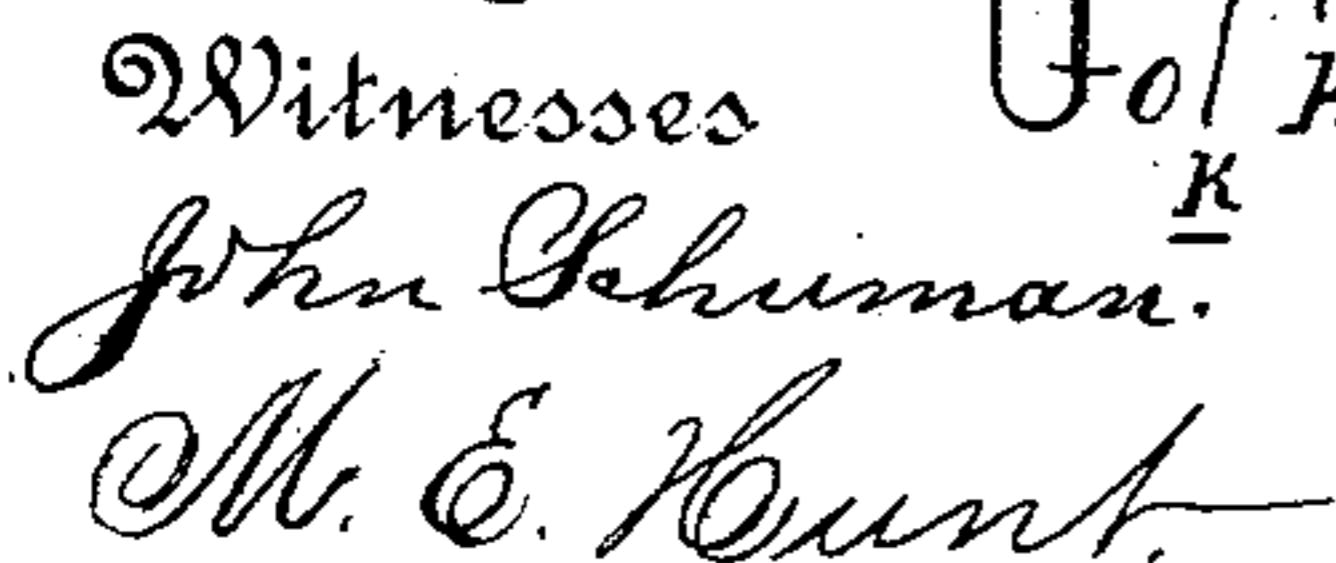


J. L. & J. E. WARREN.
CAPSULE TRIMMING MACHINE.

Patented Oct. 29, 1889.



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UNITED STATES PATENT OFFICE.

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CAPSULE-TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,989, dated October 29, 1889.

Application filed June 21, 1889. Serial No. 315,094. (No model.)

To all whom it may concern:

Be it known that we, JOHN L. WARREN and JOHN ERNEST WARREN, of the city of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Capsule-Trimming Machines; and we do 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.

Our invention relates to that class of gelatine-capsule-trimming machines in which the dried capsule is trimmed by a knife while the capsule is held on a spindle or mold; and it consists in the means for trimming the capsule, and in the means for revolving the spindle and capsule while the capsule is being trimmed or cut, and in the means for operating the machine, and in the peculiar combinations and arrangement of the various parts, as hereinafter more particularly set forth.

Figure 1 is a perspective view of our device from the front. Fig. 2 is a top view of our invention. Fig. 3 is a rear elevation. Fig. 4 is a horizontal section through the central girt. Fig. 5 is a top view of knife-bearing plate and knives.

In the drawings, A represents the table upon which the frame of the capsule-cutting machine rests.

B is the main frame of the machine.

B' is a flange at the bottom of the frame, projecting backward, by which the frame is attached to the table by proper bolts and nuts.

B² B² are the posts or uprights of the frame.

C, C', and C² are the lower, center, and upper girts of the frame. Two studs *c c* are cast on the front side of the lower girt, and two studs *c² c²* are also cast on the front side of the upper girt C². These four studs are all of the same height and form the rear guides of the reciprocating knife-bearing plate. Two studs *d d* are cast on the front side of the lower girt C, which are perforated for the reception of the screw *d'*.

D is a spring-bar extending across the frame in front of the lower girt C and attached to the studs *d d* by the screws *d'*. Two studs *e e* are cast on the uprights of the frame in line with the central girt C' and are perforated for the reception of the screws *e' e'*.

E is a spring-bar extending across the frame in front of the central girt and attached to the studs *e e* by the screws *e' e'*.

The spring-bars D and E are the front guides of the reciprocating knife-bearing plate, and by their elasticity always hold the plate against the studs *c c c² c²*. The lower girt is slotted at *f f* for the passage of the bolts *f' f'*, which are screw-threaded to engage with the screws in the gibs F F. The central girt is also slotted at *g g* for the passage of the bolts *g' g'*, which are screw-threaded to engage with the screws in the gibs G G. The inner ends of the gibs F F and G G form the side guides of the reciprocating knife-bearing plate H.

In order that the spring-bars D and E may have free play to hold down the reciprocating knife-bearing plate, the gibs F and G are made thinner than the height of the studs *d e* and are lower than the surface of the knife-bearing plate. Any other convenient means for guiding the knife-bearing plate may be used without departing from the spirit of our invention.

H is a reciprocating plate, carrying on its outer edges, at or near the top, the knives I I.

K is an iron bar or keeper, which is held in place by the screw-bolt *k*.

L is a leather friction driver interposed between the knife-blade I and the keeper K. This leather driver projects beyond the bar K, but does not extend to the edge of the knife-blade.

h h are stops on the back of the reciprocating plate and come in contact with the girts C and C' to limit the action of the plate.

M M are the sills of an auxiliary frame at the top and projecting backwardly from the standards of the frame B. These sills are united by the girts N N, which are perforated at *n n n n* to form journal-bearings for the spindles O O. The spindles are locked from longitudinal movement by the adjustable collars *o o o o*, secured in position by set-screws, and impinge against the inner sides of the girts N N. The outer ends of the spindles, which project beyond the front face of the frame B and the knife I, are of the same size and shape as the mold upon which the capsule is formed, or a shade smaller. The extent of the projection of the spindle beyond the knife determines the

length of the trimmed capsules. A groove P is cut entirely around the spindle in line with the edge of the knife-blade on the reciprocating plate and deep enough to allow the knife-blade to move in it without coming in contact with the bottom of the groove. This groove should be so narrow that the sides of the knife-blade should come in contact with the edges of the groove in order to make two cutting-edges.

R is a rod projecting from the rear of the reciprocating plate.

S S are two belts or straps, which are attached to the rod R in any convenient manner and pass up and over the spindles O between the girts N N. The weights T T are attached to the free ends of these straps. The friction of these belts on the spindles causes the spindles to revolve as these belts run up and down. Any other convenient means for revolving the spindles may be used as a rack and pinion without departing from our invention.

U is a pitman attached at its upper end to the foot of the reciprocating knife-bearing plate and at its lower end to the lever or foot-treadle W at a proper distance from the pivot of the lever. Foot-rests w w are formed at each end of the lever W.

X is a standard attached to and arising from the floor in a line with the front of the machine and at one side of the center of the knife-bearing plate. This standard is bifurcated at the top for the reception of the lever W, which is pivoted to the standards at x.

As it is necessary in the use of capsules in administering medicine that the capsule should be closed, it is the practice to close it with another capsule, forming a cap over the open end. Therefore, before the capsules are put on the market each must be furnished with its cap and the cap put on the capsule.

In the manufacture of capsules a mold of the shape and size of the capsule is dipped in dissolved gelatine, and the adhering gelatine is dried on the mold. For convenience of handling, a number of molds are attached to a plate, and all dipped and dried at once. The capsules thus formed are not in a proper condition to use. The open end is rough and irregular in thickness, and they are of unequal lengths. To reduce them to the same length and size is the purpose of our machine. The capsules when dried are removed from the molds and are ready to be trimmed.

In our machine one spindle is graduated to trim the body of the capsule of a certain size and length, and the other to cut the cap for the said body.

In operating our machine a tray containing the capsules to be trimmed is placed on the side of the machine next to the capsule-body spindle, and another tray with the capsules which are to form the caps on the other side. The operator, taking a capsule in each hand, places each on its proper spindle. A

downward pressure of one foot forces the knife-bearing plate upward. As the plate moves upward, the bolts or straps over the spindles are drawn down by the weights on their free ends, causing the spindles to revolve. The leather driver comes in contact with the capsule and the friction on the capsule causes that to revolve with the spindle. The revolution of the spindle and the capsule constantly presents a new surface to the knife to be cut until the revolution of the capsule and the stroke of the knife are completed and the extra length entirely cut off. A downward pressure of the other foot on the treadle causes the knife-bearing plate to recede, leaving the ends of the spindles free. The operator with one hand removes the body of the capsule, and with the other the cap, places the cap on the open end of the body of the capsule, and the finished capsule is ready for the market and for use.

What we claim as our invention is—

1. In a capsule-trimming machine, the combination of the reciprocating knife-bearing plate H with the ways in which the knife-bearing plate reciprocates, the pitman U, the foot-treadle W, the knives I, and the revolving spindles O, all substantially as described.

2. In a capsule-trimming machine, the combination of the knife-bearing plate H with the ways in which the knife-bearing plate reciprocates, the means for reciprocating the knife-bearing plate, the knives, the friction driver for revolving the capsule, the revolving spindle, and the belt and weight for revolving the spindle, all substantially as described.

3. In a capsule-trimming machine, the combination of the knife-bearing plate with the means for reciprocating the knife-bearing plate, the knives, the friction driver for revolving the capsules, the revolving spindles, and the means for revolving the spindles, substantially as described.

4. In a capsule-trimming machine, the combination of the knife-bearing plate with the means for reciprocating the knife-bearing plate, the knives, the revolving grooved spindles, the means for revolving the grooved spindles, and the friction driver for revolving the capsule, all substantially as set forth.

5. In a capsule-trimming machine, the combination of the reciprocating knife-bearing plate with the means for reciprocating the knife-bearing plate, the rear guides, the side guides, and the spring-bars in front of the reciprocating plate for preserving the alignment of the knives with the grooves in the spindles, the grooved revolving spindles, the means for revolving the spindles, and the knives, substantially as described.

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Witnesses:

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