Sept. 1, 1936. P. C. PRIESTMAN ET AL 2,052,843

REGISTERING DEVICE

Filed Jan. 27, 1934 2 Sheets-Sheet 1

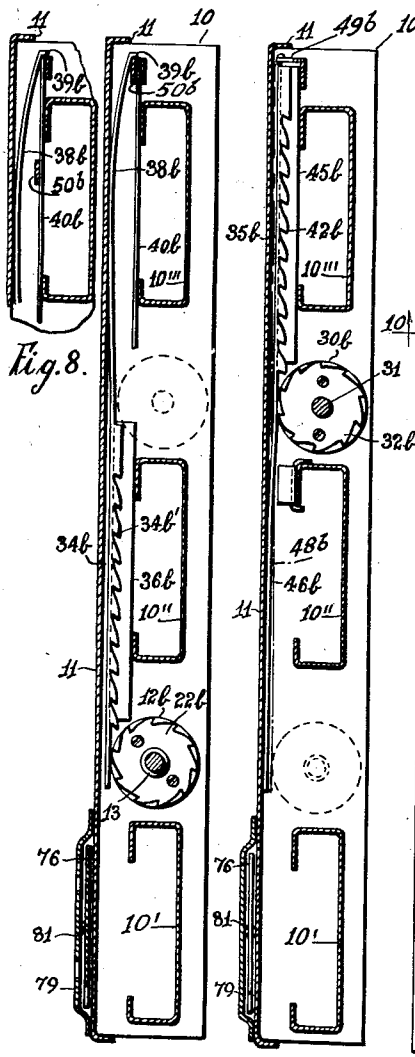


Fig. 8.

Fig. 6.

Fig. 7.

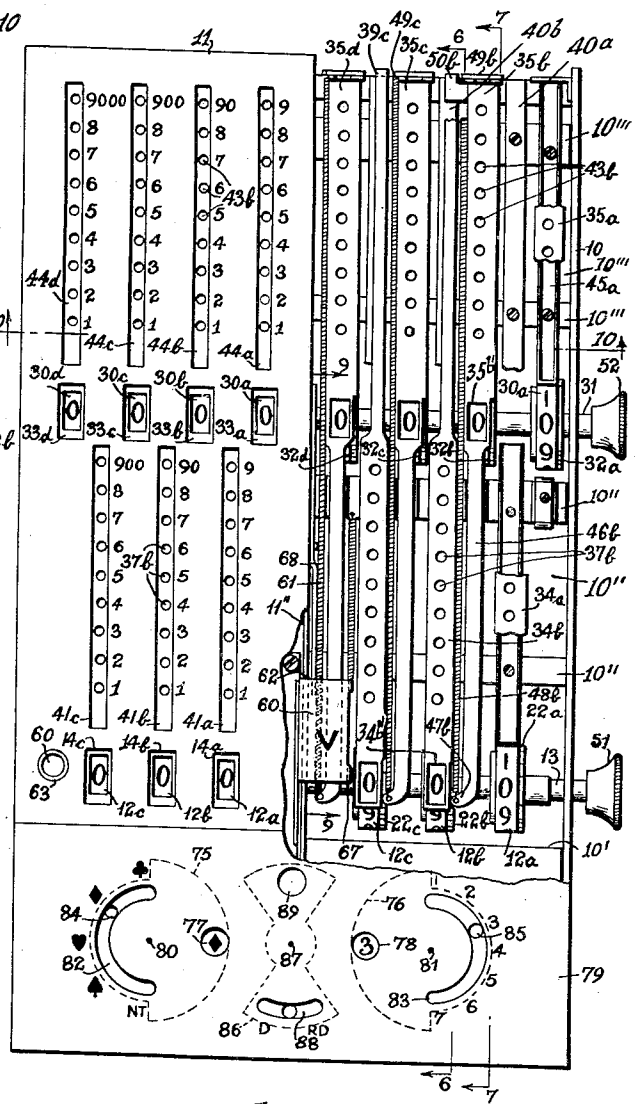


Fig. 1.

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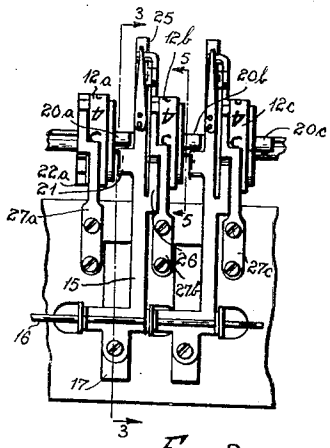


Fig. 2.

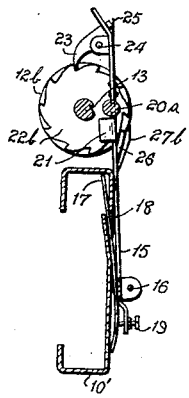


Fig. 3.

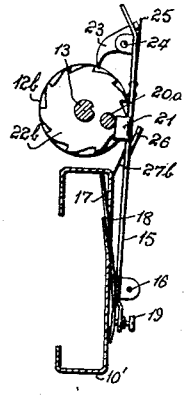


Fig. 4.

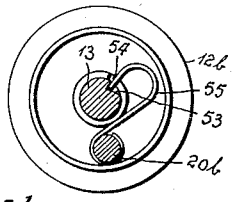
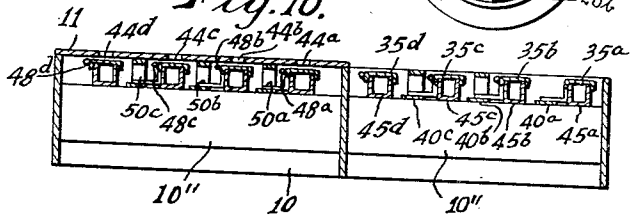


Fig. 5

Fig. 10.



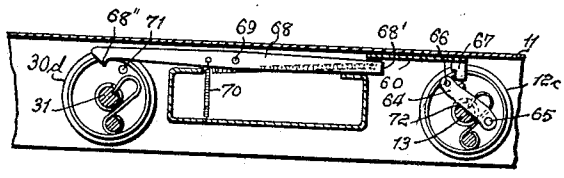


Fig. 9.

Patented Sept. 1, 1936 2,052,843

UNITED STATES PATENT OFFICE

2,052,843

REGISTERING DEVICE

Percy Claude Priestman, Sudbury, and Percy Lionel Grant, Ealing, London, England

Application January 27, 1934, Serial No. 708,672
In Great Britain February 2, 1933

8 Claims. (Cl. 235—69)

The present invention relates to the type of calculating apparatus comprising a set of rotatable registering members, such as figure drums, representing units, tens, and so forth, transfer mechanism for carrying forward tens, hundreds, and so forth from these members respectively to the members of next higher denomination, and associated with each of the registering members a slidable actuating element, such as a perforated or indented bar, drivably connected with the registering member and adapted to be moved by engaging, for example by means of a pointer, a perforation or indentation representing the number required to be added, and sliding the actuating element until the pointer or the like meets a stationary stop, whereby one or more of the registering members is rotated so as to add that number to the indicated total.

An object of the present invention is to adapt calculating apparatus of this type to the purpose of computing and registering scores in games, such for example as contract or auction bridge, so as to provide a scorer which is of relatively simple construction, but is nevertheless reliable and easily operated.

According to the present invention, calculating apparatus of the type hereinbefore set forth is provided with one set of rotatable registering members and associated slidable actuating elements for registering a running total, such as the "above the line" total in bridge scoring, with a second set of rotatable registering members and associated therewith slidable actuating elements for registering short totals, such as "trick" totals in bridge scoring, and with connecting means adapted to couple each registering member of the second-mentioned set to the corresponding registering member of the first-mentioned set in such a manner that any number added to the short total by operation of the short-total actuating elements is simultaneously added to the running total, while operation of the running-total actuating elements changes the indication of only the running-total registering members.

A further object is to provide a mechanical bridge scorer which follows, as closely as possible, the arrangement of conventional printed sheets used for recording scores in bridge and which is therefore easily understood by a player.

A still further object is to provide in a mechanical scorer, means which indicate that a particular number of points, for instance "game" points in bridge, have been registered, irrespective of whether the short-total register has been reset to zero or not.

Yet other objects are to prevent inopportune movement of the automatic indicating means, and to ensure that these means are reset at appropriate times.

The invention will be described as applied to a scorer for the game of contract bridge, with reference to the accompanying drawings, in which

Fig. 1 is a plan of the apparatus with part of the cover broken away,

Fig. 2 is a fragmentary inverted plan showing trip mechanism,

Figs. 3 and 4 are sectional side elevations, taken on the line 3—3 in Fig. 2, showing the parts in different operative positions,

Fig. 5 is a sectional side elevation of a detail taken on the line 5—5 in Fig. 2,

Figs. 6 and 7 are respectively sectional side elevations of details taken on the lines 6—6 and 7—7 in Fig. 1, the parts more clearly shown in Figures 3, 4 and 9 being omitted for the sake of clarity,

Fig. 8 is a sectional side elevation of the parts shown in Fig. 6, in a different operative position,

Fig. 9 is a sectional side elevation of a detail taken on the line 9—9 in Fig. 1,

Fig. 10 is a transverse section on the line 10—10 of Fig. 1.

The apparatus comprises two substantially similar portions, for indicating the operator's and his opponents' scores respectively. The indicating elements are mounted in a frame which comprises two side plates 10 united by three channel shaped cross members 10', 10'', and 10'''. The frame is housed in a flanged cover 11. In Fig. 1 the cover is shown broken to reveal the interior portion of the mechanism that indicates the opponents' score. The following description of the score-indicating mechanism applies equally well to either portion, corresponding elements of the two portions being denoted by the same reference symbols.

For registering "trick" points there are three drums 12a, 12b and 12c having the numerals 0 to 9 evenly spaced round their periphery. The drums are journalled on a spindle 13, and the numerals on the drums can be brought, one at a time, opposite indicating apertures 14a, 14b and 14c in the cover 11.

The trip mechanism for transferring tens from the "units" drum 12a to the "tens" drum 12b is shown in Figs. 2 to 4. A lever 15 pivoted on a fixed pin 16, is urged towards the spindle 13 by a leaf spring 17 which is located in a slot 18 in the frame cross member 10' and which bears

against an adjustable screw 19 in the tail of the lever. A pin 20a fixed on the "units" drum 12a is so arranged that, when the "units" indication changes from eight to nine, it engages a projection 21 on the lever 15 and thereafter rotates the lever away from the spindle 13 so as to increase the strain of the spring 17. Fixed to the drums 12a, 12b and 12c respectively are ten-tooth ratchet wheels 22a, 22b and 22c. A pawl 23 pivoted at 24 to the lever 15 is kept in engagement with the ratchet wheel 22b by a leaf spring 25. A stop lug 26 on the lever 15 co-operates with the ratchet wheel 22b.

Spring tongues 27a, 27b and 27c fixed to the member 10' prevent the drums from rotating backwards. While the lever 15 is being moved away from the spindle 13 by rotation of the "units" drum from positions "eight" to "nought" the pawl 23 slips one tooth of the wheel 22b (Fig. 4). As the "units" drum attains the "nought" position the pin 20a disengages from the projection 21 (Fig. 3), and this allows the lever 15 to spring back to its normal position, the spring 17 imparting through the lever 15 and pawl 23 a rotation of one-tenth of a revolution to the "tens" drum 12b, and the stop lug 26 preventing the drum from rotating too far. A similar trip mechanism is provided between the "tens" and "hundreds" drums.

For registering the total score there are provided four drums 30a, 30b, 30c, and 30d, journaled on a common spindle 31 and provided respectively with ratchet wheels 32a, 32b, 32c and 32d. These drums are provided with trip mechanism and spring tongues for preventing backward rotation, similar to those described with reference to the drums 12a, 12b, and 12c. The numerals on the drums 30a, 30b, 30c and 30d can be brought, one at a time, opposite indicating apertures 33a, 33b, 33c and 33d in the cover 11.

For actuating each of the trick and total drums there is provided a slidable rack member. The racks actuating the "units", "tens" and "hundreds" "trick" drums are denoted by 34a, 34b and 34c respectively, and those actuating the "units", "tens", "hundreds" and "thousands" "total" drums are denoted by 35a, 35b, 35c and 35d respectively. Parts of the "units" racks 34a and 35a and of the "tens" rack 34b are shown broken away in Fig. 1 so as to reveal the parts beneath. As the several pairs of racks actuating corresponding "trick" and "total" drums are similar, it will be sufficient to describe the pair, 34b and 35b, that operate the "tens" drums 12b and 30b. Corresponding parts of the various racks are denoted in the drawings by the same reference numerals, distinguished by the letters a, b, c and d for the "units", "tens", "hundreds" and "thousands" racks respectively. The trick-scoring rack 34b (Fig. 6) comprises a portion of inverted channel section embracing a channel section guide rail 36b fixed to the cross member 10'' and provided with nine undercut teeth 34b' adapted to mesh with the ratchet wheel 22b. The upper portion of the channel is provided with nine holes 37b, spaced at the same pitch as the rack teeth. A spring extension 38b of the perforated channel terminates in a downwardly turned hook 39b which is adapted to spring behind the end of a guide rail 40b fixed to the cross member 10'''. The cover 11 is provided with a slot 41b, through which the holes 37b are normally exposed, numerals from 1 to 9 and denoting tens being engraved alongside the slot in ascending order away from the aperture 14b.

The rack 35b (Fig. 7) for operating the "total" "tens" drum 30b is generally similar to the "trick" rack 34b, except that it is turned end from end. It is provided with teeth 42b and holes 43b normally visible through a slot 44b in the cover. It is guided by a rail 45b fixed to the cross member 10''', and the spring extension 46b, which bears against the under surface of the cover 11, terminates in an attachment 47b for a tension spring 48b which is fixed to the frame at 49b. The upper end of the rack is provided with a lug 50b adapted to engage with the hook 39b on the "trick" rack 34b (Fig. 6).

The clearance between the rails 36b and 45b and the cover is rather more than is required to accommodate the racks, so that the racks, though normally engaged with the wheels 22b and 32b respectively, are free to rise out of engagement with these wheels when necessary.

Since the racks are placed above the figure drums with which they are associated, each rack is provided with a rectangular opening which registers with the uppermost cypher on the figure drum when the rack is in its normal rest position and so enables this cypher to be read through the appropriate indicating aperture in the cover. The rectangular openings in the racks 34b and 35b are denoted respectively by 34b' and 35b'.

Resetting mechanism is provided for returning the drum indications to zero. The spindles 13 and 31 can be rotated by resetting knobs 51 and 52 respectively, and each drum is provided with a pawl mechanism similar to that shown in Fig. 5, which shows drum 12b. The spindle is provided with an undercut groove 53, and a slot 54 is cut in the boss of the drum, which is hollow. A spring pawl 55 has one end hooked round the pin 20b, and the other end passes through the slot 54 and presses radially against the spindle. Thus the drum is free to rotate normally (clockwise in Fig. 5) relatively to the spindle, but if the spindle is rotated clockwise by operation of the resetting knob, the spring 55 engages with the undercut side of the groove 53 so that the drum is constrained to rotate with the spindle.

The apparatus is operated as follows. To add a number, say thirty, to the trick total, a pointer is inserted through the slot 41b adjacent to the "3" marked alongside the slot so as to engage the perforation 37b that is opposite that numeral. The rack 34b is held in engagement with the ratchet wheel 22b by the pressure of the pointer, and the pointer is moved towards the operator until it comes to the end of the slot. This operation causes the rack 34b to rotate the drum 12b far enough to add thirty to the indicated "trick" total; since the hook 39b on this rack is engaged with the lug 50b on the "total" "tens" rack 35b, the latter rack is moved also, and since it is held by the spring extension 46b in engagement with the ratchet wheel 32b, thirty is also added to the "total" registration. The pointer is now removed, and the tension spring 48b returns the two racks to their original position, the racks slipping freely over the ratchet wheels by virtue of their elastic mounting.

If it is desired to add a score, say 50 to the "total" indication without changing the "trick" indication the pointer is inserted opposite "5" in the slot 44b and moved towards the operator. As soon as the rack 35b begins to move, the lug 50b moves from under the hook 39b (Fig. 8) and thus permits this hook to spring into engagement with the end of the rail 40b, so that the

"trick" rack 34b is locked against inopportune movement.

Units, hundreds and thousands may be added by similarly operating the pointer in the appropriate slots.

When necessary "game" points have been scored, the "trick" indication can be reset to zero, by rotating the knob 51, without affecting the "total" indication.

Means may be provided for indicating automatically when a player is "vulnerable". Referring to Figs. 1 and 9, a slide 60, having a flanged edge guided by a groove 11'' in the frame, is urged by a spring 61 against a stop 62. This slide bears an indication "V" which is exposed through an aperture 63 in the cover 11 when the slide is drawn downwards. A lever 64, pivoted at 65 to the drum 12c, is provided with a pin 66, which, as the drum moves from its "nought" to its "one hundred" position, engages a lug 67 on the slide 60 and exposes the indication V. A lever 68 pivoted to the frame at 69 is thereupon rocked by a spring 70 so that its end 68' engages behind the slide 60 and locks it. A pin 71 on the "total" drum 30d is arranged to engage a lug 68'' on the lever 68 as this drum is rotated from its "nine thousand" to its "zero" position. Thus, when the "total" indication is reset to zero, the lever 68 is tripped, and the slide 60 returns to its initial position.

The spindle 13 is provided with a transverse groove 72 into which the lever 64 drops while the "tricks" drums are being reset. By this means the pin 66 is prevented from projecting far enough to draw the slide 60 back to its full extent, so that risk of producing a vulnerability indication as a result of operation of the resetting knob 51 is obviated. When the drum 12c is rotated by the rack 34c or by the associated trip mechanism, the spindle remains stationary in the position shown in Figure 5. In consequence, the lever 64 pivoted to this drum is forced out of the groove 72 in the spindle, by a camming action with the bottom of the groove, so that the pin 66 is caused to project far enough to draw the slide 60 back to the full extent.

For the purpose of indicating the declaration there may be provided two movable members such as rotatable discs 75 and 76, marked respectively round a part of the periphery with suits and "no trumps", and with the numerals 1 to 7, so arranged that any declaration can be indicated by bringing the appropriate markings opposite indicating apertures 77 and 78 in a dished cover 79 secured to the top of the cover 11 and housing these discs, which are mounted on spindles 80 and 81. Over these discs are respectively arcuate slots 82 and 83 alongside which are marked a corresponding series of suits and "no trumps", and numerals respectively. Indentations 84 and 85 formed in the discs can be engaged by inserting the pointer through the slot so that by moving the pointer alongside a particular marking on the side of the slot the same marking on the disc is brought opposite the indicating aperture. Disposed between these discs is a quadrant shaped member 86 carried on a spindle 87, which can be operated by the pointer through a slot 88 to bring "doubling" indications into view in an aperture 89.

We claim:

1. A mechanical score indicator for games, comprising a rotatable registering member, a toothed wheel drivably connected with said registering member, a second rotatable registering member, a second toothed wheel drivably connected with said second registering member, parallel slidable rack members for actuating said first-named and second-named wheels respectively, an abutment on one of said racks, and a projection on the other of said racks, adapted to engage behind said abutment and so disposed in relation to said abutment that on operation of the one of said racks provided with said abutment to advance the wheel associated therewith, said abutment and projection co-operate to transmit a corresponding motion to the other of said racks.

2. A mechanical score indicator for games, comprising means for registering short totals, means for registering running totals, resetting mechanism for restoring the running-total register to zero, an indicator, means actuated by said short-total register and serving to actuate said indicator upon a predetermined number being registered, and mechanism, actuated by said running-total register, for resetting said indicator when said running-total register is reset to zero.

3. A mechanical score indicator for games, comprising means for registering short totals, means for registering running totals, resetting mechanism for restoring the short-total register to zero, an indicator, means actuated by said short-total register and serving to change the indication of said indicator upon a predetermined number being registered, and means, co-operating with said resetting mechanism and with said indicator-changing means, which serve, upon operation of said resetting mechansm, to prevent changing of the indication of said indicator.

4. A mechanical score indicator for games, comprising a rotatable figure drum serving to register short totals, a ratchet wheel adjacent to and drivably connected with said drum, a rack slidable longitudinally in one direction by an operator to advance said wheel, a rotatable figure drum serving to register running totals, the axes of said drums being parallel, a ratchet wheel adjacent to and drivably connected with said second-named drum, a second rack slidable longitudinally in the said direction by an operator to advance said second-named wheel, means for preventing reverse rotation of said wheels, spring means for automatically returning said racks in the other direction, said short-total rack being offset transversely in relation to said running-total rack, so that said short-total rack is adapted to slide parallel with said running-total rack, and a lost-motion connection between said racks, which connection, upon movement of said short-total rack in said first-named direction, causes said running-total rack to move similarly, while upon operation of said running-total rack in said first-named direction, the said connection is inoperative.

5. A mechanical score-indicator for games, comprising a rotatable registering member, a slidable rack drivably connected with said registering member, a second rotatable registering member, a rack which is drivably connected with said second-named registering member and is slidable parallel to the path of said first-named rack, a lug on said second-named rack and a projection on said first named rack adapted to engage behind one side of said lug, said lug and projection co-operating to transmit movement of said first named rack to said second named rack and permitting said second named rack to be operated independently of said first-named rack.

6. A mechanical score indicator for games, comprising a registering drum for registering running totals, resetting means for rotating said drum to zero, a registering drum for registering short totals, a spring-loaded two-position indicator, a projection on said short-total drum, adapted, upon a predetermined registration being attained, to engage said two-position indicator and move it to its operative position, a catch for retaining said two-position indicator in its operative position, and means serving to trip said catch as a result of operation of said resetting means.

7. A mechanical score indicator for games, comprising a registering drum mounted on a spindle having a longitudinal groove, a pawl mounted on said drum and adapted to engage in said groove, means for rotating said spindle to reset said drum to zero, a lever pivoted on said drum about an axis parallel to the axis of said spindle and an indicator adapted to be changed by said lever upon rotation of said drum through a predetermined angle, said spindle having a transverse groove which, when said drum is being reset, is in such a position that said lever can move into said transverse groove, its free end thereby being displaced towards the spindle axis so that said lever is incapable of changing said indicator during the resetting operation.

8. A mechanical score indicator for games comprising a cover having, in the part thereof which is remote from the operator when the indicator is viewed normally, an aperture and a longitudinal slot adjacent to said aperture, and in the part thereof nearer the operator a second aperture and a second longitudinal slot adjacent to said aperture, a figure drum rotatable about a transverse axis and visible through said first-named aperture, a longitudinally slidable rack drivably connected with said drum and operable through said first-named slot, a second figure drum rotatable about a transverse axis and visible through said second-named aperture, a second longitudinally slidable rack drivably connected with said second-named drum and operable through said second-named slot, said first named rack being staggered in relation to said second-named rack so that said racks are slidable parallel to one another, and a one-way connection between said racks, said connection acting in such a sense as to be inoperative when said first-named rack is actuated in the direction necessary to advance said figure drum associated therewith.

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