V. DAEMEN.

CALCULATING DEVICE.

APPLICATION FILED FEB. 1, 1922.

1,433,186. Patented Oct. 24, 1922.

Fig. 1.

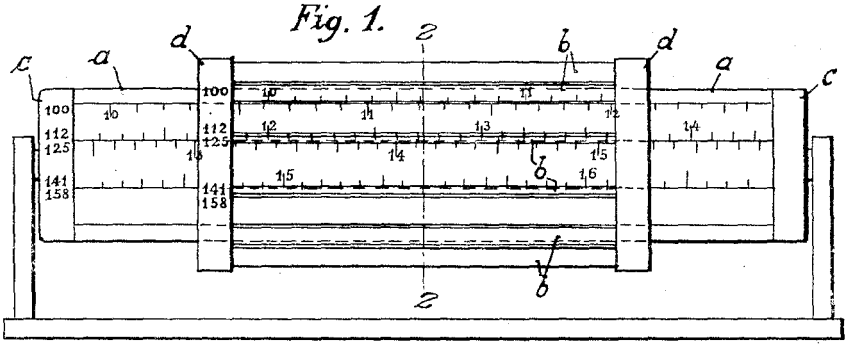


Fig. 2.

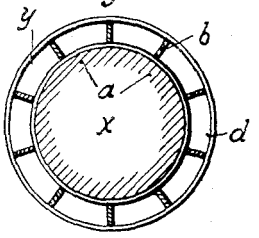


Fig. 3.

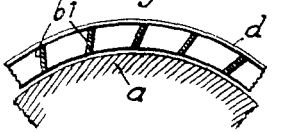


Fig. 4.

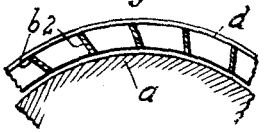


Fig. 5.

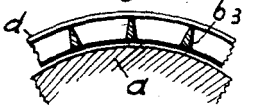


Fig. 6.

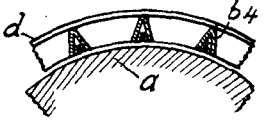


Fig. 7.

Fig. 8.

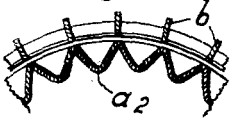


Fig. 9.

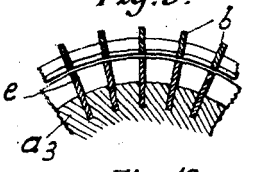


Fig. 10.

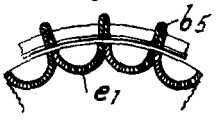


Fig. 11.

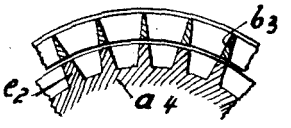


Fig. 12.

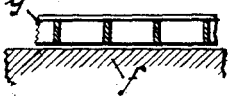
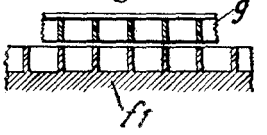


Fig. 13.



Inventor-
Victor Daemen.
By. B. Singer. Atty.

Patented Oct. 24, 1922. 1,433,186

UNITED STATES PATENT OFFICE.

VIKTOR DAEMEN, OF FRANKFORT-ON-THE-MAIN, GERMANY.

CALCULATING DEVICE.

Application filed February 1, 1922. Serial No. 533,404.

To all whom it may concern:

Be it known that I, VIKTOR DAEMEN, a citizen of the German Republic, residing at Schillerstrasse No. 26, Frankfort-on-the-Main, have invented new and useful Improvements in Calculating Devices (for which I have filed application for patent in Germany January 23, 1921), of which the following is a specification.

The present invention relates to the well known class of calculating devices comprising two bodies (cylinder and slide, rule and carrier, disks etc.) movable with reference to each other, each of said bodies being provided with logarithmical graduations, scales of figures etc. said scales, graduations being arranged in parallel rows and having a definite relation to each other allowing the performance of calculations (multiplications, division etc).

The main object of the invention is to increase the useful scale bearing portion of the surface of said bodies without increasing the size of said bodies.

I attain this object by shaping the scale bearing portions of the calculating device in such a manner that none of the cooperating parts of the device covers scales or graduations of the other part, therefore the graduations may be arranged close to each other, without intermediate blank space between two consecutive rows of figures graduations etc. The capacity of the calculating device is thereby greatly increased.

With this and other objects in view as will more fully herein after appear, the invention consists in certain novel features of construction and arrangements of parts, hereinafter fully described illustrated in the accompanying drawings and particularly pointed out in the appended claim, it being understood that various changes in the form, proportions, size and minor details of construction may be made without departing from the spirit of the invention or sacrificing any of the advantages of the invention.

In the drawing:

Fig. 1 is a side elevation of a logarithmically graduated cylinder with slide;

Fig. 2 is a cross-section on line 2—2 of Fig. 1.

Figs. 3 to 13 show each a portion of the rim of a hollow cylinder or disk and of the slide cooperating therewith in section illustrating different profiles thereof.

The calculating device shown in Figs. 1 and 2 comprises a cylinder x on which a slide y is slidably mounted. The cylinder x is rotatably mounted in a base in the well known manner. The slide comprises a number of small bars b parallel to each other and to the axis of the cylinder x and placed at regular distance apart. The slide y is provided with a logarithmic graduation placed on said bars and on the surface of the cylinder two equal graduations are arranged in rows parallel to each other and to the bars. Between two consecutives bars b of the slide two rows or sections of the logarithmic graduations of the cylinder are placed. The bars b have rectangular cross-section, they are made as thin as compatible with the handling of calculating device, and are arranged radially with reference to the cylinder and with a narrow edge presented thereto. Both sides of each bar are provided with graduations and the graduations on one bar co-operate with two consecutive sections of the graduation on the cylinder. The scales on the two sides of the bars may be part of one of the same logarithmic graduation or they may be portions of different graduations. On each face of each bar more than one scale or graduation may be arranged. The ends of the bars are fastened to rings c bearing numbers designating the value of the adjacent piece of the graduation.

As shown in Figs. 3 and 4 the bars b^1 b^2 may be placed at an angle of less than 90° to the surface a of the cylinder. The bars b^3 as shown in Fig. 5 have knife-like cross-section and the bars b^4 are bent-off of thin material and they have triangular cross-section.

The surface of the cylinder may have any of the shapes illustrated in Figs. 7 to 11. The surface may be corrugated, fluted, grooved etc. to increase the area on which scales and graduations may be placed. The mantle a^1 and a^2 shown in Figs. 7 and 8 consists of thin material, sheet metal, stiff paper etc. The grooves a^1 of the mantle are shallow, the grooves a^2 being deeper. The scales or graduations on the cylinder may be placed on bars as shown in Fig. 9. In the mantle a^3 grooves are provided in regular distances apart running parallel to each other and to the axis of the cylinder. In each groove a bar e is fastened; the portion of each bar projecting from the cylinder is

provided with graduation. Co-operating with the said bars e are bars b of the slide which bars are provided with graduations.

The bars e may be made movable in radial direction in the slots of the cylinder, each may be provided with more than one graduation on each side or face and on the space between two consecutive bars e scales of figures or logarithmic graduations may be arranged. Fig. 10 shows a slide having bars b^5 made of a strip of thin material, sheetmetal, celluloid, or paper. The mantle of the cylinder consists of bars e^1 having semi-circular cross-section, the graduations being applied to the outer side of the bars e, adjoining the edges thereof. The cross-section of the bars e^1 may be made otherwise than shown for instance semi-elliptical etc. In the construction shown in Fig. 11 the slide is provided with bars b^3 of triangular-cross section, it being understood that the small side adjacent the mantle of the cylinder is very small. The mantle a^4 is provided with ribs e^2 the side walls of which are flat and tapering in such a manner that the faces of the bars b^3 and those of the ribs e^2 may be placed in one plane. The faces of the bars b^3 and of the ribs e^2 are provided with graduations.

Also different shapes of bars are shown with reference to devices comprising a cylinder, all the different bars, ribs, corrugations etc. may be used in combination with flat disks as shown in Figs. 12 and 13. In Fig. 12 a flat disk is shown, on which the graduations are arranged in rows parallel to each other and to the bars of a slide g movably arranged in a plane parallel to the disk f. In Fig. 13 the flat disk f^1 is provided with upright bars bearing graduations on their faces and co-operating with bars of a slide g movable parallel to said disk f^1.

The mantle of the cylinder a may be provided with slots between two consecutive graduations through which slots light may be thrown from within the cylinder by suitable means (mirrors etc.).

The invention as described above may be applied to rules, round disks etc.

What I wish to secure by U. S. Letters Patent is:—

A calculating device comprising a cylinder and a slide movably mounted thereon, bars on said slide parallel to the axis of the slide set at an angle to the surface of the cylinder, logarithmic graduations on both of the faces of each bar, grooves on said cylinder running parallel to the axis of the cylinder, the flat flanks of said grooves and the faces of the said bars of the slide being provided with logarithmic graduations bearing a definite relation to each other, the flanks and the faces being so arranged that they may be brought into a common plane.

In witness whereof I affix my signature.

VIKTOR DAEMEN.

Witnesses:

H. R. SOMMERHAFF,

G. FLESCH.