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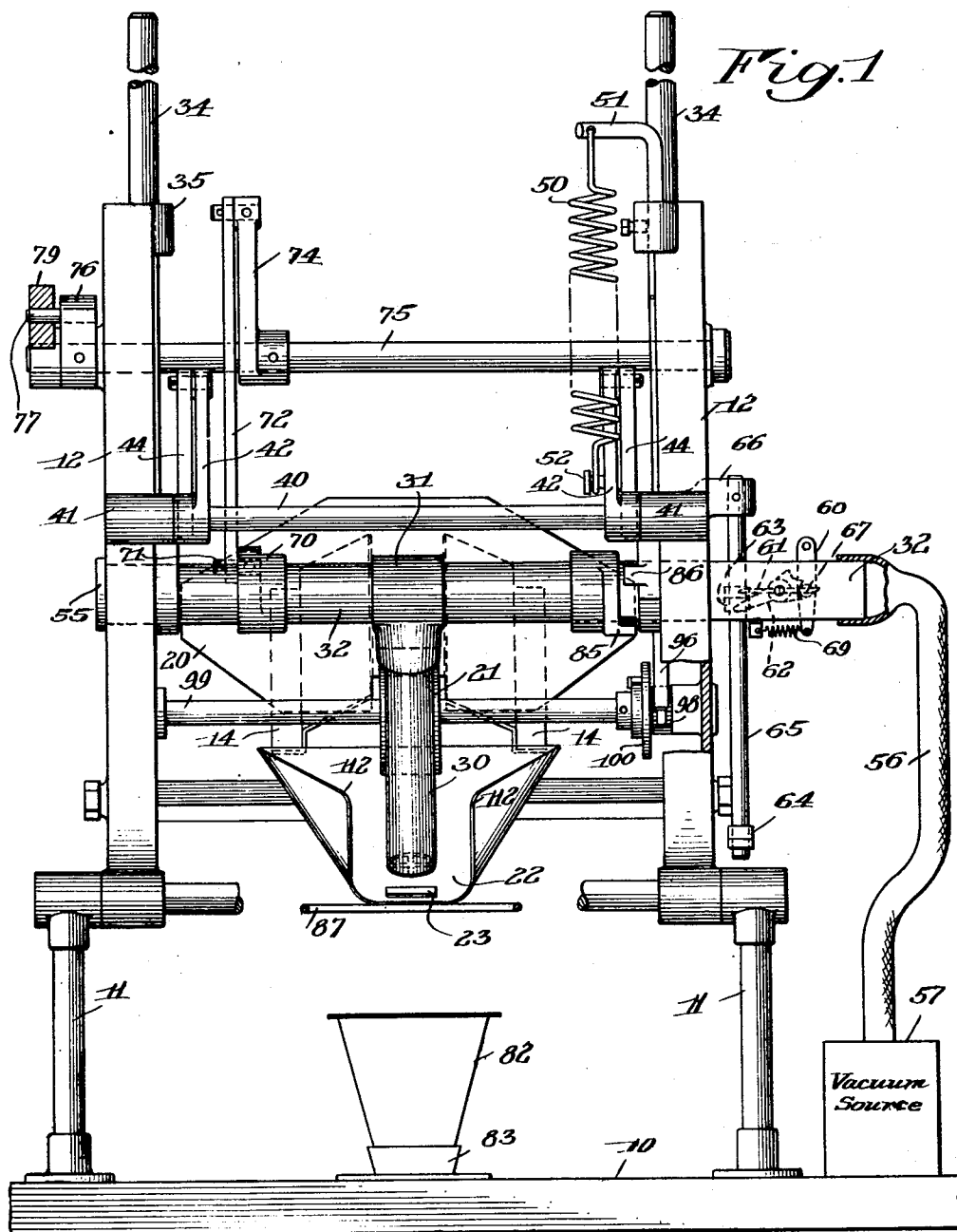
T. D. WATKINS ET AL

1,945,243

MACHINE FOR PLACING PAPER LININGS IN MOLDS

Filed April 2, 1932

4 Sheets-Sheet 1



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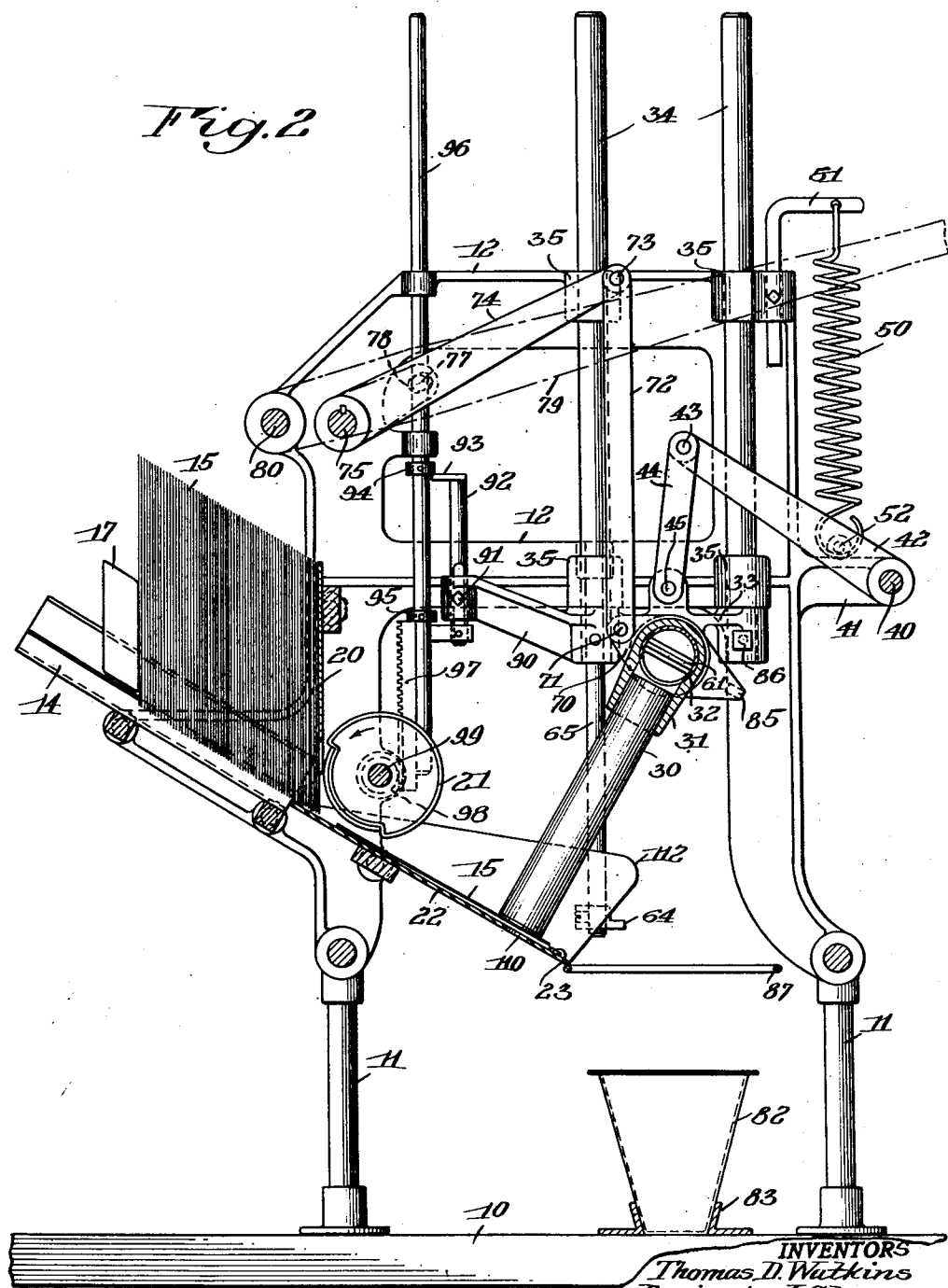
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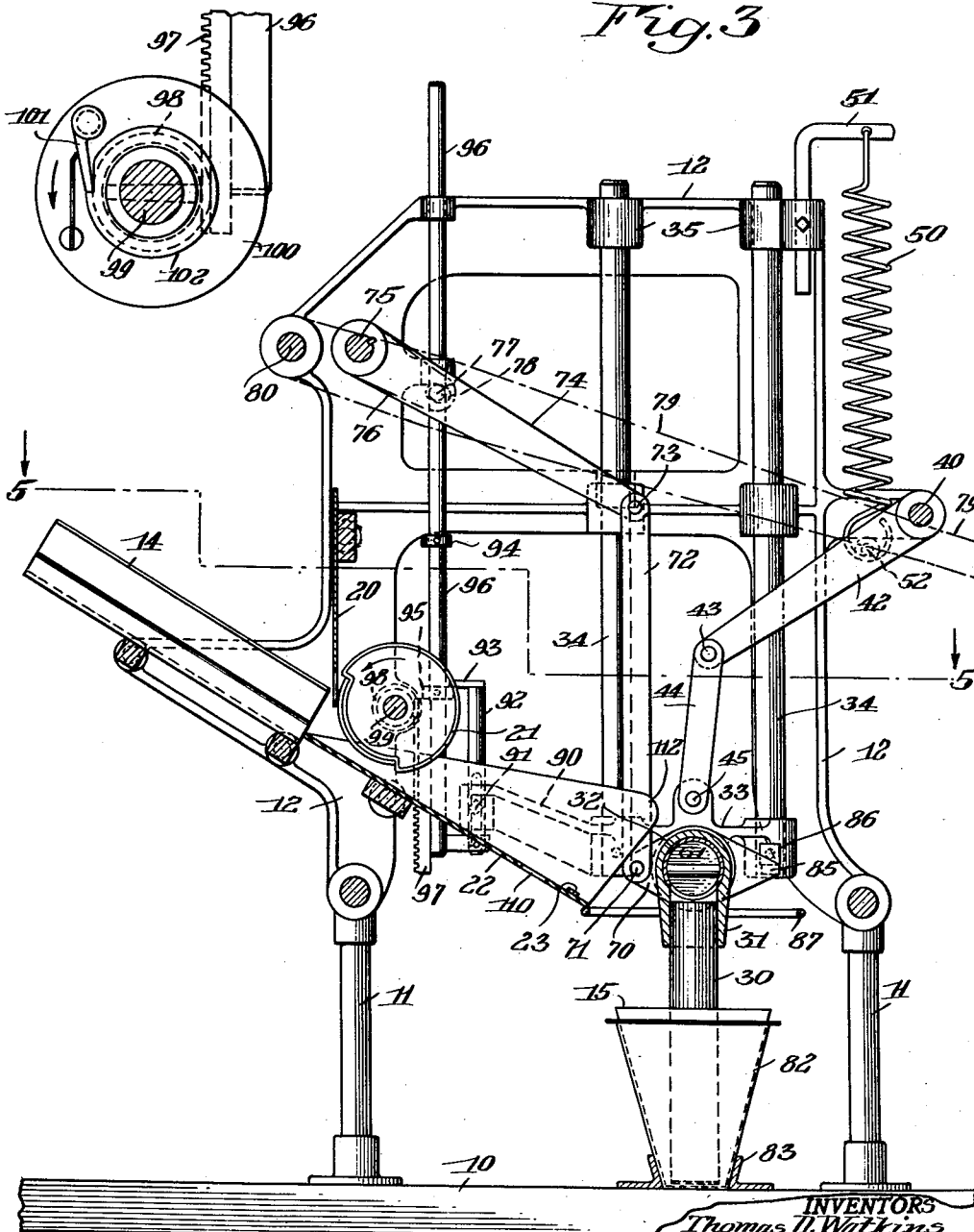
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Fig. 4

Fig. 3



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Fig. 5

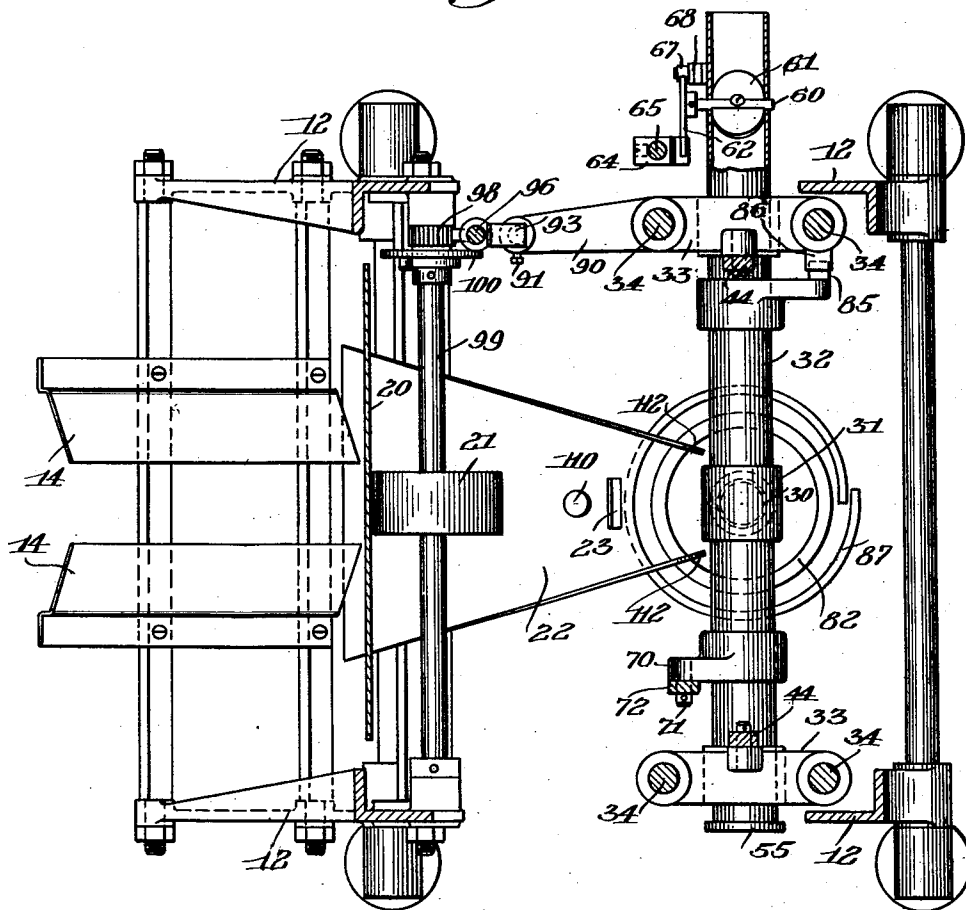


Fig. 7

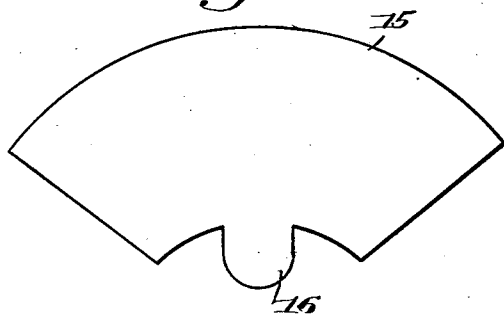
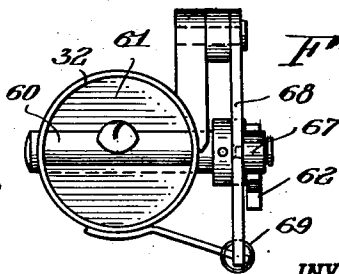


Fig. 6



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MACHINE FOR PLACING PAPER LININGS IN MOLDS

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12 Claims. (Cl. 93—36)

This invention relates to a machine for placing paper linings in molds. An object of the invention is the provision of a novel machine of this character which will operate simply and effectively to place paper linings in proper position in molds.

Another object is the provision of a machine which may be operated rapidly by comparatively inexperienced persons.

Still another object is the provision of a machine which will insure the placing of only a single lining in each mold, and which will place such lining smoothly and effectively in the intended position.

A further object is the provision of a simple machine which can be constructed in an economical manner and which has but few parts and is not likely to get out of order.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a front elevation of a machine constructed in accordance with a preferred embodiment of the invention;

Fig. 2 is a view partly in side elevation and partly in vertical section through the same showing the parts in position for picking up a lining;

Fig. 3 is a similar view showing the parts in position for placing the lining in the mold;

Fig. 4 is a detailed view of a clutch for a feeding wheel forming part of the apparatus;

Fig. 5 is a horizontal section taken substantially on the line 5—5 of Fig. 3;

Fig. 6 is a detail of the suction control valve, and

Fig. 7 is a plan of one of the paper linings which are placed by the machine.

It is frequently desired to place linings of sheet material such as paper in molds. For example, one common use of lined molds is for the freezing of ice cream according to modern practice. In many establishments, molds of somewhat conical shape are lined with paper, the fluid or semi-fluid ice cream mix is poured into the lined molds, and the mixture is then frozen in these molds. Afterwards, the contents may be removed from the molds, and each portion of ice cream will be wrapped in a wrapper which had previously been placed in the mold as a lining.

The machine of the present invention will operate simply, satisfactorily, and rapidly to place

linings of paper or similar sheet material in molds of this character.

Referring now to the drawings and especially to Figs. 1 and 2, there is shown any suitable table or support 10 having standards 11 rising from it, which support suitable frame members 12 at each side of the machine. These frame members are tied together by any suitable tie rods or braces. On the frame are mounted two inclined plates 14 of the shape best shown in Figs. 3 and 5, which form a support for a stack of linings 15 shown in Fig. 2, one of such linings being illustrated by itself in Fig. 7. Each lining has a main body portion of somewhat segmental shape, as shown, and a tab 16 positioned so that it will fit in the bottom of a suitable truncated conical mold while the main body portion lines the sides of such mold.

The linings 15 may be stacked on the supporting plates 14 in an upright substantially vertical position, as illustrated in Fig. 2, with the tabs 16 of the linings pointed downwardly and extending in the open space between the plates 14. A follower block 17 of any suitable form or construction may be placed behind the stack of linings 15 as shown in Fig. 2, to hold them in upright position and to cause them to feed downwardly along the supporting plates 14 as they are removed one by one from the lower end of the stack.

The stack of linings presses against a plate 20 which supports the lower side of the stack and which is cut away at one point so that a feeding wheel 21 may press against the lowermost lining of the stack and feed it downwardly onto an inclined apron 22 which holds the lining in proper position to be picked up by another part of the apparatus as described hereafter. The apron 22 is provided with a stop member 23 with which the end of the tab 16 on the lining may contact to position the lining in a predetermined position on the apron ready to be picked up.

The means for picking up the lining from the apron and placing it in the mold is preferably suction means, and preferably includes a member having both an oscillating movement and a reciprocating movement. In the preferred embodiment of the invention, there is provided a tubular plunger 30 having openings of substantial size at its lower end. The upper end of the plunger is mounted in a T-shaped fitting 31 on a transverse tube 32 rotatably mounted in bearings 33 which are capable of sliding up and down relative to the frame 12 of the machine. As a convenient way for guiding these bearings,

rods 34 may extend upwardly from the bearings and be slidably received in apertured lugs 35 on the frame 12. Hence when the tube 32 moves up and down, the rods 34 slide in the lugs 35 of the frame.

To insure parallel movement of the tube 32, and so that one end thereof will not move ahead of the other end, any suitable mechanism may be employed such as a shaft 40 rotatably mounted in suitable brackets 41 on the machine and having a pair of arms 42 fixed thereto, one substantially at each end of the tube 32. The end of each arm 42 is pivotally connected at 43 to the upper end of a link 44, the lower end of which is pivoted at 45 to the bearing member 33. Thus, since both arms 42 are fixed to the shaft 40 and must move in synchronism with each other, both ends of the tube 32 will be forced to move up and down together.

To tend to keep the tube 32 and plunger 30 in elevated position, there may be provided a spring 50 supported at its upper end by a bracket 51 fixed to the frame 12 of the machine and connected at its lower end to a pin 52 on one of the arms 42, so that the spring constantly tends to raise the arms.

The opening within the tubular plunger 30 is in communication through the T fitting 31 with the interior of the tube 32. One end of the tube 32 is closed as for example by the cap 55. The other end of the tube 32 is extended a slight distance beyond the frame member 12, as indicated in Fig. 1, and is connected in any suitable manner with a source of vacuum or suction. For example, the end of the tube may have connected to it a flexible tube 56 leading to a vacuum pump indicated diagrammatically at 57.

In the above mentioned extension of the tube 32 is a suitable valve for controlling the suction within the tube and plunger. This valve may comprise, for example, a transverse shaft 60 (Figs. 1 and 6) having fixed thereto a plate 61 of suitable shape so that it closes the tube 32 when the shaft 60 is turned to one position, as shown in Fig. 6. By turning the shaft 60 to another position as shown in Fig. 1, the plate 61 will lie axially of the tube 32 and the tube will be open.

An operating arm 62 is connected to the valve shaft 60 externally of the tube 32, and one end of this operating arm is in position to be engaged and shifted by contact with an upper stop 63 and a lower stop 64 adjustably mounted on a rod 65 secured to the frame member 12 in any suitable manner such as by the bracket 66. The valve is resiliently held in either open or closed position by a roller 67 on a lever 68 pressed by a spring 69 into one or another of two detent notches on the lever 62. A slight force applied to the lever 62 is sufficient to overcome the holding influence of the detent and to cause the valve to be moved to its other position.

As the tube 32 moves up and down under the influence of force imparted as hereafter described, the valve arm 62 will hit the lower stop 64 substantially at the bottom of the movement of the tube, and this will shift the arm 62 to close the valve. Then substantially at the upper end of the movement of the tube 32, the arm 62 will be hit and moved in the opposite direction by the upper stop 63 so that the valve will be opened. In this way, the suction or vacuum produced by the source 57 is alternately made and broken in the tube 32 and plunger 30.

For moving the tube 32 up and down through

its reciprocating movement and at the same time for oscillating the tube in its bearings, there is provided a short arm 70 fixed to the tube 32 and pivotally connected at 71 to the lower end of a link 72, the upper end of which is pivoted at 73 to an arm 74 fixed to a shaft 75 rotatably mounted on the frame of the machine. This shaft 75 is oscillated to move the arm 74 successively up and down in any suitable manner. For example, if the machine is to be operated by hand, the shaft 75 may have a short arm 76 fixed thereto and provided with a pin 77 engaging in a slot 78 on an operating arm 79 rotatably mounted on a stud or shaft 80 and extending to the front of the machine to a convenient position to be grasped and moved by the operator.

When the arm 74 is depressed, the parts being in the normal position shown in Fig. 2, tube 32 and plunger 30 are oscillated, by turning the tube in its bearings, until the plunger hangs straight downwardly. As will be described hereafter, the plunger 30 has picked up a lining from the apron 22 when in the position of Fig. 2, and this oscillating movement will carry such lining to a point above the mold in which it is to be placed, such mold being indicated diagrammatically at 82 and being held in the holding means 83. The above described oscillating movement of the plunger 30 is caused by the fact that the pivotal connection 71 of the link 72 to the arm 70 on the tube is offset from the axis of the tube, so that downward pressure on the pivot 71 tends to rotate the tube. Such rotation continues until a stop member 85 fixed to the tube 32 comes in contact with the stop 86 on one of the bearing members 33. This contact stops further rotation of the tube, and at this time the plunger 30 is in a vertical position.

Then further depression of arm 74 is effective to shift the entire tube 32 and plunger 30 straight downwardly against the influence of the spring 50, the guide rods 34 meanwhile sliding in their guiding lugs 35. This downward movement carries the lining, attached to the lower end of the plunger 30, downwardly through a shaping ring 87 suitably fixed to the frame of the machine and into the mold 82. Substantially at the lower end of the stroke of the plunger, the suction within the plunger is broken by the closing of the valve 61 by contact with the lower stop 64, as above described, so that the plunger leaves the lining in the mold 82 when the plunger moves back on the upstroke of its reciprocation.

During the upstroke of the plunger and tube 32, another lining is fed by the feeding wheel 21 from the stack 15 onto the apron 22 in proper position to be picked up by the plunger 30. This feeding wheel may be operated in any suitable manner in synchronism with the reciprocations of the plunger. As one suitable form of operating mechanism, there is shown in Fig. 3 a bracket 90 extending rearwardly from one of the bearing members 33 of the tube 32, and being adjustably connected as by means of the set screw 91 to a rod 92 having at its upper end an offset portion 93 arranged to contact with an upper collar 94 and a lower collar 95 on a rod 96 slidable vertically in suitable guide lugs on the frame of the machine. This rod 96 carries a rack member 97 meshing with teeth of a pinion 98 (see Fig. 4) rotatable on the shaft 99 on which the feeding wheel 21 is mounted. Secured to and rotatable with the pinion 98 is a flange 100 carrying a spring pressed pawl 101 engaging in a notch in a collar 102 fixed to the shaft 99.

Through this mechanism, it follows that upward movement of the tube 32 will cause corresponding upward movement of the bracket 90 and rod 92. The offset 93 on this rod will contact 5 with the upper collar 94 on the rod 96 and move the rod 96 upwardly to cause an upward movement of the rack 97, which will rotate the pinion 98 in a counter-clockwise direction. The pawl 101, rotating with the pinion 98, will engage the 10 notch in the collar 102 and rotate the shaft 99 in a counter-clockwise direction, revolving the feeding wheel 21 in the same direction to feed a single lining from the lower end of the stack 15 down onto the inclined apron 22 until the lower 15 edge of the lining comes in contact with and is stopped by the stop 23.

Then on the next downward movement of the plunger and tube, the bracket 90 will move downwardly carrying the rod 92 down with it, and the offset 93 will contact with the lower collar 95 of the rod 96 and move this rod down ready for its next upward movement. This downward movement of the rod will not rotate the feeding wheel 21, however, since the pawl 101 will simply slide 25 idly in a clockwise direction around the collar 102. The distance between the collars 94 and 95 on the rod 96 is of such amount relative to the stroke of the rod 92, that each reciprocation of the parts will cause one revolution of the feeding wheel 21.

The supporting apron 22 has an aperture 110 in it directly under the position assumed by the lower end of the plunger 30 when the latter is in the normal position shown in Fig. 2. This allows the lining to be picked up by the suction of the plunger and allows air to enter easily between the lining and the apron so that the lining will not stick to the apron.

The edges of the apron 22 at the lower end are curved upwardly as indicated at 112 especially in Figs. 1 and 2. This helps to shape the lining as it is drawn out of the apron by the oscillation of the plunger 30. Then the downward reciprocation of the plunger carries the lining through the shaping ring 87 above mentioned, which still further assists in forming the lining into proper conical shape so that it will fit better into the mold 82.

The operation of the machine may be briefly described as follows: A suitable supply of linings 15 is placed on the supporting members 14 as shown in Fig. 2 and the parts are given one reciprocation so as to feed an initial lining down onto the apron 22.

Then when the parts are moved to the normal position shown in Fig. 2, the valve 61 in the suction line will be opened and a suction will be created within the plunger 30. The lower end of the plunger at this moment will be directly over the tab 16 of the lining 15 lying on the apron 22, and the suction within the plunger will lift slightly upwardly on this tab and draw it against the lower end of the plunger 30. This slight upward movement is sufficient to raise the tab above the stop 23 so that the stop will not interfere with the drawing of the lining off of the apron.

Next, the arm 74 is depressed in any suitable manner, such as by the operator drawing downwardly on the operating lever 79. The first part of the downward movement of the arm 74 will be effective, through the link 72, to oscillate the plunger 30 to carry the lower end thereof rightwardly from the position shown in Fig. 2 to a position directly over the mold 82. The stop 85 on the tube 32 will then come in contact with the top 86, which will prevent further oscillating 75 movement of the parts.

Continued downward movement of the arm 74 is then effective to carry the plunger 30 straight downwardly. The lining 15, still having its tab 16 held to the lower end of the plunger, is thus drawn rightwardly through the shaping lips 112 of the apron 22 and through the shaping ring 87 and is placed in the mold 82, the tab 16 being placed substantially at the bottom of the mold and the rest of the lining extending around the sides of the mold.

Substantially at the lower end of the stroke of the plunger, the suction valve 61 is closed by contact of the arm 62 with the stop 64 and the suction within the plunger is thus broken, releasing the placed lining from the plunger. The arm 74 is then moved upwardly, such as by upward movement of the operating lever 79. This upward movement of the arm 74 releases the downward pressure previously exerted on the plunger 30 and tube 32 and permits the spring 50 to draw the plunger and tube directly upwardly. During this movement the offset 93 on the arm 92 contacts with the collar 94 to move the rack part 97 and to rotate the feeding wheel 21 through a single revolution, to feed another lining down onto the 100 apron 22.

Substantially at the end of the upper reciprocating movement of the plunger, the operating arm 62 of the suction valve is hit by the upper stop to open the valve to reestablish suction in the plunger. After the tube 32 reaches the upper limit of its motion, further upward movement of the arm 74 is effective to oscillate the plunger to its normal initial position shown in Fig. 2, and the suction within the plunger then picks up the 110 lining which has been fed onto the apron. This cycle of operation is repeated as often as may be necessary to fill the required number of molds.

It is understood, of course, that when a lining has been placed on a mold, that mold is removed 115 either by hand or automatically by suitable conveying means, and another mold is placed in proper position to receive a lining.

While one embodiment of the invention has been disclosed, it is to be understood that the 120 inventive idea may be carried out in a number of ways. This application is therefore not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention 125 or the scope of the appended claims.

We claim:

1. Apparatus for placing linings in molds, comprising a support for holding a lining, a tubular member, and means for bringing said tubular 130 member adjacent said lining and for creating a suction in said member so that a part of said lining is held thereby to said member and for subsequently moving said tubular member into a mold and releasing the suction so that said lining 135 is placed in said mold.

2. Apparatus for placing linings in molds, comprising a support for holding a lining, a tubular member, and means for bringing said tubular member adjacent said lining and for creating a 140 suction in said member so that a part of said lining is held thereby to said member and for subsequently oscillating said tubular member and for reciprocating it into an open mold and releasing said suction, so that said lining is carried 145 to and placed in said mold.

3. Apparatus for placing linings in molds comprising a tubular member mounted for oscillation about an axis and also mounted for reciprocation, a support for holding a mold lining in a position 150

adjacent said member when it is in a predetermined oscillated position, and means controlled by the reciprocation of said member for creating and breaking a suction in said member so that said member may pick up and transfer said lining.

4. Apparatus for placing linings in molds comprising means for picking up a lining and moving it into a mold, a support for holding a lining in position to be picked up by said means, and preliminary shaping means acting upon said lining while it is being moved from said support into said mold, for shaping said lining approximately to the shape of said mold.

5. Apparatus for placing linings in molds comprising suction means for picking up a lining and moving it into a mold, a support for holding a lining in position to be picked up by said means, and stationary shaping means through which said lining is drawn as it is moved from said support to said mold, for shaping said lining approximately to the shape of said mold.

6. Apparatus for placing linings in molds comprising a support for holding a stack of linings, an apron, feeding means for feeding said linings one at a time onto said apron, and means for picking up a lining from said apron, said last named means having an oscillating movement to draw a lining from said apron and a reciprocating movement to carry the lining to a mold.

7. Apparatus for placing linings in molds comprising a support for holding a stack of linings, an apron, feeding means for feeding said linings one at a time onto said apron, means movable through a cycle of operation and effective during a part of said cycle to pick up a lining from said apron and place it in a mold, and mechanism for operating said feeding means to feed another lining onto said apron during the remainder of said cycle of operation.

8. Apparatus for placing linings, comprising means for holding a hollow article to be lined, means for supporting a lining at a point offset from said article, and a lining transferring member movable in one direction to transfer a lining from said offset point to a point substantially in alignment with said hollow article, and movable in a different direction to place said lining in said hollow article.

9. Apparatus for placing linings, comprising means for holding a hollow article to be lined, means for supporting a lining at a point offset from said article, and a plunger having both oscillating and reciprocatory movements, said plunger being effective during one of its said movements to transfer a lining from said offset point to a position substantially in alignment with said hollow article, and being effective during another of its said movements to place said lining in said hollow article.

10. Apparatus for placing linings, comprising

means for holding a hollow article to be lined, means for supporting a lining at a point offset from said article, a lining transferring member having a suction channel opening substantially at one end of said member, and operating mechanism effective to produce a predetermined sequence of operations including moving said end of said transferring member substantially into contact with a lining at said offset point, creating a suction in said channel to cause said lining to adhere to said end of said member, shifting said end of said member in one direction to transfer the adhering lining from said offset point to a position substantially in alignment with said hollow article, shifting said end of said member in a different direction to insert said lining in said hollow article, destroying said suction to detach said lining from said member, and withdrawing said member from said hollow article.

11. Apparatus for placing linings, comprising means for holding a hollow article to be lined, means for supporting a lining at a point offset from said article, a tubular member mounted for oscillation about an axis spaced from said article and also movable bodily toward and away from said article, a plunger secured to said tubular member for oscillation and bodily movement with said tubular member, means for making and breaking a suction in said tubular member and plunger, and means for oscillating said tubular member to shift said plunger from a position adjacent said lining to a position substantially in alignment with said hollow article and for moving said tubular member toward said article to insert the aligned plunger into said article.

12. Apparatus for placing linings, comprising means for holding a hollow article to be lined, means for supporting a lining at a point offset from said article, a tubular member mounted for oscillation about an axis spaced from said article and also movable bodily toward and away from said article, a plunger secured to said tubular member for oscillation and bodily movement with said tubular member, means for attaching a lining to said plunger, stop means for limiting oscillation of said tubular member in one direction at a point where said plunger is substantially in alignment with said hollow article, and operating means eccentrically connected to said tubular member so that force applied to said operating means when said plunger is adjacent said lining at said offset point will oscillate said tubular member to carry said plunger and lining into a position substantially in alignment with said article and further force applied to said operating means will move said tubular member bodily toward said article to insert said plunger and lining in said article.

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