

(No Model.)

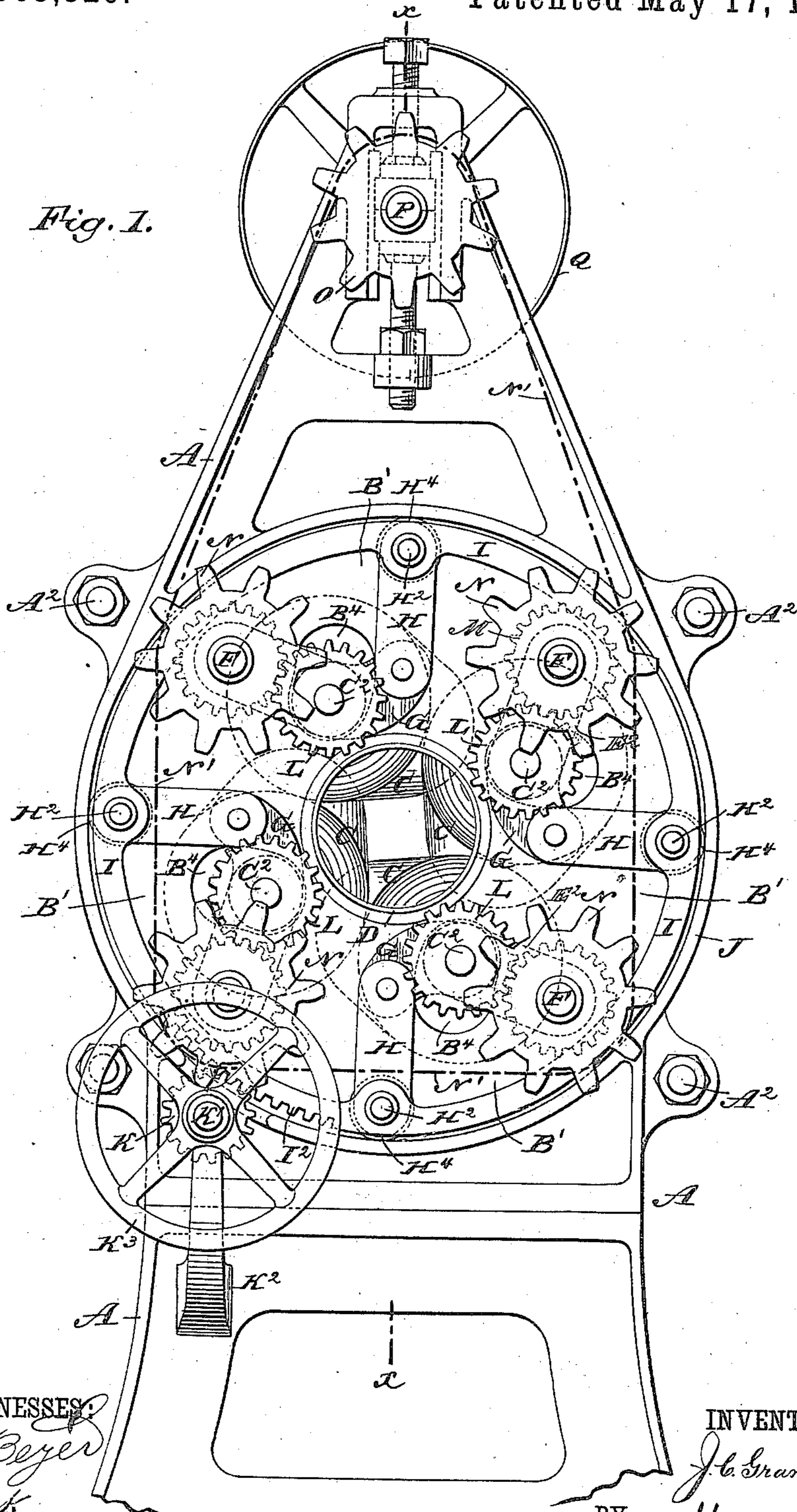
3 Sheets—Sheet 1.

J. C. GRANT.  
HAT FELTING MACHINE.

No. 363,329.

Patented May 17, 1887.

Fig. 1.



WITNESSES:  
*Knobeyer*  
*C. Sedgwick*

INVENTOR:  
*J. C. Grant*  
BY *Munn & Co.*  
ATTORNEYS.

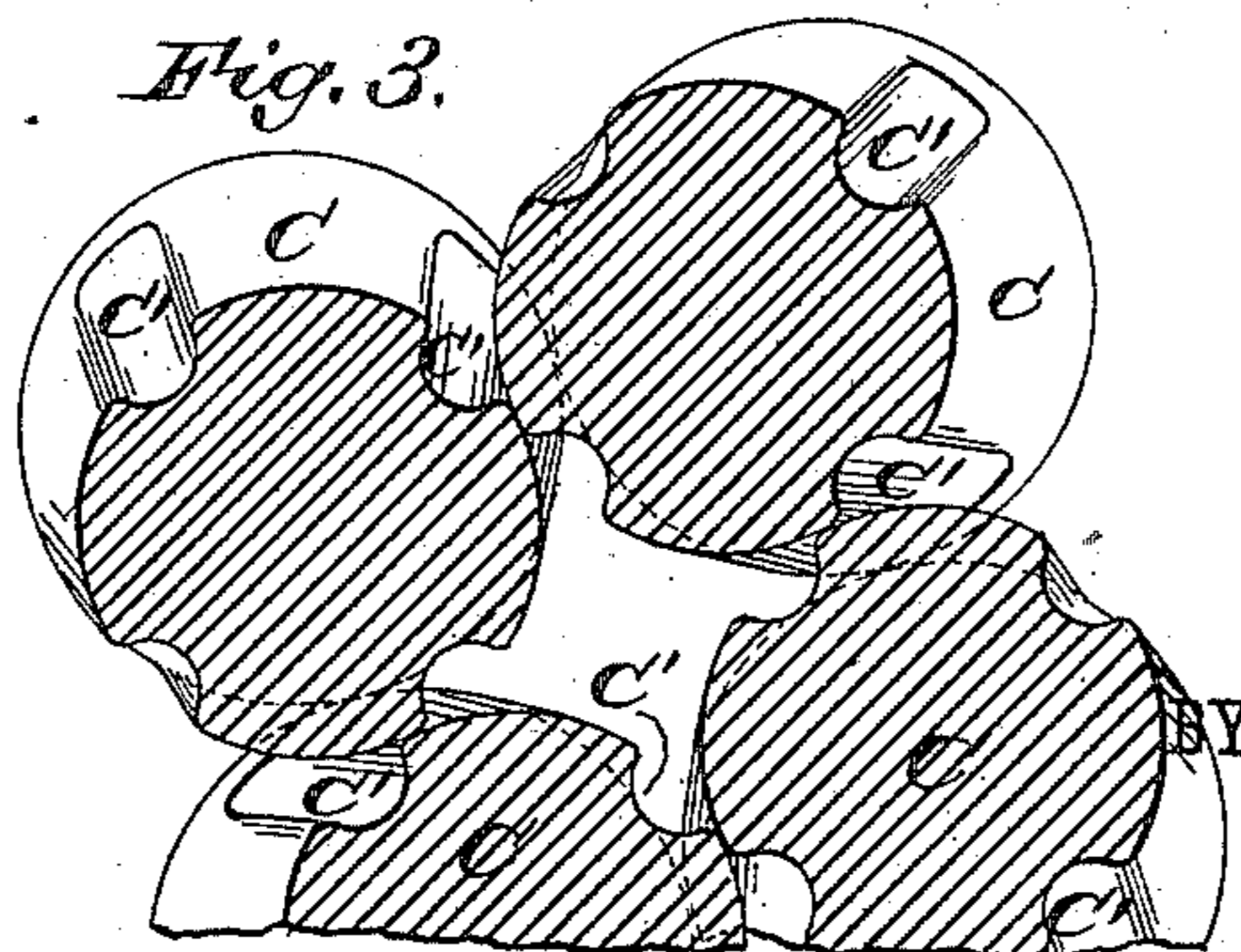
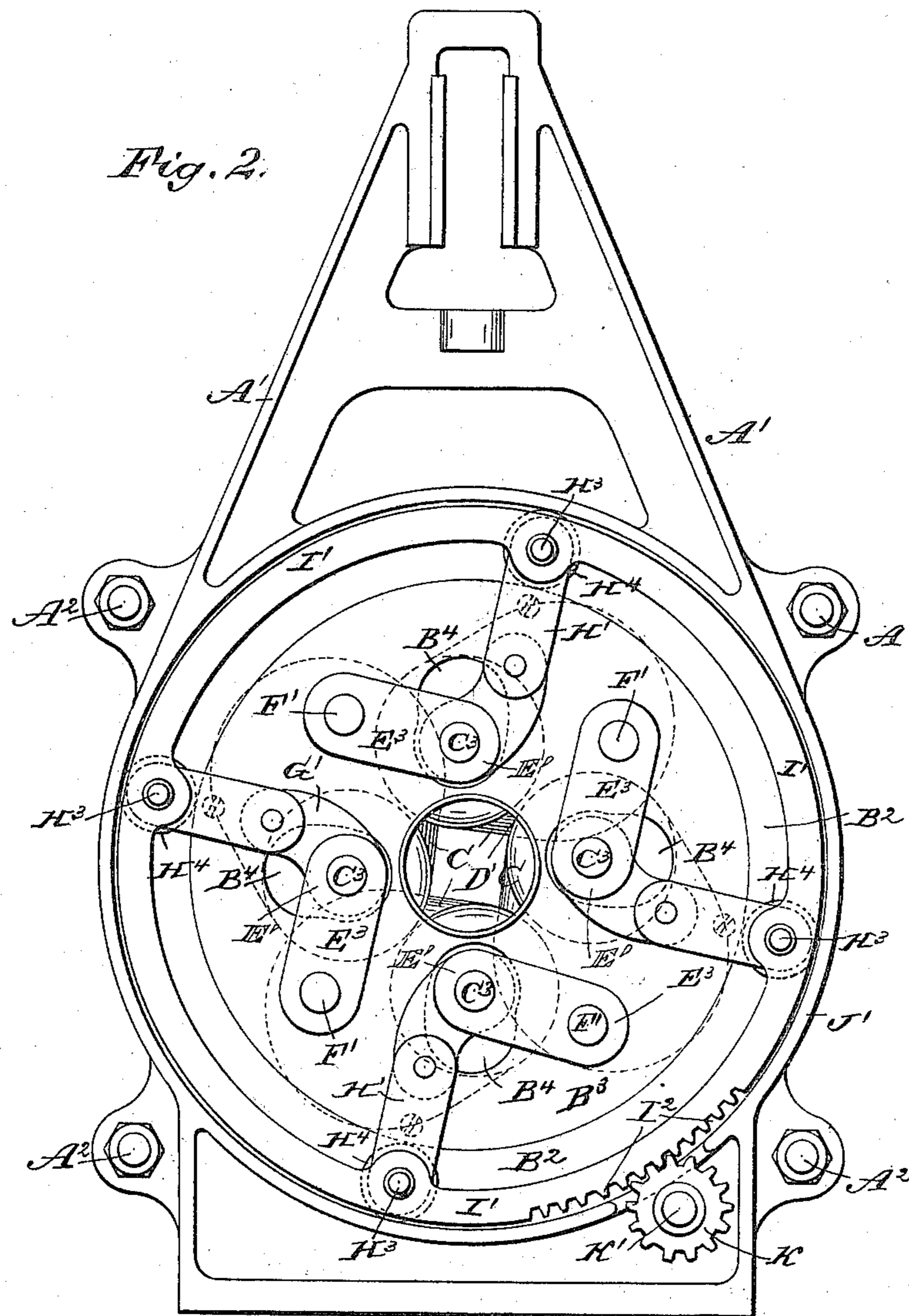
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J. C. GRANT.  
HAT FELTING MACHINE.

No. 363,329.

Patented May 17, 1887.



WITNESSES:  
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(No Model.)

3 Sheets—Sheet 3.

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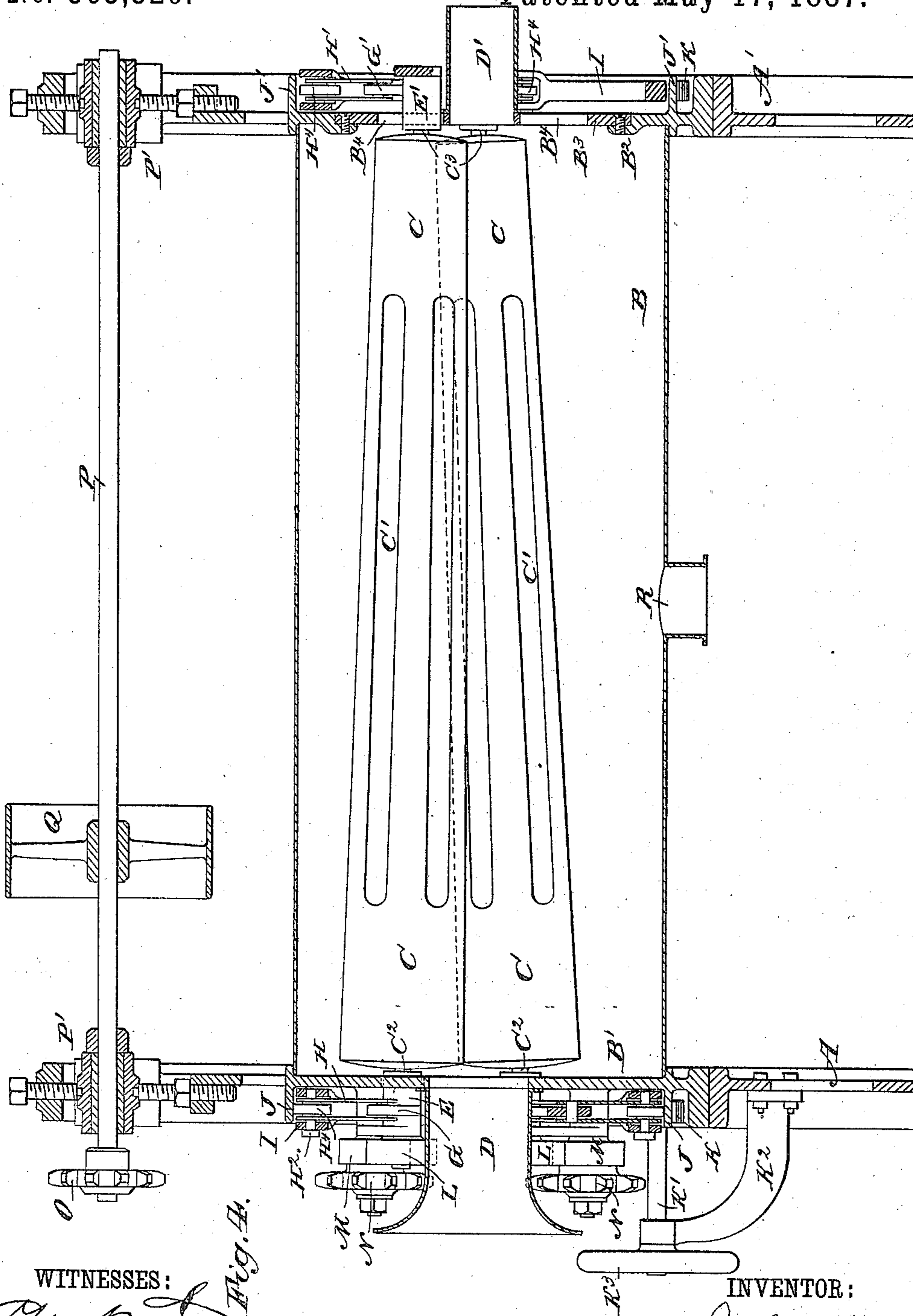


Fig. 4.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES C. GRANT, OF NEWBURG, NEW YORK, ASSIGNOR OF ONE-HALF TO  
JARVIS C. BRUSH, OF SAME PLACE.

## HAT-FELTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 363,329, dated May 17, 1887.

Application filed November 2, 1886. Serial No. 217,806. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. GRANT, of Newburg, in the county of Orange and State of New York, have invented a new and Improved Hat-Felting Machine, of which the following is a full, clear, and exact description.

My invention has for its object to provide new and useful improvements in hat-felting machines whereby the hat-bodies treated will be shrunk and felted more rapidly and more perfectly than heretofore.

The invention consists in the construction and combination of parts and details, as hereinafter fully described, and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an end elevation of my improved hat-felting machine. Fig. 2 is an elevation of the opposite end of the same, parts being removed. Fig. 3 is a cross-sectional view of the sizing-rollers. Fig. 4 is a longitudinal sectional elevation on the line *x x*, Fig. 1.

The machine is mounted on the end frames, *A A'*, connected by longitudinal brace-rods *A<sup>2</sup>*, and between which is held the cylindrical drum *B*, the heads *B' B<sup>2</sup>* of which are formed integrally with the end frames, *A A'*, as shown, or are attached thereto.

The drum *B* incloses the sizing-rollers *C*, as usual, and its rear head, *B<sup>2</sup>*, is provided with the removable plate *B<sup>3</sup>*, by which to gain access to the interior of the drum. The tapered shrinking or sizing rollers *C* are arranged obliquely with respect to each other, and so as to leave a converging passage-way between them, into which the unshrunk hat-bodies, soaked in hot water and wrapped in a cloth in the usual way, are introduced through the feed-chute *D*, fitted to an opening in the forward drum-head, *B'*, and from which passage-way the shrunk or sized and felted hat-bodies issue through the discharge-chute *D'*, attached to the rear drum-head plate, *B<sup>3</sup>*. The sizing-rollers *C* are formed for the middle part of their length with the longitudinal grooves *C'*, so that as the unsized hat-bodies are first received between the revolving rollers they encounter only "smooth work" as best suited to

their loose unfelted condition. As they are advanced and revolved by the rotation of the obliquely-arranged converging rollers, they become compressed and felted, and are then seized by the grooved portions of the rollers, by which they are more rapidly shrunk and felted, and on nearing the end of their passage they again encounter smooth work, and are thereby firmly compressed and felted.

The gudgeons *C<sup>2</sup> C<sup>3</sup>* of the sizing-rollers *C* revolve in movable bearings *E E'*, formed on or attached to the ends of swinging arms *E<sup>2</sup> E<sup>3</sup>*, which are pivoted upon studs *F F'*, attached to the forward and rear drum-heads, respectively, curved slots *B<sup>4</sup>* being cut in said drum-heads to permit the roller-bearings *E E'* to swing therein toward and from the center of the roller passage-way.

The roller-bearings *E E'* are also formed or provided with eye-lugs *G G'*, which are connected by links *H H'* with equidistant pins or pivots *H<sup>2</sup> H<sup>3</sup>*, carried by the rotary rings *I I'*, said rings being mounted to turn within circular flanges *J J'*, formed on or attached to the end frames, *A A'*. The pins or pivots *H<sup>2</sup> H<sup>3</sup>* also carry friction disks or wheels *H<sup>4</sup>*, which run on the inner surface of the guide-flanges *J J'* and render the turning of the rings *I I'* easy.

For rotating the rings *I I'*, and thus, through the pin or link connections, swinging the roller-bearings and the rollers toward and from the common center, I provide the rings with segmental gear-teeth *I<sup>2</sup>*, with which engage pinions *K*, fixed upon a longitudinal shaft, *K'*, suitably journaled in the end frames, *A A'*, and in a bracket-arm, *K<sup>2</sup>*, projecting from the front end frame, *A*. The forward end of the shaft *K'* carries a hand-wheel, *K<sup>3</sup>*, by which the shaft may be turned and the rollers adjusted, as described.

In order that the rollers *C* may be continually revolved, however they are adjusted, spur-wheels *L* are fixed upon the ends of their forward gudgeons, *C<sup>2</sup>*, and are in gear with spur-wheels *M*, revolving upon the studs or short shafts *F*, forming the pivots of the swinging arms *E<sup>2</sup>*.

Sprocket-wheels *N* are formed integrally with or attached to the spur-wheels *M*, and revolve with the same on the studs or shafts

F, an endless chain, N', being passed over the several sprocket-wheels N and over a sprocket-wheel, O, fixed upon the driving-shaft P.

The shaft P is journaled in bearings P', held  
5 adjustably in vertical guides on the upper ends of the end frames, A A', and a belt-pulley, Q, is carried by the driving-shaft, by which the same is rotated. With this arrangement of the driving-gearing the revolution of the sizing-rollers is undisturbed by their adjustment.

In operation the hat-bodies, soaked in hot water and wrapped in cloths, are passed into the passage-way between the revolving rollers, and are compressed and shrunk or sized  
15 by the convergence of the same, the water squeezed out during the treatment passing out of the drum through the discharge-spout R in the bottom of the same. As the hat-bodies issue from the discharge-chute D' they are  
20 seized by the operator, folded anew in the usual manner, and thrust into the supply-chute of an adjoining similar machine. This operation is repeated a number of times, the sizing-rollers of the machines being brought nearer  
25 together by the positive adjusting mechanism described as the operation progresses, until finally the hat-bodies are shrunk and fitted to the required degree. They are then removed and a fresh batch of goods introduced  
30 in the machine and treated in a like manner.

I have shown the sizing-rollers straight for convenience in illustration, although in practice they are usually slightly concaved lengthwise in accordance with their relatively oblique position.  
35

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

1. A hat-felting machine having its sizing-  
40 rollers formed with longitudinal grooves for the middle part only of their length, their ends

being smooth, substantially as herein shown and described.

2. The combination, with the end frames, A A', the series of swinging arms E<sup>2</sup> E<sup>3</sup>, pivoted  
45 at their outer ends to said frames and having bearings E E' on their inner ends, rotary rings I I', links connecting said rings and bearings, and means for moving the rings, of the rollers extending between the frames and having  
50 their journals projecting through the frames into the bearings E E', substantially as set forth.

3. The combination, with the end frames, A A', having circular flanges J J' on their outer  
55 faces, the rings I I', revolving within said flanges and having anti-friction rollers H<sup>4</sup> bearing on the inner faces of the flanges, the links H H', carried by the rings, the swinging arms E<sup>2</sup> E<sup>3</sup>, pivoted on the end frames and having  
60 bearings E E', to which the inner ends of the links H H' are connected, and means for rotating said rings, of the rollers extending between said end frames and having their journals projecting therethrough into the said bear-  
65 ings, substantially as set forth.

4. The combination, with the end frames, A A', the drum B, extending between said frames and having its heads B' B<sup>2</sup> formed by the frames, the head B' having a removable plate, B<sup>4</sup>, the  
70 feed-chute D in one head, and the discharge-chute D' in the opposite head, of the rollers within the drum, having a space between them in line with the feed and discharge chutes, and having their journals projecting through said  
75 end frames, and the adjustable bearings supporting said journals, substantially as set forth.

JAMES C. GRANT.

Witnesses:

CHAS. L. CHATTERTON,  
EUGENE A. BREWSTER, Jr.