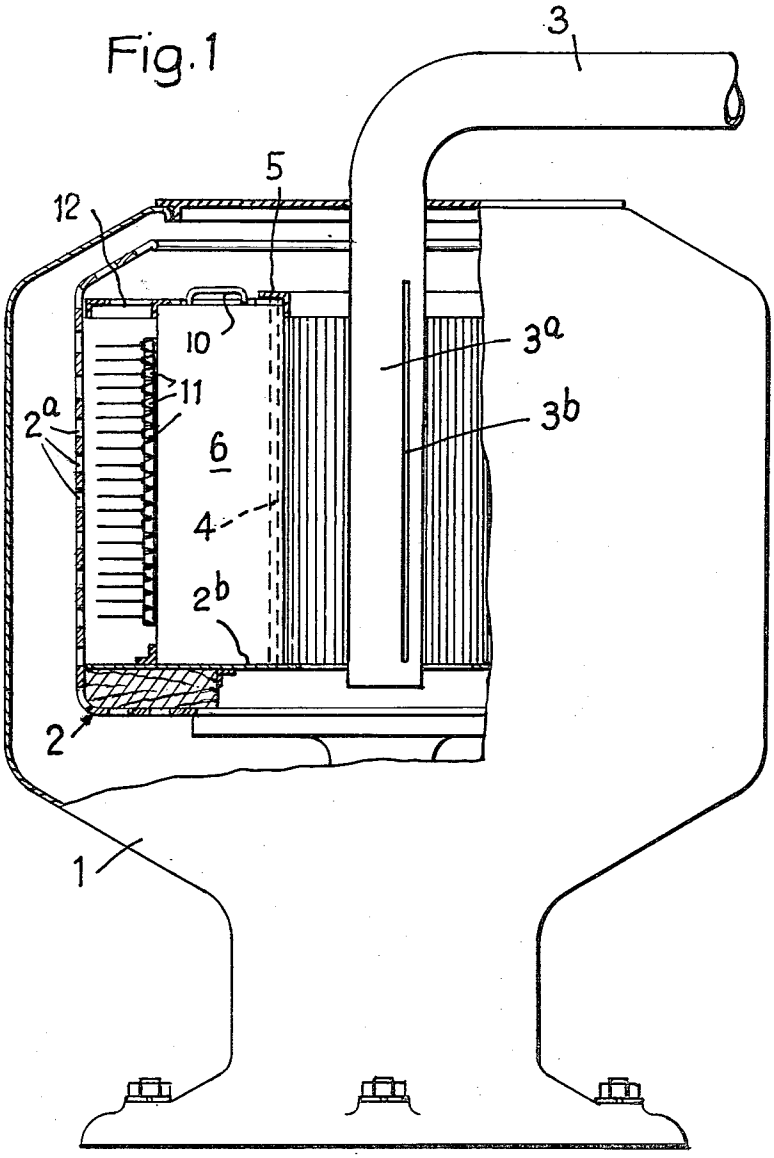
July 31, 1962 E. STINGELIN 3,047,000

APPARATUS FOR CLEANING SYRINGES

Filed May 4, 1959 2 Sheets-Sheet 1

Fig. 1



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FIG.2

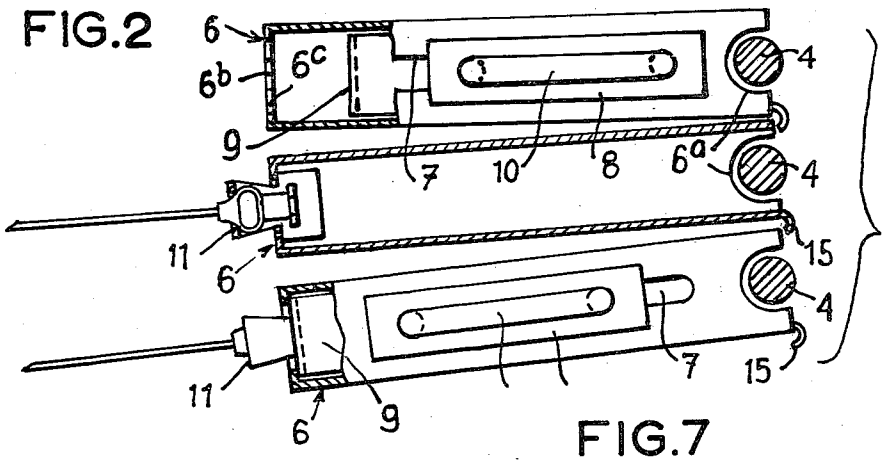


FIG.7

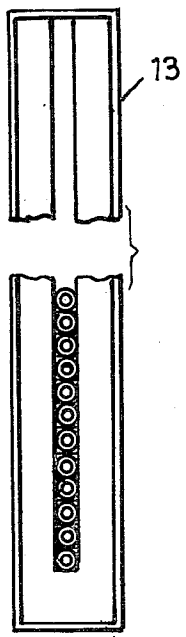


FIG.4

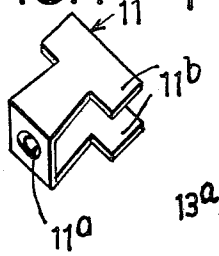


FIG.6

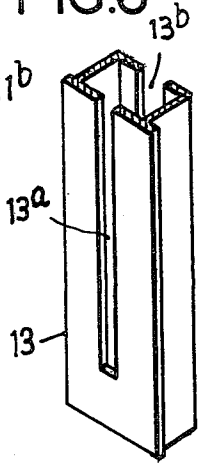


FIG.3

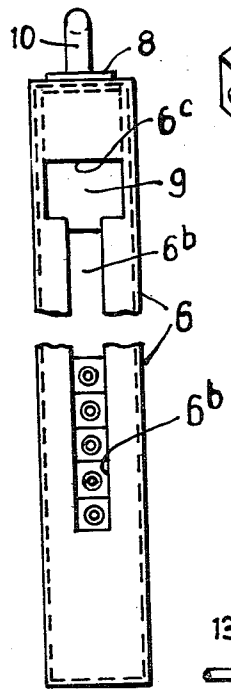
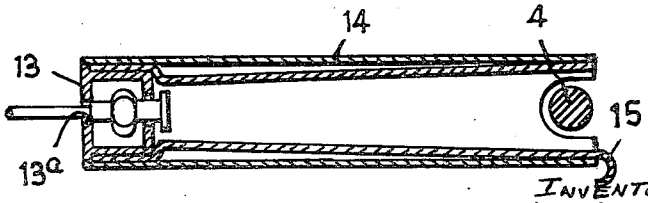


FIG.5



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APPARATUS FOR CLEANING SYRINGES

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Filed May 4, 1959, Ser. No. 810,928
Claims priority, application Switzerland May 6, 1958
7 Claims. (Cl. 134—152)

My invention has for its object an improvement in apparatus disclosed in British Patent No. 752,326 for the cleaning of syringes.

According to the specification of said patent, the injection syringes to be cleaned are disassembled and the syringe components are subjected inside a centrifugal washing machine both to centrifugal action and to the action of at least one radially directed water jet. To this end, there are used tubular carriers open at their opposite ends and inside each of which the components of a syringe are introduced, except the actual injection needle.

The above-mentioned specification disclosed also a particular auxiliary arrangement which serves for the cleaning of the injection needles. This auxiliary arrangement included long necked funnels inside which the needles are positioned, said funnels being subsequently inserted inside the openings of the cylindrical perforated wall of the washing machine drum.

Now, practice has shown that injection needles can be cleaned satisfactorily in this manner although the auxiliary arrangement provided to this end is inconvenient in so far that each funnel is suitable for the reception of only one needle at a time, whereas obviously a larger capacity is desirable.

My present invention has for its object the provision of an arrangement to be fitted inside the perforated drum of a centrifugal washing machine which arrangement is far superior and more efficient than the funnel shaped needle-carriers conventionally resorted to.

According to the invention, the arrangement includes a plurality of flat needle carrying-containers each of which is inserted and secured in radial vertical locations inside the washing machine drum designed especially for this purpose, while said container is open along its narrow side directed inwardly when in its operative position and is provided on its opposite narrow side with removable needle holding means. The latter may be fitted inside the container to further the loading thereof in a manner such that the superposed needles assume a floating location in the corresponding sections of the needle-container.

The advantage of such a needle-container lies in the fact that it may be provided with a larger number of needles. The drum may obviously be designed without any further difficulty in a manner such that it may carry a large number of such containers. It is particularly important that such containers may be filled with water during operation of the centrifugal washing machine so that the bores in the nipple connections of the needles are subjected to the pressure of a water column subjected in its turn to centrifugal action, whereby the water is urged under a high pressure through the hollow needle shank and provides a thorough cleaning action.

The accompanying drawings illustrate by way of example an embodiment of the invention.

FIG. 1 shows a centrifugal washing machine for the cleaning of the injection needles partially in elevation and partly in section.

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FIG. 2 shows on a larger scale a group of three needle-containers adapted to receive the needles to be cleaned, said containers being arranged radially inside the drum of the washing machine, the central container being drawn completely in horizontal cross-sectional view while the two others are only drawn partly in horizontal cross-sectional view.

FIG. 3 shows a single container in front view.

FIG. 4 shows separate an auxiliary component for said container.

FIG. 5 is a cross-section of a modification of the container.

FIG. 6 is a perspective view of the lower section of a component of the last-mentioned container.

FIG. 7 shows said last component in front view.

The centrifugal washing machine includes inside a stationary casing 1, a drum 2 adapted to revolve round a vertical axis and provided with a cylindrical wall perforated as shown at 2*a*. Into said machine, there opens a pipe 3 through which a washing liquid such as water carrying a cleaning medium is urged under pressure so as to enter the machine. Said pipe 3 ends with the section 3*a* extending along the vertical axis of the drum 2, and the wall of which is provided with longitudinal nozzle-forming slots 3*b*.

There is arranged concentrically with the drum axis a ring of bars or rods 4 forming a sort of cage, as shown also in FIG. 2, said rods being connected at their lower ends with the drum bottom 2*b* and at their upper ends with a ring 5 having an angular cross-section.

In the annular space formed between the rod cage and the cylindrical drum wall, are arranged flat containers 6 extending in radial vertical planes, as illustrated in FIG. 2 for three successive containers 6. Said containers 6 are open at their inwardly directed narrow sides when inserted inside the drum. The upper and lower walls of each container are provided at their inner ends with an arcuate recess 6*a*. The front or outer transverse wall of each container 6 is provided with a longitudinal slot 6*b* as illustrated in FIG. 3, each slot terminating at its upper end with a transverse horizontal broader section 6*c*. This broader section may be closed by means of a slider 8—9 guided over a slot 7 formed in the upper wall of the container. Said slider includes an upper rectangular plate 8 and a lower plate 9, folded at right angles, said plates 8 and 9 being interconnected by means of a stirrup-shaped member 10, the legs of which extend through the slot 7. The slider may thus be shifted in both directions along said slot 7. In its closed position, the bent section of the lower plate 9 engages the inside of the outer terminal wall of the container 6 and closes the rectangular slot section 6*c* in said outer wall as illustrated for the container drawn in the lower section of FIG. 2.

FIG. 4 illustrates a U-shaped needle-carrier 11 provided with an opening 11*a* in its web while its trapezium-shaped flanges are provided at their ends with projections 11*b* extending along the inner surface of the outer wall of the container to either side of the slot 6*b*.

The loading of the container is obtained by first inserting each of the injection needles in a needle-carrier 11, the hollow needle shank being introduced through the flanged side of the carrier into the opening 11*a*. The needle-carriers 11 thus provided each with a needle are then superposed along the slot 6*b* of the container 6 after shifting the slider rearwardly, so as to allow their intro-

duction through the slot section 6c at the upper end of the slot 6b. The flange projections 11b directed inwardly of the needle-carriers are held against the inner surface of the front wall of the container so that said carriers are held fast horizontally inside the slot 6b. The slider 8—9 is then urged into its closed position and the container loaded in the manner described is introduced radially inside the drum 2 of the washing machine. In this condition, the containers engage through the recesses 6a, at the inner ends of their upper and lower walls, the corresponding rods 4 of the rod cage.

Lastly, annular members 12 illustrated in FIG. 1 are inserted in the drum 2 so as to rest through their inner surfaces on the corresponding outer upper and lower edges of the carriers 6 while their outer surfaces engage the drum wall.

When the drum revolves at the desired rotary speed, the containers 6 and also the needles fitted in their carriers 11 are subjected to centrifugal action. The needles floatingly carried in the containers retain their horizontal radial direction as illustrated in FIG. 1. On the other hand, the containers are filled speedily with the washing liquid passing out of the longitudinal slots 3b of the feed pipe 3, so that a liquid column is formed in said pipe under the action of centrifugal force; the high pressure of said liquid column is applied to the liquid urged through the inside of the needles and the bores in said needles are thus perfectly cleaned.

FIGS. 6 and 7 show a needle-carrier 13 in the shape of a hollow rectangular bar and adapted to receive a large number of superposed needles. To this end, there is provided in the front transverse wall and in the rear transverse wall of said carrier a longitudinal slot, 13a or 13b, respectively, open at its upper end, the rear wall slot being somewhat broader than the front wall slot. The actual needles are introduced through the upper end of the carrier so that the connecting nipples of the needles are laid in superposition inside the broader slot 13b while the hollow needle shanks extend freely through the narrower slot 13a. The container 14 for such a needle-carrier is also open at its front end, as illustrated in FIG. 5. The side walls of said container 14 are double, the two inner wall sections defining cross-sectionally a chamber which is somewhat narrower at its front end, said narrower front end of the container chamber 14 broadening again at its extreme front to form a space limited between parallel lateral wall elements and inside which the needle-carrier 13 provided with its needles is inserted with an accurate fit, as illustrated in FIG. 5.

Furthermore, one of the two side walls of the container 14 is provided at its inner edge with an outwardly bent marginal section 15 forming a reinforcement and hindering any projection of water into the gaps between the successive containers introduced into the drum, as apparent from inspection of FIG. 2.

What I claim is:

1. In a syringe cleaning apparatus including a vertical pipe adapted to project water radially and a centrifugal drum coaxial with said pipe, the provision of needle cleaning means comprising a plurality of flat containers arranged along vertical radial planes inside said drum between the pipe and the outer wall of said drum, each container having radially spaced outer and inner peripheral walls with openings, means for removably and fluidtightly securing a plurality of radially directed needles in each container in superposed relationship along the outer peripheral wall of each container including a web carrier surrounding said needles to constrain the water passing out of the pipe to flow through each container into the needles to clean the latter, and means rigidly and removably securing the containers inside the drum.

2. In a syringe cleaning apparatus including a vertical pipe adapted to project water radially and a centrifugal drum coaxial with said pipe, the provision of needle cleaning means comprising a plurality of flat containers arranged along vertical radial planes inside said drum between the pipe and the outer wall of said drum, each container having radially spaced outer and inner peripheral walls with openings, means for removably and fluidtightly securing a plurality of radially directed needles in each container in superposed relationship along the outer narrow peripheral wall of each container to constrain the water passing out of the pipe to flow through each container into the needles to clean the latter, means rigidly and removably securing the containers inside the drum and including a plurality of vertical rods fitted in the drum in annular formation round the pipe and engaging the inner ends of the upper and lower surfaces of the containers and annular members fitted between the outer surfaces of the container and the outer wall of the drum.

3. A magazine container for holding needle syringes in a rotating cleaning drum wherein liquid is directed radially outwardly through the syringes for cleaning the syringes, comprising spaced inner and outer walls each having openings for the passage of cleaning liquid therethrough, said outer wall having an elongated slot forming the opening, a syringe carrier having an outer wall of a width substantially equal to the width of said slot and with an opening of a size to permit the passage of an end portion of a syringe and a needle therethrough to hold the syringe in said carrier, said carrier having a side wall connected to said outer wall with a narrow portion engaged in said slot and a widened portion adapted to fit in the space between said inner and outer walls of said magazine with the widened portion disposed behind the inner face of said outer wall of said magazine, said carrier being slidable along said slot to permit a plurality of said carriers with syringes to be placed in said container.

4. A magazine container according to claim 3, wherein said container outer wall includes a widened flat portion at the upper end, said carrier including widened flanges adapted to pass through said widened flat portion and to be positioned behind the walls adjacent the remaining slot portion in said outer wall.

5. In a syringe cleaning apparatus including a vertical pipe adapted to project water radially and a centrifugal drum coaxial with said pipe, the provision of needle cleaning means comprising a plurality of flat containers arranged along vertical radial planes inside said drum between the pipe and the outer wall of said drum, each container having radially spaced outer and inner peripheral walls with openings, said outer peripheral wall having a longitudinal slot, U-shaped needle carriers each including a central web provided with a perforation for fluidtight engagement by the hollow shank of a needle, two inwardly directed lateral flanges and extensions for the latter adapted to engage the inner side of the surface of the corresponding container to hold the web carrying the needle to the front of said front surface, the flanges of a number of needle carriers being fitted floatingly and fluidtightly in radially directed superposed relationship inside the outer wall slot of each container, and means rigidly and removably securing the containers inside the drum.

6. In a syringe cleaning apparatus including a vertical pipe adapted to project water radially and a centrifugal drum coaxial with said pipe, the provision of needle cleaning means comprising a plurality of flat containers arranged along vertical radial planes inside said drum between the pipe and the outer wall of said drum, each container having radially spaced outer and inner peripheral walls with openings, a hollow rectangular rod-shaped needle carrier fitted in the outer open end of each container and including inner and outer terminal walls provided with longitudinal slots, the slot in the inner wall being broader than the slot in the front wall, said slots being adapted to be engaged respectively by the nipples and shanks of superposed needles engaging the needle carrier, and means rigidly and removably securing the containers inside the drum.

7. In a syringe cleaning apparatus including a vertical

pipe adapted to project water radially and a centrifugal drum coaxial with said pipe, the provision of needle cleaning means comprising a plurality of flat containers arranged along vertical radial planes inside said drum between the pipe and the outer wall of said drum, each container having radially spaced outer and inner peripheral walls with openings, one of the sides of each container being provided with an inner vertical edge with an outwardly bent marginal section to reinforce the container and to close against the entrance of water the gaps between said container and the adjacent container, means for removably and fluidtightly securing a plurality of radially directed needles in each container in superposed relationship along the outer narrow terminal surface of each container to constrain the water passing out of the pipe to flow through each container into the needles to clean the latter, and means rigidly and removably securing the containers inside the drum.

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