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Process of and Apparatus for Coating Pills.

Patented July 6, 1880.

Fig. 3. a

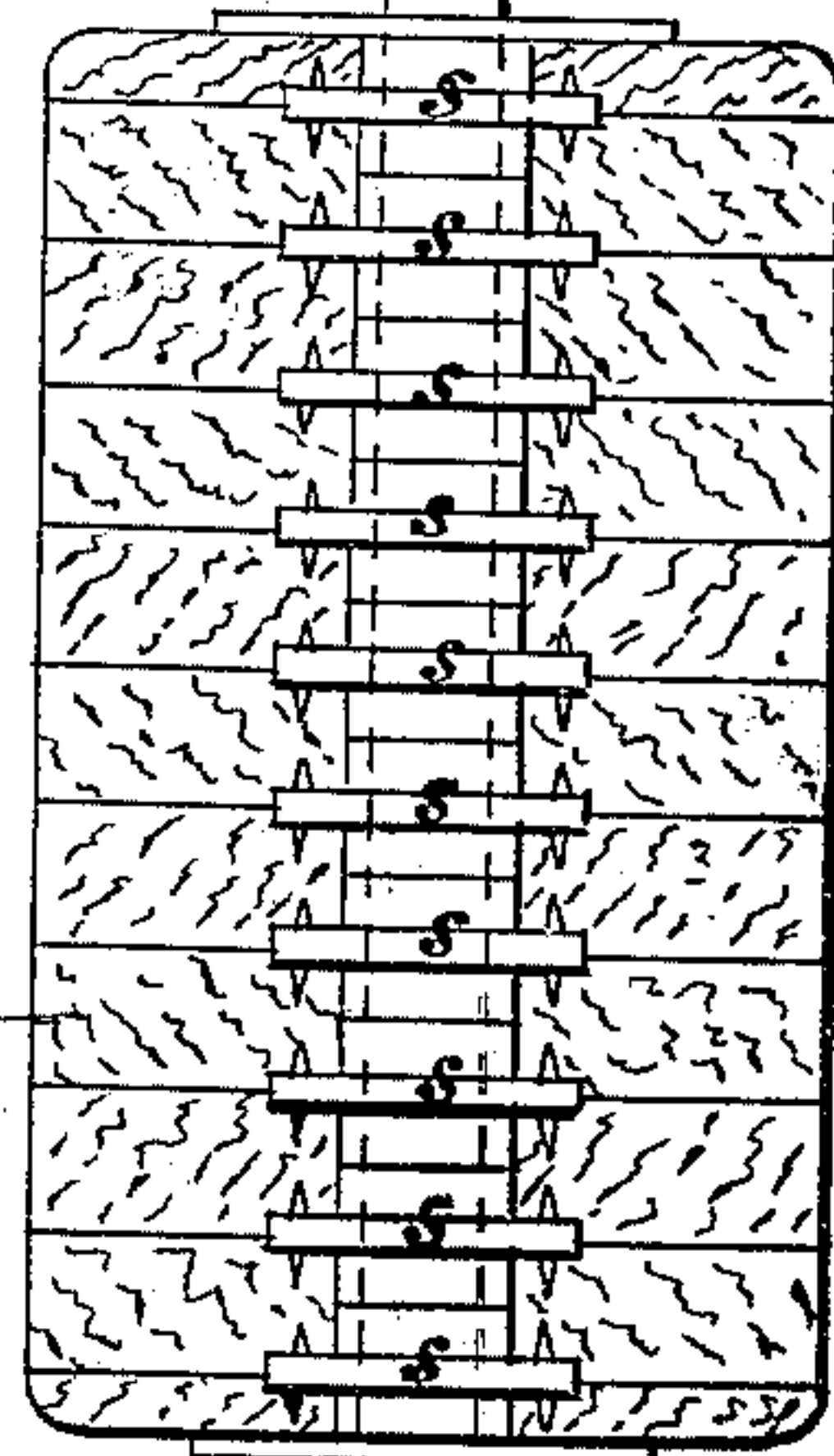


Fig. 4.

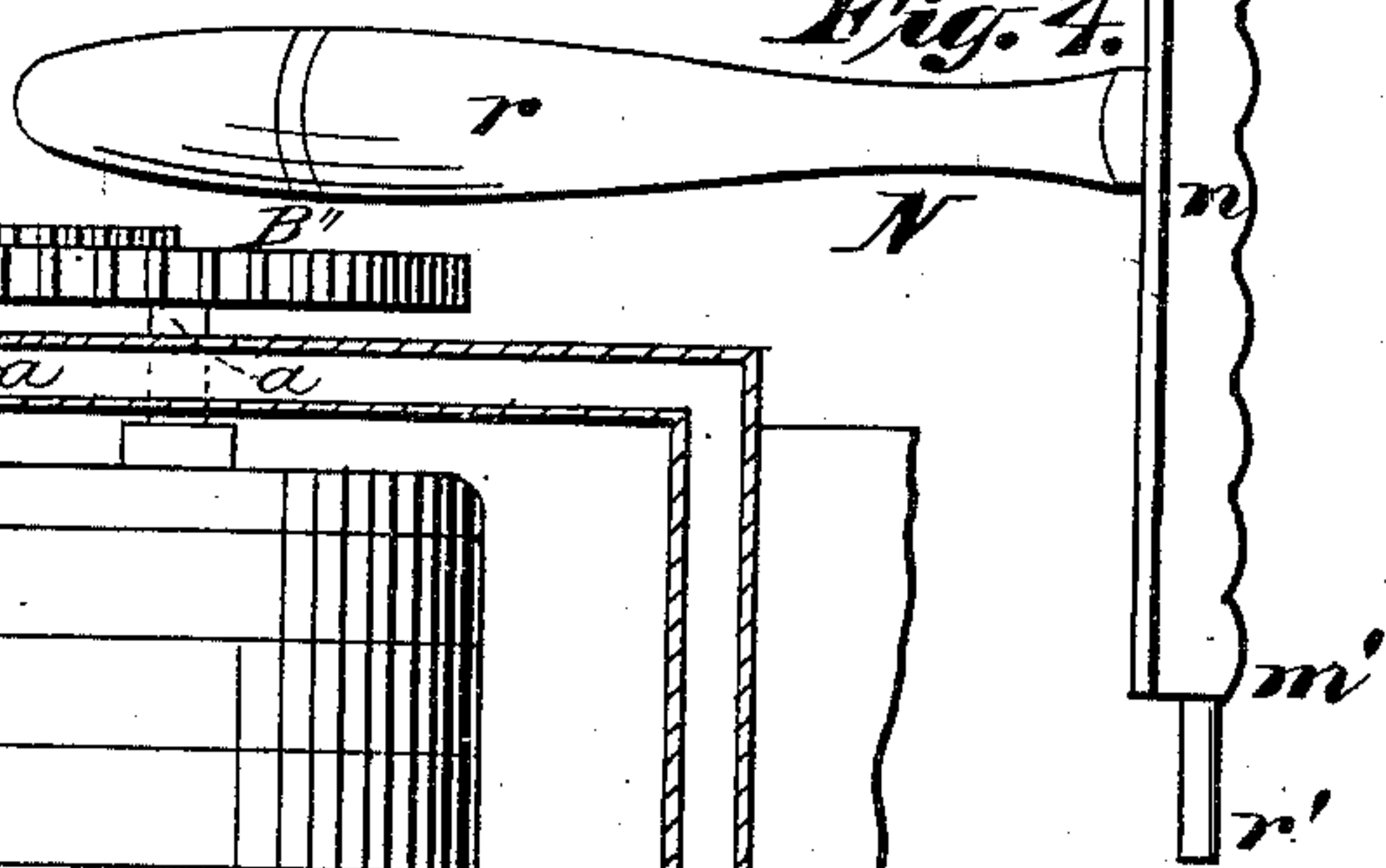


Fig. 2.

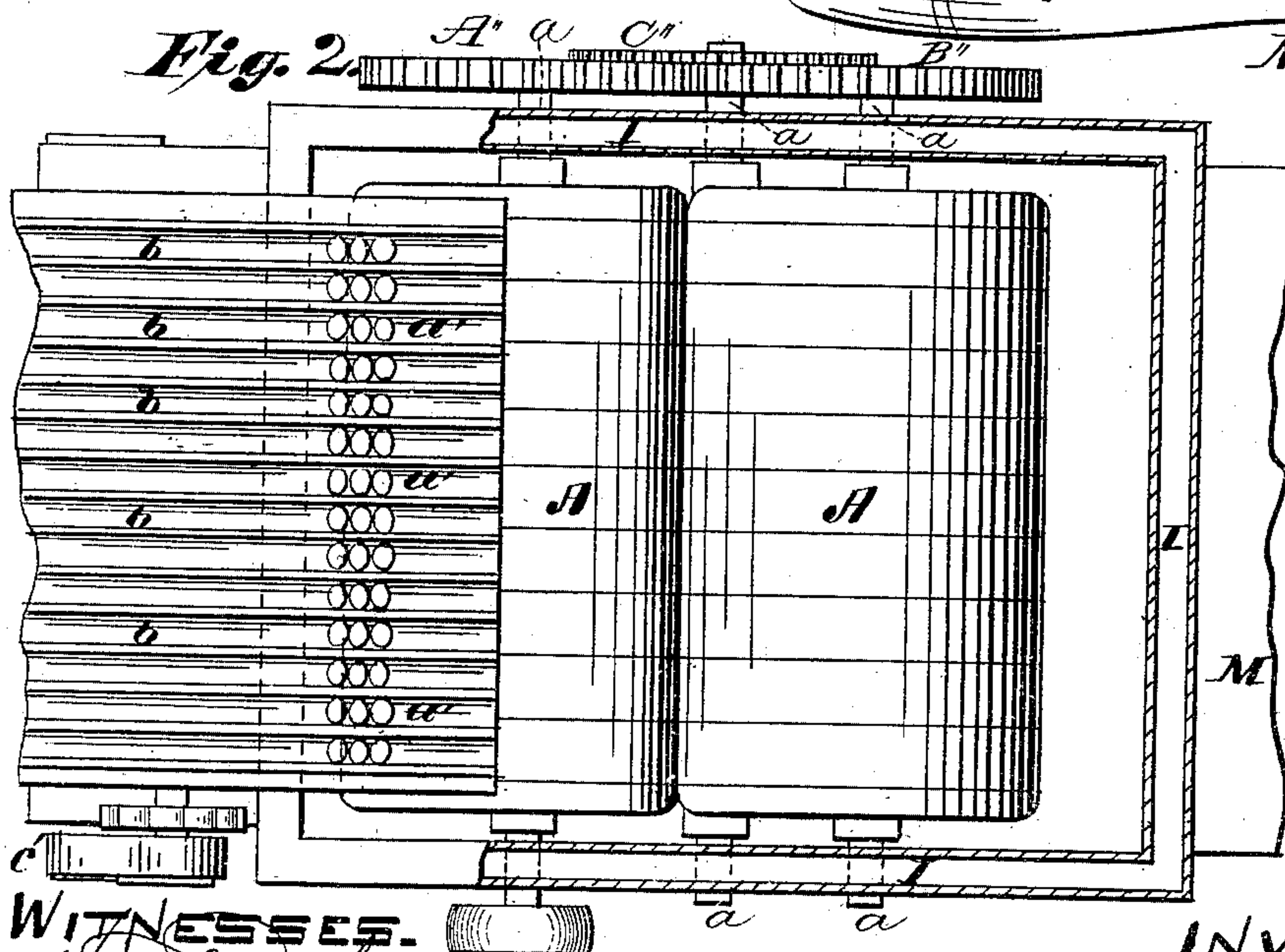
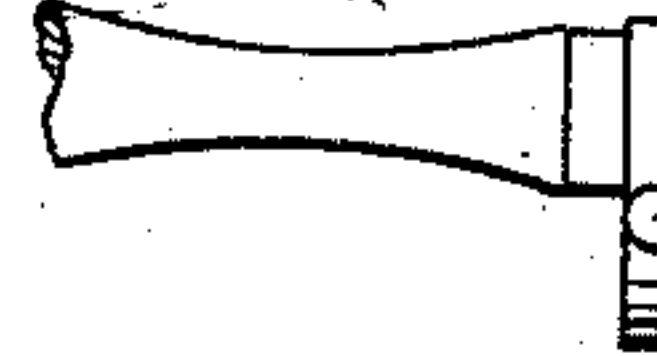


Fig. 5.



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PROCESS OF AND APPARATUS FOR COATING PILLS.

SPECIFICATION forming part of Letters Patent No. 229,785, dated July 6, 1880.

Application filed April 22, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WHITNEY, of the city, county, and State of New York, have invented certain Improvements in Process of and Apparatus for Coating Pills and Similar Articles with Gelatine or other Suitable Coating Material, of which the following is a specification.

This invention comprises a novel process or method of coating pills, &c., with gelatine or other suitable coating material by subjecting the pills or like articles to the action of soft and elastic surfaces charged or supplied with gelatine or other coating material in a more or less fluid or semi-fluid condition. Said process is carried into effect by certain novel combinations of parts, hereinafter fully set forth.

Figure 1 is a partial side and vertical longitudinal sectional view of an apparatus embraced in my said invention and intended for carrying into effect the process which forms part of my said invention. Fig. 2 is a plan and horizontal sectional view of said apparatus. Fig. 3 is a sectional view, illustrating the preferred construction of one part of said apparatus, and Figs. 4 and 5 are detached views, representing an implement designed to be used in conjunction with the apparatus aforesaid.

A, B, and C are rolls, placed substantially parallel with each other, in the position represented more fully in Fig. 1. These rolls are preferably made of sponge, A', secured upon a suitable shaft, *a*. The roll A moves in such contact with the roll B that where the said rolls touch each other the sponge or soft material A' is compressed. In like manner the roll C works in contact with the roll B, a similar compression of the sponge or soft material occurring at the place of contact between the two said rolls. The aforesaid rolls may be made of any material which possesses the properties of softness and elasticity, and, preferably, of porosity also, in the requisite degree. Thus, for example, extremely soft and elastic felt might be used in place of the sponge, and it is probable that rolls formed of curled hair, proofed against the action of water and inclosed by a suitable fabric, would serve the same purpose as those formed of sponge, as aforesaid. Placed parallel and in contact with each of the aforesaid rolls A, B,

and C is a feed-roller, D. Underneath each feed-roller D is a trough, E, in which the fluid or semi-fluid coating material is placed.

The rolls A B C and the feed-rollers D receive a continuous rotary movement in the directions indicated by the arrows in Fig. 1 by means of any suitable gearing, belt-connections, or the like.

The rolls A B C, feed-rollers D, and troughs E, except at F and G, are surrounded by a steam-jacket, I.

Extended into the opening F is a stationary feed-board, K, the upper surface of which is formed with longitudinal grooves *b*, as more fully represented in Fig. 2. The said feed-board K is placed in a slightly-inclined position, as represented in Fig. 1, and at the inner and lower end of each groove *b* is provided a slight curved elevation, as shown at *a'*.

Attached at one side of the lower opening, G, and extended into close proximity to the under side of the roll C, and parallel with the latter, is a stripping-bar, *f*. Underneath the said lower opening, G, at a suitable distance below the same, is an endless apron, L, supported upon the horizontal rollers *d*.

Extended into the space between the upper and lower parts of the endless apron L is an ice-box, G', the upper part of which may be of sheet metal and flat, so as to support the upper part of the endless apron, and at the same time keep the same in a quite cold condition, for the purpose hereinafter stated. This ice-box G', when the apparatus is in operation, may be filled with ice or any other refrigerating material to maintain the top at a temperature sufficiently low to partially congeal the gelatine or like material to a comparatively non-adhesive condition, in which it adheres with difficulty to other surfaces.

At one end of the endless apron L is a stationary table, M.

To the shaft *a''* of one of the rollers *d* is attached a pulley, *c'*, as represented in Fig. 1, from which a belt, *g*, is extended upward to another pulley, *f'*, on the shaft *b''*, as also indicated in said Fig. 1. On the shaft *b''* of the last-named pulley *f'* is placed a ratchet-wheel, *n*, the upper part of which projects upward beyond the upper surface of the feed-board K.

N is a pushing device, composed of a cross-

head, n , the outer surface, m' , of which is made of such form as to fit transversely into or upon the grooved upper surface of the feed-board K, the said cross-head n being provided with a suitable handle, r , by which it can be used, as hereinafter explained, and also having at one end a projecting stud, r' , which serves as a pawl for actuating the ratchet n , as herein presently set forth.

The operation of the apparatus is as follows: The pills to be coated are thrown upon the grooved upper surface of the feed-board K and are ranged in the grooves b , as represented in Fig. 2, the rounded elevation a' at the inner and lower end of each groove preventing the pills from passing out of the groove until designedly moved, as presently herein set forth. The elevations a' being on line across the lower or inner end of the feed-board K, it follows that the pills will be ranged in transverse lines or rows across the said feed-board, as shown in Fig. 2. The apparatus being put in operation, the solution—gelatine or other suitable coating material (said solution prepared in the usual or any appropriate manner)—in the trough C is carried in due quantity by the feed-rollers to the rolls A B C, which receive upon their circumferential surface a film or layer of the said coating material in its fluid or semi-fluid condition, the said rolls, together with the troughs C and the feed-rollers, being maintained at a suitably high temperature by means of the steam-jacket I. The tool or implement indicated in Figs. 4 and 5 is then taken by its handle r , and its cross-head n is then inserted behind the innermost transverse row of pills—in other words, that row of pills which rests immediately behind or against the elevations a' —and the whole row is then pushed over the said elevations a' to or upon the top of the roll A, the rotation of which carries the pills around between the rolls A and B, the soft elastic surfaces of which, saturated with the fluid or semi-fluid gelatine or coating material, are compressed against each other at their place of contact, and, compressing the pills between them, deposit upon the surfaces of the pills a suitable quantity of the gelatine or other coating material. The pills then fall upon the roll C, by which they are carried between the said roll C and the roll B, where the operation is repeated in the same manner as previously between the rolls A and B. The pills, still adhering to the surface of the roll C, are then carried around until they are brought to a position underneath the said roll C, when they either fall therefrom by their own weight or are stripped by coming in contact with the stripping-bar f , whereupon they are deposited upon a receiving-plate, R, which is placed upon the endless apron L, the said plate R being kept cold by the proximity of the ice-box G', so that the coating of gelatine or other material upon the pill is chilled or brought into that comparatively non-adhesive condition in which it adheres with difficulty to other surfaces.

The pills from the feed-board K, in the manner above described, are pushed in successive rows upon the roll A, and, being passed first between the rolls A and B, and then between the rolls B and C, receive a full and complete coating of the gelatine or other coating material before they are deposited upon the receiving-plate R.

In order to more thoroughly facilitate this coating operation it is preferred that the roll C should have a somewhat greater speed than the roll B, in order that the pills may be more or less turned over or rotated while passing between the two last-named rolls. In like manner, when preferred, the roll B may have a more rapid rotation than the roll A, for the same purpose; or all three of the rollers may have a different circumferential speed with reference to each other—as, for example, the roll B may be made to move faster than the roll A, and the roll C at the same time move faster than the roll B. This relative degree of motion may be secured by suitable gearing upon the shafts of the rolls—as, for example, a gear-wheel, A'', on the end of the shaft of the roll A gears with another, B'', of sufficiently smaller circumference, on the shaft of the roll B, and this second gear-wheel, B'', with a third, C'', of still less circumference, on the shaft of the roll C. Motion may be given to the rolls by means of a pulley, D'', on the shaft of any one of them—as, for instance, of the roll A.

Just before each successive row of pills is pushed from the feed-board K to and upon the roll A a stud, r' , of the tool or implement N is caused to catch on or against one of the teeth of the ratchet n , and as the implement is pushed forward to discharge the row of pills upon the roll the action of the stud r' upon the teeth of the ratchet n partially rotates the latter, and consequently, acting through the pulleys f' c' , the belt g , and rollers d , partially rotates the endless apron L, so that its upper side carries forward the receiving-plate R a certain space or distance, so that the pills as they are dropped or deposited from the roll C do not fall one upon another, but are deposited upon the plate R without being brought in contact with each other. The parts are so proportioned that as the plate R is carried forward it is passed from the endless apron to and upon the table M, so that another plate, R, may be placed behind it as occasion requires, and receive another and succeeding quantity of the coated pills, and so on during the time the apparatus is kept in operation.

By the process and apparatus herein described very large quantities of pills may be effectually coated in a very short time and at a very small fraction of the expense hitherto required.

In the construction of the rolls A B C the sponge or soft and elastic material may be attached to the shafts a in any suitable manner. It is believed, however, that the rolls may be best constructed by placing upon the shaft a

a series of clamping-plates, S, with laterally-projecting studs, as shown in Fig. 3, the sponge or soft and elastic material being made in circular plates, placed side by side, and clamped
 5 between the clamps S, the laterally-projecting spurs or teeth of the clamps S holding upon the soft material to more effectually retain it in place. Any suitable construction of the rolls, however, may be adopted, and any material may be used (in place of the sponge)
 10 which will afford an extremely soft and at the same time an extremely yielding and elastic surface to the rolls. I believe, however, that sponge is the best material, not only because
 15 of its softness and elasticity, but because of the fact that when compressed at the points of contact of the rolls A B C it will give out the fluid or semi-fluid material with which it is saturated, so as to freely deposit the same
 20 upon the pills, but when released from said pressure will more or less absorb such portions of said material as has not been deposited upon the pills into its substance, so that the pills are more readily passed from the rolls A
 25 B to the roll C, and also more readily dropped from the roll C, than would be the case if the rolls did not possess this peculiar absorbent property.

It is also to be understood that instead of
 30 three rolls placed in the position represented in the drawings, and which I prefer, four or any greater number of rolls may be used, and the pills, instead of being passed from between the rolls A and B to and between the rolls B
 35 and C, may be passed in succession between successive pairs of the soft and elastic rolls duly charged with the coating material.

It is also manifest that various methods of supplying the coating material to the rolls may
 40 be employed, although the feed-rolls D, in conjunction with suitable troughs, E, as herein described, are to be preferred.

It is also to be observed that, when preferred,
 45 any of the usual substitutes for gelatine in coating pills—such, for example, as jujube or compounds more or less resembling gelatine, such, for instance, as solutions of gum-arabic or similar substances—may be used instead of gelatine as a coating material.

The plate R is preferably made of a sheet of
 50 "oiled silk," so termed, stretched upon a circumferential wire frame, the surface of the silk affording little opportunity for any adhesion of the gelatine to said surface, and said fabric
 55 being, moreover, so thin as to be readily cooled by the action of the ice-box or refrigerated device G' when placed in relation therewith, as hereinbefore explained. The wire frame, of course, serves merely to distend and hold in
 60 position the sheet of the said fabric for the uses aforesaid.

What I claim as my invention is—

1. The process of coating pills and similar articles with a protective adhesive substance
 65 which consists in passing them between and in contact with the surfaces of soft elastic ma-

terial charged or supplied with the coating substance, substantially as herein set forth.

2. In an apparatus for coating pills or like articles, two soft and elastic rolls, in combina-
 70 tion with suitable means of supplying the coating material to the said rolls, substantially as and for the purpose herein set forth.

3. In an apparatus for coating pills or like articles, the combination of a feed-board with
 75 two or more soft and elastic rolls and suitable means for supplying the coating material to the said rolls, substantially as and for the purpose herein set forth.

4. In an apparatus for coating pills or like
 80 articles, the combination of the soft and elastic rolls A and B with feed-rolls D and troughs E, substantially as and for the purpose herein set forth.

5. In an apparatus for coating pills or like
 85 articles, the combination of the soft and elastic rolls A, B, and C, placed in relation with each other substantially as and for the purpose herein set forth.

6. In an apparatus for coating pills or like
 90 articles, the soft and elastic rolls A, B, and C, placed in the described relation with each other, in combination with feed-rolls D and troughs E, all substantially as and for the purpose herein set forth.

7. In an apparatus for coating pills or like articles, the combination of two or more soft and elastic rolls, means for supplying the said rolls with the coating material, and an endless
 95 apron, L, substantially as and for the purpose herein set forth.

8. In an apparatus for coating pills or like articles, two or more soft and elastic rolls, in combination with means for supplying the coating material to the said rolls and mech-
 105 anism, substantially as herein described, for imparting a differential velocity to said rolls, substantially as and for the purpose herein set forth.

9. In an apparatus for coating pills or like
 110 articles, the combination, with the coating mechanism, of a refrigerated receiving device, whereby the pills are chilled (and rendered incapable of adhering to other surfaces) immediately upon their release from the coating de-
 115 vices, substantially as and for the purpose herein set forth.

10. In an apparatus for coating pills or like articles, the combination of a steam-jacket, I, with two or more soft and elastic rolls and
 120 means for supplying the said rolls with the coating material, substantially as and for the purpose herein set forth.

11. In an apparatus for coating pills or like articles, the combination of the rolls A, B, and
 125 C, feed-rolls D, troughs E, and steam-jacket I, all substantially as and for the purpose herein set forth.

12. In an apparatus for coating pills or like articles, the combination of the grooved feed-
 130 board K, the soft and elastic rollers A B C, feed-rolls D, troughs E, and steam-jacket I,

all substantially as and for the purpose herein set forth.

13. In an apparatus for coating pills or like articles, the combination of the endless belt L, the feed-board K, two or more soft and elastic rolls, means for supplying the said rolls with the coating material, and mechanism, substantially as described, for actuating the endless

apron in unison with the feeding of the pills from the said feed-board K to the said rolls, all substantially as and for the purpose herein set forth.

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Witnesses:

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H. F. PARKER.