Aug. 11, 1936. D. J. SEAMAN ET AL 2,050,767

METHOD AND APPARATUS FOR UNITING PRINTED WEBS

Filed March 4, 1935 2 Sheets-Sheet 1

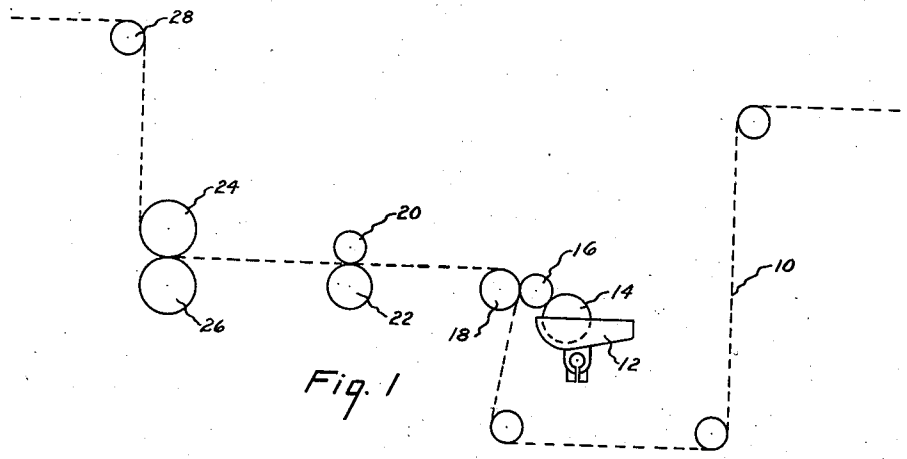


Fig. 1

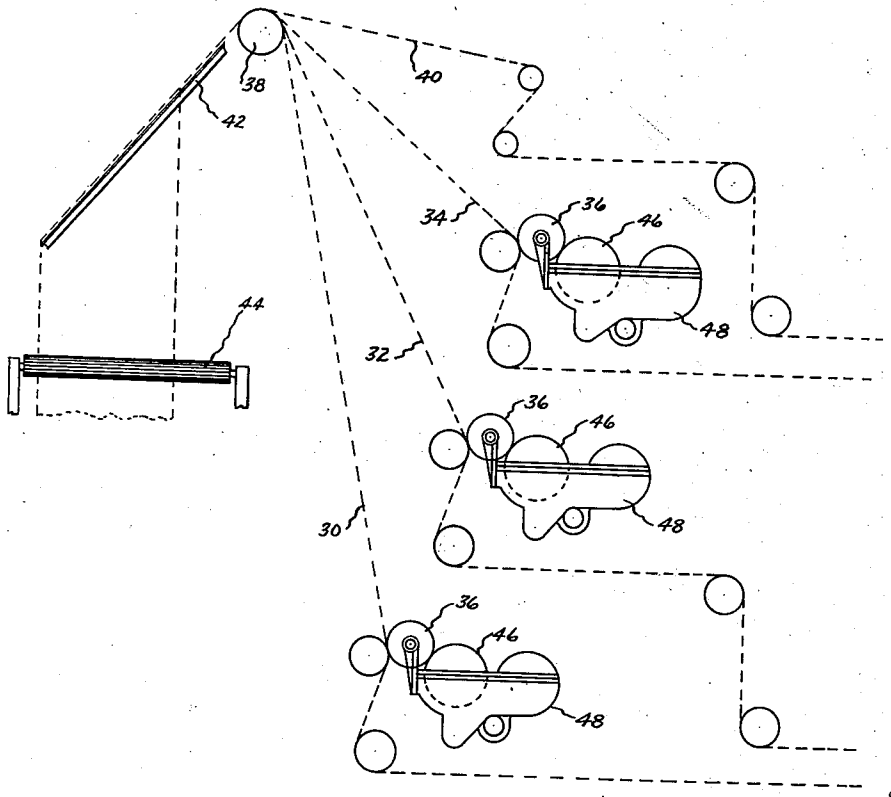


Fig. 2

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METHOD AND APPARATUS FOR UNITING PRINTED WEBS

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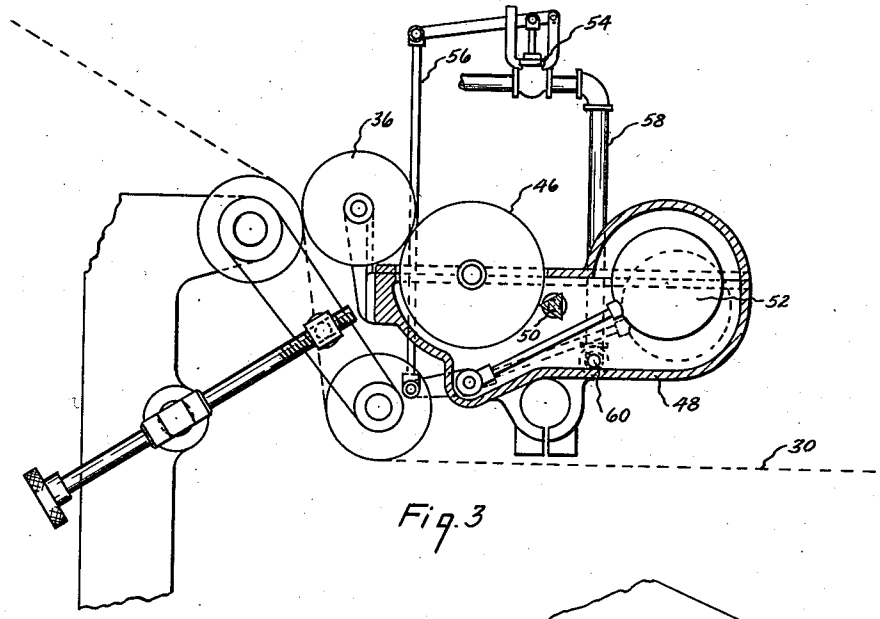


Fig. 3

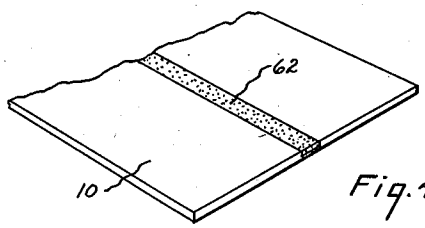


Fig. 4

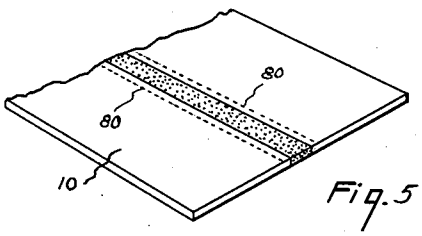


Fig. 5

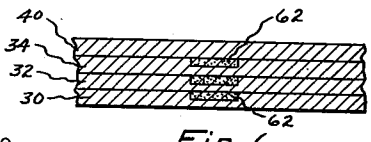


Fig. 6

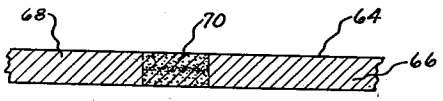


Fig. 7

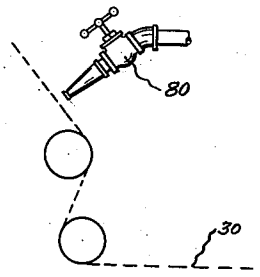


Fig. 9

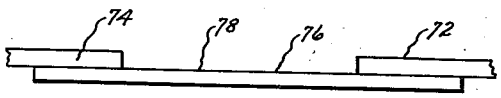


Fig. 8

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2,050,767

METHOD AND APPARATUS FOR UNITING PRINTED WEBS

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Application March 4, 1935, Serial No. 9,154

8 Claims. (Cl. 270—5)

The present invention constitutes a continuation-in-part of our copending application, Serial No. 7958, filed February 25, 1935, relating to improvements in a method and apparatus for uniting printed webs and is likewise concerned with a method and apparatus for uniting webs, particularly printed webs, in the production of newspapers, magazines, pamphlets, signatures and the like.

Heretofore it has been proposed in the patented art to apply paste to printed webs in the press prior to web association for the purpose of adhering or uniting the webs to each other in the region of the fold line. Such proposals have met with little or no commercial acceptance for the reason that the maintenance and installation of individual adhesive applying apparatus for each web to be associated has not been found practical. In the handling of paper webs at high press speeds, highly polished surfaces for supporting, guiding and tensioning of the webs, free from any accumulation of foreign matter, are a prerequisite. As it is substantially impossible to operate and replenish adhesive applying apparatus without accumulation of excessive adhesive upon associated structures, to our knowledge all heretofore proposed arrangements for applying adhesive directly to each web on the press prior to association has been found impractical. In addition, the cost of maintenance of the adhesive applying apparatus upon printing presses has been a decided factor in rendering their use impractical. Frequent cleaning of the adhesive parts is necessary and considerable difficulties experienced in maintaining the adhesive at the proper consistency for effective application.

An object of the present invention resides in the provision of a method of processing and treating newspaper webs and the like, before and after the printing operation to enable the associated webs in the press to be practically united together along the region of the fold line to produce a paper article in which the sheets are united or bound at the fold line.

Another object is to provide a method of treating newspaper webs and the like at the mill with an adhesive and then while upon the printing press again treating the webs to enable the same upon association to be united along the region of the fold line at press speed.

A further object of the invention resides in the method of providing along the fold line region of a newspaper web or the like a narrow longitudinally extending area of normally non-tacky adhesive material, and then while upon the press treating the adhesive band to make the same tacky and uniting associated webs together at press speed.

A still further object resides in a method of treating newspaper webs and the like before and while in the printing press to enable the associated webs to be united to each other along the fold line region while obviating all present difficulties connected with applying an adhesive to each web prior to association while in the press.

A still further object of the invention is present in the provision of novel means for treating the webs to render the adhesive area tacky just prior to web association.

Another object is to provide a method and apparatus for uniting webs upon a printing press which does not appreciably increase the cost of production of the printed article or the maintenance of the press.

A further object is to provide a novel method of uniting fabricated webs, such as paper, fabric, etc., printed or otherwise, in which a normally non-tacky adhesive area associated with the web is rendered tacky at the time the webs are to be united.

Other objects and advantages residing in the present invention will become apparent from the description to follow when considered in connection with the accompanying drawings wherein

Fig. 1 is a diagrammatic representation of the paper web or the like being treated with an adhesive at the mill,

Fig. 2 is a diagrammatic representation of the apparatus for rendering the adhesive upon webs tacky prior to association in the press,

Fig. 3 is a side elevational view partially shown in cross-section of an apparatus for treating the adhesive upon the webs with water or other suitable solvent to render the adhesive tacky,

Fig. 4 is a fragmentary perspective view of a web impregnated with an adhesive along one side in the fold line region,

Fig. 5 is a view similar to Fig. 4 showing the web impregnated on both sides,

Fig. 6 is a cross-sectional view through a plurality of superimposed webs showing the manner in which they are united,

Fig. 7 is a modified web construction in which, at the mill, material having adhesive properties is made an integral part of the web proper,

Fig. 8 is a further modified arrangement in which separate narrow webs are fed into the press and united by a third web having adhesive properties, and

Fig. 9 is a modified form of apparatus for rendering an adhesive area of the web tacky.

When broadly considered the herein described method of web uniting has application in the joining together webs of paper, fabric, leather and the like where it is advantageous to first treat the webs with a normally non-tacky adhe-

sive and then to render the adhesive tacky just prior to web association. The invention when more specifically considered is principally concerned with the uniting of associated printed webs at press speed in the production of printed articles such as newspaper, and the like, whereby the pages of the article will be united, for example, along the fold line region. In the preferred embodiment, the paper web is treated at the mill with an adhesive material along the region of the web which defines the fold line of the printed articles. As the newspaper stock is conventionally packaged in large rolls for shipment from the mill and is fed into the press from the roll, it is important that the adhesive does not materially increase the thickness of the web along the region to which it may be applied. For this reason the web is preferably impregnated with a suitable adhesive, which does not materially increase the thickness of the web, and which when dried is substantially non-tacky. Many kinds of adhesive may be found to be satisfactory for the purpose, such as for example, any one of the extensively used adhesives for stamps, envelopes and the like which require moistening to render the same tacky. It is only necessary that the adhesive be normally sufficiently non-tacky to permit rolling and unrolling of the paper stock and handling in the printing press and capable of being readily rendered tacky by the application of moisture, heat, steam, suitable solvents, or other convenient manner not possessing the objections and disadvantages connected with the application of an adhesive to the web in the press. Preferably, the adhesive areas of the webs are rendered tacky just prior to web association at the roll at the top of the former. In rendering the adhesive areas tacky the apparatus for accomplishing this is designed, for example, in the application of water, to moisten the adhesive just sufficiently to make the same tacky and avoiding the application of sufficient moisture to weaken the webs. When this method is carried out upon a printing press, with the adhesive areas rendered tacky, the association of the webs at the former and the passage of the same through the pinch rolls results in the adjacent webs being securely united together.

Referring to the drawings, in Fig. 1 is shown a web **10** of newspaper stock, for example, being treated at the mill with an adhesive. An adhesive applying apparatus is shown as consisting of a glue pot **12**, a supply roller **14**, and a transfer roller **16**. The web **10** is passed over the roller **18** which supports the same in engaging relation with the transfer **16** which applies glue or other suitable adhesive to the web in a continuous band or at suitable intervals as desired. Pressure rollers **20** and **22** may be employed to drive the adhesive into the body of the paper stock to obviate materially increasing the thickness of the stock which would be objectionable from the standpoint of winding the stock in large rolls as is conventional. In any event, in newspaper stock, the adhesive will be film-like in character upon the web as not to appreciably increase the web thickness. To render the adhesive normally non-tacky, the web is shown passed between drying rollers **24** and **26** and hence over the roller **28**, to the rewinder.

We wish it to be clearly understood that the structure just described for applying an adhesive to a web and rendering the same normally non-tacky is merely disclosed by way of example and not for the purpose of limiting ourselves to the particular manner disclosed. Innumerable methods all well known in the art may be employed to treat the web to provide a normally non-tacky adhesive area. These methods will vary materially depending upon the adhesive applied and the location and nature of the adhesive area. For the purpose of our invention, it is only essential that the adhesive be applied to the web prior to being introduced into the printing press, for example, that it be normally sufficiently non-tacky as not to interfere with the handling of the web in the press, and that it be uniformly applied to the web so as to have uniform and dependable web uniting characteristics.

In Fig. 2 is a diagrammatic representation of our preferred arrangement for rendering the adhesive areas of the webs tacky in the printing press or other mechanism just prior to web association. The webs **30**, **32**, and **34** pass in contact with transfer rollers **36** which apply some suitable solvent or softening substance, such as water, to the adhesive areas of the webs to render the same tacky. The webs pass to the roller **38** where they are associated in superimposed relation together with the web **40** and pass over the former **42** to longitudinally fold the web and between the pinch roller **44**, all in a well known manner. As the web **40** constitutes the outside sheets of the newspapers, it is not necessary that the same be treated with an adhesive.

As more clearly shown in Fig. 3, the transfer roller **36** contacts a supporting roller **46** operating in a tank **48** in which water or other solvent or softener for the adhesive carried by the web **30** is contained. An adjustable scraper **50** regulates the amount of liquid being applied to the adhesive areas of the web. One convenient arrangement for replenishing the tank **48**, particularly in cases where water is used to render the adhesive tacky, is to locate a float **52** in the tank which controls a valve **54** through a linkage **56** to regulate the flow of water through the pipe line **58** leading into the tank **48** at **60**. It should be readily apparent that the difficulties and cost of maintenance connected with the application of an adhesive to the web passing through the press is not present in the arrangement just described.

In Fig. 4 the web **10** is shown with adhesive applied at **62** from one side and penetrating part way through the body of the web as might result from the passage of the web through the apparatus shown in Fig. 1. If desired, the adhesive may be applied to both sides of the web **10** as shown in Fig. 5. This will have the effect of increasing the bond between the adjacent webs as the cohesion between adhesive areas of adjacent webs may in some cases be greater through the adhesion between the adhesive area and the adjacent web when the adhesion is applied to only one side of each web. Obviously, the adhesive applying and web treating apparatuses shown in Figs. 1 and 2 only have to be duplicated upon the opposite side of the webs from that shown. A cross-sectional view through the united superimposed webs resulting from the arrangement shown in Fig. 2 is presented in Fig. 6. From this it should be clear how the adhesive **62** acts to unite the adjacent webs.

In Fig. 7 the web **64** is made up from two web

sections 66 and 68 and an integral intermediate section 70 having adhesive characteristics when treated, such as by being moistened. The section 70 would be inserted as an integral part of the paper web during the milling operation. With this type of structure there would be no tendency to increase the thickness of the web as might occur in the impregnating or coating of the web with an adhesive.

In Fig. 8 two web sections 72 and 74 are connected along the fold line region of the newspaper web by a narrow web 76 having adhesive properties. The webs 72, 74, and 76 may be fed into the press in unjoined relation and the adhesive surface of the web 76 rendered tacky to join the webs 72 and 74 and to unite the central portion 78 of the web 76 to the central portion of the adhesive web joining the sections of the adjacent web being associated and passed over the former of the press in superimposed relation therewith. In some cases it may be found advantageous to join the web sections 72 and 74 by the adhesive web 76 prior to being fed into the press and then to merely render the central portion 78 tacky in the press.

A modified apparatus for moistening the webs to render the adhesive area tacky is shown in Fig. 9. It consists of a nozzle 80 supported contiguous with the web 30 and adapted to direct atomized water, saturated steam, or the like against the adhesive area of the web to render the same tacky.

As heretofore mentioned, the adhesive area of the webs may be constituted as continuous bands or strips or may be arranged or applied at spaced intervals along the fold line region of the web.

In Fig. 5 rows of perforations 80 are disclosed upon opposite sides of the adhesive area. Perforations of the webs may be conveniently done at the paper mill, simultaneously with the application of adhesive, if desired, or at any other stage. Through the perforation of the web or webs of the printed article, one or more pages may be readily removed without the disassembling of the remaining pages. Another advantage connected with perforations of the webs upon opposite sides of the adhesive areas resides in ease with which the paper may be turned and folded back, particularly in newspapers.

Having described our invention what we believe is patentable and desire to protect by Letters Patent is:

1. A method of uniting printed paper articles such as newspapers and the like along the fold line region of the associated webs comprising the steps of providing the webs to be printed with longitudinally narrow areas of non-tacky adhesive material along the fold line region of the webs, printing said webs, at press speed and just prior to web association treating said adhesive areas to make the same tacky, associating said webs in unfolded superimposed relation to bring the tacky adhesive areas of each web into contiguous relation with the adjacent web along the fold line region, and then folding said superimposed webs as a unit along said fold line region whereby said webs are nested one within the other and become united to each other along the fold line region.

2. A method of uniting printed paper articles such as newspapers and the like along the fold line region of the associated webs comprising the steps of providing webs to be printed with longitudinally extending areas of normally non-tacky adhesive material along the fold line region, printing said webs, at press speed and just prior to association of said webs for passage over the former rendering said adhesive areas tacky, associating said webs in unfolded superimposed relation to bring the tacky adhesive areas of each web into contiguous relation with the adjacent web along the fold line region, and then folding said superimposed webs as a unit upon the former along said fold line region whereby said webs are nested one within the other and become united to each other along the fold line region.

3. A method of uniting printed paper articles such as newspapers and the like along the fold line region of the associated webs comprising the steps of feeding into a printing press one or more webs of paper some at least having normally non-tacky areas of adhesive material extending longitudinally of the web along the fold line region, and then after printing and prior to web association rendering said adhesive tacky whereby adjacent webs are united together along the fold line region.

4. A method of uniting associated webs of printed paper articles and the like, to each other at press speed, comprising the steps of feeding into the press from rolls paper webs having normally non-tacky adhesive areas, and at press speed and prior to web association rendering said adhesive sufficiently tacky to unite the associated webs.

5. A method of uniting the associated webs of printed paper articles and the like, to each other at press speed, comprising the steps of feeding into the press from rolls paper webs previously treated with a normally non-tacky adhesive material, and at press speed and prior to web association rendering said adhesive sufficiently tacky to unite the associated webs.

6. In the production of newspapers and the like, the steps of treating the paper webs prior to printing with adhesive material along the region of the webs defining the fold line of the finished article, printing upon said webs, and then rendering said adhesive material tacky and associating the webs as a continuous operation to unite the same along the fold line region.

7. In the production of newspapers and the like, the steps of feeding into a press stock defining a plurality of opposite page portions and the fold line portions joining said page portions, said fold line portions having normally non-tacky adhesive characteristics, and then rendering said fold line portions tacky and associating all of said portions in superimposed relationship as a continuous operation to unite said page portions along the fold line region.

8. A method of uniting printed paper articles such as newspapers and the like along the fold line region of the associated webs, comprising the steps of feeding into the press webs having adhesive characteristics along the region of the webs constituting the fold line of the printed article when moistened, printing upon said webs, and then prior to web association moistening said webs along said fold line region to render said adhesive characteristics of said web effective whereby said webs when associated are united along the fold line region.

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