June 14, 1966 H. J. MARTIN ETAL 3,255,568

JAR CAPPING MACHINE

Filed May 14, 1962 2 Sheets-Sheet 1

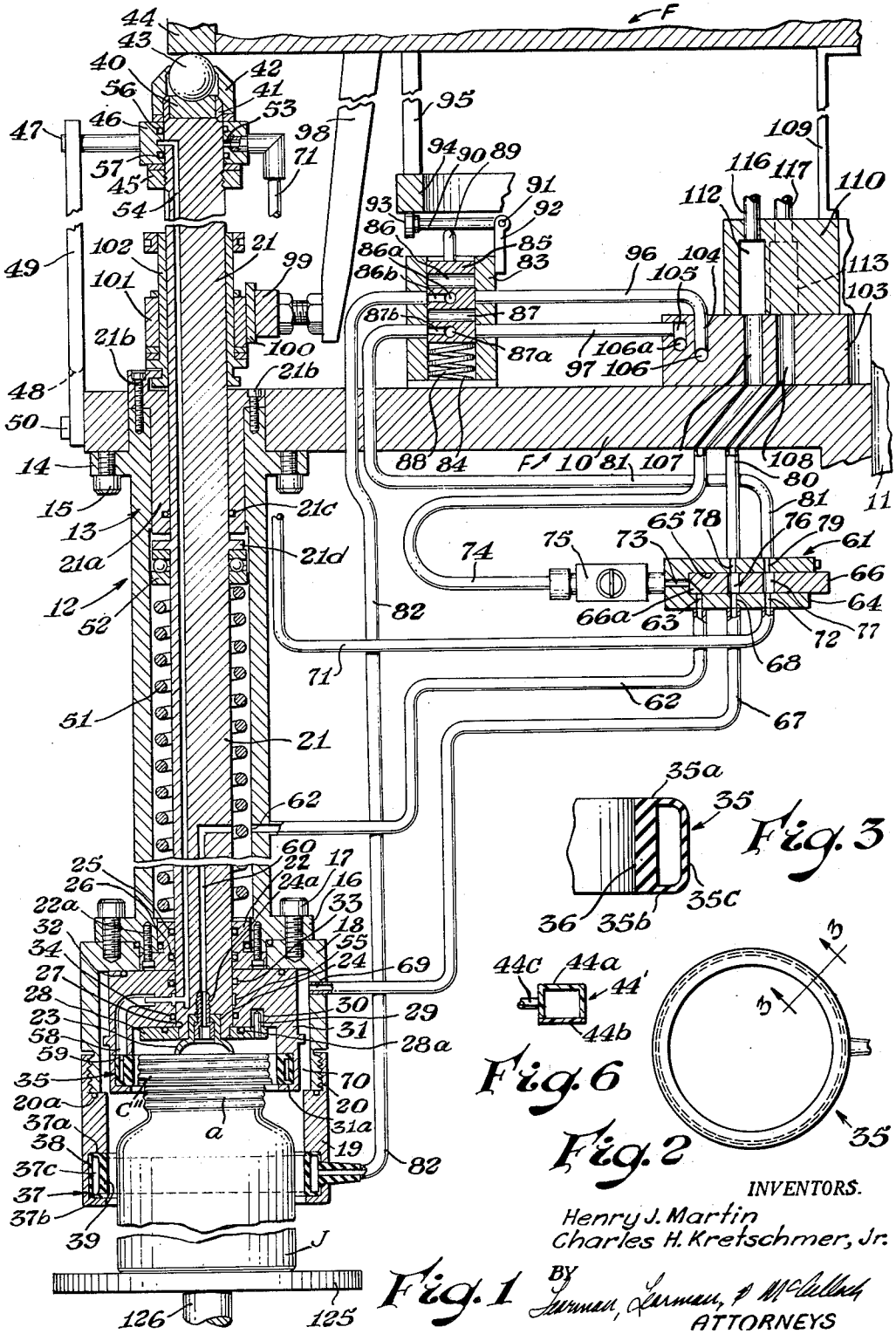

Fig. 1

Fig. 3

Fig. 6

Fig. 2

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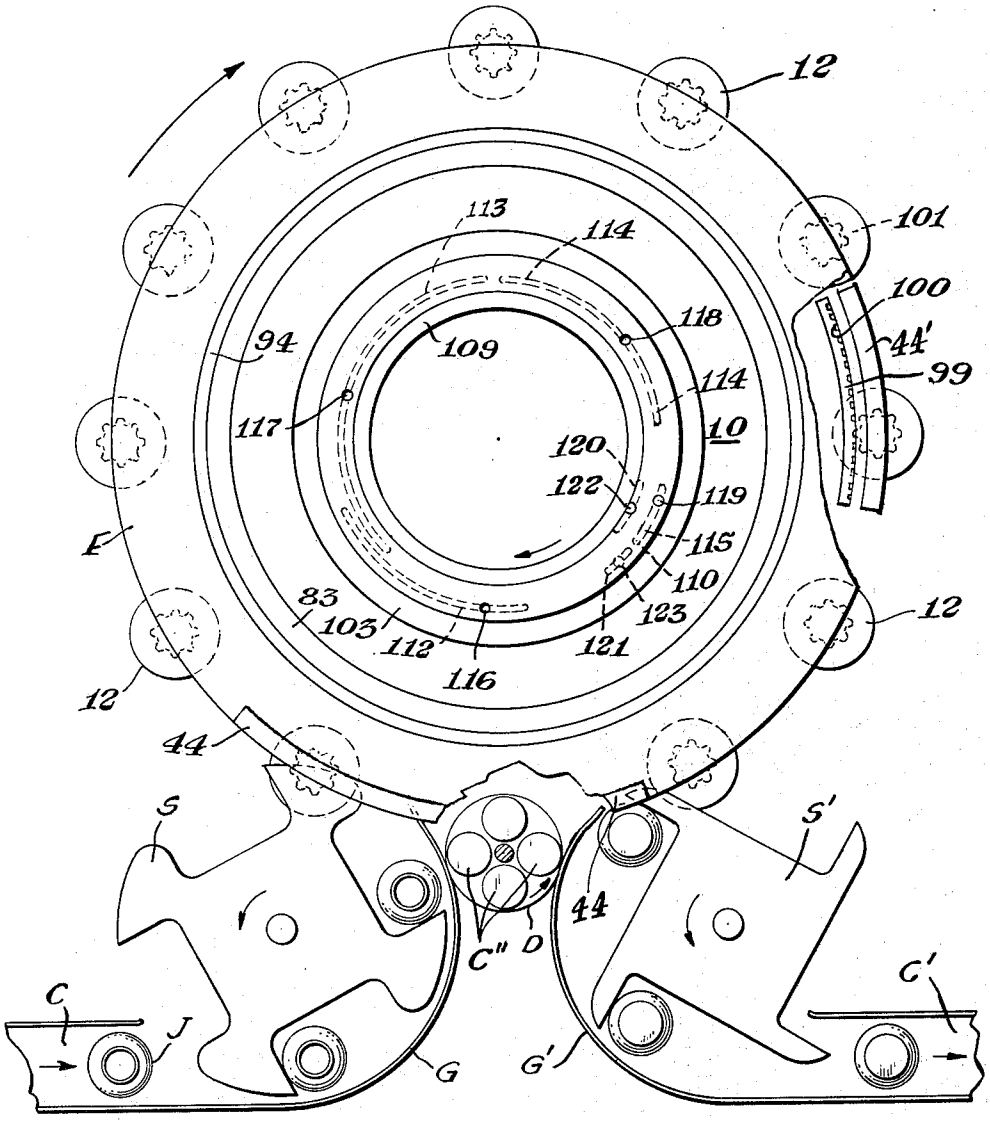

Fig. 5

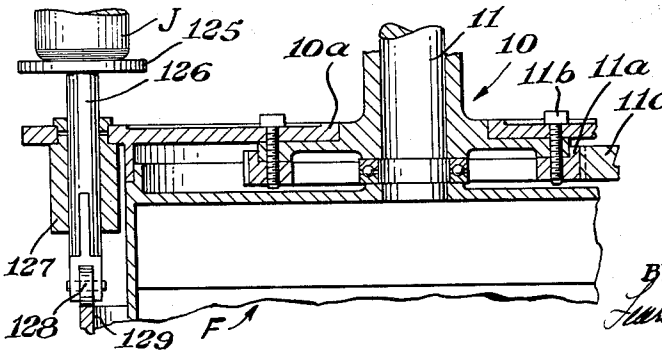

Fig. 4

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3,255,568

JAR CAPPING MACHINE

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10 Claims. (Cl. 53—95)

This invention relates to jar capping machines and particularly to certain novel and useful improvements therein. It is a prime object of the present invention to provide a jar capping machine of improved design which is highly reliable in operation and is capable of receiving jars containing products of various kinds including granular and powder products, exhausting the air therein, and hermetically sealing the jar without removing any of the food substance or other material within the container.

A further object of the invention is to design a machine which can be adapted to cap both shouldered and straight sided jars with equal effectiveness and may simply evacuate, or evacuate and then supply a suitable gas to the jar.

Another object of the invention is to provide a machine of the character described, including suction means for picking up a cap, which is so constructed that suction forces will not be applied to the product filled jar and the cap gripping member will not be expanded, unless a cap is picked up by the initial cap support member.

A further object of the invention is to provide a jar capping machine suitable for use with various caps of the thread-on, press-on, or formed in place type and constructed from various materials such as aluminum, steel, and suitable plastics.

Another object of the invention is to design a machine incorporating an inflatable member for gripping the cap and securing it in position on the top of the jar.

Still another object of the invention is to provide a machine incorporating an improved inflatable member for gripping jars which not only seals the interior of the evacuating housing but also prevents the jar from turning, even though the jars are slightly irregular, so that mechanical grippers are not required.

A further object of the invention is to provide an improved machine of turret type, employing multiple cap applying heads, which operates rapidly and more efficiently than machines of known design.

Other objects and advantages of the invention will be pointed out specifically or will become apparent from the following description when it is considered in conjunction with the appended claims and the accompanying drawings, in which:

FIGURE 1 is a fragmentary, sectional elevational view taken through one of the cap applying heads, a typical jar being shown in position within the head just prior to commencement of the capping operation;

FIGURE 2 is a top plan view of the cap gripping element;

FIGURE 3 is an enlarged, sectional view taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a sectional, side elevational view of a lower section of the machine, but on a reduced scale;

FIGURE 5 is a top plan view of the machine with certain parts omitted and certain parts depicted only schematically in the interests of clarity; and

FIGURE 6 is a sectional view through the cam used in threading the caps on the jars.

Referring now more particularly to the accompanying drawings, wherein we have shown a preferred embodiment of the invention only, a numeral **10** generally indicates a head supporting carriage or turret which is mounted for continuous rotation on a central shaft **11**,

such as shown in Hohl et al. Patent No. 2,506,363. As in that patent and Hohl et al. Patent No. 2,338,852 referred to therein, which are incorporated herein by reference, the carrier **10** carries a plurality of jar capping heads generally designated **12** and revolves in a continuous circumferential path through various stations (see FIGURE 5) at which the machine is supplied with caps and product filled jars, for instance, and the capped jars are removed in a hermetically sealed condition to a conveyor line or the like. A gear **11***a* (FIGURE 4) can be staked as at **11***b* to the carriage **10** in mesh with a gear **11***c*, connected to a suitable drive motor through speed reduction gearing for driving carriage **10** at the desired rate of speed. In FIGURE 5 the incoming conveyor is shown at C and the outgoing conveyor at C′, a transfer star wheel for the conveyor C being shown at S and a similar star wheel for the conveyor C′ being shown at S′. The construction is similar to that shown in Barnby Patent No. 2,126,942 except that the curved jar guides G and G′ are spaced sufficiently to admit a jar cap carrying rotary disc D on which the caps C″ for the jars J are supplied.

Automatic machinery of this general design is well known and the present invention is concentrated with the construction of the jar capping heads **12** and the control system for supplying air under pressure and applying suction to the jar capping heads **12** rather than to the overall turret type machine on which these heads and their control system are employed. While the invention will be described as though the jar capping head is mounted on a rotary type machine, it is to be understood that the invention is not limited to heads for such machines and it is not necessary to the construction disclosed that they be mounted on a continuously revolving turret or carriage.

As shown in FIGURE 1, each head **12** includes a main housing generally designated **13** having a flange **14** which is bolted as at **15** to the outer edge of the carriage **10**. Mounted on a lower flange portion **16** of the main housing **13**, as by bolts **17**, is a two-part jar receiving housing of enlarged diameter comprising upper and lower portions **18** and **19**, housing section **19** preferably being threaded on the section **18** as at **20** and the housing being sealed by an O-ring **20***a* provided between the members as shown.

Provided within the housing **13** to journal a shaft **21** is a bushing **21***a*, which is bolted to the housing **13** as at **21***b*, and an O-ring seal **21***c* is also provided as shown. At its lower end the shaft **21** is supported by a bushing **22** which is bolted to the lower end of housing **13** as at **22***a* and it will be seen that shaft **21** mounts a dependent suction cup member **23** which is received in an opening **24** provided in the lower end of shaft **21**. A tubular stud **24***a* threads into the lower end of the shaft **21** to hold the cup **23** in place. Outer O-ring members **25** and **26** seal the bushing **21** and shaft **16**.

The shaft **21** is also shouldered at its lower end at **27** to receive a driver plate **28** having a driver pin **29** received in a bore **30** provided in a cap gripping member **31**. The member **31** is provided with O-ring seals **32**, **33**, and **34** as shown, and driver plate **28** is provided with an O-ring seal **28***a*. At its lower end the member **31** is interiorly grooved as at **31***a* to accommodate an inflatable cap gripping ring generally designated **35** which, as shown in FIGURE 3, includes relatively thin upper, lower, and exterior walls **35***a*–**35***c*, respectively, and a relatively thick interior side wall **36**. The same construction is apparent in an inflatable ring generally designated **37**, provided in an interior groove **38** provided in the housing ring **19** which likewise has relatively thin upper, lower, and exterior walls **37***a*–**37***c*, respectively, and a relatively thick

interior side wall 39. The reason for this construction will later become apparent when the operation of the machine is described.

The shaft 21, which is revolved in a manner to be described to thread a cap C'' on the threaded neck "*a*" of a typical jar J is also vertically reciprocable in the housing 13. At its upper end a ball-receiving member 40 is fixed on the shaft 21 by a sleeve 41 which is retained in position by a guard member 42 which embraces the cam follower ball 43. The ball 43 is maintained "up" or in engagement with either a steel cam 44 or an inflated cam 44' supported in fixed position on the stationary framework F of the machine in any suitable manner, as in the Pasotti Patent No. 2,614,739. Under the influence of cam 44 the shaft 21 is depressed to lower the member 31 and suction cup 23 in the manner desired during the operation of the machine.

Supported on the upper end of reciprocable and rotatable shaft 21 by a nut 45 is a manifold ring 46 mounted by carriage 10, including a radially extending pin 47 which, when shaft 21 is moved downwardly by cams 44 or 44', rides in a slot 48 in a bifurcated bracket 49 which can be bolted to the periphery of the carriage 10 as at 50. The shaft 21 is maintained in engagement with the cams 44 or 44' by a return spring 51 within housing 13 bearing against a ball bearing race assembly 52 which in turn bears against a flange 21*d* fixed on the shaft 21 as shown. The spring 51 operates to restore the shaft 21 to the upper position in which it is shown in FIGURE 1 when permitted to do so by cams 44 or 44'.

Provided in shaft 21 in communication with an annular air passage 53 provided in the manifold ring 46 is a vertically extending, axially offset passage 54 which leads to the annular passage 55 provided in the member 31 between seals 33 and 34. The annular passage 53 in manifold 46 is sealed by rings 56 and 57 as shown. The passage 55 in the member 31 communicates with a passage 58 in member 31 which leads to the passage 59 in cap gripping tube 32.

Also provided in the shaft 21 is a vacuum passage 60, extending axially in the shaft 21, which leads to the interior of the tubular retainer 24*a* as shown. Passage 60 could lead axially to the manifold 46 and there connect to line 62, if desired. A control valve generally designated 61 communicates the line 60 with a vacuum source such as a Beach Russ mechanical vacuum pump through line 62 leading to a port 63 in the valve body 64 which has a chamber 65 receiving a reciprocable slide 66. A suction line 67 leading from a port 68 in control member 61 communicates through an opening 69 in the housing section 18 with the space 70 to evacuate air from the jar J when port 68 is in communication with a vacuum source. Also, an air line 71 which communicates with chamber 53 and the cap gripping annular tube 35 leads to a port 72 in the valve body 64. The control member 61 includes an axially extending port 73 in body portion 64 communicating with a vacuum line 74 through a regulator valve 75 and it will be seen that the slide 66 has ports 76 and 77 which are communicable with the ports 68 and 72 when the spool 66 is moved to the left as in FIGURE 1. To permit port 73 to communicate with port 63 at this time the left end of slide 66 can be cut away as at 66*a* or this may be otherwise accomplished. Valve body 64 further includes a port 78 in alignment with port 68, and a port 79 in alignment with port 72, which communicate with vacuum and air lines 80 and 81, respectively.

A line 82 connects to the jar gripping air tube 37, as shown in FIGURE 1, and leads to an air supply control member 83 which includes a chamber 84 having a slide member 85 therein with two through ports 86 and 87. Also, vent ports 86*a* and 87*a* lead through the slide 85 and housing 83 to atmosphere from ports 86*b* and 87*b* which communicate with lines 82 and 81 when the slide is in "up" position as in FIGURE 1. Provided in the lower end of chamber 84 is a spring 88 which normally biases the piston 85 to the upper position where it engages

with a vertically reciprocable pin 89. The pin 89 may be depressed by a lever arm 90 pivotally mounted as at 91 to a bracket 92 and having a follower roller 93 in engagement with a circular cam 94 supported by a member 95 from the framework F. Air pressure lines 96 and 97 supply the lines 82 and 81, respectively, with air when the piston member 85 is depressed to align the passages 86 and 87 with the respective lines 82 and 81.

Also supported by the frame F by brackets 98 is a stationary, curvilinear rack 99 having gear teeth 100 on a certain portion of its periphery which are engaged by the teeth of the spur gear 101 fixed to a sleeve 102 keyed in any suitable manner to shaft 21 for revolving the shaft 21 to thread the cap C'' on the jar J at the proper time. The rack 99 can support cam 44', which differs from cam 44 in that it includes an elastic rubber or rubber-like channel 44*a* closed by a hard wearing "disogrin" plastic plate 44*b* and an inflation and deflation valve 44*c*. If the thread on the cap C'' does not quite match the thread on the jar, the cap is not forced on by cam 44' because resilient cam 44' is deformable. Moreover, in practice the heads 12 are so closely spaced that there may be three heads 12 under cam 44' at one time. The operation of the end heads 12 will not be disrupted if it is the jar in the middle head of the three upon which the cap will not thread.

The air lines 96 and 97 connect with a ring manifold 103 mounted on the carriage 10 to revolve therewith and particularly to air chambers 104 and 105, respectively, therein. Lines 106 and 106*a* lead to suitable sources of air pressure such as Gardner Denver compressors or the like and air under a pressure of about 45 p.s.i. is provided to line 97 and under a pressure of about 60 p.s.i. to line 96. The manifold 103 also includes vertically through vacuum ports 107 and 108 communicating with the lines 74 and 80, respectively. Mounted above the rotating manifold 103 on brackets 109 or the like is a stationary manifold ring 110. The stationary manifold ring 110 includes (FIGURE 5) arcuate slots 112, 113, 114, and 121, as shown, leading through its under surface, and hoses 116, 117, 118 and 123 communicating with them respectively. In addition, there are slots 115 and 120 having vent ports 119 and 122 to atmosphere. The arcuate slot 112 communicates with the vacuum line 74 and the slots 113 and 114 with the vacuum line 80 through ports 107 and 108, respectively.

In the operation of the machine the heads 12 are first passed over the revolving disk D which has caps C'' thereon supplied from a chute or in any suitable manner, carrier 10 revolving relatively slowly, of course. As each head 12 approaches the cap supply disk D, cam 44 forces the shaft 21 to descend to bring suction cup 23 into engagement with the innermost cap C'' on the disk D. At about the time that suction cup 23 is about to engage the cap, the line 74 has moved into communication with the slot 112, which is supplied with vacuum through the line 116, and line 60 is furnished with the vacuum force to exert a lifting force on the innermost cap C''. Once the suction cup 23 has sealed to the upper surface of cap C'', then slide 66 (which has been in outward position) is drawn leftward to the position in which it is shown in FIGURE 1 by the vacuum in line 74 to communicate lines 76 and 77 with lines 80 and 81, respectively. At this time the return spring 51 is permitted by cam 44 to move shaft 21 upwardly toward the position in which it is shown in FIGURE 1. Each head 12 has a pedestal 125 mounted under it and revolving with the carriage 10 and for each pedestal 125 there is a shaft 126 (FIGURE 4) slidably received by a bearing 127 in a lower portion 10*a* of the carrier 10, each shaft 126 mounting a follower roller 128 which rides on a circular cam track 129 supported by the stationary frame F of the machine. The configuration of cam track 129 is such that the pedestal 125 and jar J tends to follow the cap C'' upwardly into the capping head housing 19.

When the suction cup 23 has risen to the upper position in which it is shown in FIGURE 1 and pedestal 125

to its uppermost position, the cam **94** depresses the pin **89**, which moves slide **85** downwardly to communicate the air passages **96** and **97** with the air supply lines **82** and **81**, respectively. At this time air is delivered to inflate the tubes **35** and **37** so that they grip the jar cap C'' and the jar **J**, respectively. The configuration of these tubes, as demonstrated in FIGURE 3, is important to proper gripping of the cap C'' and jar J. With the inner walls **36** and **39** being of substantially greater thickness, the expansion is lateral, rather than upwardly or downwardly. The walls **36** and **39** do not themselves bulge or expand but remain in tight engagement with the surfaces over their vertical lengths. In this way the cap and jar are prevented from lifting and this is particularly important from the standpoint of inflatable ring **37** since, when space **70** is evacuated, atmospheric pressure is tending to push the jar up into the head.

Just after the time that inflatable rubber rings **35** and **37** are expanded into gripping engagement with the cap C'' and jar **J**, respectively, the control slide **66** being in leftward position, slot **113** communicates with the vacuum line **80**, with the control slide **66** being at the left as in FIGURE 1. With vacuum line **80** in communication with vacuum line **67**, the air is evacuated from the space **70** and the jar **J** but in such a manner that the contents of the jar **J** remain undisturbed.

It is important to note that, had the suction cap **23** not picked up a cap C'', slide **66** would not have been shifted to the left in FIGURE 1 and no air would have been delivered to line **71** to inflate the cap gripping tube **35**. This is important from the standpoint that, if the tube **35** is not inflated when no cap C'' is in place, the tube cannot be mashed against the threads of the jar neck "*a*" or damaged by them when the shaft **21** is revolved. Further, unless a cap C'' is picked up by cup **23** the vacuum line **67** is not communicated with the space **70** and the release of vacuum will not disturb the product in the jar **J**. It is necessary to the operation of the system that the cap C'' be in position on the jar **J**, as shown in FIGURE 1, to prevent this from happening. The arcuate slot **114** may also be connected with a vacuum line **118**, or the line **118** could lead to a source of carbon dioxide gas, for instance, if it were desired to gas pack the product.

In any event, at about the time that tube **80** has revolved sufficiently to approach the end clockwisely of slot **114**, cams **44** and gear teeth **100** simultaneously revolve and lower shaft **21** to thread the cap C'' into secured position on the top of the jar **J**. Finally, the line **74** comes into communication with the slot **121**, which is supplied with air under a pressure of about 1 p.s.i. through the supply hose **123** and restores the slide **66** to the right in FIGURE 1, thereby discommunicating the suction in line **80** with the line **67** and the air pressure in line **81** with the line **71**. Cam **94** permits the spring **88** to return the slide **85** upwardly and thereby tubes **35** and **37** can be simultaneously deflated through vent ports **86***a* and **87***a*.

The slot **120** is open to atmosphere and just before the time that the slide **66** is returned to the "out" position, atmospheric air is supplied through the line **80** to the line **67** and chamber **70**. Also, at about this time, when line **74** is communicating with the slot **115**, the vacuum in line **62** and suction cup **23** is released by the pressure of the atmosphere. At this time, with the cap C'' securely in position on the jar **J**, the pedestal **125** is gravity lowered as permitted by the cam **129** until the cap on the jar clears the housing **19** and thence, having completed a circuit of the machine, is transferred to the outgoing conveyor C' by the star wheel S'. In a typical machine there may be twenty-eight heads **12** rotating continuously to cap jars through the cycle of operations described, although less are shown for convenience sake in FIGURE 5.

It is to be understood that the drawings and descriptive matter are in all cases to be interpreted as merely illustrative of the principles of the invention rather than as limiting the same in any way, since it is contemplated that various changes may be made in the various elements to achieve like results without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. In a jar capping machine; a downwardly opening housing adapted to receive the upper end of an uncapped threaded jar; a jar support member; means for relatively moving said jar support member and housing to dispose the upper end of the jar within the housing; seal and holder element means on said housing for engaging the sides of the jar and holding it from rotating while air sealing the said upper end of the jar within said housing; a vertically travelable spindle within said housing, mounting a cap carrying suction member thereon, and lowerable to a position to pick up a cap; a driver rotatably carried by said housing and surrounding said suction member; an inflatable, tubular, cap gripping element carried by said driver above said seal and holder element means generally circumferentially adjacent said suction member when the latter is in raised position; means for selectively inflating and deflating said cap gripping element; means for revolving said driver; means for selectively vacuumizing the interior of said housing above said seal and holder element means; means for selectively vacuumizing said suction member; and control means for operating all said means in sequence to vacuumize and lower said suction member to engage a cap to raise said suction member and cap, to inflate said cap gripping element to cause it to grip the cap, to vacuumize the interior of the housing above said seal means when a jar has been moved within said housing, to revolve said driver while at the same time lowering said driver to thread the cap on the jar, and to deflate said cap gripping element.

2. In a jar capping machine; a downwardly opening housing; a jar support member movable relatively vertically therewith to dispose the upper end of a jar within said housing; an inflatable member within said housing for gripping a cap to be secured on the upper end of the jar; means for relatively moving the inflatable member and jar support member; seal means on said housing below said inflatable member for engaging the sides of the jar and sealing off the interior of the housing; line means connectable with a source which will remove air from a jar and leading to the interior of the housing and the upper end of the jar; fluid pressure line means leading from a source of fluid under pressure to said inflatable member; and control means, including valve means interposed between said source and housing interior and said inflatable member and fluid pressure source for operating all said means, in the following sequence: communicating the fluid pressure source and inflatable member for inflating the inflatable member to grip the cap, thereafter communicating the said source which will remove air from the jar and interior of the housing, moving the inflatable member and jar support member relatively to secure the cap on the jar, and deflating the inflatable member.

3. In a jar capping machine; a downwardly opening housing; a jar support member movable relatively vertically therewith to dispose the upper end of a jar within said housing; a suction member within said housing for engaging the top of a jar cap; an inflatable ring member within said housing for peripherally gripping a cap to be secured on the upper end of the jar; a vacuum line connectable with a vacuum source and leading to the suction member; a fluid pressure line leading from a source of fluid pressure to said inflatable member; and control valve means interposed between said vacuum source and suction member and said inflatable member and fluid pressure source; said control valve means preventing communication of said fluid pressure line and inflatable ring member if no cap is engaged by said suction member.

4. The combination defined in claim 3 in which means is connected with said housing for selectively vacuumizing the interior thereof and said control valve means comprises a single valve preventing operation of said vacuumizing means as well as communication of said inflatable member and fluid pressure source if no cap is engaged by the suction member.

5. In an evacuating, jar capping machine; a downwardly opening housing adapted to receive the upper end of an uncapped threaded jar; vertically travelable spindle means within said housing including a cap engaging member thereon; means for revolving said cap engaging member; and a tubular, inflated, deformable cam carried above said spindle means for urging said spindle downwardly at a time when said cap engaging member is rotating to thread the cap on the jar.

6. In an evacuating, jar capping machine; a rotary table; means for revolving said table; a downwardly opening housing carried by said table adapted to receive the upper end of an uncapped threaded jar; seal elements on said housing for engaging the sides of the jar and air sealing the said upper end of the jar; a vertically travelable spindle within said housing mounting a cap carrying suction member thereon lowerable to a position to engage a cap and return with it up into said housing; cap gripping means on said spindle generally in surrounding relation with said suction member; rigid cam means above said spindle for lowering said spindle to engage the cap at a particular time during rotation of the housing with the table; a driver carried by said housing for revolving said spindle; means for revolving said driver at a later time during rotation of the housing with the table; means for moving a jar within said housing after said suction member has engaged a cap and returned; means for selectively vacuumizing the interior of said housing above said seal elements; means for selectively vacuumizing said suction member; elastic, deformable cam means carried above said spindle for urging said spindle downwardly at a time when said driver is rotating the spindle to thread the cap on the jar; and means for operating all said means in sequence to vacuumize said suction member when it is lowered to engage a cap, to vacuumize the interior of the housing above said seal means when a jar has been moved within said housing, to devacuumize the suction member, and to devacuumize the interior of said housing when the cap has been threaded on the jar.

7. In a jar capping machine; a downwardly opening housing adapted to receive the upper end of an uncapped threaded jar; a jar support member; means for relatively moving said jar support member and housing to dispose the upper end of the jar within the housing; seal element means on said housing for engaging the sides of the jar and sealing the said upper end of the jar within said housing; means within said housing, mounting a cap carrying suction member thereon; a driver rotatably carried by said housing and surrounding said suction member; means mounting said driver and jar support member for relative vertical movement; an inflatable, cap gripping element carried by said driver above said seal element means generally circumferentially adjacent said suction member; means for selectively inflating and deflating said cap gripping element; means for revolving said driver; means for selectively vacuumizing the interior of said housing above said seal element means; means for selectively vacuumizing said suction member; and control means for operating all said means in sequence to vacuumize said suction member to engage a cap, to inflate said cap gripping element to cause it to grip the cap, to vacuumize the interior of the housing above said seal means when a jar has been moved within said housing, to revolve said driver while the cap and jar are being moved relatively vertically to thread the cap on the jar, and to deflate said cap gripping element.

8. In a jar capping machine; a downwardly opening housing adapted to receive the upper end of an uncapped jar; a jar support member; means for relatively moving said jar support member and housing to dispose the upper end of the jar within the housing; seal element means on said housing for engaging the sides of the jar and sealing the said upper end of the jar within said housing; means within said housing, mounting a cap carrying suction member thereon; an inflatable, cap gripping element above said seal element means generally circumferentially adjacent said suction member; means for relatively vertically moving said cap gripping element and jar support member; means for selectively inflating and deflating said cap gripping element; means for selectively vacuumizing the interior of said housing above said seal element means; means for selectively vacuumizing said suction member; and control means for operating all said means in sequence to vacuumize said suction member to engage a cap, to inflate said cap gripping element to cause it to grip the cap, to vacuumize the interior of the housing above said seal means when a jar has been moved within said housing, to move the cap and jar relatively vertically to secure the cap on the jar, and to deflate said cap gripping element.

9. In a jar capping machine; a downwardly opening housing adapted to receive the upper end of a jar; a jar support member; means for relatively moving said jar support member and housing to dispose the upper end of the jar within the housing; means within said housing, mounting a cap carrying suction member thereon; an inflatable, cap gripping element generally circumferentially adjacent said suction member; means for relatively vertically moving said cap gripping element and jar support member; means for selectively inflating and deflating said cap gripping element; means for selectively vacuumizing said suction member; and control means for operating all said means in sequence to vacuumize said suction member to engage a cap, to inflate said cap gripping element to cause it to grip the cap, to move the cap and jar relatively vertically to secure the cap on the jar, and to deflate said cap gripping element.

10. In a jar capping machine; a downwardly opening housing adapted to receive the upper end of an uncapped jar; a jar support member movable relatively vertically therewith to dispose the upper end of a jar within said housing; vertically travelable means within said housing including a cap engaging member thereon; and a tubular, inflated, deformable cam carried above said means for urging said means downwardly to secure the cap on the jar.

References Cited by the Examiner

UNITED STATES PATENTS

1,860,270	5/1932	Thubron	53—112
2,120,272	6/1938	Williams et al.	53—88
2,343,104	2/1944	Williams	53—109 X
2,670,117	2/1954	Kantor	53—95 X
2,694,516	11/1954	Barnby	53—95
2,884,751	5/1959	Bjering	53—317

FOREIGN PATENTS

17,844	8/1893	Great Britain.

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