Dec. 26, 1933. E. R. NEWCOMB 1,941,362

APPARATUS FOR DRYING FRESHLY PRINTED WEBS

Filed Oct. 12, 1931 2 Sheets-Sheet 1

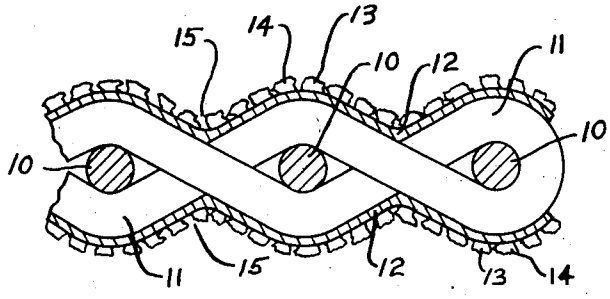
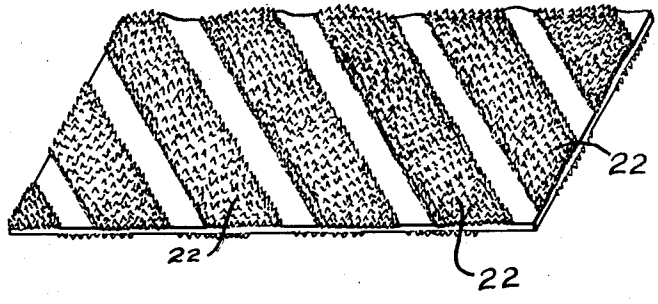


FIG 1



FIG 2

FIG 3



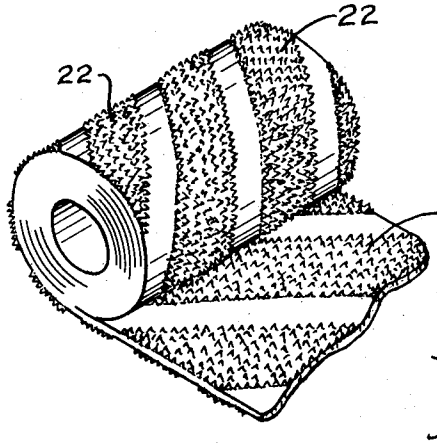


FIG 4

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APPARATUS FOR DRYING FRESHLY PRINTED WEBS

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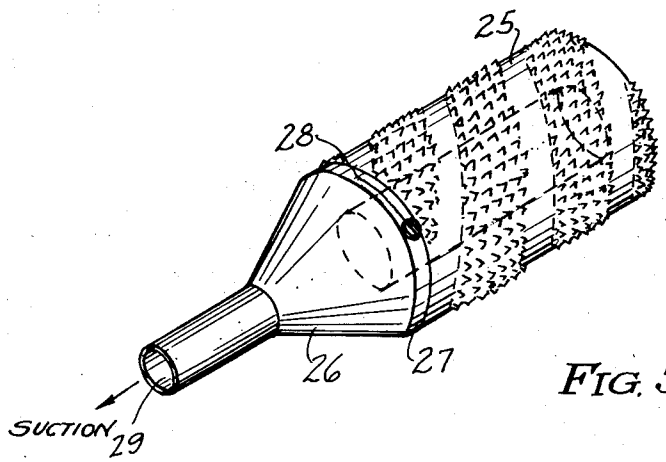


FIG. 5

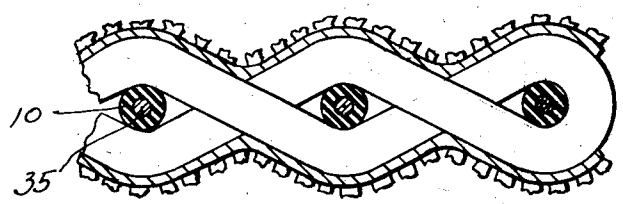


FIG. 6

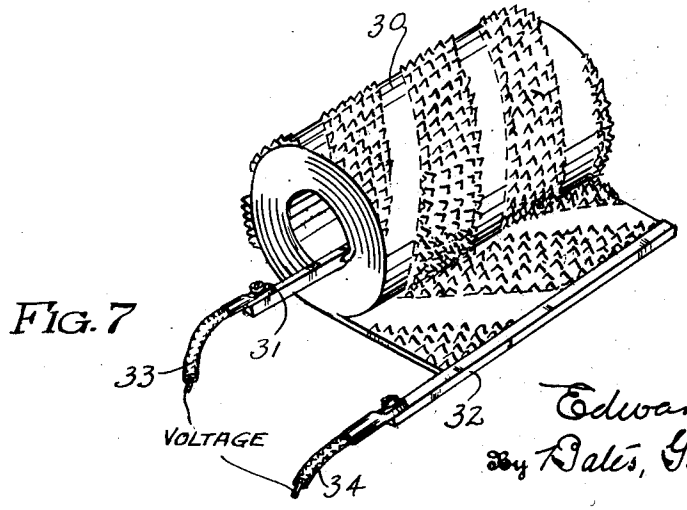


FIG. 7

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UNITED STATES PATENT OFFICE

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APPARATUS FOR DRYING FRESHLY PRINTED WEBS

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Application October 12, 1931. Serial No. 568,490

9 Claims. (Cl. 101—420)

This invention relates to apparatus for drying freshly printed webs and particularly those having a hard waterproof surface such as glazed paper, "Glassine", "Cellophane", and the like. One method of drying such webs embodies the interleaving of a web, coated on one side with granular material, into a roll on which the printed material is wound immediately after the completion of the printing operation. The sharp points of the granular material bear against the freshly printed image and allow it to dry in the roll without offsetting the image or removing any of the ink. Such method is disclosed by Erwin L. Holmes in an application for Letters Patent of the United States, which was filed September 19, 1930, and bears Serial No. 483,012.

The theory upon which the drying is accomplished by the method described in the Holmes application is that the supporting grains allow the air to circulate through the roll and thereby to effect the drying operation, notwithstanding the fact that the roll is tightly wound. This method has been improved by the utilization of a web coated on both sides with granular material, which permits images to be printed on opposite sides of material wound into a roll while the images are damp. In such case, the double-faced web is interleaved between the convolutions of a single web, or two webs back to back, carrying oppositely facing images, so that the granular material on one side of the web is in contact with the printed images on one face of one turn of the material while the granular material on the other side of the web is in contact with a subsequent turn of the other face of the printed material. This last mentioned method forms the basis of an application for Letters Patent of the United States, filed concurrently herewith by Frank J. Tone.

The difficulty experienced with the present method of printing non-absorbent webs such as "Cellophane", "Glassine", etc. is that too long a time is required for the ink to dry. This drying process usually requires approximately ten hours for completion and necessitates the use of additional rolls of sandpaper, winding equipment, storage space, and entails the added cost of these various items.

An object of my invention is to expedite the drying operation, either with the single web having printed images on one side only or with the oppositely printed material. I accomplish this by accentuating the contact portions and thereby providing spaced portions in which the air may circulate during the drying operation.

Referring now to the drawings, Fig. 1 is an enlarged sectional view through a carrier web embodying my invention, and Fig. 2 is a section through a modification of my invention; Figure 3 is a perspective view of another modification, and Fig. 4 is a perspective view of the last-named modification in roll form.

Figure 5 is a perspective view of still another modification of the invention while 6 shows a cross-sectional view of a modified form of Figure 1, and Figure 7 shows in perspective the modification illustrated in section by Figure 6.

My invention is concerned with the provision of a web which permits of the circulation of air between such web and the printed material. This result may be accomplished in various ways, and so in Fig. 1, I have shown a method which comprises the utilization of a coarsely woven textile fabric, which is suitably sized and then covered with granular material. As a typical example, I may utilize a cloth having approximately thirty warp threads to the inch and twenty-four weft threads to the inch, whereas that commonly used heretofore has been woven with eighty warp threads to the inch and forty-eight weft threads to the inch.

The coarser woven fabric thus has larger interstices between the threads, and a fabric so made is indicated, at Fig. 1, as having warp threads 10 and weft threads 11. After the fabric is woven, it is treated with a light coating of sizing material 12, which does not completely fill or level off the interstices, but leaves a wavy or pebbled surface. It is then coated on one side with adhesive material, such as glue or varnish, also in such manner that the interstices remain unfilled. The adhesive surface is then coated with granular material before the adhesive sets. The grains used may be those of hard minerals that fracture into irregularly shaped particles and provide points or edges to support the printed surface without producing offset or smear of the wet ink. By way of illustration, without intending to limit my invention to their particular use, I have found satisfactory for the purpose such minerals as magnetite, feldspar, beryl, spinel, enstatite, and the like, these grains being graded to sizes from 180 to 280. Other materials than minerals may be used provided the particles are firm and irregular in shape so that they present points or edges to the printed web rather than broad, flat surfaces. The numerals represent the number of meshes to the square inch through which the material is screened. After one side of the web has been coated, the other side may be treated similarly.

When the grains are applied to the sizing material, they bridge across the interstices and thus provide alternate mounds 14 and depressions 15 on both sides of the fabric. The mounds support the freshly printed webs on points, and thereby prevent blurring and offset while the depressed portions therebetween provide adequate space for the circulation of the drying

gases. The woven cloth used heretofore differs from this, in that the closely woven threads provide a substantially plane surface at the completion of the sizing and grain applying operations.

In Fig. 2, I have shown a modification of my invention, wherein the fabric 20 may be finely woven in accordance with the usual custom and then sized and treated with grains 21 on the opposite sides thereof. Thereafter, the web is corrugated transversely. Such corrugating operation provides desirable air passages through the rolled "Cellophane" and thus facilitates the drying thereof.

Another modification of my invention is shown in Fig. 3, wherein the granular portions are arranged in spaced rows 22 along the surface of the material, which may be either woven fabric or paper. Preferably, the rows extend diagonally across the web so that the web of printed material is supported throughout its wound-up length on points of the gritty material and yet adequate air passageways are provided therebetween.

Figure 5 illustrates the use of a mechanical adapter or cone-shaped section 26 which may be clamped tightly to one end of the roll 25 by means of a clamping band 27 which is held in position by screw 28. By applying either suction or air under pressure at opening 29 while the hole in the roll is temporarily plugged with wood, the drying rate of the moist ink is considerably hastened.

Figure 6 shows the manner in which a metallic conductor of electricity 35 is incorporated into the fabric and constitutes a core for the warp strands 10. When these wires, which may be of iron, copper, or other suitable metals or alloys of small diameter, are connected to bus bars at both ends of the roll and a suitable current of electricity passed through them, a gentle heat is generated which facilitates the ink drying process.

Figure 7 illustrates a method for carrying out this electrical heating process. The fabric and abrasive roll 30 contain the freshly printed web rolled within it. The metallic bus bars 31 and 32 are clamped to bared portions of the wires 35 at the ends of the roll, while lead wires 33 and 34 are connected to a source of electric current of suitable potential while the drying process is being carried on and disconnected when the roll is ready to be unwound.

While I have described my invention as embodying a woven textile fabric, or a fabric the warp thread of which is an insulated wire, it is possible that some of the advantages may be obtained also with woven wire, or with wire inserted portions which serve as reinforcements, but such wire fabric should have selvaged edges which protect it against fraying or other damage incident to the winding and unwinding operations to which it is subjected.

An advantage of my invention is the fact that air or other drying gases may circulate or be caused to circulate more readily through the roll, and thereby materially reduce the time required for the drying operation. I provide this advantage without materially increasing the cost of the carrier web.

Another advantage relative to rapid drying is the means provided for gently heating the entire roll. This raises the vapor pressure of the ink solvents and materially aids in their rapid removal, especially so when forced circulation is used to pass air through the roll.

I claim:

1. An elongated coated web having a layer of grains on opposite sides thereof and having regularly formed uneven surfaces, the depressed portions of said surfaces communicating with the longitudinal edges of the web, whereby passageways for air therebetween are provided when the product is wound into roll form.

2. A coated web having a flexible corrugated base, and having a layer of adherent granular material thereon.

3. A coated web having a flexible base, and having a layer of adherent granular material thereon, said web being corrugated transversely whereby air passages are provided when the web is wound in roll form.

4. A coated product comprising a woven fabric of open weave, with interwoven metallic wires to serve as conductors of electricity, and coated on both sides with an adherent layer of granular material.

5. A drying accessory for printed material which is impressed on non-absorbent sheets, said accessory comprising an abrasive coated fabric whereby the freshly printed material can be rolled up with the abrasive coated fabric, the abrasive being distributed on each side of the fabric in a manner to provide spiral paths for air circulation on both sides of the printed sheets.

6. Apparatus for supporting and separating printed sheets during the drying process, comprising an elongated flexible web having a coating of granulated material, said web and coating being arranged to provide passageways for air communicating with the longitudinal edges of the web, and electrically conducting wires contained in the web whereby the circulation of air can be made more effective by the means of an electric current.

7. A drying accessory for printed material which is impressed on non-absorbent sheets, said accessory comprising a coarsely woven fabric having an abrasive coating distributed on both sides thereof in close conformity to the weave to form a corrugated surface, whereby freshly printed sheets may be mounted for drying and air circulation is provided between the printed sheets and the mounting.

8. A drying accessory for printed material, which is imprinted on non-absorbent sheets, said accessory comprising an elongated flexible web, granulated material on both sides of the web, said web and granulated material having definitely arranged spaces additional to the space between contiguous grains to provide passageways for air communicating with the longitudinal edges of the web.

9. The combination of a freshly printed web, an elongated drying web, said drying web having a granulated coating, said drying web and coating being arranged to provide passageways for air communicating with the longitudinal edges of the drying web, both of said webs being rolled into a common roll, and means for applying an air connection to said passageways exposed at the end of said roll.

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