United States Patent

[11] 3,590,721

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[21] Appl. No. **849,468**
[22] Filed **Aug. 12, 1969**
[45] Patented **July 6, 1971**

[54] **INJECTION-TYPE PICKLING APPARATUS FOR HAMS, BACON AND THE LIKE**
14 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **99/256,** 99/107, 99/159
[51] **Int. Cl.** **A23b 1/16**
[50] **Field of Search** 99/256, 257, 255, 254, 107, 159

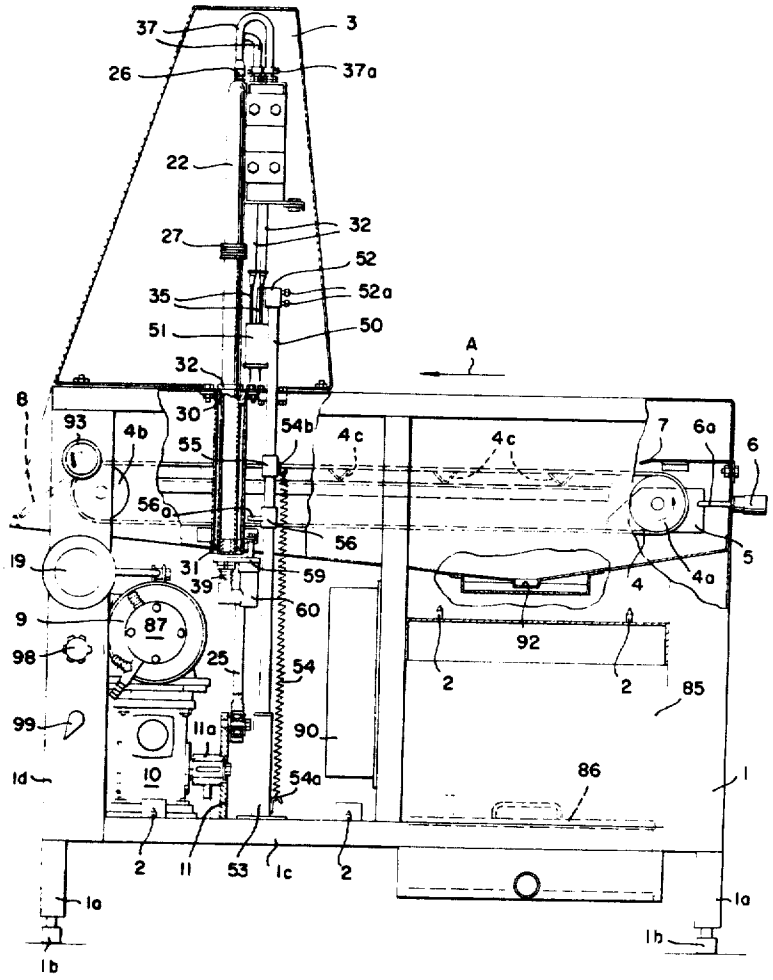
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ABSTRACT: A pickling apparatus has a transport mechanism for moving an article of food along a horizontal path. Arranged above this path is an array of needles which are displaceable into and out of penetrating engagement with the article while being connected to a source of pickling liquid under pressure. A holding element is coupled to these needles to be displaceable into and out of abutment with the article to hold it down and to enable withdrawal of the needles. A common drive mechanism is provided for jointly displacing the needles and the holding element while enabling displacement of the needle carrier downwardly relative to the retaining element. A valve mounted on the needle carrier is actuatable to feed liquid from the source to the needles only when the retaining element is immobilized and relative displacement of needles and retaining element occurs.



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SHEET 1 OF 5

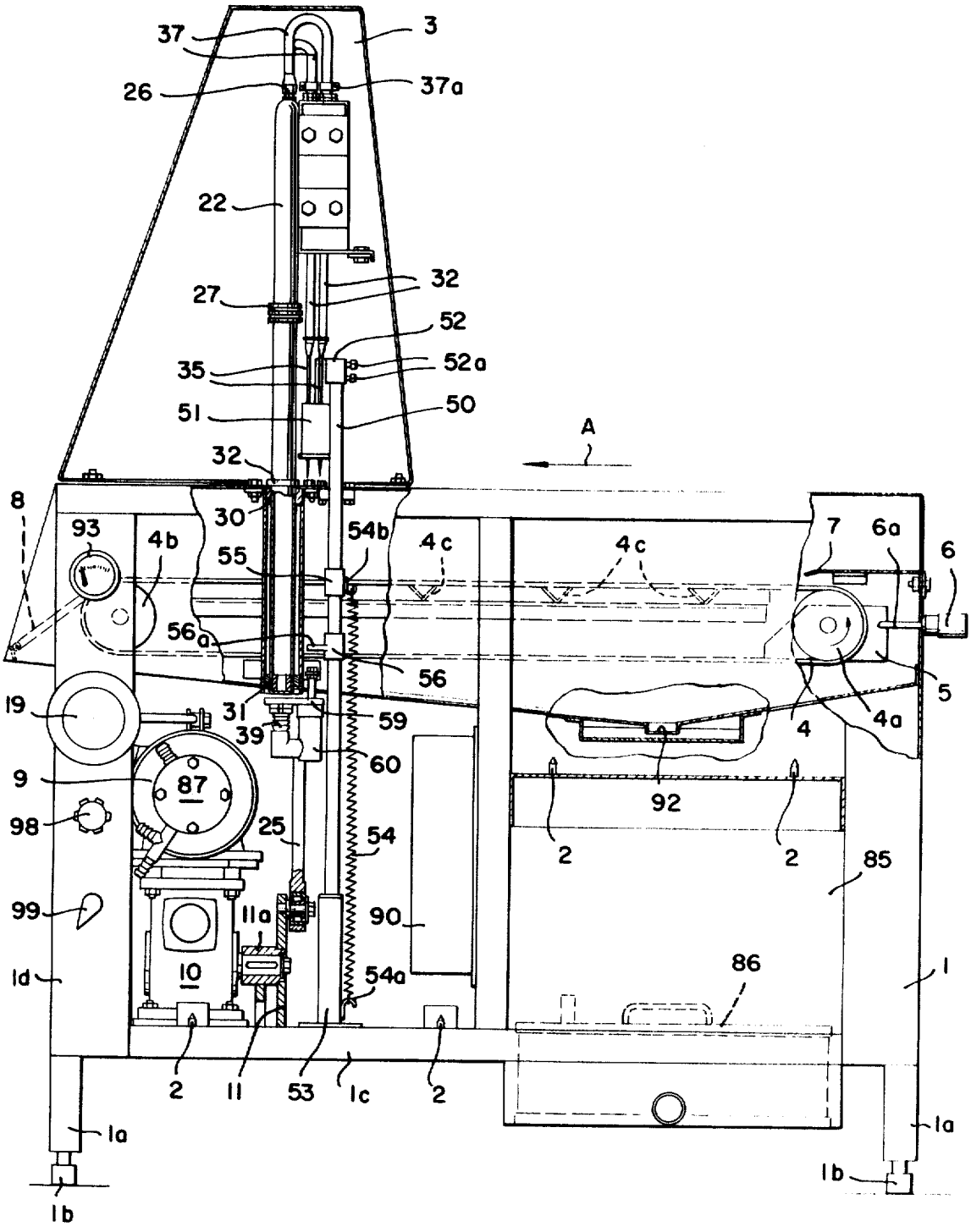


FIG. 1

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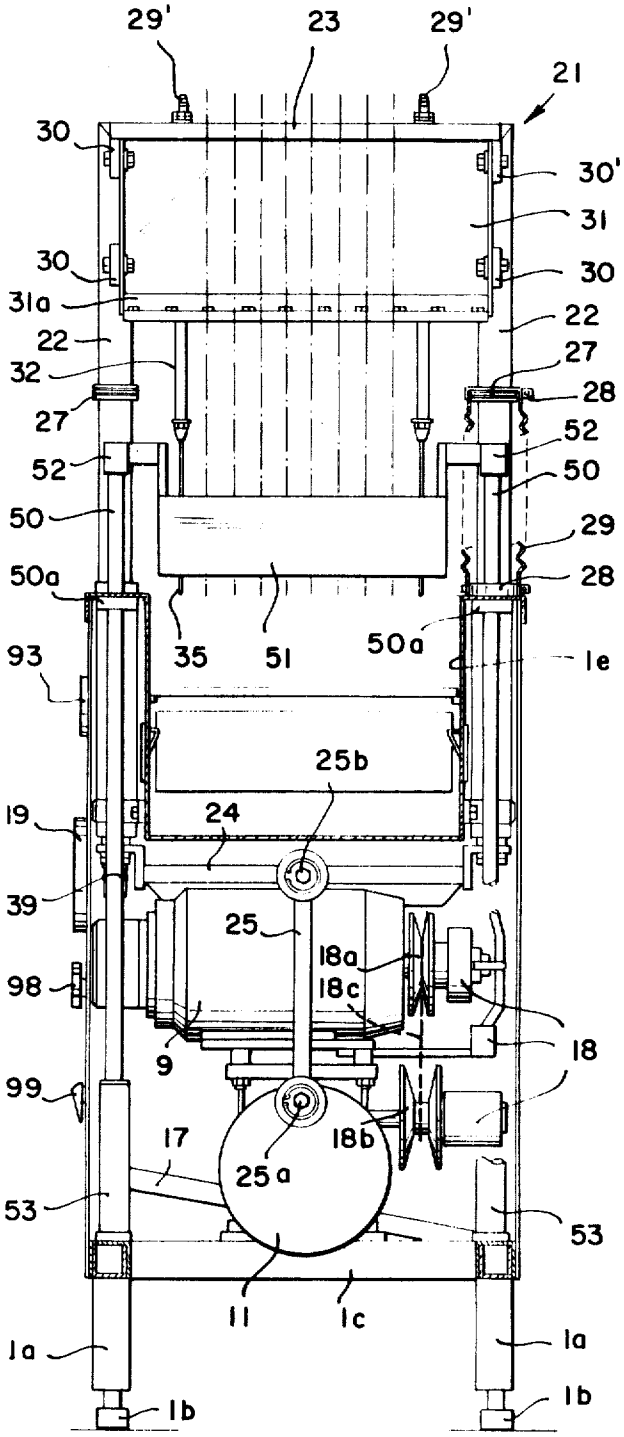


FIG. 2

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FIG. 3

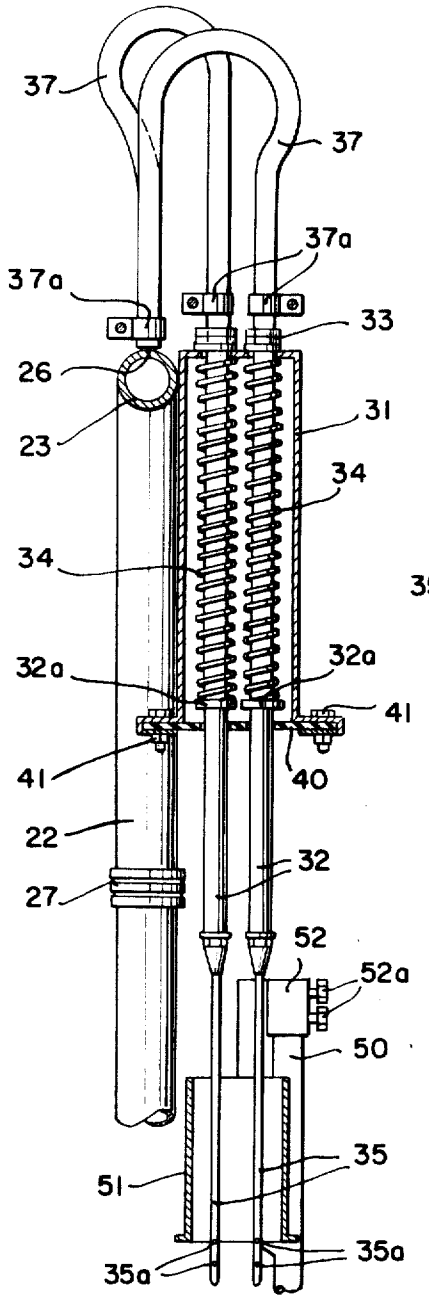
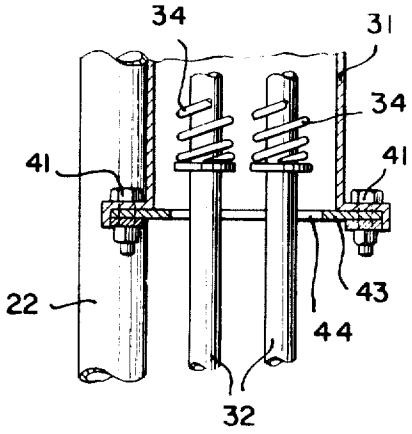


FIG. 4



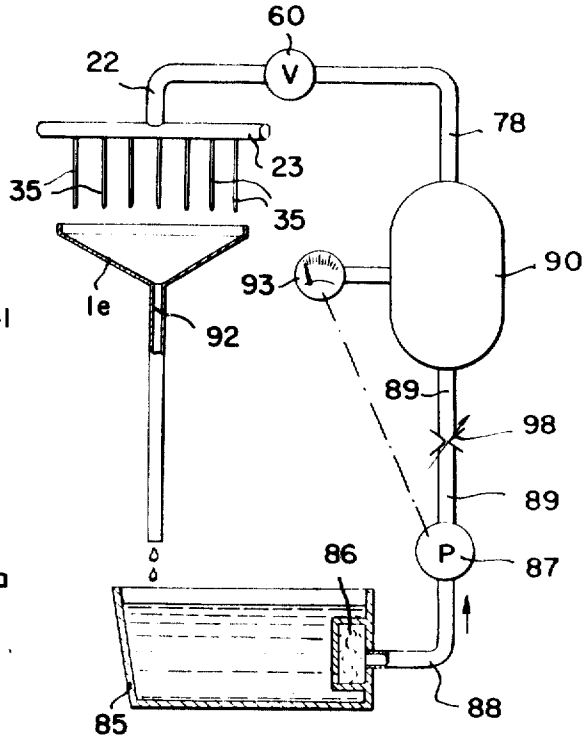


FIG. 5

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FIG. 6

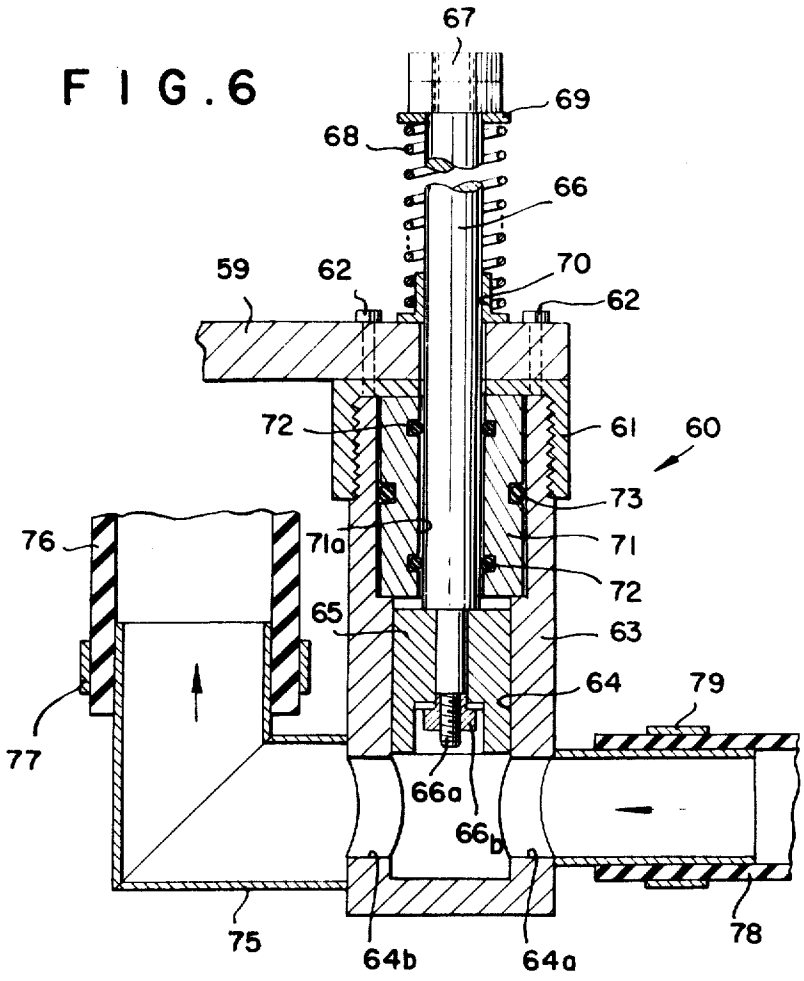


FIG. 7

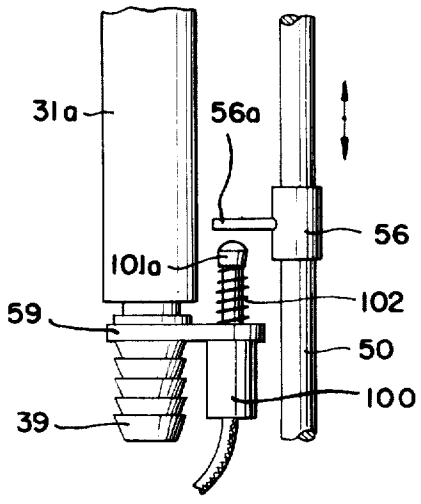
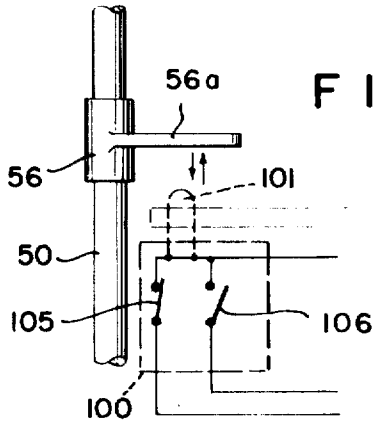
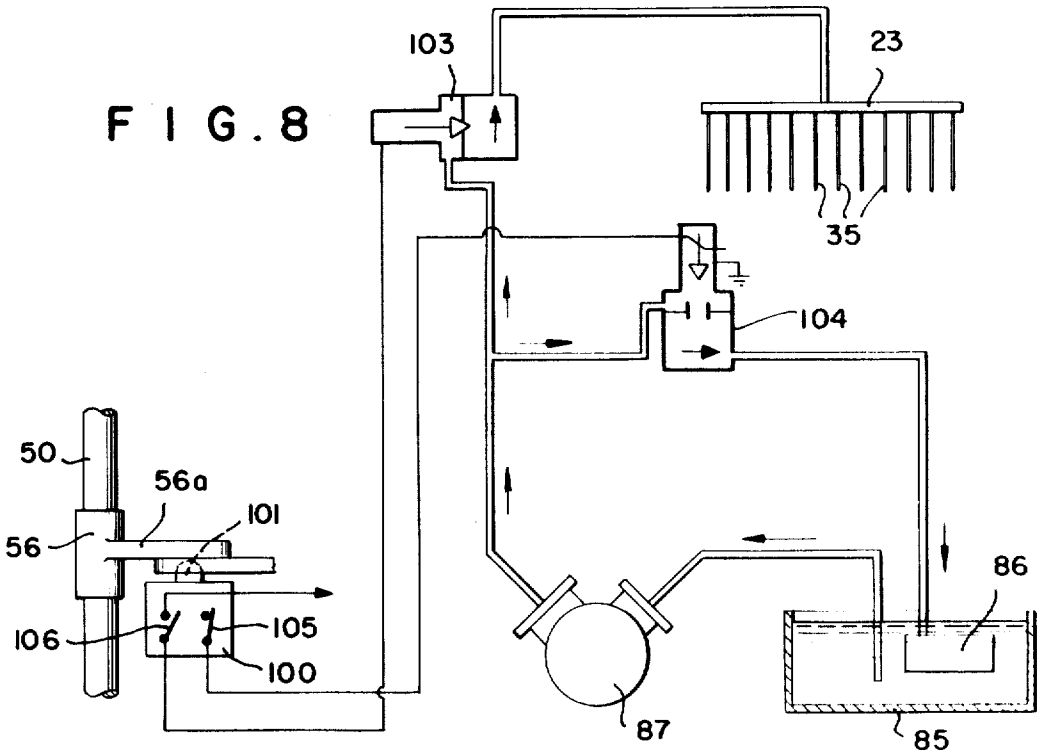


FIG. 9



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FIG. 8



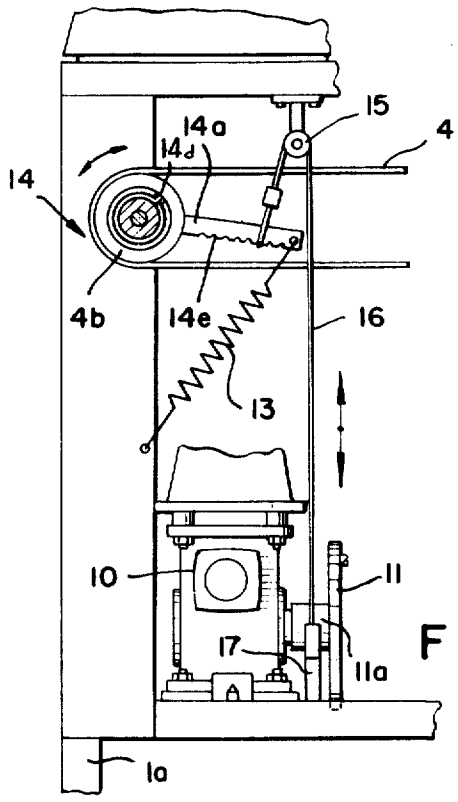
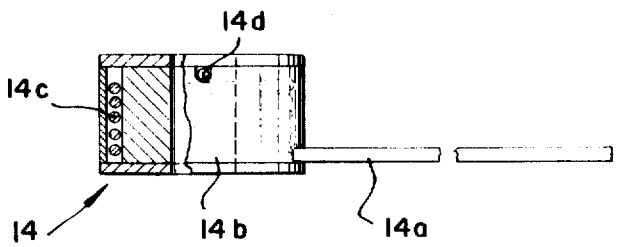


FIG. 10

FIG. 11



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INJECTION-TYPE PICKLING APPARATUS FOR HAMS, BACON AND THE LIKE

The present invention relates to an apparatus for treating food and, more particularly, to an automatic apparatus for injecting pickling liquid into articles of meat or the like.

Devices are known which automatically inject pickle or brine into meat for curing or treating same. One such device has a transparent mechanism along which a slab of bacon or the like is moved intermittently while, during each interval between movements, a plurality of needles descend and inject the curing liquid into the article of food. These needles generally are arranged in at least one row extending transverse to the transport direction.

In some arrangements, a shield or stripper bar is provided which rests on the meat to be treated adjacent where the needles will enter to hold it down. Such a shield is often little more than a bar pivoted on a lever which just lies on top of the meat moving underneath it.

In another arrangement, each needle is associated with a presser foot which contacts the meat and is thence prevented from descending further. This arresting of the foot actuates a pumping arrangement which forces a measured charge of liquid out through the needle as the needle penetrates into the meat.

Other known apparatuses have valves coupled directly with the drive of the transport mechanism so that pickling liquid under very high pressure is fed to the needles as they enter into the articles of food.

Such devices are extremely complicated and expensive. Furthermore, a great amount of pickling liquid is ejected from the needles and wasted when there is momentarily a break in the feed of meat or before the needles have penetrated the article of food. Also, high pressure is necessary to inject the desired quantity of liquid into the meat during the brief period of penetration of the needles.

It is, therefore, an object of the present invention to provide an improved food-treating apparatus of the general character referred to which offers particular advantages not to be had in the above-described devices and avoids the aforestated disadvantages.

A more particular object is to provide an apparatus of this type whose operation is substantially automatic, and which is particularly efficient in that it wastes a minimal amount of pickling liquid and pressure.

Another object is to provide an apparatus of this type which is able to use relatively low pressure behind the pickling liquid while injecting a sufficient quantity thereof into the meat.

The above objects, and others which will become apparent hereinafter, are attained in accordance with the present invention in an apparatus for treating an article of food that comprises an support for the article in the form of a intermittently operating transport mechanism, a source of food-treatment liquid under pressure, injection means including a needle carrier and a plurality of needles displaceable into and out of penetrating engagement with the article and connected to the source for injecting the liquid into the article, retaining means with at least one holding element or stripper engageable with the food article, mechanism for jointly displacing the needles and the holding element into engagement with the food article, a resilient coupling connecting the needles to the holding element for joint movement of the needle carrier and the retaining element while permitting continued displacement of the needles into the article on abutment of the holding element thereagainst, and a valve assembly between the retaining means and the injection means and responsive to relative movement thereof to connect the source of liquid under pressure to the needles only on relative displacement of the needles and the retaining element indicative of penetration of the needles beyond the holding element and into the meat.

This valve assembly, according to a further feature of the present invention, comprises a valve body on the needle carrier and a linearly shiftable valve-operating member on the support for the holding element, the valve body being a normally open spool-type slide valve closable by the valve-operating member.

With such an arrangement, the pickling liquid is injected into the meat only when the holding element abuts and comes to rest or is immobilized upon it.

Since, according to another feature of the present invention, the points of the needles are more or less flush with the bottom surface of the holding element, the opening of the valve corresponds to the moment when the needles begin to penetrate the article of food.

Furthermore, the injection takes place both during insertion and withdrawal of the needle in the meat so that liquid under lower pressure may be used. Of course, should the holding element, in the form of a collar extending around the needles, not abut anything, no liquid will be forced out through the hollow needle tips.

According to yet another feature of the invention, the needles are mounted on the ends of elongated rigid vertical tubes all received in a common upright boxlike housing. The tubes can be telescoped upwardly into the housing against the force of respective compression springs wholly received in the housing, and they can swing to the side to a certain extent to be deflected around a bone in a ham or the like. This deflection is preferably facilitated by lightly retaining the lower ends of the tubes in a highly resilient membrahe, or simply allowing them to swing freely.

The above and other objects, features, and advantages will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a side view, partly broken away and partly diagrammatic in form, of the apparatus according to the present invention;

FIG. 2 is a cross section through the apparatus;

FIG. 3 is an enlarged sectional view of the needle-mounting assembly of the apparatus;

FIG. 4 is a view similar to that of FIG. 3, showing an alternative mounting for the needles;

FIG. 5 is a largely schematic diagram of the fluid network used in the apparatus;

FIG. 6 is a vertical section through a detail of FIG. 1 drawn to an enlarged scale;

FIG. 7 is a side view of a switch mounted on a needle carrier as an alternative embodiment of the invention;

FIG. 8 is a largely schematic view of an alternative fluid network usable with the apparatus according to the invention and utilizing the switch shown in FIG. 7;

FIG. 9 is a view similar to FIG. 8, showing the switch in an alternative position;

FIG. 10 is a largely schematic view of the drive arrangement for the transport mechanism; and

FIG. 11 is a top view, partly broken away, of a detail of FIG. 10.

OVERALL LAYOUT OF THE APPARATUS (FIGS. 1 AND 2)

The pickling apparatus is supported on a frame 1 which in turn rests on four feet 1*b* that can be screwed up and down in the bottom of legs 1*a* to level the device.

A trough 1*e* extends along the upper portion of frame 1 a hood 3 for the injection and retaining devices rests atop this trough 1*e* and can be provided with a window to allow viewing of the apparatus while it functions.

The frame 1 further has a base 1*c* on which the various drives for the reciprocating parts of the apparatus are supported; one corner upright 1*d* is fitted with the controls for the machine. A plurality of pins 2 are adapted to fit in cover plates which close the device. Since the pickling liquid is a briny solution, e.g. an aqueous solution of sodium chloride and sodium nitrate, the exposed surfaces of the apparatus must be protected, e.g. with a coating of enamel, or must be nonreactive or corrosionproof, e.g. stainless steel.

TRANSPORT MECHANISM (FIGS. 1, 2, 10 and 11)

Conveyor

The apparatus is provided with a conveyor belt **4** wound around an idler roller **4***a* and a drive roller **4***b*. This belt **4** forms a horizontal transport path within the trough **1***e* and is supported in the middle by a plurality of struts **4***c*.

The roller **4***a* is journaled in two plates **5** (one shown) which can be pulled to the right in FIG. **1** by means of J-shaped threaded pins **6***a* screwed into handles **6** which are braced against the end wall of the housing to allow tensioning of the belt **4** by hand.

The inlet end of the belt **4** is provided with an inclined plate or ramp **7** onto which the ham, bacon or other food article is loaded prior to being pushed onto the belt **4**. A similar plate **8** on the outlet end of the belt **4** acts as an unloading chute or ramp for the treated article of food.

Clutch

A unidirectional spring clutch **14**, e.g. as described on page 197 in *Magnetic Tape Recording* (U.S. Government Printing Office, 1966), is mounted on the driver roller **4***b*.

This clutch **14** has an arm **14***a* formed with notches **14***e* and a cylindrical cup-shaped body **14***b* which fits around an end of the roller **4***b*, a coil spring **14***c* being situated between its interior and the outside of the roller **4***b*. The spring **14***c* is anchored to the body **14***b* at **14***d* so that on counterclockwise rotation of the clutch **14** (as seen in FIG. **10**) the spring **14***b* seizes the roller **4***b* and rotates it, while counterclockwise rotation of the clutch **14** takes place independently of the roller **4***b*.

Motion-Transmitting Mechanism

A cable **16** is attached to the arm **14***a* at one of the notches **14***e*, according to the amount of advance desired, and is looped over a small pulley **15** and attached at its other end to a lever **17**. A coil spring **13** attached between the end of the arm **14***a* and the housing **1** urges the clutch **14** in the clockwise direction. This lever **17** is pivoted on the frame **1** and rides on a raised portion or hump **11***a* of the hub of a crankwheel **11** which is in turn mounted on the output shaft of a stepdown transmission **10**.

Drive Arrangement

An electric motor **9** mounted above this transmission **10** carries a variable-pitch pulley **18***a* connected to another variable-pitch pulley **18***b* on the transmission **10** by a belt **18***c*. A speed-varying mechanism **18** provided with a control wheel **19** is coupled to the two pulleys **18***a* and **18***b* to adjust their relative pitches and change the output speed of the transmission **10**. All of the above serve as means for periodically rotating the clutch **14** back and forth through a predetermined angle.

Operation of Transport Mechanism

As the crankwheel **11** rotates, the lever **17** is pivoted back and forth through a limited arc, the spring **13** indirectly pulling it back up after the hump **11***a* on the wheel **11** pushes it down.

This causes the clutch **14** to pivot back and forth on the roller **4***b*, advancing the belt **4** a small increment with each counterclockwise pivotal movement which corresponds to a depression of the lever **17** by the hump **11***a*. Thus, the articles of food placed on the belt **4** are advanced in the direction of the arrow A of FIG. **1** by increments whose length is regulatable through the point of attachment of the cable **16** to the arm **14***a* and whose frequency depends on the setting of the pulleys **18***a* and **18***b*.

RECIPROCATING NEEDLE ARRANGEMENT FIGS. 1, 2, 3 and 4)

Needle Carrier

A large U-shaped needle-carrying hollow frame **21** has two legs **22** slidably received in bushings **30** on opposite sides of the trough **1***e*, thereby being displaceable in a vertical plane.

Each leg **22** is formed with a collar **27** and another collar is formed on the upper edge of the housing **1** so that an expandable rubber cuff **29** can be mounted between them, by means of clamps **28**. The cuffs **29** prevent the pickling liquid from leaking down into the machine.

Spanning the lower ends of the legs **22** is a L-shaped beam **24**. A connecting rod **25** is articulated to this beam **24** at **25***b* and to the crankwheel **11** at **25***a* so that rotation of the wheel **11** causes the needle carrier **21** to move up and down.

Between the upper ends of the legs **22** is a hollow beam **23** formed with a multiplicity, here 25, of nipples **26**. Four brackets **30** are welded to the legs **22** and hold a box **31** which is open downwardly, formed with an outwardly projecting rim or flange **31***a* at its lower end, and provided with 25 bores in its top, in two mutually staggered rows—one of 12, one of 13.

Needle Assemblies

Received in this box are the upper portions of 25 tubes **32** which are each threaded externally at both ends and provided with a central outwardly projecting annular circumferential flange **32***a*. Each tube **32** is adapted to slide through its respective bore in the box **31** and is prevented from passing down through the bore by locking nuts **33**. In addition, each tube **32** is formed with a nipple **29'** above the locking nuts **33**. Springs **34** are prestressed between the flanges **32***a* on the tubes **32** and the upper wall of the boxlike casing **31**, surrounding each tube **32** and urging it downwardly.

Threaded onto the lower end of each tube **32** is a hollow needle **35** formed with at least two lateral openings **35***a*. Each nipple **29'** at the top of each tube **32** is connected via a short length of flexible hose **37** to one of the nipples **26** on the crosspiece **23**, hose clamps **37***a* holding this hose **37** in place thereon.

The lower end of one leg **22** is plugged and the lower end of the other hollow leg **22** is provided with a hose connection **39**. In this manner, liquid forced in at **39** will be able to flow through the needle carrier **21**, up through the hoses **37**, down through the tubes **32**, and out of the holes **35***a* in the needles **35**.

Needle-Guide Structure

As shown in FIG. **3**, a resilient membrane **40** is held by bolts **41** across the lower end of the box **31**. This membrane **40** is provided like box **31** with a plurality of bores slidably passing the tubes **32** and hugging same. However, because of the lateral resilience of this membrane **40**, the tubes **32** can deflect to the side to a limited extent, being effectively slightly pivotable about their upper ends in the box **31**.

FIG. **4** shows another embodiment wherein a metallic sheet **43** formed with a large central opening **44** is held on the lower end of the box **31**. This hole **44** passes all the tubes **32** so that they are not constrained at all at their lower ends, not even by the resiliency of the membrane **40** from moving laterally to a limited extent.

Consequently, should a needle **35** strike, for instance, an edge of a bone, it can be slightly deflected but will continue to advance into the body of the article of food. Should it strike the bone directly, the needle **35** will be pushed up, compressing the spring **34**, without being damaged.

FOOD-RETAINING AND STRIPPER ARRANGEMENT (FIGS. 1 AND 2)

Two vertical rods **50** are slidable through seals **50***a* on opposite sides of the trough **1***e*, and within sleeves **53** mounted

on the base 1c of the housing. Extending between the upper ends of the rods, and attached thereto via clamping sleeves 52, is an annular upright collar or frame 51 through which the needles 35 can pass (see also FIG. 3). The collar 51 surrounds the needles and, in the fully revised position of the needles and the collar, the needle points just protrude below the lower outwardly turned edge of this collar 51. Screws 52a can be loosened to adjust the collar 51 up or down on the rods 50.

Each rod 50 is fitted with a sleeve 56 having a protruding flat finger 56a which is engageable with a valve 60 carried on lower end of the one leg 22 or a similar sleeve-finger arrangement carried on the other leg 22.

Another sleeve 55 is also fitted to each rod 50 and is formed with an upwardly open hook 54b. A coil tension spring 54 is stretched between this hook 54b and a downwardly open hook 54a formed on the sleeve 53.

Thus, as the wheel 11 turns and the needle carrier 21 rises, it abuts the fingers 56a and lifts the collar 51, the spring 54 also causing this collar 51 to follow the downward movement. However, all during this movement it is possible for the collar 51 to move upwardly, toward the needles 35, relative to the carrier 21 and thus for the carrier to move downwardly should the retaining or holding element represented by collar 51 be immobilized against or abut the meat.

VALVE ASSEMBLY AND LIQUID-FLOW NETWORK (FIGS. 1, 2, 5, 6, 7, 8 AND 9)

Valve

The valve 60 comprises a threaded sleeve 61 held to the plate 59 by screws 62. A cylinder 63 formed with a stepped central bore 64 and a lateral inlet opening 64a and outlet opening 64b is screwed into this sleeve 61. A small pistonlike valve body 65 is slidable in the lower, narrower portion of the bore 64. It is shown in its up position; in its down position it completely blocks the openings 64a and 64b, thereby stopping fluid flow therethrough. A rod 66 passes through the plate 59, the sleeve 61 and a bore 71a in a pistonlike body 71 and has a lower threaded end 66a which passes through the valve body 65 and is secured thereto by a nut 66b. The upper pistonlike body 71 is formed with an external groove mounting an O-ring 73 bearing against the inside of the upper, wider portion of the bore 64, and on the inside with two grooves mounting O-rings 72 which bear against the rod 66. Thus no fluid can leak out past these O-rings.

The rod 66 is surmounted by a threaded cap 67. A compression spring 68 is braced between a washer 69 under this cap 67 and a collar 70 resting on the plate 59 and surrounding the rod 66. Thus, the rod 66 and, therefore, the valve body 65 normally rest in their upper, illustrated position to permit fluid flow through the valve 60.

It is this cap 67 which contacts the finger 56 (valve actuating member) of the rod 50 so that as long as nothing holds the rod 50 up, or the collar 51 up, the spring 54 will overcome the spring 68 and hold the valve 60 closed.

Pickling-Liquid Network

FIG. 5 shows the liquid network used with this valve 60. The liquid collects in a reservoir 85 (see also FIG. 1) in the housing 1 whence it is drawn through a filter 86 and a conduit 88 to a pump 87 mounted directly on the motor 9. A further conduit 89 connects the output of the pump 87 through an adjustable restriction 98 with an accumulator 90 also in the housing 1.

A combination pressure meter and relay 93 is mounted on the upright 1d of the housing 1 and connected to the pump 87 to actuate it only when pressure in the accumulator 90 drops below a predetermined limit.

A conduit 78 leads from this accumulator 90 to the valve 60 (held thereon by a ring 79) and another conduit 76 leads from the output of this valve 60 (held thereon by a ring 77) to the carrier leg 22. Fluid from the conduits then flows through the crosspiece 23 and out through the needles 35. Any liquid not injected into the article of food is caught in the trough 1e and is discharged through a drain 92 into the reservoir 85 where it must pass through a filter 86.

An alternative valve assembly is shown in FIGS. 7, 8 and 9. There, instead of a valve 60 mounted on the plate 59, a switch 100 having a button 101 biased upwardly by a spring 102 is used to contact the finger 56a. This switch effectively comprises two sets of switch contacts 105 and 106. When the button 101 is depressed the switch contacts 106 are open and switch contacts 105 are closed.

In this embodiment the pump 87 runs constantly, pumping either through a valve 103 and out the needles 35 or simply through a bypass valve 104 and back into the reservoir 85. Both these valves 103 and 104 are solenoid actuated. The recirculated liquid must continually pass through the filter 86.

Thus, as the button 101 is depressed by the switch-actuating member 56a, the switch 106 opens to allow the valve 103 to slide into its normal, spring-biased closed position, thereby blocking liquid flow to the needles 35, and to hold the valve 104 open via the closed switch contacts 105 to allow the liquid to reenter the reservoir 85 directly.

In the up position of the button 101 the positions of the switch contacts 105 and 106 and, therefore, of the valves 103 and 104 are reversed so that liquid flows out through the needles 35.

Of course, instead of an electrical switch 100, a pneumatic or hydraulic switching arrangement may be employed.

Operation and Use of the Apparatus

An on-off switch 99 for the motor 9 is actuated and an article of food such as bacon, ham, hog bellies, or the like is loaded over the charging plate 7 onto the transport belt 4. It is advanced in direction A in stages or increments as described above.

As the article comes under the needles 35 and these are lowered into engagement with it, the collar 51 strikes the article just as the needles 35 begin to penetrate. Thus, the collar 51 abuts the article and is prevented from dropping any further by it while holding it down against the belt 4 by means of the spring 54.

The needles 35 continue to descend, moving relative to the collar 51. Simultaneously, the finger 56a on the rod 50 pulls up and away from the cap 67 or 101, thereby allowing the valve 60 (or switch 100) to begin the flow of brine out through the needles 35 and into the article of food, since at this time the needles are penetrating the food.

As the crankwheel 11 continues to turn, the needles 35 plunge deeper and deeper into the food, injecting it with pickle, until the ends of the needles 35 almost pass through the food and contact the belt 4. At this point, the continued rotation of the wheel 11 starts to pull the needles 35 out of the food while they continue to inject it with pickle. This withdrawal operation is facilitated by the retaining collar 51 which firmly holds the article of food against the belt 4.

Just as the needles 35 pull out of the article of food, the finger 56a automatically again abuts the cap 67 or 101 and thereby cuts off the supply of brine to the needles 35. Once the finger 56a comes firmly to rest, it is lifted by the upward motion of the legs 22 to pull the collar 51 away from the food.

When the collar 51 and the needles 35 are fully raised, rotation of the wheel 11 brings the hump 11a into engagement with the lever 17 to turn it and advance the belt 4 one step so as to repeat the operational sequence.

I claim:

1. An apparatus for treating an article of food, said apparatus comprising:

a support for said article;

a source of food-treatment liquid under pressure;

injection means including a plurality of needles adjacent said article displaceable into and out of engagement with said article and connected to said source for injecting said liquid into said article;

retaining means including at least one holding element adjacent said needles and displaceable into and out of engagement with said article for holding same against said support during injection of liquid into said article;

mechanism for jointly displacing said injection means and said retaining means into and out of engagement with said article;

resilient coupling means connecting said retaining means to said injection means for joint movement thereof while permitting continued displacement of said injection means toward and into said article upon abutment of said retaining means thereagainst; and

a valve assembly disposed between said retaining means and said injection means and responsive to relative movement thereof, said assembly connecting said source with said needles for feeding said liquid to said needles upon relative displacement of said retaining and injection means and blocking communication between said source and said needles during joint movement of said retaining and injection means.

2. The apparatus defined in claim 1 wherein said valve assembly comprises a valve body on one of said injection and retaining means and a valve-operating member on the other of said injection and retaining means cooperating with said valve body to actuate said valve assembly.

3. The apparatus defined in claim 2 wherein said injection means further includes a needle carrier provably supporting said needles, said valve body being mounted on said needle carrier.

4. The apparatus defined in claim 3 wherein said valve body comprises a slide valve and spring means urging said valve into a position allowing fluid communication between said source and said needles.

5. The apparatus defined in claim 2, further comprising spring means for biasing said element toward said article and said member toward engagement with said body.

6. The apparatus defined in claim 2, further comprising transport means for advancing said article in increments along a generally horizontal path, said needle carrier and in said needles being shiftable generally vertically and being disposed above said path and an article advanced therealong said transport means forming said support.

7. The apparatus defined in claim 6 wherein said transport means includes an endless belt, a roller bearing against said belt for driving same, a unidirectional clutch operatively connected with said roller and having an actuating part, and means for angularly oscillating said part periodically through an arc to incrementally rotate said roller in on rotational sense to correspondingly advance said belt.

8. The apparatus defined in claim 2 wherein said needle carrier is formed with a plurality of bores receiving the upper ends of said needles, said injection means further comprising a plurality of springs respectively urging said needles downwardly, said needles being slidable upwardly through said bores.

9. The apparatus defined in claim 1 wherein said needle carrier is elongated and is formed proximately to said element with a guide membrane slidably receiving said needles and resiliently deflectable to permit lateral deflection of said needles.

10. An apparatus for treating an article of food with a pickling liquid, comprising:

intermittently operable transport means defining a substantially horizontal transport path for said article and having a substantially rigid support at least along a portion of said path;

injection means above said portion of said path and including:

an upright, substantially vertically reciprocable substantially closed needle-carrier housing having an upper wall and open at a lower side in the direction of the article upon the positioning of same at said portion,

a plurality of vertically reciprocable elongated needle assemblies having at least upper tubular portions thereof received in said housing and tubular pointed lower portions projecting therebelow,

respective compression-type coil springs surrounding each of said needles and seated against said upper wall while bearing downwardly upon said assemblies,

a resilient diaphragm spanning said lower side of said housing while guiding said needle assemblies between said portions and permitting lateral deflection of said lower portions, and

manifold means on said housing for feeding said liquid to said needle assemblies;

retaining means including at least one holding element resiliently connected with said housing for joint movement therewith into engagement with said article and adapted to rest thereagainst during further movement of said housing to carry said pointed lower portions of said needle assemblies below said element to pierce and penetrate said article;

means for feeding said liquid to said manifold means upon penetration of said lower portions of said needle assemblies into said article; and

drive means for sequentially operating said transport means and said injection means.

11. The apparatus defined in claim 10 wherein said means for feeding said liquid to said manifold means includes:

a source of said liquid under pressure; and

valve means connected between said source and said manifold means and responsive to relative movement of said retaining means and said injection means for feeding said liquid to said needle assemblies only upon relative displacement of said housing and said holding element.

12. The apparatus defined in claim 11 wherein said valve means includes a valve assembly connected between said retaining means and said injection means.

13. The apparatus defined in claim 12 wherein said valve assembly comprises:

a valve body connected with said housing and provided with a vertically extending bore communicating between said source and said manifold means;

a valve plunger vertically and linearly reciprocable in said bore between a first position in which said plunger obstructs passage between said manifold means and said source and a second position in which said plungers admits of fluid communication therebetween;

spring means bearing upon said plunger and biasing same toward said second position; and

means on said retaining means for holding said plunger in said first position during joint movement of said injection and retaining means.

14. The apparatus defined in claim 12 wherein said valve assembly includes:

a switch mounted on one of said injection and retaining means;

a switch-actuating member on the other of said injection and retaining means; and

an electrically operable valve in circuit with said switch and hydraulically connected between said manifold means and said source for blocking communication therebetween upon joint movement of said switch and said switch-actuating member but operative to permit communication between said source and said manifold means upon relative movement of said switch and said switch-actuating member.