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THE COMBING PERFORMANCE OF DIFFERENT TYPES OF COMB CYLINDERS FOR RECTILINEAR COMBS

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ABSTRACT

The combing performance of three types of comb cylinders were investigated, and compared on the basis of top cleanliness, mean fibre length (m.f.l.) of the top and fibre breakage.

A comb cylinder with flat pins on the fine segment gave only slightly less noil, but produced a top containing much more neps and vegetable particles than one produced by a comb cylinder with round pins throughout.

A comb cylinder with saw-tooth type pins throughout gave a performance equal to that of a conventional comb cylinder as far as top cleanliness, m.f.l. and fibre breakage are concerned. The mechanical strength of the former, however, was found to be superior to that of a conventional comb cylinder.

KEY WORDS

Comb cylinders – flat pins – round pins – saw-teeth – combing – percentage noil – neps – vegetable particles – m.f.l. – fibre breakage.

INTRODUCTION

The combing action of a rectilinear comb can be divided into two parts: the combing of the leading ends of the fibres by the comb cylinder and the combing of the trailing ends of the same fibres by the top comb. The two actions are supplementary to each other and if either the top comb or the comb cylinder is inefficient in its combing action, the quality of the top will be adversely affected.

A conventional comb cylinder, suitable for combing 64's quality wools, consists of two segments each carrying 10 rows of pins with the pin density increasing progressively from 4 pins per cm on the first row to 30 pins per cm on the twentieth row. The top comb consists of a single row of pins of up to 30 pins per cm depending on the quality of the wool being combed.

As far as construction is concerned the comb cylinder is by far the more complicated of the two and in case of damage it is a long and tedious procedure to repin and rebuild the comb cylinder. The construction of the comb cylinder has remained unaltered for the last few decades and round pins are almost universally used whereas flat pins are used for the top comb to provide the necessary mechanical strength.

During the last couple of years, however, a number of manufacturers have developed new types of comb cylinders with the object of improving the combing performance, life and ease of replacing in case of damage.

This report is concerned with an investigation of the combing performance of three types of comb cylinders, of which one has a construction entirely different from the conventional type comb cylinder.

Details and discussion of the comb cylinders:

The specifications of the three conventional type comb cylinders, hereafter called comb cylinder A, B and C respectively, are given in tables I, II and III.

Comb cylinders A and C (tables I & III) contain round pins throughout and are both standard comb cylinders for combing 64's quality wools. Comb cylinder B (table II) contains round pins on its coarse segment which are identical to those of comb cylinder A. The fine segment of comb cylinder B, however, contains flat pins with pin densities basically the same as those of the fine segment of comb cylinder A.

Mechanical strength of the pins is important as this will largely determine the life of the comb cylinder. To accommodate 30 pins per cm and still obtain a reasonable gap between the pins, the dimensions of the individual pins parallel to

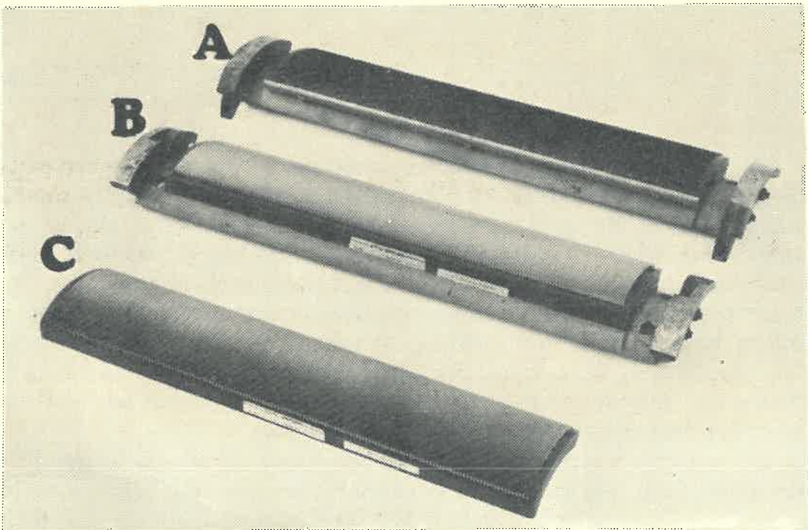

FIGURE 1

Coarse (A) and Fine (B) segments and Replaceable Upper Shell (C) of the Nitto Unicomb comb cylinder

the row must be of the order of 0.3 mm or less. Having these dimensions the mechanical strength of round pins becomes critical and may lead to a reduced life of the comb cylinder. With flat pins, however, the dimensions perpendicular to the row can be increased to provide the necessary strength, as was done in the case of comb cylinder B (table II).

TABLE I

SPECIFICATIONS FOR COMB CYLINDER A

Row No.	Pins/cm	Pin No. (B.W.G.)	Pin projection (mm)	Gap between pins at base of projection (mm)
1	4	16 × $\frac{9}{16}$	6	1.320
2	6	19 × $\frac{9}{16}$	6	0.770
3	6	19 × $\frac{9}{16}$	6	0.770
4	7	19 × $\frac{9}{16}$	6	0.530
5	10	21 × $\frac{1}{2}$	5	0.350
6	10	21 × $\frac{1}{2}$	5	0.350
7	14	23 × $\frac{1}{2}$	5	0.184
8	14	23 × $\frac{1}{2}$	5	0.184
9	17	25 × $\frac{1}{2}$	5	0.128
10	17	25 × $\frac{1}{2}$	5	0.128
11	19	26 × $\frac{1}{2}$	4	0.126
12	22	27 × $\frac{1}{2}$	4	0.095
13	22	27 × $\frac{1}{2}$	4	0.095
14	24	28 × $\frac{7}{16}$	4	0.086
15	24	28 × $\frac{7}{16}$	4	0.086
16	25	28 × $\frac{7}{16}$	4	0.070
17	27.5	29 × $\frac{7}{16}$	4	0.043
18	27.5	29 × $\frac{7}{16}$	4	0.043
19	30	29 × $\frac{7}{16}$	4	0.033
20	30	29 × $\frac{7}{16}$	4	0.033

Another method of increasing the strength of the pins is to make use of saw-tooth type clothing, similar to that used in carding. A new type of comb cylinder marketed under the trade-name Nitto Unicomb[1] has a saw-tooth type clothing rigidly secured to a semi-cylindrical base with an epoxy resin. A photograph of this comb cylinder, used in the present investigation, is shown in fig. 1.

TABLE II

SPECIFICATIONS FOR COMB CYLINDER B

Row No.	Pins/cm	Pin No. (B.W.G.)	Pin projection (mm)	Gap between pins at base of projection (mm)
1	4	16 X $\frac{9}{16}$	6	1.320
2	6	19 X $\frac{9}{16}$	6	0.770
3	6	19 X $\frac{9}{16}$	6	0.770
4	7	19 X $\frac{9}{16}$	6	0.530
5	10	22 X $\frac{1}{2}$	5	0.350
6	10	22 X $\frac{1}{2}$	5	0.350
7	14	24 X $\frac{1}{2}$	5	0.184
8	14	24 X $\frac{1}{2}$	5	0.184
9	17	25 X $\frac{1}{2}$	5	0.128
10	17	25 X $\frac{1}{2}$	5	0.128
11	22	22 X 28 X $\frac{1}{2}$	4	0.079
12	22	22 X 28 X $\frac{1}{2}$	4	0.077
13	26	23 X 30 X $\frac{7}{16}$	4	0.081
14	27.5	23 X 30 X $\frac{7}{16}$	4	0.057
15	27.5	23 X 30 X $\frac{7}{16}$	4	0.057
16	28.5	23 X 30 X $\frac{7}{16}$	4	0.047
17	28.5	23 X 30 X $\frac{7}{16}$	4	0.047
18	29	23 X 30 X $\frac{7}{16}$	4	0.041
19	29	23 X 30 X $\frac{7}{16}$	4	0.041
20	29	23 X 30 X $\frac{7}{16}$	4	0.041

The Unicomb comb cylinder also consists of two segments, but the pin density over the complete surface of each is constant, with the pin density of the coarse segment lower than that of the fine segment. Three different segment combinations are available for combing a range of wools from 60's and coarser to 70's and finer. The combination used in this investigation was recommended for wools around 64's quality and contained 46 pins per cm^2 on the coarse segment and 66 pins per cm^2 on the fine segment.

TABLE III

SPECIFICATIONS FOR COMB CYLINDER C

Row No.	Pins/cm	Pin No. (B.W.G.)	Pin projection (mm)
1	4	17 × $\frac{1}{2}$	6
2	5	18 × $\frac{1}{2}$	6
3	6	19 × $\frac{1}{2}$	6
4	8	21 × $\frac{1}{2}$	6
5	10	22 × $\frac{1}{2}$	5
6	10	22 × $\frac{1}{2}$	5
7	12	23 × $\frac{1}{2}$	5
8	15	24 × $\frac{1}{2}$	5
9	17	25 × $\frac{1}{2}$	5
10	17	25 × $\frac{1}{2}$	5
11	19	26 × $\frac{7}{16}$	4
12	22	27 × $\frac{7}{16}$	4
13	22	27 × $\frac{7}{16}$	4
14	25	28 × $\frac{7}{16}$	4
15	26	28 × $\frac{7}{16}$	4
16	26	28 × $\frac{7}{16}$	4
17	28	29 × $\frac{7}{16}$	4
18	28	29 × $\frac{7}{16}$	4
19	29	30 × $\frac{7}{16}$	4
20	29	30 × $\frac{7}{16}$	4

In the case of damage, the upper shell containing the saw-teeth is removed from the lower metallic shell and replaced by a new one (see Fig. 1). This can be done in a matter of minutes without altering any settings on the comb.

The shape of the saw-teeth is illustrated in fig. 2, which also shows the forces acting between fibres and pins during combing. The fibres in the beard exert forces (as in Fig. 2) on the pins during combing. The forces F_1 and F_2 can each be resolved into two components f_1, f_2 and f_3, f_4 respectively, of which f_1 and f_3 will always tend to move the fibres towards the vertical stem portion of the tooth. Any fibrous material and vegetable particles are thus prevented from collecting at the base of the teeth. Instead, these collect in front of the vertical portion where they can be efficiently removed by the circular brush.

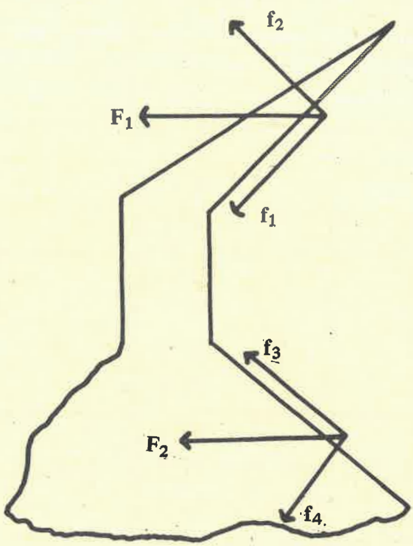

FIGURE 2
Diagram of a single saw-tooth

Fig. 3 shows the arrangement of the points of the saw-teeth on the cylindrical base. The lines XX^1 and ZZ^1 are parallel to the axis of the cylinder. The surface of the cylinder rotates in the YY^1 direction. The lines AA^1, BB^1 etc. represent the saw-toothed metallic wire strips, containing a saw-tooth at regular intervals. By changing the inclination of the lines AA^1, BB^1, etc., the combing spaces, d, (parallel

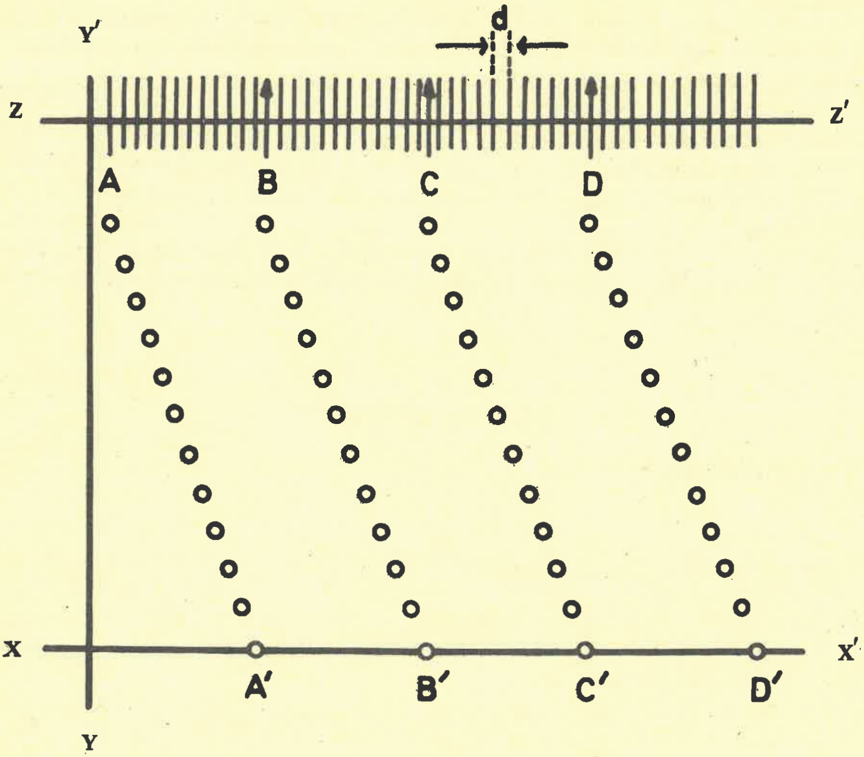

FIGURE 3

Arrangement of the saw-teeth on the cylindrical base

to the cylinder axis) between the saw-teeth can be made as coarse or as fine as required. The spaces perpendicular to the cylinder axis are wide enough to facilitate efficient cleaning by means of the circular brush.

EXPERIMENTAL

The experiments were carried out on 64's quality wools of different lengths and vegetable matter content. Comb cylinder B (table II) and the Unicomb comb cylinder were compared with the conventional type comb cylinders A and C (tables I and III) respectively.

A Schlumberger (Model PB 26) comb was used throughout. Unless stated otherwise the settings of the comb were as recommended by the manufacturer and identical for all comb cylinders.

All wools were scoured to 0.3% grease content and 1.0% Eutectal (0.33% ether extractible) was added before carding. Card slivers were given three standard preparatory gillings on an intersector type gill box.

The counting of neps and vegetable particles in the top was done on a Toenniessen Top Tester on at least 100 gram of top and the results expressed as the number of particles per 20 gram of top. The WIRA Single Fibre Length machine was used for determining the mean fibre length (m.f.l.) of the tops and the pre-combed slivers.

The m.f.l. of the noil and shoddy was determined using a counting and weighing method[2]. The formula derived by Kruger[2] was used to calculate the percentage fibre breakage.

RESULTS AND DISCUSSION

COMB CYLINDER WITH FLAT PINS

In order to compare the combing performance of flat and round pins, the percentage noil and cleanliness of the tops produced by comb cylinders A and B were determined. A 10/12 months seedy wool, containing 0.5% by weight of vegetable matter in the card sliver was used for this comparison. The results are given in table IV. A gill-feed of 4.2 mm and a combing speed of 130 cycles per min were used for this part of the experiment.

For all the gauge settings used, the round pins (comb cylinder A) produced a relative increase of noil of 4% compared with comb cylinder B with flat pins. Comb cylinder A, however, produced a top with significantly fewer neps and vegetable particles than did comb cylinder B.

The cleaner top produced by comb cylinder A could possibly be due to two reasons. Firstly, the gap between the pins at the base of the projection is smaller for the last four rows of comb cylinder A (see tables I and II). Secondly, the piercing power of the round pins through the beard may be better than that of the flat pins, due to the V-shape of the air-gap between the round pins. With flat pins some riding of neps and vegetable particles on top of the pins may take place and this will reduce the efficiency of the comb cylinder B.

Table V contains the results of the combing performance of comb cylinders A and B with the nineteenth and twentieth rows of the cylinder removed. Combing was carried out at a gauge setting of 28 mm with a gill-feed of 4.2 mm. When using only 18 rows of pins both comb cylinders showed a slight increase in impurities in the top compared with the top combed with cylinders with a full complement of pin rows.

With 18 rows of pins comb cylinder A still gave a cleaner top, although the gaps between the pins in rows 11 to 18 were, on the average, bigger for comb cylinder A than for B. These results support the hypothesis of a better piercing power of the

TABLE IV

COMBING PERFORMANCE OF COMBING CYLINDERS USING FLAT AND ROUND PINS

Gauge (mm)	Combing Cylinder *	% Noil	Impurities per 20 gram top	
			Neps	Vegetable particles
24	A	3.90	18.8	62.2
	B	3.80	26.0	73.9
26	A	4.88	8.2	12.7
	B	4.67	21.3	24.3
28	A	5.20	6.8	7.7
	B	4.99	10.9	15.1
30	A	5.65	4.3	7.5
	B	5.46	10.1	10.8
32	A	6.36	11.0	5.7
	B	5.98	17.2	8.1
Average	A	5.20	9.8	19.2
	B	4.98	17.1	26.4

* A = Coarse segment – round pins
Fine segment – round pins
B = Coarse segment – round pins
Fine segment – flat pins

round pins, with the result that the beard will go down to the base of the pins and facilitate the efficient removal of impurities.

THE UNICOMB COMB CYLINDER

Cleanliness of tops:

For comparison of the cleanliness of the tops produced by comb cylinder C and the Unicomb comb cylinder, a 9/11 months seedy wool, containing 0.9% by weight of vegetable matter in the card sliver, was used.

Table VI gives the percentage noil and the number of neps and vegetable particles in the top for three gauge settings with different gill-feeds. The average values at each gauge setting are also given.

TABLE V

THE EFFECT OF THE NUMBER OF PIN ROWS ON THE COMB CYLINDER ON TOP CLEANLINESS (COMB CYLINDERS A AND B)

Comb cylinder*	No. of rows	Gauge (mm)	%Noil	Impurities per 20 gram top	
				Neps	Vegetable particles
A	20	28	5.15	12.2	10.8
	18	28	4.99	12.8	13.6
B	20	28	4.87	13.4	15.5
	18	28	4.87	17.6	16.8

* A = Coarse segment – round pins
Fine segment – round pins

B = Coarse segment – round pins
Fine segment – flat pins

In this particular case the Unicomb comb cylinder produced more noil. The differences in neps and vegetable particles in the tops were, however, small with the result that there was little to choose between the two comb cylinders as far as cleanliness of the top was concerned.

Noil, m.f.l. and percentage fibre breakage:

The percentage noil and m.f.l. of the tops produced by the Unicomb comb cylinder and the comb cylinder C from four different wools (nearly free from vegetable matter) were measured, the results appearing in table VII.

In the case of the 7/9 months fleece wool and the 9/11 months backs (30 and 32 mm gauge setting) the Unicomb comb cylinder produced significantly less noil than comb cylinder C. In all the other cases little or no difference in percentage noil could be detected.

The differences in m.f.l. of the tops were so small that there was little to choose between the m.f.l.'s produced by the two types of comb cylinders.

Table VII also contains the total percentage fibre breakage which occurred during combing, using the Unicomb comb cylinder and combing cylinder C, respectively. Although the percentage fibre breakage differed slightly when different

TABLE VI

COMPARISON OF THE COMBING PERFORMANCE OF A CONVENTIONAL (C) AND UNICOMB COMB CYLINDER USING A 9/11 MONTHS SEEDY WOOL

Gauge (mm)	Gill-feed (mm)	%Noil		Impurities per 20 gram top			
				Neps		Vegetable particles	
		Unicomb	Cylinder C	Unicomb	Cylinder C	Unicomb	Cylinder C′
24	2.9	6.65	6.43	20.0	25.6	44.3	35.4
	4.2	6.83	6.47	22.3	15.6	66.3	63.5
	Average	6.74	6.45	21.2	20.6	55.3	49.5
26	2.9	7.28	7.14	21.6	26.4	24.6	26.0
	4.2	7.48	7.20	18.8	17.7	29.3	24.5
	5.7	8.32	7.46	10.8	12.9	40.3	33.8
	Average	7.69	7.27	17.1	19.0	31.4	28.1
28	2.9	8.86	8.33	20.5	26.2	23.3	19.6
	4.2	8.57	8.04	19.6	27.1	23.2	25.0
	5.7	9.12	8.19	12.8	20.6	22.1	23.9
	Average	8.85	8.19	17.6	24.6	22.9	22.8

cylinders were used, no definite trend could be observed. The differences in percentage fibre breakage were, however, so small that no choice could be made between the two combing cylinders on the basis of fibre breakage.

Combing speed:

To investigate the effect of combing speed (cycles/min) on the relative performance of the Unicomb comb cylinder and comb cylinder C, a 9/11 months seedy wool and a 10/12 months fleece wool (nearly free from vegetable matter) were used. Combing was carried out at a gauge setting of 28 mm and with a gill-feed of 4.2 mm. The results appear in Table VIII.

TABLE VII

PERCENTAGE NOIL, M.F.L. OF TOP AND PERCENTAGE FIBRE BREAKAGE FOR THE UNICOMB CYLINDER AND CONVENTIONAL CYLINDER C

Wool	Gauge (mm)	Gill-feed (mm)	Comb Cylinder C			Unicomb Cylinder		
			% Noil	M.f.l. top (cm)	% Fibre Breakage	% Noil	M.f.l. top (cm)	% Fibre Breakage
7/9 Months Fleeces	24	3.6	5.20	4.98	8.6	4.91	5.00	10.6
		4.2	5.14	5.00	11.9	4.90	4.98	10.1
	28	3.6	7.24	4.96	16.7	6.78	4.95	18.5
		4.2	7.01	5.12	15.6	6.42	5.06	14.8
9/11 Months Fleeces	26	3.6	2.99	5.95	7.2	3.06	5.73	13.4
		5.0	3.11	5.71	11.0	3.16	5.77	10.6
	32	3.6	5.15	5.85	15.8	5.13	5.84	18.4
		5.0	4.67	5.83	16.0	4.63	5.80	18.2
12 Months Fleeces	25	3.6	2.76	7.38	11.9	2.80	7.12	17.0
		5.0	2.84	7.52	9.5	2.87	7.60	7.8
	29	3.6	3.63	7.34	13.9	3.55	7.29	15.8
		5.0	3.60	7.59	11.5	3.59	7.50	15.8
9/11 Months Backs	26	4.2	4.38	5.30	15.0	4.32	5.19	15.1
	28	4.2	5.05	5.34	18.8	4.97	5.32	18.0
	30	4.2	6.20	5.47	21.4	5.50	5.30	18.0
	32	4.2	7.69	5.34	23.1	7.25	5.41	19.1

In both cases, comb cylinder C showed little or no change in the percentage noil with increasing speed, whereas the Unicomb comb cylinder showed a decrease in percentage noil with increasing speed.

The amount of noil extracted depends, amongst other factors, on the extent to which the pins of the cylinder penetrate the portion of the beard close to the nipper jaws. At high speeds the Unicomb comb cylinder, with its high pin density, might have been unable to penetrate the highly compressed portion of the beard, close to

TABLE VIII

THE EFFECT OF COMBING SPEED ON THE COMBING PERFORMANCE OF THE UNICOMB CYLINDER AND COMB CYLINDER C

Wool	Comb Cylinder	Speed (cycles/min)	% Noil	Impurities per 20 gram top	
				Neps	Vegetable particles
9/11 months Seedy wool	Conventional (C)	130 150 165	8.04 8.08 8.03	21.5 23.6 23.0	25.1 23.3 25.9
9/11 months Seedy wool	Unicomb	130 150 165	8.50 8.29 8.08	20.1 19.4 20.0	24.8 24.1 27.7
10/12 months Fleeces	Conventional (C)	130 150 165	5.02 5.06 5.10	20.6 28.1 24.1	6.6 6.0 8.0
10/12 months Fleeces	Unicomb	130 150 165	5.35 5.29 5.11	29.0 28.1 25.3	7.5 6.7 9.4

the nipper jaws, to the same extent as the conventional cylinder and thus extracted less noil with increasing speed.

Due to the overlap of the combing action of the top comb and the cylinder, the abovementioned effect does not affect the cleanliness of the top. Therefore, no significant tendency of impurity content of the top could be detected with increasing speed.

The timing of the comb cylinder:

The timing of the comb cylinder refers to that moment during the combing cycle at which the leading edge of the comb cylinder is exactly opposite the nipper jaws. By adjusting the timing, i.e. by rotating it on its axis, it is possible to eliminate the first or last 25% of the comb cylinder.

In the present investigation three settings were used: **normal**, when the complete comb cylinder was in action; **advanced**, when the trailing 75% (excluding the 25% on the coarse side of the cylinder, i.e. 25% to 100%) was in action; **retarded**, when the leading 75% (excluding the 25% on the fine side of the cylinder, i.e. 0 to 75%) was in action.

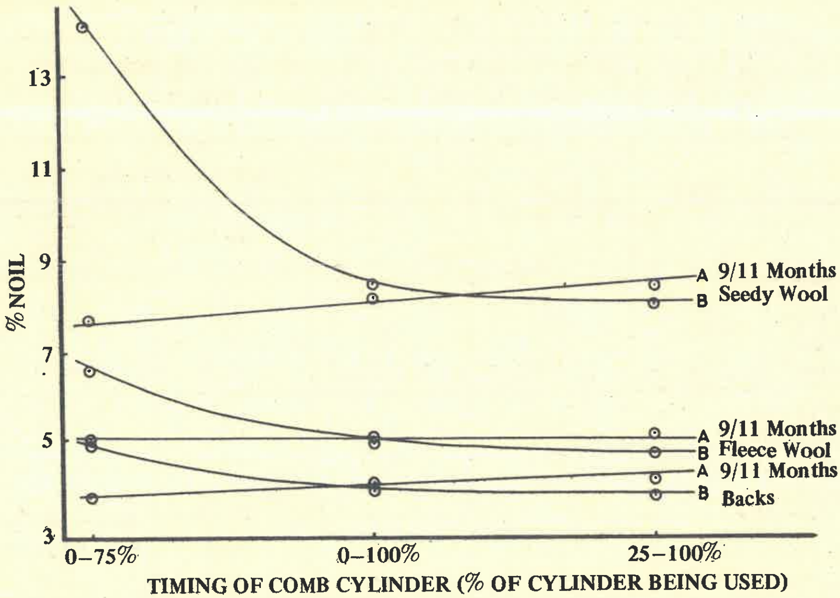

FIGURE 4

Percentage noil versus timing of comb cylinder:
A – Conventional comb cylinder
B – Nitto Unicomb comb cylinder

The results are given in fig. 4, in which percentage noil has been plotted versus timing of the comb cylinder. When only the leading 75% of the comb cylinder was in action the Unicomb comb cylinder produced from 20% to 50% more noil than the conventional type comb cylinder C. With only the trailing 75% in action the Unicomb comb cylinder produced less noil.

When the timing was such that only the leading 75% of the comb cylinder was in action, the upper nipper jaw had already reached its lowest position at the moment when the leading edge of the comb cylinder struck the beard. The complete length of the beard was therefore instantaneously subjected to the full combing action of the comb cylinder. In the case of the conventional type comb cylinder C this had very little effect as the pin densities of the first rows were low (4 to 10 pins per cm). The high pin density of the Unicomb comb cylinder, however, necessitated a gradual lowering of the beard into the pins.

It is, therefore, not advisable that the Unicomb comb cylinder be retarded to such an extent that the leading edge reaches the nipper jaws when the latter has already reached its lowest position.

Number of preparatory gillings:

The effect of the number of preparatory gillings (2, 3, 4, 5 and 6) on the combing performance of the Unicomb comb cylinder and comb cylinder C is illustrated in fig. 5, where graphs of percentage noil versus number of gillings are given

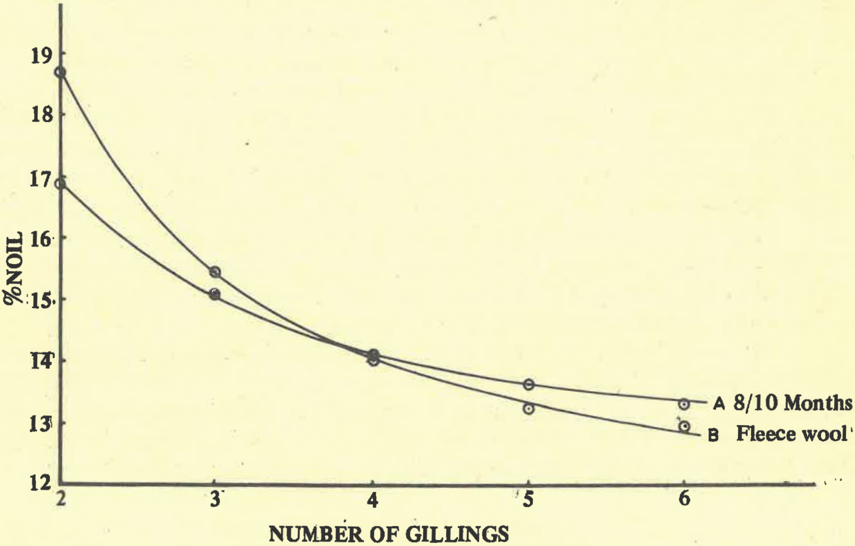

FIGURE 5

Percentage noil versus number of gillings:
A – Conventional comb cylinder
B – Nitto Unicomb comb cylinder

for a 8/10 months wool. By manually reversing the direction of the slivers, all the slivers were fed to the comb in a direction opposite to that in which they had left the card.

After two and three gillings when perfect fibre alignment had not yet been achieved the Unicomb comb cylinder produced significantly more noil than the conventional comb cylinder C. With better fibre alignment (after 5 and 6 gillings) the Unicomb comb cylinder produced less noil than the conventional comb cylinder C. Fibre alignment was found to be of less importance when the conventional type comb cylinder with progressively increasing pin density was used than when the Unicomb comb cylinder with a high pin density was used.

Fibre alignment in these particular card slivers was low as indicated by the exceptionally high withdrawal force[3] (27 kgf/g after 3 gillings), and high percentage noil. For card slivers of a higher quality resulting in better fibre alignment during gilling, the difference between the two cylinders will be less.

General performance of the Unicomb cylinder:

The Nitto Unicomb comb cylinder was used on a large variety of 64's wools, ranging from short to long and from clean to seedy. With the correct setting of the circular brush no build-up of fibrous material or vegetable particles between the pins of the Unicomb comb cylinder could be detected with any of these wools. This can lead to a reduction in the number of stoppages as no cleaning is then necessary. Regular cleaning was necessary with the conventional type comb cylinder.

The Unicomb comb cylinder was tested for a total of 130 hours, of which about 50 hours were under mill conditions. At the end of this period no damage whatsoever to the pins was observed. This indicates that, barring unforeseen accidents and provided piecing-up behind the comb is properly done, the life of the Unicomb comb cylinder is probably much longer than the conventional type cylinder.

At gauge settings of above 26 mm, overflow of the beard occurs at the sides of the Unicomb comb cylinder. This is due to the fact that the working width of the Unicomb comb cylinder is 18 mm narrower than that of the conventional type comb cylinder. This could easily be rectified by the manufacturers.

The results of the effect of speed, number of gillings and timing of the comb cylinder indicate that the combing performance of the Unicomb comb cylinder could possibly be improved if the coarse segment be constructed in such a way that there is a more gradual increase in pin density. A subdivision of this coarse segment into two sections of very low and low pin densities may be beneficial.

COMPARISONS AND SUMMARY

As far as percentage noil was concerned the comb cylinder (B) with flat pins on the fine segment compared well with the comb cylinder (A) with round pins throughout. The use of flat pins on the comb cylinder in this particular case, however, resulted in more neps and vegetable particles (see table IV) in the top.

The comparison of the Nitto Unicomb comb cylinder and the conventional type comb cylinder (C) showed, that as far as impurity content and m.f.l. of the top and fibre breakage were concerned, there was no significant difference between the two comb cylinders.

The combing performance of the Nitto Unicomb comb cylinder was, however, affected more by the degree of fibre alignment in the input slivers and by the speed of the comb than that of the conventional type comb cylinder. This could be ascribed to the unique construction of the Nitto Unicomb comb cylinder resulting in a more severe combing action.

The Unicomb comb cylinder showed advantages as far as mechanical strength, ease of replaceability and maintenance were concerned.

Although it is slightly more expensive to replace a Unicomb comb cylinder in case of damage than to repin a conventional cylinder, the higher cost per cylinder will be offset by an increased life. It was, however, beyond the scope of this investigation to determine the life of the different comb cylinders.

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THE USE OF PATENT NAMES

The fact that substances with patent names have been used in this publication in no way implies that the South African Wool Textile Research Institute recommends such substances for use or that there are not other substances that are as good or better.

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