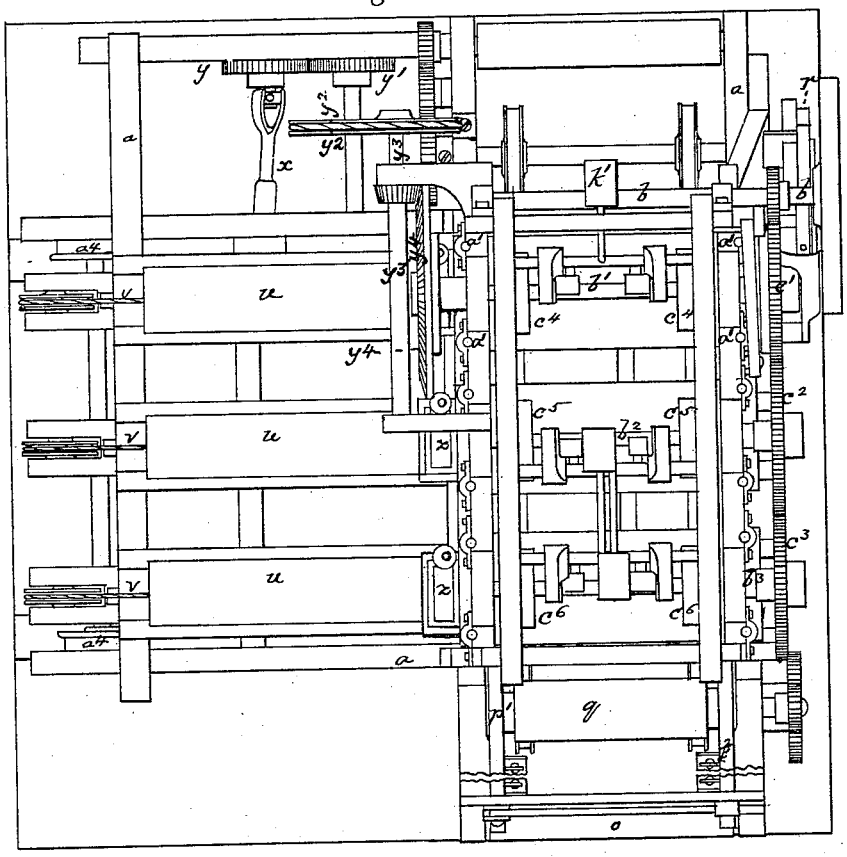
11 Sheets--Sheet 1.

F. WALTON.

Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 1.



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11 Sheets--Sheet 2.

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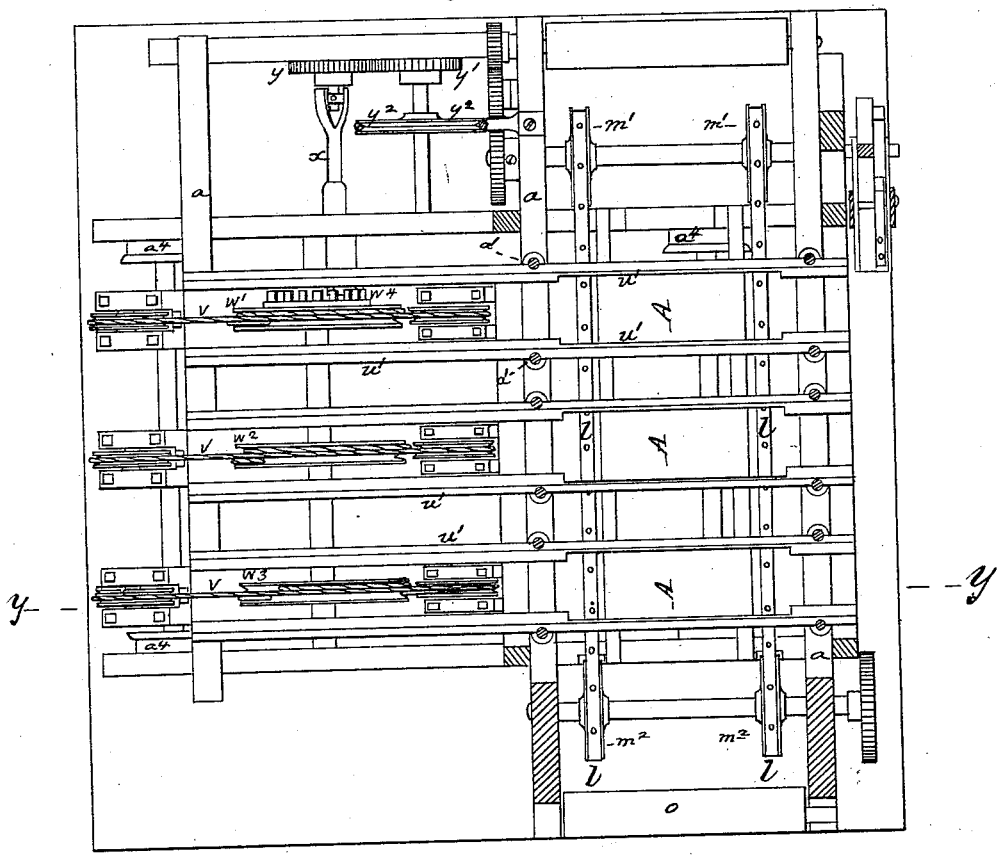
Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 2.



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11 Sheets--Sheet 3.

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Block-Printing Machine.

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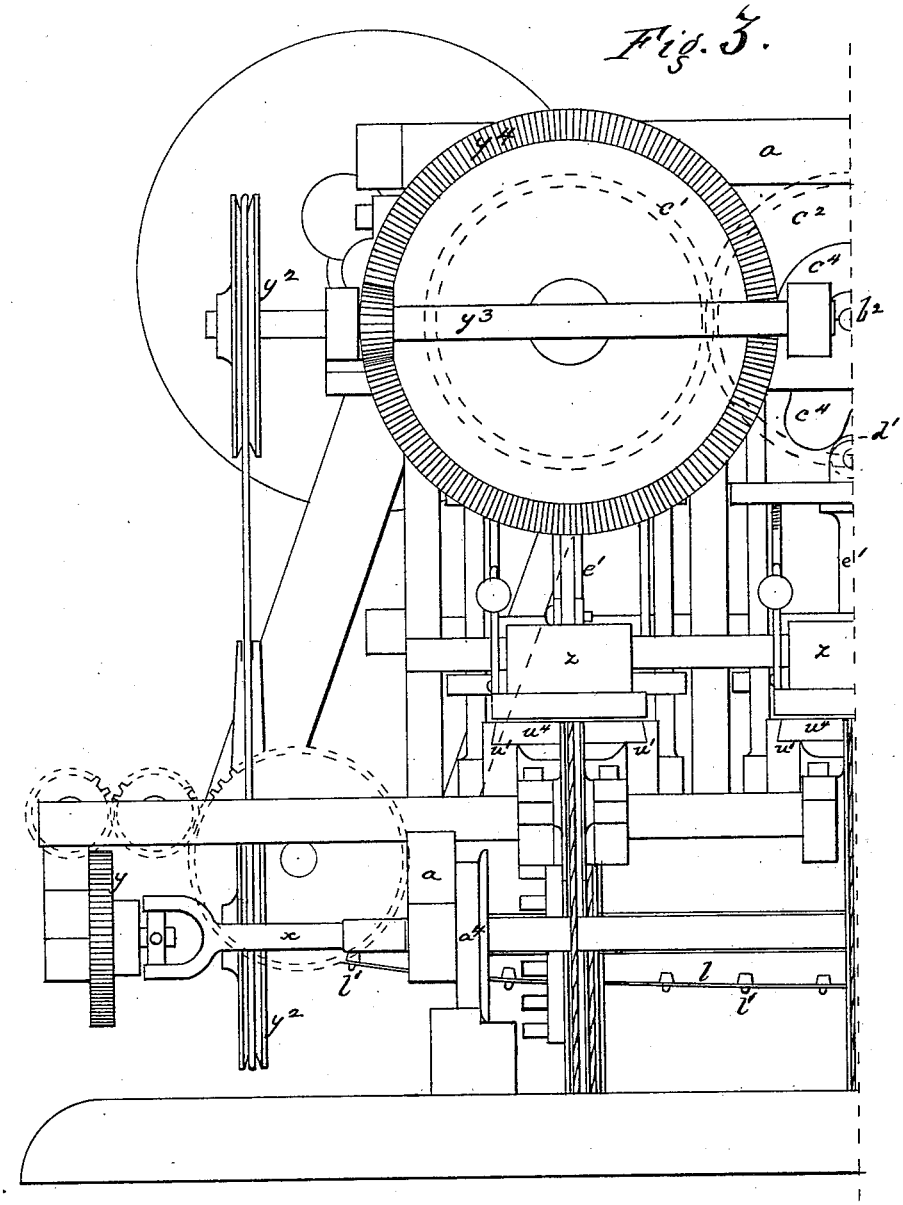
Fig. 5.



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Block-Printing Machine.

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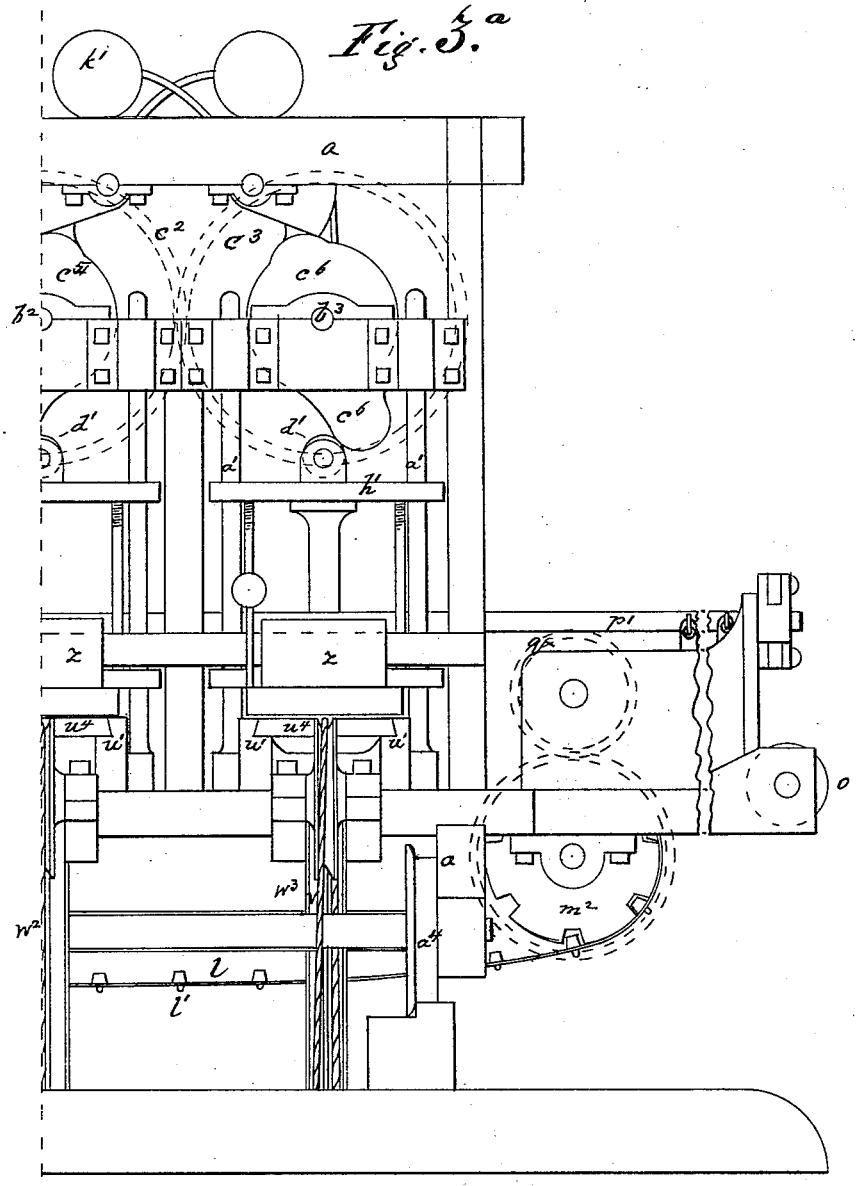
Fig. 5.a



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Block-Printing Machine.

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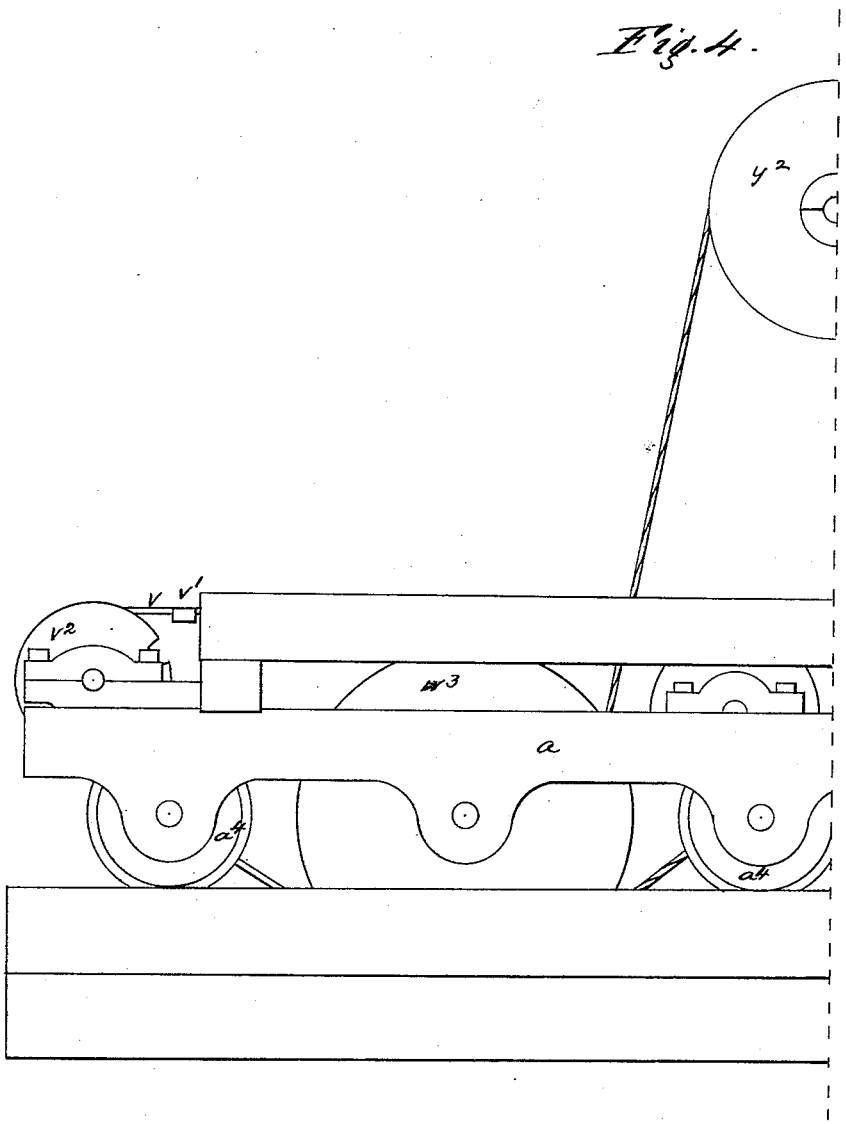
Fig. 4.



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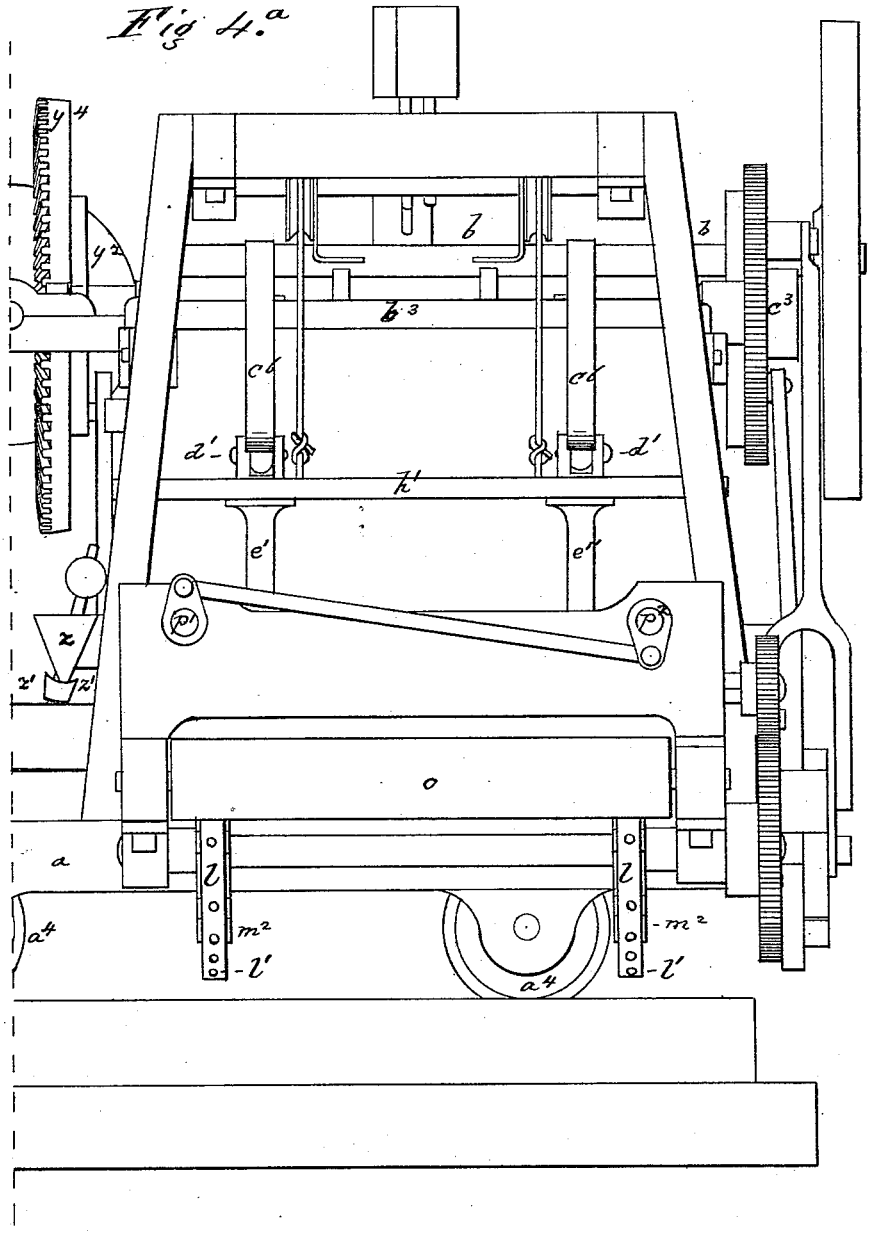
Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig 4.a



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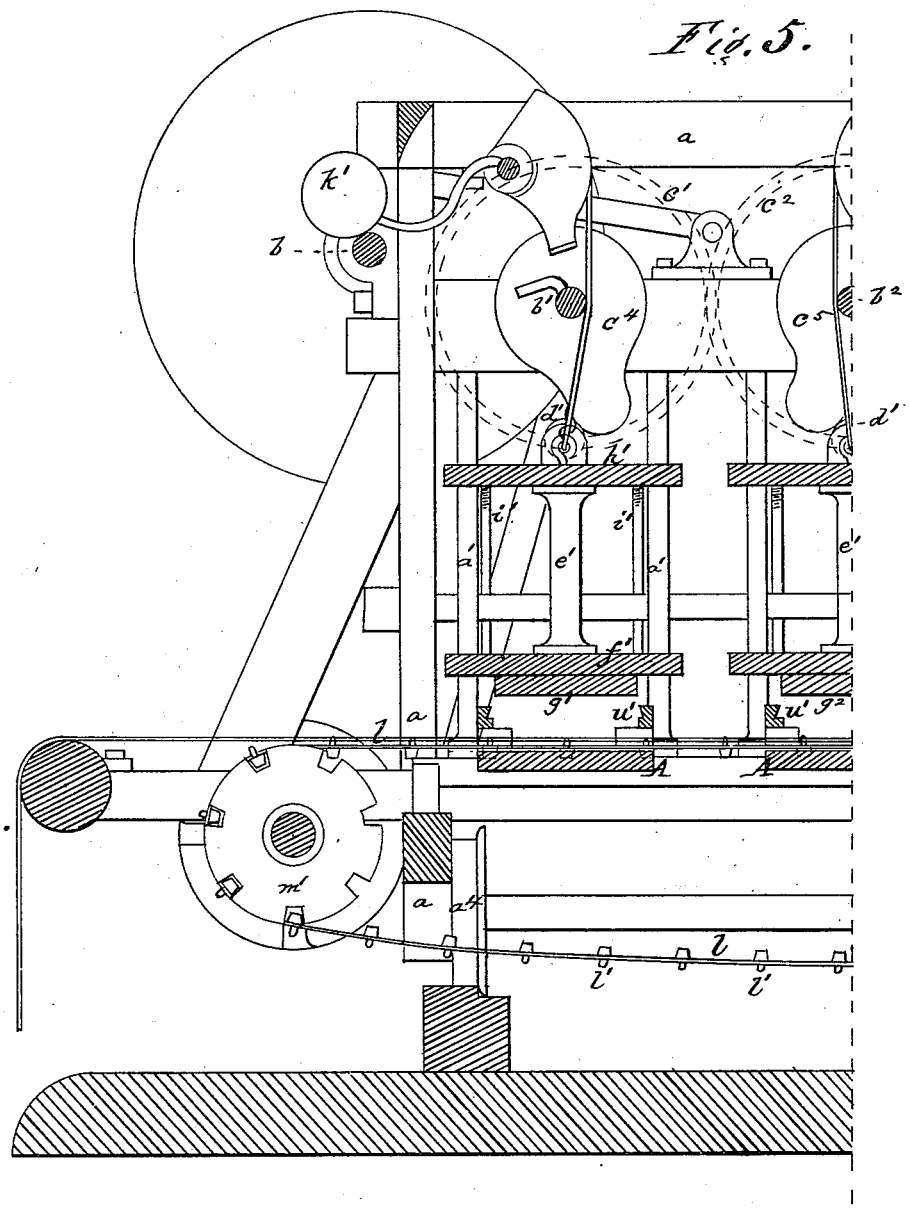
F. WALTON.

Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 5.



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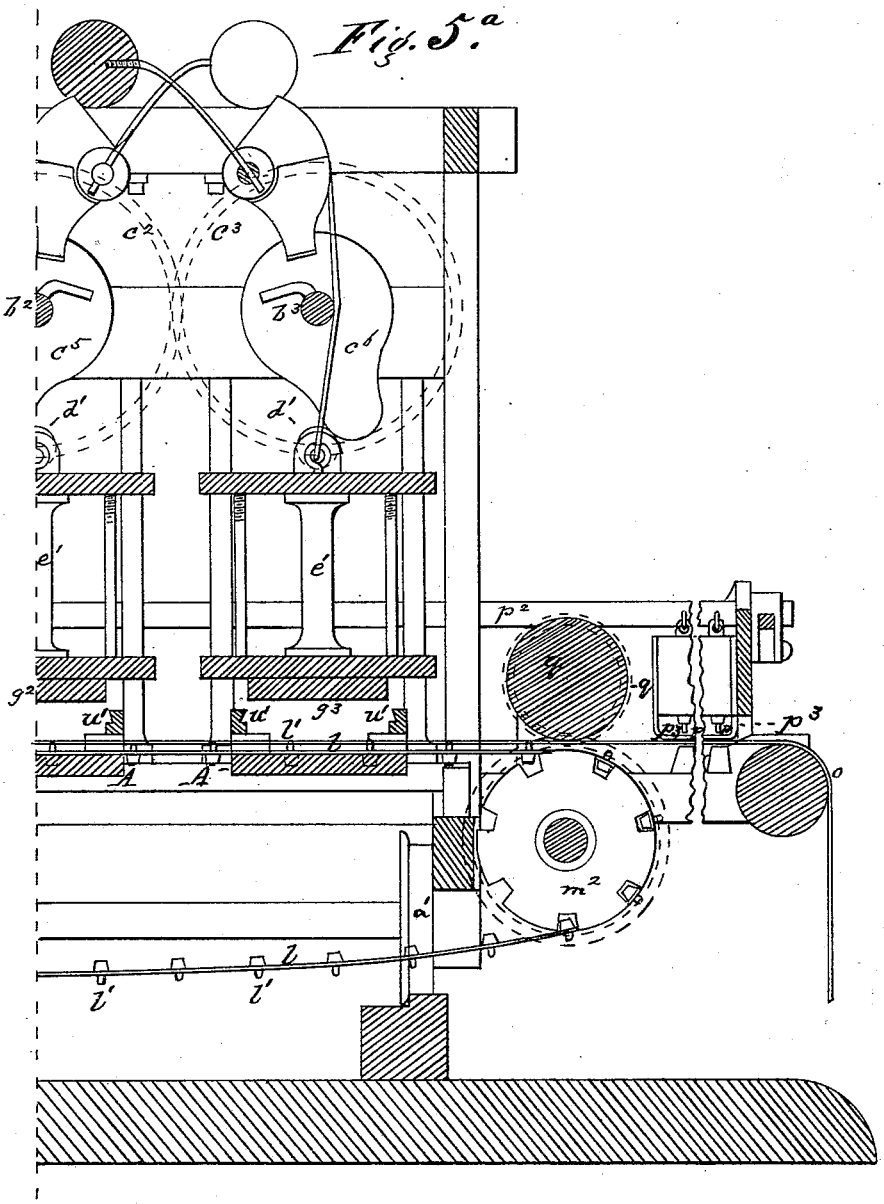
Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 5a



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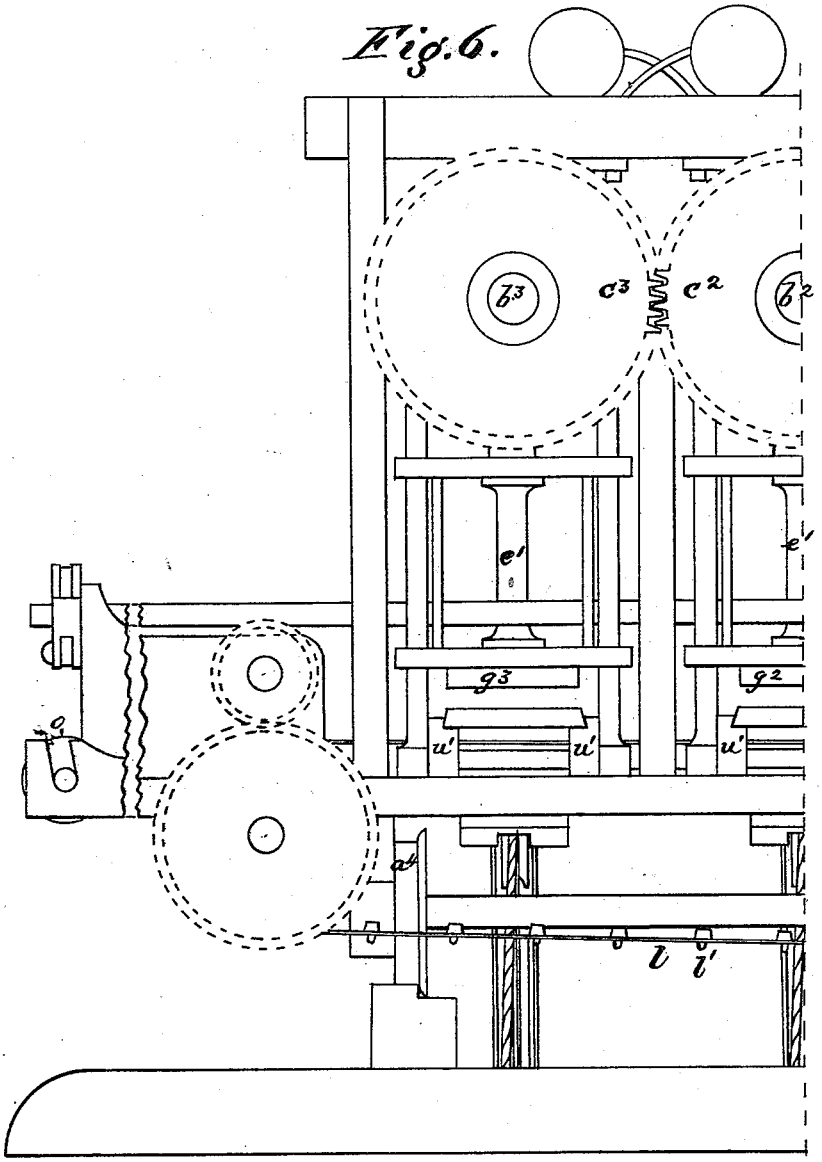
F. WALTON.

Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 6.



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Block-Printing Machine.

No. 167,283. Patented Aug. 31, 1875.

Fig. 6.a

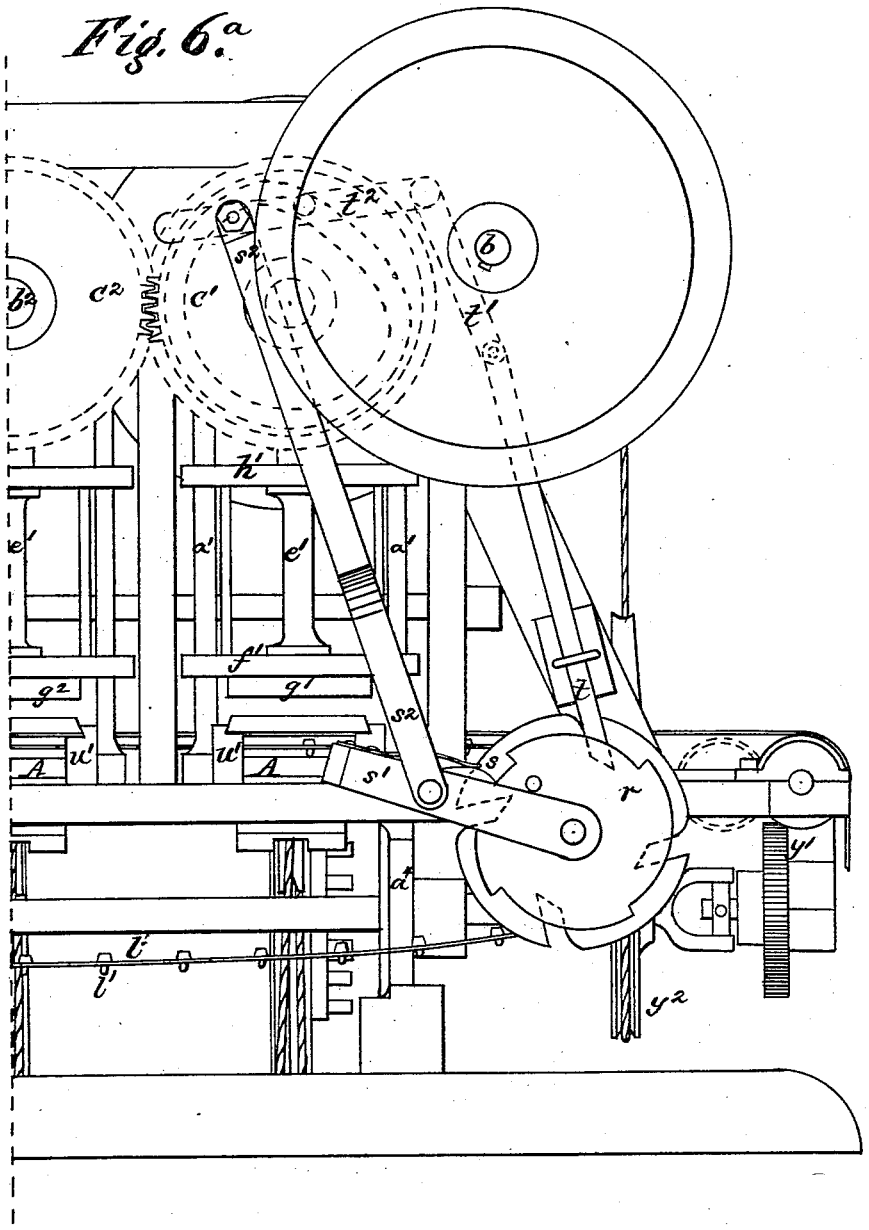

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Fig. 8.

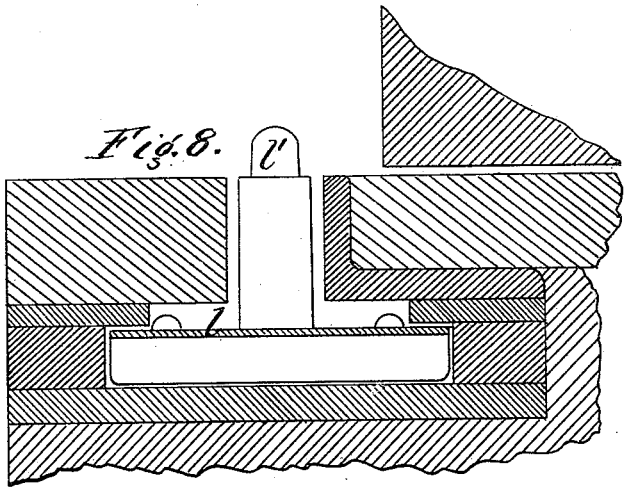


Fig. 9.

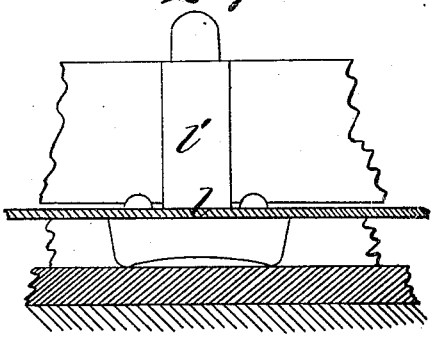
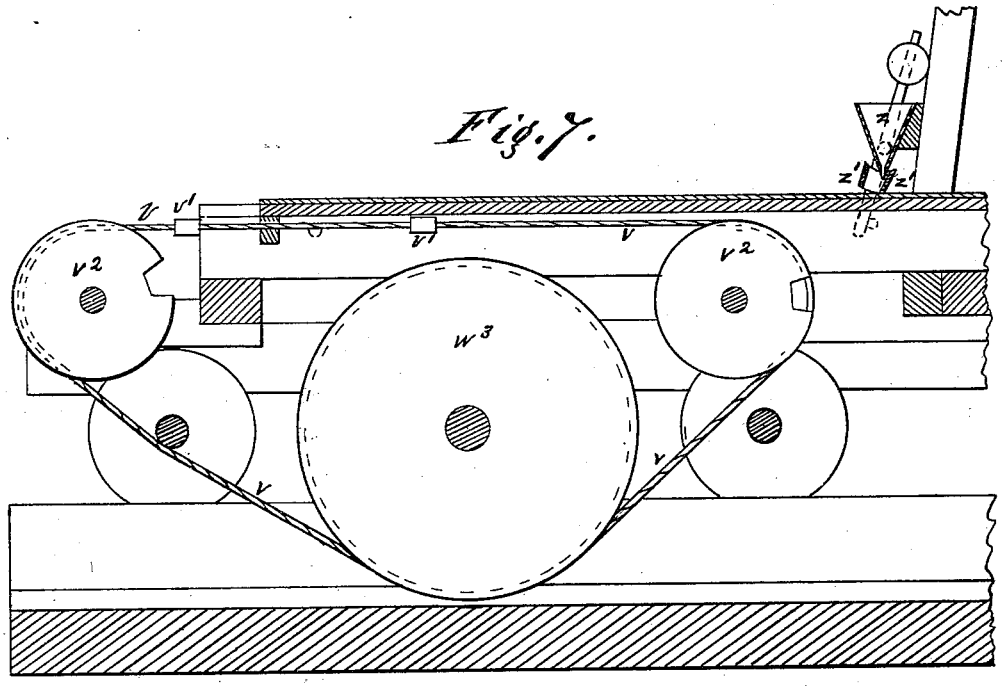


Fig. 7.



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UNITED STATES PATENT OFFICE.

FREDERICK WALTON, OF STAINES, GREAT BRITAIN, ASSIGNOR TO AMERICAN LINOLEUM MANUFACTURING COMPANY, OF NEW YORK, N. Y.

IMPROVEMENT IN BLOCK-PRINTING MACHINES.

Specification forming part of Letters Patent No. **167,283**, dated August 31, 1875; application filed March 22, 1875.

To all whom it may concern:

Be it known that I, FREDERICK WALTON, of Staines, in the county of Middlesex and Kingdom of Great Britain, have made an invention of certain new and useful Improvements in Block-Printing Apparatus; and that the following is a full, clear, and exact description and specification of the same.

This invention has for its object the printing of cloths by color-blocks, applying different colors, so as to produce parti-colored designs.

According to my invention the cloth to be printed is carried in succession under several reciprocating printing-blocks, which are caused to move to and from a table which supports the cloth. The cloth is held stationary while the said blocks impress the color upon its surface, and the cloth is moved along over the table and beneath the printing-blocks while the said blocks are removed from the cloth for the purpose of being supplied with color. The color is supplied to each printing-block by means of a reciprocating pad, which is moved to a position beneath the printing-block when the latter is removed from the cloth, is brought in contact with the block to supply it with color, and is removed laterally from beneath the block to permit the latter to be impressed upon the cloth. During the removal of the said pad it is supplied with color from a paint-trough, the layer of color being regulated by a doctor. The frame of the machine is mounted upon wheels, so that it may be moved along a range of drying-pits in which the fabrics are hung.

The invention consists of various combinations of mechanical devices by which the said system of block-printing is carried into effect, and which are specified in detail at the close of this specification.

In order that the invention may be fully understood, I have represented in the accompanying drawings, and will proceed to describe, a block-printing apparatus embodying my invention in a practical form.

Figure 1 of said drawings represents a plan of said apparatus. Fig. 2 represents a plan of the same with certain portions removed. Figs. 3 and 3^a represent a side view of the apparatus upon a larger scale. Figs. 4 and 4^a represent a front view of the same. Figs. 5 and 5^a represent a vertical transverse section of the same at the line $x\ x$ of Fig. 1. Figs. 6 and 6^a represent a view of the side of apparatus opposite that represented by Figs. 3 and 3^a. Fig. 7 represents a partial longitudinal section of the apparatus at the line $y\ y$ of Fig. 1. Figs. 8 and 9 represent views of the carrying-band.

In the machine represented in the said drawings the cloth to be printed is moved lengthwise over the supporting-table A A, and beneath a series of three printing-blocks, $g^1\ g^2\ g^3$, which are attached to the under sides of a series of platens, $f^1\ f^2\ f^3$, arranged in a row. The platens are separated from each other by spaces of such width that the distance between two adjacent printing-blocks is equal to the breadth of the blocks. Hence, when the cloth is moved step by step a distance equal to the breadth of one of the printing-blocks, and the said blocks are caused to impress it, each succeeding block in the series strikes down upon the same portion of the length of the cloth which has been imprinted by its predecessor or predecessors in the series, while the separation of adjacent color-blocks by a space permits the guides for the platens to be arranged opposite the ends of said space, out of the range of color-pads constructed to move crosswise between the platens and the supporting-bed, and also permits the said guides or guide-bars to be extended downward and secured below the range of movement of the platens. The said space, moreover, affords room for the guides or rails u^1, upon which the reciprocating table u^4 of the color-pad slides. The printing-blocks in the said machine are caused to move toward and from the supporting-table, or to reciprocate by means of cams which depress them, and counterpoise-weights which raise them. The frame $a\ a$ of the machine is mounted on three pairs of wheels, a^4, which run upon rails, so that the machine may be moved from place to place. The floor-cloth or other fabric, as it is printed, is delivered into drying-pits, where it is hung over bars in festoons, and is left to dry for several weeks; and the machine, being on

wheels, when one pit is full, is readily moved to the next, and so much unnecessary handling of the fabric after printing is avoided. By means of an endless driving-belt the transverse shaft b is driven from a steam-engine or other source of power.

The shaft b, by a pinion upon it, drives the shaft b^1, and the shaft b^1 drives the similar shafts b^2 and b^3 by means of spur-wheels c^1 c^2 c^3. The shafts b^1 b^2 b^3 are fitted with cams c^4 c^4, c^5 c^5, and c^6 c^6, for bringing the printing-blocks down into contact with the sheet to be printed, and with the color-pads.

The machine represented in the drawings is adapted to work three printing-blocks; but usually the machines will be arranged for a greater number of blocks, and then additional supporting-wheels and a third rail are provided.

The cams c^4 c^4 act on friction-wheels d' d', carried by the vertical stems e', and these stems are fixed to the platen f^1, to the under side of which the printing-block g^1 is attached. The platen f^1 is constructed to slide up and down on the upright guide-bars a^1 of the frame, and to steady the platen and the stems e' there is an upper frame, h', also sliding on the uprights a^1, and connected with the platen f^1 by the bolts i'. k' is a counterpoise-weight, attached by a lever and straps or chains passing over segments to the frame h'. This weight keeps the friction-wheels d' in contact with the cams c^4, raising the printing-block, with the parts which carry it, each time after it has been depressed by the cams. The other printing-blocks, g^2 and g^3, are similarly arranged and worked. l l are endless steel bands, with pegs l' l', to move the fabric to be printed, the pegs passing through holes punched for them in the margin of the fabric. These bands support the strain necessary to carry the fabric through the machine; and, notwithstanding that the fabric itself is more or less flexible and elastic, they carry it truly from block to block, so that the part of the pattern printed by each successive printing-block may fall accurately into its proper place.

Fig. 8 shows a transverse section of one of the bands. The peg l' is inserted from the under side, through a hole in the band, and has a T-head, which is fixed to the band by rivets. These heads enter recesses in the wheels m^1 m^2, which carry the band. The bands, when the fabric is upon them, run in guide-channels (as is seen in Fig. 8) formed in the sides of the supporting-table A, on which the fabric is supported, and which, beneath the printing-block, is padded with thick felt.

Fig. 9 is a portion of a side view of the band l, with the guide-channel in section. The fabric is led onto the machine over a guide-roller, o, and, as it is drawn forward, it passes under the punches p p, which prepare the holes for the pins l'. The punches are worked by the rocking shafts p^1 and p^2, which are connected across the machine, in the manner shown in Fig. 4ª, and the shaft p^1 takes its motion from a cam on the shaft b^1. p^3 are adjustable guards, to prevent the fabric lifting with the punches. The adjustable roller q, which has holes in its periphery, presses the fabric onto the pins, and the bands l then carry it forward. Between each descent of the printing-block and the next the bands have to receive a forward motion equal to the width of one of the blocks. All the printing-blocks are of the same size, and the spaces between them are of the same width as the blocks. The wheels m^1 are driven, in order to give motion to the bands, by a ratchet-wheel, r, and a driving-pawl, s, on a lever, s^1. The lever s^1 is worked by a connecting-rod, s^2, taking its motion from a crank-pin carried round by the shaft b^1.

In order to obtain great accuracy of movement, the last portion of the forward motion of the fabric is obtained by the insertion of the pin or plunger t into recesses at the side of the ratchet-wheel r. These recesses are taper, and their faces, which are adjustable, are accurately fitted, so that the pin or plunger t, being forced down between them, brings the wheel, and consequently the carrying-bands l, exactly to the proper position, and holds it there while the printing-blocks descend onto the fabric. The pin or plunger t is worked by a link, t^1, (represented in dotted lines in Fig. 6ª,) connecting it with a lever, t^2, which is moved by a cam on the shaft b^1.

The printing-blocks receive the color from color-pads u, which are covered with felt with a smooth water-proof surface, and are carried by tables u^4. These color-tables slide on the guides u^1. They are caused to move to and fro, or to reciprocate at the proper times, by endless bands v v v, which have stops v^1 upon them, and these come in contact with the ends of the tables.

The bands v pass round wheels v^2, and are fixed to the peripheries of the wheels w^1 w^2 w^3. The first of these three has a mangle-wheel, w^4, fixed to it, which is driven first one way and then the other by the pinion, the shaft x of which is connected by a universal joint to the wheel y, and is suitably guided, so that it may pass along the mangle-wheel teeth alternately on the inner and outer side. The wheel y is driven by the wheel y^1, and this by an endless chain and chain-wheels, y^2, from the shaft y^3, on which is a pinion in gear with the wheel y^4 on the axis b^1. The bands or chains v v v are thus constantly traveling to and fro, but the color-pads pause at each end of their course, while the chains travel the distance between the stops v^1 v^1.

As the printing-blocks rise from the fabric which is being printed, the color-tables carrying the pads are run in beneath them; then, when the pads are stationary, the blocks come down in contact with them, being caused to do so by the smaller grade on each of the printing-cams; then, when the blocks have again risen from the pads, the pads are run out by the movement of the color-tables, and

as soon as they are clear the color-block comes down and prints the fabric. The punching of the holes in the fabric is effected while the fabric is stationary for printing.

The color-pads are supplied from the paint-troughs *z*, the flow of the color from which is regulated by wooden plugs, (not indicated in the drawings,) and the color is spread by means of duplex doctors or scrapers *z'*, there being two scrapers to each trough *z*, which are connected to a weighted rock-shaft that is rocked by pin or projections on the color-table, in such manner that in whichever direction the table be traveling it can only carry with it from the color-trough so much color as will pass beneath the edge of the scraper or doctor.

The printing-blocks are, as has heretofore been the practice, grooved or saw-cut on the printing-face, to prevent the color sucking inward toward the center of each patch when the block is lifted. Sometimes, to obliterate the marks of these grooves or saw-cuts, I give the printing-blocks a slight motion while in contact with the fabric. The block g^1 g^2 g^3 is then not rigidly fixed to the surface of the platen f^1, but can move upon it a short distance under the control of an eccentric or such like instrument. In some cases I spread two colors on each of the printing-pads, half of the width of the pad being occupied by each color. In this way a greater variety of color in the printed pattern may be obtained.

By punching holes in the edges of the fabric, not only is the fabric accurately guided while it is printed, but the subsequent processes of washing the surface of the fabric, and cutting the edge true and straight with the pattern, are much facilitated.

Having thus described the nature of my said invention and the manner of performing the same, I declare that I am aware that previous to my invention block-printing machines have been constructed with a series of platens arranged in juxtaposition, and arranged to move laterally, as well as to reciprocate vertically; also, with endless chains of links, between which the fabric was stretched on hooks. Therefore, I do not claim, broadly, the combination of endless moving mechanism and a platen, nor the combination of a series of platens arranged in any manner and endless moving mechanism; but

I would have it understood that I claim as my improvements in block-printing machinery—

1. The combination, substantially as before set forth, of the endless carrying and supporting bands fitted with pegs projecting from their upper surfaces, (to enter holes punched in the margins of the fabrics,) the supporting-table, and the reciprocating platen for the color-block.

2. The combination, substantially as before set forth, of the endless carrying-bands fitted with pegs, the supporting-table, and the presser-roller for pressing the fabric upon the pegs of the supporting-bands.

3. The combination, substantially as before set forth, of the endless carrying-bands fitted with pegs, and the punching mechanism, whereby the cloth may be punched in the same machine in which it is carried along.

4. The combination, substantially as before set forth, of the series of reciprocating platens for the color-blocks, the color-blocks separated by spaces, and the guide-bars for said platens arranged opposite the ends of the spaces between said color-blocks.

5. The combination, substantially as before set forth, of the cloth-moving mechanism, the supporting-table, the series of platens for the printing-plocks, and the series of color-tables arranged to reciprocate horizontally between the supporting-table and the platens.

6. The combination, substantially as before set forth, of the reciprocating color-table for the color-pad, the paint-trough, and the duplex doctor.

7. The combination, substantially as before set forth, of the supporting-table, the endless carrying-bands, the recessed ratchet-wheel, and the pin therefor.

8. The arrangement, substantially as before set forth, of the supporting-bed, the intermittent cloth-moving mechanism, the series of platens for the printing-plocks, the series of reciprocating color-tables for the color-pads, and the frame of the machine upon supporting-wheels, the whole constituting a locomotive block-printing machine for printing fabrics by means of a series of blocks.

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