(No Model.)

2 Sheets—Sheet 1.

C. WILLARD.

GRINDING MILL.

No. 450,689. Patented Apr. 21, 1891.

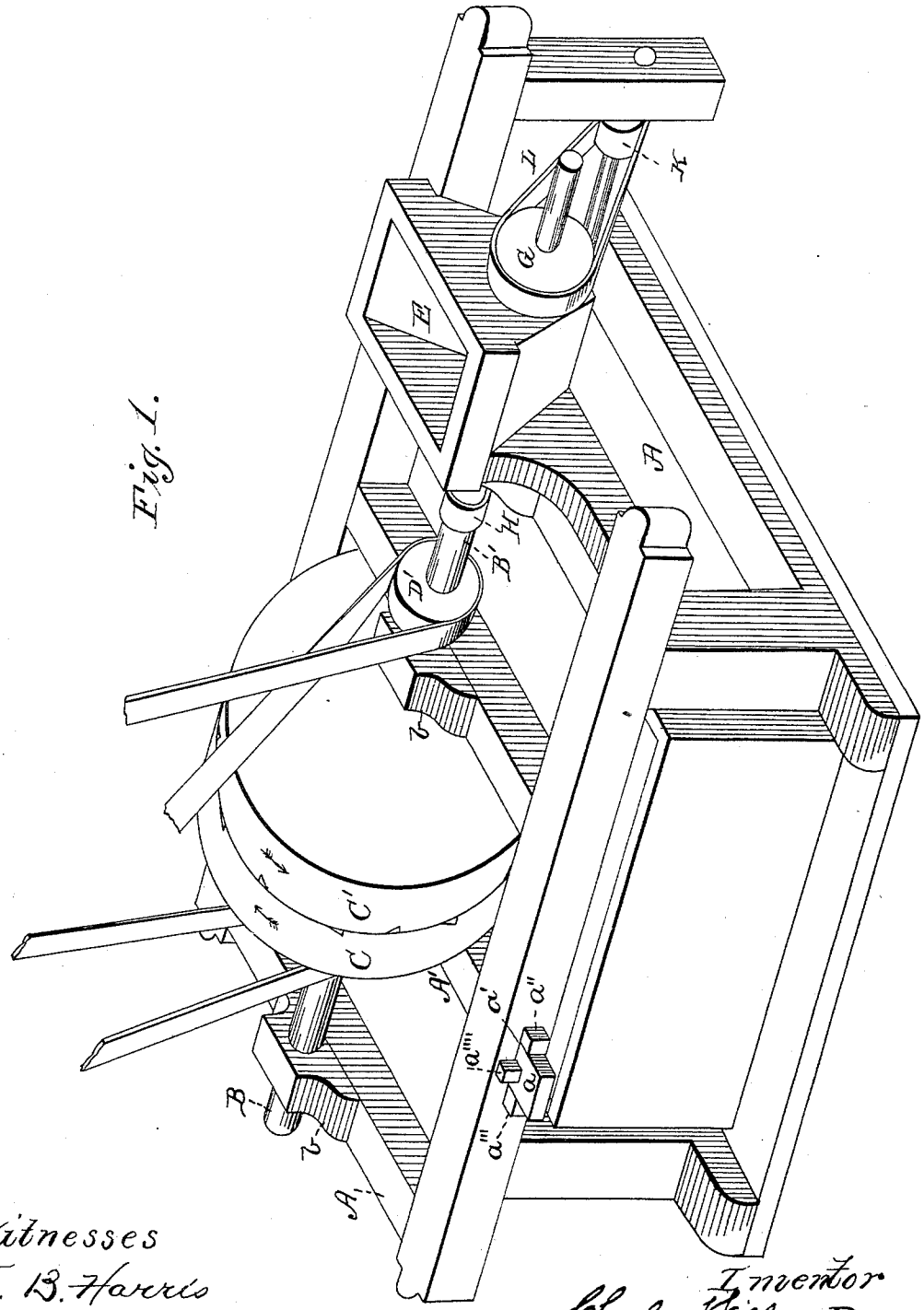


Fig. 1.

Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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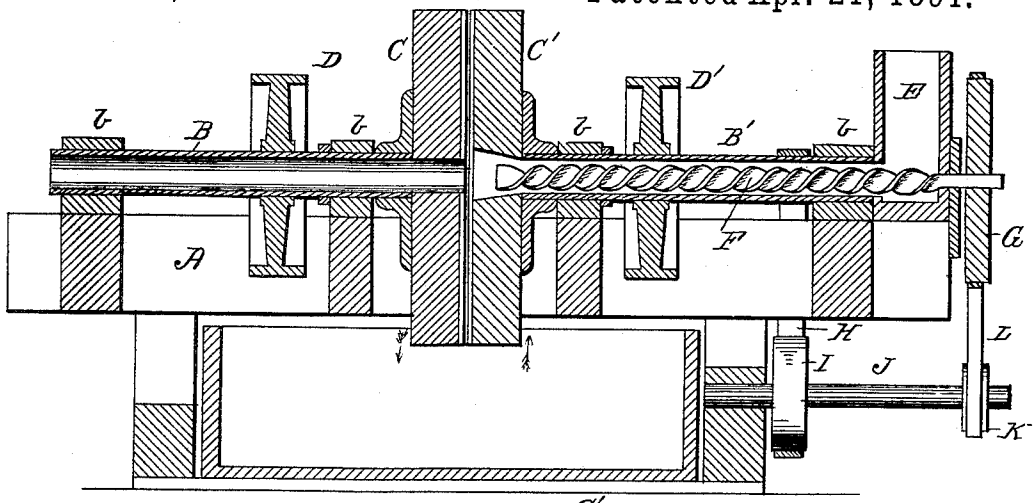


Fig. 2.

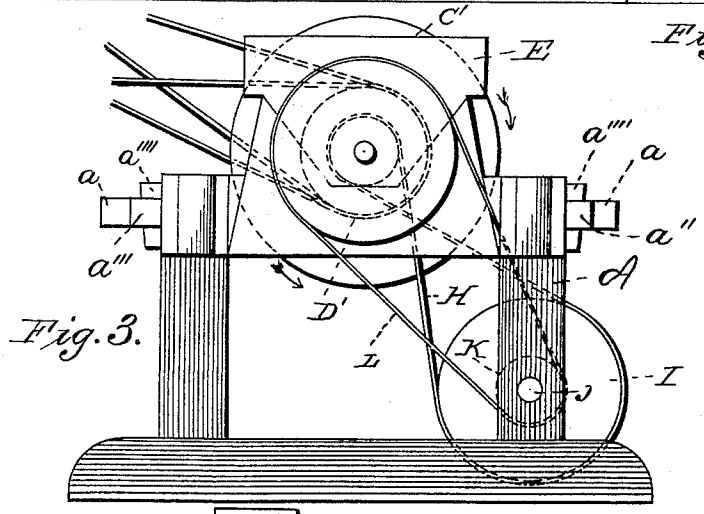


Fig. 3.

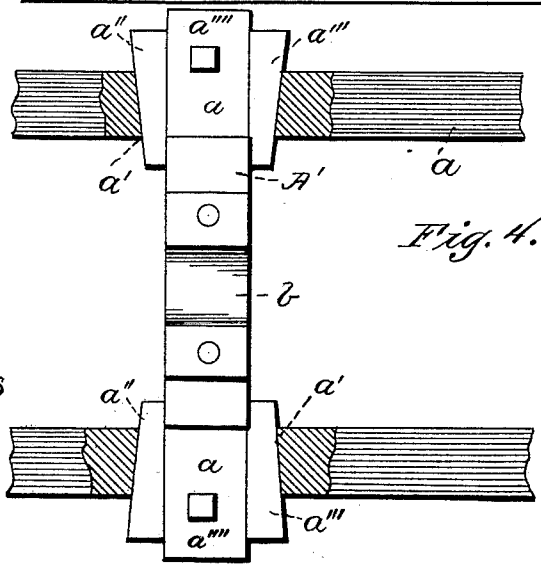


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES WILLARD, OF NEWPORT, ASSIGNOR OF ONE-HALF TO WILLARD SAULSBURY, JR., OF WILMINGTON, DELAWARE.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 450,689, dated April 21, 1891.

Application filed September 23, 1890. Serial No. 365,922. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WILLARD, a citizen of the United States, residing at Newport, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Grinding-Mills; 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.

My invention has particular relation to that class of grinding-mills in which two revolving stones are employed arranged upon horizontal shafts; and my said invention consists in certain details of construction and arrangement of parts, as will be hereinafter fully described and claimed.

The objects of my invention are to provide for the proper admission of air between the faces of the stones to provide for the proper adjustment of stones to take up wear, &c., and to provide for the automatic feeding of the grain to the stones; and to accomplish such objects I proceed as follows, reference being had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a view in perspective of a grinding-mill constructed according to my invention; Fig. 2, a central longitudinal section, and Fig. 3 an end view of the same; Fig. 4, a detail plan view in partial section of a portion of the frame illustrating the means for adjusting the stone to take up wear, &c.

Upon the frame A, which may be of any suitable dimension, are journaled in boxes *b* two hollow shafts B and B′, which carry at their opposing ends the grinding-stones C and C′, by which shafts said stones are rotated.

D and D′ are belt-pulleys fixed to the shafts B and B′, respectively, by which motion is communicated to the stones C and C′, said stones being run in opposite directions, as indicated by the arrows.

E is the feed-hopper at the bottom of which is arranged a worm or conveyer F, that extends through the hollow shaft B′, and terminates at one end at the eye of the stone C′ and at its outer extremity is supplied with a belt-pulley G, by which the motion is communicated from shaft B′ through the belt H upon said shaft to a pulley I on an intermediate shaft J, that carries a small pulley K, around which pulley and the wheel G passes a belt L. By such arrangement of parts and by relatively proportioning the sizes of the pulleys I, K, and G any desired degree of revolution relative to the speed of the shaft B′ may be given to the conveyer F, and the feed governed accordingly.

The shafts B and B′ that carry the stones being hollow their entire length, a free circulation of the air is provided, so that heating of the parts as well as the clogging of the stones is prevented.

To provide for the adjustment of the stone C the cross-piece A′ of the frame is made adjustable as follows: The tenon ends *a* of the cross-piece A′ are made smaller than the mortise *a′* in the frame A, and at each side of said tenon are wedges *a″* and *a‴*, *a⁗* being keys for holding the piece A′ in place. By withdrawing the keys *a⁗* and backing out the wedges *a″*, then driving up the wedges *a‴* the piece A′ will be forced against the stone C, and the same adjusted nearer the stone C′, whereby wear thereof may be compensated for.

The operation may be briefly described as follows: Motion being imparted to the shafts B and B′ through pulleys D and D′, connected by belt or band with the counter-shaft of an engine or other motive power, the stones C and C′ are caused to revolve in opposite directions. The revolution of the shaft B′ communicates motion through band H to the pulleys I and K on shaft J, thence through band L. The pulley G on the conveyer F causes a revolution of said conveyer and a proper feeding of the grain from the hopper E to the eye of the stones.

Among the advantages incident to this construction may be mentioned that of a free circulation of air through the shaft to the stones, and the conveyer being separate and independent of the shaft carrying the stones the two may be run at different rates of speed, so that the feed can be accurately proportioned in accordance with the capacity of the stones, and clogging thereby prevented, which would

not necessarily be the case where the stones and conveyer both run at the same speed. To secure the desired results the stones must be run at a high degree of speed and the speed of the conveyer so regulated as to convey just sufficient grain to the stones as they shall be working to their full capacity without clogging. This is accomplished by the arrangement herein described, and in addition thereto the grinding is quickly done and a superior class of article obtained.

I claim and desire to secure by Letters Patent of the United States—

1. In a grinding-mill of the nature described, the two stones, the two separate hollow shafts carrying at their abutting ends the said stones and forming a continuous air-passage from end to end and through the said stones, and a conveyer for delivering the grain to the eye of the stone.

2. In a grinding-mill of the nature described, the combination, with the hollow revolving shaft B and stone C, of the hollow revolving shaft B′ and stone C′, the conveyer F, terminating at the eye of the stone and having a movement independent of the shaft B′, and the pulleys I and K, shaft J, and pulley G and belts H and L, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

CHARLES WILLARD.

Witnesses:
WM. H. BRERETON,
HARVEY S. W. DE GAW.