# United States Patent [19]

**D'Amato et al.**

[11] **3,900,219**

[45] **Aug. 19, 1975**


[54] **DOCUMENT HAVING A CONCEALED MARKING AND METHOD OF MAKING SAME**


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[73] Assignee: **American Bank Note Company,** New York, N.Y.



[22] Filed: **Apr. 23, 1973**

[21] Appl. No.: **353,467**

[52] **U.S. Cl.** ..... **283/6;** 273/139; 283/8

[51] **Int. Cl.²** ..... **B42D 15/00**

[58] **Field of Search** ..... 283/6, 21, 22, 8; 273/139; 206/DIG. 22; 282/11, 12; 40/2 R



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*Primary Examiner*—Lawrence Charles
*Attorney, Agent, or Firm*—Cooper, Dunham, Clark, Griffin & Moran



[57] **ABSTRACT**

The documents illustrated are lottery tickets, each having a number concealed by being printed on a base sheet having a two-ply cover means including an intermediate sheet and a cover sheet. The intermediate sheet is opaque and extends over the area on the base sheet where the number is printed. The upper side of the intermediate opaque sheet is coated with a wax. The cover sheet is larger than the intermediate sheet and the under side of the cover sheet is coated with an adhesive material which forms a strong bond with the paper of the cover sheet and of the base sheet, and a relatively weak, releasable bond with the wax on the opaque sheet. One edge of the opaque sheet is engageable with the fingernail so that the opaque sheet may be lifted, thereby tearing the cover sheet along the edges of the opaque sheet and revealing the concealed number. The cover sheet is not weakened along lines registering with the edges of the opaque intermediate sheet. Nevertheless, the cover sheet is provided with short diagonal cuts diverging from those lines into the surrounding portions of the cover sheet. These cuts are effective to lead a tear along such a line intermittently into those surrounding portions so that tearing produces an irregular edge which it is practically impossible to restore to its original appearance. The margins of the cover sheet, where it adheres to the base sheet, are cut to define a multiplicity of small localities enclosed by cuts. If an attempt is made to peel the adhesive coated cover sheet away from the base, then some of these small localities stick to the base and become separated from the cover sheet. These small localities become slightly displaced from their original positions during that separation, making it practically impossible for the cover sheet to be removed and replaced without detection. Any attempt to restore the cover sheet to its original position will result in a misalignment between the cover sheet and some of the small enclosed localities which stuck to the base. The base sheet and the cover sheet have contrasting colors, so that any such misalignment appears in sharp contrast, revealing that an attempt has been made to read the concealed number. A method of making a multiplicity of such lottery tickets is disclosed.


**17 Claims, 34 Drawing Figures**

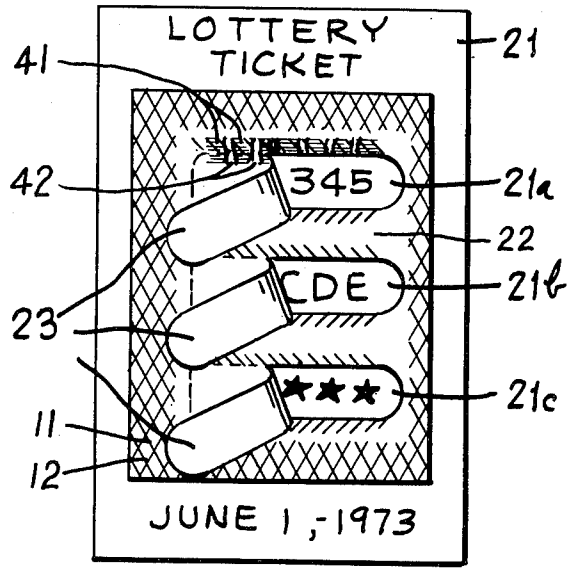


Fig. 1.

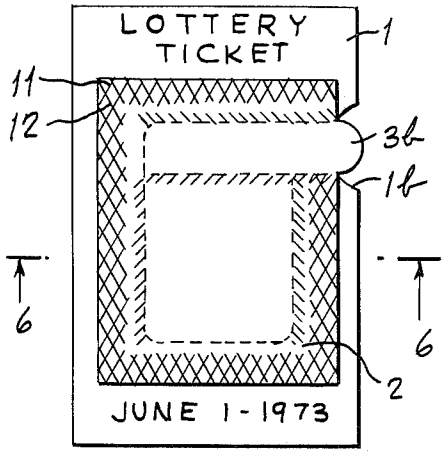



Fig. 2.

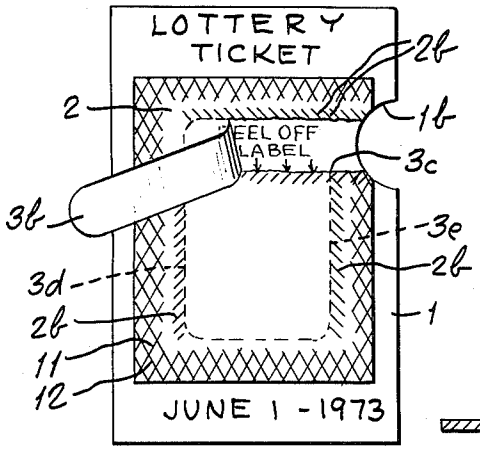



Fig. 3.

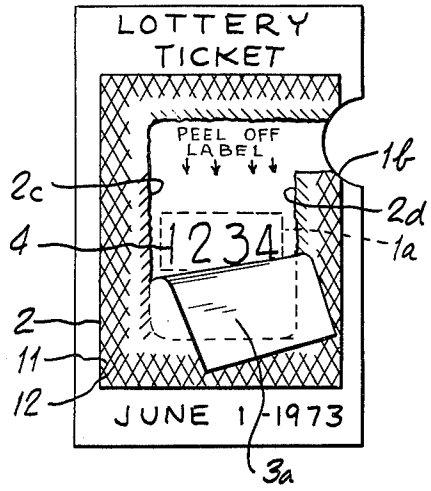



Fig. 4.

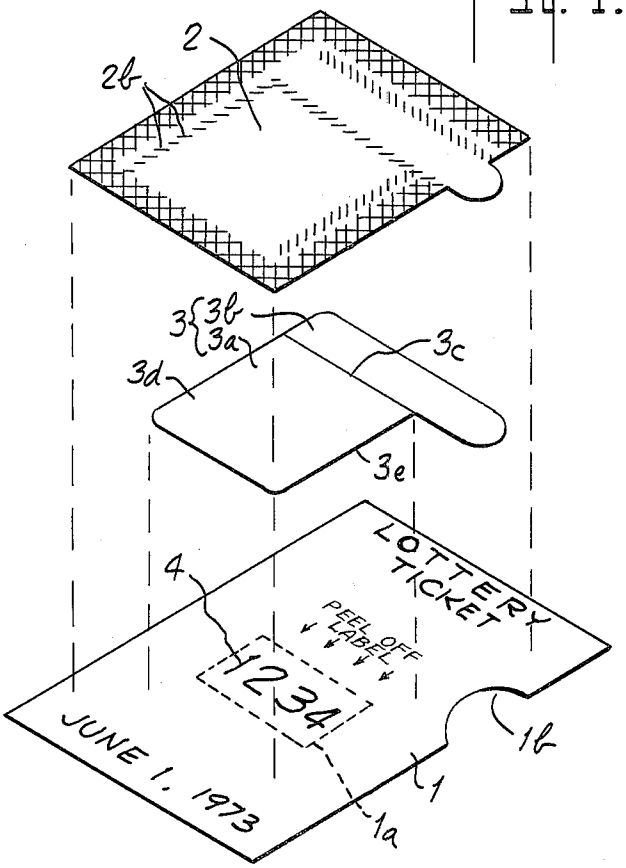



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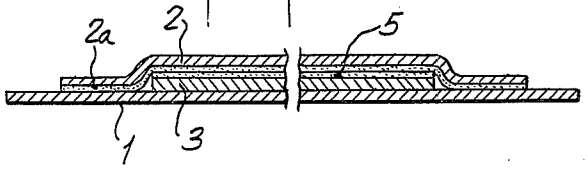



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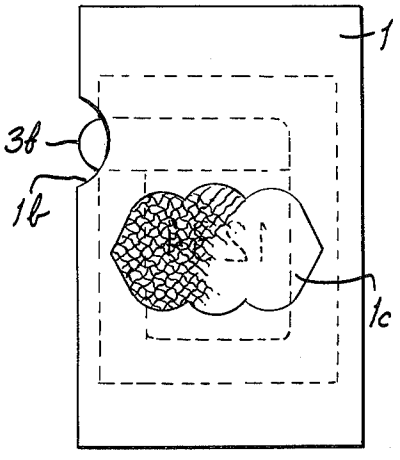



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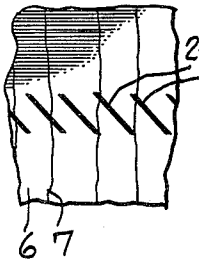


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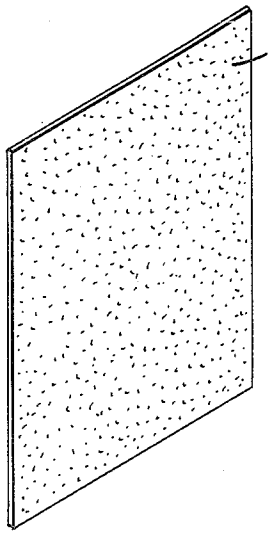



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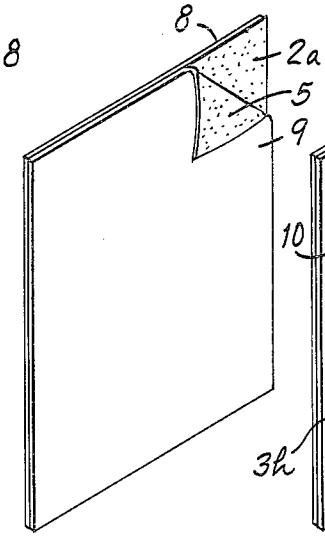



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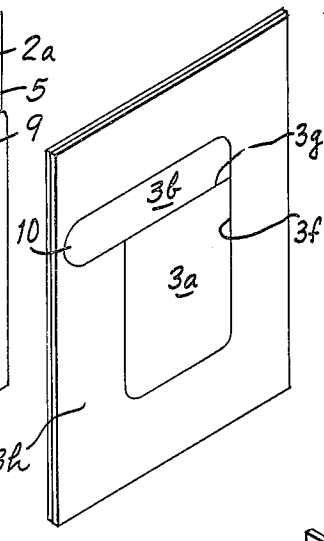



Fig. 10A.

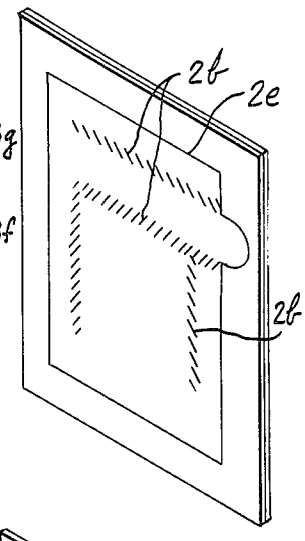



Fig. 11.

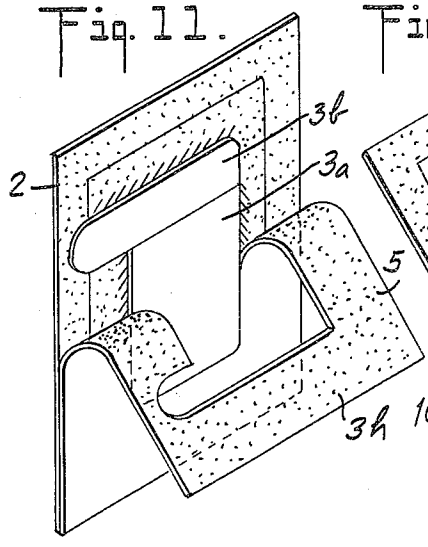



Fig. 11A.

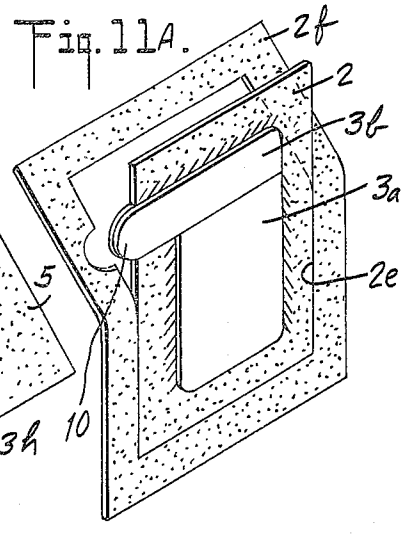



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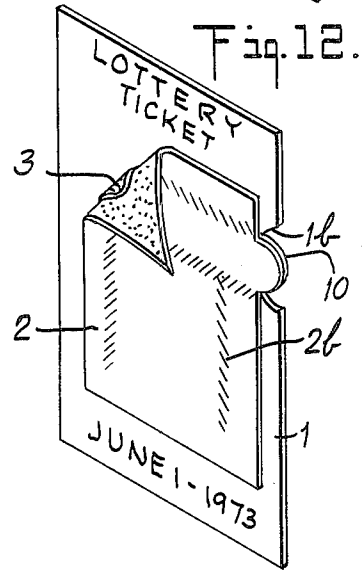



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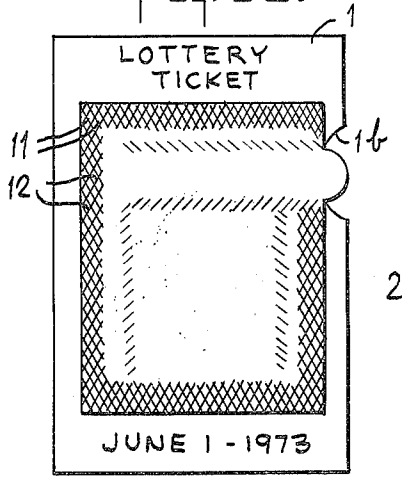



Fig. 14.

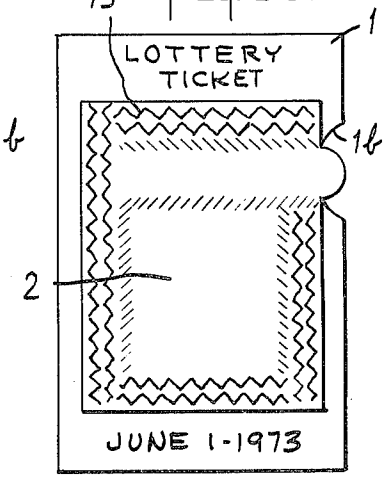



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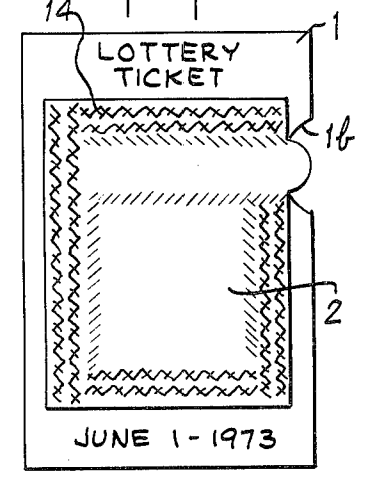


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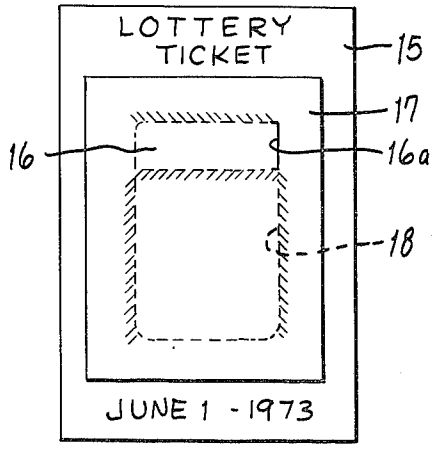



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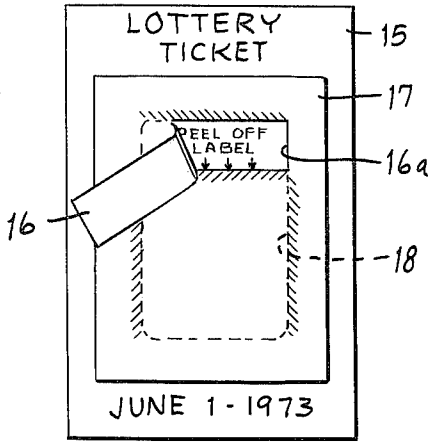



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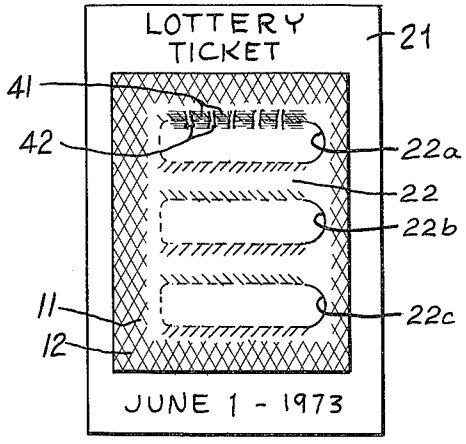



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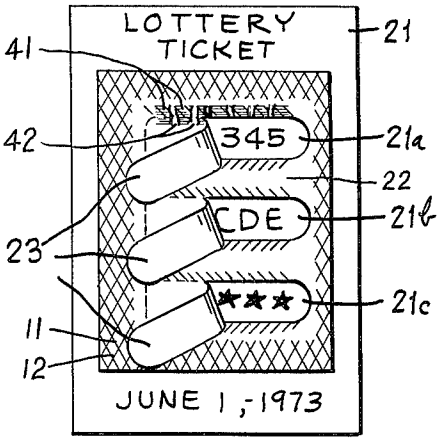



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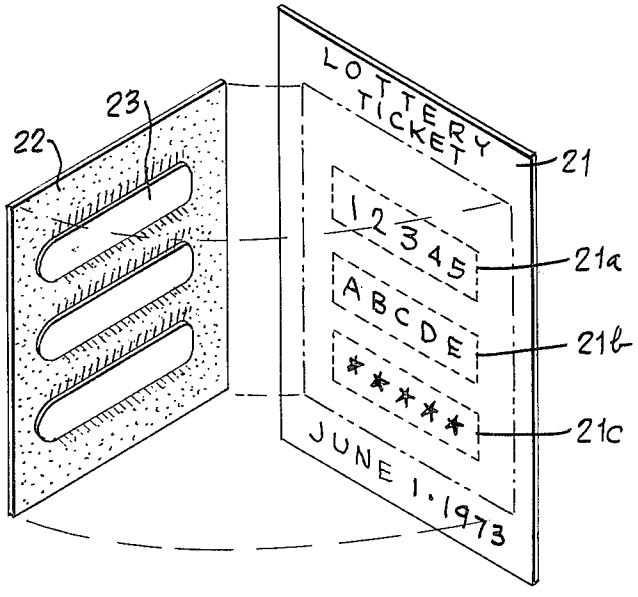


Fig. 21.

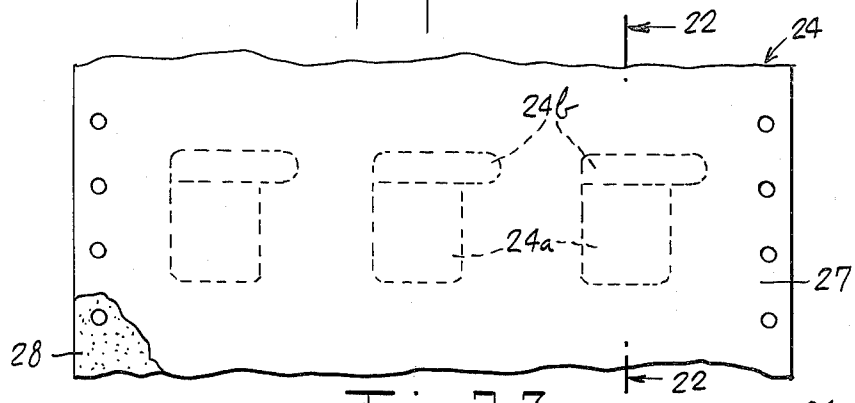



Fig. 22

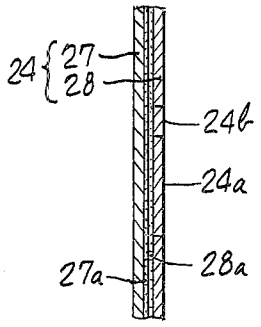



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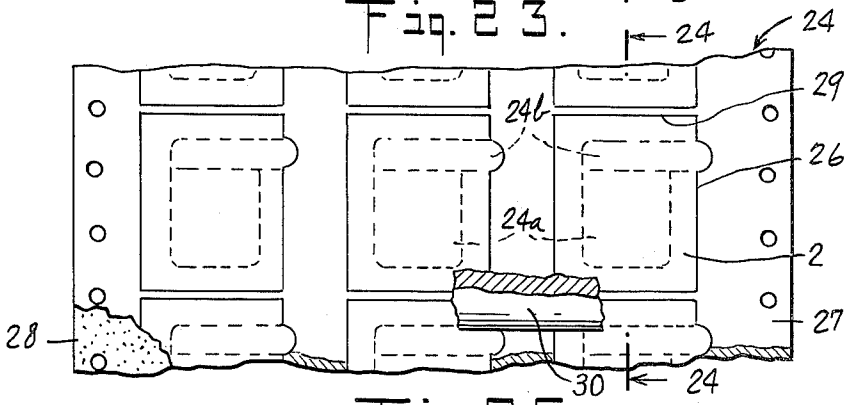



Fig. 24.

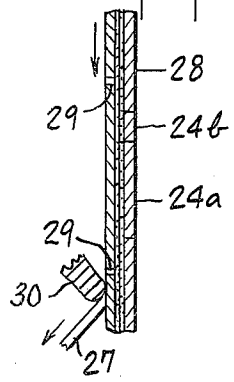



Fig. 25.

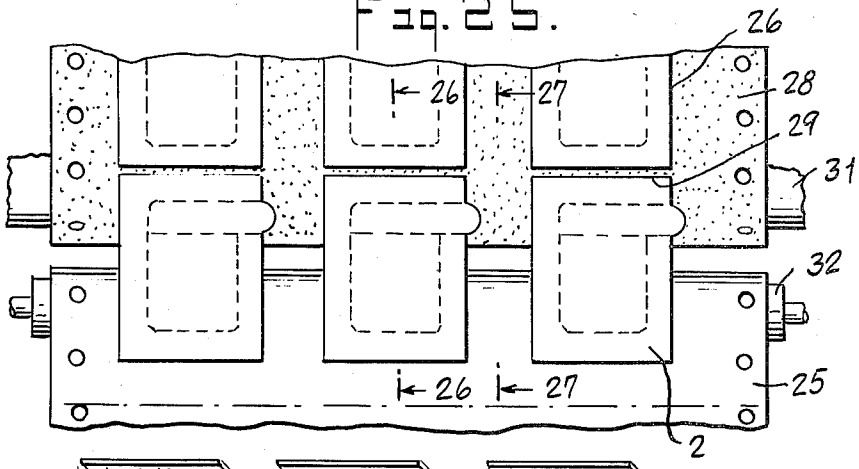



Fig. 26.

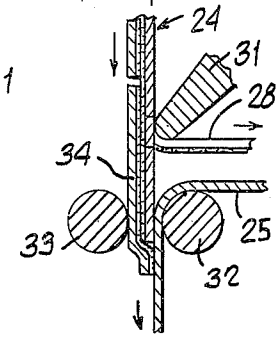



Fig. 28.

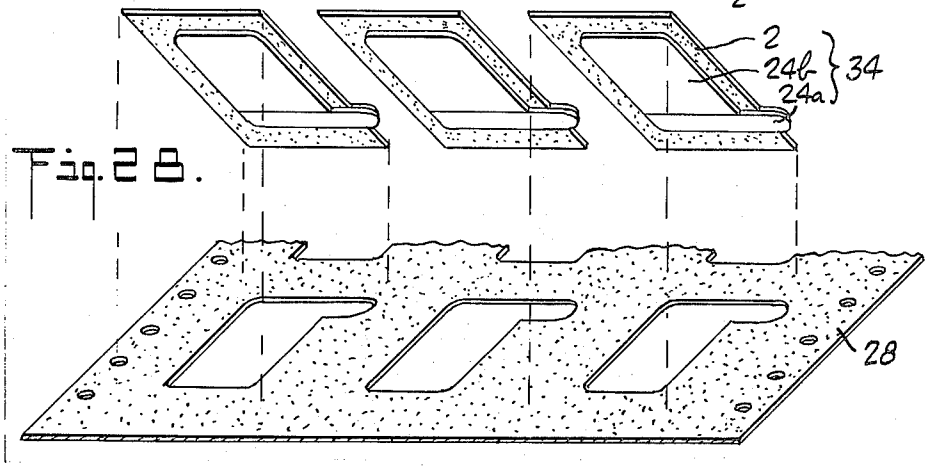
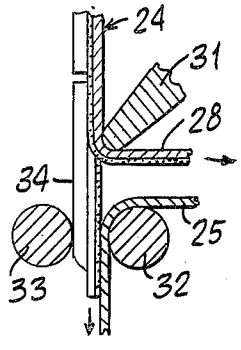



Fig. 27.



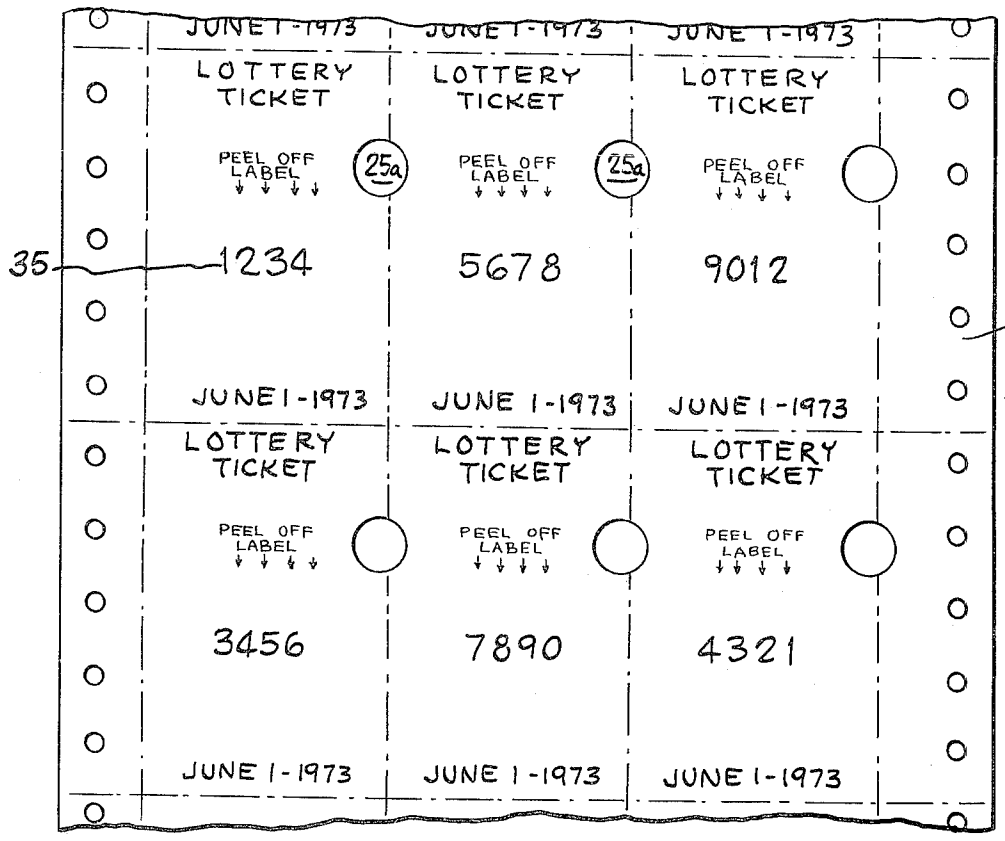

JUNE 1-1973
LOTTERY TICKET
PEEL OFF LABEL
25a
1234
5678
9012
3456
7890
4321
35
25

Fig. 29.

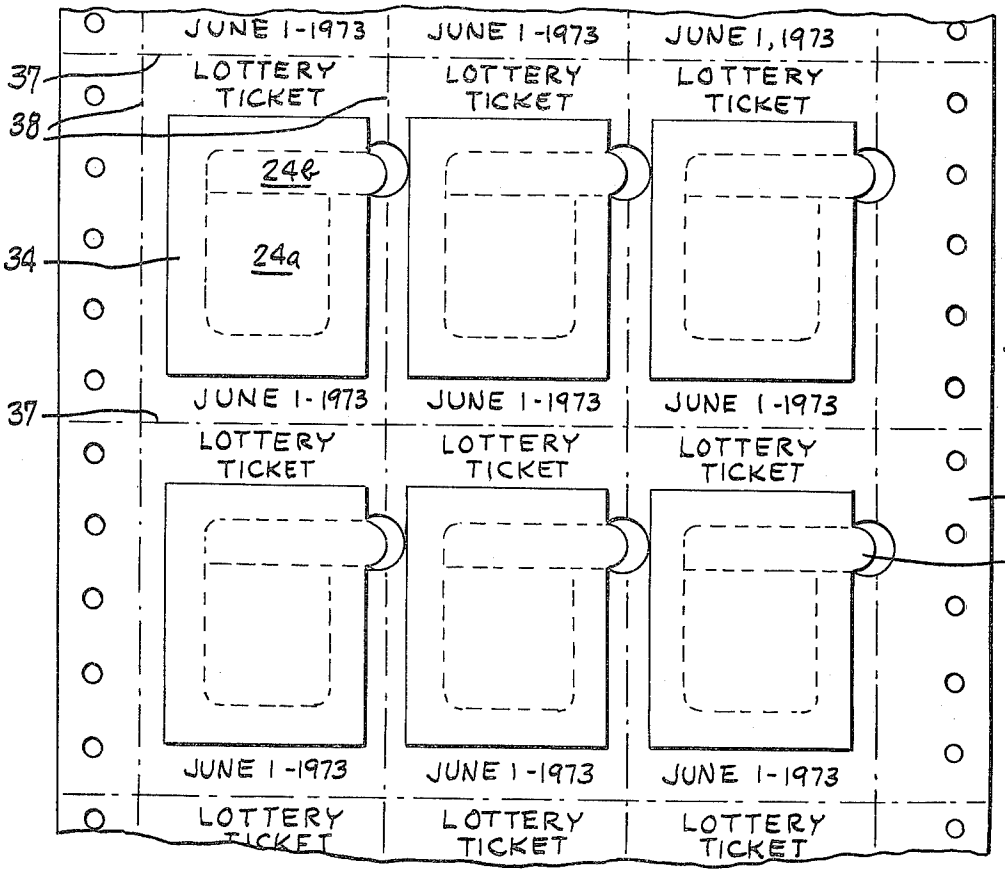

JUNE 1-1973
JUNE 1,1973
LOTTERY TICKET
24b
24a
34
37
38
25
36

Fig. 30.

Fig. 31.

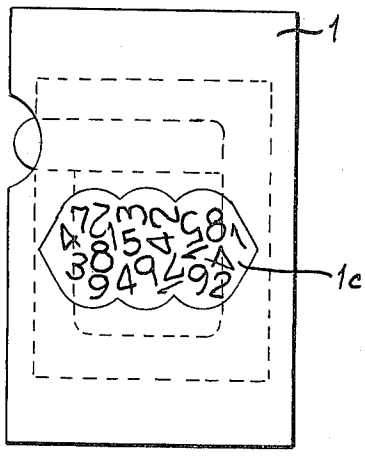
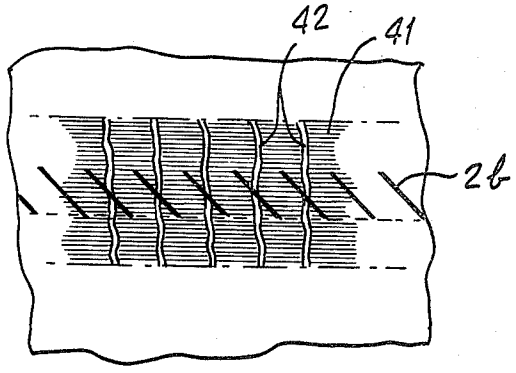



Fig. 32.



# DOCUMENT HAVING A CONCEALED MARKING AND METHOD OF MAKING SAME

## BRIEF SUMMARY OF THE INVENTION

This invention is applicable to any document having a concealed marking which cannot be observed without defacing the document. The invention is illustrated as applicable to tickets intended for a daily lottery. With such a lottery, the winning number may be known at the time the ticket is purchased. Also, the vendor may have a substantial supply of unsold tickets at the time the winning number becomes known. In either of those circumstances, it is important for a purchaser to know that the number on the ticket he is buying has not been observed.

The number on each ticket is concealed by being printed on a base sheet having a two-ply cover means including an intermediate sheet and a cover sheet. The intermediate sheet is opaque and extends over the area on the base sheet where the numbers or other characters employed in the lottery marking are printed. The upper side of the intermediate opaque sheet is coated with a wax. The cover sheet is larger than the intermediate sheet and the under side of the cover sheet is coated with an adhesive material which forms a strong bond with the paper of the cover sheet and of the base sheet, and a relatively weak, releasable bond with the wax on the opaque sheet.

One edge of the opaque sheet is engageable by the fingernail so that the opaque sheet may be lifted, thereby tearing the cover sheet along the edges of the opaque sheet and revealing the concealed number. The cover sheet is not weakened along the edges of the opaque intermediate sheet, but instead short diagonal cuts are made in the cover sheet, diverging from the edges of the intermediate sheet into the surrounding portions of the cover sheet. These cuts lead a tear along such an edge intermittently into those surrounding portions, so that the tearing produces an irregular edge which it is practically impossible to restore to its original appearance.

The margins of the cover sheet, where it adheres to the base sheet, are cut to define a multiplicity of small localities enclosed by cuts. If an attempt is made to peel the adhesively coated cover sheet away from the base, then some of these small localities stick to the base and become separated from the cover sheet. The small localities become slightly displaced from their original positions during that separation, making it practially impossible for the cover sheet to be removed and replaced without detection. Any attempt to restore the cover sheet to its original position will result in a misalignment between the cover sheet and some of the small enclosed localities which stuck to the base. The base sheet and the cover sheet have contrasting colors, so that any such misalignment appears in sharp contrast, revealing that an attempt has been made to read the concealed number. The cover sheet may also have fine unprinted lines against a solid printed background, so that any misalignment produces readily visible discontinuities in the fine lines.

The preferred method of printing and assembling the tickets described above involves printing the tickets in rows across a base web. This printing includes the numbers or other characters to be concealed and may also include other printing on portions of the base web which are not concealed by the cover sheet means.



The cover sheet means is formed from a two-ply web, which includes a cover web and an intermediate web, these two webs being releasably adhered together. A first die cut is made through the intermediate web to outline one or more opaque concealing areas for each ticket. A second die cut is then made through the cover web to outline the cover sheets to be applied to the tickets. The cover web may be printed, either as a separate step or concurrently with one or the other or both of the two die cuts. The intermediate web may be printed on its under surface before the first die cut. The material of the cover web outside the outlined cover sheets is then removed and the intermediate web with the cover sheets attached continues to the next step. The material of the intermediate web outside the outlined concealing areas of the intermediate web is then turned along a sharply convex path.. While the cover web moves straight. The outlined concealing areas of the intermediate web move with the cover web. During this separation of the webs, the cover web is separated into cover sheets in rows corresponding to the number of tickets in each row on the base. Each cover sheet with its attached concealing areas of the intermediate web is then pressed against a ticket on the base web. The leading edge of each cover sheet carrying the concealing areas must be pressed against a ticket on the base web before the trailing edge of the cover sheet separates from the intermediate web. This latter relationship is necessary because the cover sheet is unsupported except by its attachment either to the intermediate web or to the base web.

Alternatively, if desired, the cover sheets and attached concealing areas may be made by hand and applied by hand to the base sheet.

Each cover sheet is then die cut, in margins where it is adhered to the base web, with a multiplicity of cuts defining multiple small localities completely enclosed by the cuts.

The base web may then be cut into individual tickets, or it may be cut into rows of tickets or columns of tickets, as desired.

## DRAWINGS

FIG. **1** is a plan view of a preferred form of lottery ticket embodying the invention.

FIG. **2** is a similar plan view illustrating the first step in removing a tear strip to observe a concealed number on the ticket of FIG. **1**.

FIG. **3** is a similar plan view illustrating a second step in removing the cover sheet means to reveal the concealed number on the ticket of FIG. **1**.

FIG. **4** is an exploded view showing the three plies of the ticket of FIG. **1**.

FIG. **5** is a fragmentary view, on an enlarged scale, showing a printed tamper-indicating marking which may be used on the ticket of FIG. **1**.

FIG. **6** is a sectional view taken on the line **6—6** of FIG. **1**.

FIG. **7** is a bottom plan view of the ticket of FIG. **1**, showing the printing on the reverse side.

FIG. **8** is a perspective view showing the under side of the cover ply of the ticket of FIG. **1**.

FIG. **9** is a view similar to FIG. **8** showing an opaque intermediate ply fastened to the cover ply of FIG. **8**.

FIG. **10** is a perspective view of the two ply cover sheet means of FIG. **9**, with certain cuts made through the opaque ply.

FIG. 10A is a perspective view of the front side of the cover sheet means of FIG. 9, showing certain cuts made through the cover ply.

FIG. 11 is a perspective view similar to FIG. 10, showing a portion of the opaque ply being peeled off the cover sheet.

FIG. 11A is a perspective view of the cover sheet means of FIG. 9, showing a portion of the cover ply being removed.

FIG. 12 is a perspective view of the cover sheet means of FIG. 11 applied to the face of a base sheet.

FIG. 13 is a plan view of a lottery ticket, in which certain small localities around the margins of the cover sheet have has been outlined by a multiplicity of cuts.

FIG. 14 is a view similar to FIG. 13, showing a modified form of cuts.

FIG. 15 is a view similar to FIG. 13, showing still another modified form of cuts.

FIG. 16 is a plan view similar to FIG. 1, showing a modified form of ticket.

FIG. 17 is a plan view similar to FIG. 2, but showing the ticket of FIG. 16.

FIG. 18 is a plan view similar to FIG. 1, showing still another modified form of ticket.

FIG. 19 is a plan view similar to FIG. 2, showing the ticket of FIG. 18.

FIG. 20 is an exploded view showing the construction of the ticket of FIGS. 18 and 19.

FIG. 21 is a plan view of a web of two-ply material, which will be cut to provide cover sheet means for a plurality of the lottery tickets of FIGS. 1–15.

FIG. 22 is a cross-sectional view taken on the line 22—22 of FIG. 21.

FIG. 23 is a view similar to FIG. 21, showing the same web material at a later stage in the operation of making lottery tickets.

FIG. 24 is a cross-sectional view on the line 24—24 of FIG. 23.

FIG. 25 is a plan view showing the transfer or a row of the finished cover sheet means from the two-ply web to a base sheet web.

FIG. 26 is a cross-sectional view taken on the line 26—26 of FIG. 25.

FIG. 27 is a cross-sectional view taken on the line 27—27 of FIG. 25. FIG. 28 is a perspective view showing a row of finished cover sheet means, and also showing the sheet of waste material left after the row of cover means has been removed therefrom.

FIG. 29 is a plan view of the base sheet means before the cover sheets are applied thereto.

FIG. 30 is a plan view of a finished sheet of lottery tickets, showing two rows of three tickets each.

FIG. 31 is a view similar to FIG. 7, showing a different form of overprinting which may be used on the base sheet.

FIG. 32 is a view similar to FIG. 5, showing another form of tamper-indicating marking.

## DETAILED DESCRIPTION

FIG. 1 shows a lottery ticket including a base sheet 1 to which is attached a cover sheet 2, and an opaque intermediate sheet 3 (FIG. 4), held in place between the base sheet 1 and the cover sheet 2. The base sheet 1 is provided with a printed number 4 located within an area 1*a* which is covered by the intermediate sheet 3 and cover sheet 2. The dotted line framing the area 1*a* in FIG. 4 need not be printed on the base sheet 1. It is added to the drawing only to clarify the illustration. The base sheet 1 may be provided with other printed matter, some of which may be outside the area 1*a*, and which may be partly observable when the ticket is sold.

The intermediate sheet 3 includes a cover region 3*a*, which is adapted to overlie and hence to block from view the area 1*a* of the base sheet 1, in which the ticket number is printed. Preferably, the cover region 3*a* is larger than the area 1*a*, to avoid the necessity of careful registration with the area 1*a* when the tickets are assembled. A tear strip 3*b* adjoins one edge of the cover region 3*a* and extends to an edge of the base sheet 1. In the modification shown, the base sheet 1 is provided with a semicircular recess 1*b*, into which the tear strip 3*b* extends. The upper surface of the intermediate sheet 3 is coated with a suitable wax 5, for example, a silicone wax, which forms a weak bond with adhesive materials but forms a strong bond with the paper sheet 3. The cover sheet 2 is coated on its under side with an adhesive 2*a* which forms a strong bond with the paper cover sheet 2 and with the base sheet 1, but only a weak bond with the wax 5 on the intermediate sheet 3. The cover sheet 2 is bonded to the base sheet 1 in all portions where the intermediate sheet 3 does not intervene between the cover sheet 2 and the base sheet 1.

A plurality of parallel cuts 2*b* are provided in the cover sheet 2 adjacent certain edges of the cover region 3*a* and tear strip 3*b*, the cover sheet 2. The cuts 2*b* diverge from the edges of the intermediate sheet 3 into the adjacent portions of the cover sheet 2.

When a purchaser receives lottery tickets, he may buy it under such circumstances that the winning number is known and posted at the point of purchase. Furthermore, even though the winning number is not known at the time of sale, it may occur that the sales agent will have a large number of unsold tickets on hand at the time the winning number becomes known. In either event, it is highly desirable that neither the purchaser nor any other person be able to determine the number on the ticket without defacing a part of the ticket, in such a manner that a subsequent purchaser will known that the number on the ticket has been observed, or that an attempt has been made to observe it.

In the ticket illustrated, the normal method of observing the number is to grasp the end of the tear strip 3*b* with its covering layer of the cover sheet 2 and pull it upwardly away from the base 1, thereby tearing the cover where it overlies the edges of the strip 3*b*. This results in a tearing of the cover 2 along an irregular line which, although it may follow some of the cuts 2*b* must necessarily tear uncut material between the cuts 2*b*, and thus creates a rough edge where the tear is made, as illustrated in FIG. 3. When the tear strip 3*b* has been pulled up to its end remote from the recess 1*b*, the upper edge of the cover region 3*a* is exposed, as shown at 3*c* in FIG. 2. Note that the intermediate layer 3 is cut along the line 3*c* and that the removal of the tear strip 3*b* opens for observation a legend printed on the base sheet 1 reading "PEEL OFF LABEL," with arrows indicating the direction in which the peeling operation is to take place.

The holder of the ticket may then start peeling the cover region 3*a* by placing his fingernail under the edge 3*c* and lifting upward, thereby tearing the cover 2 along the edges 3*d* and 3*e*. The cover sheet 2 is provided with short cuts 2*b* diverging from the edges of sheet 3 into the adjacent portions of the cover sheet 2 which are

bonded to base sheet 1, so that this tearing operation will also result in rough edges along the sides of the tear, as illustrated at 2c and 2d in FIG. 3. Hence, if any attempt is made to see the number 4 printed on the base sheet by removing the tear strip 3b and the cover region 3a, then rough edges will be left on the cover sheet 2 which will be difficult to repair so that the ticket cannot be thereafter sold without the purchaser being aware that an attempt has been made to observe the number 4. The roughly torn edges provide a permanent indication that the tear strip 3b or the cover area 3a of the cover sheet 3 has been lifted.

The base sheet 1 may be printed on the back so as to cover the back of the concealed area 1a with an intricate overprint 1c (FIG. 7). The purpose of this overprint is to make it difficult for anyone to observe the number printed on the front sheet 1b by observing it through the back.

The under side of the intermediate sheet 3 should be printed so as to make it opaque, for example, by printing it in solid black. If both the black printing and the overprint 1c are used, it is impossible to observe the concealed number either from the back or front of the ticket, whether the ticket is frontlighted or backlighted.

The cover sheet 2 adjacent the tear lines may be provided with irregular bands 6 appearing in a solid color separated by fine contrasting lines 7 which intersect the tear line defined by cuts 2b as shown on an enlarged scale in FIG. 5. This printing makes it even more difficult for one who is tearing the cover sheet 2 along one of the tear lines to replace part of the cover sheet without creating a misalignment of the contrasting lines 7 which would be readily observable. Either the bands 6 may be unprinted, as shown in FIG. 5, or the crossing lines may be unprinted, as shown in FIG. 32.

It should be noted that the cuts 2b have one end aligned with an edge of the tear strip 3b and extend at an acute angle to that edge into the cover sheet 2, terminating in blinds ends in the cover sheet. By virtue of this construction, the tearing of the cover sheet repeatedly starts to follow one of the cuts 2b, and produces an irregular tear when it reaches the farther end of that cut.

Another method of observing the number 4 which might possibly be used by an unauthorized person is to apply heat to the cover sheet 2 in an effort to loosen the bond between the adhesive layer 2a and either the cover sheet 2 or the base sheet 1, so that the entire cover sheet means, including the cover sheet 2 and the intermediate sheet 3 may be lifted from the base sheet 1 far enough to observe the number 4.

To prevent such an operation from being carried out without detection, the cover sheet 2 is provided in its margins with a multiplicity of small localities enclosed by lines cut in the cover sheet, said localities extending in a plurality of abutting rows. As shown in FIG. 3, this structure may be produced by providing one set of parallel diagonal cuts 11 and a second set of parallel diagonal cuts 12 crossing the cuts 11 at an angle. The cuts 11 and 12 provide a multiplicity of smal diamond shaped localities. If an attempt is made to separate cover 2 from the base sheet 1 by the use of heat to loosen the adhesive bond 2a, then some of the small diamond shaped localities will remain behind when the cover sheet 2 is lifted. Some of these localities will be slightly displaced from their normal position, so that when the cover sheet 2 is replaced, the displaced localities will not fit in the holes in the cover sheet. Since the cover sheet and the base sheet have contrasting colors, this displacement is readily detected. It is practically impossible for a manipulator of the tickets to replace the cover sheet and get all the small localities back into their original places in the cover sheet 2. The resulting irregularity in the appearance of the ticket will provide a permanent indication that the ticket has been tampered with, and hence should be rejected by a prospective purchaser.

## FIGS. 8–15

These figures illustrate a method of constructing a single document having a concealed marking, such as the lottery ticket of FIGS. 1–7. As illustrated in FIGS. 8–11A, the cover sheet means, comprising the cover sheet 2 and the intermediate sheet 3, may first be constructed as a two-ply unit. As shown in FIG. 8, a cover ply 8, from which the cover sheet 2 is to be cut, has its under side coated with adhesive material. In FIG. 9, the cover ply 8 has applied thereto an intermediate ply 9, which has a wax coating 5 on the surface facing toward the adhesive coating 2a on the cover ply 8.

The intermediate ply 9 is then die cut as shown at 3f and 3g in FIG. 9 to define the cover region 3a and the tear strip 3b, which lies adjacent the upper edge of the cover region 3a. The cover region 3a and the abutting tear strip 3b are thereby enclosed by a frame 3h. The tear strip 3b extends beyond one lateral edge of the cover area 3a to define a pull tab 10.

The cover ply 2 is then die cut as shown in FIG. 10A, along the parallel cuts 2b, as described above, and along a frame line 2e which outlines the cover sheet 2, and separates it from a border 2f. Alternatively, the cover ply 2 may first be die cut and the intermediate ply 9 may be cut later.

The frame 3h may then be removed, as shown in FIG. 11, by peeling it away from the cover ply 2, relying on the peelability of the bond between the adhesive coating 2a on the wax coating 5.

Note that all corners of the cuts 3f are rounded, to facilitate removal of the frame 3h without concentration of stress at the corners. If the corners were angular instead of arcuate, the stress at the corners might be great enough to cause part of the frame 3h to tear during this operation.

The border 2f of the cover ply 2 is then removed, as shown in FIG. 11A, by separation along the frame line 2e, thereby leaving a pull tab portion attached to the pull tab 10 of the intermediate sheet.

After the border 2f is removed, the cover sheet means may be placed on a precut base sheet 1, as shown in FIG. 12, with the pull tab 10 projecting into the recess 1b in one edge of the base sheet 1.

After the cover sheet means, including the cover sheet 2 and the intermediate sheet 3, has been placed on the base sheet 1, then the two sets of crossed lines 11 and 12 may be cut into the margins of the cover sheet 2, as shown in FIG. 13.

FIG. 14 shows a modified form of cuts 13 which may be used in place of the two sets of crossing diagonal cuts 11 and 12 of FIG. 13. After the sawtooth cuts 13 have been made in the cover sheet 2, then additional diagonal cuts 14 may be made crossing the sawtooth cuts and providing a multiplicity of small localities enclosed or substantially enclosed by cuts. As explained above, these small cuts will effectively frustrate at-

tempts to observe the concealed number without detection. The array of cuts shown in FIGS. **14** and **15** is easier to make than cuts of FIG. **13**, since if the cuts of FIG. **13** are made with very small dimensions, some of the small localities defined by the cuts may stick to the cutting blades, so that some of the new tickets may give the appearance of being tampered with. In the arrangement of FIGS. **14** and **15**, the small localities defined by the cuts may not be completely enclosed. Nevertheless, the small localities are substantially completely enclosed and sufficiently so that some of them will tear loose from the cover sheet **2** and stick to the base sheet **1** when any attempt is made to remove the cover sheet **2** by the application of heat. The partial attachment to the cover sheet **2** is very effective to create displacements of the small localities with respect to the cover sheet which makes them especially difficult to replace without detection. Note that in order to observe the numbered area **1***a*, some of the small substantially enclosed localities on some part of the ticket would have to be lifted from the base sheet.

## FIGS. 16–17

The ticket shown in these figures includes a base sheet **15** which differs from the base sheet **1** of the previous figures in not having the semicircular recess **1***b* cut in an edge thereof. Furthermore, the tear strip illustrated at **16** is differently constructed from the tear strip **3***b* of FIGS. **1–15**. The tear strip **16** does not extend to an edge of the cover sheet **17**, but terminates at a cut edge **16***a* aligned with an edge of the covering region **18**, which corresponds to the covering region **3***a* of FIGS. **1–15**. The edges of the tear strip **16** which extend horizontally in FIG. **16**, and the edges of region **18** which extend vertically, are provided with parallel cuts, as shown, similar to the cuts **3***b* of FIGS. **2** and **4**.

In order to remove the tear strip **16**, the holder of the ticket inserts a fingernail under the edge **16***a* and lifts it up thereby making the tear strip graspable and removable by tearing the cover sheet **17**, so that the covering region **18** may thereafter be removed in a manner similar to that shown for the covering region **3***a* in FIG. **3**. All the sheets are flexible, so that access by fingernail to the edge **16***a* may be aided by flexing the ticket to lift that edge slightly.

The ticket shown in these figures may be modified by adding cut lines as shown at **11**, **12**, in FIG. **13**, or cut lines **13** and **14**, as in FIGS. **14** and **15** or overprinting as shown in FIGS. **5** and **32**.

## FIGS. 18–20

In these figures, a base sheet **21** is covered with a cover sheet means including a cover sheet **22** and an intermediate sheet **23**. These figures show a finished ticket. in which the intermediate sheet **23** has been cut away except in three covering regions where it covers three regions **21***a*, **21***b* and **21***c* of the base sheet **21**. The cover sheet **22** is provided with cut edges **22***a*, **22***b*, **22***c*, by means of which a portion of the cover sheet and the underlying intermediate sheet can be lifted up and pulled back to reveal the characters printed underneath on the base sheet **21**. As illustrated in FIG. **19**, these characters may either be numerical as at **21***a*, alphabetical as at **21***b*, or may have some other shape, as the star-shaped characters shown at **21***c*. There may be characters printed in all three of the areas **21***a*, **21***b*, **21***c*, or one or more of them may be left blank.

The margins of the cover sheet **22** may be provided with two intersecting arrays of diagonal cuts **11**, **12**, as described above in connection with FIGS. **2** and **3**. Furthermore, the cover sheet may be printed, as described in FIGS. **5** and **32**, at the edges of the three covering regions of sheet **23**, with irregular bands **6** separated by fine contrasting lines **7**. This printing should be in alignment with all the edges of the three covering regions of the intermediate sheet **23**, although it is shown only at one edge of one covering region in FIGS. **18** and **19**, to avoid confusing the drawing.

While the lottery tickets illustrated above employ a three-ply construction, it will be appreciated that certain protective features of the invention, such as the cuts **2***b* of FIG. **2** or the multiplicity of small localities defined by cuts **11** and **12** of FIG. **3** or the cuts **13** and **14** of FIGS. **14** and **15**, might be employed to advantage in tickets or other documents using a two-ply construction.

## FIGS. 21–30

These figures illustrate a method of manufacturing the lottery tickets of FIGS. **1–15** in a mass production operation, wherein a multiplicity of tickets are printed on a continuous web. Two continuous webs are employed, one being a two-ply cover sheet web **24** shown in FIGS. **21–28**. The other web is the base sheet web **25**, which appears in FIGS. **25–27**, **29** and **30**.

The cover sheet web **24** includes a cover sheet **27** coated on its under surface with a suitable adhesive material **27***a* and an intermediate sheet **28** coated on its upper surface with a suitable wax material **28***a*.

The first step in treating this two-ply web **24** is to run it through a die cutting apparatus which cuts the intermediate sheet **28** along lines, (shown dotted in FIG. **21**), defining regions **24***a* and strips **24***b* corresponding respectively to the regions **3***a* and strips **3***b* in the ticket of FIGS. **1–15**. The next step is to run the two-ply web **24** through another die cutting apparatus which cuts through the cover sheet **27** along lines **26** and **29** defining cover sheets **2**. Note that the cover sheets **2** for successive tickets along the length of the web **25** are preferably separated from one another at the longitudinal ends of the tickets.

The cover sheet **27** outside the lines **26** and **29** is then drawn around a turning bar **30**, leaving the cover sheets **2** attached to the intermediate sheet **28**. See FIG. **24**.

FIGS. **25** and **26** show the intermediate sheet **28** passing over a rod or turning bar **31** of small radius, so that the sheet **28** is required to turn sharply. This causes the cover sheets **2**, with attached regions **24***a* and strips **24***b* of the intermediate sheet, to separate from the laterally adjacent portions of the intermediate sheet **28**, which are forcibly turned around the short radius turn defined by the rod **31**. The cover sheets **2** and the regions **24***a* and strips **24***b* of the intermediate sheet **28** which are attached thereto move straight ahead (downwardly in FIGS. **25** and **26**) as the longitudinally continuous web **24** passes around the rod **31**. The base web **25**, shown by itself in FIG. **29**, enters FIG. **26** from the right and moves around the roller **32**, and thence downwardly as shown by the arrows. The cover sheets **2** and base web **25** are engaged in the nip of roller **32** and a roller **33**, which press the cover sheets against the base web **20**, so that they become attached to the base web **25** by the action of the adhesive layer **27***a*. As best seen in FIG. **28**, the cover sheet means **34** consisting of the cover

sheets 2 and the covering regions 24*a* and strips 24*b* attached thereto proceed straight ahead, i.e., downwardly in FIGS. 26 and 27, while the remainder of the intermediate sheet 24, which appears at the bottom of FIG. 28, is discharged toward the right in FIGS. 26 and 27, as waste material. The cover sheet means 34 are fastened to the base web 25 by compression between the rollers 32 and 33, to form completed lottery tickets, as shown in FIG. 30.

The base web 25 is printed before it is engaged by the cover sheet means 34, the printing including the numbers 35 or other characters employed in the lottery and any other information, such as a title and a date, which may be desired. The base web 25 is separated by suitable tear lines 37 and 38 (FIG. 30) into document pieces, each of which forms the base sheet of a lottery ticket. Holes 25*a* are punched in the web 25, one half of each hole 25*a* serving as a recess to receive a pull tab 36 corresponding to the pull tab 10 of FIGS. 1–15. When the cover sheet means 34 are attached to the base web 25, each cover sheet means 34, together with its attached base sheet, forms a completed lottery ticket. The covering regions 24*a* cover the lottery numbers and the covering regions 24*b* cover the area immediately under the pull tab.

The covering strips 24*b* are separated by cuts from the covering regions 24*a* because the area under a covering region 24*a* might become partially visible from the edge of the ticket by bending the ticket transversely so that the base sheet would be given a concave curvature on its upper surface causing the sheet to bow away from it. Consequently, if the region 24*a* were not separated from strip 24*b* by a cut, a person might thus be able to read the printing under the covering area region 24*a*.

With the regions 24*a* and strips 24*b* separated by cuts, it is not possible to observe the printing under the covering region 24*a* by this technique.

While the rollers 32 and 33 run continuously, moving the base sheet through the apparatus of FIGS. 26 and 27, the driving apparatus employed for the cover sheet web 24 runs intermittently, so as to space each of the cover sheet means 34 from its neighbors above and below, as viewed in FIG. 30, thereby providing marginal space for printing at the cup and bottom of the base sheet of each lottery ticket. It would be possible to drive the cover sheet web 24 continuously and to have the base sheet of the lottery tickets completely covered by the cover sheets, with all the identifying printing on the cover sheet. It is greatly preferred, however, to have identifying printing of a type difficult to counterfeit, such as intaglio printing, on the same sheet, i.e., the base, sheet, which bears the lottery number.

An alternative method of making lottery tickets in mass production in accordance with the invention involves printing of the cover sheets 2 in a sidewise configuration as compared to the configuration shown in FIGS. 21 and 23. In other words, the cover sheets 2 may have their long dimensions extending across the web and their short dimensions extending longitudinally of the web. The successive cover sheets along the length of the web should not be spaced apart, but would be adjacent one another. The cover sheets might or might not be spaced apart along the crosswise dimension of the web. The web should be cut after the cover sheets were made so as to produce strips of cover sheets. which might be wound in rolls.

The strips of cover sheets so formed might then be applied to the base sheets by an apparatus which repeatedly traversed successive rows of base sheets, moving crosswise of the base web, applying one cover sheet to each document piece of the base sheet.

In the method of preparing tickets shown in FIGS. 25 and 28, or in the method described above, it is possible to prepare the cover sheet means, comprising the intermediate sheet and the cover sheet, in an operation separated in time and by geography from the operation of preparing the numbered base sheets. The operation of applying the cover sheet means to the base sheet should take place immediately upon the numbering of the base sheets, although the printing of the numbers on the base sheets may be separated in space and time from the other printing on those sheets.

FIG. 31

This figure illustrates a method of overprinting a location 1*c* on the back of the ticket directly behind the area 1*a* which may be used together with the overprinting shown in FIG. 7, or possibly separately, to make it impossible to read the significant number on the ticket by strong lighting. As shown in FIG. 31, the region 1*c* is printed with an array of numbers, preferably of the same font as the significant numbers on the top side of the base sheet, but with a random orientation of the numbers.

It has been found that such an array of numbers in a scrambled orientation makes it practically impossible to separate the overprinted numbers in the location 1*c* from the significant numbers on the face side of the base sheet 1, and therefore impossible to read the significant numbers.

FIG. 32

This figure illustrates another method of overprinting the diagonal tear lines 2*b* so as to make it practically impossible for anyone to remove the tear strip 3*b* and replace it without leaving indications of tampering which would be readily observable. In FIG. 32, the cover sheet adjacent the parallel cuts 2*b* is overprinted with evenly colored background bands 41 separated by fine unprinted lines 42. When the tear strip is lifted, the bands 41 and lines 42 are necessarily separated, and it becomes practically impossible to replace the tear strip without leaving discontinuous zigzags in the lines 42.

The method shown in FIG. 32 is to be contrasted with the method shown in FIG. 5, where fine lines 7 are printed on a lighter or unprinted background. The two methods are generally equivalent, but it is presently preferred to use the method of FIG. 32, since it is considered that it produces a more readily observable indication that the tear strip has been torn and replaced. This feature may be defined broadly as evenly colored bands separated by fine contrasting lines.

We claim:

1. A document having a concealed marking, comprising:

a. a base sheet having a marking printed on one side thereof in at least one area spaced inwardly from all edges of the sheet;

b. an opaque sheet smaller than the base sheet and overlying said area, said opaque sheet being separable from the base sheet;

c. a cover sheet overlying said opaque sheet and larger than the opaque sheet so that portions of the

cover sheet extend beyond the opaque sheet throughout at least a major part of its periphery, said cover sheet being adhesively attached to the opaque sheet and having said extending portions adhesively attached to the base sheet;

d. said opaque sheet having one edge accessible so that it may be gripped to displace the opaque sheet and tear the overlying attached cover sheet along the edges of the opaque sheet to reveal the marking on the base sheet, so that the torn edges of the cover sheet provide a permanent indication that the opaque sheet has been displaced.

**2.** A document as in claim **1**, in which said extending portions of the cover sheet completely surround the periphery of the opaque sheet, said cover sheet is cut in alignment with one edge of the opaque sheet to make said one edge accessible, and all said sheets are flexible, to allow access to said one edge of the opaque sheet by flexing the document.

**3.** A document as in claim **1**, in which said opaque sheet includes separate regions overlying a plurality of areas on the base sheet, all of which separate regions are surrounded by said extending portions of the cover sheet, and said cover sheet is cut in alignment with one edge of each of said separate regions, so that each separate region has one edge accessible for gripping.

**4.** A document as in claim **1**, in which:

a. said opaque sheet includes a portion overlying said one area of the base sheet and a tear strip abutting said overlying portion and extending therefrom to an edge of the base sheet;

b. said cover sheet has a first portion covering the overlying portion of the opaque sheet, a second portion covering said tear strip, and extending portions adjacent the periphery of the overlying portion of the opaque sheet, where the overlying portion thereof abuts the tear strip.

**5.** A document as in claim **4**, in which the tear strip and the second portion of the cover sheet extend beyond the edge of the base sheet.

**6.** A document as in claim **5**, in which the base sheet has a recess in an edge thereof, and said tear strip and said second overlying portion of the cover sheet extend into said recess.

**7.** A document as in claim **1**, in which said cover sheet has a plurality of cuts therein, transverse to an edge of the opaque sheet and diverging therefrom into the extending portions of the cover sheet so that the displacement of the opaque sheet is accompanied by irregular tearing of the cover sheet between said cuts.

**8.** A document as in claim **1**, in which said cover sheet has cut lines substantially enclosing a multiplicity of areas in the extending portions of the cover sheet, so that if an attempt is made to separate the cover sheet from the base sheet, some of the enclosed areas separate from the cover sheet and remain attached to the base sheet.

**9.** A document as in claim **1**, in which said cover sheet is printed, at least in the region of one edge of the opaque sheet, with even color areas separated by fine contrasting lines.

**10.** A document having a concealed marking, comprising:

a. a base sheet having a marking printed on one side thereof in at least one area spaced inwardly from all edges of the sheet;

b. cover sheet means overlying at least a part of said base sheet including said printed area, and opaque at least in the region covering said printed area, said cover sheet means having portions extending beyond said printed area throughout at least a major part of its periphery, said extending portions being adhesively attached to the base sheet;

c. said cover sheet means being tearable between the extending portions and the region covering said area, so that the region covering said area may be displaced to reveal the marking on the base sheet;

d. said cover sheet means having a plurality of straight parallel cuts separated by uncut material, and diverging from the edge of said region at angles less than 90° and terminating at blind ends in said extending portions, so that the displacement of said region to reveal the marking is accompanied by irregular tearing of the cover sheet means between said cuts, said irregular tearing extending along substantially the entire length of the displaced edges and permanently indicating that the region has been displaced.

**11.** A document as in claim **10**, in which the outer surface of the cover sheet means is printed with even color bands separated by fine contrasting lines, said bands and lines overlying the boundaries of said area.

**12.** A document having a concealed marking, comprising:

a. a base sheet having a marking printed on one side thereof in at least one area spaced inwardly from all edges of the sheet;

b. cover sheet means overlying at least a part of said base sheet including said printed area, and opaque at least in the region covering said printed area, said cover sheet means having portions extending beyond said opaque region throughout at least a major part of its periphery, said extend-portions being adhesively attached to the base sheet;

c. said cover sheet means being tearable between the extending portions and the region covering said area so that the region covering said area may be displaced to reveal the marking on the base sheet;

d. said cover sheet means having cuts substantially enclosing a multiplicity of localities in the margins of the cover sheet means, said enclosed localities extending in a plurality of abutting rows, so that if an attempt is made to separate the cover sheet means from the base sheet, some of the substantially enclosed localities remain attached to the base sheet, and provide a permanent indication that the cover sheet means has been separated from the base sheet.

**13.** A document as in claim **12**, in which said cut lines include two sets of parallel cuts intersecting to define a multiplicity of quadrilateral localities.

**14.** A document as in claim **12**, including a plurality of straight parallel cuts in the cover sheet means separated by uncut material and diverging from the edge of said region at angles less than 90° and terminating at blind ends so that parting of the cover sheet means is accompanied by tearing thereof between the cuts.

**15.** A document having a concealed marking, comprising:

a. a base sheet having a marking printed on one side thereof in at least one area spaced inwardly from all edges of the sheet;

b. an opaque sheet smaller than the base sheet and overlying said area, said opaque sheet being separable from the base sheet and having two parallel edges;

c. a cover sheet overlying said opaque sheet and larger than the opaque sheet so that portions of the cover sheet extend beyond the opaque sheet throughout at least a major part of its periphery, said cover sheet being adhesively attached to the opaque sheet and having said extending portions adhesively attached to the base sheet;

d. said opaque sheet having a third edge accessible so that it may be gripped to displace the opaque sheet and tear the overlying attached cover sheet along the parallel edges of the opaque sheet to reveal the marking on the base sheet;

e. said cover sheet having a plurality of straight parallel cuts separated by uncut material and extending from the parallel edges of said opaque sheet along the entire lengths thereof at angles less than **90°** and terminating at blind ends, said tearing of the cover sheet producing irregular edges crossing the uncut material between the cuts, said irregular edges providing a permanent indication that the opaque sheet has been displaced.

**16.** A document having a concealed marking, comprising:

a. a base sheet having a marking printed on one side thereof in at least one area spaced inwardly from all edges of the sheet;

b. an opaque sheet smaller than the base sheet and overlying said area, said opaque sheet being separable from the base sheet and having two opposite edges; and

c. a cover sheet overlying said opaque sheet and larger than the opaque sheet so that portions of the cover sheet extend beyond the opaque sheet throughout at least a major part of its periphery, said cover sheet being adhesively attached to the opaque sheet and having said extending portions adhesively attached to the base sheet;

d. said opaque sheet having a third edge accessible so that it may be gripped to displace the opaque sheet and tear the overlying attached cover sheet along the parallel edges of the opaque sheet to reveal the marking on the base sheet;

e. said cover sheet having cuts substantially enclosing a multiplicity of localities in the extending portions of the cover sheet, said enclosed localities extending in a plurality of abutting rows, so that if the cover sheet is lifted by loosening the adhesive bond between the extending portions thereof and the base sheet, some of the substantially enclosed localities remain attached to the base sheet and provide a permanent indication that the cover sheet has been separated from the base sheet.

**17.** A document as in claim **16,** in which said cover sheet has a plurality of straight parallel cuts separated by uncut material and intersecting the parallel edges of said opaque sheet along the entire lengths thereof at angles less than **90°** and terminating at blind ends, said tearing of the cover sheet producing irregular edges crossing the uncut material between the cuts, said irregular edges providing a permanent indication that the opaque sheet has been displaced.

* * * * *

# UNITED STATES PATENT OFFICE

# CERTIFICATE OF CORRECTION

PATENT NO. : 3,900,219

DATED : August 19, 1975

INVENTOR(S) : Salvatore F. D'Amato et al

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

Col. 3, line 14, delete "has";
line 39, "or" should read -- of --.

Col. 4, line 42, "known" should read -- know --;

Col. 9, line 45, "cup" should read -- top --;
line 53, remove the comma (,) after "base".

Col. 10, line 24, "region" should read -- location --.

Signed and Sealed this

*twenty-seventh* Day of *January 1976*

[SEAL]

*Attest:*

**RUTH C. MASON**
*Attesting Officer*

**C. MARSHALL DANN**
*Commissioner of Patents and Trademarks*