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 DEVICE FOR AND ART OF ADHESIVELY ATTACHING  
 LABELS AND OTHER SHEETS TO ARTICLES  
 Filed Nov. 14, 1945

2,489,837

Fig. 1

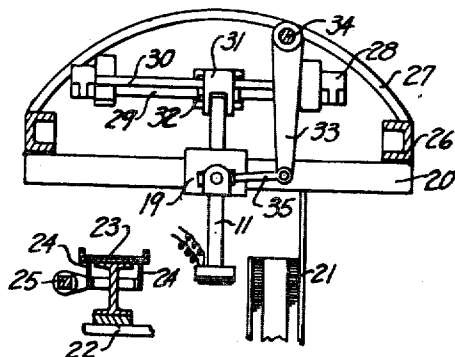


Fig. 2

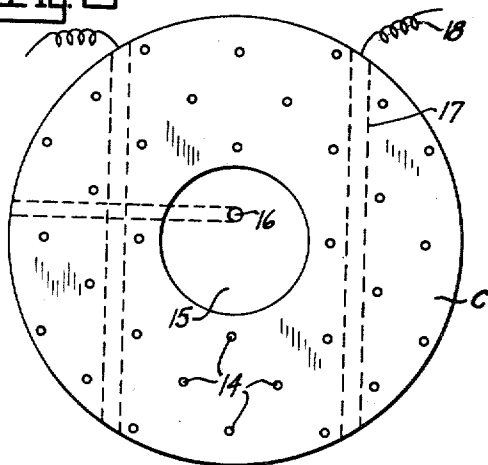


Fig. 4

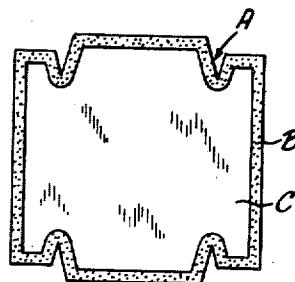


Fig. 5

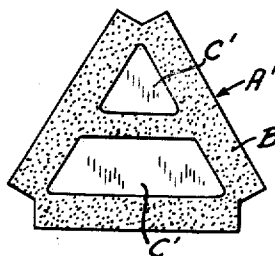
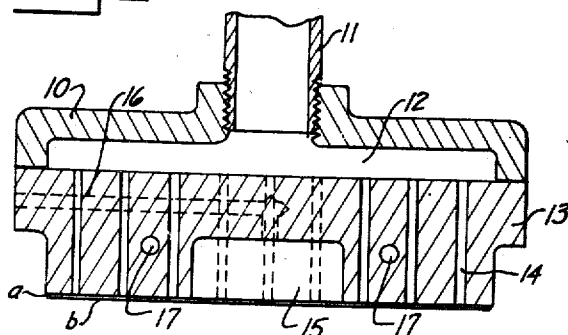


Fig. 3



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## UNITED STATES PATENT OFFICE

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DEVICE FOR AND ART OF ADHESIVELY  
ATTACHING LABELS AND OTHER SHEETS  
TO ARTICLESGeorge W. von Hofe, Bound Brook, N. J., assignor  
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The invention relates to the art of adhesively attaching labels and other sheets to articles and more particularly to the application of labels, wrappers, paper or similar sheets coated with an adhesive which is normally nonadhesive and is capable of becoming adhesively activated in the presence of heat; such adhesives frequently are referred to as thermo-plastic adhesives and are of various types well known in actual practice. In existing machines designed for the application of labels and the like coated with thermo-plastic materials, the coated labels are removed in individual succession from a supply stack by a transfer device, for instance, in the nature of a suction head, and transferred to an applying station in the labeling machine for application to an article supported thereat in label-receiving position. In known labeling machines, the heat for activating the coatings is developed in said transfer device or suction head so as to be effective during the aforesaid transfer of the labels to the applying station and during the actual applying step.

The object of the invention is to provide novel means whereby the coatings will be adhesively activated only throughout predetermined portions thereof and will otherwise remain adhesively inactive.

The invention contemplates further the provision of a novel transfer device or suction head constructed and arranged to apply heat to certain parts of the coatings for activating the same, without developing adhesive activation in other parts of said coatings.

A further object of the invention is to provide a novel arrangement in which the coatings of the label or their equivalent are subjected to spot-heating in accordance with predetermined adhesive patterns.

Other objects will appear from the description hereinafter, and the features of novelty will be pointed out in the claims.

In the accompanying drawing, which illustrates an example of the invention without defining its limits,

Fig. 1 is a fragmentary view of a labeling machine embodying the novel features;

Fig. 2 is an enlarged inverted plan view of the novel transfer device or suction head;

Fig. 3 is a sectional view thereof on the line 3—3 of Fig. 2, and

Figs. 4 and 5 are face views illustrating examples of various adhesive patterns capable of being activated by the novel device.

To enable the invention to be readily under-

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stood, I have illustrated and described the novel features in a form adapted particularly for embodiment in labeling machines designed for applying labels coated with thermo-activatable adhesives to the articles for which said labels are intended. It is to be understood that this does not define the limit of usefulness of the invention, which is capable of efficient use in association with sheets of material other than labels, but correspondingly coated with thermo-activatable adhesives and intended for adhesive attachment to articles for purposes other than mere labeling such as, for instance, finishing wrappers for box bodies, covers, and the like. The following description is to be construed accordingly.

In its illustrated form, the novel device comprises a transfer device or, specifically, a suction head whereby the adhesive-coated labels are transferred from a supply stack to an applying station and, during transfer and application, are subjected to the influence of heat in dependence upon a predetermined adhesive pattern as will appear more clearly hereinafter.

In practice, the label or equivalent sheet *a* (see Fig. 3), which is coated with an adhesive material *b* having no particular adhesive activity in its normal condition, is subjected to the effects of heat in such a manner that only predetermined portions of the adhesive coating will be activated and other portions thereof will be protected against such activation. This spot-heating of the adhesive coating preferably is in dependence upon a predetermined adhesive pattern which, in turn, is predicated upon the use to which the label or its equivalent is to be put. Those parts of the adhesive coating *b* which are not to be activated are protected in a novel manner by means of gaseous insulation. In the illustrated example, this result is obtained by applying the heat to the adhesive coating in the predetermined manner during transfer of the label or its equivalent *a* to an applying station or equivalent point in a machine such as a labeling machine in which the novel features are embodied.

To effect the desired results, the suction device comprises a hollow body *10* carried by a supporting member which may comprise a tube *11* communicating with the suction chamber *12* of the body *10* and connected with a suitable source of suction in any well-known way. The supporting member or tube *11* may also comprise part of the mechanism whereby the suction head is operated to transfer and apply the labels *a* or

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their equivalent to the articles for which they are intended. Such mechanism per se comprise no part of the instant invention although an example thereof will be described hereinafter. A suction plate 13 is suitably mounted upon the body 10 and is provided with suction apertures 14 which terminate in the lower face of the plate 13 as shown in Fig. 3. As illustrated in Figs. 2 and 3, the suction apertures 14 are located only in predetermined portions of the plate 13 which is provided, for instance, at its central portion with a recess 15 of predetermined dimensions and shape. The recess 15, as illustrated, may be of circular form or it may be of any other suitable shape dependent upon the activated adhesive pattern as may be desired; in some instances, several of such recesses 15 may be located at different parts of the lower face of the plate 13—it being understood that, in all cases, the recess 15 or the recesses 15 have no communication with the suction chamber 12 of the body 10. In addition, the plate 13 is provided with a passage or channel 16 which establishes communication between the recess 15 and the atmosphere so that said recess 15 contains, at all times, a supply of atmospheric air; other fluids may be supplied to the recess 15 at will. If the device includes more than one recess 15, all of said recesses are correspondingly in communication with the atmosphere for the same purpose. Any suitable provision may be made for heating the perforated portions of the plate 13 as, for instance, by locating therein one or more heating elements 17 which may be of the electrically-operated type and connected with a source of electricity by means of conventional wires 18 or the like. In the illustrated example, the circular portion c of the plate 13, accordingly, is heated and surrounds the recess 15 as shown in Fig. 2.

In practice, the suction head comprising the body 10 and plate 13 and associated elements may be suspended by means of the tube 11 from a carrier 19 which, itself, is slidably mounted upon a rail 20 located above and transversely of a supply stack of coated labels 21 and an article support 22 upon which the articles 23 to which the labels are to be applied are supported in label-receiving position. If the articles 23 are in the nature of blanks such as box body blanks or similar articles, the arrangement may include shifting means comprising fingers 24 operated by suitable mechanism 25 to shift said articles 23 into label-receiving positions in proper timing with the operative cycle of the machine. The rail 20 may be supported by means of parallel channel irons 26 mounted in any convenient manner upon a suitable support 27. The suction head may be moved vertically in registry with the stack 21 of coated labels, and the articles 23 to respectively remove terminal labels from the upper end of said stack and to apply said labels to the articles 23, by means of levers 28 fixed on the opposite ends of a shaft 29—said levers, at their free ends, carrying a shaft 30 on which a connecting link 31 is adapted to slide, said connecting link 31 being loosely connected with the upper end of the tube 11. The shaft 30 is oscillated in predetermined-timed relationship with the movements of the mechanism 25 by means of a cam-controlled lever 32 also fixed on the shaft 29—it being understood that the controlling mechanism for operating the lever 32 may be of any conventional design.

Movement of the suction head transversely along the track 20 may be effected by means of

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an oscillating lever 33 fixed on its upper end upon a shaft 34 and connected at its lower end by means of a link 35 with the carrier 19. The shaft 34 is journaled on the supports 27 and is connected with suitable means to effect oscillation of the shaft 34 and lever 33 in properly-timed relation to the other parts of the machine.

The operation of the parts described for spot-heating the adhesive coatings b of the labels in dependence upon predetermined patterns of adhesive is as follows:

During the time the mechanism 25 is being actuated to place an article 23 in position for receiving a label or its equivalent, the suction head 10 has been moved from a position in contact with the uppermost label in the stack 21 to a position immediately above the article 23 which is in label-receiving position. While the label is being removed from the supply stack and transferred to the applying station, the heated portions of the plate 13 are effective upon the portions of the label in contact with the heated section c of said plate. At the same time, the air or equivalent gas which is contained in the recess 15 serves to insulate that portion of the label which is in registry with said recess 15 against the effects of such heat so that the adhesive on the last-named section of the label is insulated against such heat, and, consequently, the corresponding portion of the adhesive coating remains adhesively inactive.

The movement of the suction head is a combined vertical and horizontal movement with the head first being moved upwardly by the action of the parts 29, 28, 30, 31, and 11, and any conventional cooperating means for imparting movement thereto to raise the uppermost label from the top of the supply stack—such label being caused to adhere to the perforated portions of the lower face of the plate 13 by means of the suction induced in the chamber 12 and apertures 14 of said head through the connection 11 which, as previously stated, leads to any suitable source of suction. It is to be understood that the application and discontinuance of the suction is controlled by properly-timed valving means of any suitable type. Those portions of the label which are in contact with the section c of the plate 13 are, consequently, heated by the action of the heating elements 17 so that the adhesive coating on the corresponding portions of the label in registry with said section c are correspondingly heated and brought to a state of adhesive activation. At the same time, that portion of the label and the corresponding portion of the adhesive coating which registers with the recess 15 are insulated by the air or its equivalent in the recess 15 against the effects of such heat, and, consequently, the last-named sections of adhesive remain in a non-activated condition. This spot-activation of the adhesive coating of the label takes place during the transfer of a given label from the supply stack to the applying station and, during the application of the label to the article as will be apparent. Inasmuch as the form of the section c of the plate 13 always corresponds to the shape of the pattern of the adhesive coating which is to be activated, it will be obvious that any variety of spot-heating operations may readily and efficiently be carried out at will. It will be understood that the horizontal movement is imparted to the suction head by causing the carrier 19 to be moved along the rail 20 through the intermediary of the lever 33, link 35, shaft 34, and a conventional

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cam or equivalent means with the necessary connections. The article 23 is supported in label-receiving position so that, when the suction head 10 with the label and its spot-activated coating is brought down into contact with the article; the activated areas of the adhesive coating of said label or its equivalent will be positioned in proper-registering relation with the article 23. After the label or its equivalent with the adhesive-activated pattern thereof has been pressed into contact with the article 23, which may be accomplished in any conventional manner, the suction head 10 moves upward and then laterally in a return direction. The suction head will continue this lateral return movement until it is again in operative relation with the labels or their equivalent in the hopper 21, from which, said suction head will remove the next successive terminal label or its equivalent, after which, the operations described above will be repeated.

From the above description, the manner in which an activated-adhesive pattern of predetermined form is automatically attained will be evident. The plate 13 as shown in Fig. 2 being provided with a circular-heated surface c and enclosing the insulating air in the circular recess 15 will produce an activated-adhesive pattern of circular form. By varying the form and arrangement of the lower surface of the plate 13 and by correspondingly locating the insulating recesses 15, large variations of activated-adhesive patterns are capable of being produced by the novel method and device. Several variations are illustrated in Figs. 4 and 5.

In Fig. 4, A represents a box wrapper in which the adhesive coating has been activated according to the pattern B, while Fig. 5 shows a wrapper or label A', the coating of which has been activated according to the adhesive pattern B'. It will be obvious that the patterns B and B' are produced by providing plates 13 having perforated portions c corresponding in shape to the patterns B and B' and including air containing recesses 15 corresponding in shape and location to the portions designated c and c', respectively, in Figs. 4 and 5 of the drawings. It is to be noted that with the novel arrangement, activated-adhesive patterns having curved paralleled or non-paralleled edges may easily be made by merely changing the configurations of the surface portion c and recesses 15 of the plate 13 and then selecting the proper plate for attachment to the body 10.

It is to be distinctly understood that the term, "label," as used in the specification and claims, is intended to cover not only labels but to include wrappers and paper, or similar flexible sheets, designed for use as covers or linings for boxes, cartons, containers, and the like, as well as any other elements on which it may be desirable to produce predetermined-activated-adhesive patterns.

While the device and apparatus above described represent satisfactory and practical constructions, it will be understood that principles of the invention are not limited to the specific constructional details of the various parts which perform the several operative steps herein disclosed, but that many changes, variations, and modifications of such constructional details of such parts may be resorted to without departing from the spirit and principles of the invention.

I claim:

1. A device for activating thermo-activatable

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adhesive coatings comprising a suction head having a suction controlled carrying surface for supporting an adhesive-coated sheet, means for heating a predetermined portion of the carrying surface of said head and thereby of said sheet while on the carrying surface of said suction head to activate a corresponding portion of said coatings in registry with the heated portion of said head, and insulating means carried by said head and effective at said carrying surface on other portions of said coatings to coincidentally insulate said other portions against the activating action of said heating means.

2. A device for activating thermo-activatable adhesive coatings comprising a suction head having a carrying surface for supporting an adhesive-coated sheet, means for heating a predetermined portion of the carrying surface of said head to activate a corresponding portion of said coatings in registry therewith, said carrying surface being provided with an open recess in predetermined relation to the heated portion of said head for confining an insulating gas in registration with another portion of said coating to protect the latter against the activating action of said heating means.

3. A device for activating thermo-activatable adhesive coatings comprising a suction head having a carrying surface for supporting an adhesive-coated sheet, means for heating a predetermined portion of said head to activate a corresponding portion of the carrying surface of said coatings in registry therewith, said carrying surface being provided with an open recess in predetermined relation to the heated portion of said head and in registry with another portion of said coating, and a connection from said recess to the exterior of said head for maintaining a supply of air in said recess whereby the portion of said coating in registry with said recess is insulated against the activating effects of the heated portion of said head.

4. The method of applying a label composed of a layer of thermo-activatable adhesiveable material and activated in accordance with a predetermined adhesive pattern, which comprises applying heat to the adhesiveable material on predetermined portions of said layer, and during such application of heat applying to other portions of said layer within the area defined by said predetermined portion a gaseous material capable of insulating said adhesiveable material on such other portions against the action of such heat and without substantially displacing such other portions from the plane of such layer at the place of and during such heat application, and then applying the thus activated label to an article.

5. The method of applying a label composed of a layer of thermo-activatable adhesiveable material and activated in accordance with a predetermined adhesive pattern, which comprises applying heat to the adhesiveable material on predetermined portions of said layer and during such application of heat subjecting other portions of said layer surrounded by said predetermined portions to the protective action of confined atmospheric air to prevent activation of the adhesive material on such other portions by such heat and without substantially displacing such other portions from the plane of such layer at the place of and during such heat application.

6. The method of applying a label composed of a layer of thermo-activatable adhesiveable material and in accordance with a predetermined

adhesive pattern, which comprises applying heat to the adhesiveable material on predetermined portions of said layer and during such application of heat subjecting at least one isolated portion of said layer within the region of such heat application to a fluid capable of insulating the adhesiveable material of such isolated portion against the action of such heat, and then applying the thus activated label to an article.

7. A device for supplying a label composed of a layer of adhesiveable material activated in accordance with a predetermined adhesive pattern to be affixed to an article, comprising a label carrier having a label supporting surface, means for applying an activating agent to predetermined portions of the adhesiveable material of such label while the label is carried by said surface, means for applying to other portions of the label on said surface a material to protect said adhesiveable material against the action of said activating agent without substantially displacing such other portions from the plane of the label while in the region of such activating agent applying means, and means for affixing the thus activated label to an article with the activated and unactivated portions thereof all maintained in substantially the same plane.

8. A device for supplying a label composed of a layer of thermo-activatable adhesiveable material activated in accordance with a predetermined adhesive pattern to be affixed to an article, comprising a label carrier having a label carrying surface, means for applying at such surface a condition of suction such as to support a label thereon, means for heating predetermined portions of the adhesiveable material of such label while the label is supported on such surface, means for applying to other portions of the label supported by said surface a gaseous material to insulate said adhesiveable material against the action of such heat without substantially displacing such other portions from the plane of the label supported on such surface, and means for affixing the thus activated label to an article with the activated and unactivated portions thereof all maintained in substantially the same plane.

9. A device for supplying a label composed of

a layer of thermoactivatable adhesiveable material activated in accordance with a predetermined adhesive pattern to be affixed to an article, comprising a label carrier having a label carrying surface of a predetermined configuration, means for applying at such surface a condition of suction such as to support a label thereon, means for heating such label carrying surface to activate the portion of said label in engagement therewith, and means in said surface for applying to a predetermined portion of the label supported thereon a gaseous material to protect the adhesiveable material of such portion against the activating action of said heating means.

10. A device for activating thermo-activatable adhesive coatings comprising a suction head having a carrying surface for supporting an adhesive coated sheet, means for heating a predetermined portion of the carrying surface of said head to activate a corresponding portion of said coatings in registry therewith, said head being provided with a recess having at said carrying surface an opening of predetermined form in predetermined relation to the heated portion of such carrying surface and in registry with another portion of said coating, and said head having a passageway connecting said recess to the exterior of said head for maintaining said recess in communication with the atmosphere when the opening thereof is closed by such sheet, the portion of said coating in registry with the opening of said recess being insulated by the air in the latter against the activating effects of the heated portion of said head.

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