March 7, 1939. A. C. WOOD 2,150,016

METHOD OF PRINTING AND PUNCHING BLANKS

Filed June 7, 1935 5 Sheets-Sheet 1

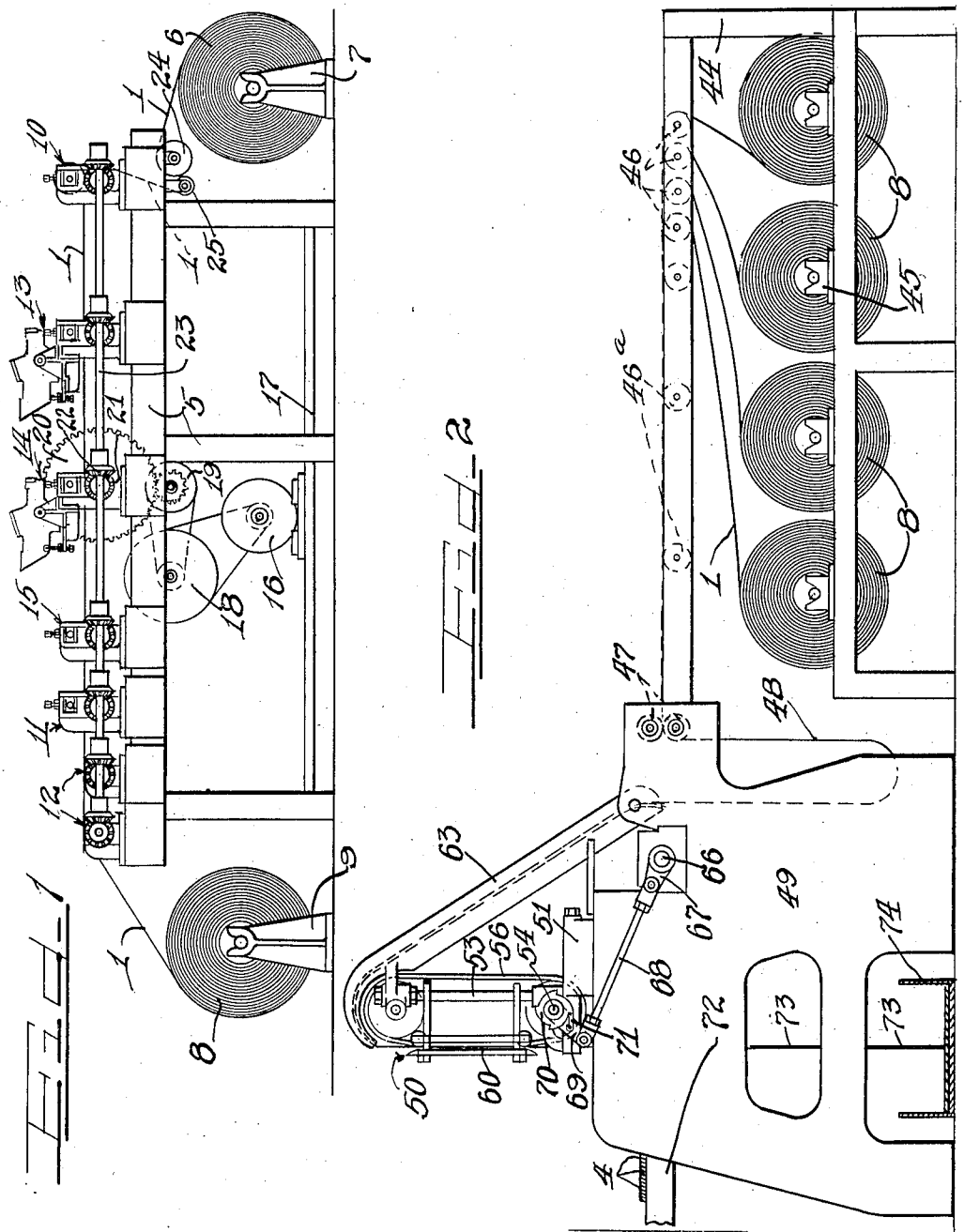


Fig. 1

Fig. 2

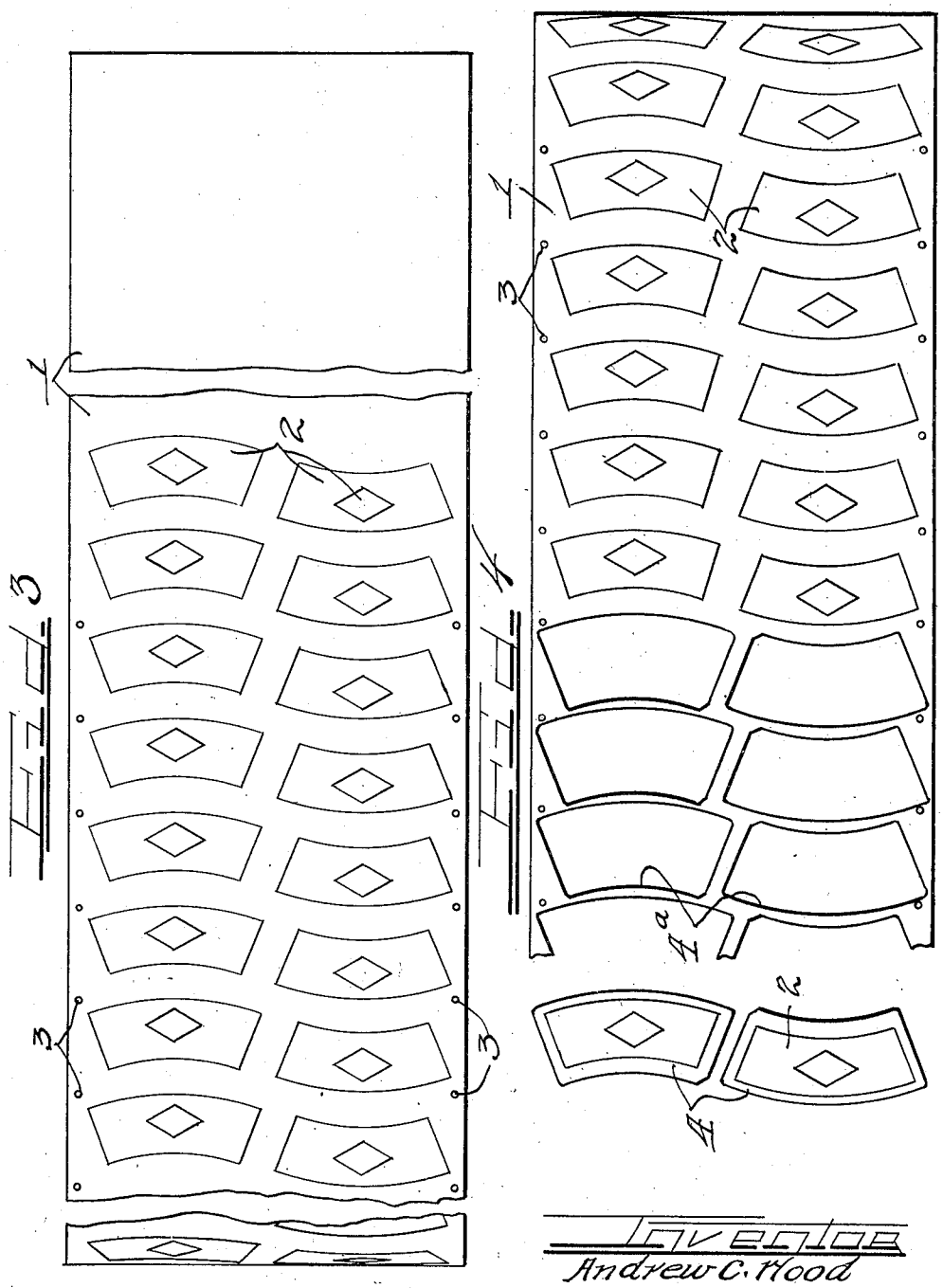
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March 7, 1939. A. C. WOOD 2,150,016

METHOD OF PRINTING AND PUNCHING BLANKS

Filed June 7, 1935 5 Sheets-Sheet 2



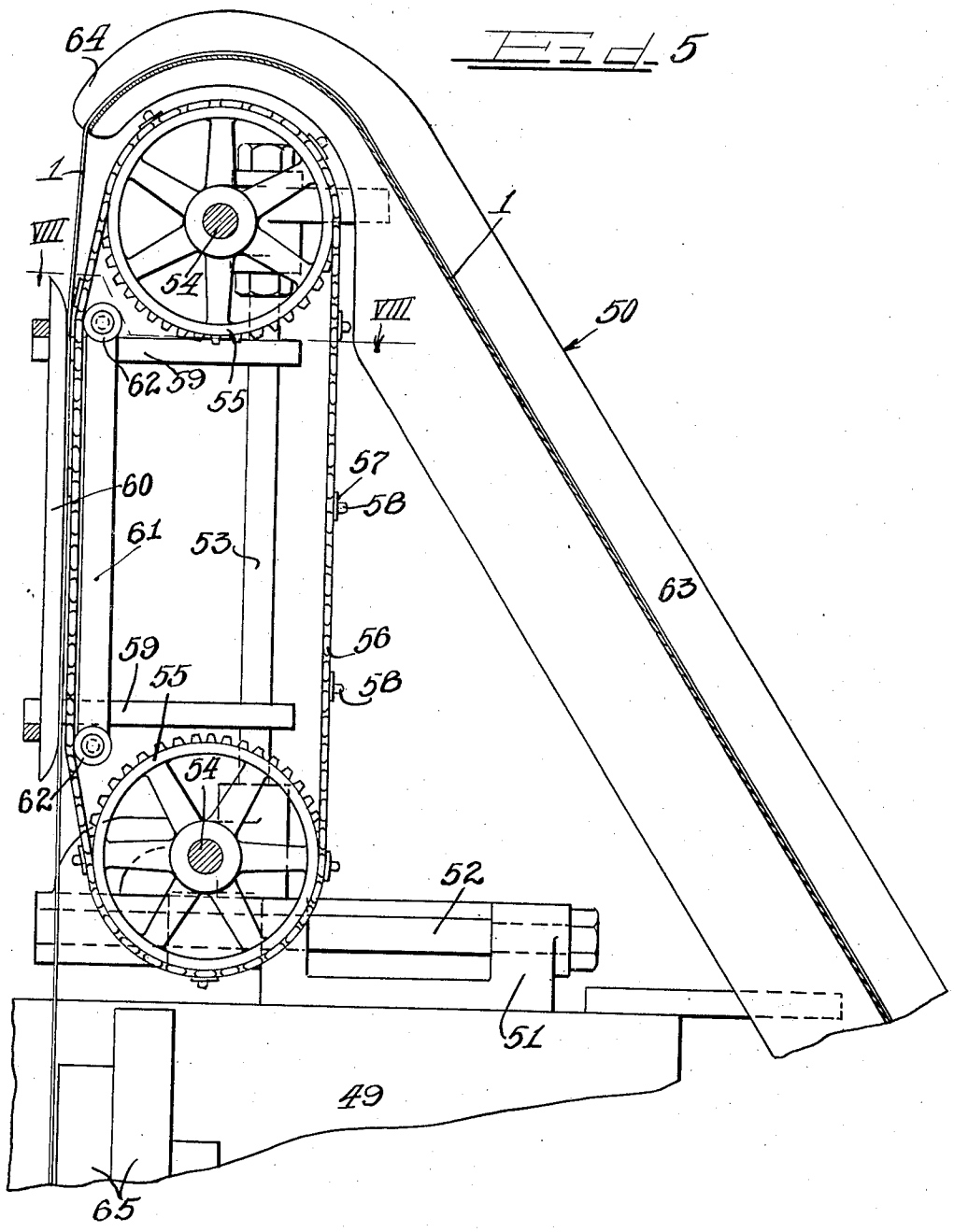
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March 7, 1939. A. C. WOOD 2,150,016

METHOD OF PRINTING AND PUNCHING BLANKS

Filed June 7, 1935 5 Sheets-Sheet 3

Fig. 5



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METHOD OF PRINTING AND PUNCHING BLANKS

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Fig. 6

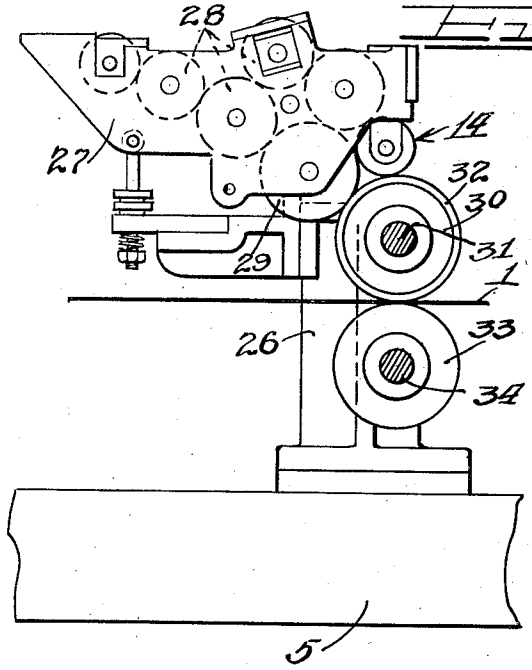


Fig. 7

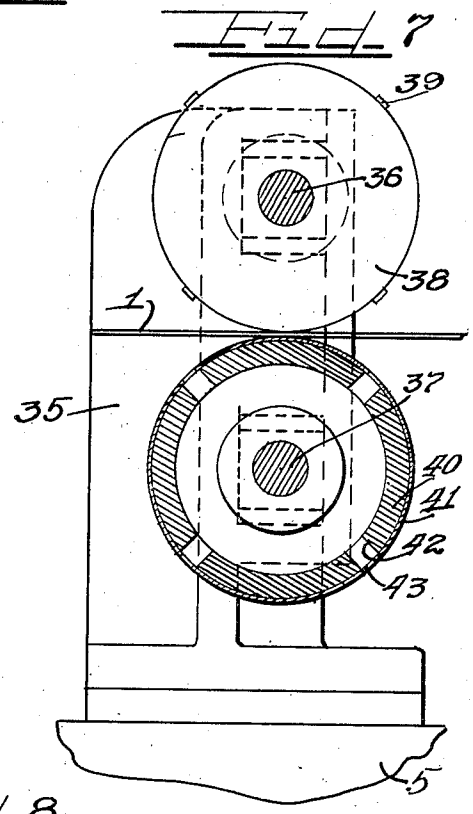
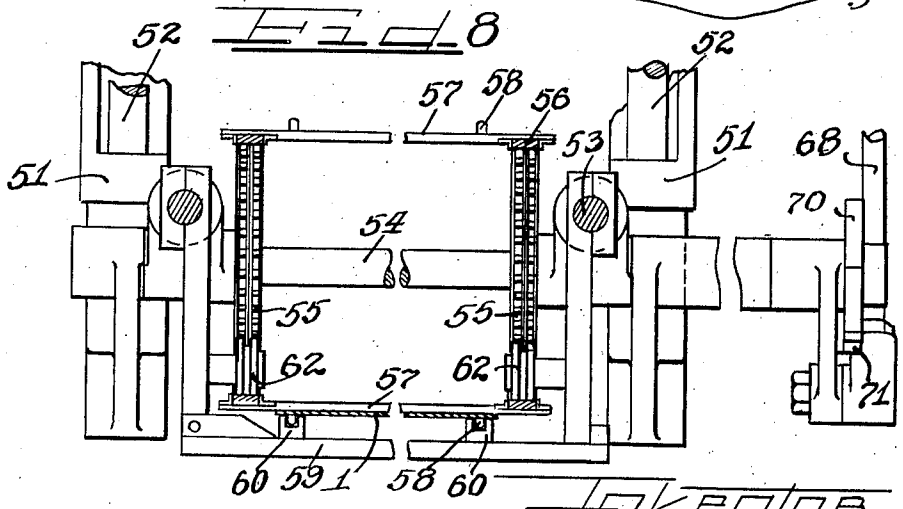


Fig. 8



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METHOD OF PRINTING AND PUNCHING BLANKS

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Fig. 9

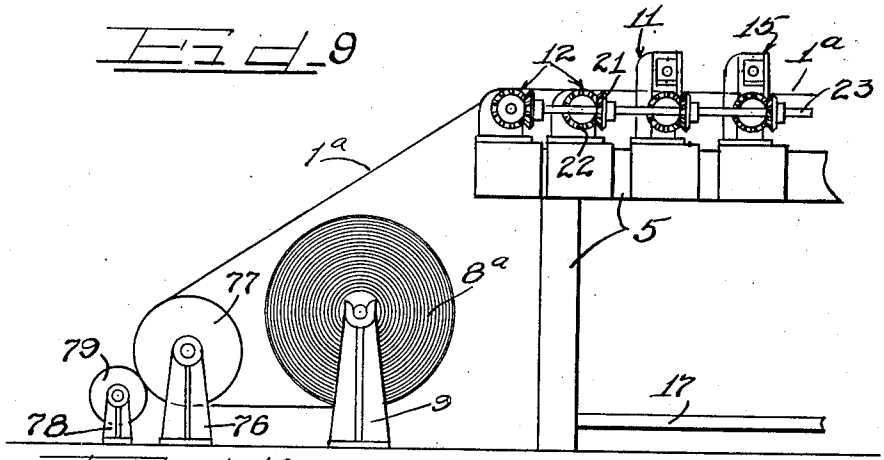


Fig. 10

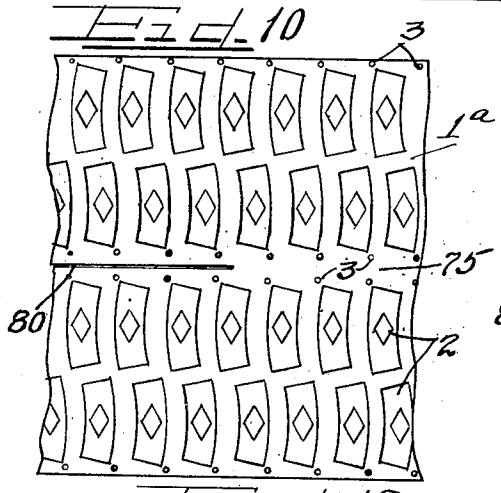


Fig. 11

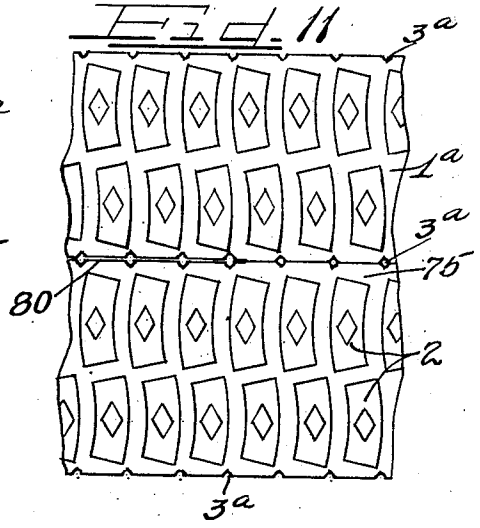
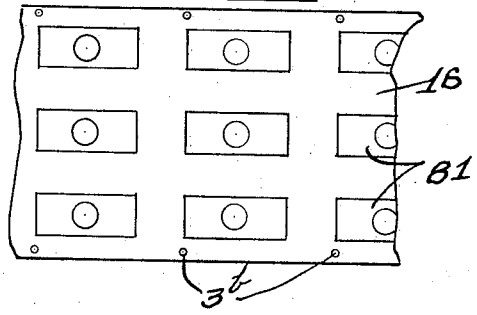


Fig. 12



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Patented Mar. 7, 1939 2,150,016

UNITED STATES PATENT OFFICE

2,150,016

METHOD OF PRINTING AND PUNCHING BLANKS

Andrew C. Wood, Chicago, Ill., assignor to Dixie-Vortex Company, a corporation of Delaware

Application June 7, 1935, Serial No. 25,438

7 Claims. (Cl. 270—1)

This invention relates to improvements in a method of and apparatus for printing and punching blanks of any suitable or desirable kind from paper stock and the like. After being printed, lithographed or similarly decorated, and then punched, the blanks are ready for use in the manner intended, such as pictures, decorative portions of advertising calendars, decorated hand bills, score cards, and similar items.

The present invention is highly desirable for producing printed or decorated blanks for subsequent formation into paper containers, such as drinking cups and the like, although as stated above, the invention is suitable for the production of other and various forms of blanks, as is apparent to one skilled in the art.

Hereinafter, the present invention will be mainly set forth in connection with the printing and punching of blanks for paper containers, as an example and for the purpose of disclosing the invention with the requisite clarity.

Heretofore, by way of further example, where some form of printing matter has been desired on the outer surface of a paper container, it has been the practice to punch out the blanks for the containers, stack the punched blanks and feed them, one at a time, into a printing machine, after which the blanks were again assembled for feeding into a container forming machine. Running the blanks individually through a printing machine after the cutting of the blanks was a slow, tedious and expensive process. Such a process tends to slow up the making of paper containers from start to finish, or else requires considerable additional apparatus for the printing, since, in most instances, blanks are punched or cut more than one at a time from sheets of stock, while the printing must be done by feeding the blanks one at a time to a printing machine. In the manufacture of paper cups and similar containers, economy in production is a matter of vital importance, and the printing of the blanks one at a time results in objectionably expensive production.

With the foregoing in mind, it is an object of the present invention to provide a method of printing and cutting or punching blanks, the method being characterized by first printing the blanks in multiform on a roll of stock, and subsequently punching or cutting the blanks from the stock after the printing.

The method embodied in this invention also includes the multiple printing of blanks upon a roll of stock, and then the simultaneous punching of the blanks from a plurality of such printed rolls of stock.

The method herein involved also includes the steps of printing the blanks in multiple on a roll of stock, providing the stock with aligned openings, registering the stock sheets from several such printed rolls by means of said openings, and punching blanks from a plurality of superimposed layers of such printed sheets of stock.

A further object of the invention is the provision of a method of printing and punching blanks for paper containers and the like, including the steps of contemporaneously printing a desired number of blanks on a continuous sheet of stock and perforating the sheet, utilizing the perforations as a means for aligning a plurality of superimposed continuous printed sheets, and punching blanks from the superimposed printed sheets of stock.

The method of this invention also embodies the steps of rewinding a roll of paper stock, printing the stock at spaced intervals during the rewinding operation, and subsequently punching out the printed portions of the stock to form decorated blanks.

This invention also contemplates the method of first printing rows of blanks upon a continuous sheet of paper stock, and subsequently punching complete rows of printed blanks from the sheet of stock.

It is also an object of this invention to provide a method whereby a continuous sheet of stock is first provided with printing matter for a number of blanks, and the blanks are subsequently punched or cut from the printed continuous sheet, which blanks are then ready for formation into paper cups and the like.

Still another object of this invention is the provision of a method of printing and punching blanks including the steps of printing a relatively wide sheet of stock with printed matter for a plurality of blanks, slitting the relatively wide sheet into desirable widths, and winding the slit portions of the sheet upon spools for subsequent use with punching mechanism.

Also a feature of this invention is the provision of a method of printing and punching blanks including the steps of providing printing for a plurality of blanks upon a relatively wide sheet of stock, providing suitable openings at desirable points in said sheet, slitting the sheet into desirable widths, and winding the slit widths upon spools for subsequent usage in connection with punching mechanism, wherein the spools may be positioned so that the now relatively narrow strips

may be placed in superimposed relationship, aligned by means of the openings, and blanks punched from a plurality of such superimposed sheets at the same time.

It is also an object of this invention to provide apparatus capable of performing the steps of the present method as mentioned broadly hereinabove.

While some of the more salient features, characteristics and method steps of the present invention have been above pointed out, others will become apparent from the following disclosures.

It will, of course, be understood that various types of apparatus or mechanism may be used to perform the method embodied in this invention. Consequently, the accompanying drawings illustrate this apparatus in a relatively diagrammatic manner without bringing out all of the specific details of the construction. While other apparatus might be substituted for that disclosed, certain arrangements or certain uses of the apparatus for performing the method in a preferable manner are desired and the drawings illustrate a satisfactory arrangement.

On the drawings:

Figure 1 is a diagrammatic elevational view of apparatus capable of performing the initial portion of the method embodied in this invention.

Figure 2 is a diagrammatic elevational view of apparatus capable of performing the remaining portion of the method.

Figure 3 is a plan view of a sheet of paper stock after being acted upon by the apparatus of Figure 1.

Figure 4 is a fragmentary plan view of the same sheet of stock after being acted upon by the apparatus of Figure 2, the view disclosing a pair of the punched blanks separate from the sheet of stock and ready for formation into containers.

Figure 5 is an enlarged fragmentary, part sectional, part elevational view of the upper portion of the structure seen in Figure 2.

Figure 6 is an enlarged fragmentary, part sectional, part elevational view of one of the printing elements embodied in the apparatus of Figure 1.

Figure 7 is an enlarged fragmentary, part sectional, part elevational view of the perforating element embodied in the apparatus of Figure 1.

Figure 8 is a fragmentary plan sectional view taken substantially as indicated by the staggered section line VIII—VIII of Figure 5, looking in the direction indicated by the arrows.

Figure 9 is a fragmentary view of the structure shown in the left hand portion of Figure 1, illustrating diagrammatically certain additional apparatus for performing another operation desirable in some instances in the initial portion of the method embodied in this invention.

Figure 10 is a fragmentary plan view of a sheet of stock after being acted upon by the apparatus shown in Figure 9.

Figure 11 is a fragmentary plan view of a sheet of stock after being acted upon by apparatus of the nature of that shown in Figure 9 with a different adjustment.

Figure 12 is a fragmentary plan view of a sheet of stock after being acted upon by apparatus of the character shown in Figure 1, illustrating a different type of printing for blanks of a different nature than those for forming paper containers.

As shown on the drawings:

Before indicating in a general way the construction of the various mechanisms illustrated to perform the method, it will be better to outline in general the method itself.

With references to Figures 3 and 4, it will be seen that in performing the method, a continuous sheet of paper stock 1 of the kind and character suitable for paper drinking cups and similar containers is first run through the printing and perforating apparatus of Figure 1. This sheet of stock 1 may be of any desired width and may have printed thereupon rows of printed matter, as indicated at 2, the printed matter being properly spaced so that a cup blank may be punched from the sheet 1 for each patch of printing. The printing, as will later appear herein, may be in one or more colors, as may be deemed most desirable.

In the present instance, the sheet 1 is of such width as to accommodate two cup blanks in a transverse row, and the printing is, of course, arranged accordingly. For the sake of economy in space, it will be seen that the two blanks in the same transverse row are arranged in opposite order, although any desired arrangement may be had. It will also be understood, as explained more fully later herein, that, if so desired, the sheet 1 may be of such width as to accommodate any desired number of blanks in a transverse row, consistent with feasible construction of machinery and the space to be had at any particular location, and the stock may then be slit or cut into strips of two or more blanks per transverse row, depending on the number of dies in the punching mechanism.

Contemporaneously with the printing of the patches 2, the sheet 1 is provided with aligned openings 3, preferably at equal intervals. These openings 3 may be of any desirable or suitable character, such as notches, recesses, indentations, etc., and are shown in this instance as perforations. While these openings are illustrated as running down the sheet adjacent each lateral edge thereof, in the event the sheet is made wider, the openings may equally as well be run down the center of the sheet or at any desired interior point as well as adjacent the edges of the sheet.

After the sheet 1 has been printed and the openings provided, as indicated in Figure 3, the sheet is next run through the apparatus shown in Figure 2, wherein cup or container blanks 4 are punched from the sheet, leaving openings 4a in the sheet after the removal of the blanks. In Figure 4, the sheet is clearly shown with both a punched and unpunched portion thereof. To the left in this figure, the individual blanks are seen as they appear after being punched from the sheet, each blank carrying a patch of printing 2 thereupon. These blanks 4, when formed into container shape, will each carry the respective printed patch 2 upon the outer surface thereof.

In the punching operation, it is preferable to punch through several superimposed sheets 1 at one time, and the openings 3 along the sheets are utilized to properly align the sheets with respect to each other so that the blanks will be punched from the sheets at the right spots.

While the blanks 4 in this instance are shown as being of a shape to form body portions for flat bottomed cups, to each of which body portions a bottom member is added, it will be understood that the blanks may be of any desired shape for the formation of substantially any

desirable paper container. For example, it might be desired to punch blanks having the general shape of a sector of a circle for subsequently forming conical cups, and in such case, the blanks could also be outlined in inverse alternate order transversely across the sheet 1 to save material.

After the blanks have been printed and punched in the manner outlined in general above, they are ready for transfer to container making mechanism of any desired or suitable character.

The form of apparatus diagrammatically shown in the drawings, which is one form capable of performing the above outlined method, includes a platform or understructure 5 upon which the printing and opening providing mechanisms are mounted. The continuous sheet 1 is fed through this apparatus from a roll or spool of stock 6 mounted on a cradle 7 adjacent one end of the platform 5 to a roll or spool 8 seated in a cradle 9 adjacent the opposite end of the apparatus. In passing through the mechanism, the continuous sheet 1 is unwound from the roll 6 and rewound on the roll 8.

On the understructure 5 adjacent the roll 6 is a tensioning mechanism, generally indicated by the numeral 10, comprising a pair of rolls between which the sheet 1 travels, these rolls being relatively tightly pressed together to securely hold the sheets while feeding the same to the other mechanism. At the opposite end of the structure 5 is a similar tensioning mechanism, generally indicated by the numeral 11, and these tensioning means 10 and 11 maintain the sheet 1 under proper tension therebetween. Between the tensioning means 11 and the roll 8 are a pair of ordinary guide or supporting rolls 12, over which the sheet 1 passes before reaching the roll or spool 8.

Between the two tensioning means 10 and 11, any desirable number of printing units may be provided, depending upon the character and color of the printing desired. In this instance, I have shown two such units, indicated generally by the numerals 13 and 14. Immediately after the printing operation or operations, as the case may be, the sheet 1 passes through an opening providing mechanism, in this instance a perforating unit generally indicated by the numeral 15, which provides the openings 3 above mentioned. It will be noted that the openings 3 are provided contemporaneously with the printing but, if so desired, the openings may be provided in advance of the printing operation, or simultaneously therewith, as may be deemed most feasible.

All of the elements mounted upon the understructure 5, of course, must have a relatively equalized drive in order to keep the sheet 1 under proper tension and prevent tearing of the same. To this end, a driving unit, such as a motor 16, is mounted upon the lower deck 17 of the understructure 5, and the motor is connected by any suitable means, such as a belt, to a reduction pulley 18, in turn connected to a pinion 19 in mesh with a driving gear 20. This driving gear 20 is connected to a horizontally disposed shaft also carrying a bevel gear 21 which in turn meshes with a transversely disposed bevel gear 22 carried by an elongated shaft 23. It is apparent, therefore, that the shaft 23 receives its drive from the bevel gear 21.

The shaft 23 carries a similar bevel gear 22 for driving each of the respective units 10 to 15, inclusive, through a bevel gear mounted on each unit similar to the gear 21. In this manner, all of the units 10 to 15, inclusive, are subject to a uniform speed drive. Adjacent the spool 6, a roller 24 and rider 25 depending from the understructure 5, provide adequate means to form a loop in the paper and take up the slack, or provide the necessary tension between the rider and the tensioning means 11.

With reference now to Figure 6, it will be seen that a printing unit 14, for example, comprises in general a frame 26 to which is pivotally mounted an upper frame 27 carrying the usual gearing and rolls 28 associated with a direct inking roll 29. A printing roll 30 carried upon a transverse shaft 31 mounted in the frame and provided with a printing matrix 32 of any desired character, contacts the inking roll 29. Beneath the printing roll and in vertical alignment therewith is a backing roll 33 carried upon a transversely disposed shaft 34. Of course, the backing roll 33 and the printing roll 30 turn in opposite directions to feed the sheet 1 therebetween while at the same time the printing roll provides the upper surface of the sheet with the proper and desired markings. Of course, any other suitable type of continuous printing mechanism might be used in practicing the method of this invention.

With reference to Figure 7, it will be seen that the perforating unit 15 includes a frame 35 carrying a pair of horizontally disposed shafts 36 and 37, vertically spaced and vertically aligned. The upper shaft 36 carried thereupon a perforating roller 38 having upon its outer surface spaced punching elements 39. The lower shaft 37 also carries a roller 40 thereon encased preferably in a steel covering or tire 41.

The wheel 40 is apertured at spaced intervals, as indicated at 42, and the tire 41 is likewise apertured at spaced intervals with smaller apertures 43 of a proper size to receive therein the punching elements 39, the apertures 43, of course, being in alignment with the apertures 42. Both rollers 38 and 40 are so arranged that when they rotate in opposite directions to feed the sheet 1 therebetween, a punch member 39 will pass in and cut of an aperture 43 during the rotation and thereby perforate the sheet 1, as indicated at 3 in Figures 3 and 4. Of course, the wheels 38 and 40 are arranged to provide a desired number of rows of perforations. The small pieces of stock punched out of the holes 3 by the members 39 fall through the apertures 42 into the interior of the roller 40, from which they can be removed at proper times by any suitable means.

After a continuous sheet 1 has been printed and perforated and wound into a spool 8, the sheet is next passed through the apparatus seen in Figure 2 which punches out the blanks to be later formed into containers. The punching apparatus comprises in general a framework 44 carrying a plurality of spools 8 of printed and perforated stock. Any desired number of spools may be utilized with this apparatus consistent with a feasible size of machine. In this instance, I have shown four spools which, with the particular stock shown in Figures 3 and 4, will result in the simultaneous cutting of eight container blanks. The frame 44 also carries a plurality of stock straightening rollers 46, one for each of the spools 8, disposed substantially rearwardly of the forward edge of the respective spools. The spools 8 each feeds its sheet 1 over the respective roller 46, over suitable carrier rollers 46a and thence through the tension rolls 47. In this manner, four sheets 1 are arranged in superimposed relationship. Immediately beyond the tension rolls 47, the super-

imposed sheets 1 are permitted to form a slack loop 48.

The punching mechanism per se includes a frame 49 which houses any suitable form of punching mechanism for stamping out a blank 4. Upon the top of the frame 49 an aligning and feeding mechanism, generally indicated by numeral 50, is provided. The superimposed sheets 1 of printed and perforated stock are fed from the loop 48 into the feeding mechanism in which they are aligned and again fed into the punching mechanism housed in the frame 49.

General details of the construction of the feeding mechanism 50 will be found by reference to Figures 5 and 8. It will be seen that a pair of brackets or bosses 51 project upwardly from the frame or housing 49, each of which accommodates a bolt 52, by means of which spaced uprights 53 forming the frame of the feeding mechanism 50 are held in position and may be adjusted relatively to the housing 49. These uprights 53 carry suitable bearing means adjacent each end thereof for properly supporting an upper and a lower horizontal shaft 54, on each of which is mounted a pair of sprocket wheels 55. Trained around the sprocket wheels 55 is an endless link chain 56 carrying at spaced intervals thereupon cross bars 57. Each of the cross bars 57 is provided with a pair of spaced detents 58 of a proper size to project through the perforations 3 in a sheet 1.

The uprights 53 also carry upper and lower transverse frames 59 which support a pair of vertically extending channel bars 60. The upper and lower frames 59 are joined by an upright 61 upon each side thereof, and these uprights support upper and lower rollers 62 over which the chain 56 travels. The rollers are merely mounted free and serve as guiding elements to provide a straight stretch of travel for the chain inside of the channel bars 60, as seen clearly in Figure 5. The spacing between the uprights 61 and the channel members 60 is such as just to accommodate the thickness of the chain 56, the thickness of a cross bar 57 and the superimposed sheets of stock 1, so that, as the superimposed layers of stock pass forwardly by the uprights 61, the projections 58 on each cross bar 57 will extend through the apertures or perforations 3 on the opposite sides of the sheets into the channels of the members 60, thereby holding the superimposed sheets of stock in even and exact alignment.

The superimposed sheets of stock are fed to the feeding mechanism structure by means of an inclined trough 63 (Figure 5) curving over the upper sprocket wheels 55, as indicated at 64. As the superimposed sheets leave the portion 64 in the feeding trough, the projections 58 on the cross bars 57 fall into the apertures 3 in the sheets and the sheets are pressed together and aligned while passing the channel bars 60. As the now aligned sheets 1 leave the vicinity of the channel bars 60, the lowermost wheels 62 afford a break for the respective chains 56 so that the projections 58 are withdrawn cleanly from the apertures or perforations 3 in the sheets. The aligned sheets then pass downwardly into the housing 49 of the punching mechanism wherein the blanks 4 are stamped or punched from the sheets by any suitable mechanism generally indicated by numeral 65 in Figure 5.

Suitable driving means (not shown) are provided for the punching mechanism, and, with reference to Figure 2, it will be seen that a shaft 66 also driven by the same means, carries a crank arm 67 pivotally connected to a pitman or connecting rod 68 which is in turn pivotally connected to a link 69 freely rotatable or floating on the lowermost shaft 54. Keyed to the shaft 54 is a ratchet wheel 70 having relatively widely spaced teeth thereupon. The link 69 carries a pivotally mounted dog 71 engageable with the teeth of the ratchet wheel 70, as seen in Figure 2, the dog causing a rotation of the shaft 54 and likewise the sprocket wheels 55 upon the inward stroke of the pitman 68, and riding freely over the ratchet wheel on the outward stroke of the pitman 68, whereby an intermittent drive of the stock feeding mechanism 50 is provided. This intermittent drive, of course, is in proper timing with the actuation of the punching mechanism in the housing 49, so that the superimposed sheets 1 are advanced in accordance with the cutting stroke of the punching mechanism 65.

The operation of the respective mechanisms and the method involved in this invention is believed to be sufficiently clear from the foregoing as to warrant no further detailed description. It suffices to say, in summary, that a spool 6 of blank stock is seated in the crade 7 and the stock fed through the mechanism of Figure 1, wherein a continuous sheet of stock 1 is provided with printing 2 by the units 13 and 14 and with perforations 3 by the unit 15, and is wound into a spool 8. A plurality of spools 8 are mounted in the framework 44 (Figure 2), and the continuous sheets 1 are fed from these spools in superimposed relationship through the feeding mechanism 50 in which they are pressed together in intimate relationship and properly aligned, utilizing the apertures or perforations 3 as aligning means. Upon leaving the feding mechanism, which is intermittently driven as above set forth, the superimposed sheets pass into the blank punching mechanism, and a plurality of blanks are simultaneously cut from the sheets with each blank carrying upon its outer surface a patch of printing matter placed upon each respective sheet by the units 13 and 14. As the blanks are cut they are automatically stacked in a blank receiving trough 72 for subsequent transfer to suitable container making mechanism for formation into cups, containers and similar paper articles. The aligned stock skeletons 73 from which the blanks have been punched descended into a suitable conveyor carriage 74 for proper disposition.

If so desired, the printing might be done with the stock in sheet form, and the stock blanked with tubular ring dies immediately after or contemporaneously with the printing. However, such procedure is much slower than that previously described and subject to unwelcome difficulty in aligning the printing.

As mentioned hereinabove, in some instances it might be desirable to print relatively wide sheets of stock with more than two blanks in a transverse row. Of course, substantially the same mechanism as shown in Figure 1 will be utilized, with the exception that the mechanism will be sufficiently wide to properly print the wider sheet of stock. In the event the punching mechanism is not of suitable width to take a wider sheet of stock, such as the sheet 1a shown in Figure 10, is is desirable to slit or cut the sheet into strips and wind the slit sheets on sectionalized spools. Accordingly, various spool sections may be removed, each with a roll 8a of stock (Figure 9) thereupon, and these spool sections may be aligned in the same manner as the rolls 8 seen in Figure 2 for feeding superimposed layers of printed stock into the punching or cutting mechanism.

In Figure 9, I have illustrated a portion of the apparatus of Figure 1, with the exception that the apparatus of Figure 9 is of sufficient width to accommodate a wider sheet of stock 1*a*. In this instance, the sheet 1*a* is shown as being substantially twice as wide as the sheet 1 previously described herein. The printing mechanism is so arranged that when this sheet is printed, there will be a relatively wider space 75 between the inside longitudinal rows of printing patches. The mechanism 15 for providing the openings 3, which in this instance are again shown in the form of perforations, is adjusted so as to provide not only a row of perforations along each marginal edge of the sheet 1*a* but a pair of spaced rows of perforations in the space 75.

With reference to Figure 9, suitable cutting mechanism for slitting the sheet 1*a* is diagrammatically shown in connection with the printing and perforating apparatus. Mounted in advance of the cradle 9 supporting the segmental roll 8*a* of stock is another cradle 76 carrying a positioning and cutter receiving roll 77. Immediately in advance of this roll is a cradle 78 carrying a cutting wheel 79 positioned so that the cutting edge of the wheel 79 will pass through the sheet 1*a* of stock and enter a suitable groove in the positioning roll 77. In this manner, as the sheet 1*a* is wound into the roll 8*a*, it is longitudinally slit, as indicated at 80 in Figure 10, this figure showing a section of the sheet partially slit. It is desirable to have the slit run through the space 75 in the center of the sheet 1*a*, so that after the cutting, there will be a marginal row of perforations 3 for each strip of the sheet.

Sectionalized spools are preferably used for the roll 8*a*, and these spools are of such a character that they can be left intact or separated into various sections. By slitting the stock during the rewinding operation, other economies in the handling of the stock are evident. There is also less variation in the stock from moisture or other atmospheric causes due to the keeping of the stock in mill-size rolls until after the printing operation and substantially until the stock is ready or required for further handling.

As stated above, different forms of openings 3 may be utilized in the stock. In Figure 11, I have shown these openings in the form of notches 3*a* provided in a sheet of stock 1*a* like that illustrated in Figure 10. The notches 3*a* extend inwardly from the side edges of the sheet and are utilized in the same manner as above explained in connection with the perforations. By using notches along the edges of the stock, only one set of punchers is required between the roll width or in the space 75. The notches may have any suitable form, such as V-shaped as illustrated, in which event a diamond-shaped punch in the space 75 is required. When the sheet is slit by the cutter 79, the slit 80 is made through the center of the middle row of openings so that the central diamond-shaped perforations are divided into two V-shaped notches. In the event the notches are semi-circular, then the center punches would be circular.

It is to be understood that the sheets 1*a* may be of any desirable width, it being a simple expedient to provide another cutter 79 in the event the sheet is to be slit or divided more than once, and it is equally simple to properly adjust the mechanism for providing the alignment openings in the sheet, whether these openings are in the form of perforations, notches, indentations or otherwise.

As illustrative of the fact that the present method is not limited to the printing and punching of blanks for use in connection with the making of paper containers, I have shown a sheet of stock 1*b* provided in the manner above described with printing patches 81 of a distinctly different shape than those utilized for paper container blanks. This sheet of stock may also be provided with openings 3*b* of any desired character for alignment of a plurality of superimposed sheets for feeding into the punching mechanism. The printing patches 81 may be of any desired character, suitable for pictures, advertising, hand bills, decorative portions of calendars and similar articles, or for substantially any printed piece of merchandise capable of being made by the teachings of this invention, which printed blanks may be left flat or formed into suitable shapes for a particular object.

From the foregoing, it is apparent that I have provided a new and novel method of printing and punching various blanks, including those from which paper cups and the like may be made. It will be especially noted that the blanks need not be cut and then run individually through a printing machine, but that an endless sheet of stock is run through the printing machine prior to the cutting and provided with all the desired printing at properly spaced regions thereupon, the printing mechanism printing a plurality of blanks simultaneously. After the printing, it is a simple expedient to punch or stamp the blanks from the continuous printed sheets. It is obvious that the present method affords not only a rapid and easy commercial production of blanks, but also an extremely economical production.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than is necessitated by the prior art.

I claim as my invention:

1. In the art of making paper containers, the method of printing and punching blanks, including first printing a plurality of continuous sheets of stock, aligning the printed sheets, and simultaneously punching complete blanks from an intermediate region of the aligned sheets.

2. In the art of making paper containers, the method of printing and cutting blanks, including contemporaneously printing a desired number of blanks on a continuous sheet of stock and providing a series of openings longitudinally of the sheet, utilizing the openings to align a plurality of superimposed printed sheets, and punching blanks from the superimposed printed sheets.

3. In the art of making paper containers, the method of printing and cutting blanks, including printing the blanks in multiple on a continuous sheet of stock, perforating said sheet at spaced points, aligning several of such printed and perforated sheets in superimposed relationship by means of the perforations, and simultaneously punching blanks from the superimposed sheets.

4. In the art of making paper containers, the method of printing and cutting blanks, including the multiple printing of blanks in rows on each of a plurality of sheets of stock, aligning said sheets in superimposed relationship, and

simultaneously punching complete rows of blanks from the superimposed sheets.

5. The method of printing and cutting blanks, including printing a relatively wide sheet of stock, perforating said sheet in spaced longitudinal rows, slitting said sheet between adjacent rows of perforations, aligning the pieces of slit stock by means of said perforations, and cutting blanks simultaneously from a plurality of aligned pieces.

6. The method of printing and cutting blanks, including printing a sheet of stock, providing said sheet with openings in longitudinal series, slitting said sheet through a series of said openings to divide each opening and leave a portion thereof in each piece of the sheet, aligning the pieces of the sheet by means of said openings, and cutting blanks from the aligned sheets.

7. In the art of making paper containers, the method of printing and cutting blanks from which to make paper cups, including printing a plurality of rows of patches on a sheet of stock with the patches in adjacent rows oppositely disposed, providing spaced rows of openings longitudinally of said sheet, aligning a plurality of said sheets by said openings in superposed relationship, and simultaneously punching blanks from a plurality of rows of printing and from all said superposed sheets.

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