Jan. 4, 1966 W. P. HOEFLINGER 3,227,474

ENCODING APPARATUS

Filed Nov. 23, 1962 2 Sheets-Sheet 1

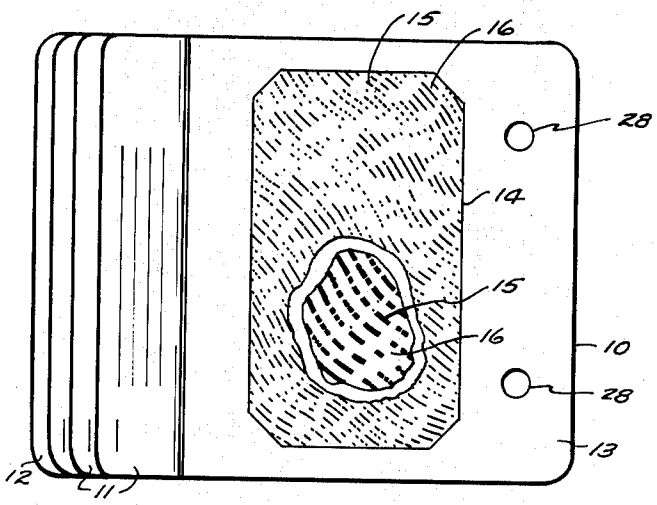
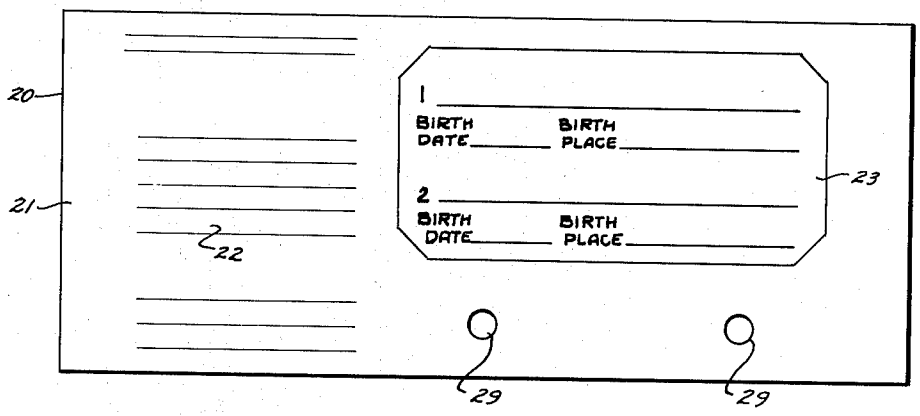


FIG. 1

FIG. 2



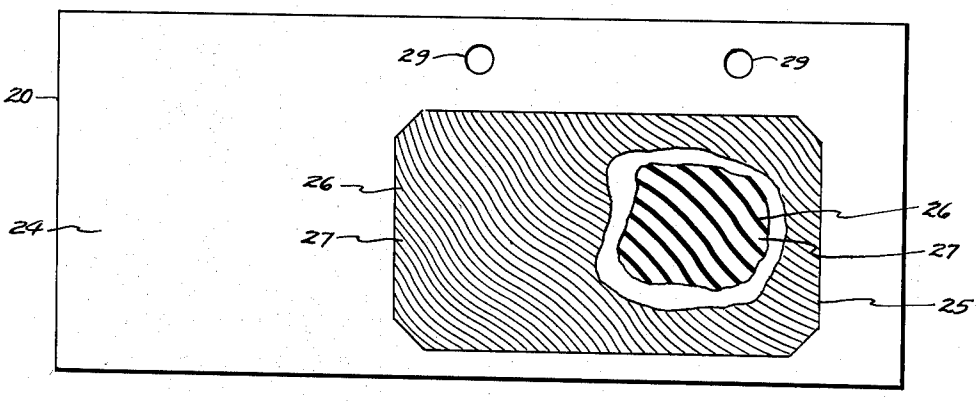


FIG. 3

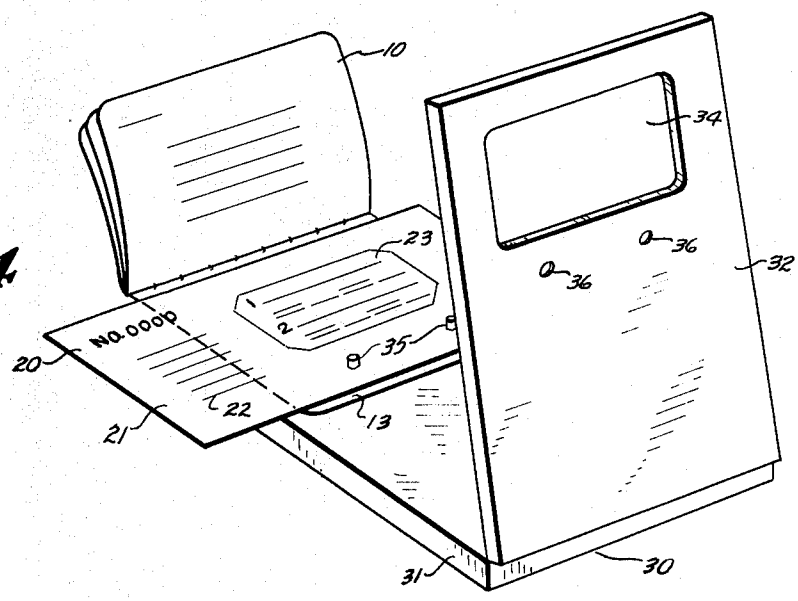
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ENCODING APPARATUS

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FIG. 4



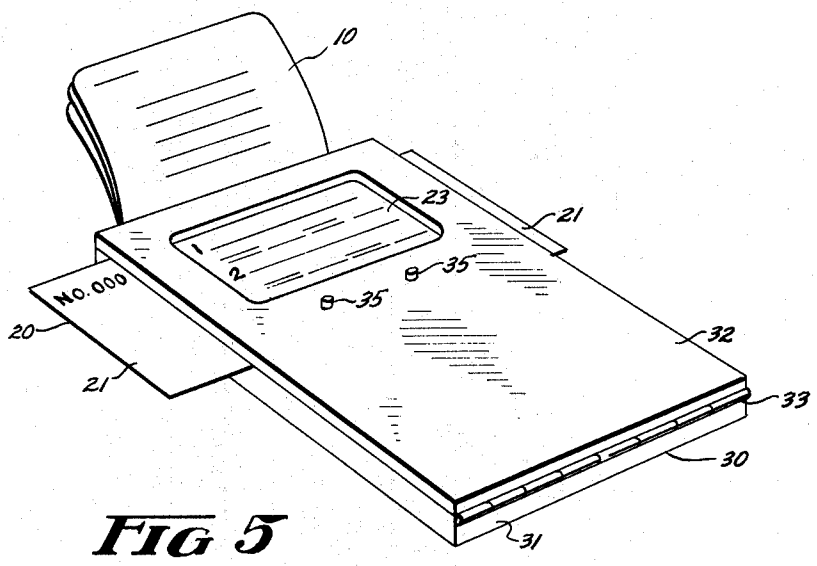


FIG 5

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ENCODING APPARATUS

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7 Claims. (Cl. 283—7)

The present invention pertains to encoding apparatus and particularly to an improved encoding apparatus employing the principles described in U.S. Patent No. 2,952,-080 to Avakian et al. dated September 13, 1960.

The aforesaid patent describes both a method of and various apparatus for encoding an intelligible display, which may be a signature, a picture or other material. Essentially, that method comprises eliminating or obscuring certain portions of the display in a predetermined manner and substituting therefor nonintelligible matter generally of a character like that of the display. The apparatus employed utilizes basically a "grid screen" having a great number of alternate display transmitting and nontransmitting zones, those shown in particular in the above patent having the form of alternate transparent and opaque bands on a plate glass, photographic film or similar surface. The extent or width of the transmitting zones or bands is such that the portions of the display transmitted thereby are sufficient by themselves to render the display intelligible. In typical practice the nontransmitting bands are thrice the width of the transmitting bands. When the screen is placed over the display only certain portions of the latter, therefore, are transmitted by or visible therethrough, which portions are referred to in the patent and herein as the "information or signature bits."

An "encoding dummy," fashioned in the manner described in the above patent from one or more sets of subject matter similar to that of the display, contains what the patent refers to as the "noninformation bits," which term or "dummy bits" is also used herein, in zones or bands corresponding exactly to the nontransmitting zones or bands of the grid screen. When the encoding dummy is superimposed upon an opaque white screen, described in the patent and prepared from the grid screen, and properly aligned therewith, the resulting composite is spoken of as the "master encoder." When the latter in turn is superimposed upon the display, another composite, known as the "encoded display," is thereby formed with the dummy or noninformation bits appearing in place of the nontransmitted portions of the display. To decode the encoded display it is necessary only to align thereover a decoding screen, similar to the encoding screen and described in the patent, so that the nontransmitting zones or bands of the decoding screen correspond with and obscure the dummy bits in the encoded display, thus leaving visible only the information bits and rendering the display intelligible.

The foregoing method and apparatus have found valuable commercial application particularly in savings banks. In the past it had been the custom for the depositor's name to appear in his passbook and when he wished to make a withdrawal he presented his passbook and a signed withdrawal slip. The teller would then take the latter and compare it with the depositor's signature on file in the bank's records. This practice was necessarily time-consuming and it did not avoid the possibility of a forged withdrawal slip being presented to and overlooked by the teller. Using the teachings of the above patent the foregoing disadvantages and hazards have been largely removed. In savings banks employing the patented method and apparatus the depositor writes his signature in the usual way on a signature card over which, in turn, is placed a master encoder. The encoded display thereby

formed is photographed and a print thereof is bonded to the inside of the back cover of the passbook, thus making the encoded signature an integral part of the passbook itself. The encoded display in the latter is then aligned with respect to a decoding screen and two aligning holes are punched therein by apparatus known as the "master reader." Each teller is provided with a "teller reader" incorporating a decoding screen and a pair of aligning pins having the same relation to each other as the decoding screen and punches of the master reader. The construction and operation of the master and teller readers are described in the co-pending application of Howard et al., S.N. 98,949, filed March 28, 1961. Consequently, when the depositor presents the passbook and withdrawal slip the teller can immediately compare the signature on the latter with that encoded in the passbook without spending time to refer to the bank's signature records. At the same time the hazards of a forged withdrawal slip are substantially eliminated owing to the fact that the depositor's name nowhere appears in the passbook except in the form of his signature encoded therein.

The foregoing commercial adaptation of the encoding method and apparatus of the above patent has found wide acceptance in many savings banks, both in the United States and abroad. However, in the larger savings banks where many hundreds of accounts may be opened each working day the foregoing encoding procedure has proved to be too time-consuming. It is with regard to reducing the number of steps and consequently the time required for encoding a depositor's signature in a passbook that the present invention is concerned. Essentially encoding of a signature employing the present invention is made directly into the passbook without the necessity of any photographic steps. For this purpose the inside of the back cover of the passbook is already provided with an encoding dummy and two aligning holes. An additional sheet, known as the "code sheet," is provided having on the rear face thereof an encoding or transmitting screen formed of bands or zones of dense carbon ink. These bands are so arranged that when the code sheet is aligned over the encoding dummy in the passbook the complementary bands or zones between those of carbon ink fall directly over only the bands of dummy bits, while the carbon inked bands fall directly over only the signature or information bit receiving bands on the dummy between those of the dummy bits. The code sheet is also provided with two aligning holes therein so that the code sheet and the encoding dummy in the passbook can be quickly and accurately aligned with respect to each other. The top face of the code sheet is printed to outline and designate the area in which the customer is to write his signature.

When the code sheet and the passbook are aligned in a collating frame the customer affixes his signature directly to the top face of the code sheet, the pressure of the pen or other writing instrument transferring bits of the signature directly to the encoding dummy by virtue of the carbon ink on the underside of the code sheet. The signature bits are thus interspersed on the encoding dummy between the zones or bands of the dummy bits. A suitable piece of thermoplastic resin is then placed over the encoded signature in the passbook and bonded securely thereto. Consequently, a great saving in time and equipment is achieved and signatures may be encoded in the passbooks at many times the rate than was formerly possible. The apparatus of the present invention is subject only to the limitation that it requires the presence of the depositor at the bank for reasons which will be more fully explained hereafter. However, the older apparatus may continue to be used for accounts opened by mail inasmuch as it does not require the customer's presence at the bank.

Accordingly, the primary object of the present inven-

tion is the provision of encoding apparatus employing an encoding dummy of the type described and an encoding screen capable of transmitting to the dummy predetermined portions of a display to be encoded imposed by pressure upon the screen.

Another object of the present invention is to provide an encoding set having an encoding dummy of the kind described and a code sheet superimposed thereon, the underface of the code sheet being provided with an encoding screen formed of carbon ink adapted to transmit to the dummy in a predetermined manner portions of a signature imposed by pressure upon the upper face of the sheet.

An additional object of the present invention is the provision of a bank passbook containing an encoding dummy of the type described therein adapted to receive predetermined portions of a signature transmitted thereto in a predetermined manner by pressure upon a code sheet incorporating an encoding screen formed of carbon ink and superimposable upon the encoding dummy.

A further object of the present invention is to provide a bank passbook encoding ensemble utilizing a collating frame containing a passbook having an encoding dummy of the kind described therein and a code sheet having an encoding screen capable of transmitting by pressure thereon predetermined portions of a signature written thereon to the dummy, the passbook, code sheet and frame being provided with means to operatively align the same with respect to each other.

Other and further objects, features and advantages of the present invention will be apparent from the preferred form thereof hereafter described, read in conjunction with the drawings, in which:

FIGURE 1 is a view, partly in plan, of a passbook illustrating the encoding dummy applied to the inside of one cover, a portion of the dummy being greatly enlarged for clarity;

FIGURE 2 is a plan view of the upper face of a code sheet;

FIGURE 3 is a plan view of the underface of the code sheet shown in FIGURE 2 illustrating the encoding screen applied thereto, a portion of which is greatly enlarged for clarity;

FIGURE 4 is a perspective view of the passbook and code sheet aligned in the collating frame; and

FIGURE 5 illustrates the assembly of FIGURE 4 ready to encode a depositor's signature.

The encoding dummy and the code sheet

Turning now to the drawings, a typical bank passbook is indicated generally at **10** having several pages **11** included between front and rear covers **12** and **13** respectively. On the inside of the rear cover **13** is printed an encoding dummy **14** comprising sectionalizations of one or more groups or sets of random signatures. Dummy **14** may be prepared in the manner described in Patent No. 2,952,080 from the basic grid screen, and in actual practice may be printed in a press on cover **13** by conventional "silk screen" methods. A photographic negative of the dummy is placed in contact with a piece of pre-sensitized silk screen process photo-film and processed. By means of the "stripped film" process the emulsion from the silk screen process photo-film is placed in turn on a fine stainless steel screen of 200 mesh stretched over an open frame, thus creating a "silk screen" stencil wherein the emulsion covers the entire screen rendering it impenetrable by the ink, except those portions corresponding to the noninformational or dummy bits **15**. For the actual printing itself a black silk screen ink is used, thinned down. Such ink is well known and is particularly made for half-tone work so that it holds the necessary resolution without running or blurring. The result is an alternating pattern, determined by virture of the basic grid screen from which the dummy is made, of bands or zones of dummy bits **15** and unobstructed signature bit receiving bands or zones **16**.

The arrangement and relative sizes of the dummy bits **15** and receiving bands **16** of dummy **14** will now be described in connection with code sheet **20**. The latter is formed from suitable paper stock and imprinted on its upper signature receiving face **21** with appropriate instructions **22** and a signature receiving area **23** in which the depositor is to inscribe his signature. The reverse or signature transmitting face **24** of code sheet **20** is provided with a carbon inked encoding or transmitting screen **25** printed thereon. Screen **25** is identical to and, in fact, is prepared from, the basic grid screen from which encoding dummy **14** is prepared according to the aforesaid patent, except that the ratio of the width of the carbon inked signature transmitting bands or zones **26** to the non-inked or nontransmitting bands or zones **27** therebetween is the reverse of that of the basic grid screen. That is to say, using the ratio specifically illustrated in the patent, if the ratio of the width of the opaque bands of the grid screen to the width of the clear or transparent bands thereof is 5 to 1, the ratio of the width of the carbon inked bands **26** of screen **25** to the nontransmitting bands **27** is 1 to 5. In the embodiment being presently described, however, the corresponding ratio in the case of the basic grid screen is actually 3 to 1 because only one set of dummy bits is utilized. In the specific illustration in the patent, where two sets or groups of dummy bits were utilized, it is pointed out that if with a 5 to 1 ratio but one set of dummy bits were used the signature bits would then be discernible. This is because there the order and widths of the dummy and signature bit bands or zones were: (1) dummy bit set A band, .005"; (2) separation band, .005"; (3) dummy bit set B band, .005"; (4) separation band, .005"; (5) signature bit band, .005"; (6) separation band, .005". Accordingly, the total width devoted to the dummy bits and separation bands was .025" while that devoted to the signature bits was .005", or a ratio of 5 to 1. Thus, if but one set of dummy bits in a band .005" wide were disposed in the .025" width, the relatively large separation bands .010" wide thereby formed on each side of the dummy bit band between the latter and the adjacent signature bit bands, would make the signature bits themselves, as the patent says, easily discernible to the eye.

On the other hand, as mentioned in the patent, other ratios may be employed if a different degree of resolution is required. In practice, in the use of the invention in savings banks, only one set of dummy bits has been found to provide sufficient encoding in order not to make the signature bit discernible, provided that the band or zone devoted to the dummy bits alone is increased in width relative to the width of the signature bits. In practice the order and width of the dummy and receiving bands of dummy **14** are: (1) dummy bit band, .010"; (2) separation band, .010"; (3) signature bit band, .010"; (4) separation band, .010". Thus, the total width devoted to the dummy bits and separation bands is .030" and that devoted to the signature bits alone is .010", or a ratio of 3 to 1. Accordingly, the ratio of the width of the band of dummy bits alone to the sum of the widths of the separation bands on each side thereof is now 1 to 2 (.010" to .020") instead of 1 to 4 (.005" to .020") as in the patent. Consequently, the dummy bits are both larger relative to the signature bits and closer thereto so that the latter are thereby not discernible, the increase in the relative space devoted to the dummy bits serving to increase the intensity of the dummy pattern.

To summarize: since the basic ratio utilized in the embodiment being presently described is 3 to 1, the ratio of the width of the opaque bands of the basic grid screen to the width of the clear or transparent bands thereof is also 3 to 1. The ratio, in turn, of the width of a band of dummy bits **15** of encoding dummy **14** to the width of a signature bit receiving band **16**, including the adjacent sep-

aration bands on each side thereof, is also 3 to 1. Therefore, the ratio of the width of a carbon inked band **26** of screen **25** to a nontransmitting band **27** is 1 to 3, namely, the reverse of that of the basic grid screen. Of course, if a higher degree of encoding or resolution is desired for other applications, a ratio such as that illustrated in the patent or some other suitable one could be employed together with two or more sets of dummy bits. Simple experimentations with ratios and one or more sets of dummy bits will quickly determine what combination is most fitting for a particular application.

Screen **25** may also be prepared by conventional "silk screen" technique in the same manner as encoding dummy **14**, utilizing a similar fine stainless steel screen and a press. However, screen **25** should be printed with a heavy carbon ink so that bands **26** will provide sufficient transfer of the signature bits to dummy **14** and so that the transferred signature bits will closely match the dummy bits **15** in color and texture in order not to be distinguishable therefrom. The most suitable carbon ink for this purpose has proved to be a black "cold wax spot ink," manufactured, for instance, by Pacific Carbon & Ribbon Mfg. Co. of San Francisco, California, as No. 86. Such ink was developed for use in offset printing where zinc or metal plates are employed. It contains a very high concentration of carbon black in a wax base and will provide both sufficient transfer to dummy **14** and accurate resolution. More ordinary carbon inks have proved inadequate in both these respects.

In practice, dummy **14** and encoding screen **25** may be both printed in the same press or each in a separate press. In either case, the press or presses are each provided with a pair of spaced punches adjacent the silk screens so that, (1) when dummy **14** is printed on cover **13** of a passbook **10**, a pair of aligning holes or apertures **28** may be punched along the outer margin of cover **13** without disturbing either the silk screen or the passbook; and (2) when a code sheet **20** is inserted, either in the same press or in the other, as the case may be, and printed with encoding screen **25**, an identical pair of aligning holes **29** may be punched along the outer margin of sheet **20** without disturbing either the silk screen or the sheet, the punches, of course, being fixed with respect to each screen so that any passbook **10** may be quickly and accurately aligned with any code sheet **20** simply by aligning their respective pairs of apertures **28** and **29**. Since the carbon ink forming bands **26** is very thick and heavy, indeed, the bands are perceptibly raised above the surface of the code sheet, the ink must be dried to some extent in order to prevent smudging. For this purpose the code sheets, after being printed and punched are placed on a conveyor and dried under suitable heat lamps which form a thin outer seal over the carbon ink.

Operation

The actual encoding of the depositor's signature employs a convenient collating frame **30** having lower and upper rectangular leaves **31** and **32**, respectively, suitably hinged at **33** along one pair of their corresponding ends so that they will fold one on the other. Leaves **31** and **32** may be of any suitable material with the qualification only that at least the upper surface of lower leaf **31** must be hard and unyielding. Adjacent the opposite end of upper leaf **32** a cutout **34** is provided through leaf **32** having generally the same outline as the signature receiving area **23** of code sheet **20**. The lower leaf **31** has imbedded therein a pair of short, upstanding aligning pins **35** identical in spacing and diameter to aligning holes **28** and **29** in cover **13** and sheet **20** and positioned so that when cover **13** and code sheet **20** are operatively positioned with respect to each other and engaged by pins **35**, the signature receiving area **23** of the latter is exposed through cutout **34**. A pair of reliefs **36** are provided in the upper leaf **32** for pins **35**. The remainder of upper leaf **32** affords support for the hand of the depositor as he inscribes his signature.

Encoding a signature requires merely the placing of the cover **13** of an unused passbook **10** upon pins **35** with dummy **14** facing upwards and superimposing thereover an unused code sheet **20** on pins **35** so that screen **25** is in face to face contact with dummy **14**. Leaf **32** is then closed and the signature inscribed in area **23**, preferably with a ballpoint type of pen or stylus in order to produce a uniform transfer to dummy **14**. Since transfer occurs only when the stylus passes over the carbon inked bands **26**, the signature is thus broken up into signature bits, all of which, owing to the construction and alignment of dummy **14** and screen **25** with respect to each other, will lie only in the signature receiving bands or zones **16** of the former. Inasmuch as the signature bits, represented by the transferred carbon ink, are of the same color and texture as the dummy bits **15**, the signature is thereby effectively lost or scrambled amid the welter of dummy bits. The passbook is removed and a sheet of suitable thermoplastic resin is laid over the encoding and bonded thereto for preservation. The used code sheet is then discarded.

The encoding dummy **14** and its corresponding encoding screen **25**, as well as the decoding screen, are, of course, different for each bank. This is achieved by variations in the pattern of the basic grid screen from which each is made and in turn requires a separate set of "silk screens" by which each is printed. The pattern of each basic grid screen is kept confidential by the particular bank involved and neither it nor the decoding screens are permitted in unauthorized hands. In this connection it should be pointed out that code sheets **20** should also be carefully guarded and destroyed after use, owing to the fact that each, in effect, contains the basic grid pattern from which a decoding screen could easily be fashioned. Consequently, only authorized personnel should have access to them and the code sheets should not be handed out indiscriminately to customers of the bank but used by them only when their signature is encoded and under bank supervision.

While the present invention has been described in terms of a particular embodiment for a particular purpose, it is not so limited but may be both incorporated in other apparatus as well as used for other purposes, being adaptable to the same wide range of uses as mentioned or suggested in the aforesaid Patent No. 2,952,080. The following claims, therefore, are to be read in this light, as encompassing all such alterations and uses as would ordinarily occur to persons in the art.

I claim:

1. Encoding apparatus comprising a sheet having an obverse display reception face and a reverse display transmitting face and an encoding dummy having a display receiving face disposed in face to face contact with said transmitting face; said sheet having a plurality of alternate display transmitting and non-transmitting zones on its transmitting face providing an encoding screen, said transmitting zones containing means responsive to the pressure imposed on said display face when an intelligible display is impressed thereon to transmit to said receiving face predetermined portions of said display, said portions comprising information bits which by themselves are capable of rendering said display intelligible, and said non-transmitting zones being adapted to prevent transmission of the remaining portions of said display to said receiving face; and said encoding dummy having one or more sets of non-contiguous non-information bits on its receiving face, which bits are incapable of supplementing said transmitted informational bits to create an identifiable image of said display, said non-information bits being disposed in a predetermined manner only in predetermined zones on said receiving face aligned with said non-transmitting zones of said screen.

2. The device of claim 1 wherein said means comprises a substance applied to said transmitting face to form said transmitting zones and capable of transmitting to said receiving face information bits of a coloration and density effective to render said non-information and said information bits indistinguishable from each other.

3. The device of claim 2 wherein said substance includes a carbon ink, said substance having a seal thereover formed integrally upon the outer surface thereof, said seal being breakable upon the impression of said display upon said display reception face of said sheet.

4. The device of claim 3 wherein said encoding dummy is affixed to a bank passbook, said encoding dummy after said transmission thereto of said information bits being provided with a transparent protective cover adhered thereto.

5. A passbook including a sheet having an encoding dummy on one face thereof, said dummy comprising alternate predetermined signature bit receiving and non-information signature bit containing zones, said receiving zones being of sufficient extent and number to receive sufficient predetermined bits of an intelligible signature so that said portions by themselves are capable of rendering the signature intelligible and said containing zones having one or more sets of non-contiguous non-informational signature bits therein derived from one or more sets of random signatures, each of said sets of bits being disposed in a predetermined manner only in said containing zones so as to be incapable of supplementing said signature bits to create an identifiable image of said signature, said passbook being for use with a code sheet carrying a substance disposed in predetermined signature bit transmitting zones on one face thereof such that when said face is in contact and aligned with said encoding dummy said substance both transmits to and forms said signature bits only in said receiving zones of said dummy in response to a signature imposed by pressure upon the other face of said code sheet, said substance being effective to provide a coloration and density of said signature bits rendering them indistinguishable from said non-informational signature bits.

6. Signature encoding apparatus comprising a passbook having a cover sheet with an encoding dummy on one face thereof, said dummy having alternate predetermined signature bit receiving and non-information signature bit containing bands selectively spaced from one another in a direction substantially perpendicular to the direction of a band at any point therealong, said receiving bands being of sufficient number and width to receive predetermined bits of an intelligible signature so that said portions by themselves are sufficient to render the signature intelligible, said containing bands having one or more sets of non-contiguous non-informational signature bits therein derived from one or more sets of random signatures, each of said sets of bits being disposed in a predetermined manner only in said containing bands and incapable of supplementing said signature bits to render said signature identifiable; and a code sheet superimposed over said dummy containing face and having a signature receiving face and a reverse signature bit transmitting face in face to face contact with said dummy containing face, said transmitting face having spaced transmitting bands thereon in alignment with said signature bit receiving bands of said dummy, said transmitting bands being formed by means applied to said transmitting face and responsive to pressure imposed upon said receiving face when said signature is inscribed thereon to transmit predetermined bits of said signature to said receiving bands, said means comprising a substance including a carbon ink capable of transmitting to said receiving bands signature bits of a coloration and density similar to that of said non-information signature bits.

7. The device of claim 6 wherein said dummy containing face of said passbook after transmission thereto of said signature bits is provided with a transparent protective cover of a thermoplastic resin bonded thereto.

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