

(No Model.)

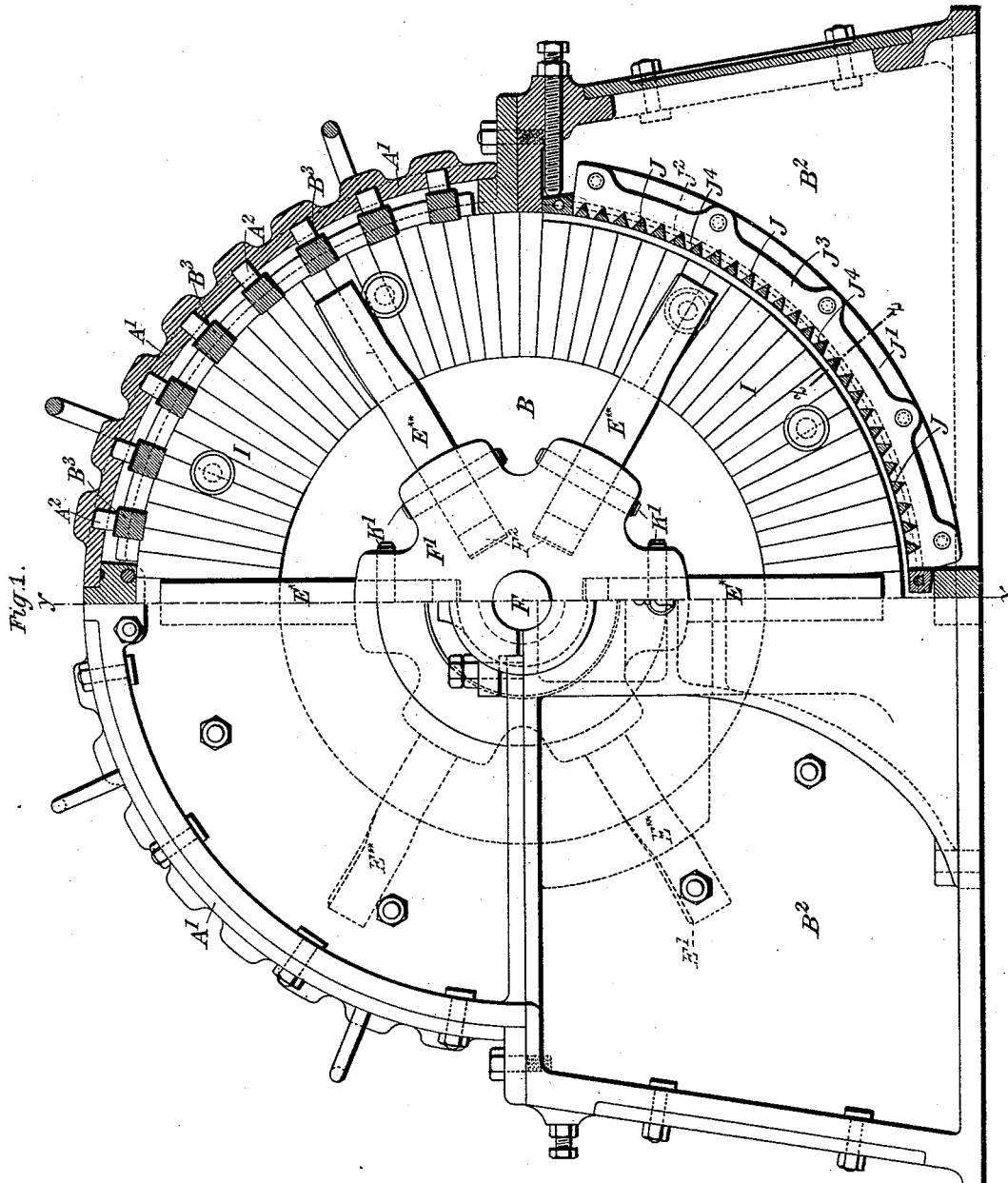
2 Sheets—Sheet 1.

S. STRAKER.

MACHINE FOR GRINDING, CRUSHING, OR DISINTEGRATING GRAIN, &c.

No. 493,531.

Patented Mar. 14, 1893.



Witnesses:  
J. A. Rutheford.  
R. H. Conant.

Inventor:  
Sidney Straker.  
By J. M. L. Norris.  
Attorney.

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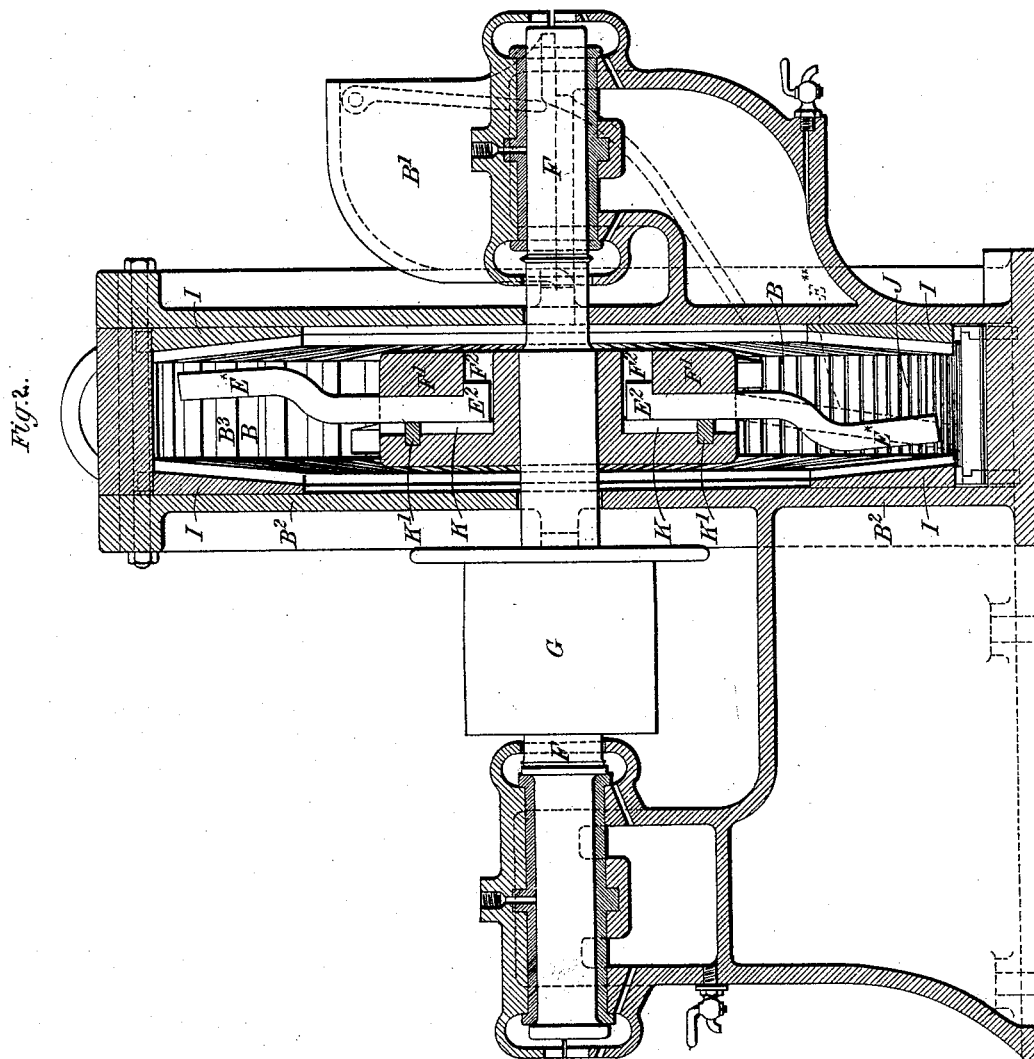
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Witnesses  
J. A. Rutherford.  
Robert G. Smith.

Inventor:  
Sidney Straker.  
By James L. Norris.  
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# UNITED STATES PATENT OFFICE.

SIDNEY STRAKER, OF LONDON, ENGLAND, ASSIGNOR TO THE CENTRAL  
CYCLONE COMPANY, LIMITED, OF SAME PLACE.

MACHINE FOR GRINDING, CRUSHING, OR DISINTEGRATING GRAIN, &c.

SPECIFICATION forming part of Letters Patent No. 493,531, dated March 14, 1893.

Application filed July 21, 1892. Serial No. 440,806. (No model.)

*To all whom it may concern:*

Be it known that I, SIDNEY STRAKER, civil engineer, a subject of the Queen of Great Britain, and a resident of London, England, have  
5 invented certain new and useful Improvements in Machines for Grinding, Crushing, or Disintegrating Grain and other Materials, of which the following is a specification, reference being had to the accompanying drawings.  
10

My invention relates to mills for grinding crushing or disintegrating cereals and other dry substances.

A very important feature of my invention  
15 is the provision of a serrated ring or rings of peculiar construction bolted to the casing, facing the beater, and having an inclined or oblique face against which the material to be pulverized is driven by the vanes or arms of  
20 the beater.

In the drawings, Figure 1, is a sectional elevation of a mill constructed according to my invention. Fig. 2, is a vertical sectional view taken on the line  $y-y$  Fig. 1. and Fig. 3, is a  
25 cross sectional view taken on the line  $z-z$  Fig. 1.

Referring to the drawings which represent a mill suitable for reducing heavy material not subjected to a preliminary crushing, the  
30 letter B indicates a reducing chamber which is formed within a single semi-cylindrical cover or casing and a suitable hollow bed  $B^2$  which supports the said cover. The inner circumference of the said cover or casing is fitted with bars  $B^3$ , the ends of which rest in recesses in the said drum. The said bars, which  
35 are arranged parallel with the driving shaft F are preferably made of steel and of rectangular cross section. The segmental covers  $A'$   
40 by which the semi-cylindrical casing is closed are provided with buffers  $A^2$  of india-rubber which bear upon the bars  $B^3$  to hold them in place. Suitable steel or other springs may be substituted for the rubber buffers if desired.

45  $B'$  is a channel or chute by which the material to be disintegrated is introduced into the central portion of the reducing chamber. Upon the inside of the said drum and the bed,  
50 two serrated impinging rings I are bolted in parallel vertical planes, one ring on each side of the fan E. The serrated faces of the said rings

are inclined so as to be nearer the fan E at their outer circumference than at their inner circumferences as shown in Fig. 2. Each said ring may be built up of bars or of separate  
55 serrated plates or may be made in one piece or in four or more segments.

Screens comprising a series of bars J are arranged in a semi-circle in the bed  $B^2$  and the said bars are retained in place by means  
60 which are hereinafter described. The said bars J are arranged with spaces between them so that the series acts as a sieve to grade the crushed or disintegrated material, which,  
55 when sufficiently reduced passes through the said spaces and out of the mill through the bottom of the bed  $B^2$ . The said means whereby the bars J are secured in place are important features of this invention and are arranged as follows:—Four segments  $J'$  provided with segmental slots  $J^2$  are secured  
70 within the casing  $B^2$  two on each side thereof. The ends of the the bars J are placed in the said slots and other segments  $J^3$  containing recesses  $J^4$  are then secured to the segments  
75  $J'$  to keep the bars at proper distances apart. This arrangement constitutes a self-contained screen and is illustrated in Fig. 1 and also in Fig. 3 which latter is a cross-section through  
80 the segments on the line  $z, z$  of Fig. 1 showing the bars J in place. The fan or beater shown in this example is an important feature of this invention, and will now be described in detail. In the said fan the arms  $E^x$ ,  $E^{xx}$  are  
85 firmly secured in a boss or hub  $F'$  which is keyed on to the driving shaft F. The said boss is provided with holes  $F^2$ ; a portion of each hole lies radially in the hub, the other portion being at right angles therewith and  
90 parallel with the driving shaft.

The arms  $E^x$   $E^{xx}$  are provided with hooked portions  $E^2$  at their inner ends which engage with the hub at the places where the said two portions of each hole meet. When the said  
95 arms are thus engaged with the hub, filling pieces K are placed in the radial portions of the said holes when required and act as weights to balance the fan or beater into a state of equilibrium. The filling pieces are of  
such cross section as to fit the space in each  
100 of the holes  $F^2$  which is not occupied by the arms, when the latter are engaged with the

hub, so that as long as the filling-pieces are in place the hooked portions of the arms cannot become disengaged. The cotters K' are driven through other suitable holes in the hub to retain the hooked arms in secure engagement with the hub. These cotters may be held from displacement by any suitable means. The said arms E<sup>x</sup> E<sup>xx</sup> are either straight or are cranked or bent in the plane of the driving shaft and the outer ends of some of the said arms are bent about their own axes so as to be at an angle with the plane in which they travel. The arrangement of the said fan or beater-arms in relation to the aforesaid serrated rings or any other surface is a most important feature of my said invention, for by the said arrangement I effect a preliminary disintegration of the material by certain of the said arms and effect a finer and final reduction by other of the said arms. For this purpose I make the arms E<sup>x</sup> which are to effect the preliminary disintegration, of suitable shape, and I arrange them so that the material fed into the machine is first reduced between them and portions of the rings for instance at the inner circumference of the said rings, the said material then passing outward radially across the rings and being still further crushed during its outward movement by other portions of the arms arranged in gradually increasing proximity to the faces of the rings. I form the other arms E<sup>xx</sup> which are to effect the final reduction, so that their ends approach still closer to the said rings preferably at the outer circumference of the same, so closely, in fact, that they are enabled to reduce material which has undergone the preliminary reduction by the other arms as aforesaid. The position which the said arms E<sup>xx</sup> would occupy relatively to the impinging rings is shown in dotted lines in Fig. 1. By this means the output of the machine is considerably increased as compared with machines of equal size constructed as has heretofore been customary.

The material to be disintegrated is fed into the reducing chamber B of the machine

through the channel B', is crushed by the action of the beater arms E<sup>x</sup> E<sup>xx</sup> and the impinging rings I, and, when sufficiently reduced falls as aforesaid through the spaces between the bars and out at the bottom of the bed.

What I claim is—

1. In a pulverizing or grinding mill the combination with a semi-cylindrical casing forming the upper portion of the reducing chamber, of bars placed around the inner circumference of the said casing and resting in recesses therein, and segmental covers having india-rubber buffers or steel or other springs to bear upon the said bars.

2. In a pulverizing or grinding mill the combination with a semi-cylindrical casing forming the upper portion of the reducing chamber, of bars placed around the inner circumference of the said casing and resting in recesses therein, segmental covers having india-rubber buffers or steel or other springs to bear upon the said bars, and two serrated impinging rings, one on each side of the fan or beater, with faces inclined to the plane in which the fan or beater rotates, substantially as set forth.

3. In a pulverizing or grinding mill the combination with a series of bars arranged in a semi-circle in the bed with spaces between them, of segments slotted segmentally to receive the ends of the said bars, and other segments secured to the first-named segments and provided with recesses to receive the said bars substantially as set forth.

4. In a pulverizing or grinding mill, the combination with a series of bars arranged in a semicircle in the bed with spaces between them, of segments slotted segmentally to receive the ends of the said bars, and supplemental segments provided with recesses to receive said bars, substantially as described.

In witness whereof I have hereunto set my hand this 1st day of July, 1892.

SIDNEY STRAKER.

Witnesses:

G. G. BRIDGES,  
ARTHUR CARRICK.