(Model.)

2 Sheets—Sheet 1.

J. KREHBIEL.

CAPSULE MACHINE.

No. 315,416. Patented Apr. 7, 1885.

Fig 1

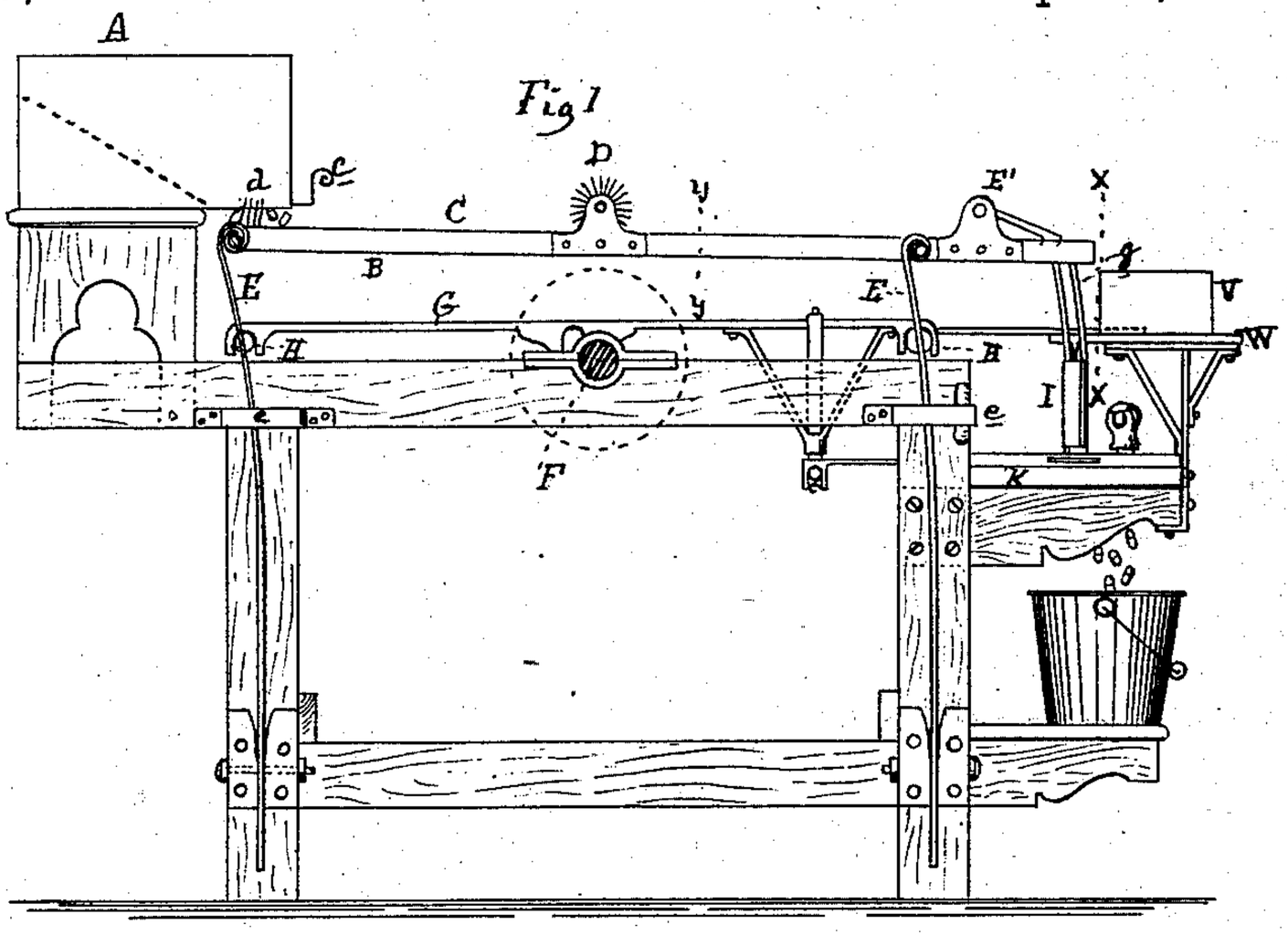


Fig 2.

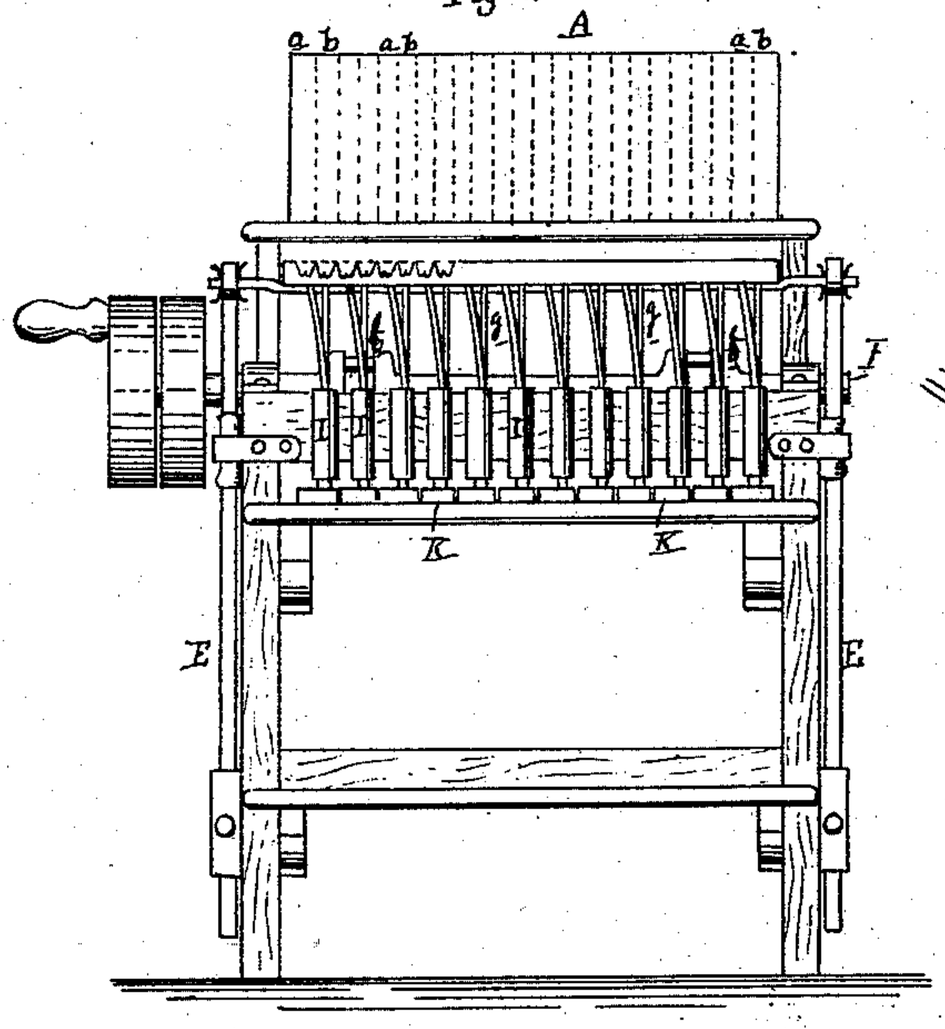


Fig. 3.

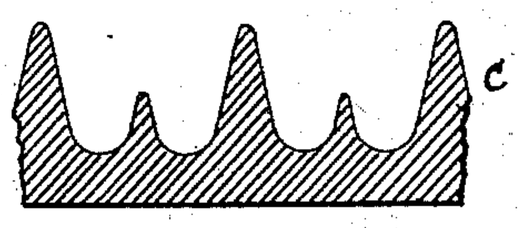
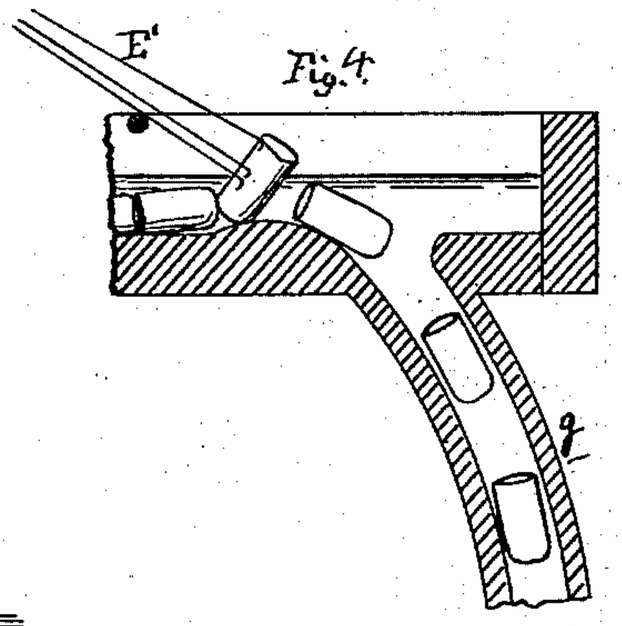


Fig. 4.



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(Model.) 2 Sheets—Sheet 2.

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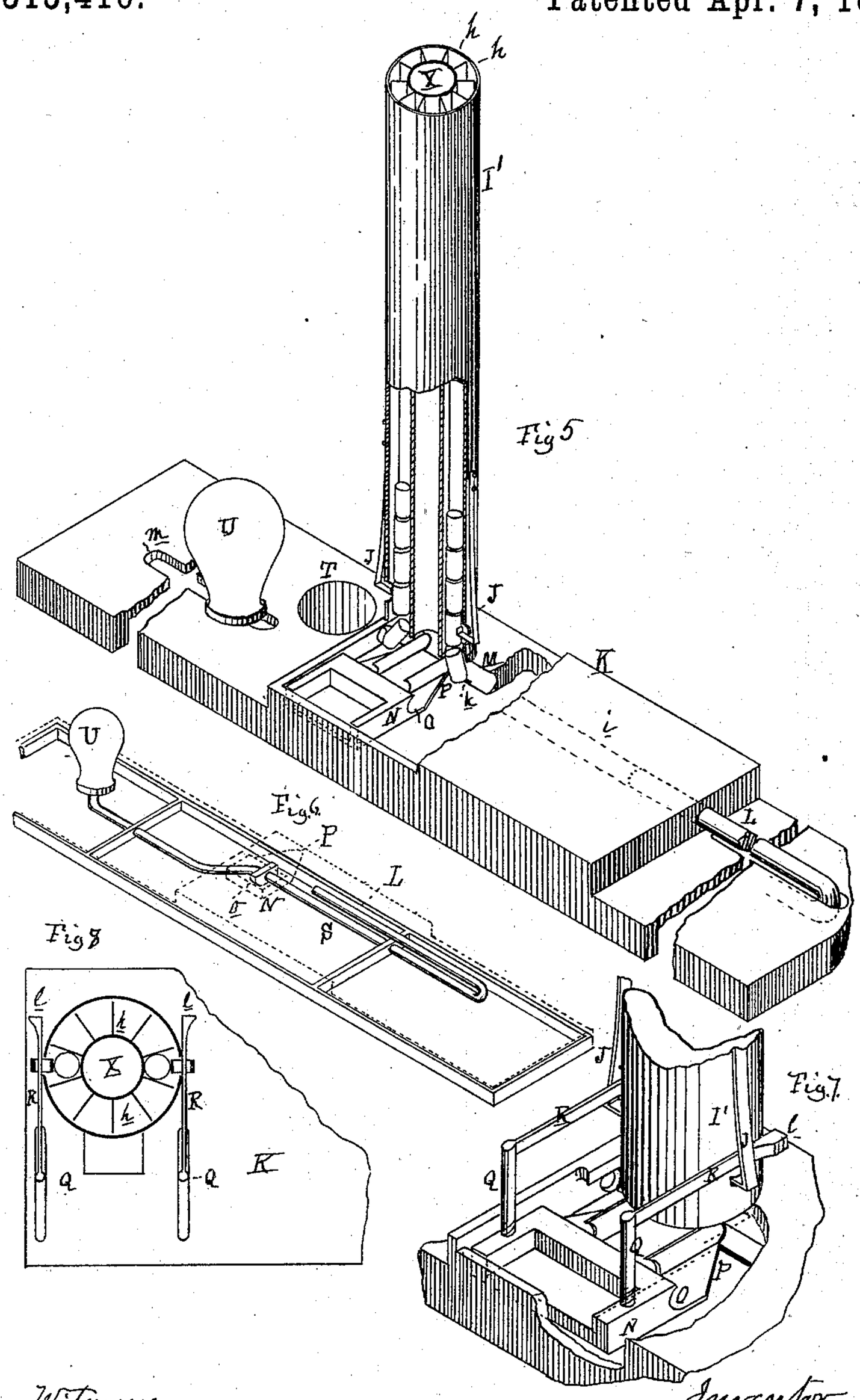
CAPSULE MACHINE.

No. 315,416. Patented Apr. 7, 1885.



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UNITED STATES PATENT OFFICE.

JOHN KREHBIEL, OF DETROIT, MICHIGAN.

CAPSULE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 315,416, dated April 7, 1885

Application filed March 26, 1884. (Model.)

To all whom it may concern:

Be it known that I, JOHN KREHBIEL, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Capsule-Finishing Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in devices for joining together automatically the caps and bodies of gelatine capsules, such as are now ordinarily made, with the internal bore of the cap fitting the external of the body, making what is commonly called a "stove-pipe" joint. The device is so constructed as not only to perform this function, but also, when desired, to fill such capsules with quinine or other dry medicaments before the cap is arranged in place. As is well known, gelatine capsules are now formed in the shape of cylinders with one end closed, and of regulated sizes to hold from one grain upward of dry medicaments, and the cap is similarly made, but shorter.

The invention consists in the peculiar construction of parts and their various combinations and operation, as more fully hereinafter described and claimed.

Figure 1 is a side elevation of the device. Fig. 2 is a cross-section on the line X X in Fig. 1. Fig. 3 is a cross-section on the line Y Y, Fig. 1. Fig. 4 is a vertical central longitudinal section through one of the conductors. Fig. 5 is an enlarged section showing the conducting-tubes for the capsules and their caps surrounding a conducting-tube for the medicaments, and the arrangement of parts which close the cap upon the body of the capsule. Fig. 6 is a detail of Fig. 5. Fig. 7 is a perspective of the lower part of the delivering-tubes. Fig. 8 is a cross-section in line with the arms R, shown in Fig. 7.

In the accompanying drawings, which form a part of this specification, A represents a hopper with an incline bottom, as shown in dotted lines, and divided longitudinally into pairs of chambers, the first one, *a*, of each pair being designed to be filled with capsule-bodies, and the second one, *b*, of each pair to receive the caps, or vice versa, and there may be as many pairs of these chambers as may be desired. A slide with an external handle, *c*, controls an opening in the front edge of the bottom of this hopper A, to regulate the delivery of the contents of the various chambers.

The capsules and caps are put into their respective chambers without reference to their position each with relation to the other; but as it is necessary that the open ends of both the caps and capsules be finally presented toward each other, in order to secure such presentation I provide across the bottom of such hopper a series of very fine spring-teeth, which project slightly into the opening on the bottom, and, being attached to a vibrating bar, B, preventing the capsules and caps choking in the delivery-orifice of the hopper. These caps and bodies are delivered into grooved ways C, which are arranged in pairs, as shown in Fig. 3, and as many of such pairs standing side by side as are desired, and these ways are secured to or formed upon the vibrating bar B, the vibrations of which have a tendency to carry the caps and bodies each in its particular groove toward the front of the machine, and this bar and ways may be vertically adjustable, so that the rear end, if preferred, may be slightly elevated to give a more certain travel to the caps and bodies. Now, in the travel down the ways toward the front of the machine, some of the caps or bodies may be presented with the closed end and others with the open end, and as it is necessary that before reaching the front of the machine the closed ends all be presented in one direction, I employ a series of rotary brushes, D, arranged upon a shaft laterally across the grooved ways, one of such brushes being provided for each of such grooved ways. Now, as these bodies and caps travel down each its own groove, if the open end is presented toward the front, one of the spring-teeth of these brushes, always being presented at the right angle, will enter the open end of the capsule or cap and turn it over, so that the butt of the closed end is presented.

Near the front end of the ways there is arranged (one for each of the grooves and laterally across the same) a series of like spring-fingers, E′, so arranged that should by any accident caps or bodies be presented at this point with the open ends these little spring-

teeth will turn them over prior to their being discharged into the delivery-tubes. If preferred, such spring-fingers may be substituted for the spring brush wheels D, as they are very accurate and certain in their operation.

A vibratory motion may be given to this carrier-bar C by any of the known ways. I have shown it supported upon the upper end of two vertical spring-bars, E, the lower ends of which are adjustably secured to the frame, and near the upper portion of the frame guides *e* are employed to hold such spring-bars in a vertical position, and at the same time allow the vibrating motion. A crank-shaft, F, driven by hand or by power, as may be desired, is provided with two eccentrics, *f*, which communicate the vibratory motion to bars G, the ends of which engage with the cross-bars H, the ends of which latter engage with the spring-bars E, and by this means the vibratory motion is given to the carrier-bar C. I do not desire to confine myself to this method of communicating this vibratory motion, as many other ways equally effective can be employed without departing from the spirit of my invention. Neither do I desire to confine myself to this carrier-bar C as a means of carrying the caps and capsule-bodies from the hopper to the joining devices, which will be hereinafter described, as an endless belt grooved for the purpose may be employed as a carrier, perhaps with equally good results.

We have now the capsules and their bodies presented with their closed ends at the end of the rod for delivery now to the joiner. At the end of the carrier, and so arranged as to receive the caps and bodies each from its particular groove of the carrier, there are arranged pipes or tubes *g*, one to receive the body and the other the cap, with their closed ends projected in advance, as more clearly shown in Fig. 4, and each one of the grooves of the carrier is arranged to discharge the bodies and capsules each into its special tube, the closed end downward, and the tubes, by the action of the vibrator and its attachments, are kept filled with such bodies and caps resting upon each other, and these tubes or pipes may be extended through the cylinder I to the lower end; or they may discharge into the cylinder I′, constructed as shown in Fig. 5, such tube-cylinder I′ being divided into an equal number of radial chambers, *h*, the pipes or tubes being so arranged as to discharge the bodies and the caps into chambers immediately opposite each other, as shown in the latter-named figure, and this cylinder I′ is made to revolve upon its base, so that when one pair of the chambers are filled it may be slightly turned to present another pair, and so on until it is filled, if it is so desired, and as may be preferred for some uses. Near the bottom of this cylinder spring-catches J are arranged, as shown in Fig. 5, either in relation to the pairs of radial chambers or in relation to the lower end of the tubes in the cylinder I, when the radial chambers are not used, and by the action of these springs the capsules are held in place until the pressure of the spring is removed.

K is the bed of the joiner proper, through which is formed a cylindrical guide, *i*, through which the plunger-rod L reciprocates, and this hollow guide is in axial line with the axis of the fixed half M of the jaw.

N is a slide, upon the inner face of which is formed the other portion, O, of the jaw, the recess or cylinder formed by such parts of the jaw, when in immediate juxtaposition, being coincident with the guide *i*. This slide N has a reciprocating motion across the bed K, and its front edge or end, P, is V-shaped and passes in the reciprocation of the slide under the fixed portion of the jaw in a slot, *k*, formed therein. To this slide N the standards Q are secured, carrying at their upper ends laterally-projecting arms R, which pass underneath the springs J and terminate in wedge-shaped heads *l*, so that in the rearward motion to close the jaws O M together the V-shaped termination of the slide N passes between the body of the capsule upon one side and the cap upon the other, as shown in Fig. 5, and presents them toward each other by crowding at their bottom ends, which are the closed ends, with their open ends in juxtaposition, the movable jaw O closing upon them and holding them in that position until the plunger L is operated to force the open end of the body of the capsule into the open end of the cap, when a further motion of the plunger drives them through the jaws into the opening T in the bed, whence they are discharged. The retraction of the slide N brings the wedge-shaped heads L of the arms R into contact with the springs J and opens them, so that the next body and cap will drop, their closed ends resting upon the bed, ready to be tilted by the next forward movement of the slide and movable jaw.

In Fig. 6, which is a plan of the plunger L and its attachments with the bed removed, the plunger L is shown bending back upon itself to form the lever S, which passes through a guide, *o*, upon the under side of the slide N, and from this point this lever curves outwardly, as shown, and terminates in a handle, U, by means of which the plunger is moved backward and forward, the slot *m* in the bed allowing this to be done, so that in the forward movement of the plunger a reciprocating motion of the slide N is communicated to it, and a retraction of the plunger, by means of the handle U, withdraws the slide N, ready to repeat the operation.

If it is desired to fill the capsule-bodies with quinine or other dry medicaments in certain quantities which the body is designed to receive, a box, V, which has a reciprocating motion upon the standard W, being attached to the arm G for that purpose, as shown in Fig. 1, is divided into proper chambers, similar to that of the box A, every alternate chamber being coincident with the pipe which carries the body of the capsule, so that as each

body falls into the pipe the box B will discharge into it from its proper chamber in said box and immediately recede to cut off any further flow until the next capsule-body is presented, and this is all effected by the movement of the bar G, as hereinbefore described. In this case the body of the capsule is filled before the body is capped below; or, what is the equivalent of the process just described, the central bore, X, of the cylinder I′, as shown in Fig. 5, may be filled with medicament, discharging at its bottom in the line of the advance of the plunger between the chambers which discharge the capsule-body and cap, respectively, so that the movement of the plunger compels the body of the capsule to scoop up or fill itself with the medicament before it reaches the open end of the cap.

No claim is made in this application to the two-part adjustable jaw having an enlarged portion for holding the cap of a capsule in line with the body thereof, in combination with a reciprocating plunger constructed to compel the open end of the capsule to enter the open end of the cap, as this feature is shown and claimed in my application No. 114,333, filed December 12, 1883.

What I claim as my invention is—

1. In a device for joining the bodies and caps of gelatine capsules together, a series of chambers arranged in pairs adapted to deliver from one chamber of the pair the body of the capsule and from the other the cap thereof upon a grooved carrier, and turning devices, substantially as described, arranged in the paths of the bodies and the caps, for compelling a presentation of the closed end of said body and cap in their passage along the carrier, substantially as described.

2. In a device for joining the bodies and caps of gelatine capsules together, and in combination with the chambers arranged in pairs adapted to deliver from one chamber of the pair the body of the capsule and from the other the cap thereof, a grooved carrier, turning devices, substantially as described, for compelling a presentation of the closed end of said body and cap in their passage along the carrier, and a series of tubes or pipes arranged in pairs, one of said pipes being constructed to receive the body of the capsule and the other the cap from the conveyer or carrier, and to deliver the same to the joining mechanism, substantially as and for the purposes specified.

3. In a device for joining the bodies and caps of gelatine capsules together, and in combination with the chambers arranged in pairs adapted to deliver from one chamber of the pair the body of the capsule and from the other the cap thereof, a grooved carrier, turning devices, substantially as described, for compelling a presentation of the closed end of said body and cap in their passage along the carrier, a series of tubes or pipes arranged in pairs, one of said pipes being constructed to receive the body of the capsule and the other the cap from the conveyer or carrier, and to deliver the same to the joining mechanism, a fixed jaw, a device for compelling the body and cap to present their open ends toward each other, a reciprocating jaw constructed to hold such body and cap in position against the fixed jaw, and a plunger or rod to compel the open end of the body of the capsule to enter the open end of the cap, substantially as and for the purposes set forth.

4. The combination, in a capsule-machine, of a series of capsule-holders, a series of pairs of guides, one of each pair constructed to conduct the bodies and the other of each pair to conduct the caps, a series of medicament-holders for filling the capsules, and a series of cappers for jointing the caps to the bodies, substantially as described.

5. The combination, in a capsule-machine, of a series of channels for the conveyance of the parts of the capsule to the holders, with a series of turning devices constructed and arranged to catch in the open mouths of such portions of the capsules as are traveling wrong end foremost, to turn them over, and a series of pushing devices to cause the capsule-bodies to enter the caps thereof, substantially as described.

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