

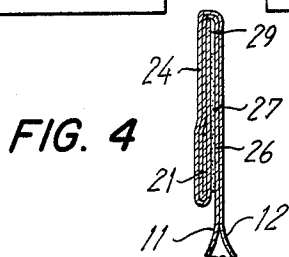
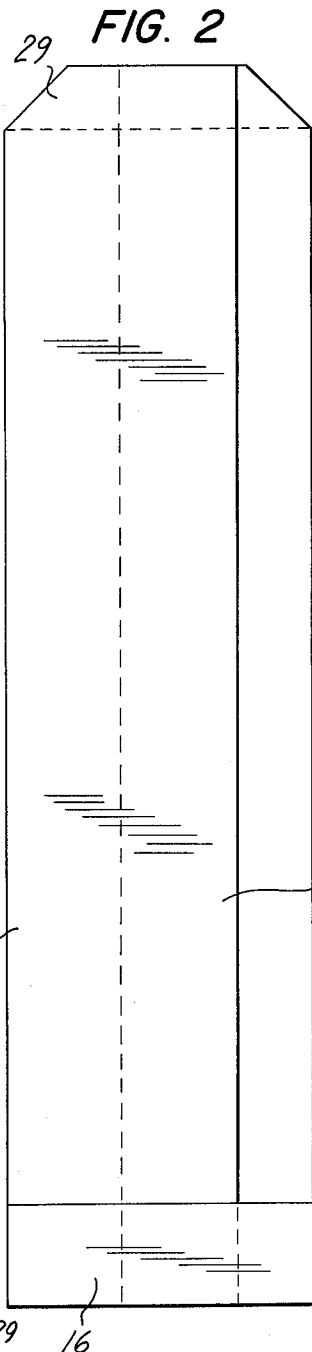
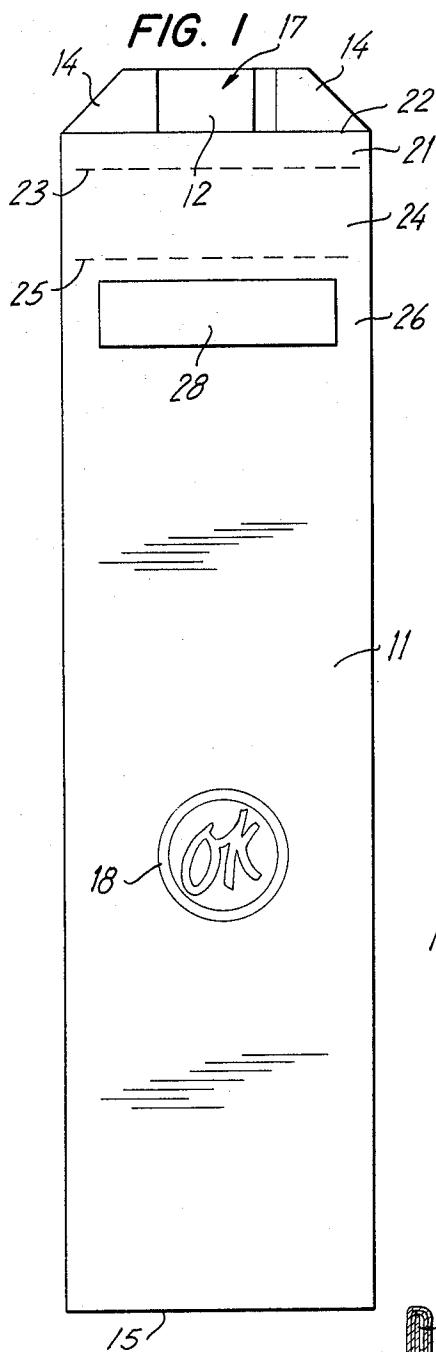
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STERILIZATION BAG CONSTRUCTION

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3,245,607

STERILIZATION BAG CONSTRUCTION

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4 Claims. (Cl. 229-62)

This invention relates generally to a sterilization bag construction and more particularly to an improved construction of a bag adapted for use in the sterilization of instruments, especially medical and surgical instruments.

Instruments of this general type are generally sterilized under pressure and at high temperatures in a steam autoclave. Prior to the development of the sterilization bag, great care was required in the handling of the instruments subsequent to sterilization so that the instruments would not become contaminated by handling and by bacteria in the atmosphere prior to use. The sterilization bag substantially simplified the sterilization technique and is in common use in hospitals, clinics, laboratories, and doctors' offices. Each instrument to be sterilized is inserted in an individual bag and the bag is sealed by being folded over and pinned or stapled. The bags containing the instruments are then placed in an autoclave and subjected to an autoclave cycle for a suitable period to insure complete sterilization. Sterilization of the instrument within the bag takes place due to the porosity of the bag material. It is also common to imprint the bag with a heat sensitive ink which changes color as a result of the temperature or temperature and pressure of the sterilizing cycle so that bags containing sterilized instruments can be readily identified and distinguished from those which have not yet gone through the sterilization cycle. After removal of the bags from the autoclave, the bags may be readily stored for subsequent use of the instruments. Once the bags have been sealed and the instruments sterilized, no special storage or handling is required and the instruments will remain sterile until used. While the bag paper must necessarily be porous to permit passage and circulation of the steam in the autoclave around the instrument being sterilized, the instruments will not be contaminated by bacteria in the air when the sterilized bags are stored for use due to the filtering action of the paper. In other words, any air that enters through the paper is filtered to prevent contamination of the instrument due to the bacterial filter action of the paper.

While the sterilization bag represents a substantial improvement over known prior sterilization techniques, the requirement that the bag be sealed by pinning or stapling has caused considerable inconvenience and improper sealing resulting in improper sterilization. Quite often, suitable pins, clips, or staples are not available and the nurse or operator preparing the instruments for sterilization loses considerable time in securing these items. While it has been suggested that the bags can be sealed by the provision of oppositely disposed adhesive portions which stick only to one another on mutual contact, such bag constructions have proven unsatisfactory because of the short shelf life of such adhesives and the ready contamination of such adhesive surfaces during handling of the bag and accompanying loss of adhesion.

Accordingly, a primary object of this invention is the provision of a sterilization bag having sealing means integral with the bag and so arranged to provide immediate and secure sealing of the bag after an instrument has been inserted, which sealing means has a substantially indefinite shelf life and which maintains the bag in the sealed condition throughout the high temperature and pressure steam autoclave sterilization cycle.

Another object of the invention is the provision of a bag which may be quickly and securely sealed so as to

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prevent the entry of air through the bag opening and which will remain sealed while subjected to the high temperature and pressure of a steam autoclave and thereafter until the seal is purposely broken.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

Generally speaking, in accordance with the invention, a pleated bag is provided constructed of a porous, filter-like material. The bag is open at one end and may be imprinted with a heat sensitive ink which changes color when the bag material is subjected to high temperature. The end of the bag proximate to the opening may be divided into three sections so that the first two sections may be folded over one another to overlie the third section. The third section is provided with a transfer adhesive covered by a strippable release paper which may be removed before the first two sections are folded on the third section whereby the side of the bag opposite to the side carrying the transfer adhesive in the area of the first section may be brought into contact with the adhesive section to thereby seal the bag against the entry of air through the bag opening throughout the sterilization cycle and until the seal is purposely broken.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawing, in which:

FIG. 1 is a front elevational view of a sterilization bag constructed in accordance with the invention;

FIG. 2 is a rear elevational view thereof;

FIG. 3 is a side elevational view thereof; and

FIG. 4 is a partial sectional view showing the upper portion of the bag in the folded, sealed position, at an enlarged scale.

Referring now to the drawing, the bag is basically formed as the usual type of paper bag with pleated sides to permit expansion for receiving bulky articles. The bag has a front panel 11, a rear panel 12 with an overlapping seam or joint 13 and pleated sides 14. The bottom edge 15 of the bag is permanently sealed through overlapping portion 16 and an opening 17 is provided at the top of the bag. The bag is fabricated of a porous paper material having a high wet strength and the overlapping portions are permanently secured by a suitable adhesive which is impervious to the high temperature and pressure environment of a steam autoclave.

Rear panel 12 is preferably longer than front panel 11 to facilitate opening of the bag for insertion of an instrument. The proportions of the bag are, of course, not critical, with the length, width and pleat expansion being selected for the size and shape of the instrument to be sterilized in the bag. By way of example, a long and narrow bag suitable for sterilization of a syringe, is shown.

A symbol 18 is preferably applied to front panel 11 and consists of a heat sensitive ink which will change color during the autoclave cycle to readily distinguish between bags which have been through the autoclave cycle and those which have not. The top portion of front panel 11 proximate to opening 17 is delineated into three general areas. Area 21 extends between the top edge 22 and a line 23 parallel to and spaced from the top edge. Area 24 is further from the bag opening and extends between line 23 and a line 25 parallel to and spaced from line 23. Area 26 is immediately below area 24 and is further from the bag opening. A transfer adhesive 27 on a release paper 28 is secured to front panel 11 within

area 26 with release paper 28 being outermost as best shown in FIG. 3. Release paper 28 is coated with a suitable material so that its adherence to transfer adhesive 27 is substantially less than the adhesion of the transfer adhesive to porous paper panel 11. The transfer adhesive is suitably selected to provide good adhering properties without deterioration at the high temperature and moisture conditions encountered in a steam autoclave as well as at room temperatures.

In use, an instrument to be sterilized is inserted in the bag through opening 17 with the instrument being inserted sufficiently far into the bag so as to be below area 26. Area 21 is thereafter forwardly folded along line 23 to overlie area 24. Release paper 28 is stripped from transfer adhesive 27 and, because of the relative adhesion of the release paper and the bag paper to the transfer adhesive, the transfer adhesive remains on the bag and is exposed. Thereafter, area 24 is folded forwardly along line 25 to bring the uppermost portion 29 of rear panel 12 into contact with the transfer adhesive. Pressure is applied to the folded portions to insure good contact and sealing. The folded or sealed condition of the bag is best shown in FIG. 4.

Subsequently, the sealed bag is placed in an autoclave which is operated for the full sterilization cycle. The porosity of the bag material permits the steam under pressure to pass through the bag and sterilize the contents thereof without affecting the seal of the bag effected through the folding of the panel areas and the high temperature transfer adhesive. When proper sterilization has taken place, symbol 18 changes color to thereby indicate that the contents of the bag have been sterilized. Once the bag has been removed from the autoclave, it may be stored on a shelf until the instrument in the bag is called for. No special precautions are required for storage of the sterilized instrument in the bag as the seal remains intact to prevent entry of air-borne bacteria through the bag opening. Bacteria cannot enter the bag through the porous bag as the paper fiber acts as a bacterial filter. To use the instrument, it is merely necessary to break the seal, such as by tearing and destroying the bag, thus delivering to the operator an instrument which is assured to be in a sterilized condition.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A porous, high wet strength bag for the sterilization of instruments in an autoclave comprising a front panel, a rear panel, pleated side panels, a sealed bottom and a top opening, a heat sensitive symbol applied to at least one of said front and rear panels and adapted for changing color when said bag is placed in a high temperature environment, means delineating first, second and third areas on said front panel, said first area extending downwardly along said front panel from the top edge thereof at said bag opening, said second area extending downwardly along said front panel from the terminus of said first area for a length substantially equal to the length of said first area measured along the longitudinal axis of said bag parallel to the side edges of said front and rear panels, said third area extending downwardly along said front panel from the terminus of said second area, a section of transfer adhesive secured to said front panel along said third area commencing slightly spaced from

the terminus of said second area for a length parallel to the longitudinal axis of said bag no greater than the length of said second area, the width of said transfer adhesive section being slightly less than the width of said front panel, and a sheet of release paper releasably secured to the exposed surface of said transfer adhesive whereby, when said sheet of release paper is removed and said first and second areas are folded forwardly on one another, the uppermost portion of said rear panel commencing at substantially the top edge thereof will be brought into contact with said exposed surface of said transfer adhesive to effect a substantially air-impervious seal unaffected by the high temperatures and pressures of a steam autoclave.

2. A porous, high wet strength bag for the sterilization of instruments in an autoclave comprising a front panel, a rear panel, pleated side panels, a sealed bottom and a top opening, said rear panel extending above said front panel at said top opening, a heat sensitive symbol applied to at least one of said front and rear panels, and adapted for changing color when said bag is placed in a high temperature environment, means delineating first, second and third areas on said front panel, said first area extending downwardly along said front panel from the top edge thereof at said bag opening, said second area extending downwardly along said front panel from the terminus of said first area for a length substantially equal to the length of said first area measured from the top edge of said rear panel along the longitudinal axis of said bag parallel to the side edges of said front and rear panels, said third area extending downwardly along said front panel from the terminus of said second area, a section of transfer adhesive secured to said front panel along said third area commencing slightly spaced from the terminus of said second area for a length parallel to the longitudinal axis of said bag no greater than the length of said second area, the width of said transfer adhesive section being slightly less than the width of said front panel, and a sheet of release paper releasably secured to the exposed surface of said transfer adhesive whereby, when said sheet of release paper is removed and said first and second areas are folded forwardly on one another, the uppermost portion of said rear panel commencing at substantially the top edge thereof will be brought into contact with said exposed surface of said transfer adhesive to effect a substantially air-impervious seal unaffected by the high temperatures and pressures of a steam autoclave.

3. A porous, high wet strength bag for the sterilization of instruments in an autoclave comprising a front panel, a rear panel, a sealed bottom and a top opening, a heat sensitive symbol applied to at least one of said front and rear panels and adapted for changing color when said bag is placed in a high temperature environment, means delineating first, second and third areas on said front panel, said first area extending downwardly along said front panel from the top edge thereof at said bag opening, said second area extending downwardly along said front panel from the terminus of said first area for a length substantially equal to the length of said first area measured along the longitudinal axis of said bag parallel to the side edges of said front and rear panels, said third area extending downwardly along said front panel from the terminus of said second area, a section of transfer adhesive secured to said front panel along said third area commencing slightly spaced from the terminus of said second area for a length parallel to the longitudinal axis of said bag no greater than the length of said second area, the width of said transfer adhesive section being slightly less than the width of said front panel, and a sheet of release paper releasably secured to the exposed surface of said transfer adhesive whereby, when said sheet of release paper is removed and said first and second areas are folded forwardly on one another, the uppermost portion of said rear panel commencing at substantially the top edge thereof will be brought into contact with said exposed

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surface of said transfer adhesive to effect a substantially air-impervious seal unaffected by the high temperatures and pressures of a steam autoclave.

4. A porous, high wet strength bag for the sterilization of instruments in an autoclave comprising a front panel, a rear panel, a sealed bottom and a top opening, said rear panel extending above said front panel at said top opening, a heat sensitive symbol applied to at least one of said front and rear panels, and adapted for changing color when said bag is placed in a high temperature environment, means delineating first, second and third areas on said front panel, said first area extending downwardly along said front panel from the top edge thereof at said bag opening, said second area extending downwardly along said front panel from the terminus of said first area for a length substantially equal to the length of said first area measured from the top edge of said rear panel along the longitudinal axis of said bag parallel to the side edges of said front and rear panels, said third area extending downwardly along said front panel from the terminus of said second area, a section of transfer adhesive secured to said front panel along said third area commencing slightly spaced from the terminus of said

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second area for a length parallel to the longitudinal axis of said bag no greater than the length of said second area, the width of said transfer adhesive section being slightly less than the width of said front panel, and a sheet of release paper releasably secured to the exposed surface of said transfer adhesive whereby, when said sheet of release paper is removed and said first and second areas are folded forwardly on one another, the uppermost portion of said rear panel commencing at substantially the top edge thereof will be brought into contact with said exposed surface of said transfer adhesive to effect a substantially air-impervious seal unaffected by the high temperatures and pressures of a steam autoclave.

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