

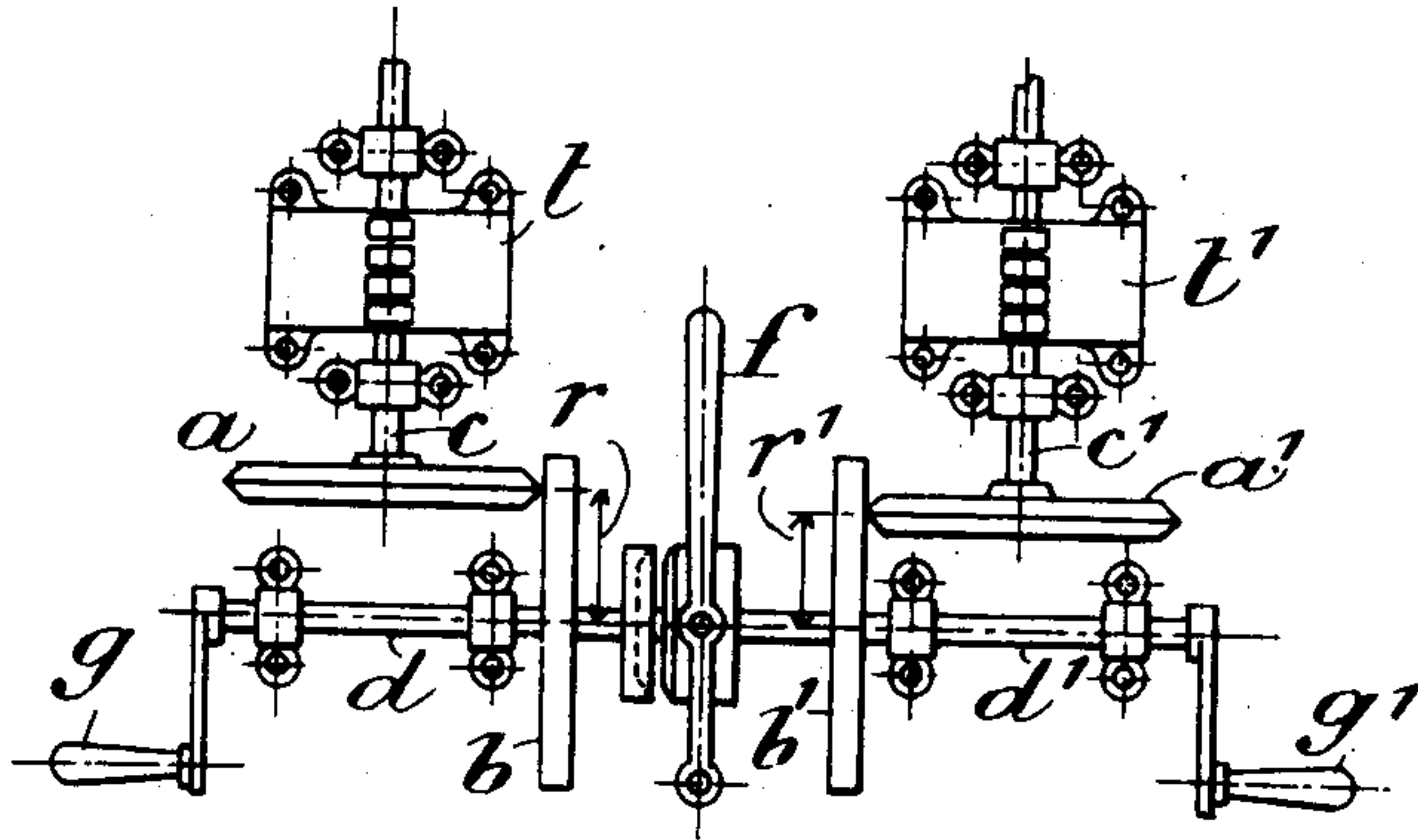
No. 711,887.

Patented Oct. 21, 1902.

J. VERMEHREN.
CALCULATING MACHINE.

(Application filed Sept. 1, 1900.)

(No Model.)



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CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 711,887, dated October 21, 1902.

Application filed September 1, 1900. Serial No. 28,786. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES VERMEHREN, head clerk, of No. 9 Johannevej, Hellerup, near Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Improvements in or Relating to Calculating-Machines, of which the following is a specification.

The invention relates to calculating-machines; and it consists in the special construction and combination of two or more pairs of friction or calculating disks, one disk of each pair running with its edge on the face of the other disk belonging to the same pair and which first disk may be mounted in such a manner that its contact-points with the second disk have a constant but adjustable distance from the center of said second disk, and in the combination of said pairs of calculating-disks with a number of counting apparatus, the machine thereby being able to perform multiplications and divisions of whole numbers and fractions and multiplications, divisions, involutions, and calculations by means of logarithms.

The accompanying drawing shows a diagrammatical view of the improved calculating-machine.

In the figure a machine is shown having two pairs of calculating-disks $a\ b$ and $a'\ b'$, of which the disks a and a' each is connected with a counting apparatus, respectively t and t' , for registering the complete or partial revolutions of the said disks.

In the form of the apparatus shown the disk a (a') is mounted in such a manner that it runs with its edge on the face of the disk b (b') and that its contact-point with said second disk can be set at any desired distance from the center of the disk b (b') by moving its spindle c (c') lengthwise through the corresponding counting apparatus t (t'). The friction-disks $b\ b'$, which when rotated rotate the disks $a\ a'$ by friction, are mounted upon spindles $d\ d'$, which can be rotated by means of cranks or handles $g\ g'$. The spindles $d\ d'$ may be rotated independently of each other, or they may be coupled together—as, for instance, by means of a clutch operated by a handle f —so that both the spindles rotate when one of them is rotated. The axes of the spindles d and c intersect, and so

do the axes of c' and d' , too. In this case both the counting apparatus $t\ t'$ are of such known construction that they can be set at zero without turning the spindles c and c' , and when the crank g then is turned (the spindles d and d' being coupled together) the values of the indications of the two counting apparatus will be in the ratio of r to r' . The multiplication of a figure with a fraction is therefore easily performed by means of this simple machine. If, for example, it is required to take eighteen and three-fourths per cent. of a series of numbers (values)—that is to say, to multiply the same by seventy-five four-hundredths, equal to three-sixteenths—the two disks $a\ a'$ are set so that r is equal to sixteen and r' equal to three, in which case the disk a' , and consequently the counting apparatus t' connected with a' , will rotate at three-sixteenths or three hundred sixteenths per cent., equal to eighteen and three-fourths per cent. of the speed of the disk a and the counting apparatus t connected with a . The counting apparatus t' shows in this case the eighteen and three-fourths per cent. of the numbers indicated by the counting apparatus t . In particular this mechanism presents great advantages in calculating the exchange value of bonds and the like. If, for example, one German mark is thirty-eight öre Danish, and one French franc equals 72.5 öre, the disks must be adjusted so as to make r equal to eighty-eight and r' equal to 72.5, so that the counting apparatus t will indicate the number of francs and the other one, t' , the corresponding number of marks; but the said arrangement may also be employed for multiplications in general, as may be seen from the example quoted. If, for example, any given number is to be multiplied by sixty-seven, it is the same as to multiply with the fraction $\frac{67}{10}$. It is obvious that the machine also may be used for performing divisions.

The improved machine may also be provided with a greater number of calculating-disk pairs than $a\ b$ and $a'\ b'$. If, for example, four such pairs are used, it is feasible to simultaneously indicate with the one counting apparatus dollars and cents and by the other three the corresponding values in mark, florins, and francs. The machine will

therefore will be of the greatest advantage for money-changers and bankers.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

In a calculator, a main shaft, a plurality of primary friction-disks carried thereby, a corresponding number of supplemental disks
10 having their edges in contact one with each

primary disk, spindles adjustably supporting said supplemental disks, and a calculating device operatively connected with each spindle, substantially as described.

In witness whereof I have hereunto set my 15 hand in presence of two witnesses.

JOHANNES VERMEHREN.

Witnesses:

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