April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

Filed Jan. 17, 1928 8 Sheets-Sheet 1

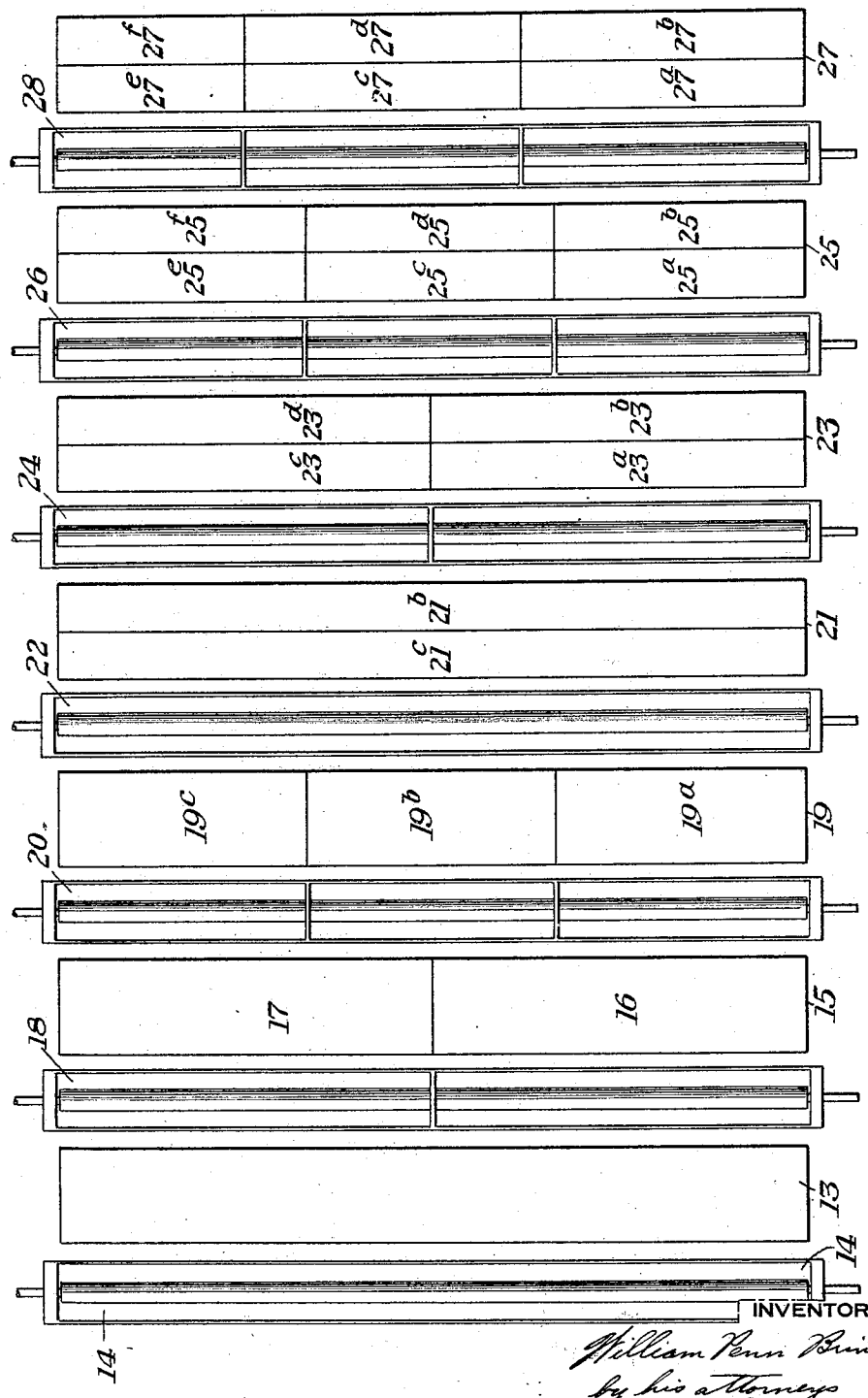


Fig. 1.

INVENTOR

William Penn Brinton

by his attorneys

Byrnes, Stettinius & Parmelee

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BLOCK PRINTING MACHINE AND METHOD OF PRINTING

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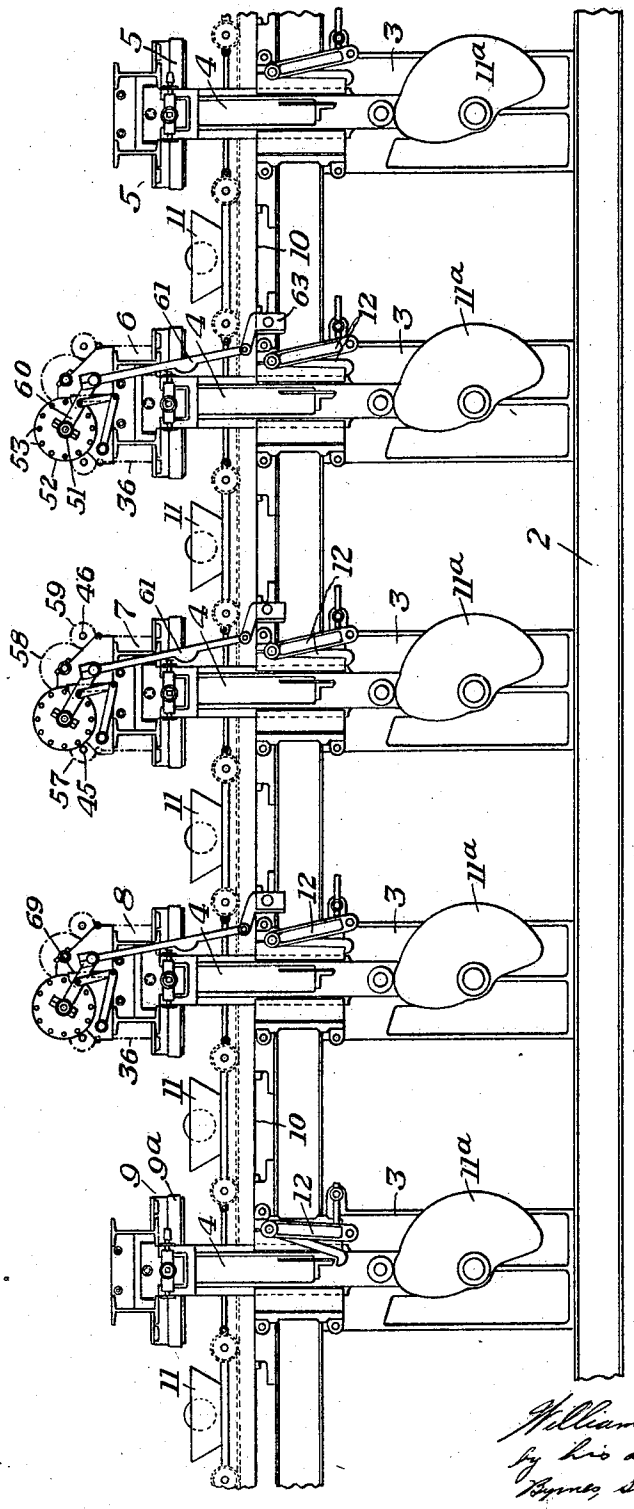


Fig. 2.

INVENTOR

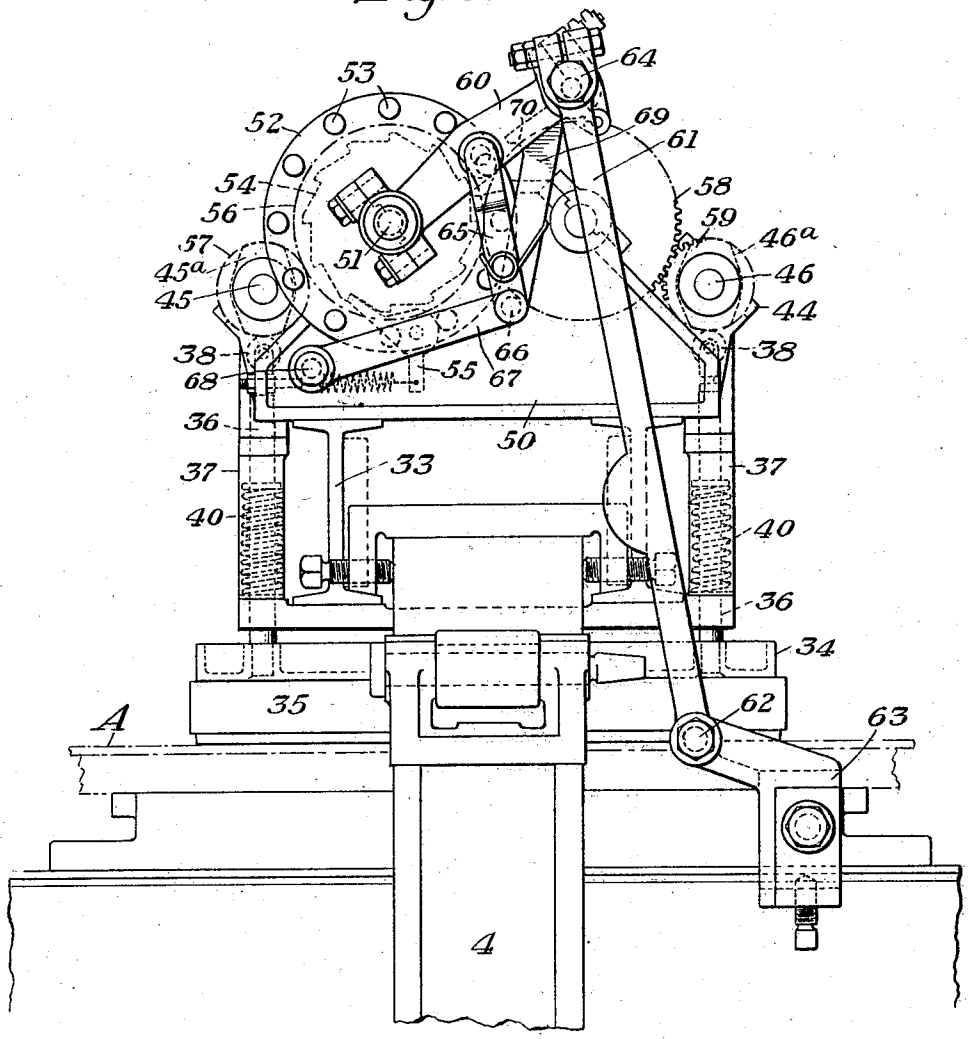
William Penn Brinton
by his attorneys
Byrnes, Stebbins & Parmelee

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BLOCK PRINTING MACHINE AND METHOD OF PRINTING

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Fig. 3.



INVENTOR

William Penn Brinton

by his attorneys

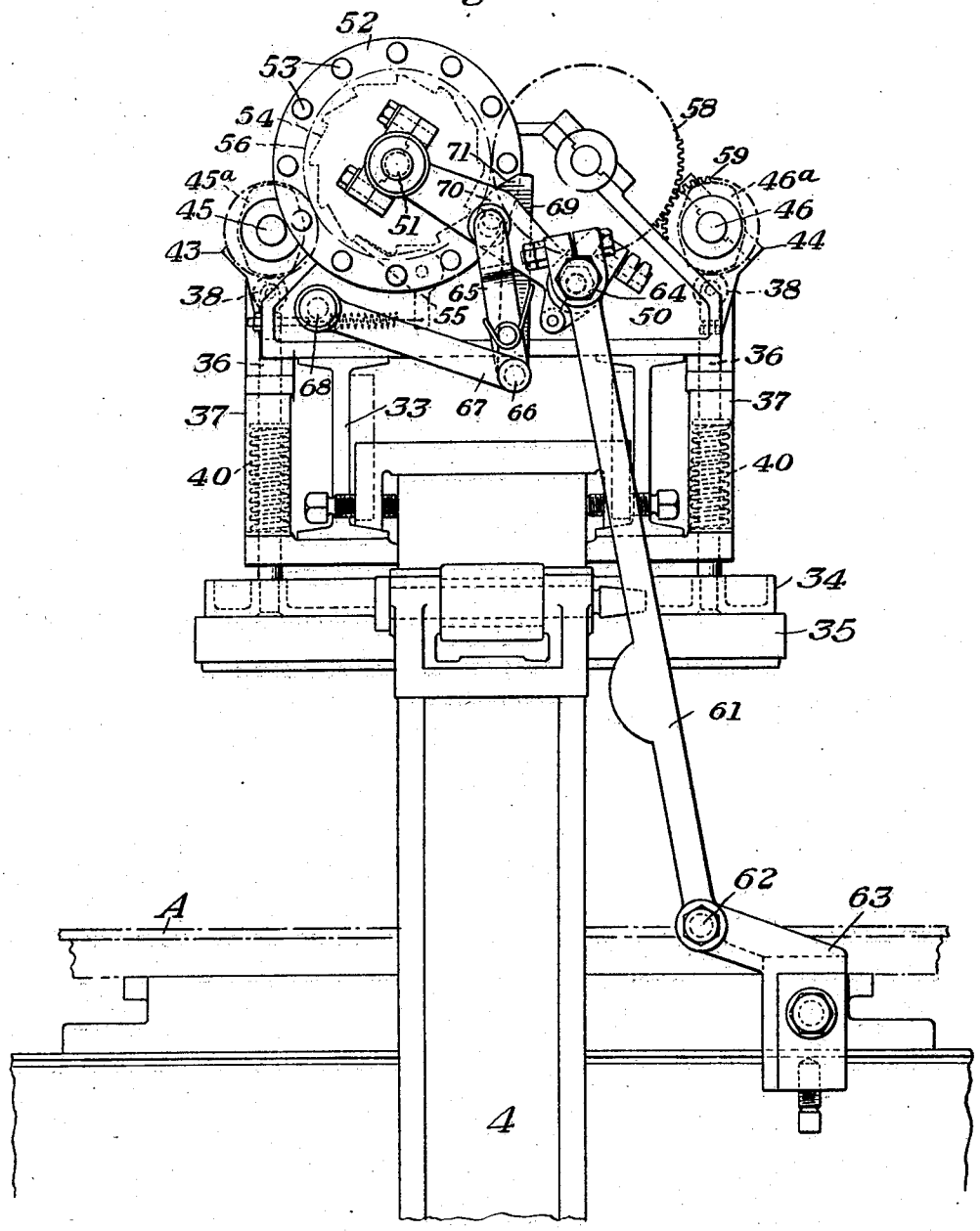
Byrnes, Stebbins & Parmelee

April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

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Fig. 4.



INVENTOR

William Penn Brinton

by his attorneys

Byrnes, Stebbins & Parmelee

April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

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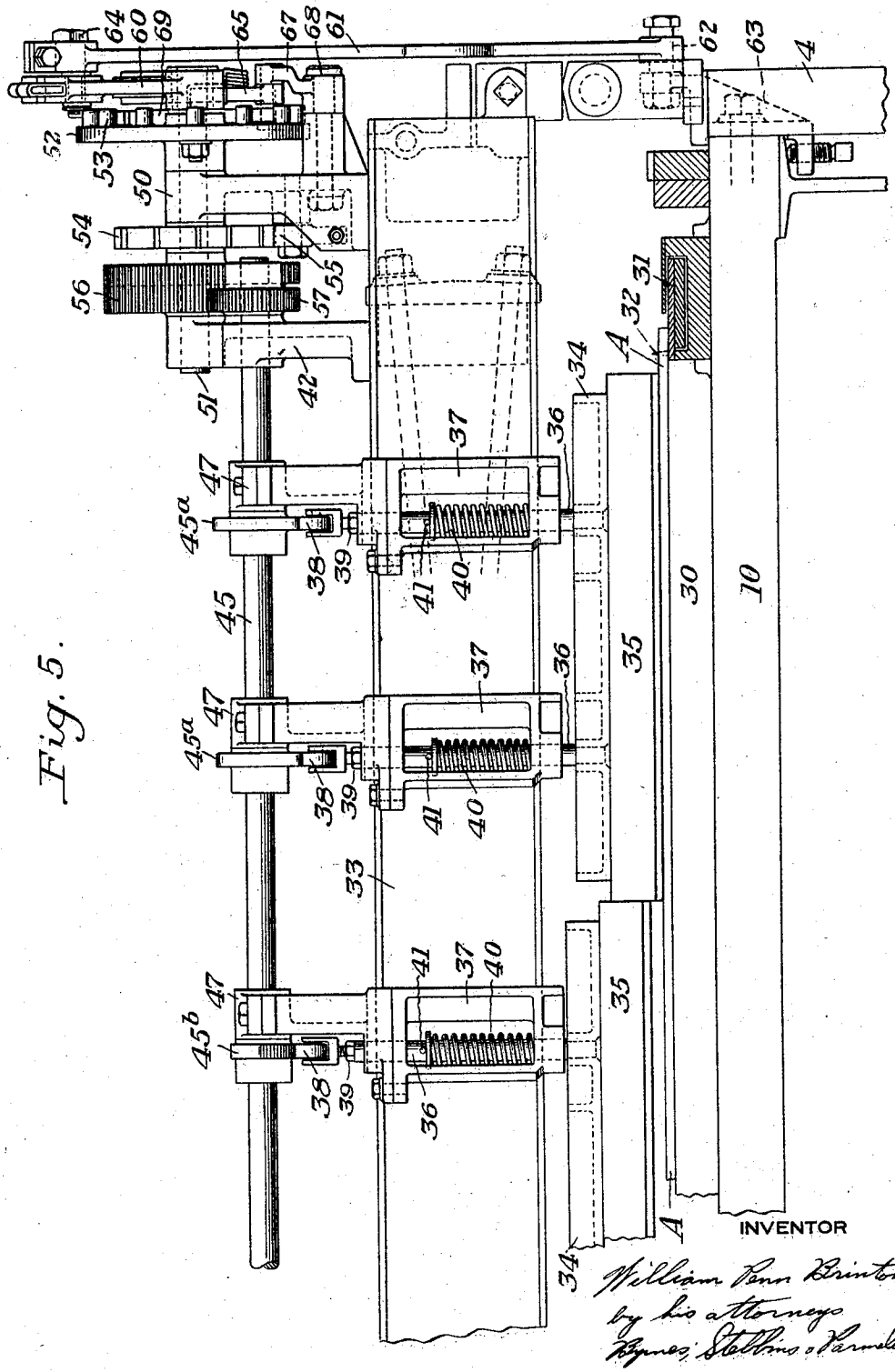


Fig. 5.

INVENTOR

William Penn Brinton

by his attorneys

Byrnes, Stebbins & Parmele

April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

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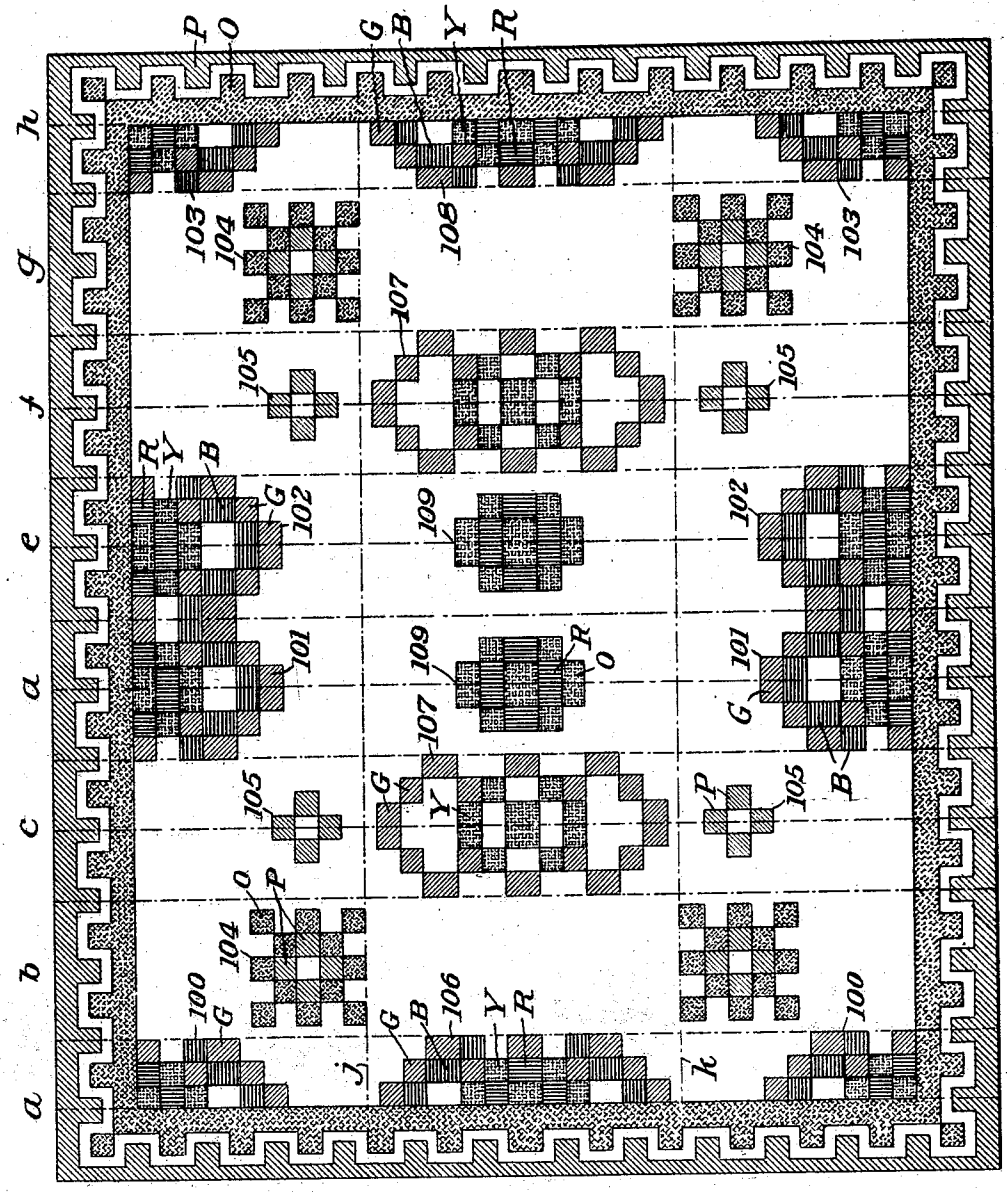


Fig. 6.

INVENTOR

William Penn Brinton

by his attorneys

Byrnes, Stetson, Parmelee

April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

Filed Jan. 17, 1928 8 Sheets-Sheet 7

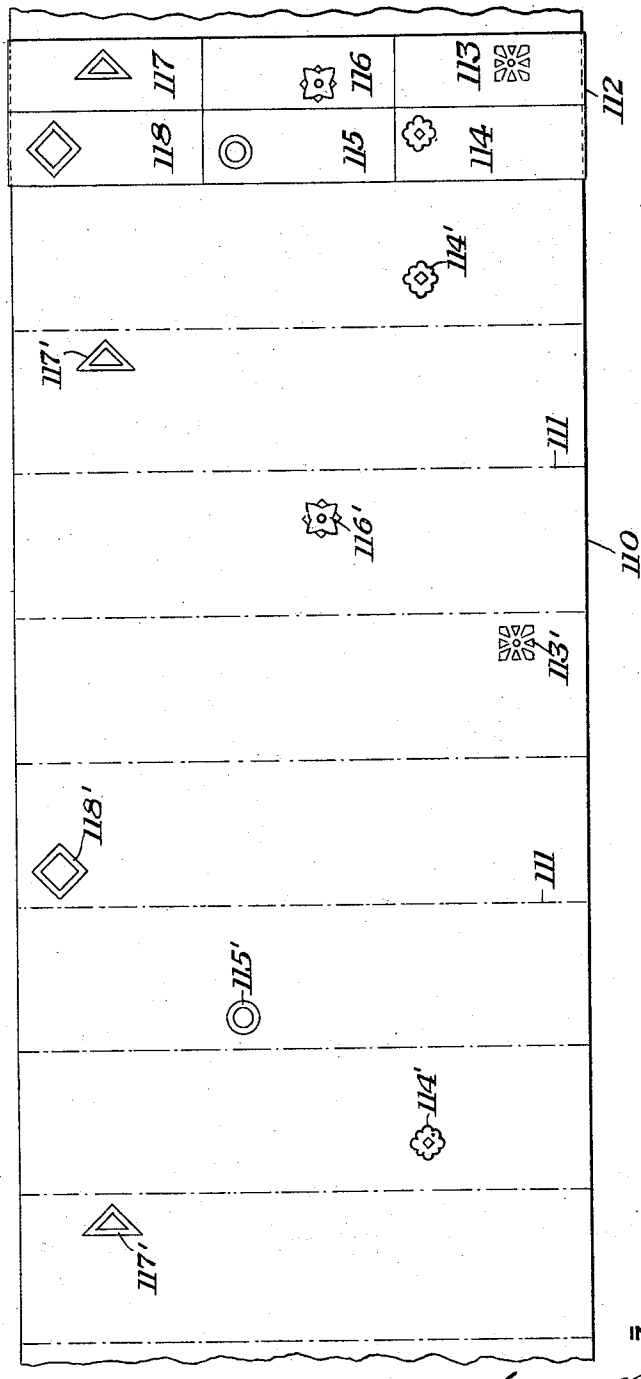


Fig. 7.

INVENTOR

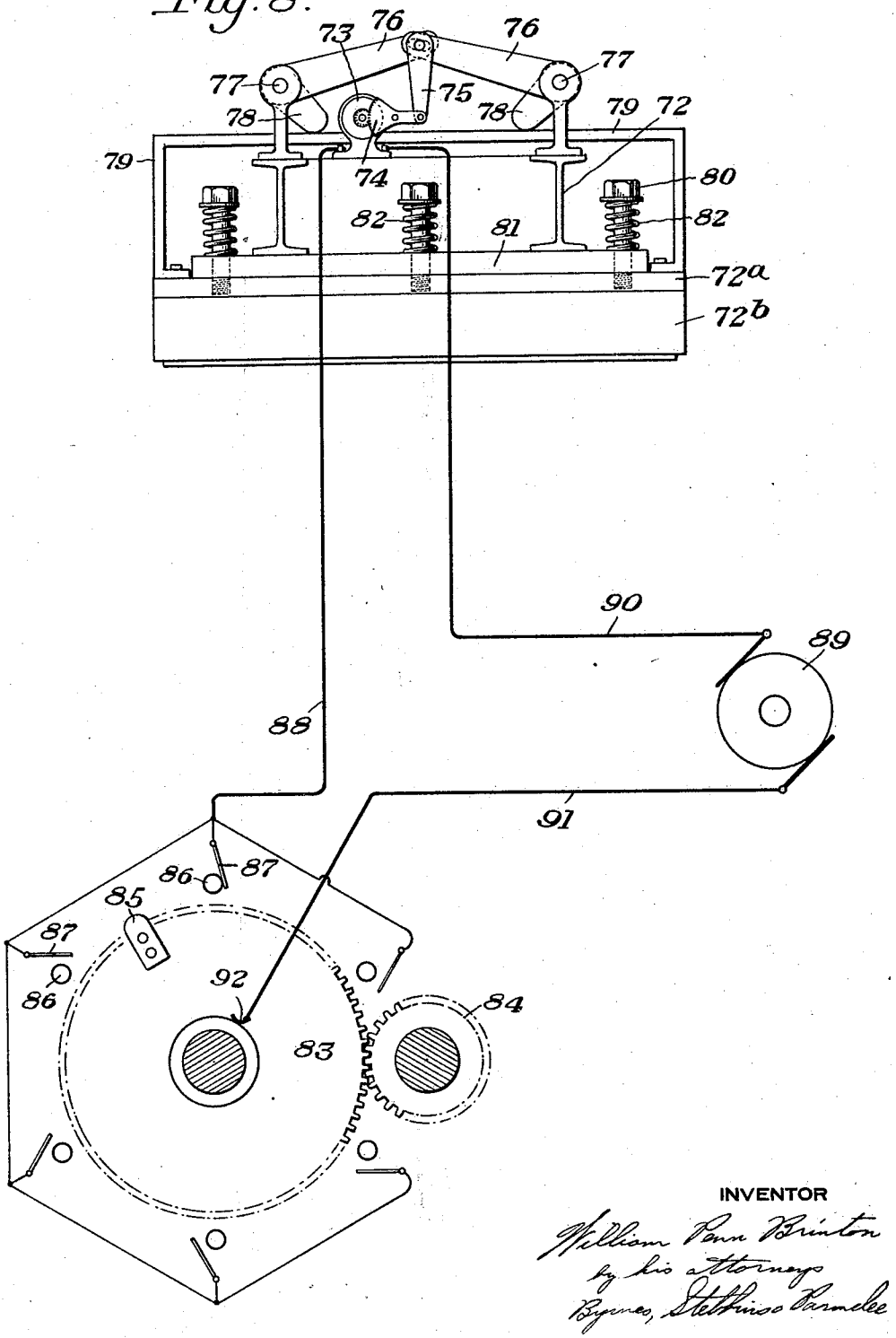
William Penn Brinton
by his attorneys
Byrnes, Stebbins & Parmelee

April 29, 1930. W. P. BRINTON 1,756,177

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

Filed Jan. 17, 1928 8 Sheets-Sheet 8

Fig. 8.



INVENTOR

William Penn Brinton

by his attorneys

Byrnes, Stetbuss & Landee

Patented Apr. 29, 1930 1,756,177

UNITED STATES PATENT OFFICE

WILLIAM PENN BRINTON, OF LANCASTER, PENNSYLVANIA, ASSIGNOR TO ARMSTRONG CORK COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

BLOCK PRINTING MACHINE AND METHOD OF PRINTING

Application filed January 17, 1928. Serial No. 247,319.

This invention relates to the art of printing floor coverings, such as linoleum and felt base goods, and is for an improvement in machines for printing materials of this nature and a method of printing.

In the manufacture of printed floor coverings, block printing machines are used. These printing machines are well known in the art, and comprise a series of spaced apart printing heads which are normally maintained in an elevated position, but which are dropped down into contact with the material at the moment of printing. The material is intermittently advanced under the series of printing heads, and the lowering of the heads is selectively controlled so as to procure the desired sequence of operation in order to reproduce the desired pattern. According to the present usual practice in the art, each head carries a single printing block which prints any one color in the pattern of the rug or piece of goods being printed. Since each head carries only one block, and that block is capable of printing only one color, it will be seen that in producing a given pattern in several colors, it is necessary to use a series of complementary blocks. In the printing of a rug, for instance, wherein there is a cross border and field, and one or more medallions, it is necessary to have a set of blocks for each color in the cross border, another set of blocks for the field, and possibly, although not necessarily, a set of complementary blocks for the medallion. Greater flexibility is sometimes secured by using divided color boxes, whereby different portions of the same block will print different colors at the same time, but without any selection, all portions of the block printing at the same time.

Because of the number of blocks required in the printing of a rug, the variety of colors which can be used is greatly reduced, for the reason that the number of blocks is limited by the number of printing heads in the machine. If the number of colors is increased the pattern must be very simple.

The present invention provides a method and a machine by which far greater flexibility is obtained in the printing of floor coverings, the invention securing a greater variety of colors and a wider range of possible patterns, together with less regularity in the repeat than has heretofore been considered possible in block printing machines and without increasing the number of printing heads.

In the present invention I provide a plurality of individually selectively operable printing blocks on a single cross head whereby the separate blocks on the heads may be selectively moved into printing position, so that when the printing head drops to printing position any selected one or more of the individual blocks will print while the remaining blocks on the head will not print, and preferably, will not receive paint. The invention contemplates the division of the available printing area of a printing head either longitudinally or transversely of the head, or both, into any desired number of individual printing blocks. The invention further contemplates the provision of a machine wherein some of the printing heads may have but one single block, while other printing heads may have a plurality of blocks, or a machine wherein all of the printing heads have a plurality of separate blocks. Furthermore, the invention provides a machine wherein divided color boxes may be used in combination with printing heads having a plurality of individual selectively operable printing blocks so as to secure an even wider variation of the pattern and color combinations obtainable.

The invention also provides a new method in the art of printing floor coverings in that heretofore only a single pattern could be printed on the floor covering at a given printing station or head, whereas, with the present invention, selectively different patterns may be printed at one station on successive sections of material.

The invention may be readily understood by reference to the accompanying drawings which serve to illustrate one embodiment of the invention and in which

Figure 1 is a schematic plan view showing a plurality of printing heads and color boxes of a printing machine with various arrangements of printing blocks, and with divided and undivided color boxes, the purpose of

this view being merely to show generally some of the variations which are obtainable in the present invention;

Figure 2 is a side elevation of a portion of a block printing machine embodying one form of the present invention;

Figure 3 is a detail end view of one of the printing heads with the actuating mechanism for controlling the movement of the individual printing blocks of the head, the view showing the printing head near the lowermost limit of its vertical travel;

Figure 4 is a similar view showing the head at the upper limit of its travel;

Figure 5 represents a side elevation of one end of one of the printing heads, showing one of the individual printing blocks on the head in printing position with another block out of printing position;

Figure 6 is a diagrammatic view illustrating a rug printed in various colors according to the present invention;

Figure 7 is a schematic view showing a printing head and length of piece goods, illustrating the application of the present invention to the printing of scattered designs through a length of piece goods; and

Figure 8 is a schematic view of another type of mechanism for operating one of the individual printing blocks on a cross head.

The nature of my invention may be best understood by reference to Figures 1 and 2. In Figure 2 there is shown a side view of the usual type of block printing machines having a frame 2 with spaced apart upright frames 3 thereon. The frames 3 carry vertically movable supports 4 for raising and lowering the printing heads carried at the top thereof, these printing heads being designated 5, 6, 7, 8 and 9. The bed of the machine is located at 10, and the material to be printed is intermittently advanced along this bed in uniform steps or sections. The spacing of the printing heads is equal to the width of the printing heads so that as the material advances, a given section is alternately located under a head and then under a space between the heads.

In the arrangement shown in Figure 2, heads 5 and 9 are of the usual construction, having but a single printing block 5^a and 9^a respectively secured thereto. The printing blocks 5^a and 9^a are co-extensive with the length and width of the head and have no relative movement on the head.

In Figure 2 heads 6, 7 and 8 are provided with a plurality of individually movable printing blocks with a mechanism for selectively effecting the movement of the desired blocks on the head into and out of printing position.

The color carriages or boxes for applying the paint to the printing blocks are designated 11. Each printing head is provided with a cam 11^a for raising it, and the cams 11^a are all driven in synchronism. Each head is provided with a holdout latch 12 for controlling the downward movement of the head. When a hold-out latch mechanism for a given head is in released position the head is free to lower into contact with the material to be printed upon and thereby print upon the goods. If the latch mechanism is in holding position, the head cannot drop and therefore it will not print upon the material. By controlling the hold-out latches, selective printing of the various heads is secured.

This selective operation of the hold-out latches is well known and generally used in the operation of block printing machines.

In Figure 1, I have illustrated the arrangement of the printing blocks and the color boxes apart from operating mechanism therefor, this view being a diagrammatic or schematic showing. In this view there is shown a printing head 13 having a single printing block. Cooperating with this head 13 is a color box 14 which is co-extensive with the width of the printing block 13. At 15 is a second printing head having two separate printing blocks 16 and 17, either of which may be selectively operated, as hereinafter described. This block cooperates with a color box 18 that is divided in the middle to provide separate colors for the blocks 16 and 17. The printing head which is located at 19 has three individual sections, 19^a, 19^b and 19^c. A correspondingly divided color box for cooperation with this head is indicated at 20. The printing head at 21 has two separate blocks 21^a and 21^b. These blocks are co-extensive with the length of the printing head and are not divided transversely. The color box 22 is provided for this head. At 23 is another printing head having individual printing blocks 23^a, 23^b, 23^c and 23^d, the printing area of the head being divided both longitudinally and transversely. I have shown a divided color box 24 for cooperation with this head. At 25 is another head having six separate printing blocks thereon, 25^a, 25^b, 25^c, 25^d, 25^e and 25^f. A color box 26 divided into three compartments is shown for cooperation with this head although, of course, it need not be so divided. There are also six printing blocks in the head 27, but the blocks 27^a, 27^b, 27^c and 27^d are longer than the blocks 27^e and 27^f. The color box for the head 27 is correspondingly divided, this box being designated 28.

While it is not likely that in actual use any machine would use the arrangement of blocks on the heads as therein disclosed, the drawing shows some of the various ways in which the blocks may be divided and some of the ways in which they can be used in combination, and shows the possibility of using divided color boxes in combination with the printing heads having a plurality of indi-

vidually movable printing blocks thereon. This drawing brings out the idea that the printing area for some of the heads may be divided transversely, longitudinally, or both ways, and that heads having the printed area divided may, if desired, be used in combination with other heads whose printing area is not divided or in combination with heads whose printing area is differently divided. Figure 1 is intended to show some of the variations and modifications, and the flexibility obtainable with the present invention.

One particular construction and operating means for the printing blocks on the head may now be described.

This construction and operation may be best understood by reference to Figures 3, 4, 5 and 6. In these figures there is shown in detail, any one of the heads 6, 7 or 8 of Figure 2. Referring to these figures, the linoleum or floor covering material to be printed upon, designated A, is moved along over the bed 10 of the machine, being supported on a pad 30. The movement of the material is effected by means of an endless belt 31 having pins 32 that pass through the edge of the material. The printing head, which is carried on the vertically reciprocal post 4 at each side of the machine is ordinarily comprised of I-beams 33 suitably trussed and braced. The heads are adjustably and removably carried on the vertically movable post 4 in a manner well understood in the art. Depending from the frame of the cross head are a plurality of block pads, the number of pads and the size of the pads depending on the manner in which the available printing area of the head is to be divided into a plurality of individual blocks. There must be one pad for each individual block carried by the head. A printing block 35 is secured to the underface of each pad 34. Each pad 34 is suspended from the frame of the printing head by a plurality of vertical rods 36 passing through supports 37 carried on the frame of the head. The upper ends of the rods 36 have cam followers 38 thereon, the followers 38 being connected to the rods through a threaded joint 39. Major adjustments for the printing block can be made by setting the cam followers up or down by reason of the threaded connection. Surrounding each of the posts 36 is a compression spring 40 that is confined between a pin 41 on the rod 36 and the lower part of the frame 37, the function of the springs 40 being to raise the pads 34. In Figure 5 one of the pads 34 is shown in a depressed position. The pad thus depressed will, at the proper time, receive paint from the paint carriage and will thereafter print on the material A, while the other pad will not receive paint and will not print. The other pad 34 in Figure 5 is shown in the normal position to which it is returned, after being depressed, by the springs 40.

As above stated, the actuation of the cams 45a and 46a serves to selectively depress the printing blocks. When the selected blocks are thus depressed below the normal plane to which they are urged by the springs 40, they are in position to receive paint at the proper time in the operation of the machine. An important advantage of the invention is that the cams accurately determine the paint receiving position of the blocks. One of the important duties of the operator in setting up a block printing machine is the shimming of the blocks so that they all receive paint. Shims graduated in thousandths of an inch are employed so as to accurately position the blocks with respect to the paint roll. The various blocks must be accurately adjusted so as to take sufficient paint from the paint roll and still not go so close that the roll will knock any pegs from the printing block. Since the cams provide positive backing and positioning for the several printing blocks when in paint receiving position, the nicety of adjustment required may be secured and indefinitely maintained.

Located at each end of the frame of the head is a bearing support on which are carried split bearings 43 and 44. The split bearing 43 supports a cam shaft 45 and the split bearing 44 supports a cam shaft 46. The cam shafts 45 and 46 are supported intermediate the ends of the head in split bearings 47, as shown in Figure 5. The shaft 45 carries a pair of cams 45a and other cams 45b, the number of cams being determined by the number of individual printing block sections on the head. The shaft 46 carries similar cams 46a. As the cam shafts 45 and 46 revolve, the cams carried thereon are rotated. According to the shape and disposition of the cams on the shafts 45 and 46, one or more of the printing blocks 35 will be depressed at one time while the other printing blocks on the head will remain in normal position.

The cam shafts 45 must be intermittently rotated and their rotation must be synchonized with reference to the operation of the head on which they are carried and with reference to the rest of the machine. They must also be rotated at a time when the rotation will not interfere with the operation of printing, the movement of the color boxes under the head, or at a time when the block which is to print is receiving color from a color box. It is therefore desirable to rotate the shafts 45 one step at a time upon each lifting or raising movement of the head. The intermittent or step by step rotation of the shafts 45 must be accomplished by a suitable mechanism.

In Figures 3, 4 and 5, there is disclosed a mechanism for effecting this rotation mechanically from the raising and lowering movement of the head. In the construction shown in Figures 3, 4 and 5, there is mounted at one

end of the head only, a supporting plate 50. Supported in bearings on the bearing support 42 and in the plate 50 is a shaft 51. On the outer end of the shaft 51 is a disk 52 having pins 53 projecting from the side face thereof. The pins 53 are preferably equally spaced. Carried on the shaft 51 is a ratchet wheel 54. Supported on the plate 50 is a pawl 55 cooperating with the ratchet 54 for preventing reverse movement of the shaft 51. Secured to the shaft 51 is a spur gear 56. Mounted on the shaft 45 is a gear 57 that meshes with the spur gear 56. Supported on the bearing support 42 is an idler gear 58. The idler gear 58 meshes with a gear wheel 59 on the end of the cam shaft 46. The gears 57 and 59 are of corresponding size so that both are rotated to the same extent by rotation of the gear 56.

Loosely carried on the outer end of the shaft 51 is an actuating lever 60. The outer end of the lever 60 is connected with a link 61 pivotally secured at 62 to a bracket 63 on the frame of the printing machine. The link 61 is preferably connected to the lever 60 through an adjustable eccentric pin 64. By adjusting the position of the eccentric pin 64 the effective length of the link 61 can be varied to an extent equal to the eccentricity of the pin.

Pivotally connected to the lever 60 between its ends is a drop link 65 having a pin 66 at its lower end. The pin 66 passes through the end of a lever 67 pivotally secured to the support 50 at 68. The pin 66 carries a vertically extending hook member 69. The hook member 69 has a hook 70 at its outer end, which hook is inclined at 71 to ride past the pins 53 on the disk 52 when the hook rides upwardly with respect to the disk 52. The hook 70 is adapted to engage one of the pins 53 when the hook member 69 is moved downwardly relative to the disk 52.

The operation of this portion of the mechanism may now be understood. When the head is at the uppermost limit of its travel the parts are in the position shown in Figure 4. When the head moves down, the lever 60 is held stationary by the link 61. The shaft 51, and the wheel 52 with its pins 53 of course move down with the head. During this downward movement of the head, the inclined surface 71 of the hook 70 comes into contact with one of the pins 53 on the disk 52, and throws the hook member 69 outwardly. When the head has reached its lowermost position, the parts are in the position shown in Figure 3. Upon upward movement of the head, the hook 70 of the hook member 69 engages one of the pins 53, and as the head continues to rise, carrying the disk 52 up with it, the hook rotates the disk 52 a distance equal to the spacing between the pins. The rotation of the disk 52 is imparted to the shaft 51 which in turn rotates the gear 56 and thereby rotates the cam shafts 45 and 46. With this arrangement the cam shafts 45 and 46 are intermittently rotated through a predetermined arc upon each dip or drop of the printing head. If the printing head does not drop, the mechanism rotating the cam shafts is not operated.

The particular mechanism for rotating the cam shafts as herein specifically described, forms no part of my present invention, being the subject matter for an application for patent of Harry A. Webster, Serial No. 278,811, filed May 18, 1928, and is merely described herein as showing one mechanism contemplated by my invention for effecting relative movement of the individual printing blocks on the head.

In place of this mechanism, which is highly practical, any other suitable mechanism may be used. For instance, the operation of the individual blocks might be effected through an electrical arrangement, as disclosed in Figure 8, which is diagrammatic, and wherein the printing head is designated 72 and 72^a is one of the pads carried thereon. One of the printing block members 72^b is carried on the pad 72^a. Instead of cam shafts extending continuously across the length of the head, there is provided a torque motor 73 for each block on the head. The torque motor 73 drives a segment gear 74. Movement of the segment gear 74 transmits motion through a link 75 to levers 76 pivotally supported at 77 on the frame of the head. The levers 76 transmit motion to the lever arms 78 which bear against a yoke 79 rigidly connected to the pad 71. The pad is suspended from the frame by means of bolts 80 passing through a bed member 81 forming a part of the head, these bolts being surrounded by compression springs 82. When the torque motor is energized it rocks the lever 76, and the lever arms 78 force the yoke 79 down, thereby depressing the block 72, and compressing the springs 82. When the motor 73 is deenergized the parts return to the normal position shown in Figure 8. Energization of the motors 73 at the proper intervals may be controlled by any suitable selector synchronized with the operation of the printing machine.

In Figure 8 I have shown one selector which may be employed. The selector comprises a disk 83 driven through a gear 84 from one of the operating shafts of the machine. The disk 83 carries a wiper 85. As the disk 83 rotates the wiper 85 passes successively over contacts 86 arranged in its path of travel. A separate switch 87 is provided for opening the circuit to each contact. All of the contacts 86 with their switches 87 are connected to a wire 88 leading to one side of the torque motor 73. The other side of the motor is connected with a source of power 89 through a wire 90. The circuit

from the source of power to the wiper 85 is completed through a wire 91 and slipring contact 92.

Such a selector would be provided for each one of the torque motors carried on a head and there would be as many of these motors and their associated mechanisms as there are individual printing blocks on a single head. By setting the switches 87, the operation of the motor 73 can be selectively controlled to secure the desired sequence of operation.

The advantages of the invention and a method of printing may be understood by reference to Figure 6 showing a rug printed in a machine wherein the printing heads carry a plurality of individually operable printing blocks in accordance with the present invention. In the drawing, conventional cross-hatching has been used to indicate contrasting color. Dot and dash lines have been used to show the outline of the printing blocks, or sets of printing blocks used in printing the rug pattern shown. The rug shown in Figure 6 is comprised of eight sections, *a*, *b*, *c*, *d*, *e*, *f*, *g* and *h*, each section representing the width of the available printing area of a head in the printing machine. The end sections *a* and *h* carry the cross border pattern and every section carries a portion of the side border pattern. An examination of the dot and dash lines of section *a* shows that it is divided longitudinally along its center, and at one side transversely along the lines *j* and *k*, so that its area may be considered as being comprised of four sub-sections. A separate block or a separate set of blocks is necessary for printing the pattern in each sub-section. Section *b* is divided into but three sub-sections. Sections *c* and *f* are divided into six sub-sections, and each of them contains the same pattern. Sections *d* and *e* are divided into six sub-sections, and are just alike. Section *g* is just like section *b*, being comprised of only three sections. Section *h* is similar to section *a* with the exception that the patterns are reversed.

The rug shown in Figure 6, in addition to having side and cross borders, is printed with various patterns in the field thereof. The field patterns are shown as being symmetrically arranged, the patterns on each side of the mid portion of the rug being the same. In the upper left hand corner of the rug there is a field pattern 100, which falls within section *a* of the rug and in sections *d* and *e* are like patterns 101 and 102. In the upper right hand corner there is a field pattern 103. The field patterns 100 and 103 each constitute half of the field patterns 101 and 102. In sections *h* and *g* of the rug above the center portion thereof are patterns 104. In the sections *c* and *f* of the rug above the central portion are field patterns 105. The patterns 104 are printed in two colors, orange and purple, and the patterns 105 constitute the purple portions only of the patterns 104.

In the central portion of the rug in the section *a* there is a field pattern 106 printed in four colors, green, blue, yellow and red. In addition to the cross hatching, initial letters have been used to designate the colors. In the section *h* of the rug there is a field pattern 108 which is similar to pattern 106, but is just the reverse thereof. In sections *c* and *f* of the rug in the central portion are like patterns 107. The patterns 107 are formed by placing the patterns 106 and 108 together, but the color blue is omitted in patterns 107. In the central portions of sections *d* and *e* are like patterns 109 formed of the red and yellow portions of patterns 106 and 108. The patterns in the lower portion of the rug correspond to those in the upper portion.

For printing the rug shown in Figure 6 there would be one set of heads for printing the cross borders, and one set of heads for printing the field patterns. All of the blocks for printing the cross borders would be contained on one set of heads. For instance, one head would have the printing area thereof divided into individual printing blocks which would print the purple in the cross border, the blocks of the head being arranged like the blocks 21^b and 21^c of the head 21 in Figure 1. This head would lower twice during the printing of a single rug to printing position, but on one dip just the block for printing the cross border in the section *a* would be projected down to receive paint and to print while the block for printing the cross border in the section *h* would be held out of printing position. Likewise, a single head would carry two blocks for printing the orange in the cross borders, and such head would dip twice during the printing of the rug. On the first dip of the block on that head for printing the orange in the cross border of section *a* would be operated and on the next dip of the head the block for printing the orange in the section *h* would be operative. Thus a single head serves to alternately print the two patterns merely by rendering one and then the other of the blocks carried thereon alternately operable. If the border blocks were not divided, as shown, but were the usual double cross border blocks ordinarily employed, it would be difficult to secure the right spacing of the borders with respect to the field where the field, as in the rug shown, has a definite number of sections of full width and a half width field section lying along each border.

In the printing of the field patterns, a single head would carry a set of printing blocks necessary for printing one color in any of the patterns 100, 101, 102, 103, 106, 107,

108, and 109. The heads for printing field patterns in sections *a*, *c*, *d*, *e*, *f* and *h* can be considered as having their printing area divided the same as blocks 25 in Figure 1 of the drawing. That is to say, each head for printing a given color in any one of these sections would have six individually movable printing blocks thereon. For instance, the head which prints the color green in any one of these sections will have six individually movable printing blocks. Since the color green appears in the field pattern in sections *a*, *c*, *d*, *e*, *f* and *h*, it will be seen that this head must dip to print in each one of these sections. However, not all of the blocks on the head print at any one time. In section *a*, the three individual blocks corresponding to 25^b, 25^d and 25^f of head 25 in Figure 1, are in operative position on the first dip of the head. This prints in the green portions of the two patterns 100 and the middle pattern 106. No green appears in section *b* so that this head would not dip to print in this section of the rug. In section *c* no part of the pattern 100 is printed, but the green portions 106 and 108 are printed. Therefore on the second dip of the head carrying the blocks for printing green, blocks corresponding to blocks 25^c, and 25^d of head 25 in Figure 1 would be in printing position while all of the other blocks were inoperative. In section *d* of the rug the green is printed in the side portions but not in the middle portion of the rug. On the third dip of the head carrying the blocks for printing in the green portion of the pattern, the two central sections corresponding to 25^c and 25^d of head 25 in Figure 1 would be held inoperative while all of the other four sections or blocks would be projected to printing position. The same would be true in printing the green in section *e* of the rug. For printing in section *f* the various blocks would again shift to print the same as in section *c*. In printing in section *h* the three blocks corresponding to 25^a, 25^c and 25^e of block 25 in Figure 1 would be projected to printing position while the three blocks corresponding to blocks 25^b, 25^d and 25^f would be held inoperative. Likewise a single head would carry the blocks for printing the red in sections *a*, *d*, *e* and *h*. Another block divided in similar manner would reproduce the blue in the field patterns in sections *a*, *d*, *e* and *h*. Another head would carry the six blocks necessary for printing in the yellow in sections *a*, *c*, *d*, *e*, *f*, and *h*.

For printing the patterns 104 and 105 another set of blocks is required. The head for printing the orange in patterns 104 would be divided the same as head 19 in Figure 1. The head for printing the complementary purple portion of the pattern would also be similarly divided.

In the operation of printing the dipping of the heads at the proper time would be controlled by the usual selector mechanism used for controlling the operation of the printing heads in block printing machines. The operation of the individual printing blocks carried on each head would be controlled by rotation of the cam shafts carried on each head and the shapes of the cams.

From the foregoing, it becomes apparent that the printing area of each head may be divided up in various ways into a plurality of individual sections, any one of which can be selectively rendered operable while remaining blocks on the same head are held in a non-printing position. This allows for a flexibility and variety of design in a printing machine having a moderate number of printing heads far in excess of the flexibility and variety which could be secured in present types of printing machines with present types of present methods having two or three times the number of printing heads. The selective use of a given portion of the area of a printing head to the exclusion of other printing surfaces on the same head provides for the use of a wide range of colors and intricate patterns without increasing the number of printing heads on the machine, and permits of a wide variation of pattern without a repeat. The diagram shown in Figure 6 illustrates only a simple possibility in the use of the present invention. In this view patterns and colors have been used which could be readily shown and to which conventional color indication can be applied.

The variation and flexibility of the machine is even further increased where divided color boxes are used in combination with printing heads having the available printing surface divided into a plurality of selectively usable blocks.

In Figure 7 I have shown the invention as applied to the printing of piece goods, and particularly that type of piece goods known as "arabesque" wherein small patterns of unique design are scattered with an appearance of irregularity over the surface of the piece goods.

In this view the piece material is designated 110, and the dot and dash lines 111 show the sections in which the material is printed. At 112 there is indicated diagrammatically a printing head or a printing station which is provided with six selectively operable printing blocks 113 to 118 inclusive, each printing block being provided with a different pattern. The head 112 carrying the several printing blocks 113 to 118 inclusive will lower on each section of material, because one of the patterns, 113′ to 118′ appears on each section. However, only one design is printed with each dip of the head. In Figure 7 the pattern 114 has just been printed. The previous printing of this design is in the sixth preceding section. Likewise each of the other designs is printed only

once in every six sections. Since the width of a section is ordinarily eighteen inches, it will be seen that the pattern only repeats every one hundred eight inches. Heretofore, in order to secure this result it would have been necessary to have six separate heads even if the patterns were only printed in one color. Since the arabesque patterns are generally printed in several colors it will be seen that according to previous methods, it would have required nearly all of the printing heads of an ordinary machine to print in the arabesque designs alone. For instance, if these designs were in three colors, it would have been necessary to have used eighteen heads of the machine alone for printing them, whereas, with the present invention the same result can be achieved with three heads.

From the foregoing it will be seen that the invention lends itself to a new method in the printing of rugs or floor coverings. Heretofore it has been the practice to print one pattern, and one pattern only at each printing station or cross head of the machine. With the present invention it is possible to print any one of a number of different patterns at a single printing station. The number of patterns which can be printed at a given station is limited only to the number of separate printing blocks which it is practical to provide in the area of a given head. Not only is it possible to selectively utilize any one of the several printing blocks at a given printing head or station, but various combinations thereof may be used. As previously pointed out, the invention also makes it practical to use only certain colors in a set of blocks for producing a given pattern in some parts of the rug, and using all of the sets of blocks to print in all of the colors in a pattern in another part of the rug. This is due only to the fact that the printing area of each head or station is divided into a number of separate selectively operable printing blocks. Coupled with the use of divided color boxes, even wider variations from present methods of printing can be practiced.

While I have shown and described my invention in connection with particular details of construction and in combination with particular forms of operating mechanisms, it will be understood that the invention is not confined to any particular construction of parts or to any particular operating mechanism. I have also endeavored to show certain simple instances of the flexibility and novelty of my improved method and apparatus for printing floor coverings, but it will be understood that this is merely by way of illustration and that wide variations and various ramifications in the method of using the invention are within the contemplation of my invention and under the scope of the following claims.

I claim:

1. In a block type printing machine, a guided movable printing head, means for moving the material through the machine in a step-by-step manner, and a printing surface on the head divided in two directions, each part of the printing surface being movable up and down to a limited extent on the head relatively to the other.

2. In a block type printing machine, a printing head, means for raising and lowering the printing head, a plurality of printing blocks on the head movable up and down therewith, and movable to a slight extent up and down relatively thereto, and means for raising and lowering the printing blocks relatively to the head.

3. In a block type printing machine, a plurality of reciprocable printing heads, at least one of said heads having a plurality of separately operable printing surfaces thereon.

4. In a block type printing machine, a plurality of reciprocable printing heads, at least one of said heads having a plurality of separately operable printing surfaces thereon, and means on these heads for effecting operation of said printing blocks into and out of operative position.

5. In a block type printing machine, a plurality of reciprocable printing heads, at least one of the heads having the printing area thereof provided with a plurality of independently movable printing blocks, and divided color boxes cooperating with some of those heads whose printing area is so divided.

6. In a block type printing machine, a plurality of printing heads, some of said printing heads having a single printing block thereon, other of said heads having a plurality of selectively operable printing blocks thereon.

7. In a block type printing machine, a plurality of printing heads, some of said printing heads having a single printing block thereon, other of said heads having a plurality of selectively operable printing blocks thereon, a color box for each printing head, the color box for at least one of the heads which carries a plurality of printing blocks being divided into a plurality of compartments.

8. In the method of printing floor coverings in a block type printing machine, having a head, which head has a plurality of portions adapted to print in different colors, the steps consisting in printing all of said colors on a section of the floor covering, causing relative movement between the floor covering and the head so as to bring another section of the floor covering into printing position, and then printing on such section with the head, at least one color being omitted on the last-mentioned printing step.

9. In the method of printing floor coverings in a block type printing machine, having a head with a plurality of relatively mov-

able printing portions, the steps consisting in printing with one of the printing portions on a section of the floor covering, causing relative movement between the floor covering and the head so as to bring another section of the floor covering into printing position, and then printing on such section with such printing portion and an additional printing portion.

10. In a block-type printing machine, a vertically reciprocable printing head, a plurality of printing blocks carried by the head, a paint carriage movable under the blocks, means controlling the vertical movement of the printing head, said means being effective for holding the head in substantially fixed position during movement of the paint carriage thereunder and for thereafter permitting the head to lower so as to print, and means for moving at least one of the blocks into or out of a position on the head wherein it will receive paint when the paint carriage moves thereunder and will print when the head is thereafter lowered.

11. In a block-type printing machine, a vertically reciprocable printing head, a plurality of printing blocks carried by the head, a paint carriage movable under the blocks, means controlling the vertical movement of the printing head, said means being effective for holding the head in substantially fixed position during movement of the paint carriage thereunder and for thereafter permitting the head to lower so as to print, means for moving at least one of the blocks into or out of a position on the head wherein it will receive paint when the paint carriage moves thereunder and will print when the head is thereafter lowered, and means providing a positive backing for said block when it is in paint receiving position.

12. In a block-type printing machine, a printing head having a plurality of relatively movable printing blocks thereon, said blocks lying in a line extending crosswise of the printing machine, means controlling the movement of the printing head, a paint carriage movable under said head for supplying paint to desired ones of the relatively movable printing blocks, the paint carriage being divided into compartments corresponding to the blocks, and means for effecting such relative movement whereby desired printing blocks are brought into paint receiving position.

In testimony whereof I have hereunto set my hand.

WILLIAM PENN BRINTON.