May 26, 1925. 1,538,951

W. PRINGLE

STENCILING APPARATUS

Filed April 1, 1924 5 Sheets-Sheet 1

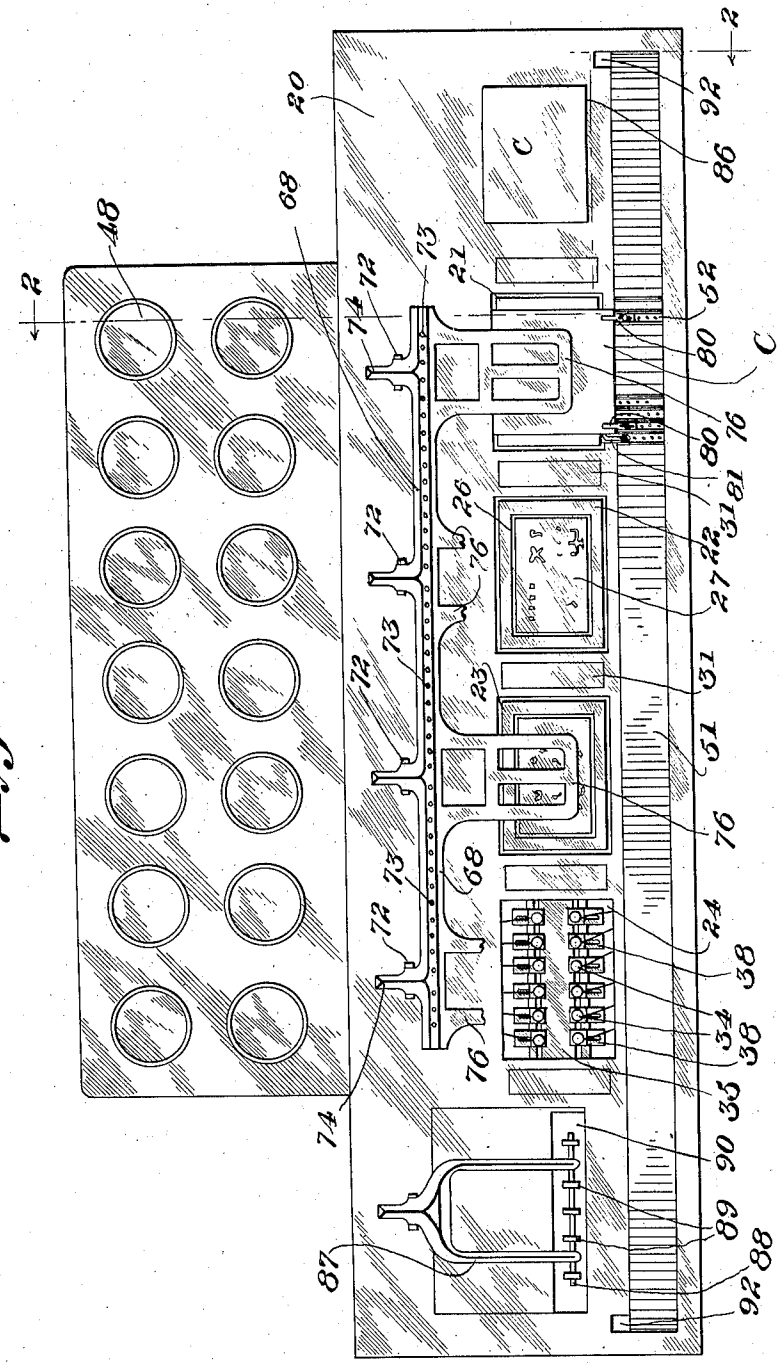


Fig. 1.

Inventor

William Pringle.

By J. W. Milburn

Attorney

May 26, 1925. 1,538,951

W. PRINGLE

STENCILING APPARATUS

Filed April 1, 1924 5 Sheets-Sheet 2

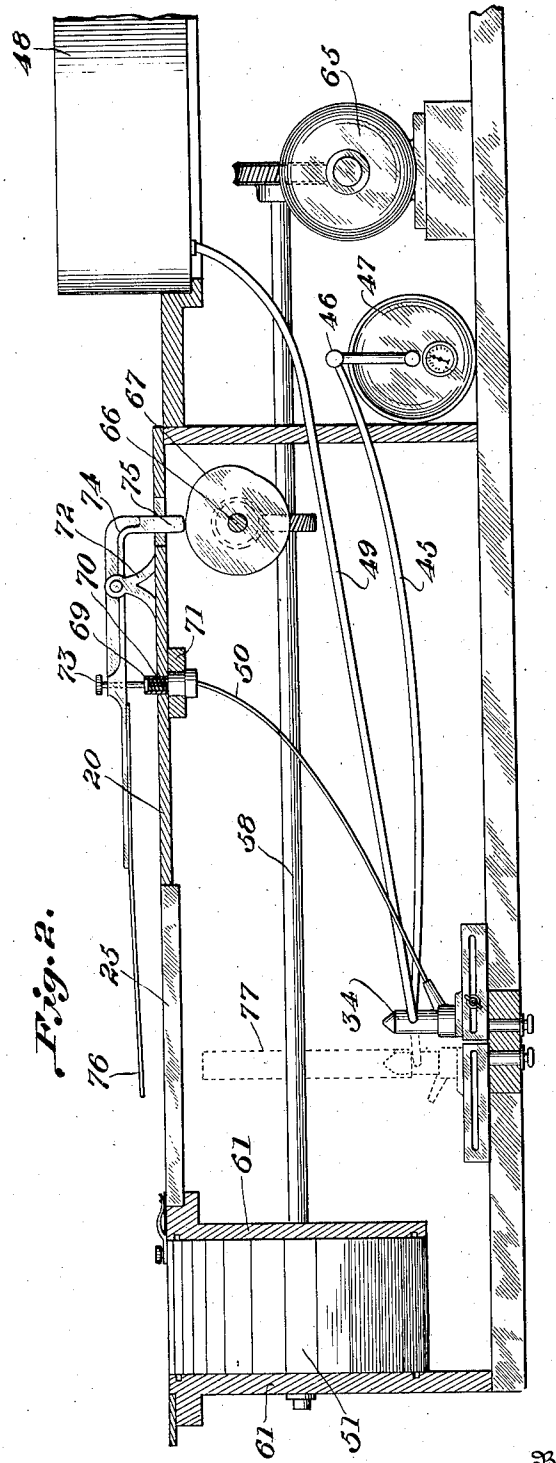


Fig. 2.

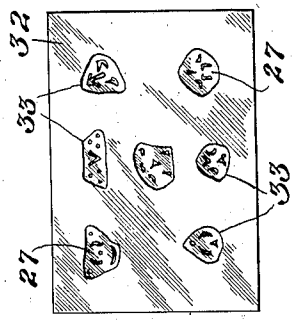


Fig. 12.

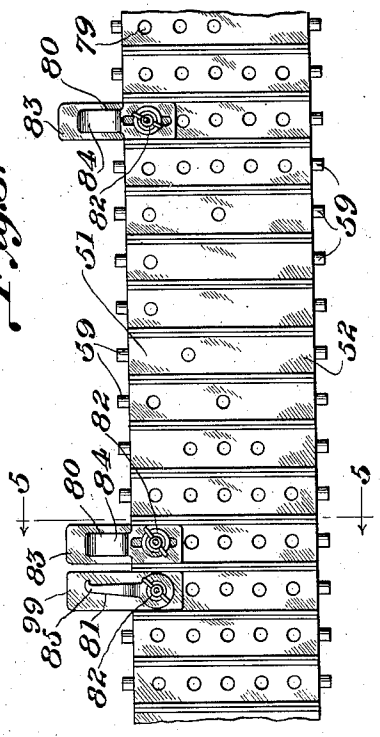


Fig. 3.

Inventor
William Pringle.

By J. W. Milburn
Attorney

May 26, 1925. 1,538,951

W. PRINGLE

STENCILING APPARATUS

Filed April 1, 1924 5 Sheets-Sheet 3

Fig. 4.

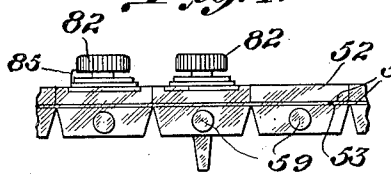


Fig. 5.

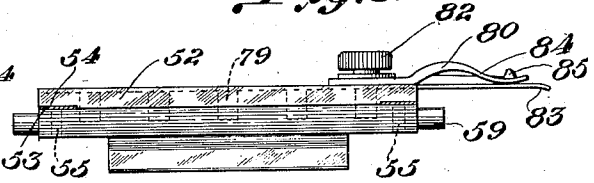


Fig. 10.

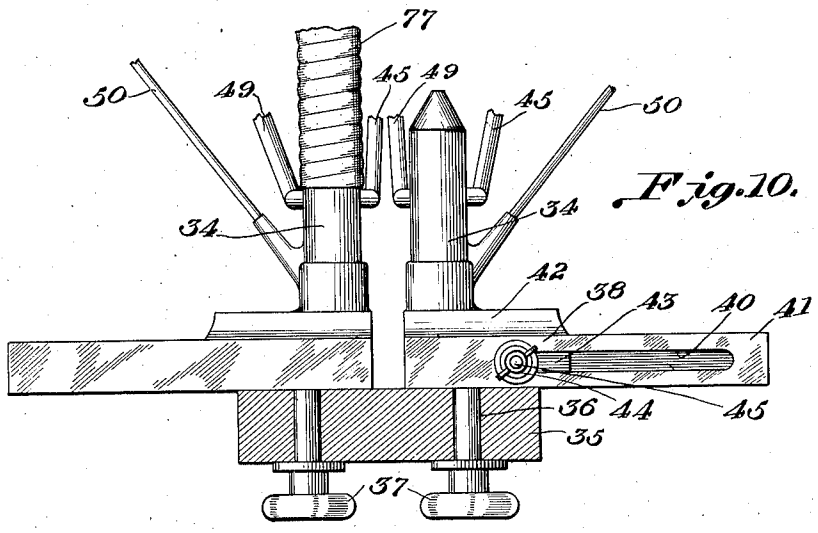
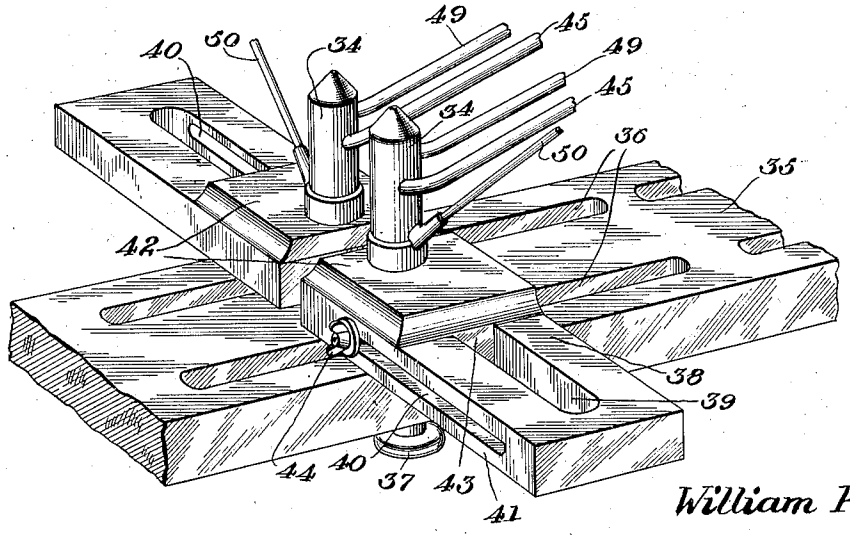


Fig. 11.



Inventor

William Pringle.

By J. W. Milburn

Attorney

May 26, 1925. 1,538,951

W. PRINGLE

STENCILING APPARATUS

Filed April 1, 1924 5 Sheets-Sheet 4

Fig. 6.

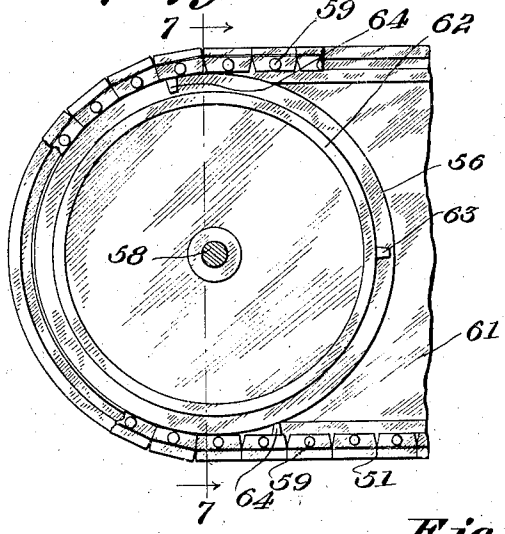


Fig. 7.

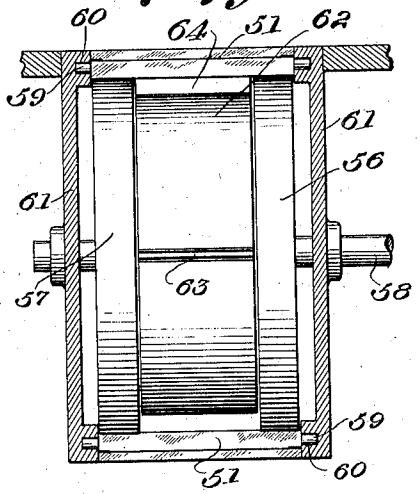
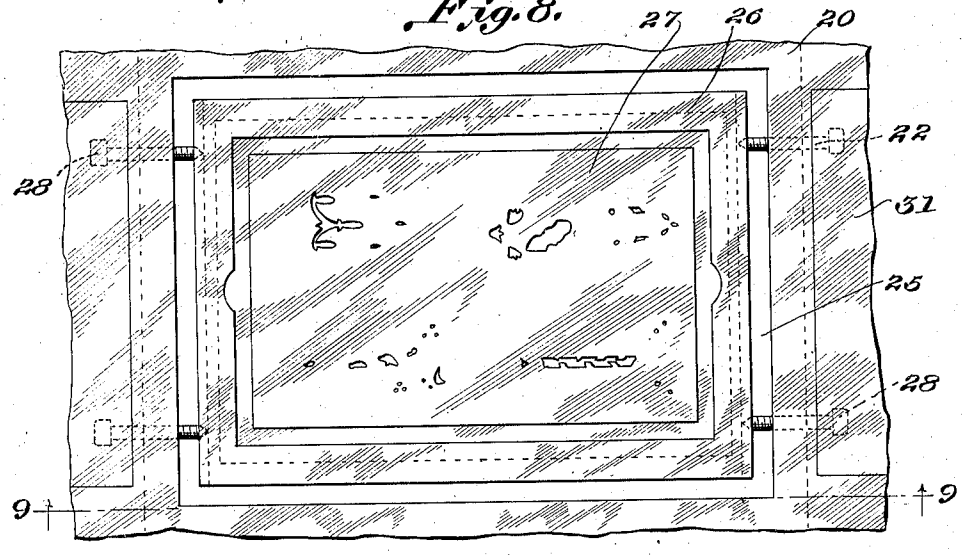


Fig. 8.



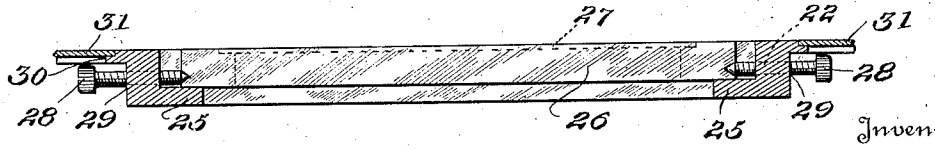


Fig. 9.

Inventor
William Pringle.

By J. W. Milburn
Attorney

May 26, 1925. 1,538,951

W. PRINGLE

STENCILING APPARATUS

Filed April 1, 1924 5 Sheets-Sheet 5

Fig. 13.

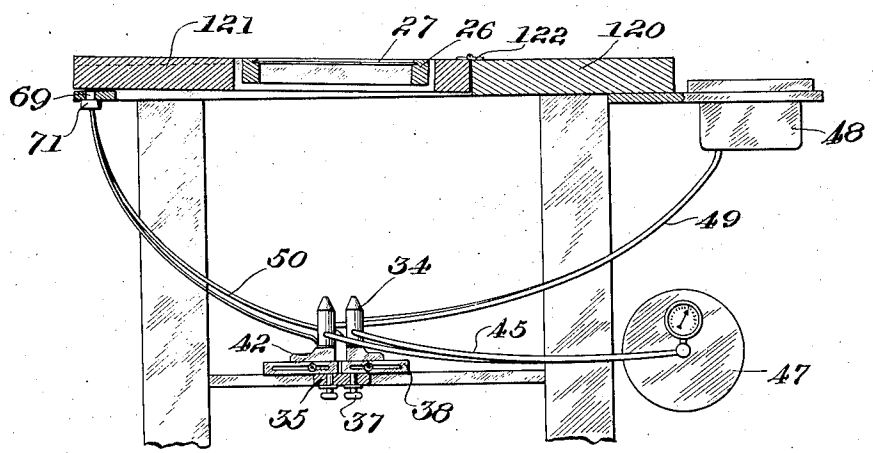
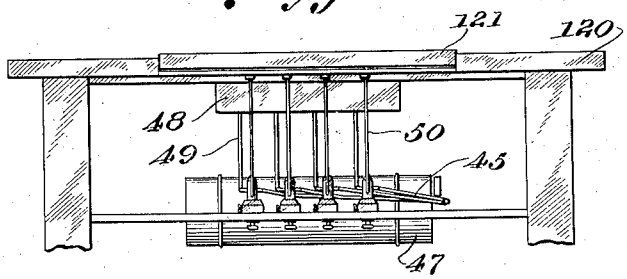


Fig. 14.



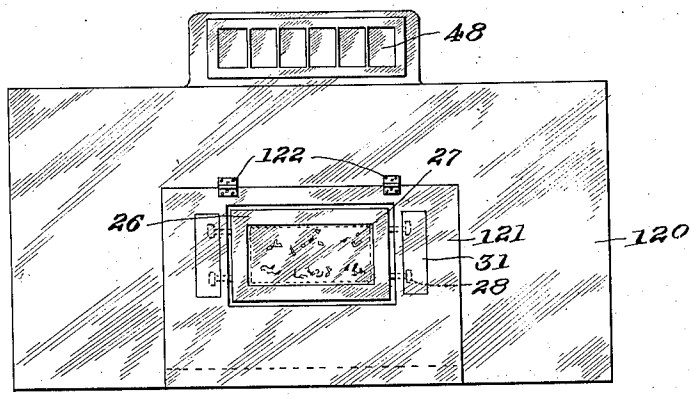


Fig. 15.

Inventor

William Pringle.

By J. W. Milburn

Attorney

Patented May 26, 1925. 1,538,951

UNITED STATES PATENT OFFICE.

WILLIAM PRINGLE, OF RICHMOND HILL, NEW YORK.

STENCILING APPARATUS.

Application filed April 1, 1924. Serial No. 703,506.

To all whom it may concern:.

Be it known that I, WILLIAM PRINGLE, a citizen of the United States of America, residing at Richmond Hill, New York city, in the county of Queens and State of New York, have invented certain new and useful Improvements in Stenciling Apparatus, of which the following is a specification.

My invention relates to stenciling apparatus and particularly to stenciling apparatus in which fluids are applied to the work under pressure. The invention is particularly adapted for production of multi-color work, but is capable of use in any process where fluid is applied to work under pressure.

One of the typical and most important uses of multi-color work is in the production of greeting cards. These cards may be colored either by hand or by machine although hand coloring is too laborious and expensive for ordinary conditions. For this reason the bulk of such cards are colored by machine.

Machine coloring, as heretofore practiced, has also been found unsatisfactory in certain important respects. Under the usual machine processes, the color work presents an interior appearance, and is considerably more expensive of application than might be desired.

The hand method is performed by means of an air brush, the color being directed to the card either through a stencil or without such device. Whether a stencil is employed or not, costs under this process are inordinately high. When no stencil is used an unusually skilled operator or artist is required and the waste of color and stock will always be excessive. With a stencil the finished product theoretically should be of as good appearance as if no stencil were used, and more uniform, because of the fixed design. This of course assumes that the stencil design remains unchanged and is uniformly adhered to. In actual practice, however, this is not the case. Few perfect reproductions are obtained and much stock is wasted. It has been found that these difficulties arise from the tendency of the color to spread on the card beneath the stencil, which heretofore has always been placed on top of the card. A certain portion of the spreading color adheres to the under side of the stencil and around the edges of the stencil apertures. If the color remains wet, the card will become smeared; if it dries immediately it will of course remain on the stencil. Repeated use of the stencil will result in the stencil being so caked with the color as to destroy the sharp lines formed by the edges of the cut-out design, and prevent the stencil from bearing firmly and evenly upon the card. When this occurs the application of color will not be confined to the stencil design, but will be blown onto the card beyond the outlines of the design, through the spaces thus formed between the card and stencil. A ragged, uneven, line of color will result. The finished cars are often smeared and otherwise unsatisfactory in appearance and are not infrequently spoiled.

More satisfactory results are obtained by other methods.

Cards, articles, or other work may be colored mechanically by die-stamping or printing upon presses adapted for color work. By each of these methods the cost of manufacture is very high. The waste of stock also bears much too high a ratio to the properly finished product and many operations are necessary to obtain a fair range of color. By these mechanical processes, also, a relatively narrow range of color is available and the appearance of the work is too sharply mechanical, even in the most expensive work.

By either the hand or mechanical processes mentioned only flat, smooth surfaces can be well colored, as ridges and hollows do not take the color with uniformity.

By employing the stenciling machine and the color-applying process which constitute my invention, greatly improved results are obtained. Effects can be produced that can only be equalled by the most expensive and laborious hand methods. Moreover, by means of my invention color can be uniformly applied to both flat and raised surfaces on either rough or smooth work.

The primary object of my invention is the provision of means by which stencil work can be accurately and properly produced at a minimum expenditure of time, labor, and materials.

A further object is the provision of means whereby practically perfect multi-color

work may be produced in a large variety of colors and effects upon paper and cardboard or other materials of any character of surface. A further object is the provision of means whereby multicolor work may be produced in uniform sharp line effects according to a stencil design by application of color thereto through an air brush.

A still further object is the production of multicolor work through the use of an air brush and stencil so arranged as to eliminate wastage of color and stock and effect quantity production of such work in uniform and perfect condition.

A still further object is the provision of means to direct the color upwardly to the card or other work and through a stencil plate, the work being held face downward on the upper side of the stencil. By this arrangement, with the use of very thin but rigid stencils, exceedingly accurate linework is obtained because all of the color which strikes the stencil but does not pass through the cut-out design will tend to gather on the lower side of the stencil, removed from possible contact with the face of the work. With this arrangement, also, a heavy accumulation of color on the under surface of the stencil will not affect the work, since the color will either drip from the stencil toward the source of color or dry upon the under surface of the stencil without in any way affecting the lines of the design or the fixed relation of the work and stencil.

In providing means to produce the above-stated results I also contemplate as one of the objects of the invention the provision of means for effectively maintaining the card or other work firmly and surely in its proper position upon the stencil. By this means no color is permitted to gather upon or reach the side of the stencil upon which the card bears. Because of the means thus provided the color cannot pass the upper edge of the stencil outline. Furthermore, as previously explained, any excess of color tends to fall away from the stencil rather than seep between the stencil and the work.

By way of further explanation of the invention which I have devised, another of its main objects may be described as the provision of means for spraying color upwardly upon the card or other work through the stencil plate, such means comprising one or more vertically or substantially vertically positioned air brushes placed below the stencil. By the use of an air brush instead of a positive impression printing member a gradual fading of color from one portion of the card to another may be obtained.

Another object of the invention is the provision of a machine whereby color can be applied to the cards by a step by step process, that is, the cards may be carried by a moving member and passed through the machine by intermittent movements. One portion of the design may thus be colored over one stencil and other portions over other stencils at later stages of the operation of the machine, all without readjustment of the position of the card.

Another object of the invention is to provide a machine which is so designed that a plurality of air brushes may be arranged under each stencil so that the various portions of the design may be colored with a wide range of either heavy or light applications of the same or different colors.

A still further object is to so construct the machine that the application of color from each brush may be readily adjusted by the operator independently of the other air brushes.

A still further object is to so support the stencil that it will be readily adjustable so that its design will appear on the work or card in perfect alignment with the designs placed on the card by the other stencils. This permits the position of the design on the card to be readily changed and maintained on succeeding cards, all without adjustment of the individual cards.

The machine comprises, broadly, a working table or platform with a conveyor belt passing along one side thereof in step-by-step or intermittent movements. Blank cards or other work to be colored by the machine are attached to the belt by clips while the belt is temporarily stationary. When the driving mechanism next moves the belt the card will be advanced to a position over the first stencil plate. A spring arm, operated by a cam timed to the movement of the belt, will move downwardly to press the card firmly against the upper side of the stencil plate and the downward movement of the arm will also actuate the valves of air brushes vertically positioned below the stencil plate to spray color upon the card through the openings in the stencil. By movement of the cam, after a short interval the arm will be raised, releasing the card from the stencil plate and shutting off the air brushes. The conveyor belt will then carry the card to the next stencil plate where the former operation will be repeated. Similar operations will be performed at each of the remaining stencil plates in succession, until as many colors as desired have been applied. After passing all of the stencils the card will come to the far end of the working table where it will be removed from the belt by a releasing mechanism.

It will be understood that the machine which is shown in the drawings accompanying this specification and the operation of which has just been briefly described is merely a preferred form of apparatus by which my invention may be carried out.

Figure 1 is a top plan view of the machine, parts of the machine being shown broken away.

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a top plan view of a section of the conveyor belt used in the machine.

Figure 4 is a detail view showing a side elevation of the conveyor chain.

Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a side elevation, partly broken away, of the conveyor chain drive wheel.

Figure 7 is a view taken on the line 7—7 of Figure 6, showing the conveyor chain and casing in section.

Figure 8 is a detail plan view showing the stencil frame and stencil frame supporting gallery.

Figure 9 is a sectional view taken on the line 9—9 of Figure 8.

Figure 10 is a detail view, partly in section, showing the manner in which the air brushes are mounted in the machine.

Figure 11 is a detail perspective view showing the air brush mounting.

Figure 12 is a view of a stencil plate reinforced by a supporting plate.

Figure 13 is a vertical sectional view of a modified and hand operated form of the machine.

Figure 14 is a front elevation of the machine shown in Figure 13, and,

Figure 15 is a top plan view of the modified form of machine.

Referring to Figures 1 to 12, inclusive, of the drawings, wherein similar numerals refer to like parts throughout the several views, the numeral 20 designates the working table or platform of the machine. Upon the table are provided a number of preferably rectangular stencil frame supporting galleries 21, 22, 23 and 24 each provided with an inwardly extending flange 25 about its lower edge for supporting a stencil frame 26 carrying a stencil plate 27. Means for horizontally adjusting the position of the stencil frame 26 are provided in hand screws 28, carried in the downwardly extending side walls 29 of the galleries. As is shown in Figure 8, one of these hand screws is placed adjacent each corner of the supporting galleries. By operating these screws in pairs the stencil frame 26 may be shifted upon flange 25 as desired so that the position of the design placed on the card by each stencil may be adjusted relatively to the position of the designs of the other stencils. The screws 28 may be reached for operation through hand holes 30 between the stencil galleries, the hand holes being normally closed by cover plates 31.

The stencil plates 27 are preferably formed of very thin sheet tool steel or other material suitable for stencils and the stencil designs may be formed or cut out in any desired manner. When necessary, a supporting blank of brass or other suitable material may be cemented or otherwise fixed to the under side of the stencil 27, to brace it and prevent it from bending. A plate of this type is indicated by the numeral 32 and, as shown in Figure 12, it has apertures 33 therein aligned with the cut-out portions of the stencil 27 and much larger than the latter openings. The number of designs included in a stencil may of course be varied according to the size of the work upon which the design is to be placed. In post-card work it will be found most economical to have four designs to a stencil, positioned as shown by the stencil 27 of Figure 8.

The air brushes 34 with which the machine is equipped may be of the usual type and are preferably supported or arranged beneath the stencil plates 27 and galleries 21, 22, 23 and 24 in the manner illustrated in Figures 10 and 11 and shown in connection with the gallery 24 in Figure 1. As shown in these views, longitudinal bars 35 are suitably supported beneath the working table or platform 20 and each bar is provided with two pairs of longitudinal slots 36 adapted to receive the hand screws 37 carried on the under side and at one end of the transverse slide blocks 38. The slide blocks 38 are longitudinally slotted as shown at 39 and a slot 40 is cut through one side 41 of the block. Brush supporting blocks 42 carrying the air brushes 34 are mounted on the slide blocks 38, each block having a square depending lug 43 on its lower edge to engage the longitudinal slot 39 of the slide block 38. Each brush block 42 may be clamped in position upon its slide block 38 by a wing nut 44 on a bolt 45 which extends through the side slot 40 into lug 43. It will be seen that the position of the air brushes 34 may be changed relatively to the stencil 27 by adjusting the slide block 38 on bar 35 or the brush block 42 on slide block 38. Since either of these adjustments may be employed separately or combined with the other, the arrangement provides a ready horizontal adjustment of the air brushes so that they will project a stream of color upon any desired portion of the stencil and card. The brushes are held in adjusted position by tightening the removable hand screws 37 and wing nuts 44.

Any desired number of air brushes may be placed under each stencil. Ordinarily twelve brushes to a stencil, six on each side of bar 35, will be found convenient. This arrangement renders possible a wide range and depth of color and permits the color to be applied to the card at any point desired. If desired, the color from different air brushes may be mingled on the card. On the other hand, if it is desired to confine

the spray from the brushes, a sleeve such as 77 may be placed over the upper portion of the brush. The tube shown may be formed of flexible metal tubing.

The air by which the brushes are actuated is supplied through flexible tubes 45 attached to a manifold 46 which communicates with a compressed air tank 47. The color for the brushes is obtained from tanks or jars placed at the back of the machine (Figure 1) or in any other convenient location, and connected to the brushes by suitable tubing 49. The color supplied to each brush may be changed at will by attaching the flexible color supply tube 49 of any of the brushes to the desired tank of ink or color. The air brushes 34 are controlled through Bowdoin wires 50 in a manner hereinafter described.

The apparatus may be operated either with or without a conveyor belt 51 for conveying the cards to be colored from one stencil to another. The structure of this belt is shown in detail in Figures 3, 4 and 5. It comprises relatively narrow plates 52 held together in belt formation by flexible steel bands 53 passed through slots 54 at each end of the plates, as particularly illustrated in Figure 5. The plates 52 are held on the bands 53 by set screws 55 inserted from the lower side of the plates. The lower side edges of the plates are beveled as shown in Figure 4 so that the belt as a whole will have the necessary flexibility.

In the preferred form of my invention the belt 51 extends along the front of the working table 20 and is supported at the right hand or "feed" side of the machine (Figure 1) by an idler drum, not shown. At the other end of the table the belt is supported on idler drums 56 and 57 so mounted on a shaft 58 that each drum is under one edge of the belt, as shown in Figure 7. The belt is further supported throughout its length by pins 59 projecting from each end of the plates 52 and slidably inserted in endless grooves 60 in the casing members 61 at each side of the belt 51. Intermittent motion is imparted to conveyor belt 51 by a driving drum 62 fixed to the shaft 58 between the idler drums 56 and 57. The driving drum has upon its periphery a tooth 63 which engages teeth 64 on the under side of the belt 51, as shown in Figure 6. These teeth 64 are preferably so spaced on the belt that the space between them is equal to one-half the circumference of the drum 62. The rotation of the driving drum 62 will move the belt 51 intermittently by reason of the fact that tooth 63 will only be in engagement with a tooth 64 on the belt during one-half of the rotation of the drum 62. As shown in Figure 6, a tooth 64 on the belt will always stop approximately directly above the axis of the driving drum 62 and a subsequent rotation of the drum will cause its tooth 63 to engage and move with it this tooth 64 on the belt. Thus the belt 51 and the cards carried thereby will be moved forward about the idler drums 56 and 57 a distance equal to that between the stencil plates 27, the teeth 64 on the belt being that distance apart. When the belt tooth 64 has been moved to a point below the drum and just past its axis it will be disengaged by the tooth 63 when the latter moves upwardly. The belt 51 will stop and will remain stationary until the next tooth 64 is engaged by the continued movement of the drum 62. This interval will be sufficient to permit the operator to clamp the cards to be colored upon the belt and enable the air brushes to be actuated.

The particular arrangement of teeth described above has been found to produce a step by step movement of the belt that is well suited to the operation of the apparatus, but the distance between these teeth and the size of the drum may of course be varied to produce movement of the belt at longer or shorter intervals.

A card C is shown in Figure 1 mounted on the belt 51 by means of devices which are illustrated in detail in Figures 3, 4 and 5. These holding devices are attached to the belt plates 52. Each plate has a plurality of spaced threaded sockets 79 adapted to receive a set screw 82 which passes through suitable openings in clips 80 and 81 and secures the clips to the inner edge of the belt plate. The clip 80 has a lower flat jaw 83; and an upper spring jaw 84 with a slot to receive the screw 82. The clip 81 has a lower flat jaw 99 and an adjustable stop arm 85 bearing thereon. Sets of these clips, comprising a pair of clips 80 and a single clip 81, are attached to the belt 51 at intervals, the distance between adjacent sets being equal to the distance between stencil plates 27. When in use, the outer edge of a card C will be held by the jaws 83 and 84 of the clips 80 while the forward edge of the card will bear against the stop arm 85 of the clip 81. The position of the clips on each plate 52 may be varied at will by inserting the set screws 82 in the appropriate sockets 79. The use of these clips obviates the necessity of a "pin" adjustment for the cards such as is used in presses.

The cards C will be placed in the clips 80 and 81 while the belt is stationary. The operator takes a card C from the pile at the "feed" end 86 of the machine working table and inserts its edge in the clips 80 with its side edge bearing against the stop arm 85. In the operation of the apparatus this is done the instant that each successive set of clips stops before the pile at end 86. The

clips are uniformly spaced along the belt so that each of the cards C will be properly positioned over the stencils 27 as it is successively stopped at the respective galleries 21, 22, 23 and 24. When the cards have passed on from the gallery 24 they will next stop at the releasing mechanism. This comprises a pivoted arm or lever 87 carrying a loose shaft 88 at its outer end. Friction rollers 89 are carried on the shaft and the lever 87 is so geared to the driving mechanism of the apparatus that it will be lowered when a card C stops under its outer end. The card will be gripped and firmly held between the rollers 89 and a pad 90. When the belt 51 starts to move again the card will be pulled from the clips 80 and 81. Upon release of the card, the lever 87 will be raised, as will be later described, so as to be in readiness to grip the next card. The conveyor belt passes through openings 92 provided for this purpose in table 20, these openings being made sufficiently large to permit the passage of the clips 80 and 81 attached to the belt.

The shaft 58 to which the belt driving drum 62 is fixed is geared to a motor 65 by suitable reduction gearing. A cam shaft 66 geared to shaft 58 carries a series of cams 67 against which bear arms 74, carried by a bar 68, by means of which actuation of the air brushes is controlled. As previously stated, a group of air brushes 34 are located beneath each stencil plate 27. A Bowdoin wire 50 extends from each brush and has fixed to its upper end the usual plunger 69, normally held in an elevated position by a coil spring 70. The plungers 69 are carried in a terminal plate 71 extending along the working table of the machine, the plungers associated with each group of brushes being located adjacent one another in the terminal plate 71. The brush controlling plungers project upwardly through the working table into close proximity to bar 68. The latter is pivoted in journals 72 at its rear edge and, as is shown in Figure 1, extends along the top of the working table behind the stencil galleries 21, 22, 23, and 24. Bar 68 carries a series of adjusting screws 73, one for each of the plungers 69. The screws 73 extend through the bar, each screw being positioned directly above a plunger 69. Spring arms 76 extend forwardly from the brush operating bar 68 over each of the stencil plates 27 and serve to hold the cards in position by pressing the cards downwardly against the stencil plates. Extending rearwardly from the bar 68 between each pair of journals 72 is the arm 74 with its end 75 bent downwardly to bear against the cam 67. The plungers 69 are normally held against the lower ends of the adjusting screws 73 by means of the springs 70. A single bar 68 may be employed, but it is preferably actuated by a plurality of cams 67 to insure smooth operation.

In the operation of the apparatus the rotation of the shaft 58 will intermittently move the belt driving drum 62 and will also effect the rotation of the cams geared to the shaft. The cams 67 are so positioned upon the shaft 66 that when the tooth 63 on the driving drum 62 has moved the belt forward one step (stencil plate) and disengaged the tooth on the belt so that the belt will be stationary, the highest point on the cams 67 will come under the lower ends 75 of the bars 74 and raise the latter. The consequent tilting of bar 68 on its journals 72 causes the adjusting screws 73 to depress the Bowdoin wire plungers 69 and actuate the air brushes 34 to spray color upon the cards held upon the stencil plates 27. The spring arms 76 which aid in holding the cards in position are made to depend slightly from the plane of the bar 68 so that they will contact with the cards C over the stencil plates before the plungers 69 are actuated. This will insure against any color being sprayed while the cards are loose on the stencils. The parts of the apparatus are so arranged and timed that the coloring of the cards will be completed by the time the cam, in its continued rotation, permits the end 75 of arm 74 to drop; and as soon as the bar 68 is thus elevated the driving drum tooth 63 will contact with the next tooth 64 on belt 51 and move the belt the required distance to place the cards in their next position on the working table 20.

The card releasing lever 87 is also actuated in a manner similar to the bar 68 by a cam 67 on the shaft 66, but the contour of this cam is such that the lever 87 is held down somewhat longer than the bar 68. By this arrangement the card C which is then under the rollers 89 is held by them until after the belt 51 has started, so that the card will be released from the clips on the belt.

In the operation of the apparatus shown in Figures 1 to 12, inclusive, the stencil plates 27, by means of which the series of designs are to be placed on the cards, are placed in the respective stencil frames 26 and the latter properly adjusted. This adjustment may best be made after a short preliminary operation of the machine, to bring the successive portions of the design into accurate alignment. The clips 80 and 81 will also be placed on the belt 51 as desired, each set of clips being so spaced that they will, in their passage over the table, stop opposite the feeding space 86, the galleries 21, 22, 23, and 24 and the release lever 87 in succession. When the apparatus is being operated, the operator will place a card C in the clips 80 and 81 on the belt each time the belt stops. The newly inserted cards carried along with the belt by the operation of

the belt driving drum 62, will first stop over the stencil plate 27 in gallery 21. The air brush operating bar 68 will immediately be swung downward by the rotation of cams 67, the movement of bar 68 first causing card C to be clamped down upon the stencil 27 and subsequently effecting the actuation of the air brushes 34 to spray the color upon the under side or face of the card C. Continued rotation of the cam 67 will permit the bar 68 to rise, thus cutting off the air brushes 34 and releasing the card from the stencil plate. Upon completion of this operation the drum 62 will have rotated sufficiently to again move the belt 51, which will carry the card to the next gallery 22, where it will be stopped and colored with another portion of the design as the result of a second operation of the bar 68. This will continue until the card has passed over each stencil in turn, when it will next stop under the releasing lever 87 and there be taken from the belt.

It will be understood that the operator at the "feed" end 86 of the table has placed a card in the clips on the belt each time the belt has stopped, so that a card C will be over each stencil plate each time the belt 51 stops. In this way four cards C may be colored simultaneously with the apparatus shown. The number of cards to be colored at one time will of course depend upon the number of stencils used. In operation it will be advisable to place a sheet of paper over the uncovered stencils until all are covered by cards C so that color will not spray through the stencils and over the working table.

The amount of color to be sprayed by a given air brush 34 can be easily regulated by adjusting the screw 73 which normally contacts with the plunger 69 of the air brush. If the screw is raised its downward movement will of course exert less pressure upon the plunger and will cause a lighter stream of color to be ejected by the brush, while if the screw is lower the brush will throw a correspondingly heavier stream. One color may be sprayed by any number or all of the brushes of a group or each may eject a different color, just as desired. In the latter case it will be seen that forty-eight different colors may be placed on the cards in one "run" through the apparatus disclosed, a much wider range of color than can be supplied by any multi-color press. An even greater number of colors may be employed by increasing the number of air brushes. For an operator to produce a similar range or variety of color by the hand process it would be necessary for him to operate a corresponding number of air brushes one by one as separate and distinct operations.

The device shown in Figures 13, 14 and 15 is broadly similar to the apparatus shown in the preceding figures, the only differences in structure being such as to permit this device to be operated by hand instead of by power as in the other form of the invention.

The hand operated device is somewhat similar to a table and comprises a working platform 120 to which is pivotally connected a gallery 121 by means of a hinge 122 at the rear edge of the gallery. A stencil plate frame 26 carrying a stencil 27 is adjustably carried by gallery 121 and may be adjustably positioned therein by hand screws 28.

The air brushes 34 are mounted beneath the stencil plate 27 and are connected to the color tanks and air tank in a manner similar to that employed in the apparatus illustrated in Figures 1, to 12, inclusive.

In the device illustrated in Figures 13, 14 and 15 the air brush controlling wires 50 lead to a bar 71 below the front edge of the pivoted gallery 121. The plungers 69 at the upper ends of the wires 50 project through openings in the bar into contact with the lower side of the pivoted gallery. The springs which normally hold the plungers 69 in elevated position are sufficiently strong to support the gallery 121 in its raised position.

In the operation of the device, when the operator, after having placed a card to be colored upon the stencil 27, depresses the outer edge of the pivoted gallery 121, the plungers 69 will be depressed and the air brushes 34 actuated to spray color on the card. The amount of color sprayed by the brushes will of course depend upon the length of time the gallery 121 is held depressed, as the machine is not automatic in this respect. The construction and operation of the air brushes and the manner of adjustment of these and other parts of the device will be clear from the description given of the apparatus of Figures 1 to 12.

In both of the forms of my invention disclosed herein, the stencils are placed in a normally inverted position with respect to the cards or other work to, be colored, i. e., beneath instead of above the cards, and the color or other fluid is sprayed upon the cards from below. As previously explained, this method insures a uniform and accurate coloring of greeting cards or other cards and articles, and prevents color from spreading or being smeared upon the face of the article being colored.

The appearance of the stenciled work will compare most favorably with hand work and a much wider range of color and shading can be obtained at a much more reasonable cost.

I claim:

1. A stenciling apparatus comprising a substantially horizontal stencil, an air

brush beneath the stencil for spraying fluid upwardly upon the under side thereof, and means for actuating the air brush.

2. A stenciling apparatus comprising a substantially horizontal stencil, an air-brush beneath the stencil for applying fluid to the under side thereof, means for positioning articles upon said stencil, and means for actuating said air brush in accordance with the operation of said positioning means.

3. A stenciling apparatus comprising a substantially horizontal stencil, an air brush beneath the stencil, and means for moving articles over the stencil and for actuating the air brush when an article is aligned with the stencil.

4. A stenciling apparatus comprising a stencil, an air brush beneath the stencil to apply color to the under side thereof, conveyor means for depositing articles upon the stencil and means synchronous with the conveyor means for actuating the air brush when an article is deposited on the stencil.

5. A stenciling apparatus comprising a stencil, color projecting means beneath the stencil, an intermittently actuated conveyor for positioning articles on the stencil and means for actuating the color projecting means while the article is positioned on the stencil.

6. A stenciling apparatus comprising a stencil, color projecting means beneath the stencil, means for positioning cards upon the stencil, and means for actuating the color projecting means, said positioning means and color projecting actuating means being synchronized for actuation of the projecting means when the card is positioned.

7. A stenciling apparatus comprising a stencil, color projecting means beneath the stencil, means to position cards on the stencil and means to alternately actuate the positioning and color projecting means whereby the latter will be actuated when the card is positioned.

8. A stenciling apparatus comprising a plurality of stencils, color projecting means beneath the stencils, conveyor means for successively positioning cards upon the respective stencils, means for alternately actuating the conveyor means and color projecting means whereby the latter will be actuated when the cards are positioned on the stencils.

9. A stenciling apparatus comprising a substantially horizontal support having an opening therein, a stencil on said support in alignment with said opening, means for projecting fluid upon the lower side of the stencil, a clamping member adapted to be moved into operative position to engage and hold the work upon the upper face of the stencil and to actuate the fluid projecting means, and means for intermittently operating said clamping member.

10. A stenciling apparatus comprising a substantially horizontal support having a plurality of openings therein, stencils on said support in alignment with said openings, means beneath the stencils for projecting fluid upon the under side of said stencils, conveyor means for successively positioning articles upon the upper surface of the respective stencils, a pivoted member adapted to be moved into operative position to engage and hold the articles positioned upon said stencils and to actuate the fluid projecting means and means for intermittently operating the conveyor means and the pivoted member.

11. A stenciling apparatus comprising a substantially horizontal stencil, means for spraying fluid upwardly upon the under side of the stencil, means movable relative to the stencil for positioning articles upon said stencil, and means for actuating said spraying means by the operation of said positioning means.

12. A stenciling apparatus comprising a plurality of stencils, means for projecting fluid upon said stencils, conveyor means for successively aligning cards with the respective stencils, means for alternately actuating the conveyor means and color projecting means whereby the latter will be actuated when the cards are aligned with the stencils.

13. A stenciling apparatus comprising a stencil, fluid projecting means beneath the stencil, means for positioning articles on the stencil, and means controlled by the positioning means for actuating the fluid projecting means.

14. A stenciling apparatus comprising a stencil, fluid projecting means beneath the stencil, an intermittently actuated conveyor for positioning articles on the stencil, and means controlled by the positioning of an article on the stencil for actuating the fluid projecting means.

15. A stenciling apparatus comprising a stencil, an air brush beneath the stencil for applying fluid to the under side thereof, means to position articles on the stencil, and means controlled by the positioning means for actuating the air brush.

16. A stenciling apparatus comprising a stencil, means for projecting fluid upon the lower side of the stencil, a movable member adapted to engage and hold an article upon the upper side of the stencil and to actuate the fluid projecting means, and means for operating the movable member.

17. A stenciling apparatus comprising a stencil, a support beneath the stencil, said support having a plurality of apertures to admit fluid to different portions of the sten-

cil, an air brush beneath the support for applying fluid to the under side thereof, and means for actuating the air brush.

18. A stenciling apparatus comprising a stencil, a support beneath the stencil, said support having a plurality of apertures to admit fluid to different portions of the stencil, a plurality of air brushes each adapted to project fluid through one of the apertures of the support, and means for actuating the air brushes.

19. A stenciling apparatus comprising a stencil, an air brush beneath the stencil for applying fluid to the under side thereof, means for actuating the air brush, and means associated with the air brush for directing the fluid therefrom to a predetermined portion of the stencil.

20. A stenciling apparatus comprising a substantially horizontal stencil, a plurality of air brushes beneath the stencil for applying fluids to the under side thereof, means for actuating the air brushes, and means for confining the area of application of the fluids applied by the respective brushes.

21. A stenciling apparatus comprising a stencil, an air brush beneath the stencil for applying fluid to the under side thereof, means for actuating the air brush, means for adjusting the position of the air brush relative to the stencil, and a flexible tube around the upper part of the air brush, whereby fluid from the air brush may be directed to any desired portion of the stencil.

22. The method of applying colors to an article which consists in projecting sprays of fluids of different nature under pressure upwardly through a stencil simultaneously to different portions of the under surface of the article.

23. The method of applying colors to an article which consists in projecting sprays of fluids of different nature under pressure simultaneously upon different portions of the under surface of the article, confining the application of the respective sprays to a predetermined portion of the surface upon which they are projected, and preventing the application of the confined sprays to the surface at selected points.

24. A stenciling apparatus comprising a substantially horizontal stationary stencil, an air brush beneath said stencil for applying fluid to the under side thereof, and means for actuating the air brush.

25. A stenciling apparatus comprising a substantially horizontal support having an opening therein, a stencil on said support in alignment with said opening, an air brush for spraying fluid upwardly upon the under side of the stencil, and means for controlling the actuation of the air brush.

WILLIAM PRINGLE.