No. 886,189. PATENTED APR. 28, 1908.

T. T. CROUCH.

CALCULATING DEVICE.

APPLICATION FILED NOV. 15, 1907.

6 SHEETS—SHEET 1.

Fig. 1.

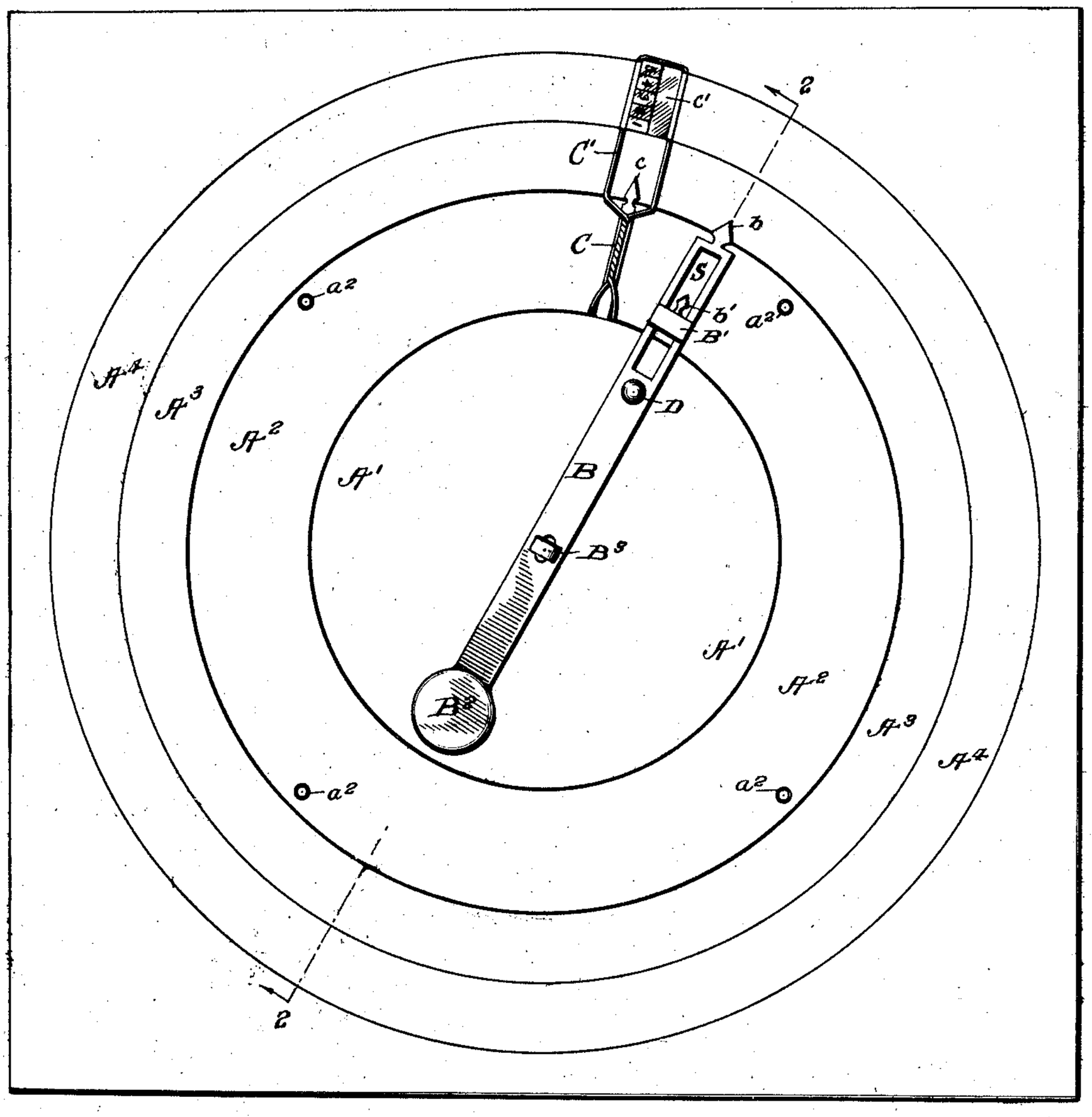
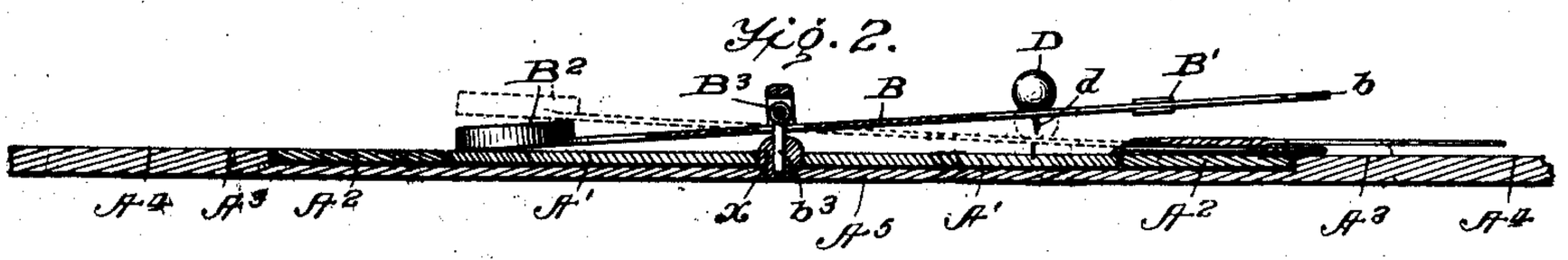


Fig. 2.



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6 SHEETS—SHEET 2.

Fig. 3.

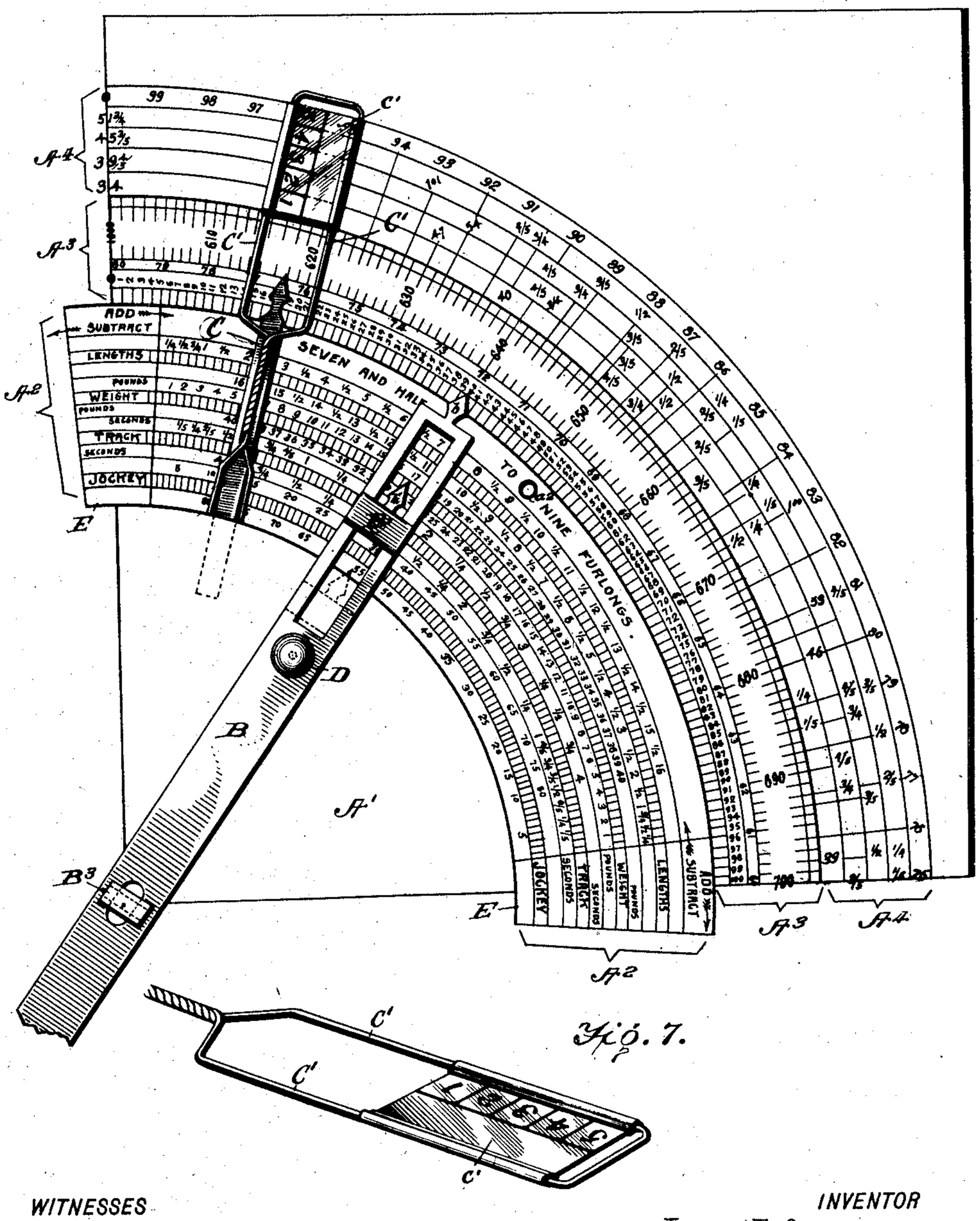

Fig. 7.

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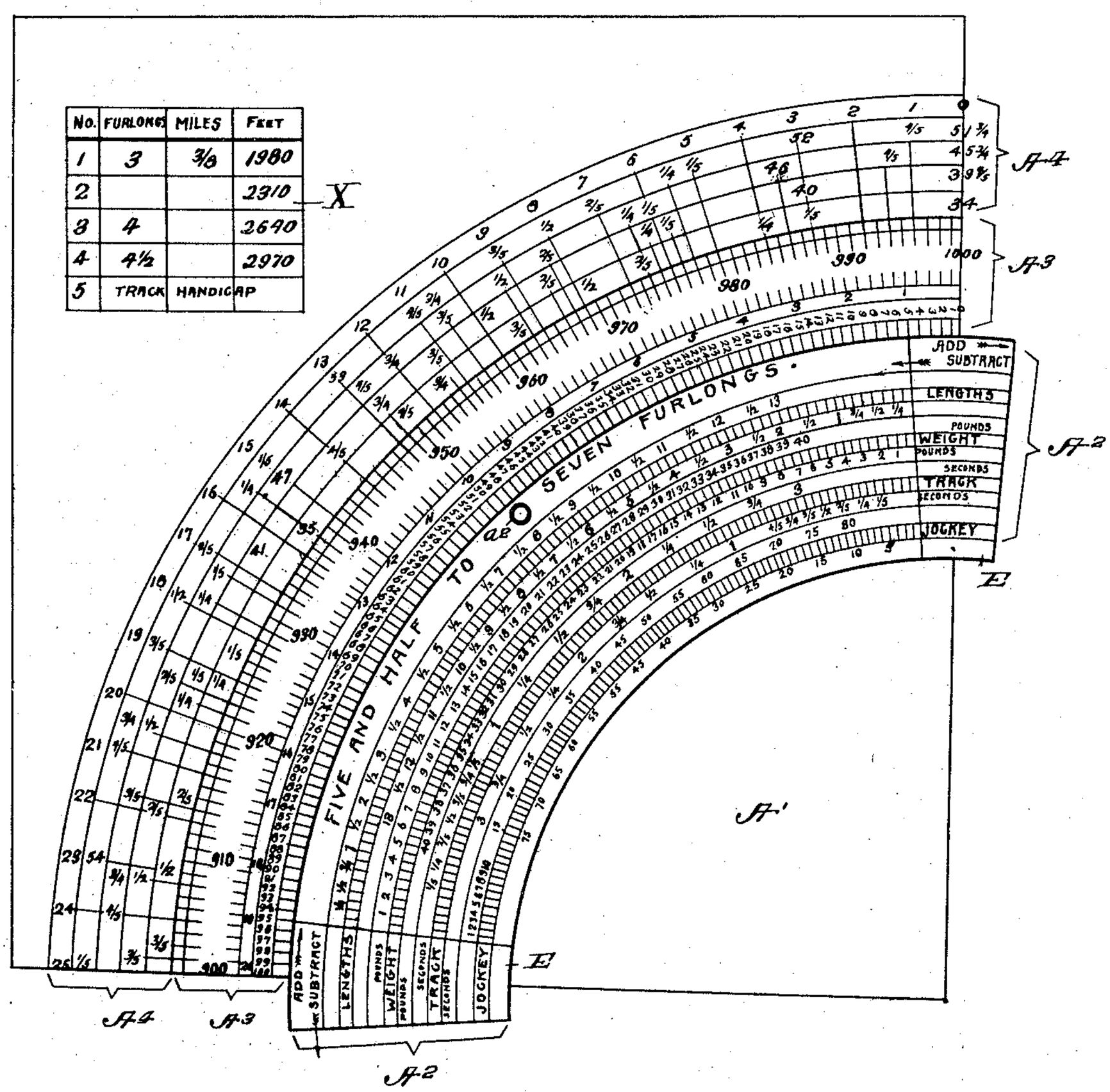
6 SHEETS—SHEET 3.

Fig. 4.



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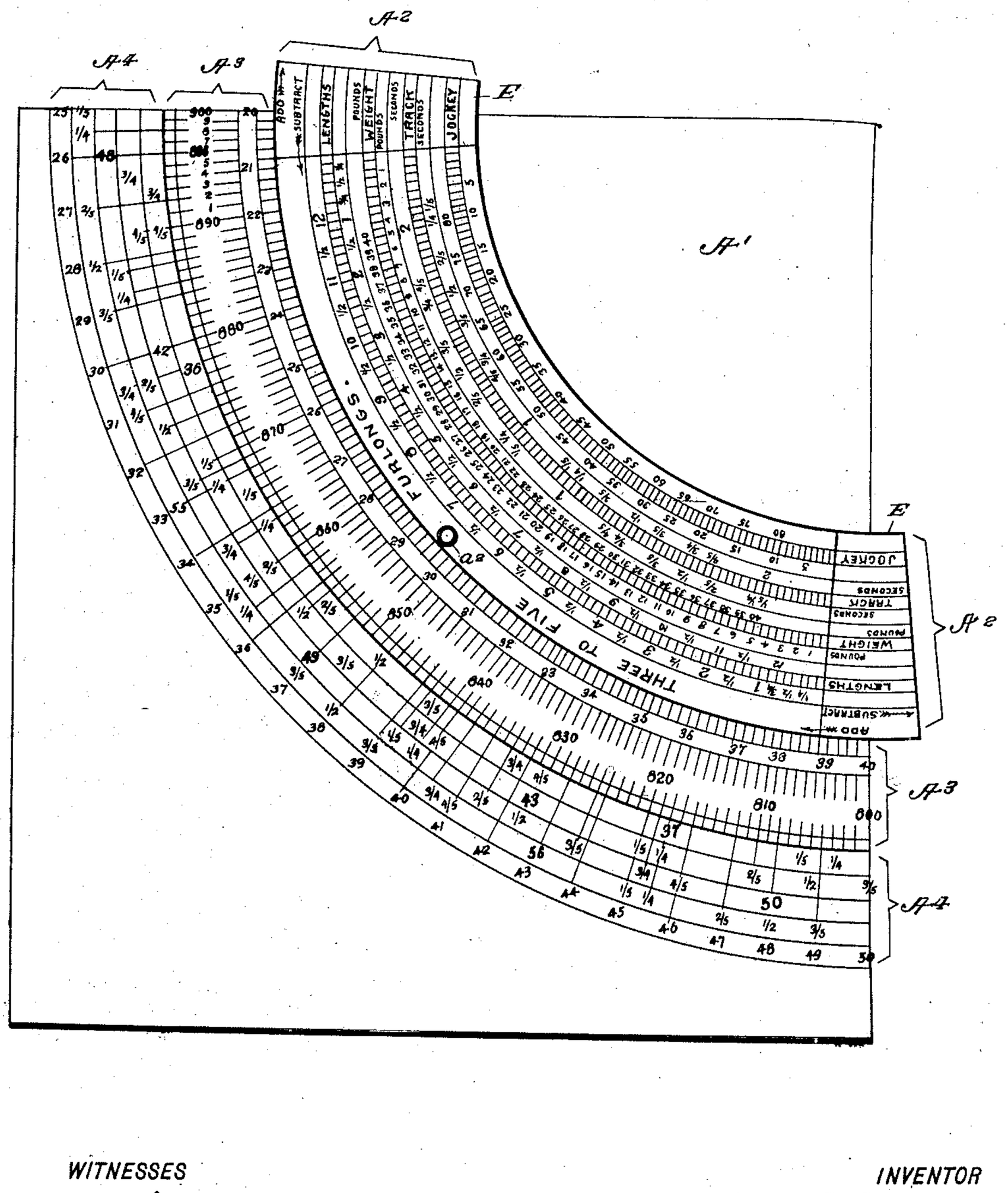
6 SHEETS—SHEET 4.

Fig. 5.



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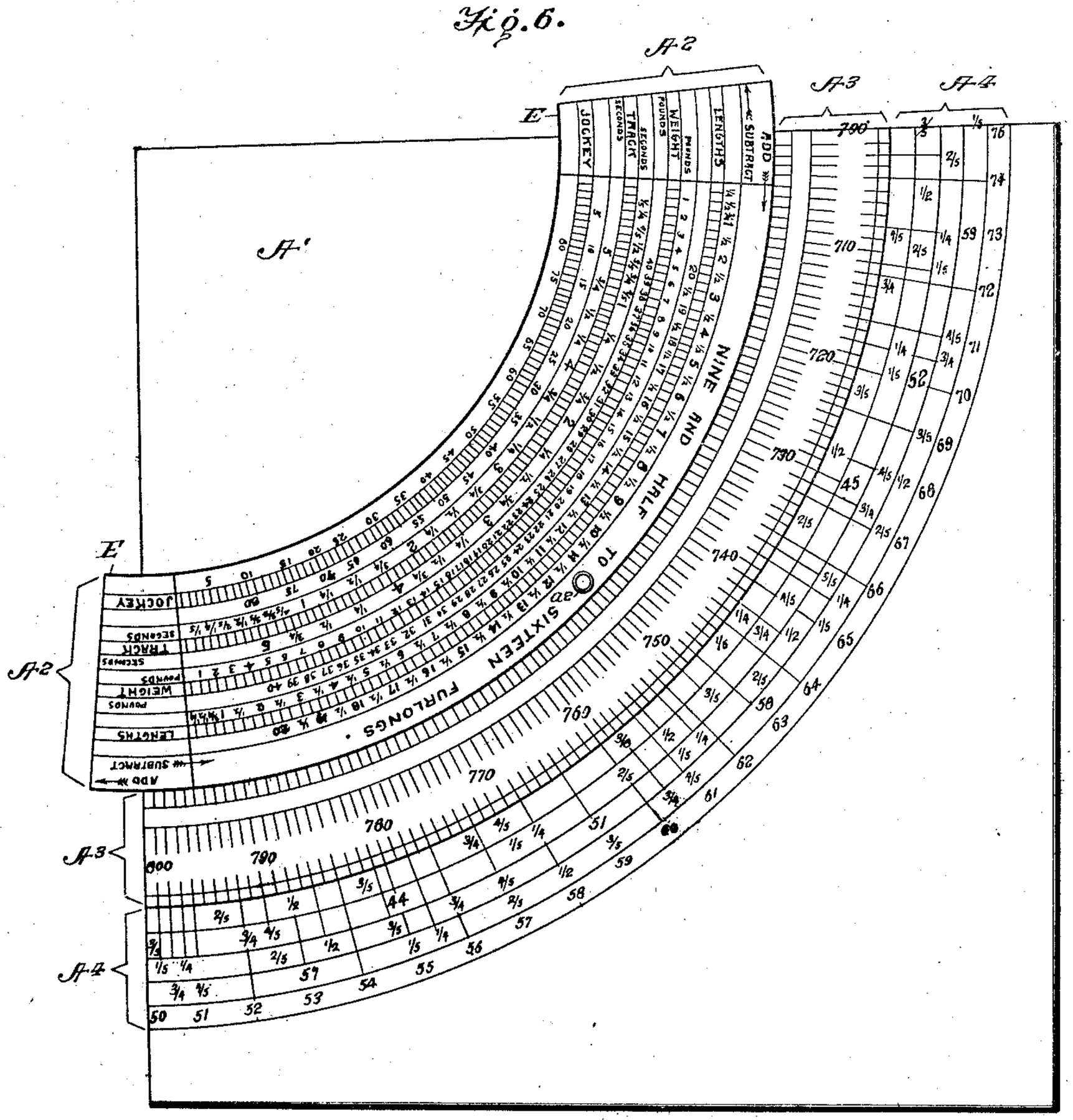
6 SHEETS—SHEET 5.

Fig. 6.



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6 SHEETS—SHEET 6.

No.	Furlongs	Miles	Feet
1	5.	5/8	3300
2	5.1/2	11/16	3630
3	Futurity		3790
4	6	3/4	3960
5	Track	Handicap	

X^2

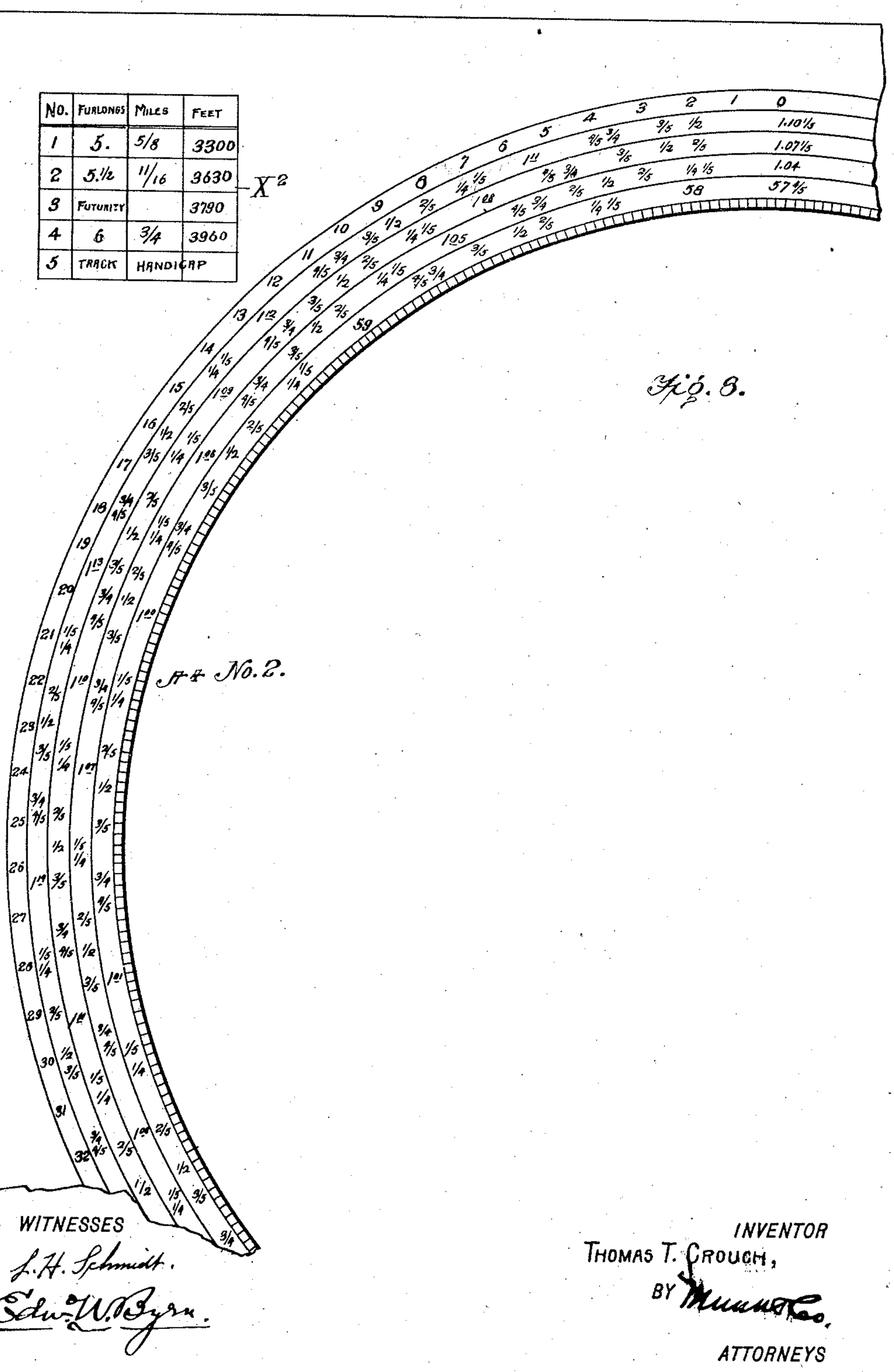

Fig. 8.

Fig. No. 2.

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UNITED STATES PATENT OFFICE.

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CALCULATING DEVICE.

No. 886,189. Specification of Letters Patent. Patented April 28, 1908.

Application filed November 15, 1907. Serial No. 402,288.

To all whom it may concern:

Be it known that I, THOMAS T. CROUCH, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Calculating Devices, of which the following is a specification.

My invention is in the nature of a new, simple and scientific device for handicapping horses at different race tracks, different weights, under different conditions and ridden by the same or different jockeys; and also for arriving at track conditions.

It is designed to provide for absolute correctness in arriving at the position in a race that a horse should run under changed conditions governed by different weights, tracks and jockeys, based on former performances. The rapidity with which it arrives at the information desired saves much valuable time and the device supplies a long-felt want among breeders, horse owners, trainers, handicappers, and others. It eliminates the necessity of long calculations and intricate figuring in placing different horses, and in determining the proper weights to assign to make each horse equal to his opponents. The device withal is a simple and inexpensive construction and with careful handling will last for years.

My invention consists in the novel construction and arrangement of the mechanical parts including the shiftable dials and index hands moving over the dials and adjusting the same, whereby the above named results are carried out in a simple, rapid, and correct manner as hereinafter more fully described with reference to the drawings, in which

Figure 1 is a face view of the calculating device showing merely its adjustable mechanical parts, the graduations and figuring being omitted. Fig. 2 is a central section taken through line 2—2 of Fig. 1. Fig. 3 is a quadrantal section of the circular dials with the index hands superimposed thereon, said dials being provided with the various graduations and figurings for carrying out my invention. Figs. 4, 5 and 6 are other quadrantal sections of the dials with their various graduations and figurings for completing the whole apparatus seen in the general illustration of Fig. 1. Fig. 7 is a perspective view in detail of one of the indicators, and Fig. 8 is a fragmentary view of a portion of one of the substitute sheets of the dial A^4 with the markings and figures adjusted for races of from $5\frac{1}{2}$ to 7 furlongs, and which in races of this length is superimposed upon the dial face A^4 shown in Figs. 3, 4, 5 and 6, the dial face A^4 of these latter figures being arranged only for races of from 3 to 5 furlongs.

Before undertaking in detail a description of the figured values on my calculating device, I will first describe the general features of its mechanical construction, and the adjustment of the movable parts.

Referring to Figs. 1 and 2, A' is a thin disk of pasteboard or other similar material, A^2 is an annular dial whose inner periphery corresponds with and fits closely to the outer periphery of the disk A' and lies in the same plane therewith, A^3 and A^4 are other circular dial markings also lying in the same plane with each other and with the disks A' and A^2, the inner periphery of the dial A^3 corresponding to and lying adjacent to the outer periphery of the annular dial A^2. The inner disk A' is pivotally mounted upon a central boss x, Fig. 2. The annular dial A^2 also has a circular adjustment by swiveling in its seat upon the subjacent backing A^5 in the recess between the dials A' and A^3. The adjustment of this annular dial A^2 is effected by means of any pointed instrument introduced into one of the eyelets a^2. The two outer dials A^3 and A^4 are in fixed relation to each other, and also to the subjacent face A^5 of which it may be a part.

Within a central hole in the boss x is inserted a pivot stem b^3 whose upper end is connected by a hinge B^3 to an index hand B in such a manner that said index hand may be rotated about the vertical axis of its stem b^3 or may be tilted about the horizontal axis of its hinge B^3, as shown in dotted lines in Fig. 2. At the outer end of the index hand B is formed a longitudinal slot s and at the extreme outer end is formed a pointer head b which laps over the inner edge of the dial A^3. Within the slot s of the index hand B is arranged a secondary index hand consisting of a cross-head B', sliding on guides within the slot s and having a pointer head b' which has a range of adjustment across the transverse dimensions of the annular dial A^2. The index hand B is provided at the opposite end from its pointer with a balance weight B^2 which normally holds the pointer end of the index hand lifted, or away from the dials as seen in Fig. 2, so that said index hand B is free to rotate about its pivotal axis b^3 to any

position on the several dials without moving the same. On the opposite side of its center B^3 the index hand B is provided with a knob D and immediately beneath the same on the lower side of the index hand is fixed a sharp pin point *d*. As before stated the normal position of the index hand B maintains the pointer end of the hand in elevated position, as seen in Fig. 2, with the point *d* elevated from and out of contact with the disk A′. When, however, the application of pressure upon the knob D by the finger, forces the pin point *d* into the subjacent disk A′, then the index hand B is connected to the disk A′ for coextensive rotary adjustment therewith about a central axis b^3, and upon releasing the pressure upon the knob D, the pointer end of the index hand B will again rise to its elevated position and, becoming detached from the subjacent disk A′, may be adjusted to any new position desired.

At one point along its periphery the disk A′ is provided with an index hand C rigidly attached thereto and whose outer end extends to and laps over the graduated and figured dial A^3. At the same point on the disk A′ there is also attached an indicator C′ consisting of a bent loop of wire having a transparent diaphragm of celluloid, horn, or mica *c′* see Figs. 7, and 1 on which is marked at different radial distances from the center, figures 1 to 5, indicating the positions of the different readings on the outer dial A^4 hereinafter more fully described. It will be seen that the pointer C and the indicator C′ are attached to and move with the central disk A′ so that whenever the index hand B is put into connection with the subjacent disk A′ by means of the pin *d* and is rotated about the central axis, the index hand C and also the indicator C′ are carried over and made to express by their position on the dials A^3, and A^4 certain values as to handicap, track conditions, time and distance, as hereinafter described.

Referring to Figs. 3, 4, 5 and 6 it will be understood that the graduations and figuring placed thereon form together a complete expression of the device shown in Fig. 1. These several Figs. 3, 4, 5 and 6 are true quadrantal sections except that in each one of these views the annular dial A^2 has fixed at its end the labeled designation E, one-half of which is on one quadrantal section and the other half on the next adjacent quadrantal section.

The central disk A′ contains no figures or graduations but has rigidly attached to it in radial position and projecting beyond its periphery the index hand C and the indicator C′.

The annular adjustable dial A^2 contains the figures by which the relative value of length, weight, track and jockeys, are determined, and is the basis on which the additions and subtractions are made by the use of the index hand B with its small pointers, the reading in one direction making the additions, and that in the other direction making the subtractions. This annular dial is divided in its complete circumference into four segments providing for the different distances of the races to be run. Thus, referring to Fig. 5, this quadrantal section is for lengths, weight, track and jockeys at distances from 3 to 5 furlongs. The quadrantal section shown in Fig. 4 is marked and figured with the same data for distances of from $5\frac{1}{2}$ to 7 furlongs. The quadrantal section shown in Fig. 3 is similarly marked for $7\frac{1}{2}$ to 9 furlongs and the quadrantal section shown in Fig. 6 is from $9\frac{1}{2}$ to 16 furlongs. As the annular dial A^2 has a swiveling circular adjustment it may be conveniently moved by any pointed instrument introduced into the small eyelet holes a^2 so as to bring any segment of its four quadrantal sections into convenient uppermost position so as to make the readings right side up.

The stationary dial A^3 contains graduated markings and figurings for handicap values running from 1000 down to 600, and also the figures have the average track speed conditions that run from 1 up to 100. Just under these figures are found the average figures, the same being 5 points apart and showing a division of 5 of accumulated track speed for 5 races (or the average).

The outermost stationary dial A^4 contains the time for different distances, which is so arranged as to show the handicap value of the different times at different distances. Thus, by way of illustration, referring to Figs. 3 and 4 the dial A^4 with its fourth circle indicated by the figure 4 on the indicator *c′* will give the time at $4\frac{1}{2}$ furlongs, the circle 3 will give the time at 4 furlongs, the circle 2 at $3\frac{1}{2}$ furlongs, and the circle 1 the time at 3 furlongs, as also shown by the table X in Fig. 4.

The figurings and markings on the outermost dial A^4 in Figs. 3, 4, 5, 6 are those that are arranged for races of from 3 to 5 furlongs, and have relation to the quadrantal section of the annular dial A^2 shown in Fig. 5. Thus, by way of example, in dial A^4, circle 3, furlongs 4, time 48, handicap value 896.

As shown the dial A^4 in all the figures 3 to 6 is figured successively for the readings of from 3 to 5 furlongs, and when races of longer distances are to be run, a substitute outer dial of the same size as A^4 is placed thereon, but this superimposed dial has its markings and readings adjusted to the longer races to be run. One of these substitute dials is seen in Fig. 8 marked A^4 No. 2. There may be as many of these outer dials as desired to cover all desired distances and times.

My invention is based on scientific principles and methods in which each of the five chief or ruling factors has been carefully considered, which factors are: first, the horse; sec-

ond, the distance; third, the weight; fourth, the track speed and condition; and fifth, the jockey. As to the first factor, the horse, the merit of the animal is determined by his ability to cover a certain distance carrying a certain weight, the rider and speed and condition of track considered (the condition of the horse must be left to the trainer who is supposed to know when a horse under his care is equal to his best efforts). The second factor, the distance, means the distance that different horses can go with the weight assigned, and is determined by comparison with other horses and the time made. The third factor, the weight, means the weight that can be carried and, as with distance, must be by comparison. The fourth factor, the time, must be likewise taken on a comparative basis, and the fifth factor, the jockey, like the foregoing is also determined by comparison.

To make the above comparisons in the most concise, rapid, correct and simplified manner is the object of this invention. In making use of the invention we take the horse to be handicapped; first find the dates and track upon which he performed, the distance, and weight carried, the jockey who rode him, and then find the speed of the track. Now get the track condition and in what time the race was run; also his position in the race. The above data should be obtained for one or more races for each horse competing, three races being preferred.

There is to be furnished with my device, instructions as to how to obtain track average conditions, and to give comparative track speed tables at all tracks; also comparative merit of jockeys table; also comparative scale weights as they count for distance. With the above data obtained in the way ordinarily known to race tracks, we are ready to operate with my invention. Thus, by way of illustration, if Gipsy runs 4 furlongs ($\frac{1}{2}$ mile) in 48—track speed 2 ($\frac{1}{2}$ second slow)—conditions 20—105 lbs. No. 5 jockey, finish 2 by 2 lengths, 882. If Gipsy had won, her handicap would have been 896, as will be seen by reference to Fig. 5, in which 48 in dial A^4 is opposite 896 in dial A^3, but as a matter of fact she was two lengths back. We now set the index hand C, Fig. 3, at 896 of Fig. 5 and turn the index hand B to the extreme right on the annular dial A^2. We then press the knob D to connect the index hand B with disk A′, and the index hand C and turn them together to the left to deduct two lengths, and we find that the index hand C now stands at 882, having deducted 14 points for the 2 lengths that she was beaten; thus 882 is the handicap value for Gipsy under the above conditions. Now take Gipsy under different conditions, on a different track, at a different weight and ridden by a different jockey, based on the above race, for a race that is to be run. Gipsy to run 4 furlongs ($\frac{1}{2}$ mile) track speed 4 (1 second slow) conditions 25—100 lbs. No. 10 jockey. We place the index hand C at 882 and the index hand B at the extreme left of the weight circle on annular dial A^2, then press the knob and turn to the right 5 lbs. (as she had the advantage in the weight). Release and turn to the left (2 track points, $\frac{1}{2}$ second); then release and go back and turn to (5 condition points) or $\frac{1}{5}$ of second. Now on the jockey circle, 5 points to the left and the indicator C stands at 862 or she should run the race under these conditions in $48\frac{3}{4}$ seconds. This method is continued with each horse until each horse has been assigned the proper handicap number.

In Figs. 3, 4, 5, 6, the outer dial A^4 bears graduations and figures for races of from 3 to 5 furlongs, and as shown in the table X at the lefthand corner of Fig. 4. If the track be from $5\frac{1}{2}$ to 7 furlongs, a substitute sheet like that partially shown in Fig. 8 is employed, which is superimposed upon the outer dial A^4, shown in Figs. 1 to 6. The marked graduations and figures on this substitute sheet are adjusted to the races of from $5\frac{1}{2}$ to 7 furlongs, and in races coming within this distance this substitute sheet shown in Fig. 8, as superimposed upon the device, is read in connection with the other dials A^2 and A^3. For races of from 7 to 9 furlongs still another substitute sheet of the same dimensions as in Fig. 8 is employed, but with its readings adjusted to this longer class of races and so on through the races of still greater length.

Although I have shown my invention in the form of circular scales with radial and rotary adjustable index hands, it will be understood that my invention comprehends broadly the combination of the scales and the index hands whether arranged for a movement about a center or in a straight line; that is to say broadly, for a movable index hand, such as B, attachable to and detachable from another movable index hand such as C, for independent or contemporaneous movement and having the relation described with reference to the dial scales A^2, A^3, A^4, bearing the values hereinbefore described.

I claim—

1. A race track calculating device for estimating the values and positions of horses, comprising three parallel scales; an outer scale A^4, an innermost scale A^2, and a middle scale A^3, all bearing graduations and markings as described and two movable index hands, one of said index hands having two pointers, one of which pointers extends to and reads upon the middle scale and the other pointer being mounted with a longitudinal adjustment on the said index hand and moving over and reading upon the innermost scale, and the other index hand having a

pointer also reading on the middle scale and an indicator attached thereto and extending across the outermost scale, and means for moving the two index hands simultaneously or independently.

2. A race track calculating device for estimating the values and positions of horses, comprising three concentric circular scales; an outer scale A^4, an innermost scale A^2, and a middle scale A^3, all bearing graduations and markings as described, and two concentrically hung and rotarily adjustable index hands, one of said index hands having two pointers, one of which pointers extends to and reads upon the middle scale and the other pointer being mounted with a longitudinal adjustment on the said index hand and moving over and reading upon the innermost scale, and the other index hand having a pointer also reading upon the middle scale and an indicator attached thereto and extending across the outermost scale, and means for moving the two index hands simultaneously or independently.

3. A race track calculating device for estimating the values and positions of horses, comprising three parallel scales; an outer scale A^4, an innermost scale A^2, and a middle scale A^3, all bearing graduations and markings as described, the inner one of which scales is movable and the two others stationary, and two movable index hands, one of said index hands having two pointers, one of which pointers extends to and reads upon the middle scale and the other pointer being mounted with a longitudinal adjustment on the said index hand and moving over and reading upon the innermost scale, and the other index hand having a pointer also reading on the middle scale and an attached indicator extending across the outermost scale, and means for moving the two index hands simultaneously or independently.

4. A race track calculating device for estimating the values and positions of horses, comprising three concentric circular scales; an outer scale A^4, an innermost scale A^2, and a middle scale A^3, all bearing graduations and markings as described, the innermost one of which scales is rotarily adjustable and the two outer ones stationary, and two concentrically hung and rotarily adjustable index hands, one of said index hands having a central pivot and two pointers, one of which pointers extends to and reads upon the middle scale and the other pointer being mounted with a longitudinal adjustment on the said index hand and moving over and reading upon the innermost scale, and the other index hand having rigidly attached thereto a central disk having a peripheral bearing against the movable innermost scale and having a pointer also reading upon the middle scale and an indicator attached thereto and extending across the outermost scale and means for connecting the first named index hand to the swiveling disk of the second index hand for simultaneous or independent movement.

5. In a device of the kind described, the combination with a supporting base, of a disk pivotally mounted at the center to rotate and bearing a radially extended index hand, a centrally pivoted index hand having a tilting support at its turning center with a pointer at one end, a weight at the other end normally holding the pointer up, and a prick pin on the tilting index hand on the opposite side of the center from the weight adapted to engage and lock said index hand to the disk.

6. In a device of the kind described; the combination with a supporting base, of a disk pivotally mounted at the center to rotate and bearing a radially extended index hand, a centrally pivoted index hand having a tilting support at its turning center with a pointer at one end, a weight at the other end normally holding the pointer up, and a prick pin on the tilting index hand on the opposite side of the center from the weight adapted to engage and lock said index hand to the disk, a longitudinally sliding index hand arranged on the weighted index hand, and an annular dial arranged beneath the range of adjustment of said longitudinally sliding index hand.

7. In a device of the kind described, the combination with a supporting base, of a disk pivotally mounted at the center to rotate and bearing a radially extended index hand, a centrally pivoted index hand having a tilting support at its turning center with a pointer at one end, a weight at the other end normally holding the pointer up, and a prick pin on the tilting index hand on the opposite side of the center from the weight adapted to engage and lock said index hand to the disk, a longitudinally sliding index hand arranged on the weighted index hand, and an annular dial arranged beneath the range of adjustment of said longitudinally sliding index hand, a dial arranged outside the annular dial having on its inner portion markings related to the two main index hands and having outside these markings other markings at different radial distances from the center, and an indicator for these markings connected to the central disk and overlapping and registering with these last named markings.

8. In a device of the kind described, the combination with a supporting base, of a disk pivotally mounted at the center to rotate and bearing a radially extended index hand, a centrally pivoted index hand having a tilting support at its turning center with a pointer at one end, a weight at the other end normally holding the pointer up, and a prick pin on the tilting index hand on the opposite side of the center from the weight adapted to engage and lock said index hand to the disk,

a longitudinally sliding index hand arranged on the weighted index hand, and an annular dial arranged beneath the range of adjustment of said longitudinally sliding index hand, a dial arranged outside the annular dial having on its inner portion markings related to the two main index hands and having outside these markings other markings at different radial distances from the center, and an indicator for these markings connected to the central disk and overlapping and registering with these last-named markings, said outer sets of markings being placed on a series of supplemental dials adapted to be superimposed and each having markings related to races of different lengths.

9. A race track calculating device for estimating the values and positions of horses comprising a series of circular concentric scales, the inner scale being of annular form rotarily adjustable and bearing a plurality of like sections each arranged for a different length of race and each having concentric divisions for the values in length, weight, track, and jockey, and the outer scales being relatively stationary and bearing markings for the handicap, track conditions, and time, and distance tables, and three index pointers; one extending to the inner portion of the outer scale, another sliding on the latter across the annular scale, and the third extending to the inner portion of the outer scale and bearing an indicator extending over the outer portion of the outer scale, and means for moving these index hands independently and conjointly.

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