Aug. 17, 1965 R. W. BARTON ETAL 3,200,860

NURSING APPARATUS

Filed April 3, 1961 3 Sheets-Sheet 1

Fig. 2.

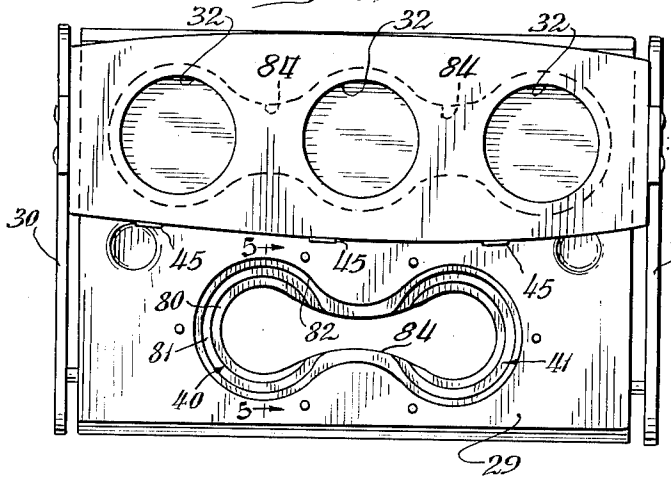


Fig. 8.

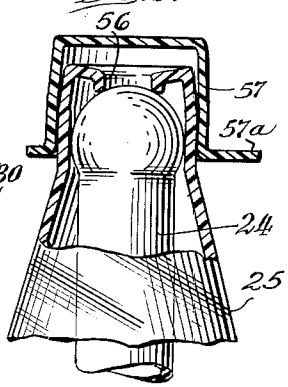
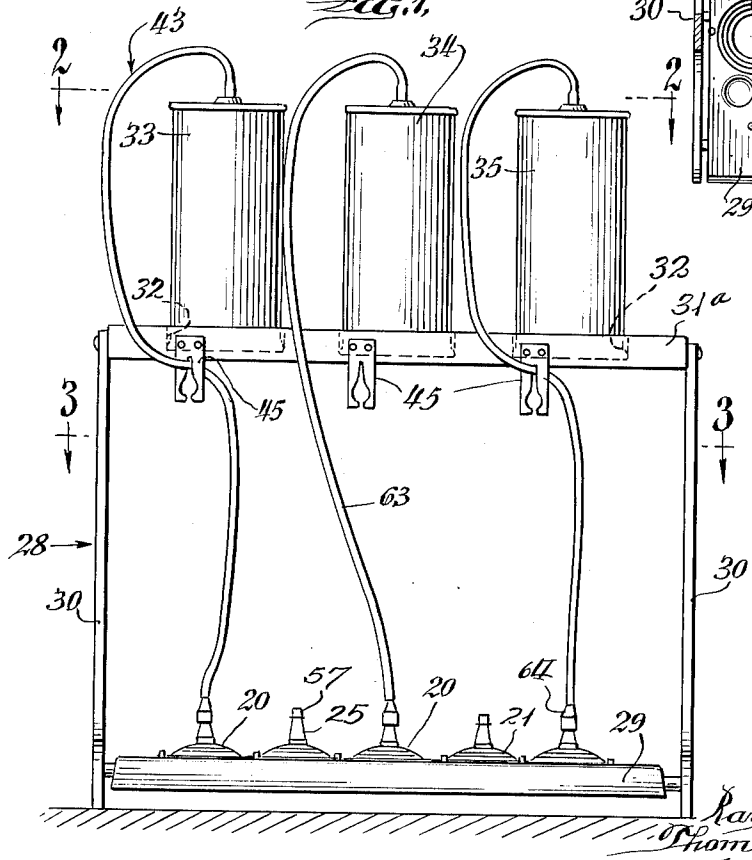


Fig. 1.



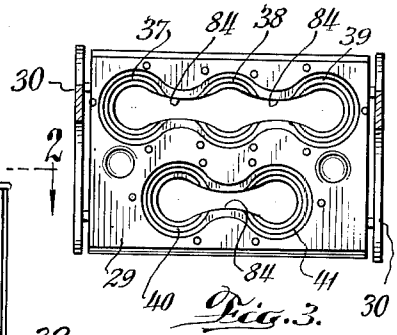


Fig. 3.

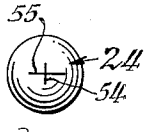


Fig. 9.

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Attorneys

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NURSING APPARATUS

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Fig. 4.

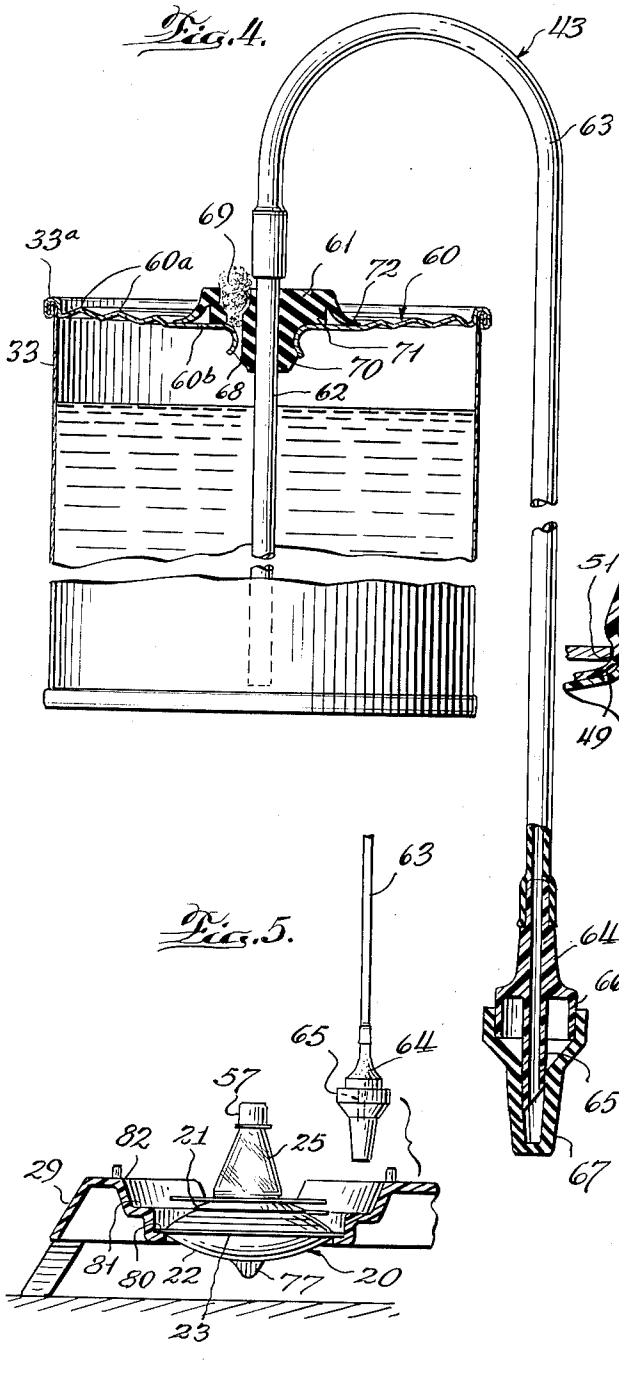


Fig. 6.

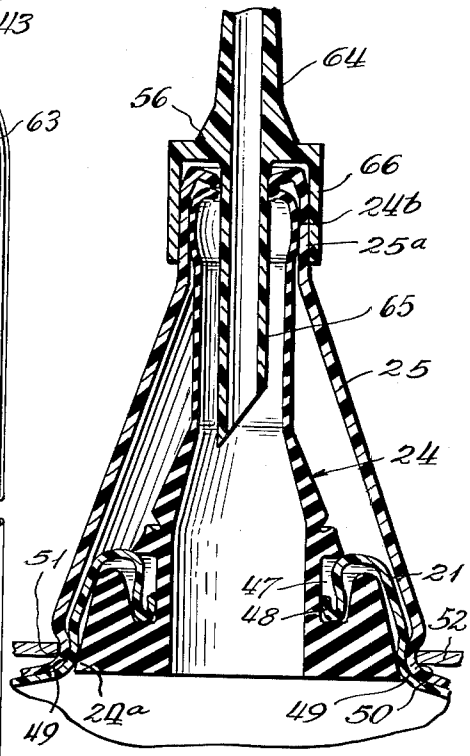
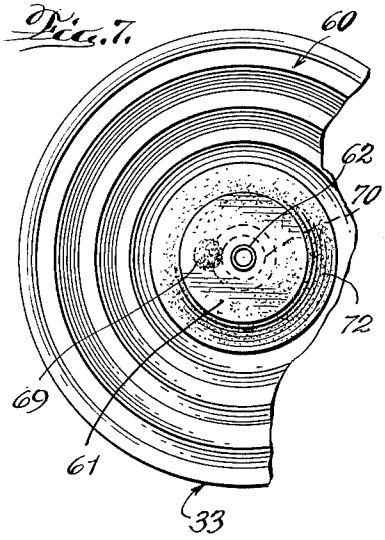


Fig. 5.

Fig. 7.



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NURSING APPARATUS

Filed April 3, 1961 3 Sheets-Sheet 3

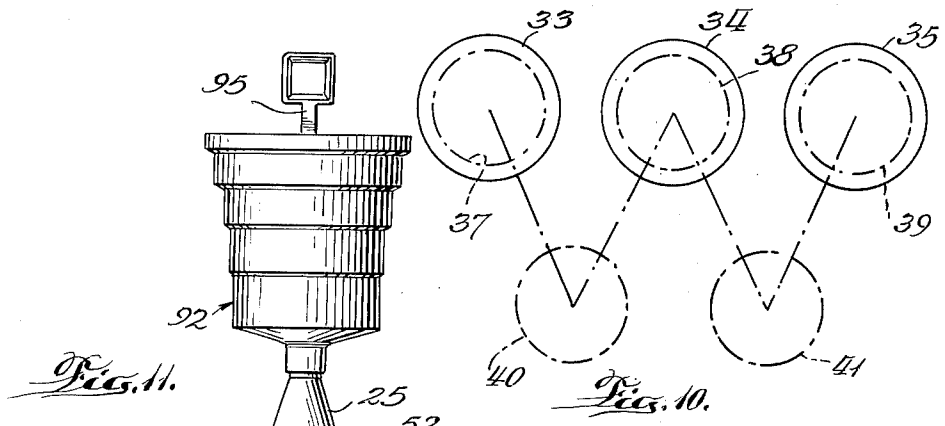

Fig. 10.

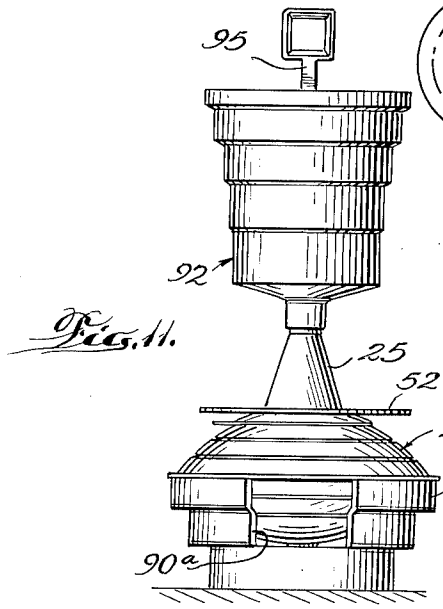

Fig. 11.

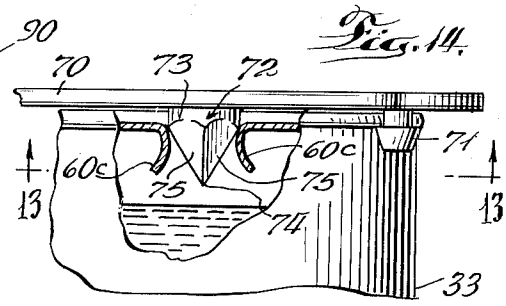

Fig. 14.

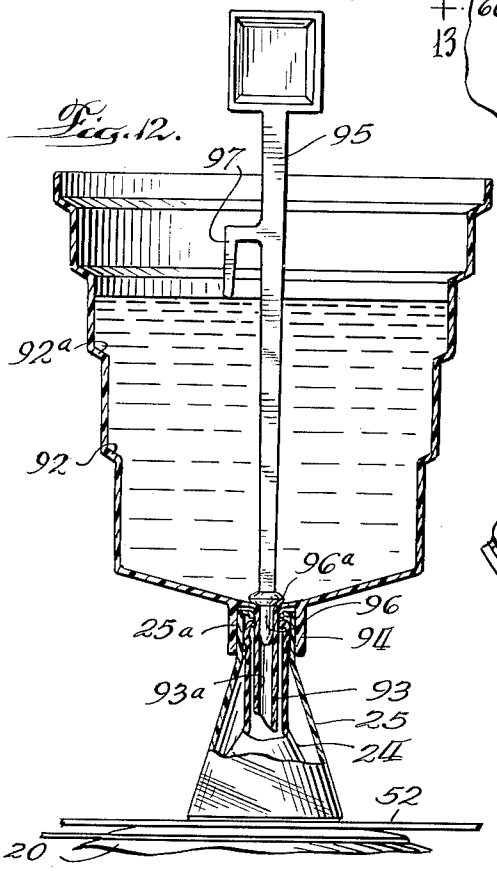

Fig. 12.

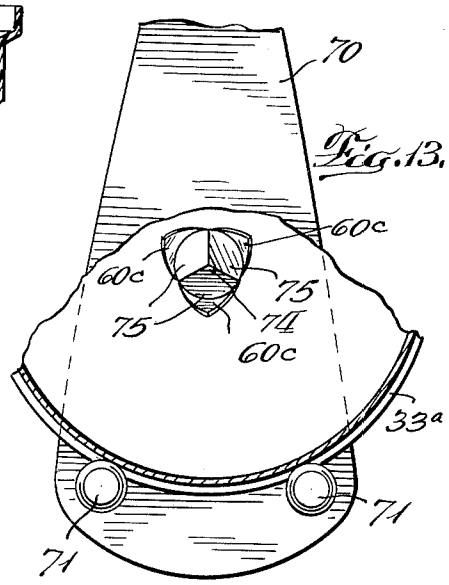

Fig. 13.

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3,200,860

NURSING APPARATUS

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Filed Apr. 3, 1961, Ser. No. 100,169
16 Claims. (Cl. 141—330)

This invention relates to a nurser, more specifically a disposable nurser, and to filling apparatus therefor.

Disposable or throw-away nursers have several advantages over more conventional reusable glass or plastic nursing bottles. The elimination of the cost of washing, sterilizing and handling, and of replacement is obvious. Furthermore, empty nursers may be supplied to a hospital in a sterile condition, and with proper filling apparatus and techniques complete sterility may be maintained prior to feeding. With conventional nursing equipment, there is an ever present danger of contamination, principally through handling of nipples during and following filling. This is a particularly serious problem in hospitals where a large number of nursers are required and often must be handled several times before feeding. In the home, the use of throw-away nursers eliminates the laborious and time consuming operation of washing and sterilizing bottles, nipples and associated apparatus.

A principal object of this invention is to provide an improved throw-away nurser, and a filling apparatus and method providing for easy, accurate filling of nursers in a sterile manner.

A further feature is the provision of a nursing apparatus including a nurser having a nipple, a supply of nursing formula, and connector means connected with the supply and having a portion insertable through the nipple to fill the nurser. The connector is preferably sealed with a nurser so that a gravity flow of formula into the nurser automatically stops when the nurser is substantially filled.

Yet another feature is the provision of a filling apparatus for an expandable nurser having a supporting surface portion, a support having a surface receiving said supporting portion of the nurser, the support being relieved to receive the expanded nurser. Still a further feature is that the support has an open side for ease in removal of the nurser therefrom. And another feature is that the support has a plurality of juxtaposed supporting positions of graduated size, for use with varying sizes of nurser.

A further feature of the invention is the provision of a bulk filling apparatus including a stand having a plurality of supports for bulk formula containers, a plurality of nurser receiving positions operably related with said supports and transfer apparatus connecting bulk containers on the supports with nursers at said receiving positions. Another feature is that provision is made for the reception of at least one more nurser than the number of bulk containers. This permits the use of two nurser receiving positions for a filling operation from one bulk container, with an emtpy nurser always in readiness, while the connecting means for the other bulk containers are connected with the empty nursers, maintaining complete sterility.

Still another feature of the invention is the provision of a method for filling an expandable nurser which comprises providing a supply of nursing formula, making a sealed connection between the supply and the nurser, elevating the supply above the nurser, causing a flow of nursing solution, and breaking the sealed connection upon cessation of the flow. A further feature is the step of maintaining idle connectors in sterile condition during the active use of another connector.

Yet a further feature is the provision of a small quantity or home-filling apparatus including a funnel having a cannula insertable through the nipple cover of the nurser and through the nipple into the nurser, with a sleeve surrounding the cannula and engaging the nipple cover, supporting the funnel on the nurser.

Further features and advantages of the invention will be readily apparent from the following specification and the drawings in which:

FIGURE 1 is an elevational view of a bulk filling apparatus embodying the invention;

FIGURE 2 is a plan view of the apparatus of FIGURE 1 with the bulk containers, connecting means and nursers removed;

FIGURE 3 is a section taken generally along line 3—3 of FIGURE 1 with the nursers removed;

FIGURE 4 is a broken sectional view of a bulk container showing the fitting connected therewith;

FIGURE 5 is a broken section taken generally along line 5—5 of FIGURE 2;

FIGURE 6 is an enlarged section through the nipple of a nurser with a filling connector in place;

FIGURE 7 is a fragmentary plan view of a bulk container;

FIGURE 8 is a fragmentary view of the nurser, nipple, cover and cap, with a portion broken away for clarity;

FIGURE 9 is a plan view of a nipple;

FIGURE 10 is a diagrammatic illustration of the use of the bulk filling apparatus;

FIGURE 11 is an elevational view of a home-filling apparatus for the nurser;

FIGURE 12 is an enlarged vertical section of FIGURE 11;

FIGURE 13 is a bottom view of a can opener, illustrating its operation; and

FIGURE 14 is a fragmentary elevation of the can opener and can with a portion broken away.

The throw-away nurser illustrated herein is basically that disclosed and claimed in Dailey et al. application Serial No. 814,110, filed May 18, 1959, and assigned to the assignee of this application. There are certain differences which will be pointed out below.

Briefly, the nurser 20 (FIGURE 5) has top and bottom sections 21 and 22, respectively, both of a plastic material and sealed together at a peripheral seam 23. The two sections have a configuration of a portion of a sphere less than a hemisphere, and the bottom section 22 is of a material which is more flexible than the top section 21, and may be collapsed into the top section, conforming closely with is as shown in the aforementioned Dailey et al. application. The nurser is supplied with the bottom in the collapsed position; and it may be filled shortly prior to use, the bottom expanding to the position shown in FIGURE 5 upon filling. A nipple 24 is secured in an opening in top section 21 and is provided with a nipple cover 25. A variety of sizes of nursers, as with capacities of two, three and eight ounces, may be provided for feeding differing quantities of formula.

In a hospital nursery or other institutions where a large quantity of nursers must be prepared at one time, it is desirable to utilize a bulk filling apparatus. A preferred

embodiment of bulk filling apparatus is shown in FIGURES 1–3. The filling stand indicated generally at 28 includes a base 29 and a pair of upright members 30 carrying between them an elevated platform or shelf 31. Three recesses 32 are provided in the platform 31 to receive and support bulk formula containers 33, 34 and 35. The base 29 is provided with a plurality of recessed portions 37, 38, 39, 40 and 41 for receiving the nursers during filling. Each of the bulk containers has affixed thereto a filling set 43, through which formula is caused to flow to the nursers carried on base 29. It has been found that a bulk filling operation is most efficient carried on with three supply containers of formula as there are three principal formula preparations used in a hospital nursery. Newborn infants are first given a special prelacteal formula, following which they are switched to a standard hospital formula. In addition, special formulations are often required because of allergic problems.

Briefly, the connecting means 43 may be sealingly connected with one of the nursers 20 and the formula caused to flow by gravity from the bulk container to the nurser. As the flow continues, the lower portion of the nurser expands, until the nurser is substantially completely filled at which point the flow stops. The attendant may then shut off the connection between the bulk container and the nurser, as by a tubing clamp 45 mounted on a shelf 31, and disconnect the filling set from the nurser. The operation may be repeated with the same or one of the other formulas.

The nurser illustrated in this application differs from that of the aforementioned Dailey et al. application primarily in the arrangement of the nipple and nipple cover. This is shown in detail in FIGURES 6 and 8. The nipple 24 is provided with an annular groove 47 in which a folded edge 48 of the top nurser section 21, surrounding the nipple receiving opening, is received. A groove 49 is formed in the top body section 21 adjacent the base portion 24*a* of the nipple, further locking the nipple in place on the nurser body. Cover 25 has an inwardly formed rib 50 which seats in groove 49 and which has an outwardly opening groove 51 associated therewith on the outer surface of the cover. Rib 50 is seated in groove 49 of the nurser body and secures the cover on the nurser. Furthermore, a sheet 52, which may be of heavy paper, has an annular opening therein within which the cover is received, the sheet being seated in groove 51, keeping cover 25 locked in place. Sheet 52 may have indicia imprinted thereon and serve as a label for the nurser.

The outer end 24*b* of nipple 24 fits fairly tightly within a cylindrical portion 25*a* of nipple cover 25, and is supported and positioned therein. The end of nipple 24 is provided with a suitable opening as formed by a pair of crosscuts 54 and 55 (FIGURE 9). A hole 56 is formed in the end surface of cover 25 aligned with and immediately adjacent the nipple opening. A cap 57 (FIGURE 8) is fitted over the cylindrical portion of nipple cover 25, closing the hole 56. Cap 57 is provided with a tab 57*a* to facilitate removal and to prevent the cap from rolling when removed and laid on its side on a surface.

The connector or filling set 43 is shown in detail in FIGURE 4. The bulk container or can 33 has a generally planar end member 60 which is suitably punctured, as will appear, to receive a fitting 61 which carries an elongated tube 62 which reaches substantially to the opposite end of the can. A length of flexible tubing 63 is connected with tube 62 and has affixed to its opposite end a suitable connector 64 for communication with a nurser 20. Connector 64 has a pointed spike or cannula portion 65 which may be inserted through the hole 56 in nipple cover 25 and through the crosscut opening in the end of the nipple, as shown in FIGURE 6. A depending skirt 66 surrounds a portion of cannula 65, and when connection is made with the nipple, surrounds the cylindrical upper portion 25*a* of the nipple cover 25, as an aid in positioning the connecting means. A cover 67 is provided for cannula 65, and is removed when it is desired to use the filling set.

Can connector fitting 61 is also provided with an air passage 68 therethrough, which has an enlarged outer portion in which a filtering material 69, as a wad of cotton is received. The fitting 61 includes a first or plug portion 70 which is inserted through the opening in the end surface 60 of the can, and has a curved wall surface which engages the inturned portions of the end wall, formed when the can is punctured. Fitting 61 has a shoulder 71 which seats against the end surface 60 of the can. An outwardly extending flange 72 is deformed upon connection of the fitting with the can and seals tightly against a surface 60. The flange 72 is of a rather thin and flexible material so that a good seal is effected.

The can of bulk formula material preferably has a series of ribs 60*a* formed in the end surface 60 thereof, adding to the strength of the container. A relatively small circular flat area 60*b* is left in the center of the end. The opening which is formed in the end of the can to receive fitting 61 must be properly located in the central porton of area 60*b* so that flange 72 has a flat surface against which to seal. A can opener or punch for providing a properly positioned opening is illustrated in FIGURES 13 and 14. The opener includes a handle 70, only a portion of which is shown in the drawings, having a pair of hooked members 71 extending from one end thereof. A cutter member 72 is affixed to the handle at a point spaced from hook members 71. The cutter has a round shank portion 73 and a cutting portion with an apex 74 and a plurality of planar cutting faces 75, of which there are at least three. Cutter 72 is so positioned on handle 70 that when the hook members 71 are engaged with the rim 33*a* of a can, the apex 74 of the cutter is centered on end member 60. The can opener is merely hooked with the can and the cutter is forced through the end member providing the desired opening. It is desirable that the opening be generally triangular, as it also has been found that such an opening is more reproducible than one which has more sides or is round. As the number of sides increases, there is an increasing tendency for the material of the can end to tear. The cutting edges which join the planar faces of the opener sever the can material in such a manner that tabs 60*c* are formed, which are turned back by circular shank 73 upon complete insertion of the opener. These tabs provide the surfaces with which the plug 70 of fitting 71 is engaged.

After the can is opened and the connecting or filling set 43 attached thereto, a syphon action is used to cause gravity flow of formula from the can 33 to a nurser. The opened can with a filling set 43 attached thereto is placed in one of the support openings 32 on the shelf 31. The cover 67 is removed from the connector device 64 of the filling set and cannula 65 is connected with an empty nurser. A flow of formula is started by pulling on the tab 77 which extends from the bottom body section 22 of the nurser. This opens the nurser reducing the pressure therein allowing atmospheric pressure to force the formula from can 33 through the filling set 43 to the nurser. Only filtered air is admitted to can 33 through filter 69, preventing contamination of the contents. Once the flow is started, it continues until the nurser is substantially filled. Then, as the cannula 65 is sealed with the hole 56 through nipple cover 25, the flow stops automatically.

The connection between the bulk container and the nurser 20 is then interrupted, as by inserting tubing 63 in the clamp 45, and the cannula 65 removed from the nurser, breaking the sealed connection. The cannula 65 is then inserted in a further nurser which may be filled by removing the tubing from clamp 45.

The system provides the utmost in sterility during the filling operation. The filling set 43 is a one-use device, thrown away when the container of formula is empty. Neither cannula 65 nor nipple 24 is touched during the filling operation. Cap 57 is merely removed from the

nurser nipple cover 25 and the cannula inserted. With the apparatus shown in the drawings, there are sufficient nurser receiving positions that two nursers may be provided in which the cannula of the filling sets of the idle bulk containers are inserted, while nursers are filled from the third container. As best seen in diagrammatic FIGURE 10, the filling set from a bulk container 33 in the left-hand bulk container support position will reach nurser positions 37 and 40; the set from bulk container 34 reaches positions 38, 40 and 41, while the set from container 35 reaches positions 39 and 41. Cannula 65 is only momentarily exposed to the atmosphere when it is being moved from one nurser to another. Nipple cover 25 is not removed until it is time for feeding.

It is desirable to use two of the nurser receiving positions of base 29 for the active filling operation. While the filling set 43 is connected with the nurser in one position, an empty nurser is placed in the other position. As soon as one nurser is filled, tube 63 is closed off and connector 64 moved to the empty nurser and the tube released so that the flow of formula continues. Cap 57 is replaced on the filled nurser, the nurser is removed from the supporting position on the base and an empty nurser put in its place.

Shelf 31 is preferably offset from the base 29 so that the forward edge 31*a*, over which the filling tubes 63 pass, is directly above a line midway between the front and rear rows of nurser receiving portions in the base. The tubing is of sufficient length to reach at least two nurser receiving positions, without being long enough for cannula 65 to touch the base surface if the tubing hangs free.

The cuts 54 and 55 in the nipple are of different length, as is apparent from an examination of FIGURE 9. The illustrated arrangement permits insertion of the connector cannula, without having an excessive feeding rate which would occur if both cuts were of the longer length.

It is desirable to provide nursers in varying sizes so that different quantities of formula may be made up, according to the needs of the infants in the nursery. Generally speaking, nursers of the general type illustrated herein may be designed to have different capacity by changing the diameter, and to a lesser extent, the height. The nurser receiving portion of the base is best seen in FIGURE 5. In the embodiment illustrated, three concentric but vertically and laterally spaced generally annular surfaces 80, 81 and 82 are provided for nursers which may have a volume of two ounces, three ounces, and eight ounces. In each case, the annular sealed portion 23 of the nurser provides a nurser supporting surface which is received on the appropriate surface of the base. The vertical spacing of the supporting surfaces is such that the top of the nipple cover of the smallest size nurser, resting on the lowest supporting surface 80, is approximately one inch above the upper surface of the base. This provides ample leeway in the selection of the length of tubing 63 without increasing the danger of contact of the cannula with the base.

It is preferable that the recessed nurser receiving portions of the base be joined, as best seen at 84, in FIGURE 3, providing a channel through which the connecting device 64 of the filling set may be swung, further reducing the danger of striking the base and contaminating the cannula. Similar channels may be provided between the receiving portions in the two parallel rows. Channel 84 also provides an opening for handling the nursers.

The apparatus and method described above facilitate the use of throw-away nursers by providing a sterile and relatively foolproof means for filling. In a hospital, for example, not only is the problem of collection, washing, sterilization and reassembly of nursers completely eliminated but filling is provided for in a sterile manner where there is no danger of contact between the nurser nipple and a contaminated surface. The nipple cover remains securely fixed in place on the nurser until it is actually time to feed the infant.

In home use, it is normally not necessary to use more than one type of formula at any given time. Accordingly, modified filling apparatus and methods may be used. In FIGURE 11, a nurser 20 is shown in a stepped stand 90 provided with a plurality of concentric, vertically and laterally spaced annular supporting surfaces. A portion of the stand is cut away at 90*a* to facilitate insertion and removal of the nurser.

The filling apparatus include a funnel 92 provided with a spike or cannula 93 at the outlet thereof, which is inserted through the hole in nipple cover 25 and into nipple 24, sealing with the cover. A sleeve 94 surrounds cannula 93 and closely engages a cylindrical portion 25*a* of the nipple cover, supporting funnel 92 thereon. An elongated member 95 is provided with a stopper portion 96 which may be inserted in the bore 93*a* of cannula 93. A shoulder 96*a* limits the extent of insertion of stopper 96. With the funnel 92 in place on an empty nurser carried in the support 90, an appropriate amount of formula may be placed in the funnel from a bulk supply. The stopper is then removed and the formula flows by gravity into nurser 20, expanding it. During this portion of the operation, stopper member may be hung within the funnel 92 by placing the hook extension 97 over the upper funnel rim. When the formula has filled the nurser, flow stops and the stopper may be replaced and the funnel removed. The filled nurser is taken from the support 90 and replaced with an empty nurser and the funnel again mounted on top of the nipple cover. The operation is then repeated to fill as many nursers as may be necessary. The wall of funnel 92 is preferably stepped and calibrated to indicate the quantity of formula therein.

The use of a throw-away nurser in the home eliminates the need for investment in sterilizing equipment and the periodic job of scrubbing bottles, nipples, caps and associated devices. It is only necessary to wash and sterilize funnel 92 and stopper 95 which are preferably of a suitable high temperature plastic material, as a high density polyethylene and may be sterilized by boiling. The disposable nurser and the filling apparatus illustrated in FIGURES 11 and 12 are particularly suited for use where it is inconvenient to use conventional nursing equipment, as on a trip.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

We claim:

1. A nursing apparatus of the character described, comprising: an expandable nurser having a nipple with an end, said nipple having a crosscut opening in the end thereof, one dimension of the crosscut being greater than the other; a supply of nursing formula; and tubular connector means connected with said supply and including an elongated pointed cannula at the end thereof, extending through the crosscut opening of said nipple, to fill the nurser from said supply.

2. Nursing apparatus of the character described, comprising: a nurser having a nipple with an opening therethrough; a cover for said nipple having a hole adjacent the opening in said nipple; a supply of nursing formula; and connector means connected with said supply and insertable through the hole in said cover and through the opening of said nipple and seal with said cover to fill the nurser from said supply.

3. Nursing apparatus of the character described, comprising: a nurser having a nipple having an end with an opening therein; a cover for said nipple having a hole adjacent the opening in said nipple, said cover being in sealed engagement with the nurser and having a portion

closely engaging and supporting the end of said nipple; a supply of nursing formula; and connector means connected with said supply and having a portion insertable through said hole and the opening in said nipple to fill said nurser, said connector portion being sealed with said cover.

4. Nursing apparatus of the character described, comprising: a nurser having a nipple with a slit opening therein; a cover for said nipple having a generally cylindrical portion closely surrounding and supporting the end of said nipple, said cover being sealed said nurser and having a hole in the end of the cylindrical portion thereof, aligned with the opening in said nipple; a supply of nursing formula; and filling apparatus connected with said supply and including a cannula inserted through the hole in said cover and the opening in said nipple to fill the container from the supply, said cannula sealing with said cover.

5. Nursing apparatus of the character described, comprising: a nurser having a nipple; a cover for said nipple having a hole adjacent said nipple; a supply of nursing formula; and connector means connected with said supply and having cannula portion insertable through the hole in said cover and through said nipple to fill the nurser from said supply, said connector means also having a sleeve portion spaced from said cannula surrounding and in engagement with said cover supporting the connector on the cover.

6. A filling apparatus of the character described for a nurser, comprising: a stand having a shelf providing at least one support for a bulk formula container; a base located below said shelf, there being at least two nurser receiving positions on said base, each position including an annular, dished nurser support having a tapered surface; nursers, each having an expandable wall portion with a peripheral flange portion extending outwardly therefrom, forming a supporting surface, said expandable wall portion in expanded condition depending and extending inwardly from said flange, said flange resting on said tapered support surface at a nurser receiving station, the tapered surface below the nurser being spaced from said nurser wall portion in expanded condition; and transfer apparatus selectively interconnecting a bulk container on said shelf with nursers located in said two receiving positions, said transferring apparatus including a transfer tube of such length that it reaches nursers at each receiving position and hangs freely above the surface of said base.

7. A filling apparatus of the character described in claim 6 in which there are at least two supports for bulk formula containers and one more nurser receiving position than bulk formula container support, whereby idle transfer apparatus connected with the bulk containers may be attached with nursers while two nurser receiving positions are utilized for a filling operation from an active bulk container.

8. A filling apparatus of the character described for a nurser, comprising: a stand having a shelf with a plurality of supports for bulk formula containers; a base below said shalf having a plurality of nurser receiving positions operably related with said supports, said base having an upper surface formed with recesses between said receiving positions; a bulk formula container on one of said supports; a nurser in a receiving position on said base and transfer apparatus connecting bulk containers on said supports with nursers at said receiving positions said transfer apparatus including a tube hanging downwardly from a bulk container, having a nurser connector at the end thereof, and of a length to space the connector from said recessed base.

9. Nurser filling apparatus of the character described, comprising: a nurser having a nipple with an opening therein; a cover for said nipple having a hole adjacent the opening of said nipple; a funnel having a cannula portion insertable through the hole in said cover and through the opening in said nipple to fill the nurser with formula; and a sleeve surrounding the cannula having a tight fit with the cover and supporting the funnel on the nurser.

10. A filling apparatus of the character described, comprising: a nurser having an expandable wall portion with a peripheral flange portion extending outwardly therefrom forming a supporting surface, said expandable wall portion in expanded condition depending and extending inwardly from said flange; an annular dished support for said nurser, said support having a tapered surface on which the flange portion of said nurser rests, said generally tapered surface being located outside said expanded wall portion in expanded condition; and a supply of nursing formula connected with said nurser.

11. The filling apparatus of claim 10 wherein said support has an open side for access to a portion of the supporting surface of said nurser.

12. The filling apparatus of claim 10 wherein said annular support has a plurality of concentric, annular horizontally and vertically spaced supporting surfaces of graduated sizes for peripherally supporting nursers of different sizes.

13. Supporting apparatus of the type described for holding any one of a plurality of expandable nursers of different sizes, each having a flange portion extending outwardly therefrom and forming a supporting surface, and an expandable wall portion depending below and inside said flange portion, in expanded condition, a support having a plurality of horizontal supporting surfaces of graduated lateral dimension on which the flange of a nurser rests, each surface having an inner edge outside the expandable wall portion of the comparable nurser, and said supporting surfaces of lesser dimension being located inside and below surfaces of greater dimension; a nurser carried on said support; and a supply of nursing formula connected with said nurser.

14. A filling apparatus of the character described for a nurser, comprising: a stand having a shelf with a plurality of aligned supports for bulk nursing formula containers; a base below said shelf having nurser receiving positions operably related with said supports, there being at least one more receiving position than bulk container support, said receiving positions being arranged in two spaced rows parallel with the bulk container supports on said shelf, an edge of said shelf being above said nurser receiving position rows; bulk containers on said supports; nursers at said receiving positions on said base; and transfer apparatus connecting bulk containers on said supports with nursers at said receiving positions, each transfer apparatus hanging downwardly from said container past said shelf edge and being connectable with nursers at receiving positions in each row.

15. The filling apparatus of claim 14 wherein said nurser receiving positions are staggered in said two rows.

16. Nurser filling apparatus of the character described, comprising: a nurser having an expandable portion and a nipple, said nipple having an end portion with a slit opening therein; a cover for said nipple having a hole adjacent to said nipple and aligned with said slit opening, said cover having straight side walls engaging and supporting the end portion of said nipple; a funnel having a cannula portion insertable through and sealed with the hole in said cover and through the opening in said nipple to fill the nurser with formula from said funnel; and a sleeve extending from said funnel surrounding the cannula and having a tight fit with said side wall of the cover and supporting the funnel on the nurser.

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