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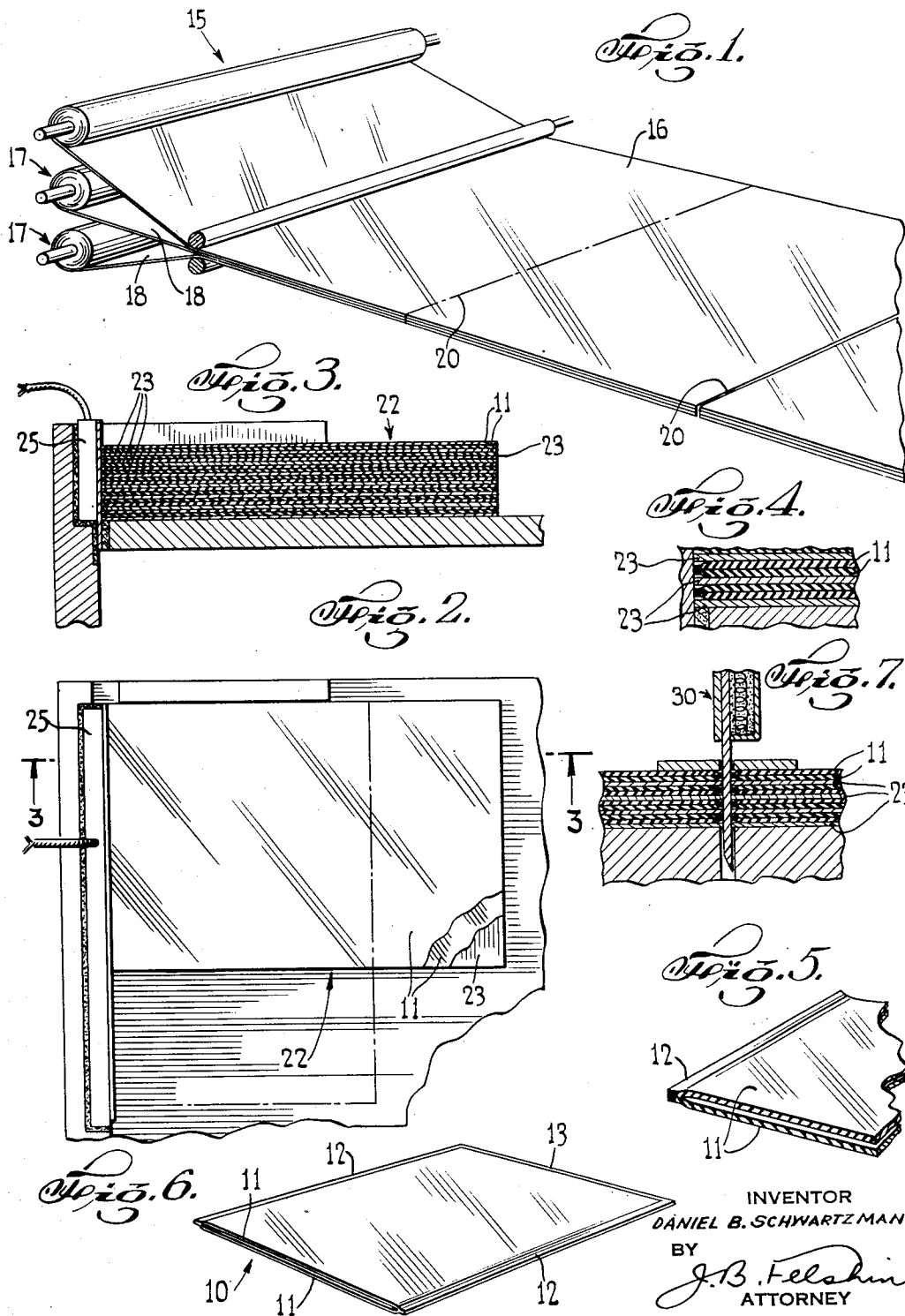
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2,232,640

METHOD OF MAKING ARTICLES FROM HEAT FUSIBLE SHEET MATERIAL

Filed Dec. 23, 1938

2 Sheets-Sheet 1



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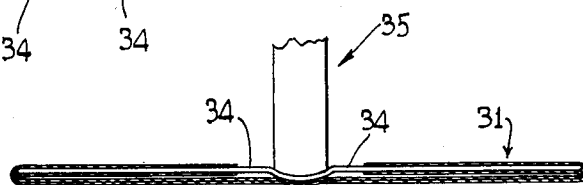
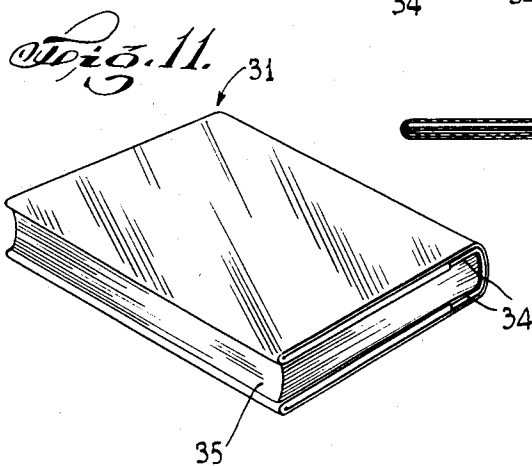
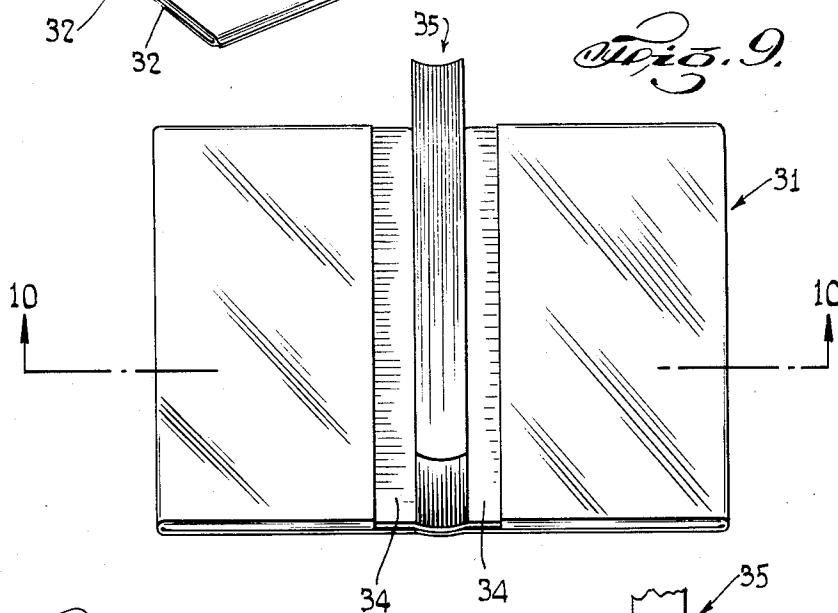
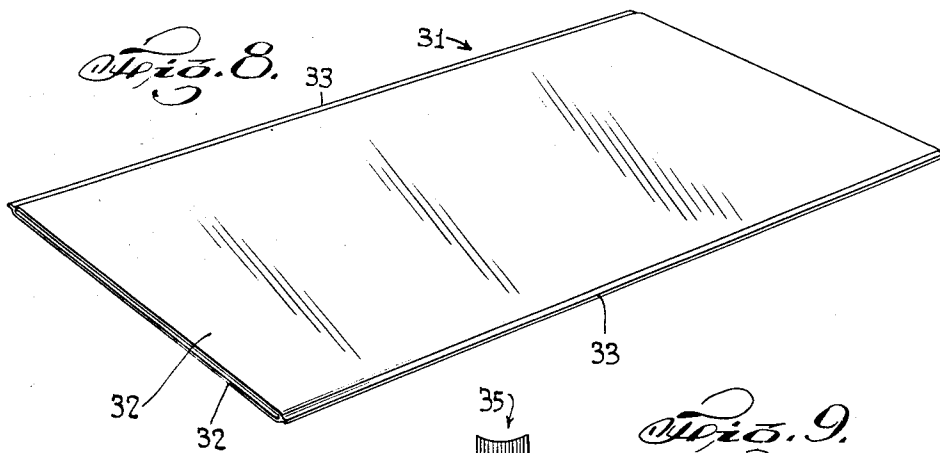
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METHOD OF MAKING ARTICLES FROM HEAT FUSIBLE SHEET MATERIAL

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2 Sheets-Sheet 2



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METHOD OF MAKING ARTICLES FROM HEAT FUSIBLE SHEET MATERIAL

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3 Claims. (Cl. 93—35)

This invention relates to methods of an apparatus for making articles such as envelopes, bags, shoulder length garment covers, umbrella covers and the like articles, out of pieces of sheet material. It is particularly directed to a process of heat sealing or seaming the meeting edges of pieces of heat fusible sheet material, such as hydrochlorinated rubber, or the like material which becomes adhesive or plastic when heated, whereby a plurality of sheets are attached together to form a complete article.

An object of this invention is to provide a highly improved process of the character described for simultaneously making a plurality of such articles in a stack, while keeping the articles separate from one another, and whereby said articles are uniform in size.

Envelopes, shoulder length garment covers, umbrella covers, and the like flat articles made of sheets of film material may be advantageously shipped in stacks. To facilitate removal of the articles from the stack, one at a time, it is advantageous to interpose a sheet of paper between adjacent articles. The sheets of paper prevent static electricity between the articles, and also prevent the articles from sticking together. It is therefore a further object of this invention to provide a process of the character described for simultaneously making a stack of flat articles out of film material, together with sheets of paper between the articles ready for shipping, whereby to make it unnecessary to place sheets of paper between the articles after the articles are made.

Another object of this invention is to provide a highly improved article made of sheets of transparent heat fusible material, such as a book cover, composed of two superimposed vertical sheets of transparent heat fusible material, the longitudinal registering edges of which are fused together by heating, whereby to form a book cover which will fit books of various widths and thickness.

Still another object of this invention is to provide an improved process of the character described, particularly adapted for quantity production, and reducing the cost of manufacture by saving labor and time, for the reason that the articles may be made uniformly, and in large quantities ready for shipment, and not individually, as was the practice heretofore.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the combination of steps, features of construction, combinations of elements, and arrangement of parts

which will be exemplified in the method and construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings in which is shown various possible illustrative embodiments of this invention,

Fig. 1 is a perspective view illustrating a step in the process embodying the invention;

Fig. 2 is a top plan view illustrating a further step in the improved process;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged, cross-sectional view through a stack of articles made in accordance with the invention;

Fig. 5 is a partial, perspective view of one of said articles with parts in cross-section;

Fig. 6 is a perspective view of a complete article made in accordance with the process embodying the invention;

Fig. 7 is an elevational, cross-sectional view illustrating a modified apparatus and process embodying the invention;

Fig. 8 is a perspective view of a book cover embodying the invention, and made in accordance with the improved process;

Fig. 9 is a perspective view of a book with the book cover thereon;

Fig. 10 is a cross-sectional view taken on line 10—10 of Fig. 9; and

Fig. 11 is a perspective view of the closed book.

For the purpose of illustration, there is shown in Fig. 6 of the drawings, an envelope 10 made in accordance with the process embodying the invention. The envelope 10 is made of two, similar, superimposed sheets 11, of heat fusible material, such as hydrochlorinated rubber, known as "Pliofilm," or the like material which becomes adhesive and plastic upon application of heat.

The sheets 11 are seamed or sealed at the side edges 12, and at its rear edge 13, the envelope being open at one end. The sheets 11 are fused or attached together at their outer edges 12 and 13 by the application of heat to the edges of said sheets, in the manner described hereinafter. The drawings show sheets 11 somewhat separated for the purpose of illustration only, said sheets in fact being in contact.

The dominant feature of the present invention is the provision of a method of simultaneously making a stack or quantity of envelopes 10, or other articles made of sheets of heat fusible material, seamed together by application of heat.

The process of making a stack of envelopes 10,

in accordance with the invention, will be described:

There is simultaneously unwound from a roll 15, a sheet 16 of paper, and a pair of rolls 17, sheets 18 of heat fusible material, such as "Pliofilm." The sheets 16 and 18 are unwound into superimposed relation, and may be cut down along lines 20, to sizes easy to handle. The cut batches are stacked one on top of the other, to produce a stack consisting of a sheet of paper for every two contacting sheets of "Pliofilm." The stack may then be cut by suitable cutting blades or dies, to the correct size of envelope desired, to produce a stack 22, shown in Figs. 2 and 3 of the drawings.

The stack 22 in Figs. 2 and 3 comprises a pair of adjacent contacting sheets 11 of "Pliofilm" between sheets 23 of paper, or the like material which is not fusible by heat and which is more resistant to heat than sheets 11. One end of the stack 22 is then moved into contact with a vertical, elongated, electrically heated plate or member 25, so that the end edges of adjacent pairs of sheets 11 may become fused together to form the fused ends 13 of the envelope 10. The stack need be held against the heater 25 only for several seconds, the heat being sufficient to fuse the edges of sheets 11, but insufficient to scorch the paper. The paper prevents the heat from penetrating too deeply so that only the outer edges of the sheets 11 are fused together.

As it is desired to fuse only a narrow strip, adjacent the edges of the contacting sheets 11, the stack is held against the heater for a short time, the length of time and the temperature of the heater determining the width of the fused edge. It has been found that with a temperature of about 300 degrees Fahrenheit, about one-sixty fourth of an inch in width will become fused.

The stack 22 may then be manipulated to bring a side edge of the stack into contact with the heater 25, to permit the side edges of adjacent sheets of "Pliofilm" to fuse together, for producing seamed or fused side edges 12. The stack may then be moved and turned around to bring the opposite side edge into contact with the heated plate, so that the meeting edges of adjacent sheets 11 are fused together to produce another sealed edge 12, to complete the envelope. One edge of the envelopes may be left open, as shown in Fig. 6 of the drawing.

The sheets of paper between the contacting pairs of sheets 11 of "Pliofilm" keep the contacting pairs of sheets of "Pliofilm" separate from adjacent pairs of sheets of "Pliofilm" so that the edges of only contacting sheets of "Pliofilm" will fuse together. Thus, one pair of contacting sheets of "Pliofilm" cannot become fused to another pair of sheets of "Pliofilm" because of the interposed sheets of paper 23.

It will be noted that by carrying out this method, the envelopes 10 may be made in large quantities, in stacks, and with interposed sheets of paper, exactly in the way they may most advantageously be shipped. The sheets of paper between adjacent envelopes make it easier to handle the envelopes, and easier to pick up individual envelopes off the stack. The sheets of paper eliminate static between the envelopes, and prevent adjacent envelopes from sticking together. By cutting the stacks to the right sizes and fusing the edges of the sheets while stacked, the sheets 11 are uniform and the edges at the open ends are in perfect registry.

It only requires a very few seconds to fuse the meeting edges of contacting sheets of "Pliofilm." It has been found that the fused edges 12 and 13 are strong. The articles are extremely uniform. The meeting edges at the open ends of the envelopes are in perfect registry. The process is economical and easy to carry out because the articles are made in large quantities and not individually.

Although the drawings illustrate the improved process as applied to the manufacture of envelopes, it will be noted that the process may be applied to the manufacture of a large variety of articles made of sheets of "Pliofilm" or the like heat usable material, such as umbrella covers, garment covers and the like articles.

In making umbrella covers, the sheets are elongated and of narrower width, and are sealed at their long edges only, thus producing an article open at both ends, so that an umbrella or other article may be passed through said article.

In making shoulder length garment covers, the sheets may be cut by a die having the correct shape for producing such articles, and the stack of sheets may be applied to a heater having the shape of the portion of the edges which are to be fused. If desired the stack may be moved past a fixed heated surface to heat seal the edge of the stacked articles.

In Fig. 7 there is illustrated a step in a modified process embodying the invention. In accordance with Fig. 7, the stack of sheets of "Pliofilm," with the sheets of paper interposed between alternate sheets of "Pliofilm," is cut by an electrically heated die 30, so that the meeting edges of contacting sheets of "Pliofilm" will become fused by reason of contact with the heated die.

The paper sheets may be replaced by any sheet material which will not fuse or stick to the sheets of "Pliofilm," and which will resist heat at temperatures necessary to fuse the "Pliofilm" sheets, so as not to scorch or burn. Such sheets, furthermore, are preferably non-metallic so as not to conduct heat because it is desired to fuse only the outer edge of the "Pliofilm." The paper being a poor conductor of heat does not conduct the heat to any substantial degree inwardly of the outer edges of the sheets of "Pliofilm."

The "Pliofilm" sheets may be replaced by sheets having coatings of heat fusible material on the contacting surfaces thereof.

In Fig. 8 there is shown a book cover embodying the invention, and made in accordance with the improved process described hereinabove. The book cover 31 shown in Fig. 8 comprises superimposed top and bottom similar sheets 32, the longitudinal edges whereof are fused together, as at 33, by heat. The book covers may be made in stacks with intervening sheets of paper, in the manner described hereinabove.

It will be noted that the outer ends of the book cover 31 are open. The book cover may be folded over the rear of a book, as shown in Figs. 9, 10 and 11, to receive the hard outer covers 34 of the book 35.

The book cover 31 should be made to fit a book of a given height, that is, the height of the book should be somewhat less than the height of the book cover 31, between the sealed edges 33 thereof. The book cover 31 however can fit books of various widths and thickness.

For a wider or thicker book, less of the outer

ends of the book cover will be received on the covers 34. The book cover 31 is preferably transparent so that the printing on the outside of the book can be read. Said book cover 31 is very 5 thin, so as not to materially add to the thickness of the book. The cover 31 is preferably made of hydrochlorinated rubber or "Pliofilm," which will not crack upon the book being opened and closed. The same is sanitary and washable, and may 10 be manufactured economically in large quantities.

In fact, the cover 31 is a flattened tube, as shown in Fig. 8 of the drawings. An umbrella cover may be made similar to the book cover 15 shown in Fig. 8, except that it is longer and narrower. The flattened tube may be opened up so that the umbrella may be inserted there-through.

It will thus be seen that there is provided a 20 device and method in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various 25 changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A process of the character described, consisting in stacking sheets of hydrochlorinated rubber and paper, with paper being interposed 5 between contacting sheets of hydrochlorinated rubber, and then cutting through the stack with a heated die, whereby the edges of the contacting sheets at the cut edges of the stack will become 10 fused and attached together.

2. A process of the character described consisting in stacking a plurality of pairs of contacting sheets of thermoplastic material, with non-thermoplastic material between adjacent pairs of 15 contacting sheets and cutting through the stack with a heated die, whereby the edges of the contacting sheets of thermoplastic material at the cut edges of the stack become fused and attached together.

3. A method of the character described consisting in stacking a plurality of units together 20 each including two sheets of thermoplastic material, interposing non-thermoplastic insulating material between adjacent units and cutting through the stack with a heated die to heat seal 25 the cut edges of the units.

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