

J. O. MELLEN.

Grain Drier.

No. 63,412.

Patented April 2, 1867.

Fig. 1.

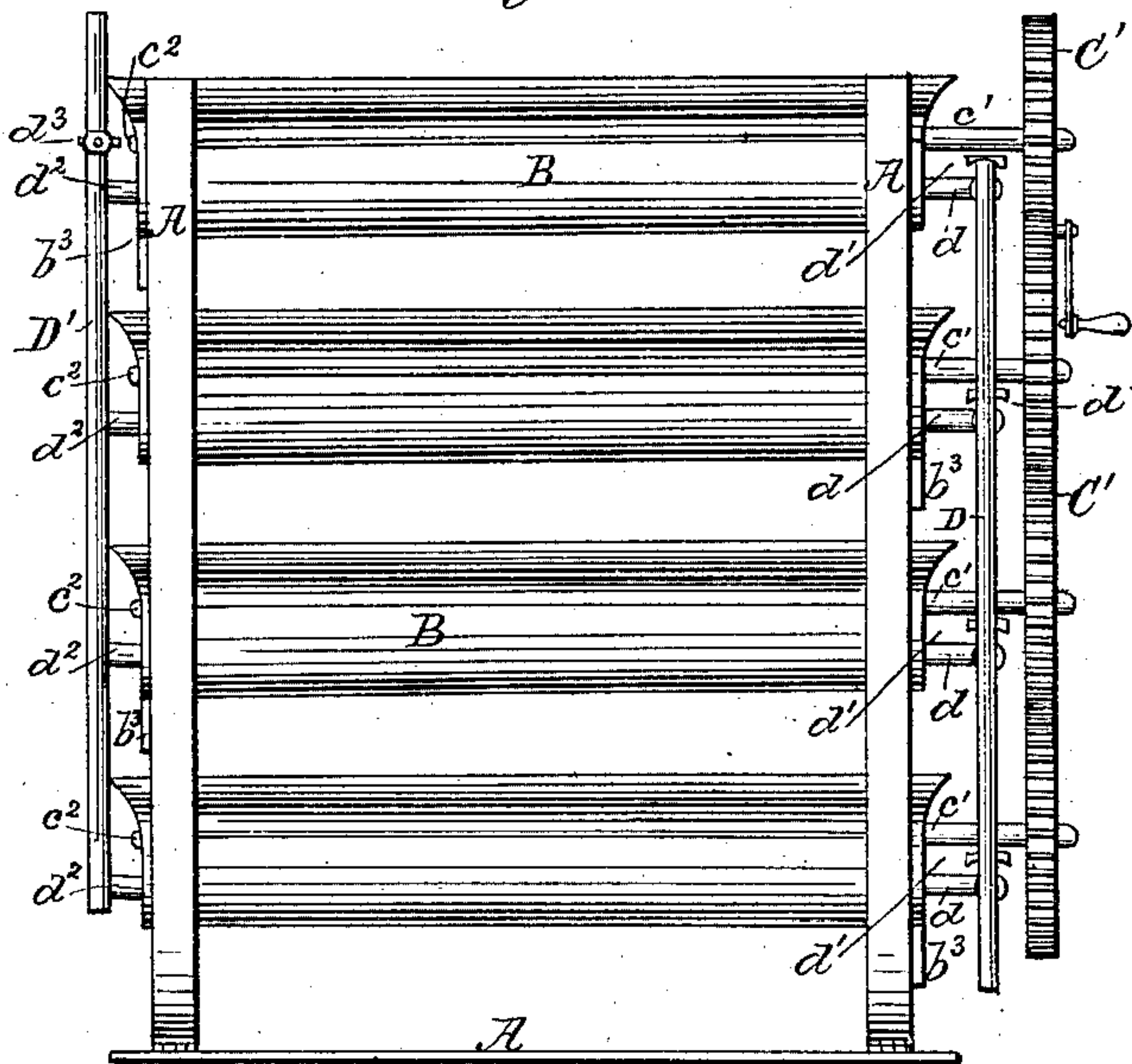


Fig. 2.

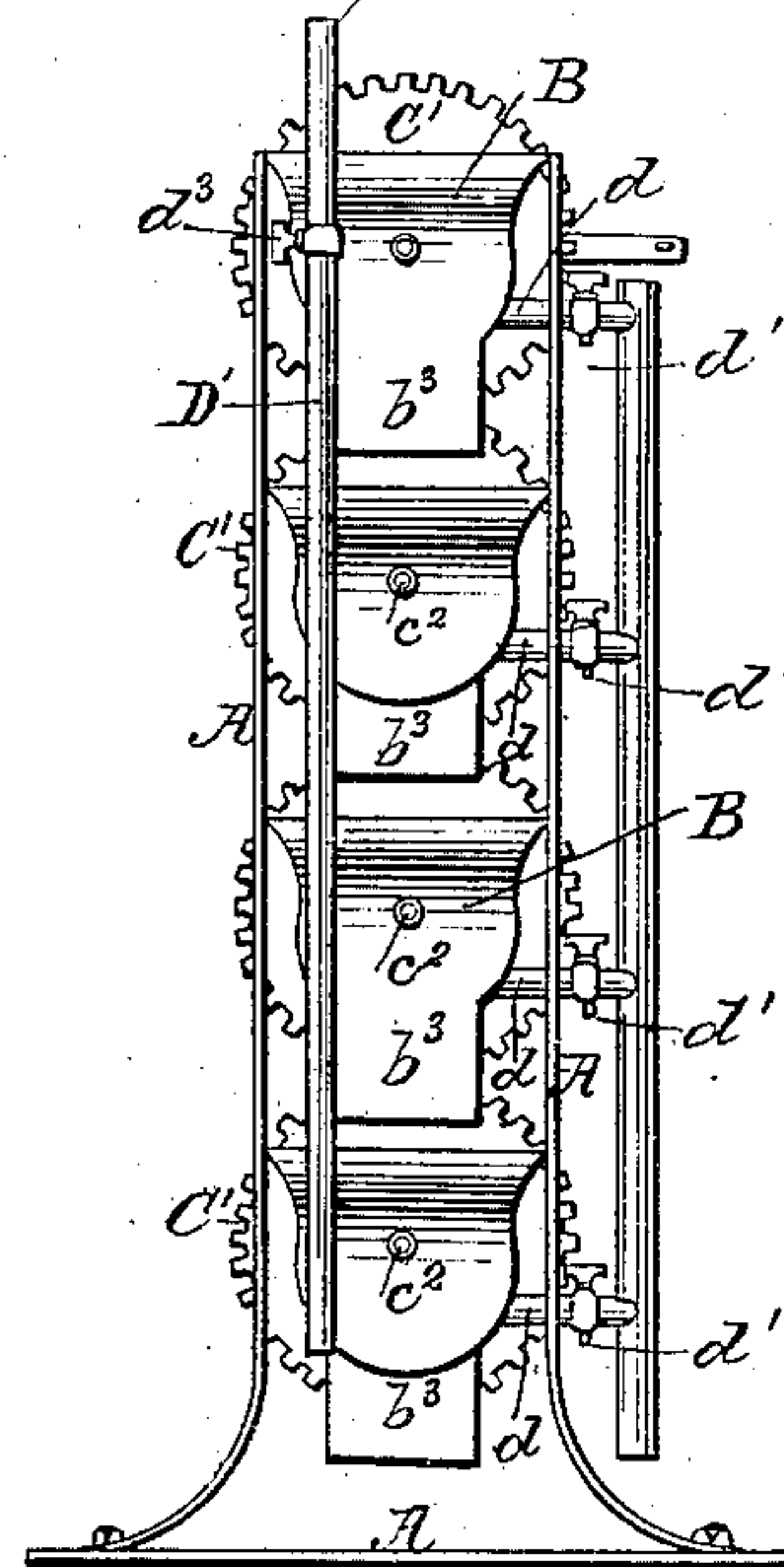


Fig. 3.

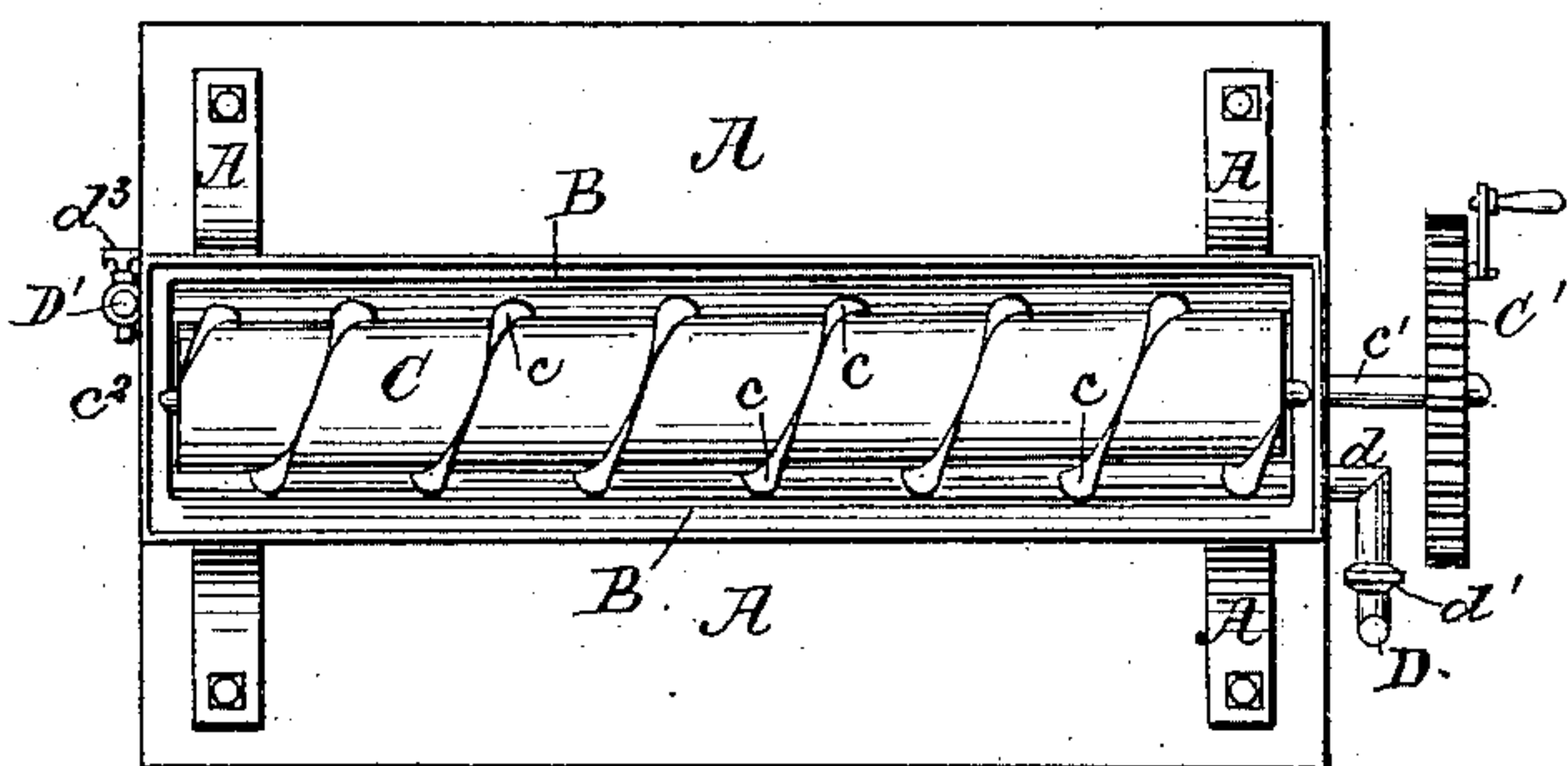
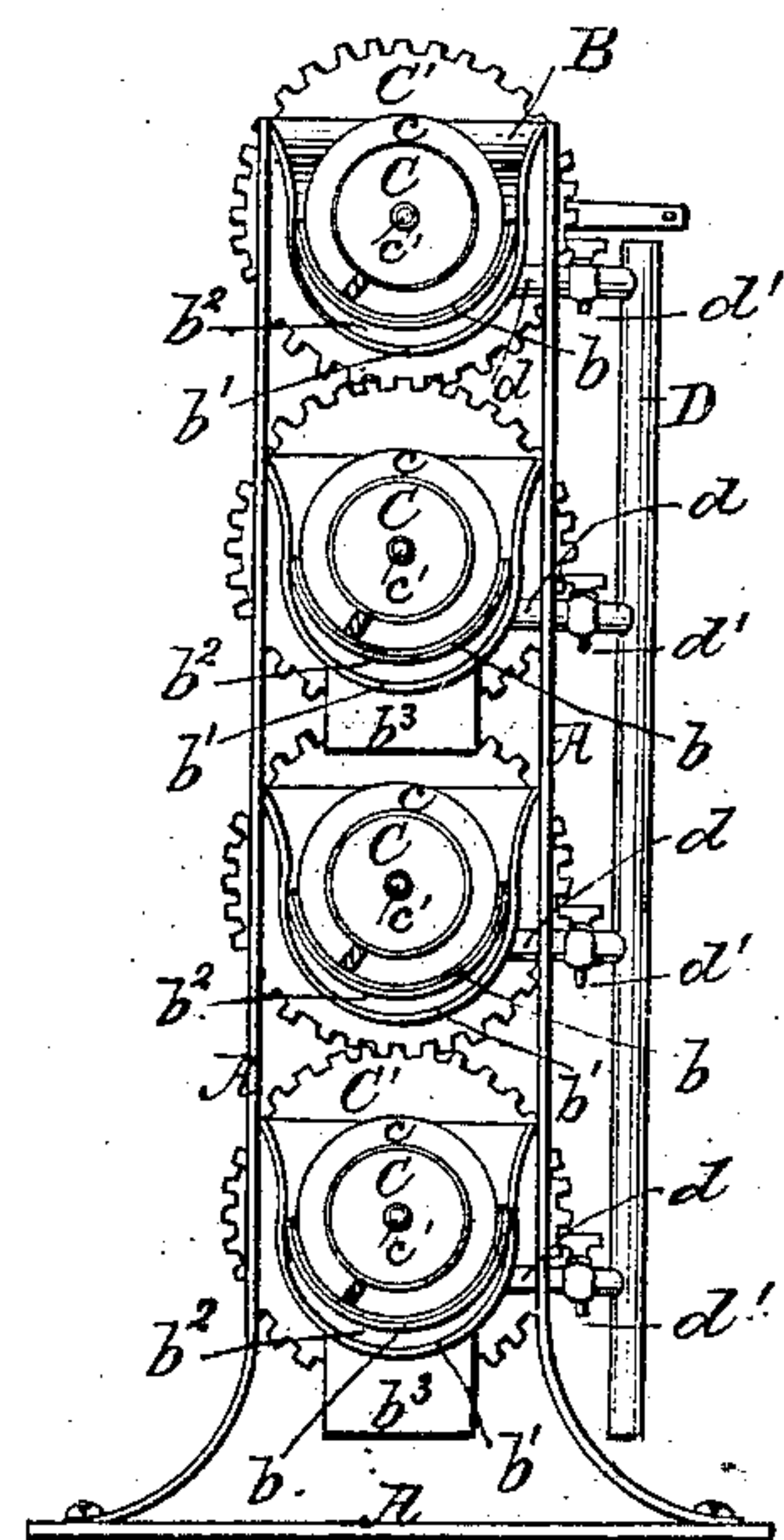


Fig. 4.



Witnesses.  
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*Letters Patent No. 63,412, dated April 2, 1867.*

## DRYING APPARATUS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN O. MELLEN, of the city and county of St. Louis, and State of Missouri, have invented a new "Drying Apparatus," for drying grain, flour, and other like articles; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 of the drawings is a side elevation of the improved apparatus.

Figure 2 is an end elevation.

Figure 3 is a plan; and

Figure 4 is a transverse sectional elevation.

The nature of my invention consists in forming the bottom of the troughs which constitute the receptacle for the grain or other article to be dried of two pieces or metal plates, forming a chamber for heated air in and along the bottom of the trough, for equalizing the temperature of the grain or other article within said trough. Also in combining hollow spiral conveyers, or hollow cylinders, provided with a hollow spiral flange communicating with the interior of such cylinders, whereby the conveyers themselves afford drying surface in addition to that obtained in the sides and bottom of the troughs proper.

To enable those skilled in the art to make and use my improved drying apparatus, I will proceed to describe its construction and operation.

A is the framework, upon which the other parts of the machine are supported. Arranged in this frame is a series of conveyer-troughs, B, one above the other. These troughs are semicircular in form, as clearly shown in fig. 4, and each one is formed of two pieces or shells  $b^1$ , between which there is a heating chamber,  $b^2$ . Within each of the troughs B there is a hollow metal cylinder, C, the periphery of which is provided with a thread or worm,  $c$ , such as is usually employed in flour conveyers of the screw variety. The cylinders C are mounted on hollow journals  $c^1$   $c^2$ , which may be connected, by means of suitable swivel-joints, with the induction and eduction pipes, (not shown,) which are to convey the hot air or steam into and out of the said cylinders, as will be hereinafter more fully explained. The journals  $c^1$  are to be provided with cog-wheels  $C'$ , or equivalent devices, whereby the whole of the set of conveyers C  $c$  may be set in motion and rotated in harmony. Power applied to one of these wheels will set in motion the whole set. The spiral flange or worm  $c$ , formed on the outer periphery of the cylinders C, may be of any suitable hollow shape that will admit of communication between the cavity formed therein and the interior of the cylinder, though this spiral flange may of itself form a part of the cylinder C. Thus the hot air or steam which is to fill the latter will also fill the former, and the heating surface of the conveyer will be thereby correspondingly increased. The induction pipe D is connected, by means of the branch pipes  $d$ , with the heating chambers  $b^2$ . Each of these branch pipes should be provided with a stop-cock,  $d^1$ , for the purpose of regulating the flow of the heated air or steam into the said chamber  $b^2$ . There is also a branch pipe,  $d^2$ , leading from each of the said chambers  $b^2$  to the eduction pipe D', and this last-named pipe should also be provided with a stop-cock,  $d^3$ , for the purpose of retaining the hot air or steam within the said cylinders.

The grain or flour which is to be dried by this apparatus is to be fed into the forward end of the topmost conveyer, from whence the revolving screw will convey it to the other end of its trough, where it will find an exit down through the discharge pipe  $b^3$  into the next conveyer below, where the screw of that tier will carry it back to the other end again, where it will find another exit,  $b^3$ , through which it will pass into the next lower conveyer, to be again conveyed, in a horizontal direction, to the opposite end; and so on through the whole series of conveyers.

The cylinders C will be provided with a series of branch pipes and stop-cocks similar to that already described for the chambers  $b^2$ , and atmospheric air, heated to a high temperature, or steam, may be introduced into both the chamber  $b^2$  and the cylinder C. As the grain or flour to be dried will come into immediate contact with the heated plates of the conveyer C  $c$ , and also the trough plating  $b$ , and as the said heated surfaces may be increased to any desired number of superficial feet, simply by increasing the number or length of the conveyers, it follows that a drying apparatus may be constructed, in the manner herein described, which will thoroughly and quickly cure or dry any material which can be passed through the conveyers; and as the material

which is thus passed through the conveyers is constantly turned over, and worked up, and kept in motion, there can be but little or no difficulty to be apprehended from scorching or burning. If hot air be used for the purpose of heating the chambers, it is probably preferable to open all the stop-cocks and let the hot air be forced through the chambers in continuous currents, by means of some suitable air-forcing apparatus. But if steam be used, it will be better to close the cocks in the eduction pipes during most or the whole of the operation. And in this case it will also be necessary to provide suitable stop-cocks for drawing off the water that may accumulate in the chambers from the condensation of steam. In either case the stop-cocks of the induction pipes may be used to regulate the heat.

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

The hollow spiral or spirally flanged conveyers C, in combination with a double-bottom trough, B, and chamber  $\mathcal{C}^2$ , substantially in the manner and for the purpose herein set forth.

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Witnesses:

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