

Jan. 14, 1941.

C. H. BACHER

2,228,807

COLORING AND PRINTING MACHINE

Filed May 11, 1937

5 Sheets-Sheet 1

Fig. 1.

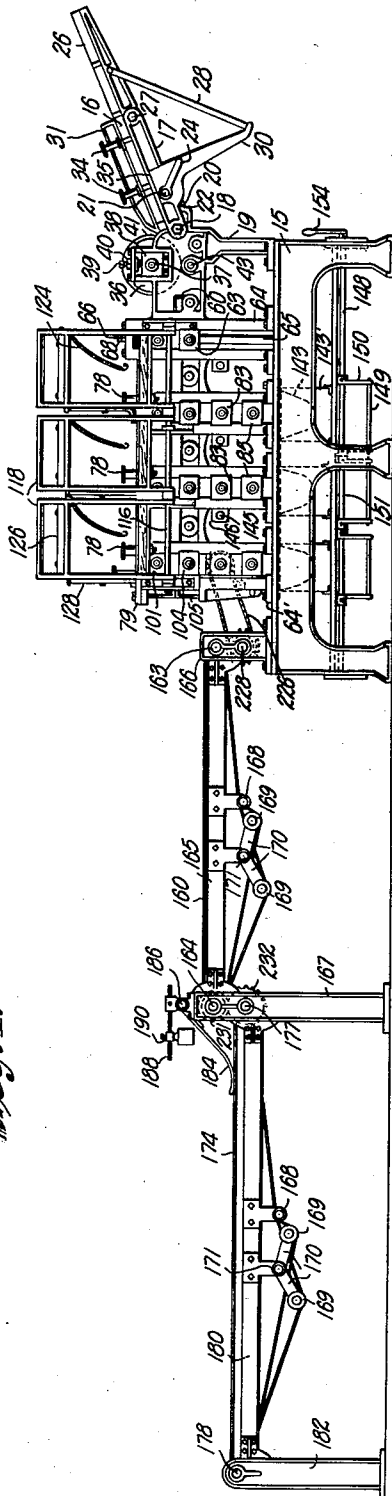


Fig. 10.

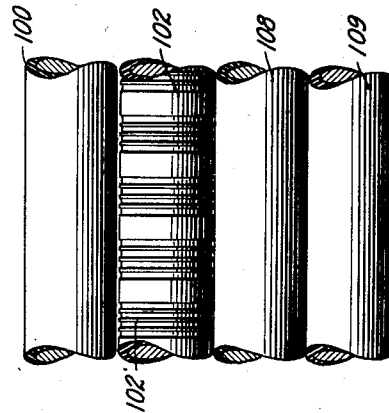
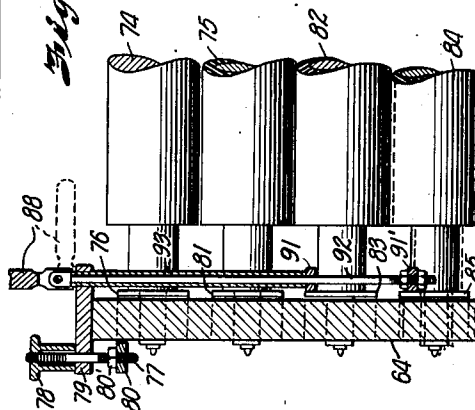


Fig. 9.



INVENTOR
C. H. Bacher,
BY *Chas. W. Gerard,*
ATTORNEY

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5 Sheets-Sheet 2

Fig. 2.

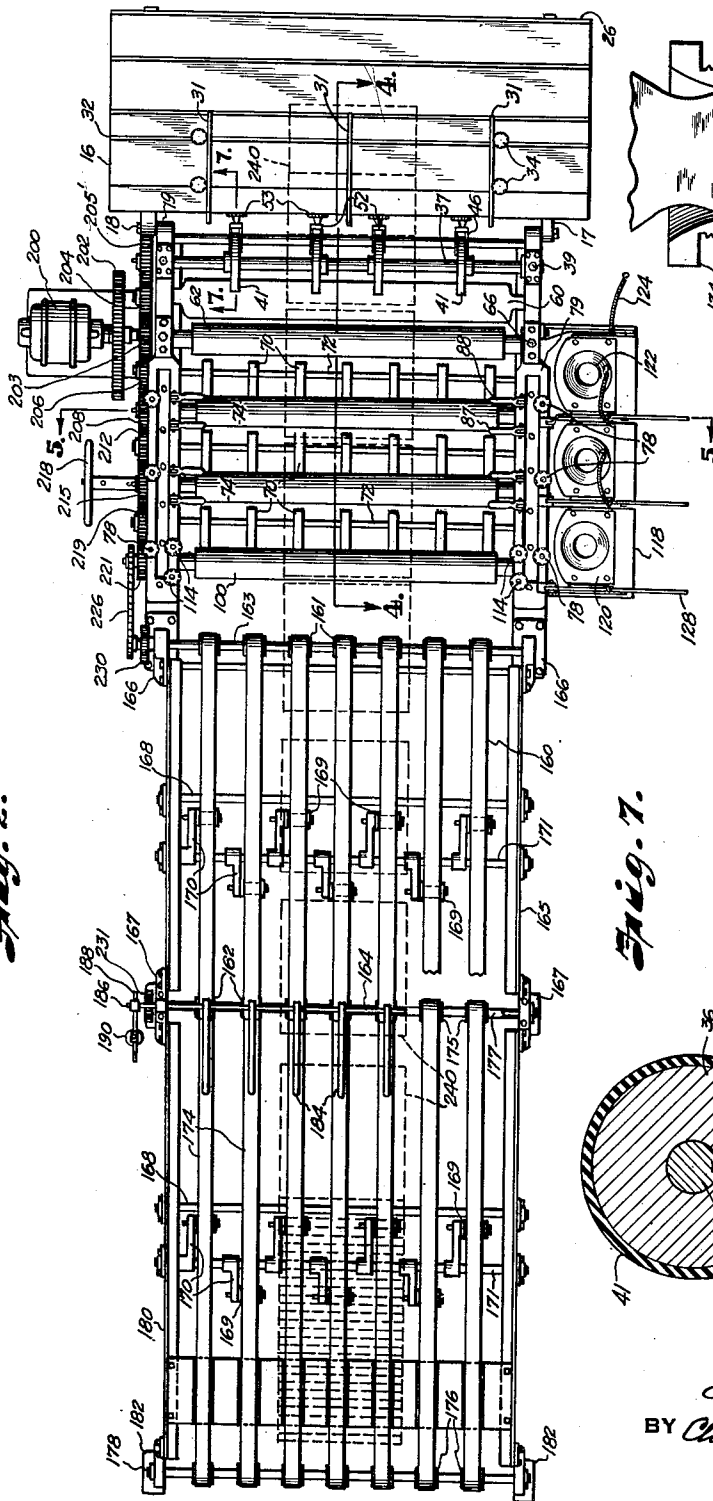


Fig. 7.

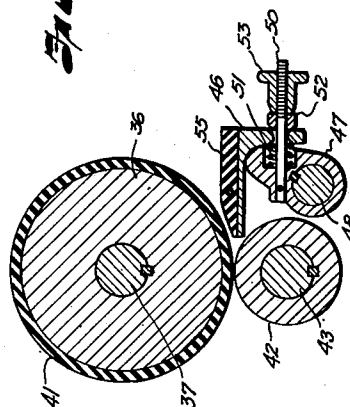
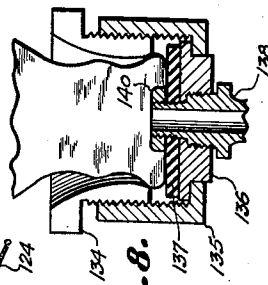


Fig. 8.



INVENTOR
C. H. Bacher,
BY *Chas. W. Ward*
ATTORNEY

Jan. 14, 1941.

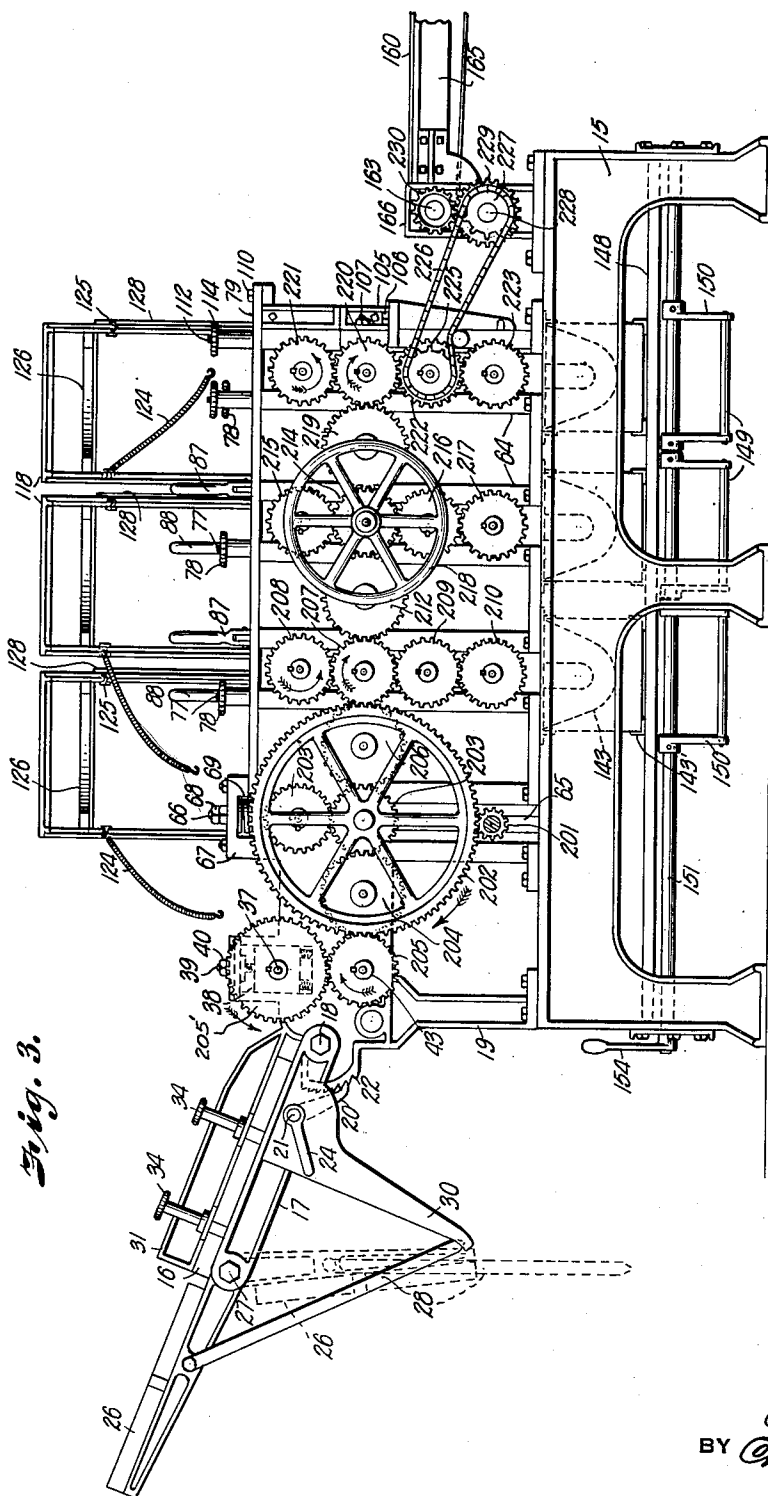
C. H. BACHER

2,228,807

COLORING AND PRINTING MACHINE

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5 Sheets--Sheet 3



INVENTOR
C. H. Bacher,
BY *Chas. W. Gerard*
ATTORNEY

Jan. 14, 1941.

C. H. BACHER

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COLORING AND PRINTING MACHINE

Filed May 11, 1937

5 Sheets-Sheet 4

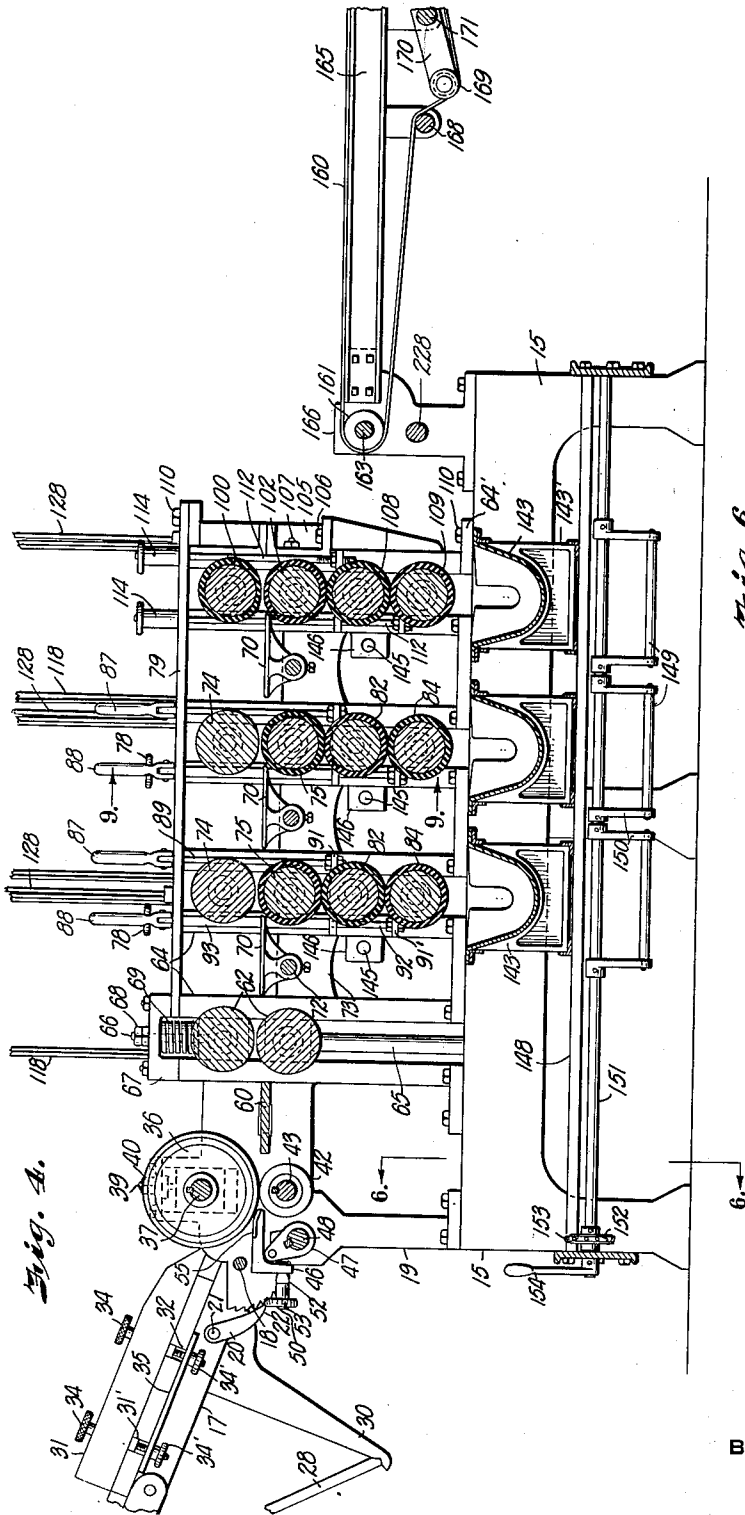
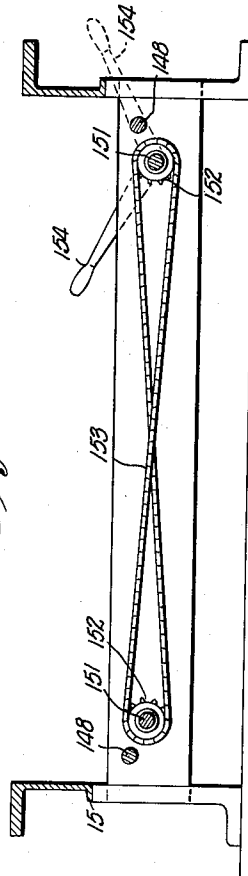


Fig. 6.



INVENTOR
C. H. Bacher,
BY *Chas. W. Gerard.*
ATTORNEY

Jan. 14, 1941.

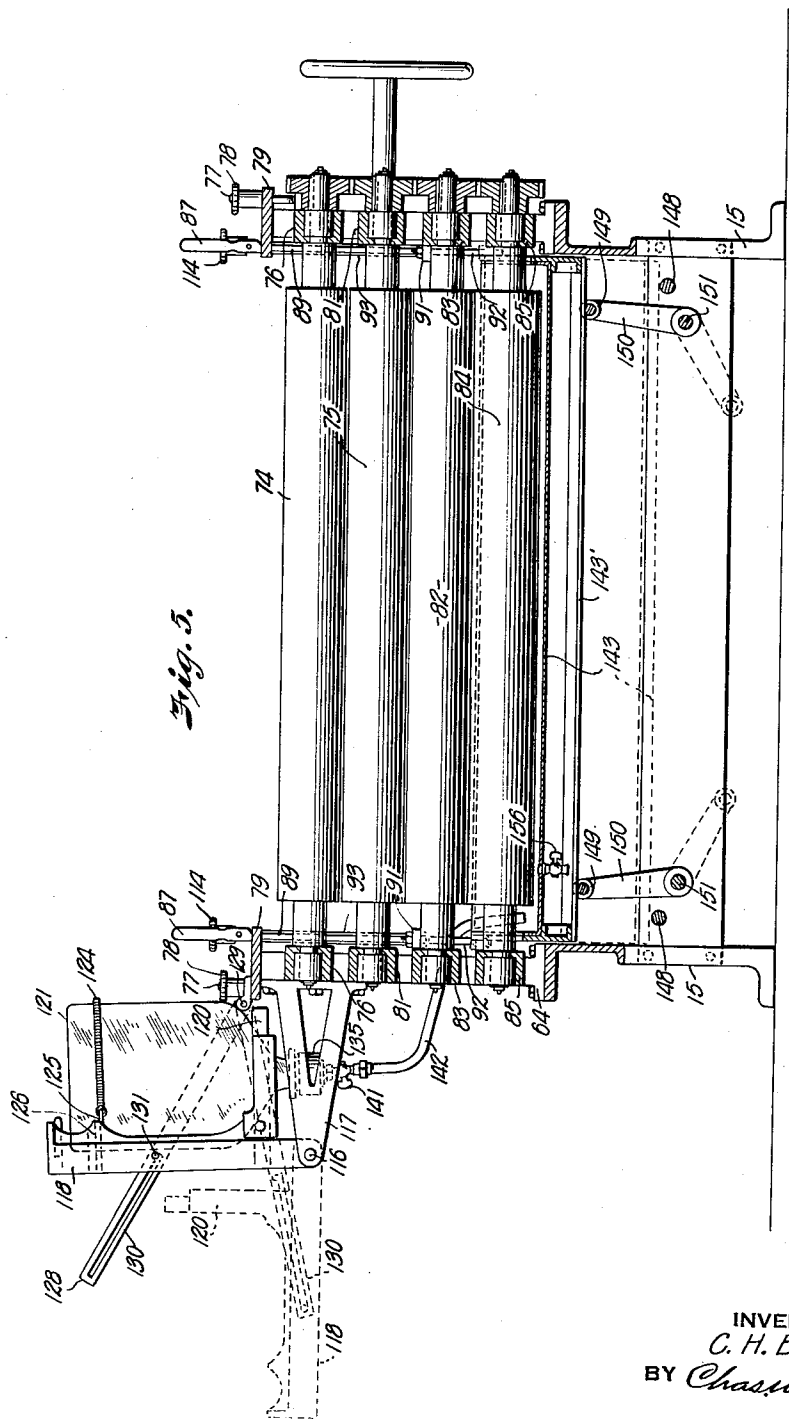
C. H. BACHER

2,228,807

COLORING AND PRINTING MACHINE

Filed May 11, 1937

5 Sheets-Sheet 5



INVENTOR
C. H. Bacher,
BY *Chas. W. Gerard*
ATTORNEY

UNITED STATES PATENT OFFICE

2,228,807

COLORING AND PRINTING MACHINE

Charles H. Bacher, St. Joseph, Mo.

Application May 11, 1937, Serial No. 141,895

5 Claims. (Cl. 91—16)

The present invention relates to coloring and printing machines for applying coloring dyes or inks to sheets or blanks of cardboard material used for making boxes or cartons, and aims to provide a novel and efficient machine for applying a coloring treatment to such material in either the sheet or web form, or to the carton or box blanks after they have been cut from the sheet.

It is also an object of the invention to provide a practical and efficient machine of this character which is equipped not only for applying the desired coloring treatment to the cardboard material or blank, but is further equipped for printing the same with decorative matter such as stripes, patterns or appropriate designs, as well as to print thereon special matter such as names, advertising matter and the like, if desired.

For the purpose of the invention I have devised an automatic machine for carrying out the aforesaid general functions, in conjunction with which various subordinate functions are provided for by means of appropriate mechanism involving certain other features of improvements which will be hereinafter more particularly described and set forth in detail.

With these general objects therefore in view the invention will now be described by reference to the accompanying drawings illustrating an apparatus especially designed for the carrying out of these objects as well as various minor objects forming a necessary adjunct to the primary functions of the machine, after which those features and combinations deemed to be novel and patentable will be particularly set forth and claimed.

In the drawings—

Figure 1 is a side elevation of a coloring and printing machine constructed in accordance with the present invention;

Figure 2 is a plan view of the same;

Figure 3 is a view on a larger scale illustrating a side elevation of the main portion of the machine comprising the coloring and printing mechanism and including the receiving end of the machine;

Figure 4 is a vertical sectional elevation, illustrating a section taken on the line 4—4 of Figure 2;

Figure 5 is a transverse sectional elevation, illustrating a section taken from line 5—5 of Figure 2;

Figure 6 is a transverse sectional elevation taken on the line 6—6 of Figure 4, showing the

means for raising and lowering the ink or dye pans;

Figure 7 is an enlarged sectional detail, representing a section taken on the line 7—7 of Figure 2;

Figure 8 is an enlarged sectional detail of a part of one of the color feeding means in relation to the mouth of one of the dye or ink containers;

Figure 9 is a vertical sectional detail, representing a section taken on the line 9—9 of Figure 4; and

Figure 10 is a fragmentary elevation of one of the sets of rollers.

In the manufacture of cardboard containers for the trade, the procedure varies somewhat in the production of what are called stock boxes which are sold from price lists, and other cartons and specialties which are usually made up and supplied as ordered. Competition is particularly keen in the stock box line, where in order to show a profit the manufacturer is accustomed to cut the blanks in large quantities, and finish and print them as ordered. Since the demands of the trade vary quite widely as to size and weight as well as color of stocks used, this imposes a considerable burden on the manufacturer as regards carrying an inventory of sufficient variety to meet those demands, with the result that only those manufacturers with adequate capital for maintaining the requisite stock range have been able satisfactorily to deal with and meet the requirements of the trade.

Such conditions have of course placed the smaller manufacturer at a considerable disadvantage on account of his inability to carry an inventory of the necessary range of grades, sizes, and colors of stock, and to overcome in a measure this handicap on the part of the minor producer I have devised the apparatus of the present invention whereby it is possible to color and decorate (as with stripes or the like, or any "repeat" designs) not only large sheets of the board material but also blocks or carton blanks after the same have been cut and creased. Since such creased formation requires particular provision for forcing the color into the creases, I have adapted the apparatus for efficient operation to carry out this coloring function efficiently and uniformly, together with provision for changing from one color to another in a few moments, and to continue the operation without further adjustment or interruption after the machine has once been set.

The idea of coloring sheets of board by the

use of more expensive opaque inks, is of course, not new. Frequently, in the small box plant, sheets of board and cut box blanks are printed from tint blocks on regular printing presses.

5 Also, the same result has been produced by using various kinds of the more modern so-called aniline ink, which is a fast drying substance made with alcohol and shellac, or other gums, loaded with China clay, zinc oxide or other materials to
10 produce opacity and then colored to the shade desired.

The manufacture of opaque aniline inks requires that they must be run through an ink grinder to make them smooth. They can be obtained only from an ink manufacturer at several
15 dollars a gallon. Even when applied by machines of very high speed, the use of opaque ink makes the cost of the colored stock so much more than when obtained from the mill as to make it impractical for general use. Further, stock covered with opaque ink takes on a different appearance. It is easily distinguished as against stock colored at the mill in that it loses its soft, attractive appearance. Board and box blanks are therefore
20 colored in this manner only in emergencies.

The idea in the present invention is to use a dye that will produce the same general effect as if the stock were colored in the beaters at the mill and at a cost that will compare favorably
30 with the charges made for colored board. While the machine herein described will handle the several kinds of opaque ink, it is primarily intended to use a dye composed of water, or a combination of water and alcohol, into which the proper amount of dry aniline powder has been
35 mixed.

The manufacture of such a solution is so simple that the ingredients may be purchased in large quantities by the user of the machine and made
40 in his own plant as needed, or solutions that are most frequently used can be made up ahead of time and carried in bottles fitting the machine. Such a solution costs as little as 25¢ per gallon and the coverage is just about double that of the more expensive oil or aniline opaque inks.
45

This type of dye is not opaque, so that if one part of a sheet is colored with one application while another part is treated with two, a very pronounced contrast results. It can easily be
50 seen that in a dye composed of liquid and aniline powder, the more powder incorporated into the solution, the deeper will be the shade. The contrast produced as between one and two applications of any solution is exactly in the same ratio
55 as if that part of the surface covered by two applications were colored with a solution of double strength.

The system of coloring paper in a continuous web with this type of dye has long been in use.
60 More recently it has been applied to box board, also in the web, but the handling of sheeted stock presents an entirely different problem.

In feeding sheets into a machine with any of the well known feeds, it is not possible to run
65 them so close together that the applicator rollers will be in constant contact with the material passing through the machine. Spaces between the sheets vary from a half inch to two inches. When there is no stock between the rollers, a part of
70 the applicator roller gets a second supply of color. Unless special provision is made to overcome this, that part of the surface of the applicator roller having received a double supply of dye will print a shade of double density when it again comes in
75 contact with the sheet, leaving an unsightly

streak. Also, that part of the box blank cut away for the lock permits certain parts of the applicator roller to obtain a second inking, which makes a series of replicas of the cut away places at various localities on the surface of the following sheet, which produces an appearance so unsightly that no customer will use it.
5

After long experimentation, I found that if an appreciable surplus of dye is allowed to accumulate between the applicator roller and inking
10 roller, so that the entire surface of the applicator passes through said surplus before being again submitted to the pressure which must be maintained between these two rollers and which allows only a predetermined amount of dye to pass,
15 regardless of the number of inkings one part of the surface of the applicator may have received as against any other part, the entire surface is again restored to a common level and the unsightly marks are thereby eliminated.
20

The machine also includes provision for readily and quickly changing the patterns or designs or other printed matter on the printing roller as required by any particular job.

Referring now to the drawings, in detail, the improved machine is illustrated as comprising a heavy bed frame 15 for the support of the feeding, coloring, and printing mechanism as shown in
25 Figures 3 and 4 and at the right in Figures 1 and 2. The feeding equipment at the front of the machine comprises a platform frame 16 carried by arms 17 which are pivoted at 18 to upright
30 frame brackets 19 carried by the bed frame 15. This platform frame 16 is adapted to be supported in variously inclined positions by means of pawls 20 at the opposite end of a rock shaft 21
35 mounted in the frame pieces 17, and the latter are also formed with curved racks 22 for engagement by said pawls in any set position as represented in Figure 3. The shaft 21 is also provided with a
40 handle 24 for the operation of the pawls 20.

The platform frame 16 is also provided with an extension 26 for use with larger stock or blanks, which extension is pivotally mounted at each end, as at 27, and provided with swinging braces
45 28 for supporting engagement with suitable recesses formed in the lower ends of rigid arms 30 projecting down from the frame 16, whereby said extension is supported with its upper face in substantially flush relation with the upper face of
50 the frame 16, as represented by the full lines in Figure 3.

A set of stock guides 31 are mounted on the upper face of the platform frame 16, and provided with suitable guide blocks or ribs 31' for
55 adjustment along longitudinal slot openings 32 in the frame 16, to which they may be clamped in any set position by means of clamping screws 34 engaging clamp plates 35 embracing the lower
60 face of the frame, the intermediate guide 31 being provided with a clamping plate 35 operated by clamping screws 34' located beneath said frame, as shown in Figure 4.

Opposite the forward margin of the platform frame 16, the stock is engaged by a set of feed
65 wheels comprising upper wheels 36 which are carried by a shaft 37 mounted in adjustable bearing blocks 38, the same being vertically adjustable in the bracket members 19 by means of
70 adjusting screws 39 set by lock nuts 40. These wheels 36 are fitted with rubber tires 41 (see Figure 7) for feeding cooperation with a set of rollers 42 on a shaft 43 journaled in fixed bearings in said bracket members 19.

A retarding means for holding back the lower 75

pieces of stock approaching the feed wheels is provided in the form of angular finger members 46 adjustably mounted on tapered arms or projections 47 keyed to a fixed shaft 48 supported by the bracket members 19 and provided with pins 50 supporting said members 46, the adjusting means consisting of coiled springs 51, washers 52 and nuts 53 on the outer ends of the pins 50, as shown in Figure 7, whereby the position of the finger members 46 may be set in proper relation to the feed wheels. The upper working faces of the members 46 are fitted with rubber blocks 55 partly inclined in the direction of the bite between said wheels.

After leaving the feed wheels 36 and 42, the stock crosses a platform 60, the ends of which are supported by the bracket members 19, after which the stock is engaged by a pair of steel rollers 62 journaled in bearing blocks 63 which are mounted in guideways, a plurality of said guideways being provided at the opposite sides of the machine by means of spaced upright bracket frames 64 supported by the bed frame 15. The lower bearing blocks 63 are carried in fixed position by means of posts 65, while the upper bearing blocks 63 are adjustably supported by rod stems 66 extending up through cap pieces 67 (see Figure 4) and equipped with adjusting and lock nuts 68. Heavy coil springs 69 are also interposed between said cap pieces and the upper bearing blocks 63 for accommodating any yield in the upper pressure rollers 62 as the stock passes between it and the lower roller 62.

On leaving the pressure rollers 62, the stock travels over a set of guides 70 carried by a transverse shaft 72, the opposite ends of which are mounted in bridge portions 73 connecting adjoining brackets 64 (see Figure 4) whereby the stock is presented opposite the bite between an upper pressure roller 74 (which may be of steel or rubber or other composition material) and a cooperating inking roller 75 (preferably faced with rubber or composition material), from which rollers the stock passes on over another set of guides 70 carried by another and similarly mounted shaft 72 to a second upper pressure roller 74 and cooperating inking roller 75.

For adjusting the upper pressure rollers 74, their bearing blocks 76 are provided with screws 77 engaging hand adjusting nuts 78 supported by top plates 79 carried by the frame member 64, which screws 77 are in turn threaded through lugs 80 rigid with the blocks 76, lock nuts 80' being carried by the screws for clamping engagement with said lugs 80, all as more particularly illustrated in Figure 9.

The bearing blocks 81 of the inking roller 75 are relatively fixed, and below each of said rollers 75 is provided an ink transfer roller 82 mounted in adjustable bearing blocks 83, while below each roller 82 is also located an ink fountain roller 84, also mounted in adjustable bearing blocks 85. Both rollers 82 and 84 are preferably faced with rubber or other composition material, the same as the roller 75.

The means for adjusting the transfer and fountain rollers comprises a set of cam levers 87 and 88 mounted above the frame plate 79, the levers 87 being connected by operating rods 89 to lugs 91 on the bearing blocks 83 on the transfer rollers 82, while the levers 88 are connected by operating rods 92 with lugs 91' on the bearing blocks 85 of the fountain rollers 84. The construction is such that the levers 88 may be oper-

ated to raise or lower the fountain rollers independently of the transfer rollers, whereas the operation of the levers 87 will raise and lower the fountain and transfer rollers in unison, for which purpose sleeves 93 are interposed between the lugs 91 of the bearing blocks 83 and said cam levers, the upper ends of said sleeves operating slidably through the plates 79 (as shown in Figure 9), from which it will be seen that rising movement of the bearing blocks 83 will operate simultaneously to elevate said sleeves and the rods 92 connected to the lower bearing blocks carrying the fountain rollers 84.

From the second set of pressure and inking rollers, the stock travels over another set of guides 70 to a third set of rollers comprising an upper pressure roller 100 mounted in adjustable bearing blocks 101 provided with adjusting means similar to that of the other upper pressure rollers, and also a printing roller 102 carried by bearing blocks 104 which are mounted for removal to interchange with other printing rollers by removal of the front brackets 105 shown as held in place by bolts 106 and carrying screws 107 for appropriate horizontal adjustment of the blocks 104 for correct positioning of the roller 102.

Below this roller 102 are also assembled an ink transfer roller 108 and a fountain roller 109 mounted in bearings in the same way as the other transfer and fountain rollers, with the exception that the outer bearing frame members 64' are removably bolted at 110 for independent removal to permit convenient removal of the rollers 108 and 109 at times, when necessary.

The bearing blocks of said rollers 108 and 109 are also independently adjustable by means of rods 112 and hand adjusting nuts 114, in the same manner as the rollers 74 already described.

For accommodating an ink or dye supply for the coloring and printing rollers, a set of swinging holders are provided, which are mounted on a longitudinal shaft 116 carried by bracket frames 117 secured to the frame members 64 at one side of the machine. Each holder comprises an upright frame 118 rockably mounted on said shaft and carrying a shelf 120 for supporting one of the ink or dye containers 121, for the neck of which an opening 122 is provided in the shelf. The container is held in place by a coil spring 124 engaging hooks 125 on the frame 118 for holding the container against a curved seat 126 in said frame.

The frames 118 swing out on the shaft 116 for permitting loading and unloading of the containers, and when swung back into upright position they are secured by means of latch arms 128 pivoted at 129 to frames 64 and provided with bayonet slots 130 for engagement with pins 131 on the holders, all as clearly represented in Figure 5.

For providing fluid tight outlets from the containers, the mouth of each container is fitted with an attachment illustrated in Figure 8 and comprising a split coupling 134 for engaging the neck of the container and threaded for engagement with an exterior flanged coupling 135 which in turn engages a flanged collar 136 supporting a rubber washer 137 against the mouth of the container and is connected with a coupling 138 provided with a clamping nut 140 also engaging said washer. Each coupling member 138 is provided with a valve 141 and a suitable metal tube 142 extending into position to discharge into one of the ink or dye pans 143 provided for each of the fountain rollers 84. The pipes 142 are supported by means of suitable bracket plates 146 attached to

the framework and provided with openings 145 for the pipes, whereby the latter are carried at the proper elevation (see Figure 4).

The ink or dye pans 143 are supported in frames 5 143' which rest temporarily on longitudinal supporting rods 148 and are lifted by means of rollers 149 carried by arms 150 secured to rocker shafts 151. These shafts are mounted in the lower part of the machine at each side thereof, and corresponding ends of said shafts are provided with sprockets 10 152 connected by crossed sprocket chains 153, and one of the shafts is provided with an operating handle 154 whereby the shafts may be simultaneously rotated for moving the supporting members 150 from the dotted line position of Figure 5 15 to the full line position, or into inking relation to the fountain rollers 84. Each of the pans 143 is preferably provided with a drain outlet valve 156.

The printed stock is discharged from the rollers 20 100 and 102 onto a set of carrier belts 160 operating around rollers 161 and 162 on shafts 163 and 164, respectively, provided in connection with framework 165 supported by brackets 166 and standards 167 formed as an extension from the 25 discharge end of the coloring and printing mechanism already described. Tensioning means is provided for the lower runs of the belts 160, comprising a transverse roller 168 and a series of sheaves 169 carried by alternately and oppositely 30 extending arms 170 supported by a rock shaft 171 mounted in said framework 165, the belts being alternately engaged with the sheaves 169 of said series. The carrier belts 160 discharge the printed stock onto a second set of carrier belts 35 174 operating around sheaves 175 and 176 on shafts 177 and 178, respectively, provided in connection with framework 180 supported by said standards 167 and a second pair of standards 182, as illustrated in Figures 1 and 2. Similar tensioning means is provided in connection with the 40 second set of carrier belts, and in addition a set of metal arms 184 is provided for engaging and retarding the stock delivered to the carrier belts 174, said arms 184 being attached to a shaft 186 45 mounted at the tops of the standards 182 and provided with an arm 188 carrying an adjustable counterweight 190 for adjusting the pressure between said arms and the stock.

The apparatus is designed to be driven by a 50 motor 200 (Figure 2) operating a gear 201 (see Figure 3) meshing with a gear wheel 202 on the shaft of the lower pressure roller 62, which shaft is also provided with a gear 203 meshing with an idler gear 204 for driving a gear 205 on the shaft 55 43 for operating the feed rollers 42. The gear 203 also drives a gear 203' on the shaft of the upper roller 62 and further meshes with an idler gear 206 for driving a gear 207 on the shaft of the first inking roller 75, which gear 207 drives 60 two other gears 208 and 209 on the shaft of the first pressure roller 74 and first transfer roller 82 respectively, while the gear 209 in turn drives a gear 210 on the shaft of the first fountain roller 84.

65 The gear 207 also meshes with an idler gear 212 for driving a gear 214 on the shaft of the second inking roller 75, which gear 214 drives two other gears 215 and 216 on the shafts of the second pressure roller 74 and second transfer roller 70 82 respectively, while the gear 216 in turn drives a gear 217 on the shaft of the second fountain roller 84. A hand wheel 218 is also secured to one end of the shaft of the second inking roller 75 for convenience in manually adjusting the machine preparatory to starting its operation. The

gear 214 also meshes with an idler gear 219 for driving a gear 220 on the shaft of the printing roller 102, which gear 220 drives two other gears 221 and 222 on the shafts of the third pressure roller 100 and third transfer roller 108 respectively, while the gear 222 in turn drives a gear 223 on the shaft of the third fountain roller 109.

The shaft of the third transfer roller 74 is also provided with a sprocket 225 for operating a sprocket chain 226 and driving a sprocket 227 10 on a shaft 228 mounted in the brackets 166, which shaft 228 also carries a relatively larger gear wheel 229 for driving a gear 230 on the shaft 163 which operates the first set of carrier belts 160. The shafts 164 and 177 are also provided with meshing gears 231 and 232 respectively, the gear 232 being relatively larger, for driving the second carrier belts 174 at a somewhat slower rate than the first carrier belts.

In preparation for the operation, the bearing 20 blocks for the several rollers are adjusted by their individual adjusting means above described, for proper operation in connection with the particular grade of stock to be colored and printed. In the case of the rollers 42 and 62, while these 25 are not absolutely essential to the remainder of the operation for some grades of stock, their operation will improve the quality of the work on blanks that might be creased heavily or have other surface defects, and accordingly the roller 30 62 is adjusted according to the character of the material; as for example, adjusted far enough above the roller 42 to avoid clashing therewith and yet sufficiently close to smooth out excessively deep creases in the material. The upper 35 or pressure rollers 74 of the first and second coloring units are adjusted far enough above their companion rollers 75 to avoid contact therewith and consequent picking up of any ink or dye when no stock is passing between them, and at the same time close enough to exert sufficient pressure for the proper application of the ink or dye, to obtain even and uniform coverage 40 of the stock.

Since many grades of stock show more or less 45 frequent imperfections, and material in the form of blanks is always creased to a certain extent, the first bank of rollers may not always force the dye or ink into all the low places in the stock, for which reason the second bank of rollers is provided to repeat the inking or coloring 50 operation by making a second application of the ink or dye, the upper roller 74 being adjusted similarly to the first roller 74. The space between the banks of rollers is designed to be close enough to insure engagement of the stock with the second or succeeding bank of rollers prior to its being fully released from the preceding set of rollers, thereby insuring continuous forward 55 movement of the material. The adjusting means provided for the bearings of the ink transfer and fountain rollers enables these to be individually lowered, since operation of the cam members 88 first lowers the fountain rollers (as represented by the dotted lines in Figure 9) and the cam 60 levers 87 then lower the transfer rollers, so that the three lower rolls of each bank are thus separated for enabling any attention necessary to be given to the separate rollers or any adjustment to be made of their respective mountings, after 70 which they are elevated back in the proper position with the rollers 75, 82, and 84 of each set in proper operative engagement with each other.

The ink or dye supply means is of the automatic air lock type, the supply pipes 142 being 75

of the proper length so that when the ink or dye has risen in the pans 143 to the correct height, the air is cut off for interrupting the feeding from the containers until the fluid level in the pans is lowered enough to admit more air and resume feeding until the proper fountain level is restored. The ink or dye pans 143 initially rest upon the bars 148 and are elevated by movement of the handle 154, which swings all the arms 150 for simultaneously lifting the pans to the height illustrated in Figure 5, or to the extent necessary to bring the ink level into inking contact with the lower or fountain rollers 84 and 109. Other methods of ink or dye feeding may be employed so far as the remainder of the apparatus is concerned.

The machine is adapted to use a special aniline dye, which is almost as thin as water and will not bleed or rub off and is also reasonably fast to light. However the so called aniline ink, containing varnishes or other binders, may be used, as well as thin oil pigment inks of the consistency used by the news print trade.

A printing roller 102 carrying the desired pattern or design and printing for the particular job is installed in position in the bearings 104 and said bearings properly adjusted.

Sheets or blanks, indicated by the broken outlines 240, are then placed on the framework or platform 16, or 16 and 26, at the receiving end of the machine, and the guides 31 on the framework adjusted to correspond to the width of the stock and the framework itself adjusted to a proper incline for allowing the stock to feed by gravity to the feed rollers 36 and 43. These rollers grip and feed the stock across the platform 60, while the rubber-faced retarding means 55 engage the lower sheets and hold these back as the upper sheets are consecutively gripped and fed by the rollers. The steel pressure rollers 62 receive the stock from the feed rollers and apply a pressure treatment to the stock for smoothing out any excessively deep creases or other imperfections, after which the stock proceeds successively over the guides 70 through the two sets of coloring rollers for successive coloring treatment, and then over the third set of guides to the last set of rollers where the design or pattern and printed matter is impressed upon the stock—Figure 10 illustrating the printing roller as carrying means for striping the stock in accordance with a certain pattern 102'. This roller 102 may of course be provided with "repeat" designs of any desired description, including advertising matter and the customer's name, address, etc., at predetermined points in conjunction with the stripes or other patterns, and these interchanged as required for each particular job.

As the colored and printed stock is discharged from the bank of rollers including the printing roller, the sheets are caught by the carrier belts 160 which are driven at a slightly faster rate than the lineal travel of the printing roller to eliminate the possibility of the stock being carried back into the machine. These belts 160 discharge the stock onto the second series of belts 174 traveling at a slightly lower level as shown in Figure 1 and at a somewhat slower rate, the stock being also retarded as it is delivered to the belts 174 by frictional engagement with the retarding fingers 184 as above explained. This combined action of the slower belt travel and retarding action of the fingers 184 slows down the movement of the stock so as to produce a stacking operation, in which the sheets or blanks are gathered in partially over-

lapping relation, as illustrated by the dotted lines in Figure 2, for facilitating the removal of the finished stock by the workman and piling it in neat stacks on a truck or platform.

The operation continues in the manner above described, in an entirely automatic fashion and with neat stacking of the finished product at the discharge end of the machine, until the desired quantity of the same colored and printed design has been completed. The machine can then be conveniently and quickly changed over to the printing of another job requiring a different grade, size, or coloring or printing, etc., by making the necessary adjustments of the rollers and interchanging the printing roller, as well as the colors of ink or dye supplied to the fountain pans 143.

By this means it is to be noted that the sheets or cut blanks may have a coloring applied thereto over their entire surface, while other matter such as patterns, designs, and printing, in an entirely different color, is also applied to the sheet or blank by the same operation of the machine, thus enabling the manufacturer to produce a decorated material not now turned out by any mill, but is obtainable only from manufacturers who laminate a sheet of colored or decorated paper to the box material (involving a much more expensive operation). The present improved machine is therefore of a nature which will assist the smaller manufacturer to hold his business by enabling him to turn out these more special, though smaller jobs, without the carrying of huge stock ranges in all the varying colors which as a rule would be prohibitive and entirely beyond his means.

From the foregoing it will be apparent therefore that I have devised a practical, efficient, and economically operating apparatus for the carrying out of the several aforesaid objects of the invention; and while the foregoing represents what I have found by experience and actual operation to represent one of the preferred forms of embodiment of the improved features of construction, the same is obviously susceptible of minor modification in various particulars while still operating within the essential principles of the invention as set forth; I therefore desire to reserve the right to make all such changes or modifications as may fairly fall within the spirit and scope of the appended claims.

What I claim and desire to secure by Letters Patent is:

1. A coloring and printing machine comprising an upper pressure roller, a lower coloring roller mounted in operative relation to said first roller but out of contact therewith, an ink or dye transfer roller and a fountain roller mounted in co-operative relation with said transfer roller and in inking relation to said coloring roller, and bearings for the opposite ends of said rollers and provided with guideways for maintaining said bearings in vertical alinement, and individually adjustable supporting means for the bearings of said transfer and fountain rollers and operative consecutively to drop said fountain roller away from said transfer roller and the latter away from and out of contact with said coloring roller.

2. A coloring and printing machine comprising an upper pressure roller, a lower coloring roller mounted in operative relation to said first roller but out of contact therewith, an ink or dye transfer roller and a fountain roller mounted in co-operative relation with said transfer roller and in inking relation to said coloring roller, and bearings for the opposite ends of said rollers and pro-

- vided with guideways for maintaining said bearings in vertical alinement, and separate and individually adjustable supporting means for the several bearings of said transfer and fountain rollers and operative to raise and lower said fountain roller into and out of engagement with said transfer roller and also to raise and lower said transfer roller into and out of contact with said coloring roller.
- 10 3. A coloring and printing machine comprising an upper pressure roller, a lower coloring roller mounted in operative relation to said first roller but out of contact therewith, an ink or dye transfer roller and a fountain roller mounted in co-
- 15 operative relation with said transfer roller and in inking relation to said coloring roller, and separate adjusting means for individually moving said transfer and fountain rollers into and out of engagement with each other and said coloring roller, said adjusting means including means responsive to the adjusting means for the transfer roller for simultaneously raising both said fountain and transfer rollers into operative engagement with each other and with said coloring roller.

4. A machine of the character described comprising a plurality of sets of rollers for coloring or printing the stock, each set of rollers including a fountain roller, a color or ink pan for each of said fountain rollers, supporting means comprising rocker arms engaging the opposite ends of said pans, and means for operating the supporting means for simultaneously actuating said arms and thereby raising or lowering the pans into and out of operative relation to said fountain rollers.

10 5. In a coloring machine, a roller assembly comprising a coloring roller, an ink or dye transfer roller and a fountain roller mounted in cooperative relation to said transfer roller and in inking relation to said coloring roller, a color or ink pan 15 for said fountain roller, supporting means comprising a pair of rocker shafts carrying arms in supporting relation to the opposite ends of said pan, and means for simultaneously actuating said shafts in either direction for swinging said arms 20 and thereby moving said pan into and out of operative relation to said fountain roller.

CHARLES H. BACHER.