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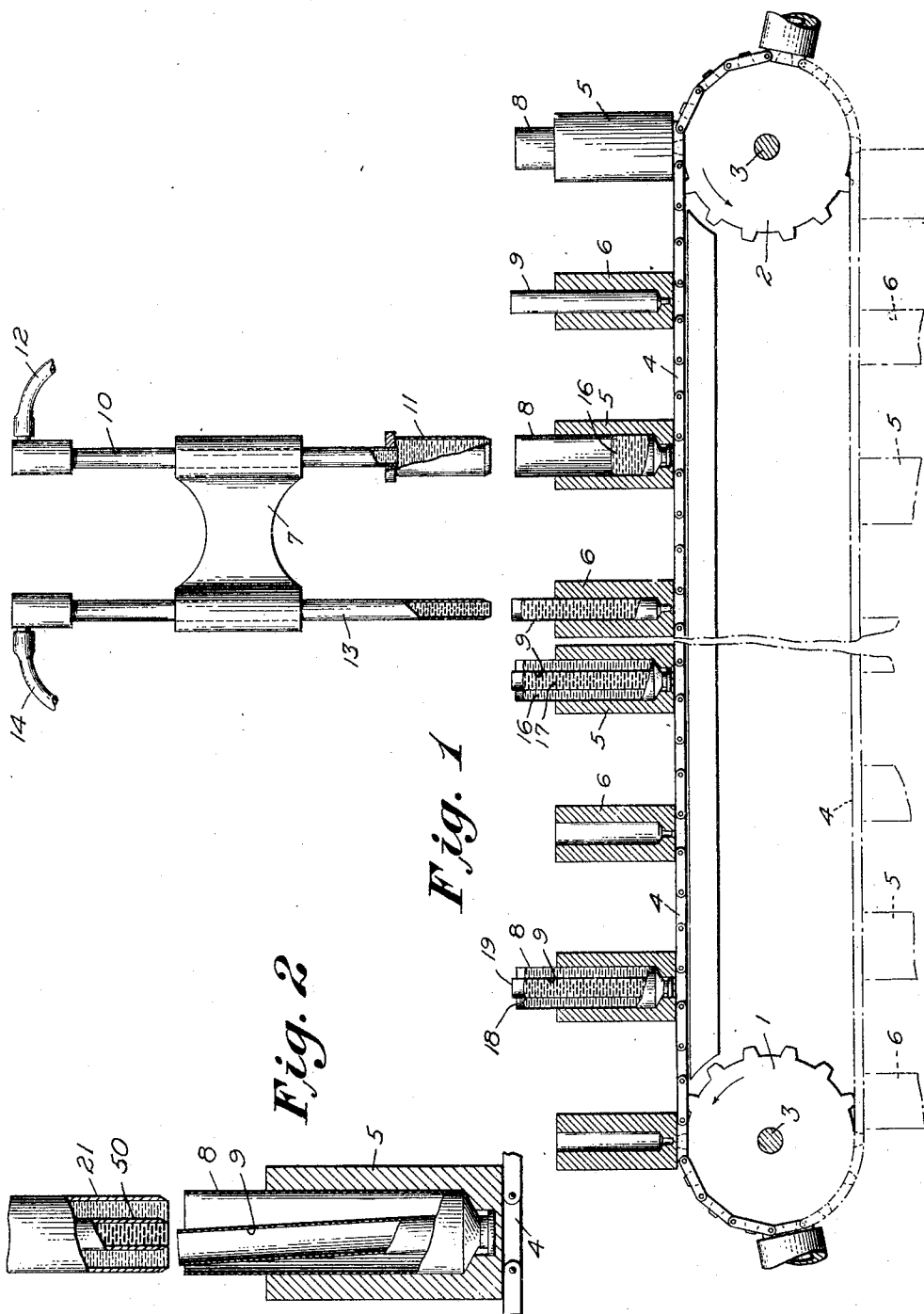
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METHOD OF FILLING BICOMPARTMENT COLLAPSIBLE TUBES

Filed Feb. 20, 1923

3 Sheets-Sheet 1



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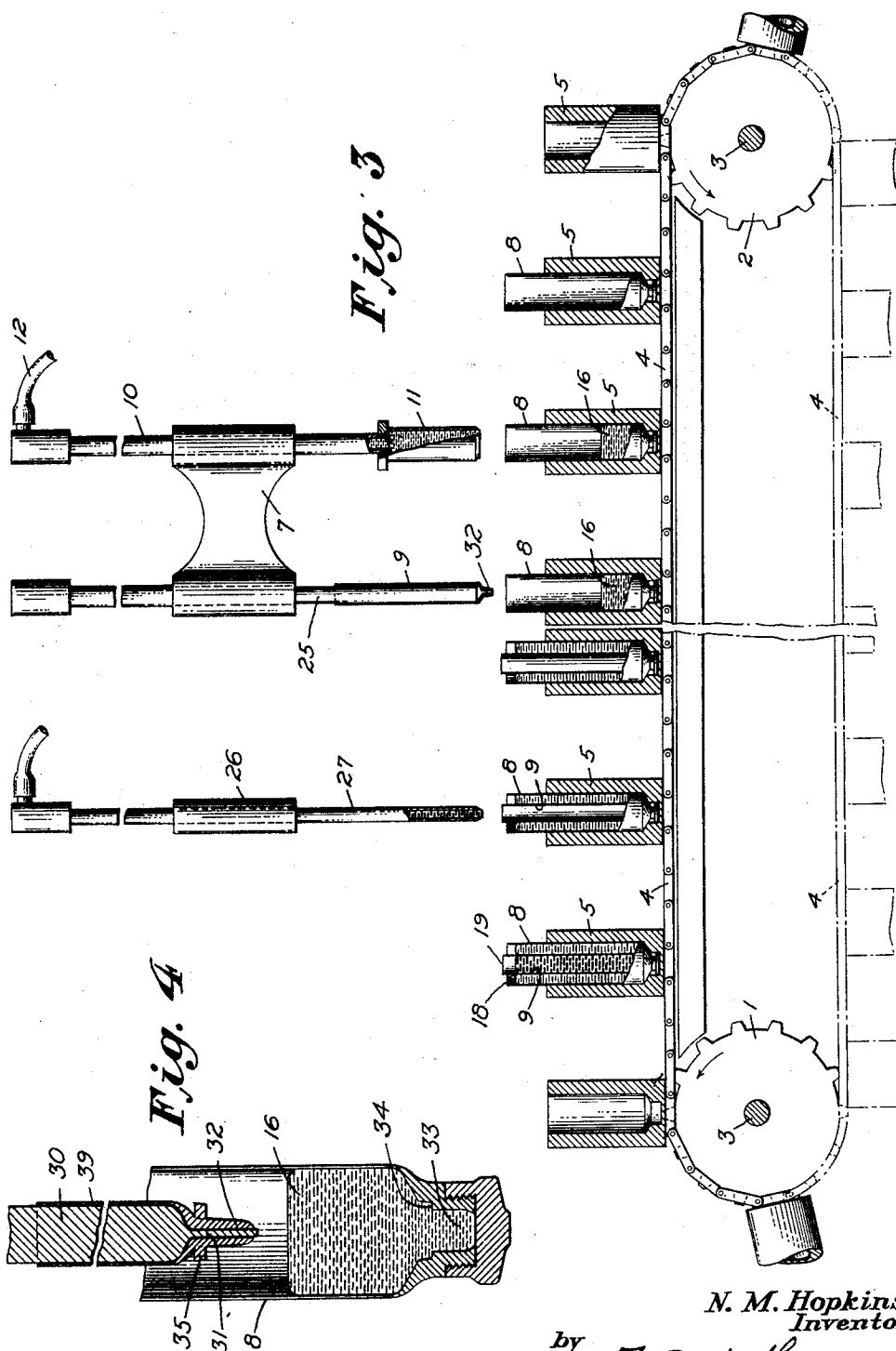
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3 Sheets-Sheet 3

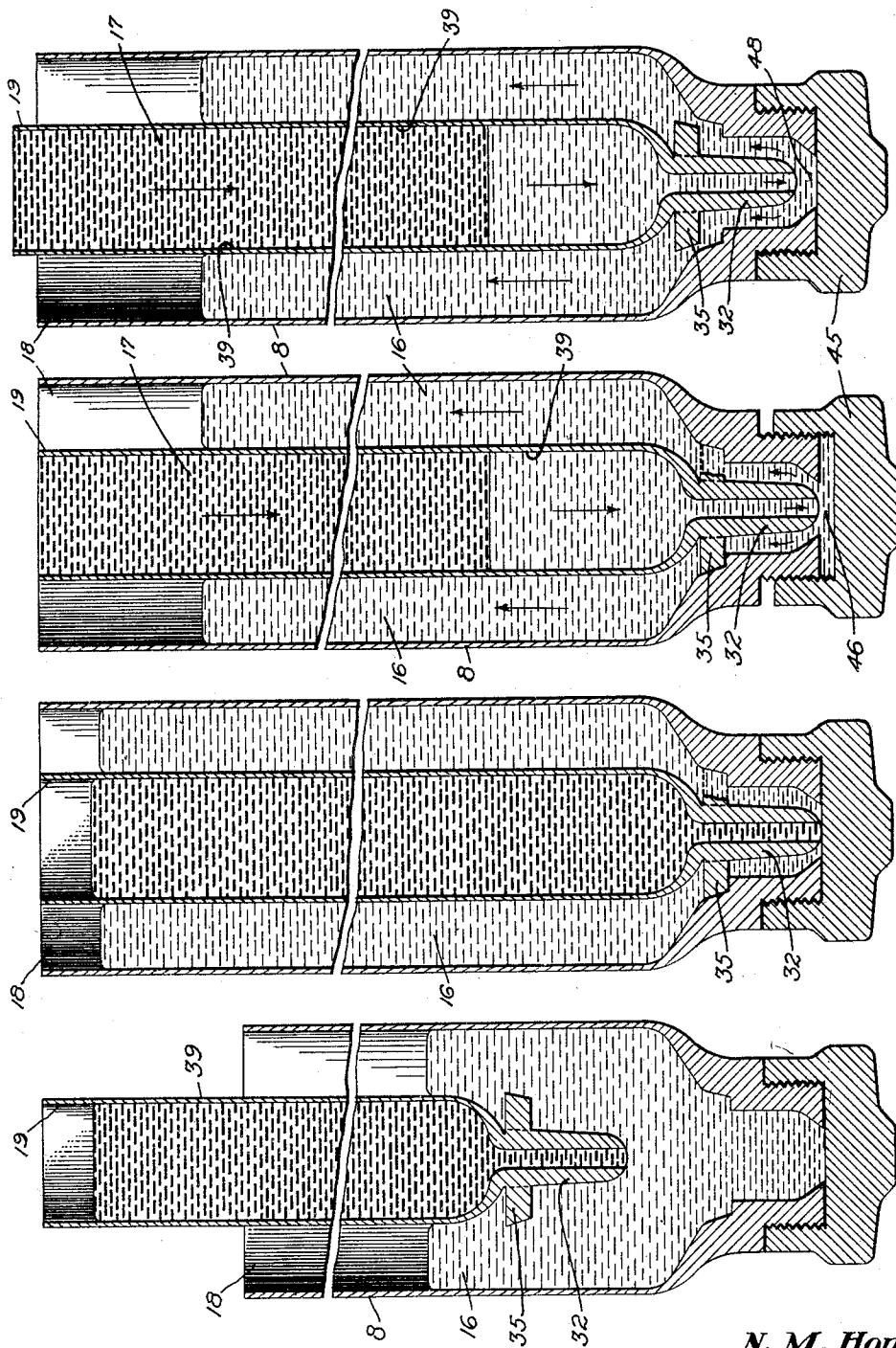


Fig. 8

Fig. 7

Fig. 6

Fig. 5

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METHOD OF FILLING BICOMPARTMENT COLLAPSIBLE TUBES

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This invention relates to methods of and apparatus for filling bi-compartment collapsible tubes, and has for its object to provide an apparatus and a procedure which will be more efficient in practice than those heretofore proposed.

With these and other objects in view, the invention consists in the novel steps and combinations of steps constituting the process, and in the novel parts and combinations of parts constituting the apparatus, all as will be more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:

Figure 1 is a diagrammatic partially sectional view of an apparatus made in accordance with this invention;

Figure 2 is a sectional detail view of a portion of another form of apparatus;

Figure 3 is a view of an apparatus similar to that shown in Figure 1 but modified thereover in certain particulars;

Figure 4 is a sectional view of a modified form of the mandrel portion of the parts shown in Figure 3;

Figures 5 and 6 illustrate still further modified methods of filling this bi-compartment tube;

Figure 7 illustrates a further modified form of procedure; and

Figure 8 is a still further modified method of filling bi-compartment collapsible tubes.

In order that the precise invention may be the more clearly understood, it is said: I have invented what is known as bi-compartment collapsible tubes for holding tooth pastes, face creams, shaving soaps, etc., which comprise inner and outer flexible containers, and it has been found to constitute a problem to fill the same by machinery owing to the very flexible nature of the metal constituting these tubes. For example, if a double filling head like that disclosed in Figure 2 is employed, the inner tube often fails to maintain its proper upright position inside the outer tube, as indicated, and therefore the descent of the filling head is liable to crush the same.

On the other hand, I have found by supporting the inner and outer tubes in separate holders or jigs that I can then by only partially filling the outer tube, completely filling the inner tube, and finally inserting the filled inner tube into the partially filled outer tube, avoid the above difficulties. In such procedure I can also use the ordinary machinery now in use with the illustrated slight modifications, all as will now be disclosed.

Referring more particularly to Figure 1, of the drawings, 1 and 2 indicate the usual well known sprocket wheels used in collapsible tube filling machines, 3 the shafts carrying said wheels, 4 the sprocket chain driven by said wheels, 5 and 6 the holders for the tubes carried by said chain, and 7 a portion of the filling head with which the ordinary well known filling machines are provided.

According to this invention, between each pair of larger tube holders 5, I secure a smaller tube holder 6 as shown, and in the larger holders I place the larger outer tubes 8, while in the smaller holders I place the smaller inner tubes 9. Through the member 7 I pass the filling tube 10 and provide the end of the same with the filling nozzle 11 adapted to enter and partially fill each of the larger collapsible tubes 8 as they are carried by the conveyor chain 4 underneath said nozzle, in the usual manner of filling single tubes. The nozzle 11 is supplied from the well known filling machine proper (not shown) through the flexible pipe 12 and the amount of paste material delivered to each tube 8 is governed by the well known mechanism carried by said machine. In the same way, the member 7 is provided with the smaller filling tube 13 fed from the flexible pipe 14 leading from the supply on the said filling machine, and said tube 13 enters each of the smaller collapsible tubes 9 as they pass under said tube 13 along with the tubes 8. Each pair of tubes 8 and 9 are so spaced apart that the filling tube 13 and the nozzle 11 will enter their respective collapsible tubes 9 and 8 simultaneously and deliver the predetermined amount of material in the manner well known.

It will be understood that in the finished bi-compartment collapsible tube that is filled

by this mechanism the inner tube 9 is centrally disposed inside the outer tube 8 as best illustrated at the left hand portion of Figure 1, and that when both tubes are filled the material in each tube occupies the positions shown. Therefore, in filling the tubes 8 the amount of material is so regulated and predetermined as to only partially fill said tubes 8 or say to about 40% of their height so that when the filled inner tubes 9 are inserted inside the partially filled tubes 8, the material 16 in said tubes 8 will be displaced upwardly and around the inner tubes 9, to the end that the level of said material 16 will be about the same as is the level of the material 17 in the tubes 9. The filled tubes 9 may be inserted into the partially filled tubes 8 by hand, or by other means, which form no part of this invention. The material inside the tubes 9 gives the walls of said tubes a rigidity which they do not have when empty, and therefore it is a comparatively easy matter to insert the said tubes 9 into the partially filled tubes 8 and to cause the supporting material 16 to surround the said tubes 9; and thus is a structure provided which can be easily manipulated by the well known machines now in use for rolling up or closing the bottoms 18 and 19 of said tubes 8 and 9 respectively.

It will thus be seen that by proceeding in the manner above disclosed, all danger of collapsing the inner tubes 9 by the descent of the inner filling tube 50 carried by the filling head 21 illustrated in Figure 2, is avoided.

Coming to the somewhat modified form of the invention illustrated in Figure 3, the parts that are common to Figure 1 have been given the same reference numerals and the larger tubes 8 are filled in the same manner as are the tubes 8 in Figure 1. On the other hand, instead of providing a filling tube 13 for the smaller tube 9, a mandrel or plunger 25 is supplied to the member 7, and over this mandrel 25 are slipped the smaller tubes 9, as shown. In this construction said mandrel 25 as it descends, centers and accurately locates said smaller tubes 9 inside the outer tubes 8, whereupon the conveyor belt 4 carries the bi-compartment collapsible tubes 8 and 9 thus formed underneath the filling head 26 provided with the filling tube 27 which readily enters the inner tube 9, as will be clear from the left hand portion of Figure 3, and fills the same to a predetermined height as will be readily understood. In this manner, the open ends 18 and 19 of the larger and smaller tubes respectively are left in such a condition that they can be readily rolled up by the usual mechanism (not shown) and the double tube thus closed.

In the still further modified form of the invention shown in Figure 4, the outer tube 8 is partially filled as above described but the mandrel 30 instead of being shaped as is the mandrel 25 is provided with a depending pin

or projection 31 adapted to enter the nozzle like end 32 of the smaller tube 39, and to thus hold the same in the proper position to be centered inside the outer tube 8 with the member 32 occupying the cavity 33 as will be readily understood. During this operation, said pin member 31 prevents the paste 16 in the outer tube 8 from entering the inner tube 39. Said cavity is preferably surrounded by an annular shoulder 34 on which fits the radial projections 35 carried by the lower end of the smaller tube 39, as shown.

In the still further modified form of the procedure illustrated in Figures 5 and 6, the method is more like that followed in Figure 1. That is, the outer tube 8 is partially filled to a predetermined height as shown, whereupon a smaller inner tube 39 provided with the nozzle 32 and the guide or supporting members 35 is or may be filled in a separate holder 6, see Figure 1, whereupon it is removed by hand, or otherwise, from said holder 6 and inserted in the larger outer tube 8, whereupon the parts occupy the position shown in Figure 6, and are ready to have the open ends 18 and 19 closed in the usual manner.

In the still further modified form of the invention shown in Figure 7, the inner tube 39 is or may be the same as that in the previous figures, but the cap 45 of the outer tube 8 is partially unscrewed as shown so as to provide the passage 46 around the nozzle 32 of the inner tube. In carrying out the process in this instance the material 16 is first filled down through the inner tube 39 by any suitable means as for example the filling tube 13. After a predetermined amount of material 16 has thus passed down through the inner tube 39, out of its nozzle 32 and through the passage 46, into the inside of the outer tube 8, then the material 17 is filled down into the inner tube 39 either through the same nozzle 13 or through a different nozzle 27, as may be desired. It is preferred, however, to move the bi-compartment tubes 8 and 9 from the first filling position under tube 13 to its second filling position under tube 27, and thus employ different nozzles for filling the different materials 16 and 17 in their respective tubes.

In the still further modified form of the invention shown in Figure 8 the cap 45 is left screwed up in place on the outer tube 8 but the inner tube 39 is lifted somewhat as illustrated either by hand, or by a suitable means not shown, so as to provide a passage 48 and while this passage exists the material 16 is fed down through the inner tube 39, through the nozzle 32 thereof, through said passage 48 and up inside the outer tube 8, until a predetermined amount is had, whereupon the material 17 is filled into the inner tube 39 in the manner above disclosed or by any other suitable means.

It will now be clear that in such form of the

procedure for filling the double collapsible tube, I first partially fill the outer tube 8 with a particular paste material 16 to a predetermined extent, and then fill a predetermined quantity of the material 17 (which generally differs from the material 16) into the inner tube, and that in all cases the inner tube is centered inside the outer tube before the bi-compartment tubes 8 and 9 are closed.

It is obvious that those skilled in the art may vary the details of procedure as well as the arrangement of parts, without departing from the spirit of the invention, and therefore I do not wish to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. The process of assembling and filling bi-compartment collapsible tubes comprising inner and outer collapsible containers which consists in partially filling said outer container; filling said inner container; and inserting the filled inner container in filled condition into the contents of the partially filled outer container through the bottom of the latter, and positioning the discharge openings of the inner and outer containers adjacent to each other whereby the contents of both containers may be discharged substantially together.

2. The process of filling bi-compartment collapsible tubes comprising inner and outer collapsible containers, which consists in partially filling the outer containers while separated from the inner containers; simultaneously filling the inner containers; and inserting the filled inner containers into the partially filled outer containers so as to displace the contents of the latter, and positioning the discharge openings of the inner and outer containers adjacent to each other whereby the contents of both containers may be discharged substantially together.

3. The process of filling and assembling bi-compartment collapsible tubes comprising inner and outer collapsible containers which includes filling to a predetermined extent the outer container through the bottom thereof when in inverted position, filling the inner container when disassembled from the outer container and subsequently inserting the inner container through the open bottom of the outer container to extend into the contents thereof into assembled position with said outer container with the discharge openings of both containers adjacent each other whereby the contents of both containers may be discharged substantially together.

4. The process of filling and assembling bi-compartment collapsible tubes comprising inner and outer collapsible containers which includes partially filling the outer container through the bottom thereof when in inverted position, filling the inner container through the bottom thereof when disassembled from

the outer container and arranged in inverted position, subsequently inserting the inner container through the open bottom of the outer container into assembled position with the latter with the discharge openings of the two containers adjacent to each other whereby the contents of both containers may be discharged substantially together and then closing the bottoms of said containers.

5. In an apparatus for filling plural compartment tubes comprising inner and outer containers including, in combination, a pair of filling nozzles mounted in spaced relation with reference to each other and together constituting a unitary pair of nozzles, the nozzles of said pair being respectively positioned for selectively simultaneously filling different compartments of the container, a separate supply connection for each of said filling nozzles, and a pair of container supports mounted in spaced relation corresponding to the spacing of said filling nozzles for respectively supporting inner and outer containers for simultaneous filling by said filling nozzles.

6. In an apparatus for filling plural compartment receptacles comprising inner and outer containers including, in combination, a pair of filling nozzles mounted in spaced relation with reference to each other and together constituting a unitary pair of nozzles, the nozzles of said pair being respectively positioned for selectively filling the inner and outer containers, a separate supply connection for each of said filling nozzles, a series of container supports mounted in pairs, the members of which are spaced apart corresponding to the spacing of said filling nozzles for respectively supporting inner and outer containers for simultaneous selective filling by said filling nozzles and a movable carrier for supporting said container supports so as to successively bring pairs of supports into alignment selectively with the respective filling nozzles.

7. The process of assembling and filling plural compartment collapsible tubes comprising an inner collapsible tube adapted to be centered inside of an outer collapsible tube which includes, partially filling said outer tube, placing the inner tube inside of the outer tube through the open bottom of the latter to displace the partially filling contents thereof, while said inner tube is supported against inward collapse, and positioning the discharge openings of the two tubes adjacent each other whereby the contents of both tubes may be discharged substantially together.

In testimony whereof I affix my signature.
NEVIL MONROE HOPKINS.