

1. General background on Textile Machinery Patents.

- 1.1 Because the manufacture of textile machinery has been going for so long, this is a very complex subject.
 - 1.1.1 Without a detailed knowledge of the subject matter it is difficult to make informed judgments.
 - 1.1.2 There are no black and white situations related to patents in such a long established industry, mainly differently shaded areas of grey.
- 1.2 What this report tries to achieve is to give a view from Belroy's perspective, not only of the SpinWell's prepared patents, but the background to the patents.
 - 1.2.1 The report is worded in such a way that it can be considered by people not familiar with patents.
 - 1.2.2 As such, we have made it somewhat simplistic for those who are familiar with this subject.
- 1.3 We consider that patenting is only one of a number of ways to protect commercial interest and not a means of proving how clever one is.
- 1.4 In relation to the SpinWell, there are two problems to be addressed.
 - 1.4.1 Do we infringe other peoples patents ?
 - 1.4.2 Have our patents any significance ?
- 1.5 It is also important to understand that Belroy only needs to worry about infringing patents which will be in force when the first commercial machines are installed and operated in customers' premises.
- 1.6 The most important aspect is to achieve a process that works and can be turned into a commercially viable product.
 - 1.6.1 Any "high quality" patents are a bonus.
 - 1.6.2 But patents without a process that works, are a drain on a firm's financial resources.
 - 1.6.3 To retain such patents in force, can only be classed as speculative investment.
- 1.7 On a practical level, we cannot believe that anybody would sue for infringement if the patent they were suing on had only one or two years to run, or if they were not active in manufacturing short staple spinning machinery.
 - 1.7.1 Any rewards would probably not even cover their legal costs.
- 1.8 In Belroy's technical library we hold a comprehensive catalogue and copies of friction spinning patents which we have obtained over the years, including those referred to in the following sections.

2. Friction Spinning Patents in the 1960's

- 2.1 In the early 1960s, patents were filed on the use of friction twisting to consolidate the fibre material input to the so called open-end spinning devices.
 - 2.1.1 This fibre material is called sliver.
- 2.2 By the end of the decade friction twisting had been extended into forming a yarn with a strand of fibres stripped out of the input sliver.
- 2.3 The first yarn friction spinning patent GB 1 231 198 was filed on 11 September 1967 by T.M.M. Research.
 - 2.3.1 This was the R & D arm of Platt Industries, which after a series of name changes and acquisitions became Platt Saco Lowell Ltd.
 - For a period in the late 1970s, the SpinWell's inventor had somebody working for him who had been involved with this first project.
 - He explained that yarn was spun, but it was of such poor quality and at such a low speed, they could see no future for this technology at that point in time.
- 2.4 This patent was allowed to lapse after only a few years, presumably because rotor spinning was being developed in earnest at that time, some 25 years ago.
- 2.5 Everything disclosed in this patent is therefore free to use.
- 2.6 This patent was very significant to the MasterSpinner's friction spinning technology which the SpinWell's inventor developed for Platt Saco Lowell Ltd.
 - 2.6.1 It prevented Dr. Ernst Fehrer from claiming general patents relating to friction spinning.
 - He was the first to get a commercial friction spinning machine onto the market.
 - But only for coarse yarns in specialized market areas.
- 2.7 It is also still very significant to the SpinWell because this is the "basic technological concept" its inventor returned to when starting the SpinWell design in 1986.
- 2.8 The Shirley Textile Institute also carried out work in this field during the 1960s.
 - 2.8.1 They filed a patent US 3 636 693 with a priority date of 16 January 1968.
 - 2.8.2 This was allowed to run its course, but has clearly run out now.
 - 2.8.3 In any case, there was nothing in this that added to the knowledge of the previously mentioned lapsed patent GB 1 231 198.

3. By 1970 the Fundamental Principles of Friction Spinning were free to use.

3.1 T.M.M. Research's 1967 patent GB 1 231 198 clearly disclosed the fundamental principles of a friction spinning process.

3.1.2 With the patent having been allowed to lapse around about 1970, these fundamental principles became free for anyone to use.

3.2 It is impossible to overstate the importance which the Patent Manager of Platt Saco Lowell Ltd., Adrian Battison, and the SpinWell's inventor attached to this patent when the MasterSpinner's friction technology was being developed in the late 1970s.

3.2.1 Because the patent had only been filed in the UK and allowed to lapse, it did not readily show up in patent searches.

3.2.2 The SpinWell's inventor even made sure the lapsed patent's contents were made as public as possible by including discussion of it in a lecture tour he gave on friction spinning in the USA during the early 1980s.

3.3 In terms of claims, the one disclosure which relates most to what is proposed on the SpinWell is the final claim which states :-

Apparatus for making a yarn or like assembly comprising a cylinder having a perforated surface, a roller having a surface arranged to define a nip with the perforate surface, means for feeding fibres to the nip for engagement by the surfaces with the fibre axes substantially parallel to the axes of the cylinder and roller, means for rotating the cylinder and roller surfaces in opposite senses at the nip, means for providing a fluid flow in the region of the nip to assist twisting together of the fibres, and means for drawing off the twisted fibres transversely to the direction of rotation of the cylinder surface at said nip.

3.4 In patent language those words describe exactly what the SpinWell's inventor did on the MasterSpinner for Platt Saco Lowell Ltd and what he has also applied to the SpinWell.

3.5 Consequently, from this juncture in the late 1960's, all short staple friction patents using one perforated and one solid roller relate to the detailed technical features which turn this free to use concept into a commercial process.

3.5.1 To clarify further - this is no different than the first person who patented that for man to fly a machine had to be built with static wings and an engine to create air movement to provide forward propulsion.

→ And whereafter, there can be no doubt that generations of aircraft designers have made significant and patentable contributions to the advancement of flying.

4. 1970s - Interest renewed in Friction Spinning

4.1 Dr. Ernst Fehrer - Fehrer AG of Austria - DREF friction spinning machines.

- 4.1.1 Interest in friction spinning was revived in the mid 1970s when Dr. Ernst Fehrer filed the first of his many patents on friction spinning using two perforated rollers.
- 4.1.2 More significantly, he introduced the first commercial friction spinning machine, which is sold under his acronym DREF label.
- 4.1.3 Dr. Fehrer was absolutely convinced it is only possible to make a friction spun yarn with two perforated rollers.
 - It is around this belief that all his patents are based.
- 4.1.4 We do not know whether he was aware of the earlier patents which would have made it difficult to make general claims.
- 4.1.5 Most importantly, the use of two perforated rollers has no bearing whatsoever on the SpinWell.
- 4.1.6 In any case, Dr. Fehrer's more fundamental patents have already, or are about to, run out.
 - For instance - GB 1 1524 659 first filed in Austria on 21 June 1976 - US 3,972,173 filed April 10 1975.
- 4.1.7 They will clearly not be relevant when the first commercial machine based around the SpinWell's technology is introduced into the market place.
- 4.1.8 His later patents have moved into the detail concerned with having a workable process suitable for high performance yarns using complex fibres, for which his DREF machines very successfully found a niche market.

4.2 VUB

- 4.2.1 This firm was very active in a form of friction spinning in the late 1970s.
- 4.2.2 At this time they were a very large Czechoslovakian textile machinery manufacturer, supplying mainly Russia with rotor spinning machines.
- 4.2.3 They took out a number of patents which disclosed quite a few features, but their claims were specific to a complex method of forming the yarn.
- 4.2.4 In 1987, the early days of the SpinWell project, a Belroy delegation visited the firm in Czechoslovakia to talk about a joint venture to make the first SpinWell prototype.
 - They openly admitted their process produced rubbish yarn and they could not make it work.
 - A deal could not be struck because the firm could not raise any foreign exchange as their currency was not marketable.
 - At the time, barter dealing between firms from the East and West was in its infancy and the British Embassy in Prague advised us against going down that route.
- 4.2.5 When the break up of communism took place, they sold their patents as part of a deal to a spinning machine company in Italy, called Savio.
 - Those patents that would not already have run out, have now been abandoned by Savio.

4.3 BARMAG

- 4.3.1 Barmag, a high quality German maker of filament yarn machines were involved in friction spinning in the late 1970s, but abandoned their interest.
- 4.3.2 Dr. Fehrer claims it was because he won a patent argument concerning the use of 2 perforated rollers.
- 4.3.3 Others close to Barmag say it was because they had other more pressing priorities.
- 4.3.4 All these patents will have run out before 1998 (if they have not been abandoned) and are therefore of no commercial significance.

4.4 T.M.M. Research - which became Platt Saco Lowell Ltd.

- 4.4.1 Clearly the SpinWell's inventor knows these patents extremely well since most of them are in his name.
- 4.4.2 He was involved with all of these patents until 1986, when he left the employ of the USA Hollingsworth Organisation's wholly owned UK subsidiary, Platt Saco Lowell (UK) Ltd.
 - This new UK Private Limited Company had been set up in 1981 when the American \$ billionaire, John D. Hollingsworth, bought the MasterSpinner's technology from the Receiver of Platt Saco Lowell Ltd.
- 4.4.3 We believe these patents are the most important, because the MasterSpinner process came closest to realising the dream of having a commercially successful friction spinning machine in the short staple spinning industry.
- 4.4.4 The two fundamental patents GB 2 042 599 and 2 062 023 were filed in October 1979 with priority date between 2 and 12 months earlier.
- 4.4.5 We do not believe that either of these patents are infringed by the SpinWell
 - However, its inventor had to carefully design a way round GB 2 042 599.
- 4.4.6 In any case, these patents will be running out in 1998/1999.
 - As it will be 1998 before commercial SpinWell based friction spinning machines are starting to be installed, it is inconceivable that any infringement action would be taken on these patents, as any rewards would never even cover the legal fees.
- 4.4.7 The Hollingsworth Organisation has without any shadow of doubt given up friction spinning.
 - We believe that when these two fundamental friction spinning patents run out, they will realize they are not going to have anything worthwhile to license to other interested parties and will start to abandon patents as they come up for renewal.
- 4.4.8 For example, they have already abandoned GB 2 074 201.
 - The inventor and his patent colleagues always knew it was weak, since it was a bit obvious, however, this would have been the last one he would have abandoned.
 - But because they now have nobody in their employ who knows anything about friction spinning, it is very clear they are unable to make an informed judgement.
- 4.4.9 Others, as for example EP 0 034 427 and EP 0 062 404 are at the date of this report in March 1995, several months overdue for renewal.
- 4.4.10 Later patents are irrelevant.
 - They concern the piecing and operational procedures on the machine and covered those features which did not work.

5. Hollingsworth's market entry caused others to examine Friction Spinning

As a result of the commercial introduction of the MasterSpinner, the two major players in the Spinning Machinery Industry started to consider this technology.

5.1 Rieter - Schubert & Salzer - Ingolstadt

5.1.1 They filed a number of patents, but got absolutely nowhere.

5.1.2 When in 1986 they failed in their attempt to head hunt the SpinWell's inventor, they abandoned friction spinning altogether and concentrated on a new rotor spinner.

5.1.3 They will do nothing about friction spinning until a SpinWell based machine gets into the market place.

→ The firm is simply too big and too long established in the old fashioned traditions of the textile machinery business, that its management culture will not enable it to react quickly to the possibility of competition.

→ When they do wake up, let us hope that a SpinWell based friction spinner will be doing what Schlafhorst, then a textile winding manufacturer, did when they linked with Suessen and started to manufacture a rotor spinner, which they called the Autocoro.

→ By the time they woke up, the Autocoro was already decimating Rieter's world domination in rotor spinning machines.

→ Rieter's commercial foresight was so poor, that for many years they were locked out of the largest market for rotor spinners, namely the USA, due to infringing a small, but important feature within a Schlafhorst/Suessen patent.

→ Rieter's rotor spinning arm, Schubert & Salzer from Ingolstadt, West Germany, had to go back to the drawing board and redesign their machine to overcome this problem.

→ It was only last year when they once again started to make inroads into the USA market.

→ Talk about closing the stable door after the horse had bolted !

5.2 Schlafhorst - Suessen - Fehrer

5.2.1 They formed a consortium to develop a friction spinning machine for short staple yarns.

5.2.2 We have spoken to both Suessen and Schlafhorst on a number of occasions.

→ Suessen openly admitted to us that they had literally had a brain storming session and made patent applications on anything and everything they could think which could be remotely applicable to friction spinning.

→ Anyone studying their list of patents will understand what we mean.

5.2.3 Now they have been unable to develop a commercial friction spinning process, how many of these they have abandoned we do not know.

→ Even for a large company, patents are an expensive luxury if they don't have a commercial process to protect.

5.2.4 We have studied most of these patents, many were in German so we relied more on their diagrams to gain an understanding.

5.2.5 They have approached friction spinning in a totally different way than Belroy and there is nothing in any of their patents that we are worried about infringing.

- 5.2.6 This consortium was abandoned with great acrimony: each blaming the other for the failure.
- 5.2.7 Of commercial significance is that when a SpinWell based machine starts to sell and Schlafhorst try to "follow our route" into friction spinning, then, apart from patent problems, the major problem they will experience is that almost everything they have done will have been wasted.
- And to contemplate going back to basics and re-learning all over again, will not be an easy pill to swallow, particularly for the German mentality.

6. The SpinWell

- 6.1 All the inventor's experience with patents is concerned with the textile machinery industry and have always followed a similar approach.
- 6.2 When one is working on a completely new concept, the first patents taken out disclose the fundamental principles of the process.
 - 6.2.1 Later patents disclose features needed to overcome problems of transforming these principles into commercial reality.
- 6.3 When the inventor first started the development of the SpinWell his objective was somewhat different than conceiving a completely new concept.
 - 6.3.1 The MasterSpinner machine failed because the problems in transforming 1978 conceived principles into commercial reality had been insurmountable.
 - 6.3.2 In 1986, what was seen to be needed was to design the SpinWell as a somewhat technologically similar friction spinning unit, but with great emphasis placed on a radical rethink of its engineering design.
 - The objective of a new engineering design was to ensure the SpinWell, unlike the 1978 conceived MasterSpinner unit, would be easy to manufacture, assemble and quality control.
 - Whilst also facilitating maintenance, full machine automation, and the capability to change internal components when the need to switch production from one yarn type to another arises in the mills: again unlike the MasterSpinner unit.
- 6.4 Consequently, as he had done with the MasterSpinner's friction spinning technology, the inventor decided to employ the free to use "basic fundamental principles" of friction spinning disclosed in the previously mentioned lapsed patent GB 1 231 198, filed on 11 September 1967.
- 6.5 The SpinWell's inventor had spent considerable time trouble-shooting MasterSpinner manually operated production machines operating in spinning mills.
 - 6.5.1 Of particular importance was his 18 months at Schoeller Textil's mill in Duren, West Germany, who had purchased two 144 position manual MasterSpinners.
 - 6.5.2 Hundreds of tonnes of friction spun yarn were sold by Schoeller Textil.
 - 6.5.3 The SpinWell's inventor worked in close collaboration with Schoeller's yarn specialists from their Quality Control Department on the following aspects :-
 - (a) Deciding the best fibres to use so as to enable the MasterSpinner's friction spinning technology to perform at its best.
 - (b) Experimenting as to which were the most suitable types of yarns to produce on the MasterSpinner from the various fibre types.
 - ☛ The objective being to enhance as far as possible the most marketable aspect of the MasterSpinner yarns.
 - ☛ Namely, the very nice soft feel of fabrics made from the yarns.
 - (c) Working closely with customers, both knitters and weavers, to identify and try to resolve difficulties in producing fabrics from Schoeller Textil's friction yarns.

- 6.6 During the same 18 months period, the SpinWell's inventor also worked on designing component add-ons to enable Schoeller Textil's 288 friction spinning units to be individually "tuned" on site.
 - 6.6.1 His task being to get them all spinning to within the same industry acceptable tolerances of yarn variability, when spinning from the same sliver.
 - 6.6.2 And also to run at a commercially acceptable standard for satisfactory periods of continuous operation.
- 6.7 As a result of this concerted effort, Schoeller Textil were able produce hundreds of tonnes of commercially acceptable yarns.
 - 6.7.1 In fact, they were able to command an extra price premium for their MasterSpinner friction spun yarns, thus achieving a greater profit than from their Autocoro produced rotor yarns.
 - 6.7.2 This is the sole reason why Leopold Schoeller jr. is happy to be working alongside ourselves in trying to raise money to get into production with a SpinWell based friction spinning machine.
- 6.8 In 1986, armed with this invaluable and lengthy experience at the sharp end of commercial friction spinning, together with the benefit of hindsight as to where technological aspects had not been fully thought through in the late 1970s, the inventor started to design the SpinWell in such a way that it would be able to overcome all the difficulties of the MasterSpinner.
 - 6.8.1 Also, to build up a portfolio of patents which disclosed features needed to overcome problems of transforming these principles into commercial reality.
 - 6.8.2 By 1987, Belroy had 8 detailed patents ready for filing covering all aspects of a full machine built around the SpinWell.
- 6.9 However, in the course of our development work on the 8 previous single position prototypes, the inventor made a breakthrough in the SpinWell's technology which was incorporated into the 9th prototype.
 - 6.9.1 This breakthrough caused him to take a completely different approach.
- 6.10 Some of these detail features were not very substantive from a patent aspect, except to stop people making a direct copy, which is still important.
- 6.11 The importance of this technological breakthrough was that, as against the yarns produced by the free to use friction spinning technology in the lapsed patent GB 1 231 198, filed on 11 September 1967, the inventor was enabled to modify and improve the basic structure of the friction spun yarn.
 - 6.11.1 By chance, he had found a way of aligning more parallel with each other the millions of tiny individual fibres per second which are spun together as the yarn is being formed.
- 6.12 This concept was incorporated into the 9th SpinWell prototype.
- 6.13 It enabled the SpinWell to produce a quality of yarn which had not been possible with the MasterSpinner's unit, nor had it been possible with the previous 8 SpinWell prototypes.
- 6.14 However, to achieve this new yarn structure had necessitated a redesign of the SpinWell's length and certain key internal components.
- 6.15 So much so, that the SpinWell was no longer an "upgrade" of the inventor's 1970's application of the previously mentioned free to use fundamental principles, but instead, from a technological standpoint, it had become a completely new friction spinning technology.

7. The SpinWell's Patents

7.1 Belroy have now prepared two fundamental patents for the now 12th prototype.

7.1.1 One covers the new technology relating to the modified yarn structure.

7.1.2 The other covers the SpinWell's piecing methodology.

7.2 There are a number of detail engineering features which should also be patentable, and once there is a financial commitment to build a commercial machine, Belroy will finalise these patents for filing, some of which are already part prepared.

7.3 The SpinWell's inventor had a very close working relationship with the patent agent Adrian Battison and his assistant Harry Cowking when they all worked for the pre-Hollingsworth Platt Saco Lowell Ltd.

7.3.1 Although Adrian's name appears on all the earlier patents, it was Harry who actually wrote the patents, as in Adrian's words, Harry was a much better drafter than Adrian.

7.3.2 Neither of them would join Hollingsworth's new Platt Saco Lowell (UK) Ltd.

→ So, the firm employed an agent in London from a company called Kemps who knew nothing about textiles and was somewhat less than adequate. We assume this was because of the agent's lack of knowledge of the textile industry and why we feel it important to have somebody who knows this industry to file patents.

7.4 We approached Adrian, who now has a private practice in Canada, to see if he would prepare the patents for the SpinWell. But he felt there could be difficulties due to a conflict of interest and suggested we use Harry Cowking as, at that stage, all we wanted was somebody who knew the subject and was a good drafter of patents.

7.5 Consequently, this is what we did and Harry Cowking has prepared the two patents.

7.6 Patents apart, our first consideration is that the technological breakthrough the inventor made in the SpinWell's yarn structure allows it to spin much better yarns than the MasterSpinner which, as previously mentioned, did make a commercial impact into the yarn market place during its short and ignominious life time.

7.6.1 However, we feel very pleased that so long after the first patents were filed on friction spinning, the inventor was able to "stumble" on such a major technological advance which was incorporated in the 9th SpinWell prototype.

7.7 As such, we believe this will be a very strong patent.

7.7.1 The very fact that the first patents on friction spinning were filed so long ago gives strong credence to the view that the new method of yarn structure improvement is not obvious to "those skilled in the art".

7.8 The automation of the total procedure from yarn breakdown during spinning, to starting up again by robotically re-piecing the broken ends together in a manner which the industry will class as "fault free", is absolutely crucial to the success of a commercial machine.

7.8.1 The SpinWell has major advantages over rotor spinners in this regard.

7.8.2 In relation to our patent on the SpinWell's piecing methodology, our considered view is that others following later will be able to find a way round this patent, but without extensive knowledge and experience of the problems of operating a short staple friction spinning process in a commercial spinning mill environment, such an exercise will lead them in a direction which will not be commercially viable.