

12

# EUROPEAN PATENT APPLICATION

21 Application number: **89107409.8**

51 Int. Cl.4: **B42D 15/00**

22 Date of filing: **24.04.85**

30 Priority: **27.04.84 GB 8410918**

43 Date of publication of application:  
**27.09.89 Bulletin 89/39**

60 Publication number of the earlier application in  
accordance with Art.76 EPC: **0 160 504**

84 Designated Contracting States:  
**CH DE FR GB IT LI SE**

71 Applicant: **THOMAS DE LA RUE & COMPANY  
LIMITED**  
**De La Rue House 3/5 Burlington Gardens**  
**GB-London W1A 1DL(GB)**

72 Inventor: **Whitehead, Colin John**  
**16 Willowside**  
**Woodley Reading Berks. RG5 4HJ(GB)**  
Inventor: **Haslop, John Martin**  
**22 Radcott Close**  
**Woodley Reading Berks.(GB)**  
Inventor: **Bratchley, Robin**  
**30 Bingley Grove**  
**Woodley Reading Berks. RG5 4TT(GB)**

74 Representative: **Skone James, Robert Edmund**  
**et al**  
**GILL JENNINGS & EVERY 53-64 Chancery**  
**Lane**  
**London WC2A 1HN(GB)**

## 54 Numbered documents.

57 This invention relates to documents, such as banknotes, which are produced and used in large numbers and which, for a given series, are identical one with another except for a unique multi-digit number upon each individual document, the number thus uniquely identifying that document within the series. According to the present invention, to render unauthorised reproduction of the document more difficult, on each document the numerical or alphabetical characters in the identifying number are provided one above the other. In addition, at least two characters in the identifying number may differ from each other (in addition to any differences in the letters or digits which they represent) in one or more visible characteristics. Thus the differing characters may have different heights or widths or be in different styles of type. Preferably, the identifying number appears twice on each document, in diagonally opposite corners, and preferably the variation of physical characteristics of the characters along the

length of one of the numbers is reversed in direction in the other of the numbers.

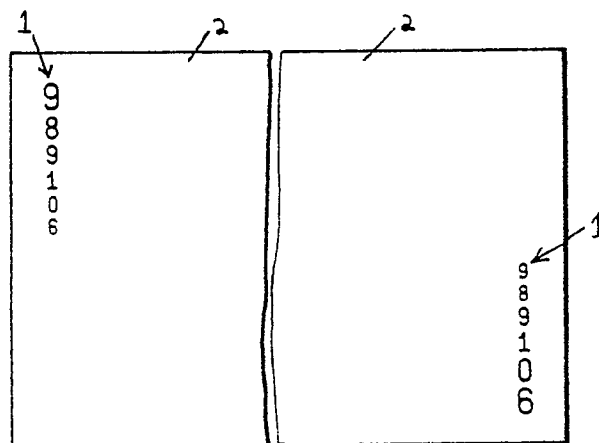


Fig. 1

## NUMBERED DOCUMENTS

This invention relates to documents of the kinds which are produced and used in large numbers and which, for any given series, are identical one with another, except for a unique multi-digit number upon each individual document. In this specification the word "number" is to be taken to mean something which is wholly numerical, or is wholly composed of letters of the alphabet, or is a combination of numerical digits and "alpha" digits. The invention also extends to a method and means for applying such "numbers" to documents of the aforesaid kinds.

Generally, the documents to which this invention relates are numbered consecutively, adjacently produced documents differing from each other by one digit or letter in a readily recognized series, but the invention is not restricted to such serial numbering.

The documents may be of any desired kind and, most commonly, the numbering thereof will be for purposes associated with the security and/or administration of the documents, either in their production or in their use. By way of example, security documents, such as banknotes, bonds, warrants, share certificates, vouchers and lottery tickets will each be uniquely identifiable by the number or numbers thereupon.

The documents to which this invention relates are most commonly numbered, during or after production, by means of number printing machines, sometimes called "numbering boxes" or "numbering barrels", which are adapted to print the number in a desired position or positions upon each document and to change, in a predetermined sequence and between documents, the number to be printed by the machine. However, numbering may be effected by other means, including both other mechanical means and electronically controlled systems such as are used in ink-jet printing and in laser-utilising methods and means.

US-A-4207814 describes a method and apparatus for numbering a series of documents with consecutive serial numbers and corresponding check digits. In this case, the serial number and check digit are placed adjacent a corner of each document.

DE-C-523276 illustrates a numbering apparatus which has a plurality of rotatable elements carrying numbers with different forms from those of adjacent elements.

Any person who attempts the unauthorized reproduction of a security document is faced with a large number of problems, one of which is that each document in a given series of genuine documents bears its own unique multi-digit number in

one or more places thereupon. He may attempt to overcome this problem in a number of ways. For example, he may regard it as sufficient in some circumstances, to produce a plurality of documents, all of which bear identical multi-digit numbers. This may be done by the repetitive use of a printing plate made from a photograph which includes the multi-digit number of one arbitrarily selected genuine document. However, once it is known that an unauthorised reproduction has been made, it is easier to detect further copies if they all bear the same number.

Another possible solution involves the manufacture and use of a printing plate for printing some only of the digits of a "genuine" or officially used multi-digit number (for example, the first three digits thereof) and the later insertion of the missing digit or digits, by suitably positioning the authorized and partially numbered document so that it receives desired impressions from a numbering box or from some other printing means or system.

A still further solution also involves the printing of a part of the multi-digit number from a printing plate with fixed digits. By altering the side-lay, i.e. the relative position of the printing means and the document being printed, the part numbers upon the plate may be printed so that they occupy different positions or locations within the multi-digit number. Thus, by the use of a limited number of plates with fixed "part-numbers" in conjunction with different combinations of side-lay adjustment, a relatively large number of different multi-digit numbers may be obtained with a small number of part-number printing operations. The missing number or numbers again must be filled by numbering boxes, for example, as mentioned in the preceding paragraph.

Whatever the method employed, the aim of the producer of the unauthorised document is to make its appearance, including the appearance of the identifying numbers, approximate closely to the appearance of the genuine document.

The object of this invention is substantially to increase the difficulties faced by the unauthorised reproducer of such documents.

According to this invention a document, which is one of a series of documents which are identical in content except for a number made up of a set of alphabetical or numerical characters, which uniquely identifies each document within the series, and in which the numerical or alphabetical characters in the identifying number are provided one above the other.

Typically, at least two characters of the identifying number differ from each other, in addition to

any differences in the letters or digits which they represent, in one or more visible physical characteristics.

The digits may, for example, differ in their heights, their widths, or their type styles, or in any combination of these. The pitch of the digits of the multi-digit number may be constant or may vary. When the digits vary from digit to digit in a characteristic which is progressively variable (e.g. height), such variation may be in a progressive manner, from one end of the multi-digit number of the other.

Preferably the number appears in diametrically opposite corners of the document, so that if a corner or strip of the document is torn away the identifying number is left on the remainder. The direction of variation of the physical characteristics is preferably opposite in the two representations of the number. For example, if in one representation of the number the digits increase in size from one digit to the next in a left-to-right direction, in the other representation of the same number on the same document the digit sizes decrease in the left-to-right direction.

The digits of the multi-digit number may be printed in one or more different colours in a single printing operation.

The multi-digit number may comprise two separate numbers, each of which forms part of a different overall series of numbers.

The invention also consists in a set of such documents.

Documents according to this invention will require an unauthorised reproducer to devote considerably more time, effort and expenditure than would be required for the reproduction of standard forms of multi-digit identification numbers. He will need to make many more printing plates than previously required and, in any infilling operation, is likely to have problems in obtaining or making the required type. The varying physical characteristics of the digits are such that an illicit reproducer cannot use, either wholly or partly, a commercially available number box. If the reproduction is not of high quality, it will be readily detectable; and the variations in type faces, and the dispositions of the various forms of the digits of a genuine document, may render uneconomic attempts at high quality unauthorised copying.

In order that the invention may be better understood, an embodiment will now be described with reference to the accompanying drawing, in which:-

Figure 1 is a diagrammatic representation of a document on which only the identification numbers are illustrated.

In Figure 1, the number 1, which occurs in both the top left-hand corner and the bottom right-hand

top corner of a document 2, is intended to be read vertically from top to bottom (i.e. as 989106). The digits shown are all in a type style in which the heights and widths of the digits vary progressively from digit to digit. The direction of the graduation of digits is reversed as between the left-hand and right-hand numbers; the greatest height and width is to be seen in the first "9" of the top left-hand number and the final "6" of the bottom right-hand number.

The document 2 may be printed in sheets on rotary printing presses with the use of parallel six-wheel convex or barrel numbering boxes to print the numbers 1 in a direction parallel to the direction of rotation of the impression cylinder.

A machine for printing the document 2, shown in Figure 1, with the numbers 1 could comprise a rotary numbering machine having a number of type rings, each of which includes a number of type faces angularly spaced about the common axis of the rings. Each ring is angularly adjustable to bring any of the type faces into printing position. Each type face carries a digit.

An operating lever is fitted with a cam follower roller. A cam on the printing equipment lifts the cam follower roller up and down to cause the type rings to be indexed with the printing of each document. Such indexing normally causes the numerical value of the whole number to increase by one with each indexing step.

The height and width of the digits are the same for all type faces of a single ring but the digit height and width may differ from ring to ring. Also, there may be a progressive variation in height and width from one end ring to the other end ring.

If the number is to be repeated on each document, it is advantageous to provide two such numbering machines in which the variation of digit height and width is in opposite directions.

Other type styles may be used in addition to the type style shown in Figure 1. For example, each of the six digits could have the same height but the style or design of the digits could differ as follows. Describing firstly the number in the top left-hand corner of the document, the figures "9 and 8" could both be of a second type style, giving a heavy print. The figures "9 and 1" could both be of a third lighter type style and figures "0 and 6" could both be of a fourth, yet lighter, type style. The same number would be printed in the bottom right-hand corner of the document, but in this case the order of styles is reversed so that "9 and 8" would be printed in the lightest type style and "0 and 6" in the heaviest type style.

In a different example (not shown), in the top left-hand number, "9 and 8" would both be printed in a fifth type style, "9 and 1" would be in the above-mentioned second type style "0 and 6"

would be in the above-mentioned fourth type style. Additionally at a given distance below each digit a discrete line having a predetermined thickness could be printed. In the bottom right-hand corner, the same number would be printed with reversed styles. Again the digits would be underlined. In each case the underlining of the number as a whole is discontinuous.

11. A series of documents according to any of the preceding claims which are identical except for respective identifying numbers which uniquely identify each document within the series.

## Claims

1. A document which is one of a series of documents which are identical in content except for a number composed of a set of alphabetical or numerical characters which uniquely identifies each document within the series, and in which the numerical or alphabetical characters in the identifying number are provided one above the other.

2. A document according to claim 1, wherein each character defines a top portion and a bottom portion, adjacent characters in the identifying number being provided with their respective top and bottom portions adjacent.

3. A document according to claim 1 or claim 2, wherein at least two characters of the identifying number differ from each other, in addition to any differences in the letters or digits which they represent, in one or more visible physical characteristics.

4. A document as claimed in claim 3, in which the differing characters have different heights.

5. A document as claimed in claim 3, in which the differing characters have different widths.

6. A document as claimed in claim 3, in which the differing characters are in different styles of type.

7. A document as claimed in claim 3, in which the pitch of the characters varies, at least between the characters which exhibit varying visible physical characteristics.

8. A document as claimed in any of the preceding claims, in which each of the characters of the identifying number includes an underline which is discrete from the underline of the adjacent character or characters.

9. A document as claimed in any one of claims 3 to 8, in which the variation of physical characteristics of the characters of one of the two numbers is reversed in direction in the other of the two numbers.

10. A document in accordance with any one of the preceding claims, in which the number is printed twice on the document in diagonally opposite corners.

5

10

15

20

25

30

35

40

45

50

55

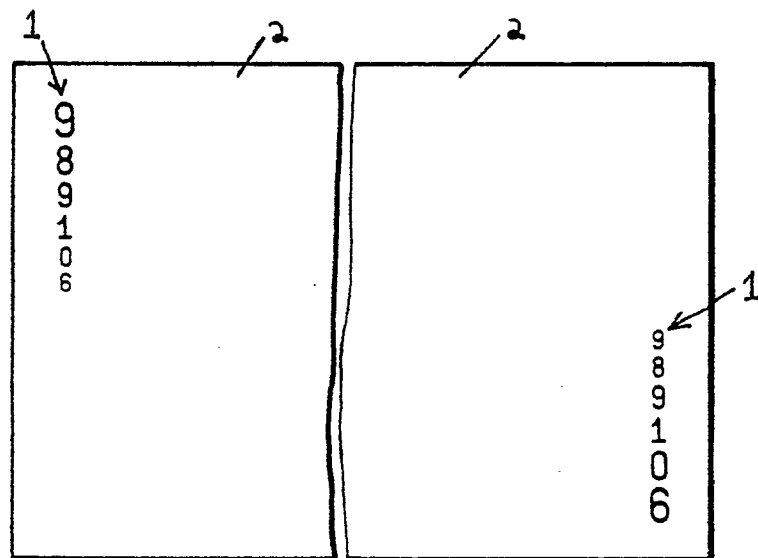


Fig. 1