

(No Model.)

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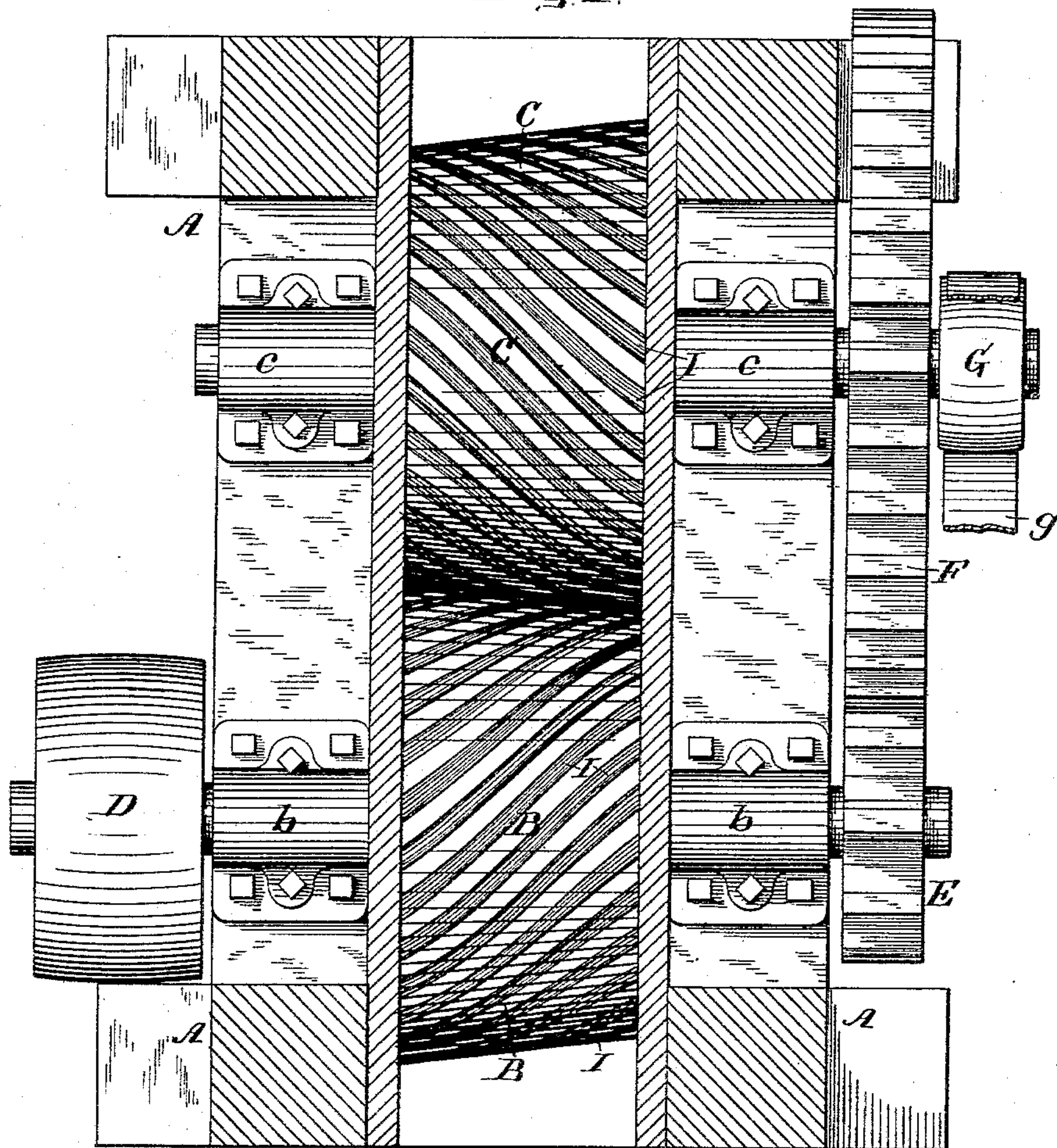
J. W. ANTHOINE.

CRUSHING AND GRINDING MACHINE.

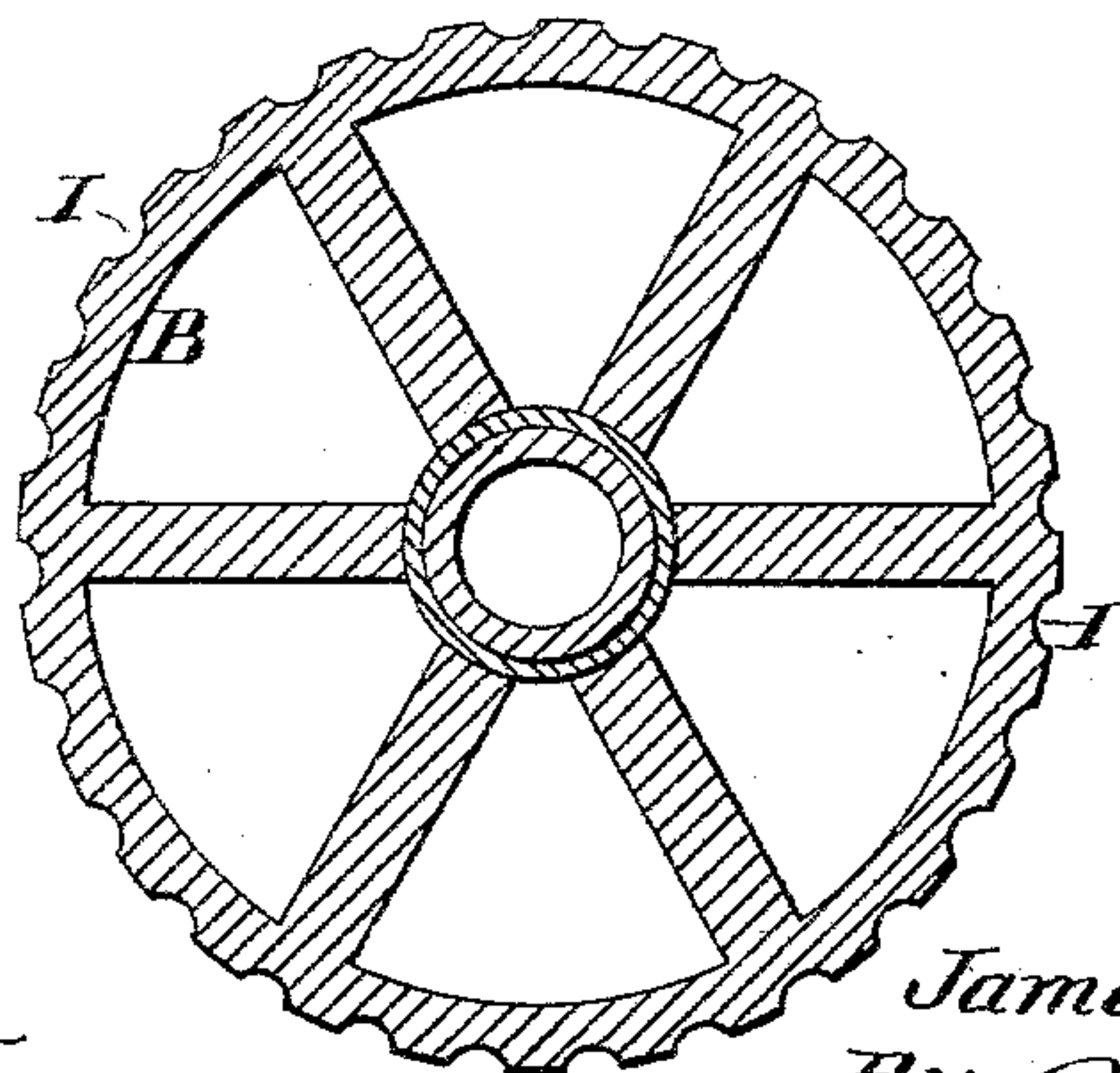
No. 319,166.

Patented June 2, 1885.

*Fig. 1.*



*Fig. 2.*



WITNESSES

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INVENTOR

*James W. Anthoine*  
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(No Model.)

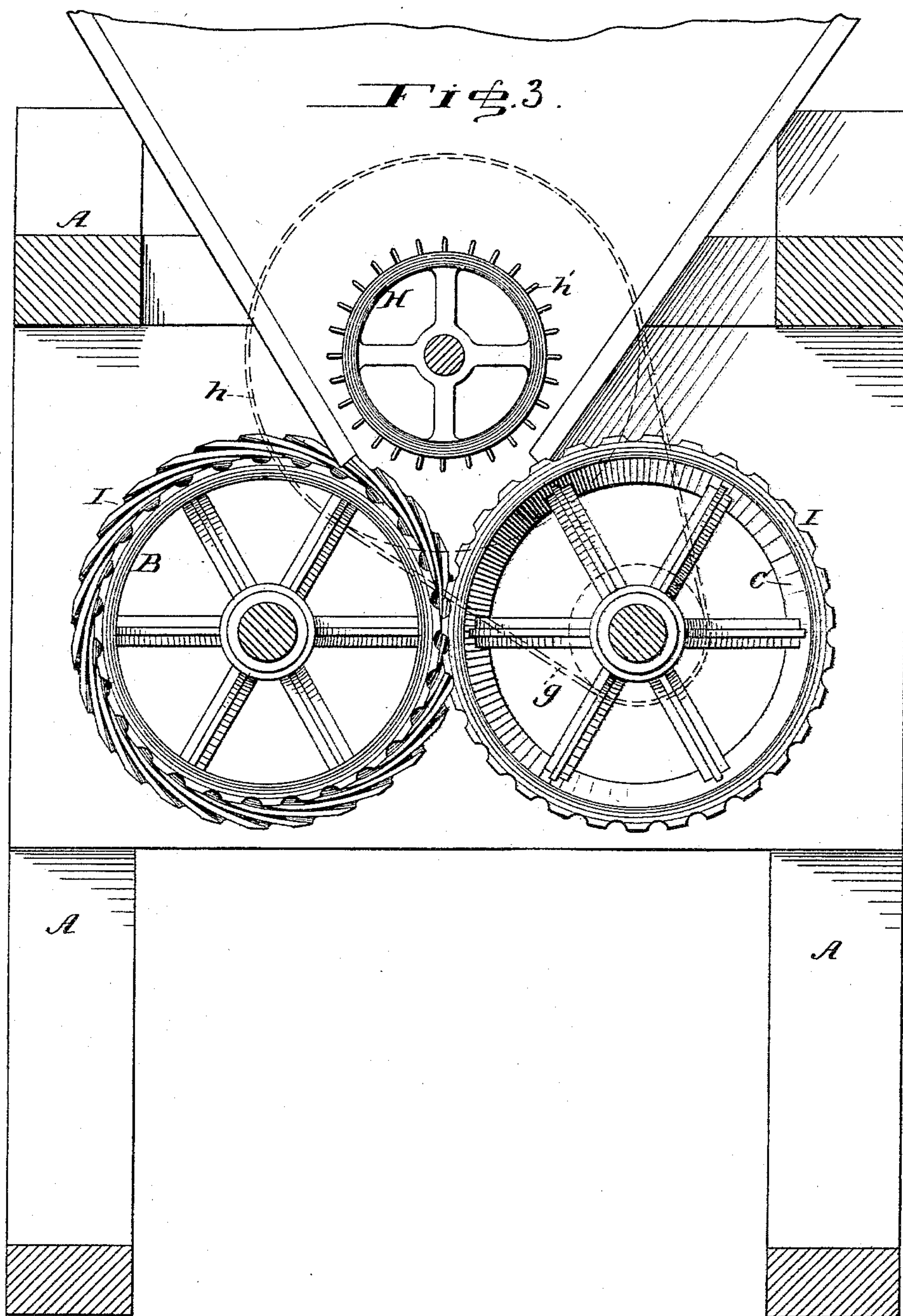
2 Sheets—Sheet 2.

J. W. ANTHOINE.

CRUSHING AND GRINDING MACHINE.

No. 319,166.

Patented June 2, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JAMES W. ANTHOINE, OF EUFAULA, ALABAMA.

## CRUSHING AND GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 319,166, dated June 2, 1885.

Application filed July 3, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. ANTHOINE, a citizen of the United States, residing at Eu-  
faula, in the county of Barbour and State of  
5 Alabama, have invented certain new and use-  
ful Improvements in Crushing and Grinding  
Machines; and I do hereby declare the follow-  
ing to be a full, clear, and exact description  
10 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 or fig-  
ures of reference marked thereon, which form  
a part of this specification.

15 The present invention relates to the class of  
grinding-rolls in which one roller rotates faster  
than the other; and the object of my invention  
is to provide a machine for crushing and dis-  
integrating cotton-seed and feed for stock  
20 which shall be simple in construction and ef-  
fective in its operation.

My invention, which consists of an improved  
machine especially designed for the purpose  
stated, will be fully described, and then set  
25 forth in the claim.

Figure 1 is a top view of the rolls with the  
hopper and feed-wheel removed. Fig. 2 is a  
transverse section of one of the rollers, and  
Fig. 3 is a vertical transverse section taken  
30 through the machine at one end of the grind-  
ing-rolls.

The frame A is of any approved construc-  
tion. The rollers B and C are both conical,  
placed with the cones reversed, so that the  
35 large end of one comes opposite to the small  
end of the other, and their shafts are mount-  
ed in suitable bearings, *b* and *c*. The shaft of  
the roller B is provided at one end with a belt-  
pulley, D, to receive a driving-belt from any  
40 prime motor, and at the other with a small  
gear-wheel, E, which meshes in with a large  
gear-wheel, F, on the shaft of the roller C.  
This causes the roller B to rotate much faster  
than the roller C, preferably in the ratio of  
45 about three to one. At one end of the shaft  
of the roller C there is a small belt-pulley, G,  
which drives, through the medium of a belt,  
*g*, a large belt-pulley, *h*, on the shaft of the  
feed-wheel H. The feed-wheel is a small cylin-  
50 der studded with steel pins *h'*. It is journaled  
in the throat of the hopper and placed parallel  
with the grinding-rolls and the opening in

the bottom of the hopper. Each of the rollers  
has a grooved or furrowed surface formed by  
the oblique or diagonal grooves I, extending 55  
obliquely across the faces of the rollers from  
end to end. The normal surface of the conical  
rollers is smooth, and the grooves have a semi-  
circular cross-section, as clearly shown in Fig.  
2, which form cutting-edges along both sides of 60  
each groove. The cotton-seed, feed for stock,  
or other material to be crushed having been  
delivered into the hopper, it is fed down  
to the rolls uniformly and evenly by the feed-  
wheel H. The rollers have a twofold action 65  
on the cotton-seed or other material on account  
of the difference in the speed of the two roll-  
ers. When plain surfaces of the rolls are op-  
posite to each other, the material caught be-  
tween them is subjected to a crushing and 70  
grinding action, due to the compression of the  
material between the rolls and the attrition  
caused by one of the compressing-surfaces  
moving much faster than the other; but when  
a groove of one roller comes opposite to the 75  
plain surface of the other, or two grooves come  
opposite to each other, the difference in the  
speed of the two rollers causes the edges of the  
grooves to cut and tear the material.

It will be seen that the relative surface-speed 80  
of the rollers is not the same at any two points,  
for the conical form of the rollers causes the  
surface-speed of each roller to be fastest at  
the larger end and slowest at the small end,  
and the reversed position of the rolls brings 85  
the slowest-moving end of one opposite to the  
fastest end of the other, there being a middle  
point where the surface-speed of both rollers  
would be the same but for this difference in  
the periods of revolution of the two rollers. 90  
The effect of the combination of these roller  
movements with the cutting action of the fur-  
rows on cotton-seed or stock-feed is to cause  
a rapid disintegration of the same with a com-  
paratively small expenditure of power. When 95  
the diagonal grooves are formed longitudinally  
upon the surface of the rollers, and when one  
of the said rollers is made to revolve more rap-  
idly than the other, as hereinbefore fully de-  
scribed, the opposing surfaces of the two roll- 100  
ers at the point where they meet successively  
consist of two plain faces, a plain face and a  
groove, and two grooves. These opposing  
surfaces successively subject the material be-



tween them to the following actions: crushing only, crushing and shearing, and shearing only, and thereby effect the complete disintegration of the material.

5 I am aware that grooved conical rolls driven at various speeds have been used in grinding-mills; that the grooves applied to such rollers have been formed under various systems; also, that hoppers and feed-rollers have been used  
10 in connection with such mills. I therefore do not claim any of these features, broadly.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

15 A crushing and grinding machine compris-

ing the conical rolls B and C, having the diagonally-arranged grooves I formed upon their surfaces, the gear-wheels E and F, the driving-pulley D, the feed-cylinder H, having its surface studded with steel pins *h'*, and the pulleys *g* and *h*, for imparting motion to the said feed-cylinder, substantially as described and shown, and for the purpose set forth.

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

JAMES W. ANTHOINE.

Witnesses:

E. Y. DENT,

M. S. ROBERTS.