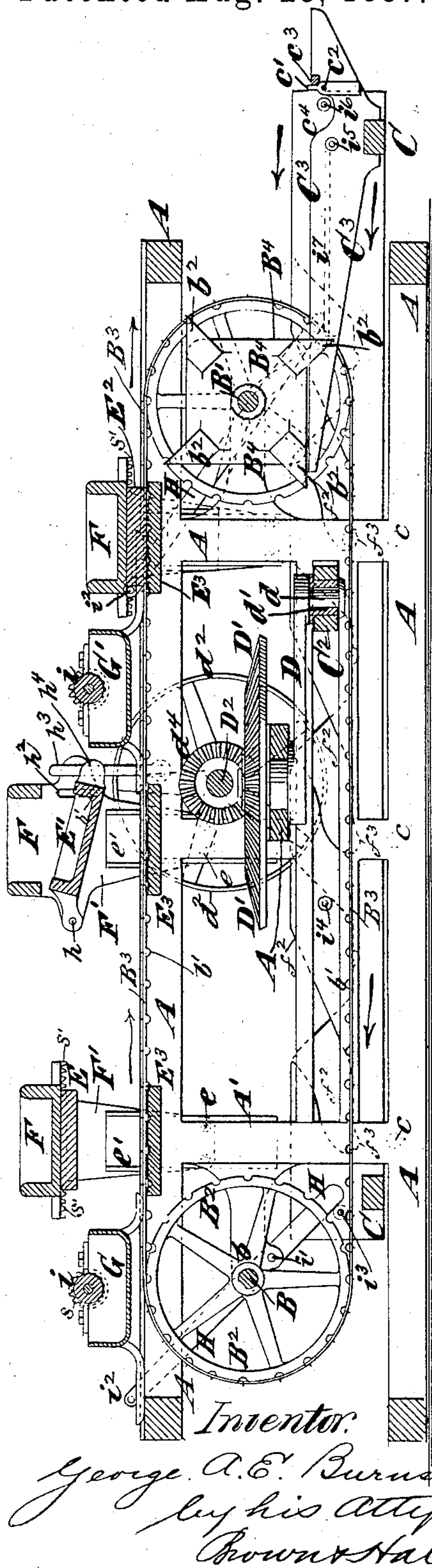
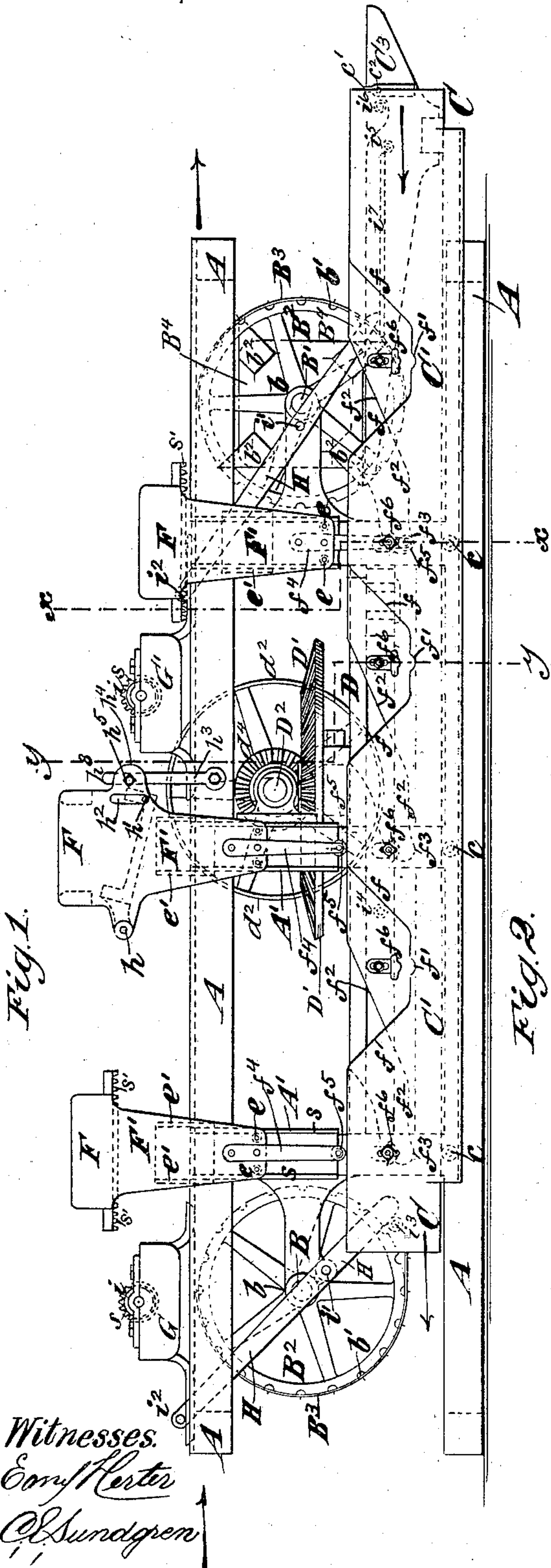


G. A. E. BURNSIDE.

MACHINE FOR PRINTING OIL CLOTH.

No. 368,751.

Patented Aug. 23, 1887.



(No Model.)

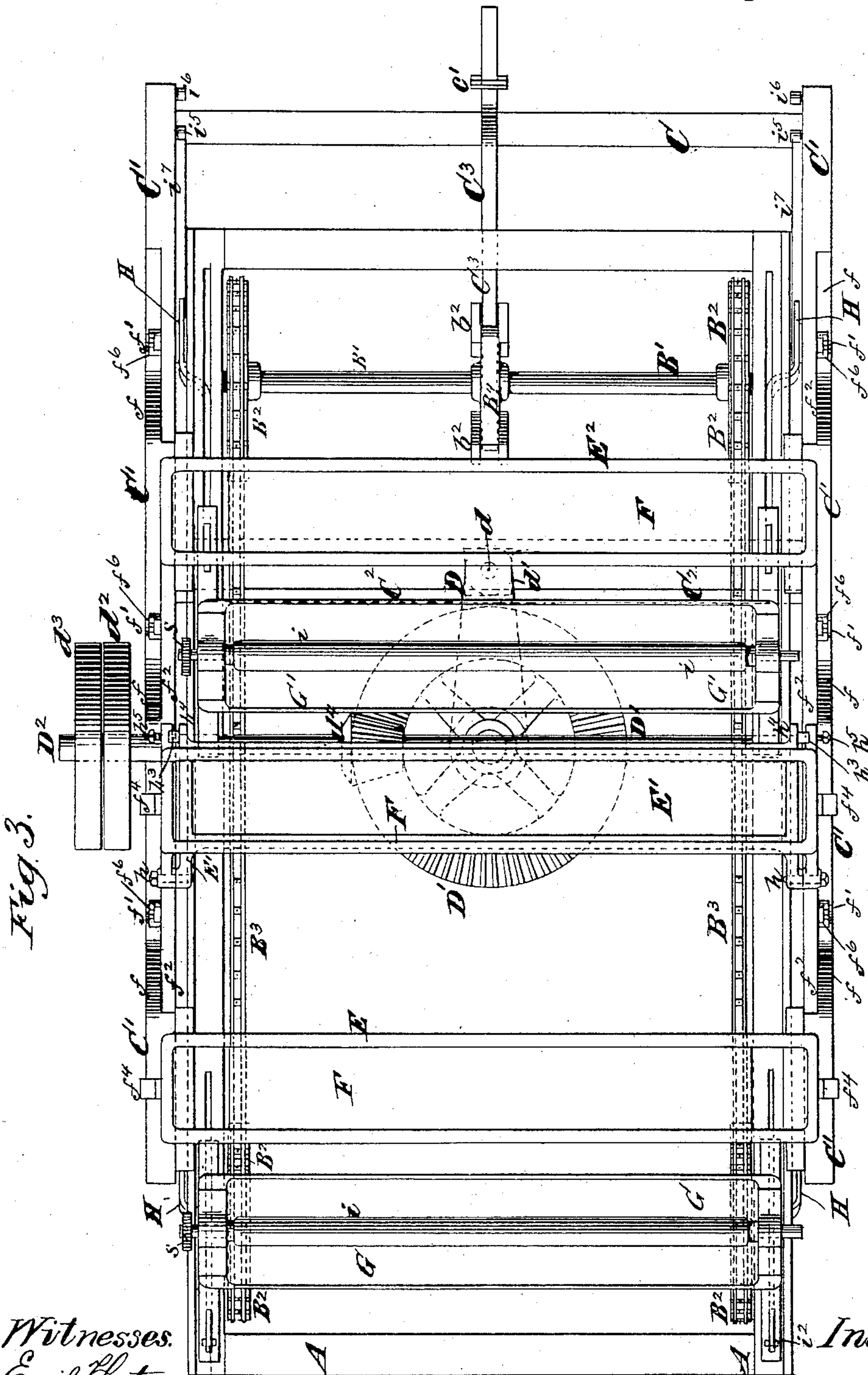
3 Sheets—Sheet 2.

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Fig. 4.

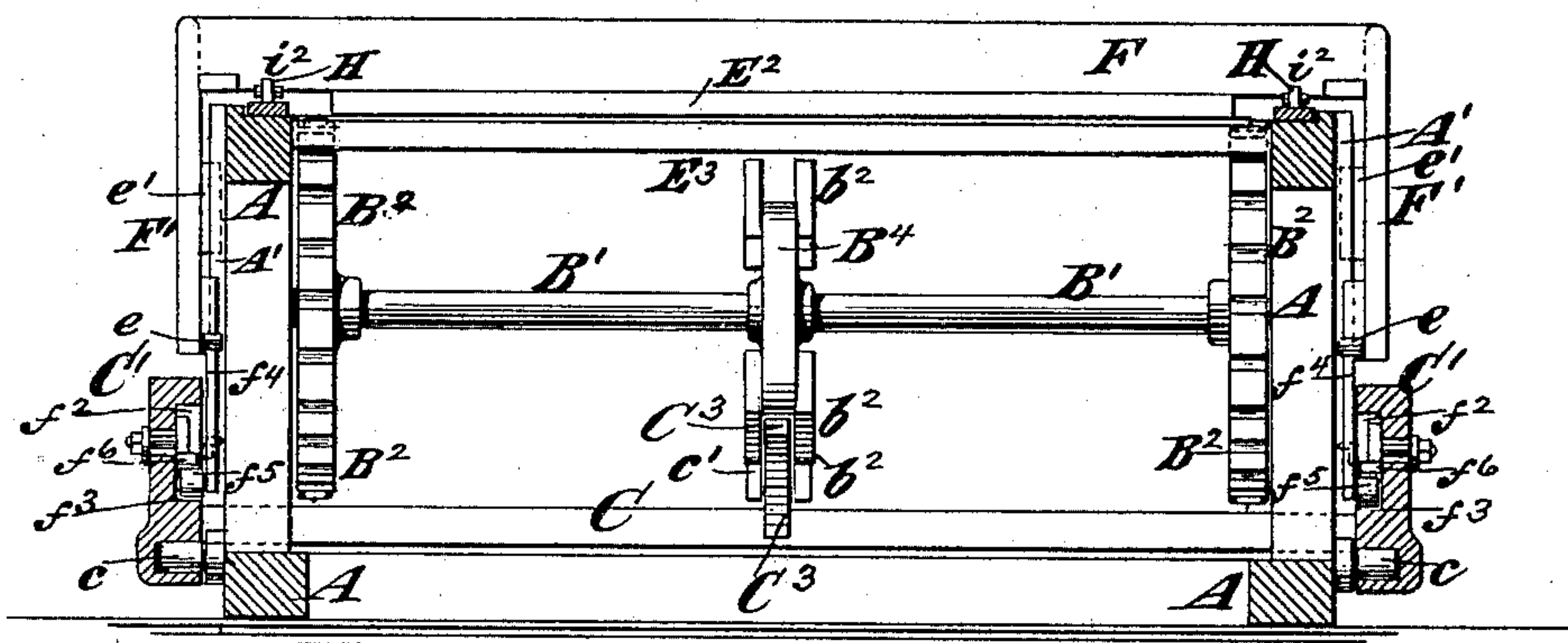
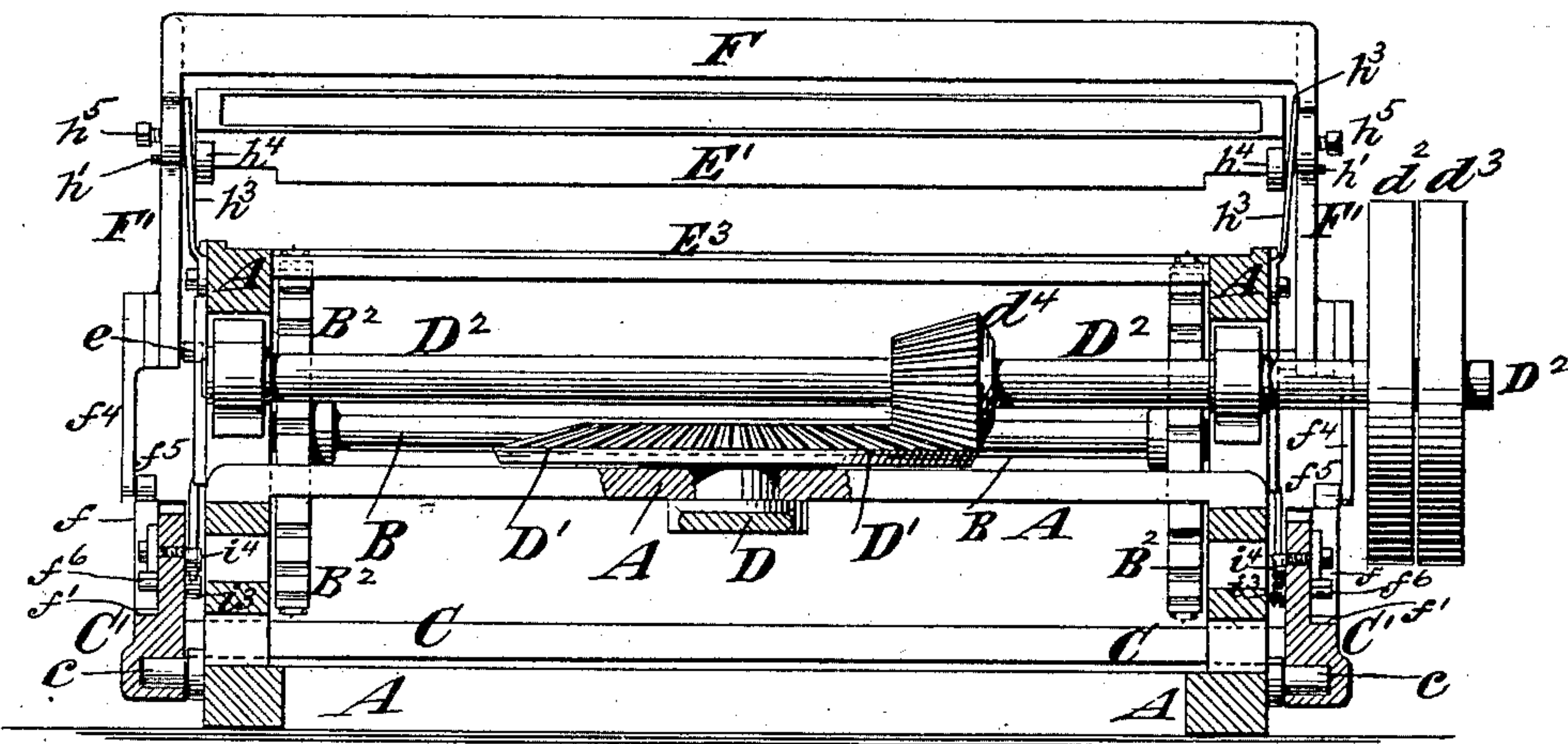


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE A. E. BURNSIDE, OF BROOKLYN, NEW YORK.

MACHINE FOR PRINTING OIL-CLOTH.

SPECIFICATION forming part of Letters Patent No. 368,751, dated August 23, 1887.

Application filed October 5, 1886. Serial No. 215,358. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. E. BURNSIDE, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Machines for Printing Oil-Cloth, of which the following is a specification.

In machines for printing oil-cloth as usually constructed there are employed filling-in blocks and outline-blocks, which are drawn or forced downward upon the cloth in order to apply the color thereto. The oil-cloth is caused to move by a traveling carrier, which has an intermittent motion, and between the movements of the cloth the filling-in blocks and outline-blocks are pressed downward upon the cloth at different points in its length. The filling-in blocks have usually two printing movements or make two impressions at each forward movement of the cloth, and such blocks have color applied to them by means of color-rollers which pass under them before each impression. The outline-blocks only print once at each movement of the cloth, and the color-rollers pass under them twice prior to each printing movement. In addition to filling-in and outline-blocks, there are also employed cover-blocks, which are depressed upon the color left by the filling-in blocks and serve to flatten or bed the color upon or into the cloth.

A machine for the purpose above described may have any number of the filling-in blocks and any desired number of the outline-blocks, and all the different blocks are usually secured upon carriages having a vertical movement, whereby the blocks are forced downward upon and raised from the cloth.

My invention relates more particularly to machines in which the block-carriages are operated by the rectilinear movement of reciprocating cams; and one feature of my invention consists in novel combinations of parts, hereinafter particularly described, whereby the cams may be severally made to actuate either one of the block-carriages, as may be desired.

The invention also consists in novel combinations of parts, hereinafter particularly described, and pointed out in the claims, for operating the cover-block.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a longitudinal vertical

section thereof. Fig. 3 is a plan thereof. Fig. 4 is a transverse section upon the plane of the dotted line *x x*, Fig. 1; and Fig. 5 is a similar section upon the plane of the dotted line *y y*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A designates the main frame of the machine, which may be constructed of wood or metal, or of a combination of such materials. At opposite ends of the main frame are supported shafts B B', upon which are secured drums B², and which are mounted in suitable bearings, *b*. At opposite sides of the machine are belts or chains B³, which may be provided with projections *b'* on their inner surfaces, and which have pins or points upon their exterior surfaces adapted to engage with and move the cloth. These belts or chains B³ constitute an endless traveler or traveling carrier, whereby the cloth is taken in at the left-hand end of the machine, as represented in Figs. 1 and 2, in the direction of the arrows, and is carried forward by the upper portions of the belts or chains to the opposite or delivery end of the machine. I have not shown the apparatus employed from which the cloth is supplied to the machine, nor have I shown the mechanism for taking the printed cloth therefrom, as these parts may be similar to those in common use, and do not in any way embody my invention. The endless belts or chains here shown form a convenient arrangement of endless traveling carrier for the cloth, but any other carrier of suitable arrangement and construction may be employed.

C designates a reciprocating frame, which is supported by rollers *c*, projecting from the main frame, as shown in Figs. 4 and 5, or by other suitable arrangement of guides. The reciprocating frame comprises side bars, C', which are constructed, as hereinafter described, so as to constitute cams for moving the block-carriages, and the to-and-fro motion in the direction of travel of the carrier B³ may be imparted to the frame C by means of a crank, D, which is journaled in a portion of the main frame A, and which has connected rigidly with it, in this example of my invention, a bevel-wheel, D'. The crank D has a wrist or crank pin, *d*, which has fitted to it a sliding block, *d'*, arranged in a slotted cross-bar, C², of the frame C. The block *d'* may play backward and forward from one side of the machine to

the other in the slot in the cross-bar C^2 , and as the wheel D' is rotated the crank D imparts a positive reciprocating motion to the frame C .

D^2 designates a counter-shaft provided with fast and loose pulleys d^2 d^3 for receiving a driving-belt, and having at the inner end a bevel-pinion, d^4 , which engages with the wheel D' , and through it imparts motion to the crank D , as is best shown in Fig. 5. Any suitable mechanism may be employed for imparting an intermittent motion to the endless travelers B^3 . I have here represented upon the shaft B' a rectangular hub or rotary part, B^4 , having bifurcated or forked projections b^2 at the corners, and to one end of the reciprocating frame C is attached a bar or slide, C^3 , which is in the same vertical plane with the rectangular hub B^4 , and which plays between the sides of the bifurcated projections or forks b^2 , as is best shown in Fig. 4. Upon the bar or slide C^3 is a trip or cam, c' , which is pivoted at c^2 and embraces the bar or slide C^3 , as is best shown in Fig. 3.

Upon the bar or slide, immediately behind the trip c' , are shoulders c^3 , which preclude the trip c' from swinging at the top toward the right hand of Figs. 1 and 2, but permit it to swing freely in an opposite direction.

Immediately in front of the trip c' is a depression or recess, c^4 , in the top of the bar C^3 , and it will be obvious that when the reciprocating frame C is moved by the crank D in the direction of the arrow marked upon said frame the trip c' will be brought against one of the projections of the hub or rotary part B^4 , and as the trip cannot yield backward, inasmuch as it is supported by shoulders c^3 , the hub or rotary part B^4 will be turned, and, in turning, the corner thereof will enter into the recess or depression c^4 , and the shaft B' and shaft B will be turned each one-quarter of a revolution, and the endless travelers B^3 , with the cloth, will be moved a corresponding distance. The movement of the bar or slide C^3 upon the reciprocating frame C is of such length that by its operation toward the left of Figs. 1 and 2 the shaft B' will be turned exactly one-quarter of a revolution.

I have here represented a filling-in block, E , and cover-block E' , and an outline-block, E^2 ; but it will be understood that any desired number of these blocks may be employed and operated, the cover-blocks E' being between the filling-in blocks E and the outline-blocks E^2 .

The carriages whereby the several blocks E E' E^2 are supported and moved upward and downward are of very similar construction, differing but slightly from each other. Each carriage comprises an upper portion or platen, F , which extends transversely across the machine, and side portions or pieces, F' , which extend downward at each side of the machine and are suitably guided in parts attached to the main frame A . As here represented, the main frame has upon the inner side of each side piece, F' , a channeled slideway, A' , upon the inner sides of the flanges s of which bear roll-

ers e upon the side pieces, F' , and upon the outer sides of which bear flanges e' upon the side pieces. By this or any other suitable arrangement of guides the carriages F are caused to move in truly vertical lines, and the blocks E E' E^2 are brought downward directly against the surface of the cloth.

It is very important in machines of this character to provide for readily changing the carriages or the connections through which they are operated, so that any one carriage may be employed either as a carriage for a filling-in block or the carriage for an outline-block. The movement of the carriages F upward and downward is accomplished solely by cams, which are formed upon or attached to the side pieces, C' , of the reciprocating frame. As here represented, these side pieces are composed of single pieces of wood or metal, the outer portions of which for about half their vertical thickness are constructed to form cams for operating the filling-in block or blocks, and the inner portions of each for about half their thickness are constructed to form cams for operating the outline block or blocks, or, in other words, in each instance, for operating the carriages to which these blocks are attached.

In the outer vertical half of each side piece, C' , extending from the top downward, are recesses or depressions f , which have at the bottom minor recesses or depressions f' , and upon the inner vertical half of the side pieces, C' , are grooves or recesses f^2 , which are open at the top and which extend therefrom downward horizontally and have at their ends slight drops or depressions f^3 . The number of the recesses or depressions f and the grooves f^2 will correspond to the number of block-carriages which are to be operated. The part in which are the several recesses or depressions f constitutes a reciprocating cam for operating the filling-in blocks, and the part in which are the several recesses or grooves f^2 constitutes a reciprocating cam for operating the carriages for the outline-blocks. Upon the side pieces, F' , of each carriage is a downwardly-extending arm, f^4 , which is armed with a roller, f^5 , and these arms may be secured either to the inner side or the outer side of the downwardly-extending pieces F' . When the arms f^4 are secured to the outer surface of the side pieces, F' , as shown in the carriage at the left hand of Fig. 1, the rollers f^5 are in position to ride upon the irregular surfaces of the recess or depressions f , as is best shown in Fig. 5, which surfaces constitute the reciprocating cam for working the filling-in blocks. When the arms f^4 are reversed in position and secured to the inner surfaces of the side portions, F' , of the carriages, as shown at the right hand of Fig. 1 and in Fig. 4, the rollers come in proper position to enter and ride upon the bottom of the recesses or grooves f^2 , which constitute a reciprocating cam for operating the outline-blocks.

The stroke of the reciprocating frame C is such that the depression f , formed in the side

portion, C' , thereof, and which constitutes the filling-in cam, will be carried entirely beyond the arm f^4 of the carriage F , which operates the filling-in block E , and hence by each complete or double reciprocation of the frame C , whereby is effected a single movement of the cloth, the carriage of the filling-in block E will have a double reciprocating movement and will be caused to make two impressions. When, by the movement of the cams upon the side pieces, C' , of the reciprocating frame C , the roller f^5 on the carriage reaches the depression f' or f^3 , the carriage on which the roller is, is at once drawn downward by the roller passing under an abutment or projection, f^6 , as is best shown in Fig. 1, but also in Figs. 4 and 5. One of these abutments or projections f^6 is arranged immediately over the minor depressions f' and the depressions f^3 , and as the rollers f^5 of any one carriage pass under such abutments f^6 the carriage is drawn forcibly down and the block caused to forcibly make an impression upon the cloth.

The blocks or abutments f^6 are adjustable by means of a screw-bolt and slot, as shown in Fig. 1 and also in Fig. 4, so as to slightly change their vertical position and to cause them to draw the block-carriage downward with greater or less force upon the cloth.

From the above description it will be readily understood that by simply changing the arms f^4 from the outer sides of the side pieces, F' , of the carriages, as shown at the left-hand of Figs. 1 and 5, to the inner sides of the side pieces, F' , as shown at the right-hand of Figs. 1 and 4, the movements of the carriages will be changed from those necessary for operating the filling-in block to the movement necessary for operating the outline-block; hence, in a machine having a number of block-carriages, as many as desired may be operated with filling-in blocks and any desired number may be operated with outline-blocks.

The carriage F' for the cover-block E' is substantially like the carriages for the filling-in and outline blocks, and it has imparted to it movement corresponding to the movement of the carriage for the filling-in block—that is to say, it is depressed to cause the block E' to press upon the cloth twice between each two movements of the cloth. It has at opposite sides arms f^4 , which are armed with rollers f^5 , and which operate upon the recesses or inclined surfaces constituting the filling-in cams f^3 .

Where the cover-block E' is secured in fixed position in its carriage, so that its face always maintains a truly horizontal position, the atmospheric pressure opposes a great resistance to the rising of the block from the cloth after it has been forced down upon the color left upon the cloth by the filling-in block, and in consequence of such resistance, and the failure to vent the face of the cover-block as it is lifted, the color will be raised in pits or points by the rising cover-block and the cloth will have an uneven and rough appearance. To

avoid this I so connect the cover-block E' with its carriage that one longitudinal edge of the block will be raised before the other, or, in other words, the block will be lifted at one edge first. As here represented, the cover-block E' is hinged to the carriage at some little distance beyond one longitudinal edge of the block and at the point h , and the center of this pivot should be in line with the face of the block. Near the opposite edge the block is provided with pins h' , which play in slots h^2 in the sides of the carriage. When the carriage is moved upward, that edge of the block nearest the pivots will be lifted first, and the opposite edge will not be lifted until the bottom edge of the slots h^2 come against the pins h' . Consequently the block E' , as it is lifted, will be lifted from the hinged side first and gradually from that side toward the other, and in lifting the block will assume the position shown in Fig. 2.

Although the block may be lifted while occupying the inclined position shown in Fig. 2, it is necessary that as it moves downward it should be brought into horizontal position, so that its face, before it strikes the cloth, will be directly parallel with the cloth. To secure this result I provide brakes which offer a frictional resistance to the downward movement of the block E' near its free edge, and these brakes may consist of springs h^3 , secured to the side of the frame A and bearing upon the ears or projections h^4 of the block E' . The tension of these spring-brakes may be graduated by screws h^5 , inserted in said side pieces, F' , of the carriage, and as the carriage moves downward the hinged longitudinal edge of the block E' moves with it, while the action of the brake retracts the movement of the block at its free edge and causes it to be brought into a horizontal position before it strikes the cloth. The slots h^2 should be so proportioned that when the top of the slots is brought against the pins h' , by reason of the block E' being retarded in its downward movement, the face of the block E' will be horizontal and parallel with the cloth.

The lower ends of the slots h^2 may be considered as constituting bearings which, by coming against the pins h' , will lift or raise the cover-block E' at its longitudinal edge which is most distant from its pivots h , and the pivots h constitute a bearing for raising the block at one longitudinal edge before the other.

I have represented below the several blocks E E' E^2 , and impression-beds E^3 , over which the cloth passes; or, if desired, a single bed may be extended the entire length of the machine between the endless chains or belts B^3 .

G G' designate two color-troughs having rollers i , which are capable of sliding upon the frame A beneath the blocks to which they are intended to apply color. The trough G is moved across to ink the block E before each downward movement of the block, while the trough G' is moved across beneath the block E^2 forward and backward before each down-

ward movement of the block, so as to apply color to the block twice between its impressions. These troughs slide or roll upon the top of the main frame, and are operated each by levers H, arranged one at each side of the machine and fulcrumed at i' . The upper ends of the levers may be connected at i^2 with the trough, and the lower ends of these levers, which work the trough G, project in the path of tappets i^3 i^4 upon the reciprocating frame. The lower ends of the levers H, which operate the trough G', are operated by tappets i^5 i^6 upon the reciprocating frame, in connection with horizontal bearing-surfaces i^7 , which extend from the tappets i^5 , as shown in Figs. 1 and 2.

In the position of parts shown in the drawings the filling-in block E is raised from the cloth, while the outline-block is held in its lowermost position by its carriage in order to produce its impression upon the cloth. As the reciprocating-frame moves toward the left hand of Figs. 1 and 2, it raises the carriage F of the outline-block and during its movement in such direction brings the filling-in block E down upon the cloth. During the operation or movement of the reciprocating carriage toward the left the levers H, which operate the trough G', are supported by the bearing-surface i^7 ; but as soon as the tappet i^6 comes against the lower ends of the levers H said levers will be swung upon their fulcrums, so as to cause the trough G' to pass under the elevated block E², and at the first reversal of the movement of the carriage the tappet i^5 will act upon the lower ends of said levers, so as to make or give the trough G' a return movement under the block E², thereby applying color to the block E² twice before its downward movement upon the cloth.

In the movement of the reciprocating frame C toward the left of Figs. 1 and 2 the carriage F of the block E is lowered to impress said block upon the cloth, and as the carriage about completes its rising movement the tappet i^4 comes against the levers H which operate the trough G and causes said trough to pass under the block E, to the right hand thereof. In the return movement of the carriage C the block-carriage F is again operated, and as it rises, after operation, the tappets i^3 come against the levers H and move the trough G backward under the block E to the position at the left hand thereof. (Shown in Figs. 1 and 2.) The tappets whereby the levers H are operated may, if desired, have rubber bushes applied over them, as represented by dotted lines in Fig. 1 and full lines in Fig. 2, in order to deaden the slight shock which might be produced by their striking the levers H.

It is advantageous to make the hub or part B⁴ square and the bar C³ of considerable length, because then the upper edge of the bar C³ bears upon one of the flat sides of the hub or part B⁴, and holds it against turning during the whole movement of the frame C, save when the trip c' acts to turn it, and the cloth is thus held

absolutely stationary as the blocks make their impressions.

The color-rollers i may be turned positively as they are carried under the block-carriages by pinions s upon them engaging racks s' on the carriages.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a traveling carrier and carriages for the outline-block, the filling-in block, and the cover-block, of a reciprocating frame comprising at each side of the machine cams which are arranged side by side, and which serve one for operating the carriages of the filling-in and cover blocks and the other for operating the carriage for the outline-block, and arms adjustable upon said carriages to engage at will either of said cams, substantially as herein described.

2. The combination, with a traveling carrier and a fixed frame, of block-carriages having end pieces provided with slides $e e'$, fitting on the fixed guides A' on the fixed frame, a reciprocating carriage comprising at each side of the machine cams serving, respectively, for operating the carriages of the filling-in and cover blocks and the carriage or carriages for the outline-blocks, and arms f^4 , which may be secured to the inner or outer sides of the end pieces of the carriages for operating any carriage by one or the other of said cams, as desired, substantially as herein described.

3. The combination, with a traveling carrier for oil-cloth and a cover-block carriage arranged transversely to the path of the carrier and having at the ends downwardly-projecting arms, through which it is moved upward and downward, of a cover-block extending between the arms of the carriage and hinged to the carriage near one longitudinal edge and having at the opposite edge an upward and downward movement in the carriage, substantially as herein described.

4. The combination, with a traveling carrier for oil-cloth and a cover-block, of a cover-block carriage movable upward and downward and having a bearing on the block for bringing it squarely down on the work, and a bearing for raising the block at one longitudinal edge before the other, and brakes for adjusting the block to a position parallel with the cloth as it descends upon the cloth, substantially as herein described.

5. The combination, with a traveling carrier and a cover-block carriage, of the block E, hinged at h near one longitudinal edge and free to move in the carriage at the opposite edge, and stationary brakes or retarding devices h^3 , in contact with which the block moves as it descends and by which the block is brought into parallelism with the cloth before it strikes the cloth, substantially as herein described.

GEO. A. E. BURNSIDE.

Witnesses:

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