L. E. GRAVES.

CALCULATING DEVICE FOR ELECTRICAL DATA, &c.

APPLICATION FILED NOV. 25, 1907.

924,058. Patented June 8, 1909.

Fig. 1.

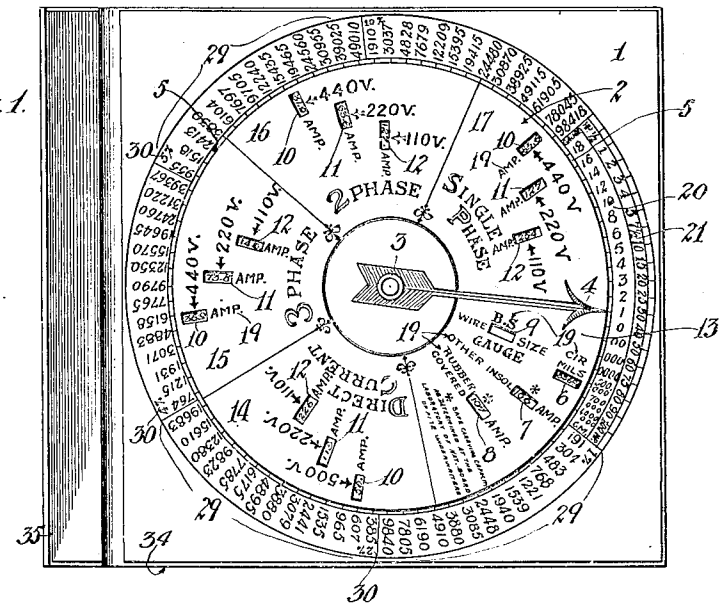


Fig. 2.

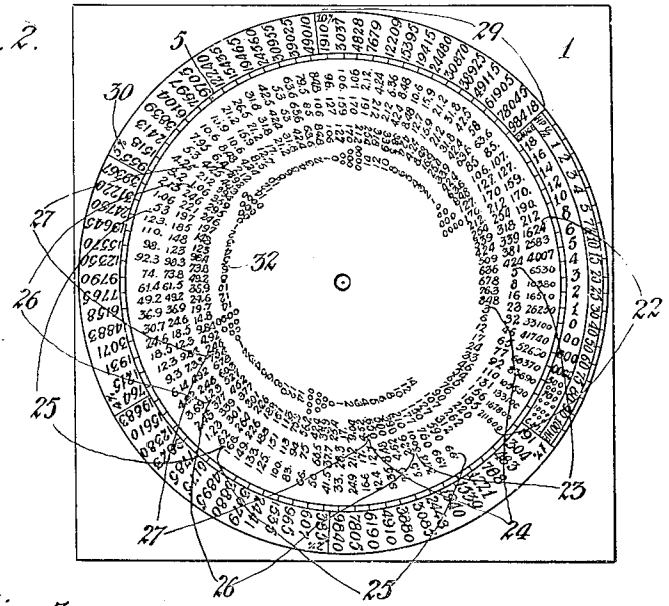
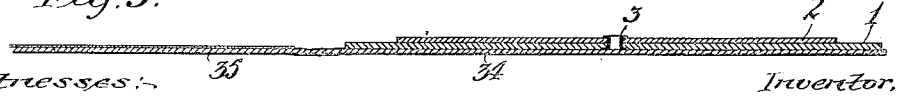


Fig. 3.



Witnesses:-
Louis W. Gratz.
Frank L. Graham

Inventor.
Louis E. Graves.
by Townsend Lyon & Hackley
his attys

UNITED STATES PATENT OFFICE.

LOUIS E. GRAVES, OF LOS ANGELES, CALIFORNIA.

CALCULATING DEVICE FOR ELECTRICAL DATA, &c.

No. 924,058. Specification of Letters Patent. Patented June 8, 1909.

Application filed November 25, 1907. Serial No. 403,811.

To all whom it may concern:

Be it known that I, LOUIS E. GRAVES, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Calculating Device for Electrical Data, &c., of which the following is a specification.

The main object of this invention is to provide means for indicating in a limited space a large amount of correlated data, in such manner that any item or series of items may be quickly ascertained by setting of relatively movable parts.

The invention is particularly applicable to calculating or ascertaining electrical data relating to the properties of wires and consumption devices, such as are required by engineers, contractors, etc., in making plans and estimates for electrical installations.

Another object of the invention is to provide means for this purpose which is so compact that it can be carried in the pocket.

In the accompanying drawing:—Figure 1 is a plan of the device. Fig. 2 is a plan of the base sheet or table, the movable indicator being removed. Fig. 3 is a vertical section of the device.

1 designates a base or card of suitable material on which are provided a plurality of series of numbers or marks arranged in concentric circles. A movable disk or member 2 of celluloid cardboard or other material, constituting an indicator, is pivoted at 3 to member 1, for example, by means of an eyelet, and covers the inner annular series of marks, leaving one or more annular series of numbers or marks uncovered extending around the disk, said disk having an arrow or index 4 thereon to point to the exposed marks, a scale or circular series of divisions 5 being provided on card 1, to facilitate bringing the arrow to the exact point corresponding to any one of the numbers in the outer row or rows. The movable member 2 has openings 6, 7, 8, 9, 10, 11, 12, arranged in groups, the openings in each group being at different distances from the center of the disk so as to extend over the different series of normally covered marks or numbers on the base 1. These groups of openings are in different angular portions or sectors 13, 14, 15, 16, 17 of the disk, such sectors being appropriated to different classes of data.

In applying the device as an electrical calculator, sector 13 herein termed the main sector of the disk is appropriated to information relative to wires, and has openings 6, 7, 8, 9, which are adapted to expose items relating respectively to circular mills, safe carrying capacity of two different classes of wire, and wire-sizes corresponding to different lengths of wire for carrying different amounts at given percentage of drop. The other sectors, 14, 15, 16, 17, herein termed the supplementary sectors of the disk, taken together are complementary to sector 13 and are appropriated to information relative to amperage of motors of different horsepower—the three openings 10, 11, 12, at different radial distances in each group corresponding to different voltages and the different sectors corresponding to different classes of current (direct, single-phase, etc.). The disk is provided with marks 19 on its face adjacent to each opening, designating the kind of information to be given thereat.

A segmental portion herein termed the main segment of the outer, exposed series of numbers on base 1, comprises two rows, 20, 21, arranged side by side, and representing respectively horsepower and wire size, and as the index 4 moves past these numbers in rotation of disk 1, these groups occupying a division of the base member herein termed the main division and said groups; the openings in sector 13 will pass over groups 22, 23, 24 in the concentric series of concealed numbers on base 1, representing the circular mills and safe carrying capacity of the wires of the size indicated by the parts, and the openings in the sectors 14, 15, 16, 17 will at the same time pass over groups 25, 26, 27 of marks on the normally concealed series of numbers corresponding to the amperage at different voltages, for different horsepower, as indicated by the arrow, with reference to the row of numbers 21 on the base. Thus a single segment of the exposed parts of the base groups 25, 26, 27, all arranged in a plurality of divisions occupying different angular portions of the base member 1 and all herein termed the supplementary divisions of the base member is read with reference to all the sectors on the disk, by reading the pointer with reference to one or the other of the two rows, 20, 21, extending in said single segment. This leaves unappropriated a complementary segment to this single segment, which is utilized for other data, being divided into groups 29 of numbers arranged in a single row and representing products of

length by amperes at different percentages of drop for the different groups, as indicated by marks 30. This segment complementary to the main segment of the exposed numbers is herein termed the supplementary segment the main and supplementary segments occupying a complete circle. The index 4 on the disk reads also with reference to these numbers 29, and the openings 9 in sector 13 at the same time expose numbers in groups 32 on an inner, normally concealed series on base 1, these numbers being wire sizes which, with the given length and given amperage, will give the drop as indicated in groups 29. These groups 32 constituting an extra series of normally concealed marks.

The device is used as follows: By setting disk so that the index 4 thereon points to any wire size in row 20, the main segment on the base member 1; the circular mills for that size can be read at openings 6, in the main sector of disk 2 and the safe carrying capacity for different classes of wire can be read at openings 7 and 8 in the same sector. Or, within the same range of motion of the disk, by setting the index to any horsepower number in row 21, the amperes for that horsepower can be read, for different voltages, at the respective openings 10, 11, 12 in the several supplementary sectors 14, 15, etc., according to the class of current, the horsepower numbers being read in the respective supplementary divisions of the numbers on the base member embraced in the groups 25, 26, 27. Or, by turning the disk through another range of movement, index 4 can be made to read with reference to the groups of numbers 29, in the supplementary segment of exposed numbers on the base member, so that by multiplying together the amperes to be carried by any wire and the length in feet, and setting the index to the nearest number to the product, in the group 29 for the percentage drop allowed, the proper size of wire to use will be shown at opening 9 in the main sector 13 of the disk. These numbers being read in the special series of groups of numbers on the base member which series is of angular extension corresponding to that of supplementary segment 29.

For convenience in carrying, the device is supported in a cover having back and front members 34, 35, to one of which the base card 1 is affixed, the other member serving as a cover and being provided, if desired, with instructions as to the use of the device.

What I claim is:—

A device for the purpose set forth comprising a base member and a disk pivoted thereon, said base member having a main segment comprising two rows of marks side by side, and a supplementary segment comprising a single row of marks, these two segments being uncovered by the disk and occupying a complete circle, said base member having also a plurality of concentric groups of marks arranged in divisions in different angular positions and normally covered by the disk and said disk being also provided with an extra series of normally covered marks corresponding in length to the supplementary segment of uncovered marks, and a disk having an index for indicating the position of the disk with reference to the uncovered series of marks, said disk being provided with a plurality of openings in a main sector thereof to expose for reading the marks in the main division on the base member when the index reads on one of the rows of marks in the main uncovered segment on the base member and said disk having openings in a plurality of supplementary sectors thereof for exposing the marks in each of several different supplementary divisions of groups of marks on the base member when the index reads with reference to the other row of marks in the main uncovered segment on the base member, and said disk having in the main sector thereof an opening for reading in the extra series of normally concealed marks on the base when the index reads with reference to the supplementary segment of uncovered marks on the base member.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 18th day of November, 1907.

LOUIS E. GRAVES.

In presence of—

ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.