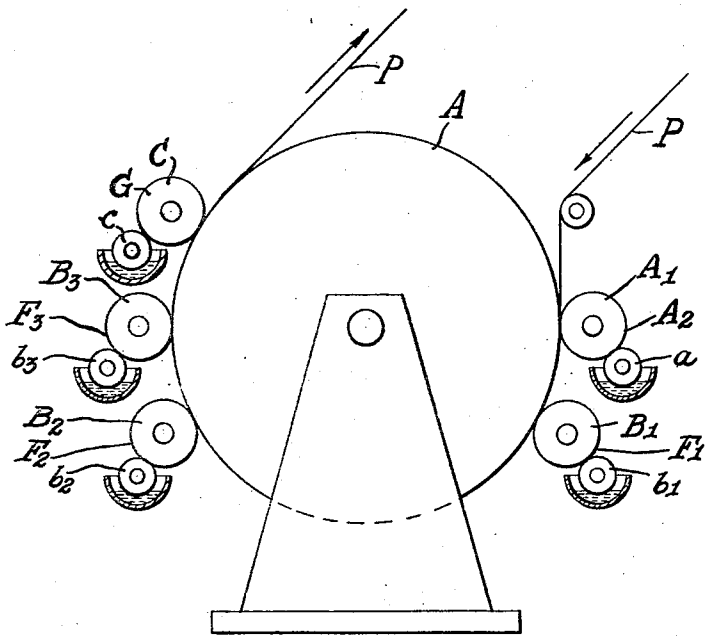
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METHOD OF MANUFACTURING WALL PAPERS

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METHOD OF MANUFACTURING WALL PAPERS

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The present invention relates to the manufacture of wall papers printed by means of a plurality of colour printing devices especially in accordance with the multicolour or three and four colour printing process.

At the present condition of the art it has been impossible to apply the said three or four colour printing process in the manufacture of wall papers for the reason that the paper usually employed for the purpose is too rough so as to not take the colours from the etched rollers with sufficient readiness and to involve unclean, vitiated and incorrect prints. The employment of enamelled paper or even plain paper coated with suitable covering substances to give the same a smooth tight and dense surface upon subsequent compression would be too expensive for use as common wall paper.

According to the present invention the ordinary papers usually employed in the wall paper manufacture, so-called ingrain or rough fibre papers or better sorts of paper ranging between the former and smooth or super-calendered fine papers are printed in a plurality of colours, preferably the three prime colours yellow, red and blue, without subjecting the rough paper to any previous treatment such as usually employed in the manufacture of enamelled or art paper, and the printing operation is accomplished by passing the paper web to be printed upon, between a backing cylinder or drum and a plurality of colour printing rollers or colouring devices corresponding in number to the number of colours to be applied and located near the circumference of the said backing cylinder and whereof the etched area corresponds to the proportion of colour intended to be applied onto the web by the printing roller concerned in conformity with the original design or pattern.

In the course of the same operation the printed paper or web is coated with a layer of any suitable transparent substance for finishing or protective purposes, a coating roller (finishing device) similar to the hereinbefore described printing rollers being provided in the printing apparatus for the purpose. The said transparent substance is just of such a covering power as to veil all of the unclean inaccuracies of the several colour impressions produced on the comparatively tough paper, and keep the same entirely out of sight. The coarse and variegated appearance of the coloured pattern is softened down in a pleasant manner so that the design will afford an artistically improved aspect and, in accordance with a more or less high degree of transparency of the coating or protective layer the colour of the impression will be more or less contrasting glaring or subdued.

The substance referred to herein for coating the printed design preferably is a size-colour composed of glue, water and a pigment such as powdered chalk, mica or the like, but in some cases it may be advisable or preferable to use in lieu thereof a water-soluble aniline colour and/or any appropriate substance adapted to protect the printed colours from the bleaching or otherwise injuring influence of the sun-light.

In a modification the method according to the present invention may be carried into effect by first applying to the rough paper a layer or coating of a substance forming a grounding and consisting of glue, water and powdered chalk or a colouring matter or the like and subsequently applying onto the said layer or coating while the same is still moist, the colours according to the described colour printing process. In this way coloured impressions of a more delicate and milder nature will be obtained.

The colour dyes or dye-stuffs usually to be employed in the multicolour printing process for manufacturing wall paper must be transparent and may be as far as possible incorporated dyes such as colloid solutions or aniline colours or dye-stuffs dissolved in a volatile solvent such as alcohol, gasoline, benzol, oils and the like.

In practice the invention may be performed in the following manner, reference being had to the accompanying diagrammatic drawing showing for purposes of exemplification a preferred construction of the printing apparatus.

The multicolour printing process is supposed to be known in general to persons versed in the art and it may be mentioned only that the four colour printing process is not distinguished from the three colour printing process except by the addition of a fourth colour, that is black, to the usual three prime colours, that is to say, yellow, red and blue, in order to obtain deeper blackness and deeper shades.

In the drawing forming a part of this specification A designates the drum or backing cylinder and F^1, F^2, F^3 denote three colouring printing devices arranged adjacent to the circumference of the drum A at suitable distance apart from each other, while G designates the finishing device.

It will be seen that the apparatus illustrated in the drawing is a three colour printing machine and it will be understood that in case of a four colour printing apparatus the construction will

be substantially the same with the sole difference that a fourth printing roller would be provided so that the apparatus would comprise four printing rollers besides the finishing device.

The printing devices comprise each a set of two rollers B^1, b^1, B^2, b^2 and B^3, b^3 respectively and a vessel or trough containing the liquid colour or ink into which the lowermost roller b^1, b^2 or b^3 respectively dips. Liquid colour adhering to the circumferential surfaces of the rollers b^1, b^2 and b^3 is transferred, as usually, to the contacting rollers B^1, B^2 and B^3 respectively and subsequently or continuously applied to the paper web P running about the drum A. The finishing device G comprises a vessel or trough and two rollers C and c arranged in the same manner as the printing devices. The roller A^1 designates a grounding roller having the contacting roller A connected therewith, the surface of A^1 being designated as A^2.

The printing rollers B^1, B^2 and B^3 are arranged to be readily exchangeable and adapted to be substituted for each other. Preferably they are made of a suitable metal or of wood covered with a tight fitting metallic jacket. The paper web P is conducted about the circumferential surface of the drum A in the direction of the arrows, so as to pass first the three printing rollers B^1, B^2 and B^3 and subsequently the roller C of the finishing device G. It goes without saying that also the vessels or troughs of the printing devices may be made, exchangeable and adapted to be substituted for each other.

Supposing the printing devices F^1, F^2 and F^3 have been supplied with yellow, red and blue colour dyes, respectively and the roller B^1 has an etched or printing area corresponding to the proportion or area covered by yellow colour in the original pattern to be copied on the wall paper, the roller B^2 has an etched or printing area corresponding to the proportion or area the red colour occupies in the pattern to be copied and the roller B^3 has an etched, printing area corresponding to the proportion or area of the blue colour in the pattern to be copied; now if the said rollers are mounted in the apparatus in a manner that the rollers B^1 etched as above supposed, to correspond to the yellow parts of the pattern to be worked from is a member of the printing device F^1 the roller B^2 forms a member of the second printing device F^2 and the roller B^3 controls the printing of the third or blue printing device it will be seen, that a three colour impression will be obtained on the paper web which is accurately identical with the colouring of the pattern.

Thus each individual roller will apply a proportion or percentage of its colour corresponding to that of the pattern and determined by the etching. In case of green colour which for example consists of 60 per cent of yellow and 40 per cent of blue the roller B^1 will transfer or apply the said 60 per cent of yellow while the roller B^2 will apply the 40 per cent of blue co-operating with yellow to produce the correct green colour, due to the superposition and the transparency of the individual colours.

The following example will contribute to explain the matter more clearly. Supposing the pattern to be copied on the paper comprises yellow stripes and spots of violet or purple colour on a green foundation or field. The green consists of 60 per cent of yellow and 40 per cent of blue, the yellow of the stripes consists of 70 per cent of yellow 20 per cent of red and 10 per cent of blue and the violet colour of the spots consists of 70 per cent of red and 30 per cent of blue. The roller B^1 therefore will apply on the whole of its circumferential surface, the 60 per-cent for the green colour of the foundation or field and in the form of stripes, the 70 per cent of yellow for the stripes, while the roller B^2 will apply the 40 per cent of red for the violet spots and the 20 per cent of red for the yellow stripes and the roller B^3 will apply the 40 per cent of blue for the green foundation or field the 30 per cent of blue for the violet spots and the 10 per cent of blue for the yellow stripes. The finishing device will act in this case to apply a transparent protective coating on top of the several colours or prints.

As the manufacture of wall-papers does not depend on copying an image in accurate harmony with the pattern, it being rather sufficient to produce a copy corresponding to the pattern more or less exactly as regards configuration form and colours the hereinafter described application and utilization of the present invention which is of specially practical advantage, deserved particular consideration. By changing the rollers B^1, B^2 and B^3 so that B^1 will cooperate with either the printing device F^2 or the printing device F^3 the roller B^2 will cooperate with the device F^1 or F^3 and the roller B^3 will cooperate with the device F^1 or F^3 and the roller B^3 will cooperate with the device F^1 or F^2 it is possible to obtain six designs of the same configuration but of various colours without changing the prime colours in the three troughs or vessels.

If for example the roller B^1 is mounted in the printing device F^2 the roller B^2 mounted in the printing device F^1 and roller B^3 remains in its place in the device F^3 the following result will be realized: the roller B^2 applying from F^1 yellow colour dye instead of red colour dye from F^2 will work to apply 70 per cent in the form of spots and 20 per cent in the form of stripes the spots thus receiving 70 per cent of yellow colour dye instead of 70 per cent of red dye-stuff or ink and the stripes receiving 20 per cent of yellow dye-stuff or ink only in lieu of 70 per cent of red; the roller B^1 applying red colour-dye from F^2 instead of yellow dye-stuff or ink as before will work to apply 60 per cent for the foundation and 70 per cent for the stripes, the foundation thus receiving 60 per cent of red colour-dye instead of 60 per cent of yellow and the stripes 20 per cent of red instead of 20 per cent of yellow; the roller B^3 will work as hereinbefore described with reference to the apparatus shown in the drawing, applying a blue colour-dye or ink to the amount of 40 per cent for the foundation, 30 per cent for the spots and 10 per cent for the stripes.

The foundation consisting in the former case or apparatus shown in the drawing, of 60 per cent of yellow and 40 per cent of blue so as to have a light or yellow green colour will consist in the other or latter case (with changed rollers) of 60 per cent of red and 60 per cent of blue so as to be of violet colour, while the stripes composed of 70 per cent of yellow, 20 per cent of red and 10 per cent of blue so as to be of ochreous yellow colour in the former case, now will be composed of 20 per cent of yellow 70 per cent of red and 10 per cent of blue so as to have a red colour due to the change of the rollers. The spots of red-violet colour in the former case, resulting from 70 per cent of red and 30 per cent of blue, will be of a yellow-green colour in the latter case resulting from 70 per cent of yellow and 30 per cent of blue due to the change of the rollers.

It will be seen that the printing operation resulting in producing in the former case, a wall-paper of light green colour with yellow stripes and violet or purple spots, will produce in the latter case a paper of violet colour with red stripes and yellow-green spots.

In connection with the pattern herein selected for purposes of exemplification only the following table may be put up:

Printing device	1	2	3		
Colour	Yellow	Red	Blue		
Roller	B^1	B^2	B^3		
Foundation	60%	-------	40%	Yellow-green.	
Stripes	70%	20%	10%	Ochre.	I
Spots	-------	70%	30%	Red-violet.	
Roller	B^2	B^1	B^3		
Foundation	-------	60%	40%	Violet.	
Stripes	20%	70%	10%	Red.	II
Spots	70%	-------	30%	Yellow-green.	
Roller	B^2	B^3	B^1		
Foundation	-------	40%	60%	Blue-violet.	
Stripes	20%	10%	70%	Cobalt blue.	III
Spots	70%	30%	-------	Light orange.	
Roller	B^1	B^2	B^3		
Foundation	60%	40%	-------	Orange.	
Stripes	70%	10%	20%	Yellow.	IV
Spots	-------	30%	70%	Violet blue.	
Roller	B^3	B^1	B^2		
Foundation	40%	60%	-------	Orange.	
Stripes	10%	70%	20%	Dark red.	V
Spots	30%	-------	70%	Green blue.	
Roller	B^2	B^3	B^1		
Foundation	40%	-------	60%	Blue green.	
Stripes	10%	20%	70%	Blue.	VI
Spots	30%	70%	-------	Vermilion.	

The rollers may be manufactured in accordance with the usual etching method and the transfer of the pattern to the rollers may be carried out photographically as usually in the three colour printing process with the aid of colour filters and screens, it being advisable to select screens of a large grain for printing wall-papers on account of the roughness of the paper.

In some cases it may be advisable or preferable to provide and use a plurality of grounding or finishing devices such as G or the like in connection with the drum or backing cylinder A and the said devices may be arranged either before or in the rear of the printing devices, just as required for the purpose in view. Thus the finishing device G shown in the drawing may be said to be a grounding device if the web P would be caused to travel in a direction contrary to that indicated by the arrows.

From the foregoing it is believed that the advantages and novel features of the present invention will be readily understood and therefore, further detail description is deemed unnecessary.

What I claim is:

1. A machine for the manufacture of coloured wall-paper comprising a paper-web carrying cylinder, a grounding roller, three printing rollers in correspondence to the three colours to be applied on the wall-paper, the printing area of the single roller being in correspondence to its colouring capacity and a smoothing coating applying roller, all of these rollers being spaced around the cylinder and contacting therewith.

2. A machine for the manufacture of coloured wall-paper comprising a paper-web carrying cylinder, a grounding roller, three exchangeable printing rollers in correspondence to the three colours to be applied on the wall-paper, the printing area of the single roller being in correspondence to its colouring capacity and a smoothing coating applying roller, all of these rollers being spaced around the cylinder and contacting therewith.

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