Nov. 22, 1966 J. J. ESTY 3,286,430

METHOD OF SEALING AND PACKAGING

Filed Feb. 11, 1963 3 Sheets-Sheet 1

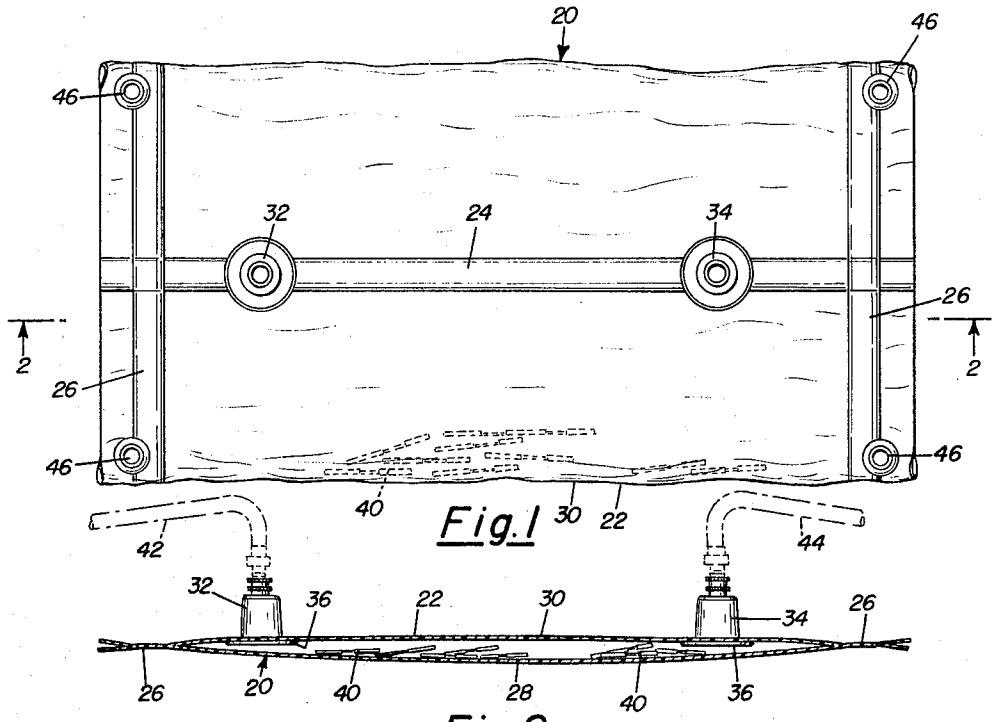


Fig. 1

Fig. 2

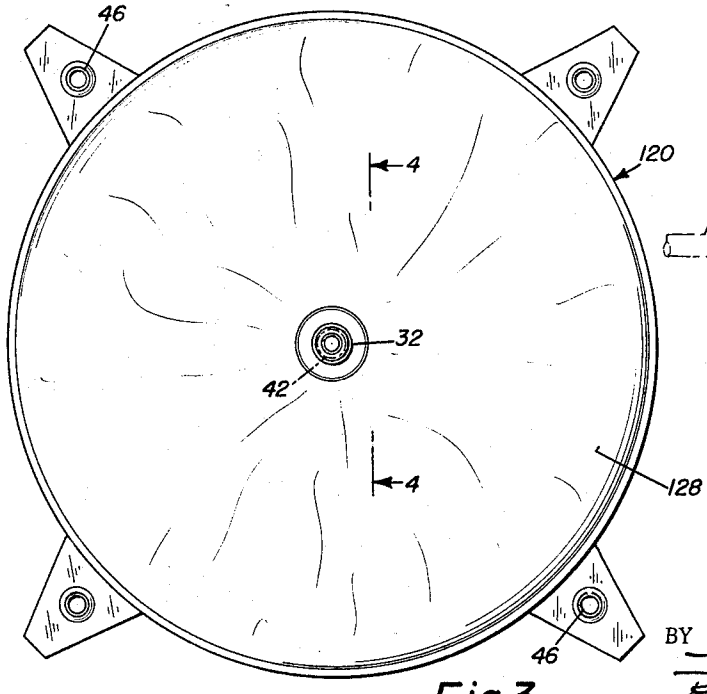


Fig. 3

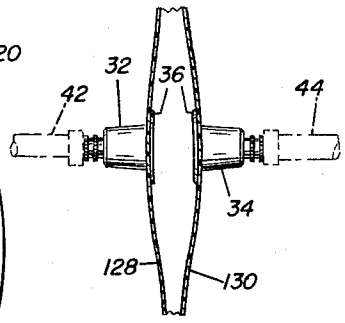


Fig. 4

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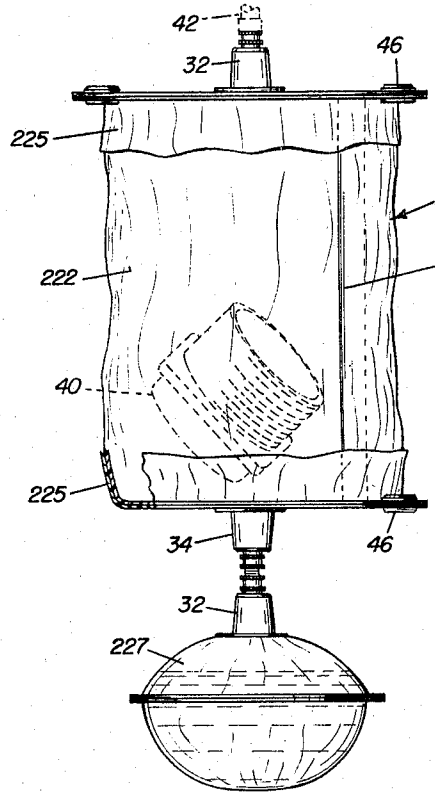


Fig. 5

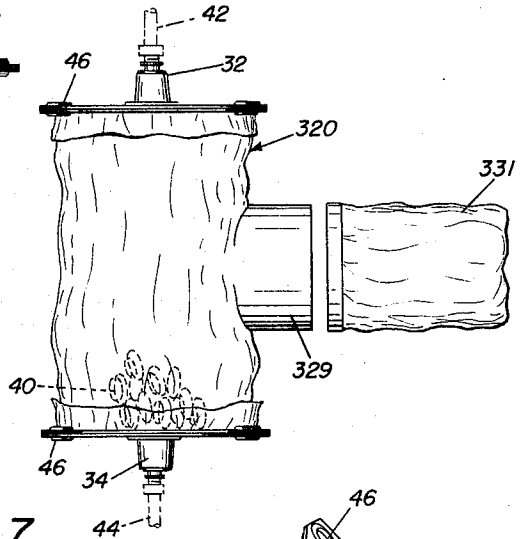


Fig. 7



Fig. 6

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METHOD OF SEALING AND PACKAGING

Filed Feb. 11, 1963 3 Sheets-Sheet 3

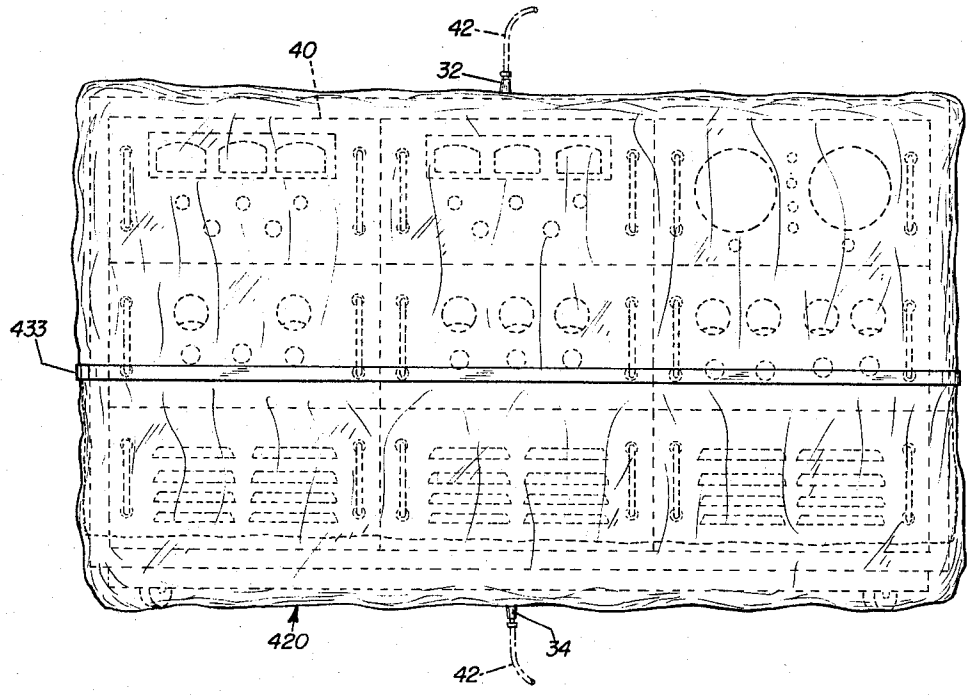


Fig. 8

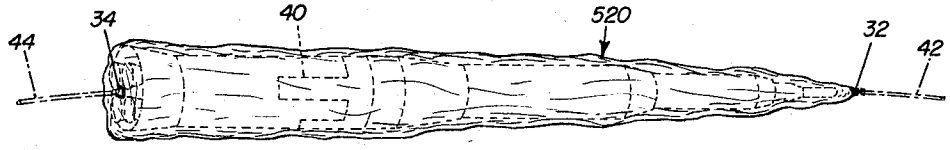


Fig. 9

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3,286,430

METHOD OF SEALING AND PACKAGING

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8 Claims. (Cl. 53—21)

The present invention relates to the process of treating material and packaging the same. The present invention is concerned with the removal of extraneous and undesirable matter from, for example, machined parts, and the packaging of the same without subjecting the parts to contaminating environment.

Heretofore it has been the practice to clean material parts in a room which has been subjected to conditioning, i.e. extraordinary attempts to remove extraneous matter such as dust, moisture etc. which conditioning is extremely costly. The packaging of the material also had to take place without recontaminating the material and usually such packaging took place in the same room where the cleaning was effected. Obviously an inlet and/or an outlet must be provided for the entering of the material into the room and the removal of the material from the room. Extreme care had to be taken for preventing the ingress of contaminating air through the inlet and outlet of the room. Extreme care had to be exercised in preventing ingress of contaminating air through doors through which the workmen had to pass.

In practicing the present invention, the material to be treated, for example, cleaning of machine parts, these parts are placed in an air impervious and flexible container, then a cleaning fluid, such as a filtered trichloroethylene or carbon tetrachloride is passed through the container, and then a drying agent such as nitrogen is passed through the container. Thereafter, the container is sealed, as for example, inlet and outlet valves are closed to prevent ingress of contaminating fluid. The container then forms the sealed shipping envelope for the material.

If desirable, the drying agent can be evacuated prior to closing of the valve or valves. Then after the sealing of the container, the container can be folded into a compact unit containing the sealed-therein material.

Further features and the advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the invention are illustrated.

In the drawing:

FIG. 1 is a top plan view of one form of container employed in the process;

FIG. 2 is a cross sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a top plan view of another form of container employed in the process;

FIG. 4 is a fragmentary section view taken along line 4—4 of FIG. 3;

FIG. 5 is a side view showing a cylindrically shaped container in which the process is carried out, and also showing a second container containing a treating fluid;

FIG. 6 is a perspective view of a container which is folded for shipment;

FIG. 7 is a side view of a container with an auxiliary shipping container attached thereto;

FIG. 8 is a side view of a container, in which a large instrument, such as a computer, is enclosed; and

FIG. 9 is a side view of a container in which a rocket is enclosed.

Referring more in detail to the drawings, the container 20 of FIGS. 1 and 2 is relatively flat. It comprises a sheet 22 of air impervious and flexible material, such as polyvinyl-chloride. The sheet is folded back upon itself and then the overlapping ends thereof are welded, such overlapping ends and weld being shown at 24. The sheets are also welded to one another adjacent opposite ends,

such welds being shown at 26, to thus form the envelope or container 20. The container includes a bottom section 28 and top section 30.

Inlet valve 32 and outlet valve 34 have their bases 36 welded to the upper section 30. These valves may be adjusted to open or closed position. Any desirable form of valve may be employed. Those herein shown are known as "Roberts Valves" 140–ACE or 140–ASE, manufactured by Holkey-Roberts Corporation, Spring Valley Avenue, Paramus, New Jersey and shown in its catalogue "CAT–578."

In carrying out the process, the material 40 to be treated, as for example to be cleaned, is placed in the container 20. Then the container is sealed by welding. Thereafter a cleaning fluid, such as carbon tetrachloride or trichloroethylene is caused to flow from an inlet tube 42, inlet valve 32, through the container 20, outlet valve 34, and then through the outlet tube 44. This flow is continued until the material 40 is thoroughly cleaned.

If desirable, the cleaning fluid can be retained in the container and shipped with the container. In which event both valves are closed prior to the evacuating of the cleaning fluid. The container with the encased material therein can be shipped relatively flat or may be folded for compactness.

It may, however, and in most instances be desirable to ship the material in a dry state. In this event, the cleaning material is evacuated, as for example, by shutting off the flow of cleaning fluid to the inlet tube 42 and then draining the container. Thereafter, a material drying agent is caused to flow through the container. After the encased material is thoroughly dry, the drying fluid is exhausted and then the inlet and outlet valves are closed. Again the container with the material encased therein can be shipped with the container flat or folded for compactness, as shown in FIG. 6.

The opposite ends of the containers may be provided with grommets 46 for holding them in desired position, as by rods (not shown) while the process is being performed. Too, in the preferred embodiment, a transparent material is employed.

The process is carried out in the same manner in the embodiment shown in FIGS. 3 and 4. However, in that embodiment, the valves 32 and 34 are connected to opposite sections 128 and 130 of the container 120. In that embodiment, the peripheries of the flexible polyethylene sections are welded to one another.

The same process is carried out in the embodiment shown in FIG. 5. In this latter embodiment, the flexible polyvinyl-chloride container 220 is cylindrical in form, the cylinder 222 being formed from a sheet having overlapping ends which are welded to one another, the overlap and weld being shown at 224. The opposite ends of the container are formed as cups 225 which are suitably welded to the cylindrical sheet 222. Here, the valves 32 and 34 are welded to the cups 225, respectively.

Under certain conditions, it may be desirable to subject the encased material to an environment, for example, just prior to its removal from the container. An although such subjection is applicable to all embodiments herein, it is illustrated only in FIG. 5. If such subjection is desirable, as for example, delaying the drying step or applying a second drying step to the material after it reaches desired designation and just prior to removal from the sealed container, a second container 227, filled with the drying agent is attached to one of the valves of the container, here shown at 220 and here shown as attached by a valve 32 to the valve 34.

Usually in this modified or additional step, the cleaning and/or drying fluid is evacuated at the station where the cleaning and/or drying took place. The valves 32 and 34 are then closed. Then the container 227 housing

the conditioning fluid, is attached to the container, which encases the material, through the valve **32** thereof, this said valve at that time being closed. The container **227** may be formed also of a flexible air impervious sheet material. Then just prior to removing the material from the container **220**, all valves are opened. The container **227** can then be collapsed to eject the conditioning fluid therefrom and into the container **220** to wash the material with a drying fluid.

In the embodiment shown in FIG. 7, the container **320** is similar to that shown at **220** in FIG. 5. The container **320** is provided with a hollow, air impervious extension **329** which may be flexible or rigid. An air impervious and flexible bag or container **331** is adapted to have its mouth end tightly fitted to the outer end of the hollow extension **329**. In this embodiment, after the treating of the material in the container **320** is performed, the material is shifted into the bag **331**. The mouth end of bag **331** is then sealed and removed for shipment. Or if desirable, treatment can be performed on several articles in the container **320**, simultaneously. It may be desirable to insure that the articles do not touch one another during shipment. In that event, he extension is also formed of air impervious and flexible material. Then after treatment or treatments of the articles in the container **320**, certain article or articles of material are shifted into the bag **331**, and instead of removing the bags, its mouth is welded to the outlet end of extension **329**. Other articles can be retained in container **320**.

It will be understood that in all embodiments thus far described, the container can be departmentalized after the treatment is effected by welding so that the materials can be held separated from one another throughout the shipping.

FIGS. 8 and 9 show the containers **420** and **520** for encasing large elements, such computers (FIG. 8) and rockets (FIG. 9). In these embodiments, when welding its impractical, the sheets formed of air impervious and flexible material, such as polyvinyl-chloride, are sealed with pressure sensitive tape wherever welding is impractical, such being shown in FIG. 8 by numeral **433**.

From the foregoing, it is apparent that there has been provided a simple and inexpensive process for treating materials and insuring that such materials are in no way contaminated from the time that they are treated to the time that they are to be applied as intended. The envelope or casing in which they are treated, originally, provides a tough shipping container.

Since the containers are formed of inexpensive material, they can be treated as scrap after the material is removed therefrom or, of course, can be reused. Also, it is to be understood that each container can be serviced with fluids separately or they may be connected in series.

While the forms of embodiment herein shown and described constitute preferred forms it is to be understood that other forms may be adopted falling within the scope of the claims that follow.

I claim:

1. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material with a cleaning fluid while the material is in the container;

(C) then exhausting at least part of the fluid from the container;

(D) and then sealing the container with the material therein.

2. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material by causing cleaning fluid to flow through the container;

(C) then exhausting at least part of the fluid from the container;

(D) and then sealing the container with the material therein.

3. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material with a cleaning fluid while the material is in the container;

(C) exhausting at least part of the fluid from the container;

(D) and then folding the container with the material confined in the container.

4. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material by causing a cleaning fluid to flow through the container;

(C) exhausing at least part of the fluid from the container;

(D) and then folding the container with the material confined in the container.

5. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material by causing a cleaning fluid to flow through the container through valve controlled inlets and outlets in the container;

(C) closing the inlet valve;

(D) exhausing at least part of the fluid from the container through the outlet valve;

(E) closing the outlet valve.

6. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) placing the material in an air impervious and flexible container;

(B) cleaning the material by causing a cleaning fluid to flow through the container through valve controlled inlets and outlets in the container;

(C) closing the inlet valve;

(D) exhausting at least part of the fluid from the container through the outlet valve;

(E) closing the outlet valve;

(F) and then folding the container with the material confined within the container.

7. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) Placing the material in an air impervious and flexible container;

(B) causing a material treating fluid to flow through the container through valve controlled inlets and outlets in the container;

(C) closing the inlet valve;

(D) exhausting at least a part of the fluid from the container;

(E) causing a drying fluid to be introduced to the valve controlled inlet;

(F) opening the inlet valve and causing the drying fluid to flow through the container through the valve controlled inlet and outlet in the container;

(G) closing the inlet valve;

(H) exhausting at least part of the drying fluid from the container through the outlet valve;

(I) closing the outlet valve.

8. Those steps in the process of treating materials and packaging the same, which steps consist in:

(A) Placing the material in an air impervious and flexible container;

(B) causing a material treating fluid to flow through the container through valve controlled inlets and outlets in the container;

(C) closing the inlet valve;

(D) exhausting at least a part of the fluid from the container;

(E) causing a drying fluid to be introduced to the valve controlled inlet;

(F) opening the inlet valve and causing the drying fluid to flow through the container through the valve controlled inlet and outlet in the container;

(G) closing the inlet valve;

(H) exhausting at least part of the drying fluid from the container through the outlet valve;

(I) closing the outlet valve;

(J) and then folding the container with the material confined within the container.

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