United States Patent [19]

Walker

[11] **3,795,394**

[45] **Mar. 5, 1974**

[54] **APPARATUS FOR MANUFACTURING A CODE-BEARING TICKET**

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[73] Assignee: **Zenith Radio Corporation,** Chicago, Ill.

[22] Filed: **Sept. 10, 1971**

[21] Appl. No.: **179,400**

[52] **U.S. Cl.** **270/79,** 270/68

[51] **Int. Cl.** **B65h 45/20**

[58] **Field of Search.** 270/39, 61, 61 F, 79, 68, 68 A

[56] **References Cited**

UNITED STATES PATENTS

3,712,610	1/1973	Garrone	270/79
2,854,233	9/1958	Groeper	270/79
2,997,295	8/1961	Beck	270/68 A X
3,684,275	8/1972	Schweitzer	270/79
3,279,784	10/1966	Schwendinger	270/79

Primary Examiner—Wm. H. Grieb
Assistant Examiner—L. R. Oremland
Attorney, Agent, or Firm—John H. Coult

[57] **ABSTRACT**

Apparatus and process for producing a subscription television decoding ticket of the type having a matrix decoding element comprising a plurality of electrically conductive segments bonded into accordion-folded pleats in the ticket body. The apparatus includes a novel one-step die punch operation which simultaneously die-cuts the conductive segments and applies them to the ticket body, and a novel single-station folding operation for accomplishing the accordion fold.

7 Claims, 12 Drawing Figures

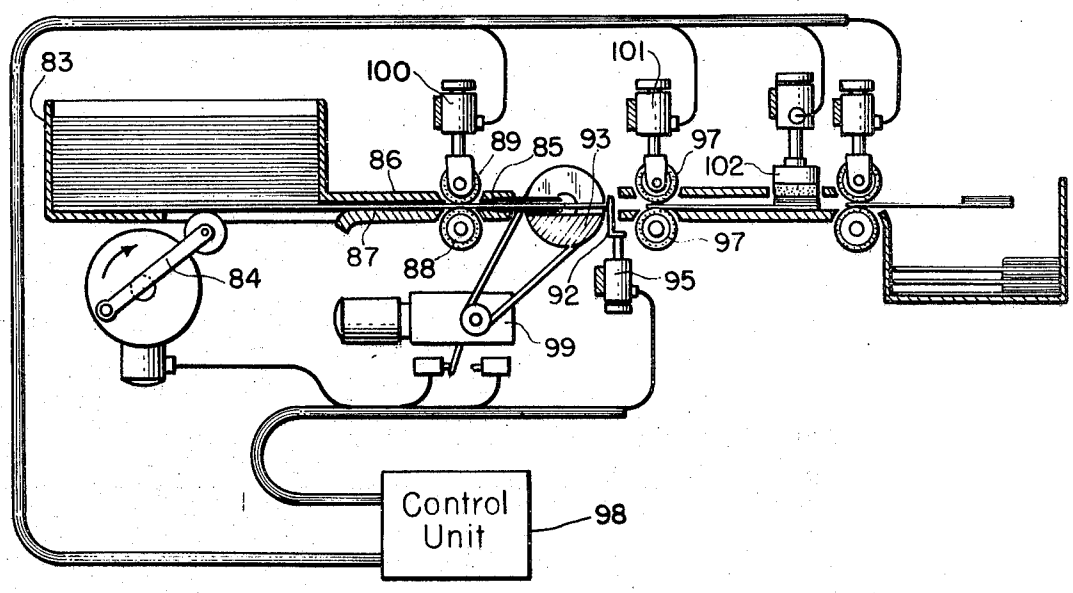


FIG. 1

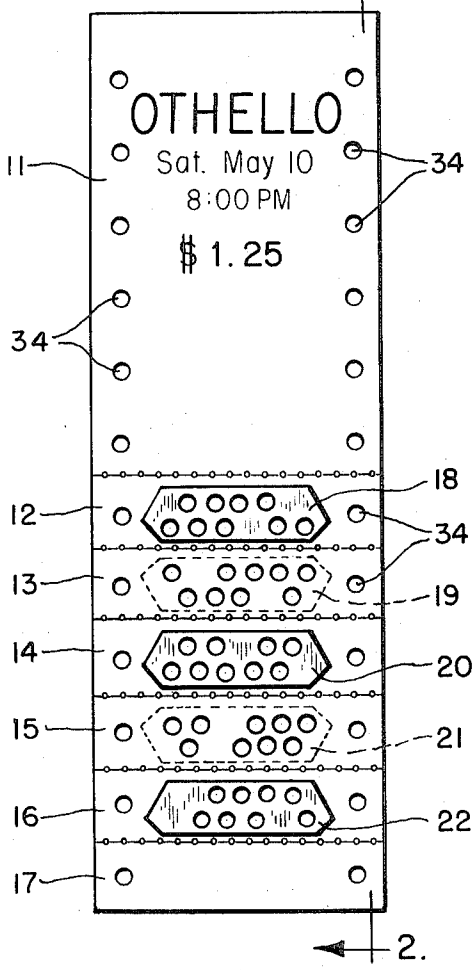


FIG. 2

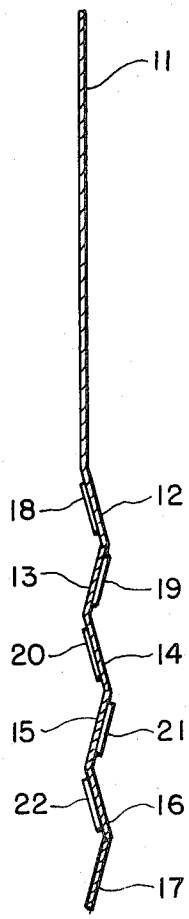


FIG. 3

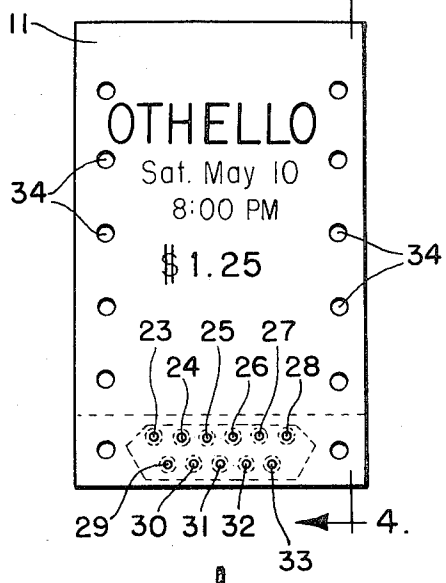
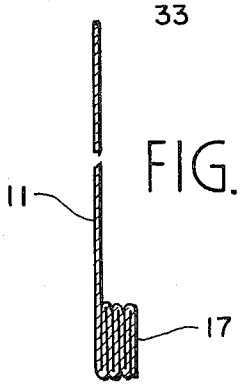


FIG. 4



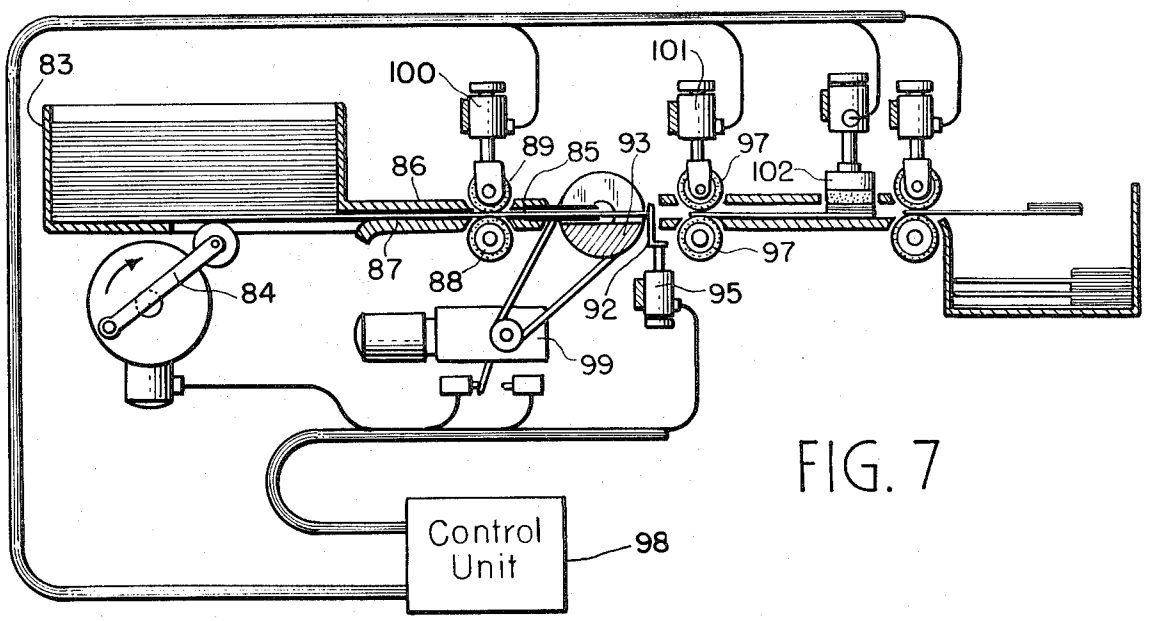


FIG. 7

FIG. 5

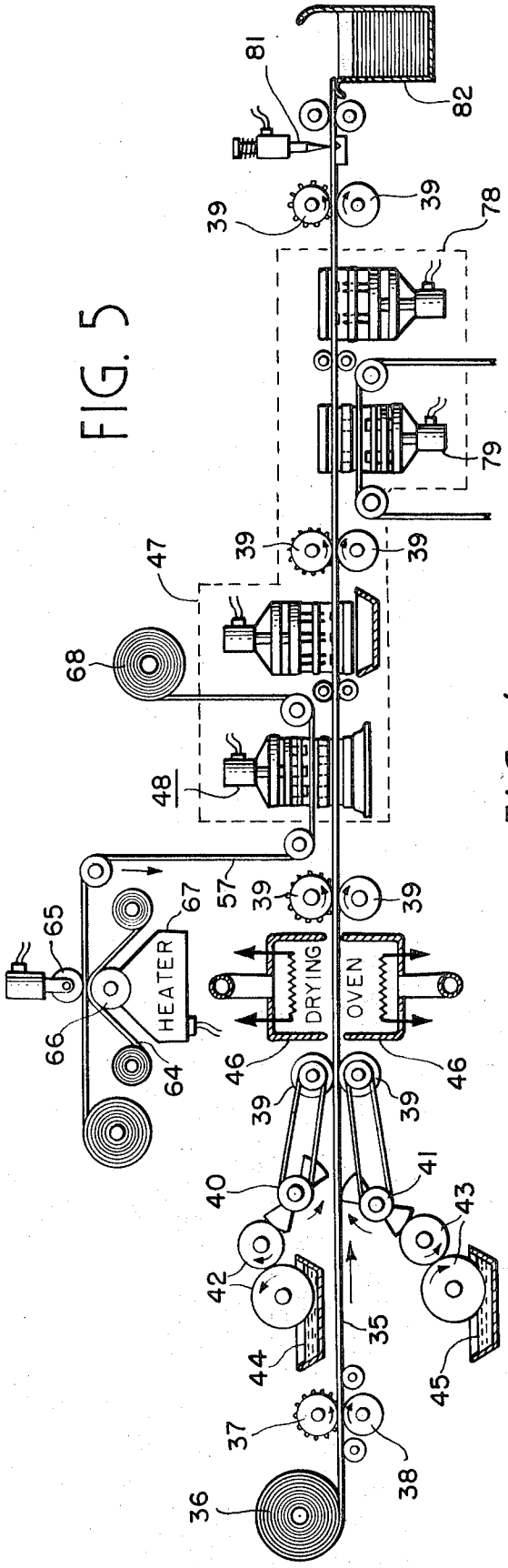

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FIG. 6

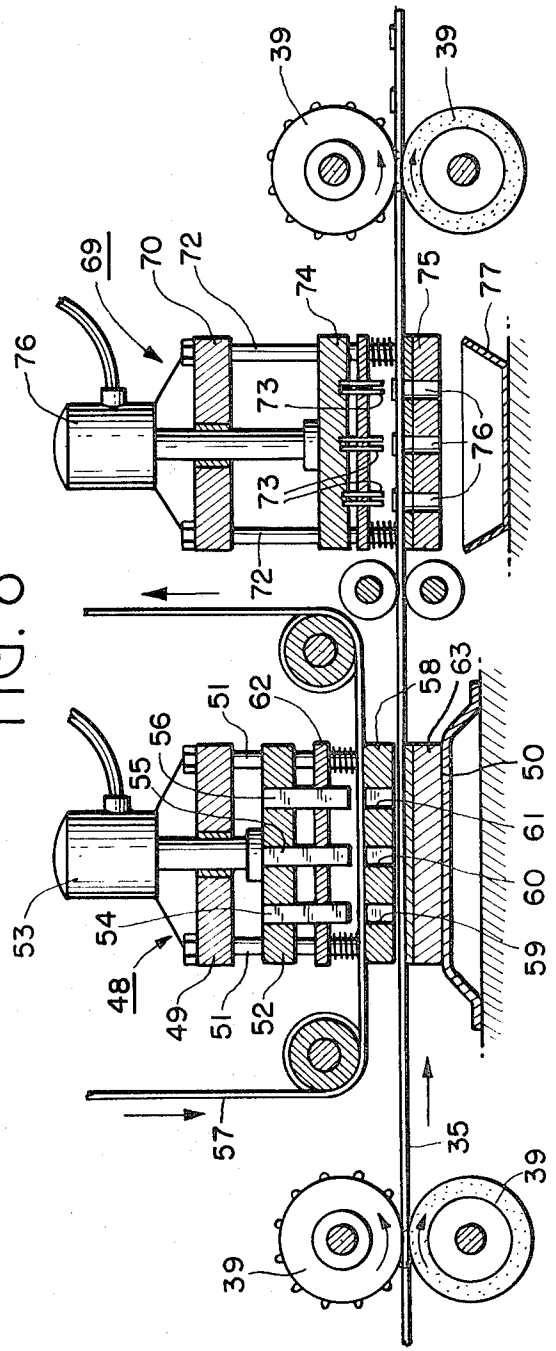
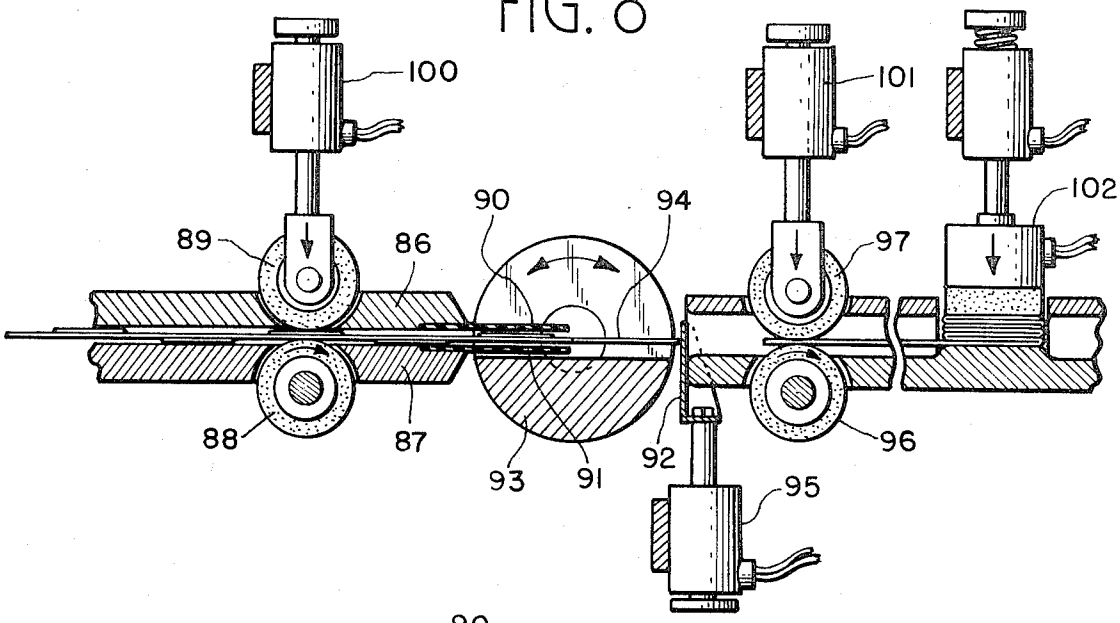

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FIG. 8



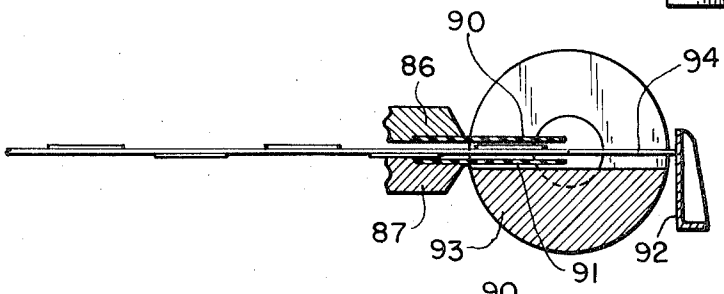


FIG. 9

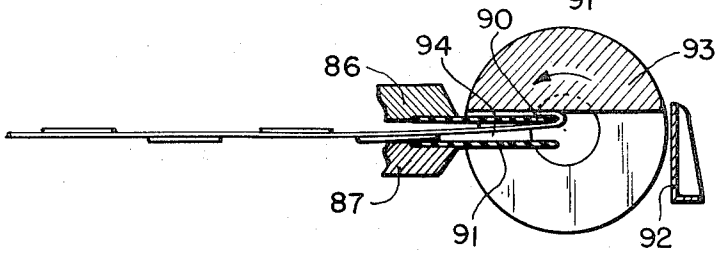


FIG. 10

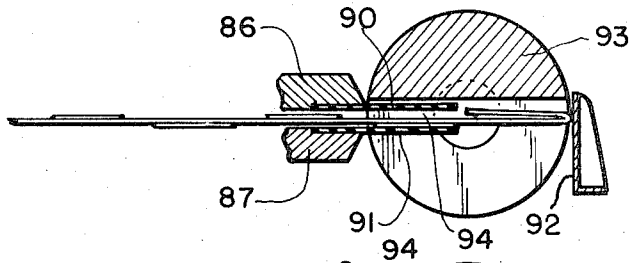


FIG. 11

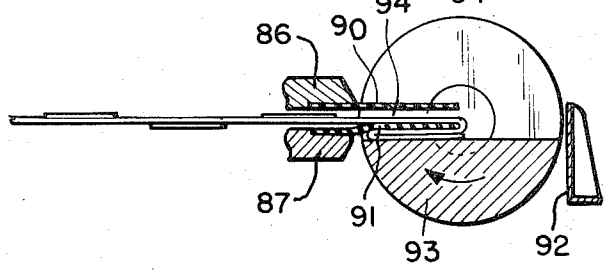


FIG 12

APPARATUS FOR MANUFACTURING A CODE-BEARING TICKET

BACKGROUND OF THE INVENTION

This invention is directed to methods and apparatus for manufacturing code-bearing tickets, and more particularly to methods and apparatus for manufacturing tickets capable of completing a plurality of electrical connections in a predetermined manner.

Numerous electronic control systems are adaptable to respond to or operate in accordance with the stored information on a manufacture efficiently element, such as a code ticket. One such system is that used to decode a subscription television broadcast, wherein the decoding process at the subscriber's television receiver is controlled by code information contained in a removable code ticket. More specifically, in a preferred one of such subscription television systems, there exists a decoder associated with each subscriber's television receiver which unscrambles a scrambled received signal to render it capable of reproduction by the receiver. This decoder contains a plurality of switch contacts in the form of sensing pins which must be connected in a particular predetermined pattern in order for a particular program to be unscrambled. Prior to each use of the decoder, the subscriber establishes these interconnections by inserting into his decoder a code-bearing element in the form of a removable code ticket. This ticket contains a plurality of electrically conductive segments which, when pierced by the sensing pins, establish the necessary electrical connections for rendering the decoder operative. By changing the required permutation pattern for different programs or different time periods, the broadcaster retains control of the system since the subscriber must periodically obtain from him a new ticket in order to continue using his decoder.

A suitable preferred basic subscription television system is shown, in various forms, in various patents assigned to the assignee of the present application, including U.S. Pat. No. 2,910,526, issued Oct. 27, 1959 to Walter S. Druz; U.S. Pat. No. 2,995,624, issued Aug. 8, 1961 to Norman T. Watters; U.S. Pat. No. 3,081,377, issued Mar. 12, 1963 to Norman T. Watters; U.S. Pat. No. 3,107,274, issued Oct. 15, 1963 to Erwin M. Roschke; and U.S. Pat. No. 3,244,806, issued Apr. 5, 1966 to George V. Morris. A preferred construction of the code-bearing ticket is also shown in various patents assigned to the present assignee, including U.S. Pat. No. 3,531,582, issued Sept. 29, 1970, and U.S. Pat. 3,598,938, issued Aug. 10, 1971 to the present applicant.

Decoding information in the code ticket is contained in a laminated portion formed by a plurality of accordion-folded transverse strips or pleats, each containing an electrically conductive foil segment or patch arranged to establish a particular electrical connection between assigned ones of the sensing pins, which in use perforate the various layers of the laminate at individual predetermined contact centers.

While the laminate portion of the ticket has functioned well for its intended purpose, it has proven difficult to manufactureefficiently with known existing equipment in the large quantities necessary for commercial use. Of particular difficulty has been the positioning of the electrically conductive segments or

patches on the accordion-folded pleats with the required degree of accuracy.

Accordingly, it is an object of the present invention to provide a new and improved apparatus for manufacturing a code-bearing ticket.

It is a more specific object of the present invention to provide new and improved apparatus for simultaneously die-cutting an electrically conductive foil patch and applying it to ticket stock or the like.

It is another more specific object of the invention to provide new and improved apparatus for accordion-folding ticket stock or the like.

It is another object of the invention to provide a new and improved method for manufacturing a code-bearing ticket.

It is another more specific object of the invention to provide a new and improved method for die-cutting and applying foil patches to ticket stock or the like.

It is another specific object of the invention to provide an improved method for folding ticket stock or the like.

SUMMARY OF THE INVENTION

In accordance with the invention a new and improved apparatus for die-stamping a segment from a first predetermined location on a first tape, or the like, and applying the segment at a second predetermined location to a second tape, or the like, comprises a punch element suitably shaped and dimensioned to die-cut the segment, means comprising a slidable carriage for constraining the punch to reciprocate along a predetermined track, means comprising a die bed having a thru-passageway complementarily shaped to the punch and axially aligned with the punch track, for positioning the first tape with the first predetermined location interposed in the punch track, means comprising an anvil disposed at the end of the track for positioning the second tape with the second predetermined location interposed in the punch track, and means for reciprocating the punch along the track to die-cut the segment from the first tape and transport the segment through the passageway and into compressive engagement with the second tape at the second predetermined location.

In further accord with the invention, apparatus for accordion folding a ticket or the like into a plurality of equiwidth pleats comprises first and second elongated parallel planar elements defining the top and bottom of a chute for the ticket, the planar elements having adjacent parallel edges forming upper and lower folding anvils at the end of the chute, means for selectively advancing the ticket along the chute until the ticket extends beyond the end of the chute by a distance substantially equal to the width of one of the pleats, means for folding the extending portion of the ticket back over a first one of the folding anvils, means for again selectively advancing the ticket along the chute, until the ticket again extends beyond the end of the chute by a distance substantially equal to the width of one of the pleats, and means for folding the extending portion of the ticket back over the second one of the folding anvils.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The invention, together with further

objects and advantages thereof, may best be understood by reference to the accompanying drawings, in the several figures of which like reference numerals identify like elements, and in which:

FIG. 1 is a top view of the ticket showing the code-bearing laminate portion partially expanded;

FIG. 2 is a side view of the ticket of FIG. 1;

FIG. 3 is a front view of the ticket showing the laminated portion fully assembled;

FIG. 4 is a side view of the ticket of FIG. 3;

FIG. 5 is a schematic diagram of apparatus constructed in accordance with the invention for processing blank ticket stock into code tickets;

FIG. 6 is an elevational view, partially in section, of a die-punching station of FIG. 5;

FIG. 7 is a schematic diagram of apparatus constructed in accordance with the invention for accordion-folding portions of the ticket produced by the apparatus of FIG. 5 into a code-bearing laminate;

FIG. 8 is a detailed elevational view, partially in section, of the folding station of the apparatus of FIG. 7; and

FIGS. 9–12 are sequential views of the folding station elements of FIG. 7 showing the various steps of the folding operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The functioning of the ticket manufacturing apparatus of the invention can best be appreciated by first considering the construction of the code-bearing ticket it produces. To this end, FIGS. 1 and 2 illustrate the ticket in an intermediate stage of construction, and FIGS. 3 and 4 illustrate the ticket in its final or completed form. Referring to FIG. 1, the lower two-thirds of the ticket body 11 is divided into a series of six equal area parallel strips or pleats 12–17 extending transversely relative to the length dimension of the ticket stock. With the exception of the lowermost pleat 17, each has affixed or cemented to it a respective one of a series of five electrically conductive patches or segments, 18–22, which are preferably formed from a metallic foil, such as aluminum or copper. Segments 18, 20 and 22 are affixed to their respective assigned pleats on the exposed or front side of the ticket body 11, while segments 13 and 15 are affixed to their respective pleats on the opposite or rear side of ticket body 11 for reasons which will become apparent.

Each of the conductive segments, together with their supporting pleats, is perforated or punched out to provide a unique electrically conductive pattern. More specifically, each segment is effectively divided into parallel spaced-apart contact areas, five of such areas being in one row and six being in another row. The eleven dashed circles 23 through 33 in the FIG. 3 view of the completed ticket designate the locations of these contact areas as they finally underlie each other in the completed laminate. At least one of the spaced-apart contact areas of each row of each pleat is imperforate while the remaining contact areas of the row are perforated. For example, in segment 18 on pleat 12 there are five contact areas in the top row and six contact areas in the bottom row. The contact area on the extreme right of the top row and the third contact area from the right of the bottom row are imperforate while the other nine contact areas are perforated. Along the right and left margins of ticket body 11 are a series of ten equally spaced pilot holes collectively designated 34 for aligning or indexing the ticket during its manufacture and subsequent use.

In production, after segments 18–22 have been affixed to their respective pleats and all the required holes have been punched, the pleats are folded accordion-style as shown in FIG. 2 into a stack or laminate structure, and the ticket assumes a final assembled form as shown in FIG. 4. The pleats and their associated conductive segments overlie each other in the laminate, with the respective contact areas 23–33 on pleats 12–16 being in exact vertical alignment. To retain the laminate form, and at the same time prevent unauthorized disassembly or tampering, as a final step in the ticket assembly process the laminate portion is bonded under pressure with a thermoplastic solution.

As a consequence of the accordion-style construction, and segments 19 and 21 being on opposite sides of the ticket body from segments 18, 20 and 22, no two segments are in direct physical contact. This is essential, since the ticket stock of each pleat serves as an electrical insulator which allows each segment to establish an independent electrical connection between two or more of the decoder sensing pins in a manner now to be described. The decoder with which the illustrated ticket is used contains 11 sharp-pointed sensing pins, which are brought to bear against the laminate portion of the ticket at respective ones of contact centers 23 through 33. Sufficient pressure is applied to the pins to pierce the laminate and extend the pins down through all seven layers. Wherever the sensing pins pierce an imperforate contact area on a particular segment they establish electrical contact with that segment, and wherever they pierce a perforated contact area they do not establish contact. Thus, when two sensing pins pierce the same segment they establish contact with each other. Accordingly, the conductive segments are perforated at the contact areas where pins will pass with which they should not have electrical continuity, and are imperforate at the contact areas where pins will pass with which continuity is desired. For example, in FIG. 1 segment 18 establishes contact between the pins piercing contact centers 26 and 33 only.

Having considered the structure and functioning of the code ticket, we are now in a position to consider the apparatus for manufacturing this ticket shown in FIG. 5. Cardboard ticket stock 35, contained in strip or web form on rolls of 100 feet or more, is received and stored on a drum 36. As the ticket web feeds from this drum, it passes beneath a rotary die-cutter 37 and is pressed into engagement therewith by a pressure roller 38 which cooperates with the die wheel in punching or cutting a continuous string of equi-spaced pilot holes 34 on either or both, but preferably both, edges of the web 35. Reliance is placed on these holes as a transport and timing means for accurately relating the operation of subsequent work stations to particular points on the web. The web is henceforth pulled by conventional sprocket wheels 39 which mesh with the pilot holes in the ticket web.

At the next station a pair of opposed rotary applicators 40 and 41 apply a solution of thermoplastic bonding material to selected zones on each side of the web. The zones are predetermined to correspond at least to those portions of the web which will be later punched and pleated to form the code-bearing lamination of the

ticket. The rotary applicators rotate in opposite directions as indicated in FIG. 5, and each comprises a roller on which one or more wick-like pads are carried to periodically contact respective sides of the web. By turning the applicators at a speed proportional to the speed of the sprocket wheels, and hence the speed of the ticket web, and by properly dimensioning the pads on the wheel, the zone to which the thermal plastic material is applied can be accurately controlled.

The applicators are each supplied with thermoplastic solution by means of respective pairs of transfer rollers 42 and 43, one roller of each pair being disposed to rotate through a respective one of a pair of baths 44 and 45 of thermoplastic solution. A preferred bonding solution is cellulose acetate, which may be dissolved by known solvents such as ethylacetate, cyclohexanol, nitro-propane, ethylene dichloride, or the preferable and widely used dimethyl ketone, or acetone. The degree of ticket impregnation can be controlled and depends on such factors as the porosity of the fibers of the ticket stock, the viscosity and surface tension of the thermoplastic solution, and the type and amount of the applied solution. It should be appreciated that this particular work station may instead incorporate other methods, such as a hot-melt spray method, for applying the thermoplastic material without affecting the functioning of the balance of the apparatus.

The bonding solution dries rapidly once applied to the ticket web, but it nevertheless may be desirable to accelerate the drying process by applying heat. This may be accomplished by any one of a number of conventional methods; in the illustrated embodiment it is accomplished by passing the web through a forced-air electric drying oven 46.

After the web has dried, it is advanced to a code segment punch station 47, represented for reasons of clarity by a broken line in FIG. 5 and detailed in FIG. 6. In accordance with one aspect of the invention, this work station employs a novel one-step punch apparatus 48 which simultaneously die-cuts a plurality of metallic segments from a row of foil and applies these at predetermined locations to the ticket web. Referring to FIG. 6, punch 48 comprises a frame 49 and a base 50, held in a parallel spaced-apart relationship by two or more support columns 51. These columns slidably support a punch carriage 52, which is constrained by the columns to reciprocate between frame 49 and base 50 under the control of a pneumatic actuator 53. Carriage 52 has affixed to it, facing base 50, a trio of punches 54, 55 and 56 shaped and dimensioned to die-cut the electrically conductive segments 18, 20 and 22 for pleats 12, 14 and 16, respectively, from a strip of thin electrically conductive foil 57. Means in the form of a die block 58, are disposed under strip 57 and contain three passageways 59, 60 and 61 which cooperate with punches 54, 55 and 56, respectively, in cleanly die-cutting the segments from strip 57. In a manner to be explained shortly, these passageways also enable the punches to carry the separated segments into contact with ticket web 35. The punches also pass through appropriately dimensioned holes in a conventional stripper plate 62, which is carried by support columns 51 and spring biased away from punch carriage 52 in a manner well known to the art to separate the foil strip from the punches as the punches are retracted. To affix the foil segment to the ticket web the punch further comprises means in the form of an anvil 63 which underlies ticket web 35 and enables the separated segments to be brought into compressive engagement therewith as the punches complete their down stroke. This compressive force is sufficient to bind the segment to the ticket web, since prior to the die-cutting process a specially compounded adhesive is applied to the foil as a backing. This backing normally displays a non-tack characteristic in order for the foil to be handled by conventional press-tool technology, and yet develops a tack under compression.

In operation, metallic foil 57 is positioned over passageways 59, 60 and 61 of die block 58, and the portion of ticket web 35 which is to accept the code segments is accurately positioned on anvil 63 with the aid of the previously punched pilot holes located along the edges of the ticket web. With the foil and ticket web thus positioned, punch carriage 52 is forced to move downward by actuator 53 with sufficient force to die-cut the segments from foil 57, carry them through passageways 59, 60 and 61, and compress them against ticket web 35 and anvil 63. This pressure is exerted by the punches for a sufficient period of time to activate the adhesive and bond the metallic segments to the ticket web.

The metallic foil can be purchased in roll form with the adhesive already applied, or alternatively, the adhesive can be applied just prior to the punching operation by one of several known methods. In the illustrated embodiment the adhesive is received in the form of a coating on a roll of transfer paper 64 and is applied to the foil by means of a contact-transfer technique. Specifically, foil 57 is passed over a roller 65 together with transfer paper 64, the adhesive side in contact with the foil. Another roller 66, heated by an electric heater 67, applies continuous pressure and heat to the contact point of foil 57 and transfer paper 64 to accomplish the transfer of the adhesive. The processed foil, after passing through punch station 47, is wound on a take-up roll 68 for possible future reprocessing.

After the code segments have been die-cut and applied to pleats 12, 14 and 16, the ticket web progresses to a code perforating punch 69 wherein segments 18, 20, and 22 are perforated as required by the ticket code. Punch 69 is conventional, in that it contains a frame 70, a base 71, and connecting support columns 72. A plurality of punches 73, one for each code perforation, are mounted on a punch carriage 74 which reciprocates along a track defined by columns 72. Ticket web 35 is accurately positioned along this track over a die bed 75, which contains appropriate passageways 76 for cooperating with the punches in perforating the ticket web. Once the web is in position over die bed 75, a hydraulic actuator 76 reciprocates the punch carriage and the required holes are cut. A bin 77 is provided beneath the die bed to catch the resulting foil and paper chaff. Of course, provision is made for changing the punch and die block configuration as necessary to change the ticket code.

From our earlier examination of the ticket, it will be recalled that there are five code segments on the completed ticket, three being applied to respective pleats on one side of the web and two being applied to respective pleats on the other side. We have seen that punch station 47 comprises two punch machines arranged to apply the code segments as required on one side of the web only. Thus, the same operation must be repeated to punch and affix the code segments to the other side of the ticket. To this end another punch station 78

comprising a combination die-cut and compression press **79** is provided for die-cutting and affixing segments **19** and **21** to pleats **13** and **15**, respectively, and a punch press **80** for perforating these segments as required by the ticket code. The apparatus in punch station **78** being the same, except for its orientation, as that of punch station **47**, no additional explanation need be given.

The ticket web now moves to a cut-off station, wherein a pneumatically actuated shear **81** separates the web into individual tickets at appropriate locations. As in the previous operations, exact positioning of this cutting operation is assured by pilot holes **34** and cog wheels **39**. The individual tickets are directed to a storage bin **82** wherein they are stored for eventual transfer to the final folding and sealing apparatus.

Referring now to FIG. **7**, the tickets, prior to folding, are stored in a bin **83**. A feeder arm **84**, under the direction of an appropriate control effect, feeds the tickets one at a time along a chute **85** formed between a pair of spaced-apart parallel planar elements **86** and **87**. A unidirectional constant velocity drive capstan **88** strategically positioned along this chute, cooperates with an electrically acutated pinch roller **89** to incrementally advance the tickets along the chute in response to an applied control effect.

Referring to FIG. **8**, planar elements **86** and **87** are seen to have semi-compliant portions **90** and **91** which serve as anvils for the folding operation. These anvils preferably terminate with adjacent parallel edges transverse to the longitudinal axis of the chute at a distance from the rigid portion of their respective planar elements of approximately the width of one pleat, effectively forming an extension of the chute for that distance. Beyond the end of this chute extension, a removable stop **92** is provided so that with the stop in position the ticket can extend out beyond the chute approximately the width of one pleat, which is the position necessary for accomplishing the first fold. A pivotable bending table **93** is disposed with its pivotal axis adjacent the parallel edges of the anvils and tranverse to the chute.

In operation, bending table **93** initially resides adjacent anvil **91** and a ticket **94** is advanced along chute **85** until pleat **17** abuts stop **92**, as seen in FIG. **9**. Table 93 is now rotated approximately 180° counterclockwise about its axis, bending pleat **17** back over anvil **90** towards pleat **16**, as in FIG. **10**. The first fold having been thus accomplished, ticket **94** is again advanced against stop **92** by capstan **88** and pinch roller **89** so that folded pleats **16** and **17** abut against stop **92**. This is seen in FIG. **11**. At this point bending table **93** rotates 180° clockwise, which, as seen in FIG. **12**, accomplishes a second bend such that segments **15, 16** and **17** are compressed against anvil **91**. Anvil **91** flexes as necessary to accommodate the increased thickness of the folded portion of the ticket. The aforementioned steps are repeated until all six pleats have been accordion-folded. At this point stop **92** is withdrawn by an electrical solenoid **95**, allowing ticket **94** to be advanced by capstan **88** and pinch roller **89** until it is clear of the folding station and under the control of a second capstan **96** and cooperating pinch roller **97**. Stop **92** is then returned to position, and another ticket from hopper **83** is advanced along chute **85** until it abuts against the stop and is therefore in position for the folding operation.

It will be appreciated that a coordinated control program is necessary to accomplish the folding process. To this end a control system **98** (See FIG. **7**) is provided to generate the necessary control effects for controlling pinch rollers and rotary actuators used to manipulate the card. In the case of bending table **93**, a bidirectional motor-driven electrically controlled actuator **99** is provided and belt-coupled to the table. The pinch rollers **89** and **97** are provided with electrical actuator solenoids **100** and **101**, respectively.

The six overlying pleats are now sealed into a permanent laminate structure by a dielectric heating station, which preferably comprises a dielectrically heated press **102** which is forced into compressive engagement with the laminate portion of the ticket as the ticket passes by. This press preferably supplies pressure only at the periphery of the laminate structure, and not to the inside areas occupied by the code-bearing segments, to prevent possible difficulty in puncturing the laminate layers with the decoding sensing pins. Assuming the ticket to have been previously impregnated by cellulose acetate solution, the use of dielectric heating is desirable because it is possible to heat only the cellulose acetate without materially increasing the temperature of the ticket fibers, thereby achieving a much higher temperature for the cellulose acetate in a much shorter period of time. The entire bonding process takes only a few seconds and the thermoplastic material cools and sets very rapidly to form a permanent and tamper-proof laminate structure.

A novel process has been described for manufacturing a uniquely structured ticket having a code-bearing laminate structure requiring accordion-folding and punch operations heretofore unknown to the ticket manufacturing industry. In conjunction with these operations, new and improved apparatus have been developed including a one-step punch for simultaneously die-cutting a segment from a metallic strip and accurately positioning and applying it to a web of ticket stock, and a novel folding apparatus which effectively accordion-folds ticket stock. While these apparatus have been shown for the purpose of manufacturing a code-bearing ticket, it must be appreciated that the same apparatus can accomplish similar functions with other types of materials for other applications.

While a particular embodiment of the invention has been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects, and, therefore, the aim of the appended claims is to cover all such changes and modifications.

I claim:

1. Apparatus for performing a succession of folding operations for accordion folding a ticket into a captured plurality of equal width pleats, comprising:

first and second elongated equidistantly spaced parallel planar folding anvils, defining the top and bottom of a chute for said ticket;

driving means for selectively advancing said ticket along a ticket folding path through said chute substantially parallel to said first and second folding anvils until said ticket extends beyond the end of said chute by a distance substantially equal to the width of one of said pleats, and for incrementally advancing said ticket through said chute after each

folding operation by a distance substantially equal to the width of a pleat;

ticket folding and holding means for folding the extending portion of said ticket back over a first one of said folding anvils to form a first pleat; for folding the first pleat back over the second of said anvils to form a second pleat after said ticket has been incrementally advanced by said driving means; and for holding successively folded pleats against each other in a stack until the last pleat has been formed.

2. Apparatus as described in claim **1** wherein said folding anvils are semi-flexible to accommodate the increasing thickness of the stacked pleats.

3. Apparatus as described in claim **1** wherein said ticket advancing means comprises a continuously rotating capstan wheel and a pinch roller.

4. Apparatus as described in claim **3** wherein said advancing means further comprises a removable stop disposed to selectively prevent said ticket from extending from said chute beyond a distance substantially equal to the width of one of said pleats.

5. Apparatus as described in claim **1** wherein said folding means comprises a planar element having a pivotal axis adjacent said parallel edges and transverse to said chute.

6. Apparatus as described in claim **5** wherein said planar element extends substantially the width of one of said pleats on either side of and perpendicularly to its pivotal axis.

7. Apparatus as described in claim **6** wherein said planar element is adapted to rotate 180° clockwise or 180° counterclockwise from a reference position parallel to the longitudinal axis of said chute.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,795,394 Dated March 5, 1974

Inventor(s) Emil C. Walker

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

column 8, line 62, delete "folding" and substitute
--feed--

Signed and sealed this 30th day of July 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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