The invention relates generally to a game device and more particularly to a game device of the type in which a playing piece is delivered under the direction and control of a player for the purpose of showing the degree of skill of the player in striking a remotely located object.

A general object of the invention is to provide a new and improved game device of the type above described having mechanism constructed more accurately to reflect the skill of the player and arranged to initiate and hold the interest of the player.

A more particular object of the invention is to provide a game device having a playing piece intended to be delivered by the player manually under his direction and control, and mechanism of improved construction responding to impact of the playing piece to move an object varying amounts depending upon both the velocity of the playing piece and the precision of striking the target at the time of impact.

Another object is to provide a game device having an elongated playing surface with a player's station at one end and objects to be actuated at the other end, a playing piece of any character to be propelled by the player under his direction and control, and means at the end of the playing surface remote from the player's station serving the dual function of rebounding the playing piece to the player and transmitting the force of the impact to the object-moving mechanism without partaking of the movement of the mechanism.

Still another object is to provide in a game device having a playing piece for projection at a target mechanism for moving an object a distance varying with the force and accuracy with which the target is struck, wherein the reaction of the mechanism to the striking of the target serves to move the mechanism to a position where it has potential energy for returning to a normal position and, as an incident to such return, moves the object a distance proportional to the force and accuracy with which the target is struck.

A further object of the invention is to provide, in a game device having a playing piece for projection at a target, a resilient member stationarily held for the purpose of rebounding a playing piece and mechanism for moving an object having one element in normal position of the mechanism bearing against the resilient member but without any other connection or association with the resilient member so as to be free to respond in proportional movement to the force and directness with which the playing piece strikes the resilient member.

Still a further object is to provide ratchet mechanism for actuating an object, the mechanism having a normal position and a pawl and cooperating stop member cooperating to lock the object actuated by the mechanism against movement in either direction when the mechanism returns to normal position while permitting withdrawal of the pawl for the purpose of potentiizing the mechanism for subsequent movement of the object upon return of the mechanism to normal position.

Other objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a game device embodying the features of this invention.

Fig. 2 is an enlarged front elevational view of the target and scoring mechanism at the end of the game device remote from the player.

Fig. 3 is a partial sectional view taken approximately along the line 6—6 of Fig. 2.

Fig. 4 is a sectional view taken approximately along the line 4—4 of Fig. 3 and showing one only of the plurality of mechanisms.

Fig. 5 is a sectional view taken approximately along the line and looking in the direction of the arrows 5—5 of Fig. 3.

Fig. 6 is a view similar to Fig. 3 but showing the mechanism in a potentiized position.

Fig. 7 is a sectional view taken approximately along the line 7—7 of Fig. 4.

Fig. 8 is a fragmentary plan view taken approximately along the line 8—8 of Fig. 6.

While the invention is susceptible of various modifications and alternative constructions, it is herein shown and will hereinafter be described in a preferred embodiment. It is not intended, however, that the invention is to be limited thereby to the specific construction disclosed. On the contrary, it is intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention as defined in the appended claims.

As indicated by the objects, the invention comprises generally a device usually in the form of a game for measuring the skill with which a person can direct a playing piece at a target, the device being sensitive both to the speed of the playing piece as well as the accuracy of direction. For purposes of disclosure, it being understood that the embodiment shown and hereinafter described is purely exemplary and that the invention may take many other forms and be adapted to many other uses, the invention is shown as embodied in a game device in which the playing
piece is a disk-like element 15 commonly and hereinafter referred to as a puck. The playing piece is adapted to be propelled over a playing surface 16 supported by means of legs 17 at a convenient height for a player manually to propel the playing piece lengthwise of the playing surface 16. As best seen in Fig. 3, the legs 17 are of triangular cross-section, and the faces 18 of the triangle are carried by a hub or collar 36 rotatable on the shaft 23. The hub 36 is in contact with the hub 22 and the airn 35 is mounted on the end of the hub 36 remote from the hub 22 so as to provide space between it and the ratchet gear 25. Pivotedly mounted on the free end of the arm 35 is a pawl 37 yieldably urged by means of a tension spring 38 into engagement with the teeth 26 of the ratchet gear. As best seen in Fig. 2, the pawl 37 and the hub 36 are so arranged that clockwise movement of the arm 35 without a corresponding rotation of the ratchet gear 25 is permitted, whereas during any counterclockwise movement of the arm 35 the pawl 37 engages the teeth 26 and causes rotation of the ratchet gear and the parts nonrotatably fixed thereon.

The free end of the arm 35 is by a link 40 connected to the free end of one arm 41 of a lever 42, the other arm 43 of which depending generally downwardly to constitute a target or target means. The lever 42 is rotatably mounted on a second shaft 44 extending transversely of the housing 18 vertically below the shaft 23. Like the shaft 23, shaft 44 is nonrotatably held and lever 42 is held against axial movement by means of a pair of collar 45 mounted on the sides of the lever and retained by set screws 46.

The impact delaying mechanism, that is, lever 42, link 40, and arm 35, are so designed that the mechanism seeks as a normal position one in which the arm 43 depends downwardly with arm 43 somewhat beyond vertical position in a clockwise direction, as viewed in Fig. 3. The impact delaying mechanism is further designed so that this tendency to seek the position above described is strong enough so that the impact delaying mechanism is able to carry the wheel 19 and attached parts with it during any movement toward this hereinafter called "normal" position. While this characteristic of the impact delaying mechanism may be designed directly into the component parts thereof, it is preferable that the component parts be made as light as possible consistent with the necessary strength, and that the wheel-turning force be incorporated through the medium of a weight 47 mounted on the arm 43. This weight preferably is mounted for adjustment along the arm so as to vary the moment arm of the weight and hence the effectiveness of the impulse delaying mechanism.

Preferably incorporated as a part of each mechanism M is means for preventing rotation of the wheel while the impact delaying mechanism is being moved from its normal to a "potentialized" position, such as shown in Fig. 6, and means cooperating with the pawl 37 to arrest rotation of the wheel 19 in definite positions where the areas on the periphery will be in registry with an opening in the housing 18. By "potentialized" position is here meant any position in which the impact delaying mechanism is swung away from the position shown in Fig. 3 and in which it will thus have potential energy which will be converted to kinetic energy for rotating the wheel 19. The means for preventing rotation of the wheel 19 during movement of the pawl mechanism to a potentialized position takes the form of a pawl 50 pivotally mounted on the free end of an arm 51 fixed on the shaft 23. The pawl 50 is directed in the opposite direction to the pawl 37 and thus permits rotation of the wheel 19 in a counterclockwise direction but prevents rotation in a clockwise direction. At the end of the pawl 50 is a hub 52 which serves as a collar for restraining axial movement of the hub 22 and of the hub 36 forming a part of the arm 35. Preferably the pawl 50 is yieldably urged into engagement
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Depending from the arm 51 is a bracket or fin 54, extending in a line 55 radially from the periphery of the ratchet gear 25 a distance such that the free end of the pawl 37 may be received between the lip and the gradually inclined face of the bracket 54 as shown in Fig. 3.

It is believed clear from the foregoing description that upon rocking of the lever 42 in a counterclockwise direction arm 35 will be rotated in a clockwise direction and that during such rotation pawl 37 will ride over the teeth 26. Any tendency of the wheel 19 to be rotated clockwise due to the frictional drag of the pawl over the teeth 26 is resisted by the pawl 50 and thus the wheel remains stationary. During counterclockwise pivoting of the lever 42, arm 35 will be swung in a counterclockwise direction whereinupon pawl 37 will engage a tooth of the ratchet gear 25 and will cause the wheel 19 to rotate with the arm. During this movement the pawl 50 rides over the tops of the teeth 26 without interfering with the rotation of the wheel. Upon engagement of the pawl 37 with the stop 54 wheel 19 is arrested in a definite position with the pawl and stop serving to prevent any momentum that may have been built up in the wheel from carrying it beyond the movement imparted to it by the impact relaying mechanism. With pawl 37 and stop 54 locking the wheel against counterclockwise rotation, and with pawl 50 locking it against clockwise rotation, assurance is given that whenever the wheel comes to rest it will occupy a definite position with one of the areas on its periphery in registry with an opening in the housing 18.

Means is provided herein for imparting to the impact relaying mechanism and through it to the wheel 19 the force and the accuracy with which the puck is delivered without actual contact of the puck with any portion of the impact relaying mechanism. In addition, this means is caused to serve a second function, namely, to return or rebound the puck to the player. To that end, there are provided with the housing 18, there are fly channels 66, at the time of impact of the puck therewith, as shown at D in Fig. 8. In view of this fact, the width of channel 66 has a bearing on the angle through which the wheel 19 is rotated for any given impact of the puck with the strip. Assuming that the puck always strikes the strip squarely in line with the arm 43; additionally, the width of the channel is going to influence the resultant rotation of the wheel 19 for a given impact of the puck with the strip where the puck does not strike the strip squarely in line with the arm 43.

In the present instance the channel 66 as clearly seen in Fig. 8, is made considerably wider than necessary for mere free passage of the arm 43, being on the order of ten to twelve times the width of the arm 43. This is a purely arbitrary relationship found to give a desirable reaction and requiring a fair and reasonable amount of skill on the part of the player in the delivery of the puck. By varying the width of the channel 66 the area of the target is varied becoming larger as the channel is made wider, and for a given impact of the puck against the strip the reaction on the relaying mechanism will also vary being greater with increase in the width of the channel. Thus it will be seen that the channel 66 serves as a convenient means for varying the size of the target and the force with which the puck is thrown in order to produce a certain rotation of the wheel 19. That way both the required accuracy and force with which the player delivers the puck may be controlled. This channel 66 thus supplements the control that is obtained by adjustment of the weight 47.

With the strip 57 composed of resilient material and with it being backed by the retaining block 61 except at the channel 66, the strip 57 will also serve to rebound or return the puck to the player end of the playing surface. Thus it will be seen that the strip performs a dual function, namely, that of rebounding the puck to the player and of transmitting the force of the puck to the wheel 19 through the impact relaying mechanism.

While the construction of the strip 57 and the functioning thereof has been described principally in relation to one of the mechanisms M, it will be readily understood from the drawings that the strip extends continuously across the entire width of the playing surface 16. Similarly the parts 62 and 63 forming the retaining block 61 extend transversely across the entire width of the playing surface with the block cut out at intervals with channels 66 to accommodate the various arms 43. Since, as previously stated, five mechanisms M are contained within the housing 18, there are five channels 66. It will also be appro
ciated that the width of the channel 66 and the number of channels plus the width of the playing surface must all be coordinated so that the first place the targets or target areas will be sufficiently widely spaced that each target will be separate and distinct and so that there will be a reasonable skill required in order to strike the target. Herein the distance between channels is roughly twice the width of a channel 66.

By varying the number of mechanisms M and by varying the nature of the movable object, which here takes the form of the wheel 15, or by varying the number of the indicia carried by the rim of the wheel, a great variety of game devices can be developed employing the basic mechanism that has been disclosed. By way of example, there is herein disclosed a game device in which the object of the player is to so position the wheels 19 as to obtain some predetermined arrangement or sequence of indicia constituting the goal.

As has already been stated, the periphery 20 of the wheel is divided into areas which in the present instance number twenty. In correspondence therewith, the ratchet gear 23 also has twenty teeth 26. Each of the areas on the periphery of each of the wheels 19 has a numeral. In this particular instance, the left-most wheel as viewed in Fig. 2 bears the numerals 9, 21, 13, 5 and 17 in that order, with the numerals repeated four times so as to have a numeral in each of the areas and so that the numeral appears the same number of times. The second wheel from the left in Fig. 2 bears the numerals 15, 2, 19, 6 and 23 in that sequence and also repeated four times. The middle wheel bears the numerals 10, 7, 25, 4, and 26 to the right the numerals 22, 14, 1, 18 and 10; and the right-most wheel the numerals 3, 20, 7, 24 and 11. The series of numerals on the last three wheels described, like the first two, are repeated four times. Housing 18 contains five apertures 70 in the front wall 11 thereof so located that some number on the wheels 19 will be accurately in registry with the apertures when the wheel is at rest. Above the aperture 70 is a panel 72 divided into twenty-five squares arranged in five vertical columns of five squares each, with the left-most column bearing the numerals reading from top to bottom 9, 21, 13, 5 and 17. The next column to the right bears the numerals 15, 2, 19, 6 and 23; the middle column the numerals 16, 6, 25, 12 and 4; the next column 22, 14, 1, 18 and 10; and the right-most column the numerals 3, 20, 7, 24 and 11. It will be noted that the numerals in the respective vertical columns correspond to the numerals carried on the corresponding wheels 19. It is also pointed out that the sum of the numerals in any vertical or horizontal column, and even the two diagonal lines of numerals, is the same, namely, 65. This arrangement of numerals may become important in avoiding any preference to complete a certain sequence in preference to other possible sequences where an award is also given for the highest score.

Mounted behind each square of the panel 72 is a light adapted once the game is placed in operation by the deposit of a coin, as is customary practice, to light up and remain lit when the corresponding number on the corresponding wheel appears in the aperture 70. Operation of the particular type of game here illustrated can best be explained by setting forth a possible sequence of events. Let it be assumed that the previous game has ended with the wheels in such position that numerals 5, 15, 12, 1 and 20 appear in the apertures reading from left to right in Fig. 2. A player deposits the necessary coin which then places the game device in operation and entitles the player to some predetermined number of shots, for example, five. In the particular game the player slides the puck over the playing surface toward the far end of the game and let it be assumed that he strikes the strip 57 lightly at a point opposite the middle mechanism M. As a result the middle wheel 19 is advanced just one square. Let it be assumed that he now is looking at the numeral 25 in the aperture 70 and lighting the light behind the numeral 25 on the panel. This is an unusually favorable number for the player for the number 25 on the panel constitutes a part of four different sequences that constitute goals to be reached, namely, either the completion of the middle vertical column; completion of the middle horizontal column; or completion of either of the two diagonal straight line series of numerals. The player has, as a result, another shot at the diagonal lines of numerals 5, 15, 12, 1 and 20. Let it be assumed that he decides to try for the numeral 14 in the fourth column from the left, for he can observe that again he need move that wheel only a single square and if he succeeds in doing so he will then have two numbers in the diagonal lines of numerals, 5 and 14, which indicates the player to advance the wheel one square. The player's aim, however, was bad and instead of striking the strip 57 in what constitutes the target area of the fourth mechanism he strikes the strip between that area and the target area for the fifth mechanism, with the result that the shot is wasted. The shot is, however, recorded as one of the twenty shots to which the player is entitled by mechanism and in the manner well known and consequently here not disclosed. After each shot the puck of the resilient strip 57 rebounds to the player and he takes aim to deliver the puck again.

Let it be assumed that he still tries to advance the fourth wheel one step so as to light up the numeral 14 in the fourth column. The puck is delivered by the player and this time his aim is true but he delivered the puck with too much force, as a result of which the wheel instead of being advanced one step is advanced two and the numeral 22 appears in the fourth aperture from the left and is lit up on the panel 71. The player now realizes that the numeral 14 of the panel is still a desirable number to record for scoring that number would give him two numbers in a vertical column, namely, 22 and 14, and would also give him two numbers in the same diagonal column that he previously had been striving for, namely, 23 and 14. Let it be again aims for the portion of the strip 57 constituting the target area for the fourth mechanism M and this time delivers the puck with a great deal of force for he realizes that he must cause the wheel to be rotated four steps, for with the numeral 22 now appearing in the aperture 70 and with the numerals on the wheel repeating in the sequence in which they are shown on the panel, the player can figure out just what must be done to obtain his objective. Let it be as-
assumed, therefore, that in this particular shot the player's aim was true and he also delivered the puck with the required amount of force, with the result that the puck traveled a diagonal distance of four units and thus comes to rest with the numeral 14 registering with the aperture 10 and as a consequence with the numeral 14 lighting up on the panel.

The player must now decide whether he is going to try to complete the vertical series of numbers, of which he has two, namely, 22 and 14, or complete the diagonal series of numbers of which he also has two, namely 25 and 14. Depending upon his decision, he will either try for one of the numerals 1, 18, or 10; or one of the numerals 25, 20, and 14. The player will then continue with the player delivering the puck at the targets and with his success dependent entirely upon his skill in delivering the puck truly and with the right amount of force. At the end of twenty shots the machine is shut off and the player's score is determined by the number of straight line sequences of numerals that he has been able to complete.

It will be clearly apparent that we have perfected mechanism having many applications and which when employed in a game device results in a game where the attainment of the results are dependent upon the skill of the player. Whether the target element of the mechanism is struck directly by the playing piece or has the force of the playing piece indirectly imparted to it in the manner hereinafter disclosed, the mechanism truly responds to the velocity of the playing piece at the time of impact and the inertia of the wheel 10 does not affect the responsiveness of the mechanism to the impact. By employment of the strip 57, many additional advantages are obtained, the principal one of which have already been specifically mentioned, such as the rebounding of the playing piece and the ability to vary the effective area of the target. Other advantages are the elimination of the noise that would otherwise be an incident to the metal to metal contact of the playing piece and the associated wear and battering that the playing piece would otherwise receive, and the tendency to bend or loosen the arm 43 when given a glancing blow by the playing piece particularly where the playing piece is a puck.

We claim as our invention:

1. In a game device having a playing piece to be projected under the direction and control of a player, an elongated playing surface over which the playing piece is projected having a station at one end, a housing at the opposite end of said playing surface having five apertures therein arranged in a horizontal line, a plurality of target elements rotatably mounted said housing with the periphery of one wheel visible through each of said apertures, each wheel on its periphery bearing at least five different numerals arranged in a particular sequence, the numerals on each wheel being different from the numerals on the other wheels, a score panel displaying above the apertures in said housing bearing numerals corresponding to the numerals on said wheels and arranged in the same manner, electrical means for illuminating a numeral on said score panel when a wheel comes to rest with the numeral in the aperture in said housing, and mechanism for advancing any of said wheels varying degrees in accordance with the skill of a player comprising a target element for each wheel in the form of a lever arm piv-

2. In a game device having a playing piece intended to be projected under the direction and manual control of a player, an elongated playing surface with a player station at one end, a target element at the end of the playing surface remote from the player station, said target element being movably mounted, a movable object operatively associated with said target element adapted to be given a degree of movement corresponding to the degree of movement of said target element, a firm but resilient cushion-like member, and means for stationarily mounting said member on said playing surface on the player station side of said target element with said member having one side in contact engagement with said target element when in normal position with the opposite side of said member extending transversely of said playing surface for receiving the direct impact of said playing piece, said member transmitting to said target element without partaking of the movement thereof a force proportional to the velocity of the playing piece at the time of impact and the accuracy of direction of the playing piece and then rebouncing the playing piece toward the player station end.

3. In a game device having a playing piece intended to be projected under the direction and manual control of a player, an elongated playing surface with a player station at one end, a target element at the end of the playing surface remote from the player station, said target element being movably mounted, a movable object operatively associated with said target element adapted to be given a degree of movement corresponding to the degree of movement of said target element, a firm but resilient cushion-like member of rubbery material, and means for stationarily mounting said member on said playing surface on the player station side of said target element with said member having one side in contact engagement with said target element when in normal position with the opposite side of said member extending transversely of said playing surface for receiving the direct impact of said playing piece, said member transmitting to said target element without partaking of the movement thereof a force proportional to the velocity of the playing piece at the time of impact and the accuracy of direction of the playing piece and then rebouncing the playing piece toward the player station end.

4. In a game device having a playing piece intended to be projected under the direction and manual control of a player, an elongated playing surface with a player station at one end, a plurality of target elements spaced transversely of the playing surface near the end thereof remote from the player station, a firm but resilient cushion-like member extending transversely of said playing surface on the player station side of
said target elements, and a block channeled to receive said member having in one face an aperture through which one side edge of said member projects for exposure to impact by the playing piece and the other face being formed with a plurality of channels extending laterally rearwardly to expose said member to contact by said target elements, each of said target elements being movably mounted and having a normal position in contact engagement with said strip.

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