Machinery and Appliances.

THE UNIVERSAL WARP BALLING MACHINE.

Mr. J. H. Scott, Rochdale.

Warping is the second in the series of processes constituting what is technically termed "manufacturing." It is a very simple process, having merely for its object the arrangement of the threads intended to compose the warp in parallel order. The Hidlow weaver, who makes his own warp, even to this day sticks a few pegs into the ground, and with one or more threads in his hand walks round these, passing the threads upon them, and crossing them at certain points in order to get a "leash." Of course his warps are very short ones. The English handloom weaver of the last century had a similar plan. He put his pegs into a wall to save stooping down to them, and, walking backwards and forwards, accomplished the same result as his Eastern competitor. Both these systems are called peg warping. To save the tedious tramping this involved the old red mill was invented. This consisted of a large red arranged with its axis vertical. On the bottom of this axis was a small pulley connected to a driving pulley of larger dimensions by a band. A crank handle turned by the warper constituted the driving arrangement. The warp was traversed so as to cover the periphery of this, the "leash" being taken at the top or bottom, according to requirement or arrangement. When completed the warp was balled off the reel by the warper, a process rapidly diminished in both numbers and importance, having been retained only in a few places where the old methods maintained their hold, or where it began to be found that in using dried warps in one colour they could be economically dyed in the ball form. Even these are rapidly disappearing before the progress of invention. In a short time the ball warper will be as extinct as the Anathabasian idol. It seems as if an edict of nature had gone forth that the manual labourer should everywhere give place to the mechanical one, and in compliance with this decree the ball warper is everywhere disappearing.

Mr. J. H. Scott, of Rochdale, the well-known maker of warping machines, has just introduced into the market a patent warp balling machine, which bids fair to soon become a great favourite in the departments for which it has been specially designed. The accompanying illustration gives a good idea of its general appearance. It has a curved creel and reed, in this respect differing from ordinary warping machines. The balling arrangement consists of a strong frame carrying the working parts. These are composed of a steel flyer, carried by a series of four grooved rollers. Connected to this flyer is a small roller, in which is cut a deep flat groove. This constitutes a guide for the warp, as it passes to the balling mechanism. The latter consists of a spindle suitably arranged, and carrying the balling mandril, which is actuated by a specially constructed cam, this giving it the suitable oscillating motion required for balling the warp. It has an automatic differential tension apparatus; a measuring and marking arrangement; and an indicator by which at any moment it can be ascertained how many pieces have passed upon the ball. The differential tension apparatus with its connections, is a beautiful piece of mechanism, admirably accomplishing its purpose—that of providing for the difference resulting from the increasing circumference of the ball as the winding proceeds.

The process briefly described is as follows:—The warp is taken from the bobbins in the creel, passes through the hooks and converges upon the measuring rollers, one of which is necessarily positively driven. The piece-marking apparatus is placed in front of these and marks any length required. The yarn next passes upon the tension arrangement and then to a circular flyer, which balls it upon the spindle. From this, when completed, it is dosed and is then ready for sizing or dyeing.

The new machine possesses many advantages...
compared with the ordinary process. It soon permeates the entire space; it balls the warp at an even tension, and without strain upon any portion of it. It affords facilities for making very large balls, or a succession of small balls, whereby for some weft this warp is largely discarded. Its production is great, as it will ball the warp at the rate of from 120 to 140 yards per minute, and it needs no skilled or costly labour to attend it, young girls being quite competent to do all that is required.

The maker will be pleased to supply any further information on application.

**Bleaching, Dyeing, Printing, etc.**

**Benzophene Colouring Matters.**

Benzophene, or as chemists sometimes call it, Di-phenyl ketone, which has the formula, C_7H_5(COCH_3)_2, is a compound belonging to a class of bodies called ketones. These bodies are specially characterized by the fact that they contain a carbonyl group C=O, which is fixed among themselves in combination with two other groups of elements, and when one of these consists of C_2H_5, phenyl the ketones are called benzophenones, and when the other is not of themselves colouring matters; benzophene is a colourless prismatic substance, insoluble in water, but its homologue acetophenone forms colourless plates, also insoluble in water; but it has recently been discovered by a large German firm of color makers that the colour phenones prepared or derived from these phenones resemble them in not being colouring matters, capable, under certain conditions, of producing colour on dyeing or printing, and they have found that if certain of these ketones, which are known to be capable of producing colour, it has recently been observed that only three of these known ketones—galloctophenone, benzyropatechin, and anhydropryagalcol ketone—are colour producers. Those of them that have this property contain at least two hydroxyl groups in combination with a strong carbonic residue, and it has been observed that much, if not all, of the colouring power of these ketone bodies depends on these two groups in juxtaposition on one another. Among the new and old ketones which have this valuable property mention may be made of a few.

Galloctophenone, or, as it is better named, triphenylaceton, has the formula C_7H_5(COCH_3)_2. This body has been known for some time, but its colouring properties were unsuspected until lately. It belongs to the same class of colouring matter as azoanilines, those that have no colour of themselves but in combination with metallic bases form colour-compounds, thus with alizarin, yellow compounds are formed; with chrome, brown colours; and with iron black colours are obtained. The methods of applying these to fabric is the same for azoanilines, the new colour being mordanted on wool or other fibre with the required mordant and then dyed in a fresh bath with the galloctophenone until the desired shade is produced.

The shade thus produced can be varied very much by using different proportions of the metal and dyestuff, and they are very fast and useful. They may be employed in printing, and the following colours will serve as examples.

1. Yellow,
   - 2½ lb. galloctophenone paste,
   - ½ lb. sulpho-anhydride of alumina, 30° T.W.
   - 4 lb. of any suitable thickening.

2. White,
   - 1 lb. galloctophenone,
   - 1 lb. sulpho-anhydride of chrome, 40° T.W.
   - 2 lb. of any suitable thickening.

3. Black,
   - 2 lb. galloctophenone,
   - 2 lb. sulpho-anhydride of alumina, 30° T.W.
   - 3 lb. of any suitable thickening.

4. Green,
   - 1 lb. galloctophenone,
   - 1 lb. sulpho-anhydride of chrome, 40° T.W.
   - 2 lb. of any suitable thickening.

The goods are printed, steamed, soaped and dried.

Another of these oxoesters is trixylophenone, obtained by heating pyrogallol with benzonic acid. This body has the formula C_9H_7(COCH_3)_2, and it is finely divided powder, or it may be used in cold water, but is easily soluble in alcohol, ether, acetone, and glacial acetic acid. It dissolves in alkaline solutions, but not in caustic potash or caustic soda, if the solvents are in excess, rapidly absorbs oxygen from the air, forming a green precipitate. It dissolves in strong sulphuric acid, with an intense yellow colour. This body dyes a golden-yellow colour on alumina-mordanted cotton, on chromed fibre it forms brownish yellow shades, while iron mordants produce olive colours. A very bright yellow is produced in printing with a colour composed of the oxoester, acetate of alumina, and tin crystals. These yellow thus obtained are as fast to light, etc., as the alizarine colours, which is a very good deal for them. A trixylophenone can be obtained by fusing pyrogallol with salicylic acid; this body produces rather redder shades of yellow than the last named.

Various other oxoesters have been made, but these are not of such much technical interest as the preceding, and a more state on their long scientific names would not interest our readers.

**RECIPIES FOR DYERS.**

The following are mostly translations from foreign sources. We do not guarantee the results from these recipes, but give them for the purpose of showing our readers what their foreign competitors are doing.

**FAST BROWN ON WOOL.**

For 100 lb. wool. Mordant by boiling for 1 hour in a bath of
- 2 lb. chromate of potash,
- 3 lb. tannic.

Lift, rinse well, and dye in a fresh bath with
- 8 lb. alizarine red,
- 3 lb. /indicator 1° T.W.,
- 3 lb. logwood extract, 51° T.W.

Enter the wool at 100° F., slowly raise to boil, and dye boiling for 1 hour, lift, rinse wool, and dry.

**GREEN ON WOOL, FAST.**

For 100 lb. wool. Mordant for one hour at the boil with
- 2½ lb. bicromate of potash,
- 2½ lb. tannic.

Lift, rinse, and dye in a new bath with
- 6 lb. /indicator 50° T.W.,
- 1 lb. masonic blue,
- 5 lb. mordant for 1 hour, then lift, add a solution of
- 2 lb. alizarine black, 3 lb.
- 1 lb. Indian yellow.

Re-enter goods and boil for 1 hour longer, lift, wash, and dry.

**CHERRY-BROWN ON COTTON FLANNEL.**

For 100 lb. cloth, prepare a dyebath with
- 1 lb. common salt,
- 2 lb. benzonic acid,
- 1 lb. chrysophenine.

Enter the goods at 100° F., raise to boil and dye boiling for 1 hour.

**PURPLE BROWN ON COTTON FLANNEL.**

For 100 lb. flannel, prepare a dyebath with
- 1 lb. common salt,
- 2 lb. benzonic acid,
- 1 lb. aurantiac acid.

Enter the cloth at 150° F., raise to boil and dye boiling for 1 hour, lift, wash, and dry.

**GREEN GREY ON COTTON.**

For 100 lb. cotton, prepare a dyebath with
- 10 lb. Glazer's salt,
- 3 lb. colour black 8° T.W.,
- 1 oz. thiosulphate S.

Enter at from 150° to 160° F., 180° F., raise to boil, and dye for 1 hour. Wash and dry.

**GREEN ON COTTON.**

For 100 lb. cotton, prepare a dyebath with
- 10 lb. Glazer's salt,
- ½ lb. dianine black 9° T.W.,
- ⅛ lb. dianine yellow 7° T.W.

Enter at about 150° F., and then raise to boil, and dye boiling for 1 hour; wash and dry.

**PAPYRUS BLUE AND ACID VIOLET N.**

These colouring matters have been recently prepared by a large German firm of colour manufacturers, and possess many unique features. They are the calcium salts of the sulpho-acids of the oxoesters of colours from the same base as is present in malachite green. Patent blue is prepared in several shades, the ordinary shade being a mixture of the "superfine" and "N" marls which are pure blues, which retain their tint even under artificial light. The "N" mark is +1° "N" mark is +1° Papyrus blue and acid violet are also used in the rendering of those indigo-carmines, which is much superior in use than is the ordinary substitute for indigo-carmines, namely, a mixture of dyestuffs of the kind of indigo-carmines, and is much superior in use than is the ordinary substitute for indigo-carmines.

Alizarine colours are a characteristic and brilliant shade, dye very evenly, fast or nearly so to acids and alkalies, and considerable fastness to light.

Acid violet N has a different chemical composition from the ordinary acid violet, and possesses many qualities similar to patent blue. All those colouring matters dye wool in an acid bath, with or without the addition of Glazer's salt or alum. They will also dye on chromed wool, either in a neutral bath or with a little acetic acid; they can therefore be used alone with alizarine, gambolin, or the dyewoods. The shade will stand a little maling, but it is important to wash off immediately afterwards or there is some risk of the colour bleeding into the whites.

Papyrus blue and acid violet can also be used for dyeing on silk, to which they have some affinity and give fine shades.

This new matter should be made of wood, metal baths having a tendency to interfere with the brilliancy of the shades.

**NEW COMPOUNDS OF TANNIN FOR CALICO PRINTING.**

By heating tannin with glycerine or glucose a compound is formed which is readily soluble in water and dilute acetic acid, and which possesses the property of splitting up on steaming into its two constituents. Thus a property particularly valuable in calico printing, and the compound can be used as an excellent substitute for tanner's lake for tanning leather for printing. Experiments made with them have shown that all colours fixed with tannin can be equally well fixed with the tannin-glycerine or tannin-glucose. Besides being a mordant, the compounds in question are also solvents for tannin lakes, so that colours made with them keep fluid much longer than those made in the ordinary way, and they do not on standing form insoluble tannin lakes, which are useless, and yet on steaming the tannin is liberated in a free form, and fixes the colouring matter upon the cloth.

These new compounds are made in the following manner:—50 kilos of tannin are made into soaps with 30 kilos of glucose until the reaction is complete. The best temperature is 100°C., as higher temperatures are liable to produce a change in the products. The product so formed is a solid body which dissolves in water, forming a syrup. The foregoing glycerine compound is colourless or faint brownish syrup.