ground is produced. The following formulae may be employed for white and coloured resists :—

*White.* 8 lb starch.

8 lb British gum.

30 lb potassium sulphite, 90° Tw.

3 gals. water.

15 lb soda acetate.

10 lb bisulphite of soda, 66° Tw.

¼ lb ultramarine blue.

Boil together.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Red. | Pink. | Blue. | Yellow. | Green. | Violet. |
| Rhodamine 6 G.(100 per cent.). | 2¼ lb | 1 lb |  |  |  |  |
| Auramine O | ¼ .. |  |  |  |  |  |
| Acridine yell. G |  |  |  | 2 lb | 2¼ lb |  |
| Thionine blue O |  |  | 2 lb |  |  |  |
| New solid green 2 B. |  |  |  |  | I lb |  |
| Methyl violet, B. x |  |  | *, .* |  |  | 2 lb |
| Water | 1¾ gals. | ιi gals. | 1*1* gals. | ι⅛ gals. | ι⅛ gals. | ι⅛ gals. |
| Tragacanth mucilage | I | I | I | **I** | I | I |
| Glycerin ..... |  |  | i .. | **X**  **4 1»** | X  4 t> | í n |
| Albumen, 40 per cent, solution . | I gal. | I gal. | I | I | I | I |
| Resist paste | 6 „ | 6 ,, | 6 „ | 6 ,, | 6 ,, | 6 ,» |

Print on the padded cloth, age, chrome and wash. The resist paste is as under:—

*Resist Paste.* 10 lb zinc oxide.

li gals, magnesium acetate, 400 Tw.

2⅛ „ tragacanth mucilage (dragon).

I „ starch paste.

For reducing the colours take 6 parts resist paste.

4 ,, starch paste.

4 ,, white resist.

Very good results can be obtained by the alternative method, *i.e.* printing the resists on white cloth and applying the black afterwards. The basic colours are chiefly used, though chrome yellow and ultramarine are also employed for some styles. The following formulae will serve as types of the composition of white and colours:—

*White.* 20 lb precipitated chalk.

5 lb potassium sulphite, 90 o Tw.

5 lb acetate of soda.

⅜ lb ultramarine blue for sightening.

I gal. water.

6 ,, starch paste.

The whole ground together in a mill.

*Colour, r2* lb basic dye-stuff.

- I gal. water.

1-2 J ,, starch paste.

17 lb zinc oxide.

I gal. water.

. i ,. glycerin.

I „ turpentine.

{ „ bisulphite of soda.

3 ,, starch paste.

Print on white cloth, allow to lie a day or two, then slop-pad in the Prud'homme black already given, dry, age, chrome and soap.

Pigment colours may be applied on black padded cloth as follows:—

*Yellow.* 40 lb chrome yellow, &c. ,&c.

2⅛ gals. 40 per cent, albumen.

2∣ ,, tragacanth water, 6 oz. per gal.

6 lb soda ash.

I gal. citrate of soda, 40 o Tw.

Other methods, varying in detail, have been used from time to time, but the above two are at the present time generally employed —especially the former, by which many fine patterns have been producedin all sorts of delicate and artistic shades.

*The Treatment of Cloth after Printing.*

After printing, the various classes of goods undergo many different treatments according to the character of the colours printed. These treatments include steaming, hanging in the ageing chamber, passing through tartar emetic, the chalk bath, washing, soaping, “ chemicking ,' or clearing and finishing.

(1) The operation of steaming is necessary for all styles except those with the insoluble azo-colours, vat dyes discharged, and some colours that are precipitated on the fibre. The short steaming necessary for most discharges, indigo blue prints, and aniline black is effected in the Mather and Platt ager, of which a sketch is here given (fig. 2) showing its principle.

discharged by the hydrosulphite method.

A longer exposure to the action of steam is obtained by means of the *cottage steamer* and the *continuous steamer,* in both of which goods may be steamed for any length of time. The cottage steamer consists (1) of a cylindrical iron box or chamber fitted with a false bottom on which rails are laid, and under which lie the pipes for the admission of steam, and for the drawing off of the condensed water; and (2) of a carriage or iron framework mounted on wheels and furnished with a series of removable rods capable of being revolved by means of spur-wheel gearing. Convenient lengths of the cloth to be steamed, together with a “ back grey ” (a piece of unbleached calico) are then wound in the open width, into a sort of broad hank on a folding frame. As each hank, so to speak, is completed it is removed from the winding frame and hung over one of the rods, which is then placed in position on the carriage.

It consists of an iron box AAA through which the goods (indi­cated by the dotted line) pass in the direction of the arrows. They enter at B, and traverse the whole chamber over a series of top and bottom rollers C C C, finally emerging at the same point B, whence they are drawn forward, by mechanical means, and plaited down on a waggon placed conveniently near. Steam enters the chamber A A À by the steam pipe D at the bottom, and escapes through the same slot (B) that the cloth enters and leaves by. An engine or electric motor drives the gearing, and the whole process is continuous.

This ager affords quite a sufficient steaming for aniline blacks, printed indigo, chlorate discharges, and for some mordants, but alizarine reds and pinks, mordant dyes gener­ally, and basic colours require much more than the 2 to 3 minutes’ exposure to steam which is all that can be given in the ordinary Mather-Platt ager, although they are frequently passed through it to eliminate the greater part of the volatile acids they contain. Paranitraniline red discharged with hydrosulphite also requires a modification of the ager for its success—for the steam must be very hot and very dry if any of the azo-colours are to be effectively

When the latter is fully loaded in this way it is run into the “ cottage,” the doors are closed, and steam turned in. The steaming is continued for various periods of time—from ¾ hour to 2 hours—according to the style of work in hand, and either with or without pressure, as may be required. The carriage is then withdrawn and the goods unwound in readiness for subsequent operations.

The object of enveloping the printed goods in a “ back grey ” is to prevent the colour from marking off from the face of one fold on to the back of the next, and also to minimize the risk of damage from drops of condensed water. This latter defect is further guarded against by heating up for an hour or so every morning before any goods are introduced.

In works where the modern continuous steaming apparatus is installed the cottage steamer is reserved for the treatment of dyed alizarine reds and for goods, such as heavy printed velvets, which are difficult to manipulate in the continuous steamer.

*The continuous steamer* was originally invented by Cordillot, but its present efficient form is due to Messrs Mather and Platt, who have continually improved it, so that now it bears but little resem­blance to Cordillot’s original machine. Its construction is too complex to be adequately described without the aid of detailed sketches. Generally speaking, it may be said to consist of a long,