

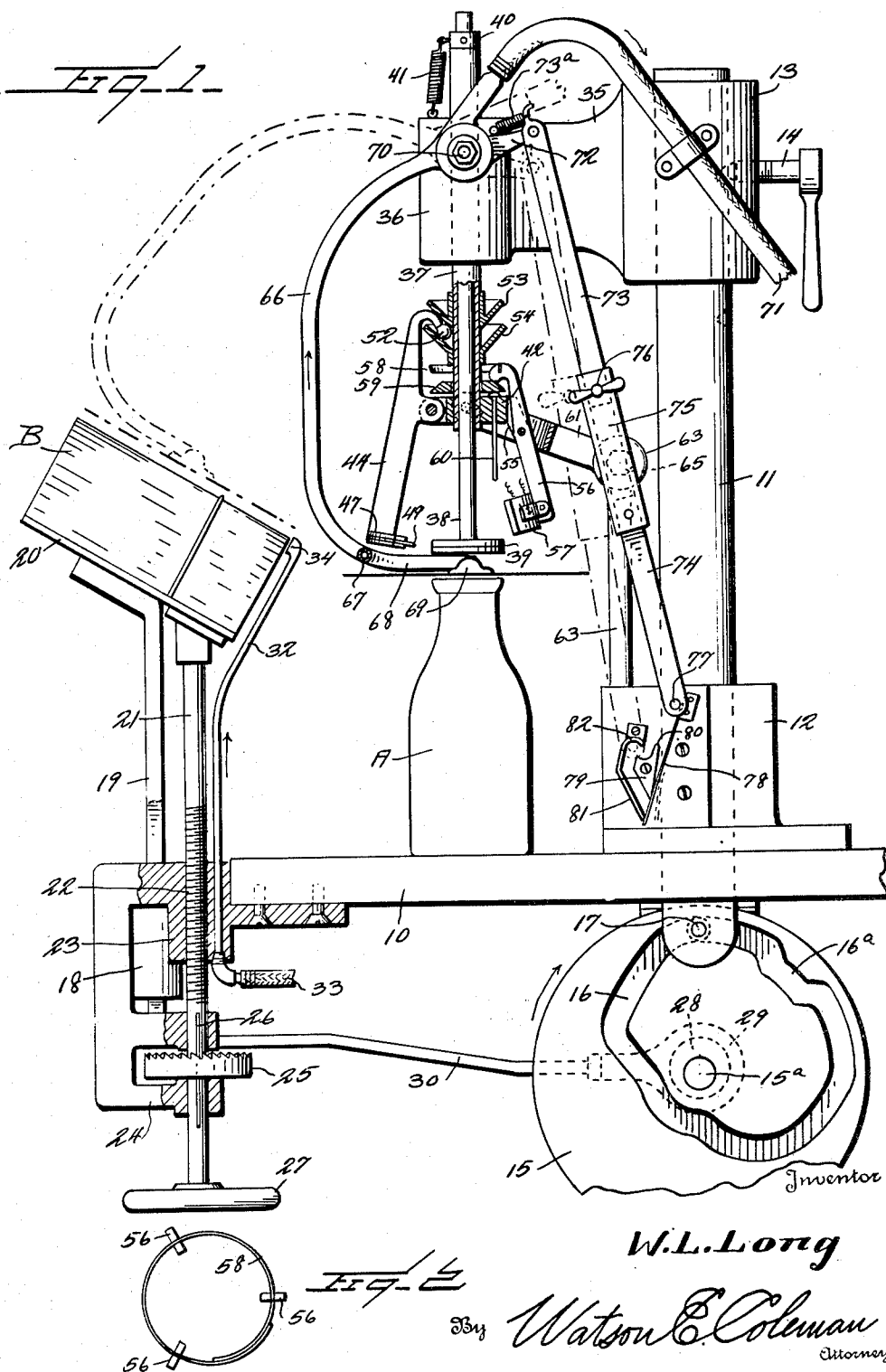
April 11, 1939.

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2,153,579

BOTTLE COVERING AND SEALING MACHINE

Original Filed July 13, 1935 3 Sheets-Sheet 1



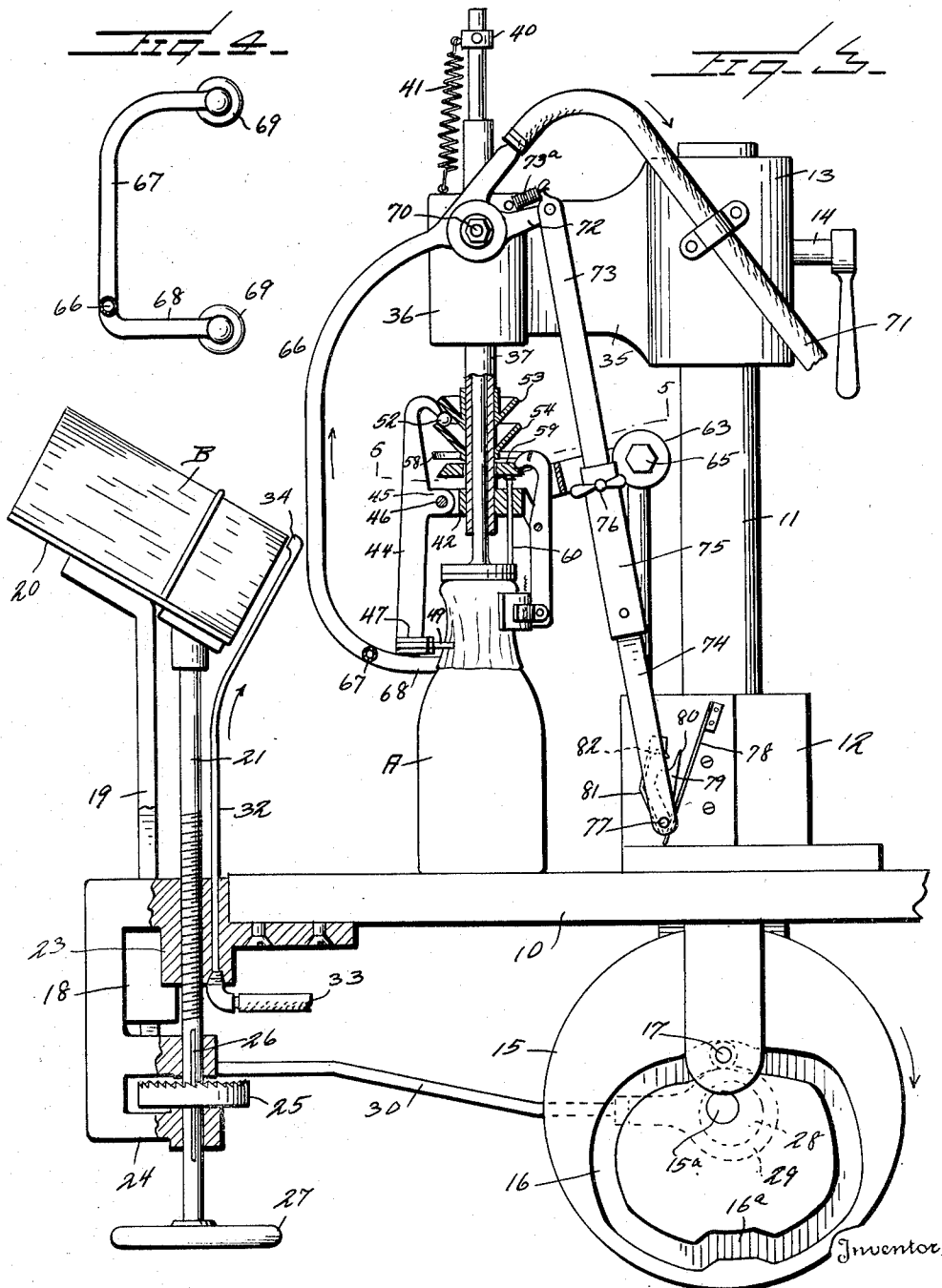
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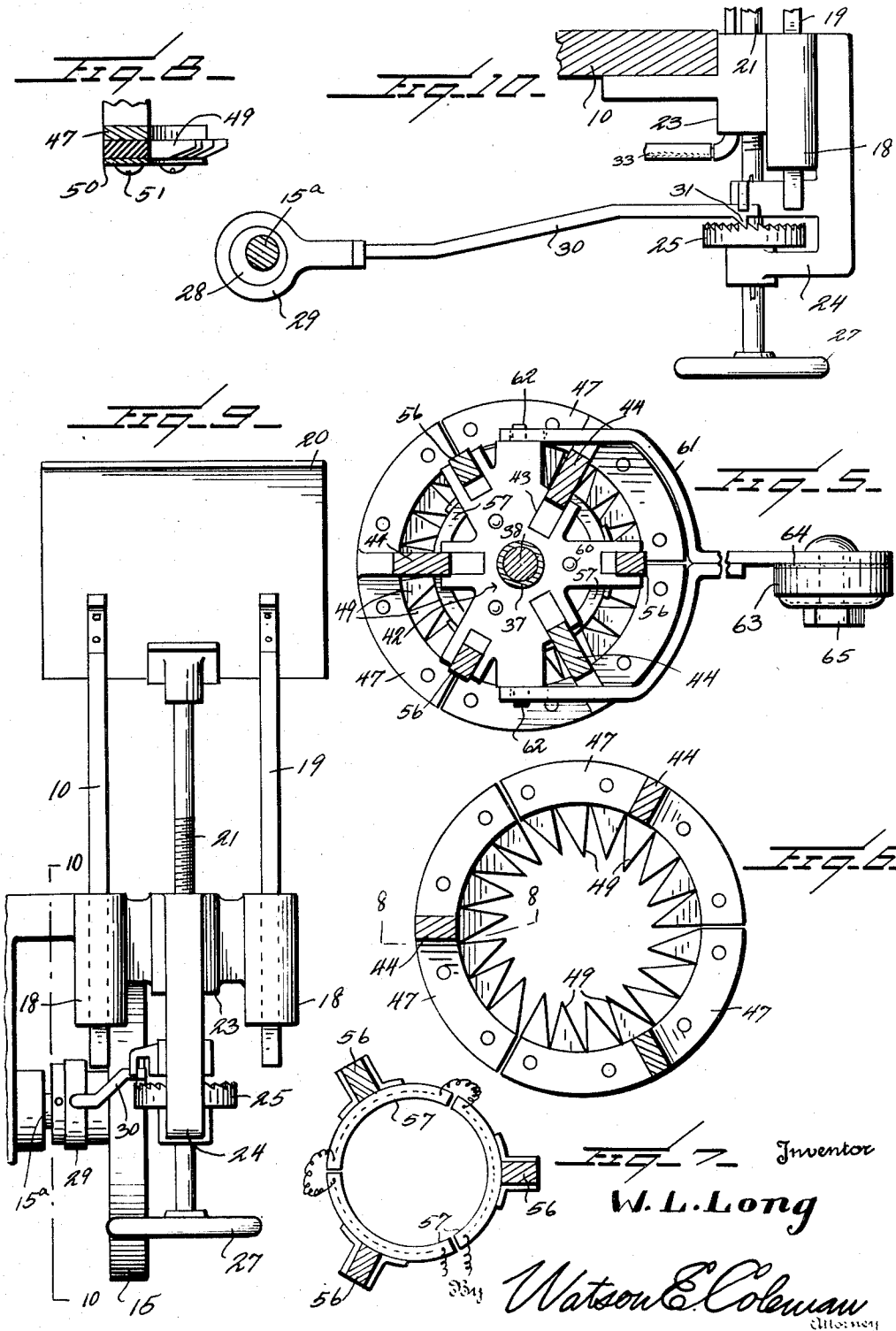
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BOTTLE COVERING AND SEALING MACHINE

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9 Claims. (Cl. 226—83)

It is quite common to-day to provide a paper covering for milk bottles and bottles of like character, these paper covers being placed over the top of the bottle, forced down around the bottle and being sometimes held in place by rubber bands and at other times simply fitting closely around the neck of the bottle.

The general object of the present invention is to provide a mechanism so constructed as to feed a flat sheet of waxed paper over the top of a bottle such as a milk bottle, force this paper downward around the neck of the bottle, and then cause the wax in the paper to melt by the application of heat thereto to thus cause the paper cap thus formed to adhere to the surface of the bottle and seal its contents, and the folds adhere to each other.

A further object is to provide means for this purpose which includes sealing means comprising electrically heated members which will melt the wax on the paper and cause it to adhere.

A further object is to provide in a machine of this character a plurality of formers segmental in form to fit around the circumference of the bottle and force the paper into place downward around the neck of the bottle and provide heating members segmental in form which after the paper has been forced into contact with the bottle will come in contact with the paper around nearly the entire circumference of the bottle to heat the wax and cause the paper to adhere to the bottle and seal the contents thereof.

A further object is to provide means whereby the instrumentalities above described may be operated and whereby the paper may be fed sheet by sheet from a stack of paper carried by a magazine onto the successive bottles.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation partly in section of a machine constructed in accordance with my invention.

Fig. 2 is a top plan view of the spring which initially holds the heating elements away from the bottle.

Fig. 3 is a like view to Fig. 1, but showing the parts in the position taken when the paper has been forced down around the bottle.

Fig. 4 is a plan view of the connections to the vacuum feeding cups, the main pipe being shown in section.

Fig. 5 is a section on the line 5—5 of Fig. 3.

Fig. 6 is a plan view of the means for forcing

the paper into place, the arms supporting this means being in section.

Fig. 7 is a plan view of the heating elements, the arms thereof being shown in section.

Fig. 8 is a fragmentary section on the line 8—8 of Fig. 6.

Fig. 9 is an elevation of the table or magazine supporting the sheets of paper.

Fig. 10 is a section on the line 10—10 of Fig. 9.

Referring to these drawings, 10 designates a base or table on which the bottle A is adapted to be disposed. Any suitable means may be provided, if desired, for conveying the bottles across this table or the bottles may be placed upon the table by hand. I have not illustrated any particular conveying means because a large number of different conveyors may be used for this purpose and form no part of my invention.

Mounted for reciprocating movement upon this table 10 is the upright post 11 supported in a guide 12 mounted upon the table, this post at its upper end carrying the vertically adjustable head 13 held in adjusted position by means of the set screw 14 or any suitable means of this character. For the purpose of reciprocating the post 11 in its guide 12, I may provide the cam 15, as shown in Figs. 1 and 3 which is formed upon one face with the cam track 16, the post being provided with a portion 17 having a roller engaging in this cam track. Any suitable means may be used for constantly rotating this cam. I have not illustrated such driving means as this will be obvious.

The table is also formed or carries the vertically disposed guides 18 within which are guided the shanks of vertical brackets 19, the upper ends of these brackets supporting a sheet holding plate or magazine 20. These supporting rods 19 move freely within the guides 18 and for the purpose of lifting the magazine step by step, I provide the fixed screw 21 attached at its upper end to the plate 20 and extending downward thru a screw-threaded aperture 22 in that portion of the table designated 23. The portion 23 which is shown as attached to the table, but may be made in one piece with the table, is bifurcated at 24 and disposed within this bifurcation is the ratchet wheel 25, the screw 21 being formed with a spline 26 engaging this ratchet wheel. When the ratchet wheel is rotated, it will rotate the screw 21 and cause the upward or downward movement of the magazine. The shaft 21 is provided at its lower end with a hand wheel 27 whereby it may be rotated by hand. As illustrated in Fig. 10, the ratchet wheel is given a step by step rotation by

means of an eccentric 28 mounted upon the shaft 15^a on which the cam 15 is mounted. This eccentric carries the usual eccentric ring 29 to which is attached the pawl 30 having a tooth 31 engaging with the ratchet teeth. Upon a rearward movement of the rod 30, the tooth 31 will ride over the teeth of the ratchet wheel 25 and upon a reverse movement of the rod 30 the tooth 31 will drop into the ratchet teeth and give the ratchet wheel a forward movement of one step. Disposed to extend parallel to the screw 21 is a leaf flutterer comprising a pipe 32 connected at its end to a source of air, as at 33 and at its upper end formed with a nozzle 34 discharging air against the topmost sheets B. These sheets are preferably of paper, cut to a certain size, tho I do not wish to be limited to paper. The paper is waxed or coated with a substance which will adhere when warmed or heated.

The head 13 has an arm or extension 35 formed at its end with a tubular head 36. Extending thru this tubular head is a vertically elongated sleeve 37, as shown in Fig. 1 and extending thru this sleeve is a plunger rod 38 having on its lower end a plunger disk or head 39 adapted, as shown in Fig. 3, to be forced down upon the top of the bottle. The upper end of this rod is provided with a collar 40 to which a contractile spring 41 is connected in turn engaged with a head 36. Thus it will be seen that when the head 36 is raised, the sleeve 37 will engage with the collar 40 and lift the plunger rod but that when the head 36 is depressed, the rod 38 will be depressed until its head 39 comes in contact with the paper on the top of the bottle and then the head 36 may continue to move downward while the spring 41 resiliently holds the plunger in contact with the bottle.

Mounted on the lower end of the sleeve 37 for slight vertical movement, is a spider 42, an enlarged view of which is shown in Fig. 5. This spider is shown as having three radially extending slots 43 within which slots three arms 44 are pivotally mounted, the inner face of each arm being provided with a lug 45 thru which the pivot pin 46 passes. There are preferably three of these arms 44 and the lower end of each arm, as illustrated in Fig. 6, carries upon it an arcuate head 47 formed as shown in Figs. 6 and 8 with a plurality of inwardly extending triangular rubber fingers 49 which are adapted to yieldingly press against the paper cap formed from the sheet B and force the paper inwardly to conform to the shape of the bottle and fit closely around it. I do not wish to be limited to any particular means for supporting these rubber fingers in place but as illustrated in Fig. 8, the fingers are engaged with the arcuate head 47 by means of a segmental plate 50 and screws 51.

The upper ends of the arms 44 are inwardly and downwardly turned as shown in Figs. 1 and 3 and provided each with a spherical terminal 52. Mounted upon the sleeve 37 are the opposed conical cams 53 and 54 between which the spherical terminals 52 of the arms 44 are disposed. When the sleeve is moved downward, relative to the spider 42, these cams will force the upper ends of the arms 44 outward and the lower ends of the arms inward.

When the sleeve 37 moves upward, the cam 54 will force the terminals 52 inward and the lower ends of the arms 44 outward.

Also pivotally mounted upon the extensions 55 of the spider are arms 56 which carry at their lower ends the arcuate heating elements 57 as

shown in Fig. 7. These heating elements are preferably electrical heating elements, that is, elements having resistances embedded therein connected to a source of current as indicated diagrammatically in Fig. 7. The upper ends of these several arms 56 are engaged with an annular spring 58 shown in Fig. 2, the ends of the spring being overlapped and the spring contracting to draw the upper ends of the arms inward and throw the lower ends of these arms outward. For the purpose of causing the inward movement of these arms, I provide the upwardly beveled vertically movable cam 59 which is loosely mounted upon the sleeve 37 just above the spider 42. The contraction of the spring 58 causes the rounded inwardly curved ends of the arms 56 to force this cam downward, but the cam may be shifted upward by a tappet rod 60 which, as illustrated in Fig. 1, extends thru the spider and has a head at its upper end bearing against the cam 59, this pin 60 at the proper time coming into engagement with the plunger disk 39, as illustrated in Fig. 3, to force this cam 59 upward.

For the purpose of causing independent movement of the spider with relation to the sleeve 37, I provide the yoke designated generally 61 and shown in Fig. 5. The arms of this yoke are pivoted at 62 to trunnions on the spider 42. The yoke extends outward and downward and is pivotally connected to an upright 63 as shown in Fig. 1.

The confronting ends of the arm of the yoke 61 and of this post 63 are flat-faced and enlarged and disposed between the confronting faces is a washer 64 of some friction creating material. A bolt 65 holds the upper end of the post 63, washer 64 and the arm or yoke 61 into tight contact with each other so that friction is created which will tend to resist movement of the yoke and therefore resist movement of the spider 42.

For the purpose of feeding a sheet of paper from the stack of the magazine into a position over the top of the bottle, I provide a tubular arm 66 having at its lower end the two branches 67 and 68, each formed with suction cups 69. This arm adjacent its upper end is pivotally mounted upon a pivot pin 70 and the free end of the arm 66 is connected to a flexible pipe 71 which is connected to any suitable pump or other air exhausting means so that the air is being constantly exhausted from this suction device. The vacuum, however, may be relatively low. Initially the tubular arm 66 is in the position shown in dotted lines in Fig. 1 and the vacuum acting thru the suction cups will draw a sheet of paper upward as shown in dotted lines in Fig. 1, this being facilitated by the flutterer 32 in a manner which is well understood, this fluttering device being provided for the purpose of preventing the sheets of paper from adhering to each other under the pressure of air exterior to the stack of paper.

The arm 66 swings inward to the full line position in Fig. 1, carrying the sheet of paper into position over the top of the bottle and then the plunger 39 forces the sheet of paper down upon the bottle and detaches it from the vacuum cups. The sheet is then folded down around the bottle and then the sheet feeding arm is swung back to the dotted line position.

The oscillation of the sheet feeding arm is secured by providing an arm 72 on pipe 66 at its pivotal point, this arm being connected to a sectional arm 73. This arm is formed of an upper section, a lower section 74 and an intermediate

sleeve 75 having a set screw 76 engaging with the upper section of the link. Thus the lower section 74 of the arm may be adjusted relative to the upper section of the arm. The lower section of the arm is provided with a pin 77 and mounted upon the base and more specifically adjacent the guide 12 is a fixed cam with which the pin 77 engages. This cam includes the downwardly and laterally inclined spring 78 shown best in Figs. 1 and 3. Adjacent the lower end of this spring is a fixed triangular abutment 79, the upper end of which is formed with a slight recess and an upwardly extending finger 80. The lower end of the spring bears against a wall 81 which extends upward parallel to one edge of the triangular abutment 79, then extends upward and inward and terminates in a hooked portion 82 disposed to extend partly over the recess and toward the finger 80. Bearing in mind that the head 36 reciprocates with the post 11, it will be seen that when the head 36 moves downward from the position shown in Fig. 1, the arm formed by the sections 73 and 74 will be swung inward by the pin 77 engaging against the spring wall 78 and this will swing the tubular arm from the full-line position in Fig. 1 to the dotted-line position in Fig. 3. This motion will continue, generally speaking, until the post 11 starts upward, at which time the pin 77 will catch beneath the hook 82. A further movement of the head 36 upward will swing the arm outward to the dotted-line position. The pin 77 is then released from the hook 82 by a slight downward movement of the post, all of which will be later described in more detail. The arm 73 will then be swung by the spring 73^a into the position shown in Fig. 1 by full lines. This slight depression of the post 11 for the purpose of releasing the arm from its engagement with the hook is provided by the depression 16^a in the cam track 16 which acts just before the post 11 has been shifted to its highest position.

The operation of this mechanism is as follows: Taking the parts, as shown in Fig. 1, it will be seen that a sheet of paper B has been shifted by means of the vacuum arm 66 into position over the mouth of the bottle A and is held in this position by the vacuum cups 69. At this point, the cam track 16 is holding the post 11 at its highest position and the head 36 is thus held upward and all of the parts are raised relative to the bottle. When the highest point of the cam track has passed beyond the pin 17, the post will descend. As it descends, the sleeve 37 with the plunger 39 will descend until the plunger head engages against the sheet of paper immediately above the top of the bottle, as shown in Fig. 3. This will prevent any further downward movement of the plunger. The head 36, however, continues to move downward with the sleeve 37.

About the time that the plunger engaged the sheet with the top of the bottle and is stopped in its movement, the friction between the members 63 and 61 will be sufficiently great to impede the further downward movement of the spider 42 and the sleeve 37 will move downward slightly with relation to the spider as is shown in Fig. 3. This downward movement of the sleeve carries with it the cam members 53 and 54 and the cam member 54 acting upon the terminals 52 will wedge these terminals outward from the position shown in Fig. 1 toward that shown in Fig. 3.

This will swing the segmental members 47 inward and as these fingers 49 are depressed, will fold the sheet of paper down around the top of

the bottle. As the arms 44 are further shifted inward at their lower ends, the fingers 49 will compress the paper snugly around the mouth as illustrated in Fig. 3. During downward movement of sleeve 37, pin 60 engaging against the plunger is forced upward thru spider 42 and carries upward the cam 53 and this, acting on arms 56, causes the lower ends of these arms to swing inward and the heating elements on the arms will bear against the paper cap, warming or heating this cap to a degree sufficient to melt the wax with which the paper is impregnated, thus causing this wax to adhere to the bottle and sealing the bottle and causing the folds in the paper to adhere to each other. During this movement, the arm 73 has moved downward to the lower end of the spring wall 78, the spring giving to permit the pin 77 to pass the triangular abutment 79. The inclination of this spring 78, which is a relatively stiff spring, will cause the lower end of the arm 74 to swing inward while the hook on the upper end of the arm swings outward, tensioning a spring 73^a with which this hook on the upper end of the arm 73 is engaged.

Upon the upward movement of the post 11, the arm 73 will be raised and the pin 77 will move into position against the hook 82 as shown in dotted lines in Fig. 1. Upon the further upward movement of the post 11, this pull on the arm 73 will swing the tube 66 to the dotted-line position in Fig. 1. At this point, the depression 16^a of the cam track 16 causes a slight downward movement of the post 11 just sufficient to free the pin 77 from the hook 82 and the spring 73^a being then under tension will cause the arm 73 to swing outward against the finger 80 so that it may move upward upon the further upward movement of the post 11 into the position shown in full lines in Fig. 1 which will again swing a sheet of paper into position above a bottle disposed upon the table 10.

It will be seen that I have provided a mechanism which holds the sheet of paper down around the bottle and closely compresses it against the same and in which the wax of this sheet is melted and caused to adhere to the bottle, thus sealing the cap to the bottle. The mechanism is entirely automatic in its action, is relatively simple, and has been found thoroughly effective in practice.

I claim:

1. A bottle covering and sealing machine including a bottle support, means for automatically feeding a sheet of waxed paper into position over the top of the bottle, a plurality of segmental sheet folding means normally held in expanded position above the bottle, a plurality of segmental heating devices normally held in an expanded position above the bottle, a plunger normally disposed above the top of the bottle, means for causing the descent of the plunger to thereby cause the plunger to engage the sheet with the top of the bottle, means for causing the inward movement and descent of the segmental sheet folding means to thus fold the margin of the sheet down and around the bottle and hold it in tight engagement therewith and hold the folds in engagement with each other, and means then acting to force inward and lower said heating members into contact with the sheet to thus soften the wax on said sheet and cause the folds to adhere to each other.

2. A bottle covering and sealing machine including a bottle support, means for feeding a sheet of waxed paper into position over the top

of the bottle, a plunger disposed in alinement with the bottle and above the top thereof, a sleeve in which the plunger slides, means for alternately depressing and raising said sleeve, a spider thru which the sleeve slides and having frictional engagement with the sleeve, arms pivotally mounted intermediate their ends upon said spider, each arm at its lower end having a segmental head provided with paper folding fingers, arms also pivotally mounted upon the spider and each having at its lower end a segmental heater, the segmental heads of the first named arms and the segmental heaters when closed approximately surrounding the bottle, means acting upon a depression of the sleeve to lower said spider to thus cause the folding segments to fold the paper sheet down around the neck of the bottle, means acting upon a further movement of the sleeve to cause the inward movement of said folding arms to bring the folding fingers into contact with the paper and force the paper against the neck of the bottle, and means then acting to swing the lower ends of the heater carrying arms to bring the heaters into contact with the folded paper to thus melt the wax on the said paper and cause it to adhere to the bottle, said means acting upon a reverse movement of the sleeve to open said arms and raise the plunger from the paper.

3. A bottle covering and sealing machine including a bottle support, means for feeding a sheet of waxed paper into position over the top of the bottle, a vertically reciprocable post having an arm, a sleeve carried by said arm and disposed in alinement with the axis of the bottle, a plunger rod disposed loosely within said sleeve and resiliently urged downward and having a plunger head at its lower end adapted when the plunger is lowered to engage the paper and hold it upon the mouth of the bottle, a spider frictionally engaged with said sleeve for limited movement relative thereto, a plurality of paper folding arms pivotally mounted intermediate their ends upon said spider, the lower end of each arm having a segmental head provided with paper folding fingers, the upper end of each arm being inwardly curved and provided with a terminal end, a pair of conical cams mounted upon the sleeve between which cams the terminal ends are engaged, a downward movement of the cams acting to shift the lower ends of the arms inward, an upward movement of the cams acting to shift the lower ends of the arms outward, a plurality of heater carrying arms pivotally mounted intermediate their ends upon the spider, segmental electric heaters carried by the lower ends of said arms, a beveled cam slidably mounted upon the sleeve above the spider and engageable with the upper ends of said heater carrying arms, a spring urging the upper ends of the heater carrying arms inward, a pin extending thru the spider and bearing against the cam and adapted, as the spider is lowered, to engage the plunger and force the cam upward to thus close the heater carrying arms against the bottle, and means resisting the movement of the spider with the sleeve.

4. A mechanism of the character described including a bottle support, a magazine supporting sheets of paper thereon, a swinging tubular arm having suction cups at its free ends, the arm being evacuated, means for swinging the arm from a position immediately above the magazine to a position over the bottle, means for folding the sheet of paper carried by the arm down and around the mouth of the bottle and detaching

it from the vacuum cups, means acting to swing the arm back to a position with its vacuum cups disposed above the magazine, and means for intermittently raising the magazine as each sheet is disengaged therefrom.

5. A mechanism of the character described including a bottle support, a magazine supporting sheets of paper thereon, a swinging tubular arm having suction cups at its free ends, the arm being evacuated, means for swinging the arm from a position immediately above the magazine to a position over the bottle, means for folding the sheet of paper carried by the arm down and around the mouth of the bottle and detaching it from the vacuum cups, means acting to swing the arm back to a position with its vacuum cups disposed above the magazine, means for intermittently raising the magazine as each sheet is disengaged therefrom, and means for fluttering the sheets.

6. A bottle covering and sealing mechanism including a bottle support, a vertically movable post, a cam for causing the reciprocation of said post mounted upon a shaft, a head carried by the post, a vertically shiftable magazine, a tubular arm mounted upon the head, means for connecting it to an evacuating means, the arm at its free end having suction cups adapted when in one position to be disposed in a position immediately above the magazine and in another position to be disposed just above the bottle, means acting as the post and head are raised to cause the arm to swing to a position with its cups above the magazine and as the head is further raised to cause the arm to swing to a position to carry a sheet of paper over the bottle, a plunger acting as the head is lowered to engage the sheet to force it against the mouth of the bottle and out of engagement with the vacuum cups, and means for intermittently lifting said magazine comprising a screw-threaded rod supporting the magazine, a fixed screw-threaded member thru which the rod passes, and means for intermittently rotating said screw comprising a ratchet wheel, a pawl coacting therewith, and means on the cam shaft for reciprocating said pawl.

7. A bottle covering and sealing machine including a support for a bottle, a magazine adjacent the support and carrying sheets of paper, a vertically reciprocable post having a head, means for reciprocating said post, a tubular arm pivotally mounted upon said head and having means whereby it may be connected to an evacuating means and at its free end provided with suction cups, said tubular arm having an arm extending radially from its pivotal point, and means for oscillating said tubular arm comprising a rod pivotally connected to the radial arm, a spring urging the lower end of the rod outward, and a fixed cam comprising a downwardly inclined spring, a triangular abutment adjacent said spring, and a wall extending parallel to one face of the abutment and having a hook at its upper end, the rod having a pin engaging as the head moves downward with the spring wall passing said abutment and then as the head moves upward, moving upward into engagement with the hooked portion, the post operating means having means for giving momentary downward movement to the post before its final upward movement whereby to release the pin from said hook and permit the spring to return it to its initial position.

8. A bottle covering and sealing machine including a bottle support, means normally disposed above the bottle support but movable down-

ward and inward with relation thereto for forcing a sheet of waxed paper disposed over the top of the bottle downward over and around the upper portion of the neck of the bottle and cause folds to be formed in the paper, segmental heating means, and means for causing the heating means to close in and around the folded sheet and simultaneously move downward to thereby heat the paper to melt the wax thereon and cause the folds to adhere to each other.

9. A bottle covering and sealing machine including a bottle support, a plurality of segmental sheet folding means, normally held in expanded position above the bottle, a plurality of segmental heating devices normally held in expanded position above the bottle, a plunger normally disposed

above the top of the bottle, means for causing the vertical reciprocation of the plunger, the descent of the plunger engaging a waxed sheet of paper with the top of the bottle, means then acting upon a descent of the plunger to cause the descent and inward movement of the segmental sheet folding means to thus force the margin of the sheet down and around the bottle and hold it in tight engagement therewith, and successively lower and force inward said heating devices into contact with the sheet to thus soften the wax on the sheet and cause it to adhere to the neck of the bottle, and means then acting upon the raising of the plunger to cause the lifting of the sheet folding means, and the heating devices with said plunger.

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