pair of rolls, where a finer reduction is effected in a similar manner, and the process is continued until by gradual steps the bran has been flattened and the entire stock removed in the shape of middlings.

The efficiency of a single pair of rolls constructed as described has been explained by me in United States Patent No. 341,546, May 11, 1886, and need not be herein repeated. In this case the utility lies in the gradual adaptation of the corrugated furrows to the gradually-changed condition of the chop, whereby the approximate parallelism of the acting surfaces is maintained to the finest reduction, with the result hereinbefore specified.

I claim—

Rolls for grinding-mills arranged in a series of pairs, all the rolls having longitudinal furrows longitudinally corrugated and composed each of an approximately-tangential surface and a surface more abrupt, each pair comprising a slow roll and a fast roll, in the former of which the abrupt surfaces of the furrows are presented in the direction of the roll's rotation and in the latter in a contrary direction, and the proximity of the rolls of the pairs and the size of the furrows being proportionately, regularly, and continuously modified throughout the series, substantially in the manner and for the purpose set forth.

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

FRANK BEALL.

Attest:

ORVILLE B. GORIN,  
L. P. GRAHAM.