

**No. 684,346.**

**Patented Oct. 8, 1901.**

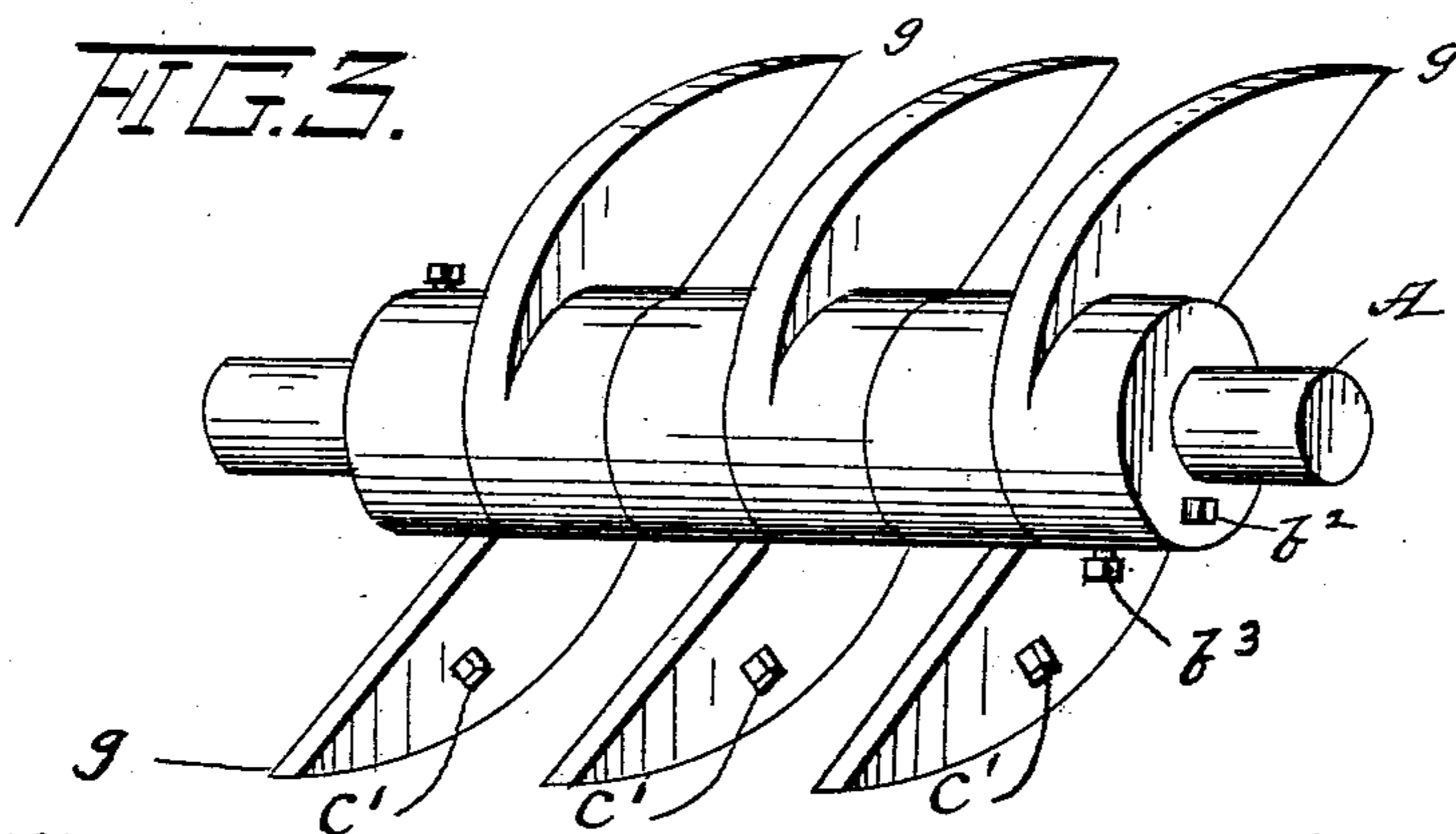
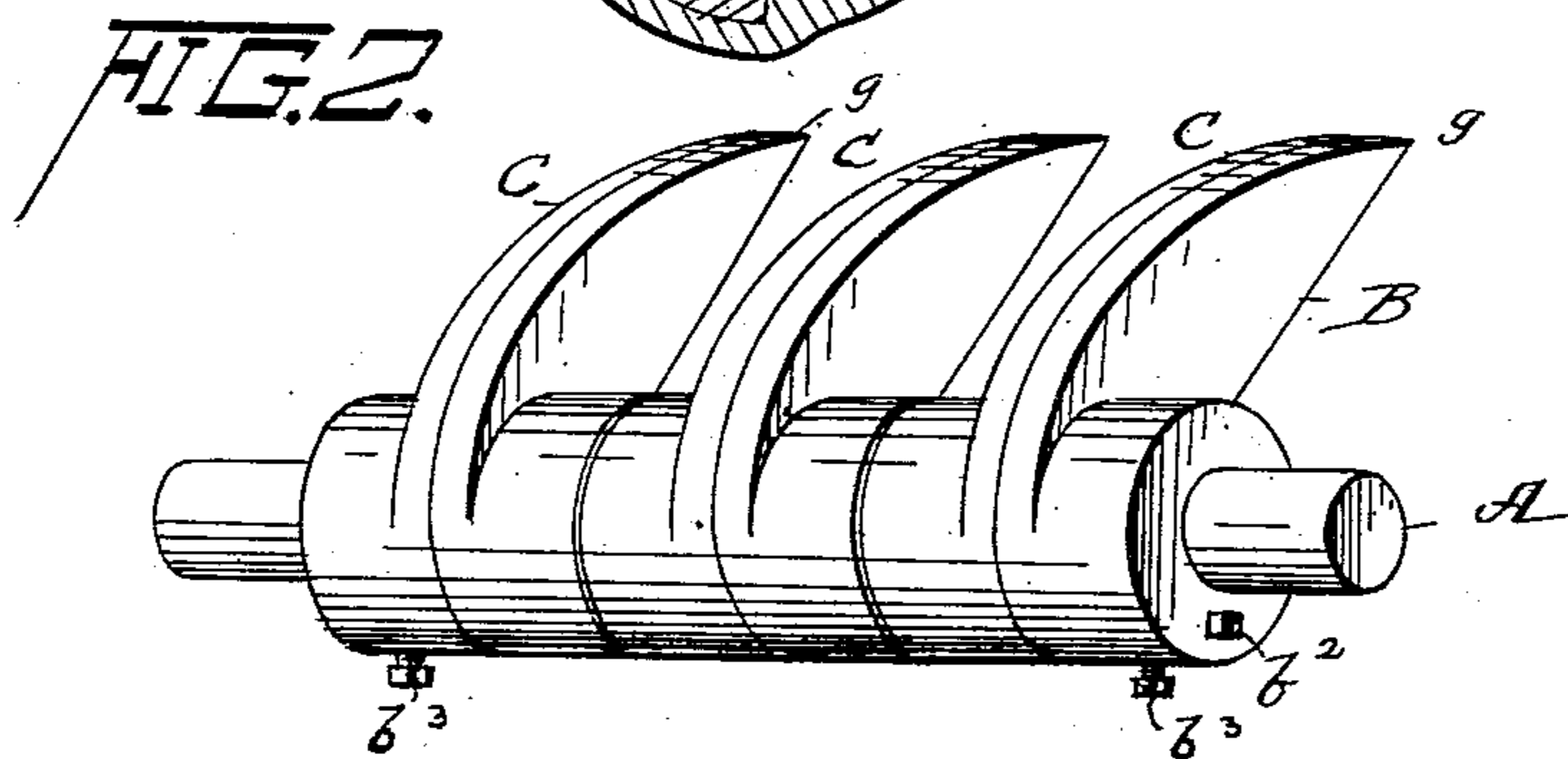
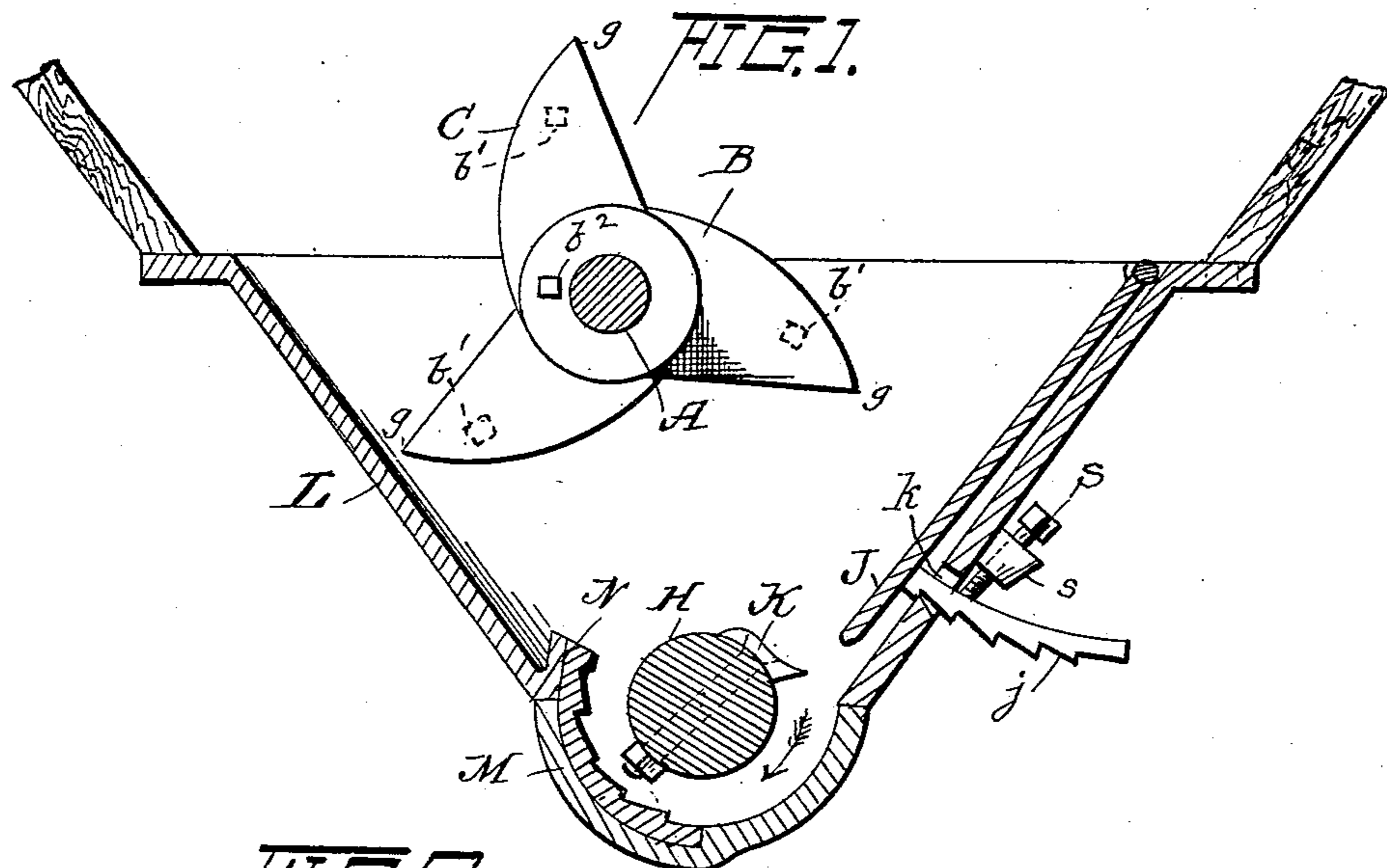
**J. C. BOWSHER.**

## GRINDING MILL.

(Application filed Jan. 26, 1900.)

(No Model.)

**2 Sheets—Sheet 1.**



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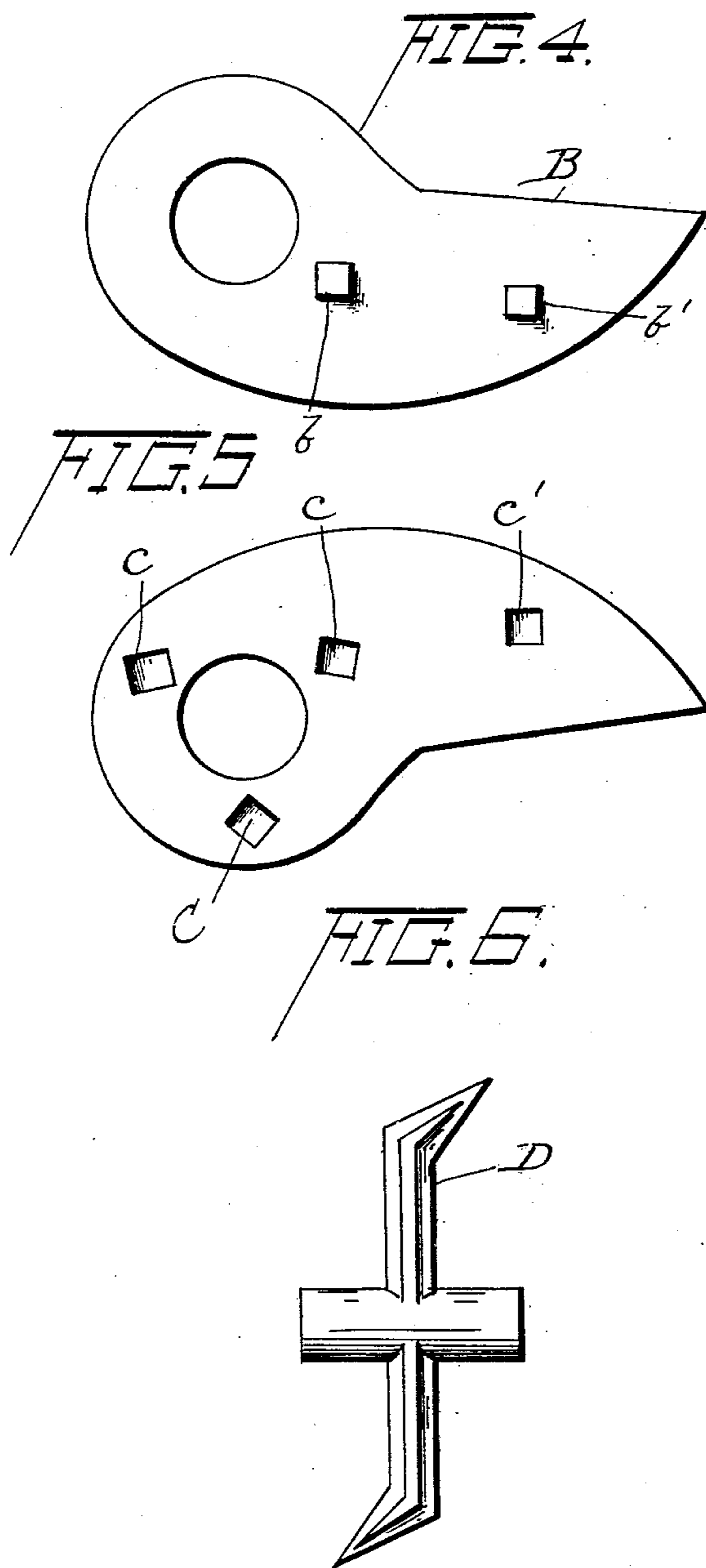
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GRINDING MILL.

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(No Model.)

2 Sheets—Sheet 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JAY C. BOWSHER, OF SOUTH BEND, INDIANA.

## GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 684,346, dated October 8, 1901.

Application filed January 26, 1900. Serial No. 2,874. (No model.)

*To all whom it may concern:*

Be it known that I, JAY C. BOWSHER, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

My improvements relate particularly to the construction and arrangement of devices for feeding grain of various kinds from a box into which it is received from a hopper into a crushing and grinding chamber or for presenting it positively, continuously, and effectively to the action of crushing or grinding mechanism or devices.

The especial objects of my improvements are to provide means which will feed by force coarse material, such as corn on the cob, to crushing blades or knives without depending on gravity, as heretofore; to force the material into position to be grasped by said blades or knives; to adjust the feed by changing the number of knives, blades, or fingers which perform the feeding function; to effect further modification in the feed by means secured to the feeding-box, and to accomplish these objects by devices which are simple in construction, strong and durable, and capable of application to various forms of grinding-mills.

In the accompanying drawings, which form a part of this application, Figure 1 is a transverse section through a feeding-box of a grinding-mill supplied with my improved feeding devices. Fig. 2 is a perspective view of a shaft having secured thereon a series of feeding-fingers made in accordance with my invention and arranged in pairs. Fig. 3 is a similar view with the fingers arranged singly. Fig. 4 is an elevation, on a larger scale than the preceding figures, of the inner side of a male finger. Fig. 5 is a similar view of the inner side of a female finger, and Fig. 6 is a side elevation of a double or compound finger which may be used in lieu of the arrangement shown in Fig. 3.

Referring to the drawings, A represents a shaft which is rotatably mounted in the ends of a feeding-box L, to the top of which a hopper is secured and to the bottom of which the crushing-chamber M is secured. Secured to the shaft A in any desired manner, and adapt-

ed to rotate therewith, are the feeding-fingers B and C, which extend radially from said shaft. These fingers are formed with a perforated hub through which the shaft extends, and preferably have their edges curved in the direction of their rotation and terminate in a point *g*, though other forms may be utilized, if desired. On the inner side or face of the finger B are formed lugs *b* and *b'*, the former being near the hub and the latter near the point or outer end of the finger. On the inner side or face of the finger C are recesses *c* and *c'*, the former being near the hub and the latter near the point, and these recesses are so positioned that they will exactly register with and therefore be engaged by the lugs *b* and *b'*, respectively, when the inner sides of the two fingers B and C are in juxtaposition, thus coupling or locking said fingers against lateral displacement when arranged in pairs on their common shaft. The finger B at a point on its hub exactly opposite the lug *b* has a third lug *b*<sup>2</sup>, which registers with and engages the recess *c* when the finger C is placed in position shown in Fig. 3—that is, at an angle of one hundred and eighty degrees to the finger B—and thus serves to retain said fingers in their relative positions, as shown in said figure.

It will be noted that the blade portions of the fingers B and C extend from the right and left hand sides of the hub portions, respectively, so that when arranged in pairs the blades are in juxtaposition, as shown in Fig. 2, and when arranged singly or as shown in Fig. 3, the blades rotate in substantially the same plane, thus allowing ample openings between the several pairs of the blades for the passage of the cobs or coarser material and preventing the choking of the apparatus. The space between the blades may be varied by widening the hubs or placing rings between them or in any other desired manner, such feature forming no part of my invention.

Each finger may be provided with a set screw or nut, as *b*<sup>3</sup>, by which it may be fixed on the shaft in any axial or longitudinal adjustment, though in the drawings only the end fingers are shown to be provided with such set-screws.

The double or compound finger D (shown in Fig. 6) is mounted on the shaft in the same

manner as the fingers B and C and presents the same surface to the material to be fed as when the latter fingers are arranged separately, as shown in Fig. 3.

5 It will be apparent that the number of lugs and corresponding recesses on the sides of the fingers may be increased and that they may be placed at any desired points on said contiguous faces and be of any suitable shapes  
10 without departing from the spirit of this invention.

In the operation of the devices the fingers constructed and arranged as described will catch the material as it falls from the hop-  
15 per into the feeding-box and carry or force it through the throat of the said box, where it is ground or crushed between the rotating crusher H, carrying the knife K, and the serrated plate N, secured to the side of the  
20 crushing-chamber M. When a small amount of material is to be fed to the crushers or where a slow feed is desired, the fingers will be used in pairs; but where a larger amount is to be operated upon or a rapid feed is re-  
25 quired the fingers will be arranged singly on opposite sides of the shaft, thus doubling the capacity of the machine without adding new parts or materially altering the arrangement of the old parts. Other adjustments of the  
30 fingers on their shaft may be made which will regulate their feeding capacity from normal to any degree up to double the normal quantity fed to the crushing mechanism.

35 Passing through the hubs of the fingers are screw-bolts  $b^3$ , by means of which the fingers are secured to the shaft A in a well-known manner, and by loosening these bolts the fingers may be axially adjusted or turned about the shaft, and they may be moved along the  
40 shaft, and thus adjusted longitudinally singly or in pairs.

As it is important in machines of this class to provide for their use on all kinds of grain, from the coarse corn in large ears down to  
45 small grain, it becomes necessary to provide means which will control the feed of the various kinds or forms of material under all conditions. To accomplish this, I provide in addition to the adjustable fingers a diaphragm  
50 or apron J, which is hinged at the top of the feeding-box L, so as to swing within the same. To the lower free end of the apron is secured a toothed sector  $j$ , the teeth of which engage the lower edge of a notch  $k$ , cut through the  
55 side of the box. The sector is held in its adjusted positions by means of a set-screw S, which passes through an internally-threaded

lug s, secured to the outside of the box at a point just above the notch  $k$ , so that the lower end of the screw rests upon the upper edge  
60 of the sector. As this apron is swung in or out from the adjacent side of the box it widens or narrows the throat of the box in a manner clearly apparent and at the same time forms a smooth and unbroken passage for the ma-  
65 terial on its way to the crushers.

Having thus described my invention, what I claim is—

1. In grinding-mills, the combination with a chamber provided with crushing mechan-  
70 ism, of a feeding-chamber communicating with said crushing-chamber, means for regulating the passage of material from the feeding to the crushing chamber, feeding-fingers located in the feeding-chamber, said fingers  
75 having interlocking parts on their contiguous faces and secured on a rotating shaft, as set forth.

2. In grinding-mills, the combination with a chamber provided with crushing mechan-  
80 ism, of a feeding-chamber communicating with the crushing-chamber, means for regulating the passage of the material from the feeding to the crushing chamber, feeding-fingers located in the feeding-chamber, said fin-  
85 gers having interlocking parts on their contiguous faces, and axially and longitudinally adjustable on a rotating shaft, substantially as set forth.

3. In grinding-mills having crushing mech-  
90 anism, a feeding-chamber located adjacent to the crushing mechanism, feeding-fingers adjustably mounted in said feeding-chamber on a suitable shaft, said fingers having interlocking parts on their contiguous faces, sub-  
95 stantially as set forth.

4. In grinding-mills, feeding-fingers arranged in pairs, one of each pair having lugs formed on its inner face, and the other hav-  
100 ing recesses in its inner face adapted to be engaged by said lugs, substantially as described.

5. In grinding-mills, feeding-fingers arranged in pairs, one of each pair having lugs on the inner face of the hub and near the  
105 point of the finger, and the other having recesses adapted to be engaged by said lugs, as set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses. 110

JAY C. BOWSHER.

Witnesses:

JAMES DU SHANE,  
WILL G. CRABILL.