

Dec. 28, 1937.

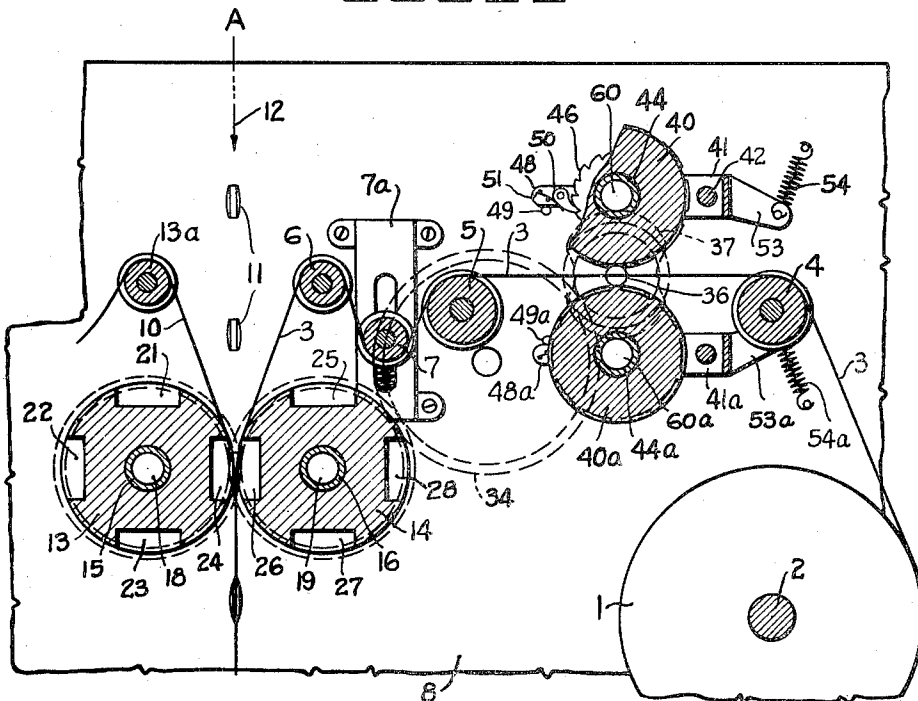
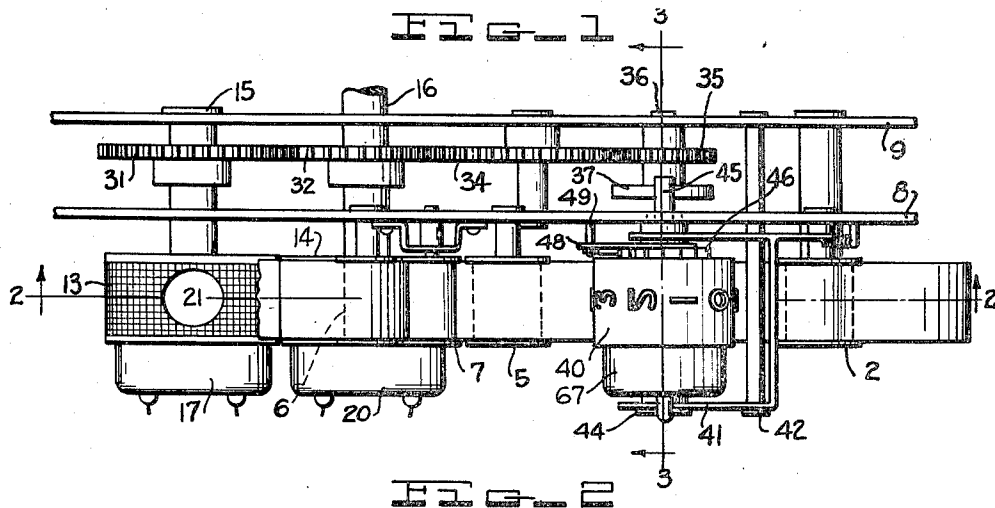
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2,103,385

PACKAGE FABRICATION

Original Filed Nov. 22, 1934

2 Sheets-Sheet 1



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PACKAGE FABRICATION

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2 Sheets-Sheet 2

FIG. 4

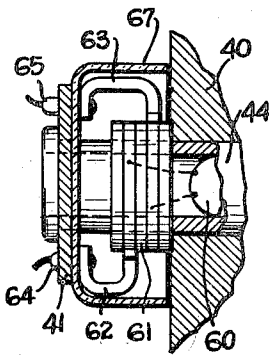


FIG. 5

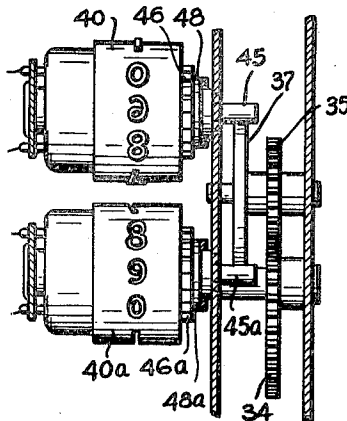


FIG. 6

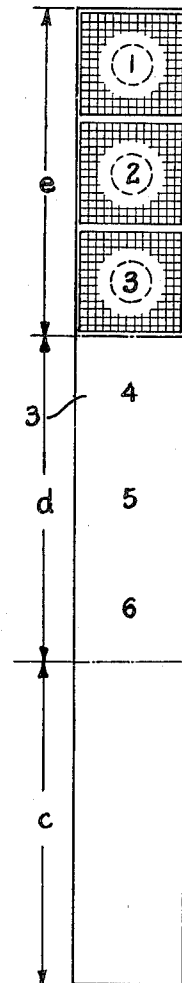


FIG. 8

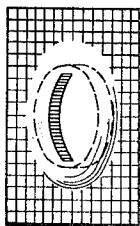


FIG. 7

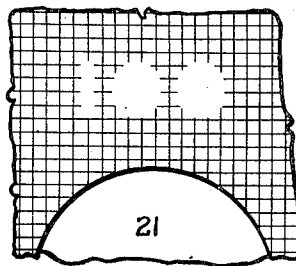
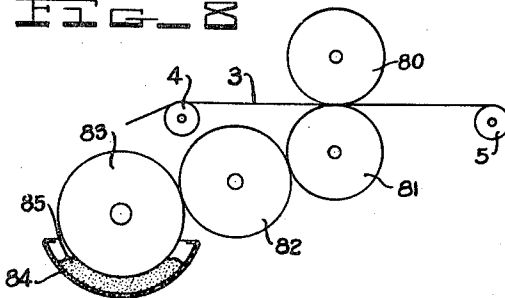


FIG. 8



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2,103,385

PACKAGE FABRICATION

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tion of Delaware

Original application November 22, 1934, Serial
No. 754,311. Divided and this application May
4, 1935, Serial No. 19,762

4 Claims. (Cl. 41—21)

This invention pertains in general to the ornamentation and marking of regenerated cellulose material, this being a division of my application Serial No. 754,311, filed Nov. 22, 1934, now Patent No. 2,037,825, issued April 21, 1936.

One of the objects of this invention consists in providing indicia in regenerated cellulose material in the form of markings produced by physiochemical changes in the material.

Another object comprises providing a method for utilizing a heat and pressure process to form characters in regenerated cellulose material.

These and other objects will be apparent from the following, reference being had to the accompanying drawings in which like reference numerals designate corresponding parts and in which:

Fig. 1 is a top plan view of an essential portion of one embodiment of the mechanical system according to the present invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a view of a commutating arrangement employed;

Fig. 5 is a representation of a strip of packaging material as used in the mechanical arrangement of Fig. 1, showing several steps of the oxidization process;

Fig. 6 is a perspective view of a package unit constructed in accordance with the invention;

Fig. 7 is a view of packaging material bearing indicia markings in accordance with the invention; and

Fig. 8 is a schematic representation of an arrangement which may be employed in connection with the system of my invention for providing colored indicia effects.

In this invention use is made of an oxidization process for changing the physiochemical nature of regenerated cellulose. The invention contemplates the preferable use of regenerated cellulose material of ribbon formation fed through a plurality of rollers for operating on the material in a plurality of oxidization treatments produced under pressure. According to one embodiment of the invention, cellulose material is subjected to an oxidization marking step for producing various indicia on the material. This indicia may be in the form of advertising, serial numbers, or instructions for the use of the packaged article.

In another step, the material, thus provided with indicia markings, is formed to enclose the article

with a seal, the seal being produced by further oxidization of the material.

In the use of strip packaging material, such as regenerated cellulose, various difficulties have heretofore been encountered in providing packages with suitable indicia markings. Recourse has generally been had to inked stampings on the surface of the material but it is found that such markings are often unsuitable for various reasons, one of which is that the material does not receive and maintain such stampings in a very suitable manner. A further difficulty resides in the proper alignment of the indicia markings with the package itself. That is, even though the cellulose material has been provided with inked stampings, it is very difficult, in a packaging process, to insure that these markings coincide with a particular package. In other words, during the processing packages are eventually produced which will have the indicia markings out of alignment with the package giving an awkward and unsatisfactory appearance, and often being entirely useless for the purpose intended, such as where instructions are given for the dosage of packaged medicines.

Regenerated cellulose strip material may be provided with stamped ink markings produced in a separate process and then rolls of the material used in a packaging machine. In a continuous packaging machine, however, there is no satisfactory method to insure the alignment of the stamped markings for the particular package, inasmuch as expansion and contraction as well as tension produce various linear changes in the material which cannot be foreseen and compensated for with any exactitude in a continuous manufacturing process. In some related processes, photoelectric cells and adjusting systems have been used in an attempt to secure alignment, but such arrangements are not believed to be practical or desirable in packaging systems of the type here indicated. Further, since packaging processes depend upon the use of heat in an oxidization process, the inked stampings are subject to more or less deterioration and effacement. Such objections are even more true if an attempt is made to place the inked stampings directly on the material during the packaging process. If this method is resorted to, a considerable length of the cellulose material must be provided between the packaging operation itself and the inking operation in order to permit drying. Such a length of material permits the linear changes which displace the markings and produce disalignment of the indicia in the pack-

aging process. It will therefore be seen that the use of inked markings is fraught with various difficulties and is an unsatisfactory arrangement at best.

5 The present invention, by forming the indicia markings directly in the material without any addition of ink or other matter, makes a permanent marking which cannot be effaced without destroying the package and which is, 10 further, of a structure similar to the rest of the package and in keeping with its general appearance and structure. A very important advantage is that it is possible to have the packaging operation and the indicia marking operation in 15 close proximity with each other to insure the absolute alignment of the indicia marking in the proper place on each package. The package produced according to this invention utilizes a regenerated cellulose material of a normally 20 tough and wiry nature to produce article enclosing envelopes of a resilient nature resistive to tearing and having the necessary strength to properly retain the commodity articles in sealed and sanitary segregation. This envelope is 25 formed by surrounding the packed article with sealing areas in which the material is joined together in an inseparable bond subjected to an oxidization process wherein the physiochemical nature of the cellulose material is altered to become brittle and easily torn, in contradistinction 30 with the normally tough and wiry nature of the cellulose material. The indicia markings may be provided in a central portion of the commodity containing enclosure of the package so as not to weaken that portion of the enclosure 35 areas which actually engage with the article. In another form of the invention, the indicia markings may be accomplished by utilizing an outline effect of the oxidization process to form the indicia. In any event, the indicia markings are 40 produced by the use of an oxidization treatment of the cellulose material to produce a change in the refractive index of the material along predetermined lines signifying intelligence conveying symbols.

45 Referring to the drawings in detail, Figs. 1 and 2 show a portion of the packaging machine according to the invention. A roll of regenerated cellulose material 1 of strip formation is provided upon the spindle 2. The regenerated cellulose material comprises a base bearing a fusible coating thereon, is initially of a tough and wiry nature and is substantially transparent to light. A leader 3 extends from the roll 1 and is fed 55 over idler rollers 4, 5, and 6, the spindle 2 and idler rollers 4, 5 and 6 being suitably mounted on a frame member 8. From idler roller 6 the leader strip 3 extends into the article feeding and package forming equipment. The commodity articles 11 are fed in the direction of the arrow 12 along vertical axis A. These commodity articles may be, for example, in the form of medicinal pellets and the article feeding mechanism, as well as the form of the packaging equipment in general, may be of a form shown 65 in more detail in my copending application Serial No. 748,846, filed October 18, 1934, now Patent No. 2,083,617, issued June 15, 1937.

70 Another lead sheet 1 similar to lead sheet 10 extends over idler pulley 13a and proceeds from equipment substantially similar to that shown on the right hand side of the axis A in Fig. 2. That is, the apparatus is substantially symmetrical on opposite sides of the axis A, the left-hand 75 portion of the equipment being omitted to avoid

duplication and promote simplicity in the representation.

The package forming equipment consists, in part, of a pair of rollers 13 and 14. These rollers are mounted upon shafts 15 and 16 extending 5 through suitable bearings in the supporting frame 8 and another supporting frame 9. These shafts 15 and 16 have a hollow portion coextensive with the rollers 13 and 14 in which heater cartridges 18 and 19 are provided, respectively. 10

Suitable collector and terminal units 17 and 20 are provided for supplying electrical energy to the heater cartridges 18 and 19, and the exact construction of these units may be similar to other such structures described later in connection 15 with indicia marking rollers.

The roller 13 is provided with a peripheral row of recesses 21, 22, 23 and 24 while the roller 14 is provided with a peripheral row of recesses 25, 26, 27, and 28. In the peripheral surfaces surrounding these recesses, the rollers 13 and 14 20 are provided with crimping areas as may be seen in part in Fig. 1 with reference to roller 13. These crimping surfaces are mechanically complementary to each other so that the crimping 25 surface of roller 13 meshes or engages with the crimping surface of the roller 14 to produce a forced interdigitation of the cellulose material fed therebetween. The exact configuration of these crimping surfaces may be compared with 30 a criss-cross formation.

In rotation of the rollers 13 and 14, the recesses 21-24, respectively, coincide with the recesses 25-28 of the roller 14, so that the commodity articles are held therebetween in a proper 35 positioning effect without crushing, while the crimping surfaces join the opposed layers of packaging material in crimped bonding areas surrounding these articles. This forced interdigitation process between the crimped areas is accompanied by a heating process due to the 40 heating cartridges 18 and 19 which cause the oxidation of the coated cellulose material within a range lower than that required to produce mere adherence of the material and less than that 45 which would produce crumbling of the material, thereby producing an embrittled structure.

The shafts 15 and 16 are provided with gears 31 and 32 which engage with one another and cause the complementary rotation of the rollers 13 and 14 in opposed directions. The shaft 16 50 may be coupled through suitable gearing with an electric motor and also with other equipment in the packaging machine such as the article feeding mechanism to which reference was previously made. The gear 32 also engages with an intermediary gear 34 which transmits motion to a driven gear 35. The driven gear 35 is secured upon a shaft 36 mounted between the 60 frame members 8 and 9. This shaft 36 carries a cam member 37. At a point above the axis of the shaft 36, but on the other side of the frame member 8, an indicia roller 40 is provided. The surface of the roller 40 is provided with raised indicia marking elements which, in the present 65 instance, by way of illustration, are numerals from "0" to "9". This indicia roller is mounted on a shaft 44, supported between the members of a yoke 41 pivoted on a shaft 42 extending through the frame members 8 and 9. Extending 70 from the yoke 41 in alignment with the shaft 44 and the roller 40, there is provided a cam follower element 45 which peripherally engages the cam 37. A suitable slot is provided in the frame member 8 to permit a vertical movement of 75

the follower element 45 therethrough in following the contour of the cam. Mounted on the shaft 44 adjacent the roller 40 and secured thereto, there is provided a ratchet 46 for imparting step by step motion to the roller 40. The number of indicia markings and the teeth on the ratchet 46 are disposed so that each tooth of the ratchet advances the roller 40 sufficiently to present a new number or indicia marking in proximity to the strip 3. Adjacent the ratchet 46 an arm 48 is provided on the shaft 44 and is positioned to engage with a pin 49 mounted in the frame member 8. As shown in Fig. 2, a pawl 50 is provided on the arm 48 and is forced by a spring 51 into engagement with the teeth of the ratchet 46. Other ratchet and pawl means not shown, are provided for preventing rotation of the indicia roller except under influence of the ratchet 46. Arm 53 extends from the yoke 41 on the other side of the shaft 42 and is provided with a tension spring 54 which is secured to the frame member 8. The spring 54 urges the follower element 45 in continuous peripheral contact with the cam 37.

The shaft 44 is hollow and is provided with a heater cartridge 60. Fig. 4 shows more in detail the construction of this heater cartridge as well as a commutator arrangement for delivering electrical energy thereto. Referring to Fig. 4 it will be seen that the shaft 44 extends into the yoke structure 41 and that an insulating member 61 is mounted on the shaft adjacent the roller 40 and is adapted to rotate therewith. This insulating member 61 is provided with collector rings which respectively engage with brushes 62 and 63. The brushes 62 and 63 are respectively connected with terminal posts 64 and 65 which have insulating bushings provided with connections to a source of heating current. Shell 67 encloses the collector ring and brushes and is secured between terminals 64 and 65 to the yoke structure 41. Thus, as the roller 40 is rotated, electrical energy is transmitted through the brushes and collector rings to the internal heater cartridge 60 which includes a proper resistance for maintaining the roller 40 within the oxidation temperature range.

Beneath the leader strip 3, and in line with the roller 40, there is provided a roller 40a which is substantially similar to the roller 40 with the exception that the indicia markings provided thereon are mechanical complements of the indicia markings on roller 40. That is, whereas the indicia markings on roller 40 are raised characters, the indicia markings on roller 40a are complementary depressions. All of the other parts described in connection with roller 40 are similarly provided in connection with roller 40a and include the arm 48a, pin 49a, yoke 41a, as well as spring 54a.

The cam 37 has a configuration substantially in the form of an ellipse. When the major axis of the cam is in alignment between axes of the rollers 40 and 40a, as shown in Fig. 2, the cam followers associated with these two rollers are in an extended position so that the rollers occupy positions spaced apart from the strip 3 as shown in Fig. 2. When the cam 37 has rotated into a position with the shorter axis in alignment between the two rollers 40 and 40a, the rollers 40 and 40a come into engagement, thereby producing a forced indicia interdigitation of the strip 3, while at the same time heating the desired portion to produce an oxidation sufficient to change the physiochemical character of

the material to alter the index of refraction in the area forming the indicia marking.

Intermediate the idler rollers 5 and 6, an idler roller 7 is provided. The idler roller 7 is mounted for rotation in a member susceptible to vertical movement through slots provided in a mounting bracket 7a and the frame member 8. A suitable spring is provided for normally retaining this member in a downward position. The strip of packaging material 3 extends beneath this idler roller 7 which acts as a tension pulley for the cellulose strip material.

In the operation of the system, the cellulose strip is fed, on one side of the machine, over roller 4 between rollers 40 and 40a, over idler roller 5, under tension pulley 7, over idler roller 6, and thence between the bonding and heating rollers 13 and 14. A similar arrangement may be provided on the left hand side of the axes A in Fig. 2 for feeding the strip material in a right hand direction toward the crimping rollers 13 and 14. As the rollers 13 and 14 are rotated to draw the cellulose material through the various idler pulleys, while the commodity articles 11 are deposited between the strips of material by suitable operating mechanism, the cam 37 is driven through the intermediary of gears 34 and 35 in timed relationship with the rotation of rollers 13 and 14. The configuration of the cam 37 is such that its continuous rotation causes the rollers 40 and 40a to come quickly together for an instant corresponding to the passage of an amount of package material corresponding to one package unit. When the cam 37 revolves to a position permitting the rollers 40 and 40a to return to the normal extended position due to the springs 54 and 54a, the arms 48 and 48a engage pins 49 and 49a which operate the ratchets on each of the rollers to revolve the rollers one step, so that a new indicia marking is in proximity to the leader strip 3. Thus, in each marking operation of the rollers 40 and 40a, a new indicia marking is provided. It will be understood that instead of the arrangement shown, several adjacent rollers could be provided on each side of the strip 3 and mechanical means arranged to actuate them in accordance with the mechanism usually found in counters or speedometers whereby each successive roller is operated after a complete revolution of the adjacent one. In this manner serial numbers up to several digits can be applied in succession to the strip so that each package unit can have its own serial number. Again, the ratchet actuating mechanism can be modified so that the indicia marking is changed at any desired point in the passage of packaging material so that the same indicia marking could be applied to a group of packages and then automatically altered for a subsequent group.

Fig. 5 illustrates the appearance of a strip of the material passing through the various operations of the machine shown in Fig. 2. The section "c" represents a portion of the strip before reaching the rollers 40 and 40a. The section "d" represents the subsequent portion of the strip after having been acted upon by the rollers 40 and 40a and in which the indicia characters have been marked by the oxidation process in anticipation of the formation of packages in predetermined areas. The section "e" represents completed package sections in which the leader strip 3 has been joined with the leader strip 10 to enclose commodity articles 11 with further oxidation areas surrounding the articles to form embrittled sealing areas, the packaging material

thus being subjected to a dual oxidization process.

Fig. 6 shows one of the package units such as might be detached from section "e". It will be seen that the package presents a uniform appearance and has many advantages due to the novel form of sealing in combination with the novel form of indicia marking due to the oxidization process.

Fig. 7 shows an alternative form of indicia marking where a similar marking is placed on a considerable number of package units. In this form of the invention, the crimping rollers 13 and 14 are themselves modified so that the crimping surfaces have areas in which no crimping occurs but which areas are surrounded by crimping and heating surfaces. The outline indicia marking in Fig. 7 represents the number "100". Such an arrangement provides another method of applying indicia which may be employed for certain purposes in lieu of the rollers 40 and 40a or in combination therewith. Again, the surface of the crimping rollers may be disposed in a way such that the entire crimping area intermediate each of the commodity containing enclosures of the finished package is in the form of an indicia marking, whereby the embrittled indicia configuration serves not only for designation purposes but forms a bond joining the layers of packaging material. Fig. 7 shows how the crimping area intermediate the package containing areas can be utilized to provide indicia markings and these indicia markings may be either of the outline type as shown in the figure, or, conversely, with the crimping area forming the indicia as well as the bond.

For special effects, it may be desirable to produce color indicia markings, and for this purpose an arrangement such as shown in Fig. 8 may be used. Fig. 8 represents an adaptation of the machine shown in Figs. 1 and 2, whereby means are provided to apply a coloring material to the indicia markings. In place of rollers 40 and 40a there are provided two rollers 80 and 81 which are similar to the rollers 40 and 40a except that, instead of a series of consecutive numbers, similar numbers are provided entirely around the periphery of each of the rollers, the numbers being spaced in accordance with the spacing between individual package units. This arrangement of the numbers is only an alternative form and, of course, it will be understood that any desired arrangement of numbering or indicia markings can be provided as desired.

A color roller 83 is suitably mounted for rotation and is of a form having a soft rubber peripheral surface. The roller 83 is positioned to rotate partially within a container 84 having a coloring material 85 therein. The coloring material 85 is preferably of a finely divided form such as a gold, silver, or aluminum powder. Intermediate the roller 83 and the roller 81 is a transfer roller 82 which also has a rubber peripheral surface. The roller 83 and roller 82 are driven by a suitable mechanical connection with the other rotatable elements. The surfaces of the rollers 82 and 83 may be of any desired texture for transferring the desired amount of coloring powder to the surface of the roller 81. If desired, these surfaces may be of a slightly roughened form to collect greater amounts of powder than would cling to a smooth surface. As the roller 83 revolves within the container 84 a certain amount of the material 85 clings to

the surface of this roller. The transfer roller 82, peripherally contacting roller 83 and roller 81, transfers a sufficient amount of this coloring material to the indicia characters on the surface of the roller 81. The rollers 80 and 81 are mechanically complementary and differ from the rollers 40 and 40a in that they revolve continuously without the intermittent movement in a plane intersecting their axes. As the coated cellulose feeder 3 is fed between rollers 80 and 81, the indicia characters on the surfaces of rollers 80 and 81 form embrittled indicia characters upon the material of feeder 3, as before described. At the same time, the coloring material on the roller 81 is caused to become integral with the embrittled indicia area of the cellulose material due to the oxidization process. In other words, the heating of the coated regenerated cellulose material within the oxidization range produces a physiochemical union of the cellulose material and the color material in the area of indicia configuration. The treated material is thus of a different character than the normal texture of the cellulose material.

Various changes can be made in the representation of Fig. 8. For example, the coloring powder may be applied directly to the material after it has been treated by the rollers 80 and 81 and before the indicia areas have cooled and before the oxidization process ceases. Likewise, the roller 83 may be provided with various means for supplying the finely divided powder. If required, a pneumatic force system can be provided for feeding the powder against the roller 83 or directly against the cellulose material as before pointed out. In any event, the system shown in Fig. 8 may be utilized to provide a form of indicia of striking appearance. Reference is made to my co-pending divisional application Serial Number 52,806, filed December 4, 1935.

Although the foregoing discloses a preferred form of the invention, it will be understood that many changes and modifications can be made therein without departing from the intended scope of the invention. No limitations are intended other than those imposed by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of providing indicia characters on regenerated cellulose material comprising a base having a fusible coating which comprises, applying heat to a predetermined area of said material corresponding to an indicia configuration to fuse and oxidize said coating to change its refractive index.

2. The method in accordance with claim 1 including the step of oxidizing said base concomitantly with the fusing of said fusible coating.

3. The method in accordance with claim 1 which consists in applying a coloring material in said predetermined area to mix with said fusible coating while heated and within the confines of said indicia configuration.

4. The method of providing indicia characters on regenerated cellulose material which comprises applying heat and pressure simultaneously on both sides of said material in the same predetermined area corresponding to an indicia configuration, said heat being continued to a degree sufficient to oxidize said cellulose material to alter the refractive index thereof.

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