

E. D. JOHNSTON.
 COLOR ATTACHMENT FOR PRINTING PRESSES.
 APPLICATION FILED MAY 4, 1915.

1,189,453.

Patented July 4, 1916.
 4 SHEETS—SHEET 1.

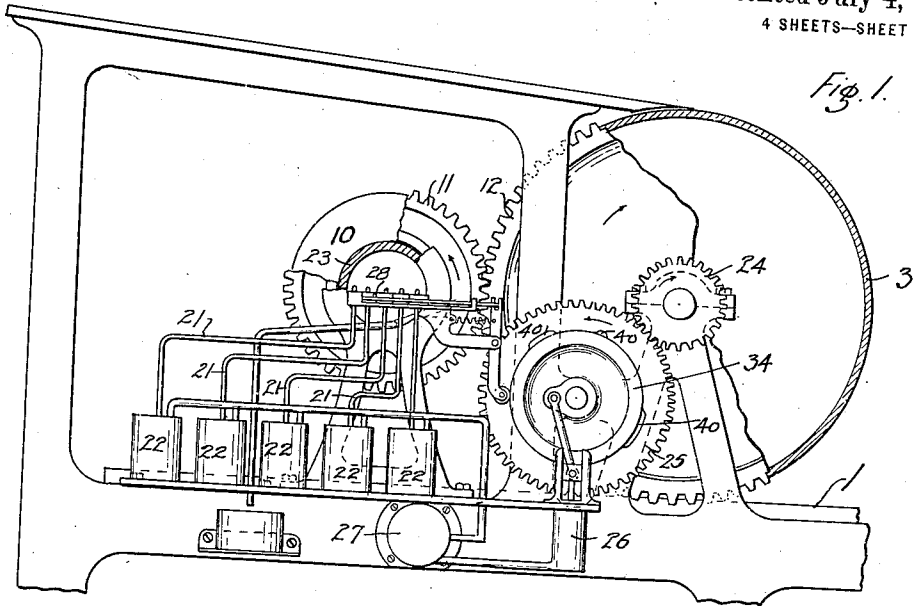


Fig. 1.

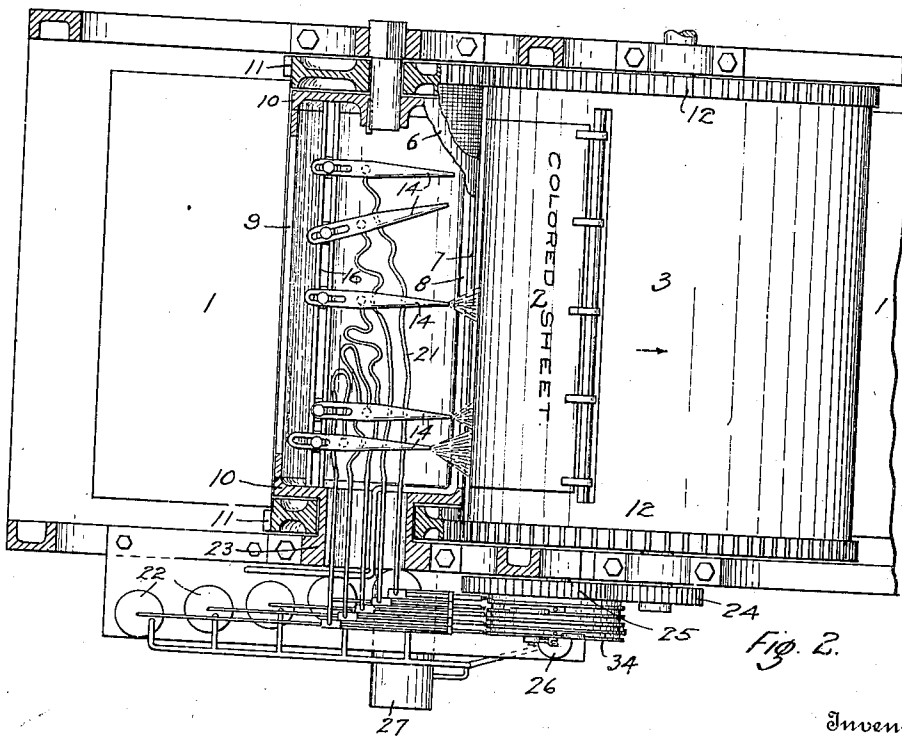


Fig. 2.

Witness

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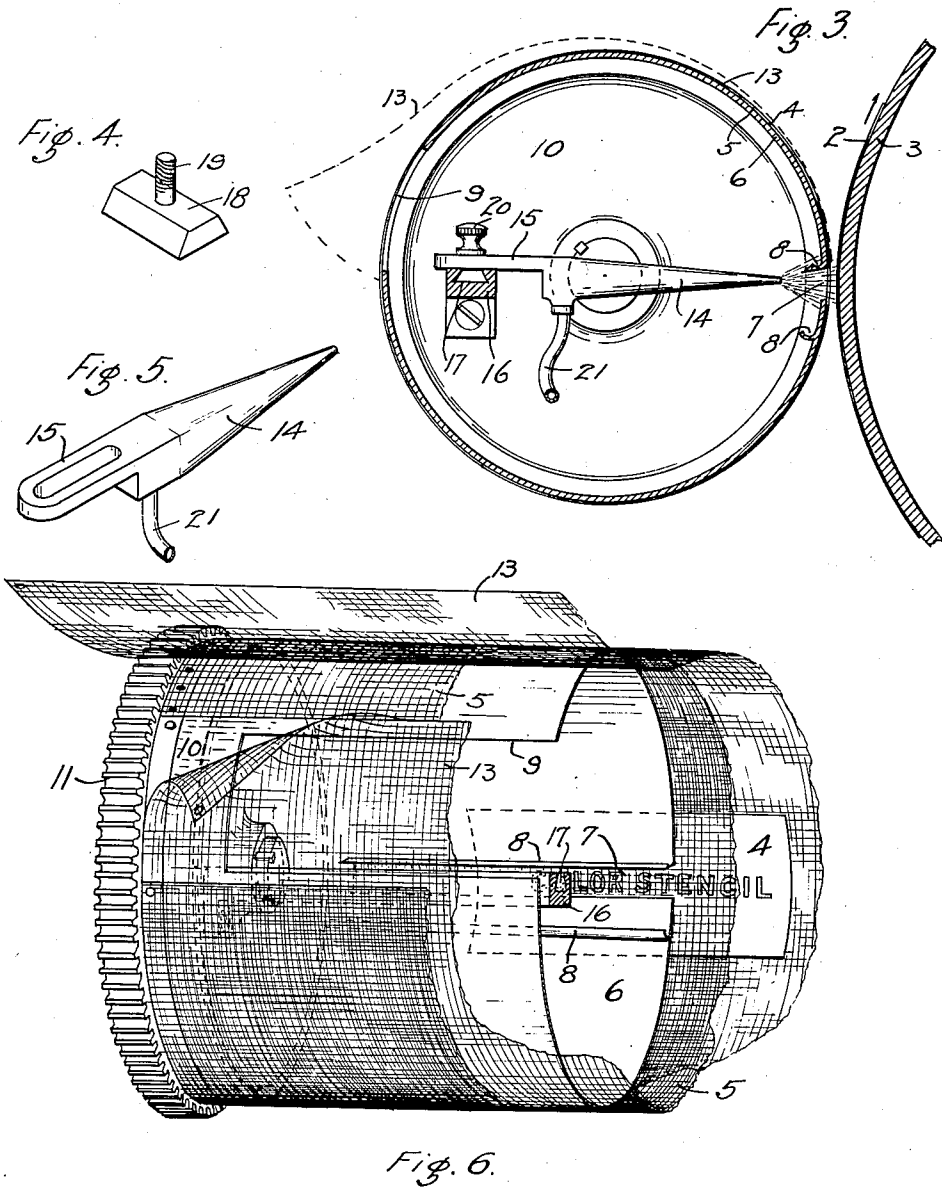
Inventor

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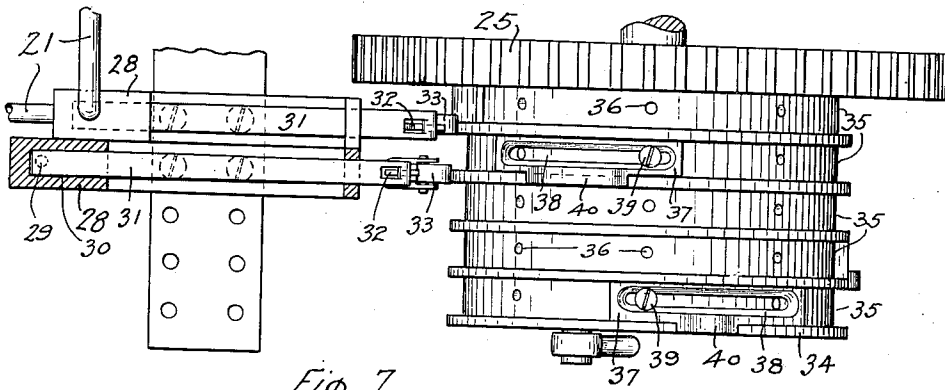


Fig. 7.

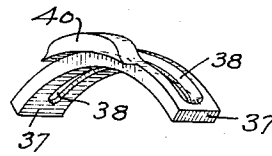


Fig. 8.

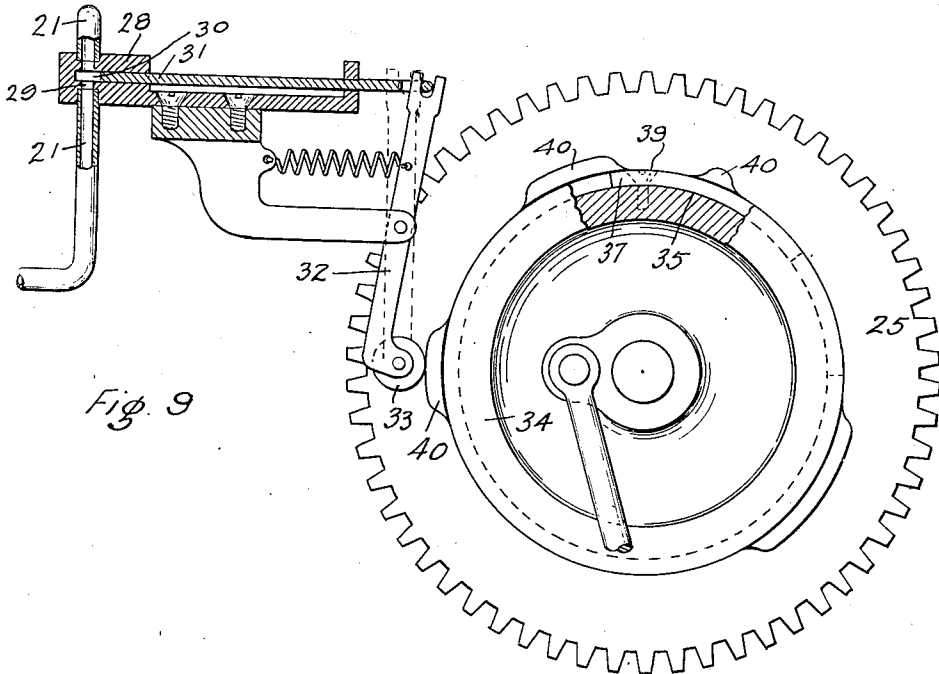


Fig. 9.

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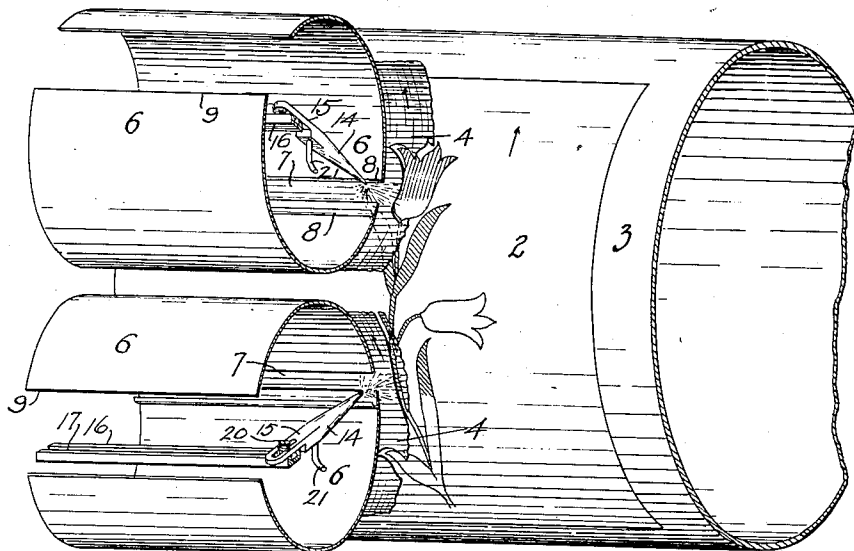
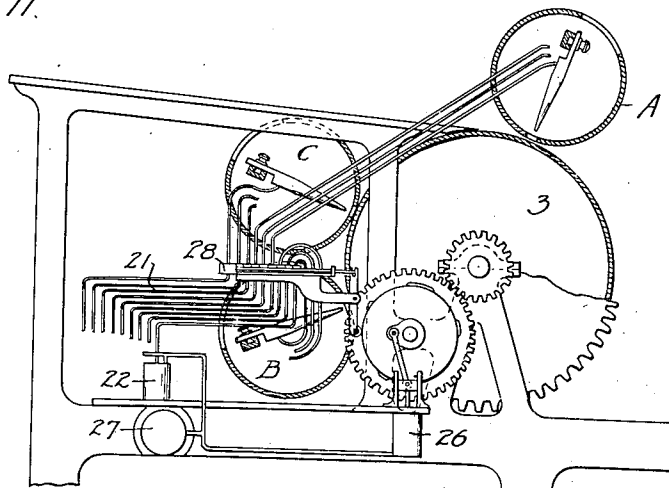


Fig. 10

Fig. 11.



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Witness

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UNITED STATES PATENT OFFICE.

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COLOR ATTACHMENT FOR PRINTING-PRESSES.

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Specification of Letters Patent.

Patented July 4, 1916.

Application filed May 4, 1915. Serial No. 25,735.

To all whom it may concern:

Be it known that I, EDWARD D. JOHNSTON, a citizen of the United States, residing at Tacoma, in the county of Pierce, State of Washington, have invented certain new and useful Improvements in Color Attachments for Printing-Presses, of which the following is a specification:

This invention relates to devices for stenciling color on sheets and especially on sheets while they are in a printing press.

The objects of this invention are to apply color to a sheet either before or after it is printed.

Further objects are to apply this color in any degree of intensity, over any desired portion of the sheet, and in any form or shape without coloring any other part of the sheet; whereby any desired number of colors may be placed on different parts of the sheet; and whereby different colors may be superposed on the same part of the sheet.

I attain these and other objects by the devices, mechanisms, and arrangements illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a bed press showing my apparatus applied thereto; Fig. 2 is a plan thereof, a portion of the apparatus being broken away to reveal the interior thereof; Fig. 3 is a section of a portion of my apparatus in action; Fig. 4 is a perspective view of one of the slide blocks; Fig. 5 is a similar view of one of the color nozzles; Fig. 6 is a perspective view, from the rear, showing a portion of the stencil-carrying cylinder; Fig. 7 is a plan of the color control mechanism; Fig. 8 is a perspective view of one of the adjustable cam plates; Fig. 9 is a side elevation and section showing the color control mechanism in action; Fig. 10 is a perspective view of a portion of the apparatus illustrating its action; and Fig. 11 is a side elevation of a printing press on which a plurality of my apparatus are mounted in order to superpose a number of colors on the same portion of the printed sheet.

Similar numerals of reference refer to similar parts throughout the several views.

This invention uses the well known moving bed sheet printing press and also the well known air brush for applying the color to the printed sheet and since these parts of the device are already well known I have not shown them in detail nor will their ac-

tion or construction be described except in so far as they affect the results to be attained.

In general, this invention consists in apparatus for carrying a stencil in contact with a moving sheet, and for spraying the color through the stencil on the desired portion of the sheet. This may be done without any connection with the printing press or it may be done either before or after the sheet has been printed but, in practice, I prefer to use it in connection with a printing press and after the sheet has been printed on, as shown in the drawings. In order to do this it is evident that the stencil must move exactly with the sheet, must register with the printing thereon, and the color must be applied when the said stencil and sheet are very close together. Further, the color should be ejected by the nozzle only at such times as it is to be used.

This invention allows the application of a number of colors to a printed sheet without having to pass the sheet through the press more than the one time when it is printed, thus cutting down the expense of producing colored prints for various purposes. It also eliminates the necessity of having an expensive plate made for each color since the stencil can be cut from very cheap material and several colors can be applied through the same stencil either simultaneously or successively, either in continuous blocks of color or in fine lines or other shapes. It is therefore readily seen that my invention permits a great reduction in the cost of producing various classes of color printing, such as half-tones, maps, post-cards, advertising cards and bill-board sheets, etc.

In the drawings I have illustrated the apparatus in connection with a printing press but it is to be understood that it may be separately mounted and the printing may be done before or after the colors have been applied to the sheet, or in some cases no printing whatever will be needed.

Referring to the drawings, the reciprocating type-bed 1 of the printing press applies the printed matter to the sheet 2 which is securely fastened to and moves with the rotating platen cylinder 3 in the usual way. The color projecting apparatus is positioned within a rotating double stencil-carrying cylinder made of fine wire mesh or other suitable open construction between which

the stencil sheet 4 is clamped. The inner cylinder 5, of this double stencil-carrier, is preferably made of thin bars or strong wire mesh and slides freely over a fixed concentric metallic cylinder 6. This cylinder 6 has a slot or narrow opening 7 on the line joining the center of the cylinder 3 with that of the cylinder 6. The color is sprayed through this opening 7.

Referring to Fig. 3, it will be seen that I have provided troughs 8 on the inner side of the cylinder 6, above and below the slot 7, to carry away the waste color which was not projected through the opening 7. The fixed cylinder 6 also has an opening 9, at a point about opposite to the slot 7, through which the color nozzles may be reached for adjustment. The fixed cylinder 6 is supported at each end on stationary disks 10, said disks being mounted on non-rotating shafts suitably mounted in the frame of the machine. The disks 10 are spaced inward from the frame, as shown in Fig. 2, and rotating gear wheels 11 are mounted on the said fixed shafts between the frame and the disks 10. These gears 11 mesh with a gear 12 on the platen cylinder 3 and are driven thereby. A shoulder is formed on the gears 11 on the sides adjacent the disks 10 forming thus a rotating disk on which the inner and outer stencil-carrying cylinders 5 and 13 are secured at their two ends. The gears 11 and 12 are arranged so that the speed of the stencil 4, which is placed between the two concentric cylinders 5 and 13, will correspond with that of the printed sheet 2, and so that the stencil sheet 4 will be in close proximity to the said sheet 2. In practice the gears 11 will be of one-half the diameter of the gears 12. The cylinders 5 and 13 are separately secured at each end to the shoulders formed on the gears 11 so that the outer cylinder 13, which may conveniently be made of fine wire mesh, may be loosened to insert, remove or adjust the sheet of stencil 4 without loosening the inner cylinder 5 on which the sheet 4 is supported. Also a portion of both of said cylinders 5 and 13 may be loosened in order to insert the hand through the opening 9 in the fixed cylinder 6 to adjust the color nozzles within the cylinder 6.

The color nozzles 14 (Fig. 5) are of any approved type and are provided with slotted rearward projections 15. A fixed bar 16, having a dovetailed slot 17 in its upper side, is secured between the two fixed disks 10. A number of dovetailed slide blocks 18 (Fig. 4) fit in the slot 17, each having a screw-threaded pin 19 extending upward therefrom. The pin 19 passes through the slot in the projection 15 and a nut 20 is screwed thereon, thus it is apparent that the nozzles 14 can be adjusted laterally on the machine by sliding the blocks 18 in the slot

17, and longitudinally by sliding the nozzle on the pin 19 nearer to or farther from the stencil 4, thus controlling the intensity of color, and also the nozzles may be turned at any angle to spray a graded intensity of color on the sheet. These adjustments are clearly shown in Fig. 2. Each nozzle is provided with a flexible supply tube 21 which passes thereto from their respective color pots 22, through one of the fixed shafts 23 which support the disks 10 and gears 11, and which is made hollow for this purpose.

Referring now particularly to Figs. 1, 7, 8 and 9. The shaft of the cylinder 3 has a gear 24 thereon, which meshes with the gear 25, which is mounted on a shaft on which the color control cams and the crank of the air pump 26 are also mounted. This pump 26 may be of any approved type and compresses air in a tank 27 from which it is led to the various color pots 22. One or more pipes 21 lead from each color pot 22 to a control valve and thence to the nozzles 14. The pipes 21 all pass from the respective pots 22 to a plate 28 suitably secured to the frame, each such pipe 21 communicating with a separate passage 29 through the plate and leading thence from the plate to the nozzle. A slot 30 intersects the passage 29 within the bar 28, and a slide valve-plate 31 rides in each slot 30 and is adapted to close or open each passage 29 according to its position. Each plate 31 is engaged at its free end by the end of an operating lever 32 suitably pivoted to the frame. The other end of each lever 32 is provided with a roller 33 adapted to engage the operating cam. In practice I arrange the plate 28 so that all the passages 29 therein will come in line with each other, thus bringing the plates 31 side by side and bringing all the rollers 33 in a line, side by side, so that each will be engaged by its own cam.

The shaft of the wheel 25 has a drum 34 secured to it, said drum having a series of grooves 35 in its surface, and said grooves having screw-holes 36, equally spaced apart, in its bottom surface. The cam plates consist of a portion 37 adapted to lie within the groove 35 and having an elongated slot 38 which enters one of the said holes 36, the length of said slot 38 being greater than the distance between said holes 36. This portion 37 has a cam lug 40 extending outward therefrom, said lug being adapted to engage and operate one of said rollers 33 which is correspondingly positioned. The size and form of said cam lug 40 is made to suit the length of time which the color is to be sprayed through the nozzle controlled thereby, and its position on the drum 34 is adjusted by sliding the part 37 in the groove 35 until the lug 40 engages the roller 33 at the desired moment and then clamping it in

said position by tightening the clamping screw 39. Any desired number of these lugs 40 may be arranged around the drum to produce the spray from any one of the nozzles at the desired instants.

Referring now to Fig. 11:—I have illustrated herein a plurality of my apparatus arranged to superpose one color on another or in the line of motion of the other. The arrangement of the parts are all similar to that already described except that all the cams are mounted on a single shaft and the pipes from the color pots are conducted to the proper nozzles, whether in one cylinder 15 or another. In the case illustrated it is necessary that the color applied by the apparatus marked "A" shall be sprayed on the sheet before the sheet has been printed, and that the colors from the other two apparatus 20 marked "B" and "C" shall be sprayed thereon after the sheet leaves the printing surface, the reason being that on the second revolution of the platen cylinder 3 the sheet 2 is not secured thereto and therefore, if 25 the color were applied during the second revolution, it would not register with the printing or with the other colors applied thereto.

From the above description it will be readily understood that any number, within the limits of the machine, of nozzles may be arranged to project color through the openings cut in the stencil sheet and therefore each nozzle will apply its color, in the form 35 of said stencil opening, on the printing surface of the sheet of paper which lies immediately adjacent to and moves exactly with the said stencil, and that each said nozzle may apply its color once, or any number of 40 times, to each such sheet. It must be understood however that each nozzle projects only one color through the stencil and that if two colors are to be applied to the same area, or to any point in the line of travel of 45 that area, it will usually be necessary to provide a second duplicate color projecting apparatus as shown in Fig. 11, which said apparatus will have its own stencil, which may be wholly different in appearance to 50 the stencil of the first apparatus, through which the appropriate colors will be projected at the proper time. Thus it will be seen that any color or colors can be applied by my apparatus to an already 55 printed sheet while it is still in the press, and that without any handling a sheet completely printed and colored will be produced at a minimum of expense, and with a great saving in time and labor and therefore with a very material reduction in cost. 60

The stencil sheet may be made of paper, card board, thin zinc, or any other thin sheet of material which leads itself to the purpose. Since the stencil is held at a very large number of points it will never slip out of

place when once set. The chief objection to stencils as formerly used is found in the fact that closed letters or figures—such as O—could not be made without bridging 70 across the circumscribing slit, in order to support and hold the central part in position. With my stencil carrier the central part is held just as firmly as the rest of the stencil and therefore no such bridging is 75 necessary. Since the air brush is stationary and sprays along diverging lines, and since the carrier, stencil, and receiving sheet are moving it is evident that the wires of the carrier which cross the said slit in the stencil will leave no mark on the receiving sheet 80 because the spray strikes the sheet from different directions.

It will readily be understood that this apparatus may be used in a large variety of 85 work from the fine post-card and colored half-tone work to the great blocks of color used in bill-board sheets. When the invention is used for coloring half-tones it will be understood that the properly prepared plate 90 on the press will provide the ground work of the picture and that a solid color block applied thereto will in no way interfere with the picture but will tint it uniformly 95 all over; that if a frisket or piece of stencil of any shape is inserted between the stencil-carrying cylinders in will leave a correspondingly untinted area on the picture, which area may subsequently be tinted by a color from a second or third apparatus as 100 desired. The printed half-tone will provide all the shadow effects by the familiar dots. If the stencil cylinders are erected in a separate frame from the printing press then the sheet is carried on a cylinder corresponding 105 with the cylinder 3 as above described, and the colors are applied thereto, after which the sheet may be transferred to the printing press for the type or half-tone work. In this case care must be taken in bringing the 110 colored sheet to a correct register with the printing press in order that the work of the two machines shall properly cooperate to produce the finished product.

Having described my invention, what I claim is:

1. In a machine of the class described, 115 the combination with a stationary guide plate whose outer face is curved to form a portion of the surface of a cylinder; of a pair of concentric rotary cylinders mounted 120 outside of said guide plate, the inner of said cylinders being in contact therewith and guided thereby, each said cylinder formed of open work to permit the substantially unretarded passage of spray therethrough; 125 a stencil sheet held between said rotary cylinders and carried thereby; and means for applying a spray of color through the rotary cylinders and the opening in the stencil sheet as said opening passes a prede-

terminated point adjacent the edge of said guide plate.

2. In a machine of the class described, the combination with means for holding and moving a sheet to be colored; a stencil sheet; rotary means for holding said stencil sheet in substantially rolling contact with said first sheet; driving means connecting said first sheet holding and moving means with said stencil sheet rotary holding means whereby said sheets move in accord the one with the other; a stationary air brush mounted within said rotary stencil sheet holding means and adapted to project a spray of color through the stencil sheet as the opening therein passes said point of rolling contact; and means controlled by said first sheet holding and moving means for controlling said air brush whereby it will apply said spray only at the desired moments.

3. In a machine of the class described, the combination with a sheet to be colored; of means for holding and moving said sheet; a stencil sheet; rotary means for holding said stencil sheet in substantially rolling contact with said first sheet; driving means connecting said first sheet holding and moving means with said stencil sheet rotary holding means whereby said sheets move in accord the one with the other; an air brush; stationary means for adjustably holding said air brush within said rotary stencil sheet holding means whereby the position and intensity of the spray of color from the air brush may be adjusted; and means controlled by said first sheet holding and mov-

ing means for controlling said air brush whereby it will project a spray of color through the stencil sheet as the opening therein passes said point of rolling contact.

4. In a machine of the class described, the combination with a stationary cylinder, having a slot across its face; of a pair of rotary cylinders mounted concentric with and outside of said stationary cylinder and each formed of open work to permit the substantially unretarded passage therethrough of a spray; a stencil sheet held between said rotary cylinders and carried thereby; and means for applying a spray of color through the slot in said fixed cylinder and through the rotary cylinders and the opening in the stencil sheet as said opening passes the slot in said fixed cylinder.

5. In a machine of the class described, the combination with a stationary cylinder, having a slot across its face; of a pair of rotary cylinders mounted concentric with, adjacent to, and outside of said fixed cylinder and each formed of open work to permit the substantially unretarded passage therethrough of a spray; a stencil sheet held between said rotary cylinders and carried thereby; means for applying a spray of color through the slot in the fixed cylinder and through the rotary cylinders and the opening in the stencil sheet as said opening passes the slot in the fixed cylinder; and means for controlling said spraying means whereby the spray is emitted only when an opening in the stencil sheet is in line with said slot in the fixed cylinder.

EDWARD D. JOHNSTON.