

T. ROBERTSON.
LOZENGE-MACHINE.

No. 171,699.

Patented Jan. 4, 1876.

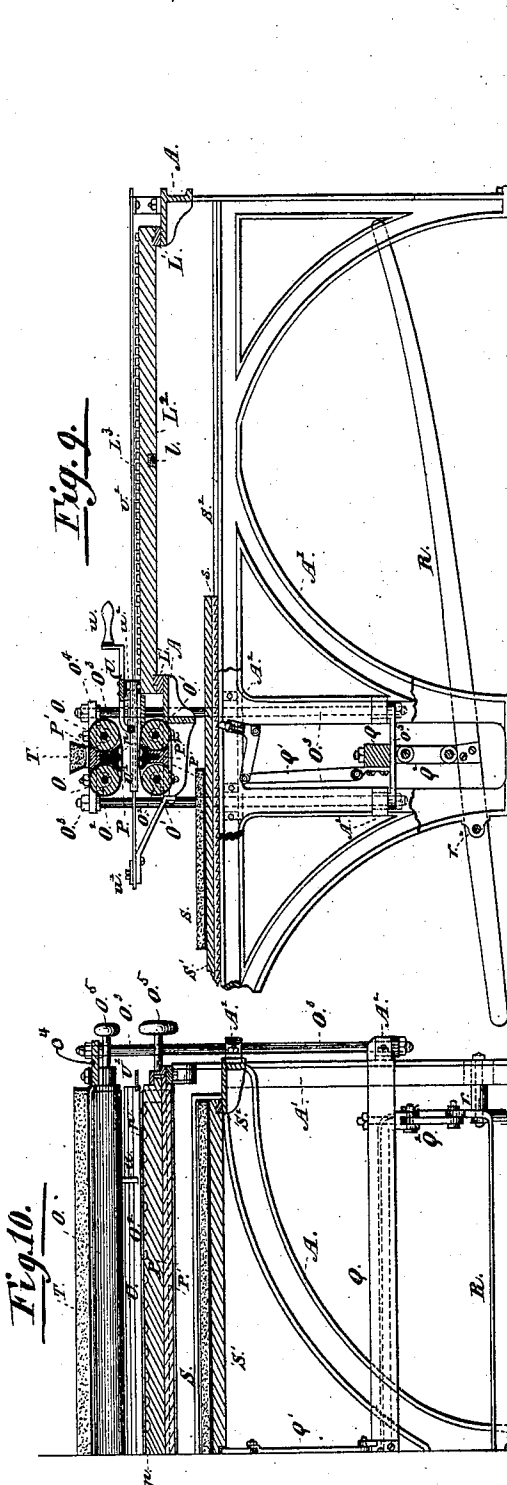


Fig. 10.

Fig. 9.

Witnesses;
Geo. A. Bird
Hugh A. Bird

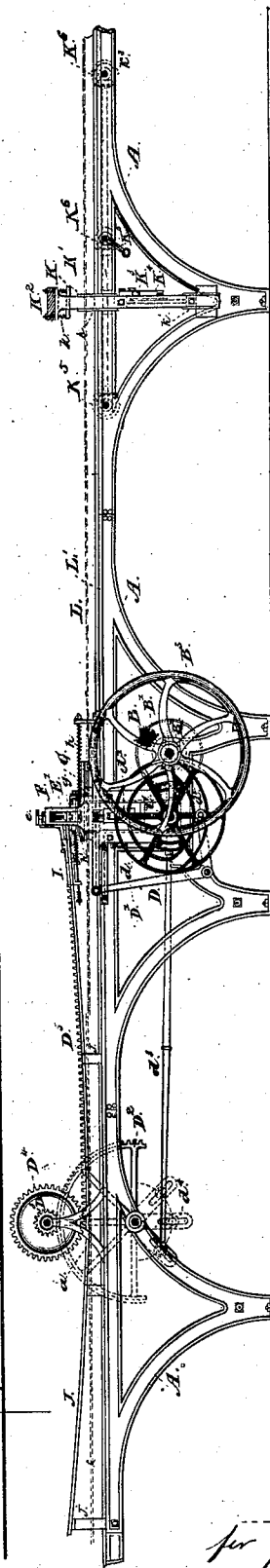


Fig. 1.

Inventor:
Thos. Robertson
per E. C. Ridout & Co. Mch

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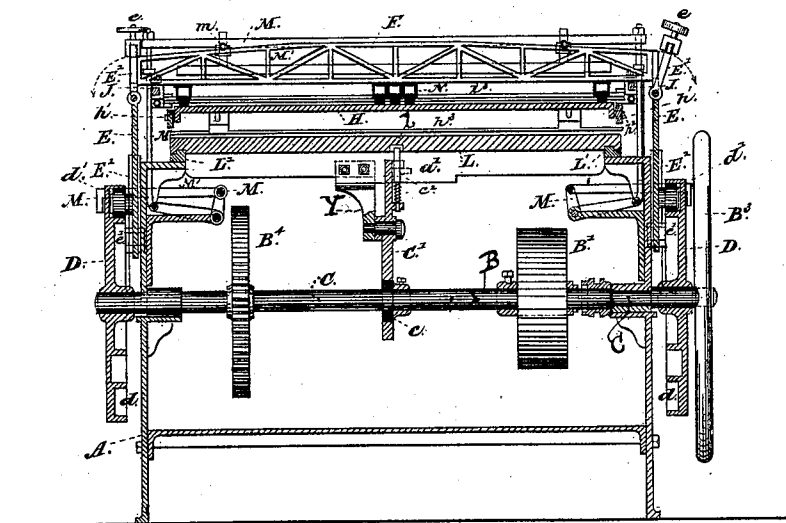


Fig. 2.

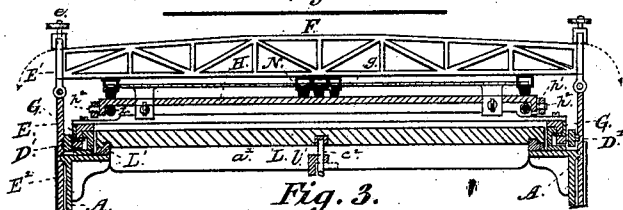


Fig. 3.

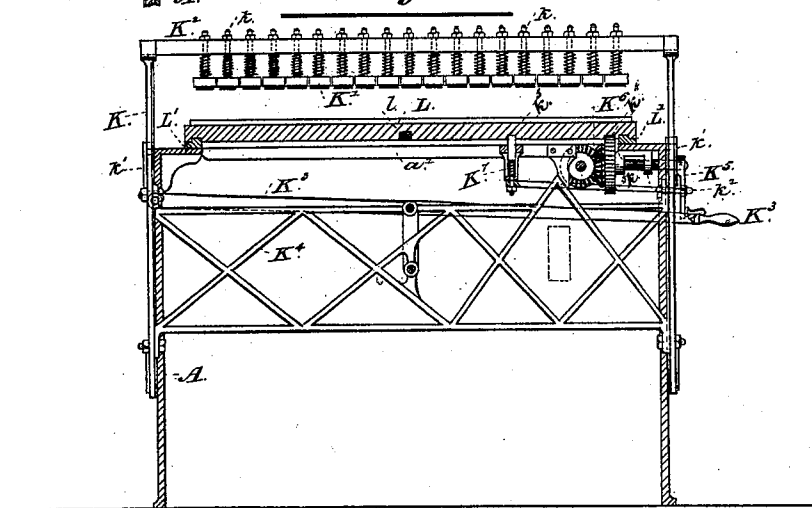


Fig. 4.

Witnesses:

Geo. A. Bird
Hugh Bird

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Fig. 8.

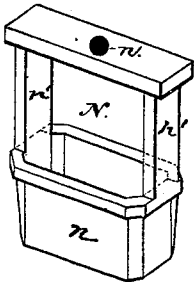


Fig. 7.

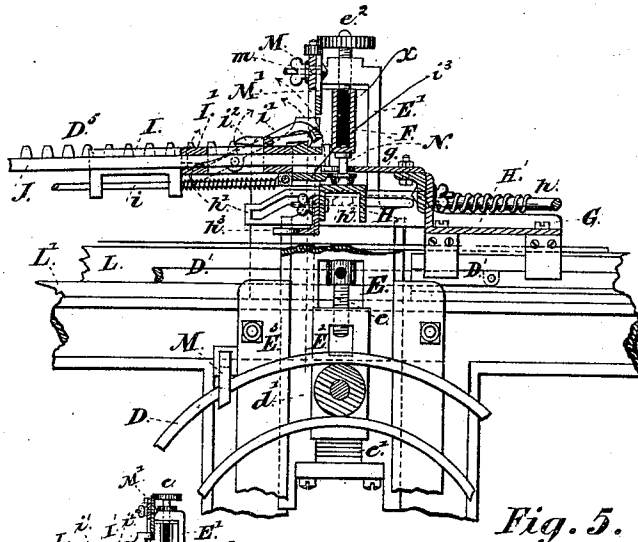


Fig. 5.

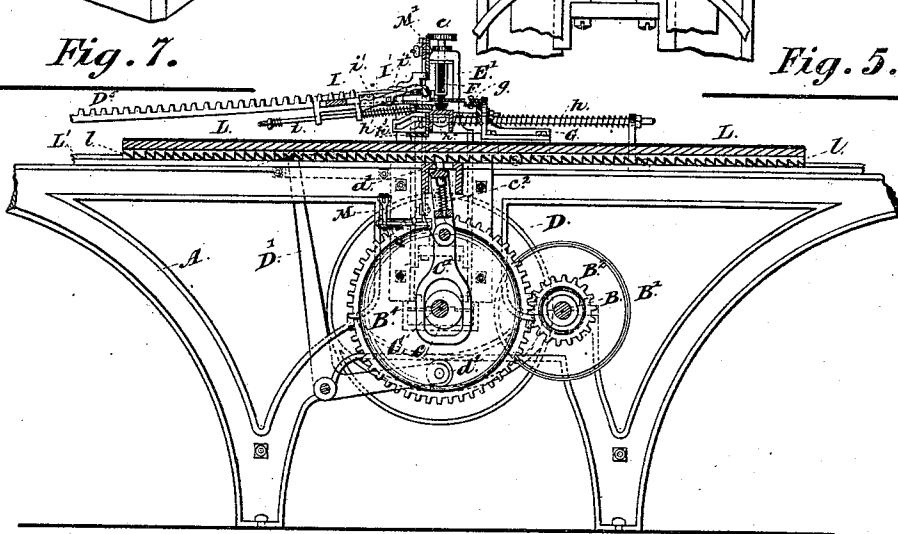


Fig. 6.

Witnesses;

Geo. A. Bird
Chas. A. Bird

Inventor;

Thos. Robertson
per D. C. Kidoutt & Co. Attys.

UNITED STATES PATENT OFFICE.

THOMAS ROBERTSON, OF TORONTO, CANADA.

IMPROVEMENT IN LOZENGE-MACHINES.

Specification forming part of Letters Patent No. **171,699**, dated January 4, 1876; application filed July 17, 1874.

To all whom it may concern:

Be it known that I, THOMAS ROBERTSON, of the city of Toronto, Province of Ontario, Canada, manufacturer, have invented an Improved Lozenge-Making Machine, of which the following is a specification:

My invention relates to the manufacture of printed and plain lozenges, and may be divided into four principal parts, viz:

First, printing the paste as it lies on the cutting-board. This is accomplished by a printing block or head, with adjustable dies affixed, attached to sliding standard, and worked by a suitable arrangement of levers.

Second, cutting the sheet of paste as it lies on the cutting-board, either after printing or when plain, into lozenges of any desired shape or size. This is accomplished by the action of adjustable hollow dies or cutters, affixed to a cutting-head, to which a reciprocating up-and-down motion is given by a pair of revolving wheels, each having an eccentric channel sunk in its face, in combination with sliding side standards, to which the cutting-head is attached.

Third, removing the lozenge, when cut, from the hollow dies, and placing them regularly on suitable drying-frames. This part of my invention is effected by the action of pushers, attached to a reciprocating horizontal frame, which push the lozenges, as they are crowded up through and above the top of the die at each cut, onto a traveling shelf or conveyer, which, worked by rack and pinion, as more particularly specified hereafter, deposits each set of lozenges cut in each revolution on frames, covered with bolting-cloth or other suitable material.

Fourth, feeding the cutting-boards and drying-frames forward automatically. This portion of my invention is performed by the action of an eccentric, keyed to a revolving shaft, in combination with, and working within the end of, a pivoted lever, whose opposite end fits in a toothed track sunk in the bottom of the cutting-boards.

In the accompanying drawings, Figure 1 is a side view of my machine, embodying only the printing, cutting, and conveying mechanism, want of space compelling the drawings, Figs. 9 and 10, of the lozenge-molding appa-

ratus to be placed above on the same sheet; but it must be distinctly understood that the frame of the machine is continuous throughout. Fig. 2 is a cross-section through the cutting-head, looking toward the pressing end of machine. Fig. 3 is a section through the same point, looking in the opposite direction. Fig. 4 is a cross-section through the printing-block. Figs. 5 and 6 are longitudinal sections through the cutting-head. Fig. 7 is a detail in perspective of the cutting-die. Fig. 8 is a detail of the shelf or conveyer when at the back end of the stroke, and just before depositing the lozenges on the frame.

A is the frame of the machine, constructed, as shown, of iron or other material, consisting of two sides, connected by bolts and girders. At or near the center of the machine is placed the mechanism for cutting the lozenges; at the front end, the printing apparatus; at the rear end, the molding mechanism. The paste is received on the wood cutting-board L, in an evenly-spread and regular sheet, from a pair of rollers placed at the front end of the machine. The cutting-boards L are rabbeted out near the edge, and fit on guides L¹, which extend the whole length of the machine, and are fastened to a broad flange cast on the top of the sides. In the center of the bottom of the cutting-boards L a toothed rack, l, is inserted. K² is the printing head or block, fastened at each end to the upright sliding standards K. To K² are attached the adjustable printing-dies K¹, having on their under faces the mottoes or designs to be printed. Any convenient number of mottoes may be placed on one die. k are die-spindles, around which are placed spiral springs, for regulating the pressure on each die, and also the pressure that can be applied in printing the mottoes on the paste. The compressive strain on these springs is regulated by a nut on the spindle k, above the printing-block K². The standards K are connected by a wide cross-girder, K⁴, which is attached in the center to the lever K³, by which the standards and attachments are operated.

The weight of the head, &c., can be counterbalanced by a weight or by friction. K⁶ are three bevel-wheels attached to a shaft and operated by the handle K⁵. The end wheels

gear into wheels which are attached to short shafts, on which are placed spur-wheels, which fit into a toothed rack sunk in the bottom of the cutting-boards. K^7 is a spring-stop, which fits into notches sunk in the under side of the cutting-boards, and is withdrawn by means of the lever k^2 . These notches are sunk at regular intervals to agree with the width of the dies K^1 .

The object of the spur-wheels and stop is to enable the operator to cause the cutting-boards L to travel regularly forward after printing a portion of the sheet, and to stop exactly in the right place for the next impression on the sheet. The front spur-wheel propels the boards forward nearly their whole length; the next wheel then catches them and forces them forward under the cutting-dies.

B is the driving-shaft of machine, revolving in suitable bearings, on which are affixed the driving-pulley B^1 , with clutch-coupling, fly-wheel B^3 , and pinion B^2 , gearing into the wheel B^4 , attached to the counter-shaft C . On the ends of the shaft C outside of the frame A are attached the wheels D . An eccentric channel, d , is sunk in these wheels on the inner face, in which are placed at the top of the channels the friction-rollers d^1 , attached by a pin in the usual way to the standards E . As the wheels revolve an up-and-down reciprocating motion is imparted to the standards E , working within the guides E^3 , and all their connections, the length and character of the stroke depending on the shape of the eccentric channel d . Where the friction-roller pins connect with E adjustable sliding boxes E^2 are placed. These boxes are adjusted by the screws e , and are pressed down upon a rubber bearing, e^1 . The tops E^1 of the standards E are made to hinge for convenience in putting in and taking out the cutter-heads F . When the heads F are in position they are secured by the screws e^2 . N are the hollow cutters or dies, attached to the head F by countersunk screws. These cutters may be of any desired shape or size, but must be hollow in order that each lozenge as it is cut may force the lozenges cut before it one thickness up.

From this it will be seen that each revolution of the wheels D forces one set of lozenges above the cutters, whence they are removed, as hereinafter specified.

The peculiar shape of the eccentric channel d is one of the features of my invention. By it I am enabled not only to lower and raise the cutting-head F , but also to keep the cutting-head stationary a sufficient length of time when at the top of the stroke to enable the pushers g to remove the lozenges and retire. The channel d operates both head and pushers, actuating the head when the pushers are at rest, and vice versa.

In no machine that I am acquainted with is the cutting-head stationary when the lozenges are removed. The cutters N are another peculiar feature.

The base n holds the lozenges until they are

forced up by each succeeding set above the rim. The holder is attached to the head by stems n' , leaving the front and rear of the cutters open above the base, thus allowing the pushers g (see Fig. 5) to pass above the base and between the stems, shoving the lozenges out on the shelf i^3 .

Working at the bottom of the eccentric channels d are the friction-rollers d^2 , Fig. 6, attached to the pivoted levers D^1 , which are connected to the frame G , as shown in Fig. 5. This connection, when the machine is in operation, imparts to G a horizontal reciprocating motion, the length of the stroke being regulated by the length of the arms D^1 , and is timed so that the pushers g , Fig. 5, which are attached to G , come forward when the head F has risen and shove the uppermost set of lozenges on the shelf i^3 , and retire again before the head begins to descend on the next stroke.

To each end of the sliding frame G are attached the lifters H' , having the inflected slot h^1 . H is the lifting-bar, worked by means of the bearings h^2 , placed within the slot h^1 . This bar follows the cutters on their upward stroke, and, pressing against their base, lifts up the lozenges which are inclined to drop. h are rods attached to the lifting-bar H at one end, the other end passing through a hole cut in an upright standard. Around H are coiled spiral springs, pressing at one end against the bar H , the other ends pressing against the standards. The object of these rods is to cause the bar H to rise, by means of the bearings h^2 in the inflected slots h^1 , before the frame G has reached the end of its forward stroke. The springs hold the bar H in position during the operation. The end of h is threaded and fitted with a nut, so that the bar may be caused to rise at any part of the stroke. To the front of the bar H is attached, by thumb-screws, the guard h^3 . This guard is so arranged and cut that, when the cutters N are down, it fits closely around and between the cutters, and prevents the paste clinging to the cutters when they rise. The position of this guard above the paste can be regulated by thumb-screws.

D^2 , Fig. 1, is a toothed arc of a circle, having a slotted leg, d^4 , connected to and worked from the revolving wheel D by the rod d^3 . Gearing into D^2 is the wheel D^3 , fastened to a cross-shaft, on which is keyed the toothed wheel D^4 . D^5 is a curved rack, with teeth gearing into the wheel D^4 .

From the above description and an inspection of the drawing it will be seen that as the wheel D revolves a reciprocating horizontal motion is imparted to the rack D^5 , which motion can be regulated by moving the position of the connection on d^4 .

Cross-heads are attached at each end of the rack, and bear upon curved guides J . These guides extend up to the cutting-head F , and have a suitable stop on the ends, as shown. The guides are connected to the frame A , and held in proper position by the bearings j . I,

Figs. 5 and 6, is the front cross-head of the rack D^5 , each side having a pair of lugs drooping below the bearing, through which pass the rods i , the latter being connected to the lozenge conveyor or shelf i^3 by hinged joints x . Around the rods i , between the cross-head and shelf i^3 , are coiled spiral springs, the other ends of the rods being threaded and fitted with nuts to adjust the springs. I' is an independent carriage, which carries the guard i^1 and locking-latches i^2 . The guard i^1 is thrown up, coming forward, by horns i^4 . The latches i^2 , which lock the carriage I' and shelf i^3 together, are lifted, at the end of the stroke, by a projection, j' , fitted on one of the slide-bearings at each side. To describe this part of my invention, we will suppose that one set of lozenges have just been deposited on the frames and the machine has commenced another stroke. The horns i^4 lift the guard i^1 , and the independent carriage I' is back from the shelf i^3 . The several parts keep this position during the whole stroke until i^3 stops against the turned-up ends of the guides J , and fits up close against the dies N , which have risen to their proper height. The rack D^5 not yet being at the end of the stroke, the springs coiled on i compress and allow, and are adjusted to allow, the parts I , I' , and i to approach and touch each other. When they do touch, the rack is at the end of the stroke, the lozenge has been delivered on the shelf i^3 by the pushers g , and the latches i^2 lock the independent carriage I' and the shelf i^3 together. The rack now begins to recede; but the compressive strength of the coiled spring keeps I' and i^3 stationary until the rear lug on I strikes the nut on the end of i , when all go back together.

As the cross-heads recede, the horns i^4 release the guard i^1 , which falls down on the front of the shelf i^3 , and prevents the lozenges falling off. When the back end of the stroke is reached, the latches i^2 are lifted by the projections j' , releasing the independent carriage I' , the lozenges still remaining on the shelf i^3 . The rack D^5 now begins its forward stroke, and i^3 , being connected by the rods i , moves with it; but I' , having no connection, remains stationary until the front of track strikes it. The latch i^2 , resting on i^3 , holds the lozenges while the shelf moves from underneath. The lozenges falling on the frame L^2 below are shoved up into position on the next back stroke of the rack.

The guides J are curved, in order to bring the lozenges from the level of the cutters N to the level of the frames, so that they will fall but a short distance when the shelf i^3 moves away. The lozenges do not always fall regularly in a transverse direction from the shelf, but on the next back stroke the rear of I' pushes them forward a short distance, placing them exactly in line. The object of this will be seen hereafter.

The frames L^2 are covered with bolting-cloth or other porous material, in order to facilitate

the passage of air to the lozenges for drying. These boards, when they are covered with lozenges, are placed in a drying-rack.

In the center of the shaft C , Fig. 1, is affixed an eccentric, e , over which passes the open end of the pivoted lever C' . C' is pivoted on a bracket, Y , fastened to the girder a' . The upper end of C' has attached a spring-pawl, c^2 , with latch-point fitting into the rack l , let in the bottom of the cutting-boards L . The length of the upper and lower lever-arms of C' is so arranged that at each revolution of the shaft C one notch of the rack l is fed forward. The length of these notches agrees with the width of the lozenges, allowing some space, of course, for the cutters to clear themselves at each stroke. The cutting-boards butt against the receiving-frames, and the forward motion is thus communicated to the frames, impelling them the exact distance required for the clear deposit of each new row of lozenges. M is a system of levers, worked from a cam placed on the outside of the wheels D , which operate a horizontal bar, M' , giving to it an up-and-down motion.

When the lozenges are shoved forward on the shelf i^3 by the pushers g , from the nature of the paste they are apt to stick to the pushers. This bar, just at the turn of the stroke, comes quickly down upon, and lightly but sufficiently presses the lozenges, and holds them until g begins to recede, when it is lifted out of the way.

A^1 is the frame which supports the pressing or lozenge-holding heads P P' . It is attached at the rear of A , and forms a part of it. When the lozenges L^3 are to be pressed or molded, they are deposited from the cutters onto frames made of wood, instead of bolting-cloth, but in every other respect similarly placed. The molding-heads P and rollers O^2 are of such a length that they take in one entire row of lozenges. The lower head and rollers are stationary, being attached to A by brackets with suitable bearings. The upper head and rollers are attached to outside sliding standards O^3 , connected together by the bars O^4 , and working in bearings A^2 , attached to the frame A^1 , and operated by the foot-lever R , with the suitable connections r , Q^2 , Q , and O^4 . O O^1 are endless bands, of rubber, passing over the rollers O^2 , and stretched tightly on the faces of the heads P .

In the heads P are sunk two rows of holes, p , directly opposite to each other, and at a distance apart that exactly agrees with the lozenges L^3 on the frames L^2 . U is a hinged bar, attached to a frame sliding on the guides U^2 , and operated by the handles u . u^2 are fingers fastened below the bar U , with curved ends which fit and are adjusted to fit exactly at the rear of the lozenges. u^1 are adjustable stops placed on the sides U^2 , which center the rows of lozenges immediately between the holes p . O^5 are the shafts of the rollers, revolving in suitable bearings, to one end of which are attached pulleys for turning the

endless bands. T is a starch-box, with a bottom of bolting-cloth. S is a board containing a suitable depth of starch, and into which the lozenges fall after being molded. S is placed on an under board, S¹, which slides on guides S², and is arranged to feed automatically forward by means of a lever and spring-pawl attachment, Q¹, connected to the cross-bar Q, and working in connection with the toothed rack s, sunk in the lower side of S¹.

Having now described the parts, I will describe the operation: The successful working of the heads P is entirely dependent on the accurate location of the lozenges L³ on the frames L². The conveyer i³ and its attachments deposit the lozenges so regularly on the frames that there is not the difference of the breadth of a hair in the position of each lozenge in any direction, and without this exactness they could not be molded properly. The operator lifts the bar U, pulls it forward, and, lowering it, places the fingers u² behind the lozenges. The fingers are arranged to take every second lozenge in two rows, and the holes p correspond. The operator then slides the lozenges forward until the frame U¹ strikes the stop u¹. He then withdraws the frame, and forces the upper head down by the foot-lever R, with the required pressure on the lozenges; the lozenges sink in the holes p, and are molded to correspond. The rubber bands, from their nature, do not stick to the lozenges, and at the same time always spring up out of the holes p, loosening the lozenges when the pressure is withdrawn. The lower band also acts as a conveyer, carrying the finished lozenges away when the rollers are turned by the handles at the end. The bands are kept well dusted with fine starch-powder, to prevent any possibility of the lozenges sticking to the rubber. This dust is supplied by two boxes, one above, at T, and another placed on the frame U¹, the shock of the lever R, as it returns, showering the dust in a spray on the bands.

After each set of lozenges is pressed, the bands are moved around until a fresh surface on each is stretched over the holes p. The finished lozenges fall from the lower band into the starch-board.

Lozenges while soft are of a delicate nature, and lose their shape very easily. Falling into soft starch they retain the form given to them.

The starch-board moves a tooth forward as each set is pressed, thus giving a clear space in the starch for the next set to fall upon.

The heads P are made to slide in and out, so that any desired form of hole can be used for molding the lozenges.

In regard to that part of the mechanism herein described which constitutes the apparatus for molding, I make no claim therefor at present, but reserve such improvements for a subsequent application.

I claim—

1. The driving-shaft B, driving-pulley B¹,

fly-wheel B³, toothed wheels B² and B⁴, shaft C, and wheels D, with eccentric channels d sunk in their faces, in combination with the friction-rollers d¹, standards E, and cutter-head F, the said standards E working in guides E³, fastened to the frame A, and having adjustable boxes E², to which the rollers d¹ are attached, the top of the said standards also being hinged and slotted to fit over the ends of the head F, and held in place by screws e², all arranged and operating substantially as described, and for the purpose specified.

2. The cutter-head F, with dies N attached, to which a reciprocating up-and-down motion is given in the manner described, but held stationary during the time that the pushers g are operating, substantially as described, and for the purpose specified.

3. The hollow cutters or dies N, constructed as shown, with the base n, side stems n', and open at the front and rear above the base, attached to the head F, to which a reciprocating up-and-down motion is given, arranged and operating substantially as described, and for the purpose specified.

4. The pivoted levers D¹, connected to and worked from the eccentric channels d in the wheels D by the friction-rollers d², the reciprocating sliding frame G, having attached the lifters H', with inflected channels h¹, bar H, with end bearings h², having connected the rods and spiral springs h, in combination with the cutters F, arranged and operating substantially as described, and for the purpose specified.

5. The pivoted levers D¹, connected to and worked from the eccentric channels d in the wheels D by the friction-rollers d², the reciprocating sliding frame G, having attached the adjustable pushers g, in combination with the cutters F, arranged and operating substantially as described, and for the purpose specified.

6. The cams m', attached to the outside of the wheels D, in combination with the system of levers M and M', arranged and operating substantially as described, and for the purpose specified.

7. The eccentric c, fastened to the revolving shaft C, pivoted lever C', with spring-pawl c², in combination with the toothed rack l, sunk in the lower side of the cutting-boards L, arranged and operating substantially as described, and for the purpose specified.

8. The pivoted toothed quadrant D², with leg d⁴, connected to and operated from the revolving wheel D by the connecting-rod d³, the toothed wheel D³ and D⁴, in combination with the toothed rack D⁵, having the cross-head I, and working on the curved guides J, arranged and operating substantially as described, and for the purpose specified.

9. The reciprocating shelf i³, in combination with the cutter-head F and the pushers g, arranged and operating substantially as described, and for the purpose specified.

10. The independent carriage I', having the hinged guard i' attached, and operated by the horns i', in combination with the shelf i', arranged and operating substantially as described, and for the purpose specified.

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Witnesses:

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CON. W. LALLY.

11. The hinged latch i', attached to I', in combination with the shelf i', arranged and