March 17, 1942. R. R. RICHARDSON 2,276,997

CARTON MAKING APPARATUS

Filed Sept. 20, 1939 3 Sheets-Sheet 1

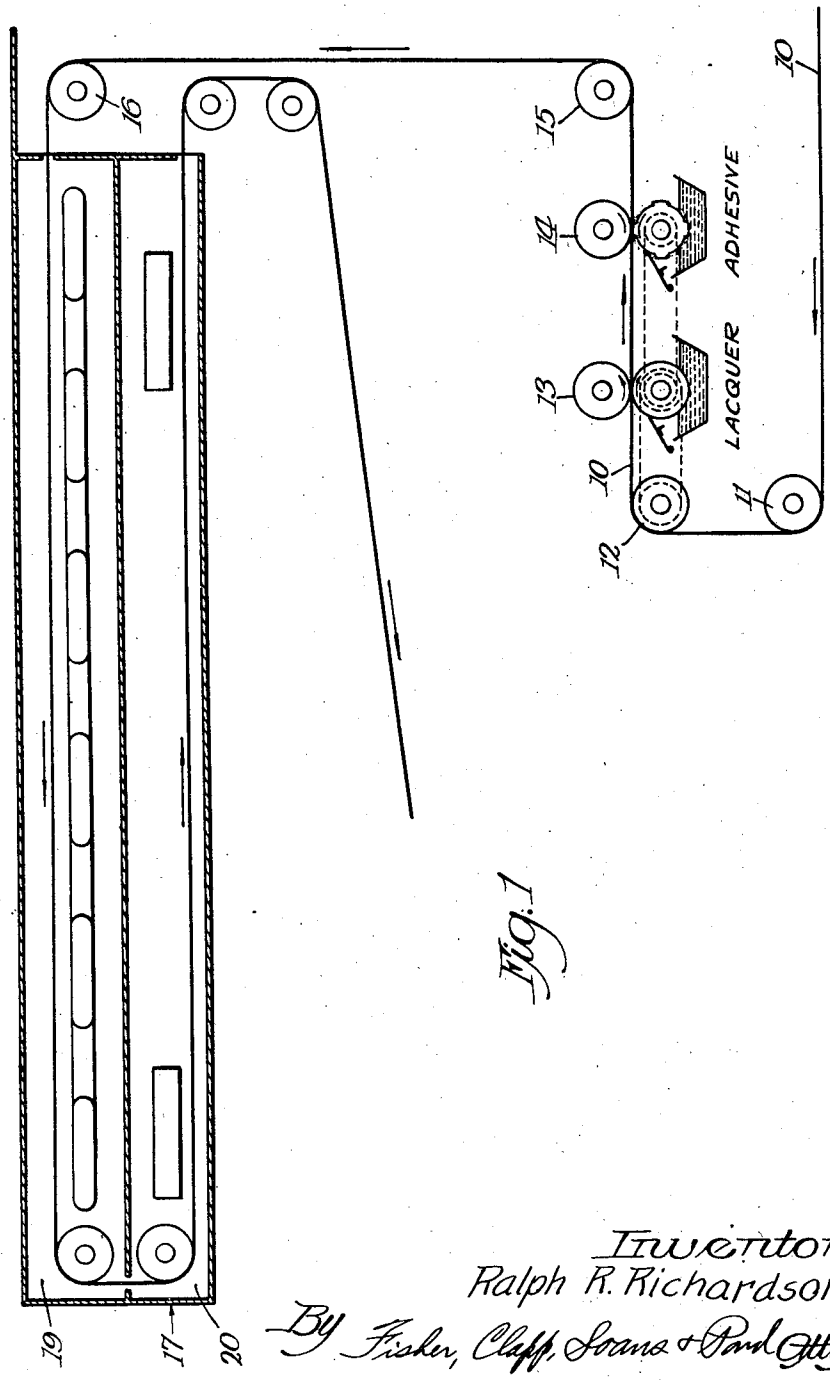


Fig. 1

Inventor:
Ralph R. Richardson
By Fisher, Clapp, Soans & Pond Attys.

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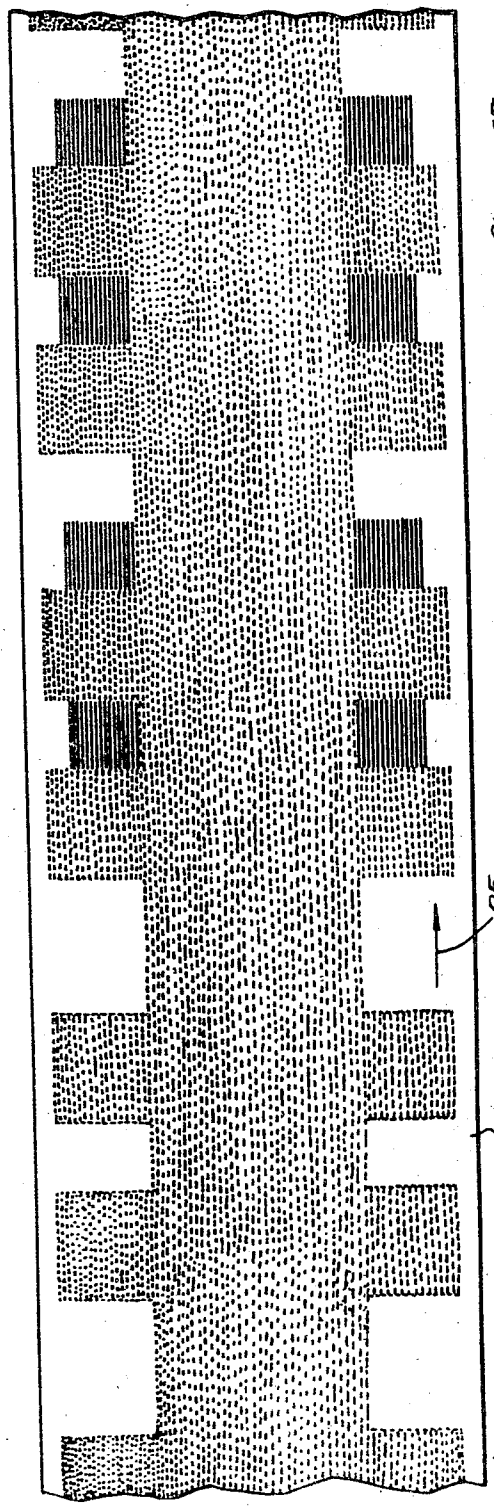


Fig. 2

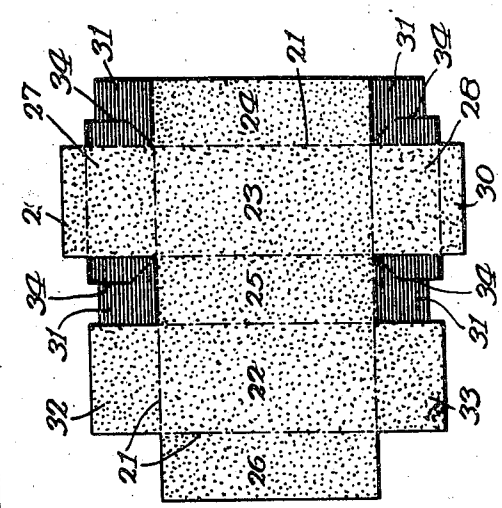


Fig. 3



Fig. 9

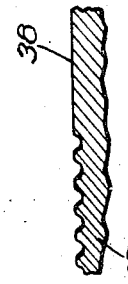


Fig. 8

Inventor:
Ralph R. Richardson
By Fisher, Clapp, Soans & Pond
Attys

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CARTON MAKING APPARATUS

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Fig. 4

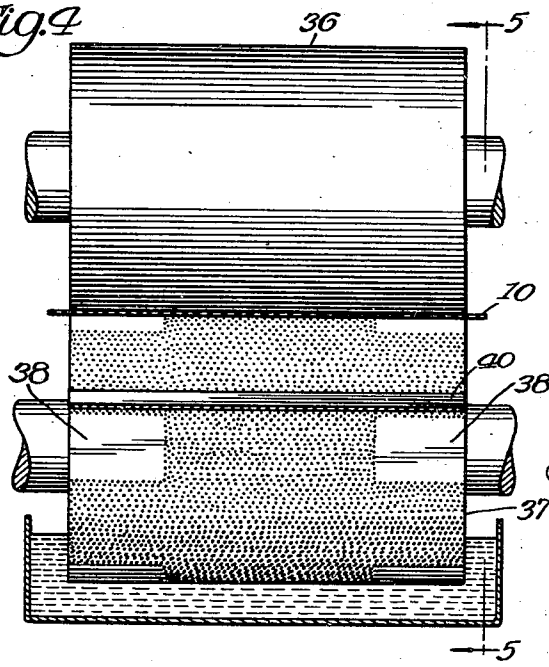


Fig. 5

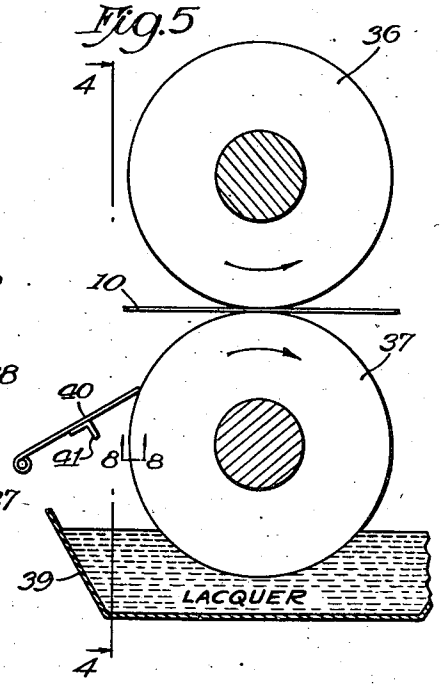


Fig. 6

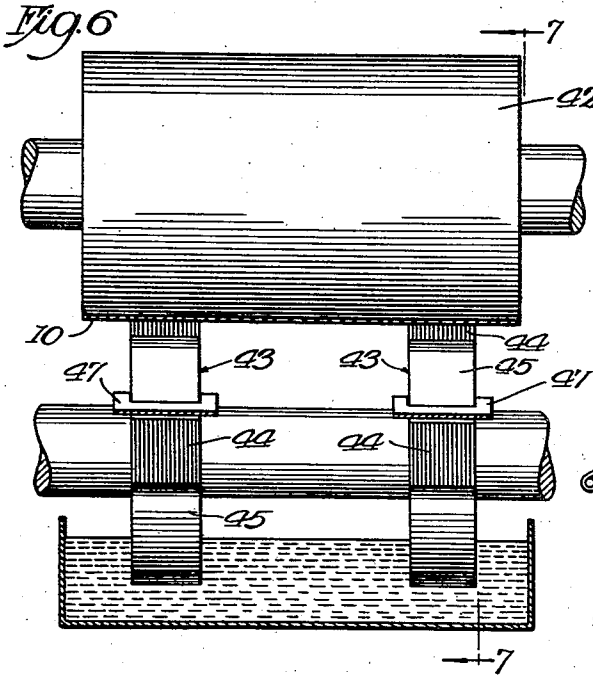
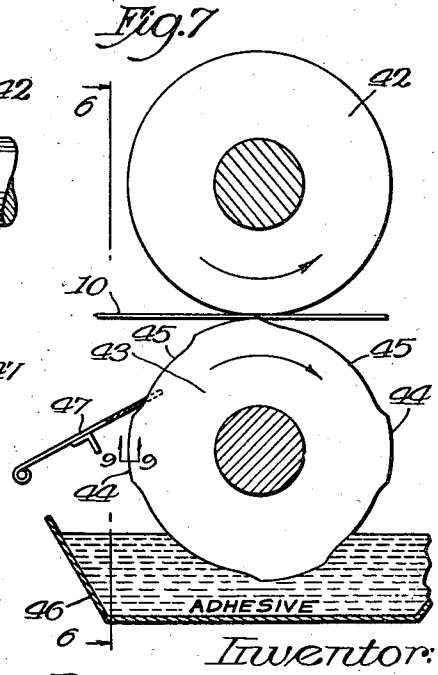


Fig. 7



Inventor:
Ralph R. Richardson

By Fisher, Clapp, Soans & Pond Attys.

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UNITED STATES PATENT OFFICE

2,276,997

CARTON MAKING APPARATUS

Ralph R. Richardson, Chicago, Ill., assignor to United Biscuit Company of America, Chicago, Ill., a corporation of Delaware

Application September 20, 1939, Serial No. 295,715

3 Claims. (Cl. 91—51)

This invention has for one of its objects the provision of means for facilitating the production of a carton-forming blank having a face, or predetermined portions thereof, coated with impervious or other finishing material, or adhesive for employment in maintaining the blank permanently folded, either set up in carton form or in collapsed form from which it may be readily adjusted to set-up form.

The invention is furthermore concerned with the provision of a carton structure and the method and apparatus for making the same and in which a finishing coating, and adhesive material for the purpose indicated, may be applied to the same face of the carton-forming blank in such a manner that when the blank is folded to carton form the entire inside or outside of the carton will be lined or coated with the impervious or other coating material.

It is also an object of the invention to provide a method and apparatus whereby two or more kinds of coating materials may be applied to a carton blank in successive operations, the succeeding coating being applied while the preceding coatings remain wet; to provide such an arrangement in which the depth or thickness and also the area of the coating may be effectively controlled; to provide means whereby two or more coatings may be successively applied but simultaneously dried; and in general, it is the object of the invention to provide an improved carton and an improved method and apparatus for making the carton.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings (3 sheets) wherein there is illustrated a carton and the method and apparatus herein contemplated for producing the carton.

In the drawings:

Figure 1 is a diagrammatic illustration showing the general scheme for applying two wet coatings to a web of carton stock and the arrangement for simultaneously drying such coatings;

Figure 2 is a plan illustrating the form in which the two coating materials are applied to the web of material for the production of a carton blank selected for purpose of illustration in this application;

Figure 3 is a plan of a carton blank which is selected for the purposes of illustration in this application;

Figures 4 and 5 are front and end views, respectively, of a roll set for applying one kind of coating material, the relationship of Figures 4 and 5 to each other being indicated by the lines designated 4—4 and 5—5 on Figures 5 and 4, respectively;

Figures 6 and 7 are front and end views, respectively, of another roll set for applying another form of coating material to the web, the relationship of Figures 6 and 7 to each other being respectively indicated by the lines designated 6—6 and 7—7, respectively, on Figures 7 and 6; and

Figures 8 and 9 typify sections, respectively, on lines 8—8 and 9—9 of Figures 5 and 7, respectively.

Referring now to the drawings and particularly to Figure 1, a paper web designated 10 of suitable carton stock is directed around guide rollers 11 and 12 and through roll sets or devices respectively indicated at 13 and 14 for successively applying lacquer and adhesive or other predetermined coatings to predetermined areas of the underside of the web 10 of the carton stock as it passes through said devices. The web with its wet coating on its under surface is then guided around another guide roll 15 and carried upwardly and over a guide roll 16, thence through a suitable drying and conditioning oven 17 from which the web travels to apparatus for performing other desired operations on the web.

The drying and conditioning equipment above referred to should be understood as merely typifying any suitable equipment for the purpose indicated. It may consist of only a drying section such as represented by the upper section 19 of the oven, or it may comprise or include a moistening or conditioning section represented by the lower section 20.

It will be understood that it is here contemplated, for illustrative purposes only, that the coating materials applied by the devices indicated at 13 and 14 will be applied to one side of the web and that printing or other matter will be applied to the opposite side, which in the finished carton will be the outside thereof. Obviously, however, the method and apparatus illustrated may be employed with advantage in applying coatings to the carton stock in other relationships.

As shown in Figure 3, the blank prepared by the method and apparatus herein disclosed is of generally rectangular form and it is scored or creased to provide panels and flaps adapted to be folded to form a rectangular carton. The blank as shown in Figure 3 is provided with crease or fold lines designated 21 represented by

dot and dash lines. The crease lines divide the blank into top and bottom panels 22 and 23, respectively, front and back panels 24 and 25, respectively, which are adapted to be folded upwardly relative to the bottom panel, and a side panel 26 integral with the top panel and designed to be folded downwardly therefrom to overlap the front panel 24 when the blank is folded to carton form. There are also formed end panels 27 and 28 which are adapted to be folded upwardly relative to the bottom panel 23 to form end walls for the container. Flaps designated 29 and 30 extend from the end wall panels 27 and 28, respectively, and are adapted to be folded inwardly over the top of the contents of the package or, if preferred, folded to overlap the inside of the respective end walls. The end walls 27 and 28 are respectively connected to the side walls 24 and 25 by means of corner portions each of which is designated 31 and each of which is suitably slitted and creased to permit folding of such corner portion either inwardly or outwardly of the end wall in a manner well known in the art. The top panel 22 is also provided with end extensions 32 and 33, which are adapted to be folded downwardly to overlap end walls 27 and 28 when the carton is formed.

The carton blank shown in Figure 3 may, for purposes of illustration, be considered as having been designed for containing a food product or the like which deteriorates upon exposure to the air. To impart to the carton the ability to preserve its content against such deterioration, it is preferably coated with an impervious lining material which in this instance may be a lacquer coating. Lacquer dries quickly and forms a smooth, non-sticky, non-soluble, but flexible coating, which permits folding of the blank without cracking the coating. The entire inside face of the blank, except the corner portions 31, is preferably coated with such impervious lining forming material, so that when the blank is folded to carton form the carton will have its entire inside surface lined with the impervious coating. The lacquer coating is indicated in Figure 3 (and also in Figure 2) by stippling. For the purpose of maintaining the blank in its folded condition, the corner portions 31 are coated with adhesive as indicated by the shading covering such corner portions (both in Figures 2 and 3). In folding the blank, the corner portions are preferably caused to overlap on the outside of the end wall 27, the said portions being folded upon themselves along diagonal fold lines indicated, so that their adhesively coated surfaces contact each other to securely maintain the parts in their folded condition. In the construction shown, the corner portions which are located outside of the slit designated in each case 34 will come into direct contact with the outside of the respective end walls of the carton to afford further securement of the carton in its folded condition.

As shown in Figure 2, the web of carton stock 10 may be considered as traveling in the direction of the arrow 35. In the passage of the web through the lacquer-applying device 13, a continuous coating of lacquer is applied to the central portion of the web and sidewise projections are also simultaneously applied to correspond with the lacquer-coated portions of the blank illustrated in Figure 3. The web progresses and in its passage through the adhesive-applying device 14, adhesive is applied to areas as indicated which correspond to the corner areas 31 as shown in Figure 3. Thereafter the stock with its wet lacquer and adhesive coatings is conducted through the dryer and from thence to suitable cutting mechanism which creases and cuts out carton blanks in the form shown in Figure 3. It will be understood, however, that if desired the web may be subjected to printing or lithographing on the opposite side of the web, either before or after, if preferred, the web may be subjected to certain scoring and cutting operations before the application of any coatings thereto.

Referring now particularly to Figures 4 and 5, the lacquer coating is applied by means of a roll set or device comprising a platen roll 36 and an applicator roll 37. The latter has its cylindrical surface engraved with a suitable intaglio design which corresponds to the area to be coated with lacquer as illustrated in Figure 2. As shown, the engraved area is represented by stippling, small end areas designated 38 being left smooth and unengraved. The rolls 36 and 37 are suitably mounted for rotation and the roll 37 has associated with it a pan 39 carrying a supply of lacquer through which the roll rotates. In its rotation, the roll picks up a coating of the lacquer which fills the engraved design on the surface of the roll. A doctor blade 40 is provided for doctoring from the surface of the roll all of the lacquer not carried by the engraved design, the doctor being provided with a transverse member 41 which causes the lacquer scraped from the roll to be returned to the lacquer pan. By employing an engraved pattern for carrying the supply of lacquer and applying it to the carton stock, the amount of lacquer applied to the carton stock may be effectively regulated by making the pattern of proper depth and of such coarseness or fineness as will retain the desired quantity of the lacquer. It will be understood that the doctor will remove from the surface of the roll, including the unetched areas 38, all of the coating material which is not contained in the recessed portions forming the intaglio.

The roll set or device designated 14 for applying the adhesive in the areas 31 is shown in Figures 6 and 7, and preferably comprises a smooth-surfaced, cylindrical platen 42 and a pair of adhesive-applying discs 43, 43. The two discs 43, 43 are of like form and construction and each is of a thickness which corresponds to the width of the area to be coated with adhesive material. As indicated best in Figure 7, each disc 43 is provided with cylindrical surface portions 44 and intervening recessed portions 45. The cylindrical surface portions 44 are provided with intaglios or other suitable engravings as indicated in Figure 6, the said engravings being adapted to be filled with liquid adhesive material as an incident to rotation of the respective discs through a bath of the material in a pan such as indicated at 46. Suitable doctors such as indicated at 47 are provided for each of the discs 43 to remove therefrom all of the adhesive except that which is received within the engraved areas 44. As an incident to the passage of the carton stock web between the discs 43, 43 and the platen roll 42, the intaglios 44 apply adhesive to the areas of the web which constitute the corner portions 31 of the carton blank.

It will be perceived that because of the accurate control of the area to which the respective coatings are applied, it is feasible to apply two or more coatings successively and without drying one coating before the next is applied. This is

an important advantage flowing from the method and apparatus herein described, since it results in a material saving owing to the fact that but a single drying operation suffices for both coatings.

The form of the intaglio or engraved design on the roller **37** and on the discs **43, 43** is here represented by stippling and shading, respectively, merely for purposes of clarity and illustration. It will be understood that these designs may be alike and that they may be in very widely varied forms. The cross-sectional illustrations, Figures 8 and 9, merely typify the general character of the intaglio surfaces of the lacquer-applying member **37** and the adhesive-applying discs **43**.

The devices **13** and **14** are preferably interconnected by gearing or other suitable driving means so that they are properly synchronized with each other to cause the adhesive-applying device to apply the adhesive in proper register with the lacquer applied by the other device. Such driving means is represented schematically in Figure 1 by dotted line representation of a chain drive connection between the devices **13** and **14**. It will be further understood that the devices **13** and **14** are driven at such speed that the lacquer and adhesive-applying portions thereof travel at the same peripheral speed as the paper web so as to avoid relative movement therebetween. Any suitable form of interconnecting drive for this purpose may be applied between the devices **13** and **14** and one of the paper web guide rolls such as **12** or **15**. Since such driving means is well known to those skilled in the art, it is here represented only diagrammatically in Figure 1 by a dotted line representation of a chain drive connection between the paper feed roll **12** and the device **13**. Also, it will be understood that the rolls and discs of the devices **13** and **14** are journelled in suitable framework and that the platen roll of each device may be geared to its cooperating roll or disc so as to be positively driven at the proper speed. Since such details are not a part of the present invention and are well understood, they are not herein illustrated.

The described structure is such that it may be easily applied to more or less conventional carton-making equipment. It involves no difficult or complicated problems of operation and may be employed without disproportionate increase in the cost of carton production.

Changes in the structure set forth may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible, consistent with the state of the art.

I claim:

1. In apparatus of the class described, an intaglio printing unit adapted to print on a predetermined area of a sheet, a second printing unit adapted to print on another predetermined area of such sheet, said printing units being operable in closely coupled relation to each other so that the last applied printing is applied before the first applied printing is dried, said second mentioned unit comprising a platen roll and a pair of rotary disc-like members spaced longitudinally of said platen roll, said rotary members each having cylindrical surface portions provided with intaglio printing designs and having their peripheral portions beyond said designs recessed relative to said cylindrical portions so as to be disposed in spaced relation to the surface of said platen roll, said printing units being so synchronized that said second printing unit is operative to print on a continuous sheet in predetermined areas intermediate areas printed by the first unit, said recessed portions of said rotary members permitting portions of said web to pass through said second printing unit free of engagement between the first printed areas and the rotary members of said second unit.

2. In carton making apparatus, a pair of intaglio printing units, one of said units having an intaglio design adapted to cover the entire area on one side of a carton blank which will be exposed on one side of the carton formed from such blank, the other of said units having an intaglio design adapted to be applied to a different area on said side of the blank intermediate portions of said before-mentioned printed area, and which intermediate area, when the carton is formed, will be disposed in contact with an area of the blank on the side of the carton opposite said exposed printed side, said printing units being operable in closely coupled relation to each other so that the last applied printing is applied before the first applied printing is dried, the printing unit for the last applied printing being provided with a recess on opposite sides of its intaglio so as to avoid contact with the first printed surfaces of the blank, and means for simultaneously drying both printed areas.

3. In apparatus of the class described, a printing unit adapted to print on a predetermined area of a sheet, a second printing unit adapted to print on another predetermined area of such sheet, said printing units being operable in closely coupled relation to each other so that the last applied printing is applied before the first applied printing is dried, said second mentioned unit comprising a platen roll and a rotary intaglio member cooperating with said platen roll, said rotary intaglio member having a cylindrical surface portion provided with an intaglio printing design and having its peripheral portions beyond said design recessed relative to said cylindrical portion so as to be disposed in spaced relation to the surface of said platen roll, said printing units being so synchronized that said second printing unit is operative to print on a continuous sheet in predetermined areas intermediate areas printed by the first unit, said recessed portions of said rotary members permitting portions of said web to pass through said second printing unit free of engagement between the first printed areas and the rotary members of said second unit.

RALPH R. RICHARDSON.