

J. BROUGHTON.  
Grinding Mill.

No. 28,344.

Patented May 22, 1860.

Fig. 1.

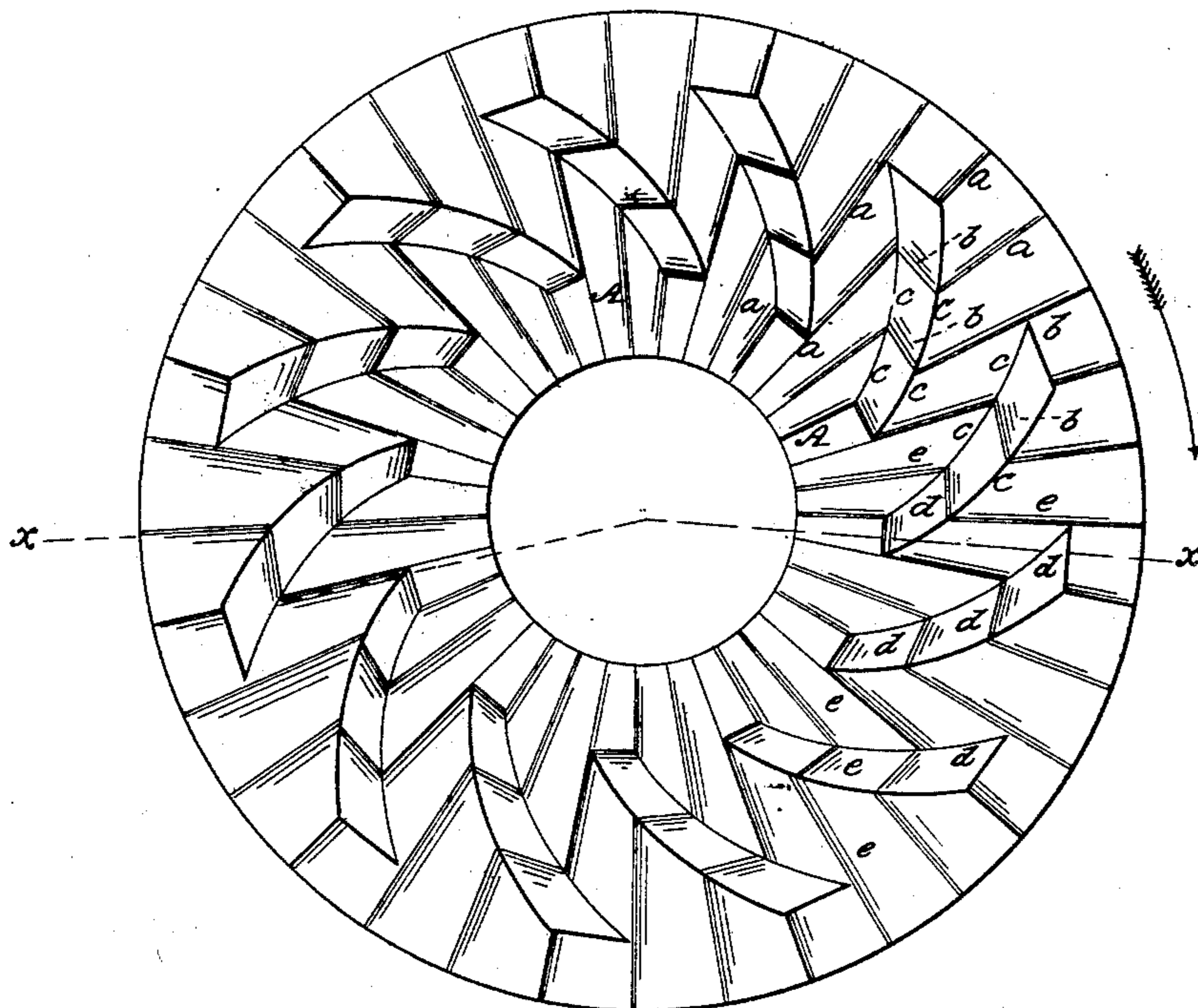


Fig. 2.

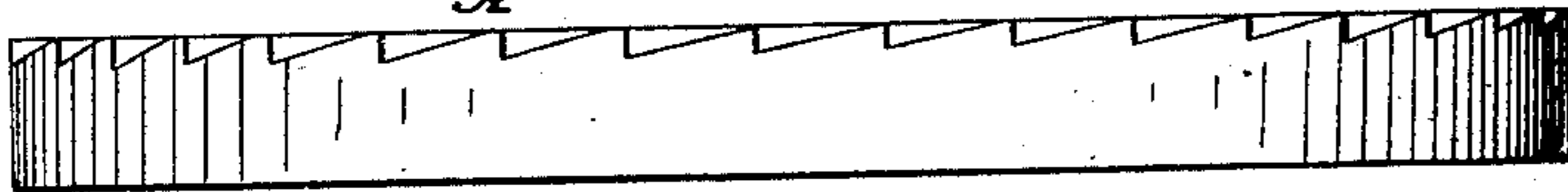
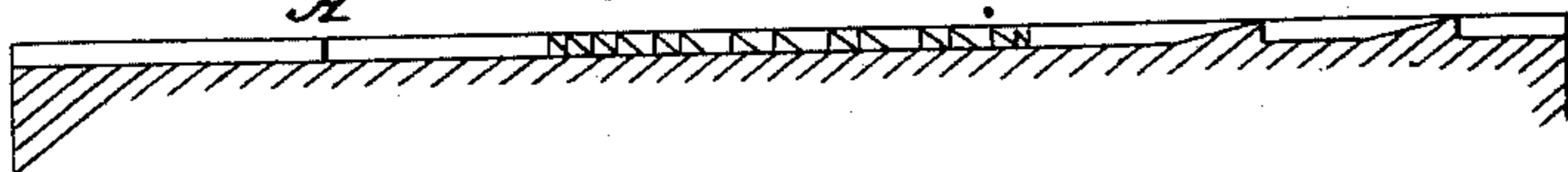


Fig. 3.



Witnesses:

*W. H. Brown*  
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Inventor:

*John Broughton*

# UNITED STATES PATENT OFFICE.

JOHN BROUGHTON, OF NEW YORK, N. Y.

## DRESS FOR MILLSTONES.

Specification of Letters Patent No. 28,344, dated May 22, 1860.

*To all whom it may concern:*

Be it known that I, JOHN BROUGHTON, of the city, county, and State of New York, have invented a new and Improved Dress  
5 for the Grinding-Surfaces of Mills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, forming a part of this specification, in  
10 which—

Figure 1 is a face view of a grinding disk, showing my improved dress. Fig. 2 is an edge view of the same. Fig. 3 is a section of the same taken in the line  $x, x$ , Fig. 1.

15 Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to an improvement in that class of grinding surfaces for mills in which the teeth are cut or so constructed  
20 as to pass or cross each other at an angle or with a shearing action. In grinding surfaces of this character whether metallic or otherwise, or whether conical, spherical or having a plane surface, it is requisite to the  
25 perfect action or working of the mill, 1st, that the working edges of the teeth be sufficiently inclined to prevent concussion by their abrupt meeting, and the absorption of an unnecessary amount of power in driving  
30 the mill. 2nd, that the angle be sufficient to insure the rapid discharge of the meal or substance ground and thereby prevent heating and clogging of the mill; and 3rd, that the grooves or furrows of the teeth be clear  
35 or open from the center to the periphery of the grinding surfaces to permit of the free passage of a current of air between them.

In constructing or forming a dress to embrace the above requisites, however, a serious  
40 defect arises from the following causes, viz: that though the angle may be sufficient to obviate concussions, and a too great absorption of power in grinding it will not be sufficient to preclude a free and rapid discharge  
45 of the meal or substance ground and prevent clogging and heating of the grinding surfaces, an increase of angle to prevent clogging and heating, and augment the grinding capacity of the mill has the effect  
50 (produced by a too great shearing action of the teeth) of carrying forward and discharging through the open channels of the teeth, portions of the substance operated

upon in an unground or but partially ground state.

The object of this invention is to remedy this defect, and while preventing the discharge of meal or substance in a partially ground state, to allow the angle of the teeth to be sufficient to develop the full working  
60 capacity of the mill and leave the grooves or channels of the teeth clear for the free circulation of air between the grinding surfaces.

The invention consists in forming the  
65 working edges of the teeth in a series of steps or zig-zag lines by turning them at an angle with their radial or tangential direction, the intersections of these disjointed angles forming lines tending to the center in a spiral  
70 direction, and their concentric faces inclined in a radial direction corresponding to the inclined faces of the radial teeth.

In Fig. 1, which is a disk, A represents the teeth, and  $a$ , are radial portions of the cutting or working edges thereof, and  $b$ , are the zig-zag portions, the angles  $c$ , of which are curved spirally toward the center of the disk, the cutting or working edges of the parts  $b$ , of the teeth form a greater or less angle with  
80 the parts  $a$ , and the concentric faces  $d$ , of the parts  $b$ , of the teeth are inclined in a radial direction. These zig-zag portions  $b$ , of the teeth serve to prevent the too free escape of the meal through or between the grinding  
85 surfaces, and cause the meal to be fully acted upon, and ground before leaving them or being discharged therefrom; at the same time the furrows  $e$ , are open or unobstructed, a due inclination of the teeth allowed to prevent  
90 concussions, and the unnecessary absorption of power, and at the same time the meal or ground substance is discharged when fully ground, not being subjected to an unnecessary grinding action, which causes the  
95 heating of the mill and the choking and clogging thereof. A free circulation of air is also allowed to pass between the grinding surfaces.

In carrying out this invention it is not essential that the portions  $a$ , of the teeth A, be radial; they may have a tangential position with a circle at a greater or less distance from the center of the disk. The parts  
100  $a$ , may be thus arranged on both surfaces, or one grinding surface may have radial parts  
105

$a$ , and the other tangential parts  $a$ , in order to obtain a shearing action of the teeth.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

The employment or use of the peculiar zig-zag form of teeth, so cut or constructed on the grinding surfaces, that while the working edges or meal-producing line shall  
10 present an obstruction to the discharge of

unground portions of the substances passing through the mill, the furrows shall be clear and unobstructed for the free passage of air and the proper ventilation of the grinding surfaces, substantially as herein set forth. 15

JOHN BROUGHTON.

Witnesses:

B. GIROUX,  
M. M. LIVINGSTON.