Dec. 7, 1926.

1,609,831

F. P. REED

APPARATUS FOR APPLYING COLOR

Filed June 15, 1926

3 Sheets-Sheet 1

Fig. 1.

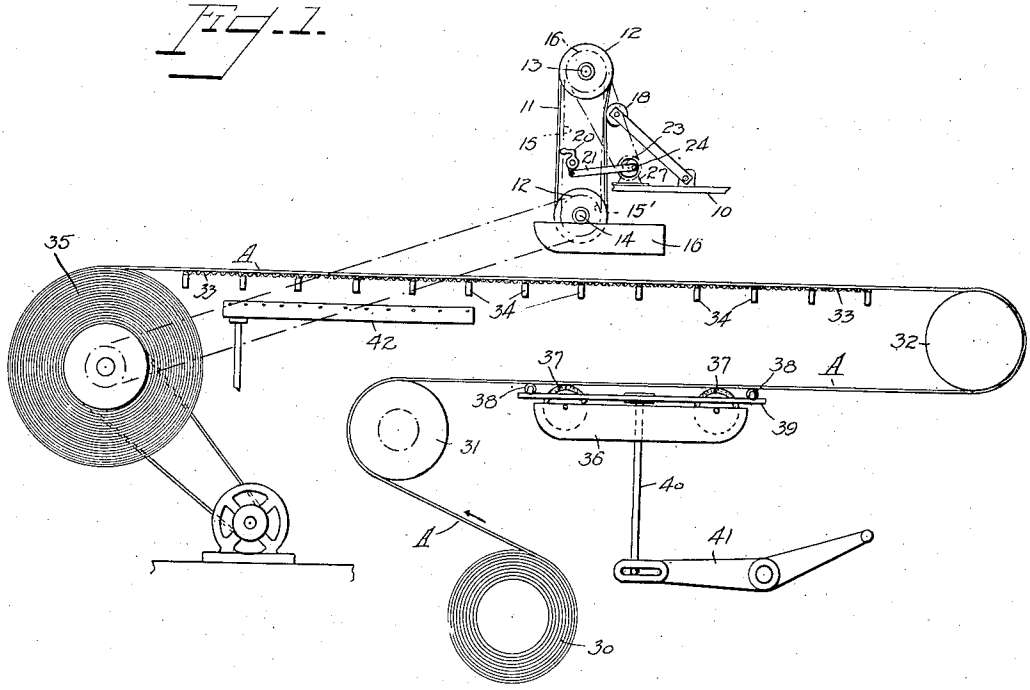
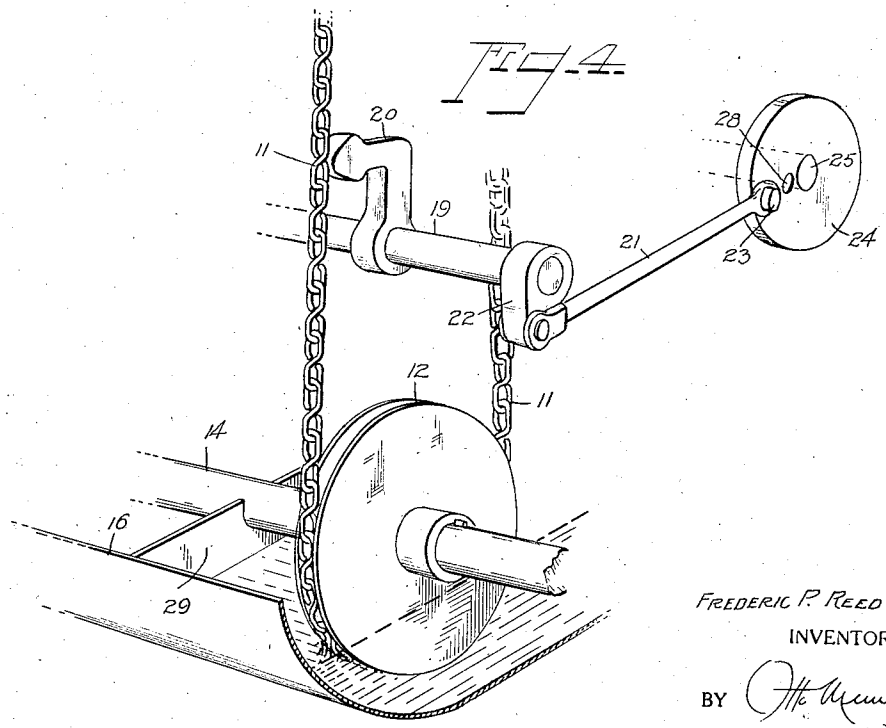


Fig. 4.



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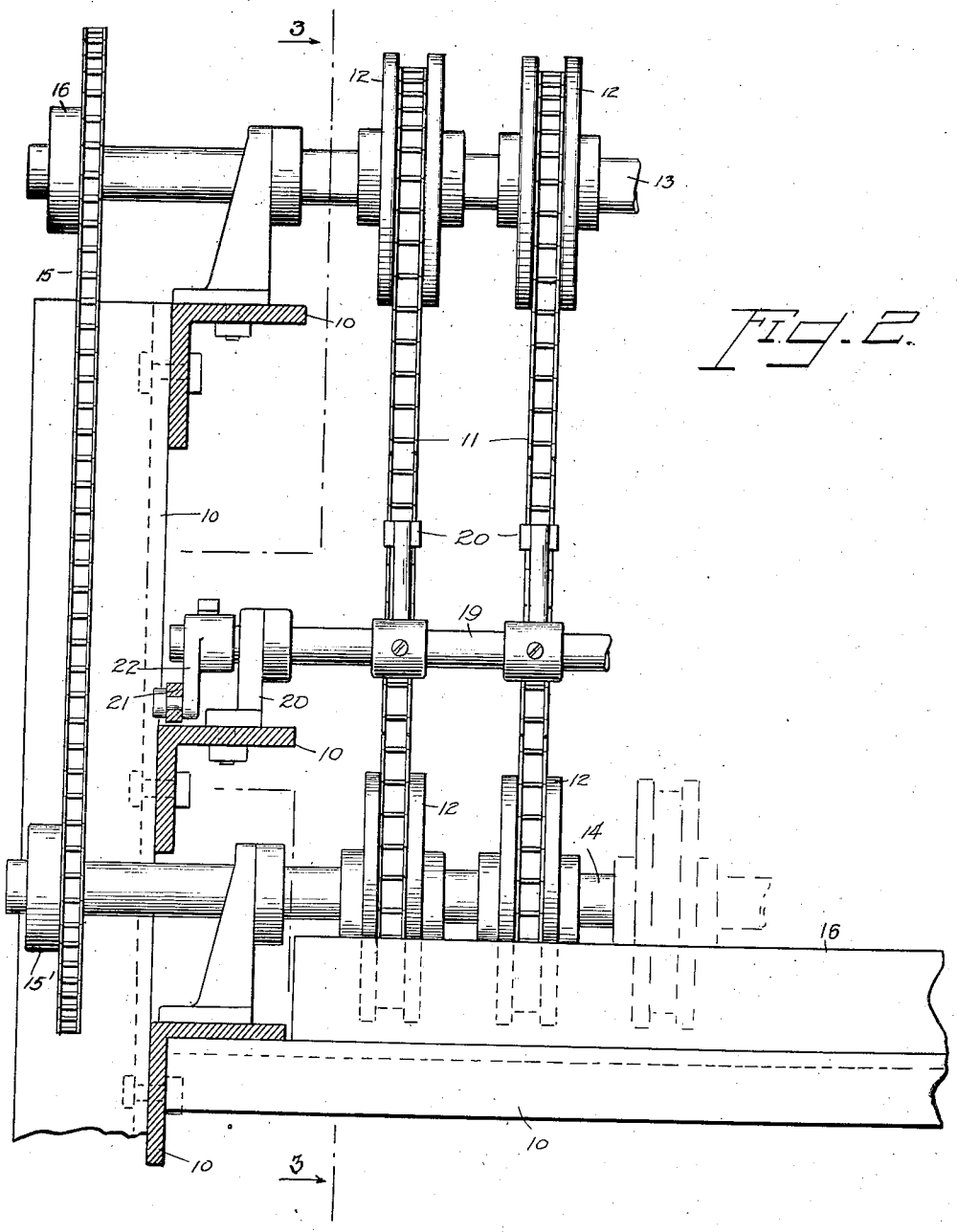


FIG. 2.

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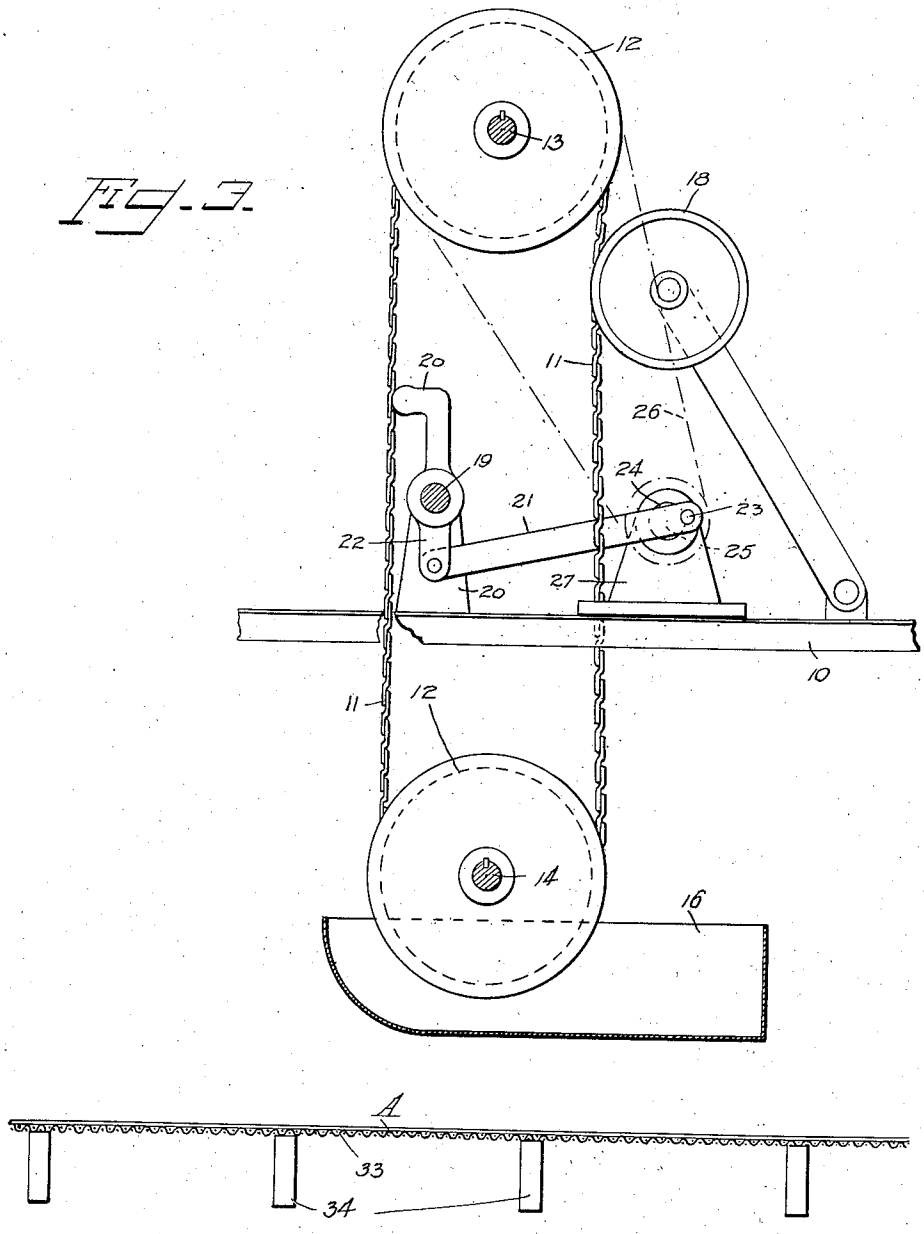
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APPARATUS FOR APPLYING COLOR

Filed June 15, 1926 3 Sheets-Sheet 3

Fig. 3.



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1,609,831

UNITED STATES PATENT OFFICE.

FREDERIC P. REED, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO S. R. S. PAPER CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR APPLYING COLOR.

Application filed June 15, 1926. Serial No. 116,092.

My invention relates to an apparatus by means of which a color or colors may be applied to wall and covering papers, card board, etc., for the purpose of producing a surface having any desired mottled effect.

According to a method and apparatus heretofore employed by me, the color or colors were applied to the moving paper by means of jets of compressed air directed against a medium supplied with fluid color. After exhaustive experiments I find that I can more economically and just as efficiently apply the color without the use of compressed air and without the use of employing the mechanism requisite for compressed air applications. I accomplish this result by a method of and apparatus for applying fluid color or colors, which consists briefly in lifting the color medium by means of a taut traveling conveyor and then vibrating the latter to cause the color to be thrown off and precipitated onto the surface of the paper or board to be colored. In my present invention I contemplate subjecting the paper or board to a moistening process before reaching its position beneath the color applying apparatus, so as to enable the color to blend more readily into the background of the paper, or into the other colors when more than one color is applied.

According to my original conception a plurality of colors were applied by a corresponding number of color stations positioned in advance of each other, one station for each color. I have found that in accordance with my present invention a plurality of colors may be simultaneously discharged from a single color station with a result that the blending process is much more effective, since all of the colors strike the moist surface of the paper at the same instant and as a consequence each color as it strikes the moist surface has an equal opportunity to spread and blend with adjacent colors. I have accomplished this result by subdividing the color fountain into a series of compartments, each thereof supplying a color to an individual conveyor which operates over driving means common to every other conveyor in the device.

I have illustrated in the accompanying drawings one embodiment of the apparatus for carrying out the present method. Figure 1 is a diagrammatical showing of a complete structure for producing mottled surfaces on papers; Figure 2 is a fragmentary rear view of the color applying unit and Figure 3 is a longitudinal sectional view of the same taken on lines 3—3 of Figure 2, and Figure 4 is a perspective view of the color carrying medium and hammers for dislodging the color by imparting a vibratory motion to the carrying medium.

My invention may be practiced by means of any suitable mechanism which includes taut color carrying elements operating continuously and means for vibrating the elements to cause the color medium to fly off in the form of a spray which precipitates onto the underlying traveling paper, the surface of which is to be colored.

Referring to the drawings, 10 denotes a skeleton frame having uprights and cross pieces to support the various elements of my invention. 11 designates the color carrying medium which in the present case comprises a link chain arranged in a continuous strand and supported in upright position by upper and lower pulleys 12. The pulleys are keyed to horizontally disposed shafts 13 and 14, the former shaft operating substantially above the lower shaft 14 and both shafts being arranged transversely of the frame 10. One shaft is driven from the other by a chain 15 operating over a sprocket 15′ keyed to each shaft, and the lower shaft is driven by a chain and sprocket connection with a power shaft arranged in the frame 10.

The lower pulley 12 operates, partly submerged in a color fountain or pan 16 disposed transversely of the apparatus and supported in suitable manner on the cross pieces of the frame 10. The pulleys 12 rotate in clockwise direction and as a consequence the front links of the chain 11 emerge from the fluid color in the fountain 16 and move in an upwardly direction to the upper pulley 12. It is desirable to maintain this front section of the chain in a taut condition and in order to accomplish this purpose, a take up idler pulley 17 is supported to rest against the rear section of the chain descending from the upper pulley, as shown in Figure 2.

Color, as stated above, is supplied to each chain from the fountain and is carried upwardly to an elevation substantially midway

between the upper and lower pulleys. At this elevation, the taut section of the traveling chain is set to vibrating by means of successive blows directed against its inner side, the blows being effected by an oscillating hammer 18 keyed to a rock shaft 19 disposed transversely of the frame 10 and parallel to the rotating shafts 13 and 14. The rock shaft 19 is journaled in hangers 20 at each side of the frame 10 and is oscillated by a pitman rod 21 which is pivoted at one end to an arm 22 on the rock shaft 19 and at the other end it is carried by a crank pin 23. The crank pin 23 is carried by a rotating disc 24 and shaft 25 which is driven by means of a sprocket and chain connection 26 from the upper shaft 13. The shaft 25 is mounted and supported in a suitable hanger 27 fixed to the frame 10. It will be clear that by changing the ratio of the sprockets on the shafts 13 and 25 the hammer may be caused to oscillate at a greater or less speed, as desired. The weight of blow struck by the hammer is predetermined by the position of the crank pin 23 in the disc 24, which is provided with a series of openings 28 arranged along a radius of the disc and adapted to receive the pin 23.

It will be clear that the present invention comprehends a plurality of color applying units arranged side by side on the shafts 13 and 14 and the chains gather their color by dipping into the fluid color in the fountain 16. In the event that one or more colors are used the pan 16 may be divided into separate compartments, one thereof for each chain. The divisions in the fountain 16 are made by partitions 29 disposed transversely thereof.

Cooperating with the color applying apparatus, I provide means for supporting the moving paper as well as means for moving the same. The paper A is drawn from a roll 30 and about a guide roller 31 from which the paper passes in a substantially horizontal plane to a second roller 32 and from this point the paper is elevated to a plane just beneath the color apparatus. From the roller 32 the paper is supported on a wire mesh 33, which is fixed along its longitudinal edges in the frame 10 and is supported at intervals by spaced transverse rods 34. The colored paper is wound on a roll 35 arranged beyond the mesh 33. Suitable chain and sprocket drive mechanism is employed to operate the roll 35 in its operation to draw the paper through the machine.

Disposed preferably midway between the rollers 31 and 32 is a device for applying the necessary film of water to the moving paper prior to its position beneath the coloring arrangements. The device comprises a pan 36 in which felt covered wet rollers 37 are running, partly immersed in water, and upon the upper peripheries of which the paper rests. Spaced from each of the rollers 37 are guide bars 38, which are carried by a frame 39 and may be elevated and lowered to lift the paper out of contact with the felt covered rollers 37. The means for elevating the frame 39 may consist of an upright rod 40 engaging the frame at one end and adapted to be lifted automatically from the other end by a lever and cam system 41 as illustrated diagrammatically in Figure 1.

A heating unit or means is installed beyond the coloring apparatus in order to remove the moisture from the paper at a point in its travel beyond the stage where the color has been deposited and allowed to spread on the wet surface of the paper. This heating unit is designated 42 and is shown diagrammatically for the purpose of illustration.

It will be clear that the chains may be of slightly different lengths and for the purpose of obtaining uniform tautness the take-up idler 17 for each chain is entirely independent of the others.

The operation performed by the invention is briefly described in the following: Assuming the machine to be set up for operation and power applied; the chains 11 move continuously over their respective pulleys 12, each chain reaching and dipping into the color in color pan 16 and emerging at the opposite side of the lower pulley completely laden with color, which has sufficient body to cause it to adhere to the surfaces of the chain links. Simultaneously with the movement of the color conveyors the hammers 18 oscillate with sufficient rapidity against the taut chain, setting it to vibrating and causing the color to be thrown off in small specks which precipitate color upon the moist surface of the moving paper. The chains having been disgorged of their color continue upwardly and about the upper pulleys to again descend into the pan of color and repeat their operation.

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

1. In an apparatus for applying color to a material to be treated, the combination of a flexible continuous color conveying medium, a color fountain associated with said medium to supply the color in which the medium is only partly submerged, and means operating to vibrate the medium to cause the color to be thrown off from the unsubmerged portion onto the surface of the material to be treated.

2. In an apparatus for applying color to a material to be treated, the combination of an endless length of chain, means operating to carry the chain in upright position, means operating against a section of the chain to hold the latter taut, a color pan in which a portion of the chain dips into the color, means operating to rapidly engage the

taut color laden section of the chain to cause the latter to vibrate and to throw off small particles of color onto the surface of the material to be treated, and power means operatively connected with the chain carrying and vibrating means for continuously and simultaneously operating the same.

3. In an apparatus for applying color to a material to be treated, the combination of a plurality of spaced endless chains, pulleys for supporting said chains in upright position, common upper and lower shafts for said pulleys, independently operating means for engaging a portion of each chain to hold the latter taut, a color pan embracing the lower pulleys and having partitions to form a separate compartment for each lower pulley, and means for vibrating the chains to cause the color to be thrown off onto the material to be treated.

4. In an apparatus for applying color to a material to be treated, the combination of a color carrying medium, means for supporting the medium, a color pan into which the medium reaches, and an oscillating member operating to rapidly strike the medium to dislodge the color and comprising rock shaft, a hammer fixed on the shaft, an arm fixed on the shaft, a crank element operated from the first means, and a connecting rod between the crank and arm, said crank being adjustable with respect to its center of rotation, substantially as described.

In testimony whereof I affix my signature.

FREDERIC P. REED.