Dec. 10, 1963 R. A. TROSS 3,113,898

METHOD OF PREPARING SCORING DIES

Filed Dec. 9, 1960

Fig. 1

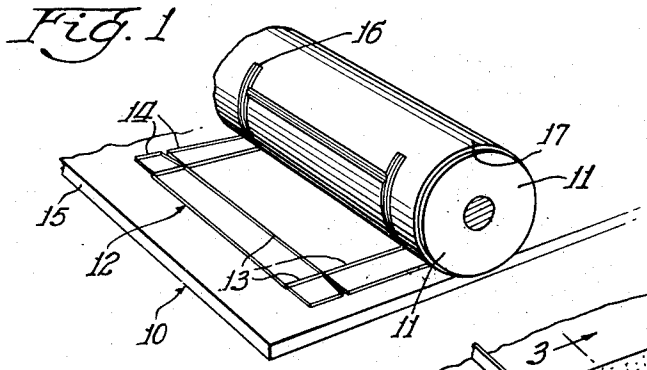


Fig. 2

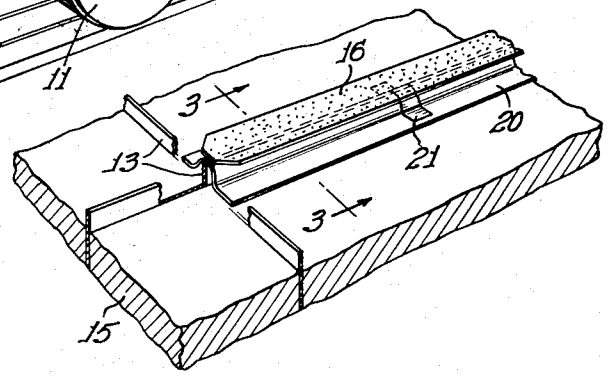


Fig. 3

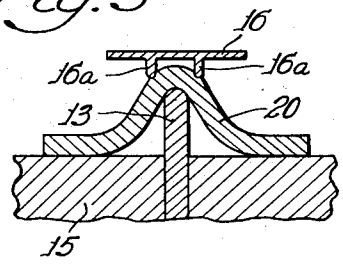


Fig. 4

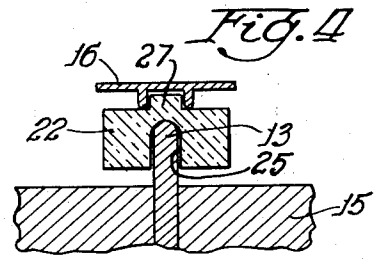


Fig. 5

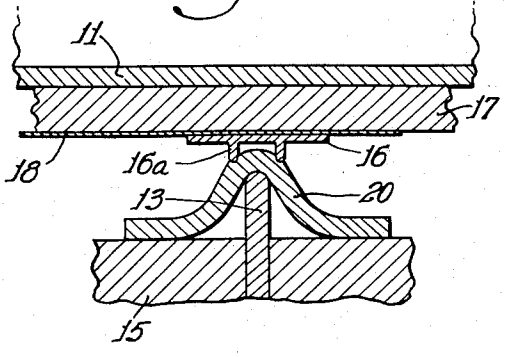
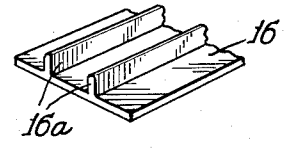


Fig. 6



Inventor:
Robert A. Tross
By: Richard W. Carpenter
Atty.

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METHOD OF PREPARING SCORING DIES

Robert A. Tross, Broomall, Pa., assignor to Container Corporation of America, Chicago, Ill., a corporation of Delaware

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The present invention relates to the art of preparing dies for scoring or creasing paperboard blanks in the manufacture of cartons upon presses having cylindrical pressure rolls or flat platens by which the paperboard is pressed against a die.

In the preparation of the mechanism for producing a paperboard carton blank a die is prepared on a flat surface. This comprises suitable cutting and creasing rules held firmly between wood (or other suitable material) blocks locked within a metal frame. A cooperating die is made up on a cylindrically curved or flat cutting jacket suitably held upon a rotary platen cylinder or a platten head. By delivery of a paperboard sheet onto the flat die and running such die with the sheet thereon beneath the cooperating die on the rotatable platen roll or flat platten head, with application of suitable pressure, the sheet may be delivered at the discharge size of the cylinder or platten properly cut and creased to form a carton blank.

Under known procedures the work of preparing a suitable cooperating die on the cylindrical or flat cutting jacket has been tedious, and involving a considerable amount of trial and error effort. When prefabricated creasing or scoring elements are employed these elements are adhesively secured on the cutting jacket. They are located as accurately as possible and one or more blanks are then run beneath the die after it is placed on the cylinder or platten. If this does not produce a satisfactory carton blank the prefabricated scoring elements must be relocated, largely by guess work, until an acceptable specimen of carton blank is produced.

An important object of the present invention is to provide a method and apparatus whereby prefabricated scoring elements may be applied initially with a high degree of accuracy to a cutting jacket on a press cylinder or flat platten and without requiring any preliminary trial positioning of such elements.

A further object is to provide a method whereby the areas on the cutting jacket that require application of adhesive may be indicated with accuracy thus effecting an economy in the use of adhesive for this purpose.

Additional and more specific objects and advantages of the invention will become apparent as the description proceeds.

In the drawings:

FIG. 1 is a schematic perspective view of a conventional form of cylinder press showing a flat die and cooperating cylindrical die on the cylinder;

FIG. 2 is a perspective view showing the manner of positioning on the scoring rules of the flat die the prefabricated scoring elements that are to be adhesively secured upon the cutting jacket on the cylinder shown in FIG. 1;

FIG. 3 is a cross-sectional view, taken on line 3—3 of FIG. 2 showing the prefabricated scoring element positioned on the scoring rule;

FIG. 4 is a view similar to FIG. 3, illustrating the use of a different form of centering base element placed over the scoring rule and on which the prefabricated element is positioned;

FIG. 5 is an enlarged detail view, in section, to illustrate the manner of attaching the prefabricated scoring element to the cutting jacket on the cylinder or flat platten;

FIG. 6 is a fragmentary perspective view of a preferred form of prefabricated scoring element.

In carrying out the steps of the present invention a flat die is first made up. This ordinarily will comprise metal cutting and scoring rules held between wood blocks and clamped within a steel form or frame. After this die has been completed, the next step is to prepare a cooperating die on the cutting jacket secured to the pressure cylinder or platten. An outline or impression of the flat die is preferably marked or applied to the cutting jacket, particularly to indicate the lines of the scoring rules. The prefabricated scoring element is preferably in the form of a flexible backing plate on which is formed a pair of spaced beads between which the scoring rules will be impressed with the paperboard interposed between the beads and the rule, thus producing the desired score line.

The prefabricated scoring elements are arranged along the scoring rules in accurately centered relation so that the rules will be in exact alignment with the center line between the beads. Some suitable material such as strips of sheet lead or plastic strips are placed over the rules and the prefabricated scoring elements are releasably positioned on these strips. Adhesive is then applied along the lines marked on the cutting jacket on the cylinder or platten and adhesive is also preferably applied to the backs or exposed plate surfaces of the prefabricated elements arranged on the scoring rules. After the adhesive has reached a point shortly before it begins to dry, the flat die will be moved edgewise slowly beneath the press cylinder or toward the plane of the platten head with the lines along which adhesive has been applied in approximate registration. The prefabricated scoring elements will in this manner be transferred onto the cutting jacket and will be located exactly in registration with the scoring rules. The centering strips will then be removed from the scoring rules and the press is then ready to run the carton blanks.

Referring particularly to the drawings, the flat bed of a conventional press is indicated at **10** and the cylinder at **11**. The flat cutting and scoring die, indicated as a whole at **12**, comprises in the present instance, scoring rules **13**, **13** and cutting rules **14**, **14**, held in place in the usual manner by wood blocks **15**, **15**.

As herein shown, suitable prefabricated scoring elements **16**, **16** are employed which comprise a backing strip with spaced, integrally formed beads **16***a*, **16***a* extending longitudinally of the strip and forming a channel to receive paperboard to be pressed into the space between the beads by the scoring rule. This form of scoring element is made from suitable metal such as annealed brass and is sufficiently flexible to permit it to be secured by adhesive onto the curved surface of press cylinder **11**. In practice a cutting jacket **17** is secured onto the cylinder and carries the curved dies.

For the purpose of enabling the prefabricated scoring elements to be secured quickly and accurately onto the press cylinder in exact registration with the scoring rules, some or all of the following steps may be employed.

An impression of the die is made on a thin sheet of paper **18**, as by means of carbon paper placed between the scoring and cutting rules. Pressure upon the paper sheet will leave lines marked thereon conforming exactly to the scoring and cutting rules.

The positions of two of the scoring rules or cutting rules, one at right angles to the other are located or laid out on the cutting jacket. These guide lines may be applied while the cutting jacket is away from the press. The thin paper sheet with the lines thereon is then cemented in place on the cutting jacket and, as the carbon lines will show on this thin sheet, it is a simple matter to place the sheet so that corresponding lines on the thin sheet will register with the guide lines marked on

the cutting jacket. Exact registration is not necessary as the main purpose of the guide lines on the cutting jacket is to enable the operator to place the thin sheet approximately in place and indicate where adhesive is to be applied for cementing the prefabricated scoring elements in place on the cylinder.

The prefabricated scoring elements may next be arranged in fixed relation to the scoring rules so that such elements are held firmly but releasably. For this purpose there may be employed centering strips of sheet lead of suitable thickness. The lead strip, indicated at 20, 20, are bent over the scoring rules, as indicated in FIGS. 2, 3 and 5. Several short strips of double backed adhesive tape 21, 21 may be placed across the lead strips to provide supplemental means for holding the scoring elements in place. The prefabricated scoring elements 16, 16 are then carefully placed, bead side down, upon the lead centering strips so that the scoring rules will be in registration with the center line of the scoring elements between the beads. Relatively gentle tapping of the scoring elements upon the lead strips is sufficient to cause them to stay in proper position and, at the same time, leave them readily removable for transfer to the press cylinder.

As indicated in FIG. 4, instead of using a lead centering strip, good results are also obtainable by using a centering strip of plastic material, indicated at 22.

This plastic strip has a central groove 25 which fits snugly over the scoring rule. Centered above the groove on the opposite side of the strip is a raised rib 27 designed to fit snugly between the beads on the prefabricated scoring elements. The plastic strip is pressed upon the scoring rule where it will remain in fixed position on the rule as long as required.

When the scoring rules have been covered with the centering strips and the prefabricated scoring elements positioned thereon as described, the rear surfaces, that is the flat, plane surfaces of the elements are covered with suitable adhesive. Likewise, adhesive is preferably applied to the thin sheet that has been cemented onto the cutting jacket. The cutting jacket at this point will have been fixed upon the press cylinder. The lines impressed on the thin sheet will constitute guide lines for the application of adhesive.

After the correct time has elapsed, depending upon the setting character of the adhesive, preferably at a time when the adhesive has advanced beyond the tacky point, the flat die is moved edgewise slowly beneath the rotatable cylinder which is arranged to press firmly against the prefabricated scoring elements held on the centering strips to obtain the necessary bonding pressure. This movement of the flat die below the cylinder will transfer the scoring elements onto the cutting jacket in the exact registration necessary to form properly scored blanks. The rolling action of the cylinder over the scoring elements causes them to be permanently formed to the curvature of the cylinder assuring a good bond at the ends of the scoring elements. This is of particular importance with respect to securing the scoring elements that extend circumferentially around the cylinder.

It is not necessary in all cases to employ a thin, marked paper sheet secured on the cutting jacket, as guide lines showing where areas of adhesive are to be applied may be marked directly on the cutting jacket, if desired.

From the foregoing it is apparent that the invention herein disclosed provides an accurate, convenient and rapid method of transferring or assembling prefabricated scoring elements onto the cylinder of a flat bed press or a reciprocating platen press. By first temporarily centering the scoring elements precisely upon the scoring rules of the previously prepared flat die and attaching the elements progressively onto the surface of the cylinder as the flat die moves beneath such cylinder or simultaneously on the flat platen head as the flat die is contacted by it, there is assured an extremely accurate scoring result as well as a considerable saving in make ready time.

While the present description sets forth a preferred embodiment of the invention, various changes may be made in the specific instrumentalities employed without departing from the spirit of the invention, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to be appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. The method of assembling a prefabricated scoring element onto the face of the rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes at least one upstanding scoring rule, selecting a flexible, prefabricated scoring element of suitable length, such element comprising an elongated back plate having a plane surface on one side and having projecting on its other side a pair of longitudinally extending beads spaced to receive between them a portion of paperboard which is to be pressed into the space by the scoring rule, releasably centering the prefabricated scoring element symmetrically along the scoring rule with its plane side up, applying adhesive to both the exposed side of the scoring element and the area on the cylinder which is to receive such scoring element, allowing the adhesive to set beyond the tacky stage, and moving the flat die with the prefabricated scoring element edgewise beneath the cylinder, as same is rotated, with the plane face of such element in pressure contact with the face of the cylinder to transfer such element progressively onto the face of the cylinder.

2. The method of assembling a prefabricated scoring element onto the face of the rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes at least one upstanding scoring rule, placing symmetrically over the scoring rule a centering strip of flexible sheet material having a thickness comparable to that of the paperboard to be treated, selecting a flexible prefabricated scoring element of suitable length, such element comprising an elongated back plate having a plane surface on one side and having projecting on its other side a pair of longitudinally extending beads spaced to receive between them a portion of paperboard which is to be pressed into the space by the scoring rule, releasably positioning such prefabricated scoring element lengthwise of the centering strip with the beads directed downward and symmetrically disposed relative to the scoring rule, applying adhesive to the exposed, plane surface of the scoring element and to the area on the cylinder which is to receive such scoring element, allowing the adhesive to set beyond the tacky stage, and moving the flat die with the prefabricated scoring element edgewise beneath the cylinder, as such cylinder is rotated, with the plane face of such element in pressure contact with the face of the cylinder to transfer such element progressively onto the face of the cylinder.

3. The method of assembling prefabricated scoring elements onto the face of the rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes a plurality of upstanding scoring rules, some of which are angularly disposed relatively to the others, making an impression on a sheet of paper representing the edges of the scoring rules, a press cylinder having a cutting jacket thereon marking on the cutting jacket of the cylinder a pair of guide lines representing the approximate position of two selected angularly related scoring elements on the cylinder, adhesively securing the paper sheet to the cutting jacket with the two selected impressions of the scoring rules in approximate

register with the lines of such rules marked on the cutting jacket, placing symmetrically over the scoring rules centering strips of flexible sheet material having a thickness comparable to that of the paperboard to be treated, selecting a plurality of prefabricated scoring elements of suitable length, such elements each comprising an elongated back plate having a plane surface on one side and having projecting on its other side a pair of longitudinally extending beads spaced to receive between them a portion of paperboard which is to be pressed into the space by the scoring rule, releasably positioning such prefabricated scoring elements lengthwise of the respective centering strips with the beads directed downward and symmetrically disposed relative to the respective scoring rules, applying adhesive to the exposed, plane surfaces of the scoring elements and to the paper sheet on the cutting jacket of the cylinder over restricted areas along the impressions indicating the positions of the scoring rules, moving the flat die with the prefabricated scoring elements edgewise beneath the press cylinder, as such cylinder is rotated, with the plane face of such elements in pressure contact with the face of the cylinder to transfer such elements progressively onto the face of the cylinder.

4. The method of assembling a prefabricated scoring element onto the face of the rotatable press cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes an upstanding scoring rule, releasably securing lengthwise upon the rule a centering strip of plastic material having a groove snugly fitting against the sides of the rule, releasably securing on the centering strip, on the side opposite its groove, a flexible, prefabricated scoring element comprising a plane back surface and a channeled face for receiving a portion of paperboard pressed into the channel by the scoring rule, the scoring element being secured with its channeled face disposed symmetrically against the centering strip opposite the groove in such strip, applying adhesive to the exposed back surface of the scoring element and to the area on the cylinder which is to receive such scoring element, allowing the adhesive to set beyond the tacky stage, and moving the die, with its scoring rule carrying the centering element and prefabricated scoring element, beneath the cylinder, as such cylinder is rotated, with the back surface of the scoring element in pressure contact with the face of the cylinder to transfer such element progressively onto the face of the cylinder.

5. Elements for use in the preparation and positioning of scoring dies on a press, including, in combination, a form, a scoring rule adapted to be fixed within said form, a centering element comprising an elongated strip of plastic material formed with a longitudinally extending groove into which the scoring rule can be received to hold the plastic centering strip in fixed position thereon, a centering rib extending longitudinally of the strip, such centering rib being on the side of the strip opposite the groove and arranged symmetrically with the groove, and a prefabricated scoring element comprising a thin, elongated, metallic strip formed with a longitudinally extending channel into which the centering rib on the plastic strip is snugly but releasably received.

6. The combination of elements as defined in claim 5, wherein the channeled scoring element is in the form of a readily flexible strip of annealed brass.

7. The method of assembling prefabricated scoring elements on the face of a rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes a plurality of upstanding scoring rules, a press cylinder having a cutting jacket thereon marking an impresison of the scoring rule lines of the die on a flexible sheet by means of carbon paper placed between the die and the flexible sheet, applying guide line markings on the cutting jacket and flexible sheet, securing such marked, flexible sheet to the cutting jacket with the guide lines on the flexible sheet and cutting jacket in register, releasably positioning suitable length strips of channeled, prefabricated scoring elements, channel side down, symmetrically upon the scoring rules, such elements each having a flat back surface opposite to any symmetrical with the channeled portions, applying adhesive to the exposed flat back surfaces of the scoring elements and to restricted areas of the flexible sheet along the scoring rule lines marked thereon, allowing the applied adhesive to dry beyond the tacky stage, moving the flat die with the scoring elements positioned on the scoring rules beneath the press cylinder as such cylinder is rotated, with the flat back surfaces of such elements in pressure contact with the cylinder to transfer such elements progressively onto the face of the cylinder.

8. The method of assembling prefabricated scoring elements on the cutting jacket secured to the face of a rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes a plurality of upstanding scoring rules, a press cylinder having a cutting jacket thereon marking an impression of the scoring rule lines of the die on a flexible sheet by means of carbon paper placed between the die and the flexible sheet, securing such marked, flexible sheet to the cutting jacket, releasably positioning suitable length strips of channeled, prefabricated scoring elements, channel side down, symmetrically upon the scoring rules, such elements each having a flat back surface opposite to and symmetrical with the channeled portions, applying adhesive to the exposed back surfaces of the scoring elements and to the surface of the flexible sheet along the scoring rule lines marked thereon, allowing the applied adhesive to dry beyond the tacky stage, moving the die with the scoring elements positioned on the scoring rules beneath the press cylinder as it is rotated wtih the back surfaces of such elements in pressure contact with the cylinder to transfer such elements progressively onto the face of the cylinder.

9. The method of assembling prefabricated scoring elements on the cutting jacket secured on the face of a rotatable cylinder of a flat bed press designed for the production of paperboard blanks for cartons, which comprises assembling on the flat bed of a press a die which includes a plurality of upstanding scoring rules, a press cylinder having a cutting jacket thereon applying line markings on the cutting jacket to indicate the lines of pressure to be applied by the scoring rules, releasably positioning suitable length strips of channeled, prefabricated scoring elements, channel side down, symmetrically upon the scoring rules, such elements each having a flat back surface opposite to and symmetrical with the channeled portions, applying adhesive to the exposed, flat back surfaces of the scoring elements and to restricted areas of the cutting jacket along the line markings thereon, allowing the applied adhesive to dry beyond the tacky stage, moving the die with the scoring elements positioned on the scoring rules beneath the press cylinder as it is rotated, with the flat back surfaces of such elements in pressure contact with the cylinder to transfer such elements progressively onto the face of the cylinder.

10. The method of assembling prefabricated scoring elements on the cutting jacket secured on the face of a rotatable cylinder of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes a plurality of upstanding scoring rules, a press cylinder having a cutting jacket thereon applying line markings on the cutting jacket to indicate the lines of pressure to be applied by the scoring rules, releasably positioning suitable length strips of channeled, prefabricated scoring elements, channel side down, symmetrically upon the scoring rules, such elements each having a flat back surface opposite to and symmetrical with the channeled portions, applying adhesive to the exposed back

surfaces of the scoring elements and to restricted areas of the cutting jacket along the line markings thereon, moving the die with the scoring elements positioned on the scoring rules beneath the press cylinder as it is rotated, with the back surfaces of such elements in pressure contact with the cylinder to transfer such elements progressively onto the face of the cylinder.

11. The method of assembling prefabricated scoring elements on the cutting jacket secured on the face of the platen of a flat bed press designed for the production of paperboard carton blanks, which comprises assembling on the flat bed of the press a die which includes a plurality of upstanding scoring rules, a press cylinder having a cutting jacket thereon applying line markings on the cutting jacket of the platen to indicate the lines of pressure to be applied by the scoring rules, releasably positioning suitable length strips of channeled, prefabricated scoring elements, channel side down, symmetrically upon the scoring rules, such elements each having a flat back surface opposite to and symmetrical with the channeled portions, applying adhesive to the exposed back surfaces of the scoring elements and to restricted areas of the cutting jacket along the line markings thereon, moving the flat die with the scoring elements positioned on the scoring rules into position beneath the platen, and moving the platen into pressure contact with the back surfaces of such elements to transfer such elements onto the platen face.

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