

May 8, 1962

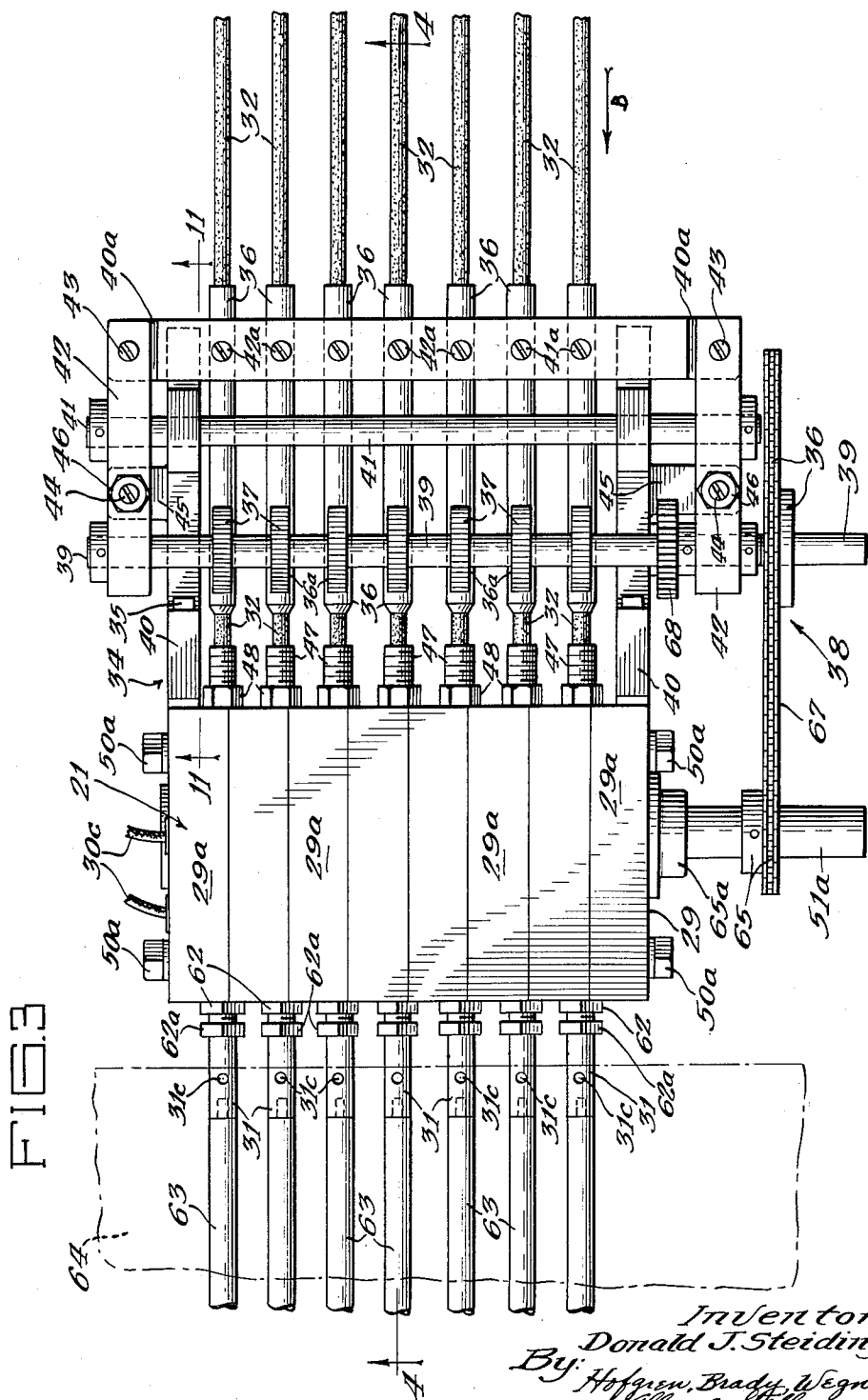
D. J. STEIDINGER

3,033,160

GLUING DEVICE

Filed Aug. 19, 1959

6 Sheets-Sheet 2



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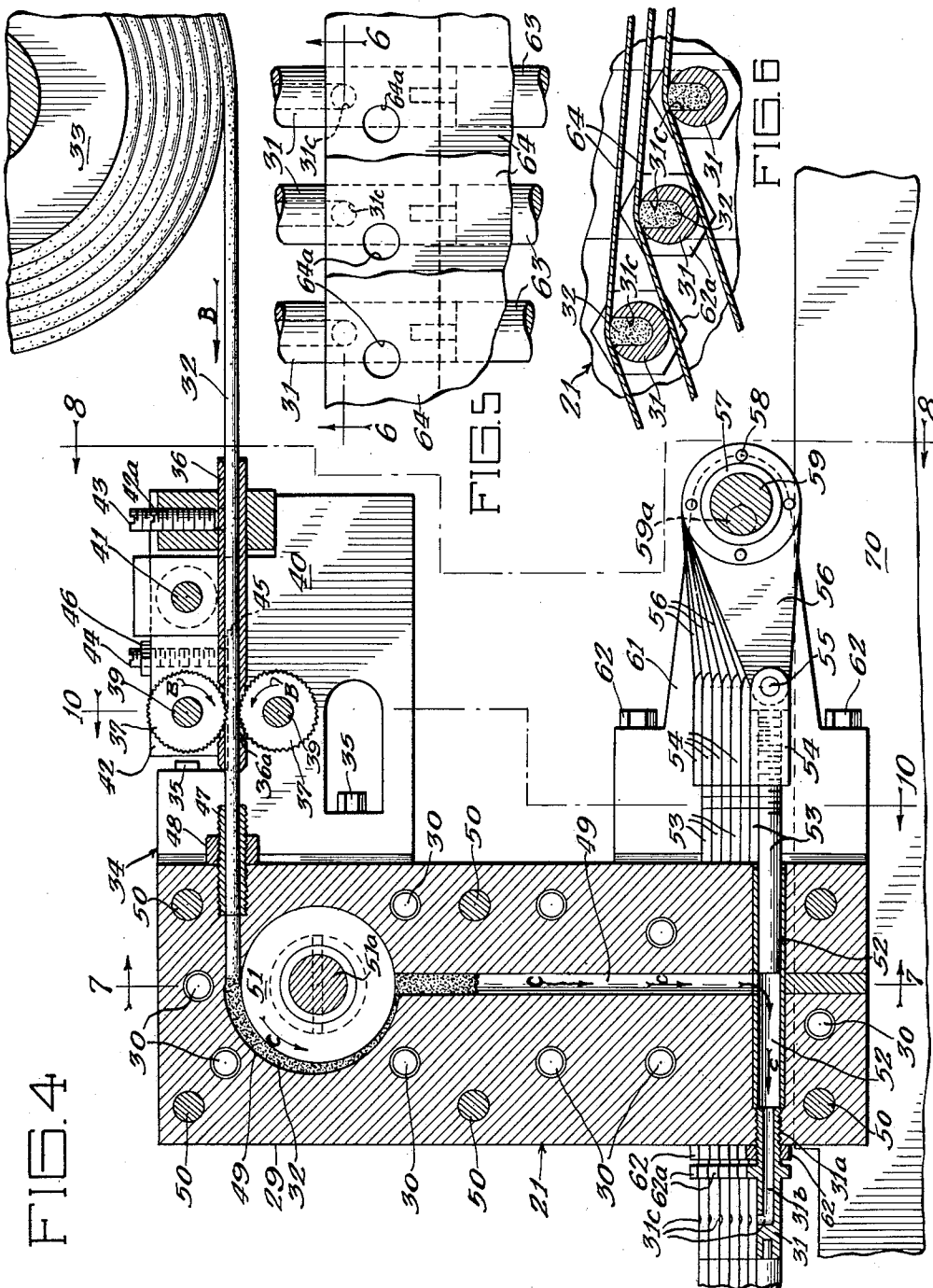
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Inventor:
Donald J. Steidinger
By: *Hoffman, Brady, Wagner,
Allen & Stillman*
Attorneys

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D. J. STEIDINGER

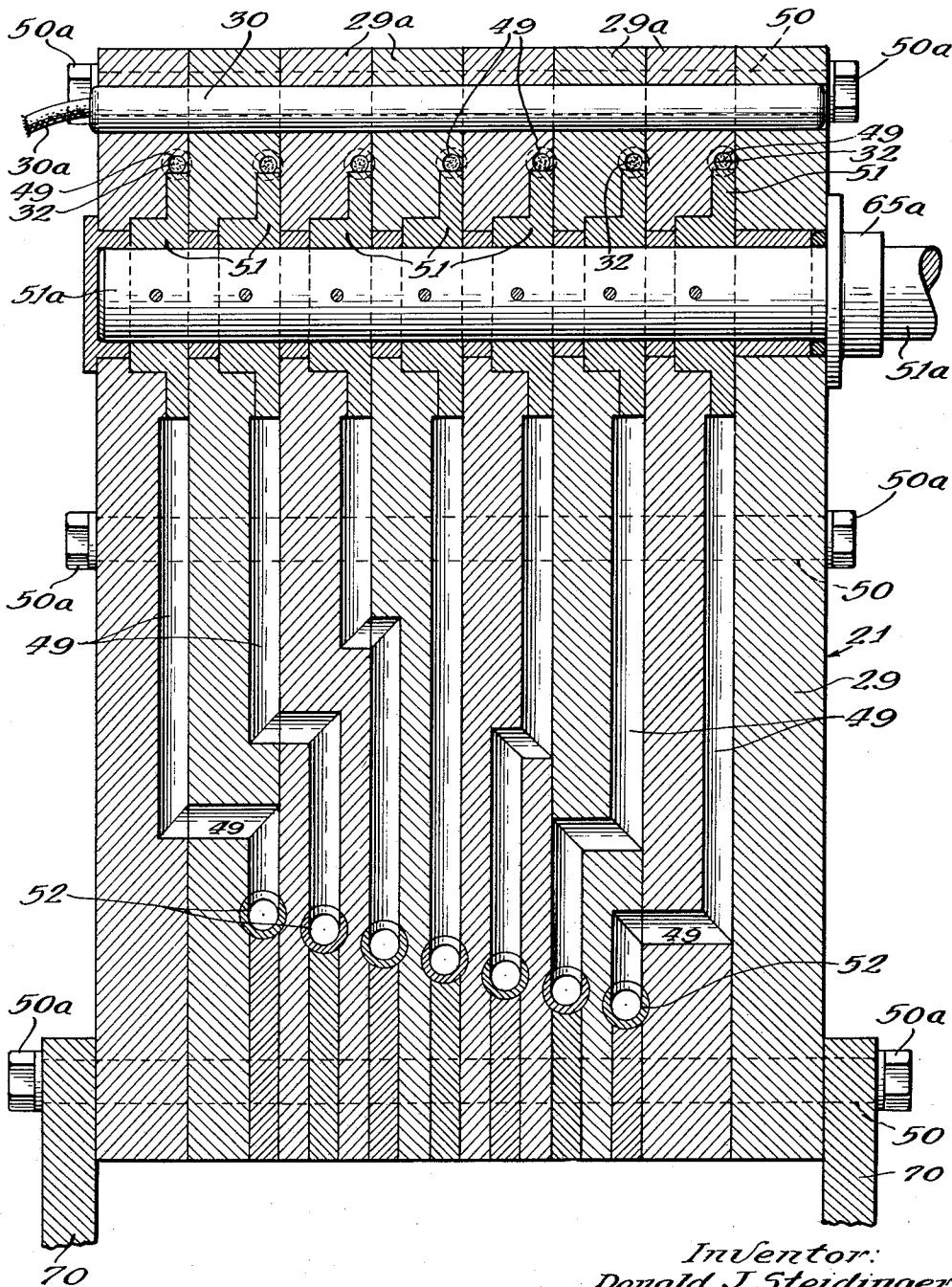
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FIG. 7



Inventor:
Donald J. Steidinger
By: Hofmann, Brady, Wagner,
Allen & Stillman
Attorneys

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D. J. STEIDINGER

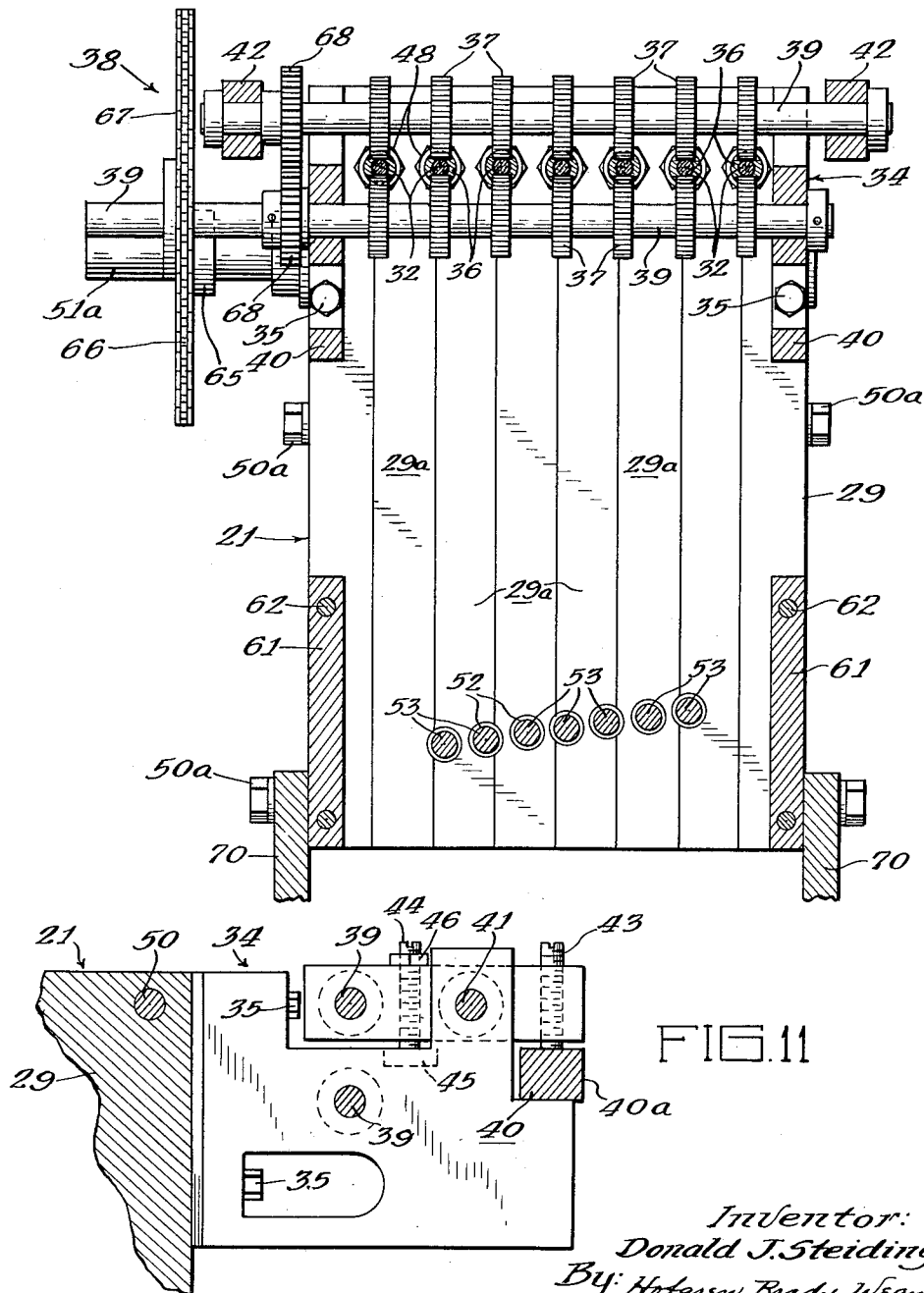
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GLUING DEVICE

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6 Sheets-Sheet 6

FIG. 10



Inventor:

Donald J. Steidinger

By: Hofgren, Brady, Wegner,
Allen & Stillman

Allen & Stillman

Attorneys

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GLUING DEVICE

Donald J. Steidinger, Clarendon Hills, Ill., assignor to
Uarco, Incorporated, a corporation of Illinois
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3 Claims. (Cl. 118—313)

This invention relates to a gluing device for manifolding stationery packs and to a method for producing manifolding stationery packs.

Numerous means have been used in the past in the manufacture of manifolding stationery packs including transfer sheets interleaved with record sheets, for holding the packs together. The various means for fastening the collated sheets or continuous strips of paper together includes mechanical elements, such as clips or staples and adhesives.

In forming such packs including multiple ply strips of stationery, it is extremely desirable to avoid an increase in the thickness of the pack along the margin where the sheets are fastened together. Such thickened portions provide lopsided packs and interfere with feeding the multiple ply stationery pack into machines or onto rolls thus resulting in jamming or other interruption of the equipment.

It is, of course, fairly apparent that the use of mechanical elements such as clips or staples will necessarily result in a pack which is thick along the attaching edge. Thus, these are the least desirable fastening means if edge thickness is to be avoided. Nor is this problem easily overcome by the use of adhesive to attach the record sheets together. In order to avoid thickening of the packs due to the presence of adhesive, it is necessary to limit drastically the amount of glue which is used. This may allow the sheets to slip during collation and thus provide improper placement in the pack. Limitation in the amount of glue also may result in incomplete adhesion. In order to overcome these problems more adhesive must be used and an increase in amount of adhesive again has the result of thickening the edge of the stationery pack.

In my copending application Serial No. 821,595 filed June 19, 1959, and entitled Continuous Form Stationery, which is made a part hereof by this reference, is shown a form of continuous form stationery which is adhered by glue spots along a margin thereof, but which does not have an increased thickness along the attaching margin. The problem of increased thickness along the attaching margin in this manifolding stationery is obviated because the areas of attachment are spaced along the margin of each sheet and the areas of attachment between adjacent pairs of record sheets are staggered and substantially non-overlapping with respect to similar areas on other adjacent sheets. Thus the areas do not overlap and thickening of the pack is substantially prevented.

It is, of course, difficult to produce such a manifolding stationery pack where the areas of attachment are glued and are also staggered with respect to adjacent areas of attachment of adjacent sheets. This is so because of the inherent difficulty in handling adhesive substances which are sufficiently quick drying to provide the necessary attachment and proper placement of the record sheets in the manifolding pack. The problem is increased because the glue generally must be applied while the stationery strips are moving.

It is often desirable in producing the manifolding sta-

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tionery packs to use what is commonly referred to as a hot melt glue to provide areas of attachment since a hot melt glue has a property of being exceptionally quick drying. Unfortunately, however, hot melt glues must be reduced to a liquid state before application and they are even more difficult to handle than other resin or cold glues. Moreover, hot melt glues tend to be thicker and thus will increase the marginal thickness of a pack even more than resin or cold glues.

It is, therefore, an object of this invention to provide a gluing device which may be used on a conventional collator to provide a manifolding stationery pack which does not have an increased thickness along the margin in the areas of attachment.

It is a further object of this invention to provide a gluing device such as that described above which may be used with hot melt glue or with cold resin glue, depending upon the desires of the operator.

It is still another object of this invention to provide a gluing device for use in producing a manifolding stationery pack which comprises a plurality of longitudinally offset nozzles arranged to deposit glue spots on sheets of material passing thereover, means for supplying liquid glue to the nozzles and means for intermittently discharging amounts of the glue through the nozzles.

It is still another object of this invention to provide a method for producing manifolding stationery packs without increasing the marginal thickness of said packs which comprises the steps of depositing a plurality of glue spots along the attaching edge of a plurality of record sheets, the glue spots being in staggered and substantially non-overlapping relationship with similar spots on adjacent sheets in the pack and thereafter pressing such sheets together along the attaching edge to allow adhesion between adjacent sheets.

Other objects and advantages of this invention will become apparent from the following description taken together with the accompanying drawings.

Of the drawings:

FIGURE 1 is a diagrammatic side elevational view of a collator embodying the gluing devices of this invention. FIGURE 2 is an enlarged partial side elevational view of the gluing device shown in FIGURE 1.

FIGURE 3 is an enlarged partial top plan view of the gluing device.

FIGURE 4 is a partial sectional view taken along the line 4—4 of FIGURE 3.

FIGURE 5 is a greatly enlarged partial top plan view partially broken away of several plies of paper passing over three of the separating rods of the gluing device of this invention.

FIGURE 6 is a partial sectional view taken along the line 6—6 of FIGURE 5.

FIGURE 7 is a greatly enlarged vertical sectional view taken along the line 7—7 of FIGURE 4.

FIGURE 8 is an enlarged rear elevational view taken along the line 8—8 of FIGURE 5.

FIGURE 9 is a partial sectional view partially broken away taken along the line 9—9 of FIGURE 8.

FIGURE 10 is a partial vertical sectional view taken along the line 10—10 of FIGURE 4; and

FIGURE 11 is a partial vertical sectional view taken along the line 11—11 of FIGURE 3.

Referring now to FIGURE 1, a collator is diagrammatically shown therein which includes the gluing device

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21 of this invention. The collator 10 includes a table-like frame 11 which has a plurality of supporting legs 12. Supported on the frame 11 are numerous rolls of paper. Thus, along the lower portion of the frame 11a are supported numerous rolls 13 of record sheet paper. The rolls are carried by spindles 15 which allow them to rotate as will be explained presently.

Along the middle portion of the frame 11b are supported numerous rolls 14 of carbon paper or other transfer material. These rolls are also carried by spindles 16 and are similarly allowed to rotate thereon.

Supported along the upper portion of the frame 11c are numerous pinwheels 17 and feed rollers 18. The feed rollers also operate with a gluing mechanism (not shown) to attach the carbon paper to the record sheets. A pin belt 19 is also carried by the upper portion of the frame 11c and is rotated along the line of travel of the paper by means of a pair of gear wheels 20. To the left of the pin belt 19 and also positioned on the upper portion of the frame 11 is the gluing device 21 of this invention which will be described in much greater detail later.

To the left of the gluing device are a pair of sealing bars 22, and a pair of perforating rollers 23. To the left of the perforating rollers 23 is another pinwheel 24 and below it is a pair of tucker wheels 25. Directly below the tucker rollers 25 is a pair of oscillator rollers 26. The pinwheels 17 and 24, the pin belt 19, the perforating rollers 23, the tucker wheels 25 and the oscillator rollers 26 are all rotated by a conventional collator drive mechanism (not shown).

In operation, the paper wound on the rolls of carbon and record paper is unwound by unwinders (not shown) in the spindles and by the pinwheels 19 so that the strips are drawn in the direction of the arrow A to the upper portion of the collator 11c and moved to the left. As the carbon sheets meet the record sheets, a gluing device (not shown) attaches them to the underside of the record sheets slightly inwardly from the outer margin of the record sheets. In the operation shown in FIGURE 1, there are eight rolls of record sheet material and seven rolls of carbon sheet material, thus the resulting product of this collating operation will be an eight-ply manifolding stationery pack.

As the now attached record and carbon sheets move along the collating machine, they pass over the pin belt 19 and under the roller 27 to the gluing device 21 which effectively applies glue spots along a margin of the record sheets. After leaving the gluing device 21, the sheets are drawn through the bars 22 which apply pressure along the margin having the glue spots thereby effectively attaching the record sheets to provide a single manifolding stationery pack.

The now attached manifolding stationery pack then passes through the perforating rollers 23 which apply a line of cross perforation or weakening through the assembled stationery and carbon strips accurately in position between form lengths. This line of perforation is adapted to allow separation of one set of forms from adjacent sets after the manifolding stationery pack has been used.

The pinwheel 24 then carries the now perforated pack downwardly to the tucking wheels 25 which alternately provide folds one way and then the other, in the manifolding stationery pack. This is to allow folding of the pack. After passing through the tucking rollers 25 the pack passes through the oscillating rollers 26 which fold the manifolding stationery pack first one way and then the other, to provide the neatly piled pack of stationery 28. This pack may then be removed and packaged for use in connection with various business machines using manifolding stationery packs of this type. It will be noted that the manifolding stationery pack does not have the increased marginal thickness along the margin of attachment that is often attendant on stationery packs of this type.

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Referring now to FIGURES 2, 3 and 4, a gluing device 21 is shown therein which in general, is adapted to be used either with hot melt or cold resin glue. The particular construction shown in this application is for a hot melt operation; however, with minor adjustments it would be possible to use the cold or resin type glues in this embodiment.

The gluing device 21 includes a heating block 29 which has a plurality of electric heater rods 39 embedded therein to provide the necessary temperature for melting the solid hot melt glue. Once the glue is melted, it is discharged through a plurality of nozzles 31 which are carried by the heating block 29. Each of these nozzles and the method of supplying glue through them is substantially the same, therefore, for ease of description, only one nozzle and accompanying supply mechanism will be described.

The glue is generally supplied in a wire-like form 32 and generally is supplied on reels 33, a portion of one of which is shown in the right hand corner of FIGURE 4. A reel for each nozzle 31, depending on the number of plies in the stationery form is mounted on a spindle (not shown) above the gluing device. The glue is removed from the reel by the glue feeding section which has been given the general number 34.

The glue feeding section 34 is bolted 35 to the rear side of the heating block 29. The section includes a plurality of glue receiving tubes 36. The glue is pulled through the tubes by a pair of corrugated wheels 37 which grip the glue and advance it in the direction of the arrow B into the heating block 29. The wheels 37 are rotated by a drive mechanism which is generally given the number 38 and which will be described later.

In order that the corrugated wheels 37 may grip the glue 32 properly an adjustable feature is provided. The upper wheel 37 is carried for rotation on an axle 39 which is journaled in the upper arm 42. The arm 42 itself is carried by a tie rod 41 which is journaled in the glue feeding section frame 40. Thus, the arm 42 is allowed a small amount of rotation about the rod 41. A pair of set screws 43 is provided in the rear edge of the frame 42 which abut the extensions 40a on the frame 40. A second pair of set screws 44 is provided in the frame 42 between the axles 39 and 41. These set screws 44 are adapted to abut against an outwardly extending tab 45 on the frame 40. In order to increase the tension on the wire-like glue, the set screw 44 is loosened and the set screws 43 are set upon to apply greater pressure against the glue through an opening 36a in the tube 36. To prevent chattering or motion of the device, the second set screws 44 may be taken up and locked in place by the nuts 46. A plurality of set screws 42a are provided to hold the tubes 36 in place after an adjustment. The glue 32 is fed from the glue feeding section 34 through a second tube 47 into the heating block 29. The tube 47 has a threaded exterior and is threadedly received in position in the heating block and seated there by means of nuts 48.

The heating block 29 as can be more plainly seen in FIGURE 3, is actually a plurality of sections 29a which are held together by the long bolts 50 and the nuts 50a. These pass through each of the segments 29a in the heating block 29 and hold the block in one piece. It will be noted in FIGURE 7 that the dividing line between the segments 29a in each case is adjacent the passages 49 and the nozzles 31. This is done so that the block may be dismantled and the passages therein which will be subsequently described, may be easily cleaned. As previously pointed out, a plurality of electric heater rods 30 connected to an electric source by wires 30a also pass through the heating block 29.

After passing through the tube 47, the glue 32 enters a transporting passage 49. At its upper end, the passage is semicircular in shape and with decreasing circumference. This portion of the passage 49 passes around the

melting wheel 51. The melting wheel is mounted on an axle 51a and is rotated by the drive mechanism 38 which as previously stated will be described later. It is the function of the melting wheel to draw the now softened hot melt glue into the heating block and continue to move it into the vertical portion of the transporting passage 49.

Near the lower portion of the heating block 29, the transporting passage joins the plunger passage 52. This provides a continuation of the transporting passage as shown by the arrows C in FIGURE 4 for the movement of the now liquid glue into the nozzles 31. A plunger 53 is located in the rear portion of each of the plunger passages 52 and is adapted to move in a reciprocating in and out fashion in the passage. The plungers 53 are threadedly carried by a plurality of plunger heads 54 which are pinned 55 to a plurality of yokes 56. The outer portion of the yokes 56 are open and have a bearing 57 riveted 58 thereto. These bearings are adapted to have an eccentric shaft 59 journaled therein. The shaft itself is carried in bearing 60 which receives the eccentric extensions 59a of the shaft 59. The bearings 60 are carried by the frame 61 which is bolted 62 to the heating block 29. The shaft 59 is rotated by a connection (not shown) of the eccentric extension 59a to the driving mechanism 38.

As mentioned above, the heated and now liquid glue travels through the transporting passage 49 into the plunger passage 52. From there, it is free to flow into the nozzle 31. As can be seen in FIGURE 4, the nozzle 31 has a threaded portion 31a which is threadedly received in the heating block 29. A locking nut 62 is provided so as to allow accurate adjustment of the location of each of the nozzles 31. A hex portion is provided for adjusting the position of the nozzle 31 in and out. The nozzle 31 has an inner passage 31b which allows the movement of the liquid glue and each of the nozzles has a discharge opening 31c along its upper portion.

As can be more plainly seen in FIGURE 3, an elongated separating rod 63 is threadedly received in the end of the nozzle 31. This rod performs the function of maintaining the sheets 64 of the manifolding stationery pack separated as they pass over each of the nozzles during the depositing of the glue spots thereon as can clearly be seen in FIGURE 6. The fact that the nozzles 31 define a line which is at an acute angle to the line of travel of the paper, facilitates maintaining the sheets separate.

Referring now to the drive mechanism 38, a sprocket wheel 65 is attached near the end of the shaft 51a. This shaft passes through the collar 65a. A similar but larger sprocket wheel 66 is attached to the lower shaft 39. A bicycle-type chain 67 passes about these two drive sprockets. A pair of meshing gears 68 is positioned inwardly of the sprocket 66 on the shaft 39. These gears transmit the rotational force of the upper shaft to the lower shaft. The collator drive mechanism which is not shown, transmits the force to rotate the shafts 39 and 51, and also to rotate the eccentric shaft 59.

As was previously described with regard to the collator machine shown in FIGURE 1, the sheets or strips of paper with the carbon material attached to the underside thereof, move along the upper surface of the collator 10. A strip 64 is fed to the gluing mechanism 21 separated by the rods 63 and passes over a nozzle 31 and a separating rod 63. Referring now to FIGURES 5 and 6, it can be seen that the separated strips 64 are located with respect to the discharge openings 31c so that the discharging glue will be applied near the edge of the strips 64. Thus, the glue will be deposited on the strips outwardly of the sprocket holes 64a which are used to draw the paper through the collating machine and then through the business machines on which the manifolding stationery packs are used. Since the plungers 53 are moving in a reciprocating motion, and are rather tightly fit with close tolerance into the plunger passages 52, they perform the function of forcing intermittently a predetermined amount of

glue through the discharge openings 31c. Further as the plunger moves on its inward stroke it crosses and seals the transporting passage 49 and forces the glue then in the plunger passage 52 through and into the nozzle 31 and out the discharge port 31c. On the outward stroke, the plunger creates a partial vacuum which performs the function of providing a positive shutoff of the amount of glue passing through the discharge port 31c. This has the effect of providing a predetermined set amount of glue at each stroke of the plunger. This then puts a spot of glue of predetermined size and thickness on the sheets 64 which are passing over the nozzles 31.

Since the nozzles are longitudinally spaced and define a line which is angularly displaced in an acute angle with respect to the line of travel of the paper, it can be seen that each of the spots of glue on adjacent sheets of paper will be offset and substantially non-overlapping. This will substantially eliminate any edge thickening of a pack of manifolding stationery due to the presence of the glue.

As the pack is drawn from the gluing device 21 and through the rollers 22, the sheets are forced together thus providing positive attachment therebetween since the hot melt glue described in this application is exceptionally quick-drying. This eliminates any possibility of misplacement of sheets in a stationery pack.

The gluing device 21 is generally bolted to the frame 11 of the collating machine by passing the bolts 50 through a pair of pads 70. The gluing device may be removed from the collator at any time and a different type of gluing device may be substituted. It may also be placed on a different type of collating machine.

If it is desirable to manufacture a manifolding stationery pack with less than eight plys, it can easily be done by simply eliminating the glue feed in any one nozzle. Although the plunger will operate and the heating block will heat those particular nozzles, no glue will be passed therethrough so long as the supply is cut off.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom for some modification will be obvious to those skilled in the art.

I claim:

1. A gluing device for use in producing manifolding stationery packs, comprising: a frame disposed substantially parallel to the line of travel of sheet material through said device; a plurality of longitudinally spaced nozzles disposed in said frame extending outwardly therefrom and arranged to deposit glue spots on the edge portion of said sheet material; said nozzles also being laterally offset from each other so as to define a line disposed at an angle less than a right angle to the line of passage of said sheet material; means for supplying liquid glue to said nozzles; and means for intermittently discharging amounts of said glue through said nozzles.

2. A gluing device for use in producing manifolding stationery packs, comprising: a frame disposed substantially parallel to the line of travel of sheet material through said device; a plurality of longitudinally spaced nozzles disposed in said frame extending outwardly therefrom, each said nozzle having a side discharge port arranged to deposit glue spots on the edge portion of said sheet material; said nozzles also being laterally offset from each other so as to define a line disposed at an angle less than a right angle to the line of passage of said sheet material; means for supplying liquid glue to said nozzles; and means for intermittently discharging amounts of said glue through said nozzles.

3. A gluing device for use in producing manifolding stationery packs, comprising: a frame disposed substantially parallel to the line of travel of sheet material through said device; a plurality of longitudinally spaced nozzles disposed in said frame and extending outwardly therefrom, each said nozzle having a side discharge port arranged to deposit glue spots on the edge portion of said sheet material, each of said nozzles also including

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an elongated rod arranged to separate said sheets and maintain them separate as they pass over said nozzles; said nozzles also being laterally offset from each other so as to define a line disposed at an angle less than a right angle to the line of passage of said sheet material; means 5 for supplying liquid glue to said nozzles; and means for intermittently discharging amounts of said glue through said nozzles.

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