Aug. 18, 1942. O. JOHNSON 2,293,142

CONTAINER AND METHOD OF MAKING CONTAINERS

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Fig. 3.



Fig. 2.

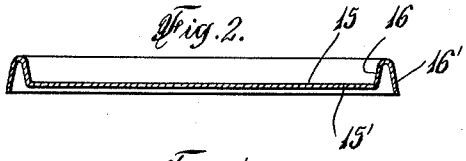


Fig. 1.

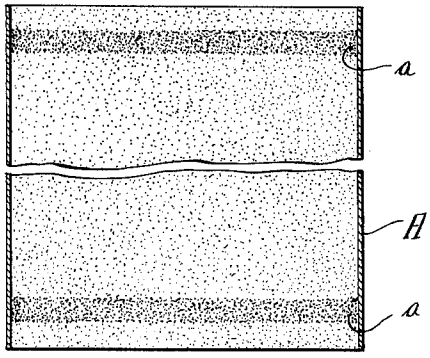


Fig. 5.

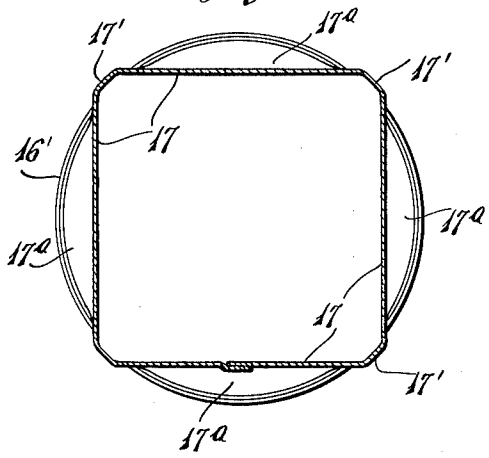


Fig. 4.

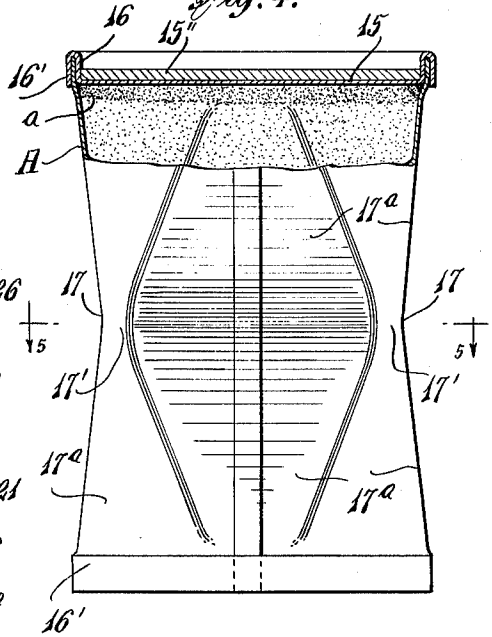
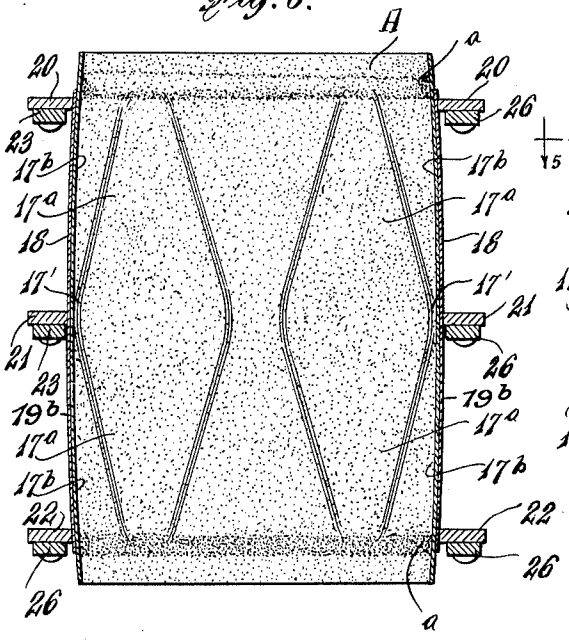


Fig. 6.



INVENTOR
Ogden Johnson
BY John O. Seifert
ATTORNEY

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CONTAINER AND METHOD OF MAKING CONTAINERS

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Fig. 8.

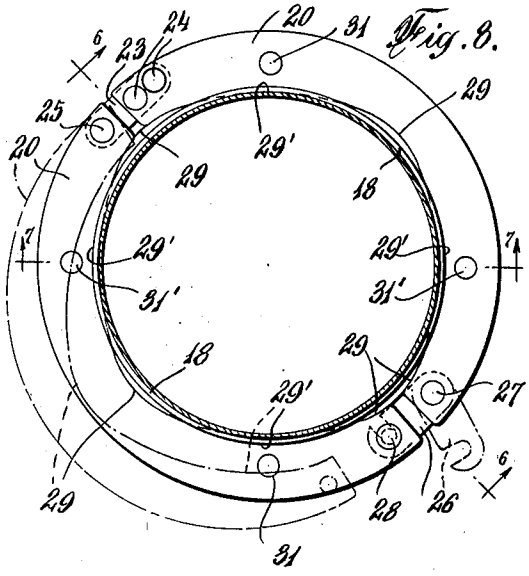


Fig. 10.

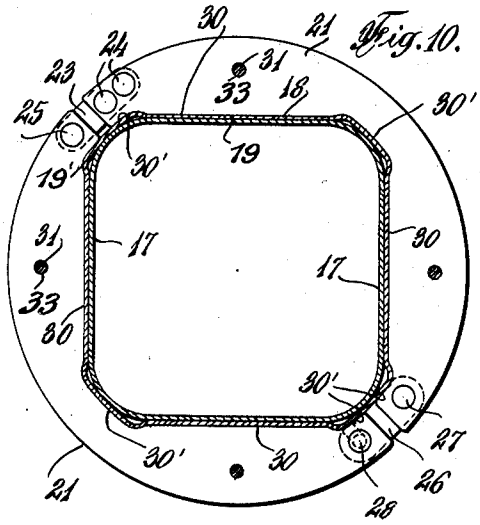


Fig. 7.

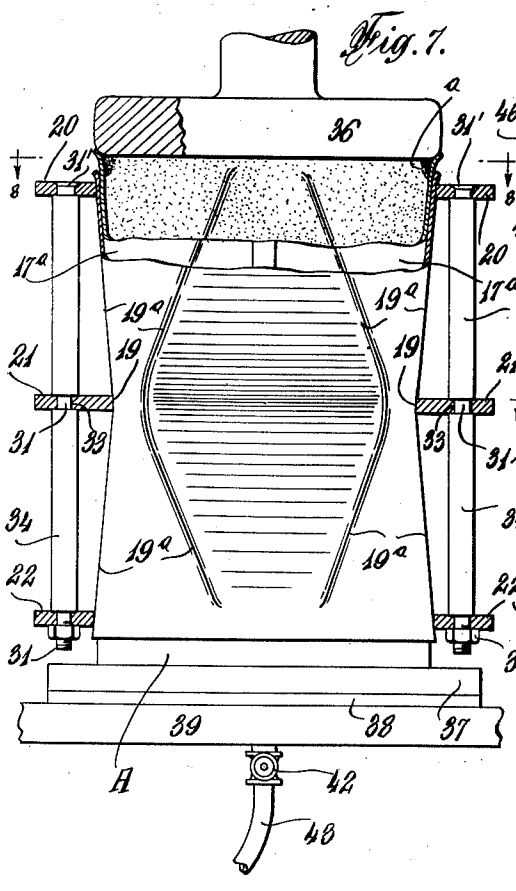
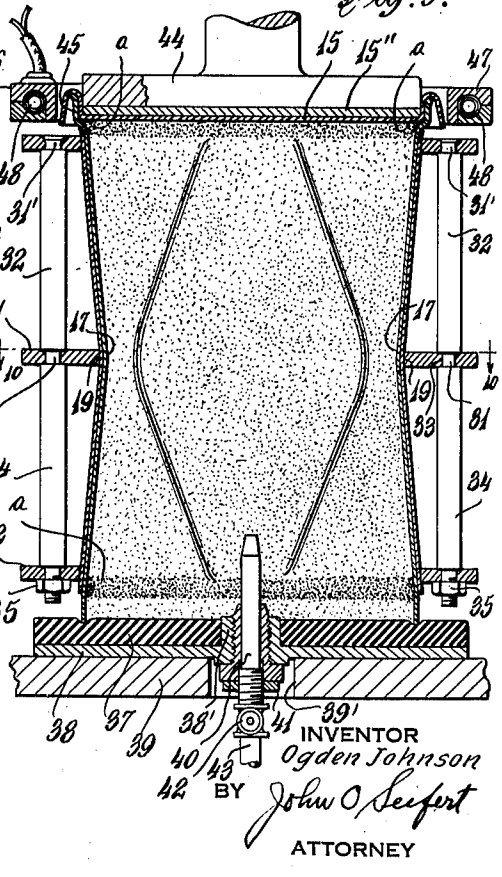


Fig. 9.



INVENTOR
Ogden Johnson
BY John O. Seefert
ATTORNEY

Aug. 18, 1942. O. JOHNSON 2,293,142

CONTAINER AND METHOD OF MAKING CONTAINERS

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Fig. 11.

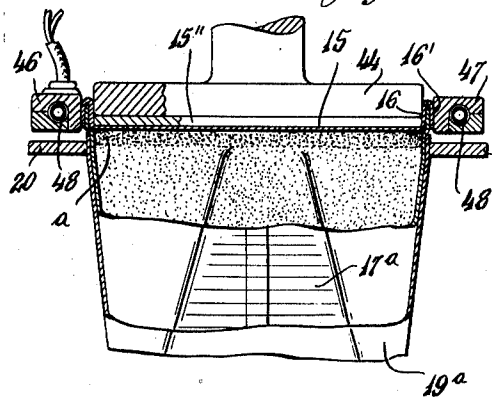


Fig. 12.

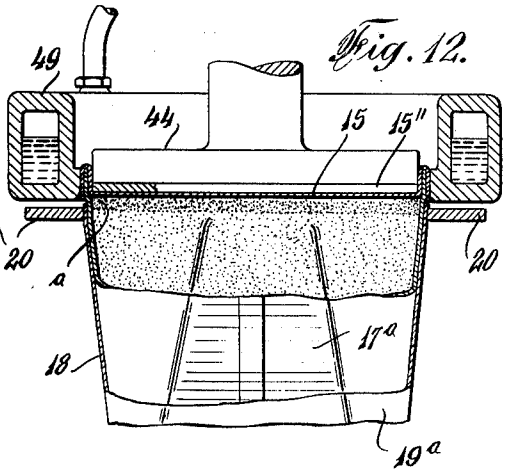


Fig. 13.

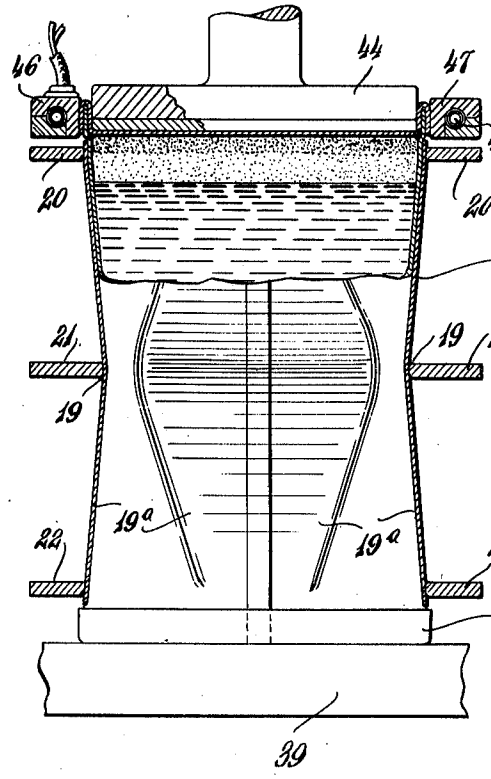
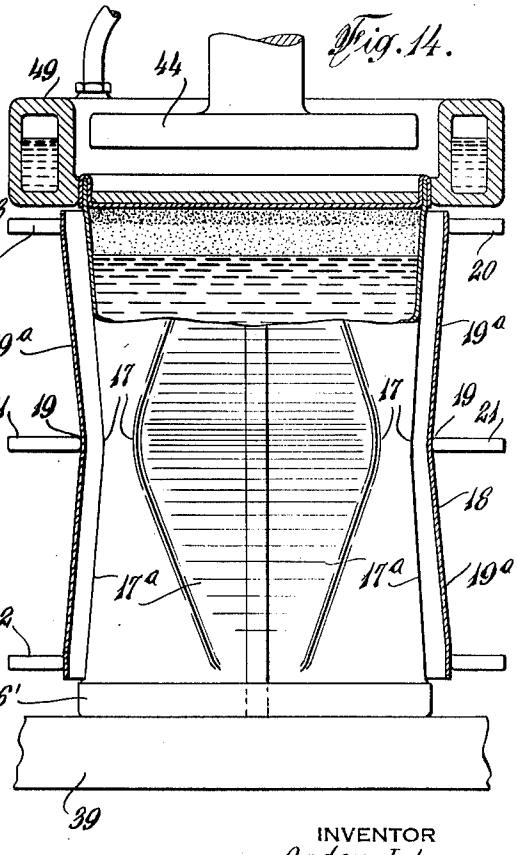


Fig. 14.



INVENTOR
Ogden Johnson
BY John O Seifert
ATTORNEY

Patented Aug. 18, 1942 2,293,142

UNITED STATES PATENT OFFICE

2,293,142

CONTAINER AND METHOD OF MAKING CONTAINERS

Ogden Johnson, Bronxville, N. Y.

Application August 3, 1940, Serial No. 350,952

14 Claims. (Cl. 93—39.1)

This invention relates to containers and to a method of making containers, and more particularly to containers of fibrous material, such as paper, and the manufacture of the same.

It is the primary object of the invention to provide a new and improved container and the method of making the same. It is a further object of the invention to provide a new and improved oil and grease proof and/or moisture proof paper container and method of making the same.

Paper containers of this character include a tubular body of uniform cross section and closure disks or heads of fibrous material are adhesively secured in the ends of the body, or secured in the body by a seam interlocking the end of the body with the peripheral portion of the closure disk or head. The contents of the container constantly exert an outward force on the wall of the container body which tends to separate the body from the closures or heads of the container, and such outward force is also exerted on the container wall by any expansion of the contents of the container with a consequent leakage of the contents from the container.

It is a further object of the invention to provide an improved container wherein the container body is of tubular form and opopsite portions of the container body intermediate the ends are collapsed inwardly to reduce the volumetric capacity of the container and serve to reinforce and add rigidity to the container body as well as take up any pressures of the contents of the container on the body of the container which exert a force on the container body tending to separate the seam parts between the body and the closure ends of the container, said collapsed portions also being adapted to be expanded by expansion of the contents of the container to increase the volumetric capacity of the container and compensate for expansion of the contents of the container, and the collapsed portions automatically assuming their original collapsed condition upon the contraction of the contents of the container.

In containers of this character should the container be subjected to a jar, as by dropping the container, the impact of the container with the surface upon which it is dropped will cause separation of the connecting seam between the end closures and body of the container with a consequent leakage should the contents of the container consist of liquid.

It is another object of the invention to provide an improved closure for container bodies and an improved method of and means for securing closures to container bodies.

To adapt paper containers for dispensing oils and greases and to also render the same moisture proof, the inner surface of the material of the paper body is provided with a coating of thermoplastic material, such as a vinyl resin, having the properties of being oil, grease and moisture proof and to also constitute a thermoplastic adhesive to unite the container parts. A surface of the material of the end closures is also provided with a coating of such thermoplastic material preparatory to shaping the same to closure form and the closures are adhesively secured to the container body by thermoplastic material under heat and pressure, a coating of suitable moisture and water proof material being applied to the exterior surface of the container. In securing the end closures to the container body by the thermoplastic material under pressure and heat to intimately contact the closure parts and render the thermoplastic material viscous to adhesively unite the closure parts it is possible that portions of the closure parts may not be in contiguous or intimate contact, or may not be heated to the proper temperature so that the thermoplastic material on said seam portions will not be rendered sufficiently viscous and tacky to cause the thermoplastic material to unite the closure parts to the container body in a firm and continuous bond with the result that the oil or grease or other liquid contents will permeate through the seam or joint.

It is another object of the invention to overcome this disadvantage by providing the seams between the container parts with a fillet or reinforcing seal, comprising an annular layer of thermoplastic material applied in semi-liquid form to the inner surface of the container body adjacent the ends thereof and cooling to a semi-solid or semi-plastic state at normal temperatures, and said material crowded into the interstices or crevices and forming a sealing fillet at the juncture of the closure with the container body as the closure is inserted in the end of the container body and adapted to be rendered viscous when the container parts are subjected to an elevated temperature to adhesively unite the closures to the container body and then solidifying or setting.

Other objects and advantages of the invention will hereinafter appear.

In the drawings accompanying and forming a part of this application,

Figure 1 is a longitudinal sectional view of a

cylindrical member constituting the body of my improved container and showing the inner surface provided with a coating of oil, grease and moisture proof thermoplastic material and an annular layer of such material within the ends of said member.

Figure 2 is a transverse section of a peripherally flanged disk constituting a part of the end closures for the container.

Figure 3 is an edge view of a reinforcing disk engaged within the flange of the disk shown in Figure 2 to constitute a part of the end closures of the container.

Figure 4 is a side elevation of my improved container partly broken away to show the method of securing the end closures in the container body.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a sectional view taken on the line 6—6 of Figure 8.

Figure 7 is a side elevational of the cylindrical member shown in Figure 1 engaged at an end with a support and means taken on the line 7—7 of Figure 8 to hold and preform the body to reinforce and add rigidity thereto preparatory to securing an end closure therein and forming a container, and the cylindrical member or body being partly in section and showing means engaged therein expanding the entrance to an end of the body.

Figure 8 is a sectional view taken on the line 8—8 of Figure 7 and showing the preforming holder for the body in partly separated condition in dot and dash lines.

Figure 9 is a sectional view showing the body preformed in the holder and engaged with a support closing one end of the body and showing a closure and a plunger engaged in the other end of the body preparatory to securing the closure therein and showing means for admitting fluid pressure into the body to increase the pressure therein higher than atmospheric pressure during the period of applying a closure to the body.

Figure 10 is a sectional view taken on the line 10—10 of Figure 9.

Figure 11 is a sectional view of the upper end portion of the parts shown in Figure 9 and showing means for pressing a depending portion of the one disk of the closure member to the end of the container body and applying pressure and heat to the closure parts to render the thermoplastic coating material thereon viscous and adhesively unite the closure parts.

Figure 12 is a sectional view of the upper end portion of the parts of the container in a holder with the closure inserting plunger engaging therein and means for applying pressure and subjecting the adhesively secured closure parts to cooling means therefor.

Figure 13 is a longitudinal section of the holder supporting a filled container on its support and showing the means of Figure 11 for inserting and securing a closure in the filler end of a container; and

Figure 14 is a view similar to Figure 13 but showing cooling means disposed relative to the adhesively secured closure parts.

In carrying out the embodiment of the invention illustrated in the drawings, there is provided a member A of pliable though somewhat stiff fibrous material, such as paper, to constitute the body of the container, and formed from a blank severed from a sheet or web and shaped to cylindrical form with one side marginal portion of the blank overlapping the opposite side marginal portion and adhesively secured thereto. The interior surface of the body is provided with a coating of thermoplastic material having a high fusing point and the properties of being resistant to oil and grease, including hydrocarbon and mineral oils and greases, and moisture resistant. I have found that vinyl resins are efficient for the purpose. Preferably the thermoplastic material is applied to the sheet or web from which the blanks are cut and after the blank is shaped to cylindrical form a coating of a reinforcing thermoplastic material is applied over the raw edge of the blank within the body. The coating material also constitutes a thermoplastic adhesive and serves to adhesively unite the overlapped portions of the blank, said overlapped portions being united under pressure and heat to intimately contact said parts and render the thermoplastic material viscous and tacky, the thermoplastic material when cooled solidifying and uniting the overlapped portions of the blank in an impregnable bond. The inner surface of the body A is also provided with an annular layer of a reinforcing thermoplastic material adjacent each end thereof, as shown in heavy stippling at *a*, said material being normally in a semi-solid or semi-plastic state and of a thickness several times the thickness of the coating on the container and adapted to function as a sealing fillet at the interstices or crevices at the juncture of the closures or heads with the body, as hereinafter described.

Closures or heads are secured in the opposite ends of the body, comprising disks **15** of pliable fibrous material, such as paper, having on a surface thereof, as **15'**, a coating of thermoplastic material similar to the coating material on the inner surface of the cylindrical member, the disks **15** being severed from a sheet or web to the surface of which the coating of thermoplastic material has been applied. The disks **15** are arranged with a reversely bent peripheral flange, the flange including a portion **16** extended laterally from the surface opposite the coated surface of the disk and an outwardly curved depending portion **16'**, the depending portion being of slightly greater length than the portion **16**, as shown in Figure 2. A disk **15''** (Figure 3) of relatively rigid material, preferably fibrous material, is assembled upon the disk **15** within the laterally extending portion **16** of the flange and preferably adhesively united to the disk **15**.

One end closure to constitute the bottom of the container may be secured in one end of the body in such condition, and the body then preformed to final container body form. In the present embodiment of the invention the container body is preformed to body shape preparatory to securing the closures or heads therein and is effected by inwardly depressing or collapsing portions of the body preferably located diametrically opposite and intermediate the ends, as at **17**, which collapsed portions may, as shown, form the container body midway the ends thereof to angular form in cross section and the corners **17'** are arranged to extend diagonally of the angle portions, as shown in Figure 5, and said depressed wall portions being substantially of concave form in longitudinal section with the opposite side portions inclining and progressively decreasing in width from the angle portion **17** toward and terminating within the opposite ends of the body, as at **17a**, the portions of

the body extending from the corner portions 17' toward the opposite ends of the body bulging outwardly and assuming a progressively decreasing convex form, as shown at 17b in Figure 6. By this arrangement of the body there is exerted a yielding inward stress thereon which not only reinforces and adds rigidity to the body but takes up pressures exerted outwardly on the body wall by the contents of the container, thus adapting the body to be expanded to compensate for any expansion of the contents of the container and when the contents contract assuming its preformed shape by the inherent resiliency of the material of the body and a reduction of pressure in the container induced by the contracting of the contents of the container.

As stated, the bottom closure may be secured in an end of the body prior to preforming the body to final shape, but in carrying out the embodiment of the invention shown the body is held in its collapsed condition during the inserting and securing of a bottom closure in an end of the body and during the period the contents is filled into the container and the closure for the filler opening of the container is inserted into and secured in the opposite end of the body. For this purpose there is provided a holder for the body comprising a sleeve of less length than the body including laterally separable sections 18, shown in Figure 8 as two in number, although a greater number may be utilized. The sleeve sections are shaped in longitudinal section to conform to the inwardly pressed or callapsed form to which the body is to be shaped. The portion 19 midway the ends of the sleeve sections in closed condition of the sleeve sections are of angular shape relative to which the angular portion 17 of the body A is disposed, and the corners of the rectangular portion extend diagonally, as at 19', relative to which the portions 17' of the body are disposed. The depressed portions 19a incline and are of progressively decreasing width from the angular portion to within the opposite ends of the sleeve relative to which the portions 17a of the container body are disposed and which are shaped to conform to said portions 19a of the sleeve. The portions relative to the corners of the angular portion are of progressively decreasing convex form and terminate within the opposite ends of the sleeve, as at 19b, and relative to which the portions 17b of the body are disposed to be shaped to conform thereto.

The sleeve sections 18 are carried by a cage comprising pairs of members of segmental ring form 20, 21 and 22. The ring segments extend through an arc of slightly less than 180 degrees and each pair of ring segments is pivotally united at one end by a link 23 (Figures 8 and 10) secured by a pair of rivets at one end to one ring segment, as at 24, and pivotally connected at the opposite end, as at 25, to the other ring segment. To releasably secure the pairs of ring segments in ring form a latch 26 is pivotally connected at one end to one ring segment, as at 27, and adapted to be releasably engaged with a pin 28 fixed in and projecting from the other ring segment, the latch being shown in full lines in Figures 8 and 10 in engagement with the pin 28 and out of engagement with said pin in dot and dash lines in Figure 8. The inner edge of the ring segments 20 and 22 is provided midway the ends and at said ends with portions 29 eccentric to intermediate portions 29' and which are in arcs of a circle having the same radius, and said eccentric portions 29 in the closed condition of the pairs of ring segments 20 and 22 being disposed diametrically opposite to each other, as shown in Figure 8, and conform in shape to the portions 19a of the sections of the holding sleeve for the container body. The inner edge of the ring segments 21 are arranged to provide an opening within the ring segments in the closed condition thereof substantially of angular form, as at 30, conforming to the angular portion 19 of the sleeve sections, and the corners of said opening are arranged to extend diagonally of the angular wall portions, as at 30', adapted for engagement of the corner portions 19' of the sleeve sections. The sleeve sections are suitably connected, as by sweating or welding, to the ring segments 20 and 22. The ring segments are connected in spaced relation by pairs of rods 31, one end of each pair of rods being engaged in openings in the ring segments 20 and peened over, as shown at 31' in Figures 7 and 8. The rods extend through spacing sleeves 32 between the ring segments 20 and 21, thence through openings 33 (Figure 10) in the ring segments 21, thence through spacing sleeves 34 between the ring segments 21 and 22, and the ends extended through openings in the ring segments 22 and said latter ends screw threaded and having nuts threaded thereon on the outer side of the ring segments 22, as at 35, to retain the sleeve carrying ring segments in assembled relation.

To shape the container body A to final form, as shown in Figure 4, to conform in longitudinal section to the sleeve sections 18, the ring segments carrying the sleeve sections are swung on the pivotal connections 25 to open position when the container body A is engaged between the same. The cage sections are then actuated to move the sleeve sections to closed position and simultaneously therewith the body is shaped to conform to the sleeve sections, as shown in Figures 7 and 9, and in which condition a closure to constitute the bottom of the container is secured in one end of the body.

The reinforcing and stiffening disk 15'' and the thickness of the portion 16 of the flange of the disk 15 disposed about the periphery of the disk 15'' is of a diameter slightly larger than the internal diameter of the cylindrical portion at the end of the container body preformed in the holder sections 18. To facilitate engaging the composite disk 15, 15'' in the end of the body, the end of the body preparatory to inserting the closures or heads therein is slightly expanded or stretched, which may be effected by engaging a head 36 of a plunger into the end of the body, as shown in Figure 7, the peripheral wall at the end of the plunger head being slightly tapered relative to the remainder of the plunger head.

To insert and secure a closure or head in the end of the body to constitute the bottom of the container, an open end of a container body carried in the preforming sleeve sections 18 is engaged in an annular groove in the face of an annular mat 37 of yielding material mounted on a disk of rigid material 38 having a tubular boss 38' axially thereof engaging in the axial opening in the mat, and said disk with the mat is engaged on a support 39 having an opening 39' therein in line with the disk boss. A nozzle 40 is mounted in and extends through a nipple 41 screw threaded into the disk boss 38' and whereby the nozzle is mounted in the disk boss to open to the container body engaged on the mat 37. The nozzle has a valve controlled connection 42 with a conduit 43 leading from a source of fluid, such

as air, under pressure. The support **39** is provided with means to engage the sleeve carrying cage to permit the end of the body to be firmly engaged with the mat but preventing such movement of the body with the sleeve carrying cage as would crush the end of the body. The sleeve carrying cage is positioned on the support relative to gauge means to aline a body carried by the sleeve relative to the reciprocatory movements of a plunger head **44**. In applying a closure or head to the end of the body the composite disk or closure **15, 15''** is engaged upon the plunger head **44** and the closure inserted by the plunger in the expanded end of the container body, and as the portion **16** of the closure flange is of slightly larger diameter than the internal diameter of the body the end of the body is slightly expanded and a shoulder or seat is formed at the juncture of the expanded end portion with the body against which the closure is seated, as shown at **45**, and the outwardly depending portion **16'** of the flange of the disk **15** is disposed over and crowds the end of the container body in the outwardly curved portion of the flange. The closure on the plunger head and while it is engaged in the end of the body is adhesively secured therein by the thermoplastic material on the surface of the disk **15**, the depending portion **16'** of the flange being pressed to the end of the container body and subjected to pressure and an elevated temperature by suitable means to intimately contact the portions of the flange with the interposed end of the container body and render the coating of thermoplastic material viscous and tacky and cause it to penetrate the material of the body and adhesively unite the parts. While any suitable means may be used for this purpose it is shown as comprising semi-circular ring segments **46, 47** movable away from each other and the plunger head **44** engaged within the disk flange in the body, as shown in Figure 9, and movable toward each other and the plunger head, as shown in Figure 11. The ring segments **46, 47** comprise laterally separable sections having opposed grooves in the mating faces thereof in which an electric heating element **48** for the ring segments is engaged in electrical insulated relation thereto.

After the contacting parts of the closure and body have been subjected to pressure and heat the container is removed from the ring segments **46, 47**, the cooled thermoplastic material uniting the closure to the body and forming an impregnable bond between the same. To facilitate cooling, an annular head **49** having a chamber therein adapted for connection with a source of and for circulating a cooling medium, such as water, therethrough is disposed about and brought into engagement with the depending portion **16'** of the flange of the disk **15**, as shown in Figure 12.

As the closure is inserted in the end of the body it crowds the layer *a* of thermoplastic material forwardly thereof in the form of a fillet at the interstice or crevice between the closure and body. Also as the plunger engages the closure in the end of the body and during the period the plunger head is engaged in the closure in the body and the closure is adhesively secured to the body the valve **42** is actuated to admit air under pressure into the body to increase the pressure therein higher than atmospheric pressure, and said pressure exerting a force on the layer of material *a* to crowd it into the crevice at the joint between the closure and body and as the closure parts and body are subjected to an elevated temperature is rendered viscous, the material when it cools hardening and setting as a solid fillet in said crevice.

Should it be desired to store the container, or transport the container from the place at which it is made to means to fill the container remote from the place where the container is made, the plunger head **44** is withdrawn from the closure during the period the cooling means **49** is disposed relative thereto, and the cage members **20, 21, 22** carrying the sleeve sections **18** are actuated to move the sleeve sections outwardly away from the container body preparatory to removing the container from its holding and preforming sleeve.

Should the contents to be dispensed in the container be filled therein in successive sequence to securing the bottom closure in the body the container is retained in the preforming sleeve therefor and the contents filled therein. In any case the container when it is filled is engaged in and supported by the sleeve sections **18** preparatory to securing a head or closure in the filler end of the container. The quantity of the material to be dispensed in the container is somewhat less than the capacity of the container to provide an air space above the material in the container, as shown in an exaggerated manner in Figures 13 and 14. The head or closure for the filler end is the same as the bottom end or closure and is engaged upon the plunger head **44** and inserted by the plunger head into the end of the body, the entrance to the end of the body being first slightly expanded or stretched, as by the plunger **36**, to facilitate the entrance of the plunger **44** with the closure thereon into the body, the plunger head with the closure thereon slightly expanding or stretching the end portion of the body and thereby forming an annular seat and engaging the closure on said seat. Simultaneously with inserting the plunger head with the closure thereon into the body the layer of thermoplastic material *a* is crowded forwardly of and into the crevice at the juncture of the closure with the body. By providing the air space above the contents of the container as the plunger head with the closure thereon is engaged in the body there is a partial compression of such air which causes the layer of material *a* to crowd into the crevice at the juncture of the closure with the body and form a sealing fillet therein preventing the contents of the body, such as oil or grease, to permeate to the thermoplastic material adhesively uniting the closure body to the container. After the closure has been inserted into the body the disk flange with the interposed end of the body is subjected to pressure and an elevated temperature by the ring sections **46, 47** and the heating means carried thereby to intimately contact said parts and render the coating of thermoplastic material on the disk flange viscous and cause it to penetrate the material of the body, after which it is subjected to the cooling action of the means **49**.

By the arrangement of juxtaposing the rigid disk **15''** within the flange **16** of the disk **15** and making the disk of a diameter substantially the same as the internal diameter of the container body at the ends thereof and the flange portion **16** of larger diameter, the rigid disk serves not only to clamp the flange portion **16** to the wall of the container body, but also reinforces and adds rigidity to the closure ends of the container and absorbs the shock of any jar to which the ends of the body are subjected, as by dropping

the container, and prevents the separation of the seam parts between the closures and body and consequent leakage of the contents from the container. The inwardly depressed or collapsed portions 17a of the container body retain such position in the filled condition of the container and are yieldingly urged to such position by the inherent resiliency of the material of the body and a reduction of pressure in the container induced by the contracting of the contents of the container and resist outward movement thereof by pressure exerted thereon by the weight of the contents of the container. However, should there be any extraordinary outward pressures exerted thereon by the contents of the container, as by the force of the expansion of the contents of the container, the inwardly collapsed portions of the container body will yield under such force and compensate for any increase in the contents of the container due to the expansion thereof, thus preventing such pressures from separating the seam between the body and closures, and when the contents of the container are contracted the collapsed portions of the container will automatically assume their original inwardly collapsed position.

The exterior of the container is provided with a coating of moisture and water resistant material, such as paraffine, or said coating may consist of a vinyl resin, the same as on the inner surface of the container, having the properties of being oil and grease or moisture resistant. Said coating material may be applied to the surface of the sheets or webs from which the body blanks and ends are cut, but it is preferably applied thereto after the container has been manufactured and filled with the head or closure secured in the filler end of the container and may be applied by submerging the container in a bath of the coating material or the coating material sprayed onto the container, depending on the nature of the material filled in and to be dispensed in the container.

Having described my invention, I claim:

1. The method of making containers, which comprises providing a tubular body, inwardly collapsing and forming the collapsed portions of the wall of the body to concave form longitudinally of the body and intermediate the ends thereof by means engaging the outer side of the body and while holding the body in said condition engaging and securing a closure in an end thereof.

2. A method of making paper containers, which comprises providing a cylindrical body of pliable paper, reinforcing and adding rigidity to the body by inwardly collapsing and shaping the body intermediate the ends to angular shape in cross section with portions inclining and converging from said angular portions in a direction toward the opposite ends of the body, then while holding the container body in said condition engaging a disk of pliable material having a coating of thermoplastic material upon a surface thereof into the end of the body and engaging a reversely bent laterally extending peripheral flange thereof over the end of the body, subjecting the disk flange to pressure and heat to intimately contact the disk flange with the body and render the thermoplastic coating material viscous and tacky and cause said material to adhesively unite said parts, and then cooling the united closure parts.

3. The method of making containers, which comprises providing a tubular body and a disk of pliable fibrous material having a coating of adhesive material on the surface thereof and a reversely bent laterally extending peripheral flange, assembling a disk of relatively rigid material on the first disk disposed within the flange thereof, engaging the assembled disks in an end of the container body with the disk flange engaging over the end and opposite sides of the body, and then pressing the disk flange under heat and pressure to the opposite sides of the body at the end thereof, and secure the same to the body by the coating of adhesive material thereon.

4. The method of making containers, which comprises providing a tubular paper body and a disk of pliable paper having on a surface thereof a coating of adhesive material non-viscous at normal atmospheric temperature and a peripheral flange extending laterally from the uncoated surface of the disk and reversely bent with the coating of adhesive material on the surface within said reversibly bent portion of the flange, assembling a disk of rigid fibrous material upon and within the flange of said first disk, engaging the assembled disks in an end of the body with the flange of the first disk engaging over the end and at opposite sides of the body, subjecting the flange portions to heat and pressure to render the adhesive coating material viscous and tacky and cause it to penetrate the material of the body and unite the closure thereto, and then while holding the disk flange united to the body under pressure subjecting the same to the action of a cooling medium.

5. The method of making paper containers, which comprises providing a cylindrical body and a disk of pliable material having a coating of thermoplastic material upon a surface thereof, flanging the peripheral portion of the disk laterally from the coated surface and reversely bending said flange, assembling a relatively rigid disk upon and within the flange of the first disk, inwardly collapsing and shaping the intermediate portion of the body substantially to angular form in cross section and while holding the body in said condition engaging the assembled disks in the end of the body with the flange of the first disk engaged over the end of the body, pressing the disk flange firmly to the end of the body to procure a close fit between the disk flange and body and subjecting the same to pressure and heat to intimately contact the disk flange with the body and maintain the close fit and render the coating material thereon viscous and tacky and to penetrate the material of the body and adhesively unite said parts, and then while holding the united container and closure parts under pressure subjecting them to the action of a cooling medium.

6. The method of making containers, which comprises providing a body having an annular layer of semi-plastic material disposed about the inner surface within the ends of the body, then while maintaining one end of the body closed admitting fluid under a pressure higher than atmospheric pressure into the body, engaging a closure disk in the opposite end of the body, said closure disk as it is engaged in the end of the body crowding the layer of semi-plastic material on the body forwardly thereof and the pressure in the body urging said material into the crevice at the juncture of the closure disk with the body to seal the same, and securing the closure disk in the body while maintaining it under pressure.

7. A method of making paper containers, which comprises providing a tubular body and a disk

of pliable paper having a coating of thermoplastic material on a surface thereof and a reversely bent peripheral flange extending laterally from the coated surface, applying to the inner surface within the end of the body an annular layer of thermoplastic material normally semi-plastic at atmospheric temperature and said material and the disk coating adapted to be rendered viscous and tacky when subjected to an elevated temperature, admitting fluid pressure into the body higher than atmospheric pressure, engaging the disk into the end of the body and the reversely bent disk flange over the end of the body and the disk as it is engaged in the body crowding the layer of material on the body forwardly of the disk and the pressure in the body urging said material into the crevice at the juncture of the disk with the body, then subjecting the disk flange to pressure and heat to intimately contact the disk flange with the body and render said layer of semi-plastic material and the coating material on the disk flange viscous and tacky and unite the parts and causing the layer of material to form as a sealing fillet at the juncture of the disk with the body.

8. The method of making containers, which comprises providing a cylindrical body of pliable paper and a disk of pliable paper having a coating of thermoplastic material on the inner surface and a peripheral flange having a portion extending laterally from the coated surface and an outwardly curved depending portion and a disk of relatively rigid material assembled in the laterally extending portion of the disk flange, said second disk and the flange of the first disk being of a diameter greater than the diameter of the body, then while holding the body at the outer surface within the opposite ends expanding the end portion of the body, engaging the assembled disks by a plunger within the expanded end of the body and simultaneously forming the body with a seat and seating the disks thereof and positioning the outwardly curved and depending portion of the flange over the end of the body, and then pressing the depending portion of the disk flange to the end of the body and clamping the same to the plunger under pressure and heat to render the thermoplastic material on the disk flange tacky and adhesively unite the disk flange to the body, then while holding the closure parts under pressure cooling the same.

9. The method of making containers, which comprises providing a cylindrical body of pliable paper and a composite closure including a disk of pliable paper having a coating of thermoplastic material on a surface thereof and a peripheral flange having a portion extending laterally of the coated surface and a disk of rigid material assembled within the flange of said first disk, collapsing the wall of the body inwardly and arranging the body intermediate the ends to angular form by means embracing the exterior of the body with the ends projecting from said means, inserting the composite closure engaged upon a plunger into the end of the body with the outwardly curved depending portion of the flange engaging over the end of the body, and while holding the closure upon the plunger within the body pressing the depending portion of the flange to the body and clamping the closure parts to the plunger head under pressure and heat to intimately contact said parts and render the thermoplastic material on the closure flange tacky and adhesively unite the closure parts to the body.

10. The method of making multi-part paper containers, which comprises providing and engaging a cylindrical container body in a sleeve including laterally separable sections of less length than the container body and having portions midway the ends collapsed inwardly and shaped to angular form in cross section and the wall inclining outwardly and arranged of progressively decreasing width from said inwardly depressed portions toward the opposite ends and shaping the body to conform to the shape of the sleeve, inserting a closure disk having a coating of thermoplastic material on a surface thereof and a peripheral flange having a portion extended laterally from the coated surface and an outwardly curved depending portion engaged upon a plunger into the end of the body in the sleeve with the outwardly curved depending portion of the flange disposed over the end of the body, then while holding the closure in the body by the plunger pressing the depending flange portion to the body and clamping the closure flange engaging over the end of the body to the plunger under pressure and heat to intimately contact the closure parts and render the coating of thermoplastic material thereon tacky and adhesively unite the closure at the flange to the body.

11. The method of making multi-part paper containers, which comprises providing a sleeve including laterally separable sections of less length than the body of the container having portions midway the ends depressed inwardly adapted in the closed condition of the sleeve section to arrange the sleeve midway the ends of angular form in cross section with the wall portions of the sleeve inclining and arranged of progressively decreasing width from said depressed portion toward the ends of the sleeve, engaging within the sleeve sections with the ends projecting therefrom a cylindrical paper container body having an annular layer of thermoplastic material normally semi-plastic at atmospheric temperature on the inner surface within the ends of the body and shaping the body to conform to the shape of the sleeve in the closed condition of the sleeve sections, engaging an end of the body in the sleeve with and closing said end by a support, inserting in the end of the body upon the plunger a closure including a disk of pliable paper having a coating of thermoplastic material on a surface thereof and a peripheral flange having a portion extending laterally from the coated surface and an outwardly curved depending portion engaged over the end of the body and said closure as it is inserted into the body crowding the semi-plastic layer of material forwardly thereof, pressing the depending portion of the flange to the body and clamping said closure parts to the plunger under pressure and heat to intimately contact the closure parts and render the thermoplastic material on the closure parts tacky and adhesively unite the closure parts, then while holding the closure parts under pressure subjecting the same to the action of a cooling medium, and placing the container under a pressure higher than atmospheric pressure during the inserting and securing of the closure in the container body.

12. The method of making containers, which consists in providing a tubular body of edgewise stiff and laterally yielding material and a disk having a diameter slightly greater than the

diameter of the tubular body, inwardly collapsing and shaping portions circumferentially spaced about the wall of the body to concave form extending longitudinally of and terminating within the ends of the body, and then while holding the body in said collapsed condition engaging the disk in an end of the body and securing it therein.

13. The method of making containers, which consists in providing a cylindrical body and a closure including a disk having a reversely bent laterally extending peripheral flange of a diameter slightly greater than the diameter of the body and a disk of relatively rigid material assembled on the first disk within the flange thereof, expanding the end of the body to increase the diameter thereof, engaging the closure in the expanded end of the container body and simultaneously arranging the body with a shoulder and seating the closure thereon and engaging the disk flange over the end of the body, and then securing the closure flange to the body.

14. The method of making containers of fibrous material, consisting in providing a tubular body and a closure disk having a laterally extending and outwardly curved flange with a coating of thermoplastic adhesive on the inner surface thereof, applying to the inner surface of the body adjacent the ends thereof an annular layer of thermoplastic material normally semiplastic at atmospheric temperature, engaging the closure disk into the end of the body and the flange thereof over the end of the body and crowding the layer of material on the inner surface of the body forwardly of the closure disk, and then subjecting the flange of the closure disk to pressure and heat to intimately contact said flange with the body and render the thermoplastic material thereon and the layer of thermoplastic material on the body viscous and tacky uniting the closure flange to the body and causing the layer of material on the body to form as a sealing fillet at the juncture of the disk with the body.

OGDEN JOHNSON.