

March 6, 1962

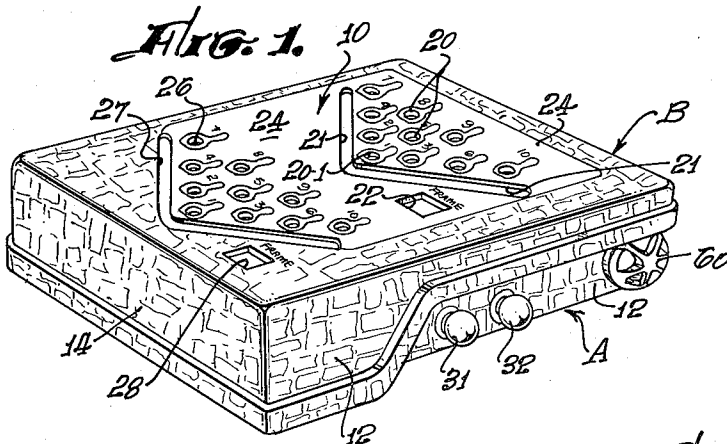
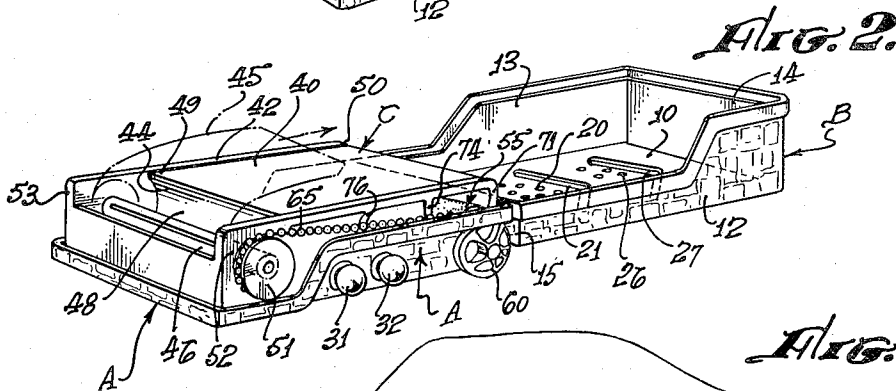
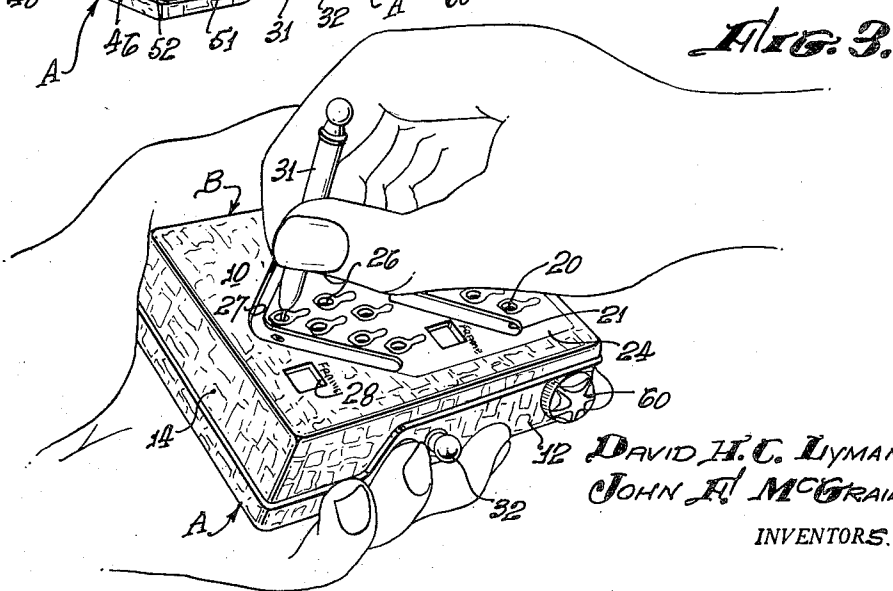
D. H. C. LYMAN ET AL

3,024,043

RECORDING APPARATUS FOR BOWLING SCORE

Filed May 25, 1959

2 Sheets-Sheet 1



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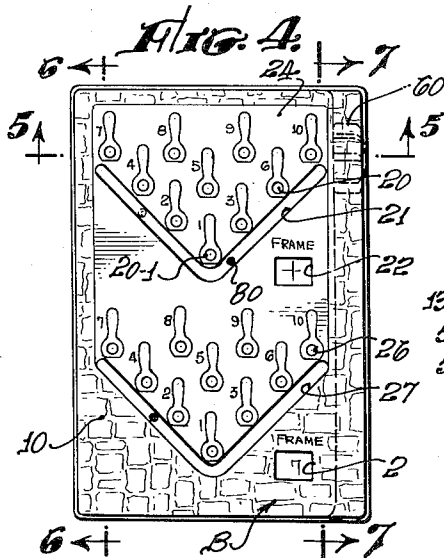
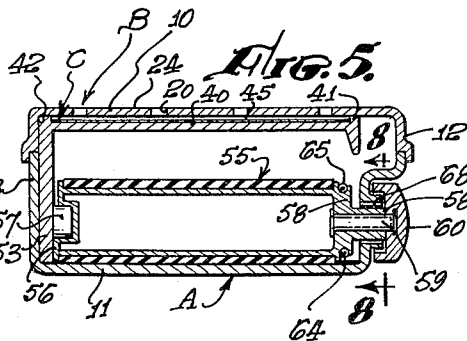
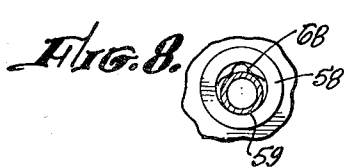
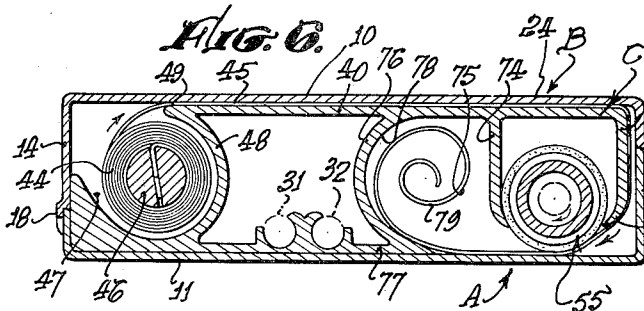
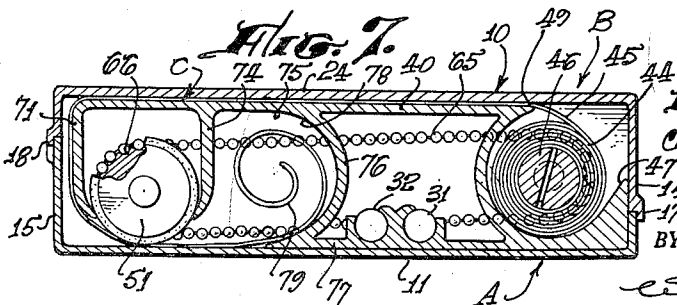
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RECORDING APPARATUS FOR BOWLING SCORE

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RECORDING APPARATUS FOR BOWLING SCORE
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Filed May 25, 1959, Ser. No. 815,467
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This invention relates to a device for keeping the score of a bowling game and more particularly to a device which will produce a permanent record showing the manner in which the bowler produced his score.

It is an object of the present invention to provide a bowling scoring device which will produce a permanent visual record of the score rolled by a bowler.

Yet another object of the present invention is to provide a bowling scoring device which will produce a permanent visual record showing where the ball hit the pins at each roll of the ball.

A further object of the present invention is to provide a device of the character described to produce a permanent visual record of the bowler's score indicating the number and location of the pins which were knocked over upon each throw of the ball.

It is another object of the present invention to provide a bowling scoring device which is rugged and compact.

The presently preferred embodiment of this invention includes a housing of generally rectangular transverse cross-section with a thickness dimension substantially smaller than the length and width. The housing comprises an upper and lower section which are mateable and separable in order to permit access to the interior of the housing. Disposed within the housing is a supply of scoring paper with means for moving the paper into predetermined register between the top plate of the housing and a support surface positioned beneath the top plate. The top plate of the housing defines a plurality of openings spaced apart in a reduced scale layout of each of the ten pins in a bowling alley set-up. The pins are represented in this embodiment by a circular opening with the number of the pin in accordance with accepted bowling practice shown proximate the opening. Additionally, a generally V-shaped opening is defined in front of the circular openings to correspond with a line drawn tangent to the pins facing the bowler. The openings are sufficient in size to allow the insertion of a marking pen therethrough to mark upon the paper beneath the top plate. Thus, with the housing assembled the bowler can mark the appropriate score by inserting a marking pen through the openings. The bowler can additionally place a mark through the V-shaped opening to indicate the point of impact between the ball and the pins. After marking a bowling frame or the results of a thrown ball, fresh scoring paper is moved into register beneath the top plate.

The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages thereof, will be better understood from the following description considered in connection with the accompanying drawings in which a presently preferred embodiment of the invention is illustrated by way of example. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention.

In the drawings:

FIGURE 1 is a perspective view of the presently preferred embodiment of a bowling score device constructed in accordance with the present invention;

FIGURE 2 is a perspective view of the device of FIGURE 1 with the upper section of the housing opened to reveal the inner construction;

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FIGURE 3 is a perspective view of the device of FIGURE 1 showing how it might be held by a bowler while he is using the same;

FIGURE 4 is a plan view of the device of FIGURE 1;

FIGURE 5 is a view taken along line 5-5 of FIGURE 4;

FIGURE 6 is a view taken along line 6-6 of FIGURE 4;

FIGURE 7 is a view taken along line 7-7 of FIGURE 4;

FIGURE 8 is a view taken along line 8-8 of FIGURE 5; and

FIGURE 9 is a plan view of the printed paper used in the presently preferred embodiment of the invention.

Referring now to the drawings and more particularly to FIGURES 1 and 2 there is shown a perspective view of a device in accordance with the present invention in the closed and open condition. The device includes a housing comprising a lower section A and an upper section B which are mateable along a longitudinal separation line. When mated as shown in FIGURE 1 the two housing sections provide a closed housing of rectangular cross-sections with a thickness relatively smaller than the length and width. The housing is defined by a top plate 10, a bottom plate 11, sidewalls 12 and 13 and end walls 14 and 15. The upper and lower sections are mated in friction engagement by any means suitable to maintain them in such engagement. That is, the upper and lower sections can be hingedly connected by a suitable hinge connecting the two sections at a position on the separation line or they can be completely separable and clamped into the assembled condition by means of friction clamps 17 and 18 as shown in FIGURES 6 and 7. The housing can be formed of any suitable sturdy durable material such as plastic or metal.

The top plate 10 of the upper section B defines a plurality of openings therethrough which are sufficient in size to allow the insertion of a marking device such as a marking pen. The openings are formed in duplicate arrays, one below the other with respect to the movement of the scoring paper as shown in the figures. That is, both arrays are similar and are oriented with respect to one end of the device.

The holes or openings of each array are of three different shapes. Firstly a set of ten holes designated by numeral 20 are arranged in a triangle in the same manner as are the bowling pins on a bowling alley. An elongated V-shaped opening 21 is provided with the inner edge thereof parallel to the sides of the inverted triangle and proximate thereto. The third opening is a rectangle 22 which is located just below and off to the right from the hole 20-1 representing the head pin or pin number one. For ornamental purposes a mark in the shape of a bowling pin is etched into or marked on the top surface 24 of the top plate 10, surrounding each of the holes.

The second array of openings is similar to the array above described with the ten pin openings designated as 26, the V-slot as 27 and the rectangle as 28. Each of the pin openings in addition to having a bowling pin configuration etched thereabout has a number marked proximate thereto which represents the number of the pin in accordance with standard bowling practice. A pair of marking devices 31 and 32 are disposed within openings provided through the first side wall 12 of the lower section A. Means are disposed within the housing for positioning a scoring paper beneath the hole arrays through the top plate of the housing and for moving the scoring paper into predetermined registration with the arrays. In the embodiment shown a magazine section C is used and includes a flat bearing plate 40 which is positioned beneath the top plate 10 and spaced there-

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from by a distance which is sufficient to allow the passage of paper between the top plate and the top surface of the bearing plate 40. Thus, the bearing plate 40 acts as a support surface for the paper while the paper is being marked and also as a guide for the movement of such paper by means of upstanding sidewalls 41 and 42 which extend longitudinally between the bearing surface and the under surface of the top plate. That is the top plate 10, bearing plate 40 and vertical guidewalls 41 and 42, define a rectangular opening of small height through which the paper can pass.

In the embodiment shown, the paper is supplied in a roll 44 and is in the form of a paper ribbon 45 as shown in FIGURE 9. The paper is substantially equal in width to the transverse distance between the guidewalls 41 and 42 and the ribbon is sufficiently long to allow the marking of a complete game as described hereinafter. The paper can be blank or printed in a manner corresponding to the hole arrays as shown in FIGURE 9. That is, consecutive arrays of circles 50 are spaced along the ribbon at the spacing of the arrays of holes 20 and 26 through the top plate 10 such that the circles can be moved into register with both hole arrays simultaneously. The ribbon 45 is wound upon a reel 46 to provide the roll 44 for loading into the device.

The magazine section provides a paper supply compartment 47 into which the paper roll 44 is positioned prior to marking. The compartment 47 is defined by the interior of the housing at the left end thereof and a transversely extending circular arcuate wall 48 of the magazine. The arcuate wall 48 leaves an opening proximate the top plate for passage of the paper from the supply compartment into the first end 49 of the rectangular opening. In order to position the rolled paper 44 within the supply compartment well known means such as a rotatable mounting wheel 51 is used. That is, the magazine section C includes vertical side walls 52 and 53 at opposite sides of the paper supply compartment between which the reels carrying the paper is mounted. The mounted wheel is affixed upon a shaft which extends through the side wall 52 and which can be retracted from the wall sufficiently to allow insertion of the reel. The wheel 51 is movable toward the side wall to cause an extension of the shaft to move inward and engage a mating slot at the end of the reel, thereby positioning the reel in the compartment and causing the reel to rotate within the mounting wheel.

At the opposite end of the housing and thus at the opposite end of the bearing plate 40 there is provided a means for pulling the paper from the supply compartment across the bearing plate 40. One friction drive cylinder 55 is used and is rotatably mounted within the housing for frictionally engaging the paper. The friction drive cylinder has an outer surface of engaging material such as rubber and is rotatably mounted at the first end 56 thereof upon a pivot boss 57 affixed to the side wall 53 of the magazine. At the second end 58 thereof the drive cylinder is affixed to a shaft 59 which extends through the opposite side wall 12 of the housing and is rotatable with respect thereto. At the exterior of the housing upon the end of the shaft 59 a drive knob 60 is affixed by which the drive cylinder can be rotated by the user of the device. The transverse axis about which the drive cylinder is rotatable together with the diameter of the drive cylinder are such that the surface of the drive cylinder is substantially in engagement with the bottom surface of the housing. The transverse width of the drive cylinder is substantially equal to although less than the width of the bearing plate 40. At the second end 58 of the drive cylinder there is defined an undercut groove 64 proximate the second end 58. The groove is peripheral and serrated or otherwise formed with gear teeth or friction engaging means for moving a drive chain 65. The undercut groove is substantially aligned with a similar groove 66 in the periphery of the

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mounting wheel 51 at the exterior side of the magazine side wall 52. The continuous chain 65 forms a closed loop extending over the drive cylinder at the undercut groove 64. Thus, there is provided an interconnecting transmission means whereby rotation of the drive cylinder will cause simultaneous rotation of the mounting wheel. The gear ratio between the two is equalized by maintaining the diameter of the respective undercut grooves equal. As best shown in FIGURES 5 and 8 a spring 68 is positioned between the drive cylinder shaft 59 and the interior wall of the transverse opening 67 through the side wall 52 of the housing within which the shaft is rotatable. The spring 68 is a friction inducing spring which causes a friction force to be exerted upon the shaft to prevent its too free rotation and to maintain it in any position of rotation to which it is turned by the user against any tension force which might be exerted by the paper. A vertically extending transverse guide wall is provided at the outer end of the bearing plate to guide the paper strip or ribbon to the proper position with respect to the drive cylinder. That is, as is shown particularly in FIGURES 6 and 7 proximate the end wall 15 of the housing but spaced slightly therefrom, the magazine section C defines a vertical depending wall 71 which depends vertically from the top plate 40 to a position below the transverse axis of the drive cylinder. At the lower end thereof the guide wall 71 is curved inwardly to direct the paper along a tangential line of the periphery of the drive cylinder. At the opposite side of the drive cylinder, i.e. the inward side thereof, a second depending wall with a tangential extension is positioned to prevent any possible movement of the paper upward beyond the center line of the drive cylinder as it is moved by the drive cylinder. Thus, the second depending wall 74 acts as a wiper to insure the proper path of the paper strip as it is driven by the drive cylinder as described in detail hereinafter.

The magazine section C then defines a paper receiving compartment 75 into which the paper can be directed by the drive cylinder 55. The paper receiving compartment 75 is defined at one side by the depending wall 74 and at the other side by an arcuate wall 76 which extends transversely through the magazine and connects the bearing plate 40 of the magazine with a bottom wall 77 of the magazine extending from the arcuate wall 76 to the paper supply compartment of the magazine. The arcuate wall 76 is formed concave with respect to the depending wall. That is, the surface 78 of the arcuate wall is curved upwardly and outwardly from the bottom of the paper receiving compartment and upwardly and inwardly towards the bearing plate 40 at the upper side of the paper receiving compartment such that paper pushed into the bottom of the compartment is forced to form into a roll within the compartment by its movement along the arcuate wall.

Thus, the operation of the device with respect to the loading of the paper therein and the movement of the paper as it is used can best be seen with reference to FIGURES 2 and 6. With the device housing disassembled as shown in FIGURE 2 the supply reel of paper is positioned within the paper supply compartment by extending the mounting wheel 51 from the side wall 52 of the magazine and inserting the reel and roll 44 of paper. The mounting wheel 51 is then pushed inward to cause the reel to be engaged by the shaft of the mounting wheel. The end of the paper ribbon is then pulled over the top plate 40 and threaded downward past the depending guide wall 71 to the position at which it is tangential to the drive cylinder 55. Rotation of the drive cylinder by turning the knob 60 causes the paper to be engaged between the periphery of the drive wheel and the surface 62 of the housing. Further rotation of the knob 60 causes the simultaneous rotation of the drive cylinder 55 and the reel 46. The friction engagement of the drive cylinder with the paper causes it to be pulled

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across the bearing plate 40, downward past the guide wall 71, beneath the drive cylinder 55 and into the paper receiving compartment 75 where it is forced into a loosely rolled configuration by the shape of the arcuate wall 76. During the use of the device of course, the upper and lower sections of the device housing are assembled such that movement of the paper across the bearing plate 40 is through the rectangular opening beneath top plate 10. Movement of the paper can be stopped when the circular arrays are in the proper registration with the hole arrays through the top plate and the paper can be marked in the manner as described hereinafter, after which it is moved to the next registration. To remove the paper from the device after it has been completely used and rolled from the supply roll into the loose roll 79 within the paper receiving compartment 75 the housing sections are again separated. It should be noted at this point that the longitudinal separation lines between the upper and lower sections is not planar. That is, as shown in FIGURE 2, the lower portion of the sidewall 12 extends beneath the mounting wall 51 and over the drive knob 60 while the lower section of the sidewall 13 extends beneath the paper receiving compartment 75. Thus, with the housing separated the loosely rolled paper now contained within the paper receiving compartment can be extracted from the magazine C without removing the magazine from the housing, by pushing the roll from the compartment at the side of the compartment which is open, i.e., the left hand side in the figures.

Thus, in utilizing the present invention to keep a visual record of a complete bowling game, the paper having at least sufficient length for 12 frames is loaded into the apparatus as previously described. In order to show the result and striking position of each ball thrown, various ways of marking the record will be apparent. A presently preferred way is to use paper which is printed as shown in FIGURE 9, and to move it into the position at which the first array comes into registration with the first hole array of the apparatus. The bowler then marks the number "1" at the proper position in the rectangle marked frame and the number "2" in the second rectangle of the array below. This may be done with either of the marking devices 31 or 32 which are preferably pens with different colored inks, one with red ink and the other with blue ink, for example. The paper will be maintained in this position due to the friction between the spring 68 and the shaft 59 of the drive cylinder 55. After the bowler throws his first ball in frame number 1 he will take one of the pens and mark a colored dot on the paper by placing the pen through the V-shaped slot on the equivalent location where the ball struck the array of pins. This causes the first dot 80 to be recorded in one color. If a strike is obtained the bowler marks an "X" in the upper left hand portion of the rectangular opening 22. If, on the other hand, less than 10 pins are knocked down, the bowler will mark the position that the first ball struck the pins in the first color such as blue, and will, with the same colored marking device, place a dot or fill in each of the circles beneath the holes 20 corresponding to the pins which the first ball struck down. After throwing the second ball, if all of the remaining pins are struck down, the bowler will mark the spare indication in a rectangular opening and the frame is completed. If, however, the bowler does not succeed in scoring a spare with his second ball, he will mark the position that the second ball struck the pins by placing a different mark such as a different colored dot with the other marking device in the V-slot 21 of the upper array at the position at which the ball struck the pins and he will, in addition, place a dot of this color, red for example, in each of the holes corresponding to those pins which were knocked over by the second ball. He can then enter in the rectangular opening the number of pins which were knocked down by bowling the first and second balls. The bowler is now ready to start the second frame and will

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repeat the marking process by using the second array which is below, using the openings 26, 27 and 28 as previously described. At the end of these two frames the scoring paper is moved by rotating the knob 60 until the next two arrays on the scoring paper are in register with the two arrays through the top plate 10 of the device. Accordingly, the paper is advanced over two frames till the game is completed. At the end of the scoring paper space may be left or blanks may be printed to enter data concerning the game to which the score applies. Thus, the present invention provides a bowling scoring device which produces a permanent visual record of the score rolled by a bowler which indicates all pertinent information of interest to the bowler in reviewing the game.

What is claimed is:

1. An apparatus for use in providing a permanent record of a complete bowling game wherein the number of pins and the positions thereof when upset by the first and second balls thrown in each frame are visually recorded in contrasting colors on an elongate paper strip, as well as the number of each frame, and whether a strike was made, which apparatus includes: a magazine structure defined by a rectangular upper bearing plate, a first side wall depending therefrom, a bottom wall extending outwardly from the lower edge of said first side wall and parallel to said bearing plate, a first arcuate wall transversely disposed relative to the rear portions of said bearing plate, bottom wall and first side wall and rigidly connected thereto, a second arcuate wall transversely disposed relative to forward portions of said bearing plate, bottom wall and first side wall and rigidly connected thereto, transversely positioned guide walls depending from the forward portion of said bearing plate and affixed thereto; a lower housing defined by a rectangular bottom plate having side walls and end walls extending upwardly therefrom, with said bottom wall snugly but removably fitting within the confines of said side walls and end walls of said lower housing and resting on said bottom plate, and one longitudinal edge of said bearing plate being laterally spaced from said side wall of said lower housing disposed closest thereto; an upper housing defined by a rectangular top plate from which side walls and end walls depend; locking means for removably holding the edge portions of said side walls of said upper housing and lower housing in abutting contact, said side walls when so disposed so holding said top plate relative to said bearing plate that there is a vertical space therebetween greater than the thickness of said paper; a drive roller on which said paper can be spirally wound; means for rotatably supporting said drive roller in a second compartment defined by the interior surfaces of said guide walls, said bearing plate, said first side wall of said magazine structure, said top plate, said bearing plate, and said side walls of said upper and lower housings, with said drive roller being in slight frictional contact with the interior surface of said bottom wall; means for manually rotating said drive roller; and transmission means connecting said drive roller and said paper-supporting roller for causing the concurrent rotation thereof to advance said paper longitudinally through said space between said bearing plate and top plate when a portion of said paper is frictionally gripped between said drive roller and said interior surface of said bottom wall, with said top plate having at least one set of spaced openings therein arranged in the same pattern as pins in a bowling alley and at least one additional opening, said set of openings permitting said paper disposed between said bearing plate and top plate to be marked to indicate the pins upset in a particular frame of a bowling game, which additional opening is used to mark whether a strike was made in said frame, with said paper being advanced by use of said means for manually rotating said drive roller after each frame to provide space on said paper for recording the next frame of said game, said paper after being advanced past said drive roller moving into a storage compartment defined by the

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interior surfaces of said second arcuate wall, one of said guide walls, and said upper and lower housings, with said paper in said storage compartment being removable therefrom by separating said upper housing from said lower housing and withdrawing said paper in said storage compartment through said space between said bearing plate and said side wall of said lower housing.

2. An apparatus as defined in claim 1 wherein an additional set of said openings in an additional separate opening are formed in said top plate to permit said apparatus to be used in tournament play.

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