

**Spin'ning Ma-chine'.** The Byewater spinning machine is remarkable as a continuous spinner in contradistinction to the intermittent work of the mule.

The condenser bobbin containing the sliver, as in the mule, is placed upon the top of the machine, and revolving, delivers its contents to and upon the tops of a number of small porcupines, arranged upon a slowly revolving shaft. The porcupines, on receiving the roving, comb and draw the fibers of the wool into parallel lines, delivering it in an attenuated form to another part of the machine, composed of two very small rollers fitted in a disk.

These rollers, one of which is fluted and the other covered with rubber, constitute a pair of draft rollers, as in the ordinary mule, but are so small in size as to serve only for the reception of one thread. The draft motion of these rollers is obtained by the action of a pair of small toothed wheels, that are covered from sight in the disk. From the great amount of twist imparted to the thread in this movement, and in which the proper degree of attenuation is obtained, a much shorter fiber can be spun with less risk of breakages than in the long stretch of the mule.

There has already been spun on this machine a material, the waste of silk noils (that is, the noils of the noils), that has hitherto been used only for upholstery purposes, etc., and which in the mule could not be spun into thread at all. The thread on its delivery from the rollers carried in the disk, is passed on to the spindle, and wound upon tubes in the form of a pin or cone, having received its complemental amount of twine.

Any quantity of twist can be put in between the rollers and the spindle, as the latter can be driven up to 7,000 or 8,000 revolutions per minute. The thread is wound upon the spool by the needle flyer. In order to build a proper cop from the yarn the traverse race differs from that found in roving frames, throstle spinning frames, etc., in having an additional movement. Besides the ordinary ascending and descending movements of the traverse, there is progressive ascent made every journey, equivalent to the growth of the yarn cone from the deposit upon it of every layer of yarn.

See CARDING MACHINE, pp. 167, 168, *supra*.