Jan. 28, 1941. J. HANDLEY 2,229,737

INDICATING APPARATUS FOR TOTALIZATORS

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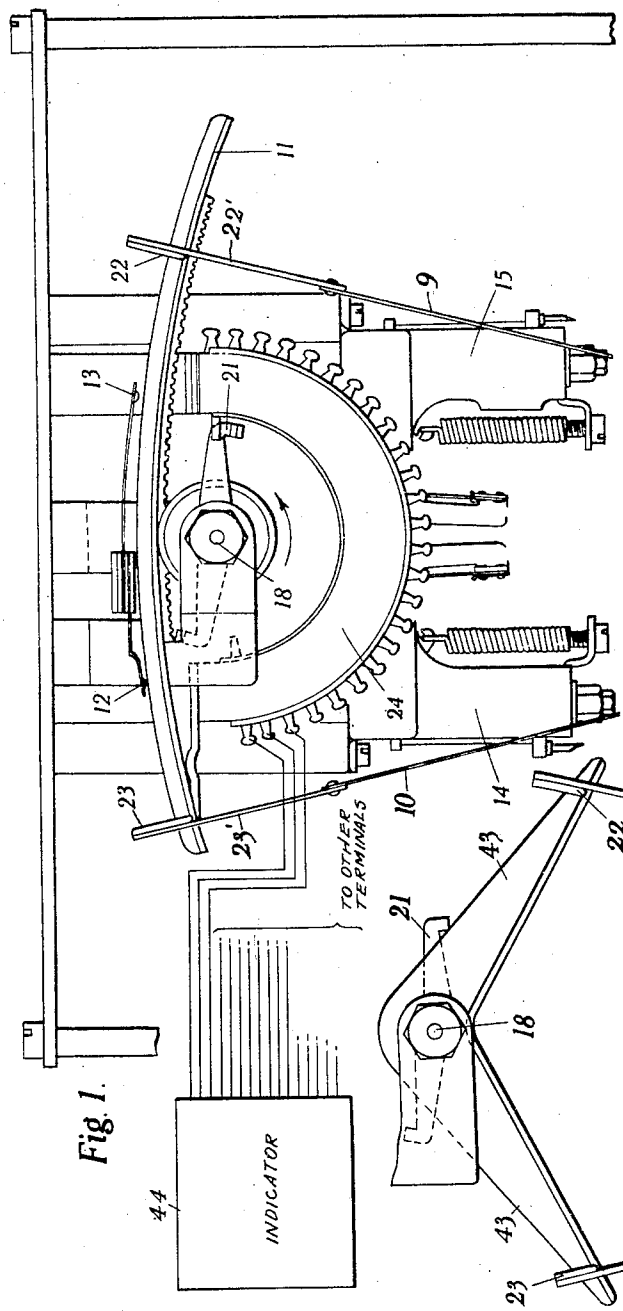


Fig. 1.

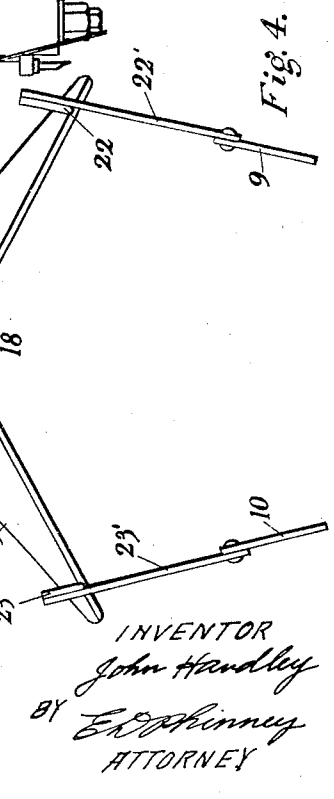


Fig. 4.

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Fig. 3.

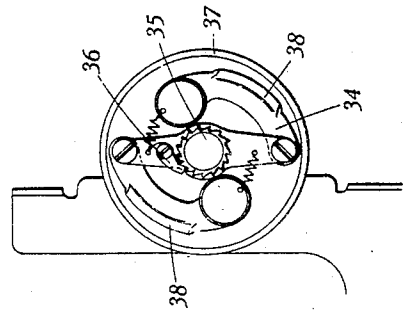
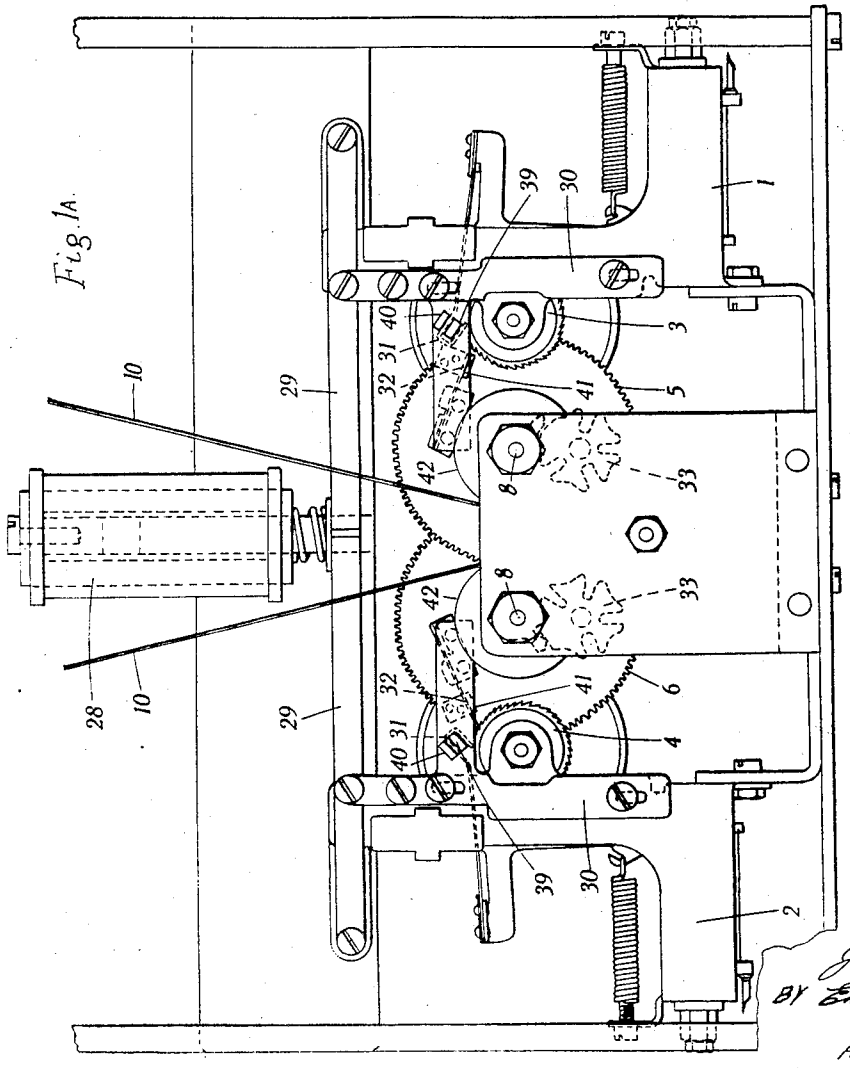


Fig. 1A.



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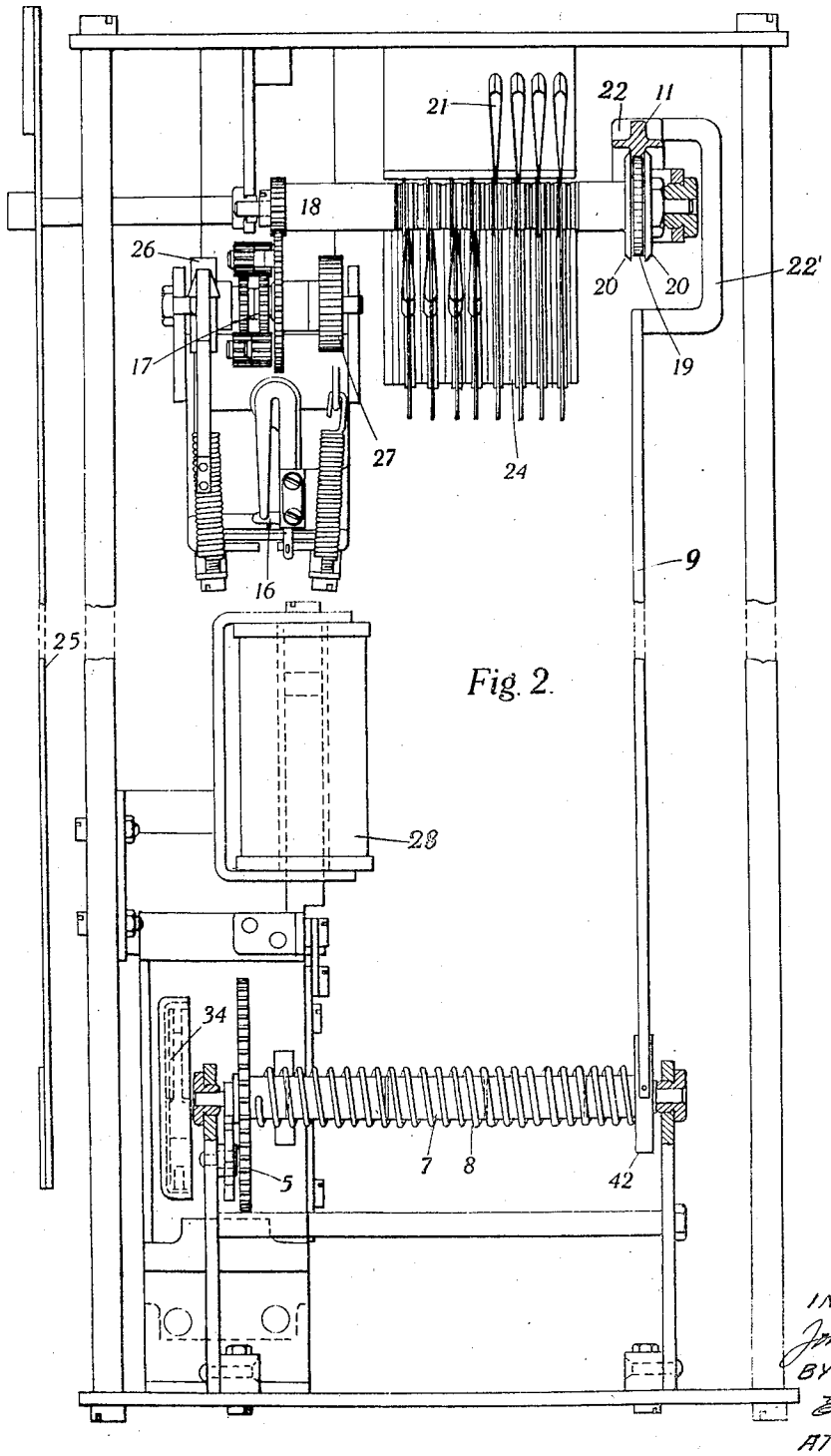


Fig. 2.

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2,229,737

UNITED STATES PATENT OFFICE

2,229,737

INDICATING APPARATUS FOR TOTALIZATORS

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Application December 7, 1938, Serial No. 244,444
In Great Britain December 8, 1937

8 Claims. (Cl. 235—61)

This invention relates to indicators for giving a variable indication of the ratio of two varying amounts.

The object of the invention is to provide an improved indicator of this character which is simple and reliable in operation.

The main feature of the invention comprises an indicator for giving a variable indication of the ratio between two varying amounts comprising a pair of coaxial lever arms, means for loading said arms so that they give opposed moments of force around the axis of the arms, means for varying the loads on the lever arms in accordance with said two varying amounts, and indicating means the setting of which is controlled by adjustment of the relative effective lengths of the lever arms to maintain said moments of force about the axis equal.

The invention will be clearly understood from the following description of one embodiment shown in the accompanying drawings, in which:

Figs. 1 and 1A when placed above one another form a side elevation of the controlling apparatus of an indicator; while

Fig. 2 is an end elevation of said controlling apparatus as viewed from the left side of Figs. 1 and 1A with certain parts broken away to clarify the showing.

Fig. 3 is detail of a governor mechanism comprised in the apparatus of Figs. 1, 1*a* and 2.

Fig. 4 is a side elevation of a lever arrangement which may be used to replace the steelyard of Fig. 1.

The embodiment shown in the drawings works on the "steelyard" principle and consists of a steelyard cantilever **11**, which rests rockingly on top of a gear wheel **19**, being provided with gear teeth on its underside to mesh with the teeth of such gear wheel. The gear wheel **19** is mounted on a spindle **18**. Rotation of spindle **18** therefore moves the cantilever **11** relative to its pivot, that is to the gear wheel **19** on which it rests. The cantilever **11** is held against the gear wheel **19** both by gravity and by the pull of strips **9**, **10** hereinafter described, sideways movement of this cantilever being restrained by guide discs **20**. The cantilever **11** is loaded by spiral springs **8** only one of which can be seen in the drawings one end of each of which is connected to a corresponding spindle **7** carrying a gear wheel **5**, **6**, while the other end is fixed to a drum **42** on the spindle. Steel strips **9**, **10** connect the drums **42** to knife-edges **22**, **23** which bear in the manner usual for steel yards on the ends of the cantilever **11**, these knife-edges **22**, **23** being secured to the strips **9**, **10** by hangers **22'**, **23'** respectively. In Fig. 2 the knife-edge **23**, the hanger **23'** and the upper part of strip **10** have been broken away (as well as also the corresponding end of steelyard **11**) in order to show gear wheel **19** more clearly. The cantilever makes contact with one or the other of contacts **12**, **13** when the cantilever tilts in opposite directions. Closure of these contacts respectively completes stepping circuits for step-by-step magnets **14**, **15** arranged to step ratchet wheels **26** and **27** respectively, thus driving spindle **18** in opposite directions of rotation through differential gear **17**.

The operation of the device when used as a betting odds indicator controlled from a totalisator will now be described.

Electrical impulses received by the grand total aggregator are also transmitted to the electro-magnet **1**, Fig. 1A, and impulses received by a competitor aggregator are also transmitted to the electro-magnet **2**. These drive the ratchet wheels **3** and **4** which rotate the gears **5** and **6** imparting tension to the spiral springs **7** and **8**, the resultant effort being applied via the steel strips **9** and **10** to the cantilever **11**.

As more impulses are received by the total magnet **1**, than the competitor magnet **2**, the strip **9** will exert more pull on the cantilever than the strip **10** so that the lever will rock and earth the contact **12**. This in turn causes the magnet **14** to operate via its interrupter **16**, Fig. 2, and to step its ratchet wheel **26**. In so doing the shaft **18** is rotated in the direction of the arrow via the differential gear **17**. This turns the gear **19** which moves the cantilever **11** and shortens the distance between the knife edge **22** and the centre line of shaft **18** and increases the distance between the knife edge **23** and the shaft centre. This operation continues until the moment of **22** about **18** balances the moment of **23** about **18**, when the cantilever **11** rocks away from the contact **12**.

If the proportion of impulses received by the competitor magnet **2** relative to the proportion received by the grand total magnet **1** assumes a more even ratio, the cantilever **11** is rocked in the other direction, the contact **13** is earthed and this causes the magnet **15** to operate. The magnet **15** rotates the shaft **18** in the opposite direction until equilibrium is again restored. Spindle **18** carries wipers **21** cooperating with a contact bank **24**, the contacts of which are connected to control terminals of an electrical digit indicator **44**; for instance, each wiper may control the value of a digit on the indicator.

When the setting of the wipers is changed during movement of the cantilever 11, the marking to the indicator is changed and the indicator will set itself to a new position marked by the wipers and display the odds according to the proportionate amounts of bets received by the magnets 1 and 2.

When the ultimate number of units received is likely to exceed the amount that can be readily accepted and stored, provision may be made so that only one impulse is received for every tenth or every hundredth unit according to the maximum capacity of the aggregators. To accomplish this these pulses may be transmitted by a cam on the aggregator's digit carrying axles.

To obtain a more accurate display in cases where the odds are high, the proportions of units may be altered so that the total magnet 1 receives a different proportion of impulses to the competitor magnet 2, for instance, the competitor magnet 2 may receive an impulse for every 10 units received by the competitor aggregator whereas the total magnet 1 may receive one impulse for every 50 units received by the grand total aggregator. It will still be possible to indicate the correct odds by choosing relevant markings for indicator positioning and instead of the distances 22 to 18 and 23 to 18 being in the ratio of 50 to 1, for a 50 to 1 indication they will only be 10 to 1, and a more practical application of the cantilever. It is to be understood that such variations are to be regarded as included in the term "varying the loads in accordance with varying amounts".

So as to prevent the indicator continuously changing, a timing device may be employed to apply battery to magnets 14 and 15 at intervals say twice per minute for one or two seconds only.

Where it is not desirable to instal indicating digits, a hand 25, may be attached to spindle 18. The wipers 21 and bank 24 would in this case be unnecessary. A suitable dial may be provided and the relative odds may be painted at intervals round the dial. Should a very large hand be required which could not be operated by the electro magnets 14 and 15 a motor drive may be employed to drive the spindle in opposite directions of rotation under control of circuits earthed by contacts 12 and 13.

Zeroizing is effected by energising solenoid 28, Fig. 1, which lifts the levers 29 and mounting plates 30 which in turn disengage the feed pawls 31 by means of a finger 39 integral with backstop 40 and detent springs 32 by means of a finger 41 so that the springs 7 and 8 may unwind and return the wheels 3, 4, 5 and 6 to their zero positions controlled by the Geneva wheels 33 which also serve to prevent overloading the springs by limiting rotation of the gear-wheels 5, 6 to five complete rotations.

To control the speed of zeroizing, a governor 34 is fitted to the ratchet wheel 3 and 4. These governors only rotate when the ratchet wheels 3 and 4 turn in the reverse direction and are driven by ratchet wheels 35 mounted on the shafts of the ratchet wheels 3 and 4, and engaged by the pawl 36 mounted on the governor.

The governor as may be seen from Fig. 3 is controlled by centrifugal force causing the pads 38 to apply a braking effect in the drum 37.

Instead of a steelyard device, two levers in fixed angular relation with each other and arranged to rotate about a common axis 18 may be used as shown in Fig. 4. The levers 43 may be at about 90° to each other and will be turned by the unbalanced loads themselves exerted by strips 9 and 10 and knife edges 22 and 23 until equilibrium is reached. It is apparent from the illustration in Fig. 4 that as the load on the lever 43 is increased by either of the strips 9 or 10 (being tensioned by torsional springs) lever 43 will rotate until the force exerted by one strip times its effective lever arm length about the axis 18 is equal to the force exerted by the other strip times its effective lever arm length about the axis 18. As before, the spindle could carry a direct reading dial hand or a marker switch for a digit indicator.

What is claimed is:

1. An indicator for giving a variable indication of the ratio between two varying amounts comprising a pair of lever arms rotatable about a common axis, means for loading said arms so that they give opposed moments of force around the axis of the arms, means for varying the loads on the lever arms in accordance with said two varying amounts, means for varying the relative effective lengths of the lever arms responsive to rotation of said arms, said adjustment being in such direction as to tend to equalize said moments and indicating means the setting of which is controlled by adjustment of the relative effective lengths of the lever arms to maintain said moments of force about the axis equal.

2. An odds indicator for totalisators comprising a pair of lever arms rotatable about a common axis, means for loading said lever arms so that they give opposed moments of force around the axis, means for varying the loads on the lever arms in accordance with the total bets on a race or the like and the total bets on an individual runner or the like respectively, means for varying the relative effective lengths of the lever arms responsive to rotation of said arms, said adjustment being in such direction as to tend to equalize said moments, and indicating means the setting of which is controlled by adjustment of the relative effective lengths of the lever arms to maintain said moments of force about the axis equal.

3. An indicator for giving a variable indication of the ratio between two varying amounts which comprises a single steelyard member rotatably supported for rotation about an axis intermediate its ends and capable of longitudinal movement relative to said axis so as to form two lever arms of variable length, means for loading said arms so that they give opposed moments of force around said axis, means for varying said loads on said arms in accordance with said two varying amounts, means for causing longitudinal movement of said member with respect to said axis responsive to rotation of the said member caused by inequality of said moments, said longitudinal movement being in such direction as to tend to equalize said moments, and indicating means the setting of which is controlled by said means for causing longitudinal movement of said steelyard member.

4. An indicator as claimed in claim 3 wherein said means for causing longitudinal movement of said member comprise electrical switching means actuated in response to the tilting of said steelyard member in a certain direction and electrically controlled means responsive to the actuation of said switching means to cause the steelyard to be moved in one direction or the other to restore equilibrium.

5. An indicator as claimed in claim 3 and in

which the steelyard member is provided with gear teeth engaging a gear-wheel on a rotatable spindle, and wherein said means for causing longitudinal movement of steelyard member comprise electrical switching means actuated in response to the tilting of said steelyard member and electrically controlled driving means for rotating said spindle responsive to actuation of said electrical switching means.

6. An indicator as claimed in claim 1 and in which the lever arms are fixed together and are arranged to rotate together about their axis in one direction or the other to restore equilibrium when the proportion between the loads varies.

7. An indicator as claimed in claim 3 wherein said indicating means comprise a wiper switch mounted on the axis of the lever arms, and means for rotating the wipers of said switch to different positions according to the setting of the lever arms, whereby electrical circuits may be formed over different contacts of the switch to control the setting of an indicator.

8. An indicator as claimed in claim 3 wherein said means for loading said arms comprise a pair of torsional springs and wherein said means for varying said loads comprises a pair of pawl and ratchet devices operable in accordance with variations in the amounts to be compared and coupled to said springs for variably winding them up

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