

(No Model.)

J. T. WARING.

Process and Apparatus for Felting Hat Bodies.
No. 227,330. Patented May 4, 1880.

Fig. 1.

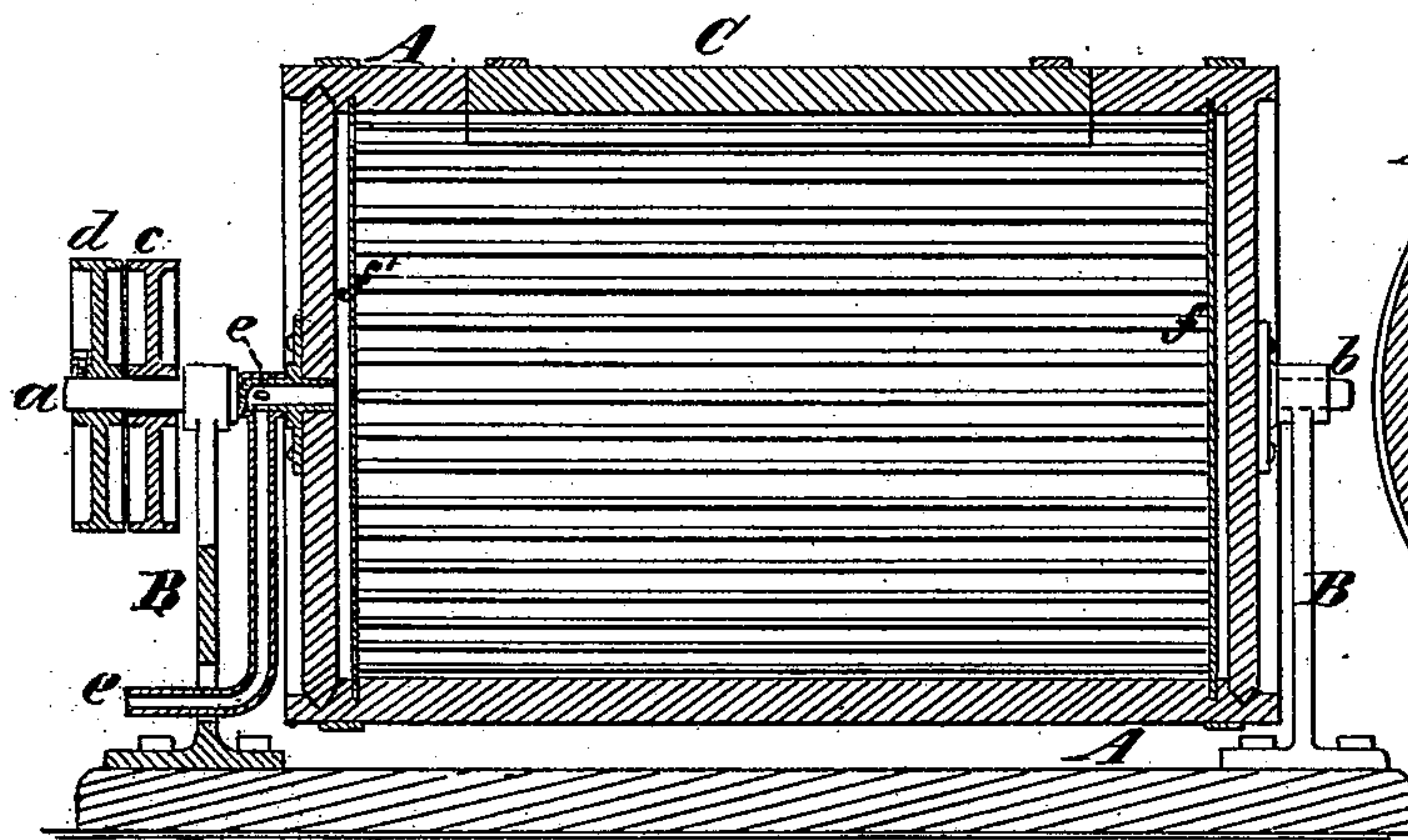


Fig. 2.

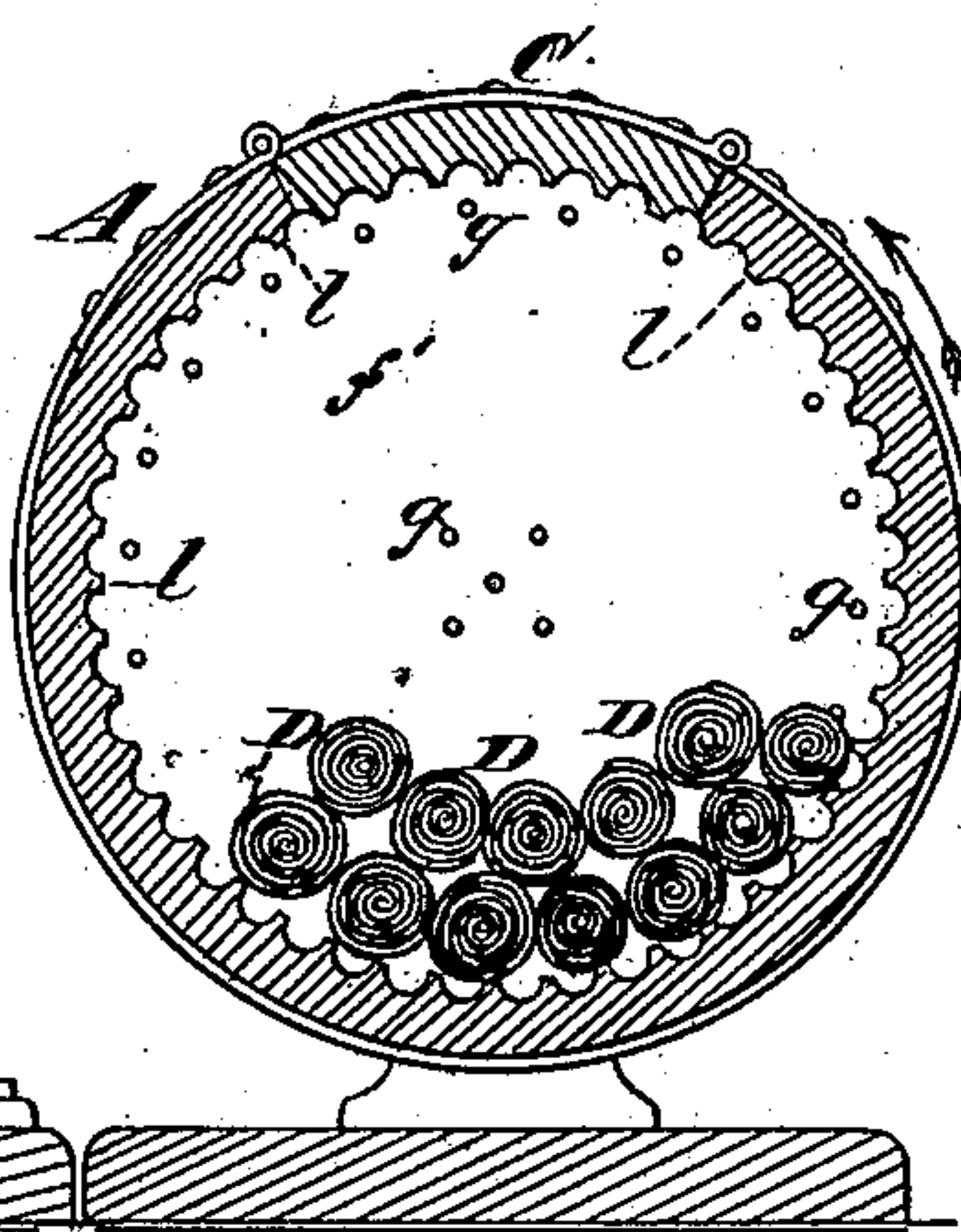


Fig. 3.

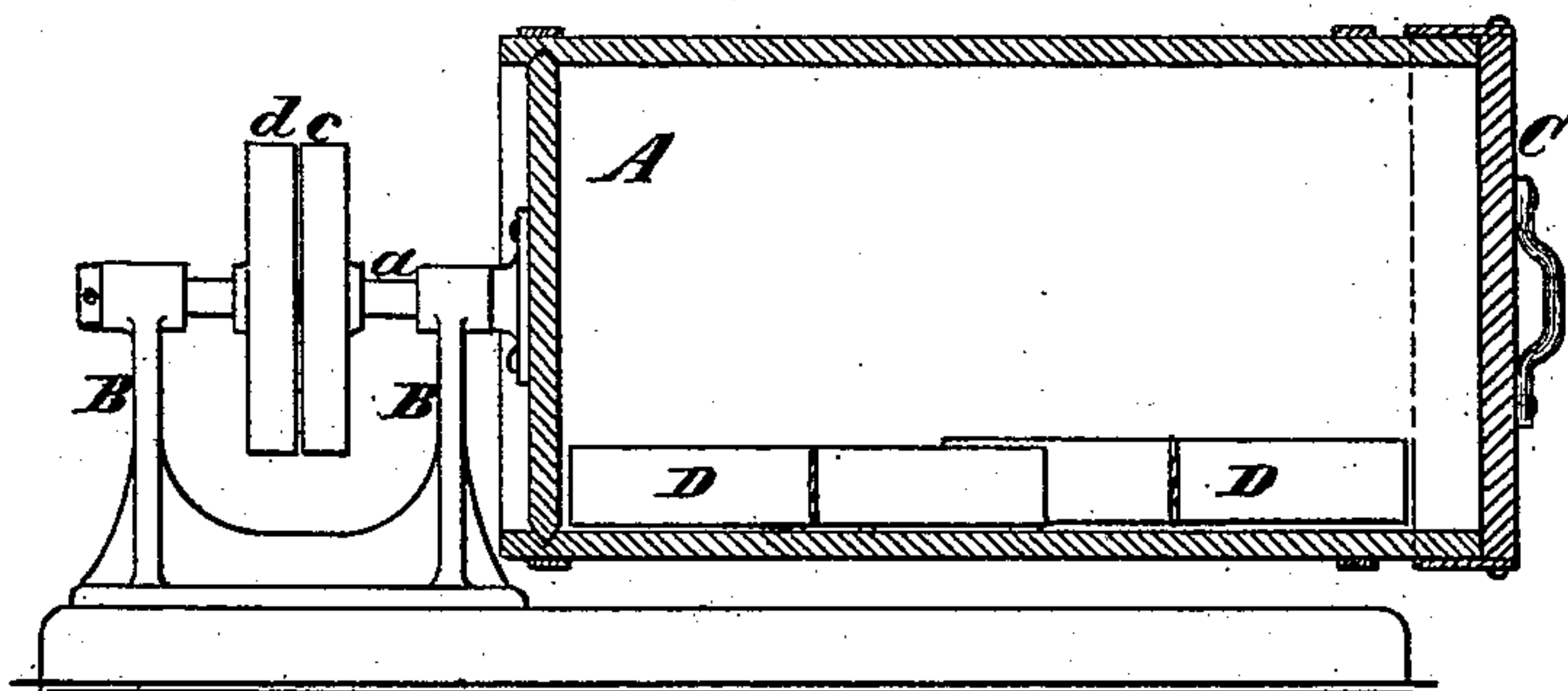


Fig. 4.

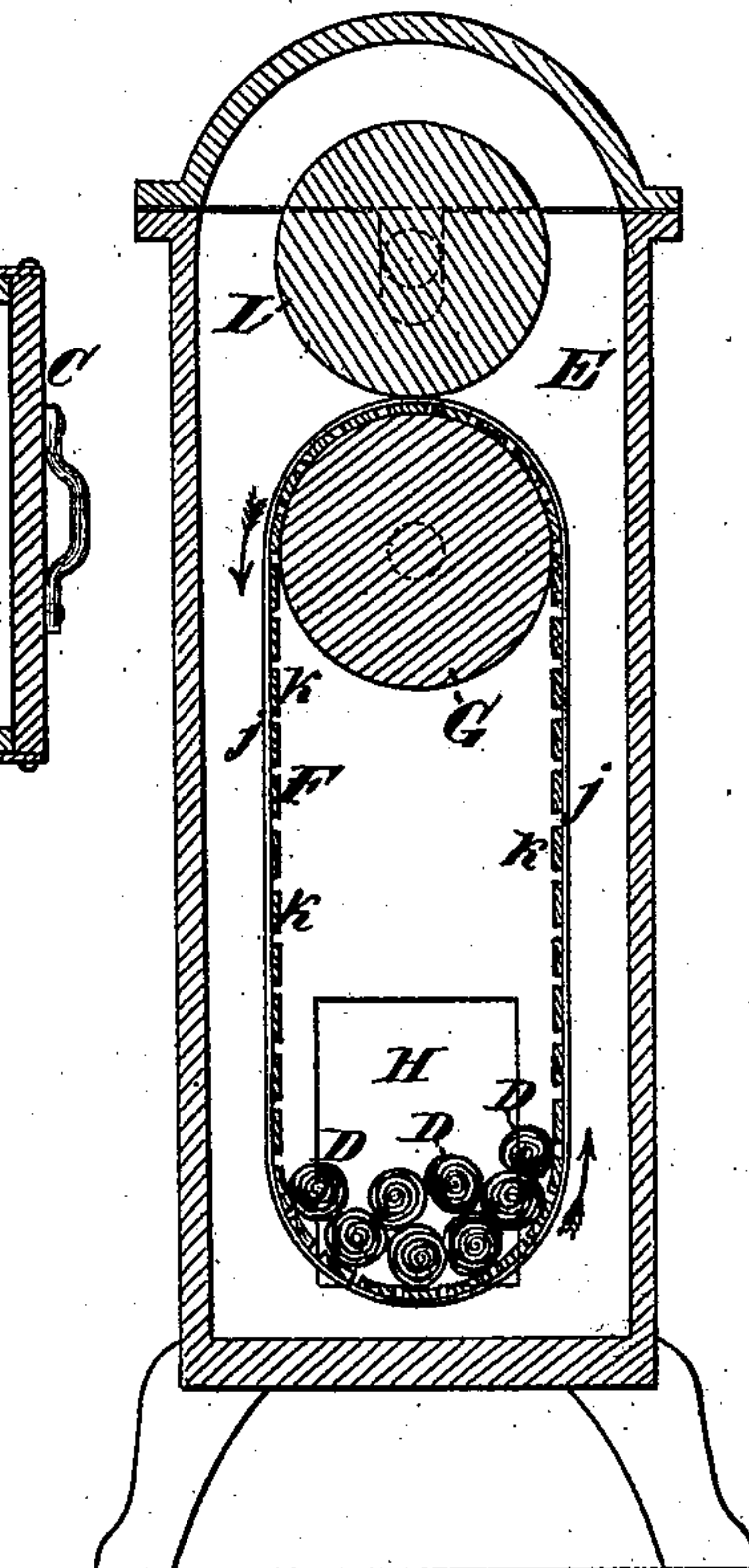
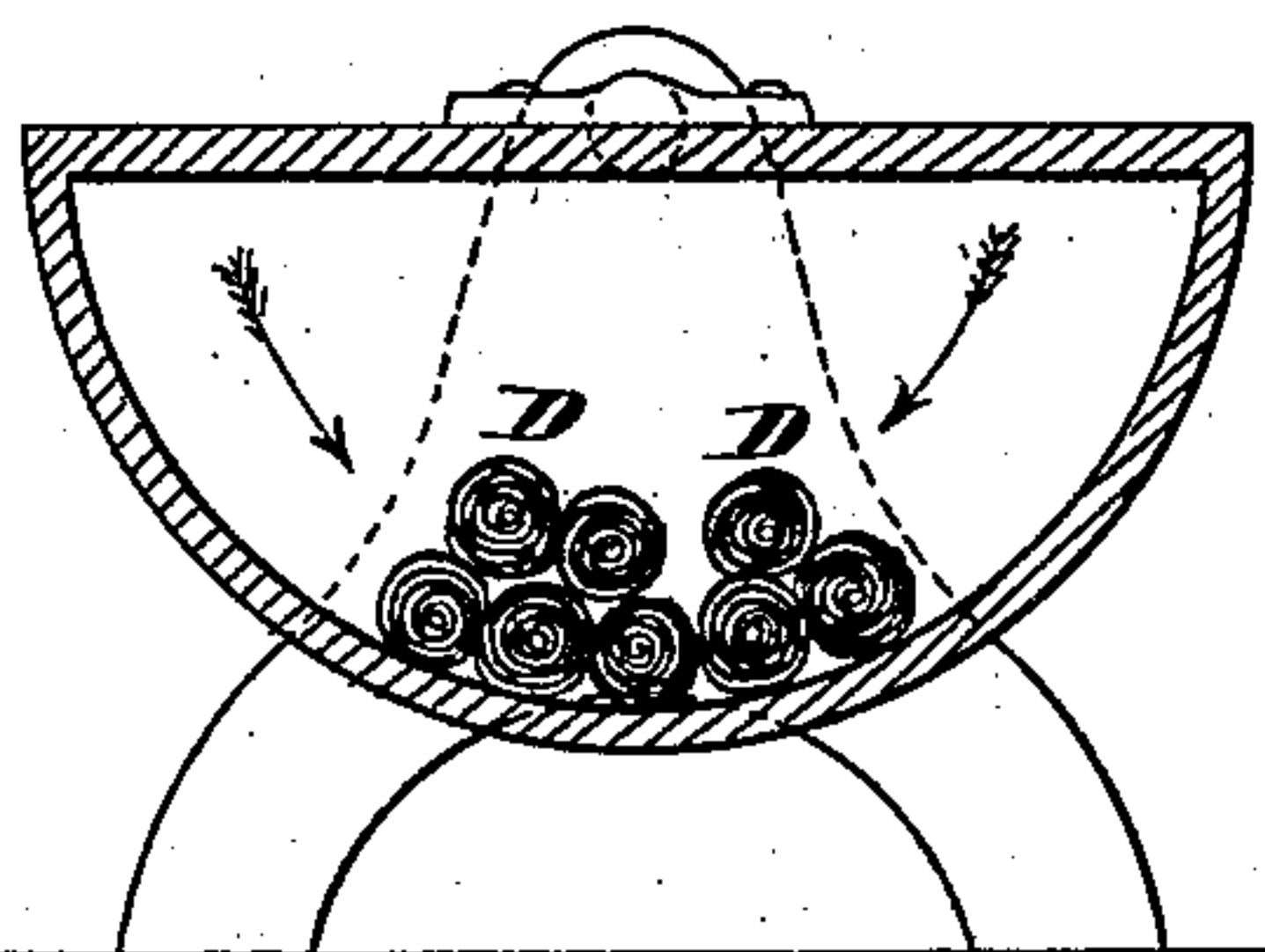


Fig. 5.



Witnesses

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PROCESS AND APPARATUS FOR FELTING HAT-BODIES.

SPECIFICATION forming part of Letters Patent No. 227,330, dated May 4, 1880.

Application filed March 16, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. WARING, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and
5 useful Improvements in the Process of and Apparatus for Felting Hat-Bodies and other articles, of which the following is a specification, reference being had to the accompanying drawings.

10 These improvements in process and apparatus are more especially intended to perform that stage of the manufacture of hat-bodies and other felted goods commonly called "starting," which immediately follows the stage called
15 "hardening," and to supersede the use of skilled hand-labor at that stage of the manufacture. The improvements may, however, be applicable in other stages of the manufacture.

20 One improvement in the process consists in subjecting the hat-bodies or other articles to the action of the interior surface of a hollow revolving, oscillating, or turning receptacle, in which they are placed, the action being such that the said articles are raised and afterward
25 caused to fall or turn or tumble over by the force of gravitation.

30 Another improvement in the process consists in subjecting the articles or goods during the felting process to the action of steam in a closed vessel or receptacle.

35 The improvements in apparatus consist in a revolving receptacle of peculiar construction and certain appliances connected therewith for carrying out the first-above mentioned improvement in the process.

40 Figure 1 in the accompanying drawings is a central longitudinal vertical section of a revolving closed cylinder or cylindrical receptacle containing a number of hat-bodies illustrating my invention. Fig. 2 is a transverse section of the same. Fig. 3 is a central longitudinal vertical section of another revolving cylinder or cylindrical receptacle illustrating a modification of the invention. Fig. 4 is a
45 transverse vertical section of a closed receptacle containing an endless apron, in which hat-bodies are placed to be treated. Fig. 5 is a transverse section of an oscillating closed receptacle containing a number of hat-bodies.

50 The cylinder A, Figs. 1 and 2, has its axis arranged horizontally, and is provided with

central journals, *a b*, fitted to bearings in standards B B, the journal *a* being prolonged to receive fast and loose pulleys *c d* for the driving-band, and being made hollow for the induction into the cylindrical receptacle of steam
55 received from a boiler through a pipe, *e*, which is furnished with a T-head surrounding the said journal. The said cylinder may be of wood or metal; but if of wood its heads should be
60 lined with smooth metal plates, as shown at *f f'*, the plate *f'* being perforated, as shown in Fig. 2 at *g g*, to distribute the steam into the said receptacle. The interior periphery of the cylinder may be smooth, but should be preferably longitudinally corrugated or ribbed, as
65 shown at *l l* in Fig. 2. A lid, C, is provided for the introduction and removal of the hat-bodies or other articles.

70 The hat-bodies D D or other articles to be felted are to be placed in this cylinder, either loosely or each either folded or rolled up, as shown in Fig. 2, and when in the latter condition each may be confined in the rolled condition by placing an india-rubber or other
75 band around it. They are previously dipped in water or other liquor, such as is used to promote felting.

80 The cylinder A, with the hat-bodies or other articles in it, has a slow rotary motion imparted to it while steam is admitted through its hollow journal, and the operation is as follows: The rotation of the cylinder causes the friction of its inner periphery to carry up the bodies or other articles on its rising side, and
85 after they have been thus carried up a certain distance they are caused to roll or turn or tumble over in the opposite direction and fall back toward the bottom of the cylinder by the force of gravitation. This rolling, turning, or tumbling operation causes an active felting action
90 to take place, although the bodies or articles are not subjected to any pressure beyond that due to their own weight or the weight of the superincumbent ones over those below them. In this operation the felting is encouraged, assisted, and expedited by the steam admitted to and confined within the receptacle.

95 The cylinder A (shown in Fig. 3) may resemble that first described in all essential particulars, except that it has a journal or shaft, *a*, at one end only, supported in standards B
100

B at a suitable distance apart to give stability, and the lid C is in the form of a cap, which fits over the other end of the cylinder, which is open for the introduction and removal of the hat-bodies or other goods to be felted when the said lid is removed.

In Fig. 4, E is a closed stationary upright box or chamber, to which steam may be admitted by a suitable pipe, and which contains an endless apron, F, suspended from a roller or drum, G, the journals of which work in bearings at the sides of the said box, and the ends of which, as well as the edges of the said apron, work close to or very nearly in contact with the sides of the said box or chamber, so that the said apron, closed at the sides by the sides of the said box or chamber, may form a receptacle for hat-bodies or other articles, D D, to be felted, the said bodies or other articles being introduced through a door, H, in one side of the box or chamber.

Above the roller or drum G and apron is a pressure-roller, I, which keeps the apron in contact with the said roller or drum, and insures its turning therewith during the rotary motion thereof.

The endless apron should preferably be made of two or more bands, *j*, and a series of slats, *k k*, arranged at short distances apart to allow the steam to enter within the said apron. The slats *k k* have the same effect as the ribs or internally-salient corrugations *l l* of the cylinder A in carrying up the bodies or other articles on the rising side of the revolving or turning receptacle constituted by the cylinder or by the apron.

The hat-bodies or other articles, D D, to be felted are operated upon in the endless apron F in the same manner as in the cylinder A, being carried up by the friction of the ascending side of the apron, and then caused to roll or tumble over or fall back toward the bottom of the apron.

Fig. 5 shows closed oscillating box, in which the hat-bodies or other articles, D D, to be felted may be subjected to a similar action to that to which they are subjected in the cylinder A or apron F. As this box oscillates in either direction the hat-bodies or other articles are carried up on the rising side, and then caused to roll or tumble over or fall back to the lowest part by gravitation.

The cylinder A or the apron F, instead of having a continuous rotary or turning motion in one direction, may have an oscillating or reciprocating motion.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. As an improvement in the process of felting hat-bodies and other articles, subjecting such articles to the action of the interior surface of a hollow revolving, turning, or oscillating receptacle, whereby they are raised and afterward caused to roll or turn or tumble over and fall back by gravitation, substantially as herein described.

2. As an improvement in the process of felting hat-bodies and other articles, subjecting them during the felting process to the action of steam in a closed vessel or receptacle, substantially as herein described.

3. A felting apparatus consisting of a closed hollow revolving or oscillating cylinder or receptacle having its interior surface corrugated or ribbed, substantially as herein described, for the purpose set forth.

4. A felting apparatus consisting of a closed hollow revolving or oscillating cylinder or receptacle, provided with means of introducing steam thereinto, substantially as herein described.

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Witnesses:

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