

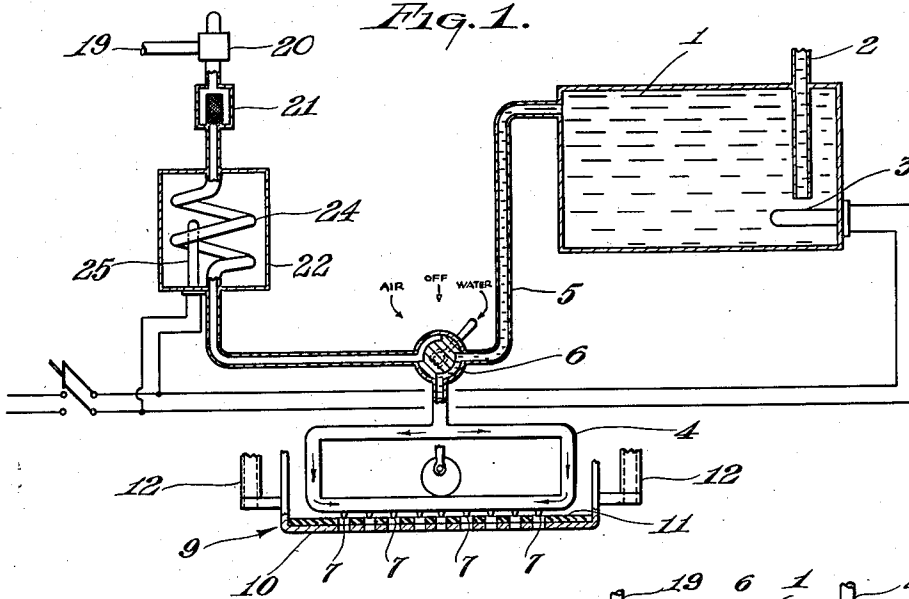
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W. J. HOLDERITH

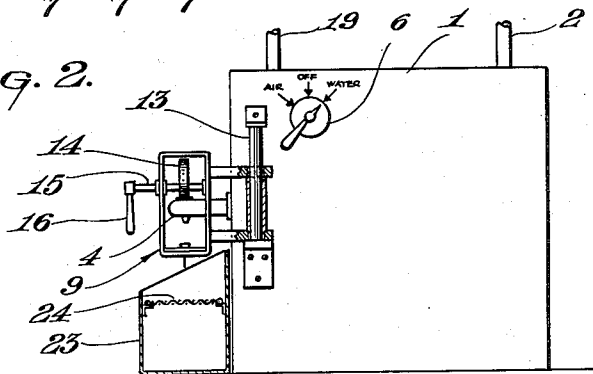
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HYPODERMIC NEEDLE CLEANING APPARATUS

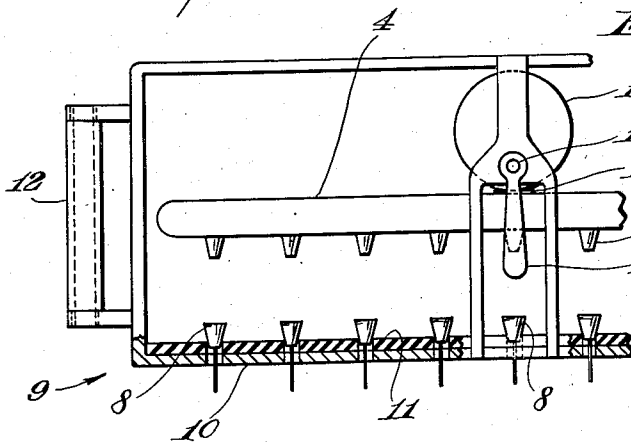
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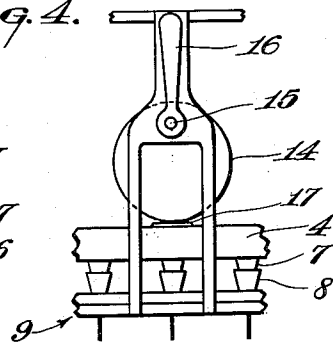
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE

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## HYPODERMIC NEEDLE CLEANING APPARATUS

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5 Claims. (Cl. 134-152)

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My invention relates to cleaning apparatus for surgical and medical equipment and particularly to hollow tubular instruments requiring cleaning after each use.

It is an object of my invention to provide an apparatus adapted to clean surgical and medical apparatus after use and before sterilization prior to future use.

It is a further object of my invention to provide an apparatus in which a relatively large number of pieces of equipment may be cleansed simultaneously.

It is still a further object of my invention to provide an apparatus which cleans, dries and prepares medical and surgical apparatus for sterilization requiring a minimum of preparatory manual operation.

These and further objects of the invention will appear as the specification progresses.

In accordance with the invention, apparatus is provided for receiving and holding medical and/or surgical equipment to be cleaned and prepared for subsequent sterilization which engages a cleaning manifold of special construction about to be more fully described and through which heated water and heated air are successively circulated to perform the cleaning and drying operation.

The manifold construction forming a part of the apparatus is arranged to receive any desired number of pieces of a given type of equipment and comprises a tube through which the heated water and warmed air can be circulated. The tube is provided with a plurality of receiving studs upon which the pieces to be cleaned can be mounted, each of which is bored to permit the water and air to circulate into the equipment for removal of extraneous matter and for drying.

A special mounting bracket adapted to receive and hold the equipment is so arranged that it can be clamped over the studs thereby firmly placing each piece of equipment in proper position. As a further feature of the invention, the clamp can be provided with a special equipment holder and remotely actuated thus permitting a relatively large number of individual pieces of equipment to be separately mounted and rapidly and expeditiously inserted into the clamp to facilitate cleaning.

The invention will be described in greater detail with reference to the appended drawing wherein:

Fig. 1 shows a diagrammatic view of the cleaning apparatus according to the invention;

Fig. 2 shows a side elevational view of the cleaning apparatus according to the invention;

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Fig. 3 shows the manifold construction in greater detail; and

Fig. 4 shows the holder construction in greater detail.

Referring to Fig. 1, the cleaning apparatus includes a supply of heated water 1 for cleaning medical equipment, for example, hypodermic needles and the like after use. Water is drawn from any convenient water supply through an intake pipe or hose 2 and heated by an electrical immersion heater 3. After being heated the water is drawn into the cleaning manifold 4 through a pipe 5 and a valve system 6 for regulating the supply of either heated water or heated air for drying. The manifold 4 is provided with a plurality of stub outlets 7 tapered to receive the instrument to be cleaned.

The manifold construction can be more clearly seen in Fig. 3 where each of the stub outlets 7 are so tapered as to receive each needle to be cleaned. In the drawing, these outlets are shown as tapered to receive the needles 8 over the stubs. However, it is equally practicable to so taper the stubs internally that the needles fit into the bore in the stubs.

The needles are mounted in a holder 9 (shown in greater detail in Fig. 4) which comprises a metal strip 10 provided with a plurality of notches for receiving and holding the needles or instruments and which is backed with a rubber strip 11. The holder 9 is adapted to fit into a mounting bracket 12 which slides on a column 13. A cam mechanism moves holder 9 into engagement with the manifold which remains stationary as shown in Fig. 1, so that the needles are caused to slip over the stubs and be positioned for washing. The cam mechanism comprises a cam 14 pivoted about a shaft 15 and is actuated by lever 16 riding on a plate 17 on the manifold. Counterclockwise rotation of the lever causes the holder to move into engagement with the manifold placing the needles over the stubs and in position for cleaning. Clockwise rotation of the lever causes the holder to release the stubs from the manifold for removal after cleaning.

In order to prepare the needles for sterilization after cleaning, air drying apparatus is provided which comprises an air inlet 19, connected through a safety valve 20 and an air filter 21 to an air heater 22 preferably provided by coiled tubing 24 through which the air passes and is heated by a heating element 25. After being heated the air supply is connected to a three-position valve 6 which serves to regulate the admission of water or air to the manifold.

After passing through the stubs, the water is

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collected in a basin 23 (shown in Fig. 2). A screen 24 is provided in the basin for preventing damage to any needles which may fall out of the manifold.

I am aware that the arrangement according to the invention is susceptible of various modifications without altering the basic inventive concept.

I therefore wish it to be understood that while I have thus described my invention with specific examples and applications other obvious modifications thereof will be readily apparent to those skilled in the art without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A device for holding hollow tubular articles for cleaning such as hypodermic needles and the like, comprising a cleaning manifold adapted to be connected, respectively, to a source of cleaning fluid and a source of warmed air for drying, a plurality of tapered cleaning stubs on the manifold each adapted to fit internally into the article to be cleansed, a holder for carrying the articles comprising a frame, a carrying strip supported by said frame and provided with a plurality of apertures to receive the articles and hold them in position, each of said apertures being aligned with a corresponding stub in said manifold, and means to move said frame supporting the carrying strip relative to said manifold to bring said tubular articles into engagement with the respective stubs, said means comprising a cam interposed between the frame and the manifold and in operative engagement with the frame, rotation of the cam causing the frame supporting the carrying strip to move relative to the manifold to bring the articles into engagement with the stubs, and means to rotate the cam to effect movement of the frame relative to the manifold.

2. A device for holding hollow tubular articles for cleansing such as hypodermic needles and the like, comprising a cleaning manifold adapted to be connected, respectively, to a source of cleaning fluid and a source of warmed air for drying, a plurality of tapered cleaning stubs each having an external taper corresponding to the internal shape of the hollow article and adapted to fit internally into the article to be cleansed, each of said stubs connecting with the manifold to allow cleaning fluid and air to circulate therethrough, a holder for carrying the articles comprising a frame, a column support along which the frame slides, a carrying strip supported by said frame and provided with a plurality of apertures to receive the articles and hold them in position, each of said apertures being aligned with a corresponding stub in said manifold, and means to move said frame supporting the carrying strip to bring said tubular articles into engagement with the respective stubs, said means comprising a roller interposed between the frame and the manifold, an eccentric pivot on said roller connected to said frame whereby rotation of the roller causes the frame supporting the carrying strip to move along the column relative to the manifold to bring the articles into engagement with the stubs, and means to rotate the roller to effect movement of the frame relative to the manifold.

3. A device for holding hollow tubular articles for cleansing such as hypodermic needles and the like comprising a cleaning manifold adapted to be connected, respectively, to a source of clean-

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ing fluid and a source of warmed air for drying, a plurality of tapered cleaning stubs each having a conical external taper corresponding to the internal shape of the hollow article and adapted to fit internally into the article to be cleansed, each of said stubs connecting with the manifold to allow cleaning fluid and air to circulate therethrough, a holder for carrying the articles comprising a frame, a column support along which the frame slides, a carrying strip supported by said frame and provided with a plurality of apertures to receive the articles and hold them in position, each of said apertures being aligned with a corresponding stub in said manifold, and means to move said frame supporting the carrying strip to bring said tubular articles into engagement with the respective stubs, said means comprising a roller interposed between the frame and the manifold, an eccentric pivot on the roller connected to said frame whereby rotation of the roller causes the frame supporting the carrying strip to move relative to the manifold to bring the articles into engagement with the stubs, and means to rotate the roller to effect movement of the frame relative to the manifold.

4. A device for holding hollow tubular articles for cleansing such as hypodermic needles and the like, comprising a cleaning manifold adapted to be connected, respectively, to a source of cleaning fluid and a source of warmed air for drying, a plurality of tapered cleaning stubs each having a conical external taper corresponding to the internal shape of the hollow article and adapted to fit internally into the article to be cleansed, each of said stubs connecting with the manifold to allow cleaning fluid and air to circulate therethrough, a holder for carrying the articles comprising a frame, a column support along which the frame slides, a carrying strip supported by said frame and provided with a plurality of apertures to receive the articles and hold them in position, said carrying strip comprising a metal strip supporting a rubber strip on the side adjacent the manifold, each of said apertures in the carrying strip being aligned with a corresponding stub in said manifold, and means to move said frame supporting the carrying strip along the column to bring said tubular articles into engagement with the respective stubs, said means comprising a roller interposed between the frame and the manifold, an eccentric pivot on the roller connected to said frame whereby rotation of the roller causes the frame supporting the carrying strip to move relative to the manifold to bring the articles into engagement with the stubs, and means to rotate the cam to effect movement of the frame relative to the manifold.

5. A device for holding hollow tubular articles having a conical internal taper for cleansing such as hypodermic needles comprising a cleaning manifold adapted to be connected, respectively, to a source of cleaning fluid and a source of warmed air for drying, a plurality of tapered cleaning stubs each having a conical external taper corresponding to the internal taper of the hollow article and adapted to fit internally into the article to be cleansed, each of said stubs connecting with the manifold to allow cleaning fluid and air to circulate therethrough, a holder for carrying the articles comprising a supporting frame, a column support along which the frame slides, a carrying strip supported by said frame and provided with a plurality of apertures to receive the articles and hold them in position, said

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carrying strip comprising a metal strip supporting a rubber strip on the side adjacent the manifold, each of said apertures in the carrying strip being aligned with a corresponding stub in said manifold, and means to move said frame supporting the carrying strip along the column to bring said tubular articles into engagement with the respective stubs, said means comprising a roller interposed between the frame and the manifold, an eccentric pivot on the roller connected to said frame whereby rotation of the roller causes the frame supporting the carrying strip to move relative to the manifold to bring the articles into engagement with the stubs, a bearing plate between the roller and the manifold, and lever means to rotate the cam to effect movement of the frame relative to the manifold.

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