

No. 780,581.

PATENTED JAN. 24, 1905.

G. H. RICH.  
GRAIN GRADER.

APPLICATION FILED APR. 22, 1904.

Fig. 1.

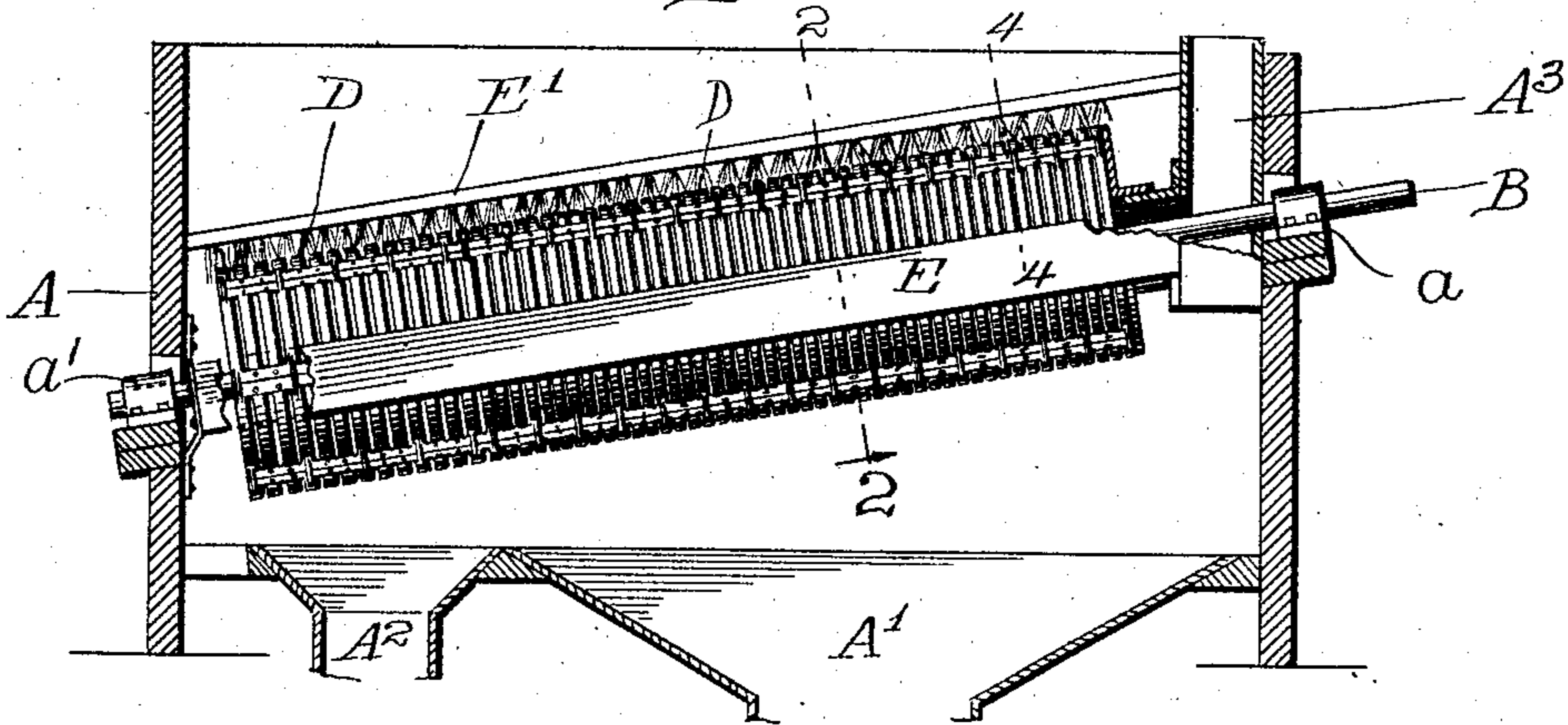


Fig. 2.

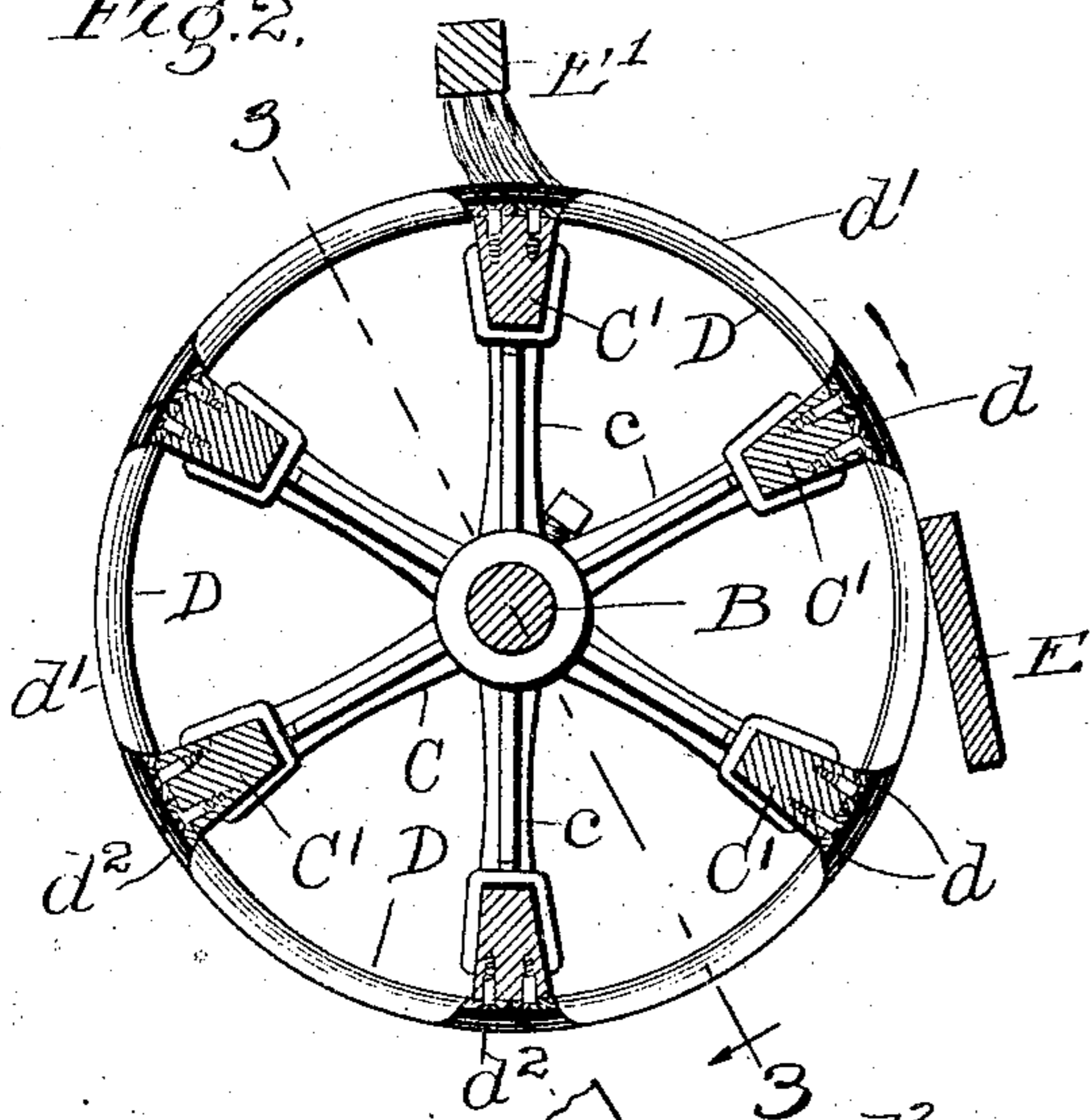


Fig. 3.

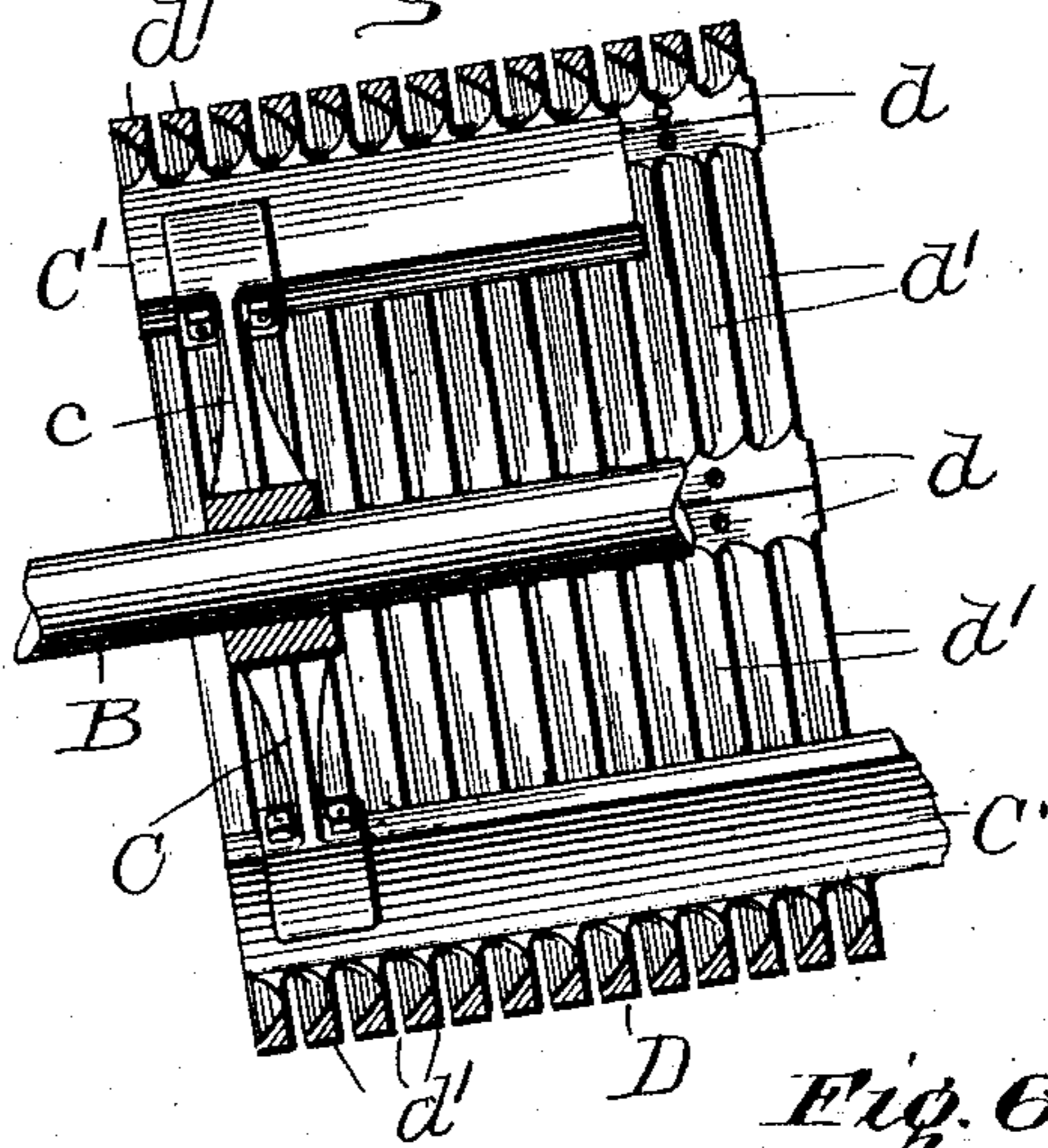


Fig. 4.

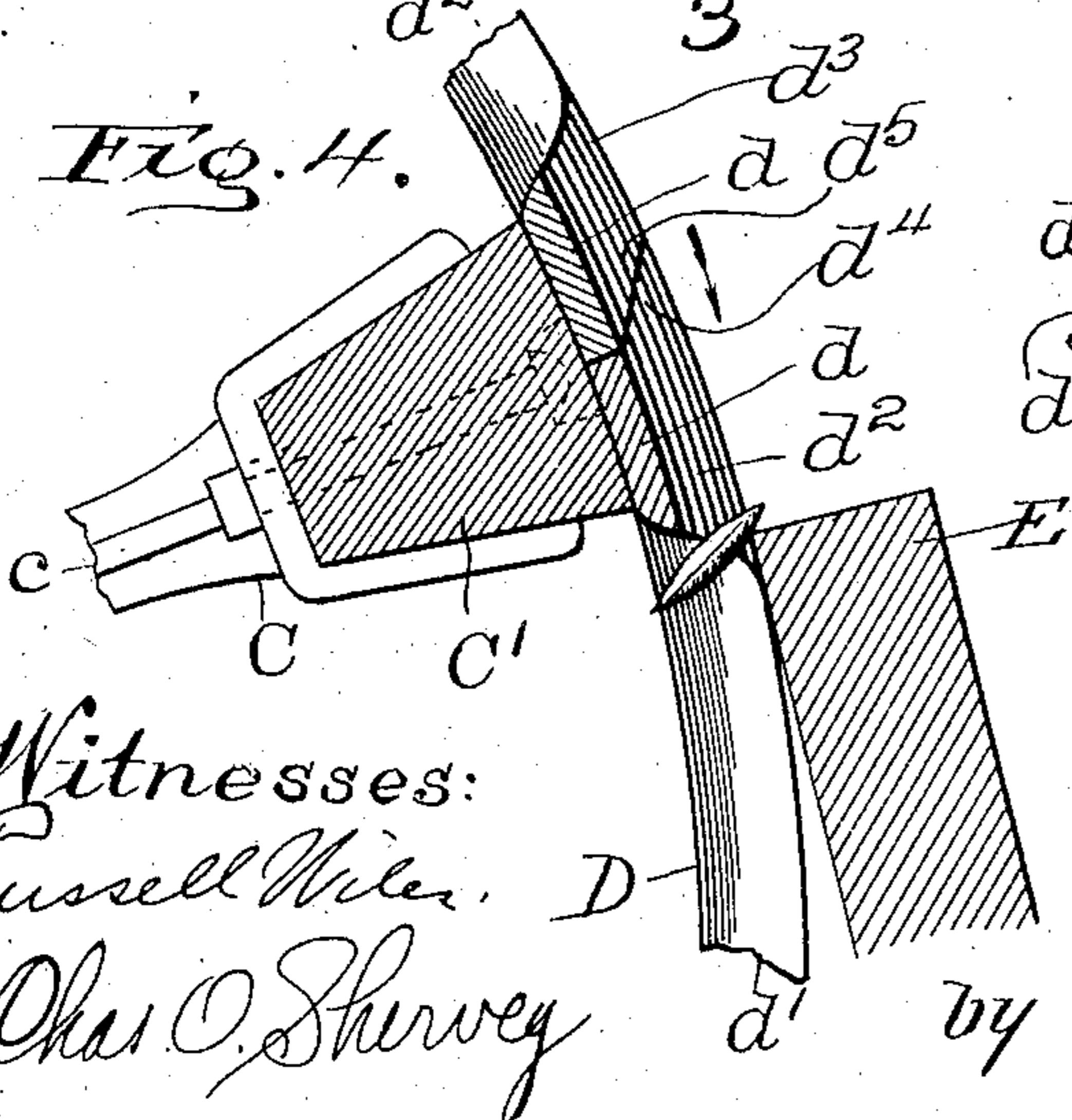


Fig. 5.

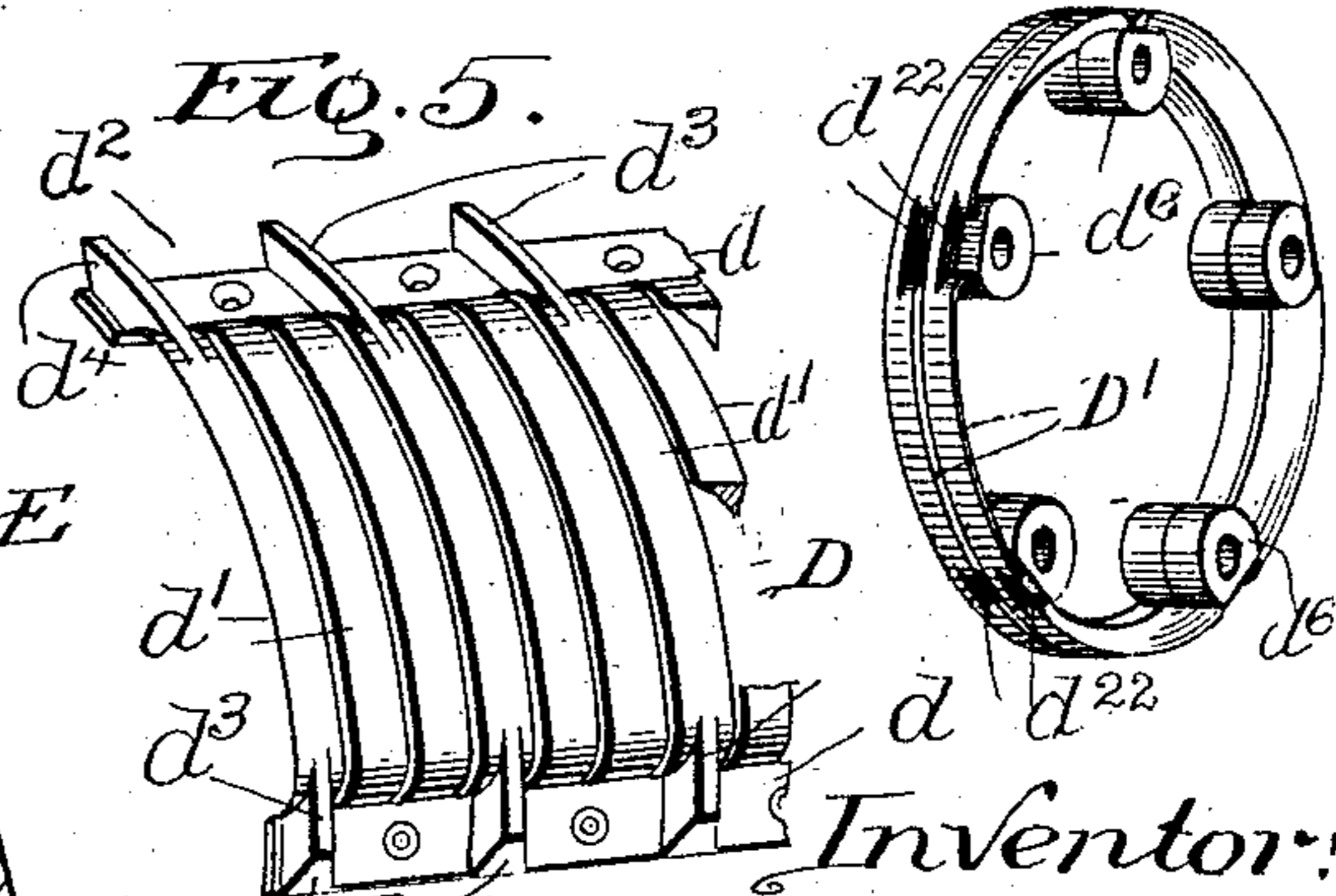


Fig. 6.

Witnesses:

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# UNITED STATES PATENT OFFICE.

GEORGE H. RICH, OF CHICAGO, ILLINOIS.

## GRAIN-GRADER.

SPECIFICATION forming part of Letters Patent No. 780,581, dated January 24, 1905.

Application filed April 22, 1904. Serial No. 204,332.

*To all whom it may concern:*

Be it known that I, GEORGE H. RICH, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Graders, of which the following is a specification.

My invention relates to certain new and useful improvements in grain-graders; and its object is to produce a device which will combine the greatest simplicity of structure and consequent cheapness of construction with an efficiency beyond that of other devices now in use.

To this end my invention consists in certain novel features of construction, which are clearly illustrated in the accompanying drawings and described in the specification.

In the aforesaid drawings, Figure 1 is a central longitudinal vertical section through my improved grain-grader. Fig. 2 is an enlarged section in the line 2 2 of Fig. 1 looking in the direction of the arrow. Fig. 3 is a section in the line 3 3 of Fig. 2 looking in the direction of the arrow. Fig. 4 is an enlarged section in the line 4 4 of Fig. 1. Fig. 5 is a perspective of one of the sections of which the revolving cylinder is composed, and Fig. 6 is a perspective view of a modified form of ring-section.

Referring to the drawings, A indicates the main body or frame of the machine, said frame being in the shape of a large box provided at its bottom with two grain-hoppers A' A<sup>2</sup> to receive the different grades of grain. It will be obvious from the following description that the number of these hoppers can be increased as desired to correspond with changes which may be made in the revolving cylinder to divide the grain into more than two classes.

Through the frame A extends a shaft B, journaled in boxes a a', secured to the frame, said boxes being at different heights, so that the shaft extends in an inclined line above the center of the hoppers in the bottom of the frame. Upon the shaft B are secured two spiders C C, each having a plurality of radial arms c, and the corresponding arms on the

two spiders are connected by longitudinally-extending bars C', preferably of wood. This structure, it will be seen, is primarily a skeleton cylinder having six lines only in its surface, (represented by the bars C'.) To the outside edges of the bars C' are secured a plurality of segments D, Fig. 5. Each of the segments consists of longitudinal portions d, provided with suitable holes to receive screws and circumferential bars or ribs d' cast integral with said longitudinal portions. The circumferential ribs d', it is to be noted, are in cross-section substantially right triangles, each having one leg on the outer surface of the rib and the other leg on the upper side of the rib—that is to say, on the right-hand side as seen in Fig. 3, which is the side toward the upper end of the shaft B. A further peculiarity of the structure lies in the fact that the longitudinal portions d are cut away to a space considerably within the outer surface of the circumferential ribs d', so as to leave depressions d<sup>2</sup>, Fig. 4. Certain of the ribs in the drawings—every fourth one—are prolonged across the depressed longitudinal portion d, so as to make narrow ribs d<sup>3</sup>. These ribs d<sup>3</sup> terminate at one end in overhanging points d<sup>4</sup>, at the other end in correspondingly-beveled portions d<sup>5</sup>. The segments D are assembled, as indicated in the drawings, by screwing them to the longitudinal bars C', so that they form a complete cylinder, with the overhanging points d<sup>4</sup> on each segment matching with the beveled portions d<sup>5</sup> on the next segment. In this way a perfect cylinder is produced.

In the form shown in Fig. 6 the circumferential ribs are made up of rings D', which, like the sections D, are triangular in cross-section and are secured to the spiders by rods passing through perforated ears d<sup>6</sup> on the inner edges of the rings. They are also formed with depressions d<sup>2</sup> at their points of attachment to the rods, so that their operation will be the same as the segments D.

It is to be noted that the slots between the circumferential ribs d' are larger at the lower end of the cylinder than at the upper end and that the portion wherein the larger slots are

located is that portion immediately above the hopper A<sup>2</sup>.

The operation of the device will now be readily apparent. The grain is fed through  
5 a chute A<sup>3</sup> into the upper end of the cylinder, which is constantly rotated by means of the shaft B. Such of the smaller particles of grain as are in contact with the sides of the cylinder fall through the slots between the  
10 circumferential ribs into the first hopper. As the rotation is kept up the grain gradually runs down the cylinder and all the smaller grain falls out before the lower portion of the cylinder where the large slots are located  
15 is reached. The large grain then falls out through these slots, and the coarsest of all, together with any large foreign substances, passes out the end of the cylinder. It is obvious, of course, that slots of different sizes  
20 may be provided, so that the grain may be divided into a great number of different grades. A scraper E is provided in contact with the outer surface of the revolving cylinder, which engages with any kernels of grain  
25 which may project partially through the slots and get stuck and force them back into the interior of the cylinder. (See Fig. 4.)

The particular advantages of this new structure lie in the following facts: The spider and  
30 longitudinal-rod construction herein shown is much the cheapest way to construct a device of this class. It, however, makes it necessary for a number of different independent slots to be provided in a single circumferential line. When the cylinders of the old  
35 types were rotated, the scrapers E, engaging with the kernels of grain which projected partially through the slots, like that shown in Fig. 4, forced them against the ends of the  
40 slots and crushed them. In this way there was considerable waste, and, furthermore, the machines were rendered dirty and the grain imperfect. This difficulty is avoided in my improved device by making the longitudinal  
45 portion  $d$  lower than the outer surface of the circumferential bars  $d'$ . In this way when a kernel of grain is forced to the end of the slot this end is merely pushed down below the general surface of the cylinder into  
50 the depressed portion without any crushing. Furthermore, inasmuch as the circumferential ribs  $d'$  are triangular in cross-section, that portion of the slot which extends into the cut-away portion is broader than the main  
55 portion of the slot, and for this reason when the kernel is pushed around, as shown in Fig. 4, it is pushed into a broader slot and falls into the cylinder. In this way the operation of the device goes on without any crushing  
60 and without any blocking up of the slots. A brush  $e'$  is provided above the cylinder for removing any grain or particles which may accumulate on the outer face of the cylinder.

When such a brush is used with the cylinder  
65 of the ordinary form, the grain fills in the

angle between the bristles of the brush and the cylinder, and a board or other scraper must be employed to remove the accumulation at this point. With the use of a cylinder having the depressions shown and de-  
70 scribed herein the use of such a board or scraper is obviated, the particles being brushed into the depressions and falling off the cylinder when the depressions are carried around  
75 toward the lower end. A further advantage lies in the fact that the circumferential ribs are made in the form of right triangles, presenting the steep face to the grain as it runs down through the cylinder. This retards its  
80 flow more than do the form of ribs now in use, and so causes a more perfect separation. Furthermore, when the inclination of the cylinder is considerably more than that shown in the drawings the oblique faces of the right  
85 triangles do not get beyond a vertical line unless the inclination is such as to make the operation of the machine impracticable. The shape of the spaces between the rings is such as to permit the easy egress of the grain,  
90 whereas when V-shaped rings are used one of the faces of each ring overhangs the slot between the rings when the inclination is slightly greater than that shown, and thus prevents in a great measure the escape of the  
95 small grain.

I realize that considerable variation is possible in the details of this construction without departing from the spirit of the invention, and I therefore do not intend to limit  
100 myself to the specific form herein shown and described, except as pointed out in the claims.

I claim as new and desire to secure by Letters Patent—

1. In a grading-machine, a cylinder comprising a plurality of circumferential segments having circumferential slots for the  
105 passage of grain, each of said segments being cut away at its ends to form a depression adjacent to the ends of the slots and a scraper bearing against the outer surface of said cylinder.  
110

2. In a grading-machine, a cylinder comprising a plurality of circumferential ribs having circumferential slots between them, said  
115 ribs being thinner at their ends than in the main portion and a scraper bearing against the outer surface of said cylinder.

3. In a grading-machine, a cylinder comprising a plurality of circumferential ribs having circumferential slots between them, said  
120 ribs being cut away from the outside at their ends and the slots being broader in the cut-away portions, and a scraper bearing against the outer surface of said cylinder.

4. In a grading-machine, a cylinder comprising a plurality of circumferential ribs triangular in cross-section, having circumferential  
125 slots between them, said ribs being cut away at their ends from the outside, whereby the slots terminate in broadened slots removed  
130

from the outer surface of the cylinder and a scraper bearing against the outer surface of said cylinder.

5 In a grading-machine, a plurality of circumferential segments and means for supporting the same to form the outer wall of a cylinder, each of said segments consisting of a plurality of circumferential ribs having slots between them and longitudinal portions below  
10 the surface of said circumferential ribs, whereby the slots terminate within the outer surface of the cylinder, and a scraper bearing against the outer surface of the cylinder.

15 6. In a grading-machine, a plurality of circumferential segments and means for supporting the same to form the outer wall of the cylinder, each of said segments consisting of a plurality of ribs, of triangular cross-section and longitudinal portions at the ends of said  
20 circumferential ribs and within the outer surfaces of the same, whereby the slots between said ribs are broadened at their termination, their termination being within the outer surface of the ribs, and a scraper bearing against  
25 the outer surface of said cylinder.

7. In a grading-machine, an inclined cylinder comprising a plurality of circumferential ribs, triangular in cross-section and disposed

with their steepest sides toward the upper end of the cylinder.

30

8. In a grading-machine, an inclined cylinder comprising a plurality of segments, each composed of a plurality of ribs, triangular in cross-section and disposed with their steepest side toward the upper end of the cylinder.

35

9. In a grading-machine, an inclined cylinder comprising a plurality of ribs, in cross-section substantially right triangles, each of said ribs having one leg of its sectional triangle upon its outer surface, and the other on  
40 the side nearest the upper end of the cylinder.

10. In a grading-machine, a cylinder comprising a plurality of circumferential ribs having circumferential grooves between them for the passage of grain and spiders carrying said  
45 circumferential ribs, the latter being formed with depressions at their points of attachment to the spiders.

In witness whereof I have signed the above application for Letters Patent, at Chicago,  
50 in the county of Cook and State of Illinois, this 2d day of April, A. D. 1903.

GEORGE H. RICH.

Witnesses:

CHAS. O. SHERVEY,  
RUSSELL WILES.