PLATTS TEXTILE RULE

This rule has been designed to give direct answers to production calculations for speed frames, ring frames and doublers. Also included are scales which facilitate certain other technical calculations.

The main advantages in using the rule are:

(1) Simplicity and quickness of operation.

(2) The effects or importance of changing the magnitude of one or more factors can be assessed readily.

(3) Possibilities of error are minimised since no calculations are required.

CONSTRUCTION AND OPERATION

The main body of the rule carries a movable slide. Both the body and the slide are scaled on each side, one side being employed for ring and doubling frame calculations and the other for speed frame calculations.

A transparent cursor, on which is marked the cursor line and an efficiency scale, is located in the body. The cursor should be positioned over the slide, whichever face of the rule is in use. Consequently, when changing from ring frame to speed frame calculations, the cursor should be removed and replaced on the other side above the slide face scaled for speed frames, and vice versa.

INSTRUCTIONS FOR USE

PRODUCTION CALCULATIONS

The form of the production calculation is identical for ring frames and speed frames. It is:

Pounds per spindle per hour at 100% machine utilization

$$= \frac{\text{spindle r.p.m. x 60}}{\text{turns per inch x 36 x 840 x hank or count}}$$

By using resultant count instead of count, this equation is equally applicable to doublers.

FRONT ROLLER DELIVERY RATE

Ignoring yarn contraction due to the twist inserted

$$\text{Front roller delivery rate} = \frac{\text{spindle r.p.m.}}{\text{turns per inch}}$$

To obtain this:

(1) Set the spindle speed on the slide against the turns per inch on the lower fixed centre scale.

(2) Read off the value of the front roller delivery rate shown in the "window" against the indicating line.

This setting is part of the sequence for a production calculation. Consequently, front roller delivery rate can be obtained during such a calculation for either speed frames, ring frames or doublers without any need for a special setting of the slide.

Example 3 (Fig. 1)

Determine the front roller delivery rate for a spindle speed of 7,500 r.p.m. with 12 turns per inch inserted.

(1) Set 7,500 r.p.m. on the slide against 12 turns per inch on the lower fixed centre scale.

(2) Read off the value 625 inches per minute in the "window".

HANKS PRODUCED PER 10 HOURS

This quantity, which is particularly useful for speed frame production and wage calculations, is obtained from exactly the same setting as that for front roller delivery. Again, the answer can be found during a production calculation.

Example 4

Find the front roller delivery rate and hanks produced per 10 hours on a speed frame when the spindle speed is 1,000 r.p.m. and 2 turns per inch are inserted.

(1) Set 1,000 r.p.m. on the slide against 2 turns per inch on the lower fixed centre scale.

(2) Read off the front roller delivery rate of 500 inches per minute in the right-hand "window" and the hanks produced per 10 hours as 9·9 in the left-hand "window"

TRAVELLER VELOCITY

A close approximation to the traveller velocity in feet per second is given by

$$\frac{\text{spindle r.p.m. x ring diameter x } \pi}{60 \text{ x } 12}$$

To obtain the traveller velocity proceed as follows:

(1) Position the cursor line beneath the required ring diameter on the centre fixed scale.

(2) Locate the required spindle speed on the slide under the cursor line.

The answer to a calculation of this kind is found as follows:

(1) Set the required spindle speed on the slide against the required turns per inch on the lower of the fixed centre scales.

(2) Retaining this setting, find the required count on the bottom scale of the slide and read off the value indicated on the fixed bottom scale below this count. The answer will be the production per spindle per hour in pounds at 100% efficiency.

It a correction for machine efficiency is desired, merely move the cursor line to the required count on the slide scale and read off the answer on the bottom fixed scale under the appropriate value on the cursor efficiency scale.

Example 1 (Fig. 1)

Find the production per spindle per hour on 9s count when the spindle speed is 7,500 r.p.m. and 12 turns per inch are inserted.

(1) Set 7,500 r.p.m. on the slide against 12 turns per inch on the lower fixed centre scale.

(2) On the bottom scale, under 9s count, read the production 0·138 pounds per spindle per hour.
At 95% efficiency the production is 0·131 pounds per spindle per hour.

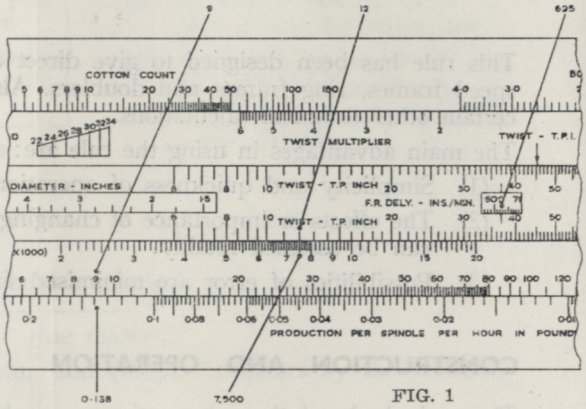

FIG. 1

TWIST CALCULATIONS

When the twist multiplier, or twist factor, is known, the turns per inch can be found from the relationship

$$\text{T.P.I.} = \sqrt{\text{count}} \times \text{twist multiplier.}$$

This calculation is performed on the rule in the following manner:

(1) Set the required twist multiplier on the slide against the required count on the top fixed scale.

(2) Read off on the upper fixed centre scale the value of the turns per inch given under the indicating arrow.

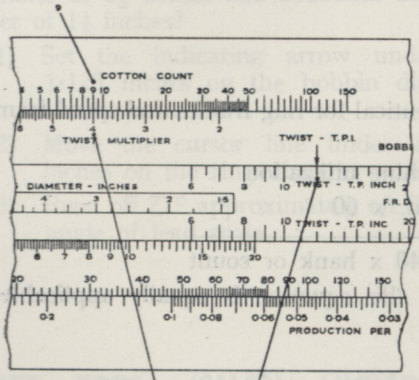

FIG. 2

Example 2 (Fig. 2)

Find the turns per inch for 9s count with a twist multiplier of 4,

(1) Set 4 on the slide against 9s count on the top fixed scale.

(2) Under the indicating arrow read the value 12 turns per inch on the upper fixed centre scale.

Now proceed as in Example 1 if the production rate is required.

(3) Read up from the indicating arrow on the slide to the traveller velocity on the fixed centre scale.

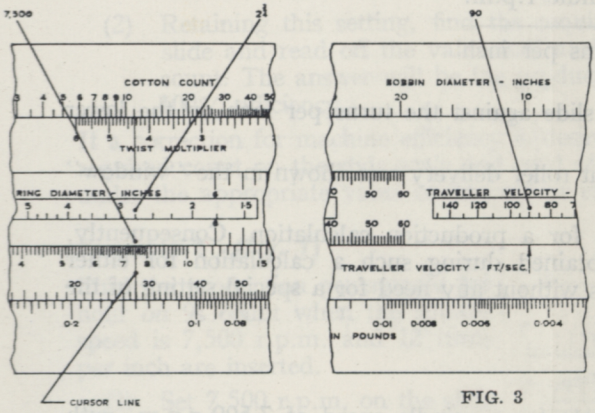

FIG. 3

Example 5 (Fig. 3)

Find the traveller velocity for a spindle speed of 7,500 r.p.m. and a ring diameter of $2\frac{3}{4}$ inches.

(1) Set the cursor line under $2\frac{3}{4}$ inches on the ring diameter scale.

(2) Position 7,500 r.p.m. on the slide under the cursor line.

(3) Read off the value 90 feet per second above the indicating arrow on the traveller velocity scale.

ANGLE OF LEAD

The angle of lead α is given by

$$\sin \alpha = \frac{\text{bobbin diameter}}{\text{ring diameter}}$$

This can be resolved for a range of ring and bobbin diameters by the following procedure:

(1) Set the indicating arrow on the slide against the required bobbin diameter on the top fixed scale.

(2) Position the cursor line beneath the required ring diameter on the centre fixed scale.

(3) Read off the angle shown under the cursor line on the small angle of lead scale on the slide.

Example 6 (Fig. 4)

What is the angle of lead for a ring diameter of $2\frac{1}{2}$ inches and a bobbin diameter of $1\frac{1}{8}$ inches?

(1) Set the indicating arrow under 1·125 inches on the bobbin diameter scale.

(2) Move the cursor line under $2\frac{1}{2}$ inches on the ring diameter scale.

(3) Read off 27° approximately on the angle of lead scale.

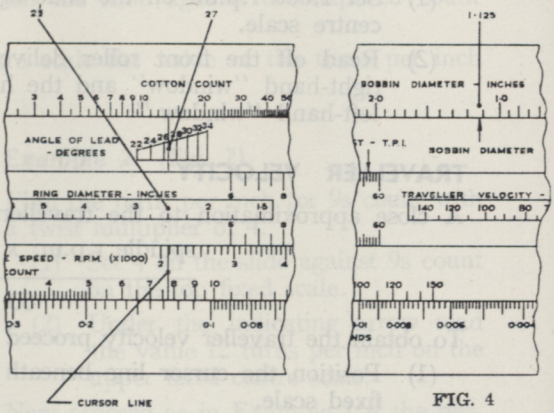

FIG. 4