geotextiles, concrete strengthening and asbestos replacement was only weakly supported during the next seven years. Most available capital was directed towards the far more successful spinneret extrusion products, and the research and development, manpower and financial resources had been significantly reduced in the pursuit of increased efficiency. A new machinery line producing continuous fine-denier filament yarn was marketed in 1981 with emphasis on ease of operation and maintenance and reliability. In 1983 an additional machine was developed which texturised the output from this new machinery line to give a high-bulk yarn suitable for carpet-face pile, without the intermediate process of carding and spinning.

Plasticisers is the leading supplier of polypropylene fibre in the UK. The superior qualities of this fibre from spinneret extrusion plant have rendered mechanical fibrillation for this purpose almost completely obsolete. While new applications for mechanically fibrillated polypropylene films are being investigated, they occupy a low priority in Plasticisers' development programme. Machinery is sold to many areas of the world and Plasticisers' involvement in product sales has enhanced its reputation in process machinery sales in that its understanding of consumer needs is particularly good. Competition arises from a few German manufacturers whose machinery is more expensive and sophisticated, and some firms from Italy which produce similar machinery to Plasticisers at a more competitive price. Patents are no longer used to protect technological advances.

27 RENOLD POWER TRANSMISSION (HOLROYD MACHINE TOOLS & ROTORS): ROTOR MILLING MACHINES

The use of helical rotors offers considerable advantages over reciprocating systems for the compression of air and gases. The first patent on these had been taken out in 1946 by a Swedish firm known as Svenska Rotor Maskiner AB (SRM). High-precision requirements for the manufacture of rotors, which had to rotate in intersecting pairs, meant that up to 200 hours of hand-finishing work was necessary, making helical rotor compressors very expensive. Following an approach to John Holroyd & Co. of Rochdale, a firm experienced in the
manufacture of worm gears, a milling process based on that used for gears was developed. In the version current at the time of the Queen's Awards blanks were held in position while three stages of machining were applied. Initially, the grooves or lobes (for female and male rotors respectively) were rough-machined into the required spiral configuration. For the next stage similar cutters were used but with a specially shaped blade. In the finishing stage an original approach was adopted. Holroyd had realised that with a large multibladed milling cutter, minute differences would exist in the heights of blades. Hence, although each blade would remove approximately the same amount of metal, the highest blade would perform a final shaving action and provide the finished size. The finishing-cutters developed by Holroyd used this concept, consisting of four equally-spaced metal-removing blades and a fifth blade, the 'shaving' blade, of particular accuracy in size and shape, set higher than the rest. New cutter blades were produced only for the shaving position, being relegated to the roughing position after a relatively short time as a result of wear. In the 1960s Holroyd machines were purchased by all SRM licensees, giving the company a virtual monopoly. The company found that some compressor-manufacturers had insufficient demand to justify purchasing a machine or else had special requirements. To meet this market Holroyd itself established a rotor-manufacturing division. The clearest measure of the technological advance achieved by this process was that the time required to produce a single rotor was reduced from 200 to six hours.

Technological development

In its appearance apart from some modern styling features, the machine is little changed. Nevertheless, there have been a number of technological improvements. This process begun prior to the Award with a change from hand-operated to fully-automatic hydraulically-controlled machines which allowed two machines per operator. The hydraulic pre-load anti-backlash unit was replaced by an electrical version in the mid-1970s. This had the benefit of reducing the size of the unit but was also motivated by the fact that the company itself manufactured electrical controls. The change offered reduced costs and enhanced performance.