July 12, 1932. H. P. ELLIOTT 1,867,399

METHOD OF MAKING STENCIL FRAMES

Filed June 11, 1931 2 Sheets-Sheet 1

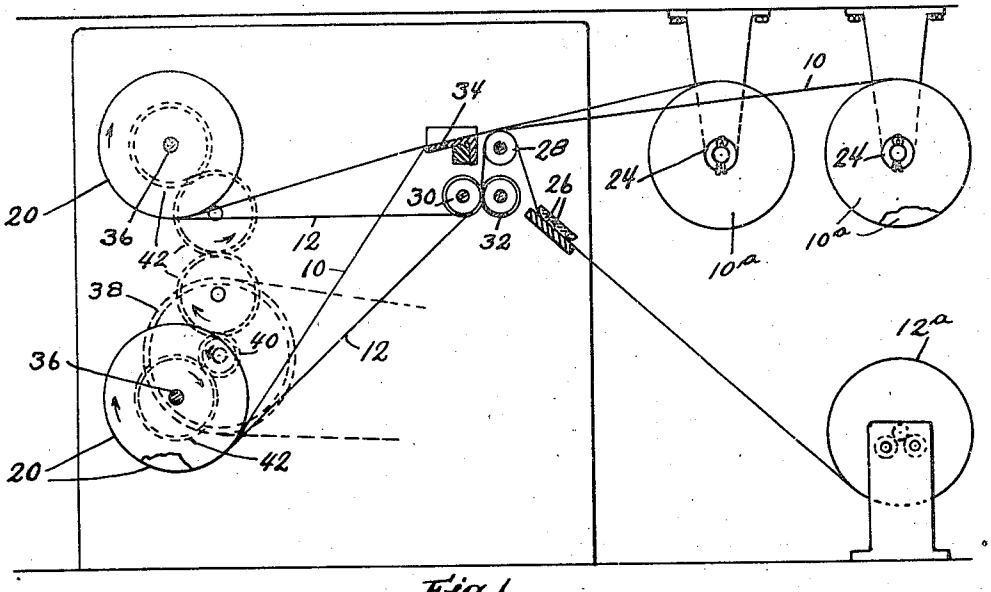


Fig. 1.

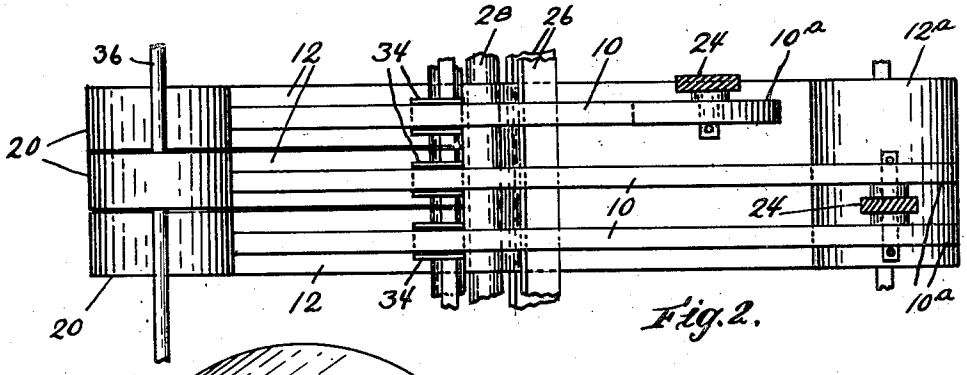
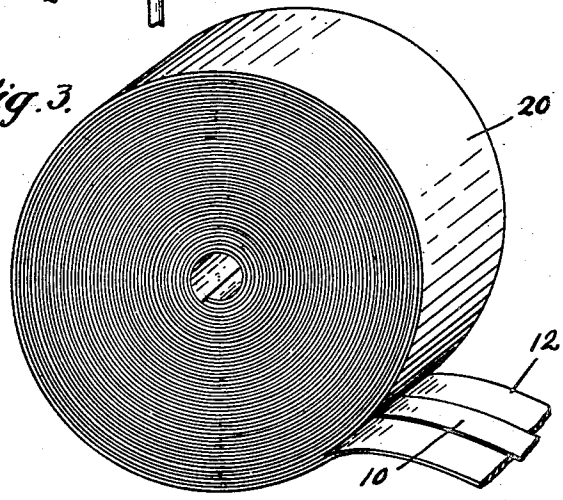


Fig. 2.

Fig. 3.



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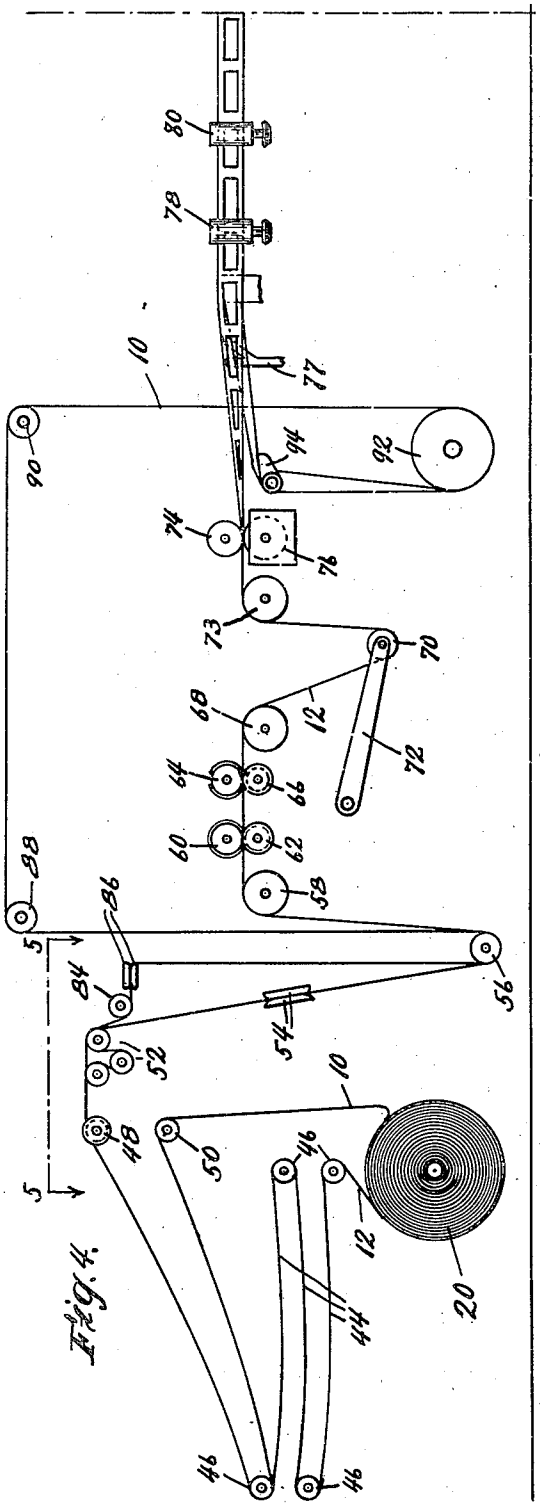


Fig. 4.

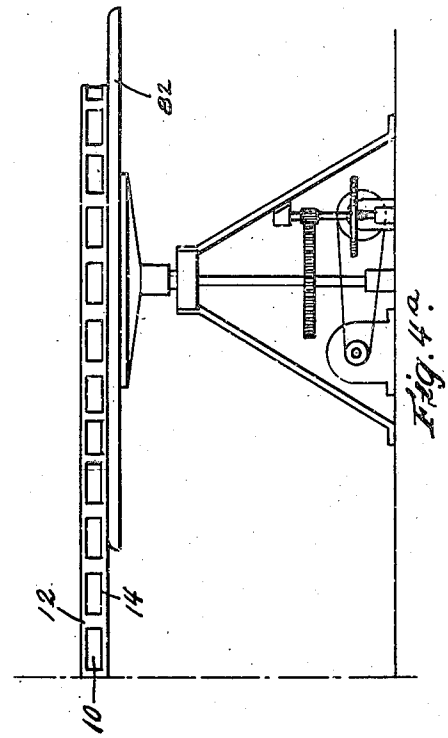


Fig. 4a.

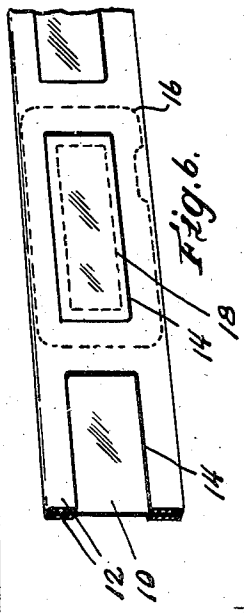


Fig. 6.

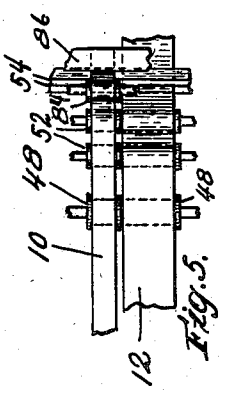


Fig. 5.

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING STENCIL FRAMES

Application filed June 11, 1931. Serial No. 543,581.

This invention relates to stencils adapted for use in addressing machines.

The stencil with which the present invention is concerned comprises a frame consisting of two sheets of paper at least one of which in relatively stiff, with a stencil sheet secured over one of the sheets and over a window therein. The specific stencil comprises a sheet of stiff paper which is folded on opposite sides of and encloses and is adhesively affixed to the thinner paper sheet. The thin paper sheet and the folded sections of the thick sheet all have registering windows and a stencil sheet is secured to the thin sheet over the window therein. Such stencils are manufactured by a machine constructed generally as illustrated in the Elliott Patents #1,121,080 and #1,140,889.

In the stencil manufacturing process, the thick paper sheet is withdrawn from a roll thereof and is passed through devices where the windows are blanked out and adhesive is applied to one surface of the sheet and the sheet is folded along its medial longitudinal line. The thin sheet is withdrawn from a roll thereof and is fed into the space between the folded portions of the thick sheet, as these portions are being folded, and thus is adhesively fixed to the folded portions. During a subsequent operation, the windows are blanked out of the thin sheet and the separate stencils are blanked out of the combined folded sheets.

The paper sheets which comprise the stencil frame are hygroscopic. Thus the stencil frame will curl or become warped out of its intended flat plane if the moisture content or hygroscopic condition of one sheet of the frame is different from that of the other sheet of the frame. A warped stencil is highly undesirable as the successful feeding of the stencils in an addressing machine depends largely upon their flatness.

It has been attempted to provide the same moisture condition in both sheets by storing the rolls of the two sheets close together in the same room so that they would both be subjected to atmosphere of the same degree of humidity. This method is not entirely successful, however. as it is found that the moisture content of different portions of the sheet vary with their positions in the roll, and that the moisture condition of a convolution of the roll of thick paper strip may be different from a similar convolution of the roll of the thin paper strip due to daily variations in humidity of the atmosphere in the room and also due to differences in the thickness and density of the two strips. Consequently, the moisture conditions of the confronting parts of the strips in the manner in which they were ordinarily combined might be different so that the severed stencils might still have a tendency to warp. Consequently an object of the present invention is a method of storing the strips so that those portions which cooperate to make a single stencil will have practically the same moisture condition and in combining the strips so that those parts having practically the same moisture conditions will be combined together.

A further object of the invention consists in winding the two strips that compose the stencil frames in one roll, storing the roll until moisture conditions are the same in contacting portions of the two strips, and in combining the strips in a series of stencil frames in the same relative order as the strips lie in contact or in confronting relation with each other in the roll so that those localities of the strips that have the same moisture condition are combined together in the stencil, thereby to prevent the warping of the stencil.

In utilizing the above method of making stencils, certain modifications in the usual stencil making apparatus are desirable in order to combine the two strips in approximately the same relation that they are in the roll and such modification constitutes a further object of the present invention.

Another object of the invention is generally to improve stencil process and apparatus.

Fig. 1 is a side elevation of the essential features of a roll winding mechanism for preparing the rolls of paper in accordance with the present invention.

Fig. 2 is a plane view of the machine of Fig. 1.

Fig. 3 is a perspective view of one of

the rolls made by the machine of Figs. 1 and 2.

Figs. 4 and 4*a* represent diagrammatically the stencil making machine for combining the strips contained in the roll of Fig. 3 into a series of stencil frames.

Fig. 5 is a plan view of Fig. 4 taken along line 5—5 of Fig. 4.

Fig. 6 is a perspective detail of a section of the stencil frames produced by the machine of Fig. 4.

The stencil frame made in accordance with the present process and apparatus is represented in Fig. 6 which illustrates a strip of connected stencil frames from which the separate frames are subsequently blanked. The strip comprises a long sheet 10 which usually is relatively thin and is located between and is affixed to the reflexed portions of a relatively thick sheet 12. The reflexed portions of the thick sheet have registering windows 14 formed therein. Separate stencil frames are subsequently blanked from the strip as indicated by the dotted lines 16 and a window 18 is also blanked out of the thin intermediate sheet 10 within the windows of the thick sheet. A thin stencil sheet, not shown, is secured to the exposed portion of the sheet 10 over the window therein and completes the stencil. If the confronting sections of the sheets 10 and 12 have different moisture conditions at the time they are combined together, the stencil will warp and it is the main purpose of the present invention to treat the sheets and to combine them in such a manner that the moisture conditions of the combined sheets in the stencil is the same, although the moisture condition of the sheets may be different in stencils made from widely different localities of the sheets.

In accordance with the present invention long lengths of the narrow inner sheet 10 and the wide outer sheet 12 are wound together in a common roll 20 as illustrated in Fig. 3, the convolutions of the inner sheet 10 lying between and in contact or in confronting relation with the convolutions of the wide sheet. The rolls are automatically wound by the machine illustrated in Figs. 1 and 2 which winds three rolls 20 at the same time. A roll 12*a* of paper 12 of sufficient width to form three rolls 20 is rotatably supported in bearings 22. Three rolls 10*a*, of paper 10, are rotatably supported in bearings 24. The broad sheet passes from the roll 12*a* between wiping felts 26 that remove dust and loose fibres from the paper and over a roll 28 and thence downwardly over a roll 30 and between this roll and slitting rolls 32 where the broad sheet is slit into narrow sheets 12. The sheets 10 from the rolls 10*a* pass above the roll 28 and over shoes 34 where each combines with a separate strip 12 and both are wound together to form one or another of the rolls 20 on the shafts 36. The shafts are rotated by a pulley 38 which drives a gear 40 that in turn through other gearing 42 rotates the shafts 36.

The combined sheets in roll form, as illustrated by the roll 20, Fig. 3, are stored until the moisture conditions of the portions of the two sheets adjacent each other are the same. The sheets are then combined together to form the stencil frames by the machine illustrated in Figs. 4 and 4*a*. A roll 20 of the combined sheets 10 and 12 is rotatably supported at one end of the machine. The wide sheet 12 thereof is withdrawn from the outside of the roll and makes a plurality of passes 44 over idler pulleys or rolls 46, and thence passes upwardly and over one end of an idler roll 48. The narrow sheet 10 of the roll 20 is also withdrawn from the outer part of the roll 20 and passes over the idler roll 50 and the uppermost one of the rolls 46 and thence over the roll 48 where it is disposed beside the wide sheet 12. The wide sheet passes from the roll 48 around a series of closely spaced rolls 52 where the curl in the thick sheet is removed and thence passes between cleaning felts 54 and downwardly over a roll 56 and thence upwardly and over a roll 58 of the blanking mechanism. The wide sheet passes between two superimposed rolls 60 and 62 which score the outline of the windows 14 in the sheet and also the longitudinal median line of fold. The sheet thence passes between the superimposed rolls 64 and 66 which blank out the material within the score lines of the windows. The sets of rolls 60, 62 and 64, 66 also advance the sheet in a continuous manner. The blank sheet thence passes over a roll 68 and into a loop which is held taut by a weighted idler roll 70 journalled on the pivoted arm 72. The sheet 12 thence passes from the loop over the roll 73 and between an upper idler roll 74 and a lower paste roll 76 that applies an adhesive to the lower face of the sheet. The sheet thence passes over the top edge of a folding plate 77 which causes the two portions of the sheet on opposite sides of the median line of fold to approach each other. The folding is finally completed and the folded strip is driven by press and driving rolls 78 and 80. The strip thence passes in edge form onto a rotating table 82 where it rests loosely on the table in roll form and is wound automatically thereon by the rotation of the table. The narrow strip 10 passes from the roll 48 over the rolls 52 and at one side of the sheet 12 and thence under the roll 84 and through cleaning felts 86. The sheet then passes downwardly and about the roll 56 and upwardly and over rolls 88 and 90 where it bridges the space taken up by the apparatus that operates on the wide sheet 12. From the roll 90, the sheet 10 thence passes down-

wardly at one side of the sheet 12 and over a roll 92 and thence upwardly over a roll 94 that is disposed at a horizontal angle with the line of movement of the sheet 12. From the roll 94 the sheet 10 passes under the sheet 12 and is twisted into a vertical plane and lies between the side portions of the sheet 12 that are being folded down so that the folded over portions of the sheet 12 are caused to be pressed against and adhesively affixed to the sheet 10 by the pairs of rolls 78 and 80.

The various portions of the sheets 10 and 12 are intended to be combined together at the rolls 78 in approximately the same relative positions that they occupied in the roll 20. To this end, the length of each sheet between the roll 20 and the press rolls 78 is intended to be approximately the same. It is not essential that those portions of the two sheets that were in contact or in confronting relation in the roll 20 must be directly in registration with each other at the rolls 78 but there must not be so much displacement between the two sheets that the portions that are combined together are at harmfully different moisture conditions. Thus one of the reasons for the passes 44 of the sheet 12 is to draw off a great enough length of the sheet 12 so that the lengths of the two sheets is about the same between the roll and the combining positions.

Thus in accordance with this invention, the corresponding portions of the two sheets 10 and 12 that comprise the frame of a stencil are stored together so that they have the same moisture conditions and are united together in the stencil frame. Consequently the stencil frame is free from tendency to warp.

I claim:

1. The method of making stencils having frames composed of two united paper sheets which consists in providing long lengths of such sheets that may have different moisture conditions in different localities located along the lengths thereof, and combining together such portions of the sheets as have the same moisture conditions.

2. The method of making stencils having frames composed of united paper sheets which consists in providing sheets, the moisture condition of which may vary in different areas thereof, and combining the sheets with areas of the same moisture condition in registration with each other.

3. The method of making stencils having frames composed of two united paper sheets which consists in winding long lengths of the two sheets together in roll form with the convolutions of one sheet disposed between the convolutions of the other sheet, withdrawing the sheets from the roll and combining the sheets into stencil frames in the same relative relation they occupied in the roll.

4. The method of making stencils having frames of united paper sheets which consists in winding long lengths of the sheet together in roll form so that the convolutions of one sheet lie between the convolutions of the other sheet, storing the roll until moisture conditions of confronting sections of the two sheets are the same, withdrawing the sheets from the roll and combining them into the stencil frames with localities of the sheets having the same moisture condition in registration with each other.

5. The method of making stencils having frames composed of united paper sheets which consists in winding long lengths of the sheets together in roll form with the convolutions of one sheet lying between the convolutions of the other sheet, storing the roll until moisture conditions of confronting localities of the sheets are the same, and combining the sheets into stencil frames.

6. The method of making stencils having frames composed of united paper sheets which consists in assembling long lengths of the two sheets together, storing the sheets until confronting localities of the sheets having the same moisture condition, and uniting the sheets into the stencil frames with the localities having the same moisture condition in registration.

7. The method of making stencils having stencil frames composed of united paper sheets which consists in winding long lengths of sheets into roll form with one sheet lying between convolutions of the other sheet, storing the roll until moisture conditions in confronting localities of the sheets are the same, unwinding the sheets from the roll and separating the sheets, subsequently combining the sheets into stencil frames with localities of the same moisture condition being in registration, and providing substantially equal lengths of the separate sheets between the roll and the combining position.

8. The method of making stencils having stencil frames composed of united paper sheets which consists in winding long lengths of the paper sheets together into roll form with the convolutions of one sheet being located between the convolutions of the other sheet, unwinding the sheets from the roll and separating the sheets, combining the sheets together into stencil frames, and providing substantially equal lengths of the separate sheets between the roll and the combining position so that the portions of the sheets that were in confronting relation in the roll are combined together in the frames.

9. That step in the method of making stencil frames composed of adhesively affixed superimposed paper sheets so that the frames are free from tendency to warp, which method consists in winding together into roll form long lengths of the sheets that comprise the frame so that the convolutions of one sheet are within the convolutions of the other sheet; and storing the roll for a sufficient period of

time for the hygroscopic condition of confronting convolutions of the two sheets to become stable.

10. The method of making stencil frames composed of adhesively affixed superimposed paper sheets so that the frames are free from tendency to warp, which method consists in winding together into roll form long lengths of the sheets that comprise the frame so that the convolutions of one sheet are within the convolutions of the other sheet, and storing the roll for a sufficient period of time for the hyproscopic condition of confronting convolutions of the two sheets to become stable, and withdrawing the sheets from the roll and adhesively affixing them together in the same relative relation with each other that they had in the roll.

11. The method of making stencil frames composed of adhesively affixed superimposed paper sheets so that the frames are free from tendency to warp, which method consists in providing long paper sheets, having the same hygroscopic condition at the same distances from the ends thereof, and adhesively affixing the sheets together with the portions of the sheets having the same hygroscopic conditions in registration.

12. The method of making stencil frames composed of adhesively affixed superimposed paper sheets so that the frames are free from tendency to warp, which method consists in providing long sections of a wide and a narrow paper sheet that have the same hygroscopic conditions at the same distances from the ends thereof, blanking windows in the wide sheet along the length thereof and on opposite sides of the median line thereof, combining the sheets by folding the wide sheet along its median line over and against opposite sides of the narrow sheet, and positioning the two sheets with respect to each other so that when they are combined those portions of the two sheets having the same hygroscopic conditions are in registration with each other.

In testimony whereof, I have signed my name to this specification.

HARMON P. ELLIOTT.