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METHOD OF APPLYING AN ADHESIVE SURFACE TO A WEB

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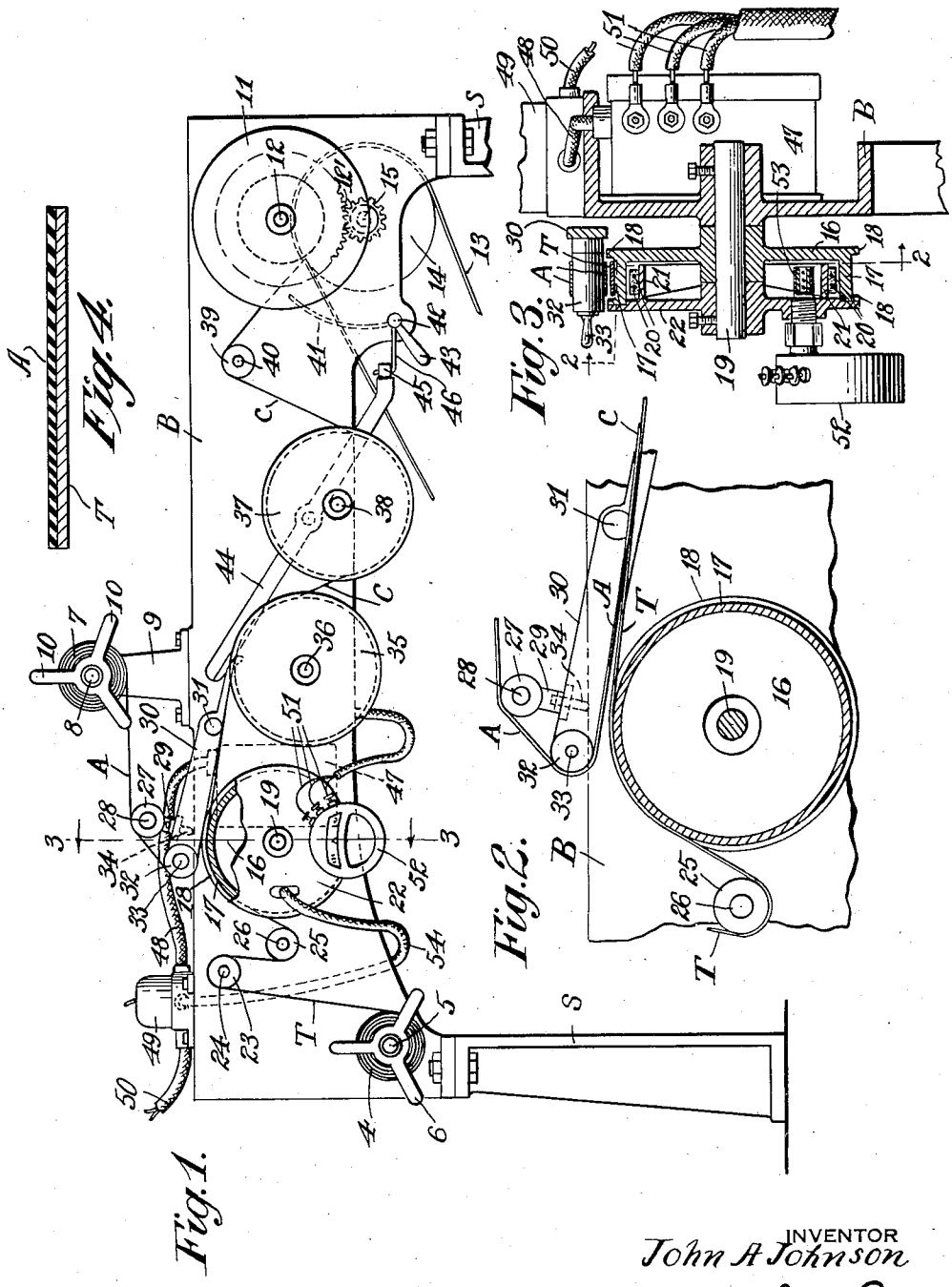


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

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METHOD OF APPLYING AN ADHESIVE SURFACE TO A WEB

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5 Claims. (Cl. 154—40)

This invention relates to the applying of an adhesive surface to a web to produce a composite web one surface of which is adhesive and the other surface non-adhesive, and is for subject-matter divided from my co-pending application filed August 29, 1929, bearing Serial No. 389,120. While the composite web is applicable for various uses it is particularly adapted to serve as an impervious lining material for sealing pads of cork or cork compositions inserted in crown receptacle closures. The web to the surface of which the adhesive material is applied in a continuous layer comprises a suitable web of highly flexible material, such as metallic foil or paper, from which disks are cut so that the adhesive will be coextensive with one surface of the disk and assembled in the closures with the adhesive surface contiguous to the sealing pads in the closures, the disks being applied to the sealing pads under heat and pressure, which is effected by heating the sealing pad in the crown closure and as a disk is cut from the web, as by a punch and die mechanism, it is assembled with the adhesive surface in contact with the heated sealing pad and thereby rendered sufficiently adhesive to adhere to the heated sealing pad after which the disk assembled on the pad is subjected to an elevated temperature and pressure to effect further fusing of the adhesive and intimate contact between the disk and pad when it is placed under pressure during the cooling period, as disclosed in my Patent No. 1,852,578, issued to me April 5, 1932, and the application for which patent was copending with the application Serial No. 389,120 from which the subject-matter of invention of the present application was divided out.

It is the object of the invention to provide an improved method of applying the adhesive material to a surface of a lining web, such as metallic foil or paper, said adhesive material being normally non-viscous under ordinary atmospheric temperature and adapted to be rendered viscous when subjected to an elevated temperature, and to provide an improved material from which linings are cut for sealing pads in crown closures wherein the adhesive material has the properties of being flexible and maintain a firm contact between the lining and sealing pad, insoluble in and impervious to moisture and water and resistant to acids and alkalies which may be present in liquids in receptacles to which the closures are applied, gutta percha or a gutta percha compound having been found as one material to have the characteristics to meet such requirements.

In carrying out the method of applying an adhesive surface to a web, there is provided a web of lining material to a surface of which the adhesive is to be applied and a web of adhesive material normally non-viscous under ordinary temperature and adapted to be rendered viscous when subjected to an elevated temperature, the web of lining material being heated as it is continuously fed from a supply roll and the web of adhesive material is continuously fed from a supply roll and progressively juxtaposed to a surface of said heated web of lining material at a point beyond the heating zone when the juxtaposed webs are placed under tension and pressure during the peried of cooling to cause the web of adhesive material to intimately contact and firmly adhere to the web of lining material to form the composite web the adhesive surface of which is to be subsequently rendered viscous by an elevated temperature.

In the drawing accompanying and forming a part of this application Figure 1 is a side elevation of apparatus for carrying out the method and showing the parts in normal operative position.

Figure 2 is a detailed sectional view taken on the line 2—2 of Figure 3 looking in the direction of the arrows, and showing the method of guiding and heating the web of tin foil and juxtaposing the web of adhesive material to a surface of the heated web beyond the heating means.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1 looking in the direction of the arrows to show the arrangement of the heating means for the web of tin foil; and Figure 4 is a sectional view of a portion of the material.

In the embodiment of the invention as illustrated in the present application for carrying out the method of the invention the apparatus comprises a bed B upon which the operative mechanism is mounted, and said bed being supported by standards S. A roll 4 of the web of lining material T of impervious material, in the present instance metallic foil, is wound about a perforated core and rotatably supported by engaging the roll core upon a stud 5 fixed in and extending laterally from the bed with flanges or spiders 6 carried by the stud at the opposite sides of the web roll. A roll 7 of a web A of adhesive material, also wound upon a perforated core, is rotatably supported on a stud 8 fixed in and extending laterally from a bracket 9 mounted upon the bed B, with flanges or spiders 10 carried by the stud at opposite sides of the web roll 7. The adhesive web may comprise caoutchouc or gutta percha, or a compound of gutta

percha or other suitable gum, the adhesive being such that it is normally nonviscous under ordinary atmospheric temperature, but is adapted to be rendered viscous when subjected to an elevated temperature and having the characteristics of being moisture or water proof and a resistant to acid and alkalies. The adhesive web is juxtaposed to a heated portion of the web of lining material and the juxtaposed webs or composite web C is guided to a take-up reel 11 and in its passage to the take-up reel is subjected to tension and pressure, the take-up reel being fixed on a shaft 12 rotatably mounted in and extending laterally from the bed B and positively driven from a source of power, such as an electric motor (not shown) by a belt 13 passing around a pulley 14 fixed on a shaft 15 rotatably mounted in the bed B and positively connected to the shaft 12 by gearing 12', so that the webs of the adhesive and of lining material are positively drawn from the respective rolls of such webs by the rotation of the take-up reel.

The web of lining material T is heated before the adhesive web A is brought into contact therewith by passing the web of lining material under tension over a heating drum embodying a disk portion 16 (Figure 3) having a laterally extending annular flange 17 at the periphery, and said flange arranged at the opposite sides with annular and radially extending web guiding flanges 18. The drum disk 16 is rotatably mounted on a shaft 19 fixed in and extending laterally from the bed B. To heat the drum there is provided an electric heating element of annular form and comprising a coil 20 of electric resistance wire imbedded in a material which is a non-conductor of electricity but having the properties of high thermal conductivity, diatomaceous earth being suitable for said purpose. The heating element is supported upon an annular flange 21 extended laterally from a disk member 22 fixed upon the shaft 19 in abutting relation to the free end of the flange 17 of disk 16 and co-operates therewith to provide an enclosing housing for the coil, the disk flange 21 positioning the heating element 20 in opposed and preferably spaced relation to the web engaging flange 17, although it may be in contiguous relation thereto. Tension is applied to the web of lining material T during its travel from the roll 4 to the heating drum by passing the web from the roll 4 over a peripherally flanged guide roller 23 rotatably supported on a stud 24 fixed in and extending laterally from the bed at a higher level than the stud 5 supporting the roll 4. The web T is then guided from the roller 23 in a downward direction under another peripherally flanged guide roller 25 similar to roller 23, rotatably supported on a stud 26 fixed in and extended laterally from the bed B at substantially on the same level as the heating drum supporting shaft 19. From the roller 25 the web T passes over the drum flange 17 and is heated by the elevated temperature created by the heating element within the drum. It will readily be seen that the rollers 23 and 25 will tend to retard the movement of the web T over the heating drum causing the drum to rotate and together with the ready paying off of the web from the roll 4 prevent the breaking of the web by the strain of the pull of the take-up reel 11.

The adhesive web A is rendered viscous to cause it to adhere to the web of lining material T by juxtaposing the adhesive web relative to the web of lining material after it leaves the heating drum to prevent the scorching and rendering of the web of the adhesive material useless for the purpose of supplying an adhesive surface to the web of lining material. This is effected by guiding the web of adhesive material from the roll 7 over a roller 27 rotatably supported on a stud 28 fixed on a horizontal axis to a support 29 carried adjacent one end of a lever 30 pivotally mounted adjacent the opposite end by a headed stud 31 engaging a perforation in the lever 30 and secured in the bed. The end of the lever 30 supporting the roller 27 extends over the heating drum, as clearly shown in Figures 1 and 2, and said end of the lever arranged with a roller 32 rotatably mounted on a stud 33 fixed in and extending laterally from the lever 30, the free end of the roller carrying stud 33 being extended beyond the roller to form a hand grip, as shown in Figure 3, to move the lever toward and away from the heating drum to facilitate the treading of the webs. The lever 30 normally moves by gravity in a direction toward the heating drum, said movement being regulated by a stop adjustably carried by the lever and engaging the top of the bed B, said stop being in the form of a screw 34 threaded into and extended through a portion of the lever 30 and secured in adjusted position by lock nuts threaded on the screw. The guide roller 32 is positioned by the adjustment of the screw 34 so that the adhesive web A will progressively converge toward and meet the web of lining material at a point beyond the heating drum or the portion of the drum where the web of lining material leaves the same, as clearly shown in Figures 2 and 3, whereby the web of adhesive material is rendered viscous through the transmission of the heat from the web of lining material thereto, said temperature being lower than that of the drum flange 17, which latter temperature will scorch the web of adhesive material should said web come into forceful contact therewith, and thereby render the composite web useless as said web could not be rendered viscous to adhere the web of lining material for the purpose specified.

To form the composite web C, the web of adhesive material A juxtaposed to the heated web of lining material T is subjected to tension and thereby pressure during the period of cooling to assure an intimate and firm adhesion of the adhesive material to the web of lining material. This is accomplished by guiding the adhesive material into juxtaposed relation to the lining material, over a peripherally flanged guide wheel 35 rotatably supported on a stud 36 fixed to and extended laterally from the side of the bed below the axis of the shaft 19. The composite web is guided from wheel 35 in a downward direction under a peripherally flanged guide wheel 37, similar to the wheel 35, rotatably mounted on a stud 38 fixed to and extending laterally from the bed in a plane below the axis of the stud 36, and is guided from wheel 37 in an upward direction over a peripherally flanged guide roller 39 rotatably supported on a stud 40 extending from the side of the bed in a plane higher than the axis of the shafts 19 and 12. From the roller 39 it is directed onto the take-up reel 11. The passing of the web C in an irregular path about the wheels 35, 37 and roller 39, as described and illustrated, applies pressure thereto to assure an intimate contact and uniting of the adhesive to the web T during the period of cooling effecting an inseparably and intimately uniting of the adhesive to the web of lining material,

and maintains the web of lining material in taut condition during the travel thereof relative to the heating drum and the juxtaposing of the adhesive thereto.

Should the feeding means be stopped the temperature of the heating drum will be transmitted by the web of lining material to the portion of the adhesive web adjacent the heating drum, which will fuse and break or separate the adhesive web and necessitating renewal of the web. To overcome this disadvantage the lever 30 is readily actuated in an upward direction to position the adhesive web A in spaced relation to the heated portion of the web of lining material T by grasping the hand grip of the roller supporting stud 33, shown in Figure 3.

The take-up reel 11 is rendered active and inactive by shifting the belt 13 to the pulley 14 or to a pulley (not shown) loose on the shaft 15, which is effected by means of a belt shifter in the form of a yoke shaped member 41 fixed in a rod 42 slidably mounted in the bed B and provided with a manipulating hand grip 43 with the member 41 extending on opposite sides of the belt, Figure 1. The lever 30 is moved to position the adhesive web A out of engagement with the heated portion of the web of lining material T simultaneously with the rendering of the take-up reel inactive by a lever 44 pivotally supported upon the bed intermediate the lever 30 and belt shifter with one end of the lever 44 extending over the end of the lever 30 adjacent its pivot support 31 and the levers arranged with co-operating portions, the other end of the lever 44 extending adjacent to the shifter rod 42 and carrying a roller 45 for engagement of a portion of an angular extension 46 of the shifter rod 42 extended in the direction of the shifter rod and inclined relative to the axis of the shifter rod, whereby as the shifter is actuated to shift the belt from the pulley 14 to render the take-up reel inactive the lever roller 45 will ride up the inclined extended portion of the extension 46 raising the adjacent end of the lever 44 and depressing the end engaging with the lever 30 and thus move the latter lever to position the adhesive web A away from the heated portion of the web of lining material T. When the shifter is actuated to shift the belt to pulley 14 to render the take-up reel active the lever roller 45 will move down the inclined portion of the extension 46 and the lever 30 will assume by gravity the position shown in Figure 1.

To maintain the heating drum at a predetermined temperature thermostatically controlled electric switch mechanism is provided, the switch mechanism being designated in a general way at 47 connected with the source of current supply by a conductor 48 through a junction box 49 to the lead in conductor 50, and through a series of conductors 51 with a thermostat, designated in a general way by 52, mounted on the disk 22 of the heating drum in heat conductivity therewith, as shown at 53 in Figure 3, one terminal of the resistance wire of the heating coil 20 being electrically connected in series with the conductors 51 and the other terminal connected by conductor 54 through the junction box with the source of electricity.

By so applying the edhesive to the web of lining material there will be an even distribution and a tenacious adherence of a continuous layer of the adhesive throughout the entire area of one surface of the web of lining material which will not be released from a disk as it is cut from the web, and particularly the marginal, portions thereof. Also by applying the adhesive in superposed relation to the web of lining material it may be readily inspected during the applying of the adhesive with the result that imperfections may be readily observed and such portions of the lining material discarded before it is used in the apparatus for cutting lining disks therefrom and the applying of the same to the sealing pads in crown closures.

While I have illustrated and described one embodiment of apparatus for carrying out the method it will be obvious that various modifications may be made in construction and arrangement of parts without departing from the scope of the invention, and that portions may be used without others and come within the scope of the invention.

Having thus described my invention, I claim:

1. The method of applying an adhesive to a web consisting in providing a web of non-adhesive material to which the adhesive surface is to be applied and a web of adhesive material normally non-viscous under ordinary temperature and adapted to be rendered viscous by an elevated temperature, and uniting the webs by heating the web of non-adhesive material and juxtaposing the adhesive web under pressure to a surface of said heated web.

2. The method of applying an adhesive surface to a web, consisting in providing a web of highly flexible material to a surface of which the adhesive is to be applied and a flexible waterproof and acid resistant adhesive material normally non-viscous under ordinary temperature and adapted to be rendered viscous by an elevated temperature, passing the web continuously through a zone having an elevated temperature to progressively heat the same, and continuously progressively supplying and guiding the waterproof and acid resistant adhesive material into juxtaposed relation to a surface of the heated web to render the adhesive viscous and adhesively unite the same to the surface of the web, and maintaining the web with the adhesive material applied to a surface under pressure during the cooling period to intimately unite the adhesive to the web.

3. The method of applying an adhesive surface to a web, consisting in providing a web to a surface of which the adhesive is to be applied and a web of adhesive material normally non-viscous under ordinary temperature and adapted to be rendered viscous by an elevated temperature, feeding the web to which the adhesive is to be applied through a zone having an elevated temperature to heat said web, progressively juxtaposing the web of adhesive material to a surface of the heated web as it leaves the zone of elevated temperature to render the contacting surface of the adhesive web viscous, and subjecting the juxtaposed webs to pressure during the cooling of the heated web to intimately adhere the webs together.

4. The method of applying an adhesive surface to a web, consisting in providing a web to a surface of which the adhesive is to be applied and a web of adhesive material normally non-viscous under ordinary temperature and adapetd to be rendered viscous by an elevated temperature, passing under tension on the web to which the adhesive is to be applied through a zone having an elevated temperature to heat said web, guiding the web of adhesive material into juxtaposed relation with a surface of the heated web as it leaves the zone of elevated temperature to render the juxtaposed surface of the adhesive web viscous,

and subjecting the juxtaposed webs successively to pressure to intimately adhere the webs together.

5. The method of applying an adhesive surface to a web, consisting in providing a web of non-adhesive material to a surface of which the adhesive is to be applied and a web of adhesive material normally non-viscous under ordinary temperature and adapted to be rendered viscous by an elevated temperature, continuously passing the web to which the adhesive is to be applied through a zone having an elevated temperature to heat said web, guiding the web of adhesive material into contact with a surface of the heated web at a point beyond the zone of elevated temperature to render the adhesive web viscous without scorching said adhesive web, and cooling the united webs under pressure to intimately adhere the webs together, and the exposed surface of the web of adhesive material adapted to be rendered viscous by a subsequent elevated temperature.

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