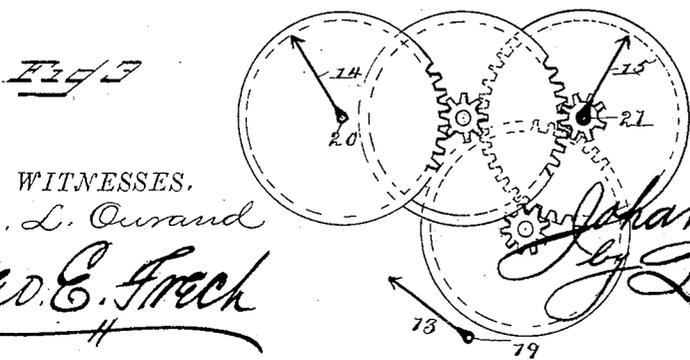
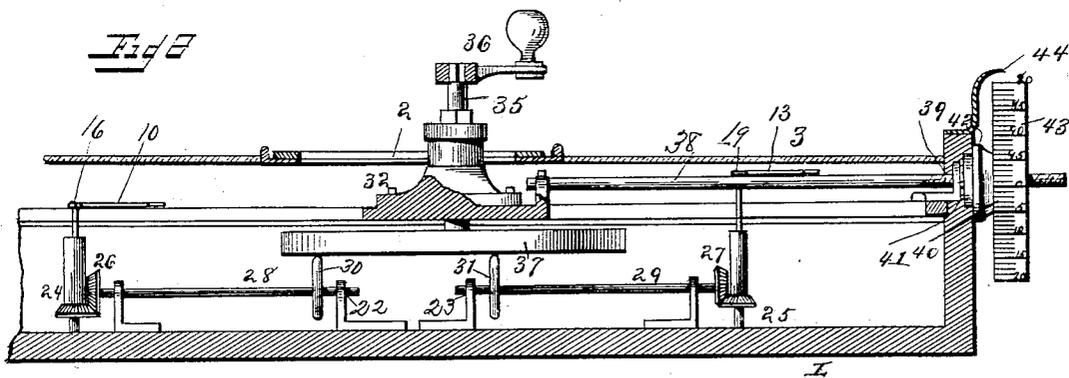
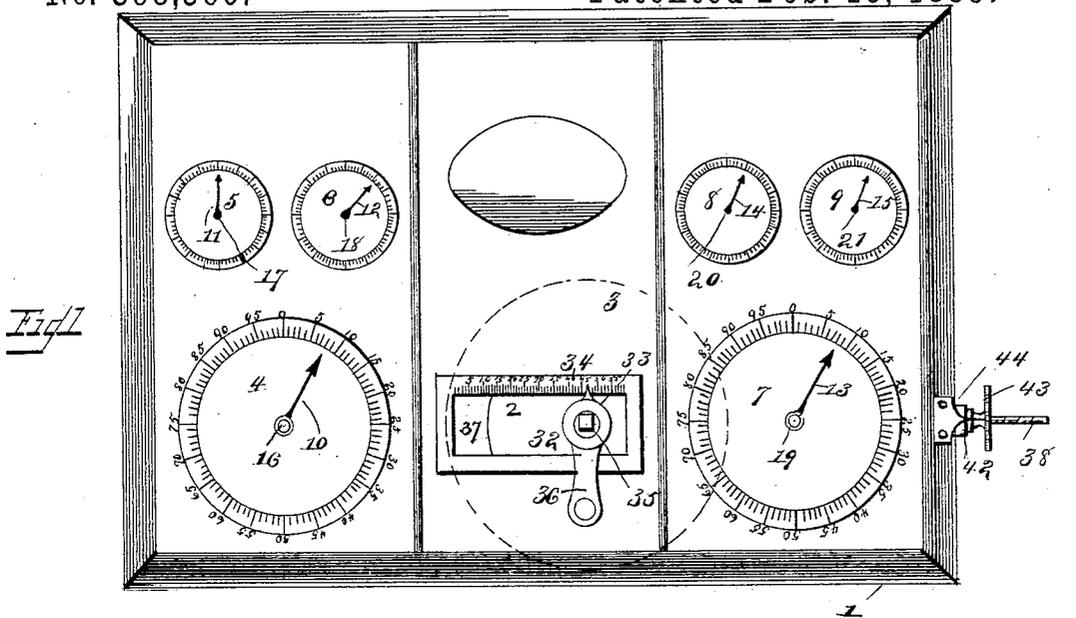


(No Model.)

J. VERMEHREN. CALCULATING MACHINE.

No. 398,360.

Patented Feb. 19, 1889.



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UNITED STATES PATENT OFFICE.

JOHANNES VERMEHREN, OF COPENHAGEN, DENMARK.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 398,360, dated February 19, 1889.

Application filed January 30, 1888. Serial No. 262,318. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES VERMEHREN, a subject of the King of Denmark, residing at Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Improvements in Calculating-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a top plan view of my improved calculating-machine. Fig. 2 is a vertical sectional view through the casing, showing parts of the mechanism in section; and Fig. 3 is a diagrammatical plan of the mechanism for operating the different sets of hands in unison.

The same numerals of reference indicate the same or corresponding parts in all the figures.

This invention has relation to calculating-machines; and it consists in the improved construction and combination of parts of such a machine, in which calculations may be made in a moment of time by adjusting the machine to a certain adjustment indicated in a key or index accompanying the machine and dependent upon the proportions and the character of the calculation, and thereupon setting the hands or pointers upon one set of disks to the number, which is to be treated in the desired manner, when the machine will indicate upon another set of dials the resulting sum, as will be more fully described hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, the numeral 1 indicates the casing of the machine, which has a longitudinal slot, 2, in its top 3, and which is formed with two sets of three dials each upon its top, the dials being respectively numbered 4, 5, and 6 and 7, 8, and 9. Hands 10, 11, and 12 and 13, 14, and 15 are secured to the upper ends of shafts 16, 17, and 18 and 19, 20, and 21, vertically journaled in the casing and connected together, respectively, by any ordinary multiple gearing, as shown in Fig. 3, so that the hands 10 and 13 may

indicate the numbers from 1 to 100 upon their respective dials, while the hands 11 and 14 will move one mark forward for each one hundred marks of the first set of hands, marking the hundreds up to ten thousand, and the hands 12 and 15 will again register the ten thousands upon their dials, registering up to one million.

The relative numbers registered by the dials and hands and the gearing or mechanism for causing this registering may be changed according to the class of work desired of the machine, and the mechanism may be of any desired construction, the relative operation of the hands of each set being, however, the same.

The unit-shafts 16 and 19 are provided at their lower ends with upwardly-facing conical pinions 24 and 25, which mesh with two conical pinions, 26 and 27, secured upon the outer ends of two horizontal shafts, 28 and 29, journaled in bearings 22 and 23 upon the bottom of the casing, and the inner ends of these shafts have friction-disks 30 and 31 of the same diameter secured to them.

A carriage, 32, slides in the slot in the top of the casing, and has an index, 33, projecting from its upper portion, which points upon a suitably divided or graduated scale, 34, upon one edge of the slot, and a vertical shaft, 35, is journaled in this carriage and has a crank or handle, 36, at its upper end, and a horizontal disk, 37, at the lower end in frictional contact with the friction-disks upon the horizontal shafts.

The inner end of a finely-screw-threaded rod, 38, is secured to one end of the carriage, and this rod slides freely through an aperture, 39, in the side of the casing, and has a disk, 40, with a screw-threaded central perforation, 41, fitted upon it outside of the casing and bearing against the side of the casing, being preferably journaled with its hub 42 in a bearing surrounding the aperture for the screw-threaded rod. The edge of this disk or nut is provided with a suitably-divided scale, 43, and a hand, 44, upon the top of the casing projects over this graduated edge, pointing to the graduations upon the same.

When the machine is to be operated—for example, the calculation of the interest of a certain sum in a given space of time—the key

or index which must accompany each machine is consulted to determine the adjustment of the carriage, the said key giving a certain adjustment indicated by the scale upon the slot and upon the nut for the amount of interest and length of time. The handle is now turned so as to bring the hands of one set of dials to point to the given number, when the hands of the other set will indicate the desired number, the hands indicating the desired number or the sum having been revolved a proportionate number of revolutions to the adjustment of the horizontal driving-disk.

The entire principle of the machine is to determine by the key or index, which is calculated beforehand to indicate the various proportions between figures in various calculations, the proportion desired between the hands indicating the given number and the hands indicating the desired number or the sum, when the hands will be moved around with a proportionate speed by the friction-disks being revolved at the proportionate speed by the horizontal disk, having their points of contact at the proportionate distances from the center of the said disk.

The construction of the machine is simple, and the machine is not liable to get out of order, and all calculations—such as calculations of commission, interest, annuity, and similar proportionate calculations—may be mechanically and correctly performed upon the machine.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a calculating-machine, the combination of a friction-disk having means for adjusting its axis and having means for revolving it, disks having their peripheries in frictional contact with the face of the former disk, and registering mechanisms having corresponding registering-indicators and operated by the revolutions of the friction-disks, as and for the purpose set forth.

2. In a calculating-machine, the combination of a friction-disk having means for revolving it and having means for adjusting its center in a line at right angles to its axis, disks journaled at right angles to the disk and with their peripheries in contact with the face of the disk, and registering mechanisms having corresponding indicators and operated from the revolutions of the friction-disks, as and for the purpose set forth.

3. In a calculating-machine, the combination of a carriage adjustable in one line, a disk journaled in this carriage and having a handle for turning it, friction-disks journaled at right angles to the shaft of the disk and having their peripheries in frictional contact with the face of the disk, and registering mechanisms having corresponding indicators and operated by the friction-disks, as and for the purpose set forth.

4. In a calculating-machine, the combina-

tion of a carriage sliding horizontally in a slot, a screw and nut for adjusting the carriage in the slot, a disk having its shaft journaled in the carriage and having a handle for revolving it, friction-disks having their peripheries in frictional contact with the face of the disk, and registering mechanisms operated by the disks and having corresponding indicators, as and for the purpose set forth.

5. In a calculating-machine, the combination of a casing having a longitudinal slot in its top provided with a scale at one end, a carriage sliding in the slot and having an index pointing to the scale, a screw-threaded rod secured to the carriage and extending through the side of the casing, a graduated nut upon the rod bearing against the side of the casing and having an index pointing to its graduations, a horizontal disk journaled with its shaft in the carriage and having a handle for revolving it, friction-disks journaled with horizontal shafts under the disk in frictional contact with its face with their peripheries, and registering mechanisms operated by the friction-disks and having corresponding indicators, as shown, and for the purpose set forth.

6. In a calculating-machine, the combination of a laterally-movable horizontal disk having a handle for revolving it and means for determining its lateral adjustment, two diametrically-opposite friction-disks journaled with their peripheries in frictional contact with the disk, and registering mechanisms operated by the friction-disks and having corresponding indicators, as and for the purpose set forth.

7. In a calculating-machine, the combination of a disk movable in a horizontal line and having means for determining its lateral adjustment, two diametrically-opposite friction-disks journaled with their peripheries in frictional contact with the disk and with their axes in line with the line of adjustment of the disk, and registering mechanisms operated by the friction-disks and having corresponding indicators, as and for the purpose set forth.

8. In a calculating-machine, the combination of a casing having a longitudinal slot in its top and a perforation in its side and having two sets of corresponding dials upon its top, a carriage sliding in the slot of the top and provided with an index pointing to a graduated scale at one edge of the slot, a screw-threaded rod extending from the carriage to the aperture in the side of the casing and through the same, a disk or nut turning with its threaded central bore upon the rod and with its hub in a bearing surrounding the aperture, a pointer projecting to the graduated periphery of the disk, a friction-disk journaled with its vertical shaft in a bearing in the carriage and having a handle for revolving it, two horizontal shafts journaled in a line with the slot in the top and having friction-disks upon their inner ends in contact with the horizontal disk, and registering mechanisms oper-

ated by the shafts and having hands pointing to the dials upon the top, as shown, and for the purpose set forth.

5 9. In a calculating-machine, the combination of a casing having a longitudinal slot in its top and a perforation in its side and having two sets of corresponding dials upon its top, a carriage sliding in the slot of the top and provided with an index pointing to a graduated scale at one edge of the slot, a screw-threaded rod extending from the carriage through the aperture in the side of the casing, a disk or nut with graduated periphery turning with its threaded central bore
10 upon the rod and with its hub in a bearing surrounding the aperture, a pointer projecting to the graduated periphery of the disk, a friction-disk journaled with its vertical shaft in a bearing in the carriage and having a

handle for turning it at its upper end, two
20 diametrically-opposite horizontal shafts in a line with the slot having friction-disks upon their inner ends in contact with the horizontal disk and having conical pinions upon their
25 outer ends, vertical shafts having hands upon their upper ends and revolving in the centers of the unit-dials and having conical pinions meshing with the pinions of the horizontal shafts, and suitable gearing and shafts having
30 hands for the remaining dials of the top and operated by the former shafts, as and for the purpose set forth.

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

JOHANNES VERMEHREN.

Witnesses:

S. SCHMIDT,
EMIL FLAUSEN.