

needle-pointed clothing for chisel-pointed on the main cylinders and doffers, and also to substitute working, stripping, and fancy cylinders for the top-flats, which should likewise be covered (except the fancy) with needle-pointed clothing. This form of the teeth permits the workers and strippers, aided by the long and flexible teeth of the fancy, to act freely on the main cylinder, keeping the stock upon its surface and ready for delivery to the doffer. If the chisel-pointed clothing, however, of the main cylinders and doffers is in good condition, and the stock is well prepared, it can be used in connexion with the working, stripping, and fancy cylinders, but the two former kinds must have needle-pointed clothing. The latter is always covered with long, fine, and flexible clothing. The surface velocity of the fancy cylinder should be about twenty-five feet faster than the surface velocity of the main cylinder; the workers and strippers should run at the usual speeds; and one worker and one stripper are sufficient for one card. The cards should have screens of perforated sheet zinc under the main cylinders, and the licker-in cylinders (if there are any) about three-eighths of an inch from their surfaces, otherwise too much of the stock will be thrown off in the form of waste by the centrifugal forces developed in the rotation of these cylinders. The feed rolls should be heavily weighted, and their speed be increased about twenty-five per cent. The stock may be carded once or twice. We think once is sufficient. In either case, the fleece should first be delivered into a railway trough; and, if intended for a second carding, the product or sliver should be collected from calendar rolls without being lengthened, and made into laps for the finishing cards, and from their railway should be drawn by means of a draught railhead from two and a half to three inches. This head should have three under rolls, one and one-quarter inch in diameter, placed about three and a half inches from centre to centre of the back and front rolls. The back and front rolls should be fluted or corrugated; the back top roll should also be fluted or corrugated, while the front top roll should be covered either with vulcanized rubber or gutta-percha, (the latter can be had at 153 Broadway, New York, of the Gutta-Percha Manufacturing Company), and both rolls should be one and one-half inch in diameter. The middle under roll should be encircled by a spring gill, with collars at either end, rising an eighth of an inch above the points of the gill needles; the back top roll should be slightly weighted, and the front top heavily. The entire draught should be between the gill roll and the front roll. The shivers from this head should be collected in cans, and passed through either one or two heads of a drawing frame, with gills on the middle under rolls, and with top rolls fitted like the top rolls of the railhead, doubling the slivers at the draughts, which should not exceed one inch into four. From the drawing frame the stock should be made into condensed and untwisted roving on a Taunton speeder, arranged with gills on the middle roll, and with top rolls similar to the rail and drawing frame heads. The spinning frames may have either rings or flyers for twisting. As good yarn can be had from one as the other, it is indispensable that the frames should have large rings or flyers designed for coarse spinning only, as the kind of stock we are treating of cannot at present be made into finer yarn than numbers ranging from six to ten, (cotton gauge), and it is wholly impracticable to think of spinning it on frames designed for yarn ranging between twenty and thirty-five skeins to the pound. The frames for this stock must be arranged with a draught not exceeding one inch into six inches, and should be fitted with spring gills on the middle rolls for each spindle, and with uncovered smooth iron back top rolls one and a half inch in diameter without weights. The front rolls should compare with the front rolls in the preceding operations. These spinning gills consist of twenty rows of tapering needles, seven-sixteenths of an inch long and one thirty-second of an inch in diameter at the base, six in a row, one-sixteenth of an inch apart, and inserted obliquely through apertures in a brass hollow cylinder one and seven-sixteenths inch in exterior diameter, and projecting through the surface four-sixteenths of an inch, making the entire diameter of the periphery of the points one and fifteen-sixteenths inch, with brass collars at their ends one and six-sixteenths inch exterior, and fourteen-sixteenths of an inch interior diameter, and flanches to the same, one and nine-sixteenths inch in diameter, fitted with steady pins and set screws for attaching the entire gill to the middle roll. The gills cost three dollars each; the needles can be purchased at \$2.50 per thousand. These gills, as well as the larger kind for railheads, drawing frames, and speeders, are made by Messrs. Lanphear, Levalley & Co., at Phenix Village, Rhode Island.

"The yarn spun from this stock makes excellent twine, and can be woven into crash, osenaburgs, burlaps, and sugar cloths; and, when doubled for warp, it makes very superior grain bags.