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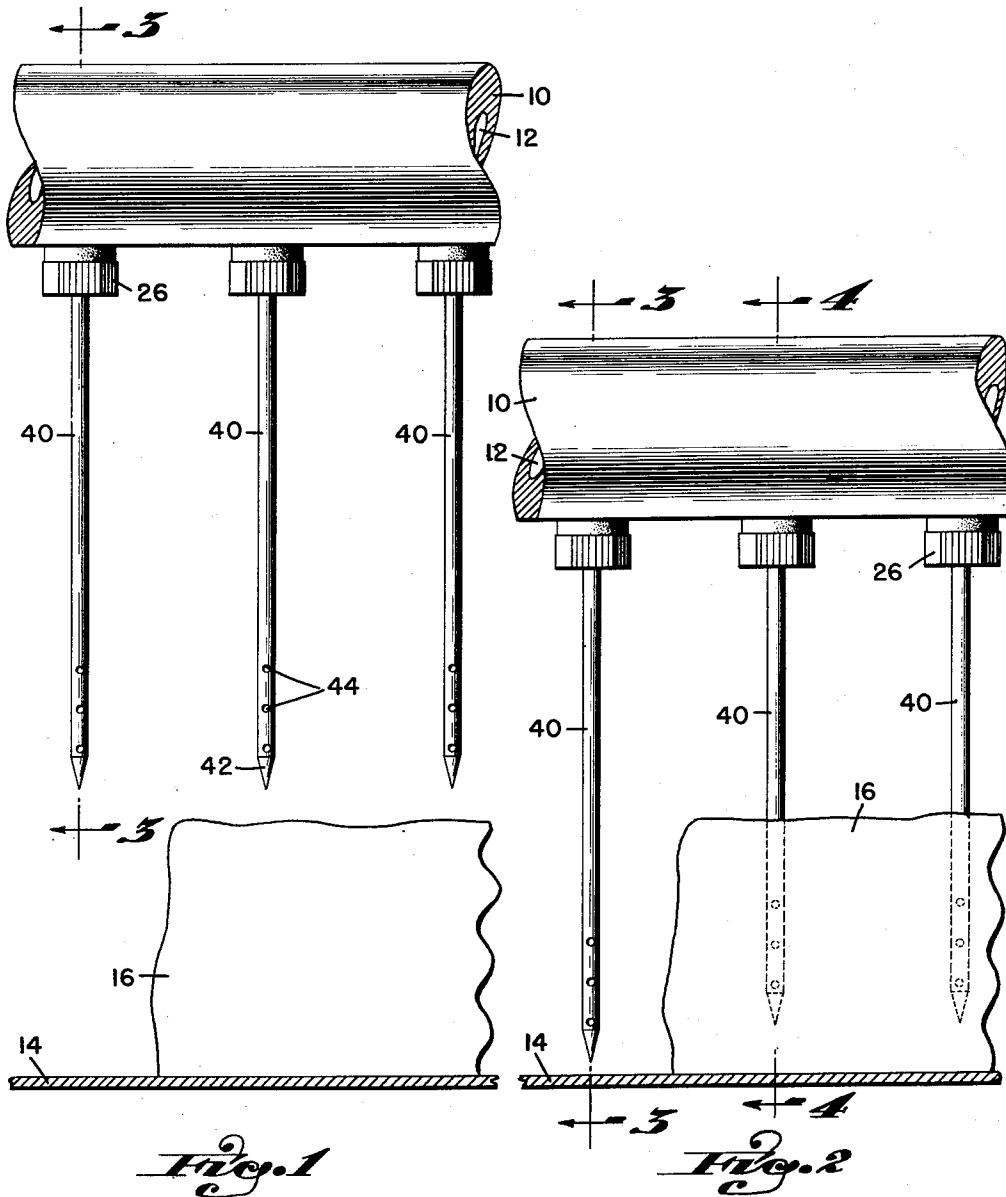
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2,796,017

INJECTION NEEDLE FOR CURING LIQUIDS

Filed Nov. 10, 1953

2 Sheets-Sheet 1



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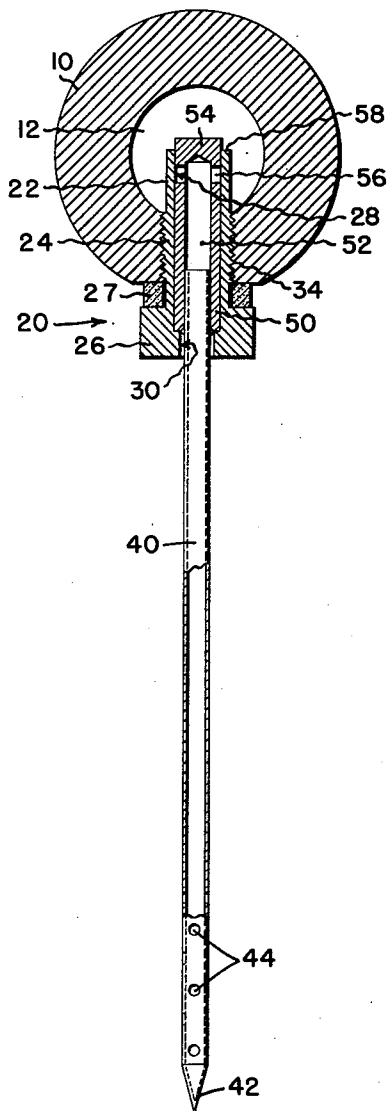


Fig. 3

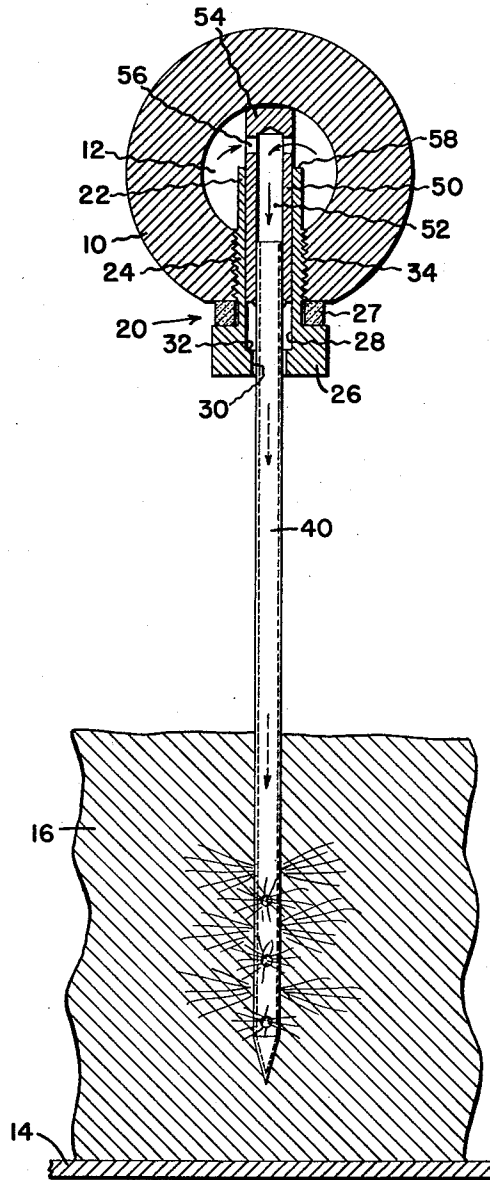


Fig. 4

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INJECTION NEEDLE FOR CURING LIQUIDS

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11 Claims. (Cl. 99—256)

This invention relates to injection needles, and more particularly to needles for injecting curing liquid, such as brine, into food products, such as, by way of example, bacon and the like.

An object of the invention is to provide a needle assembly, per se, which includes means for selectively controlling the passage of fluid through the needle.

Another object of the invention is to provide a needle assembly which, when associated with the brine manifold of an injecting device, will automatically preclude ejection of fluid unless the needle of the assembly has been properly imbedded in the product being treated.

A further object of the invention is to provide a needle assembly, having the hereinabove described characteristics, which may be associated with any of the various commercially available injecting devices, for automatically preventing the discharge of pickling fluid through those needles which are not imbedded in the product being treated, thereby insuring positive delivery of a uniform quantity or charge of fluid through those needles which are imbedded in the product, for imparting a uniform distribution of fluid into the product. Heretofore considerable difficulty has been encountered in those instances wherein a plurality of injecting needles have been connected in open communication with a common brine manifold, since the pressure of the fluid to those of the needles imbedded in the product is greatly diminished in those instances wherein one or more of the needles are not imbedded in the product with the result that the bulk of the fluid is discharged through the latter needles instead of equally through all of the needles.

In an effort to insure the injection of a predetermined and uniform quantity of fluid into a product, the industry has heretofore been forced to resort to the use of special fluid metering means and/or to highly complex and extremely expensive means comprising individual fluid-discharge-pistons for each needle. Such means, while insuring that a uniform and predetermined quantity of fluid is injected through a needle, are subject to the inherent disadvantage of discharging fluid through those needles which are not imbedded in the product. Quite obviously the discharge of the fluid through needles which are not imbedded in the product creates a messy condition which not only wastes great quantities of pickling fluid, but requires the erection of splash guards and other types of barriers, the presence of which tend to render the operating parts of the machine comparatively inaccessible.

Another object of the invention is to provide a needle assembly which includes an elongate hollow bushing adapted to threadably engage a hollow manifold through the walls of which the said bushing extends. A needle is mounted for reciprocable movement relative to the bushing between extended and retracted positions. When the needles are in extended position the passageway between the interior of the manifold and the needles is automatically closed, thereby precluding discharge of pickling fluid through the needle, however when the needles are

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in retracted position they are in open communication with the interior of the manifold.

Still another object of the invention is to provide a needle assembly wherein the pressure of fluid within the manifold is utilized for setting and maintaining a needle in fully extended position against accidental or unintentional displacement therefrom.

Still a further object of the invention is to provide a needle assembly wherein the retracted position of the needle is determined by reason of contact of an extension of the needle with the interior or upper wall of the manifold from which the needle assembly projects.

Another object of the invention is to provide a needle assembly having the hereinabove described characteristics which is highly efficient, inexpensive and which may be easily secured to and replaced by means of a single wrench.

These and other objects are attained by the means described herein and as disclosed in the accompanying drawings, in which:

Fig. 1 is a front elevational view illustrating a portion of a manifold from which three needles embodying the teachings of the present invention depend, said manifold being in an elevated position with the needles thereof in fully extended position.

Fig. 2 is a view similar to Fig. 1, but wherein the manifold has been advanced to a lowered position for imbedding two of the needles in a product to be impregnated, the third needle being out of engagement with the product.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2.

With particular reference now to the drawings, the numeral 10 denotes generally a manifold having an opening 12 for the reception of pickling fluid.

Suitable means, not pertinent to the present invention, are provided for imparting reciprocatory motion to the manifold for moving it toward and from a platform or other suitable support denoted generally by the numeral 14 upon which the product, 16, to be impregnated, is supported. The present invention is neither concerned with nor directed to the particular means used for imparting reciprocatory motion to the manifold, nor is it concerned with the particular means utilized for advancing product 16 beneath the needles. Solely by way of example, reference may be had to U. S. Patents Nos. 2,587,024; 2,641,990; 2,645,171; 2,645,172 for a disclosure of various types of means for imparting reciprocatory motion to the manifold, for advancing product 16 beneath the needles, and for supplying pickling fluid under pressure to the manifold when it has been lowered to a needle-imbedding position.

With particular reference now to Figs. 3 and 4, it will be noted that the needle assembly comprises an elongate hollow bushing 20, including an inner, central and outer portion 22, 24 and 26. The inner and central portions are provided with a bore 28 of uniform diameter, whereas the outer portion is provided with a bore 30 of a lesser diameter for providing an abutment 32 (note Fig. 4) at the outer or lower end of bore 28. A suitable washer 27 may be interposed between adjacent faces of the manifold and lower portion 26 of the bushing for providing a fluid-tight connection.

Preferably the central portion 24 is externally threaded whereby to be received within internally threaded hole 34 of the manifold. It will be noted that bushing 20 extends through the wall of the manifold.

The numeral 40 denotes an injector needle the lower end of which is closed and pointed as at 42, said needle being hollow throughout substantially its entire length, the lower portion being provided with a series of apertures 44 through which fluid may be ejected.

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A sleeve 50 is fixedly secured to and carried by the upper end of the needle, it being noted that the upper end of the needle is in open communication with interior 52 of the sleeve. Sleeve 50 is receivable in and mounted for free endwise axial movement relative to bore 28 of the bushing.

As best illustrated in Fig. 3, the lower end of the sleeve will engage abutment 32 (note Fig. 4) when the needle has been fully extended, thereby limiting the maximum extension of the needle from the manifold.

The upper end of sleeve 50 is closed as at 54 and a passageway 56 is provided adjacent end 54 and in open communication with axial bore 52 of the sleeve.

As best illustrated in Fig. 3, it will be noted that the inner portion 22 of the bushing 20 extends a considerable distance into aperture 12 of the manifold and that the upper end of said inner portion extends a considerable distance above passageway 56 when the needle and sleeve have been advanced to their extended positions.

Extensive tests have indicated that when passageway 56 has thus been received entirely within the interior of the bushing, fluid under pressure within passageway 12 of the manifold will not find its way into the interior of the needle.

With reference now to Fig. 4, it will be noted that when the needle has been shifted to a fully retracted position, upper end 54 of the sleeve will abuttingly engage the inner wall of the manifold, thereby determining the fully retracted position of the needle and sleeve. When the needle has thus been retracted, passageway 56 is located above upper end 58 of inner portion 22 of the bushing, thereby placing the interior of the needle in open communication with the interior 12 of the manifold.

With reference now to Fig. 2, it will be noted that when manifold 10 was lowered from the elevated position of Fig. 1, two of the three needles were forced into product 16 whereas the third needle did not enter the product. Fluid will not be discharged through the left-hand needle of Fig. 2 incident to discharge of fluid through the other two needles into product 16, even though all three needles are secured to and operatively connected with the same manifold, by reason of the structural details best illustrated in Figs. 3 and 4.

It has been found that the upper end 54 of sleeve 50 functions like a piston, when the needle is fully extended, and that the pressure of fluid in passageway 12 of the manifold, being exerted on closed end 54 of the sleeve, will tend to positively maintain the sleeve, and the needle carried thereby, in extended or fully lowered position against accidental or unintentional upward movement to a retracted position.

When manifold 10 is moved away from the product, those needles which are imbedded in the product will be withdrawn and moved from retracted to extended position by reason of the frictional engagement between the needle and product as the needle is being withdrawn therefrom.

From the foregoing, it will be noted that I have thus provided simple, yet highly effective means for automatically controlling the discharge of pickling fluid from a plurality of needles supported from a common manifold, wherein fluid will be discharged only from those needles which are retracted by reason of having been imbedded in the product being treated.

The built-in-valving means of each needle assembly make it practical to operate an injecting device wherein the interior of the manifold is continuously, rather than intermittently, provided with pickling fluid under pressure, thereby rendering unnecessary the need for special valving means in the fluid supply line to the manifold.

It should be understood that various changes and modifications may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. In combination with the brine manifold of an inject-

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ing device, of an injection needle, means mounting said needle for free axial movement between extended and retracted positions relative to said manifold and operative to close the interior of the needle relative to the interior of said manifold when the needle is in extended position, and to establish communication between the interior of the needle and the interior of the manifold when the needle is retracted, said mounting means comprising an apertured closed ended sleeve secured to and carried by the upper end of the needle and a sleeve-receptive bushing secured to, carried by and extending into the interior of the manifold.

2. In combination with the brine manifold of an injecting device, of an injection needle having an open upper end, a closed-ended sleeve secured to and carried by the upper end of the needle, said sleeve having a first bore in open communication with the interior of the needle and a second bore spaced from the closed end extending through the wall of the sleeve and in open communication with the first bore, a bushing secured to, carried by and extending into the interior of the manifold and having an axial bore within which the sleeve is mounted for endwise movement, said bushing having an open inner end which terminates interiorly of the manifold, the second bore of the sleeve adapted to be completely received within the bore of the bushing when the needle is in extended position for closing communication between the interior of the needle and the interior of the manifold, said second bore of the sleeve adapted to be disposed above the inner end of the bushing when the needle is in retracted position for establishing communication between the interior of the needle and the interior of the manifold.

3. Injecting means comprising a product support, an elongate, hollow manifold disposed over and transversely of the support and provided with means for imparting reciprocating motion thereto, means for supplying curing liquid under pressure to the manifold, a plurality of injecting needles secured to, carried by and depending from the manifold, means mounting each needle for free, independent limited axial movement relative to the manifold, means interiorly of the manifold associated with each needle and responsive to the pressure of the curing liquid therein for normally maintaining the needles in extended position for isolating the interior of the needles from the interior of the manifold, said means adapted to establish open communication between the interior of the needles and the interior of the manifold when said needles have been retracted.

4. Injecting means comprising an elongate, hollow manifold mounted for movement toward and from an article supporting surface, means for continuously supplying curing liquid under pressure to the manifold, a plurality of injection needles secured to, carried by and depending from the manifold, means mounting each needle for independent limited axial movement relative to the manifold, means associated with each needle interiorly of the manifold and responsive to the pressure of the curing liquid therein for normally maintaining the needles in extended position for isolating the interior of the needles from the interior of the manifold, said means adapted to establish open communication between the interior of the needles and the interior of the manifold when said needles have been retracted, said needles shiftable from extended position to retracted position incident to the contacting of the needles with an article supported on the supporting surface during movement of the manifold toward said supporting surface, whereby only those needles which contact an article will be shifted from extended to retracted positions, said retracted needles being forced into an article on the article supporting surface incident to movement of the manifold toward said surface for disposing the needles in driven relationship with the manifold.

5. Injecting means comprising an elongate, hollow manifold, an elongate, hollow cylindrical bushing extend-

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ing through a wall of and into the interior of the manifold, an injector needle provided at its upper end with an elongate closed-ended cylindrical sleeve receivable in and mounted for free axial movement in said bushing, said sleeve having a port in its side wall spaced from the closed end and in open communication with the interior of the needle carried thereby, said port adapted to be disposed entirely within the confines of the bushing when the sleeve is in extended position relative thereto for isolating the interior of the needle from the interior of the manifold, said sleeve port adapted to be disposed inwardly beyond the inner end of the bushing interiorly of the manifold when the sleeve is retracted for establishing open communication between the interior of the needle and the interior of the manifold.

6. Injecting means comprising a hollow manifold for pressure media, an elongate, hollow bushing extending through a wall of and into the interior of the manifold, an injector needle provided at its upper end with an elongate hollow sleeve closed at its outer end and receivable in and mounted for endwise axial movement in said bushing, said sleeve having a port in its side wall spaced from the closed end and in open communication with the interior of the needle carried thereby, said port adapted to be disposed entirely within the confines of the bushing when the sleeve is in extended position relative thereto for isolating the interior of the needle from the interior of the manifold, said sleeve port adapted to be disposed beyond the inner end of the bushing and interiorly of the manifold when the sleeve is retracted for establishing open communication between the interior of the needle and the interior of the manifold, the closed end of the sleeve adapted to abut against a portion of the interior of the manifold wall for defining the fully retracted position of the sleeve and needle relative to the bushing and manifold.

7. Injecting means as described in claim 6 wherein the bushing includes means engageable by the sleeve for establishing the fully extended position of the needle relative to the manifold.

8. Injecting means as described in claim 6 wherein the closed end of the sleeve comprises a piston face in open communication with the interior of the manifold and exposed to the pressure media therein for normally maintaining the sleeve in fully advanced position and against accidental or unintentional retraction.

9. Injecting means comprising an elongate, hollow manifold having a threaded hole, through the wall thereof, an elongate, hollow, cylindrical bushing including an inner, central and outer portion wherein the inner and central portions are provided with a bore of uniform diameter and the outer portion with a bore of lesser diameter for providing an abutment at the outer end of the first mentioned bore, said central portion externally threaded to engage the threaded hole in the manifold wall for locating the outer end of the inner portion of the bushing interiorly of the manifold, an injector needle dimensioned to freely pass through the bore of the outer

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portion of the bushing, an elongate closed-ended, cylindrical sleeve secured to the upper end of the needle, said sleeve receivable in and mounted for endwise axial movement in and relative to the bore of the inner and central portions of said bushing, the lower end of said sleeve dimensioned to engage the abutment in the bushing for establishing the fully extended position of the needle with respect to the manifold, said sleeve having a port in its side wall spaced from the closed end and in open communication with the interior of the needle carried thereby, said port adapted to be disposed entirely within the confines of the bushing when the sleeve is in extended position relative thereto for isolating the interior of the needle from the interior of the manifold, said sleeve port adapted to be disposed beyond the outer end of the inner portion of the bushing and interiorly of the manifold when the sleeve is retracted for establishing open communication between the interior of the needle and the interior of the manifold.

10. An ejector needle assembly for association with the brine manifold of an injecting device, said assembly comprising an injection needle having an open upper end, a closed-ended sleeve secured to and carried by the upper end of the needle, said sleeve having a first bore in open communication with the interior of the needle and a second bore spaced from the closed end extending through the wall of the sleeve and in open communication with the first bore, a mounting bushing having an axial bore within which the sleeve is mounted for endwise movement, the second bore of the sleeve adapted to be completely received within the bore of the bushing when the sleeve and needle are in fully extended position for completely blocking access to said second bore, said second bore of the sleeve adapted to be disposed outwardly of and beyond the inner end of the bushing when the sleeve and needle are in retracted position.

11. An injector needle assembly comprising an externally threaded, cylindrical bushing, an injection needle having an open upper end, a closed ended, cylindrical sleeve secured to the upper end of the needle, said bushing including an axial bore in which the sleeve is reciprocally mounted, said sleeve having a passageway adjacent the closed end in open communication with the interior of the needle, said passageway adapted to be completely received within and closed by the bore of the bushing when the sleeve and needle are in extended position relative to the bushing, said passageway adapted to be disposed outwardly of and beyond the aforesaid bore when the sleeve and needle are in retracted position relative to the bushing.

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