June 15, 1948. C. G. ALLEN 2,443,572

DEVICE FOR ELIMINATING DEAD-HEAT DECISIONS IN RACING

Filed Oct. 20, 1945 3 Sheets-Sheet 1

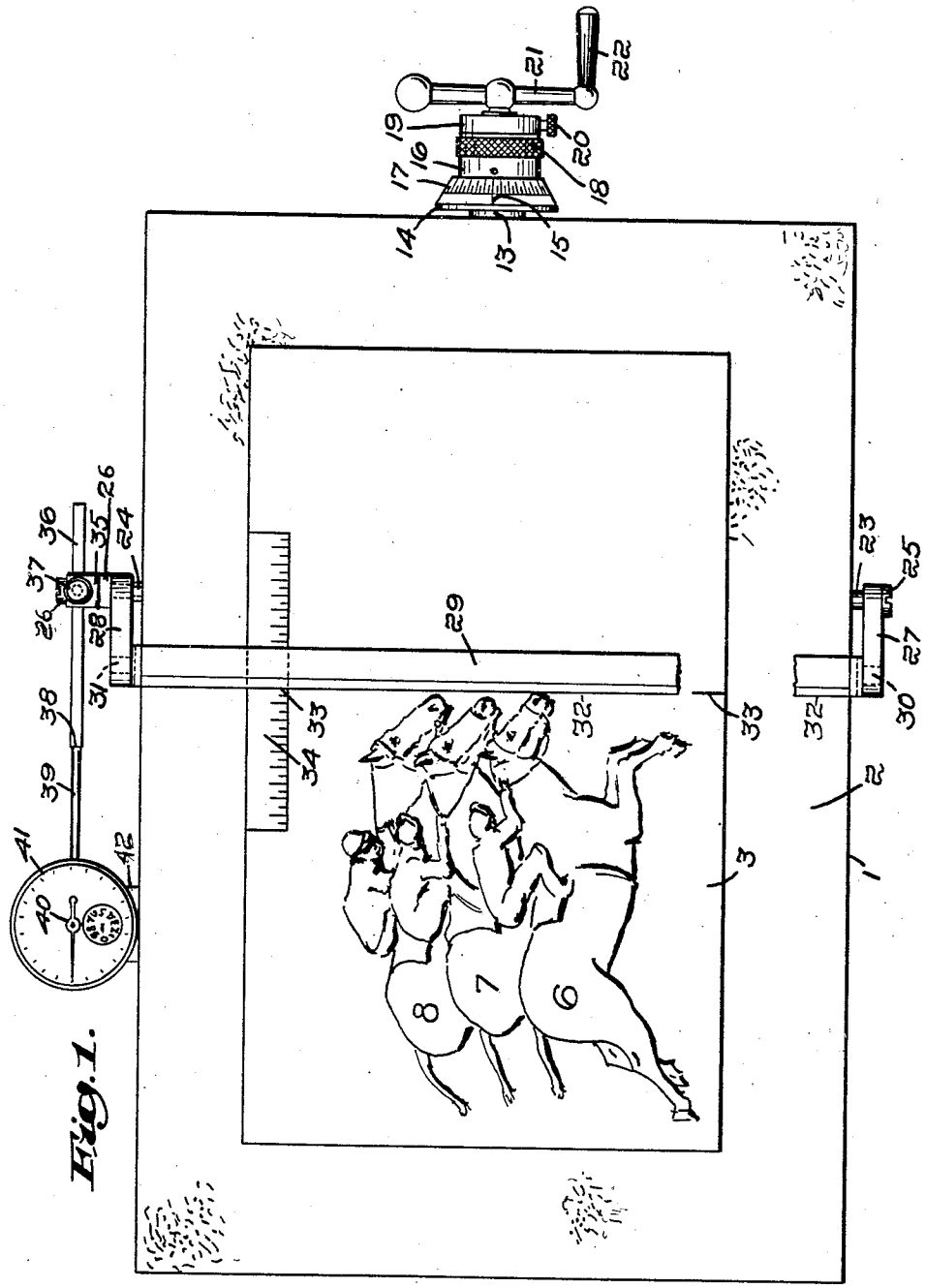


Fig. 1.

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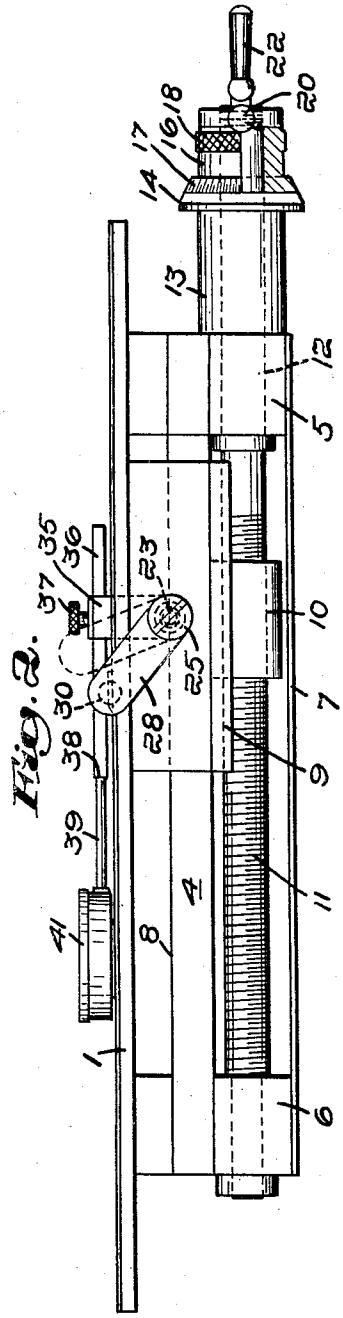


Fig. 2.

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Fig. 3.

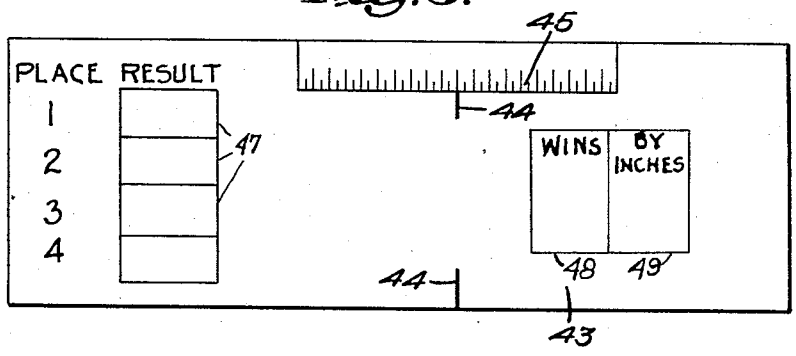
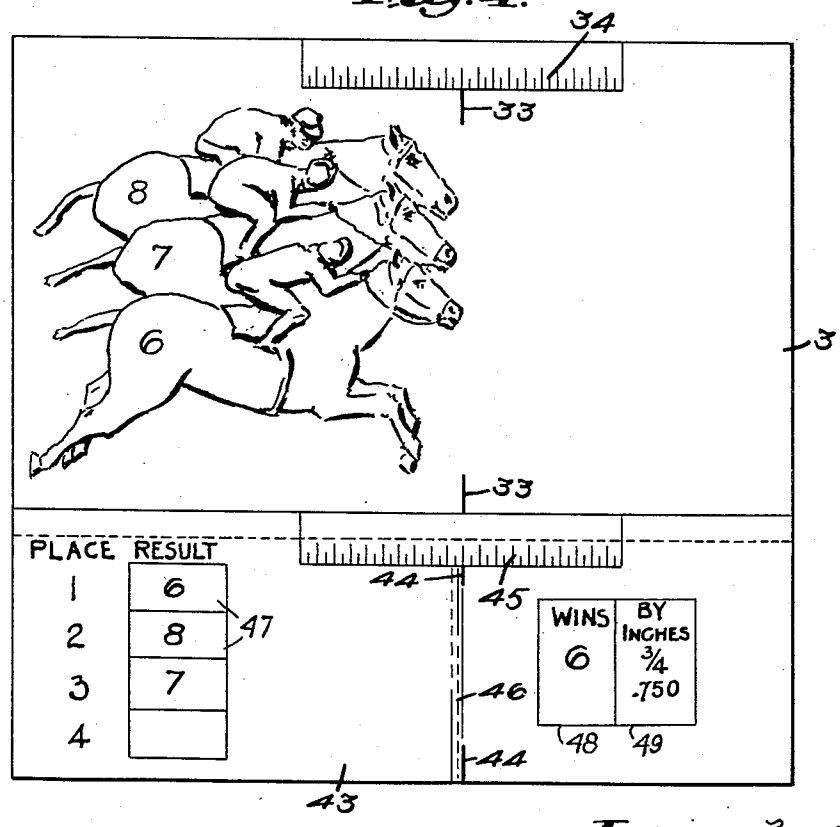


Fig. 4.



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UNITED STATES PATENT OFFICE

2,443,572

DEVICE FOR ELIMINATING DEAD-HEAT DECISIONS IN RACING

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Application October 20, 1945, Serial No. 623,557

2 Claims. (Cl. 33—76)

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This invention relates to means for eliminating "dead heat" decisions in racing, whether of horses, dogs, automobiles, or members of the human race, etc. The results of races have heretofore and at present are determined in many instances by the decisions of three judges who usually are positioned upon steps of successive height at one end of the finish line where they can each see a mark at the other end of the finish line and by observation determine which of the several contestants first crosses the line. In many instances the judges disagree and frequently the race is decided as a "dead heat."

In posting the result of a race the winner is referred to as a winner by a length, by a neck, or by a nose. In the latter instance the actual length of the "nose" is not determined. As a matter of fact the result of the race should be determined by the position of the foremost point of the winning contestant to touch the finish line. This is particularly important for the reason that as the contestants race down the straight section of the track toward the finish line the speed of each contestant is increased in such manner that the relative positions of the foremost point of the contestants may vary within a fraction of a second at the finish line and it is therefore necessary to determine accurately which touches the finish line first as a very considerable money consideration is dependent upon the result of races in which the stakes are high, for example, if the race is for a stake of ten thousand dollars the winner to take all, the winner would be entitled to the full ten thousand dollars, but if the race is decided as a "dead heat" the stake of ten thousand dollars would be divided equally between the foremost contestants and of course the betting upon the race would be similarly affected.

In order to avoid the rendering of decisions in races merely by the observation of the judges the so-called "photo finish" system has been adopted. In such cases it is customary to stretch a steel cable, usually of one-half inch diameter or more, directly above the finish line and to take a series of photographs of the race as the contestants immediately approach and pass the finish line. From this series of pictures the one which shows the positions of the contestants when any one reaches the finish line is inspected by the judges who then determine which contestant is the winner. While this to a great measure eliminates the errors due to the observation of the judges still it is inconclusive in exceedingly close cases where the width of the cable appearing upon the photograph, and which by reason of its proximity to the camera presents a substantial diameter, obscures the theoretical thin or tenuous line which should determine the finish line. Furthermore a cable no matter how

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taut it is stretched produces a certain sag and is subject to more or less lateral vibration due to wind pressure or other disturbing influences.

The object of the present invention is to provide means for eliminating the sources of error and enabling the judges to determine with accuracy the foremost point of each contestant to touch the vertical plane of the thin finish line.

This is accomplished in the present invention by providing means for measuring upon an unobstructed photograph depicting the finish of the race taken at and in alinement with the finish line the relative distances between the foremost points of the contestants at the exact instant that one of them touches the vertical plane of the finish line.

A further object of the invention is to provide means for scribing upon the photograph lines accurately touching the foremost points of the respective contestants respectively at and adjacent to the vertical plane of the finish line.

A still further object of the invention is to provide means associated therewith visually showing the distances between the scribe lines.

Illustrative embodiments of the invention are shown in the accompanying drawings, in which,

Fig. 1 is a plan view of apparatus embodying the invention showing a photograph of the finish of a horse race with means embodying a micrometer or micrometers for accurately determining the foremost point of the winning horse touching the vertical plane of the line of finish, and a plurality of means, either or both of which may be employed, for measuring the positions of the noses of the other horses relative to that of the winner;

Fig. 2 is a side elevation of the mechanism shown in Fig. 1 when viewed from one side;

Fig. 3 is a view of a chart adapted to be associated with the photograph for the purpose of enabling the result of the race to be posted; and,

Fig. 4 is a plan view of the mechanism showing the chart associated with the photograph either by application of the chart shown in Fig. 1 applied thereto, or as an integral part of the sheet upon which the photograph is printed.

The mechanism embodying the present invention comprises broadly means for supporting a photograph showing the "photo finish" of the race, a straight edge, and means for moving it longitudinally of the photograph-supporting means to enable the straight edge to register with the finish line and means including micrometer mechanism for moving the straight edge longitudinally of the support perpendicular to the finish line successively into registry with the foremost points of the several contestants, the micrometer being so constructed that it may be set to zero at the finish line and having a scale so graduated in units in proportion to a predeter-

mined scale of units of measurement of the track as to enable the distances between the foremost points of the several contestants relatively to the finish line to be read directly in terms of actual units of measurement of the track.

The preferred embodiment of the invention as illustrated in the drawings comprises a rectangular platform 1 having a flat, preferably matted, surface 2 of felt or other suitable material upon which a photograph 3 of the finish of the race may be positioned longitudinally of the surface of the platform.

The platform is fixedly mounted upon a frame having a wide longitudinal girder or plate 4 provided at its ends with legs 5 and 6 mounted upon or adapted to rest upon a suitable base 7. The plate or girder 4 is provided with a longitudinal guideway 8 upon which a suitable slide 9 is accurately mounted and is provided with a downwardly extending section 10 which engages a screw threaded shaft 11 which extends longitudinally centrally of the frame and is journaled in the legs 5 and 6 and prevented from longitudinal movement therein. Slide 9 has a guide surface abutting the flat bottom surface of platform 1. The cylindrical portion 12 of the screw threaded shaft which is journaled in the leg 5 preferably extends well beyond the outer face of the leg 5 and is surrounded by a sleeve 13 which is secured to the leg 5 and is provided with an enlarged beveled head 14 provided with an index 15. A sleeve 16, which is rotatably mounted upon the shaft 11, is provided with a beveled head forming a continuation of the beveled surface 14 and is provided with a circular scale 17 to cooperate with an index 15 on the beveled head 14. The sleeve 16 desirably has a knurled portion 18 adapted to be conveniently grasped by the operator to rotate the sleeve and is also provided with an integral section 19 adapted to be fixedly secured to the shaft 11 by a set screw 20. The end of the shaft 11 desirably is fixedly secured to an operating counterbalanced member 21 provided with a suitable handle 22 by means of which the shaft may be rotated.

The scale 17 desirably is graduated in units proportional to those of the scale of accurate measurements of distances of the track for purposes which will hereinafter appear. Rotation of the handle member in either direction will correspondingly move the slide 9 longitudinally of the platform 1 and the distance of such measurement will be indicated upon the scale 17 as in usual micrometer constructions of this type.

The slide 9 is provided with diametrically opposite pivotal shafts 23 and 24 having respectively large heads 25 and 26 and arms 28 and 27 of equal length are pivotally mounted upon the shafts 23 and 24 respectively. A preferably metal bar 29 having reduced cylindrical end portions 30 and 31 is pivotally mounted upon the arms 27 and 28 at equal distances from the axis of the shafts 23 and 24 and is provided with a beveled sharp straight edge 32 extending transversely across the platform 1 perpendicular to the longitudinal axis thereof.

By reason of this construction the bar 29 can be raised from the platform to permit the photograph to be placed beneath it and the bar then swung down so that its beveled edge will contact the surface of the photograph.

The photograph which should be taken from such a position in alinement with the thin finish line as to provide an unobstructed view is provided with means such as a line 33 at one or both edges

of the photograph showing the end of the finish line and preferably with a scale 34 associated with one of the finish lines graduated in units corresponding to those of the track, e. g., feet, inches, etc.

In the operation of the device the straight edge 32 is moved by the rotation of the screw 11 by its handle 22 until it registers with the ends of the finish line shown upon the photograph. The set screw 20 of the micrometer mechanism is then released and the sleeve 16 then rotated to position the zero of the micrometer scale 17 in registry with the index 15 on the head of the collar 14. A thin line is then scribed upon the photograph to exactly register with the finish line and the foremost point of the leading contestant. The set screw 20 will then be set up to clamp the sleeve 16 upon the shaft 11 and the handle 22 rotated until the straight edge registers with the foremost points of the second and third contestants and other lines similarly scribed on the photograph. The distance separating the foremost points of the contestants can be read upon the micrometer scale 17 in units corresponding to actual distances of the track.

By reason of this invention the relative position of the winner and of other contestants may be readily and accurately determined and "dead heat" decisions effectively eliminated.

Other forms of micrometer mechanism may be provided which may be used alone, or in addition to that above described, as illustrated herein, for the purpose of checking and insuring accuracy in determining the result of the race. Such a mechanism, which is shown in Figs. 1 and 2 as supplementary to that above described comprises a vertical post 35 which is suitably mounted on the slide 9 preferably upon the head 26 of the pivotal shaft 24. The post 35 is provided near its upper end with a horizontal bar in which a rigid rod 36 is slidably mounted and is adapted to be clamped accurately in adjusted positions by a set screw 37. The rod 36 has a flat end 38 adapted to be engaged by the flat end of a micrometer-actuating rod 39 which acts through suitable gearing to rotate an index hand 40 cooperating with a suitable graduated circular scale of a usual type of dial micrometer 41 which is provided with a standard 42 fixedly secured to the platform 1 or its supporting plate 4.

When a dial micrometer of this type is used the carriage 9 is adjusted by rotating the screw 11 by its handle 22 until the straight edge is in registry with the finish line on the photograph. The set screw 37 is then released and the sliding bar 36 adjusted longitudinally until the micrometer-actuating rod 39 positions the index hand at zero on the circular scale. The set screw 37 is then set up to clamp the bar 36 firmly in place. Thereafter the straight edge is adjusted by rotation of the shaft 11 to position it successively into registry with the foremost points of the respective contestants and thin lines scribed along the straight edge upon the photograph as above described and the respective distances separating each of the foremost contestants from the finish line read directly upon the suitably graduated dial in the manner aforesaid.

A micrometer scale of this character is preferable as the graduated dial may be of a larger area and the scale more accurately read.

A further feature of the invention comprises associating with the photograph a chart upon which the result of the race may be displayed. Such a chart is illustrated in Fig. 3 and comprises a card

or strip of paper of rectangular form adapted to be adhesively secured preferably to the base portion of the photograph. The chart 43 desirably is provided with lines 44 indicative of the ends of the finish line with the line 44 associated with a suitable scale 45 graduated in units of track measurements such as feet and inches and sub-divisions of the inches in fractional or decimal form.

The chart when applied to the photograph as illustrated in Fig. 4 desirably has score lines 46 forming extensions of those which are applied to the photograph, or the score lines may be made on the chart alone in place of lines upon the photograph. The chart 43 desirably is provided at one end with panels 47 upon which may be placed the numbers of the horses in the order that they finish and upon the other end with panels 48 and 49 showing respectively the number of the winner and the winning distance in feet, inches, and parts of inches in fraction or decimal form.

The photograph with the chart attached may then be projected by well known reflecting apparatus in great enlargement upon a screen located plainly in view of the attendants at the race track.

Apparatus generally used to record photo finishes includes a cable stretched over the track sufficiently above the surface thereof to enable the horses and their riders to pass therebeneath. The camera is located at a greater height than the cable in accurate alinement with the finish line. In the photographs taken at the finish of the race the cable which is nearer the position of the camera appears upon the photograph as a wide line which obscures the actual position of the foremost points of the contestants to touch the vertical plane of the finish line and thereby prevents the accurate determination of the winner of the race. In the present invention the cable is eliminated and the position of the finish line indicated by suitable thin lines appearing upon the photograph at the respective ends of the invisible finish line so that the scribed lines on the photograph and also on the chart will show no substantial thickness and the distances from the finish line accurately measured by the micrometer to exceedingly small fractions or decimals of an inch so that when the photograph and/or the chart is projected upon a screen in greatly enlarged form there can be no doubt in the mind of any observer as to the accuracy of the outcome of the race.

It will be understood that the particular embodiments of the invention which are shown and described herein are of an illustrative character and are not restrictive of the meaning and scope of the following claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for determining accurately the relative position of objects photographed in motion from an unobstructed photograph taken at and in alignment with the finish line showing the foremost contestants and having means representing the position of the finish line on the photograph, which comprises a flat support upon which the photograph is to be arranged in fixed position, a movable member having a straight edge extending transversely of said support adapted to be placed in registry position on the photograph at a point representing the finish line, means including spaced depending supporting members projecting downwardly from the bottom surface of said flat support and arranged medially thereof, a screw mounted in bearings in said spaced supports and projecting at one end beyond one edge of said flat support, a micrometer mechanism carried at the end of the screw beyond the edge of said flat support, and a connection between said straight edge and said screw including a bushing threaded on said screw, a slide supported by said bushing having a guide surface abutting the flat bottom surface of said flat support, pins projecting transversely from said slide beyond each edge of said flat support and in parallel alignment with said straight edge, arms pivotally supported by said pins and pivotally connected to said straight edge at each of its ends and outward of said flat support to permit swinging movement of said straight edge away from the top of said support, and a micrometer adjusting means for said micrometer, to permit calculations of the straight edge movement between the photographed objects.

2. Apparatus for determining accurately the relative position of objects photographed in motion from an unobstructed photograph taken at and in alignment with the finish line showing the foremost contestants and having means representing the position of the finish line on the photograph, which comprises a flat support upon which the photograph is to be arranged in fixed position, a movable member having a straight edge extending transversely of said support adapted to be placed in registry position on the photograph at a point representing the finish line, means including spaced depending supporting members projecting downwardly from the bottom surface of said flat support and arranged medially thereof, a screw mounted in bearings in said spaced supports and projecting at one end beyond one edge of said flat support, a micrometer mechanism carried at the end of the screw beyond the edge of said flat support, and a connection between said straight edge and said screw including a bushing threaded on said screw, a slide supported by said bushing having a guide surface abutting the flat bottom surface of said flat support, pins projecting transversely from said slide beyond each edge of said flat support and in parallel alignment with said straight edge, arms pivotally supported by said pins and pivotally connected to said straight edge at each of its ends and outward of said flat support to permit swinging movement of said straight edge away from the top of said support, one of said pins supporting at its outer end a post member, a longitudinally extending bar adjustably supported by said post member for operable association with a dial indicator, and a micrometer adjusting means for said micrometer, to permit calculations of the straight edge movement between the photographed objects.

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