

**The Ring Spinning Frame** has taken the place of the Flyer Throstle for warp yarns, and besides is capable of spinning weft yarns ; and although extensively adopted for coarse and medium counts, the ring frame has in recent years been so improved, that fine yarns are now largely spun on this machine with satisfactory results, particularly in countries where skilled labour is not available. The roving from the bobbins A A, taken from the Roving Frame, passes from the creel through three lines of draft rollers B B to the bobbins C, which are placed upon and held by the spindles D D (*see section page 45*). These spindles are screwed in the girder rails E E. The requisite twist is obtained in the yarn by means of the steel traveller G G, through which the yarn (in its passage from the rollers to the bobbins) is threaded. The revolutions of the spindle are communicated to the yarn through the traveller, thus putting in the twist, and the traveller, combined with the friction of the atmosphere, creates the necessary drag to wind the yarn tightly on the bobbins. The travellers are made of various sizes to suit the strength of yarn being spun. The traverse of the yarn on the bobbins is caused by the copping motion H, which communicates the necessary motion to the ring plates I I through the volute wheels J J, the rocking shaft K K, and the lifting pillars L. The ring frame illustrated shows the machine for spinning warp yarns, and although differing in some respects, will also serve to show the machine for spinning weft on wood pirns, or weft cops on paper tubes. Much time and ingenuity have been spent in endeavouring to make the spindles durable and free from vibration, and to make the bolster holder contain a good supply of oil. Spindles of our D pattern, with front oil spout and reservoir, require oiling once only in several months, although they run well and steadily at the high speed of about 10,000 revolutions per minute.

**The Self-acting Mule** takes up the fibre at the same stage as the ring spinning frame, but works by a different method, in such a manner that it will spin the most varied grades of yarn from the coarsest to the finest qualities, and from the shortest to the longest staples. The leading peculiarity of the mule is that while the roller beams and rollers are fixed in one position, the carriage which supports the spindle has a backward and forward motion to and from the roller beams. The illustration (*page 48*) shows the headstock containing the gearing for imparting motion to the whole machine, the creel containing the roving bobbins, the draft rollers, the square, viz., that part of the carriage which is underneath the framing of the headstock, and contains some of the