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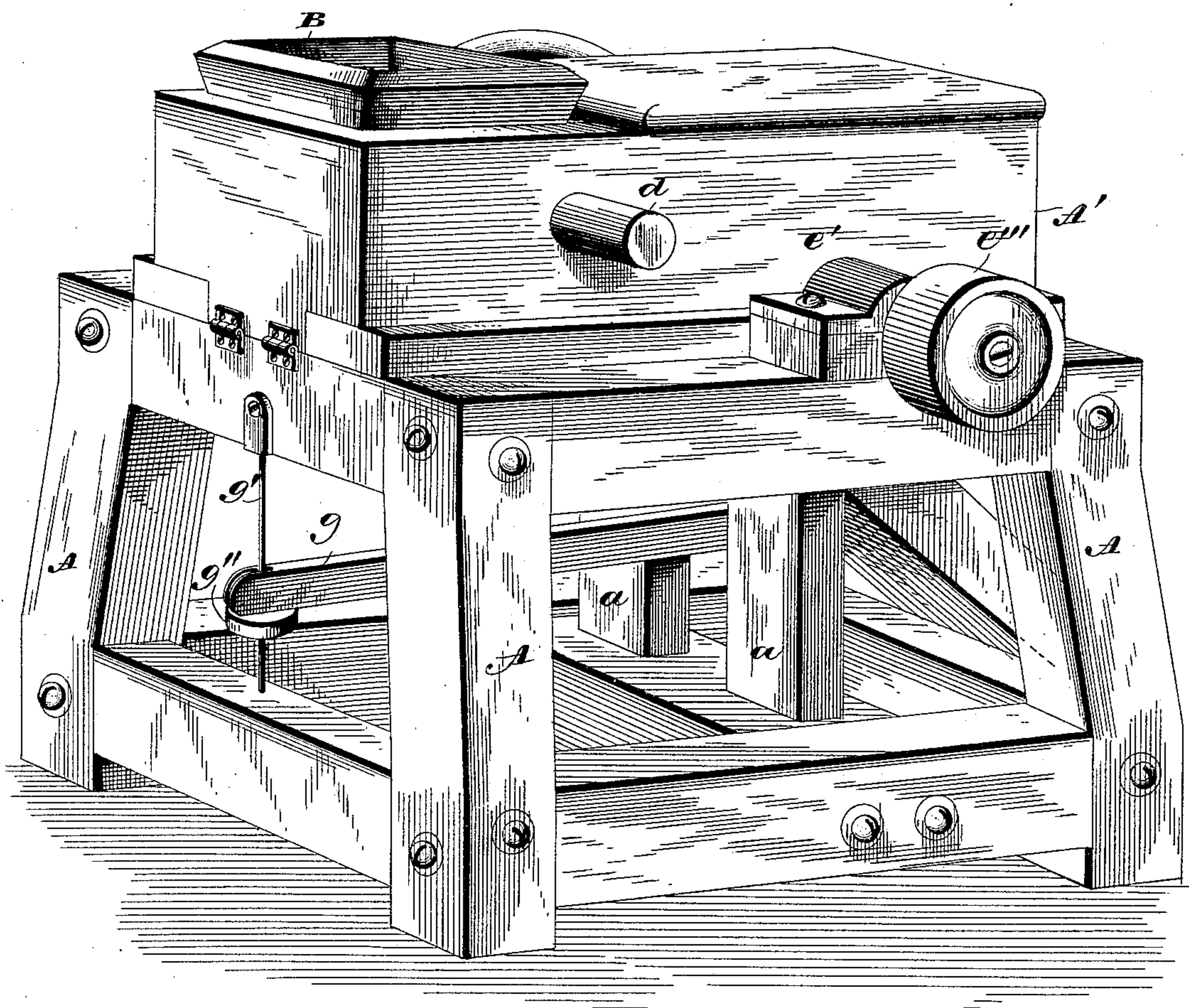
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W. BUCHHOLZ.
GRINDING MILL.

No. 437,087.

Patented Sept. 23, 1890.

Fig. 1



WITNESSES

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INVENTOR.

[Signature]

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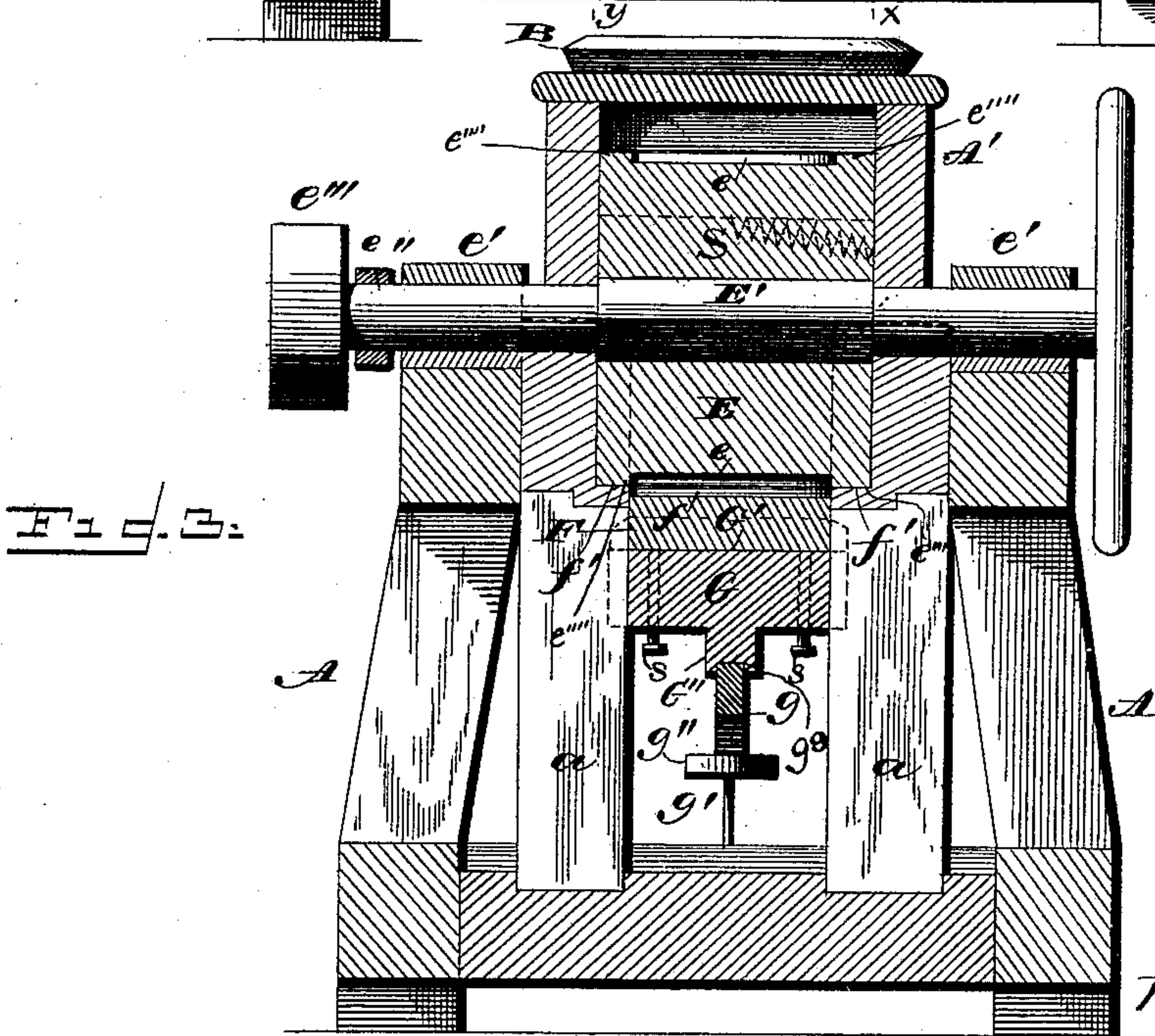
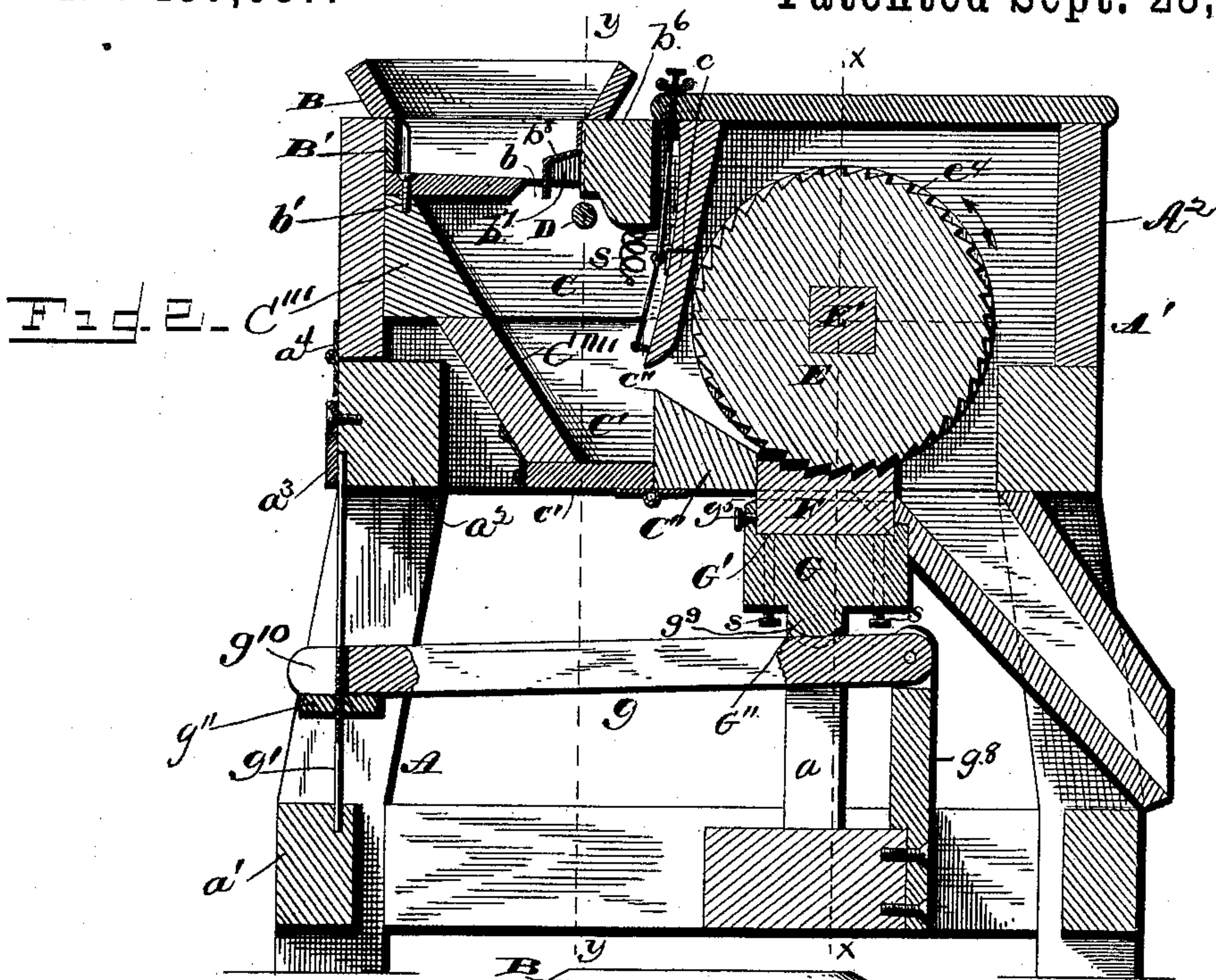
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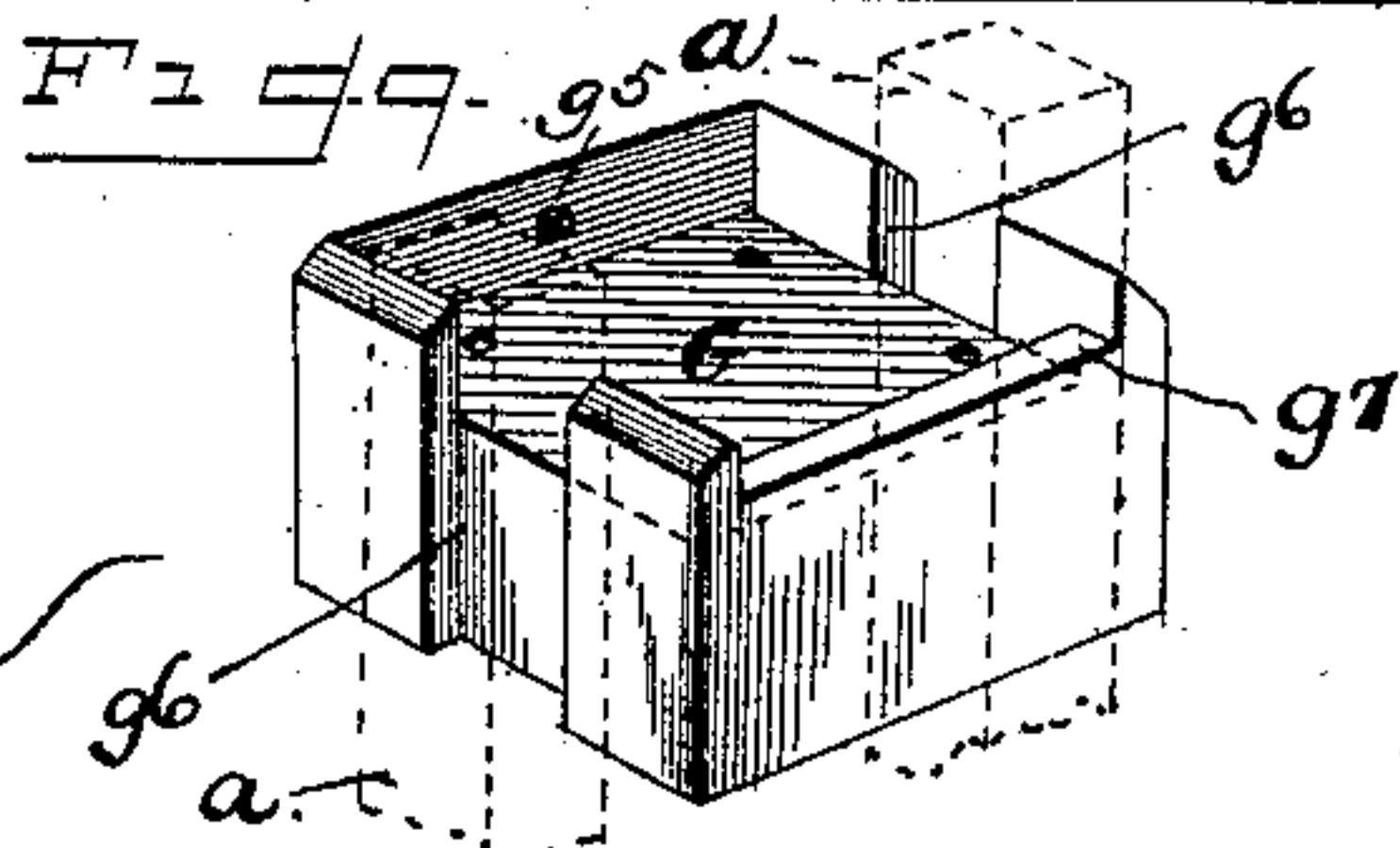
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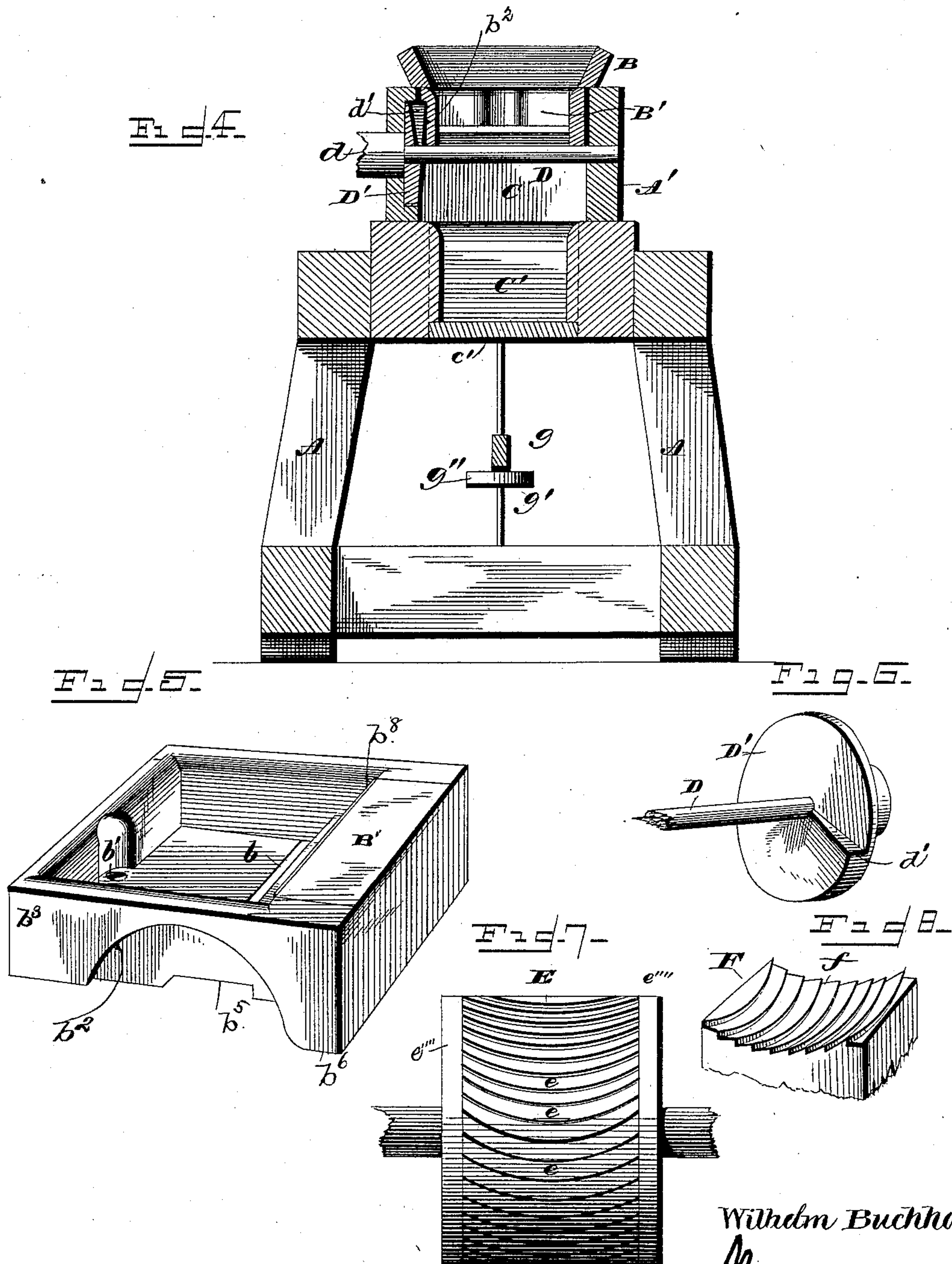
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UNITED STATES PATENT OFFICE.

WILHELM BUCHHOLZ, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO
CHARLES OLIVER BARTLETT, OF SAME PLACE.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 437,087, dated September 23, 1890.

Application filed November 24, 1886. Serial No. 219,815. (No model.)

To all whom it may concern:

Be it known that I, WILHELM BUCHHOLZ, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of grinding-mills in which a crushing or grinding roll operates in conjunction with a concave.

The invention will be described in the ensuing specification and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a mill embodying my improvements. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a transverse section taken on the line $x x$ of Fig. 2. Fig. 4 is a transverse section taken on the line $y y$ of Fig. 2. Fig. 5 is a perspective view of the feed-board of the hopper-bottom. Fig. 6 is a perspective view of the knocking or agitating cam. Fig. 7 is a face view of the grinding-roll. Fig. 8 is a perspective view of the working-face of the grinding-concave. Fig. 9 is a perspective detail illustrating the relations of the concave-carrying frame and its guides.

The mechanism embodying my improvements is mounted upon a suitable frame comprising legs or standards A and a trunk A'. The front or feeding end of the trunk is provided with a hopper B, having an aperture b in its bottom, which communicates with the chute or passage C, leading to the grinding mechanism. In the drawings I have illustrated the hopper-bottom B' as consisting of a rectangular frame and bottom board independent of the hopper proper and adapted to be oscillated horizontally upon a pivot-bolt b' remote from the feed-aperture, so as to insure a regular and constant feed of the grain from the hopper to the grinding mechanism, and

while I prefer this construction, as the side and end pieces of the frame strengthen the bottom board and prevent it from warping, it will be apparent to those skilled in the art that said side and end pieces may be dispensed with. The hopper is oscillated or agitated by a cam D', carried by a shaft D, having its ends journaled in the sides of the trunk, and this shaft is extended at one end beyond the trunk and provided with a pulley d to receive a driving-belt. A spring S is connected at one end to the trunk and at its other end to the hopper-bottom to constantly press the latter against the face of the cam.

The feed chute or passage C is provided at a point just in advance of the grinding mechanism with a pocket C', designed to arrest any heavy particles—such as gravel, nails, &c.—in their passage toward the grinding mechanism, and this pocket C' is provided with a hinged bottom c' , in order that access may be had for the removal from time to time of such foreign substances as may collect therein.

Within the chute or passage C, I prefer to arrange a hinged gate c , which may be adjusted by a screw rod and nut or in any other usual manner to vary the distance between the lower free end of said gate and crest c'' of the breast or bridge C'', thus regulating the quantity of material passing to the grinding mechanism, and it may be here observed that the feed-opening in the hopper-bottom B' may also be varied in extent by means which are so universally employed and well understood that a description thereof in detail would be superfluous.

A stone grinding-roll E is mounted upon and rotates with a shaft E', journaled in bearings e' , secured at opposite sides of the trunk, said shaft being provided at one end with a pulley e'' , carrying the belt d' , which drives the cam-shaft D, and a pulley e''' to receive the belt from any suitable driving-shaft, and at the other end with a fly-wheel. The surface of the roll or burr E is provided with a series of curved grooves e , gradually deepening from the convex to the concave side, or, in other words, from rear to front, as shown in Fig. 7. The ends of these grooves terminate short of the ends of the roll, leaving at each

side of the roll a circumferential smooth surface e''' , the purpose of which will be hereinafter explained. The grinding-face of the concave F is also of burr-stone, and is provided with curved grooves f , formed similar to those on the roll E; but the concave is so arranged that when the parts are in position for operation the grooves of the roll and the grooves of the concave cross each other, so that in operation as the roll rotates in the direction of the arrow, Fig. 2, the outer ends of each groove will act upon the material undergoing reduction in advance of the central portion thereof, thus giving said material a tendency to move toward the center of the roll and concave and operating upon it with a shearing action. As an additional guard against the escape of small particles laterally from the concave F, the trunk or casing is provided on each side of the concave with grooves f' , within which the smooth surfaces a''' of the grinding-roll E fit snugly, the length of the roll for this purpose exceeding the width of the concave and overhanging the same on each side a distance equal to the width of said smooth surface e''' .

The bottom of the concave E is seated in the socket G' of a stout frame G, adjustable vertically by means of the lever g , threaded rod g' , and hand wheel or nut g'' . This frame G is fitted snugly within stout guides a , rigidly secured to the frame, and is provided with a downwardly-projecting stub G'' , resting loosely upon the supporting and adjusting lever g , so that a movement of said lever will result only in the vertical adjustment of said frame and the concave, other adjustments of the concave being provided, as hereinafter explained. The socket G' may be of any usual or preferred construction, provided only that it is adapted to securely hold the concave. The socket illustrated consists of a base or table, from the edges of which rise strips or battens on three sides, the batten or strip on the front side being cut away centrally to permit the concave and socket to lie closely against the discharge-chute, as shown. The guides a for the frame G consists of vertical posts of timber or metal of any preferred cross-sectional contour, the frame being provided with one or more projections adjacent to said guides designed to engage the sides thereof, as indicated in Fig. 3, or when the frame is provided with but one projection on each side each guide will be provided with a groove to receive said projection.

The socket and guides herein referred to are old and well-known mechanical devices, and are not claimed, broadly, herein.

To admit of the removal of the concave for redressing or other purposes, I prefer to seat it loosely in its socket G' and then clamp it tightly by means of one or more set-screws g^5 , suitably positioned.

To perfectly adapt my roll for the reduction

of substances differing in their nature, I provide means to raise or lower the front and rear ends of the concave independently, in order that the operation of grinding may be carried on over a greater or less surface, as required. This independent adjustment of the ends of the concave may be effected by inserting wedge-blocks between the bottom or back of the concave and the floor of the socket G' ; but I prefer to employ set-screws s , suitably positioned to effect such adjustment.

Having thus described my invention, I claim—

1. In a grinding-mill, the combination of the reduction-chamber containing the cylinder and vertically-adjustable concave arranged below the same, an adjacently-located hopper and feeding-chute C immediately below the same and having a rear inclined wall, and the bridge C'' , interposed between the lower portion of the chute and the concave so that the latter is guided in its vertical movement, said bridge having its other wall cooperating with the inclined wall to form a receptacle at the base of the chute, together with a hinged door c' , substantially as set forth.

2. In a grinding-mill, the combination of the chute C, having a bridge C'' at the lower part thereof formed with an apex c'' , extending upwardly into the chute adjacent to the grinding-roll, and the partition depending from the top cover of the roll-chamber and having an adjustable gate c , hinged to the lower end thereof and normally depending downwardly adjacent to the apex c'' of the bridge C'' and forming a feed-opening therewith, said feed-opening being regulated by the adjustment of the gate c into the chute, substantially as set forth.

3. In a grinding-mill, the combination, with the reduction-chamber containing the cylinder, of a vertically-depending gate c and means for adjusting the same, and a bridge C'' , located beneath said gate and having its upper face inclined so that its apex will cooperate with said gate c , together with a vertically-adjustable concave bearing against the inner side of the bridge, substantially as set forth.

4. In a grinding-mill, the combination, with the reduction-chamber containing the cylinder, of a discharge-spout and bridge C'' , located at the bottom of the chamber, a vertically-moving concave guided between the bridge and spout, a concave-carrying frame playing between the vertical guides a , and a horizontal lever pivoted at one end supporting the concave, substantially as set forth.

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

WILHELM BUCHHOLZ.

Witnesses:

FRANK N. WILCOX,
JNO. M. WILCOX.