N° 10,055 A.D. 1899

Date of Application, 12th May, 1899

Complete Specification Left, 10th Feb., 1900—Accepted, 10th Mar., 1900

PROVISIONAL SPECIFICATION.

An Improved Calculating Device.

I, CHARLES TREGONING, of the Hotel Cadillac, Broadway and 43rd Street, in the City, County, and State of New York, United States of America, Engineer, do hereby declare the nature of this invention to be as follows:—

The object of the invention is to provide a simple device, through the medium of which various amounts may be added together and the sum total quickly and accurately obtained, or whereby one number may be subtracted from another and the result be quickly and surely known. Another object of the invention is to so construct the device that any one of a number of multiplication tables may be instantly brought to view. The device also contains one hundred or more addition tables, and one hundred or more subtracting tables, and it is particularly adapted to assist children in mastering the rudiments of arithmetic and is also useful to persons not well grounded in arithmetic. A further object of the invention is to provide a device of the kind above described that will be simple durable and inexpensive in its construction, and capable of being readily understood and easily manipulated.

In the preferred form of the device two superposed discs are pivoted, the one of lesser diameter upon the other of larger diameter. The preferred means employed for attaching the two discs together is a sleeve or eyelet passed through the centre of the larger disc and projecting from the face thereof, the sleeve being provided with an outwardly extending flange at top which engages a larger sleeve attached to the central portion of the upper disc and said larger sleeve being reduced in diameter at its lower portion, so that before the upper flange of the pivot sleeve is turned down, the reduced portion of the larger sleeve may be slipped over the said pivot sleeve, and the two sleeves be pivotally united by turning down the upper flange of the pivot sleeve. The larger sleeve is provided with a flange at its bottom portion that engages with the under surface of the upper disc. The upper portion of this sleeve acts as a button whereby the upper disc may be readily revolved upon the lower disc in either direction.

Numerals are consecutively arranged near the margin of the lower or main disc, said numerals reading from "1" to "100," but they may read from "1" to "1,000," or more if necessary, the numerals 100 being practically a starting point from which calculations are to be made in addition and subtraction. Preferably the margin of the under or larger disc is formed with scallops, each scallop embracing six numerals. For example, the end of one scallop is over the numeral 5, the other end being over the numeral 10; the next scallop has one end over the numeral 10 and the other end over the numeral 15 so that the numerals may be readily separated by the eye in groups of five. The pivoted disc is provided also with a series of numerals that are likewise consecutively arranged, and these numerals correspond to the numerals on the other disc and read in the same direction, radial lines or graduations corresponding to the numerals on both discs.

If, for example, it is desired to add fifteen and fifteen together, the numeral 15

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on the rotary disc is brought opposite the starting point on the main disc, and immediately opposite this numeral 15 on the main disc, the sum of the two amounts, namely 30, will be read upon the rotating disc. If ten and forty are to be added together, the numeral 10 on the rotating disc is brought opposite the starting point on the main disc, and upon finding 40 on the main disc, the Figure 50 will be found on the rotating disc opposite the numeral 40 on said main disc. In the same manner any two amounts may be added together, provided the sum of the two amounts is not greater than the highest figure to be found on the disc.

If, for example, fifteen is to be subtracted from seventy, the numeral 15, always the lesser numeral appearing on the revolving disc, is carried opposite the starting point on the main disc. 70 is then found on the revolving disc, and the answer 55 will be read opposite 70 on the main disc.

The addition and subtraction tables are in effect the numerals which constitute the reckoner, and appear in the two series of numerals above referred to. Supposing the numeral 15 to be opposite the starting point this numeral 15 will represent the addition table of fifteens and said table may be explained as follows:—

In an example in addition, if 15 in the numeral series of the upper disc be added to 1 in the numeral series of the lower disc, the answer appears opposite 1 in the numeral series of the upper disc namely 16. If 15 is to be added to 5, the answer 20 may be read opposite 5 in the numeral series of the upper disc and so on.

It is obvious that each individual number in the said series, when brought to the starting point, represents a table, so that one hundred tables in addition and subtraction are obtainable upon the dials, but the number of tables and amounts are practically unlimited.

Another series of numerals may be provided on the revolving disc, said numerals corresponding to those of said disc already described but reading in the hundreds from 101 to 114, and other series reading to 1,000, or to 10,000 may be added. With reference to this series of numerals, take an example in subtraction,—let 15 be subtracted from 114,—99 is the answer, and may be read opposite 114 in the series of numerals of the lower disc. If 15 is to be subtracted from 113,—98 is the answer, and may be read in that numeral series opposite 113, and so on.

The products of the multiplication table, from 1 to 20 for example, are arranged in radial columns on the upper face of the main disc within the circle described by the rotary disc, and the multipliers of the various tables are located adjacent to these columns, occupying such position that when an opening made in the revolving disc is brought over the multiplier of a table, a radial slot in said revolving disc will be brought over the product column of that particular table; and adjacent to the said slot, between said slot and the multiplier opening the multiplicand column of figures is located, reading from "1" to "12," this column being used in connection with each of the tables. At one side of the upper numeral "1" is the word "times," while at the opposite side of said numeral "1" is the word "are." Thus, for example, if the table of fours is to be used, the numeral 4 is made to appear at the multiplier opening whereupon the product column of the table of fours will appear at the radial slot and the table may be read as "4 times 1 are 4," "4 times 2 are 8," *etc.*, and in this manner any of the tables contained upon the device may be quickly brought to view and studied or used whenever desired.

In addition to the numerals for simple addition, subtraction and multiplication, I provide a means whereby a child sent to purchase an article costing a fraction of a dollar, and entrusted with a dollar, can quickly and accurately ascertain the exact amount of change that should be received.

To this end another series of consecutively arranged numerals is produced upon the main disc reading from "1" to "100," or the highest numeral in the first series on the same disc, but this further series of numerals reads in an opposite

direction to the first or outer series, the numeral 1, in the one series being opposite to and registering with the numeral 99 in the other series.

The revolving disc has an opening so located that as the said disc is turned, any one of the numerals in the further series may be exposed to view, all the rest being hidden. If a child makes a purchase to the amount of eighty-nine cents, for example, the opening in the revolving disc is carried opposite the numeral 89 in the first or outer series of numerals upon the main disc, whereupon the difference between 89 and 100, namely 11, will be exposed by said opening.

In another form of reckoner two superposed discs are also employed and sustain the same relation to each other as do the discs first described. The larger or main disc has a series of numerals consecutively arranged and reading from "1" to "100," and the revolving disc has a series of numerals consecutively arranged, but reading from "1" to "100" in a reverse direction to the series of numerals on the main disc. The numerals of both series have equal spacing, so that the numerals and lead lines of one series may be brought in radial alignment with the numerals and lead lines of the other series. If desired the revolving disc may be provided with an aperture and a slot, the aperture being adapted to disclose a multiplier and the slot the product column of a multiplication table, the multiplicand column being arranged between the slot and aperture in the same manner as before described. When the numerals are arranged in the manner just described, the main or starting point is 100 on the main disc.

If it be desired to add two numbers together, as for example 1 and 89, the numeral 89 on the revolving disc is brought opposite 1 on the main disc, and the answer 90 will appear on the revolving disc opposite the main or starting point 100; and it will be observed that when any figure is opposite 100, the main or starting point, the said figure will represent the sum of any two transversely aligning numerals in the two series. When one number is to be subtracted from another, the minuend is selected on the revolving disc and is brought opposite the main or starting point 100, on the main disc, and by finding the subtrahend on the revolving disc the answer may be read opposite the subtrahend on the main disc. For example, if ten is to be subtracted from ninety, 90 on the revolving disc is carried opposite 100 on the main disc, and opposite 10 on the revolving disc the answer 80 appears on the main disc.

Should a child, for example, desire to know how much change should be had out of a dollar, a certain amount having been spent, the numerals 100 on both discs are brought in registry, and the two series of numerals read from this given point in opposite directions so that if any two transversely aligning numerals in the two series are added together the result will be 100. Thus if a child has a dollar and has made a purchase amounting to twenty cents, upon finding the numeral 20 on the revolving disc, the answer 80, representing the amount of change that should be received, will be found opposite 20 on the main disc.

In a modified construction of the device, two discs are employed, said discs being made of wood or of any suitable material and of such thickness that the series of numerals may be produced upon their peripheries, together with the lead lines. These two discs are adapted to revolve face to face, and either one or the other may be turned. When the device is constructed as first described it is adapted to be placed upon a table or other support, whereas, when the device is constructed as last referred to it is adapted to be held in the hand, and to that end each disc is provided with a central handle, and the discs are pivotally connected by an axis passed through the handle of one disc into the handle of the other disc, and the device is operated in like manner to the device first described, but the multiplication tables are usually omitted.

Dated this 12th day of May 1899.

A. M. & WM. CLARK,
Chartered Patent Agents, 53, Chancery Lane, London.

COMPLETE SPECIFICATION.

An Improved Calculating Device.

I, CHARLES TREGONING, of the Hotel Cadillac, Broadway and 43rd Street, in the City, County, and State of New York, United States of America, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The object of the invention is to provide a simple device, through the medium of which various amounts may be added together and the sum total quickly and accurately obtained, or whereby one number may be subtracted from another and the result be quickly and surely known. Another object of the invention is to so construct the device that any one of a number of multiplication tables may be instantly brought to view. The device also contains one hundred or more addition tables, and one hundred or more subtracting tables, and it is particularly adapted to assist children in mastering the rudiments of arithmetic and is also useful to persons not well grounded in arithmetic. A further object of the invention is to provide a device of the kind above described that will be simple durable and inexpensive in its construction, and capable of being readily understood and easily manipulated.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the complete device;

Figure 2 is a transverse section taken substantially on the line 2—2 of Figure 1;

Figure 3 is a partial plan view of the under disk of the device, illustrating a portion of the tables carried by said disk;

Figure 4 is a partial edge view and a partial vertical section through a modified form of the device; and

Figure 5 is a plan view of the improved reckoner, illustrating a slight difference in the arrangement of the marginal numerals of the two dials.

In the preferred form, of the device two disks A and B are employed, the disk A being of greater diameter than the disk B. The disk B is mounted to turn upon the disk A and may be pivoted thereto in any suitable or approved manner. The preferred means employed for attaching the two disks together is that shown in Figure 2, in which a sleeve 10, is passed through the centre of the larger disk A, and is made to extend a suitable distance above the upper face of said disk, the sleeve being provided with an outwardly extending flange 11 at its top, and likewise with an outwardly extending flange 12 at its bottom. A larger sleeve 14, which acts as a button, is attached to the central portion of the upper disk B, and said larger sleeve 14 is reduced in diameter at its lower portion, so that before the upper flange 11 of the pivot sleeve 10 is turned down, the reduced portion of the sleeve 14 may be slipped over the upper portion of said pivot sleeve, and the two sleeves held in place by turning the upper flange 11 downward to its normal position, illustrated in Figure 2. The button sleeve 14 is provided with a flange at its bottom portion that engages with the under surface of the upper disk B. Thus it will be observed that the upper disk may be readily revolved upon the lower disk in either direction.

Numerals C are consecutively arranged near the margin of the lower or main disk A, said numerals reading from "1" to "100," as shown in the drawings, but

they may read from "1" to "1,000," or more, if necessary. The numeral 100 in the drawings, is practically a starting point from which calculations are to be made in addition and subtraction. Preferably the margin of the under or larger disk A, is provided with scallops 15, each scallop embracing six numerals. For example, the end of one scallop is over the numeral 5, the other end being over the numeral 10; the next scallop has one end over the numeral 10 and the other end over the numeral 15. In this manner it will be observed that the numerals may be readily separated by the eye in groups of five. The pivoted disk B is provided also with a series of numerals D that are likewise consecutively arranged, and the numerals on the disk B correspond to the numerals on the disk A and read in the same direction. A line 16 is outwardly projected from each numeral on the disk B, and a corresponding line 17 is inwardly projected from each numeral on the lower or main disk A.

If, for example, it is desired to add fifteen and fifteen together, the numeral 15 on the rotary disk is brought opposite the starting point or 100 on the main disk, and immediately opposite this numeral 15 on the main disk, the sum of the two amounts, namely 30, will be read upon the rotating disk. If ten and forty are to be added together, the numeral 10 on the rotating disk is brought opposite the starting point 100 on the main disk, and upon finding 40 on the main disk, the Figure 50 will be found on the rotating disk opposite the numeral 40 on said main disk. In the same manner any two amounts may be added together, provided the sum of the two amounts is not greater than the highest figure to be found on the disk.

If, for example, fifteen is to be subtracted from seventy, the numeral 15, always the lesser numeral appearing on the revolving disk, is carried opposite the starting point 100 on the main disk, as also appears in Figure 1. 70 is then found on the revolving disk, and the answer 55 will be read opposite 70 on the main disk.

The products of the multiplication table, from 1 to 20, for example, are arranged in the customary column form on the upper face of the main disk within the circle described by the rotary disk, as shown at E^1 in Figure 3, and the multipliers of the various tables are located adjacent to these columns, occupying such position that when an opening 18 made in the revolving disk B is brought over the multiplier of a table, a slot 19 made in said revolving disk B will be brought over the product column of that particular table; and adjacent to the slot 19, between said slot and the opening 18, the multiplicand column F of figures is located, reading from "1" to "12," this column being used in connection with each of the tables. At one side of the upper numeral "1" the word "times" is produced, while at the opposite side of said numeral "1" the word "are" appears. Thus, for example, if the table of fours is to be used, the numeral 4 is made to appear at the opening 18, whereupon the product column of the table of fours will appear at the slot 19, and the table may be read as "4 times 1 are 4," "4 times 2 are 8," *etc.*, and in this manner any of the tables contained upon the device may be quickly brought to view and studied or used whenever desired. The product columns, and likewise the slot adapted to expose said columns, are radially disposed on the disks.

In Figure 4 I have illustrated a slight modification in the construction of the device, two disks A^1 and B^1 being employed, said disks being made of wood or of any suitable material and of such thickness that the series of numerals may be produced upon their peripheries, together with the lead lines. These two disks A^1 and B^1 are adapted to revolve face to face, and either one or the other may be turned. When the device is constructed as shown in Figure 1 it is adapted to be placed upon a table or other support, whereas, when the device is constructed as shown in Figure 4, it is adapted to be held in the hand, and to that end each disk is provided with a handle 20, and the disks are pivotally connected by a pin 21, passed through the handle of one disk into the handle of the opposing disk.

It will be understood that the device shown in Figure 4 is operated in like

manner to the device shown in Figure 1, but under the construction shown in Figure 4 the multiplication tables are usually omitted.

In addition to the numerals for simple addition, subtraction and multiplication, I provide a means whereby a child sent to purchase an article costing a fraction of a dollar, and intrusted with a dollar, can quickly and accurately ascertain the exact amount of change that should be received.

To this end a second series of consecutively arranged numerals F^1 is produced upon the main disk A, reading from "1" to "100," or the highest numeral in the first series C on the same disk, but the second series of numerals F^1 read in an opposite direction to the first or outer series C, the numeral 1 in the series F^1 being opposite to and registering with the numeral 99 in the series C, as shown in Figure 3.

The revolving disk B is provided with an opening 22 (Figure 1) so located that as the said disk is turned, any one of the numerals in the series F^1 may be exposed to view, all the rest being hidden. If a child makes a purchase to the amount of eighty-nine cents, for example, the opening 22 in the revolving disk is carried opposite the numeral 89 in the series of numerals C upon the main disk, whereupon, the difference between 89 and 100, namely 11, will be exposed by said opening, as shown in Figure 1.

The addition and subtraction tables are in effect the numerals which constitute the reckoner, and appear in the series C and D clearly shown in Figure 1. In the drawings the numeral 15, representing the addition table of fifteens, is opposite the starting point 100, and said table may be explained as follows:—

In an example in addition, if 15 in the numeral series D, be added to 1 in the numeral series C, the answer appears opposite 1 in the numeral series D namely 16. If 15 is to be added to 5, the answer 20 may be read opposite 5 in the numeral series D, and so on.

It is obvious that each individual number in the series D, when brought to the starting point, represents a table, so that one hundred tables in addition and subtraction are obtainable upon the dials, as illustrated in the said Figure 1, but the number of tables and amounts are practically unlimited.

In Figure 1 I have illustrated a portion of a third series E of numerals, reading in the hundreds from 101 to 114, and other series reading to 1,000, or to 10,000 may be added. With reference to the third series E of numerals, take an example in subtraction,—let 15 be subtracted from 114,—99 is the answer, and may be read opposite 114 in the series of numerals C. If 15 is to be subtracted from 113,—98 is the answer, and may be read in the numeral series C opposite 113, and so on.

In the form of reckoner shown in Figure 5, two disks A^2 and B^2 are also employed; in fact the disks A^2 and B^2 sustain the same relation to each other as do the disks A and B illustrated in Figure 1, the disk B^2 being of less diameter than the disk A^2 and mounted to revolve on the disk A^2 by means of any suitable pivot 10^a. The larger or main disk A^2 is provided, as is the disk A shown in Figure 1, with a series of numerals C^1, consecutively arranged and reading from "1" to "100," and the revolving disk B^2 is provided with a series of numerals D^1 corresponding to the series of numerals D heretofore described, and the series of numerals D^1 are also consecutively arranged, reading from "1" to "100," but the series of numerals D^1 read in a reverse direction to the series of numerals C^1 on the main disk. The numerals of both series have equal spacing, so that the numerals of one series may be brought in transverse alignment with the numerals of the other series, and each numeral in the outer series C^1 is provided with inwardly extending lead lines 17^a adapted to meet lead lines 16^a carried outward from each numeral of the inner series D^1. If desired, the revolving disk may be provided with an aperture 18^a and a slot 19^a, the aperture being adapted to disclose a multiplier and the slot 19^a the product column of a multiplication table, the multiplicand column being arranged between the slot and aperture in the same manner as illustrated in Figure 1. When

the numerals are arranged in the manner just described, the main or starting point is 100 on the disk A^2.

If it be desired to add two numbers together, as for example, 1 and 89, the numeral 89 on the revolving disk is brought opposite 1 on the main disk, and the answer 90 will appear on the revolving disk opposite the main or starting point 100; and it will be observed that when any figure is opposite 100, the main or starting point, the said figure will represent the sum of any two transversely aligning numerals in the two series C^1 and D^1. When one number is to be subtracted from another, the minuend is selected on the revolving disk and is brought opposite the main or starting point 100 on the main disk, and by finding the subtrahend on the revolving disk the answer may be read opposite the subtrahend on the main disk. For example, if ten is to be subtracted from ninety, 90 on the revolving disk is carried opposite 100 on the main disk, and opposite 10 on the revolving disk the answer 80 appears on the main disk.

Should a child, for example, desire to know how much change should be had out of a dollar, a certain amount having been spent, the numerals 100 on both disks are brought in registry, and the two series of numerals read from this given point in opposite directions so that if any two transversely aligning numerals in the two series are added together the result will be 100. Thus if a child has a dollar and has made a purchase amounting to twenty cents, upon finding the numeral 20 on the revolving disk, the answer 80, representing the amount of change that should be received, will be found opposite 20 on the main disk.

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

1. The reckoner comprising two disks or members movable one relatively to the other, when provided in one of said members with two openings or sights and a series of multiplicands, while the other member has a series of multipliers and products, the corresponding multipliers and products being so located that they will appear simultaneously through the respective sights of the companion member.

2. The arrangement of the multiplicands between the multiplier sight (4) and the product sight (19).

3. In a multiplying reckoner such as claimed under head 1, the extension of one of the disks or members beyond the other with series of numerals at the adjoining portions of the disks to permit of using the reckoner for addition and subtraction.

4. The improved reckoner, substantially as herein described and shown in the accompanying drawings.

Dated this 10th day of February 1900.

A. M. & WM. CLARK,
Chartered Patent Agents, 53, Chancery Lane, London.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1900.

A D 1899. May 12. N° 10,950

TREGONING'S Complete Specification.

Sheet 1

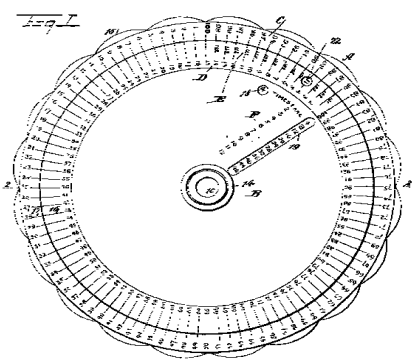
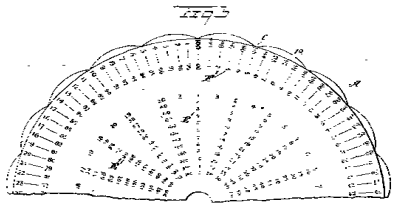


Fig 2.



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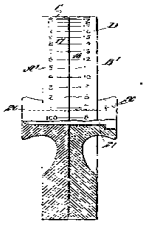

Fig 4.

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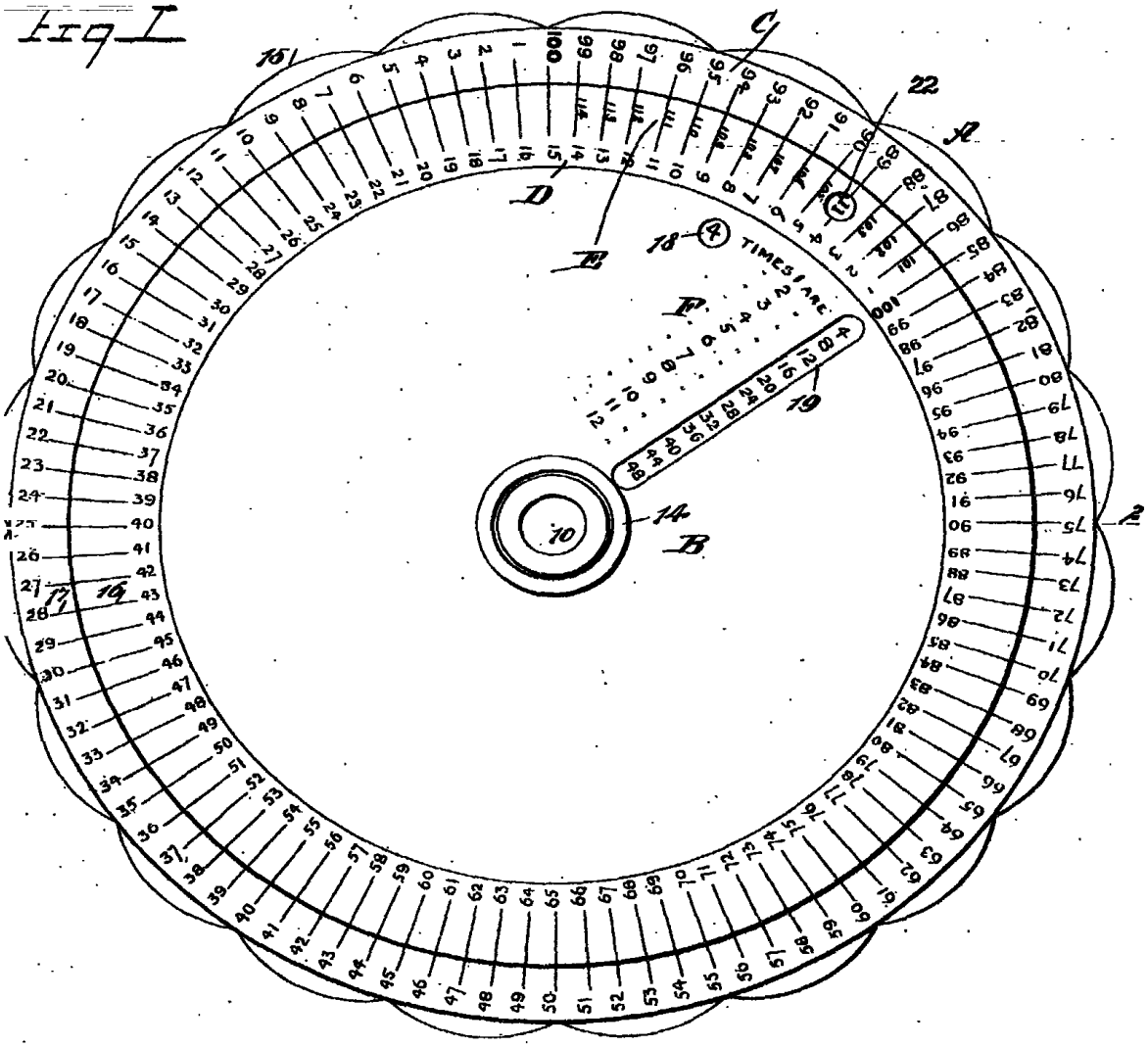
ING'S COMPLETE SPECIFICATION.

SHEET 1.

Fig 1.



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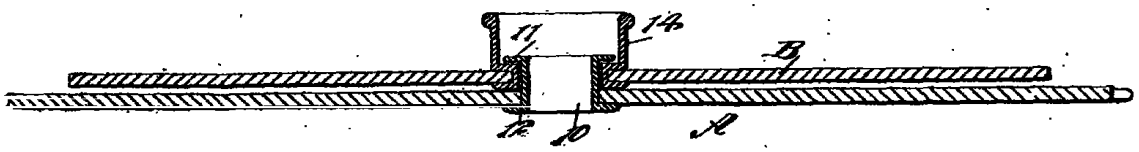


Fig 3

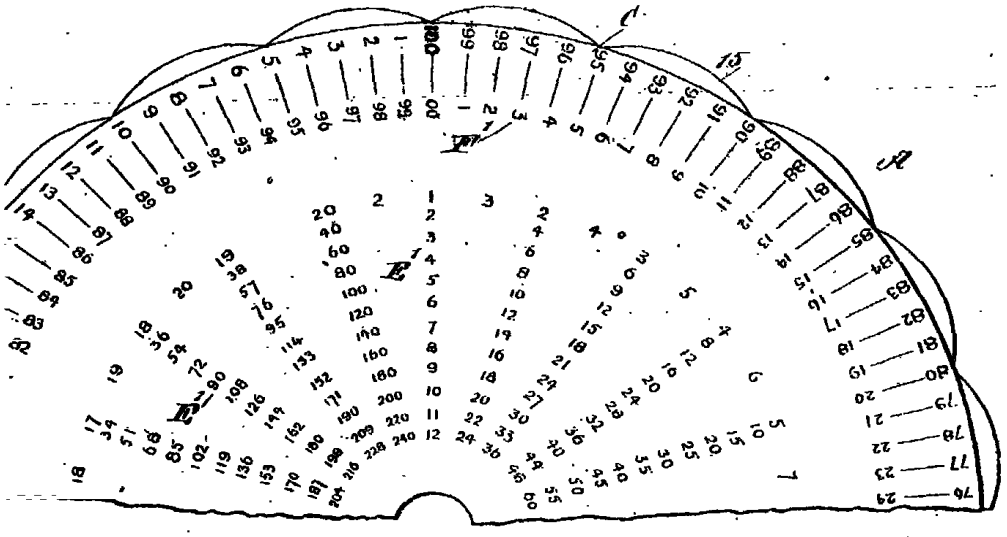
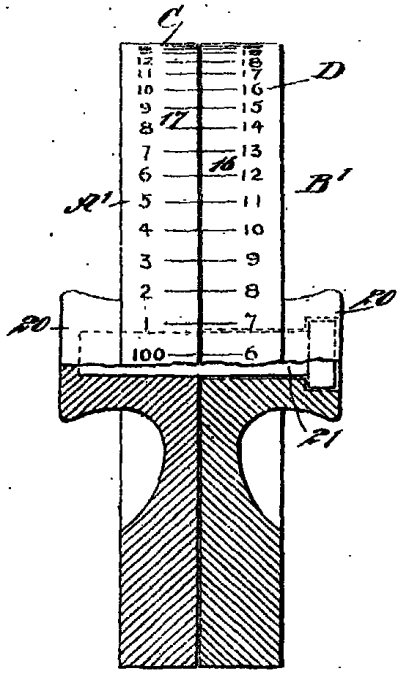


Fig 4



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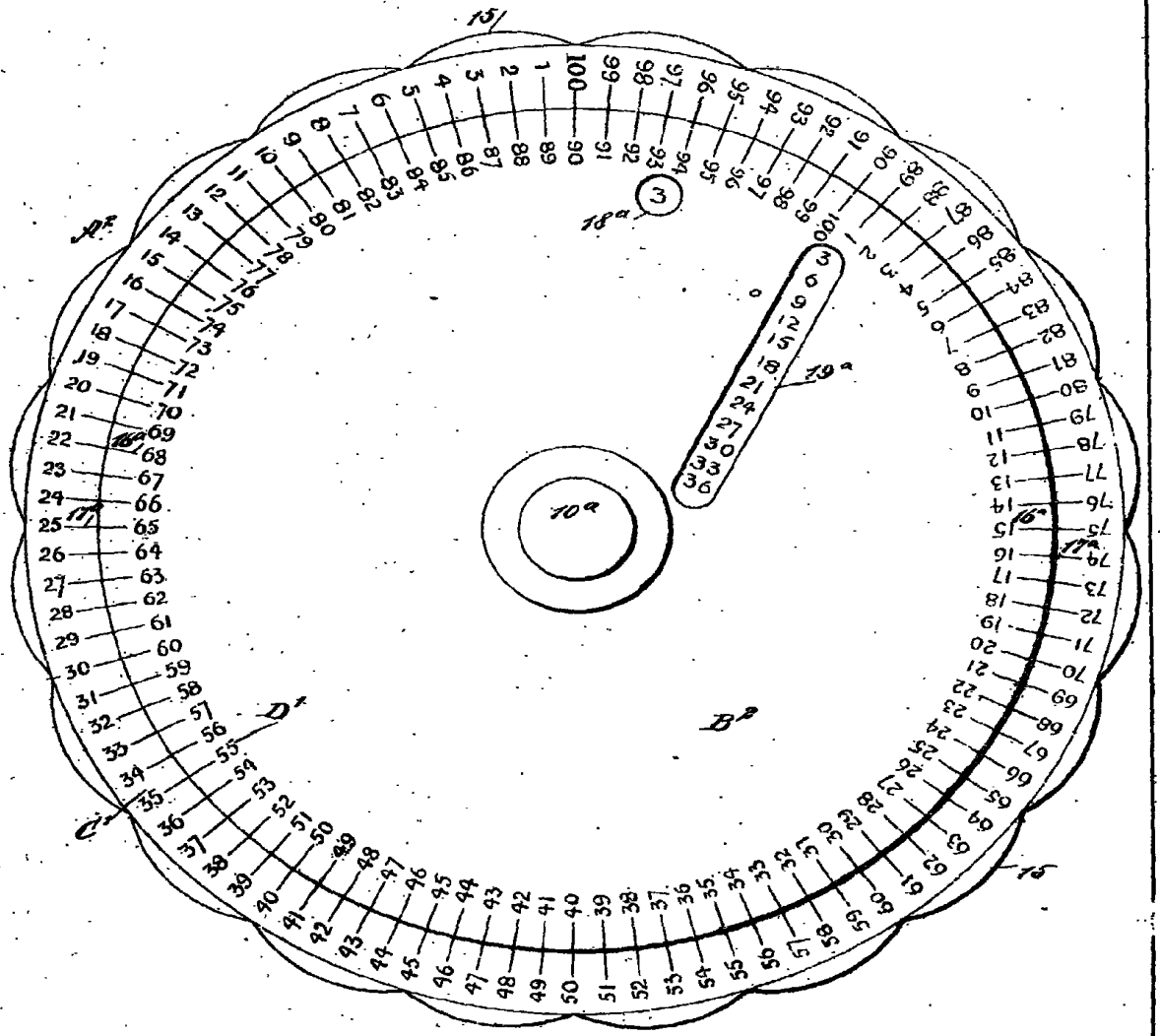
TREGONING'S Complete Specification.

(3 SHEETS)
SHEET 3.

Fig 5



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