

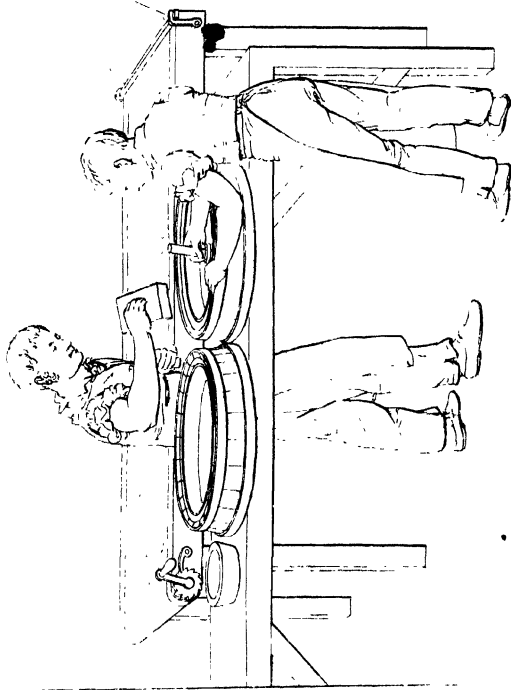
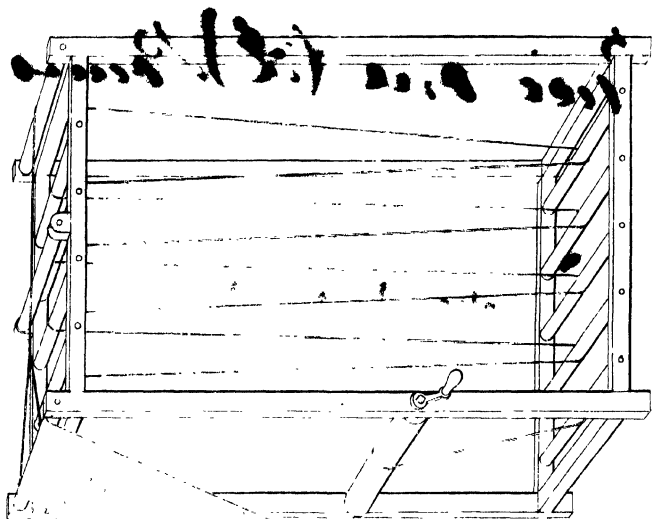


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Fig. 129. Table for printing. 446



**A TREATISE**  
**ON**  
**PRINTING AND DYEING**

*LAWS, GARMENTS, BANDANAS, AND PIECE GOODS;*

**IN THE DIFFERENT COLOURS.**

**ILLUSTRATED WITH PLATES AND DIAGRAMS.**

**BY H. M<sup>c</sup>KERNAN,**  
**AN EXPERIENCED COLOUR-MAKER AND DYER.**

**LONDON:**

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**1829.**



## PREFACE.

*The British Government having given every encouragement for the improvement of the Silk Business, particularly in the department of Silk Printing, by repealing the Act which levied a duty of sixpence per square yard on all Silk Printed, and twenty pounds per year for a license for printing the same; it is the duty of every well-wisher to his country, to co-operate in these truly patriotic measures. A treatise, therefore, on Silk Printing and Dyeing, including the most recent discoveries and improvements in these interesting branches of art, may very naturally accompany this important era in the trade.*



*The different processes described in this work, founded on long practice, and many years of actual experience, cannot but have a strong claim on public attention. The numerous and varied operations through which the Silk passes, to prepare it for Printing and Dyeing, in order to produce the different styles of work, and variations in colour, being amply detailed in this treatise, will give, even to those conversant in the business, a new set of ideas; while it will direct others, who have only a partial knowledge, how to conduct a train of experimental operations, with a certainty of obtaining a successful result.*

*Rapid and numerous as our acquirement of knowledge, in the art of Printing and Dyeing of Silk, may of late years have been, it must not be dissembled that we have many things yet to learn. The Author has seen printed muslins from Persia, the colours of which, particularly Blues, are very different from our own, and vastly superior to them; but of their method of acquiring them we are totally ignorant. He has also seen printed Calicoes, from the interior of our own Indian possessions, the*

*colours of which are as distinct from those of Persia, as they are from our own. A knowledge of the ingredients, and the process by which these colours are obtained, would be an important acquisition to the Silk and Calico Printers of this country; tending, at once, to enrich its merchants, extend its commerce, and increase its fame.*

*Not having the pecuniary means, or an opportunity of making a series of experiments, that might ultimately lead to a knowledge of Persian and Indian colours, the Author mentions this subject, to draw the attention of gentlemen who are favoured with leisure, wealth, and science, to experimental investigations, and to induce those in power to prosecute inquiries, which, in the present state of the British Empire, can hardly be urged in vain. With many gentlemen, Chemistry has long been a favourite study; and to their acuteness and perseverance, this science is laid under lasting obligations. The branches now recommended to their attention, are not only useful and essential, but interesting; and he who shall succeed*

*in his experiments, is sure to have his name recorded among the benefactors of his country.*

*For the style and manner in which the following treatise is written, some apology may perhaps be deemed necessary; but here the Author has very little to offer. Elegance of diction is not his province. He has aimed to embody that knowledge of Silk Printing and Dyeing, which he has been acquiring through life, in plain and intelligible language, and to trace the various processes through all their branches; and if in these he has been successful, he is confident that, from an Operative, nothing more will be expected.*

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*To prepare the Silk, or un-Gumming ditto.*

Take a canvass bag, one yard wide, and one yard and a half long, for twelve pieces. Open the pieces, and put them into the bag one at a time, then tie it up, and put it into a copper, three parts filled with cold water : then take the same weight of the best yellow soap, and soft soap, in equal parts, as the twelve pieces of silk weighed. Cut up the yellow soap in slices, and dissolve them in eight gallons of boiling water. Put this into the copper with the silk ; then light the fire under the copper, and boil for two hours, keeping the silk under the soap liquor with a stick. When the silk is boiled in the soap liquor for the time mentioned, lift it out of the copper into a tub of cold water ; then open the bag, and examine if the gum be off the selvage of the pieces. If it be, edge\* the pieces in the water ; then winch† in more water, until the soap liquor is out of the silk. If the gum be not off the selvage of the silk, put it back into the bag, and add more soap to the copper of soap liquor ; boil one hour. Then proceed as above ; then wring the pieces, and dry up for printing.

The soap liquor that is left is run off into a tub. This is used by adding it to the next copper of silk that is boiling off, according as it evaporates.

I am certain a great deal of madder and other work is spoiled, by not boiling off the silk in a proper manner. If the bag of silk be put into a copper of boiling soap liquor, it sets the gum in the silk so firmly as not

\* *Edge*, see Note 1.

† *Winch*, see Note 2.

to be got off. I have seen the old wax that was printed on silk set in this way, therefore it is best to begin as above directed. I also would advise that the silk should be run through a copper of water, in which is dissolved two pounds of soda ; then bring on to a heat of  $160^{\circ}$  ;\* then winch the pieces in this, ten or fifteen minutes, and winch or wash in water ; wring and dry up for printing.

The different sorts of silk require more or less soap ; but what I find the best criterion is, to give the same weight of soap as of silk. Yellow soap, and soft soap, of the best quality, in equal parts, I find to be best.

\* The glass for trying the heat of the liquors is the common thermometer used in brewing.

## PART II.

## TO MAKE THE DIFFERENT MORDANTS FOR THE FOLLOWING COLOURS.

[Mordants in dyeing are substances employed to increase the permanence and beauty of the various colouring matter. In the more general sense, a mordant is considered as an intermediate substance, to increase the affinity of the colouring matter, for the substance to be dyed.—Other substances are also called mordants, which have merely the effect of increasing the intensity and brightness of the colour, or, as the dyers term it, to bring it out. Of the first kind we have decided examples in alum and oxide of iron. In order to demonstrate the effect of affinity in the operations where alum is used, we may here give a brief description of the process of printing a piece of silk.

Since the earth or base of the alum is found to be the essential ingredient, it has been discovered that when the acetate of alumine is employed, the stuff takes the earth from that acid with greater facility than it does from the sulphuric acid, when alum is used. For this purpose, the alum is mixed in certain proportions with the acetate of lead and water. By this means the acetate of alumine is obtained in solution, while the sulphate of lead can be separated on account of its insolubility. The acetate of alumine liquor is then made of sufficient consistence with gum for printing. Then it

is printed with a pattern on the silk ; and when dry for twenty-four hours, the silk is run through bran and warm water ; then well rinsed, to get the thickening from the mordant. It is then put into a madder-bath, and boiled. The parts where the mordant was applied assume a deep and lively red, while the ground is very faint and of a different hue. The silk is then well boiled in bran and water, to clear the ground and brighten the red.

In this process it is clearly shown that the silk in itself has not a sufficient attraction for the colouring matter to receive a permanent dye, without the presence of the alumine, which, by its common affinity to both, renders the colour intense and permanent. The acetate of iron, prepared and thickened, then printed as directed for the aluminous mordant, and the silk prepared and dyed in the same madder-bath, produces a black.

#### No. 1.

##### *Mordant for Black, &c.*

- 1 quart tar-iron liquor at 23°\*,
- 2 do. common do. at 11°,
- 3 do. water,
- 4 ounces sulphate of copper.—Or,
- 2 quarts tar-iron liquor at 23°,
- 4 do. water, and
- 4 ounces sulphate of copper.

One gallon to be thickened with one pound and a quarter of white starch and two ounces of glue, or with flour. This colour works best when made two or three days before it is wanted.

\* The strength of the liquors is tried by the hydrometer of Twadell Glasgow ; glass, No. 1, answers for the purpose of the colour-maker.

## No. 2.

*Mordant for Red, &c.*

To each gallon of water, at a heat of  $150^{\circ}$ , add  
4 pounds of alum in powder,  
2 do. acetate, or sugar of lead,  
4 ounces sulphate of copper, or blue vitriol,  
2 do. whiting.

Stir the mixture well, and, when it is cold, add the two ounces of whiting to each gallon. This will cause a fermentation; therefore, add the whiting by degrees. Stir it often for two or three days, then let it settle for use.

Thicken one gallon of the clear liquor with four pounds of gum Senegal, or Arabic.

When the colour is wanting on the scarlet cast, omit the blue vitriol.

## No. 3.

*Mordant for Purple, &c.*

1 pint tar-iron liquor at  $23^{\circ}$ ,  
14 pints of gum liquor,  
8 ounces sulphate of copper.—Or,  
1 pint common iron liquor, and  
7 pints gum liquor.

Add more or less gum liquor according to the shades required; and, for some shades, omit the sulphate of copper.

The gum liquor is made by dissolving four pounds of gum with a gallon of water. When dissolved, strain it for use.

## No. 4.

*Mordant for Yellow, &c.*

To each gallon of water, at a heat of  $150^{\circ}$ , add fourteen ounces of ground alum. When the alum is dissolved, and the liquor is cold, then add one ounce of whiting. Of this mordant, there is usually made fifty or sixty gallons at a time.

## No. 5.

*Mordant, second Yellow or Red.*

To each gallon of water, at a heat of  $150^{\circ}$ , add  
4 pounds of ground alum,  
2 do. pyrolignite of lime.

Stir it often for two or three days, then let it settle for use. For some work, this will be too strong, then add gum liquor according to the shade wanted.

Thicken each gallon of clear liquor with four pounds gum Senegal or Arabic, or with gum and ground pipe-clay.

## No. 6.

*Mordant for Crimson, &c.*

To each gallon of water, at a heat of  $150^{\circ}$ , add  
4 pounds ground alum,  
2 do. acetate of lead,  
4 ounces verdigris,  
2 do. whiting.

Prepare the verdigris by pounding and sifting it, then put one quart of boiling water to it; stir it well, and, when it is dissolved, add one quart to the alum

and acetate, or sugar of lead. Then add three quarts of water; stir it well; and, when the liquor is cold, add the two ounces of whiting.

Thicken the clear liquor with four pounds of gum Senegal or Arabic, or gum and pipe-clay.

For altering the shade of crimson, use sulphate of copper, or common sulphate of zinc, instead of the verdigris.

#### No. 7.

##### *Mordant for Chocolate, &c.*

1 quart tar-iron liquor at 23°,

2 do. No. 2. Mordant for red, or more according to the shade required,

3 quarts water, or more according to shade.

Add the mordant No. 2, more or less, according to the work: viz. when the chocolate or the red shade is required, add more red mordant; but on the dark shade, add more iron liquor.

Thicken one gallon with three pounds and a half gum Senegal or Arabic, or with flour, or with gum and pipe-clay, according to the work.

#### No. 8.

##### *Mordant for Black, through the Blue Vat.*

3 pints tar iron liquor at 23°,

5 do. water,

8 ounces sulphate of copper.

Thicken them with one pound starch, or gum and pipe-clay.

This colour works best when made two or three days before it is wanted.

## No. 9.

*Mordant for Red, through the Blue Vat.*

To each gallon of water, at a heat of  $150^{\circ}$ , add,  
4 pounds ground alum,  
2 do. acetate of lead,  
8 ounces verdigris,  
2 do. whiting.

Pound the verdigris very fine, and sift it through a fine sieve; then pour one quart of boiling water on it, and stir it till it is dissolved. Then add it to the alum and acetate liquor, and stir well till all is dissolved. When it is cold, add the whiting by degrees; stir it often for two or three days; then let it settle for use.

Thicken one gallon of clear liquor with three pounds gum Senegal, and half a gallon with six pounds pipe-clay. Then take four ounces soft soap, and dissolve it over the fire in a brass pan, which add to the pipe-clay and red liquor; mix well; then add as much of the thickened gum red liquor as will answer the work. Stir up well, and strain through a sieve for use.

## No. 10.

*Mordant for Chocolate, through the Blue Vat.*

2 quarts tar-iron liquor at  $23^{\circ}$ ,  
4 do. No. 2, red mordant,  
6 do. water,  
3 pounds white copperas.



Thicken each gallon with three pounds gum, then thicken half a gallon with six pounds pipe-clay, to which add eight ounces soft soap melted in a brass pan. Strain them through a fine sieve for use.

Add more or less of No. 2, red mordant, according to the shade wanted.

### No. 11.

#### *Mild Paste, through the Blue Vat.*

2 quarts of water at a heat 150°,  
6 pounds pure sulphate of zinc,  
8 do. ground pipe-clay,  
1 do. soft soap,  
2 quarts boiling gum liquor.

When the sulphate of zinc is dissolved, then add the pipe-clay, and mix them well; then add the soft soap, after which add the gum liquor. Then strain them through a fine sieve for use.

### No. 12.

#### *Strong Blue Paste, through the Blue Vat, to print with Block, Plate, or Cylinder.*

1 gallon water at a heat 150°,  
3 pounds sulphate of copper,  
2 do. acetate of lead.

Stir the mixture for two or three days; then let it settle for use.

Thicken each gallon of clear liquor with one pound and a half of flour; when nearly cold, add six ounces single aquafortis, or thicken with British gum, adding the aquafortis. This is for plate or cylinder.

Thicken, for the block, with gum and pipe-clay.

## No. 13.

*Spirit Orange.*

Take from one pint nitric acid (specific gravity 1.500) four ounces, to which add eight ounces water, and one ounce of feathered tin. When this is dissolved or corroded, add it to the remainder of the pint of nitric acid; then add as much pipe-clay as will make it very thick. Dissolve four pounds gum Senegal in a gallon of boiling water; when cold, strain it for use: then add as much gum liquor to the nitric acid and pipe-clay, as will bring it to a working state. Try the strength of the colour, and reduce it, if too strong, with more gum liquor; or mix some flour and water, and add it to the colour; this prevents the colour from getting thin.

## No. 14.

*Red Mordants.*

The red and iron liquors, as made by Mac-Murdo, Pitchford, and Co., No. 4, Gould Square, Crutched Friars, or the Lancashire or Scotch red liquors, when mixed with the different drugs as directed, will answer for most work. The common iron liquor is made by Blake, North Street, Back Church Lane, St. George's in the East.

## PART III.

### PREPARING THE STEAM COLOURS FOR SILK, AND MAKING THE ACIDS, ETC.

#### No 15.

##### *Sulphate of Indigo.*

TAKE one pound of the best Flora indigo in very fine powder; put this into a stone-ware or lead vessel; then add gradually three pounds of the best sulphuric acid, or oil of vitriol, (specific gravity 1-800.) Mix well, and stir often, and in twenty-four hours the indigo will be dissolved.

N.B. By adding three ounces of sulphur to the vitriol, and heating it to  $180^{\circ}$ , then, when cooled down to  $100^{\circ}$ , pouring the vitriol off the sediment, and then adding it to the indigo, is considered the best way of opening, or dissolving, the indigo.

When the indigo and vitriol have been mixed twenty-four hours, then add three pints of boiling water. Stir often, and, when cold, it will be fit for use.

## No. 16.

*To Neutralize the Sulphate of Indigo.*

Take six pounds of alum, and dissolve it in two gallons of water, at  $120^{\circ}$ ; when dissolved, add by degrees five pounds of pearl-ashes, until the acid of the alum is neutralized, and the alumine formed; then put the whole on a piece of calico, that has been hooked in a square frame, or tied over a vessel. When the liquor is run off, then add one gallon of boiling water on the alumine, and stir it up well. When the water has gone through the calico, the alumine is fit for use.

Then add a part of this alumine to some of the sulphate of indigo, as prepared in No. 15, until the sulphuric acid is neutralized.

## No. 17.

*Blue for Steaming on Silk.*

Take four ounces of gum-dragon in fine powder, add to it two quarts of water; then boil until the gum is well dissolved. When at the heat of  $110^{\circ}$ , add half a pint of No. 16, neutralized sulphate of indigo, more or less, according to shade. Or, neutralize the sulphate of indigo as made No. 15, with whiting. Take three pounds of whiting, and mix it with three quarts of water, then add this by degrees to the sulphate of indigo; stirring it well. When the fermentation is over, then taste, and be careful there is no acid that will hurt the silk: it is then fit for use. If acid still remain, add more whiting.

## No. 18.

*Black for Steaming on Silk, &c.*

Take at the rate of two pounds of chip logwood to each gallon of water; boil two hours, adding water as it evaporates: then take out the chips, and add two pounds more, and water to make up what is wasted. Boil as before. Then boil down to three quarts for each gallon of water. When the liquor is cold, strain off for use.

Thicken one quart of this liquor with two ounces of gum dragon; when cold, add two ounces or more of muriate of iron; stir the whole well: it is then fit for use.

N.B. In printing with this, use some lamp-black on the sieve, to make it work.

## No. 19.

*Red for Steaming on Silk, &c.*

Take at the rate of two pounds of chip brazil, or peachwood, to each gallon of water. Boil for two hours, adding water as it evaporates; then take out the first chips, and add two pounds more of chips; boil as before. Then boil the whole to three quarts for each gallon of water used at first. Strain off the liquor for use.

Then take the same four pounds of chips, and boil them in three gallons of water for two hours. Strain off the liquor; then add to it, at the rate of each gallon, half a pint of muriate of tin; stir it; then put this on a stuff or calico sieve; and when the clear liquor is run off, gather the precipitate for use.

Thicken half a gallon of No. 19. liquor, with three quarters of a pound of white starch; when cold, add one pint of muriate of tin, in which is dissolved one pint of the precipitate made as above: strain all through a fine hair sieve for use.—Or thicken with gum dragon, and proceed as above.—Or precipitate with alum, and thicken some of No. 19 liquor with British gum, adding the precipitate and some calcined copper.

No. 20.

*Brown Red, for Steaming on Silk, &c.*

Take one gallon of the best blue archil liquor, and boil it down to one half; then strain it through a fine sieve. When cold, thicken it with half a pound fine starch, and add half an ounce of crystallized muriate of tin. Stir it up well, and it is then fit for use.

No. 21.

*Pale Red, for Steaming on Silk, &c.*

Take half a gallon of white-wine vinegar, and boil in it half a pound of black-grain ground cochineal for ten minutes. Strain it through a fine sieve; then grind the cochineal in a stone-ware mortar until it goes through the sieve; then add four ounces tartar, and one pint of muriate of tin; thicken with four ounces of gum-dragon. By using nitric muriate of tin, you get the red more on the scarlet shade, or add turmeric or saffron to the spirits. This colour should be made in a tinned copper vessel, or white stone-ware pot.

## No. 22.

*Yellow, for Steaming on Silk, &c.*

Take two pounds of quercitron bark to each gallon of water; boil them two hours, adding water as it evaporates; take out the bark, and add two pounds more bark, and water to make up the two gallons. Boil as before, so as to have half a gallon of liquor, for each gallon of water that was used at first. Strain them through a fine calico sieve, and put the liquor by for use. Take the same four pounds of bark, and add it to two gallons of water. Boil two hours, adding water as it evaporates, then strain as before; then add to each gallon of this bark liquor, four ounces measure of muriate of tin; then stir all up; then put it on a stuff or calico sieve, and when the liquor is strained off, gather the precipitate for use.

Thicken half a gallon of No. 22, bark liquor, with half a pound of white starch; when cold, add one pint, more or less, according to shade, of muriate of tin, in which is dissolved half a pint of the precipitate. Strain through a fine sieve for use.

## No. 23.

*Strong Green, for Steaming on Silk, &c.*

Take two pounds chip fustic to each gallon of water. Boil them two hours; then take out the chips, and add two pounds more chips, and water to make up the two gallons. Boil as before, so as to have half a gallon of liquor for each gallon of water that was used at first; strain through a fine sieve for use.

Take the same four pounds of chips, and boil them in two gallons of water for two hours, adding water as it evaporates, then strain as before; then add four ounces measure of muriate of tin to each gallon of liquor; stir all up, then put it on a stuff or calico sieve, and when the liquor is strained off, gather the precipitate for use.

Thicken half a gallon with four ounces gum dragon, adding half a pound of ground alum; when cold, add four ounces of muriate of tin. Stir well, then add one ounce measure of nitrate of copper: by adding the precipitate to the muriate of tin, you give the green more body. Then add half a pint No. 16, sulphate of indigo, more or less, according to shade.

#### No. 24.

##### *Light Green, for Steaming on Silk, &c.*

Take half a gallon of No. 22, bark liquor, thicken with four ounces gum dragon, adding four ounces of ground alum, and two ounces of tartar; when cold, add four ounces measure of muriate of tin, in which is dissolved four ounces measure of bark precipitate, more or less, according to shade; then add half a pint, more or less, No. 16, sulphate of indigo.

#### No. 25.

##### *Purple, for Steaming on Silk, &c.*

Take half a gallon No. 18, logwood liquor, and thicken with four ounces of gum dragon, when cold, add six ounces measure of muriate of tin, two ounces ditto nitrate of iron, and one ounce ditto nitrate of copper, more or less of these according to shade.



N.B. For strong purple, make some logwood precipitate, the way the bark or fustic is made; then dissolve it in the muriate of tin, and add it to the colour; or use alum and calcined sulphate of copper, instead of the above spirits.

### No. 26.

#### *Orange, for Steaming on Silk, &c.*

Take one pound of the flag arnotto, and one pound pearl ashes, to five quarts of water. Bruise the arnotto well in the liquor, then boil till the arnotto is dissolved, then let the liquor cool; add half a pound of ground alum, or more, so as to neutralize the ashes, and not decompose the alum. Strain them through a canvass sieve.

Thicken one quart with two ounces of gum dragon. By adding more or less arnotto, you alter the shade.

### No. 27.

#### *Drab, for Steaming on Silk, &c.*

Take one pound of galls in sorts, and bruise them; then boil them in five quarts of water till they are soft, and the liquor boiled down to three quarts; then strain them through a fine sieve.

Thicken one quart with two ounces gum dragon, then add half an ounce measure of muriate of iron, more or less, according to shade. The shade may be altered by adding a small quantity of No. 18, logwood liquor, or using less galls.

## No. 28.

*Muriate of Tin.*

Take pure muriatic acid (specific gravity 1.120) two quarts, in a stone or white-ware pot, (Wedgwood's ware is best;) add, by degrees, one ounce at a time, of feathered tin, for twenty-four hours. Then put the vessel on a sand-bath, and bring it on gently to boil, observing to add tin to it as it is consumed. There should be some tin left when the muriate is cold; then bottle it for use.

## No. 29.

*Muriate of Iron.*

Take muriatic acid (specific gravity 1.120) one quart; to which add one quart of water; then add, gradually, iron turnings, or filings, as long as the muriatic acid will dissolve them. Then pour off the muriate of iron, and bottle it for use.

## No. 30.

*Nitric Muriate of Tin.*

Take nitric acid (specific gravity 1.500) one pint; and three pints muriatic acid (specific gravity 1.120) then add three pints of water, and, by degrees, feathered tin, till the acids will dissolve it no longer, this will be in two or three days. Pour off the clear liquor, and bottle it for use.

## No. 31.

*Nitrate of Copper.*

Take single aqua-fortis one part, and add one part water; to which add turning or filings of copper, gradually, for two or three days, till the acid will no longer dissolve the copper. Bottle it for use.

## No. 32.

*Feathered Tin.*

Feathered tin is made by melting grain tin in an iron ladle, till an oxide is formed on the surface; then pour it from a height, or distance, into cold water. Put it on a sieve, and get the water off; it is then fit for use.

## No. 33.

*Calcined Sulphate of Copper.*

To calcine the sulphate of copper, put the blue vitriol into a crucible; then put it into a clear fire, to drive off the acid and water. When the oxide is red-hot, then let it cool, and grind it to fine powder for use.

## PART IV.

METHOD OF PREPARING THE SILK WHEN PRINTED,  
OR WHAT IS CALLED "RINCING;" TO DYE IN MAD-  
DER, ETC.

No. 34.

*Rincing, or Preparing for Dyeing.*

When the pieces are printed forty-eight hours, then begin to prepare them for dyeing in the following manner. This is called rincing off.—To dye in madder, &c. take for each piece of seven handkerchiefs, one pound, more or less, of sumach; then pour one gallon of boiling water on it in a vessel; then take for each piece of ditto, four pounds, more or less, of bran in a vessel, and put two gallons of boiling water on it; stir it up well: after remaining from ten to fifteen minutes, mix the whole together in five gallons of cold water. Then take a tub or square vessel, more than the breadth of the handkerchiefs; this should be fixed as high as the man can work, so as to run off the liquor used in it, to another vessel near it. For two pieces take two gallons of boiling water, and two pounds of sumach, more or less; then take four gallons of boiling water, and eight pounds of bran; let them remain in two vessels ten or fifteen minutes; then add ten gallons of cold water. When all this is at a heat between  $90^{\circ}$  and  $100^{\circ}$ , enter one piece, with the printed side downwards, keeping it open, and moving under the

liquor backwards and forwards for two minutes, or thereabouts; then edge it quickly for one minute or more; then enter the second piece in the same manner; then put the pieces into another tub, with a winch over it, and run the liquor out of the first tub, over them; then winch in this fifteen or twenty minutes; then put the same quantity of sumach liquor, and bran ditto, and water ditto, for the next two pieces, into the square vessel, and proceed as directed above, putting the pieces and liquor into the second tub, till it is full; then put into a third tub till you have twelve pieces rinsed; then hand-wash, or wheel\* ditto; but the latter is best. For some work, use half a pound of sumach, and five pounds of bran for each piece. For cochineal crimson, or black and purple, use no sumach. This is one of the most difficult operations in silk printing, and should be particularly attended to. You must see that the thickening is out of the mordant, before the pieces are out of the second or third tub. I have used cow-dung with the bran and sumach; but found no benefit from it. The bran that is used in branning other work, such as chintz, calicoes, &c., will answer for preparing, provided you use it with the proper quantity of sumach, and when it is fresh made; or, take the quantity of bran for what work you are going to rince, and add the boiling water to it; stir it up well, then take the sumach in the same way; but you must remember to stir them up when you take any out, so as to have the quantity of bran and sumach for each piece in the first square vessel where you entered the piece.

\* *Wash Wheel*, see Note 3.

## No. 35.

*To Dye, or what is called “Raising” Black and Red ; Black, Red, and Purple ; or, Black, Red, and Chocolate.*

Fill the copper\* one-third full of water ; then add, for each piece of seven handkerchiefs, two pounds, more or less, of the best crop or French madder, with half a pound, more or less, of sumach. Bring the copper to a boil, to continue for ten minutes ; then add as much bran as madder, fill the copper up with cold water, then enter twelve pieces, tied in three equal parts, this will leave three ends over the winch or reel ; turn the winch very quickly till the colours are even, keeping the pieces well under the liquor in the copper. Bring the copper to a slow boil in an hour and a half. Then take out the pieces, and winch in water for branning. Then bran according to what sort of ground is wanted. For some work use half a pound of ground Brazil, or peach-wood. This is for full reds. For red on the scarlet cast, use more sumach with the madder, as above. When the handkerchiefs are for yellow grounds, you must use no wood in the dyeing, but bran twice.

N.B. In dyeing, if the copper will not admit the madder, sumach, and bran to be boiled in a small quantity of water, then scald them in a vessel, and put them into the copper ; then fill with water, &c.

*Madder Copper, see Note 4.*

## No. 36.

*To dye the Yellow grounds on the different sorts of work, as Black, Red, and Yellow; Black, Red, Chocolate, and Yellow, and several other colours.*

Take twenty-eight pounds of woulds, and put them in the copper; fasten them down; then fill the copper up with water, to within four inches, add two ounces of pearl ashes. Boil them one hour and a half, adding water to keep the copper full. Take out the woulds, and wash them with two or three pails of water, each containing three gallons; add this to the copper of would liquor. When the pieces are well branned, and washed in clear water, wring them, and put them in the mordant No. 4, and edge them in it three or four times; then put them under the mordant to steep for four or five hours; then wring them out of the mordant, and edge or winch in clear water for raising-in the would liquor.

Take a small vessel, and put one pail of would liquor in it; then add two pailsful of cold water. When reduced to a heat of 80°, enter the piece, and edge it well in this for five or six minutes. Then put the piece into a larger vessel, with a winch or reel over it, and the same would liquor. Winch in this while the piece will receive any colour. Proceed with the second piece in the same way, viz. putting the would liquor into the small vessel first, and edging in the same manner; then put it with the first piece into the larger vessel, and keep winching it as before directed; proceed in this manner with all the pieces; then winch.

in water;\* then take twelve pieces into the larger vessel with fresh would liquor and water, winch in this till the yellow is up, then winch in water, and dry up. For some yellows, pad the pieces in No. 5 mordant, reduced with water to the strength of the yellow desired. When dry, in about twelve hours rinse with only, as directed bran in No. 34; then raise with quercitron bark as No. 46.

No. 37.

*To dye Black and Purple on Silk, &c.*

When the pieces are prepared, or rinsed as before directed for black and purple, in No. 34, then take, for each piece, one pound of rasped logwood, more or less, according to the work, putting it into the copper of cold water with the pieces; then bring the copper gently to a heat of  $140^{\circ}$ , or thereabout, and when the black and purple are up, take out the pieces, and winch them in water, then bran white. The pieces should not be touched by the hand, as this leaves a stain. I find it best to put the pieces into bran-liquor first, when they come out of the logwood-liquor, then winch well in water, and bran till the ground is white. Winch in water, and dry up.

No. 38.

*To dye Black, Crimson, and White on Silk, &c.*

When the pieces are prepared, or rinsed, as directed in No. 34, then take, for each piece, one pound, more or less, of black-grained cochineal, ground very fine. Enter the pieces in cold water with the cochineal, and

\* *Would Dyeing*, see Note 5.



bring the copper on slowly to a boil in one hour and a half; then put the pieces in bran and water, at a heat of  $160^{\circ}$ , for ten or fifteen minutes, then winch well in cold water. Then bran until the ground is white. For some work, add four or eight ounces of ground brazil to each piece, with the cochineal, this fills the black as well as the crimson.

No. 39.

*For Black and Red on Silk, &c.*

Print the mordant No. 1 for black, and the mordant No. 2 for red. Prepare as No. 34, and raise in madder, &c., as 35. Bran, &c.

No. 40.

*For Black, Red, and Purple.*

Print the mordant No. 1 for black, mordant No. 2, for red, and mordant No. 3, for purple. Prepare as No. 34, and raise in madder, &c. as 35. Bran, &c.

No. 41.

*For Black, Red, and Chocolate.*

Print mordant No. 1, for black, mordant No 2, for red, and mordant No. 7, for chocolate. Prepare as No. 34, and raise in madder, &c. as 35. Bran, &c.

No. 42.

*For Black, Red, and Yellow.*

Print mordant No. 1, for black, mordant No. 2, for red. Prepare as No. 34, and raise as No. 35. Bran twice; then steep in mordant No. 4 for yellow; then raise in woulds or bark, as directed in No. 36 or 46.

## No. 43.

*For Black, Red, Chocolate, and Yellow.*

Print mordant No. 1, for black, mordant No. 2, for red, mordant No. 7, for chocolate. Prepare as No. 34; then raise in madder, &c. as No. 35. Bran twice; then steep in mordant No. 4, for yellow. Raise in woulds or bark, as directed in No. 36 or 46. Bran, &c

## No. 44.

*For Black, Purple, and White.*

Print mordant No. 1, for black, and mordant No. 2, or No. 6, for purple. Prepare as No. 34, and raise as No. 37. For fast black and purple, raise as No. 65. Bran, &c.

## No 45.

*For Black, Crimson, and White.*

Print mordant No. 1, for black, and mordant No. 6, for crimson. Prepare as No. 34, and raise in cochineal as No. 38. Bran, &c.

## No. 46.

*For Black, Yellow, and White.*

Print mordant No. 1, for black, and mordant No. 2, or No. 5, for yellow. Prepare as No. 34, but give the pieces more time in the bran and sumach, so as to get the black and yellow well up; then raise the yellow with bark, half a pound or more to the piece, and one ounce of white soap. Enter the pieces in cold water, and raise with a heat of  $100^{\circ}$ ; then put the pieces in bran-liquor of the same heat: before they are put into cold water, winch in this at a heat of  $110^{\circ}$ , or thereabouts, for ten or fifteen minutes; then winch in water, and if not white, bran slightly. Wash, and dry up.

## No. 47.

*For Black, Orange, and White.*

Print mordant No. 1, for black, and mordant No. 2 or 6 for orange. Prepare as No. 34; then take for each piece, one pound of quercitron bark, more or less, one pound of crop madder, more or less, and half a pound of sumach, more or less. Put two gallons of boiling water on them, stir for ten minutes, then add five gallons of cold water. Enter the piece, and winch quickly. It is best to bring the colour up with as little heat as possible. By giving time in this way, you will bring the pieces out so, that they will bran white. Winch in water. Wring, and dry up.

## No. 48.

*For Black, Olive, and White.*

Print mordant No. 1, for black, and mordant No. 7, for olive. Prepare as No. 34; then take, for each piece, one pound of green ebony, finely ground, and half a pound of sumach. Enter the pieces into cold water, with the ebony and sumach, winch quickly, and bring the colours up with as little heat as possible. By giving time in this way, as in the preceding, you will bring the pieces out so that they will bran white. Winch in water. Wring, and dry up.

## No. 49.

*For Black, Brown, and White.*

Print mordant No. 1, for black, and mordant No. 7, for brown. Prepare as No. 34; then take, for each piece, one pound of madder, more or less, one pound of quercitron bark, and half a pound of sumach

Put two gallons of boiling water on them, and stir for about ten or fifteen minutes; then add five gallons of cold water. Enter the pieces, and bring the colour up, by giving time at a heat of  $110^{\circ}$ , or more, then bran, &c.

Or, use bark and sumach without madder.

No. 50.

*For Black, Blue, and White.*

Print mordant No. 8 for black, and mild paste No. 11 for white. Run the pieces through the rolling-frame,\* as directed in part the sixth. Prepare as No. 34; then take, for each piece, one pound of ground galls, or ground valonese, entering the pieces and the ingredients together in cold water. Bring the black up at a heat of  $150^{\circ}$ , then bran, &c. Where there is no yellow to be in the work, raise with logwood, instead of galls or valonese.

No. 51.

*For Black, Yellow, Green, and White.*

Print mordant No. 8 for black, and No. 11 mild paste for white. Run the pieces through the rolling-frame, as part the sixth. Prepare as No. 34; then dry up, and print mordant No. 5 over the blue and white, for green and yellow. Prepare as No. 34, and raise as No. 46.

No. 52.

*For Black, Red, Blue, Yellow, Green, and White.*

Print mordant No. 8 for black, mordant No. 9 for red, mild paste No. 11 for white. Run the pieces through the rolling frame as part the sixth. Prepare as No. 34, and raise as No. 35. When well branned, dry up, and print mordant No. 5 over the blue and white, for yellow and green; then prepare as No. 34, and raise as No. 46.

\* See Plate, No. 87.

## PART. V.

## WAX WORK, ETC.

## No. 53.

*To make the Wax to print off the Common Sieve.*

Take one part of strained Venice turpentine, and one part of hog's-lard; then, in two pounds of this, grind eight ounces of verdigris, or more, according to the strength of the blue wanted. Mix this well, and give it a heat of  $100^{\circ}$ . When the verdigris is dissolved, it is fit for work: this is for blues.\* By adding more turpentine, the wax is thicker; or more lard, it becomes thinner; this, a little practice will manage. For other work, take the same quantity of turpentine and lard, eight ounces of oxide of zinc\* instead of verdigris, or more, according to the work. Grind it well with the wax, and give it a heat of  $100^{\circ}$ ; when dissolved it is fit for use.

## No. 54.

*Table to Print the Wax on.*

The table, to print the wax on, is forty inches square and three inches thick. On this, hook a fine cloth blanket, over which hook a fine linen ticken cover, then

*Wax-work, see No. 6.*

bruise some pipe-clay into fine powder, and sift it through a fine sieve; then sift it over the ticken, so as to cover it very slightly, then put the handkerchief on the table. *Teer\** the wax on a cloth sieve, and put it in an alum leather case, then dip the print in this sieve, and see that it lifts the wax well, then border the handkerchiefs, then sift some of the fine ground pipe-clay on the printed part, then shift the handkerchief to the edge of the table, first shaking off the pipe-clay that was sifted on the border, and sifting some more ground pipe-clay on the place where the border came on the ticken, rub it over with a rule so as to have an even surface, then print the middle of the handkerchief, and sift the ground pipe-clay upon it, then shake the superfluous pipe-clay off on a large sheet of paper fixed at one side of the table, and then it is used again for sifting on the work as it is printed. This work is printed in a printing shop, heated between 60 and 70°, but where the sun has no power of melting the wax; the piece is put on rollers as it is printed, and shifted from them when the wax is hard, and will not mark off.

No. 55.

### *The Soft Wax.*

The soft wax is made with one pound of turpentine, and half a pound or more of Russia tallow; this is melted together, and printed off an alum leather case. The case swims in a mixture of one part rosin, one fourth part tallow; then there is a cloth sieve put in the case, and the wax *teered* on it; the wax that the

\* *Teering*, see Note 7.

case swims in, is kept hot by steam. The form of this apparatus will be given in Plate, No. 76. The wax is printed off the same table as No. 54, over which sift ground pipe-clay in the same manner as directed before. The prints for this work are made of copper tinned, or of a composition of lead, tin, &c. The figures fixed in the block stand out of it about half an inch. The block is put on the place as marked in the apparatus No. 76, when warm so as to lift the wax without its dropping from the print; then begin to print the border, (there is no mitre-cutting in this work, the border is cut off square at the edge of the handkerchief,) when the border is printed, then sift the ground pipe-clay on it, then shake the pipe-clay off, and sift some on the place where the border was printed on the ticken; then shift the handkerchief to the edges of the table, so as to have two parts of the border off; then print the middle, and sift the pipe-clay on it, and put the piece over the rollers to harden.

#### No. 56.

##### *The Old Wax,*

Is made by taking one part of white or black rosin, according to the work, and one part of best Russia tallow. These are melted in a small pot, marked in the apparatus, Plate, No. 77, for this work. For some work use more or less of tallow, according to the time of the year, viz. when hot or cold. The prints for this work are all cast in lead, and the figures stand about an inch from the block, on which is fixed an iron handle. This print is put on the place marked in the apparatus No. 77, and when hot, is dipped in the pan containing

the wax in a warm state. When the wax lifts on the print, and does not drop, it is fit for working. This wax is printed off the same table as No. 54, but instead of pipe-clay, fine white sand is used in the same manner, and the handkerchief or piece does not require to be put on rollers. The greatest fault of this work is, the figures are not even, and the wax is liable to set when it is warmed by fire. This may be avoided by heating with steam. This wax work is the oldest known in Europe, and was the first sort of printing done on silk or linen. It can be traced back above two hundred years.

No. 57.

*To dye the Black and White Wax-work.*

When the pieces are printed in the wax, No. 53, 55, and 56, then edge them five minutes, and steep them in No. 4 mordant, for four or five hours; then edge them up, and let them drain into the vessel; then winch in water, or edge them in ditto. Then for each piece of seven handkerchiefs, take two pounds of ground logwood, and boil it in six gallons of water, or put six gallons of boiling water on two pounds of ground logwood in a vessel. Stir it well for five or six minutes; then take half of this into another vessel, and add five gallons of cold water. When at a heat of  $70^{\circ}$ , enter the piece that was rinsed out of the alum mordant, and edge it quickly in this, till the colour is quite a purple. Edge or winch in this while the piece receives any colour; then winch in clear water, or edge it. Take the other part of the logwood



liquor, and add the same quantity of water in a vessel with a winch over it. Winch the pieces in this till of a dark purple; then winch in clear water, or edge in ditto.

No. 58.

*Saddening.*

Dissolve one pound of sulphate of iron in each gallon of water; take one quart of this to five gallons of water at 70°, in a vessel kept for the purpose of saddening. Edge the piece well in this, till you change the purple quite dark; then winch in water, and the piece is ready to have the wax taken off from it.

No. 59.

*To strip the Wax.*

To strip the Wax, take for each piece one pound of bran to five gallons, or so, of water, and one quarter of a pound of soap dissolved in water. Mix this with the bran liquor, and enter the piece cold. Then bring the copper on gently to 120°, winching the piece quickly. Get the wax off at as low a heat as possible, as then you do not strip your colours too much. When the wax is well off, then winch in clear water, and bran the second time without soap. Then winch in clear water, wring, and dry up.

I have given the method for one piece, but when the work is done in large quantities, there are a man and a boy to a vessel. Each handles two pieces in the logwood-liquor, then proceeds putting twelve pieces in the second vessel, and logwood-liquor in proportion. There are also four pieces put in the sad-

No. 60.

*For dyeing heavy Black and White.*

When printed in wax Nos. 53, 55, or 56, then steep the pieces in tar-iron liquor reduced, viz. one iron liquor, with six to ten or more waters. Steep in this four or five hours; then edge the piece up, and let it drain; then winch in clear water, or edge in ditto; then in bran liquor; then proceed to dye as before directed in No. 57, using from a quarter of a pound of sumach to half a pound, to each piece, with the logwood. Then take half the logwood and sumach liquor, &c. to each piece first, then the other half ditto, in the second vessel, and winch till the black is up, then winch in clear water. Bran, and strip the wax as No. 59. Bran and wash. Wring, and dry up.

No. 61.

*The Block-work for Black and White,*

Is printed No. 1 mordant, then prepared as No. 34, giving more time in the second vessel. Then raise with one pound of bran, one pound of sumach, two gallons of boiling water, and five gallons of cold water to each piece, then winch in this at 110° till the black is up, then bran, &c. Or for sumach, use ground galls or valonese with the bran, or logwood without the bran; then bran white, &c.

## No. 62.

*To dye Red and White Wax-work.*

When the piece is printed in the wax No. 53, 55, or 56, then edge it in the mordant No. 4, and steep it four or five hours, then edge it up, and winch it in clear cold water, or edge in ditto. Then boil, for each piece of seven handkerchiefs, one pound or more of crop madder, and half a pound of sumach, and one pound of bran, in five gallons of water, five minutes; then add this to five gallons of cold water; when all is at a heat of 70°, take half, and enter the piece, and edge or winch in this twenty or thirty minutes, then let it steep twenty minutes, then edge or winch, and steep twenty minutes or more, then winch in clear water, then proceed the second time with the same piece, with the other half of the liquor, in the same manner, till you get a full red, then winch in water, then strip off the wax as directed in No. 59. Wash, and dry up.

I find it is best to keep the pieces moving all the time till the red is up.

## No. 63.

*For Red and White Block-work.*

Print mordant No. 2; when printed forty-eight hours, prepare as No. 34, then take, for each piece of seven handkerchiefs, two pounds of crop madder, more or less, half a pound of sumach; or, omitting this, two pounds of bran. Boil in two gallons of water five minutes, add this to five gallons of cold water. When at a heat of 70°, enter the piece, and edge it quickly, or winch it ditto, for twenty or thirty minutes; then let

it steep forty minutes, then edge or winch five minutes, then winch in the cold water, and repeat the same. Bran, and dry up.

I find it best to keep the pieces moving all the time till the red is up.

No. 64.

*To dye Purple Wax-work.*

When the pieces are printed in the wax No. 53, 55, or 56, then proceed as directed for black No. 57, till you come to the saddening No. 58. Then bring the purple to the shade you wish in the second logwood liquor, then proceed to strip the wax as No. 59. Wash, and dry up.

No. 65.

*For fast Purple, and White Wax-work.*

When the pieces are printed in the wax Nos. 53, 55, or 56, wet them in water, then steep in tar-iron liquor, at 23°, (Twadell's No. 1. glass,) reduced by adding 24, 34, or 44 waters, according to shade, to one of the iron liquor, for four or five hours; then winch in water; then in bran liquor; then wash for raising. Take for each piece from half a pound to a pound of black-grained cochineal in fine powder. Put four gallons of boiling water to it for fifteen minutes; then take the half of the liquor and cochineal, and three gallons of water, and edge or winch in this, while the piece receives any colour; then winch in water, and add the other half of the cochineal and water to three gallons of water; then winch the piece in this till you get the colour desired. Then strip the wax as No. 59. Bran, and dry up.

## No. 66.

*For Purple Block-work.*

Print the mordant of iron liquor and water, made as in No. 65, thickened with gum Senegal, prepared as No. 34, and raise with logwood or cochineal, &c. as No. 65; then bran, and dry up.

## No. 67.

*Brown, Blue, and Green Wax-work.*

*For Brown.*—When the pieces are printed in wax No. 53, 55, or 56, edge them for three or four minutes in tar-iron liquor at  $23^{\circ}$ , or in tar-iron liquor reduced with water, for two, four, or six hours, according to the shade; then edge them up, and let them drain; then winch or edge in water, or lime water, made by adding one pound of slacked chalk lime, to eight gallons of water. Stir it, and winch the pieces in this for five or six minutes; then winch well in water, and strip the wax off as directed in No. 59. Wring, and dry up.

*For Blue.*—When the pieces are printed in the wax, and steeped as No. 67, then winched in water, and stripped of the wax, as in No. 59, then edge or winch in prussiate of pot-ash liquor, made by dissolving two pounds of prussiate of pot-ash in eight gallons of water, then adding an ounce or more of sulphuric acid, or muriatic acid, partly to neutralize the ash. Winch in this till the brown is exchanged to blue; then winch well in water. Wring, and dry up.

*For Green.*—When the pieces are printed in the wax, as No. 67; then steep in chocolate mordant

No. 7, and raise as No. 73, omitting the madder. Strip the wax as No. 59; then winch in the prussiate of pot-ash liquor, made as above. Winch in this till the brown or olive is changed to green. Winch well in water, and dry up.

N.B. By steeping pieces not printed in wax-work, in the different mordants, and raising or dyeing them as here directed, you get a variety of colours for plain dyeing.

No. 68.

*For dyeing Chocolate and White Wax-work.*

When the pieces are printed in the wax No. 53, 55, or 56, then proceed as directed for red, No. 62; when it is full red, then sadden with copperas, the same as for black, No. 58; then strip the wax as No. 59. Then bran, and dry up.

No. 69.

*For dyeing the Block-work Chocolate and White.*

Print mordant No. 7. When printed three days or more, prepare as No. 34; then raise as No. 35, adding either peachwood or logwood, according to shade. Then bran, and dry up.

No. 70.

*For dyeing Orange and White Wax-work.*

Proceed as for dyeing red No. 62, taking about half the madder, or more, and adding one pound of quercitron bark. Strip the wax as No. 59. Then bran, and dry up.

## No. 71.

*For dyeing Brown and White Wax-work.*

When the orange of 70 is fully dyed, then change it to brown, by saddening with copperas as No. 58, then strip the wax as No. 59. Bran, and dry up.

## No 72.

*For dyeing Block-work, Brown and White.*

Proceed as for chocolate, No. 69, omitting half the madder or more, and adding bark instead. Bran, and dry up.

## No. 73.

*For dyeing Olive and White Wax-work.*

When the pieces are printed in wax No. 53, 55, or 56, edge them in mordant No. 7, reduced one part mordant, six, eight, or ten parts water; then steep four or six hours; then edge up, and drain; then winch or edge in water; then in bran liquor; then raise with one pound of sumach, one pound of bran, and two gallons of boiling water. Stir it five or six minutes; then add five gallons of cold water. Enter the pieces when the liquor is at 70°, and winch quickly. Keep it in this while it receives any colour; then winch in water, and proceed with the same piece the second time, with the same quantity of sumach, bran, water, &c. When the colour is to the shade you want, winch in water, then strip the wax as No. 59. Bran, and dry up. By adding madder or bark, or green ebony, you get different shades of brown, olives, snuff, &c. &c.

## No. 74.

*For dyeing Olive and White Block-work.*

Print the mordant No. 7, reduced with water according to shade. When printed three days, or more, prepare as No. 34; then raise as No. 73. Bran, and dry up.

## No. 75.

*For dyeing Green and White Wax-work.*

When the pieces are printed in wax No. 53, 55, or 56, then wet them well in water, and dip in the blue vat as No. 79. Then winch in sours.—(Sours are made by adding one part oil of vitriol to forty parts water, mix them well for use;) then winch well in water; then edge in mordant No. 4, and steep four or six hours; then winch in clear water, and raise the yellow as No. 36. Strip the wax as No. 59. Bran, and dry up.

## No. 76.

*Soft Wax Pan,\* &c.*

The pan is made of cast-iron, three-eighths of an inch thick, to fit in another cast-iron pan forty inches long, ten inches deep, and nineteen inches wide; and is screwed together on the flanges two inches wide. The steam is let in at the bottom of one end, and the condensed water-cock is fixed at the other end.

## No. 77.

*The Old Wax Pan.†*

\* See Plate, No. 76.

† See Plate, No. 77.



## PART VI.

## No. 78.

*Description of the Blue Vat, Rolling Frame, and Common Frame. Also, the Setting of the Blue Vat, and Method of Dipping the different Blues.*

The blue vat is four feet six inches wide, five feet long, and six feet deep, inside measure, made of sheet or cast iron, or of deal lined with lead; the vat may be larger when convenient. The common frame<sup>\*</sup> to hook the pieces on, is made to fit within one inch of the sides and end of the inside of the vat, and is four feet high. There are two rails at the side of the frame, that move up and down with screws. In these rails are put brass hooks at two inches asunder, and in the bottom rails are correspondent hooks. The hooks in the top rail point upwards, the bottom ones the reverse. For light blues, the rolling frame,<sup>†</sup> or, what is called the gallopers, is made to fit within one inch of the sides and ends of the inside of the vat, and is four feet six inches high, with five rollers in the top rails, and five ditto in the bottom rails, and a shaft to receive the pieces on at the top part of the frame, and two rollers at the top of the other part of ditto. The bottom roller touches the liquor in the vat; the rollers are kept down by a lever and weight, so as to

<sup>\*</sup> See Plate, No. 85.

<sup>†</sup> See Plate, No. 87.

squeeze the superfluous liquor out of the piece. The pieces for running through the blue vat are sewed together, and rolled on a shell that fits the shaft at the top of the frame. Then a cord is passed through the rollers of the frame, as shown by the dotted line No. 87, and tied to the ends of the piece, and a stick put between the ends, to keep the pieces open in going through the blue vat. The pieces are run along rollers as far as possible, so as to ungreen them as they come out of the vat; then rinsed, and washed in water, &c.

### No. 79.

#### *Setting the Blue Vat, &c.*

The blue vat, nearly filled with water, is set with fifty pounds of good indigo, ground very fine, fifty pounds of fresh-slacked stone lime, and one hundred pounds of sulphate of iron, or green copperas, and five pounds, or more, of pearl ashes. Stir often for three or four days, till there is a fine copper colour scum on the top of the liquor in the vat; then let it settle for dipping in, but before you begin to dip, skim the vat. When you are dipping for dark blues, hook the pieces in the common frame, then put them in the blue vat, and screw them tightly; then move the frame gently up and down for seven minutes; then take them out, and air them for five minutes. Observe if any part of the pieces touch, and, if so, separate them, and fasten them so as to prevent it in the next dip. Then dip seven minutes more, gently stirring the frame; then take it out, and air five minutes more. You proceed in this way, putting in and taking out till you get the shade required; then winch in water, and put it into sours for two or

three hours; then take it out, and winch well, first in cold water, and then in hot. Wring, and dry up. For printing the spirit orange, see No. 13. When printed, steam it over the steam box, No. 126.

## No. 80.

*Dimensions of the Blue Vat.*

Four feet six inches	long.	} inside measure.
Four ditto	wide.	
Six ditto	deep.	

## No. 81.

*Dimensions of the Common Dipping Frame\* for Blue Vat, (Side View.)*

From	A to B	....	four feet four inches.
	C to D	....	five feet.
Rail	E	....	two inches and a half square.
	F	....	ditto ditto.
	G	....	ditto ditto.
Screws	H	....	two feet long.
Standards	I to K	....	two inches and a half square.
From	C to Rail E	three inches.	

## No. 82.

*Dimensions of the Common Dipping Frame for Blue Vat, (End View.)*

From	L to M	....	four feet four inches wide.
	O to P	....	five feet high.
Rail	Q	....	two inches square.
	R to S	....	two inches and a half square.
From	R to 1	Groove for the Rail to run in.	
	S to 1	ditto.	
	T to X	1 foot.	

\* See Plate, No. 85.

## No. 83.

*Rolling Frame for Blue Vat, (Side View.)*

From	A to B	....	four feet eight inches long.
	C to D	....	five feet six inches high.
Standard	E and F	....	three inches square.
Standard	F	...	four feet two inches long.
Rails	G and H	....	two inches and a half by two inches.
Distance	G to H	....	three feet.
Shaft	I	....	three inches square.
Rollers	K L	....	six inches diameter.
Lever	M	....	eighteen inches long.
Rollers	Y	....	two inches diameter, &c.

## No. 84.

*Rolling Frame for Blue Vat, (End View.)*

From	N to O	....	four feet four inches wide.
	P to Q	....	five feet high.
Rails	T and U	....	two inches square.
Standards	V and W	....	three inches.
Rollers	R and S	....	six inches diameter, three feet six inches long.
From	P to U	....	one foot.
Spindles	one inch diameter, four feet eight inches long.		
Wheel	X		one foot diameter.
Pinion	Y		six inches do.
Do.	Z		three do. do.

No. 85.

*Side View of Common Dipping Frame.\**

No. 86.

*End View of Common Dipping Frame.†*

No. 87.

*Side View of Rolling Frame.‡*

No. 88.

*End View of Rolling Frame.§*

\* See Plate, No. 85.

† See Plate, No. 86.

‡ See Plate, No. 87.

§ See Plate, No. 88.

## PART VII.

## No. 89.

*Description of the Steam Box and Frame; Time of Steaming, &c.*

The steam-box is made of sheet-iron, or of American pine, that is free from turpentine. When made of iron, which is best, there is a fillet of wood screwed to the inside edge of the box, and the same on the door, to which, on the inside, is tacked a thick list or woollen cloth. The door is hung on hinges, and opens on one side. When shut, it is fastened with three bars across, as marked in the plate 92; these are of wood. The figures 1, 2, 3, mark where three iron rods are put inside of the box, within one inch of each corner. These, before being fixed, are wrapped round with list; then there is a blanket put over them, that comes down the sides of the box, to within six inches of the bottom, where it is fastened. The steam is let into the box in the centre of the bottom, either from a small copper, or a steam boiler. A copper of one hundred gallons of water is sufficient. Over the hole, where the steam is let into the box, there is a board that fits within six inches all parts of the bottom of the box. This is fastened down, and admits the frame to run in and

out on castors. The frame is made of three-quarters inch iron, except the two rails which have the fifteen holes in them. They are made of inch-iron. The fifteen holes are for brass or copper wire, on which the pieces are put for steaming. These wires have a knot at one end, and a screw and thumb-nut at the other. When these wires are put in, they are covered with cloth or list, which is fastened at each end. The marks I, K, L, M, plate 93, are for four wires that support the blankets, which are put over the pieces when in the frame. It is requisite to cover all the frame with blankets, when the pieces are in it, as it prevents any drops of wet. The time of steaming is from fifteen to thirty minutes, according to the strength of steam or work. Of this, a few trials will enable you to judge. The steam is never required hotter than  $212^{\circ}$ . When it is higher, you must keep the condensed water-cock entirely open. The pieces are put over the fifteen brass wires in folds, then the blankets are put over the frame.

### No. 90.

#### *Dimensions of the Steam Box.*

- |                            |  |
|----------------------------|--|
| A to B is four feet wide,  | } inside measure.                              |
| C to D .. seven feet long, |  |
| A to E .. four feet high,  |  |
| F to G .. eighteen inches. |  |
| H                          | cock for condensed water.                      |
| 1. 2. 3.                   | three iron rods to support the inside blanket. |

## No. 91.

*Dimensions of Iron Frame for Steam Box.*

- From A to B .. three feet six inches wide, } outside  
 C to D .. six feet six inches long, } measure.  
 E to F .. three feet nine inches high, }  
 N .. three inches between the bars.  
 O .. bars one inch square, fifteen holes  
 three-sixteenths of an inch in diameter.  
 G to H .. six inches. I, K, L, M, brass rods, to  
 support blankets. Fifteen brass rods  
 with screws and thumb nuts for  
 bars O.

## No. 92.

*Steam Box.\**

## No. 93.

*Iron Frame for Steam Box.†*

See Plate, No. 92.

† See Plate No. 93.



## PART VIII.

## No. 94.

*Description of Tied Work in Spots, and Method of Dyeing the same in Chocolate, Red, Yellow, and White; also in Crimson and White.*

When the pieces are ungummed, as directed in the first part, take a wood print with a number of spots in it, made by brass wire, the spots to be at a sufficient distance from each other, to allow the silk to be tied about them. The form of the spots is, in general, a square cluster, or a round ditto, as seen in the diagrams\*. There are several patterns made of these on the silk with water-blue colour for the tiers to work by. This work was introduced from Barcelona in Spain, and, in general, this sort of handkerchief still goes by that name.

## Nos. 95 and 96.

*Knotted Work.\**

Take some stone-blue, such as laundresses use, and dissolve it in gum water; then brush it on a square

\* For the Diagrams, see the Notes 95 and 96.

piece of woollen cloth, tacked on a board, and dip the print on it. Then print one handkerchief at each end of the piece, with the prints Nos. 95 and 96, or either of them singly. When the work is required in small spots, print three handkerchiefs instead of one. They are then given to the knotters, who, doubling the piece, take two or three handkerchiefs, keeping the printed side out. They then take hold of a spot as marked with the print, and tie it with a single hemp thread, and knot it fast. When the whole of the piece is tied, it is then ready for dyeing.

No. 97.

*For dyeing Knotted Red-work.*

Take three pounds or more of barwood or camwood to each piece, and four or five gallons of water. Boil the pieces in this till they are of a full brick redness; then take them out, and, when cold, give them a rinse in water, and let them drain. Then give them to the knotter to tie where the red is to be, which is in the spot between the clusters, as marked in the diagram 95 and 96.

No. 98.

*For Saddening Knotted Red-work.*

Take and dissolve one pound sulphate of iron, in each gallon of warm water required for the work. When dissolved and settled, it is fit for use; then take a dye-tub, and nearly fill it with water at 70°; then put two or three quarts of the sulphate of iron liquor to it; stir it up;

then enter a piece that is dyed red, and work it in this till it is changed to a deep chocolate. There are in general four or five pieces done at a time. When the pieces come out of the saddening tub, they are well rinsed in water; then take hold of each end of the piece, and pull the knotting out. Then edge or winch in water. Wring, and dry up.

No. 99.

*For Pencilling-in the Yellow.*

The yellow for knotted work is made by taking one pint of spirits of wine, and mixing two ounces or more of turmeric in it. When this is done, take the clear tincture, and pencil the spots with it, where the yellow is in the pattern. When dry, the piece is finished.

No. 100.

*For dyeing Crimson and White Knotted-work.*

When the pieces are knotted as directed for the red work, steep them in alum liquor, made by dissolving one pound of alum in each gallon of water, at a heat of 120°. When cold, steep the pieces in it six hours, or more; then take them out, and let them drain; then rinse in water; then take, for each piece, one pound of black-grained cochineal, in fine powder, in five gallons of water. Enter the piece cold, and bring to a boil; then boil five minutes; then take it out, wash, and unknot as directed.

N.B. I have taken the pieces as they come out of the alum, and put them in the copper with the cochineal, and obtained a good colour.

## PART IX.

THE WHITE DISCHARGE, AND THE WAY OF RINSING  
AND DYEING THE FOLLOWING COLOURS, VIZ.  
BLACK, RED, YELLOW, ORANGE, CHOCOLATE,  
OLIVE, DRAB, AND BROWN.

## No. 101.

*White Discharge.*

Take two pounds brown citric acid, and two pounds lemon acid discharge, to half a gallon of boiling water. Then add six pounds ground pipe-clay. Mix well, and when cold, add two quarts of thick gum liquor. Stir well, and brush all through a fine sieve for use. For pale colours, add more gum liquor.

N.B. These acids are to be had of Coxwell, No. 3, Rolls Buildings, Fetter Lane.

## No. 102.

*For Black Ground and White Objects.*

Steep the pieces in a mordant made from tar-iron liquor, that stands at 23°. To one part of this add four, six, or eight waters. Edge the piece well in this, and wring it; then edge again. Edge and wring till the silk is evenly wet; then steep two, four, or six hours, according to the weight of the silk. Then wring

well out of the mordant. Open the piece, and clap it between your hands, or on a deal board, or run it through a padding machine; then dry it on the stakes, or in a stove, or other place that will take the length of it. Keep turning the piece on the stakes, or wherever it is hung. The slower it dries, the more even it will be. When dry, print on the discharge No. 101 for white.

No. 103.

*For Red Ground and White Objects.*

Take one part of mordant No. 2, or one of mordants No. 14, to one, two, or three waters, edge well the pieces in this; then wring them. Edge and wring till the piece is evenly wet. Then steep two, four, or six hours, according to the strength of colour wanted, and the weight of the silk; then wring and clap the piece between your hands, or on a deal board, or run it through a padding machine; then dry on the stakes, or in a stove, or place that will take the piece in length. Keep turning the piece till dry, the slower it is dried, the more even the colour will be. When dry, print on the discharge No. 101 for white.

No. 104.

*Yellow Ground and White Objects.*

They are prepared the same as the red No. 103.

No. 105.

*Orange and White Objects,*

Are prepared the same as the red No. 103.

## No. 106.

*Chocolate Ground, Brown, or Olive and White Objects.*

Take one part of mordant No. 7, and reduce it by adding two, four, or eight waters, according to the shade wanted. Edge the piece well in this; then wring: edge and wring till the piece is evenly wet; then steep two, four, or six hours; then wring out of the mordant well; then clap it between the hands, or on a deal board, or run it through a padding machine; then dry on the stakes, or in a stove, or place where it can be hung at full length. Keep turning it often. When dry, print on the discharge No. 101 for white. This is one of the most difficult colours to get even, therefore it must be handled carefully.

## No. 107.

*Drab or Slate Ground and White Objects.*

Take tar-iron liquor at 23°; to one of this mordant, add twenty, thirty, forty, or fifty waters, according to the shade wanted. Edge the piece well in this; then wring it; then edge again; then wring and edge till the piece is evenly wet; then steep it for two, four, or six hours; then wring it out of the mordant well; then clap it between the hands, or on a deal board, or run it through a padding machine; then dry on the stakes, or in a stove, or in a place where it can be hung at full length. Keep turning till the piece is dry; then print the discharge No. 101 for white.

## No. 108.

*Rinsing the Discharge-work, or Preparing it for Dyeing.*

When the pieces are printed in the discharge, then wind them on a shell. The pieces are either sewed together, or fastened with a brass wire run through the ends. Twelve pieces are put together in this way. Then take a vat, four-feet square\* and three feet deep, in which is fixed a frame with rollers in it, as described in No. 87; then fill the vat with half the bran and sumach liquor, and water for thirty-six pieces, as described in No. 34. When the pieces are through the rollers in the vat, they are received into a square vessel\*, with the quantity of bran and sumach for twelve pieces (seven handkerchiefs each;) then winch fifteen or twenty minutes; then winch well in water, or wash by hand, or by the wheel for raising in madder, logwood, &c.

## No. 109.

*For Raising or Dying Black Grounds and White Discharge.*

When the piece is rinsed and prepared for dyeing as in No. 108, take for each piece one pound or more of rasped logwood, a quarter of a pound or more of sumach and dye stuff, into a copper of cold water. Enter the pieces cold, and bring to a heat of 160°, or thereabout. It is best to give time for the colour to fill; then bring the copper on to a boil; then winch and wash; then bran white. Wring, and dry up.

\* See Plate, No. 136.

## No. 110.

*For Raising or Dyeing Red Ground and White Discharge.*

When the pieces are rinsed as in No. 108, take for each piece of seven handkerchiefs, two pounds, or more, of the best crop or French madder, and half a pound, or more, of sumach, with two pounds of bran. Put two gallons of boiling water on them. Stir well for ten or fifteen minutes; add this to five gallons of cold water in the copper for every piece. Stir up well; then enter the piece, and winch quickly. Get the red up, by giving time, to a heat of  $120^{\circ}$ , or more; then bran twice. Wash, and dry up.

## No. 111.

*For Raising or Dyeing the Yellow Grounds and White Discharge.*

When the pieces are prepared in the mordant as for red No. 103, and printed in the discharge No. 101; then run through the vat and rolling frame, and in the square vessel, as described;\* then well wash and raise with one pound of quercitron bark, a quarter of a pound of sumach, and one pound of bran, or a quarter of a pound of white soap instead of the sumach and bran, and five gallons of cold water for each piece, and bring the copper on to  $110^{\circ}$ . Then enter into bran liquor first; then winch in water; then bran slightly. Wash, and dry up.

\* See Plate, No. 136.



## No. 112.

*For Raising or Dyeing Orange Grounds and White Discharge.*

When the pieces are prepared in the mordant, as for red No. 103; then print the discharge No. 101; then rinse through the vat and rolling frame, and in the square vessel, as described in plate 136; then wash well for raising. Take, for each piece, one pound of quercitron bark, half a pound of sumach, half a pound or more of crop madder, and two pounds of bran. Put two gallons of boiling water on them; then stir for ten or fifteen minutes; then add five gallons cold water for each piece. Stir well; then enter the pieces into the copper, and winch quickly, bring the colour up, according to shade wanted, by giving time, at a heat of  $110^{\circ}$ , or more; then bran twice, if requisite. Wash, wring, and dry up.

## No. 113.

*For Raising or Dyeing Chocolate, Brown, or Olive Grounds, and White Discharge.*

When the pieces are prepared as No. 106; then printed in the discharge as No. 101; then rinsed as directed in No. 108, and washed; then take for each piece of seven handkerchiefs, one pound or more of crop madder, one pound of sumach, two pounds of bran, half a pound of ground peachwood or logwood, according to shade. Put two gallons of boiling water on them; then stir ten or fifteen minutes; then add

five gallons of cold water. Enter the pieces in the copper, and winch quickly. Bring the colour up by giving time, at a heat of  $160^{\circ}$ , or more; then bran twice, if requisite; wring, and dry up.

No. 114.

*For Brown Grounds.*

Take for each piece of seven handkerchiefs, prepared as No. 106, and rinsed as No. 108, one pound of quercitron bark, half a pound of sumach, half a pound of crop madder, two pounds of bran, or more—of bark, sumach, madder, and bran, according to shade. Then pour two gallons of boiling water on them. Stir for ten or fifteen minutes; then add five gallons of cold water for each piece. Enter the pieces in the copper, and winch quickly. Give time for the colours to come up at a heat of  $110^{\circ}$ , or more; then bran twice if requisite. Wash, and dry up.

No. 115.

*For Olive Grounds.*

Take for each piece, prepared as No. 106, and rinsed as No. 108, one pound of sumach, two pounds of bran, two gallons of boiling water; then add five gallons of cold water for each piece. Enter the pieces in the copper. Winch quickly, and bring the colour up, by giving time, at a heat of  $110^{\circ}$ , or more; then bran, wash, and dry up. For some shade of olives, add bark or green ebony to the sumach.

## No. 116.

*For Raising or Dyeing Drab and Slate Grounds, and White Discharge.*

When the pieces are prepared as No. 107; then printed in the discharge as No. 101; then rinsed as directed in No. 108, and washed; then take for each piece, for drab, one pound of quercitron bark, more or less, one pound of sumach, more or less, two pounds of bran. Pour two gallons of boiling water on them. Stir for ten or fifteen minutes; then add five gallons of cold water; then enter the pieces in the copper, and winch quickly. Bring the shade of colour up, by giving time, at a heat of  $100^{\circ}$ , or more; then bran, wash, and dry up.

## No. 117.

*For Slate Grounds.*

Take for each piece, as prepared No. 107, and rinsed as No. 108, one pound, or less, of sumach, and half a pound of ground galls. The galls are boiled in one gallon of water. Then put to the sumach one gallon of boiling water; add them to five gallons of cold water, and then enter the pieces in the copper; winch quickly, and bring the colour up, by giving time, at a heat of  $110^{\circ}$ , or more; then winch in water. Bran, and dry up.

N.B. When the pieces are prepared as directed in the different mordants in Part IX. but not printed, then proceed to prepare them for raising or dyeing, according to the different sorts and shades. This will produce a variety of permanent colours on piece goods.

## PART X.

## No. 118.

*The Method of producing Fast Chintz Colours on Silk, as Black, two Reds, Purple, Blue, Green, Yellow, and Drab.*

When the pieces are ungummed, as described in the first part, then print mordant No. 1 for black, thickened with starch, and mordant No. 2 for brown red, thickened with gum and pipe-clay. For pale red, take mordant No. 2, reduced by adding, to one part of the mordant, eight or twelve parts of gum liquor, more or less, according to shade. Then, for purple, to one part of No. 1 mordant, add sixteen or twenty-four parts of gum liquor, more or less, according to shade. When those colours are printed three or four days, then rinse as No. 34, but use four pounds, or more, of bran to a piece, and half a pound of sumach. When the pieces are well washed, then proceed to dye as follows:—Take one pound of black-grained cochineal, in fine powder, to each piece, more or less, according to the work, and four ounces of ground Brasil wood, more or less. Enter the pieces in the copper with five

gallons of cold water to each, and bring to a boil in two hours. Winch up, and put the pieces in bran liquor, first winching well in this, at a heat of 150°. Then wash, and bran white. Wring, and dry up for pencilling-in the blue.

### No. 119.

#### *Making the Pencil Blue.*

Take half a pound, or more, of the best Flora indigo in very fine powder, half a pound of ground red arsenic, or orange orpiment, one pound of slacked stone lime, sifted very fine, one pound of pearl ashes, and three pounds of brown sugar. Then add one gallon of boiling water. Stir up all well, at times, for two or three hours; then add three pounds of gum Senegal or Arabic, this should be bruised well; then stir up, and put the vessel in a water bath, and give a gentle heat till the gum is dissolved; then let the colour settle for use. If the colour be too strong, take gum water, and add some very fine sifted lime to it; then add the above blue colour according to shade; the lime is sifted through a silk sieve. When the pieces are pencilled in blue and dry, then winch or edge in water; running water is best; then dry up for printing.

### No. 120.

#### *To make Mordants for Yellow and Drab, and the Dyeing of these colours.*

The mordant for yellow is No. 2 or No. 5, thickened with gum. The drab is No. 1, mordant, reduced by adding to it thirty, forty, or fifty measures of gum

liquor. When the drab and yellow are printed forty-eight hours, then rinse as No. 34.; then raise as follows:—Take a quarter of a pound of sumach, one pound of quercitron bark for each piece, more or less, according to the work. Put two gallons of boiling water on them; then put them in a copper of cold water. Enter the pieces, and give them time to raise the drab and yellow at a heat of 100°; then winch them up, and put the pieces first in bran liquor; or raise as No. 46; then winch in water, and, if requisite, bran slightly. Wring, and dry up. Black, red, and purple can be raised with madder. The colours are then more permanent than the cochineal, but not so bright, nor the grounds so clear.

#### No. 121.

##### *Madder Chintz-work.*

When the pieces are printed as directed in No. 118, then rinse as No. 34, and raise as No. 35, or No. 122.

#### No. 122.

##### *For Raising Madder Chintz-work.*

Take, for each piece, one pound and a half of the best crop madder, or French ditto, half a pound of sumach, two pounds of bran, more or less of these according to the work, then add two gallons of boiling water. Stir for ten or fifteen minutes. Then add this to five gallons of cold water for each piece. Enter the pieces in the copper, and bring the colour up by giving time; it is best to get the colours up with as little heat as possible, so that the ground of the

work may bran white. If the pieces are for buff grounds, use more sumach, and bring the copper on to a boil; then winch in water, and bran well. Wring, and dry up. Then pencil in the blue No. 119. When dry, winch in water; then wring and dry up for printing in the drab and yellow; then proceed, as before directed in No. 120. Wash, and dry up.

### No. 123.

#### *Observations.*

The best silk for the preceding work is China white gum silk. This gives the purest white when ungummed, and the colours are most brilliant on it. I consider, when the gum is well boiled off, and the soap well washed off, that if the silk were left to steep for two or three hours in *sours*, made by taking one part of sulphuric acid, and thirty-five parts of water, well mixed, then well winched in hot water to get out the *sours*, it would be of service in getting good whites, when the pieces are printed in chintz colours, and dyed in madder, &c. &c.

## PART XI.

## No. 124.

*Description of the Padding Machine, Steam Box, &c.  
and Method of Padding the Spirit Orange.*

When the pieces are dyed blue, or taken in a white state, then print the wax, No. 53, 55, or 56; they are then ready to be padded.

The padding machine is made five feet long, and four feet six inches high. The bottom roller is eight inches diameter, and thirty-eight inches long in the bowl. The bearings are turned down from the solid wood, and are two inches diameter, and four inches in the bearing.\* The middle roller is six inches diameter, and thirty-nine inches long. The bearings, turned down from the solid wood, are two inches in diameter, and three in the bearing at one end, and six inches at the other, to allow room for a wheel or handle for turning the machine. The top roller is six inches in diameter, and thirty-nine inches long. The bearings are turned down out of the solid wood, and are two inches in diameter, and three inches in bearing.

\* See Note, No. 8.



The bottom roller works in *lignum vitæ* bearings, and is lifted up by wedges to set it against the middle roller; the middle roller is placed in the centre, so as not to work up or down. The bearings are made of *lignum vitæ*. The top roller is six inches in diameter, and thirty-nine inches long. The bearings are turned down out of the solid wood, and are two inches in diameter, and three in bearing. This is set to the middle roller by levers. The bottom roller works in a colour box, and is clothed with white calico or stuff. The middle roller is clothed in the same. The quantity of colour on the rollers is regulated by the wedge under the bearings of the bottom roller. The top roller is not clothed; this is pressed down on the middle roller, to make the piece take the colour, as it goes between the top and middle roller. The piece is rolled on a shell, and this is put on a shaft, that fits across the front of the machine. The spirit orange is put in the colour box. Then the machine is turned till the rollers are furnished with colour. Then enter the piece between the middle and top rollers, and turn the middle roller, so as to pad the piece with the colour off the middle roller, on the printed side of the piece. The piece is received on a roller at the other side of the machine, and is rolled in flannel sufficiently wide and long to cover the piece, and go over the steam box for printing the spirit orange. If the piece be seven yards long, the blanket ought to be ten yards long, or more. The ends of the pieces are fastened to the blanket so as to keep the piece fast to it, as it goes over the steam. When the piece is steamed, winch in lime water till the orange is up; then wash, &c. &c.

## No. 125.

*Dimensions and Description of the Padding Machine  
for Padding the Spirit Orange on White Silk, &c.**End View.*

- From A to B .... sixty inches long.  
 C to D .... fifty-four inches high.  
 E .... two levers, two feet six inches long,  
                     two inches wide.  
 F .... rail to keep the pieces even.  
 G .... top roller, thirty-nine inches long,  
                     six inches diameter.  
 H .... middle roller,           do.    do.  
 I .... bottom roller, thirty-eight inches  
                     long, eight inches diameter.  
 K .... sides eight inches wide, three inches  
                     thick.  
 L .... colour box, forty inches long, eight  
                     inches wide at top, five inches  
                     wide at bottom.  
 M & N .... rollers for the piece.  
 O .... braces three inches by three inches.  
 P .... fly wheel, three feet six inches  
                     diameter.  
 Q .... star wheel, one foot diameter.  
 R .... pinion wheel for ditto.  
 S S .... six inches square.

*Front View.*

From A to B	....	forty-nine inches wide,
C to D	....	fifty-four inches high,
E	....	wood spindle, two inches diameter, four inches long.
F	....	iron bar, one inch diameter.
G	....	top roller, thirty-nine inches long, six inches diameter.
H	....	middle roller, do. do.
I	....	bottom roller, thirty-eight inches long, and eight inches diameter.
K	....	colour box, forty inches long, eight inches wide, three inches deep, five inches wide at bottom.
L	....	rail for supporting the colour box.
M	....	roller for the piece.
N	....	bottom rail.
O	....	star wheel, one foot diameter.
P	....	pinion wheel for do.
Q	....	fly wheel, three feet six inches dia- meter.
R	....	handle for the fly wheel.
S S	....	six inches square.

No. 126.

*Dimensions of Steam Box.**End View.*

From A to B	....	fifty-four inches wide.
C to D	....	forty-two inches high.

- E** . . . . eighteen inches wide at bottom,  
fifteen inches in the sides, four  
inches at top, and forty inches  
long.
- F** . . . . steam cock for condensed water.
- G & H** . . . . rollers for the piece.
- I & K** . . . . small rollers to confine the piece  
to the top of the box.
- L** . . . . top rail.
- M** . . . . two pieces of hard wood screwed  
on so as to leave an opening of  
one-sixteenth of an inch be-  
tween, to let out the steam.
- N** . . . . middle rail.
- O** . . . . steam pipe.
- P** . . . . steam cock.

*Front View.*

- From A to B** . . . . forty-six inches.
- C to D** . . . . forty-two inches.
- E** . . . . steam box.
- F** . . . . steam cock for condensed water.
- G** . . . . roller for the piece.
- O** . . . . steam pipe to enter the centre of  
the box.
- Q** . . . . handle of rollers.
- R** . . . . steam pipe which fits on top of  
steam pipe O, in which is fixed  
a number of holes to let the  
steam out, so as to strike the  
sides of the box.

## PART XII.

## No. 127.

*Dimensions and Description of Long Table for Printing Silk on, and Improvement on it. The Way to make the Common Table answer for Printing Silk.*

The long table is twenty-two feet long, forty inches wide, and four inches thick. It is made of American pine, in two pieces bolted together in several places. At each end there is a roller, four inches diameter, the breadth of the table, with a ratchet wheel and catch. In the rollers are a groove and rods to fit in, to fasten the piece of handkerchief to, and to stretch the piece on the table. First hook a fine blanket on the table; then put a calico cover over it; then put the piece on for printing, and stretch it with the rollers.

## No. 128.

*Teering Stage and Colour Box.*

The teering stage is made to move on castors, so that when the printer begins to print on the silk, at the left hand corner of the table, the teerer moves the stage down by the side of the long table. The printer should then print the offside of the piece; then begin to ground the other colours in the same manner; then move the piece over the rollers, and separate it from

the calico cover. When the piece is dry, send it to the stove room to be hung up for eight or twelve hours. Then send it to be hooked or hung up in a cold place for twenty-four or thirty-six hours. It is then ready for rinsing and raising. The improvement is, to have a rod of wood at each shier, to keep the handkerchief fast down on the table in its place; for when the piece is printed on one side, it slackens, therefore it is best to fasten the shiers down as here directed; and furthermore, not to allow the piece to dry on the calico cover, but to separate them as soon as possible. The teering boxes are made twenty-four inches square, and six inches deep. The case is made of alum leather, then a fine thick cloth for a sieve cloth, on which the colour is teered or distributed.

#### No. 129.

##### *To make the Common Table answer for Printing Silk.*

The table is to be six feet four inches long, forty inches wide, and at one end a roller, the same as in the long table, No. 107. At the other end of the table there is a staple at the offside, and at the near side a catch, which are to fasten down a rod between the shiers of the handkerchiefs. Then hook on the blanket, and have a piece of calico to come over the roll at the end of the table, and fasten it, together with the piece of silk to be printed, at the head of the table on the roller. Then there are two handkerchiefs of the piece on the table at one time. When these are printed, move them and separate the calico. Then print the next two handkerchiefs, and proceed in this manner till the piece is printed.—See Plate 129.

## PART XIII.

## No. 130.

*The new method of Dressing Silk by Steam; Making the Size for Dressing, &c.*

The size used for dressing bandana silk handkerchiefs, or piece goods, is made by dissolving one pound of glue in each gallon of boiling water. When cold, take one part of this, more or less according to the stiffness required, and three parts of warm water, so as to dissolve the size as when first made. Put this mixture into a clean box, under the padding machine, No. 125, with clean rollers. Then pad the handkerchiefs, as directed in No. 124. When padded, then dry on a drying machine, made with six copper drums, more or less, about sixteen inches diameter. These machines are used by the calico printers, and are made at Manchester at various prices. If the handkerchiefs be not stiff enough, run them again through the size and padding machine; then the drying machine, &c.

N.B. For pale colours, the size is made from the clippings of white kid-skins, or bleached alum leather, or parings of parchment. This method will be found the best way of dressing, as the acid from the charcoal, as now used, and the fire heat in the cylinder, are prevented from injuring the most delicate colours.

## PART XIV.

## CHINA BLUES ON SILK.

## No. 131.

*Dark Blue.*

Take three pounds of best indigo, and six ounces red arsenic, in fine powder, and three pounds sulphate of iron. Grind them in an indigo mill, adding three quarts of common iron liquor by degrees. Thicken half a gallon of common iron liquor with one pound of starch, or nearly three pounds of gum; then add two parts of the three, of ground indigo. Stir well, and brush through a wire sieve, for use.

## No. 132.

*Pale Blue.*

Take half a gallon of gum liquor, to which add as much sulphate of iron as it will dissolve; then add a part of the ground indigo, according to the shade required.



## No. 133.

*Dipping China Blues.*

When the pieces are printed in No. 131 and No. 132, for twenty-four hours, they are dipped in two vats set with lime and sulphate of iron. The vats are made six feet long, four feet wide, and six feet deep, and nearly filled with water. Then add two bushel baskets of fresh-slacked stone lime to one of the vats. Stir it up well. This vat is called the lime vat. Then add five hundred pounds of sulphate of iron to the other vat. When this is dissolved, the vat is fit for use. This is called the copperas vat.

When the pieces are hooked in a frame made as No. 85; then stir the lime vat, and dip the frame and pieces into the vat, then screw up; stir the frame gently for five minutes, and at all times, in this vat; then dip in the copperas vat for five minutes, but not to stir the frame in it; then in lime for five minutes, thus:

Lime five minutes,	Lime ten minutes,
Copperas five minutes.	Copperas fifteen minutes.
Lime five minutes,	Lime fifteen minutes,
Copperas five minutes.	Copperas fifteen minutes.
Lime ten minutes,	Lime twenty minutes,
Copperas ten minutes.	Copperas twenty minutes.

Then unhook the pieces out of the frame, and winch in water quickly; then put them in sours, and winch; then see that the buff of the copperas is off; then wash well in water. Wring, and dry up.

N.B. If the lime vat is warmed by steam, it shortens the time of dipping.

## PART XV.

No. 134.

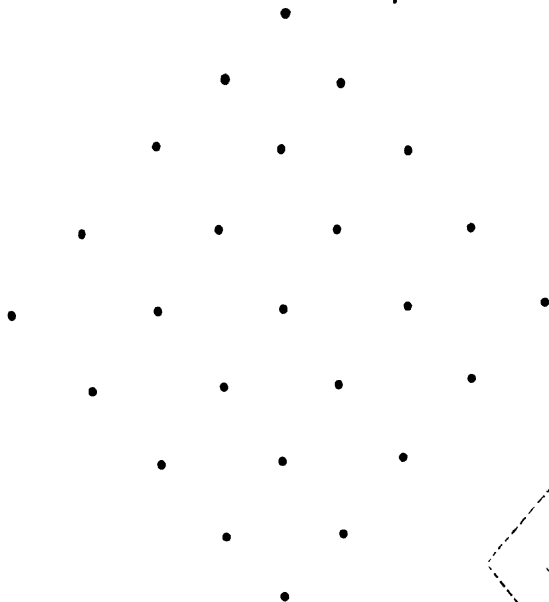
*General Observations.*

The broad piece silk goods, are, in general, manufactured with hard warp and soft shute.

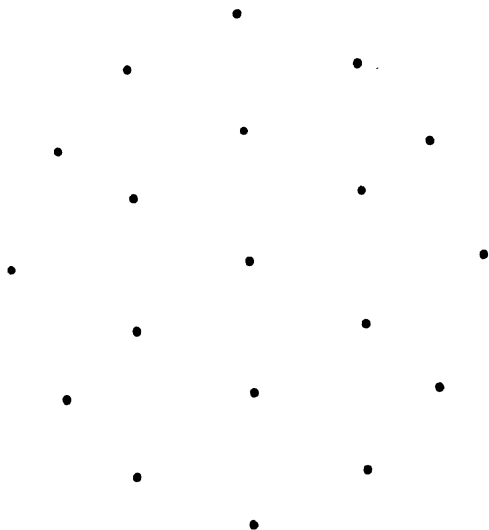
In the boiling off gum from the shute, it is requisite to have good water to wash off the soap from it, for that will enable the printer to get good colours, and clear grounds. The goods may be, apparently, well manufactured, yet, for want of attention to this particular operation of washing, and using good water, both the printer and manufacturer will be disappointed.

N.B. The Author has nearly completed another treatise on Woollen Printing, and what is termed Mixed Goods, viz. Wool and Silk—Wool and Cotton—Wool, Silk, and Cotton, &c.

*Square Print, No. 95.—See p. 62.*



*Round Print, No. 96.—See p. 62.*



**NOTES,**

*EXPLANATORY OF THE TECHNICAL TERMS*

USED IN THIS WORK.

EDGING.

Note 1.

EDGING is done by a man or boy in the following manner, viz. Take, at the end of the piece, one edge in the right hand, and raise it so high as to bring the hand and piece about one yard out of the liquor, moving the left hand down the edge of the piece; then lift the hand and piece as high as the right hand; then dip the piece down into the liquor with both hands; then raise them out of the liquor about a yard high; then dip the piece in the liquor, and move the right hand to where the left was on the edge of the piece; then shift the left hand farther, and proceed onward on the same edge, as directed above, till you come to the end of the piece; then take the other edge of the piece, and proceed in the same manner, taking the opposite edge each time, and moving the piece in this manner for the time directed. The dyers in general run the edges of the piece through their hands, and, when come to the end, put the pieces under the liquor in the vessel they are working in.

## WINCHING OR REELING.

## Note 2.

WINCHING OR REELING is done by a man or boy. The winch or reel is made the breadth of the copper or vessel, and the spindles of the winch are placed about a foot and four inches above the edge of the copper or vessel. It is made with a shaft about three inches square, and as long as the vessel it is put over. In the shaft are bored four holes, through which are put four arms about a foot long, and one inch and a quarter thick. On these are fixed four bars, two inches wide, and one inch thick, and the same length as the shaft. The winch for the copper, in general, is made with six bars.—See Plate 136.

## WASH WHEEL.

## Note 3, and Plate 136.

The WASH WHEEL for silk is made five feet six inches in diameter, and eighteen inches across the sole, with two iron hoops round it. The shaft is octagonal, one foot in diameter, and two feet six inches long. The spindle, or gudgeon, is passed through the shaft and arms, two inches square, and two feet long; the arms are mortised through the shaft, and grooved on three sides, in which are placed the four divisions of the wheel, and the four quarters of ditto. In the front quarters are put the oval holes, ten inches by thirteen ditto: this is to put in and take out the pieces from the wheel. In the back four quarters is cut a circular passage, one inch and a half wide, about the middle of the quarters; and through this the water is injected on the pieces in the wheel, which must revolve eighteen times in a minute. The power is imparted by any means most convenient, so that the swiftness mentioned is maintained. The water is supplied from a cistern, or forcing-pump; the time of washing is five, ten, or fifteen minutes, according to the work. In the sole of the wheel is bored a number of inch-holes, to let off the foul water.

## MADDER COPPER.

## Note 4.

The MADDER COPPER should be set with two dampers. When a small quantity of water and drugs are in it, the fire then must act only under the bottom of it; but when the copper is full of water, then the fire should act under the bottom and round the sides of the copper. This can be managed by a double flue.—See Plate 136.

## WOULD DYEING.

## Note 5.

When the pieces are taken out of the first Would liquor, and winched in water, then take, to every seven gallons of water, one ounce, or more, of sulphate of copper, dissolved in warm water. Edge the pieces in this ten or fifteen minutes; then in water; then proceed as before directed.

## WAX WORK.

## Note 6.

Put three pounds of sulphate of zinc, the same as prepared for calico printing, into one gallon of warm water; when dissolved, add, by degrees, a solution of pearl ashes and water, until the sulphuric acid is neutralized, and the zinc precipitated; put all on a calico or stuff sieve: when the liquor is off, stir the precipitate up, and pour one gallon of boiling water on it; when the water is through the sieve, gather the precipitate, and dry it for use.

When the turpentine, lard, and verdigris, are ground and well mixed, which will be done best while they are hot, then take and grind some of the zinc precipitate with cocoa-nut or palm oil: these are to give the wax a body, and to make it work well. This is added to both the preparations of lard and turpentine, in No. 53.

## TEERING.

## Note 7.

TEERING is a term given to the action of distributing the mordant on the cloth sieve, before the printer dips the print in it, to get the mordant on the face of the print, before he applies the print to the silk. It is, in general, done by boys, with a brush called a *Teering Brush*, and is done every time before the printer dips the print in the sieve. The teering tub is, in general, thirty inches in diameter, and eight inches deep, and wider at the bottom than the top. This is filled with thick gurn liquor, and then an oil-cloth case, or alum leather, is put on the liquor. The case is made of oiled woollen stuff, or alum leather. It is then nailed on a hoop, two inches wide, which hoop fits in the *Teering Tub*, within half an inch all round. Then, in this case, is put a fine cloth sieve, and this is *teered* over with the mordant, as directed above.—See Plate No. 137.

## PADDING MACHINE.

## Note 8.

The PADDING MACHINE for work different to the spirit orange, is made of wood rollers with iron spindles through them; the bearings are made of brass. If convenient, the middle roller to be made of copper, as this will keep the others in a more perfect state for working.

N<sup>o</sup> 76. Left max. jaw.



2725

10 inches long

1.9 inches square

12 inch  
Iron Plate  
to put the  
Wax print on

117 inches

11. 11. 11.

18 Inches square  
and 2 Inches deep

2.5 inches

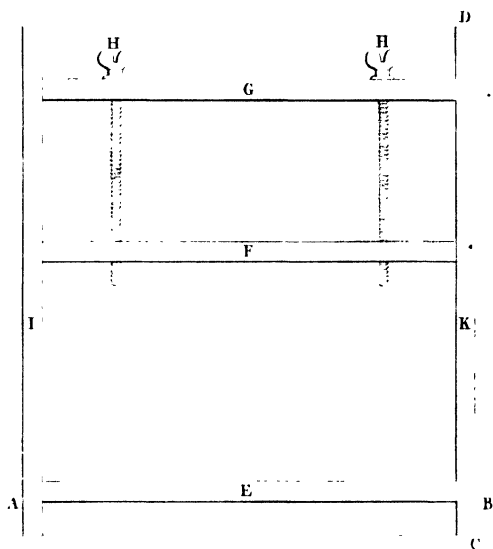
1755

The old was born

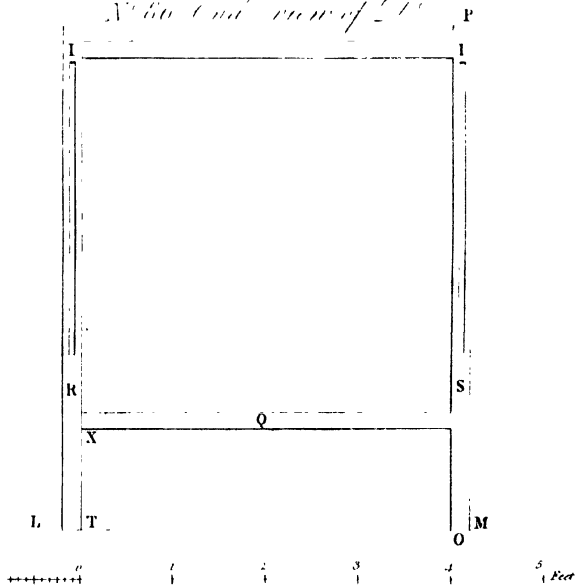




# *No. 85 Side view of Common Dipping Frame*

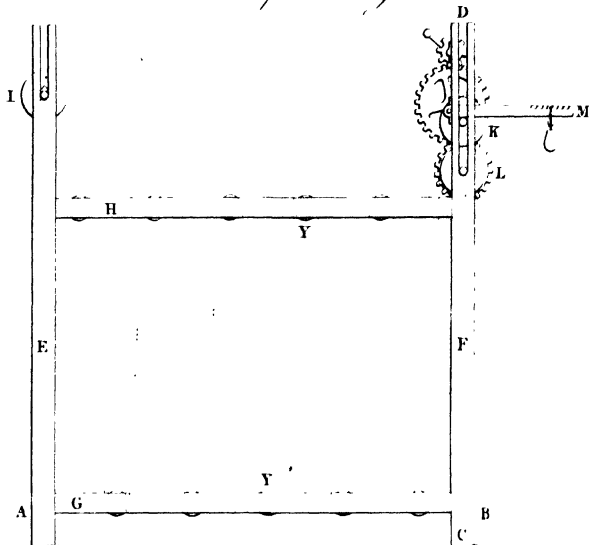


## *No. 86 End view of " "*

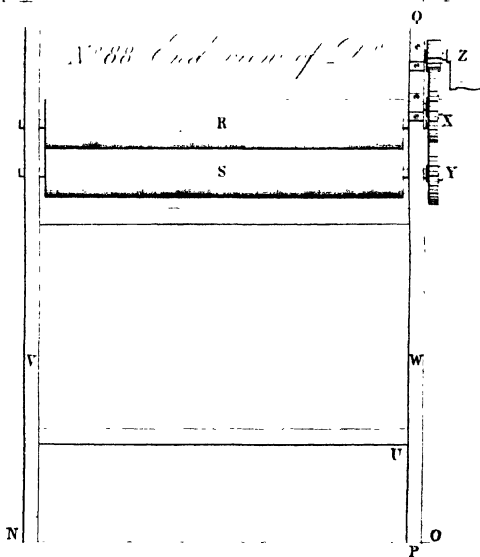




*N<sup>o</sup> 87. Side view of Rolling Frame.*



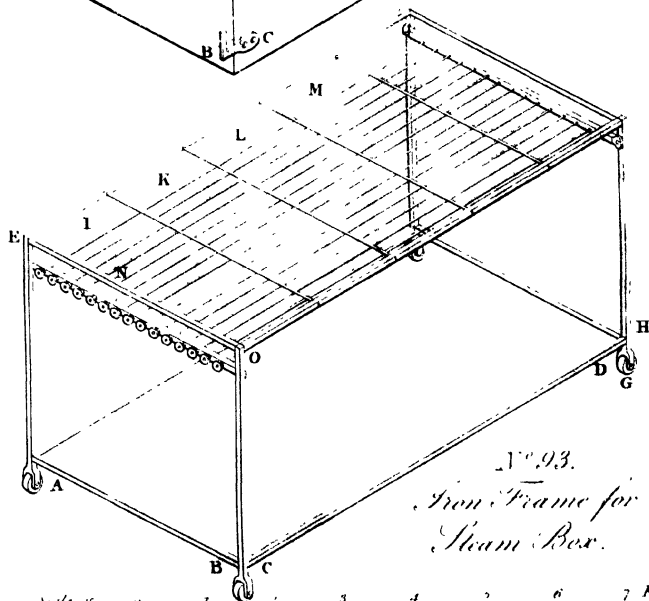
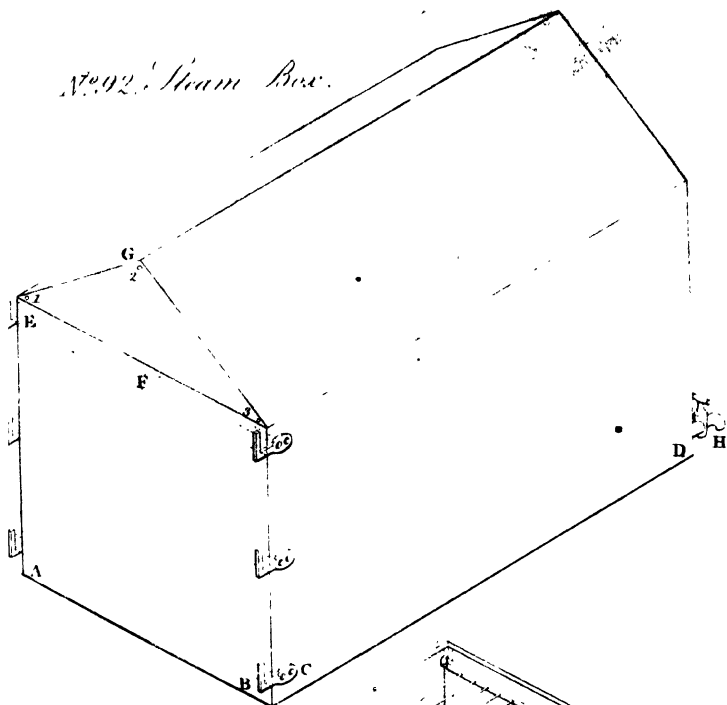
*N<sup>o</sup> 88 End view of " "*



Scale of 0 1 2 3 4 5 Feet



*N<sup>o</sup> 92. Steam Box.*

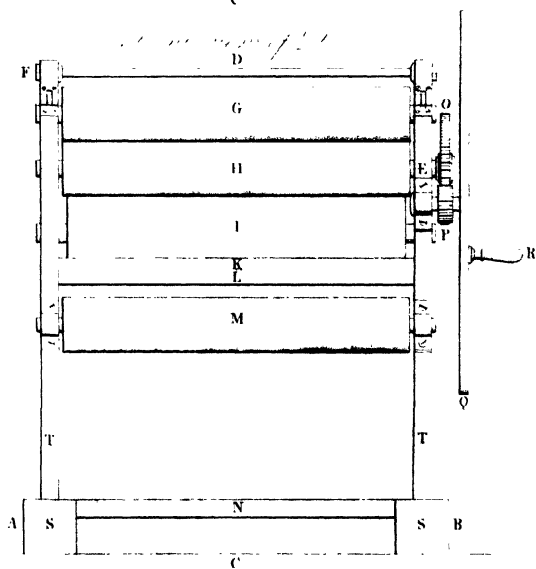
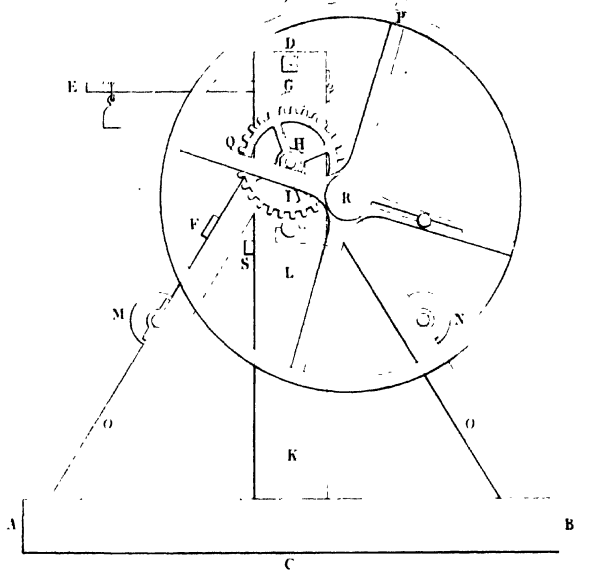


*N<sup>o</sup> 93.  
Iron Frame for  
Steam Box.*

Scale of Feet  
1 2 3 4 5 6 7



No 125  
*End view of Puddling Machine*



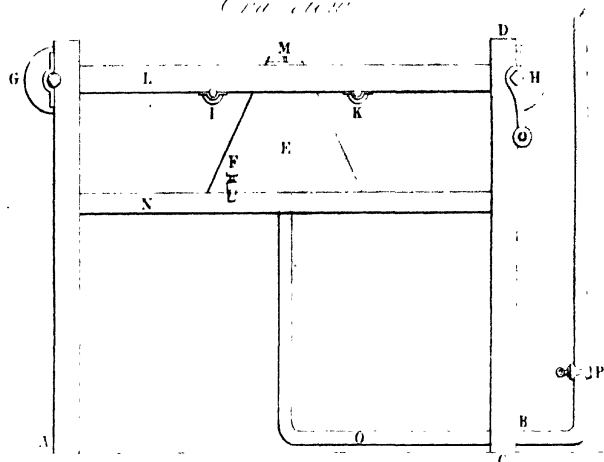
Scale of Feet



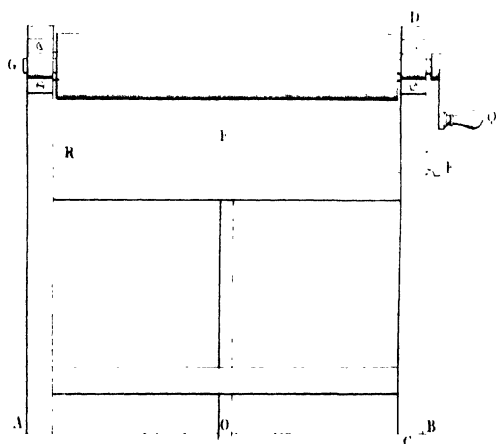


# No 126 Steam Box

End view



Side view



Scale of Feet

1 2 3 4 5 6 7 8 9 10



