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2,578,664

SANITARY NAPKIN

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Fig. 1.

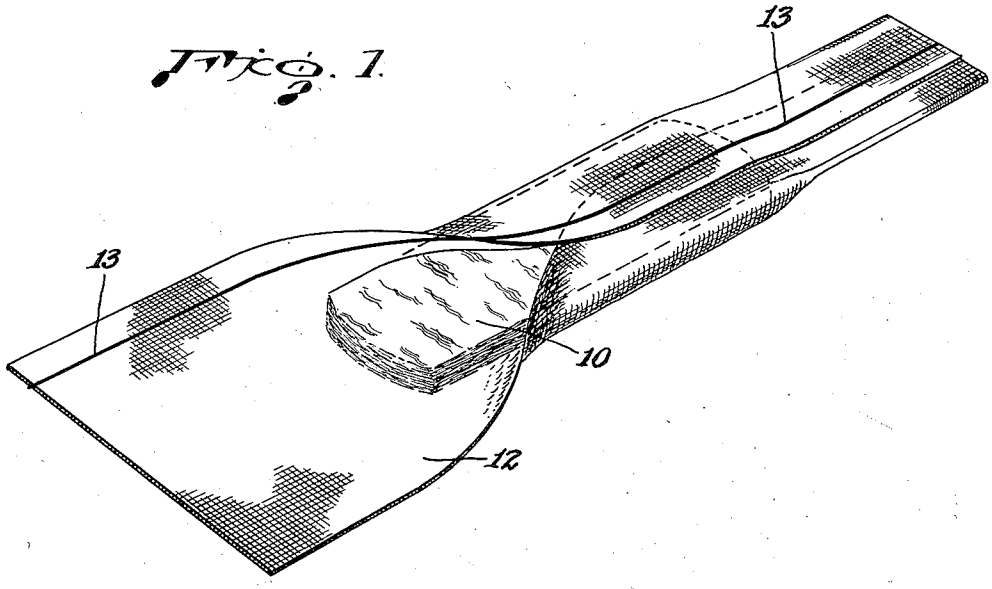
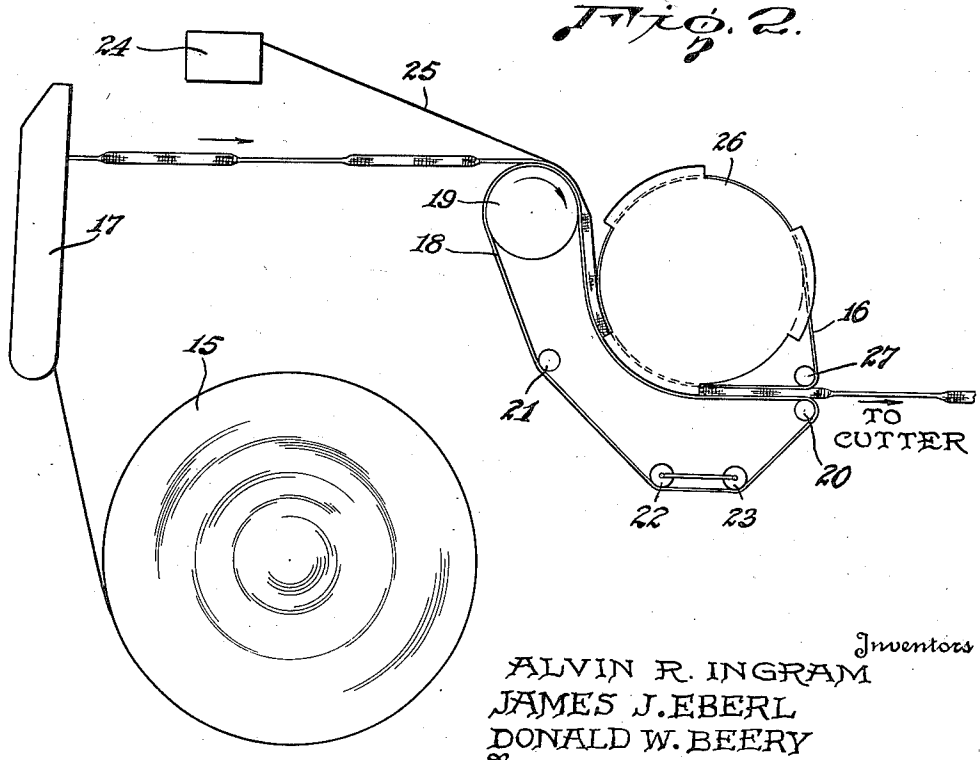


Fig. 2.



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SANITARY NAPKIN

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2 Claims. (Cl. 154—116)

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This invention relates to an improved sanitary napkin and to a method of producing the same. More particularly it relates to a sanitary napkin having a gauze wrapper that is sealed by a filament having adhesive properties.

Sanitary napkins ordinarily comprise a body of one or more layers of media having absorbent properties; the media are usually cellulosic in nature and may be cotton or paper and may also include one or more layers of material which has limited absorbency. In one type of sanitary napkin the layers of material having absorbent properties are wrapped or enveloped in a sheet of gauze. The gauze acts to hold together the various layers of the absorbent materials constituting the pad as well as to provide a means for attaching the pad to the garment. The gauze is usually simply folded over the pad and is ordinarily of such a width that there is a substantial overlap which serves to hold the gauze in place by means of friction at the overlap; such a substantial overlap has been found to be essential in an unsealed napkin. A napkin having a small overlap has the disadvantage that the gauze wrapper readily comes apart, for which reason it has been customary to use a gauze of sufficient width to provide a substantial overlap, which in some instances is as wide as the napkin itself. The expedient of having a substantial overlap as a means of sealing the gauze covering is inefficient because it requires the use of a large amount of gauze.

A general object of this invention is to provide a sanitary napkin in which the gauze wrapper surrounding the absorbent material will not separate and become detached from the absorbent material.

Another object of this invention is to provide a method for sealing the gauze wrapper of a sanitary napkin.

A further object of this invention is to provide a sanitary napkin having a minimum overlapping of the gauze wrapper.

Still another object of this invention is to provide a sanitary napkin having the gauze wrapper sealed at the lapped edges.

Another and further object of this invention is to provide a sanitary napkin having a gauze wrapper sealed at the lapped edges which is readily disposable.

A more specific object of this invention is the provision of a sanitary napkin in which the gauze wrapper is sealed at the lapped edges and in which the seal is inexpensive, flexible, non-irritating, and non-tacky at ordinary temperatures.

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Other objects of the invention will appear from the following description and accompanying drawing as well as from the appended claims.

It has now been discovered that a sanitary napkin, having a minimum overlapping of the gauze at the lapped edges, and which overcomes the difficulties of the prior art may be made by sealing the gauze wrapper of the sanitary napkin at the lapped edges by means of a thermoplastic filament that is tacky at elevated temperatures but substantially non-tacky at ordinary temperatures. As the filament is applied to the gauze wrapper at the lapped edges, it is heated at an elevated temperature so that by reason of its thermoplastic nature it is soft and tacky. Due to the open weave character of the gauze the adhesive filament penetrates both layers of gauze and after the filament has cooled, the two layers of gauze are firmly attached at the overlap.

A natural or synthetic fiber may be used as a base material in forming the filament and in this embodiment of the invention the fiber is impregnated with an adhesive composition that is tacky at elevated temperatures but substantially non-tacky at ordinary temperatures and in the preferred form of the invention a natural fiber such as cotton, wool, linen, and the like is used. A thermoplastic synthetic resinous filament composition having adhesive properties and which is tacky at elevated temperatures but substantially non-tacky at ordinary temperatures may also be used.

It is preferred that the filament be colored either by using a dyed filament or by adding a color to the adhesive composition. By having the filament colored, the side worn away from the body is readily identified.

In the practice of this invention, the components of the sanitary napkin having absorbent properties are assembled and a gauze wrapper is placed around the assembled components with the opposite edges of the wrapper overlapping slightly. A filament tacky at elevated temperatures but substantially non-tacky at ordinary temperatures or a cotton thread impregnated with an adhesive material which is tacky at elevated temperatures and substantially non-tacky at ordinary temperatures, and which preferably contains a dye, is then placed longitudinally in contact with the overlapping portion of the gauze in a linear path while the filament is at an elevated temperature. The adhesive penetrates through the two layers of gauze and upon cooling causes a sealing of the two layers of gauze at the overlap. In the preferred practice of the

invention the filament is placed on top of the first layer of gauze at the overlap and strikes through to the second layer of gauze and upon cooling the two layers of gauze are sealed together.

The adhesive filament should have the characteristics of tackiness at elevated temperatures and non-tackiness at ordinary temperatures, sufficient bonding strength to form a strong bond between the two layers of gauze at the lapped edges, low cost, stability at the elevated temperature at which it is heated when applied, low viscosity at the application temperature, sufficient tack at the application temperature when semi-molten to adhere to the gauze wrapping, ready solidification on cooling and good flexibility at room temperatures. An additional and important feature of the adhesive filament is that, when used to seal a gauze wrapper, the bond is strong enough to prevent the gauze wrapper from opening during ordinary use but is of such a strength that the wrapper may be readily opened, thus allowing the absorbent, comprising cellulosic material, pad to be readily disposed of.

The desired characteristics in the filament or composition adhesive are obtained by a composition comprising a mixture of a thermoplastic resin containing composition and diluent such as a wax that is substantially immiscible in said resin at ordinary temperatures. The proportion of diluent such as a wax used is so adjusted that the mixture is substantially homogeneous when molten, but heterogeneous when solid. It is not necessary however that the adhesive composition be in the form of a solution when at an elevated temperature; it may be a dispersion or a partial dispersion with some solution. When cooled to ordinary temperatures the wax bleeds out of the composition and forms a superficial wax coating on the surface of the resin, thereby masking any residual tackiness which the thermoplastic resin containing composition may have at normal temperatures.

Resins which have been found suitable for use in filaments and adhesive compositions include ethyl cellulose, cellulose acetate butyrate, polyvinyl acetate, vinyl acetate-chloride copolymer, polyvinyl butyral and zein. Paraffin wax and other waxes which are chemically inert, such as common vegetable wax, beeswax, and the like, have been found suitable for use as diluents in compounding the adhesive composition or filament.

The diluent such as a wax is an important component of the mixture because it exerts a viscosity reducing and diluting action on the resin containing composition when the mixture is molten. Since, however, the diluent wax is substantially incompatible with the resin containing composition at room temperatures, it separates out and migrates to the surface of the mixture, forming a superficial coating thereof, thus minimizing or masking any tacky properties that the resin containing composition may have at the temperature at which the sealed napkin is used. Another reason for having a diluent such as a wax in the filament or adhesive composition which is incompatible with the resinous material is that it gives a smooth feel and nonabrasive character to the cooled filament.

When the diluent used is a paraffin wax, it is desirable to employ a blending agent which is mutually compatible with the resin and the paraffin wax; hydrogenated methyl abietate is a suitable blending agent for this purpose and acts as a plasticizer and a tackifier. A stabilizer such as menthyl phenol may also be added to the resin composition to provide resistance to oxidation and degradation at elevated temperatures. Any type of dye or pigment which is compatible with the filament or adhesive mixture may be used to give color to the said mixture.

The following composition has been found to be particularly satisfactory:

Ethyl cellulose	parts	25
Hydrogenated methyl abietate	do	45
Paraffin wax	do	30
Menthyl phenol	do	3
Oil soluble dye		trace

This composition is particularly suited for use because it can be converted by heating into a fluid form which may be readily applied to a fibrous filament and which will cool quickly to form a flexible, non-tacky coating of the filament. A filament coated with the above composition can be placed on the gauze overlap of the napkin at the lapped edges while the adhesive composition is in a fluid form and the adhesive composition will then penetrate through the two layers of gauze wrapping at the lapped edges and upon cooling and solidification of the adhesive composition, effectively seal the gauze wrapping.

In the accompanying drawing there is disclosed one form of apparatus designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features in the drawing since various changes may be made within the scope of the claims which follow.

In the drawing:

Fig. 1 is a perspective view of a sanitary napkin according to one embodiment of the invention, showing the napkin open at one end.

Fig. 2 is a flow sheet showing the apparatus and processes used for constructing the napkin.

Referring particularly to Fig. 1, the napkin comprises an elongated pad 10 having rounded ends and composed of flexible absorbent cellulosic material, wrapped in a sheet of gauze 12, the gauze being substantially longer than the pad and overlapping the pad to a small amount. Filament 13, comprising a cotton thread impregnated with an adhesive composition and in the preferred form containing a dye, is spaced in approximately the middle of the overlap formed by the gauze wrapping. It is preferred that the absorbent material have one surface composed of an absorbent material having relatively less absorbency than the other surface.

In Fig. 2, gauze from gauze roll 15 is passed into a unit 17 in which cellulosic pads are combined with the gauze in such a way that the gauze is wrapped around the pads and that the pads are spaced at regular intervals in the gauze wrapping. The method for combining the cellulosic pads with the gauze is not shown. The pads, spaced in the continuous strip of gauze, are driven between a belt 18, which is preferably fabricated of canvas or leather, and a leather belt 16. The leather belt 16 is faced with a material to which the heated filament will not adhere. Resinous materials have been found suitable for facing the belt and plasticized vinyl acetate chloride copolymer has been found particularly suitable. If belt 16 is not faced with a resinous material the adhesive filament adheres to the belt and it is necessary for proper functioning of the process that the said belt be faced with a material which does not adhere to the

adhesive filament. The canvas belt 18 runs on rollers 19, 20, and 21 and is held taut by tension rollers 22 and 23.

An adhesive pot 24 contains a molten resin-wax mix and is maintained at a constant temperature. A filament or thread 25 passes through the adhesive containing pot 24 and is coated with the adhesive composition. The adhesive-coated thread, on which the adhesive is in a semi-fluid condition, comes in contact with the gauze wrapper as the latter passes over roller 19. The adhesive thread is pressed firmly against the gauze by the canvas or leather belt 16, which belt is carried on the surface of pocket wheel 26 and roller 27. Pocket wheel 26 is constructed so that the cellulosic pads fit into the pockets. The pads are subjected to pressure between belt 18 and belt 16 and the semi-molten adhesive composition impregnated in the filament or thread 25 is pressed through the overlapping layers of gauze by the pressure exerted, thus sealing the gauze wrapping at the overlap. The continuous strip of gauze, containing cellulosic pads at intervals, proceeds to a cutter (not shown) and is there cut into lengths which are illustrated in Fig. 1.

In the preferred embodiment of the invention, as illustrated by the drawing and described in conjunction with the detailed description above, a filament comprising a fiber or thread coated with an adhesive composition is used to seal the gauze wrapper but it is also contemplated that a filament composed of a resin containing composition and wax as the basic ingredients may be used and in this last embodiment the machine used to manufacture a sanitary napkin, sealed at the lapped edges, would be only slightly modified from the machine illustrated by the drawings: the adhesive pot 24 would be replaced by a heating unit to preheat a preformed filament comprising a resin containing composition and a diluent such as a wax.

It is further contemplated that an adhesive composition, containing a resin and a diluent such as a wax, could be printed, while in a molten state, longitudinally in a linear path onto the gauze overlap of an assembled napkin.

The term "gauze" as used in this specification refers to woven and non-woven fabrics.

It will be apparent to those skilled in the art that the principal objects of the invention have been accomplished and that various changes and modifications may be made in the embodiment of the invention herein disclosed. It will therefore be appreciated that the disclosures herein made are illustrative only and that the invention is limited only by the appended claims.

What is claimed is:

1. In a method of manufacturing a sanitary napkin having a cellulosic pad and a gauze wrapper with lapped edges; the improvement which comprises the steps of placing a heated filament which is tacky at elevated temperatures and substantially non-tacky at ordinary temperatures at the locus of the said lapped edges and on top of the first layer of gauze of the lapped edges so that it extends longitudinally along the pad in a linear path, and pressing said heated filament against the surface of the gauze wrapper.

2. In the method of manufacturing a sanitary napkin having a cellulosic pad and a gauze wrapper with lapped edges; the improvement which comprises the steps of impregnating a filament with a thermoplastic composition comprising ethyl cellulose, hydrogenated methyl abietate, paraffin wax, and a dye in which the wax is compatible with a mixture of ethyl cellulose and hydrogenated methyl abietate at elevated temperatures but at least partially incompatible therewith at ordinary temperatures and in which the wax is present in an amount such that it migrates to the surface of the said filament when the mixture passes from the semi-molten to the solid state, placing said impregnated filament at the locus of the said lapped edges and on top of the first layer of gauze of the lapped edges so that it extends longitudinally along the pad in a linear path, and pressing said heated filament against the surface of the gauze wrapper.

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