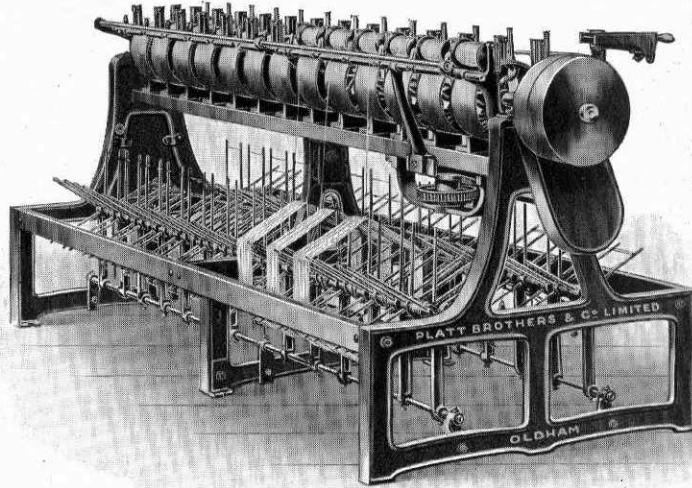


The wire brush and guide traverse upwards and downwards whilst filling the bobbins with yarn.

As the warpers' bobbins fill and get larger in diameter, a gradually increasing rate of winding and tension on the yarn takes place, owing to the greater circumference of the bobbin ; and on this account it is, therefore, usual to run the back row of spindles more slowly than the front row ; and as the bobbins on the front row of spindles increase in diameter they are placed on the back row, thus reducing the tension on the yarn. Bobbins up to about half size are therefore produced on the front row of spindles and full size bobbins on the

back row, both sets working, however, at the same time.



DRUM WINDER

**The Drum Winder** is used for winding hanks on to warping bobbins ready for the creel of the warping or beaming machine. The warpers' bobbins are placed on iron surface drums, and are driven by frictional contact. By this means a uniform surface velocity is imparted to the bobbin, and consequently a uniform tension on the thread is obtained, which is an important desideratum in winding hanks, the threads of which may have become matted together in the dyeing.

To guide the yarn on to the bobbin, thread guides are fixed to a rod, extending the length of the frame, and to which a lateral traverse equal to the lift of the bobbin or the distance between its flanges is given by suitable mechanism.