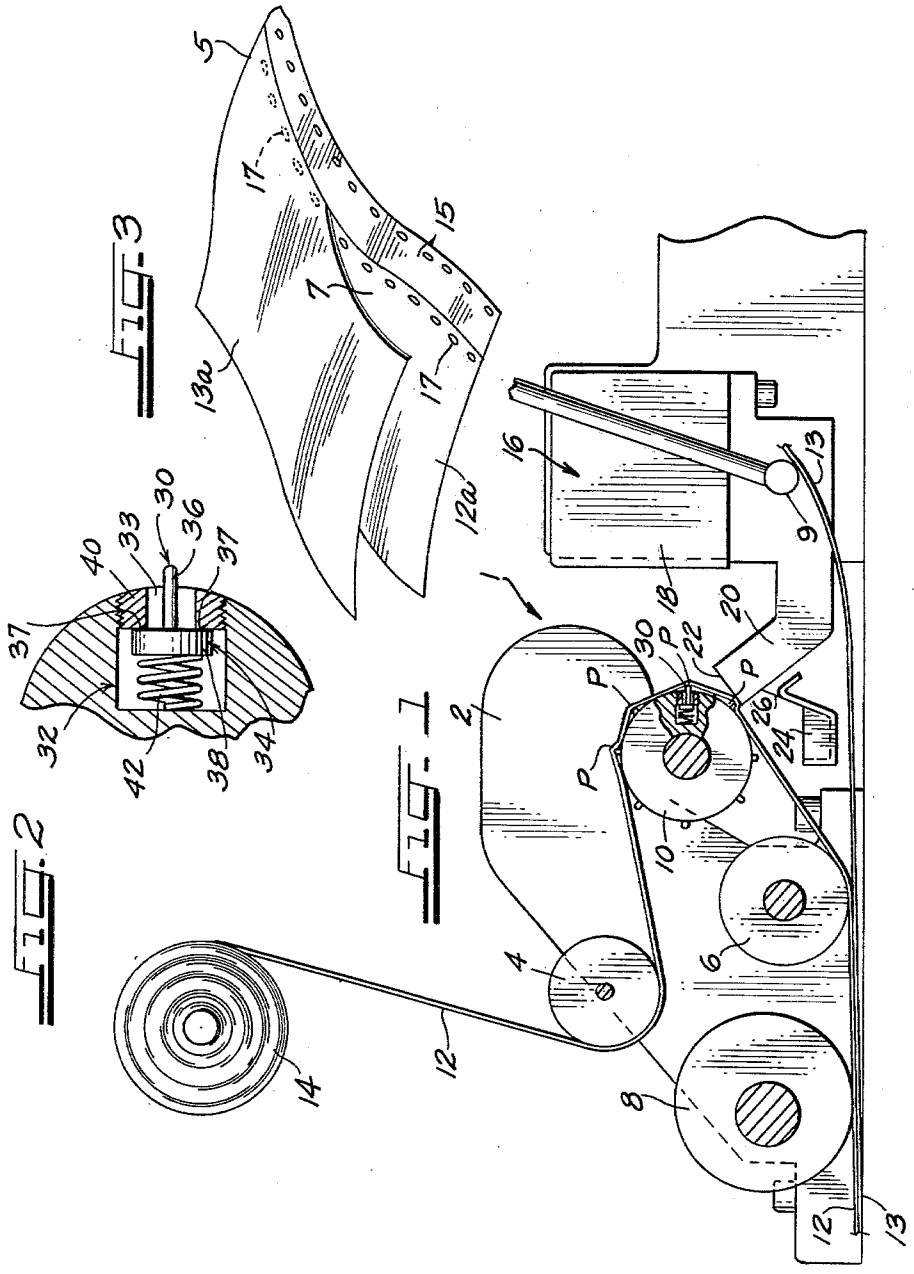
July 20, 1965 E. W. LISZEWSKI ETAL 3,196,065

SPOT GLUING OF CONTINUOUS FORMS

Filed Oct. 8, 1962



INVENTORS
EDWARD W. LISZEWSKI
ROBERT H. HORNUNG
BY
Regan, Bellamy & Regan
Attys.

United States Patent Office 3,196,065 Patented July 20, 1965

3,196,065

SPOT GLUING OF CONTINUOUS FORMS

Edward Walter Liszewski, Buffalo, and Robert Herman Hornung, Eggertsville, N.Y., assignors to Graphic Controls Corporation, Buffalo, N.Y., a corporation of New York

Filed Oct. 8, 1962, Ser. No. 229,127
4 Claims. (Cl. 156—291)

This invention relates to the manufacture of continuous business forms, and more particularly, to an improved process and apparatus for the spot gluing of interleaved continuous forms.

Business forms of the type having registered sheets with interleaved reproduction papers such as conventional carbon paper are in wide use in industry. By utilizing such forms, a memorandum imprinted onto the uppermost sheet of the registered form will be recorded upon any number of registered sheets in the stacked form, and a simultaneous recordation for such purposes as sales, shipping, packing, etc. may be effected.

A major obstacle to the satisfactory use of such forms has been the inability to achieve a form having component parts which are sturdily and compactly interconnected and yet which are readily detachable from each other when desired. Various approaches have been taken in efforts to provide a reliable product, such as crimping, stapling or gluing the respective sheets to one another. For example, one procedure in use today provides for periodic angular slits in the side edge of a carbon paper sheet and for a continuous line of glue between the slit side of the carbon paper sheet and the edge of a superimposed writing sheet.

An improvement on that procedure, also in current use, is to provide for periodic tab punch-outs in a paper sheet edge with a make cutting tool passing through the paper to punch out the tab and to depress a spring loaded member into a female recess, followed by a spot gluing of the tabs as they are subsequently extended from the plane of the paper sheet by expansion of the depressed member. While forms produced by the slit or tab gluing processes exhibit, to a certain extent, the requisite interconnection of the superimposed sheets of the form and a relative ease of separation when desired, such forms suffer from the serious disadvantages of bulkiness, irregular build up of the sheets from one side to the other, interference with subsequent handling of the forms in automatic machines caused by the tabs or slits fouling the mechanisms thereof, and, in general, undo expense and loss in efficiency occasioned by the necessity of performing the extra step of slitting or tab punch-out in the process of manufacturing the forms.

This invention is predicated upon the discovery that a satisfactory interleaved form can be produced by a continuous spot gluing process without deforming any of the sheets with slits, tabs, or any other similar irregularities. In the preferred embodiment the process comprises the steps of periodically forming an elevation in the surface of the edge of one of the treated sheets; contacting the elevated surface with a glue source whereby a periodic series of glue spots is formed on the edge of the sheet; and pressure contacting the edge of the treated sheet with the edge of another sheet whereby the first and the second sheets are effectively and detachably interjoined. Apparatus which has been found to be particularly suitable for the practice of the invention comprises a rotatable cylindrical roller member having extension plungers spring cushioned in periodic circumferential recesses formed in the surface of the member, such that passage of a tensioned paper sheet over the roller member will cause undulations in the plane of the sheet; glue applying means spaced from the roller member such that glue is spot placed on the peaks of the undulations formed in the sheet; and means for pressure contacting the spot glued sheet with another sheet whereby the two sheets are effectively and detachably interjoined.

Accordingly, it is a primary objection of this invention to provide means for interjoining two or more sheets by a spot gluing process which effectively maintains the superimposed sheets in connected and smooth register and yet which enables a ready detachment of one sheet from the other when desired.

It is a related object of this invention to provide such means without any unnecessary steps in the manufacture of the drawing sheets and without any bulkiness or other irregularities in the finished sheet product attributable to slits or tabs formed in the interleaved sheets.

These and other objects, features, and advantages of the subject invention will hereinafter appear, and, for purposes of illustration but not of limitation, an illustrative embodiment is described in the appended drawings, in which:

FIG. 1 is a schematic representation in elevation of apparatus suitable for the practice of this invention;

FIG. 2 is an enlarged fragmentary view of a portion of the apparatus shown in FIG. 1; and

FIG. 3 is a perspective view of a completed form comprising two paper sheets interjoined by the novel spot gluing technique disclosed herein.

With reference to FIG. 1, apparatus generally designated by the numeral **1** is seen to comprise a frame support **2** having the rollers **4**, **6**, **8**, and **10** rotatably journalled therein. A paper web **12**, which is secured from a paper supply drum **14**, is trained about the rollers **4–10**, as shown, such that it is tensioned about the periphery of the roller **10**. A second paper web **13** (e.g., carbon paper) is guided by the guide roller **9** for superimposed alignment with the web **12** beneath the rollers **6** and **8**.

Adhesive supplying means, generally designated by the numeral **16**, are shown in the right hand portion of FIG. 1. The means **16** comprise a conventional glue pot and melt chamber **18** from which a glue nozzle **20** extends such that glue is continuously presented at the end **22** of the nozzle **20**. A drainage cup **24** is positioned beneath the nozzle **20**, as by the bracket **26**, in order to catch any glue overflow which might otherwise drip onto the paper web **13**.

The cylindrical roller **10** is provided with means for undulating the surface of the paper web **12** tensioned thereabout. The means **30** are best illustrated in the enlarged view shown in FIG. 2. Thus, the means **30** comprise a recess **32** formed in the surface of the cylindrical member **10** and which is provided with a constricted opening **33** by virtue of the presence of the threaded collar member **40**. A plunger element **34** is positioned within the recess **32** and has a constricted central portion **36** and an enlarged base portion **38** defining the shoulders **37** therebetween. A spring **42** yieldingly urges the plunger member **34** upwardly out of the recess **32** such that the shoulders **37** are in contiguous contact with the cylindrical collar **40** threaded into the recess **32**.

As shown in FIG. 1, a series of extension members **30** is provided on the surface of the cylindrical member **10**. The members **30** are preferably equally spaced in circumferential disposition in a plane perpendicular to the axis of rotation of the member **10**. Thereby, the surface of the web **12** will be contacted by an extension member **30** at periodic spaced intervals determined by the angular relation of the elements **30** to one another.

The force of the spring **42** provided within the recess **32** is such that the constricted central portions **36** of each of the extension members **30** will yieldingly urge the tensioned web **12** upwardly away from the surface of the

cylindrical roller 10 without, however, causing a rupture or tear in the surface of the web 12.

In operation, means (not shown) are provided to pull the superimposed webs 12 and 13 to the left as seen in FIG. 1. The web 12 is thus tensioned about the cylindrical roller 10 and the protruding extension members 30 thereof which, when in contact with the web 12, produce the undulations or peaks P shown in FIG. 1. As the distorted web 12 thus passes the end 22 of the glue nozzle 20, the peaks P are caused to contact the glue supply whereby a dab or spot of glue is periodically placed in sequential arrangement on the surface of the web 12. The partially interjoined and partially detched web segments 12*a* and 13*a* of FIG. 3 show the glue spots 17 produced by the distorted passage of the web 12 across the path of the glue nozzle 20.

The roller 8 comprises pressure contacting means for interjoining the sheets 12 and 13 as they are passed therebeneath. Preferably, the roller 8 is eccentrically mounted, as shown in FIG. 1, such that the superimposed sheets 12 and 13 are compressed thereunder in synchronized relationship of pressure contact with passage of glue spots 17 beneath the roller 8.

As described, the completed form which is shown in FIG. 3 is partially connected, as shown at 5, and is partially detached, as shown at 7. The lower web portion 12*a* is shown as having an apertured marginal portion 15 for handling of the web in conventional form machines. Obviously, more than two webs may be interjoined in the manner taught by this invention by successive treatments of joined webs, that is, the composite web 12, 13 may be surface spot glued in the same manner as the original web 12, whereby a third web may then be interjoined with the composite 12, 13, etc.

It should be understood that various changes and modifications may be made in the details of construction, arrangements, operations, and materials for the various elements, without departing from the spirit and the scope of the instant invention, especially as defined in the appended claims.

What is claimed is:

1. A method for continuously spot bonding a first sheet web to a second sheet web to provide superimposed sheets bonded to one another at spaced intervals, said method comprising the steps of:

periodically pressing resiliently mounted probes against said first sheet web to physically deform linearly spaced portions of said first sheet web into spaced undulations defining raised unruptured adhesive receiving peaks;

supporting adhesive supplying means adjacent said peaks and in a position for applying adhesive thereto;

applying adhesive to said peaks to provide sheet bonding means;

superimposing said second sheet web onto said first sheet web for contacting said adhesive coated peaks thereof; and

urging said first and said second sheet webs toward and into contact with one another to bond said sheets adhesively together at spaced intervals corresponding to positions of said adhesive coated peaks.

2. Apparatus for continuously spot bonding a first sheet web to a second sheet web superimposed on said first sheet web to provide a severable bond between said first and said second sheet webs, said first and said second sheet webs being readily subsequently detachable at will to separate said sheet webs, said apparatus comprising:

a frame support;

a cylindrical member rotatably mounted in said frame support and adapted to receive and support said first sheet web trained and tensioned over a curved outer surface thereof;

spaced radial probes extending outwardly of said surface of said cylindrical member and disposed annularly thereabout to define a plurality of sheet-impression elements;

said probes comprising means adapted to press into said first sheet web tensioned over said outer surface of said cylindrical member for physically deforming linearly spaced portions of said first sheet web into periodic undulations defining raised unruptured adhesive receiving peaks in said first sheet web;

adhesive supplying means supported adjacent said cylindrical member and spaced therefrom and oriented with respect thereto such that only said peaks formed in said first sheet web contact said adhesive supplying means to receive a coating of adhesive thereon; and

pressure means for urging the sheet web having the adhesive coated peaks into contact with said second sheet web to bond said first and said second sheet webs one to the other at spaced points corresponding to positions of said adhesive-coated peaks.

3. The apparatus of claim 2 and further comprising spring means resiliently mounting said sheet deforming probes on said cylindrical member and urging said probes radially outwardly of said cylindrical member, said spring means providing controlled and regulated pressure to stress said probes against said first sheet web to deform said first sheet web to provide raised unruptured adhesive receiving peaks.

4. The apparatus of claim 2 wherein said pressure means for urging said sheet web having adhesive coated peaks into contact with said second sheet web to bond said webs together comprises an eccentrically mounted roller rotatably journaled in said frame support to force said first sheet web and said second sheet web together synchronously with respect to passage of glue coated peaks beneath said roller.

References Cited by the Examiner

UNITED STATES PATENTS

1,926,363	9/33	Bergstein	117—37
2,029,922	2/36	Heckel et al.	156—291 XR
2,081,758	5/37	Milmoe	118—239
2,102,937	12/37	Bauer	156—291 XR
2,488,685	11/49	Riddle	118—225
2,875,724	3/59	Joa	118—211 XR
3,107,181	10/63	Bauder	118—211

EARL M. BERGERT, *Primary Examiner.*