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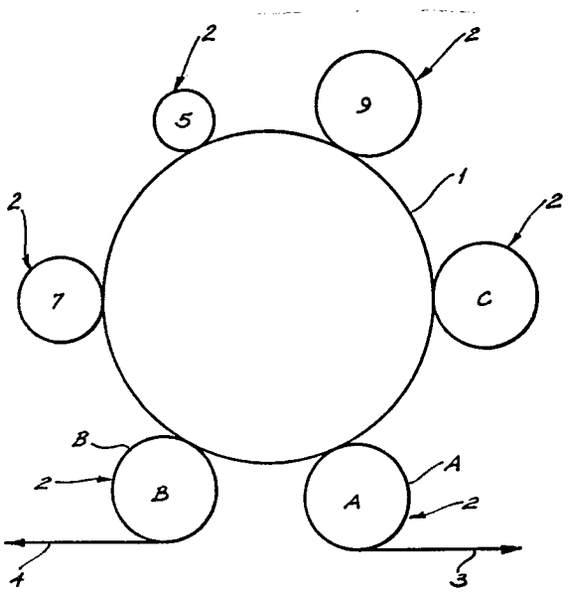
(54) Apparatus for printing quasi random number tables.

(57) Apparatus for printing quasi random number tables of the type used for games of chance such as bingo, comprising a flexographic printing press having a central drum (1) and a plurality of printing cylinders (2) arranged to print onto material fed into the press at (3) and exiting at (4). Some of the cylinders (5), (7) and (9) have different circumferences, each being a multiple of a basic pitch value, and are arranged to print various rows or columns of numbers or other indicia in a basic matrix or table such that the combination of numbers in each table varies in a quasi random manner over a large number of repeats.



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"APPARATUS FOR PRINTING QUASI RANDOM NUMBER TABLES"

This invention relates to apparatus for printing quasi random number tables and has been devised particularly though not solely for printing tables for games of chance.

It is well known to provide tables of apparently random numbers for use in playing games of chance, such as bingo or various other games requiring the selection of a number of "winning numbers" from a table of such numbers. Further adaptations of these games require a winning combination incorporating, for example, three numbers the same in a row or three "prizes" of the same value alongside three numbers drawn from a selection of such numbers and announced or otherwise published.

In fact these tables are seldom true random number tables but incorporate a very large number of variables which are eventually repeated after a large number of tables have been printed. To the end user, however, each table appears to incorporate a matrix of apparently random numbers and is referred to throughout this specification as a "quasi random number table".

It has also been known to use such tables in which "prizes" are covered by a silvered layer rendering the prize values invisible until the silver layer is scratched off. Such games are commonly called "scratch bingo games". It has been a disadvantage in the past that the cards of quasi random number tables incorporating silvered coatings used in scratch bingo games have been time consuming and difficult to print, requiring a number of printing runs and

considerable handling and collating.

It is therefore an object of the present invention to provide apparatus for printing quasi random number tables which will obviate or minimise the foregoing disadvantages in a simple yet effective manner, or which will at least provide the public with a useful choice.

Accordingly the invention consists in apparatus for printing quasi-random number tables (as herein defined) comprising a flexographic printing press of the type having at least two cylinders arrayed about a central drum, characterised by the provision of at least two of said cylinders in the form of table printing cylinders having different circumferences, the circumference of each cylinder being a multiple of a basic pitch value, each table printing cylinder being arranged to print one or more rows or columns of numbers arrayed in a matrix together with the rows or columns of numbers printed by the other table printing cylinders.

Preferably the circumference of each cylinder is determined by the basic pitch value multiplied by a prime number.

In one form of the invention the said table printing cylinders include a pair of table printing cylinders having different circumferences, each one of the pair of table printing cylinders being arranged to print a plurality of rows of numbers, the numbers in each row being spaced from one another and interspaced with numbers printed from the other of the pair of table printing cylinders.

In an alternative form of the invention each one of the table printing cylinders is arranged to print at least one column of numbers incorporating a predetermined number of numbers therein different from the number of numbers printed in a column by another of the said cylinders, the columns of numbers being arranged alongside one another in a predetermined matrix.

Preferably one or more background printing cylinders are provided, arranged to print background frameworks and/or

supporting artwork in conjunction with the quasi-random number tables.

Preferably the flexographic press is provided with a further roller adapted to print a removable coating over numbers printed by the table printing cylinders.

Notwithstanding any other forms that may fall within its scope, one preferred form of the invention will now be described by way of example only with reference to the accompanying drawings, in which:-

Fig. 1 is a diagrammatic end view of a flexographic printing press incorporating printing cylinders arranged according to the invention;

Fig. 2 is an example of a quasi random number table adapted to be printed by the apparatus shown in Fig. 1;

Fig. 3 is a diagrammatic view of the printing layout from three table printing cylinders;

Fig. 4 is a diagrammatic layout showing the numbers printed by cylinder number 5 emphasised;

Fig. 5 is a diagrammatic layout similar to Fig. 4 with the numbers printed by cylinder number 9 emphasised.

Fig. 6 is a diagrammatic end view of a flexographic printing press incorporating printing cylinders arranged according to an alternative form of the invention; and

Fig. 7 is an example of a quasi random number table adapted to be printed by the apparatus shown in Fig. 6.

In the preferred form of the invention a flexographic printing press, for example a Victory Kidder Central Impression Press, is set up to print a series of quasi random number tables as follows.

The press comprises a central drum 1 around which is arrayed a plurality of printing cylinders 2 in the manner well known for use in, for example, a six-colour press. Each cylinder has a circumference determined by the role that it plays in printing the quasi random number tables, each circumference being a multiple of a basic pitch value. For convenience the cylinders are hereinafter referred to by reference numbers corresponding to the basic pitch value

multiple which determines their circumference. It is preferred that the circumference of each cylinder is equal to the basic pitch value multiplied by a prime number as this gives the greatest number of variations before the printing pattern is repeated. The material, for example card, paper or plastic film packaging material, which is to be printed in the press is fed in as shown at 3 whereupon it wraps around the first cylinder A onto the drum 1, finally exiting by wrapping around the cylinder B and feeding off as shown at 4.

The first cylinder A is typically used to print a base colour for use under the scratch silver, and the second cylinder C may also be used for the printing of another base colour. The numbers in the quasi random number tables are printed by the table printing cylinders 9, 5 and 7 in a format as will be described further below. The final cylinder B is used to apply the scratch silver material over the numbers printed by the cylinders 9, 5 and 7.

The table printing cylinders 9, 5 and 7 are each of a different circumference which in each case is a multiple of a basic pitch value. For example cylinder 7 has a circumference of seven times the basic pitch value and is arranged to print a column of seven numbers arrayed around the circumference around the cylinder. It will be noted that the cylinders 5 and 7 have circumferences which are multiples of prime numbers (five and seven respectively) by the basic pitch value. The cylinder 9 has a circumference which is a multiple of three as this gives a convenient size, but a greater number of different repetitions could be obtained by giving this third cylinder a circumference which is, for example, eleven times the basic pitch value. One of the cylinders (in this case cylinder 9) may be the same circumference as the circumferences of the background and scratch silver printing cylinders A, B and C.

The flexographic printing press may be set up to print the quasi random number tables by column or by row. In the first form of the invention, printing the tables by column, the cylinders are set up to print quasi random number tables

of the type shown in Fig. 2 wherein each sub-rectangle 10 forms part of a matrix of similar rectangles or "numbers". In the case of the table shown in Fig. 2 the matrix is a 6 x 6 matrix. For convenience throughout this specification the contents of each sub-rectangle 10 is referred to as a "number" although it will be appreciated that the rectangle may contain more than one number and may alternatively contain other devices such as symbols, etc.

The numbers are printed onto the table using the table printing cylinders 9, 5 and 7 so that each cylinder prints every third column across the table. Explanation of this printing will now be made with reference to Figs. 3, 4 and 5 which show the layout for a 9 column table (as distinct from the 6 column table shown in Fig. 2).

Referring now to Fig. 3 the 9 columns are shown broken down into three sub-sets of 3 columns, although in practice the 9 columns may be side-by-side in a continuous array. For convenience each column in each sub-set has been headed with the designations LH, C, or RH which refer to lefthand, centre and righthand respectively. At the foot of each column can be seen a numeral designating the cylinder which is used to print that column. It can be seen that cylinder 9 is used to print the lefthand column of the first sub-matrix, the centre column of the second sub-matrix and the righthand column of the third sub-matrix. As there are 9 rows in each repeat column shown in Fig. 3, it will be appreciated that cylinder 9 prints an entire column as shown in Fig. 3 during one rotation of that cylinder. As cylinder 5 has a much lesser circumference than cylinder 9 the columns which are printed by cylinder 5 involve one revolution of that cylinder for each five numbers printed in that respective column. Similarly with cylinder 7.

This may be seen more clearly with reference to Fig. 4 which shows highlighted the numbers (shown as rectangles) which are printed by cylinder 5 during one revolution of that cylinder. The continuing numbers in that particular column or columns are then printed by further rotations of cylinder 5. Similarly the numbers shown printed by cylinder 9 are

highlighted in Fig. 5 wherein it can be seen that nine numbers in each column are printed by a single revolution of cylinder 9. As cylinder 9 is the same basic circumference as the background cylinders A, B and C it may also be used to print the game grid and other directions if required.

It can be seen from an examination of Figs. 3, 4 and 5 that the numbers printed alongside each other are "randomised" by the different number of revolutions of each table printing cylinder for each revolution of the drum 1. To further randomise the tables each cylinder is used to print a different column in each sub-matrix as can be seen in Fig. 3. By way of explanation, cylinder 9 could be used to print the lefthand column in each sub-matrix, etc. but a higher degree of randomisation is achieved by using cylinder 9 to print different columns in each sub-matrix.

In this manner it is possible to print a large number of quasi random number tables before the basic combination is repeated. The basic combination is, however, repeated at predetermined intervals and may in the examples shown in Figs. 3, 4 and 5, repeat on every 315th game panel in a printing run. In this manner it is possible to arrange the numbers on each cylinder so that a winning combination is printed on every 315th game panel. These "latent winners" may be used to designate minor (low value) prizes so that the originator of the game may activate a winning combination in every 315th game. Major prize winners are normally hand printed and interleaved and collated within the losing or "latent winner" combinations printed by the method described above.

In an alternative form of the invention the quasi random number tables may be printed by rows as will now be described with reference to Figures 6 and 7, once again using a flexographic press shown diagrammatically in Figure 6.

The press comprises a central drum 101 around which is arrayed a plurality of printing cylinders 102 in the manner well known for use in, for example, a six colour press. Each cylinder has a circumference determined by the role that it plays in printing the quasi random number tables, each

circumference being a multiple of a basic pitch value. For convenience the cylinders are hereinafter referred to by reference numbers corresponding to 100 plus the basic pitch value multiple which determines their circumference.

The cylinders comprise two background printing cylinders 110, each having a circumference of 10x the basic pitch value, which is typically 600 mm when used on a Victory Kidder machine. The background printing cylinders are used to print material such as frameworks 104 or artwork 105 in the attractive presentation of the series of tables. The background printing cylinders may also be used to print explanatory material onto the 600 mm x 390 mm preprint used for the printing of the tables.

The cylinders 102 further incorporate a first pair of table printing cylinders 108 and 112. Cylinder 108 has a circumference which is 8x the basic pitch value (480 mm) and cylinder 112 has a circumference which is 12x the basic pitch value (720 mm). The machine is further provided with a second pair of table printing cylinders 106 and 114 having circumferences of 6x the basic pitch value (360 mm) and 14x the basic pitch value (840 mm) respectively.

In use the table printing cylinders are arranged to print quasi random sequences of numbers as follows. The rows of numbers in the table may be conveniently designated rows A to J as shown in Fig. 7. One pair of table printing cylinders are arranged to print alternate rows, e.g. rows A C E G and I and the other pair of table printing cylinders are arranged to print interspersed rows B D F H and J.

One cylinder of each pair prints rows of numbers, each number in the row having a space to the next number, the other cylinder in the pair also printing rows of numbers aligned with the rows printed by the first cylinder, each number printed by the second cylinder being interspaced between the numbers printed by the first cylinder.

Although Fig. 7 shows a print-out with the words "CYL. NO.12" etc. alongside each prize value, this is for reference only, showing the cylinder which would be used to

print that particular row. Each row will have printed therein three number values, e.g. 23, 16, 4, obtained from a matrix of random numbers from 1 to 99 set up on the relevant cylinder. The object of this particular game is to get three numbers the same alongside a prize in order to win that prize.

The game can be varied by using a new control matrix to suit the particular requirements of that game.

The number values in row A (for example) do not appear in any other row. This forms part of the theory behind the game so that in each panel, i.e. rows A-J, a numeral cannot be printed more than once, so avoiding confusion on the part of the player.

A plurality of tables such as that shown in Fig. 7 would normally be printed across the length of a preprint (e.g. 10 tables side-by-side across the 600 mm dimension of a 600 x 390 preprint).

In this manner the numbers appear in a different sequence in consecutive tables which are printed side-by-side, giving the appearance of a random number distribution over a large number of tables.

It is a particular feature of this invention that the apparatus enables a series of random number tables to be printed onto newspaper preprints which may be machine processed and wrapped for incorporation with a normal newspaper at the point of printing. This process therefore saves the cost of the separate printing of random number tables onto cards and does away with the additional handling costs necessary for the distribution of those separate random number tables with each newspaper.

It is therefore possible according to the invention to print quasi random number tables particularly suitable for scratch bingo or other lottery type games in a single print run using the apparatus described above and resulting in considerable savings in man handling and time.

CLAIMS:

1. Apparatus for printing quasi-random number tables (as herein defined) comprising a flexographic printing press of the type having at least two cylinders arrayed about a central drum, characterised by the provision of at least two of said cylinders in the form of table printing cylinders having different circumferences, the circumference of each cylinder being a multiple of a basic pitch value, each table printing cylinder being arranged to print one or more rows or columns of numbers arrayed in a matrix together with the rows or columns of numbers printed by the other table printing cylinders.

2. Apparatus as claimed in claim 1 wherein the circumference of each cylinder is determined by the basic pitch value multiplied by a prime number.

3. Apparatus as claimed in either claim 1 or claim 2 wherein the said table printing cylinders include a pair of table printing cylinders having different circumferences, each one of the pair of table printing cylinders being arranged to print a plurality of rows of numbers, the numbers in each row being spaced from one another and interspaced with numbers printed from the other of the pair of table printing cylinders.

4. Apparatus as claimed in claim 3 wherein the flexographic printing press is provided with two such pairs of table printing cylinders, the second pair of cylinders being arranged to print a plurality of rows of numbers interspaced between the rows of numbers printed by the first pair of table printing cylinders.

5. Apparatus as claimed in either claim 1 or claim 2 wherein each one of the table printing cylinders is arranged to print at least one column of numbers incorporating a predetermined number of numbers therein different from the number of numbers printed in a column by another of the said cylinders, the columns of numbers being arranged alongside one another in a predetermined matrix.

6. Apparatus as claimed in claim 5 wherein three said table printing cylinders are provided arranged to print three

corresponding columns of numbers side-by-side, the number of numbers in each column corresponding to the multiple of the basic pitch value of the circumference of its respective cylinder.

7. Apparatus as claimed in either claim 5 or claim 6 wherein each said table printing cylinder is arranged to print a plurality of spaced apart columns such that a plurality of tables are created across the width of the printed material.

8. Apparatus as claimed in any one of the preceding claims wherein the flexographic press is provided with a further roller adapted to print a removable coating over numbers printed by the table printing cylinders.

9. Apparatus as claimed in any one of the preceding claims wherein one or more background printing cylinders are provided, arranged to print background frameworks and/or supporting artwork in conjunction with the quasi-random number tables.

10. Apparatus as claimed in any one of the preceding claims wherein the printing press is arranged to print onto newspaper pre-prints.

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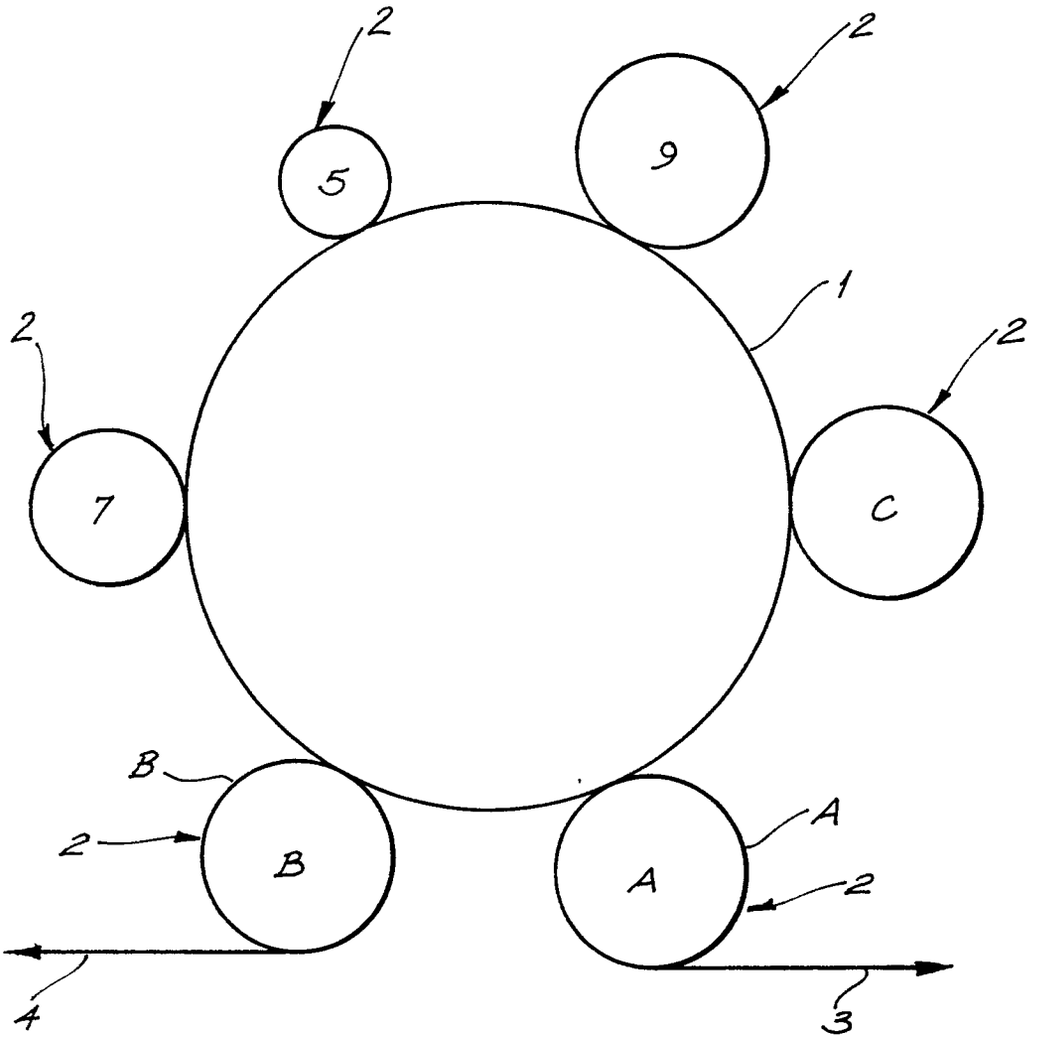

FIG. 1

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34 $100	25 $500	4 $100	15 $500	11 $200	12 $300
2 $300	3 $400	24 $100	16 $1,000	30 $10,000	13 $400
19 $5,000	18 $3,000	32 $400	23 $400	31 $200	7 $2,000
27 $2,000	21 $200	35 $500	36 $1,000	1 $200	6 $1,000
9 $5,000	20 $10,000	28 $3,000	10 $10,000	17 $2,000	22 $300
26 $1,000	33 $400	5 $500	8 $3,000	14 $100	29 $5,000

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FIG. 2

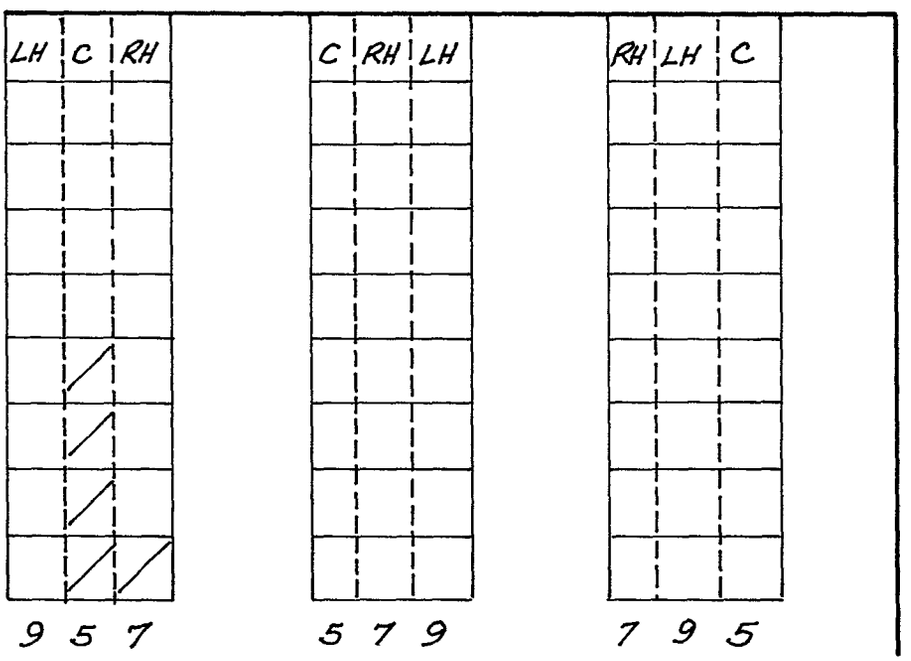

FIG. 3

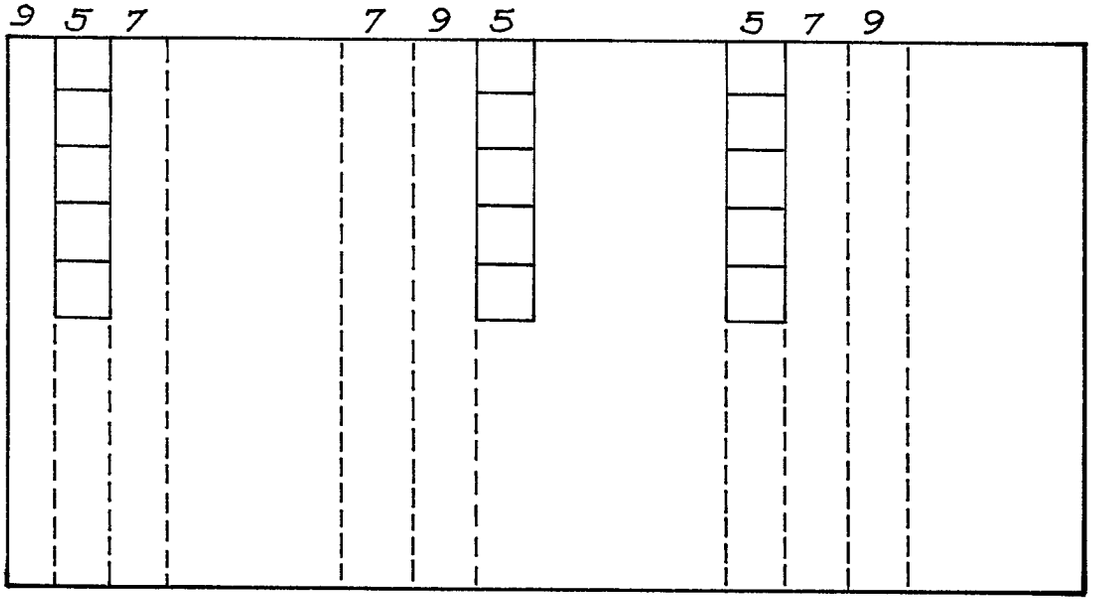

FIG. 4

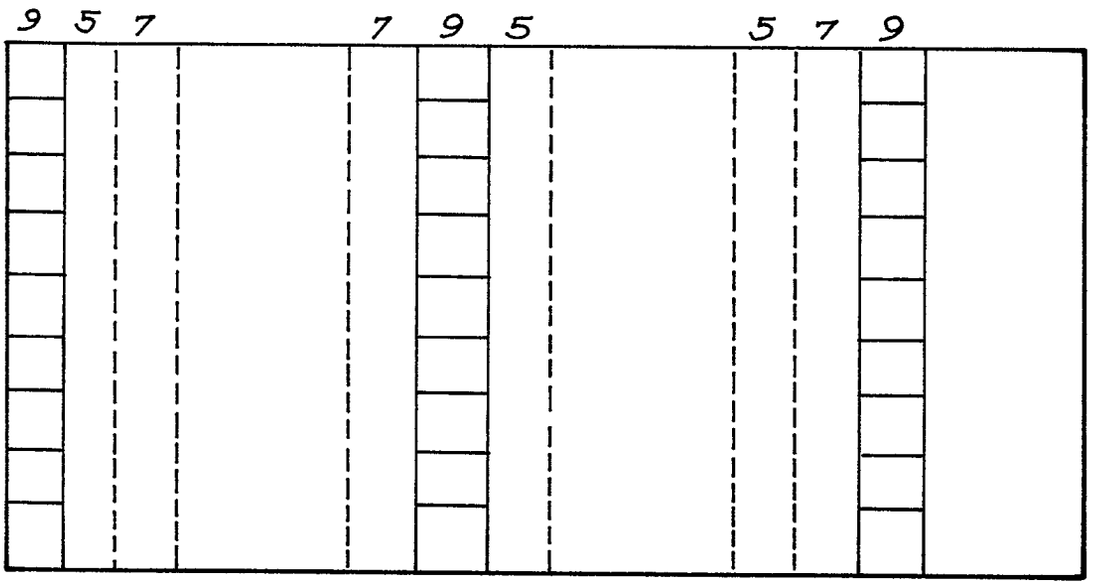

FIG. 5

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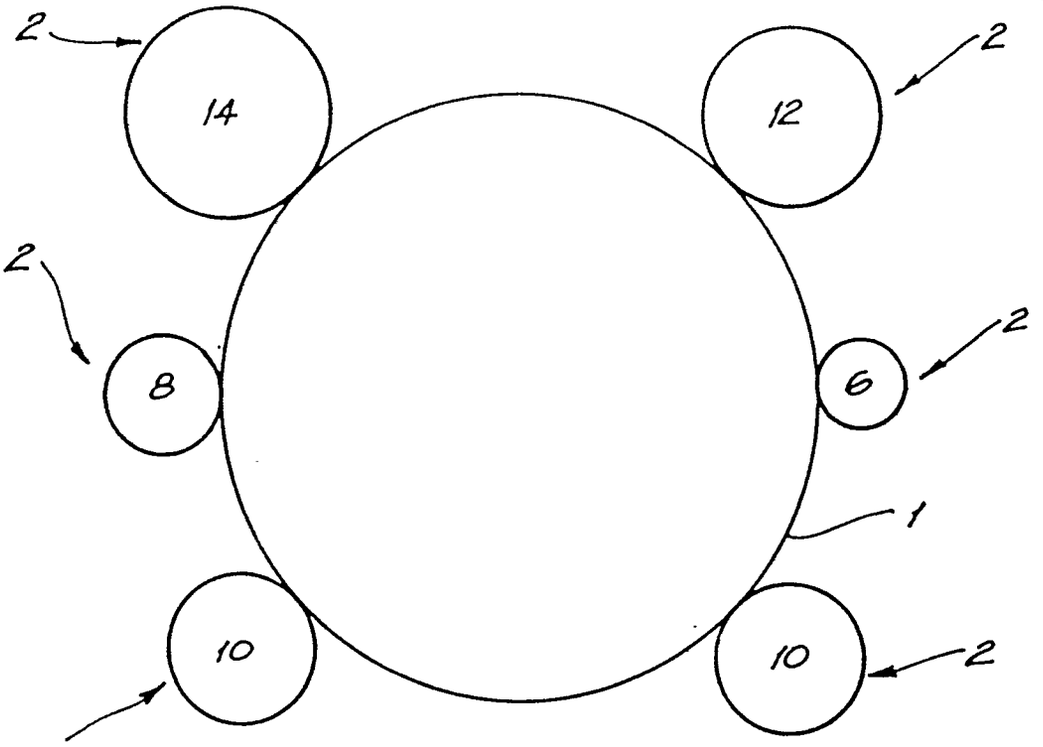

FIG. 6

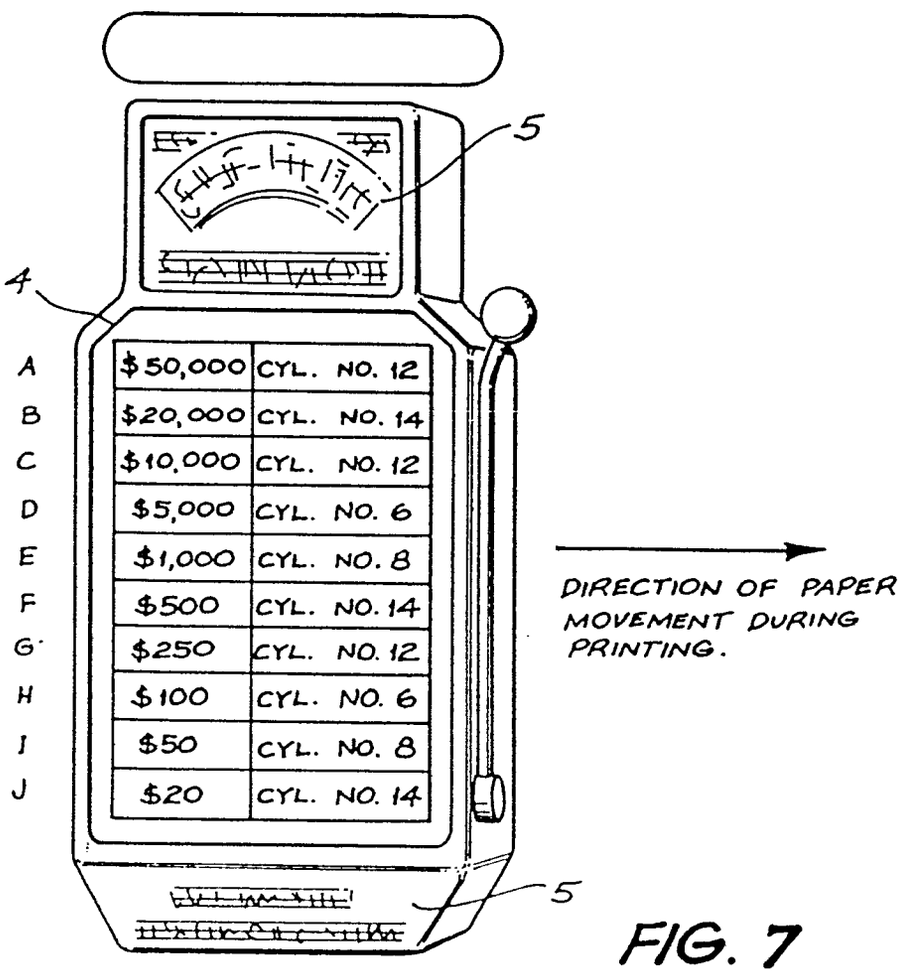

FIG. 7