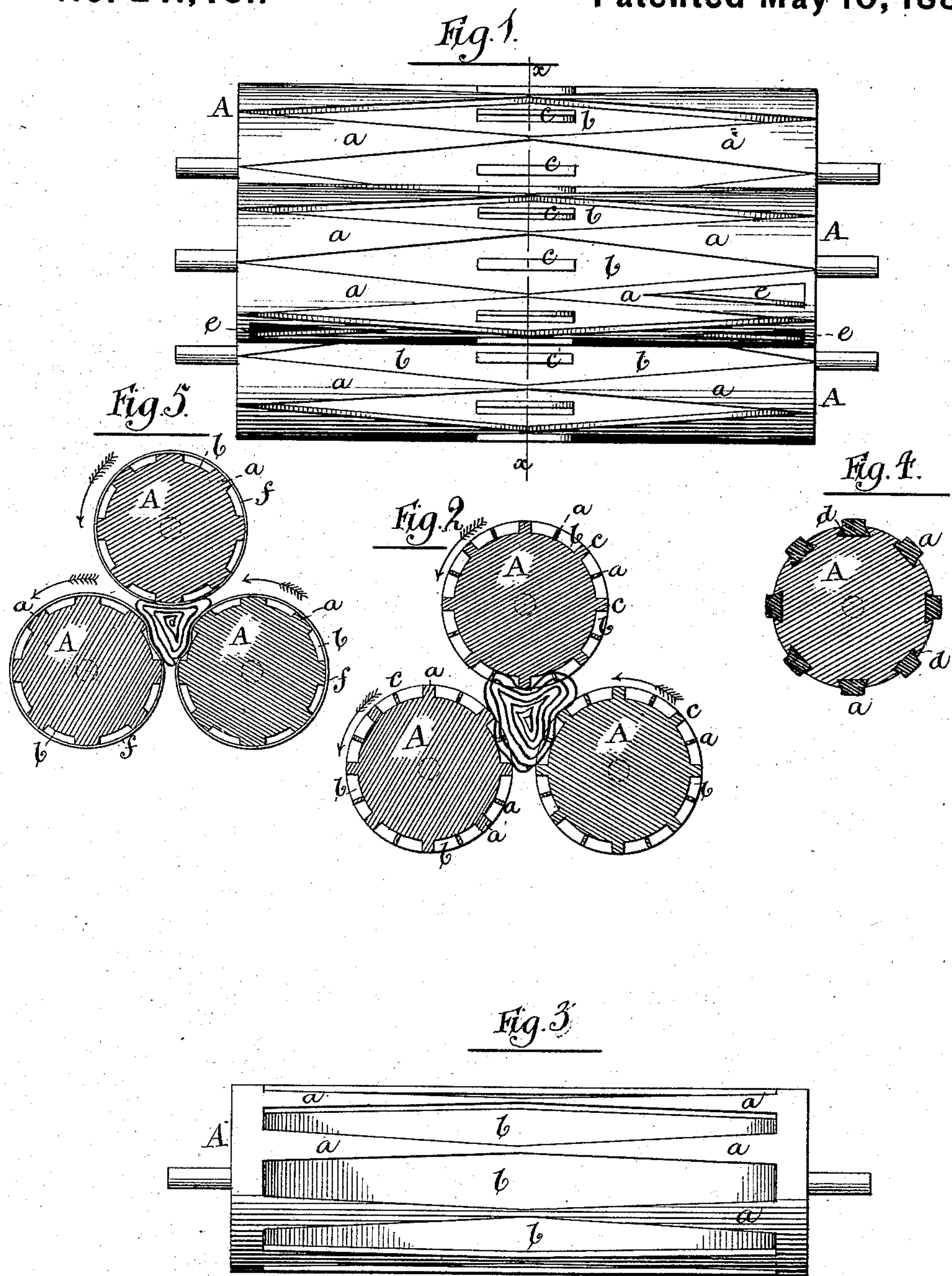


(No Model.)

J. T. WARING.  
Machinery for Felting Hat Bodies, &c.

No. 241,461.

Patented May 10, 1881.



Witnesses:-  
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# UNITED STATES PATENT OFFICE.

JOHN T. WARING, OF NEW YORK, N. Y.

## MACHINERY FOR FELTING HAT-BODIES, &c.

SPECIFICATION forming part of Letters Patent No. 241,461, dated May 10, 1881.

Application filed March 24, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. WARING, of the city, county, and State of New York, have invented certain new and useful Improvements in Machinery for Felting Hat-Bodies and other Articles, of which the following is a specification.

This invention is more especially applicable to that class of felting-machine the principal elements of which are rollers having parallel or nearly parallel axes, and between and lengthwise of which the rolls of hat-bodies or other articles to be felted are placed and subjected to a rolling operation; but it may be wholly or in part applied to felting-machines in which the working-faces are of other form than that of the peripheral surfaces of rollers.

One part of the invention consists in felting rollers or working-surfaces for felting-machines having a series of cavities which, in the direction of the revolution or working movement, are of greater width near the middle, and taper toward the ends of the rollers or the margins of the working-surfaces.

It also consists in rollers or working-surfaces having a series of ridges which run lengthwise of the rollers or transverse to the direction of movement of the working-faces, and which are narrower at and near the middle of their length, and wider toward the ends of the rollers or the margins of the working-surfaces. These ridges may be made of elastic material.

It also consists in the novel construction of such ridges and cavities in the rollers.

It further consists in the combination, in a felting-machine, of a roller having a longitudinally-ridged periphery or perimeter, and a sleeve or covering of india-rubber or other elastic material applied tightly over the ridges of said roller, and capable of being depressed into the cavities or grooves between the said ridges.

Figure 1 in the drawings is a top view of a set of three rollers for a felting-machine, illustrating my invention. Fig. 2 is a transverse section of the same. Fig. 3 is a longitudinal view of a roller, illustrating a modification of the ridges and cavities in the periphery or working-face. Fig. 4 is a transverse section of a roller, illustrating a method of constructing the ridges and cavities in the periphery. Fig. 5 exhibits a transverse section of three rollers,

illustrating the application of the elastic sleeve or covering to their ridged and grooved peripheries.

The rollers A A shown in Figs. 1 and 2 have ridges *a a* and cavities *b b* in their peripheries or working-surfaces. The cavities *b b*, the form of which is best shown in Fig. 1, are of what is familiarly known as "diamond" shape. They are shown as extending the whole length of the rollers, and having, in the direction of the revolution of the rollers, their greatest width at the middle of the length of the rollers, and tapering toward the ends thereof. The ridges formed between these cavities are narrowest at the middle of the length of the rollers and gradually wider toward the ends thereof. Ridges *c c* are also shown projecting within the cavities *b b*, to the same height as the ridges *a a*, the faces of all the said ridges being concentric with the axes of their respective rollers. A taper cavity, *e*, is also shown in one of the projections *a*. All the projections *a a* may have similar cavities *e*. The rollers may, however, be made without the cavities *e* and ridges *c*.

The roller A shown in Fig. 3 is like those shown in Figs. 1 and 2, except that the cavities *b b* are not tapered so much as to bring them to sharp points at their ends, and do not extend quite to the ends of the rollers. The rollers may be made with their working-surfaces entirely of wood or other hard material, as shown in Fig. 2; or the ridges *a a* may be composed of lags of india-rubber or other elastic material, and inserted, as shown in Fig. 4, into dovetail grooves *d d* in the hard bodies of the rollers, or otherwise secured to the rollers in any suitable manner. When the rollers having their peripheries constructed with cavities *b* wider in the middle and tapering toward their ends are working together, the said cavities in the several rollers combine to form between the rollers pockets or cavities which are largest at the middle, and so better adapted to receive the rolls of hat-bodies, which are always larger in the middle, and by this means a better felting operation is produced. Moreover, when the ridges *b b* are made of elastic vulcanized india-rubber, the said ridges, being narrower at the middle of the length of the rollers and giving less bearing-surface in that part, yield more readily to pressure, and the faces of the



said ridges tend to assume a concave longitudinal profile, which makes the felting action of the rollers more effective.

5 In Fig. 5, *f f* represent elastic vulcanized india-rubber sleeves or coverings applied to the peripheries of the rollers. These sleeves or coverings, which might be tubes drawn tightly over the rollers or be made of stout sheet-rubber lapped around and secured firmly  
10 to the rollers, are drawn tight over the faces of the ridges *a a*, so that empty spaces are left in the cavities *b b*. In the operation of the rollers the india-rubber sleeve or covering will be caused to yield between the ridges *a a* and be  
15 depressed into the cavities *b b*. These sleeves or coverings may be applied not only to rollers with ridges and cavities of the form hereinabove represented and described, but to rollers with ridges and cavities of other form.

20 The form of the ridges and cavities hereinabove described is not only adapted for rollers, but is also applicable to felting surfaces of any other kind—as, for instance, aprons or belts.

25 In some cases it may be practicable to use one or more rollers or working-surfaces with

ridges and cavities of the form and construction herein described, and one or more plain rollers or working-surfaces.

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

1. In a felting-machine, rollers or working-surfaces having cavities *b b*, wider in the middle and taper toward the ends or margins, substantially as herein described. 30

2. In a felting-machine, rollers or working-surfaces having ridges *a a*, narrower in the middle and widening toward the ends or margins, substantially as herein described. 35

3. In a felting-machine, rollers having their bodies of hard material, and provided with ridges of elastic or yielding material, substantially as herein described. 40

4. The combination, with a ridged felting-roller, of sleeves or coverings of elastic or yielding material, substantially as herein described. 45

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