

(No Model.)

2 Sheets—Sheet 1.

C. F. KING.

COMBINED GRINDING MILL, BOLT, AND PURIFIER.

No. 324,473.

Patented Aug. 18, 1885.

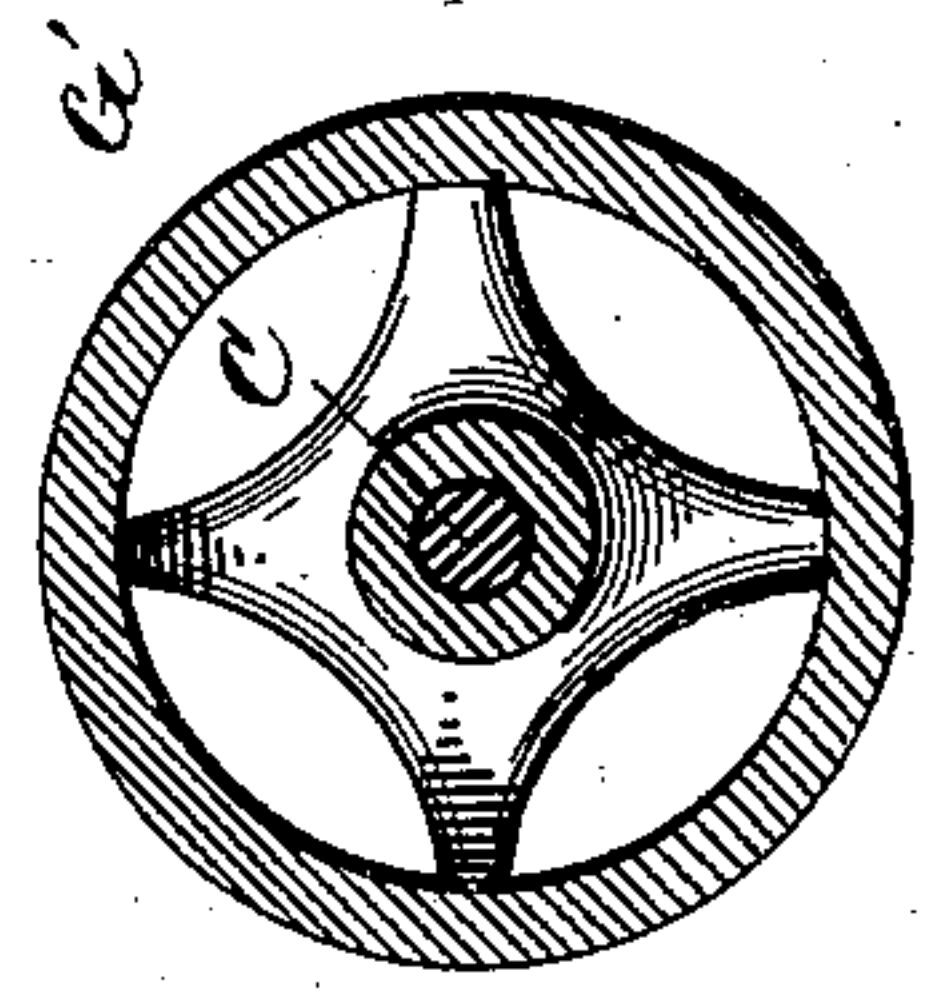
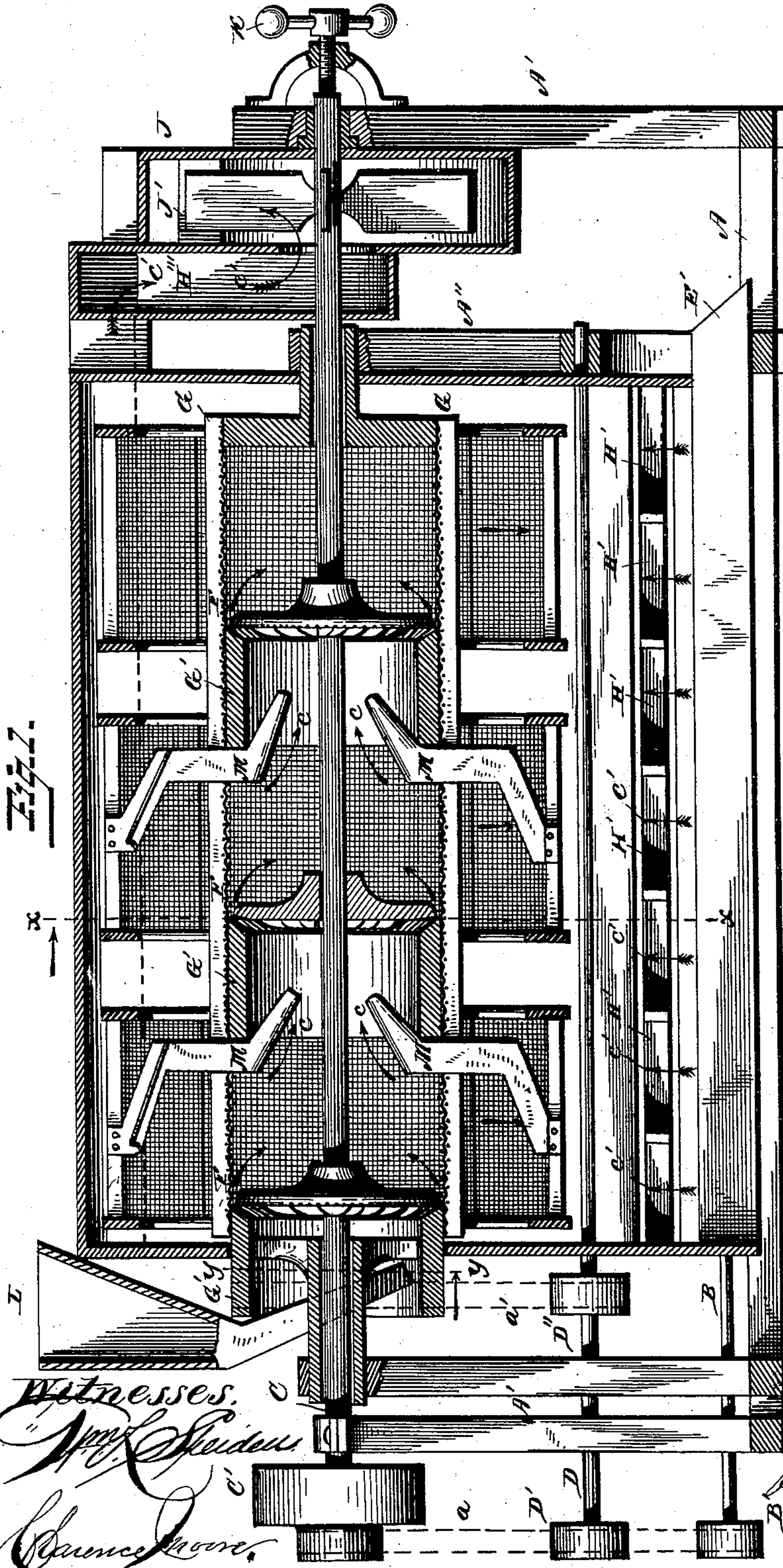


Fig. 2.

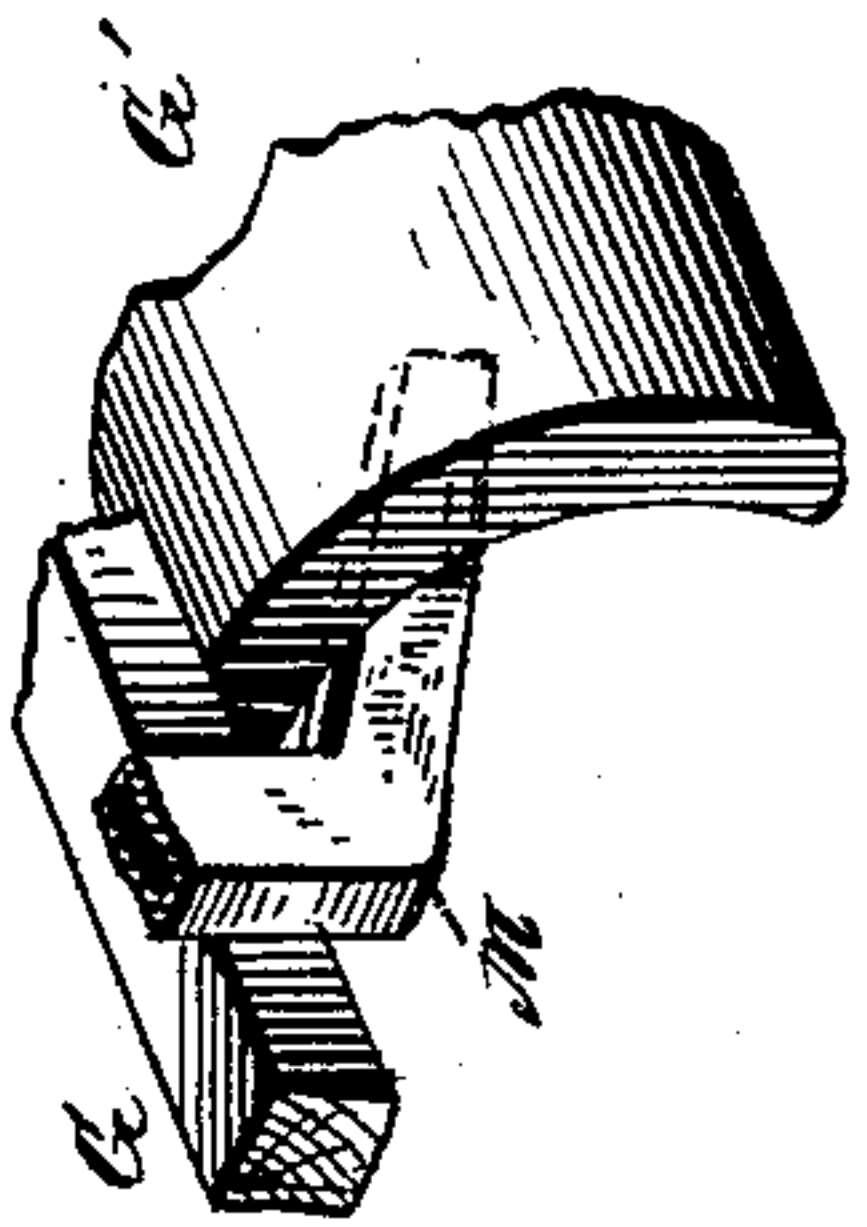


Fig. 3.

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Inventor:  
*Chas. F. King*  
by *Franklin H. Hough*  
Atty



(No Model.)

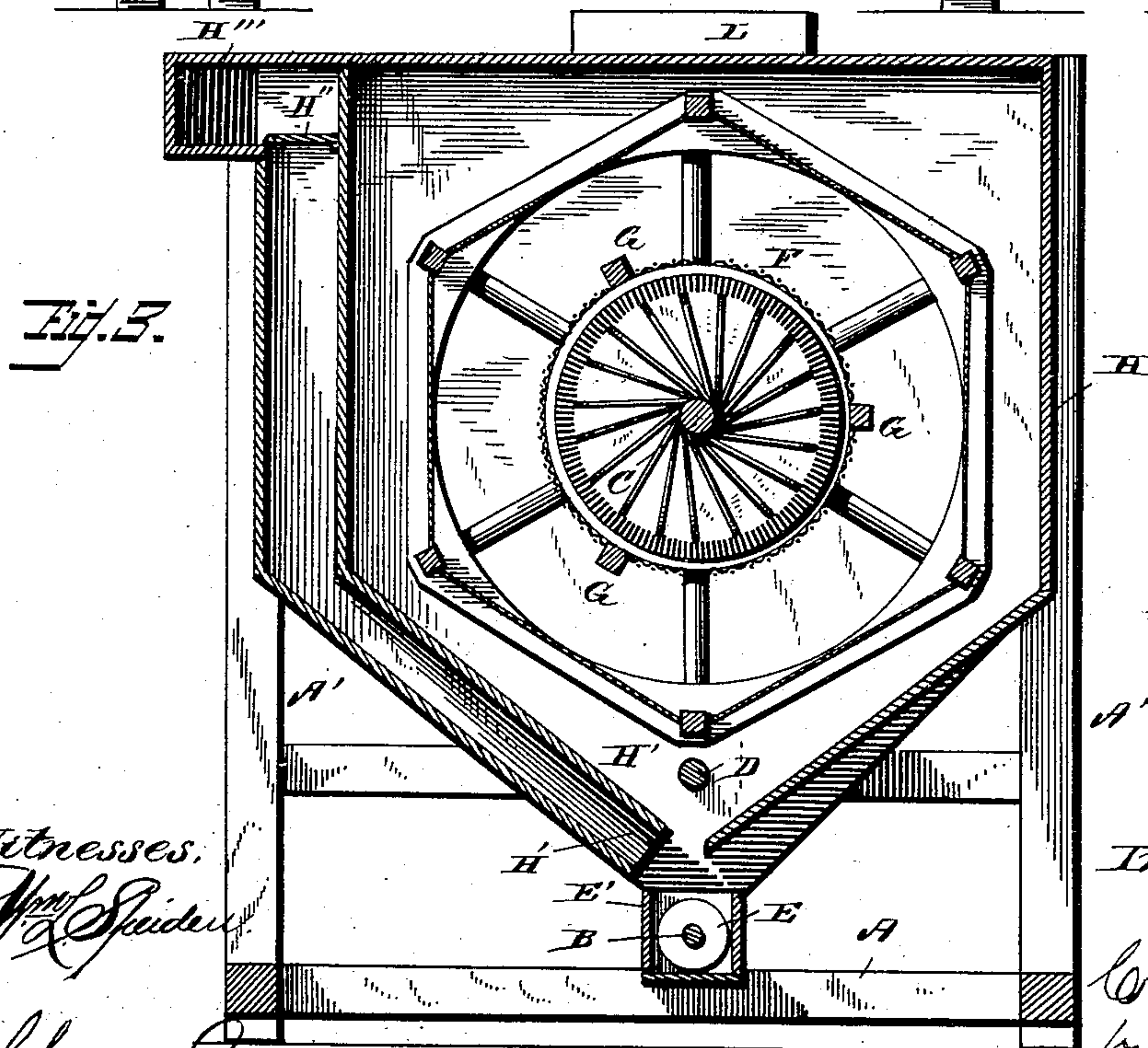
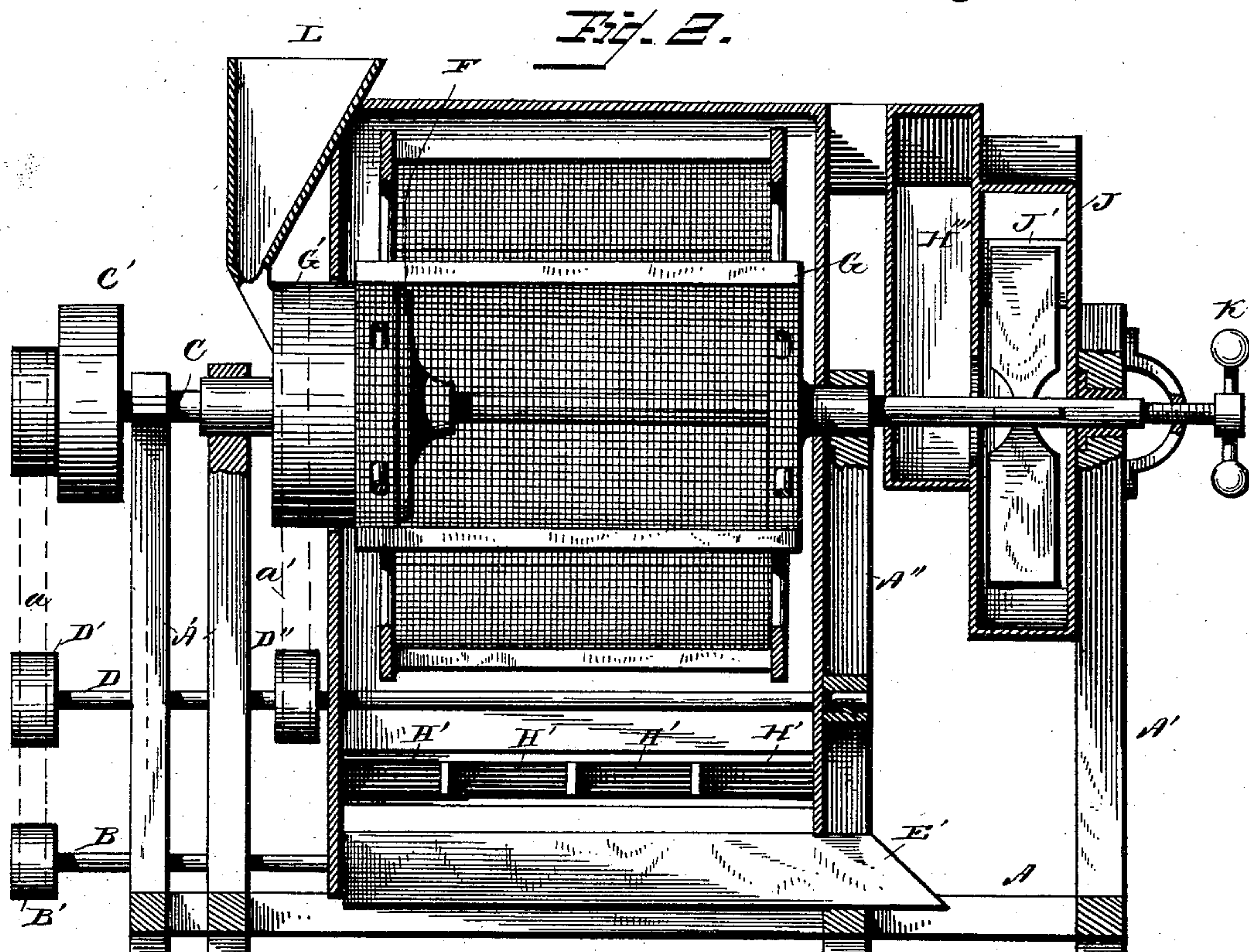
2 Sheets—Sheet 2.

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COMBINED GRINDING MILL, BOLT, AND PURIFIER.

No. 324,473.

Patented Aug. 18, 1885.



Witnesses,

*Wm. Spidey*

*Samuel Moore*

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# UNITED STATES PATENT OFFICE.

CHARLES F. KING, OF COVINGTON, PENNSYLVANIA.

## COMBINED GRINDING-MILL, BOLT, AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 324,473, dated August 18, 1885

Application filed April 10, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. KING, a citizen of the United States, residing at Covington, in the county of Tioga and State of Pennsylvania, have invented certain new and useful Improvements in Combined Grinding-Mill, Bolt, and Purifier; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in vertical grinding-mills; and it has for its objects to provide a mill wherein the grinding is done inside of the bolting-reel, to provide means whereby the chaff is more effectively removed from the cylinder and the device rendered more efficient in grinding, separating, and purifying the grain on which it operates.

To these ends, and to such others as the invention may pertain, it consists in the peculiar combinations and the construction and arrangement of parts, all as hereinafter more fully described, and then specifically pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a longitudinal section of a mill provided with a series of cylinders and disks constructed according to my improvement. Fig. 2 is a similar view of a single mill. Fig. 3 is a cross-section on the line *xx* of Fig. 1. Fig. 4 is a detail, and Fig. 5 is a section on the line *yy* of Fig. 1.

Referring to the details of construction, A represents the frame of the mill, in the uprights A' of which is journaled, in suitable boxes, the main central driving shaft, C, carrying on its end the drive-pulley C'.

B is a suitable shaft, provided with a pulley, B', on its outer end, and with a screw-conveyer, E, which is of the usual construction. This screw is inclosed in the casing or box E', and is designed to convey the fine particles from said box to a suitable receptacle (not shown) after it has been ground and purified in the bolting-reel by mechanism now to be described.

F is a grinding stone or disk rigidly secured to the main shaft C, and having its surface provided with suitable dress or corrugations. The bearings of the separating-reel G, which

are journaled in the uprights A'', are hollow, the interior of the bearings being of greater diameter than the driving shaft C, which passes through them. The reel, revolving thus upon its own bearings and supports, acts independently of the main shaft. The grinding-cylinder G' (a cross-section of which is shown in Fig. 5 of the drawings) is rigidly secured to the purifying-reel in the single mill and forms one end of the same. The shaft D carries upon its end the drive-pulley D', to which motion is communicated from the main shaft C by means of the belt *a*. The purifying-reel G has a slow rotary motion conveyed to it by means of the drive-pulley D' and belt *a'*. The purifying-reel is inclosed within the casing H, which is separated by partitions into a series of air trunks or passages, H', which communicate by means of valves H'' with the larger air passage or chamber H''', which extends the entire length of the casing, and communicates with a separate chamber, J, in which is inclosed a suction-fan, J', which is attached to and revolves with the main shaft C. At one end of the driving shaft C the hand screw K is provided, by means of which the space between the grinding-faces of the disks and cylinders may be regulated. The grain enters the interior of the grinding-cylinder G' from the hopper L, and is thrown to the outer edge of the cylinder, where it passes between the grinding-surfaces upon the outer edges of the cylinder and corresponding disk, and enters the interior of the revolving bolt G, in passing from which to the screw-conveyer E the chaff is separated from the fine material, and is carried off by means of the air-passages H' and suction-fan J'.

In combination mills, such as is shown in Fig. 1 of the drawings, a series of grinding-cylinders and corresponding disks are arranged along the main shaft C at suitable distances, the cylinders being bolted securely to the ribs of the purifying-reel, and the disks secured to the main shaft C. After passing through the first cylinder that portion of the grain which has been reduced by the first grinding to a sufficient degree of fineness to permit of its passing through the meshes of the bolting-reel falls to the screw-conveyer at the bottom of the casing. The impurities be-



ing removed by the current of air entering the air-passages across the path of the falling grain, as will be readily understood on reference to Fig. 3 of the drawings, that portion  
 5 of the grain which has not been reduced by the first grinding to a sufficient degree of fineness to permit of its passing through the meshes of the bolting-reel is, by the rotary motion of the reel, thrown to the outer surface of  
 10 the same, where it is conveyed by means of the inclined elevating-spouts M (which are secured to the ribs of the reel) into the next succeeding cylinder.

Mills may be provided with any desired  
 15 number of cylinders and disks, all of which are arranged along the central driving-shaft and inclosed within the bolting-reel.

The course taken by the grain in passing through the mill is indicated by the arrows *c*  
 20 in Fig. 1 of the drawings, while the direction taken by the air-current is indicated by the arrows *c'*.

Having thus described my invention and set forth its merits, what I claim as new is—

25 1. In a grinding-mill, the combination, with a series of cylinders and a series of grinding-disks, of a bolting-reel and an elevating-spout attached to one of the ribs of said reel, substantially as and for the purpose specified.

30 2. In a grinding mill, the combination, with the bolting-reel, the disk or stone forming an end thereof, a series of cylinders, and a series of grinding-disks arranged within said reel, of a series of elevating spouts attached to the  
 35 ribs of said reel, substantially as and for the purpose specified.

3. In a grinding-mill, the combination, with the bolting-reel, the disk or stone forming an end thereof, a series of cylinders, and a series

of grinding-disks arranged within said reel, of  
 40 a series of inclined elevating-spouts extending into said cylinders, substantially as and for the purpose specified.

4. In a grinding-mill, the combination, with the main shaft journaled in suitable bearings  
 45 in the frame thereof, of the reel provided with hollow bearings and revolving independent of said main shaft, substantially as and for the purpose described.

5. In a grinding-mill, the combination, with  
 50 a series of grinding-disks carried by the main shaft, and a bolting-reel provided with a series of cylinders and revolving at a less rate of speed than said disks, of a series of air-trunks, an air-chamber communicating with said air-  
 55 trunks, and a suction-fan secured to said main shaft, substantially as and for the purpose specified.

6. In a grinding-mill, the main shaft carrying two or more grinding-disks, the bolting-  
 60 reel provided with hollow bearings and revolving independent of said main shaft at a less rate of speed, a grinding-cylinder, ribs connecting said bearings and stone, and the inclined elevator-spouts rigidly secured to said  
 65 ribs, all combined, arranged, and operating substantially as set forth.

7. In a grinding-mill, the combination of a rotary sieve, a bolting-reel arranged within  
 70 said sieve, and a grinding stone or disk carried by the main shaft within said reel, substantially as herein shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. KING.

Witnesses:

JOHN KENDRICK,  
 G. A. SPRING.