

the dust and, through suitable conductors, lead it out of doors. This will make the work around the singeing machine much more pleasant, and also be of benefit to the goods, for the dust cannot be of any advantage to the fabric, and the sooner it is removed the better. After singeing, the pieces are taken to the crabbing machine. The old-style crabbing machines are generally used in pairs, and for continuous work this is necessary. The pieces are run on the lower roll of the first crab, the tank being filled with hot water (125 to 130° F.). The top roll is let down on the goods and a moderate pressure applied, and after the piece or pieces have all been run on they are allowed to rotate in this hot water with pressure, for about twenty minutes. The water must be kept at an even temperature, and should not be allowed to drop below 120° F. at any time. About five per cent. of pearl ash is added to the water before the pieces are run on, and this will help to loosen the sizing, as well as to aid in the washing later on. After they have run twenty minutes the goods are run back, beamed on wooden rolls, and stood on end for from forty to forty-five minutes, during which time the rolls are turned end for end, once or twice, to prevent the sizing from settling on one side. Care should be taken to regulate the work at this point so that the goods do not have to remain on the rolls longer than forty-five minutes, for, being hot, the inside end will be weakened if they are left to stand that way too long. They are then ready for the second crab, and are again wound on the lower roll under fair pressure, but the water in the second tank is kept at the boiling point all the time. After treatment for twenty minutes they are ready for the cooling tank. This tank was omitted on the older style machines; but it has been found that it is beneficial to the goods to have them cooled off as soon as the setting process is completed, and therefore another tank is added containing cold water, through which the goods pass. They are folded off cold and are then ready for the washer. On worsteds nothing but an open or breadth washer should be employed, and this one item alone will tend to make quite a large difference in the looks of the finished fabric. They should never be run in rope shape if it can be possibly avoided, and there is little use in attempting to compete in the market with firms who do employ these machines. Quite an improvement is noted in these machines of late, for they are now built with three instead of two wash rolls, which nearly doubles the washing capacity; then an opening device in the shape of two spiral rolls, is placed in front for the goods to pass over, and this keeps them entirely free from creases and wrinkles. At the washer a thin but fairly strong potash soap is used, and the strength is regulated with pearl ash in preference to soda products. This will impart a soft and silky feel to the goods, which it is impossible to obtain in any other way. By dint of much work the feel of the goods may be brought somewhere near to what may be gained by the use of potash soaps, but never can it be entirely produced by other means. This matter of using potash instead of soda soap in the finishing of any kind of woollens will be found worthy of careful investigation; but on worsteds the use of potash soaps is, beyond any doubt whatever, the best possible plan. After the washing the goods receive a generous bath of Fuller's earth, and they are then ready for the dyehouse. It is held by some that by first washing worsteds thoroughly and then subjecting them to a steaming, better results may be obtained; but, to say the least, the advocates of this plan have never handled a well-finished piece of worsted, for, if they had, they would have speedily altered their opinion. While

the steaming process is beneficial, it can never take the place of the crab with any measure of success.

The process, as outlined so far, has given, and is giving, the very best of satisfaction, and not only that, but it is the manner in which most of the finest goods are treated. As beneficial as the crabbing process is, however, it is being superseded by the new continuous wet-finishing machine. This machine consists of a series of either four or five tanks, into which squeeze rolls similar to the crab rolls are set, and each set of rolls has underneath it an opening device to keep out wrinkles. The rolls are substantially like the crab rolls, and pressure can be applied to them to any desired amount. The five-tank machine is the best for all practical purposes. Each tank is filled with water, which can be kept at the desired temperature, independent of the others. The goods are run into the first tank, passed under the guide roller at the bottom, and then brought up from the back and passed through the set of rolls with a medium pressure. This tank is heated to 125° F., and the piece passes through it slowly and over the top roll, passing on and down into the next tank, and through this in the same manner as the first tank. This tank is also heated to 125° F., and 5 per cent. pearl ash is added to both of them. When leaving the second tank the pieces pass on and into the third tank, and then to the fourth. The water in both of these tanks is kept boiling. It is not enough to keep it at the boiling point, but it has to be boiling well and strong during the time the goods pass through. Then the goods pass either into the fifth tank, filled with cold water for cooling off, and then to the folder, or if the fifth tank is omitted they are at once folded off, and are then ready for the washer. The finish obtained in this manner equals, if it does not surpass, that obtained by the old-style crab, and the saving in labor is very great. To operate a pair of crabbing machines four men are required, while on this machine two boys can do 120 pieces a day easily. If the goods are fancy, care must be taken at all stages so as not to injure the colors, but as such goods as these are generally of the best kind, a moderate amount of care will keep them all right. If, on the other hand, the goods are for piece-dyes, and a high lustre is wanted, a light steaming is now in order, and then they are ready for the dyehouse. Fancies go from here at once to the dryer, and if the last squeeze rolls are set tight enough, they do not need to go to the extractor. At any rate, it is better to pass the goods through a set of the rolls of the wet finishing machine with a very hard pressure, if squeeze rolls are not at hand, and they will then be in good shape for the dryer.

In drying worsteds it is desirable to do it more by ventilation rather than by excessive heat, for the heat, if at all high, will impart a certain harsh feeling to the goods, which it has been the object so far not to have, and therefore care must be taken that at this point the beneficial effect of the previous processes is not destroyed. If the goods come back from the dyehouse they are either run into the washer or, better, into the continuous wet finishing machine. If run into the washer they are rinsed well and then given a bath of Fuller's earth. If run through the wet finishing machine, the first two tanks should have a solution of Fuller's earth, the third one hot water of about 115 to 120° F., and the fourth cold water. The pressure must be set as hard as possible, and the goods dried after running through. After drying they are given one run over the pumicing machine, which is sufficient, as these goods have been treated in a manner which makes the work here much easier. The singeing leaves the goods clean enough not to need pumicing or polishing, for the threads will be round clear and round; and for the