Corrections (in red) of the calculating example in the article
George R. Stibitz's Film Slide Rule by D. von Jezierski and D. Rance
in the *Journal of the Oughtred Society*, Vol. 21:1, Spring, 2012, page 54

How did the Film Slide Rule work?

Sadly it is difficult to judge how accurate the Film Slide Rule was. Speculatively, and going by the length of the film roll scales, results were probably accurate to 5 or even more digits.

What follows, based on the patent description, is a worked example for a five-film machine particularly applicable to the solution of trigonometric problems. By changing the cam arrangement and the scales, various other problems could also be solved.

Let us consider a trigonometric example taken from the patent. We start with a right-angled triangle with side A and adjacent angle ß.

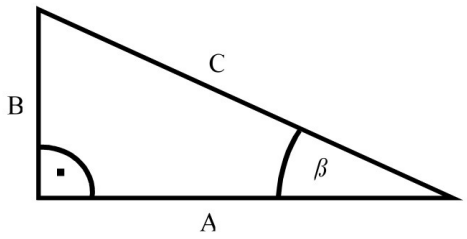

FIGURE 4. Trigonometric example problem

Formulas to be considered:

$C = A/\cos ß$ → $\log C = \log A - \log \cos ß$
$B = A*\tan ß = A*\sin ß/\cos ß$ → $\log B = \log A + \log \sin ß - \log \cos ß$

The task is to calculate the length of side B opposite to angle ß, and the length of the hypotenuse C.

For this kind of calculations the following scales are used within the machine (in the patent the scales a), b), c), d), and e) are named 10, 11, 12, 70, 71):

a) logarithmic scale 200 to 20000

b) logarithmic scale 200 to 20000

c) logarithmic scale 200 to 20000

d) log sine scale 0.56250 to 900 (given by unit mil, where 1 mil = 1/6400 of 360°)

e) log cosine scale 1.68750 to 89.43750 (given by unit mil again)

The different scales are connected to a camshaft. The camshaft controls which scales will move simultaneously during operations, where the other scales will stay in their recent positions. For the above mentioned trigonometric problem three different camshaft positions are used:

I. Scales b) and d) will move
Scales a), c), and e) will not move

II. Scales a), b), and c) will move
Scales d) and e) will not move

III. Scales a) and e) will move
Scales b), c), and d) will not move

Now we can start the calculating operations itself. Set all the scales to the starting position. (n.b.: not mentioned in the patent description). Afterwards follow the three operations given in Table 1.

TABLE 1. Three cam positions and their corresponding working

			Cumulative distances moved on single scales				
Shift to camshaft position	***Scale operation***	***Moved distance during operation***	***Scale a) log***	***Scale b) log***	***Scale c) log***	***Scale d) log sine***	***Scale e) log cosine***
I. b) and d) move	Move scale d) to ß	log sin ß	*No movement*	log sin ß	*No movement*	log sin ß	*No movement*
III. a) and e) move	Move scale e) to ß	log cos ß	log cos ß	*No movement*	*No movement*	*No movement*	log cos ß
II. a), b) and c) move	Move scale a) to A	log A - log cos ß	log A	log A - log cos ß + log sin ß	log A - log cos ß	*No movement*	*No movement*
Final scale readings			A	B = A*sin ß/cos ß = A*tan ß	C = A / cos ß	ß	ß