1,219,261.

Patented Mar. 13, 1917.

Fig. 1.
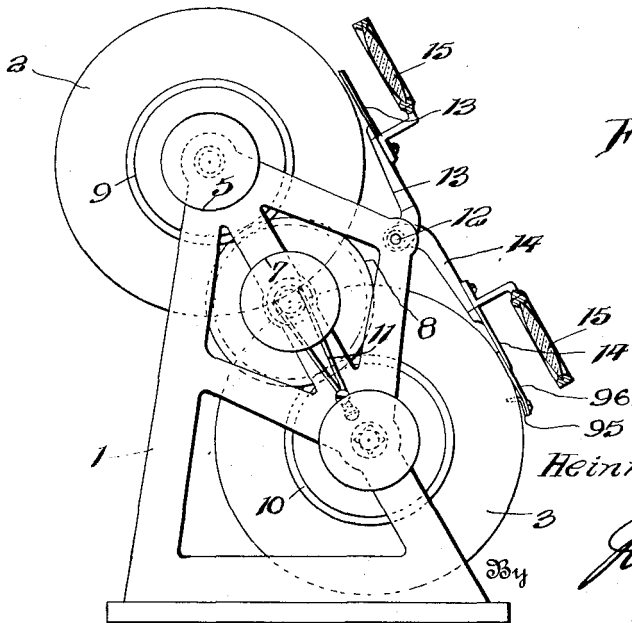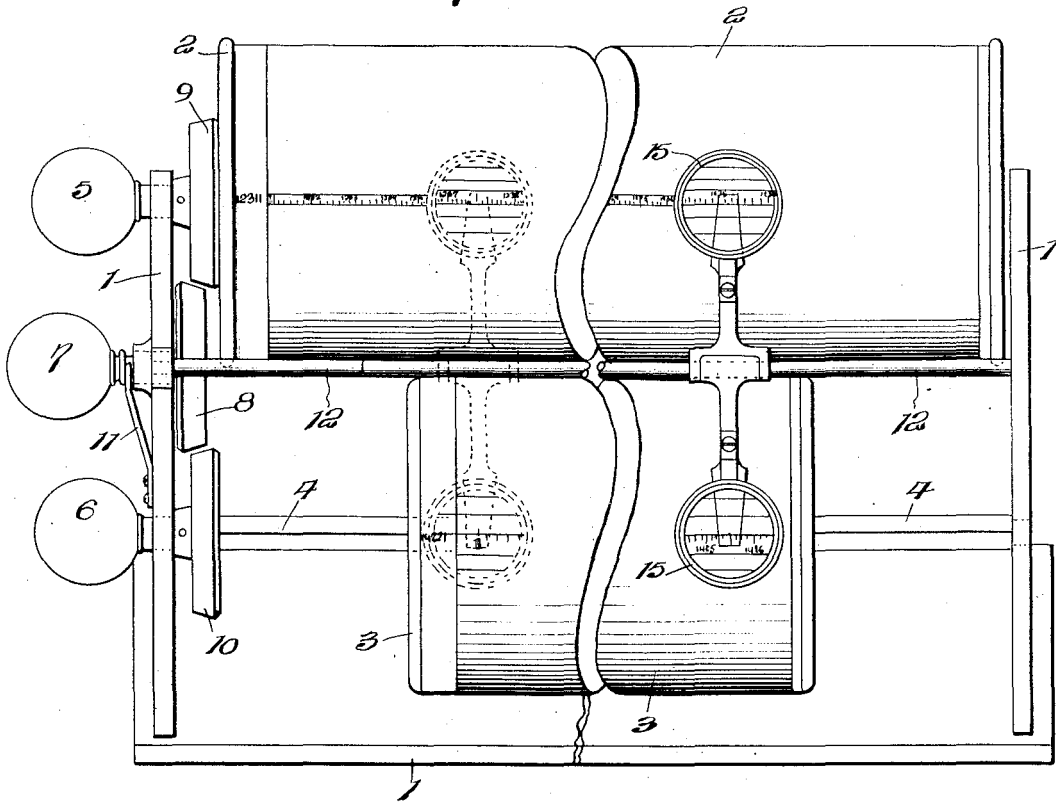
Fig. 2.

Inventor

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By

Attorney

HEINRICH DAEMEN-SCHMID, OF USTER, ZURICH, SWITZERLAND.

CALCULATING-MACHINE.

To all whom it may concern:

Be it known that I, HEINRICH DAEMEN-SCHMID, manufacturer, a subject of the German Emperor, and residing at Uster, Canton Zurich, Switzerland, have invented new and useful Improvements in Calculating-Machines, of which the following is a specification.

The subject matter of the present invention refers to an apparatus for calculating with logarithmic scales or scales of figures arranged on cylinders or rollers rotatably mounted in a suitable frame.

In such apparatus in use at present there is a slide inscribed with logarithmic scales slidably mounted on the cylinder and the primary object of the present invention is to provide an apparatus wherein the slide and the disadvantages adhering thereto are avoided.

With this primary and other incidental objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangements of parts, hereinafter fully described, illustrated in the accompanying drawings it being understood that various changes in the form, proportions size and minor details of the structure may be made without departing from the spirit of the invention.

In the accompanying drawings—

Figure 1 shows a front elevation of a calculating apparatus,

Fig. 2 is a side view of the complete apparatus.

The apparatus shown in Figs. 1 and 2 has two cylinders 2 and 3 mounted in a frame 1. The cylinders 2, 3 are parallel to each other and cylinder 2 has double the length of cylinder 3. On the surface of cylinder 3 a scale for instance a logarithmic scale of the natural series of numbers, or any scale of figures is marked off in lines parallel to the axis of the cylinder. The cylinder 2 has the same scale or graduations twice on its surface the graduations being adjacent each other. Cylinder 3 is slidably mounted on a shaft 4 with square cross section and the shaft 4 is rotatably mounted in the frame of the machine. Cylinder 2 is rotatably mounted in the frame 1 but has no axial movement. The axles of the cylinders 2, 3 are provided on their left hand sides with knobs 5 and 6 in the well known manner. Each of the cylinders 2, 3 may be rotated

separately and both may be rotated simultaneously by means of a friction gear 8 rotatably mounted in the frame 1. The axle of gear 8 carries a knob 7 and is movable in its axial direction in the frame 1. A spring 11 fixed by one end of the frame 1 engages with the free end the one or the other of two grooves on the axle 8 holding thereby the gear 8 in or out of engagement with the gears 9 and 10. To the frame 1 a bar 12 is fitted on which a pair of indexes 13, 14 are mounted. The indexes 13, 14 are movable on said guide bar 12 and each arm of said indexes can be raised independently. The indexes 13, 14 may end in points or they may be made in transparent material and may have a thin hair line. Over each index a magnifying glass 15 is arranged. The object of these indexes is to transfer values from one cylinder to the other. To make an exact adjustment of the hair lines possible the indexes may be provided with a micrometer adjustment.

To complete the foregoing description I will show by an example how the calculating apparatus may be advantageously used for practical purposes. Example: Convert 1485.45 marks into francs at the rate of 123.75 francs for 100 marks. To solve this problem an apparatus is used having on the surface of its cylinders the values of the common logarithms of numbers marked off. This graduation will hereinafter shortly be called the logarithmic scales. From the above description it appears that two logarithmic scales are on the cylinder 2 and one logarithmic scale on the cylinder 3 all the scales being alike in every respect. To make the reading of the scales easy I provide the scales with register figures (which figures I place preferably on the left hand side of the cylinder at the beginning of each line) denoting the value of the first division stroke on the corresponding line. To obtain the desired result I rotate the cylinder 2 until the register figure coming next to the rate number 12375 appears below the index 13 which is situated at the left hand side of the apparatus. The indexes 13, 14 are moved on their guide bar 12 in the right hand direction until the hair line on the index 13 coincides with the division stroke denoting the number 12375. Cylinder 3 is now rotated until the initial figure of its scale is below the hair line of the index 14. Both cylinders 2 and 3 are now simultaneously

rotated by pushing the knob 7 against the cylinders 2, 3 whereby the gear 8 engages the gears 9 and 10. Knob 7 and thereby the cylinders 2, 3 are now rotated until the register number coming next to the number 148545 appears below the index 14 on the cylinder 3. The indexes 13, 14 are now moved in the right hand direction until the hair line of the index 14 lies in the middle between the two division strokes denoting 14854 and 14855. The figure coinciding with the hair line of the index 13 on the cylinder 2 gives the result i. e. 1838.25 francs. In a similar manner divisions, multiplications, proportions and other operations may be performed; if the cylinders are inscribed with trigonometrical scales trigonometrical calculations may be performed.

What I claim is:

1. In a calculating apparatus, the combination with a frame, a manually operable cylinder provided on its periphery with suitable scale characters and rotatively mounted in the frame, a gear wheel mounted to rotate with the cylinder, a manually operable shaft rotatively mounted in the frame parallel with the cylinder, a cylinder mounted to slide on and rotate with the shaft and provided on its periphery with suitable scale characters, the cylinder on the shaft being of less length than the first mentioned cylinder, a gear wheel on the shaft, a rod mounted in the frame, a pair of indexes mounted to slide on the rod, each index extending on opposite sides of the rod to coöperate with the scale characters on the two parallel cylinders, and manually operated means mounted in the frame adapted to coöperate with the gear wheels to simulta-

neously rotate the cylinders after the latter have been independently rotated and the indexes moved to the selected characters, whereby to compute the result of the selected characters.

2. In a calculating apparatus, the combination with a frame, a manually operable cylinder provided on its periphery with suitable scale characters and rotatively mounted in the frame, a gear wheel mounted to rotate with the cylinder, a manually operable shaft rotatively mounted in the frame parallel with the cylinder, a cylinder mounted to slide on and rotate with the shaft and provided on its periphery with suitable scale characters, the cylinder on the shaft being of less length than the first mentioned cylinder, a gear wheel on the shaft, a rod mounted in the frame, a pair of indexes mounted to slide on the rod, each index extending on opposite sides of the rod to coöperate with the scale characters on the two parallel cylinders, a slidable shaft mounted in the frame between the two cylinders, a gear wheel on the slidable shaft, a spring acting on the slidable shaft to normally hold the gear wheels out of mesh, the slidable shaft when operated against the tension of the spring causing engagement of the gears and when rotated causing simultaneous rotation of the two cylinders, whereby to compute the result of selected characters.

In testimony whereof I affix my signature in presence of two witnesses.

HEINRICH DAEMEN-SCHMID.

Witnesses:
    FLORENCE B. COLDBUPPY,
    BESSIE F. DUNLAP.