June 6, 1933. O. KLEINSCHMIT ET AL 1,912,527

METHOD OF AND MECHANISM FOR SUPERIMPOSING A SHEET UPON AND ATTACHING IT TO A SELECTED BOOK SECTION OR THE LIKE IN A SHEET PASTING MACHINE

Filed May 27, 1931 3 Sheets-Sheet 1

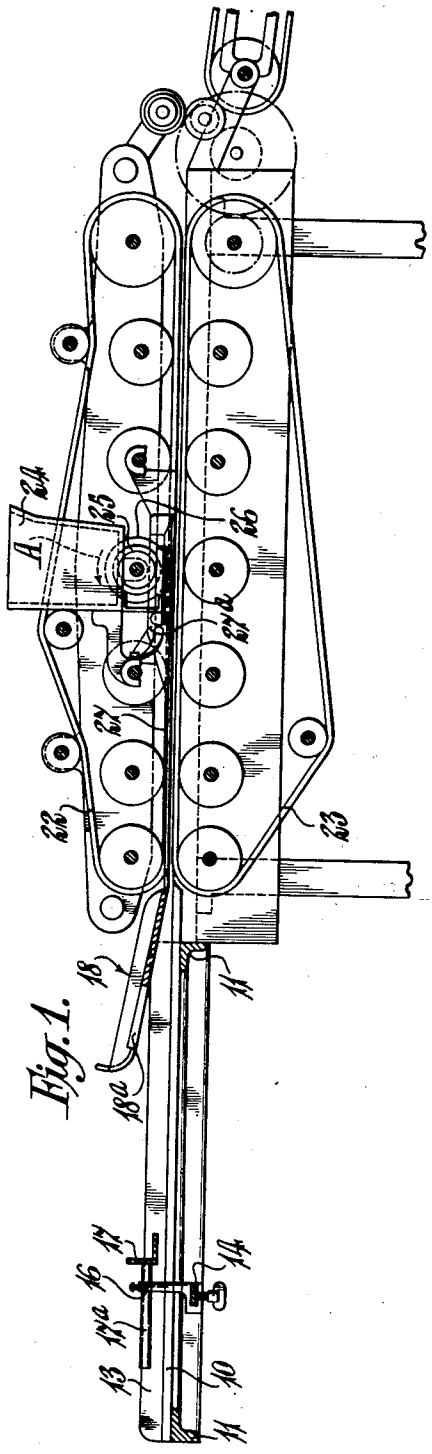


Fig. 1.

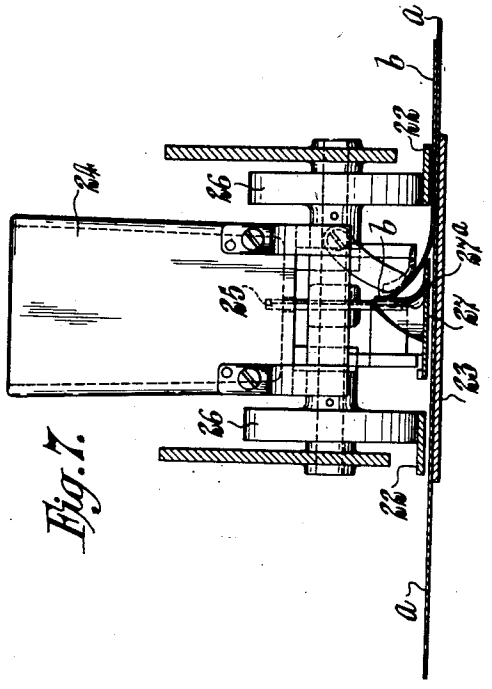


Fig. 7.

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Filed May 27, 1931 3 Sheets-Sheet 2

Fig. 3.

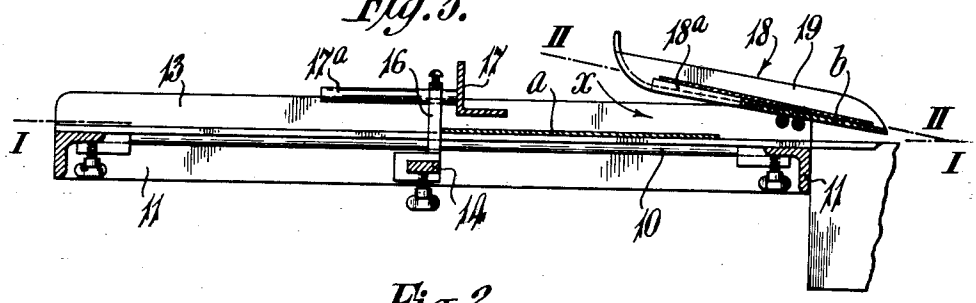


Fig. 2.

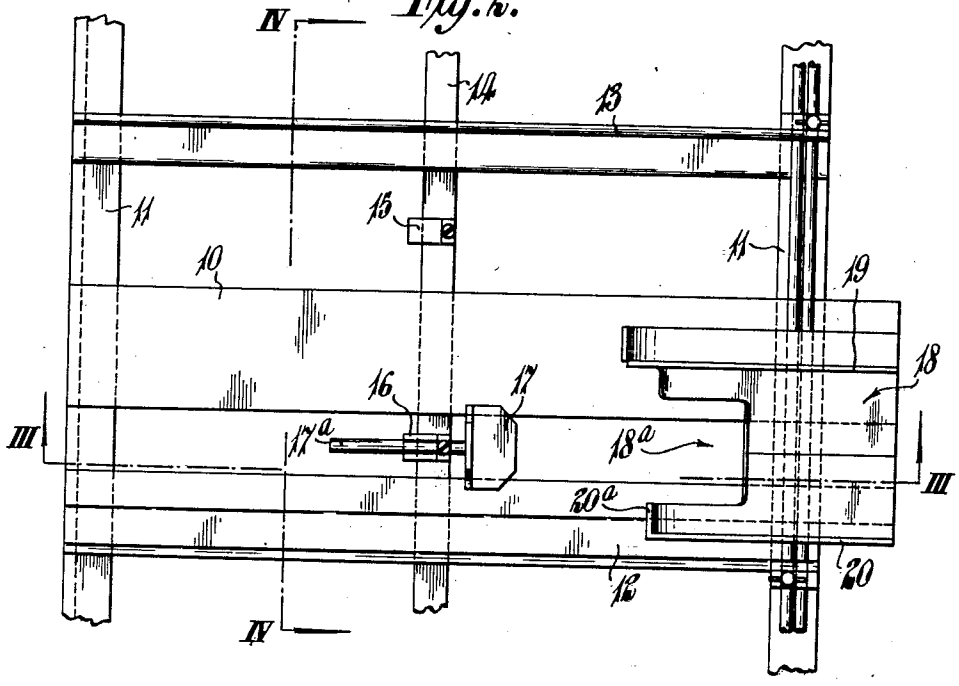
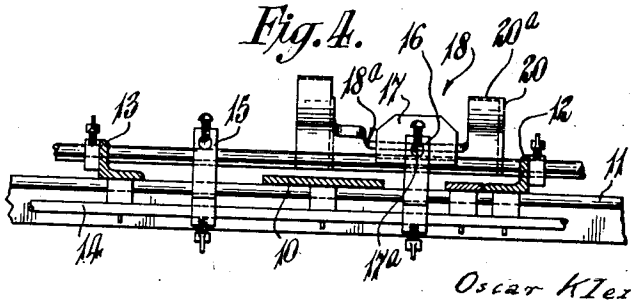


Fig. 4.



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Filed May 27, 1931 3 Sheets-Sheet 3

Fig. 5.

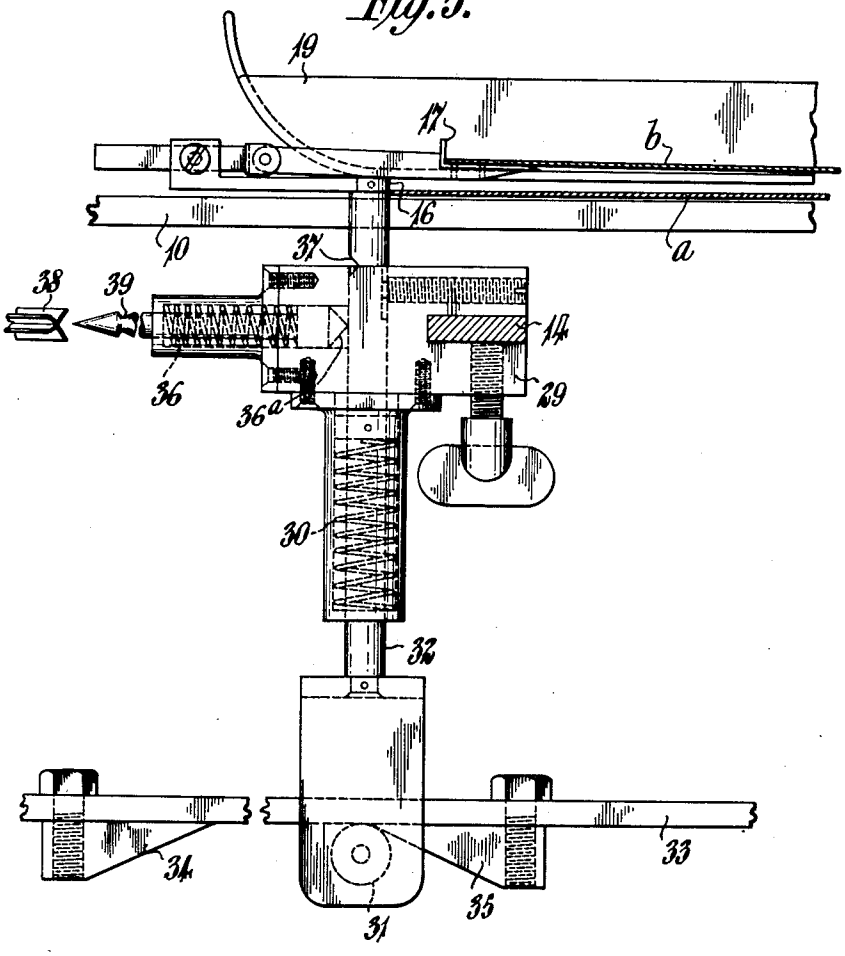
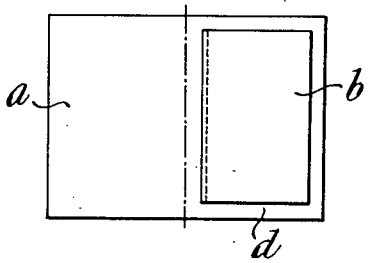


Fig. 6.



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UNITED STATES PATENT OFFICE

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METHOD OF AND MECHANISM FOR SUPERIMPOSING A SHEET UPON AND ATTACHING IT TO A SELECTED BOOK SECTION OR THE LIKE IN A SHEET PASTING MACHINE

Application filed May 27, 1931, Serial No. 540,440, and in Germany September 10, 1930.

The present invention relates to sheet pasting machines and is more particularly concerned with such machines in which paste is applied to the requisite parts of selected sheets or book sections for the purpose of connecting the latter together.

In the production of illustrated books or similar printed works of art in the graphic printing industry, it is frequently necessary or desirable to place a protecting sheet over each of the illustrations which may, for instance, comprise multi-colour plate impressions. Frequently in the art, also, such an illustration is produced separately and, instead of being bound with the remaining sheets of the book, it is mounted on a sheet provided in the book for this purpose. In these and similar cases, the sheet to be separately attached is usually smaller than the book size and thus lies back more or less from the binding edge or head of the book.

Operations of the kind above described have hitherto necessitated highly skilled manual work and the present invention has for its object to provide a method of effecting the operation by mechanical means, and moreover in a neat accurate and clean manner.

According to the method of this invention, individual sheets are fed from different planes, one sheet is superimposed upon the other during the joint feed thereof, and subsequently, adhesive is applied to the underface of the superimposed sheet thereby connecting the sheets together.

In order that the invention may be better understood we will now describe, by way of example, two constructional embodiments of the invention with reference to the accompanying drawings in which the constructions are illustrated in a more or less diagrammatical manner.

Fig. 1 shows in side elevation a sheet pasting machine.

Fig. 2 is a plan view of the sheet-feed table forming part of the machine.

Fig. 3 is a sectional view taken on line III—III of Fig. 2.

Fig. 4 is a transverse sectional view taken on line IV—IV of Fig. 2.

Fig. 5 shows drawn to a larger scale a modified embodiment of the means for carrying the invention into effect.

Fig. 6 shows diagrammatically, an example of superimposed sheets, one of the said sheets being attached to the other along one edge thereof, and

Fig. 7 is a detail view showing the masking shield or sheet-edge deflecting member.

Referring to Fig. 1, a combined lay table and feed table 10 suitably supported upon a framework or similar structure 11 is positioned adjacent to, or built on to one end of the main frame of the pasting machine. The feed table (Figs. 1, 2 and 3) comprises lateral side guides 12 and 13, adjustably mounted on the supporting framework and adapted to guide the sheet *a* (Fig. 6), upon which the second sheet *b* is subsequently imposed. A transverse member 14, arranged to be reciprocated longitudinally of the feed table by suitable driving means (not shown), carries fingers or abutments 15, 16 and 17, adjustably mounted thereon. The fingers 15 and 16 are arranged to engage the rear edge of a sheet *a* laid upon the table 10 between the side guides or lays 12 and 13, while the finger 17 engages the rear edge of the sheet *b*. The sheet *a* is positioned on the feed table in the plane indicated by the chain-dotted line I—I which in this construction is horizontal, while the sheet *b* is positioned above the sheet *a* and lies at an angle to the latter, in a plane indicated by the chain-dotted line II—II. The sheet *b* is supported on an auxiliary lay table and feed table 18 which is set at an angle to the feed table 10 and provided with adjustable side lays or guides 19 and 20. The plane II intersects the plane I at a point slightly ahead of the mouth formed by the converging feed tables 10 and 18. The guide 19 is curved at that end which faces the moving sheet *a* to provide means for smoothing the latter if it should become buckled, and the other side guide 20 is provided with an upturned flange 20*a* against which the rear end of the sheet *b* abuts when laid on the table 18. By this arrangement of the auxiliary feed table 18, a comparatively large clearance between the two sheets is provided at the point *x* so that

no jamming or confusion of the respective sheets *a* and *b* is occasioned during the feed thereof. The supporting surface of the table 18 is recessed as shown at 18*a* (Fig. 2) for the purpose hereinafter described.

The finger or abutment 17 is attached to a short rod 17*a* which is adapted to be adjustably mounted in the upper part of the abutment 16 and is held therein by a suitable set screw. By thus positioning the abutment 17 it is aligned with the recess 18*a* in the table 18 which latter, in this embodiment of the invention, is positioned to one side of the main feed table 10. The sheet engaging abutments 15, 16, 17 are thus moved together at the same speed and in the same direction, being arranged in predetermined and adjustable position relatively to each other.

The main frame of the machine is provided with superimposed conveyor belts or tapes 22, 23 arranged in known manner to run over a series of rollers, to provide positive sheet-conveying means co-operating with an adhesive applying device (Figs. 1 and 7) which latter is arranged in the centre of the main frame intermediate the run of the conveyor tapes. As will be seen from Fig. 7, the lower conveyor member 23 may comprise a belt of sufficient width to extend completely across the conveyor device while the upper conveyor member comprises two belts interposed between which is a narrow longitudinal plate 27 adapted to support the inner lateral edge of the upper sheet *b* when the latter is superimposed on the sheet *a*. The member 27 extends from the feed table 18 to the adhesive applying device and thus prevents the said inner lateral edge of the sheet *b* during this part of its travel from lying upon the sheet *a*. The adhesive applying device comprises an adhesive supply tank or container 24 and an adhesive applying roller or wheel 25 adapted to rotate partly in the container and engage some part of the contents thereof. The wheel 25 is rotatably suspended above the path I of the sheet *a* and is aligned with the inner lateral edge of the sheet *b* which is supported upon the member 27, while the remainder of this sheet has been imposed upon the sheet *a* prior to reaching the adhesive-applying device. Provision is made for rotating the wheel 25 at a speed equivalent to the speed of the conveyor tapes 22 and 23 and in the present construction this is done by rigidly mounting the wheel 25 on a stub shaft journalled in suitable bearings and carrying on its extremities, follower wheels 26 which latter are adapted to engage the conveyor tapes 22 and thus revolve the wheel 25 at the requisite speed.

Arranged in front of this wheel is a deflecting wall or guide member 27*a* (Fig. 7) formed as part of the member 27 or attached thereto as desired. The member 27*a* is shaped so as to cause the inner lateral edge of the sheet *b* to be deflected in an upward direction when approaching the adhesive applying member 25. The underface of this upwardly curved portion of the sheet *b* thus comes into contact with the adjacent side of the revolving wheel 25 and thereby receives a strip of paste. In this embodiment, the deflecting wall 27*a* is formed with a masking shield which faces the oncoming sheets in order to mask the front half of the wheel 25 from the upturned edge of the sheet *b*. The adhesive applying member which is rotating in the direction of the arrow "A" (Fig. 1) is thus prevented from contacting, during the downward part of its travel, with the upturned edge of the sheet *b* which latter would act as a scraper and thus receive uneven and excessive amounts of adhesive. By arranging for the upturned edge of the sheet to contact with the rear or upwardly moving part of the member 25, the adhesive is wiped on to the underface of the sheet as the member 25 is moving away from the said sheet, so ensuring the uniformity of the adhesive application. The operation of this sheet handling mechanism is as follows:

The sheet *a* is placed on the table 10 between the lateral guides 12 and 13 the latter having been adjusted to engage the lateral edges of the sheet, and so lies in the plane I. The second sheet *b* is placed upon the table 18 between the guides 19 and 20 which engage the lateral edges thereof, and thus lies in the plane II (Figs. 3 and 4). During the operation of the machine, the abutments 12 and 13 which are timed to move at the same speed as the conveyor tapes 22 and 23 engage the rear edge of the sheet *a* and move it forward towards the conveyor tapes. After advancing the sheet *a* through some distance of its travel towards the conveyor tapes the upper abutment 17, carried by the abutment 16, reaches and engages the rear edge of the sheet *b* which thereupon is moved forward at the same speed as the sheet *a* during the advance of the abutment 17 into the recess 18*a*. The sheet *b* is thus moved downwardly, by reason of the inclination of the table 18 and so, during the joint travel of the sheets, the sheet *b* is imposed upon the sheet *a* as shown in Fig. 6. As the sheets are urged from the feed tables by the engaging abutments, they are seized and firmly held by the conveyor belts 22, 23 by which they are conveyed to the adhesive applying device. The sheets which are thus advanced jointly, are firmly held along their outer lateral edges while the inner lateral edge of the top sheet *b* is left freely supported upon the member 27 as the sheets are advanced, the free inner lateral edge of the sheet *b* is engaged by the edge deflecting member 27*a* which causes the underface of the deflected edge to engage with the adhesive applying member as above described. During the further advance of the sheets the raised

inner edge of the sheet *b* to which adhesive has been applied, is brought down upon the sheet *a* and pressed thereon in known manner thus attaching the superimposed sheet *b* to the under sheet *a* along the inner lateral edge of the sheet *b* as shown in Fig. 6.

In a modified form of this invention the sheet engaging abutments may be arranged to descend to a lower plane during their return movement and thus allow the uninterrupted laying-on of the next sheet *a* during the return of the abutments to their initial position. An arrangement of this description is shown in Fig. 5.

Arranged on the reciprocating abutment support 14 are laterally adjacent supports 29. Slidably mounted in these supports are rods 32 which carry the abutments 15, 16 and 17 above referred to. Springs 30 tend to force these rods 32 upwardly whereby rollers 31 journalled at the lower ends of the rods 32 are caused to engage rails 33 which are provided with adjustable cam faces 34, 35. Journalled in the supports 29 moreover, are spring plunger pins 36, adapted to co-operate at one extremity 36*a* with notches 37 provided in the rods 32 when the rollers 31 engage the cams 35, that is to say, when the abutments 15, 16 and 17, Fig. 5, are lowered. Preferably, the upper abutment 17 is mounted on a hinged arm to enable it to be tripped if, in descending it should come into contact with the lower sheet *a*. Grippers 38 which are adjustable according to the travel of the abutments, are adapted to engage the outer extremity 39 of the pins 36 when the member 14 has reached the end of its movement. In the next forward motion of the member 14 the grippers 38 first hold the pins 36 firmly, thereby withdrawing the ends 36*a* of the pins from the notches 37. Since, in the meantime, the rollers 31 have left the cams 34 the abutments are now raised by the action of the springs 30 and are placed ready to engage the sheet edges. As soon as the pull on the grippers 38 is increased, the points 39 are withdrawn therefrom. Within the limit of the travel of the abutments they are drawn down again when the cam followers 31 engage the cam surfaces 35 and the point of each plunger pin 36 re-enters the requisite notch 37 in the rod 32.

In the place of this construction use may be made of any other mechanically or magnetically operated device for the up and down movement of the sheet engaging abutments.

In the above description of this invention, the auxiliary feed table 18 has been described as being positioned at an angle to the main feed table 10, but it is possible to successfully operate the machine with the auxiliary table positioned horizontally to or approximately horizontally to the main feed table 10.

By mounting the abutment 17 in an adjustable manner upon the abutment 16, it is possible to adjust readily the distance *d* (Fig. 6) between the edges of the sheets *a* and *b*.

The scope of this invention is not necessarily limited to the specific constructional examples above described, since other forms of mechanism may be readily devised to carry the invention, as defined in the appended claims, into effect.

We claim:

1. A method of connecting individual sheets in a sheet-pasting machine, which consists in feeding the sheets along paths in different planes, superimposing one sheet on the other during the joint feed thereof, upwardly deflecting a portion of the superimposed sheet, applying adhesive to the underside of said deflected portion, and bringing the sheets together.

2. A method of sheet-pasting as claimed in claim 1, in which the adhesive is applied to the underface of the upper sheet while the operative surface of a movable adhesive applying member is moving away from the said sheet.

3. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, sheet conveyor members, means for moving towards the sheet conveyor members a sheet supported on the main feed table, an auxiliary feed table converging towards the said main feed table, means for moving towards the said sheet conveyor members and first mentioned sheet a sheet supported by the said auxiliary feed table, means for predetermining the positioning of the sheets relatively to each other during the movement thereof, and means for applying adhesive to one of said sheets.

4. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, an auxiliary feed table, means for guiding a sheet placed on the main feed table, means for guiding a sheet placed on the auxiliary feed table, sheet conveyor members, means for moving towards the said sheet conveyor members the sheet supported on the feed table, means for moving towards the said sheet conveyor members and first mentioned sheet the sheet supported on the auxiliary feed table, and means for applying adhesive to one of said sheets.

5. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, adjustable sheet guides mounted on the main feed table, an auxiliary feed table, adjustable sheet guides mounted on the auxiliary feed table, sheet conveyor members, means for moving towards the sheet conveyor members a sheet supported on the main feed table, means associated with the first mentioned sheet moving means for moving towards the sheet conveyor members and the first mentioned sheet a second sheet supported on the auxiliary feed

table, and means for applying adhesive to one of the said sheets.

6. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, an auxiliary feed table having its supporting surface recessed, sheet conveyor members, means for moving towards the said sheet conveyor members a sheet placed on the main feed table, a sheet-engaging member associated with the first mentioned sheet moving means and adapted to engage a sheet supported on the said auxiliary feed table and to move into the recess in the said auxiliary feed table, and means for applying adhesive to one of the said sheets.

7. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, sheet guides mounted on the main feed table, an auxiliary feed table, sheet guides mounted on the auxiliary feed table, a longitudinally reciprocating member positioned beneath the main feed table, sheet engaging abutments associated with the main feed table and mounted on the said reciprocating member, a further sheet engaging abutment associated with the auxiliary feed table and mounted on one of the first mentioned sheet engaging abutments means for carrying to further sheet handling means the sheets fed from the feed tables, and means for applying adhesive to one of the said sheets.

8. In a sheet-pasting machine adapted to connect individual sheets together, the provision of a main feed table, an auxiliary feed table positioned above the main feed table, sheet pusher members associated with the main feed table, a sheet pusher member associated with the auxiliary feed table, means for conveying towards further sheet handling means separate sheets fed from the said feed tables, and means for applying adhesive to one of the said sheets.

9. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, an auxiliary feed table, sheet conveyor members, an adhesive-applying member, means for feeding sheets from the said feed tables to the said conveyor members, means for superimposing upon the sheet fed from the main feed table the sheet fed from the auxiliary feed table, means for contacting with the adhesive-applying member the underface of the said superimposed sheet, and means for bringing the sheets together.

10. In a sheet-pasting machine adapted to connect individual sheets together, the combination of a main feed table, an auxiliary feed table, an adhesive-applying member, means for conveying sheets to and from the said adhesive applying member, means for feeding the sheets from the said feed tables to the said sheet conveying means, means for superimposing upon the sheet fed from the main feed table the sheet fed from the auxiliary feed table, means for deflecting an edge of the said superimposed sheet in order to contact the said deflected sheet edge with the said adhesive applying member, and means for bringing the said sheets together.

11. A sheet-pasting machine adapted to connect individual sheets together, which includes a movable adhesive applying member, means for progressing sheets jointly past the adhesive applying member, means for deflecting the edge of one of the said sheets to enable the underside thereof to contact with the adhesive applying member, and means for pressing upon the adjacent sheet the sheet edge thus supplied with adhesive.

12. A sheet-pasting machine adapted to connect individual sheets together, which includes a rotating adhesive-applying member, means for progressing sheets jointly past the adhesive-applying member, means for deflecting the edge of one of the said sheets to enable the underside thereof to contact with the said adhesive-applying member, means for masking part of the moving surface of the adhesive applying member, and means for pressing the sheets together during their progress away from the adhesive applying member.

13. A sheet-pasting machine adapted to connect individual sheets together, which includes a main feed table, an auxiliary feed table, a reciprocatory member associated with the main feed table, sheet engaging abutments mounted on the said reciprocatory member, sheet conveying members, means for advancing the said sheet engaging abutments and sheets engaged thereby towards the said sheet conveying members, means for returning the said sheet-engaging abutments along a path in a plane below the level of the said main feed table.

14. A sheet-pasting machine adapted to connect individual sheets together, comprising in combination a main sheet-feed table, adjustable sheet guides mounted on said table, an auxiliary sheet-feed table, adjustable sheet guides mounted on said auxiliary table, a reciprocatory member positioned beneath said main table, sheet engaging members mounted on the said reciprocatory member and adapted to engage a sheet supported on the main table, a sheet engaging member mounted on one of the first mentioned sheet engaging members and adapted to engage a sheet supported on the auxiliary feed table, sheet conveying belts, an adhesive-applying device associated with the said conveying belts, means for contacting with the adhesive applying device, the requisite portion of a sheet carried by the conveying belts, and means for pressing the sheet thus supplied with adhesive into contact with an adjacent sheet.

15. A sheet-pasting machine adapted to

connect individual sheets together, comprising in combination, a main sheet-feed table, adjustable sheet guides mounted on said table, an auxiliary sheet-feed table having its supporting surface recessed and positioned above the main feed table, adjustable sheet guides mounted on the said auxiliary table, sheet conveying members, a movable member mounted beneath the main feed table and adapted to be moved towards the sheet conveying members and away therefrom, sheet engaging abutments adjustably mounted on the said movable member and adapted to engage a sheet supported by the main feed table, a further sheet-engaging abutment adjustably mounted on one of the first mentioned abutments and adapted to engage a sheet supported on the said auxiliary feed table and to deposit it upon the sheet supported by the main feed table, a movable adhesive-applying member associated with the said sheet conveying members, means for deflecting out of the plane of its path of travel an edge of one sheet conveyed by the sheet conveying members, means for contacting with the adhesive-applying member the underface of the deflected edge of the said sheet, and means for pressing onto the adjacent sheet the sheet thus supplied with adhesive.

16. A sheet-pasting machine adapted to connect individual sheets together, which includes a main sheet feed table, an auxiliary sheet feed table mounted above the main feed table, a reciprocatory member arranged beneath the main feed table and transverse thereto, at least one bracket mounted on the said transverse member, a substantially vertical rod slidably mounted in each bracket, sheet engaging abutments mounted on the upper extremity of each rod, a cam follower mounted on the lower extremity of each rod, a cam faced guide rail adapted to be engaged by the said cam follower, a spring plunger adapted to engage a notch in the said rod, means for engaging the said spring plunger in the notch in said rod, means for releasing said plunger from said rod, and means for restoring said abutments to the sheet engaging position.

17. A sheet-pasting machine adapted to connect individual sheets together, which includes a main sheet feed table, adjustable sheet guides associated with said main table, an auxiliary sheet feed table, adjustable sheet guides associated with said auxiliary table, a driving member positioned beneath the main feed table longitudinally thereof, a reciprocatory member mounted thereon and positioned transversely of the said feed tables, at least one bracket adjustably mounted on said reciprocatory member, a substantially vertical rod slidably mounted in each bracket, a sheet engaging abutment mounted upon the upper extremity of each rod and adapted to engage a sheet supported upon the main feed table, a further sheet engaging abutment adapted to engage a sheet supported by the auxiliary table and hingedly secured to a support adjustably mounted on one of the first mentioned abutments, a cam follower mounted on the lower extremity of each rod, a cam faced guide rail adapted to be engaged by the said cam follower, a spring plunger adapted to engage a notch provided in the said rod, means for engaging said spring plunger in the notch in said rod, means for releasing said spring plunger from said rod, and means for urging the said rod and abutments carried thereby into the operative position.

18. A sheet-pasting machine adapted to connect individual sheets together comprising, in combination, a main sheet-feed table, an auxiliary sheet-feed table placed above said main sheet feed table at an angle thereto, movable sheet conveyor belts, an adhesive-applying member positioned intermediate the length of said belts in the path of travel of the sheets carried thereby, an adhesive container adapted to supply adhesive to the said adhesive-applying member, means for moving towards the said sheet conveying means a sheet supported on the main table, means for feeding a secondary sheet from the said auxiliary table on to the said sheet, means for advancing the sheets jointly to the said adhesive applying member, means for deflecting one edge of the secondary sheet away from the surface of the first mentioned sheet, means for contacting the said deflected sheet-edge with the adhesive applying member, and means for pressing to the surface of the first mentioned sheet the sheet-edge thus supplied with adhesive.

19. In a sheet-pasting machine adapted to connect individual sheets together comprising, in combination, a main sheet-feed table, an auxiliary sheet-feed table placed above the said main sheet-feed table at an angle thereto, movable sheet conveyor belts, an adhesive applying member positioned intermediate the length of said belts, means for moving towards the said sheet conveying belts a sheet supported upon the main feed table, means for feeding a secondary sheet from the auxiliary feed table on to the first mentioned sheet, means for reciprocating the said sheet moving means, means for deflecting (during their idle movement) the said sheet-moving means away from the path of travel of the said sheets, means for advancing the sheets jointly to the said adhesive applying member, means for deflecting one edge of the secondary sheet away from the surface of the first mentioned sheet, means for contacting the undersurface of the said deflected sheet-edge with the adhesive applying member, and means for pressing to the surface of the first mentioned sheet the sheet-edge thus supplied with adhesive.

20. In a sheet-pasting machine, means for feeding individual sheets along paths in different planes and superimposing one sheet on the other during the joint feed thereof, means for upwardly deflecting a portion of the superimposed sheet, an adhesive applying device adapted to apply adhesive to the underside of said deflected portion of superimposed sheet, and means for bringing said sheets together.

21. In a sheet-pasting machine as claimed in claim 20, an adhesive applying device for applying the adhesive to the underface of the upper sheet while the operative surface of a movable adhesive applying member is moving away from the said sheet.

In testimony whereof we affix our signatures.

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