

ship, or, if it is desired to add to their appearance, place them in neat cardboard boxes holding one dozen each.

Such is a rough outline of a ladies' ribbed mitten and how it is made, as given by "Rib Rotary" in the *American Wool and Cotton Reporter*. Of course it can be varied in many ways, as the knitter will at once perceive. If it is desired to make a superior class of mittens he can do so by putting in silk welts and stripes in the wrist portion, or, if his frame is suited to the purpose, he can put in a more fancy rib than the royal. He can then indicate the various sizes by the number of stripes, decreasing one stripe each size. Where an assortment is desired, it is usual to make three or four sizes of infants', small misses', misses', small ladies' and ladies'. The infants' sizes can be made about 60 needles wide, the misses' sizes on 72, and the ladies' sizes on 80. In varying the length, take care that the proper proportions of plain and royal are retained. The silk ribbed mittens are generally hand seamed, and the dozens tied up with silk ribbons. It is a question whether it would not also pay to tie up the wool mittens with ribbon, as appearances go so far nowadays. The foreign manufacturer finds it pays to finish off the goods in an elegant manner, and why should not the domestic one?

### SHODDY.

Shoddy formerly meant only the waste arising from wool during the manufacturing process. To day, however, it has a much wider significance, and the term shoddy is applied to an almost unlimited range of fibrous substances obtained from all sorts of textile materials. Woolen rags of all descriptions, no matter how old or worn, are now a valuable commodity to the manufacturer. Improved machinery, combined with the results of long and untiring experiments by manufacturers of woolen and worsted goods, has brought the manufacture of shoddy into an exceedingly important position in the textile field, and large quantities of this re-manufactured fibre are universally introduced into all varieties of woolen cloths as a substitute for pure wool. The employment of this fibre must necessarily tend to diminish considerably the cost of the fabric, and as the practicability of producing an attractive article at a comparatively low price is thus clearly demonstrated, the trade is largely augmented by the use of this material. Although much can be said against the too liberal use of shoddy, the fact is indisputable that, if it were not used in textile fabrics, the result must invariably be an increase in the cost of the fabric to the customer.

Many of the millions who are now able to purchase a woolen garment which is cheapened by the introduction of a limited amount of shoddy, would otherwise be compelled to go without it if nothing but pure wool was used; for in the latter case the cost of the material must of a necessity be far in excess of that of the garment containing shoddy.

We may show that the much-despised shoddy is of

great practical use in numerous ways in the fabrication of woolen cloth. During the period between 1830 and 1835 the value of what were previously regarded as useless woolen rags was discovered. Since that time this industry has been making remarkable progress, until at present many thousands of pounds of the fibre procured from woolen rags is daily consumed by the mills.

A microscopical examination of a handful of shoddy will usually reveal the presence of particles of cotton, silk, and sometimes many other fibres in combination with the wool. This is caused by the great variety of material which constitutes the main portion of a bale of rags from the junk shop or the street. Clean rags from the tailor's shop, of course, produce far different results. For this reason they are preferable to rags of any other class. The shoddy fibre cannot compare with the pure wool fibre in uniformity or regularity of structure, or in any of the essential features which are characteristic of wool as a good textile fabric. Nearly all the fine, delicate scales and serrations so prominent in the wool fibre are lacking in that of shoddy. For this reason the felting and fulling properties of the latter are seriously diminished, if not wholly destroyed. The microscope also reveals a great dissimilarity in the diameter of the shoddy fibre, which is probably due to the constant wear and tear to which the exposed portion of the original fabric has been subjected while being used as a garment. The absence of the serrations may likewise be attributed to this cause. It may also be stated that the fibres are partially stripped of their scales and natural serrations by the mechanical operations through which the rags must pass, in order that they may be reduced to a fibrous condition; and the constant friction of the grinding and carding processes to which the material is submitted must in the end result in the serious mutilation of the fine, delicate structure of any natural fibre. Human skill is not capable of producing a machine so contrived that its mechanical action on the material is not plainly indicated by broken and injured fibres. To reduce the rags to a fibrous form, they must be ground between powerful steel-toothed or pointed cylinders, the action of which must inevitably break and tear the fibres while forcibly separating the filaments from each other. Therefore the substance will necessarily be short in staple, and possess a decided tendency toward brittleness. The lack of elasticity and durability will be easily detected.

Shoddy is manufactured of soft woolen and worsted rags only, such, for instance, as the clippings which come from the tailor's shop. This class of rags is always preferable, for the important reason that clippings from the tailor are generally clean and soft. It is essential, however, that they be fulled but little, for the less they have been felted and matted, the less grinding will be required to separate the fibres. When shoddy rags are required, one of the fundamental considerations is the condition of the material in this respect. In addition to tailor's clippings, such stock as castaway woolen knit garments and stockings, which have been