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# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.



### Apparatus for use in Calculating the Winnings of Wagers.

We, SYDNEY HERBERT GROOM, a British subject, of 39, Brunswick Square, Hove, Sussex, and THE SHERINGHAM DAYLIGHT LIMITED, a British company, of 4, Broad Street Place, London, E.C. 2, 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 present invention relates to calculating apparatus and refers more particularly to an apparatus for permitting the easy and rapid calculation of the winnings of wagers conducted on the credit system. The calculation of the winnings accruing from single wagers may be easily effected mentally when the odds are simple, but is more complicated when the odds are fractions having numbers other than unity for denominator, or when "double", "treble", or other "accumulator" wagers have to be dealt with, in which case there is a different stake for each wager and the original stake must finally be deducted to obtain the net winnings.

In the case of a single wager in which the stake is  $S$ , and the odds against are  $m$  to 1, the net winnings  $W$  will be  $m.S$ , and by taking logarithms  $\log W = \log m + \log S$ . According to the first part of the present invention therefore the value of  $W$  is obtained by the use of two relatively slidable logarithmic scales graduated in stakes and odds respectively, the sum of the two lengths of the scales corresponding to the stake and odds being effected by adjustment of the two scales and being read off as winnings on the stake scale or preferably by a special mark on the movable scale on a third scale parallel to the stake scale. If the odds are "on" the logarithm of the winnings will be  $\log S - \log m$ , and the winnings will be indicated by subtraction of the operative lengths of the two scales.

[Price 1/-]

The odds scale may therefore be numbered both in odds "on" and odds "against", reading opposite ways from a unity or "evens" mark. The device may also be employed to calculate for "both ways" wagers *i.e.* for win and place when a win is obtained, and when a place only is obtained. In the case of the latter the effect is exactly the same as that of reduced odds and in the case of the former of increased odds, the ratio of increase or reduction being constant. Thus if a third scale is employed for the winnings two indicating marks may be provided on the movable scale, in addition to the ordinary "win only" mark, for both ways wagers—one for a win and place and one for a place only.

In the case of double wagers in which the stake is  $S$ , and the odds on the first and second wager  $m$  to 1, and  $n$  to 1 respectively, the winnings on the first wager are  $Sm$ , so that the stake for the second wager is  $Sm + S$ , *i.e.*  $S(m+1)$ . In the case of a win on the second wager the gross winnings will therefore be  $S(m+1)n$ , added to the initial stake of  $S(m+1)$  for that wager *i.e.*  $S(m+1)n + S(m+1)$ , which equals  $S(m+1)(n+1)$ . The net winnings are therefore  $S(m+1)(n+1) - S$ . Thus if  $W$  represents the net winnings  $W = S[(m+1)(n+1) - 1]$ .

In the case of a unit stake  $S=1$  and therefore  $W = (m+1)(n+1) - 1$ .

Thus  $W + 1 = (m+1)(n+1)$ .

By taking logarithms  $\log(W + 1) = \log(m+1) + \log(n+1)$ .

In accordance with the above therefore, according to the second part of this invention we provide two fixed logarithmic scales between which is slidable another logarithmic scale. One fixed scale is numbered with "odds" for use in the first wager, the movable scale has an indicating mark and a scale marked in "odds" for use in the second wager,

Price 25g

and the lower fixed scale co-operating therewith is numbered in winnings. The sum of the operative lengths of the two odds scales is obtained by suitable adjustment of the two scales and is read off directly as winnings in the lower fixed scale.

It should be clearly understood that ordinary logarithmic scales are employed but the numbering is modified so that the length of scale for any particular number is proportional to the logarithm of the sum of that number plus 1, in order to conform to the foregoing explanation.

In order that our invention may be clearly understood and readily carried into practice we have appended hereto one sheet of drawings illustrating the same, wherein:—

Figure 1 is an illustration of a calculating device for use in single wagers with varying stakes and odds, and

Figure 2 is an illustration of a calculating device for use in double or accumulating wagers with a constant stake and varying odds.

The device may be made of cardboard or any other suitable material and comprises upper and lower scale members A and B between which slides a third scale member C. If desired the devices shown in Figures 1 and 2 may be combined together so that one is on the back of the other, or if desired one above the other.

Referring to Figure 1 the upper scale member A is graduated logarithmically in stakes of any suitable values, and the upper edge of the sliding member C is graduated logarithmically in odds "on" and odds "against" reading in opposite directions from the unity or "evens" mark. The lower edge of the member C has an arrow *a* (which coincides in position with the "evens" mark) for indicating the winnings with a "win" wager on a scale of winnings on the upper edge of the scale B. Additional arrows *b*<sup>1</sup>, *b*<sup>2</sup> may be provided on the member C to indicate "place" winnings only with a "both ways" wager, and additional arrows *c*<sup>1</sup>, *c*<sup>2</sup> are provided for indicating "win and place" winnings with a both ways wager. Generally the place odds are  $\frac{1}{4}$  of the winning odds, or in some cases  $\frac{1}{3}$  in which case the winnings resulting from a win are one quarter or one third as much again as with a simple win only wager.

In using the device the odds number on member C is set against the stake number on the scale member A and the winnings are read off on the scale C against the arrow *a*, *b*<sup>1</sup>, *b*<sup>2</sup>, *c*<sup>1</sup> or *c*<sup>2</sup> as the case may be.

Referring to Figure 2, similar scale

members are employed, but a unit stake is selected as a basis for the device and for the winnings scale numbered on the member B and by simple multiplication or division the winnings may be easily calculated for any stake which is a multiple or sub-multiple of the unit stake.

The lower edge of the member A is graduated in odds on or against on opposite sides of a unity or evens mark, for use in the first wager and similarly with the lower edge of the sliding member C for the second wager. The upper edge of the member C carries an indicating arrow *d* which is set against the odds number of the scale A of the first wager, whereupon the winnings can be read off on the scale B against the odds number of the second wager on the lower edge of the sliding member C. In the example shown in Figure 2 the scale B has been numbered so that for a unit stake of five shillings the winnings may be read directly in shillings.

It should be understood that the devices shown may be modified in various ways without departing from the invention. For example in the case of Figure 1 the lower scale B may be dispensed with and the winnings read off on to the stake scale A against the indicating mark or marks *a*, *b*<sup>1</sup>, *b*<sup>2</sup>, *c*<sup>1</sup>, *c*<sup>2</sup> which would then be placed on the upper edge of the sliding member C. Again, a device similar to that shown in Figure 2 could be readily constructed to give the winnings in the case of wagers commonly known as "place doubles". This effect would be obtained by substituting  $\frac{m}{4}$  and  $\frac{n}{4}$  for *m* and *n* respectively in the foregoing explanation.

The devices could also be constructed to be of circular form, in which case the logarithmic scales would be marked upon fixed and rotatable dial members in place of the fixed and sliding members respectively and have angular instead of linear relative movement, or the construction could be further modified to give a wager calculator of substantially cylindrical form.

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

1. A device for calculating the winnings of wagers with a variable stake comprising a logarithmic scale numbered in stakes and a logarithmic scale numbered in "odds against" and "odds on" expressed fractionally, said scales being relatively adjustable in a longitudinal direction, and the whole being so

arranged that the sum or difference of the operative lengths of such scales is indicated (by means of a single reading mark) on the stake scale or on a third scale, as the winnings.

2. A device according to Claim 1, wherein the odds scale is so arranged that when any selected number thereon is placed opposite any selected stake, an indicating mark on the movable one of said scales is opposite the number on the winnings scale representing the winnings of the wager.

3. A device according to Claim 2, wherein the indicating mark is so positioned as to indicate the winnings obtained by a single way or "win" wager.

4. A device according to Claim 2, wherein there are one or more indicating marks so positioned as to indicate the winnings obtained by a win with a "both ways" wager of one or more place ratios.

5. A device according to Claim 2 or 4 wherein there are one or more indicating marks so positioned as to indicate the winnings obtained when a place only

is obtained with a both ways wager of one or more place ratios.

6. A device for calculating the winnings of two or more accumulating wagers with a constant stake comprising two logarithmic scales numbered in "odds" and relatively adjustable, one of said scales having an indicating mark reading the sum of the operative lengths of said scales on a fixed logarithmic scale numbered in winnings.

7. A device according to Claim 6 in combination with a device according to any of the preceding claims.

8. A device for calculating the winnings of wagers substantially as herein described with reference to, and as illustrated by, Figure 1 and/or by Figure 2 of the accompanying drawings.

Dated this 1st day of August, 1922.

HAROLD J. C. FORRESTER,  
Fellow of the Chartered Institute of  
Patent Agents,  
Jessel Chambers, 88/90, Chancery Lane,  
London, W.C. 2, and  
Central House, 75, New Street,  
Birmingham,  
Agent for the Applicants.

Fig. 1

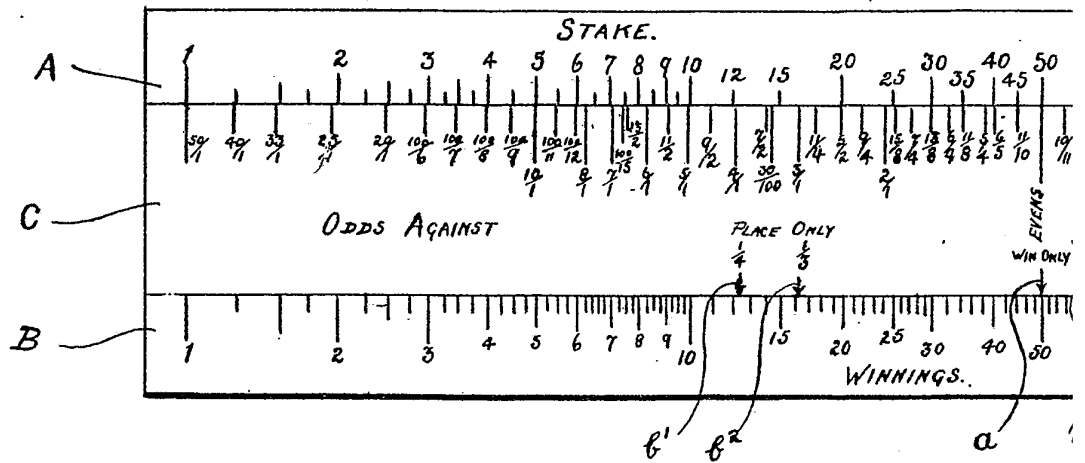
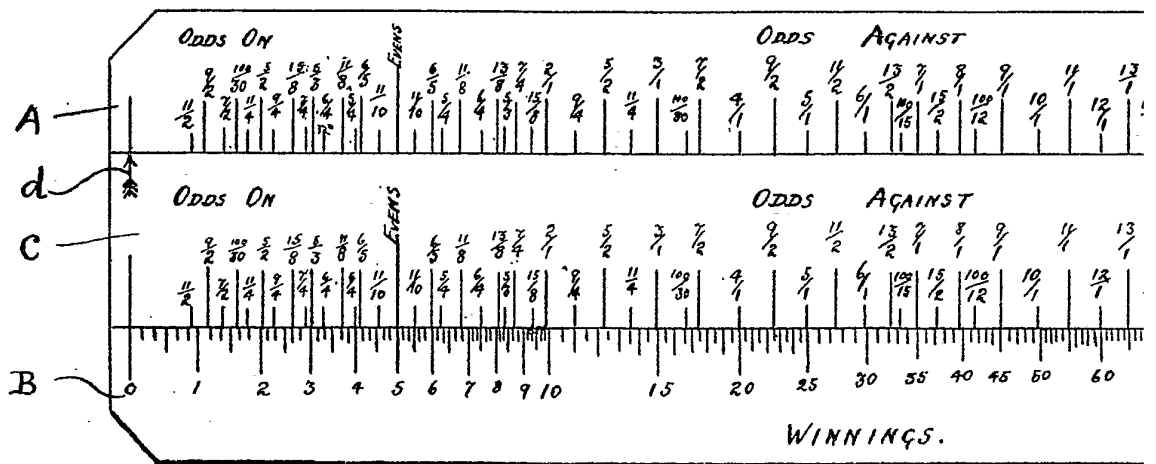


Fig. 2



[This Drawing is a full-size reproduction of the Original.]

Fig. 1.

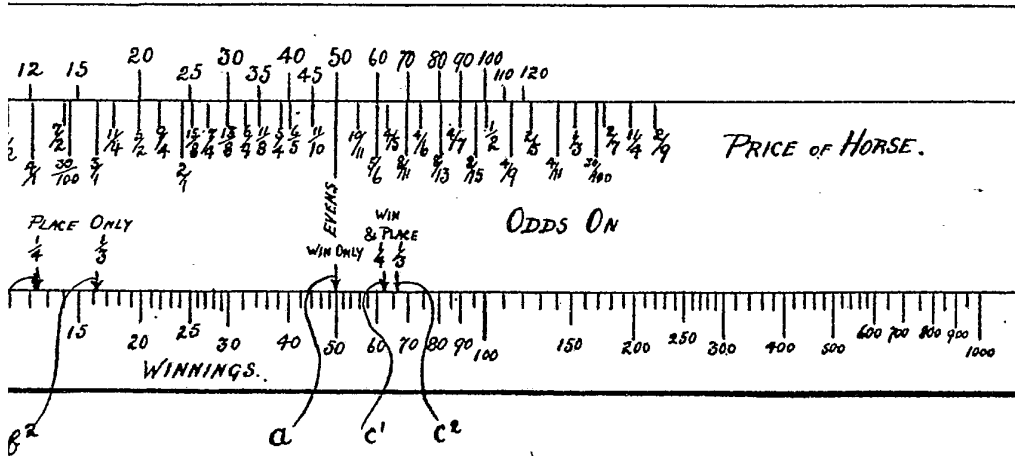


Fig. 2.

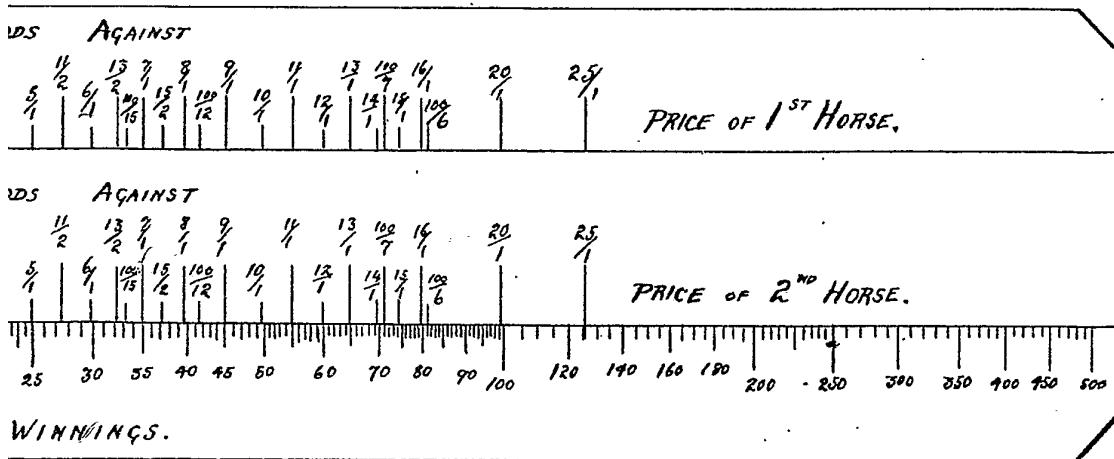


Fig. 1.

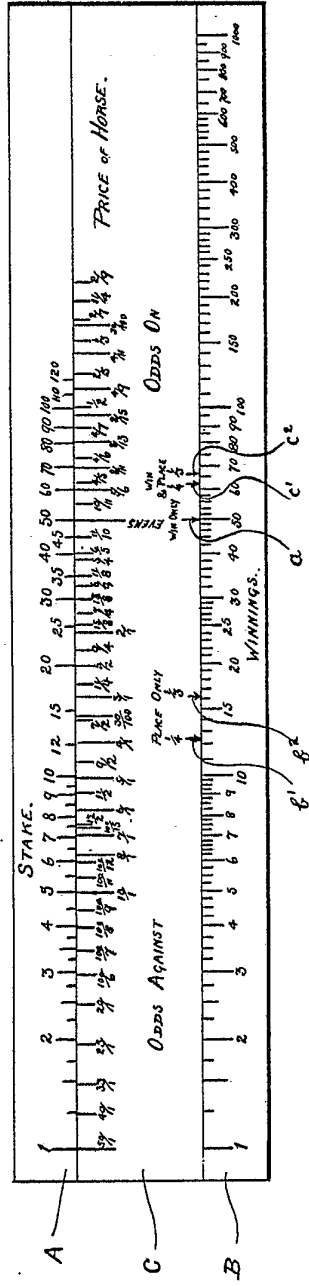
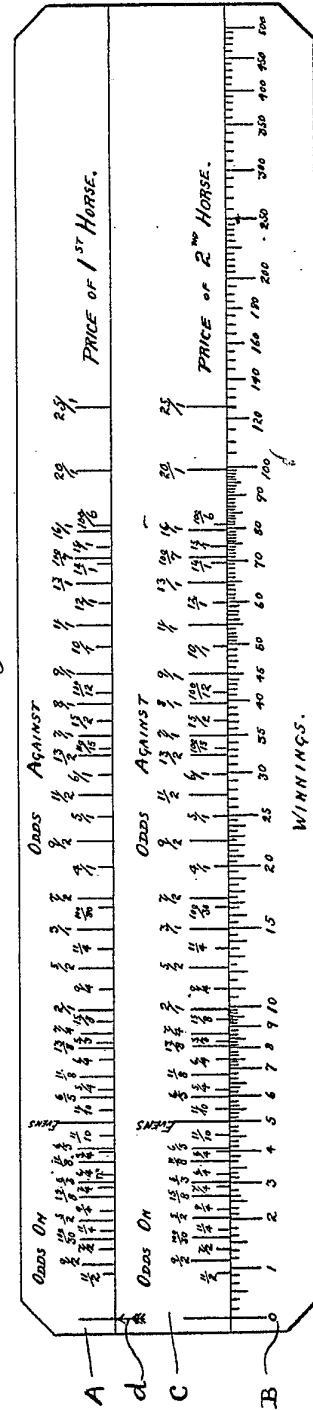


Fig. 2.



[This Drawing is a full-size reproduction of the Original.]