TEXTILE MACHINERY AT THE PARIS EXHIBITION.

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Several apparatus for recording the counts and physical qualities of yarns are shown in the Textile Gallery of the Paris Exhibition; of these the most representative may be described. M. Plat et Cie., of Paris, exhibit a device illustrated in Fig. 4; the object of this is to show the count rapidly without the previous process of winding a given weight or length on a reel of fixed diameter; it is especially useful when only a short length of the thread to be tested, is available. The reel is replaced by a flat strip of wood 50 centimetres long, around which the thread is wound a certain number of times in order to obtain the measure desired. If, for example, it is a thread of combed wool that has to be tested, giving less than 50,000 metres per kilogramme, it will be sufficient to wind the sample twice around the gauge strip, which will represent a length of 2 metres. The length thus obtained is hung to the hook at the end of a light rod shown in the figure, and to which the long index needle is attached; the end of this needle is free to sweep over the face of the graduated arc of the apparatus, and the amount of its deflection can be read directly on the arc; the reading gives the desired number. As will be seen, three scales are inscribed on the arc, corresponding to three different lengths of yarn—40, 20, and 2 metres. If, on the other hand, it be desired to fix the count of a quantity of wound yarn, ten spools are taken from the number, and from these enough yarn is drawn to wind four times around the gauge, giving 40 metres total length; when this combined 40 metres skein is hung on the arm of the device, the count desired is read off the 40-metre scale.

Among the more curious recording instruments exhibited is the "serigraphe," the invention of an American engineer, Mr. Sorrel, who visited France many years ago, to study the textile treatment of silk, and who had the idea of utilising the elasticity and tenacity of the raw silk fibre, as a measure of its commercial value. In this apparatus, which is illustrated in Fig. 5, the silk fibre, A, to be tested, coming from a spool, is wound round the roller B, which is a few centimetres in diameter, and the surface of which is covered with rubber, to prevent slipping; the fibre then passes over the small pulley C at the other end of the apparatus; this pulley is fast on a metallic pendulum G. The thread is then brought back and turned round the roller D which is fixed on the same spindle as the roller B; it also is covered with rubber, and its turn is made by a vertical roller E, which turns several times round its axis. The work of the latter is to beat the fibres, which pass between it and a horizontal drum F, and is a sort of nibbler. The drum is fast to the pendulum G, which is attached to the end of a vertical arm I, and serves as a pencil holder. The point of this pencil is made to bear on a strip of paper graduated in millimetres, and which is placed round the drum M. A light transmission shaft N, with pinions and screw gear, connects the recording drum with the rest of the mechanism. The ratio of speeds is 1 to 5000, so that for each 5 metres of silk wound on the spool E, the recording drum M turns through 1 millimetre. The working of the apparatus will now be clear; the second roller having a diameter 50 per cent. greater than the first, the silk, in order to pass from one to the other, after turning round the pulley C, is stretched 50 per cent. The tension corresponding to this extension acts on the end of the pendulum, which is drawn from its vertical position more or less according to the tensile strength of the silk. The pencil follows the movements of the pendulum, and is always in contact with the paper on the drum, the ordinates of which correspond to the sines of the angles of deviation of the pendulum, and the movements indicate the exact variations in the tenacity of the thread under a fixed percentage of extension. By raising or lowering the weight of the pendulum, the apparatus can be so regulated, that to a given tractive effort there shall correspond a known displacement of the pencil, for example, 1 millimetre movement shall represent 1 gramme of tractive effort. Although this highly ingenious device has not found a commercial adoption for the current testing of raw silk fibres, it has proved of great utility in the investigation of hidden faults. The inventor has, moreover, found a very useful application for it in silk-spinning, by making it automatic in its action. Certain additions, driven electrically, have been made, by which, when once regulated, it adds automatically the cocoons required to maintain the regularity of the silk thread; the operator has only to have a general supervision and to keep the basket served the magazines filled with cocoons, it is said that silk spun by the Sorrell system is weakened to a certain extent on account of the constant extension to which it is subjected, and that it does not possess so much elasticity as silk spun by hand; this allegation probably explains why this very ingenious system has not found a larger application, but it remains to be proved how far the objection is well-founded. M. Dassanau, of Lyons, shows an apparatus, the special object of which is to detect visible faults in silk thread, and which are due to "figure of eight" loops in which the silk-worm arranges the lining of the cocoon; these loops are much smaller in the inner than the outer parts of the cocoon, and being difficult to eliminate perfectly in the preliminary process, they are apt to reappear in the operation of spinning, sometimes separately, and often in small groups. The apparatus consists of a frame of four or five loom (Fig. 6), on which the silk to be examined has been wound; these reels run freely on their frame,
the position or angle of which can be varied at will. 

If a winding reel made with ten sides, as shown in the diagram, and with grooves one deci-
metre apart; this receives the silk on its ten-sided 
perimeter, the development of which measures 
exactly 1 metre; to this is geared a revolution 
counter. 3. Of an achromatic lens placed in the 
centre of the apparatus on an adjustable stand that 
can be inclined when desired. On two supports 
behind the lens the four or five silk threads coming 
from their respective bobbins pass through a guide. 
The threads are kept parallel as they move, and are 
seen through the lens magnified three or four times, 
the enlargement being made more distinct by the 
use of a dark screen placed in a suitable position 
behind the magnifying glasses. 4. Of a defect counter 
made with three sections, and controlled by keys.

The apparatus is placed on a table, and, needless 
to say, should be fitted with the best available 
light. Sitting opposite the lens, the operator 
turns the crank geared to the winch, with his right 
hand, thus drawing the silk off the frame contain-
ing the bobbins. The four or five threads from these 
are led through glass guides on the frame carrying 
the lens, behind which they pass parallel, and at 
distances from each other of 5 or 10 millimetres.

The operator places three fingers of the left hand 
as the control keys. The first of these records 
very serious defects; the second and third, faults 
of medium, or insignificant nature, respectively. 
This principle of winding with one hand, and 
operating the keys with the other, is not found 
difficult or fatiguing. The defects, magnified as 
they are, can be easily seen without any 
great strain on the eyes, and the process is made 
much easier from the fact that the operator can vary 
the distance between the points at which he passes the threads 
behind the lens, and in very defective parts can 
stop altogether while he makes the record. As 
the operator passes over a metre, 500 revolu-
tions, will have passed a length of 2000 metres 
(five bobbins) beneath the inspection of the 
operator; and in all ordinary cases this length is 
sufficient as a test sample. If desired the count may 
then be obtained by weighing the wound thread.

Fig. 7 illustrates a device for making torsion 
tests of threads, and is the design of M. Paul 
production of any particular tissue. Or, again, he 
wishes to know when the yarns have been dried, to 
what extent, if any, the process has affected their 
physical qualities. On the other hand, the buyer 
naturally desires to know if the textiles he purchases 
possess the strength which he requires. 

The apparatus used to test the tensile strength 
of threads, determines their elasticity at the same 
time; the latter term being applied incorrectly 
to the extension of the threads at the moment of 
rapture. There are quite a variety of devices for 
this purpose, based on different principles, 
but all have this point in common, that a part 
of the sample to be tested is held firm, and lightly 
strained through the use of two clips at a constant 
distance apart. By different means in the several 
apparatus, one of the points of support is withdrawn 
as to increase the distance between the two, 
and the moving support is connected with a recording dynamo-
meter on which the strain exerted can be read by 
means of an index passing over the scale on the 
recorder. The strain is gradually increased until a 
rapture of the sample takes place; the results 
given at that moment are carefully recorded. The 
instrument of this class, according to their 
special object, of very varying capacity, and are 
sometimes vertical, sometimes horizontal. In some 
the tractive effort is produced by a hand-turned 
crank; in others, when very small resistances are 
to be measured, a weight acting progressively, is 
employed. The recording dynamometer is operated 
either by a spring, or by a counterweighted lever; 
le Sect. 24. 24. (See Fig. 8.) One of the most accurate instruments 
of this class to be seen in the Exhibition is that 
employed officially by the Chamber of Commerce of 
Lyon, and known as the 'serrimeter'; it is used for 
testing fine yarns, and especially silk threads.

It is a vertical machine, and is illustrated in Fig. 8.

The tractive effort is obtained by a weight, the fall 
of which is checked by a clockwork regulator; the 
dynamometer is of the weighed lever type. Two 
screw studs are used to stretch the thread to be 
tested; the two points of attachment are 50 centi-
metres apart. A lever within the apparatus, act-
ing as a brake, and moving around a horizontal 
axis, keeps the weight normally at rest. By means 
of a special arrangement of this lever, the weight 
is free to fall when the thread is stretched ver-
tically, but it is stopped instantly when the 
thread breaks. As a rule, at least ten consecutive 
tests are made with the same sample, the mean of 
these being taken. The breaking strain, which 
is independent of the length of the thread, its weight 
being so insignificant, is recorded from the direct 
reading of the instrument, while the figure given 
for extension is dobled, in order to obtain the result 
for an inch. To this latter figure a correction must 
be added to compensate for the fall of the dynamo-

carried in the textile industry by 
special and very varied apparatus. In another 
article we shall deal with instruments of a similar 

class, but adapted for testing textiles.

(To be continued.)