

June 22, 1926.

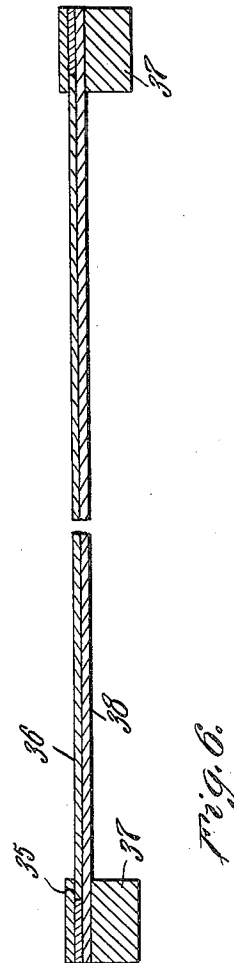
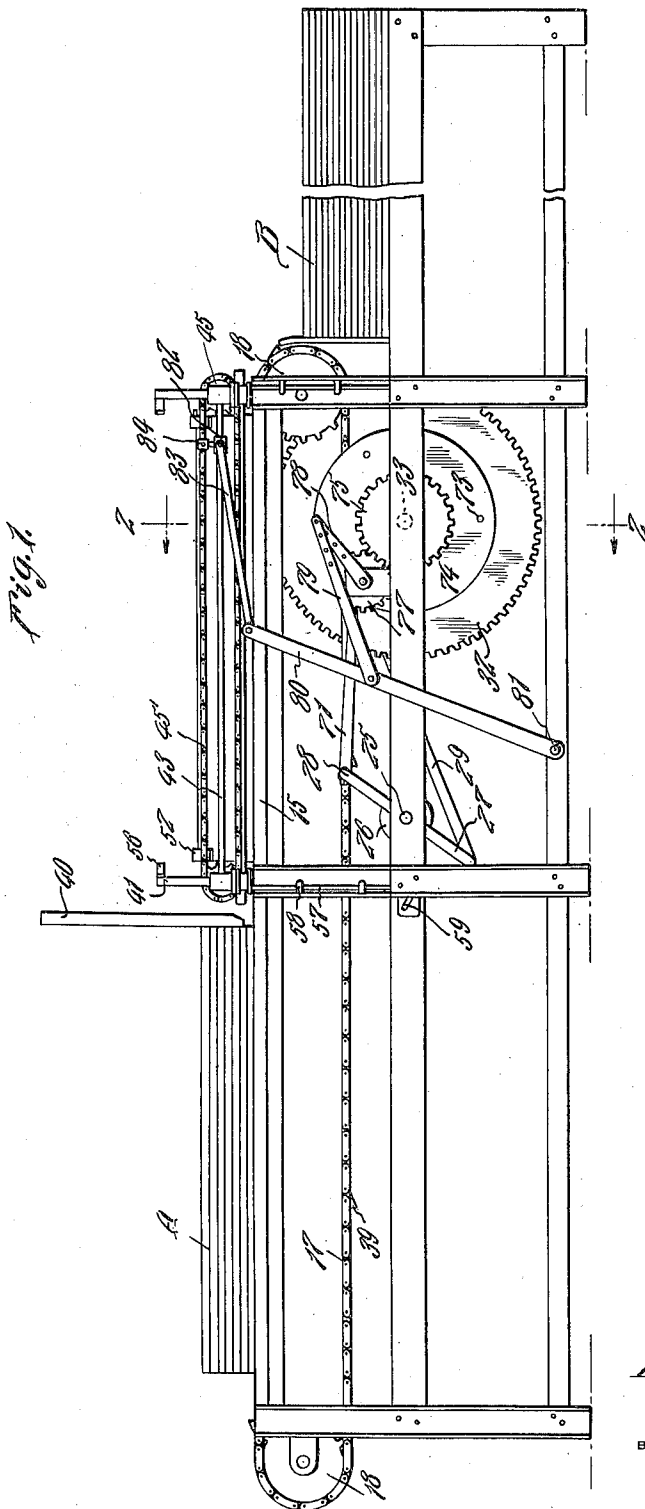
1,589,546

E. NICHOLS

PRINTING MACHINE

Filed June 18, 1925

6 Sheets-Sheet 1



Elmer Nichols

INVENTOR

BY *Victor J. Evans*

ATTORNEY

June 22, 1926.

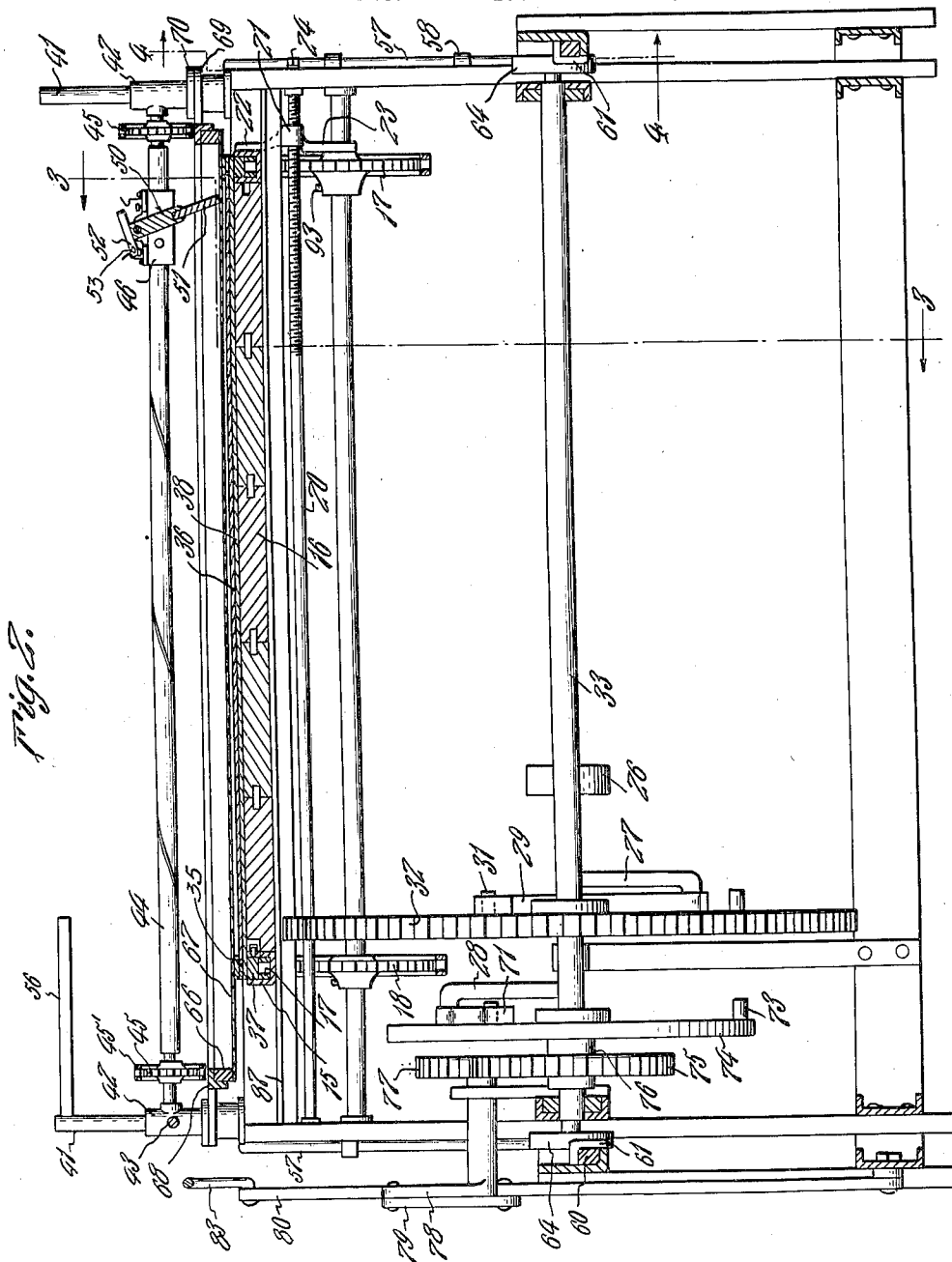
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PRINTING MACHINE

Filed June 18, 1925

6 Sheets-Sheet 2



Elmer Nichols

INVENTOR

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June 22, 1926.

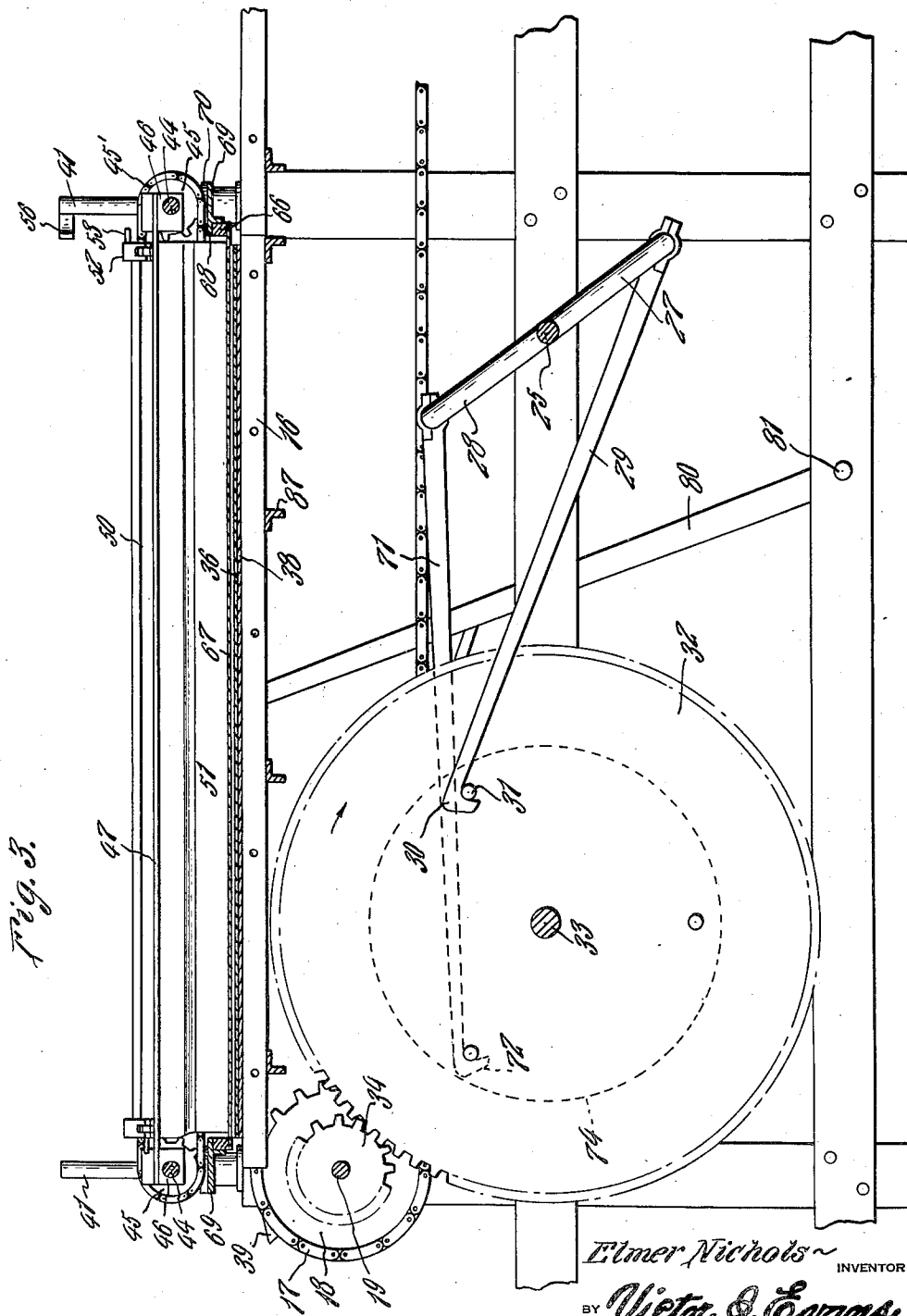
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E. NICHOLS

PRINTING MACHINE

Filed June 18, 1925

6 Sheets-Sheet 3



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June 22, 1926.

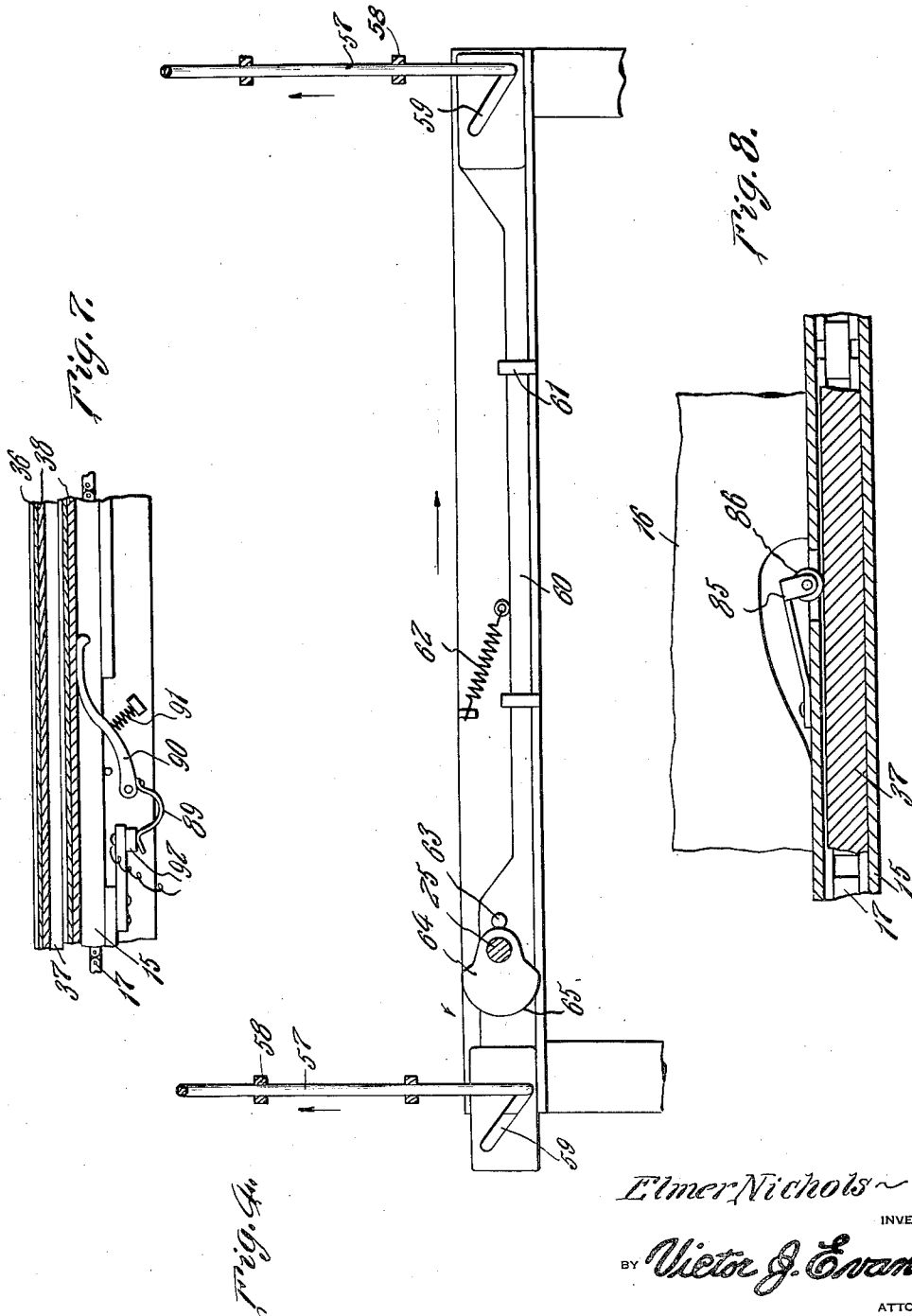
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E. NICHOLS

PRINTING MACHINE

Filed June 18, 1925

6 Sheets-Sheet 4



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June 22, 1926.

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E. NICHOLS

PRINTING MACHINE

Filed June 18, 1925

6 Sheets-Sheet 5

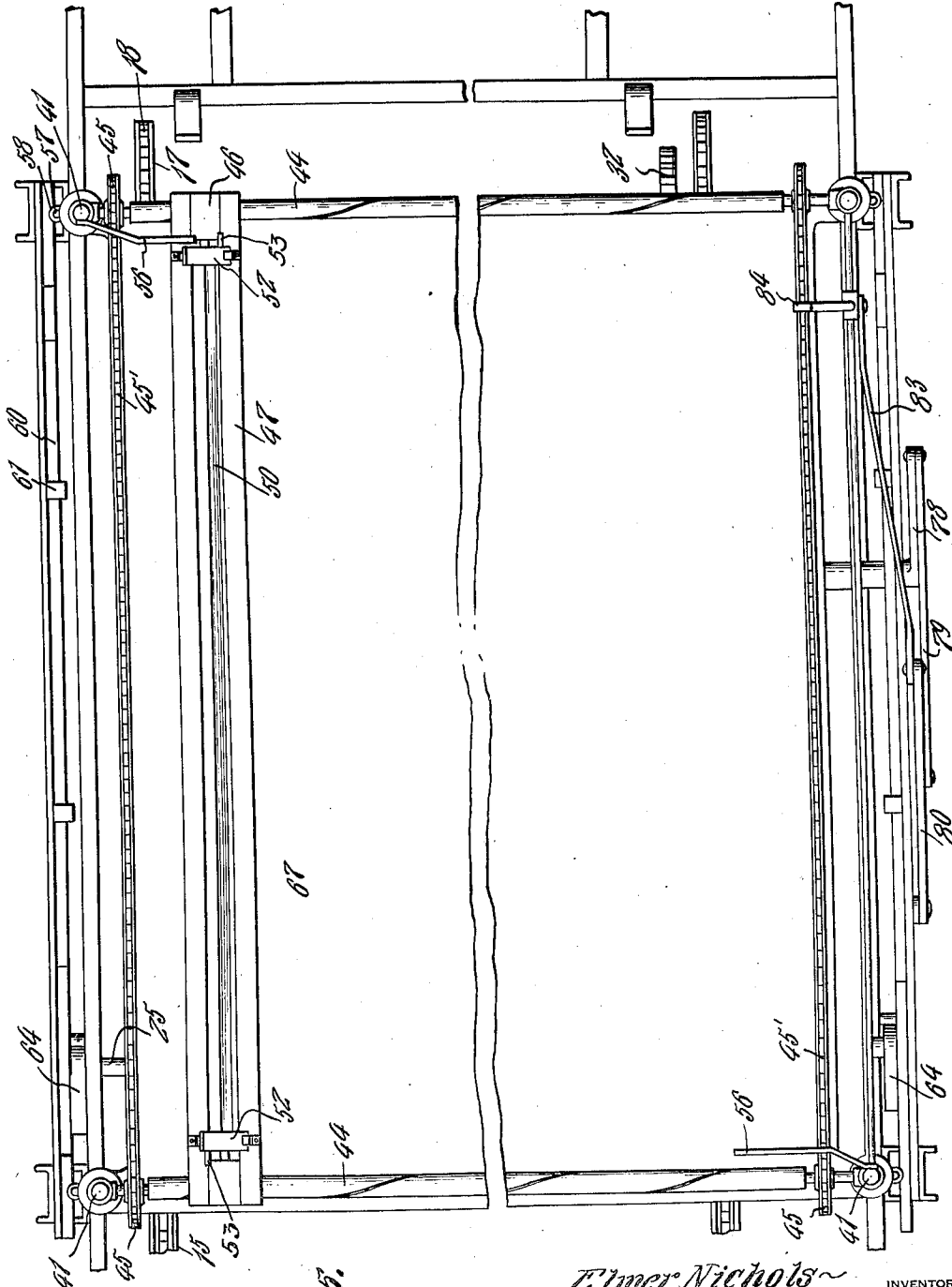


Fig. 5.

Elmer Nichols

INVENTOR

BY Victor J. Enone

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UNITED STATES PATENT OFFICE.

ELMER NICHOLS, OF KIRKWOOD, MISSOURI.

PRINTING MACHINE.

Application filed June 18, 1925. Serial No. 38,037.

This invention relates to printing machines and has especial relation to machines for printing cards, signs, posters and so forth, wherein is employed what is commonly known as a "screen process", a screen or stencil being provided to regulate the application of paint or other color to the stock.

The present invention has for an object the provision of a power operated machine or press through which the stock is automatically fed, the color being automatically applied to the stock during the period of pause or rest in the feeding means, after which, the stock is delivered in stacked position.

Another object of the invention is the provision of means for securing proper register and for distributing the color in a uniform manner.

Another and important object of the invention is the provision of means for handling the stock so that the latter may be singly passed through the machine and the color applied without permitting contact with the wet color.

With the above and other objects in view, the invention provides simple, novel and reliable means for automatically accomplishing the above, so that the capacity of the machine will be materially increased and the cost of production greatly lessened, while the character of the product will be improved.

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings:—

Figure 1 is a side elevation of a printing machine constructed in accordance with the invention.

Figure 2 is a section taken substantially on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a fragmentary section on the line 4—4 of Figure 2.

Figure 5 is a top plan view partly broken away.

Figure 6 is an enlarged cross sectional view through one of the stock carriers.

Figure 7 is a fragmentary longitudinal section illustrating the automatic cut out switch.

Figure 8 is an enlarged fragmentary horizontal section showing the means for guiding the stock carriers.

Figure 9 is a perspective view partly broken away showing one of the stock carriers with a card in position.

Figure 10 is an enlarged fragmentary sectional view showing the manner of mounting the stencil wiper.

Figure 11 is an enlarged fragmentary vertical sectional view illustrating the manner of mounting the wiper frame and the stencil frame.

Referring to the drawings in detail wherein like characters of reference denote corresponding parts, the machine comprises a suitable frame structure which includes spaced longitudinally disposed channel bars 15 which terminate short of one end of the frame and which extend upon opposite sides of a platen 16. This platen may be made of suitable material and is preferably of sectional formation with the sections detachably connected so that its width may be regulated.

Operating through the channel bars 15 are carrier chains 17. These chains are mounted upon sprockets 18 at opposite ends of the bars 15, the sprockets being supported upon shafts 19 mounted in suitable bearings provided in the machine frame. As the width of the platen 16 may be regulated, it is necessary to adjust one of the channel bars accordingly and for this purpose there is provided a shaft 20 which is rotatably mounted in bearings provided in the main frame and which is threaded for a portion of its length. Mounted upon this threaded portion of the shaft is an internally threaded sleeve 21 which carries oppositely extending arms 22 and 23, the arm 22 being secured to one of the channel bars 15 at one end of the latter while the arm 23 is swiveled to the hub of one of the sprocket wheels 18 at one end of the machine. The outer end of the shaft 20 is provided with a wrench receiving portion 24. This mecha-

nism is duplicated at each end of the machine upon one side thereof so that by rotating the shafts 20, one of the channel bars 15 may be adjusted and its chain and sprockets likewise adjusted.

The chains 17 are operated from any suitable power applied to a drive shaft 25. This shaft carries a drive pulley 26 and is provided with oppositely extending crank arms 27 and 28. The crank arm 27 has connected thereto one end of an arm 29, the opposite end of which is provided with a hook 30. This hook is adapted to engage pins 31 which extend laterally from and are spaced around the face of a gear 32, the latter being mounted upon a shaft 33. This gear drives a pinion 34 which is fast upon one of the shafts 19. Thus, when the shaft 25 is operated, a reciprocatory movement will be imparted to the rod 29 and through the engagement of its hook 30 with the pins 31, an intermittent rotary movement will be imparted to the gear 32, so that the chains 17 will be intermittently driven, the purpose of which will be hereinafter apparent.

Supported by the channel bars 15 at one end of the machine as indicated at A in Figure 1 of the drawings is a stack of stock carriers. These carriers may be constructed of suitable material and are provided with oppositely disposed spaced grooves 35 to receive the opposite edges of cards 36 or other stock to be printed. The carriers preferably consist of spaced strips 37 which are secured along the opposite side edges of a panel 38, the stock 36 resting upon this panel as clearly shown in Figures 6 and 9 of the drawings.

The chains 17 carry spaced lugs 39 and as the strips 37 of the lowermost stock carrier are located within the channel guide bars 15, the lugs 39 will engage the lowermost carrier and move the latter over the platen 16, the under face of the panel 38 resting upon this platen. A stop 40 which has its lower edge properly spaced above the channel bars 15 acts to hold the carriers in proper position and to permit only the lowermost carrier to be moved.

Extending upward from the main frame of the machine is a plurality of standards 41. Slidingly mounted upon these standards are sleeves 42, the said sleeves being connected by side bars 43 and spirally grooved shafts 44. Mounted upon the shafts 44 are sprocket wheels 45 around which pass chains 45' so that the shafts 44 are connected for simultaneous rotary movement.

Mounted upon each of the shafts 44 is a sleeve 46 which carries a pin 46' for operation in the spiral grooves of the shafts 44, so that rotation of these shafts will move the sleeves 46 longitudinally. The sleeves are connected by spaced parallel bars 47

and have located between them bearing ears 48, the latter serving to pivotally support as indicated at 49, a blade or bar 50. Secured along the outer edge of this blade or bar is a rubber or other flexible wiping element 51. Secured to the upper edge of the blade 50 near each end thereof is a transverse arm 52 which has extending laterally from one end thereof a pin 53, the pin of the arm at one end of the blade being reversely disposed with respect to the pin at the opposite end. Spring hooks 54 positioned adjacent each end of the arms 52 act to yieldingly hold the blade 50 against pivotal movement, such movement being regulated by adjusting screws 55.

Projecting inwardly from two of the standards 41 at opposite corners of the frame are arms 56 which are disposed in the upward path of the pins 53 and when the wiper element has reached the limit of its movement in one direction, one of the pins 53 will engage its particular arm 56 and rock the wiper element upon its pivot so that the said element will be in proper position for reverse movement across the machine.

The wiper frame is designed to be moved vertically and for this purpose has secured thereto the upper ends of spaced rods 57 which are movable in guides 58 mounted upon the machine frame. The lower ends of the rods 57 enter inclined slots 59 provided in opposite ends of a slide bar 60, one of these bars being provided for the rods upon each side of the machine. The slide bars 60 are movable in guides 61 and are yieldingly held against movement in one direction by a spring 62 as shown in Figure 4 of the drawings. Extending from one end of each of the bars 60 is a pin 63 which is engaged by a rotatable cam 64 upon each side of the machine as shown in Figures 4 and 5 of the drawings. When the cams 64 are rotated so that their rounded portions 65 engage the pins 63, the bar 60 will be moved to the right as indicated by the arrow in Figure 4 of the drawings. In this position, the rods 57 will be positioned in the upper ends of the slots 59 so that the wiper frame will be in its raised position. During the raising movement of the wiper frame, one of the arms 56 will be engaged by the pin 53 at the adjacent end of the wiper element so as to rock said element upon its pivot as previously explained. As soon as the pins 63 ride off the rounded portions 65 of the cams 64, the springs 62 will move the bars 60 in a reverse direction and the ends of the rods 57 will then ride downward within the slots 59 to lower the wiper frame.

Located between the platen 16 and the wiper frame is a frame 66 which may be termed the printing frame in that it carries

a screen or stencil 67. This screen or stencil is formed of suitable fabric stretched across the frame 56 and may be made by any one of a number of screen processes. The frame 66 is preferably secured within a frame 68 formed of angle iron, while extending from this frame 68 at each corner thereof is a collar 69 which surrounds the sleeve 42. The sleeve is provided with spaced flanges 70 upon each side of these collars. By this means, movement of the wiper frame will control the screen or stencil 67, but the wiper frame will be permitted a limited movement prior to the upward movement of the screen or stencil, so that the wiper element 51 will be moved out of contact with the screen before the latter starts to move upward.

The chains 45' are intermittently operated and for this purpose the crank arm 28 of the drive shaft 25 has pivotally connected thereto one end of an arm 71. This arm is similar to the arm 29 and carries at one end a hook 72 to engage one of a number of spaced pins 73 which extend from one face of a disk 74. This disk is mounted upon the shaft 33 and is fast with a gear 75 through the medium of a hub or collar 76. A pinion 77 is engaged by the gear 75 and the shaft of this pinion has rigidly secured thereon an arm 78. This arm is adjustably pivoted to one end of a link 79 whose opposite end is pivoted to a rocker arm 80, the latter being pivotally mounted upon the frame of the machine as shown at 81. The rocker arm 80 is pivotally connected to a slide 82 by means of a connecting rod 83 and this slide is connected to one of the chains 45' as shown at 84. An intermittent reciprocatory movement is thus imparted to the wiper element so that the latter may travel backward and forward in wiping contact over the screen.

It will be apparent from the foregoing description and accompanying drawings that rotation of the shaft 25 will operate the arm 29 and the arm 71, the first mentioned arm having its hook engaged with one of the studs 31, will move the gear 32 one-third of a revolution in the direction of the arrow indicated in Figure 3 of the drawings. This will impart motion to the chain 17 and one of the lugs 39 will engage the lowermost stock carrier so as to slide the latter from the stack A into position over the platen 16, the degree of movement being just sufficient to bring the stock into proper position beneath the screen, the latter being at this time in elevated position. To insure proper register, the platen has mounted near one edge a spring arm 85 which carries a roller 86, the latter bearing against the inner edge of one of the side strips 37 of the stock carrier.

As soon as the stock carrier reaches proper

position, a period of rest or pause is provided due to the movement in an opposite direction of the arm 29, the hook end of the said arm moving outward beyond the next pin 31 and then traveling inward an appreciable distance before engaging this pin to again start operation of the chains 17. Before the operation of these chains 17 is resumed, the rotary cams 64 will be positioned to permit the springs 62 to move the bars 60 in a direction to permit downward movement of the rods 57 and consequently downward movement of the screen and wiper frame. At this point, the hook 72 at the outer end of the arm 71 will engage one of the pins 73 of the disk 74 so as to rotate this disk one-third of a revolution. This movement will, through the gears 75 and 77, impart sufficient movement to the arm 78 and the arm 80 to move the wiper element 51 across the screen, a proper amount of paint or other color being placed upon the screen in the path of this wiper element so that the latter will distribute the color over the screen as will be readily understood. When the wiper element 51 has completed its travel in one direction, the pin 53 of one of its arms 52 will have engaged one of the arms 56 so that the engaged end of the arm 52 will be moved upward and the wiper element rocked upon its pivot so as to occupy an inclined position reverse from that occupied during the movement just completed. At this point, the cams 64 will have reached a position to again engage the pins 63 to move the bars 60 in an opposite direction, or in the direction of the arrow in Figure 4 of the drawings. The rods 57 will then, due to the inclined walls of the slots 59, move vertically upward so as to carry upward the wiper frame, the latter moving a distance equal to the space between the collars 69 and the lower flange 70 of the sleeve 42, before any movement of the screen occurs. The wiper element 51 will thus be moved out of contact with the screen before the latter starts to move upward.

As soon as upward movement of the screen 67 occurs, the hook 30 of the arm 29 will engage one of the pins 31 so that the gear 32 will be again rotated one-third of a revolution. The stock carrier positioned over the platen and the stock which has just received the color through the screen, will again be moved to the end of the machine and will be arranged in a stack as indicated at B, the character of the stock carrier preventing contact with the wet face of the stock. These stock carriers thus permit of the stock being automatically fed to and delivered from the machine without injury to their wet surfaces.

By moving the wiper element over the screen in the manner described, a uniform

pressure is exerted upon the screen, this pressure being regulated by adjustment of the screws 55. The platen may be reinforced and supported by spaced L beams or bars 87.

The machine may be operated by motor driven mechanism and in order to automatically stop the operation of the machine when the last stock carrier has been fed from the stack A, there is provided a switch which includes a spring contact arm 89 which is carried by a pivoted arm 90, the latter being urged in one direction by a spring 91. This switch arm 89 is adapted to be connected in circuit with the driving motor and to engage a stationary contact 92 also connected in said circuit. By reference to Figure 7 of the drawings it will be seen that the lowermost stock carrier is engaged by the arm 90 so that the free end of the latter is pressed downward to keep the spring contact 89 and the stationary contact 92 engaged. As this lowermost stock carrier is moved into position over the platen, the next adjacent stock carrier will move downward so as to engage the arm 90 and keep the parts in the position stated. As soon as the last stock carrier passes forward over the platen, the arm 90 will move upward under the action of the spring 91 so that the contacts 89 and 92 will be disengaged and the circuit interrupted.

The adjustable sprockets 18 are secured upon their shafts by set screws 93.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claims.

Having described the invention what is claimed is:—

1. In a printing machine, a platen, a stencil movable above the platen, stock carriers positioned adjacent the platen, means to singly move the carriers to position the stock over the platen for register with the stencil and to hold the stock in such position for a limited period, means to move the stencil into operative position above the stock, means to move the stencil away from the stock at the expiration of said limited period, means to move the carrier away from the platen, a wiper element and means to move the wiper element alternately in opposite directions during the periods of rest of the stencil to apply color through the stencil during each period.

2. In a printing machine, a platen, a stencil movable above the platen, stock carriers positioned adjacent the platen, means to singly move the carriers to position the stock over the platen for register with the stencil and to hold the stock in such position for a

limited period, means to move the stencil into operative position above the stock, means to move the stencil away from the stock at the expiration of said limited period, means to move the carrier away from the platen, a wiper element, means to move the wiper element over the stencil during the period of rest of said stencil and means to set the wiper element in proper operative position prior to its movement across the stencil.

3. In a printing machine, a platen, a stencil movable above the platen, stock carriers positioned adjacent the platen, means to singly move the carriers to position the stock over the platen for register with the stencil and to hold the stock in such position for a limited period, means to move the stencil into operative position above the stock, means to move the stencil away from the stock at the expiration of said limited period, means to move the carrier away from the platen, a wiper element, means to move the wiper element over the stencil during the period of rest of said stencil and means to set the wiper element in proper operative position prior to its movement across the stencil in either direction.

4. In a printing machine, a platen, a stencil movable above the platen, stock carriers positioned adjacent the platen, means to singly move the carriers to position the stock over the platen for register with the stencil and to hold the stock in such position for a limited period, means to move the stencil into operative position above the stock, means to move the stencil away from the stock at the expiration of said limited period, means to move the carrier away from the platen, a vertically movable frame, a wiper element carried by the frame for contact with the stencil, means included in the frame to move the wiper element in opposite directions over the stencil and means to set the wiper element in proper operative position prior to its movement across the stencil.

5. In a printing machine, a platen, a stencil movable above the platen, stock carriers positioned adjacent the platen, means to singly move the carriers to position the stock over the platen for register with the stencil and to hold the stock in such position for a limited period, means to move the stencil into operative position above the stock, means to move the stencil away from the stock at the expiration of said limited period, means to move the carrier away from the platen, a vertically movable frame, a wiper element carried by the frame for contact with the stencil, means included in the frame to move the wiper element in opposite directions over the stencil, means to set the wiper element in proper operative position

prior to its movement across the stencil and means associating the frame and stencil to move the stencil subsequent to a limited inward movement of the frame.

5 6. In a printing machine, a platen, means to feed the stock to the platen, means included in the stock feeding means to position the stock over the platen and hold the stock in such position for a limited period, a
10 stencil adapted to be moved into and out of position above the stock, a vertically movable frame, a wiper element carried by the frame for contact with the stencil, means to move the wiper element over the stencil,
15 means to move the frame vertically, means associating the frame and stencil to move said stencil with the frame and means to permit of a limited movement of the frame prior to the movement of the stencil.

20 7. In a printing machine, a platen, means to feed the stock to the platen, means included in the stock feeding means to position the stock over the platen and hold the stock in such position for a limited period, a
25 stencil adapted to be moved into and out of position above the stock, a vertically movable frame, a pivotally mounted wiper element carried by the frame for contact with the stencil, means to move the wiper element
30 over the stencil, means to rock said element pivotally at the end of such movement, means to hold said element against accidental rocking movement, means to move the frame vertically, means associating the
35 frame and stencil to move the stencil with the frame and means to permit of a limited movement of the frame prior to the movement of the stencil.

40 8. In a printing machine, a platen, means to feed the stock to the platen, means included in the stock feeding means to position the stock over the platen and hold the stock in such position for a limited period,
45 a stencil adapted to be moved into and out of position above the stock, a vertically movable frame, a pivotally mounted wiper element carried by the frame for contact with the stencil, means to move the wiper
50 element over the stencil, means engaging the wiper element at the end of such movement to rock said wiper element pivotally, means to hold said element against accidental rocking movement, means to move the frame vertically,
55 means associating the frame and stencil to move the stencil with the frame and means to permit a limited movement of the frame prior to the movement of the stencil.

60 9. In a printing machine, a platen, a stencil movable above the platen, stock carriers, a vertically and horizontally movable wiper element adapted to contact with the stencil, a drive shaft, a driven shaft, means
operatively associating the drive and driven

shafts to intermittently operate the latter 65 and feed the stock carriers in step by step motion through the machine, means to move the wiper element into contact with the stencil when the stock carriers are at rest and means to move the wiper element over 70 the stencil during such rest period.

10. In a printing machine, a platen, a stencil movable over the platen, stock carriers, a vertically and horizontally movable wiper element adapted to contact with the 75 stencil, a drive shaft, a driven shaft, means including a pivotally mounted reciprocatory arm operatively associating the drive and driven shafts to intermittently operate the latter and feed the stock carriers in step by 80 step motion through the machine, means to move the wiper element into contact with the stencil when the stock carriers are at rest and means to move the wiper element over the stencil during such rest period. 85

11. In a printing machine, a main frame, guide rails included in said frame, a platen located between the guide rails, a printing mechanism, a feeding mechanism, means to intermittently operate the feeding mecha- 90 nism, means to intermittently operate the printing mechanism, means to regulate the size of the platen and means to adjust the guide rails to conform to the platen.

12. In a printing machine, a printing 95 mechanism, a feeding mechanism, stock sheet carriers and means included in the stock sheet carriers to space the stock of the sheets apart when the latter are in super-imposed relation prior and subsequent to the 100 printing operation.

13. In combination with a printing machine, a stock carrier comprising side rails having longitudinally disposed stock receiving grooves in their opposed edges and 105 means connecting the rails.

14. In combination with a printing machine, a stock carrier comprising side rails having longitudinally disposed stock receiving grooves in their opposed edges and a 110 panel connecting the rails.

15. In combination with a printing machine, a stock carrier comprising side rails having longitudinally disposed stock receiving grooves in their opposed edges and said 115 rails denning guide rails for feeding the stock into the machine and means connecting the rails.

16. In a printing machine, individual stock carriers each designed to carry a sheet 120 of stock, means to feed the carriers singly to the machine, means to print the stock within the carriers and means operable subsequent to the printing of the stock to feed 125 the stock from the machine without removing the same from the carriers.

17. In a printing machine, individual stock carriers each designed to carry a sheet

of stock, means to feed the carriers singly
to the machine, means to print the stock
within the carriers, means operable subse-
quent to the printing of the stock to feed
5 the carriers from the machine and means to
stack the carriers after the latter leave the
machine.

18. A stock carrier for printing machines
comprising side rails having longitudinally
disposed stock receiving grooves in their op- 10
posed edges and a panel connecting the rails.

In testimony whereof I affix my signature.

ELMER NICHOLS.