

April 25, 1939.

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2,155,929

SCORE REGISTERING DEVICE

Filed Aug. 21, 1936

2 Sheets-Sheet 1

Fig. 1.

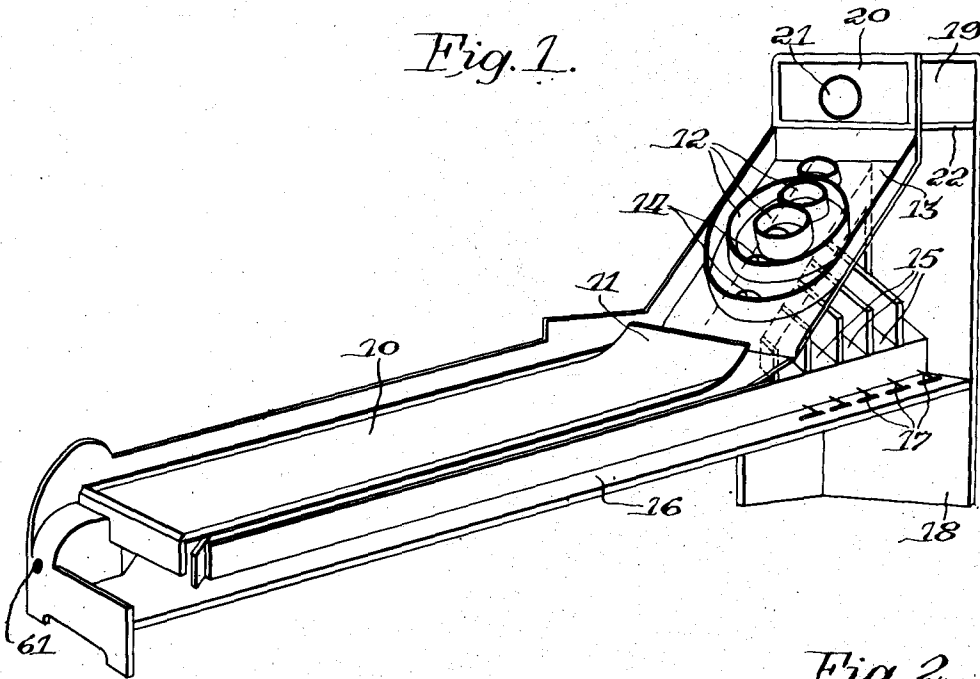
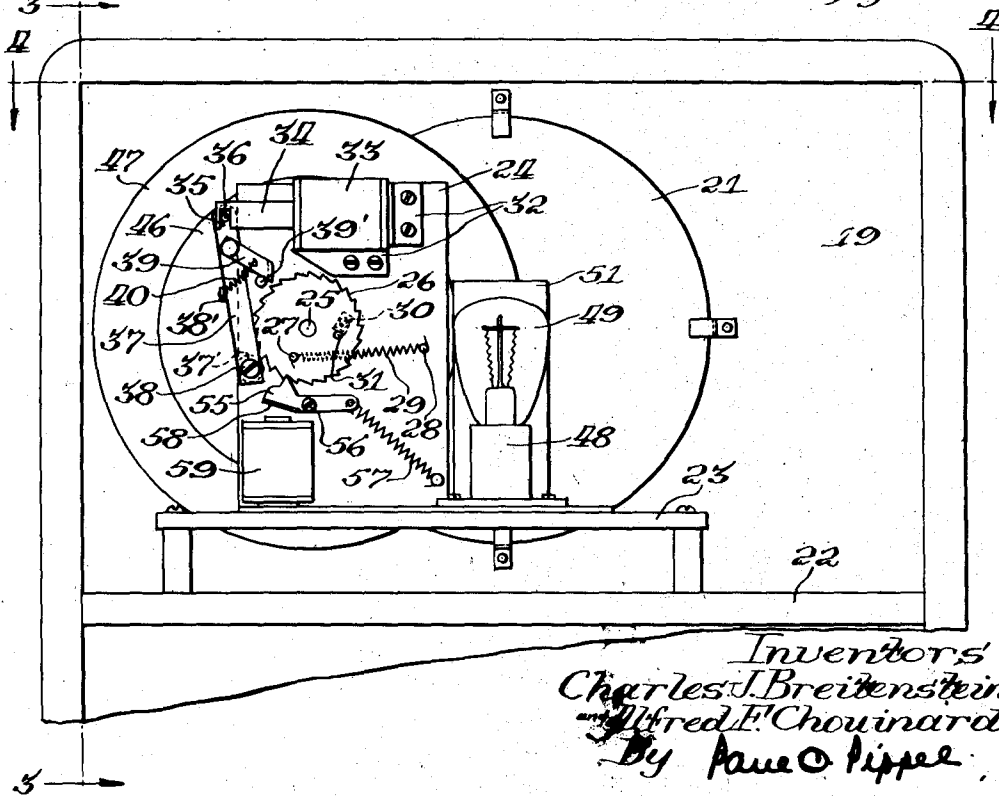


Fig. 2.



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2 Sheets-Sheet 2

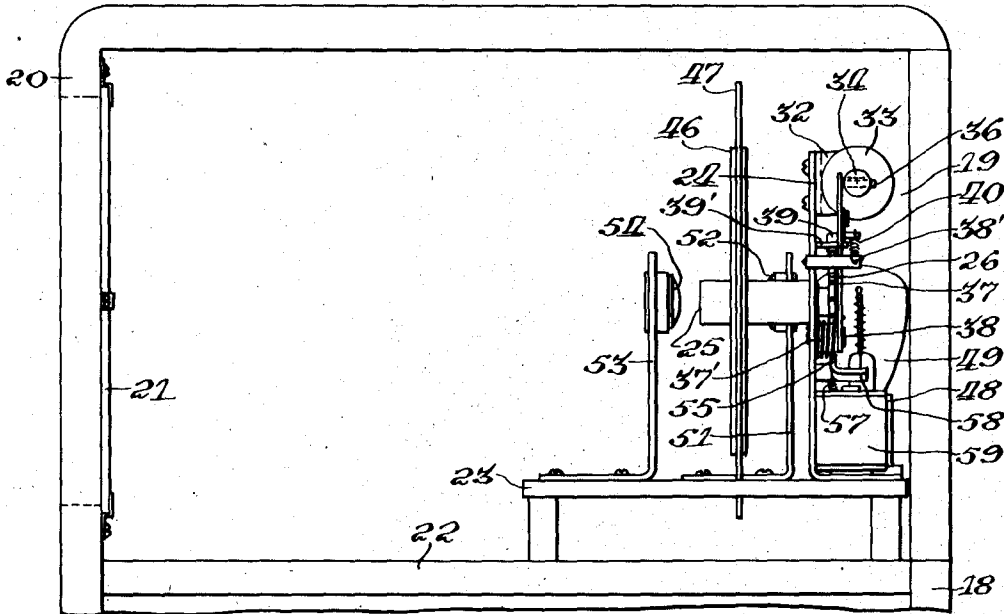


Fig. 3.

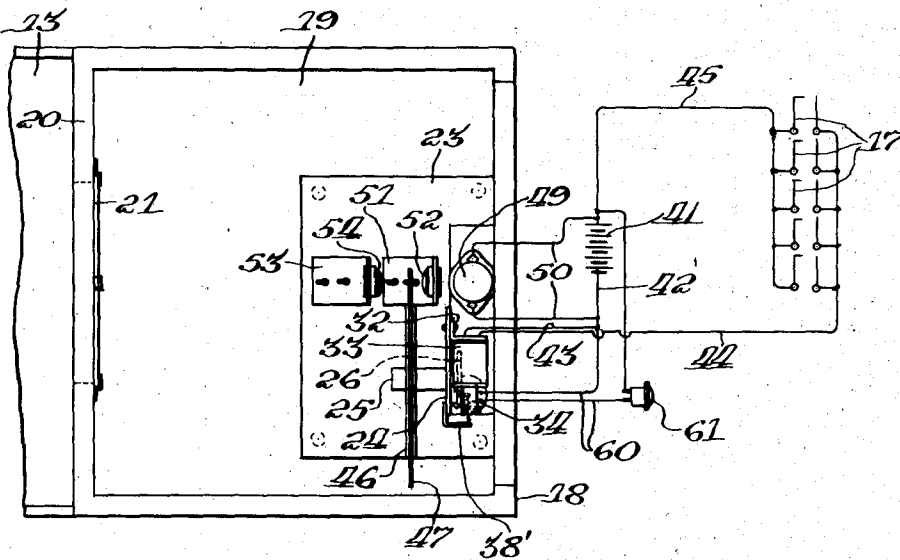


Fig. 4.

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UNITED STATES PATENT OFFICE

2,155,929

SCORE REGISTERING DEVICE

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5 Claims. (Cl. 88—27)

The invention relates to an automatic score registering device for use wherever desired, but particularly in games having playing pieces which are movable over or into pockets or targets having given numerical score values.

For instance, in ball rolling games having pockets, or the like, into which balls may be rolled, upon the display of the requisite skill by the player, it is usual to have the several pockets marked with score value numbers such as 10, 20, 30, etc. At the termination of play it is desirable to have the score total of the pocketed balls totaled and displayed to the player of the game.

The present invention, therefore, relates more particularly to an automatically acting score totalizer usable wherever desired, but particularly in ball rolling games. Since many of these games are used in poorly illuminated places, it is desirable that the totaled score be displayed as visibly as possible and the structure of this invention also purports to solve this difficulty by causing a clear display of the score total under all conditions of use of the associated game.

The main object of the invention is to provide an improved score totalizer.

Another object is to provide a simplified totalizer in which when electrical switches are momentarily closed by game playing pieces or the like, a score carrying wheel, or the like, is stepped up from an initial starting position to show instantly the score as it progresses and finally at the end of the play, the score total.

Still another object of the invention is to project light through the score number wheel, which is made transparent, so as to enable, by means of lenses, to project the score total on a display screen, or the like, in enlarged size, so that the score will be clearly visible.

Another object of the invention is to provide a release mechanism operable after a final score total has been displayed to return the totalizer mechanism back to an original starting or zero position.

Other objects will become apparent to those skilled in this art as the disclosure is more fully made.

Briefly, such desirable objects may be achieved by the illustrative example of the mechanism herein to be disclosed wherein normally open, electrical spring switches are arranged in a row. Each switch when closed, serves to complete a circuit to energize an electromagnetic device having an armature which turns a ratchet wheel one step. Movable with the ratchet wheel is a

transparent disk carrying on its marginal edge a series of number designations in proper order from 10 in multiples thereof to 20, 30, 40, etc., as high as is necessary, depending upon the character of the game, or the like apparatus with which the totalizer is to be used. Light from a lamp is condensed on the edge of the disk to project an image of the numbers through a projection lens and onto a ground glass or other translucent display screen, where the score numbers are visible. Each time a switch is closed the step up mechanism operates the display number disk, with the number in line with the lenses constantly being light projected onto the display screen where it is visible.

When the scoring cycle has been completed, an electromagnetic releaser may be operated to cause release of the step up mechanism and automatic return of the numbered display disk to an initial starting or zero position. So much will suffice in giving a general understanding of the improved counting mechanism, which is shown in detail in the accompanying sheets of drawings, wherein:

Figure 1 is a general perspective view of an illustrative type of ball rolling game with which the totalizer may be used, the near wall of the game having been removed to show the ball routing alleys to guide the pocketed balls over the control switches for the totalizer;

Figure 2 is an enlarged rear elevational view of the display totalizer per se;

Figure 3 is an end elevational view of the totalizer taken along the line 3—3 of Figure 2, looking in the direction of the arrows; and,

Figure 4 is a reduced scale, plan view of the totalizer taken along the line 4—4 of Figure 2, looking in the direction of the arrows, there additionally being shown an illustrative wiring diagram for the electrically operated parts.

For the sake of illustration only, there is shown in Figure 1 a bowling type of ball rolling game, embodying an alley 10 along which a player rolls balls toward the ramp end thereof shown at 11. The balls leap off the ramp and depending upon the player's skill, into any one of a plurality of passages formed by spaced ring shaped walls 12 disposed on an upwardly and rearwardly inclined table 13. Each ring passage thus formed at its low end includes a ball drop opening 14 to cause the balls entering the passages to drop by gravity into a number of ball routing passages 15 which are transversely disposed to lead the balls into a ball return runway 16 along the near side edge of the game

structure. Normally open spring switches 17 are disposed in longitudinal spaced alignment in said runway so that a ball coming from the highest number score value hole 14 and passage 15 is caused to roll over each of the switches 17 shown successively to operate each of them. Since in the present game shown there are five score pockets, only five switches are shown. Thus the passages 15 serve to direct the pocketed balls to control the number of the switches that the returning balls are to operate, in a manner that will be obvious, and in accordance with the desired score value of the pockets.

The rear end of the game includes a back wall 18 and with the table 13 serves as a support for an upper cabinet 19, having a front wall 20 provided with a centrally disposed opening covered by a circular ground glass, or other translucent display screen member 21. This cabinet portion 19 also includes a floor 22 which as will now be seen serves as a support for the score registering mechanism of this invention.

Preferably to facilitate manufacture and assembly of the games, the totalizer is made as a small compact unit to be included with a horizontal support plate 23 that may be fastened to the floor 22 in any convenient manner.

The plate 23 accordingly carries an upright bracket providing a transverse wall 24 carrying a horizontal, longitudinal shaft 25 for mounting a ratchet wheel 26 having the necessary number of teeth. The wheel 26 and wall 24 respectively carry pins 27, 28 between which is connected a spring 29, as shown. Also the wheel 26 carries a stop block 30 cooperable with a stop pin 31 on the wall 24.

Above the wheel 26 the wall 24 carries a bracket structure 32 for mounting a transversely disposed solenoid 33 provided with an armature core 34 the free end of which is notched as at 35 to fit loosely over a pin 36 carried on an upright lever 37 pivotally connected by a pin 38 at its lower end to the wall 24, as shown. Around the pin 38 is a coil tension spring 37' serving normally to press the lever 37 outwardly to the position shown in Figure 2 against a stop 38'. Near its upper end the lever 37 carries a pivoted pawl or dog 39 having an end positioned to engage the teeth of the wheel 26, said pawl being held yieldably down against a guide pin 39' on the bracket 24 and pointing toward the wheel 26 by means of a spring 49 connected as shown.

Looking at Figure 4 it can be seen that a source of energy appears in the diagram at 41 and that by means of wires 42, 43 the solenoid 33 is placed in circuit with the battery, or the like. A wire 44 leads from the solenoid 33 to one side of each of the switches 17 and then through the said switches by a common return wire 45 back to the battery. Each time a switch 17 is closed by a ball rolling thereover a circuit is momentarily closed to energize the solenoid 33, the stroke of the parts 34, 37 being so proportioned that the dog 39 will step up the wheel 26 one tooth. In this manner as the wheel 26 turns away from its starting position determined by the stops 30, 31 the spring 29 is tensioned to store energy for a purpose later to appear.

Turnable with the ratchet wheel 26 on the forwardly extended shaft 25 is a laminated wheel structure 46 between which is fixed a larger disk 47, having a transparent marginal edge on which numbers from zero and thereafter in order in multiples of 10, as 10, 20, 30, etc., are marked. Adjacent the wall 24 the plate 23 carries a socket

48 for an electric lamp 49 which by means of wires 50 is in circuit with the source of energy to be illuminated and serve as a light source.

In front of the lamp 49 the plate 23 carries an upright bracket 51 in which is mounted a condenser lens 52, said lens and lamp being longitudinally aligned with the transparent marginal score marked track or edge of the wheel disk 47 in such a manner that the light from the lamp is condensed directly onto the score markings. In advance of the disk 47 is another bracket 53 also carried on the base plate 23, said bracket carrying a projection lens 54 to receive the light from the score image and project it, enlarged, onto the back side of the translucent screen plate 21 heretofore described. The score thus displayed is visible from the front side of the game as indicated in Figure 1.

When the allotted number of balls have been played and the score total has been displayed the parts should be reset so that the display wheel 47 will always start from its zero marking position. Such reset mechanism comprises a pivoted retrograde preventing pawl 55 normally engaging the teeth of the ratchet wheel 26. Said pawl is pivoted between its ends by a mounting pin 56 to carry same on the plate bracket 24. The pawl is pulled to duty by means of a spring 57, as shown. The lower edge of one end of the said pawl 55 includes an armature pad 58 directly in line with the core of an upright electromagnet 59 carried on the base plate 23.

This magnet 59 is normally in an open circuit 60 with the battery 41, said circuit being closable to energize the magnet by means of a push button switch 61, or any other desirable form of circuit closer. This completes the detailed description of the mechanism and the mode of operation of the score counting and totalizing mechanism will next be described.

The starting or zero indicating position of the parts is shown in Figure 2 where the spring 29 has the ratchet wheel 26 pulled counterclockwise with its block 30 abutting the stop pin 31. Since the magnet 59 is deenergized the spring 57 engages the dog 55 in the teeth of the ratchet wheel 26. The score number disk 47, of course, is now in the light ray from lamp 49 to indicate a score of zero projecting on the screen 21. The solenoid 33 is deenergized and the tension spring 37' has the lever 37 pulled outwardly against the stop 38' with the pawl 39 abutting the stop pin 39'.

In the playing of the game, or other associated apparatus a switch 17 is closed by a ball or the like, whereby a circuit is completed to energize the solenoid 33 momentarily to pull the armature 34 to the right as seen in Figure 2, whereupon the lever 37 is pulled in the same direction to engage the pawl 39 with the ratchet wheel 26 one notch. This turns the shaft structure 25 one notch and with it the disk 47 one notch or from a position marked zero to a position marking "10", which the light and lens structure instantly projects onto the screen 21 for display. The dog 55 merely prevents retrograde turning by holding the gain of the ratchet wheel 26. Such dog 55 is necessary as the wheel 26 steps up it tensions the reset spring 29. The instant the solenoid is deenergized the spring 37' swings the lever 37 back to the position of Figure 2 to disengage the pawl 39. In this fashion each time a switch 17 is closed the ratchet wheel 26 and display disk 47 advance one step to step up the displayed score in an obvious manner. When closing of the switches 17 has ceased, as

when no more balls are available for play, then the mechanism displays the final score total on the screen 21.

By pressing the button 61 momentarily, the electromagnet 59 may be energized, whereupon to attract the pad 58 and swing the pawl 55 to release same from the ratchet wheel 26. With the wheel 26 thus freed, the spring 29 is operative to pull the wheel 26 and with it, of course, the disk 47 in a reverse direction to reset the same in the initial, or zero starting position, as determined by the stops 30, 31.

From this disclosure it will now be seen that a simple and improved score totalizer and displayer has been provided for achieving the objects of the invention heretofore recited.

It is the intention to cover all changes and modifications of the example shown for the sake of illustration, which do not depart from the spirit and scope of the invention.

What is claimed is:

1. In a device of the class described positionable as a compact projector unit in an exhibitor structure and comprising a horizontal support, a vertical bracket mounted on the support and carrying a horizontal shaft, a ratchet wheel secured to the shaft adjacent the bracket, said shaft projecting through and beyond the other side of the bracket, a light source, a disk carried on said projected end of the shaft and having a marginal edge through which a beam of light may be projected, lenses carried on the support respectively on opposite sides of the disk and in alignment with each other and with said marginal edge thereof, means on said support for securing the source of light in optical alignment with the marginal edge of the disc and the lenses, an electromagnetic device carried on the bracket on the ratchet side thereof, a lever pivotally carried on the bracket, said lever including a pawl to operate the ratchet wheel to turn the shaft and disk, means for operating the lever from the electromagnetic device, stop means between the bracket and wheel, a spring pulling the wheel to the stop means to determine a starting position from which the disk and wheel is to be turned, means to prevent retrograde movement of the disk and wheel, and means to release the latter means to permit the spring to pull the disk and wheel back to the starting position.

2. In a device of the class described positionable as a compact projector unit in an exhibitor structure and comprising a support, a bracket on the support, a horizontal shaft carried on the bracket including a disk turnable on the shaft axis, a ratchet wheel turnable with the disk, spring means exerting force on the disk and wheel, a stop means between the wheel and bracket to determine a starting position for the disk and wheel, a driver pawl to move the disk and wheel intermittently together from the starting position, a yieldable dog to prevent retrograde movement of the wheel, means to operate the driver pawl, said disk having an edge through which a light beam may pass, a light source, a condenser lens positioned between the disk edge and light source, a projector lens means on said

support for securing the source of light in optical alignment with the marginal edge of the disc and the lenses, and means to release the dog to permit the spring means to drive the disk and wheel reversely to the starting position determined by said stop means.

3. In a device of the class described positionable as a compact projector unit in an exhibitor structure and comprising a support carrying a turnable disk having an edge through which a light beam may pass, a source of light, a screen, a lens system associated with the disk to project light from the source through the disk to the screen, means on said support for securing said source of light in optical alignment with the edge of the disc and lenses, operating means for the disk comprising a ratchet wheel turnable with the disk, a spring pulling same, a stop against which the wheel is normally held by the spring, a driver pawl to advance the ratchet wheel step by step from the stop and to energize the spring, a dog to hold the gain of the wheel, and means to release the dog to free the wheel whereby the spring may reverse the disk and restore the wheel and disk to their starting positions determined by said stop.

4. In a device of the class described positionable as a compact projector unit in an exhibitor structure and comprising a support carrying a turnable disk having an edge through which a light beam may pass, a source of light, a screen, a lens system associated with the disk to project light from the source through the disk to the screen, means on said support for securing said source of light in optical alignment with the edge of the disc and lenses, operating means for the disk comprising a ratchet wheel turnable with the disk, a spring pulling same, a stop against which the wheel is normally held by the spring, a driver pawl to advance the ratchet wheel step by step from the stop and to energize the spring, electromagnetic means to operate the driver pawl, a yieldable dog engaging the wheel to prevent retrograde movement thereof, and electromagnetic means to free the dog from the wheel whereby said spring is effective to reversely drive the disk and wheel to the starting position determined by the stop.

5. In a device of the class described positionable as a compact projector unit in an exhibitor structure and comprising a horizontal support carrying a turnable disk having an edge through which a beam of light may pass, a source of light, a screen, a lens system associated with the disk to project light from the source through the disk to the screen, means on said support for securing said source of light in optical alignment with the edge of the disc and lenses, a stop means determining a starting position from which the disk is to be turned, electromagnetically operable mechanical means to move the disk step by step in a direction away from the stop means, and spring means to drive the disk reversely to its starting position.

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