

[54] **APPARATUS FOR AFFIXING FABRIC SWATCHES TO SAMPLE CARDS**

[75] Inventor: **Hans Rohner**, Kuttigen, Switzerland

[73] Assignee: **Polytex AG**, Glattdrugg, Switzerland

[22] Filed: **Mar. 13, 1972**

[21] Appl. No.: **234,151**

[30] **Foreign Application Priority Data**

Mar. 17, 1971 Switzerland..... 3944/71

[52] U.S. Cl. 214/8.5 C, 294/61

[51] Int. Cl. B65g 59/02

[58] Field of Search..... 294/61, 107; 214/8.5 C

[56] **References Cited**

UNITED STATES PATENTS

3,038,620	6/1962	Collin	294/107 X
3,112,136	11/1963	Hammond	294/107
3,176,979	4/1965	Engelmann	294/61 UX

3,402,833 9/1968 Pershing 294/61 X

Primary Examiner—Albert J. Makay

Assistant Examiner—George F. Abraham

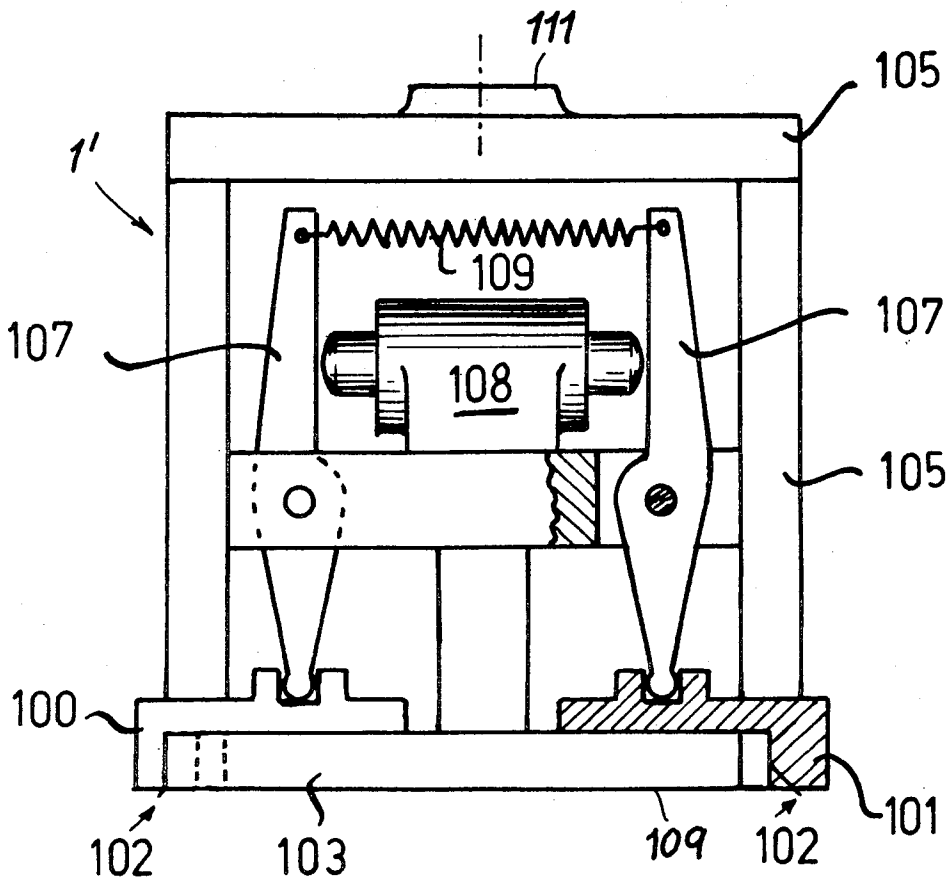
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

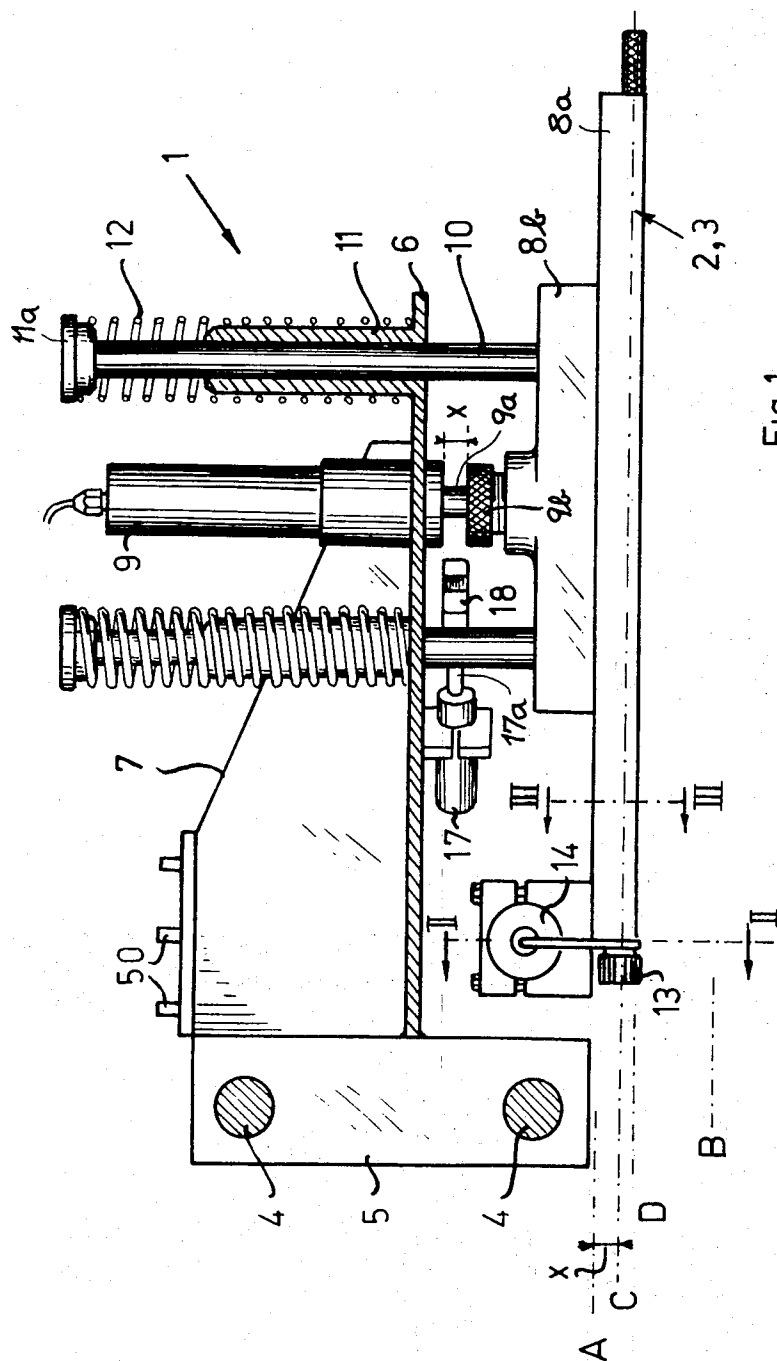
[57]

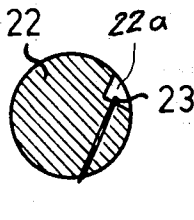
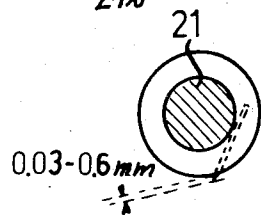
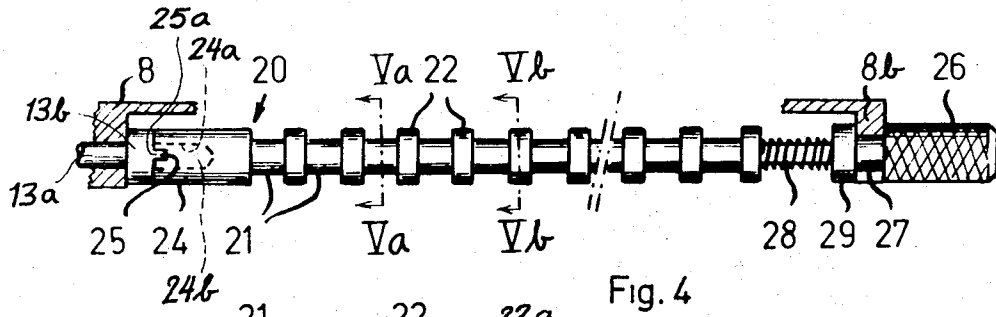
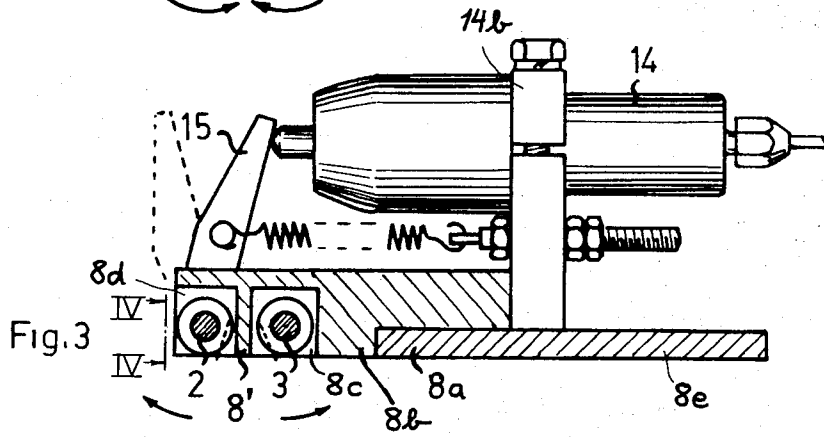
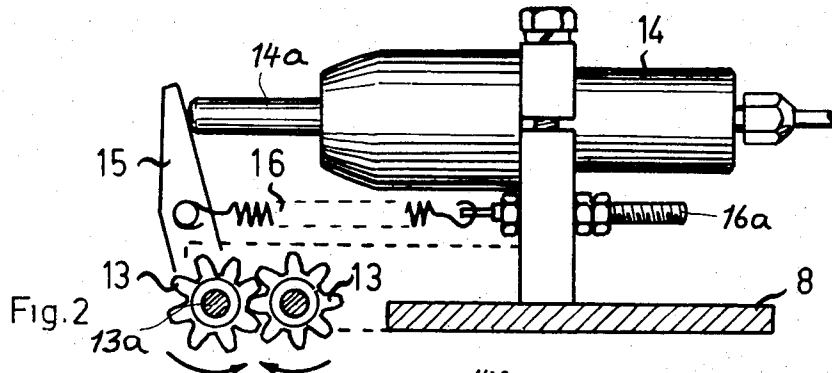
ABSTRACT

Swatches are picked up one-by-one from the top of a stack of swatches of the same size (usually of different color), folded over, and then applied to a paper strip and bonded thereto in the production of sample cards. The pickup is carried out by a pickup head having a pair of elements each carrying an array of pins whose points or tips project slightly (0.03–0.6mm) from the elements. These elements are brought down onto the top swatch, and the points are displaced outwardly to prick into this swatch. Then the pickup head is lifted, taking with it only the topmost swatch.

3 Claims, 10 Drawing Figures







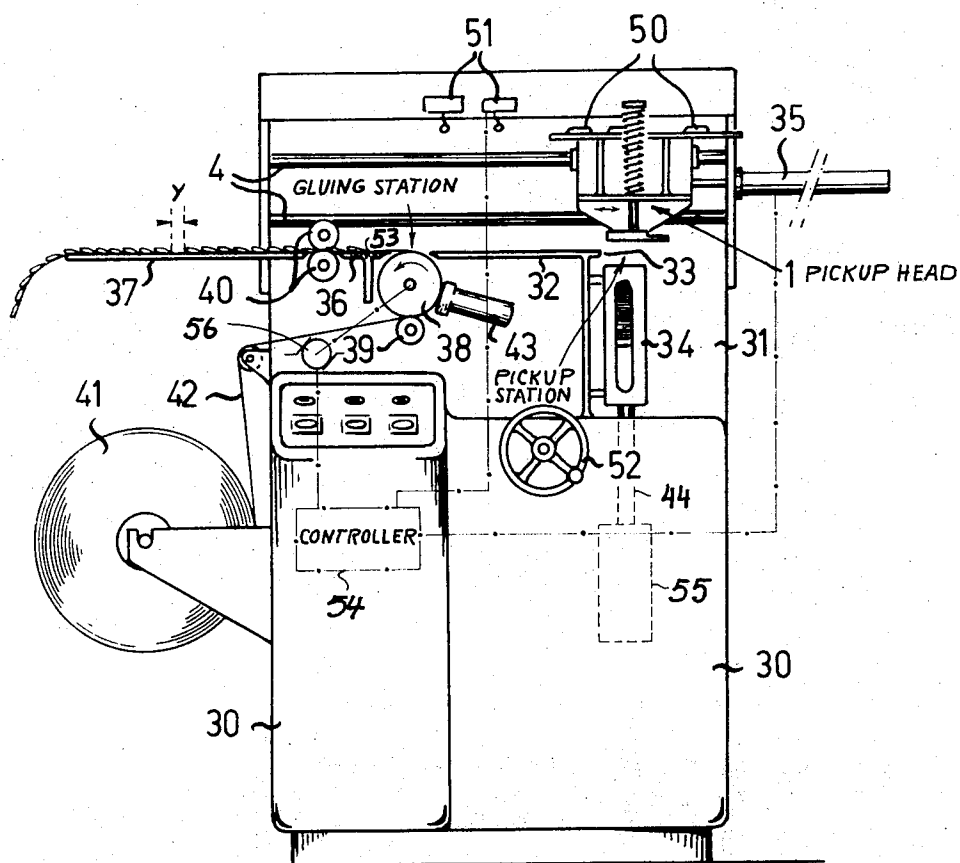


Fig. 6

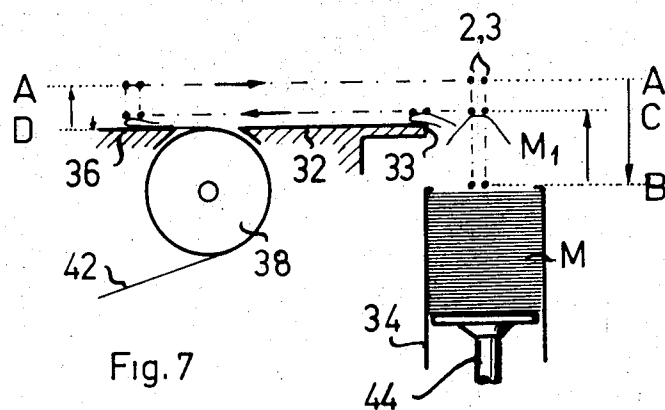
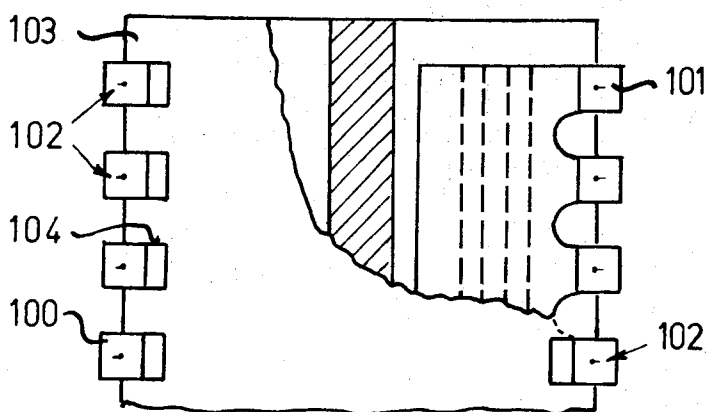
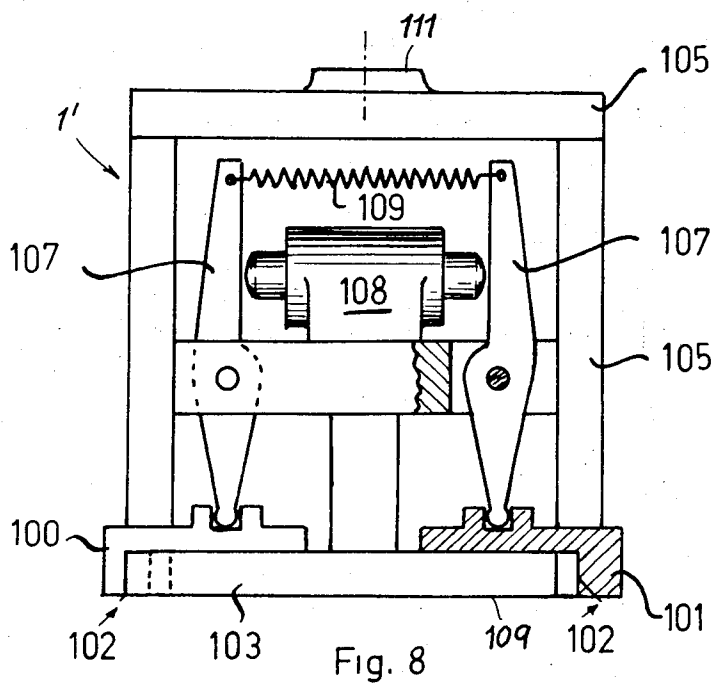


Fig. 7



APPARATUS FOR AFFIXING FABRIC SWATCHES TO SAMPLE CARDS

FIELD OF THE INVENTION

The present invention relates to a method of and an apparatus for picking the top layer off a stack of similar pierceable flat layers. More particularly this invention concerns an apparatus for producing sample cards carrying a plurality of sample swatches.

BACKGROUND OF THE INVENTION

In the preparation of sample cards and books or the like for the display of fabrics, stacks of swatches must be painstakingly glued one-by-one to mounting sheets. It is often important that the swatches be folded over and glued so that the person judging them may be able to feel the fabric between his fingers. Such sample sheets are difficult to make since thin layers which are permeable to air must be lifted singly from the stack.

OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide an apparatus for the preparation of sample sheets as described above.

Another object is to provide a method of automatically preparing such sheets.

Yet another object is the provision of an apparatus that can pick the top layer only from a stack of similar flat and pierceable layers, and thereafter can transfer this top layer to a mounting sheet.

SUMMARY OF THE INVENTION

These objects are attained according to the present invention in an apparatus having a pickup head with a lower face provided with two arrays of pins having pointed tips. This head can be moved both vertically and horizontally, and one array of tips can be displaced away from the other array. In this manner the face can be brought down on the upper surface of the upper layer, and the tips moved apart to pierce into this upper layer since these tips are advantageously downwardly and outwardly directed. Thereafter the entire head is displaced laterally to deposit this layer on the mounting sheet.

According to another feature of the present invention the points of one array prick into the top swatch near its center so that on lifting of the swatch, an edge portion will hang down. This allows the swatch to be laid on the sheet in a folded condition for formation of a flap.

The arrays of needles or pins can be, according to another feature of this invention, needles imbedded as secants (or chords) in cylindrical collars or cylindrical enlargements formed on a pair of parallel transversely spaced pivotal rods or shafts. Means is provided to rotate these rods in opposite senses in order to displace the needles from upright but downwardly and outwardly directed positions to more outwardly directed positions, with a greater angle formed between them, in order to prick them into the top layer. Alternatively it is possible to provide the needles on oppositely slidable members constituting part of the bottom face of the pickup head.

DESCRIPTION OF THE DRAWING

The above and other objects, features, and advantages will become apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is an end elevational view of the pickup head of the apparatus according to the present invention;

FIGS. 2, 3, 4, 5a, and 5b are sections taken along lines II—II and III—III, IV—IV, and Va—Va and Vb—Vb of FIGS. 1, 3, and 4, respectively;

FIG. 6 is a side view of the apparatus according to the present invention;

FIG. 7 is a diagrammatic view illustrating the operation of the apparatus of my present invention;

FIG. 8 is an elevational side view of another embodiment of a pickup head according to my present invention; and

FIG. 9 is a bottom view of the head of FIG. 8, partly broken away.

SPECIFIC DESCRIPTION

The apparatus according to my present invention has as shown in FIG. 6 a housing having a lower table-like portion 30 and an upper portion 31. Slidable under the effect of a double-acting pneumatic cylinder 35 and on two parallel and vertically spaced horizontal bars 4 mounted on the upper portion 31 is the pickup head 1. Below and parallel to these two bars 4 is a table formed of three elements 32, 36, and 37, on which the sample card is made.

More specifically, FIGS. 1-5b show how the head 1 is carried on a slider 5 fitted to the tie bars 4 and having a horizontal support plate 6 braced by webs 7. Below this plate 6 there is provided a vertically reciprocal plate assembly 8 carried on the lower ends of a pair of vertical rods 10 which pass up through the plate 6 and through vertical guide sleeves 11 unitary therewith. A coil compression spring 12 is seated between an upper end 11a and the plate 6 to urge the assembly 8 upwardly. A vertically oriented pneumatic cylinder 9 is mounted on the slide plate 6 and has a piston rod 9a whose lower end is axially connected to an adjustment sleeve 9b screwed into the plate 8.

The pickup plate 8 is formed in two parts: a flat plate 8a and a bar 8b formed with two notches 8c and 8d attached thereto and receiving pickup rods 2 and 3, respectively. Each pickup rod 2, 3 is in the form of a rod 20 formed with circumferential grooves 21 setting off collars 22. A web 8' formed between the notches 8c and 8d defines a face 8e with the lower surface of the plate 8a, this planar face 8e being tangent to the collars 22. Each rod 20 is received at one end in a notch 27 formed in an end 8f of the respective groove or pocket 8c or 8d formed in the bar 8b. This same end of the rod 20 is provided with a knurled handle 26.

A ring 29 slidable on the rod 20 and urged toward the handle 26 by a spring 28 grips the edge 8f of the bar 8b at this end. Similarly the other end of the rod 20 is formed with a cylindrical end 24 provided with an axial bore 24a receiving an end 24b of a drive rod 13a having a similarly cylindrical end 13b formed with a projection 25a engaging in a groove 25 in the end 24. Thus the two ends 24 and 13b constitute two jaws of a clutch, so that a pull on the handle 20 away from the end 13b will disengage them and allow the bar 20 to be removed by dropping it down out of the notch 27. In this manner,

the needle arrays can be replaced or interchanged with others.

FIGS. 5a and 5b show how the collars 22 are formed with notches 22a in which the upper ends of needles or pins 23 are exposed. These needles 23 lie tangent to an axial projection of the central regions 21, and have points 23a projecting from the enlargements 22 by a distance of between 0.03 and 0.6 millimeters, depending on the thickness of swatches to be picked up. The needles 23 of the rod 2 and 3 point downwardly and slightly outwardly while lying along secants of the cylindrical portions 22 in which they are received.

FIGS. 2 and 3 show how each shaft 13a which rotationally coupled to a shaft 20 is provided with a gear wheel 13. These wheels 13 mesh and one of the shafts 13a is provided with an arm 15 which is engaged by the piston rod 14a of a pneumatic cylinder 14 mounted on the plate assembly 8. In addition a spring 16 is provided tensioned between this arm 15 and the support 14b for the pneumatic cylinder 14 with its end connected to an eyebolt 16a for adjustment of the spring tension. Pressurization of the cylinder 14 will push the arm 15 against the force of spring 16 and counterrotate the two gears 13 and rods 2 and 3 to bring the points 23a of the needles 23 closer to each other.

The pickup head 1 also includes, as seen in FIG. 1, a small pneumatic cylinder 17 having a piston rod 17a which is normally biased by a spring (not shown) back into the cylinder 17, and which carries a fork 18 having a vertical width equal to a distance x . This fork is engageable around the piston rod 9a in order to prevent full retraction of the plate assembly 8 on relaxation of the cylinder 9.

FIG. 6 also shows how the apparatus 1 has a roll 41 carrying a supply of paper 42 in the form of a band. This paper strip 42 is passed around a roller 38 and out over the portions 36 and 37 of the transport and working table. Two pairs of rollers 40 grip the edges of the paper strip 42 downstream of the roller 38, and a roller 39 engages against the roller 38 to rotate this roller 38 and pull the paper strip 42 off the roll 41.

A gluing device 43 is provided adjacent the roller 38 to apply an adhesive to the tape 43 as it passes over the roller 38. This device 43 is electromagnetically operated by means of switches 51 mounted above the tie bars 4 and engageable by ridges 50 (FIG. 1) on the webs 7 of the head 1.

The swatches M (FIG. 7) are held in a stack in a magazine 34 directly below the unit 1 in the FIG. 6 position. A vertically displaceable ram 44 controllable by a handwheel 52 keeps the uppermost swatch M_1 level with the top of this magazine 33. FIG. 7 also shows how the table 32 had a leading, upstream edge 33 which lies substantially in line with the downstream edge of the swatches and which serves to fold over the swatches.

A controller 54 is connected to all the various pneumatic cylinders, to the glue applicator 43, to the drive motor 56 for the rollers 39 and 40, to the cylinder 55 controlling the ram 44 and to cylinder 35 that horizontally displaces the head 1. This controller is programmable and can operate the apparatus as follows:

Assuming the apparatus to be in the position shown in FIG. 6 the cylinder 9 is first pressurized to lower the pickup rods 2 and 3 from level A to level B, so that face 8e lies against the top swatch M_1 . Before contact is made in this manner the cylinder 14 is actuated to bring the points 23a carried by the rods 2 and 3 together. As

soon as the rods 2 and 3 contact the top swatch M_1 , the cylinder 14 is relaxed so that the spring 16 counterrotates the rods and moves the points 23a apart. This causes the points to prick into the topmost layer M_1 only, near the center of this swatch.

The cylinder 9 is thereafter relaxed, but prior thereto the cylinder 17 is pressurized to bring the fork in between the cylinder 9 and the adjustment nut 9b. This causes the springs to withdraw the rods 2 and 3 upwardly, carrying the swatch M_1 by its middle so that it hangs down on both sides, to a level C spaced below the level A by the distance x .

The level C is slightly above the level D of the table 32, 36, 37. Once this level C is attained the pneumatic cylinder 35 is pressurized to advance the pickup head 1 to the left as seen in FIG. 6. During this advance the bumps 50 engage the switches 51 to actuate the glue applying device 43 to lay a strip of adhesive on the band 42. As best seen in FIG. 7, since the level C is so close to the table 32, 36, 37, the swatch M_1 will be folded over by edge 33 and will remain folded over as it is displaced horizontally.

Finally when the head 1 reaches the end of its travel, downstream of the roller 38 and upstream of the rollers 40, the cylinder 9 and the cylinder 14 are pressurized to apply the folded-over swatch M_1 to the adhesive-covered tape 42. The web 8' serves to ensure a good contact of the swatch M_1 on the adhesive. Thereafter the cylinders 17 and 9 are relaxed to allow the head 1 to draw back up to the level A, leaving the swatch M_1 behind. Then the cylinder 14 is relaxed and the cylinder 35 actuated to withdraw the entire head 1 back to the starting position.

The rollers 40 and 39 are driven synchronously and intermittently to advance the tape 42 in steps. Similarly the electromagnetic glue-applying device 43 is operated intermittently to apply strips of glue to the tape 42. The machine may be equipped with a counter to leave an unglued strip of length y periodically between swatches. This requires synchronization of the gluer 43 and the drive 56 since the gluer customarily applies glue four strips ahead of the strip on which a swatch is being applied.

It is also possible to provide the stretch 36 with heating means 53 in the form of a resistance element for partially melting a heat-sensitive glue on a tape, or for partially fusing a tape made of, for instance, thermoplastic synthetic resin so that the gluing means 43 can be dispensed with. In such an embodiment the bond between the swatch and the glue is made possible by heat.

FIGS. 8 and 9 show an alternative head 1' according to the present invention. This head 1' has a square bottom plate 103 formed on two opposite edges with a row of notches 104 in which are received teeth 101 of a pair of slidable elements 100. Each tooth 101 is provided with a downwardly and outwardly directed needle 102 whose point protrudes slightly from a planar surface 109 formed by the teeth 101 and plate 103.

Each element 100 is provided on its upper surface with a pair of parallel ridges 110 into which engages the lower end of a two-armed lever 107 pivoted on a support 106 on the plate 103. The levers 107 have upper ends pulled together by a tension spring 109, and deflectable away from each other by a pneumatic cylinder 108 which is the functional equivalent of the cylinder 14 of FIGS. 1-7. Expansion of the cylinder 108 will

pivot the levers 107 and pull the two elements 100 towards each other, thereby bringing the needles 102 closer together.

This head 1' can be used in the place of the head 1, with the adjustment sleeve 9b screwed into the nut 111 on its top. Such an embodiment is useful in making sample cards wherein the swatches are not folded, but are laid flat on the mounting sheet. To this end the device is arranged by means of limit switches to drop down with each row of needles 102 engaging immediately adjacent the edge of the top swatch. The same effect can be achieved by spacing the pickup rods 2 and 3 apart by a distance equal to slightly less than the swatch width.

It should be noted that the above-described apparatus is ideally powered by electricity and compressed air. Limit switches controlling electromagnetically operable valves can be placed to control all of the various movements of the various cylinders and other devices.

The swatch-covered tape so produced may be cut up into individual sheets by a pinking device for mounting of these sheets in a binder or the like. The magazine is, of course, loaded with a stack of different swatches and the extent that the needles project is arranged to allow the thinnest swatch to be picked up without the needles pricking into the swatch underneath.

One such machine in operation can take a paper mounting strip 270 millimeters wide and can mount folded-over swatches having an unfolded length as short as 30 millimeters and as long as 120 millimeters on this strip at a rate of between 800 and 1,000 swatches per hour, or about 1,100 sample strips of four colors per hour.

I claim:

1. An apparatus for picking up a top layer from a stack of pierceable flat layers, said apparatus comprising:

pickup head formed with a support in the form of a horizontally plate, and a pair of flat members lying against said plate and shiftable horizontally thereon, said flat members each being formed with a multiplicity of downwardly turned fingers, said pickup head overlying the upper surface of the top layer of said stack;

respective arrays of pins on said members and including a respective pin projecting downwardly from each of said fingers, the pins of each array being turned outwardly away from the pins of the other array;

means for vertically displacing said head toward and away from said upper surface; and

means for linearly shifting said members apart and together thereby piercing said points through said upper surface and thereafter withdrawing said points from said top layer and releasing same.

2. The apparatus defined in claim 1 wherein said flat members are provided with longitudinally extending parallel slots, said apparatus further comprising a pair of levers each having one arm received in a respective one of said slots and being fulcrumed at a mid point, and spring means engaging another arm of each lever for urging said flat members apart.

3. The apparatus defined in claim 2, further comprising means between corresponding arms of said levers and actuatable for displacing said flat members together.

* * * * *

35

40

45

50

55

60

65