

Nov. 20, 1962

O. A. KUHN

3,064,976

TARGET DEVICE FOR AMUSEMENT PARKS

Filed Nov. 9, 1959

3 Sheets-Sheet 1

FIG. 1

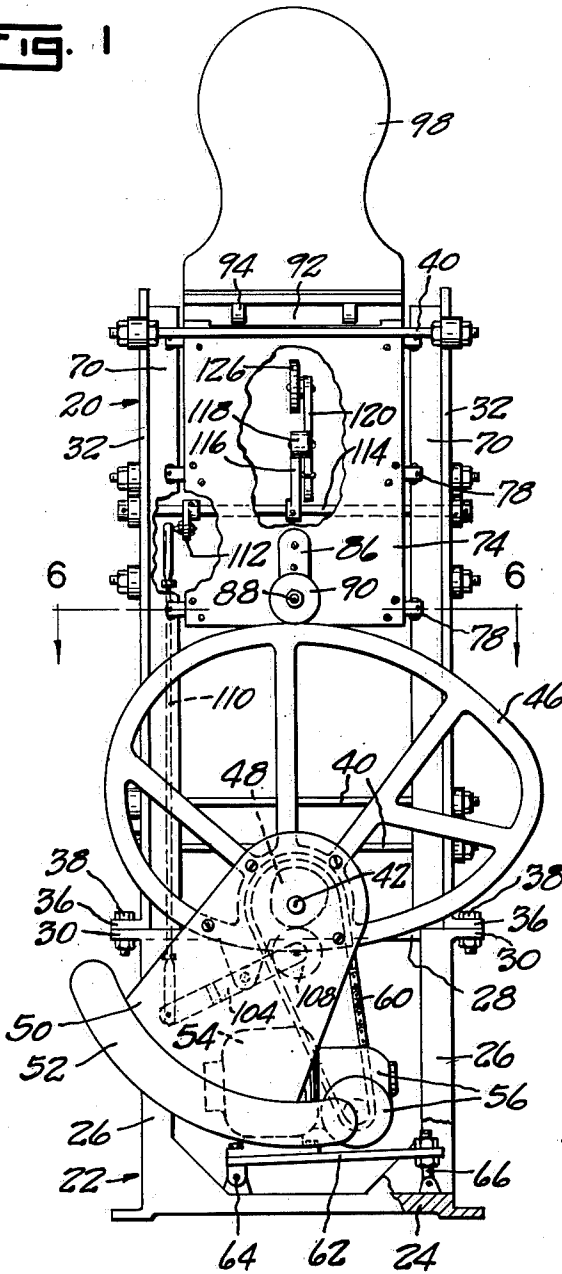
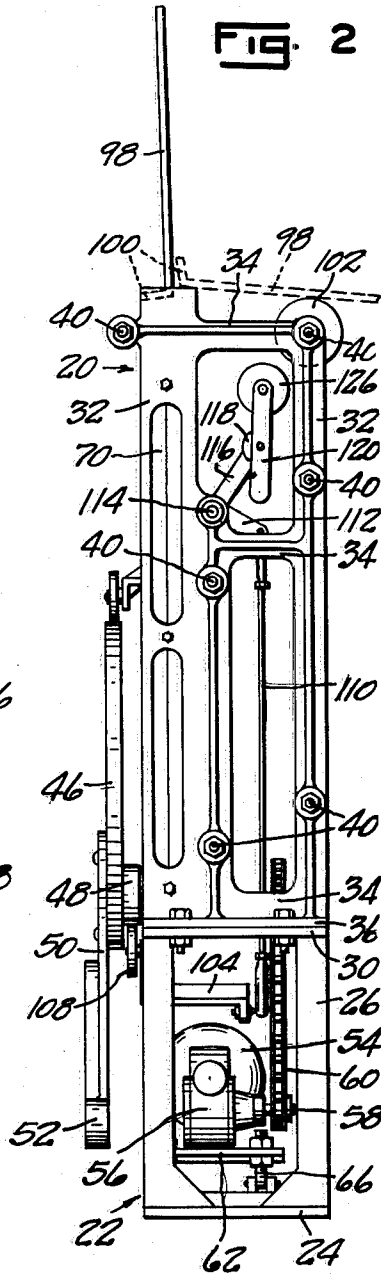


FIG. 2



INVENTOR.

OTTO A. KUHN.

BY

Engel C. Kurokawa

ATTORNEY

Nov. 20, 1962

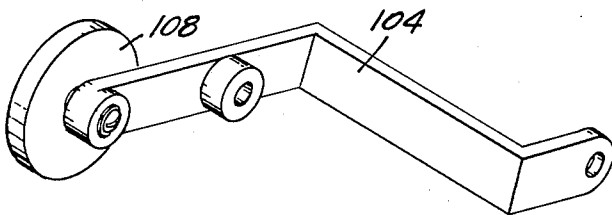
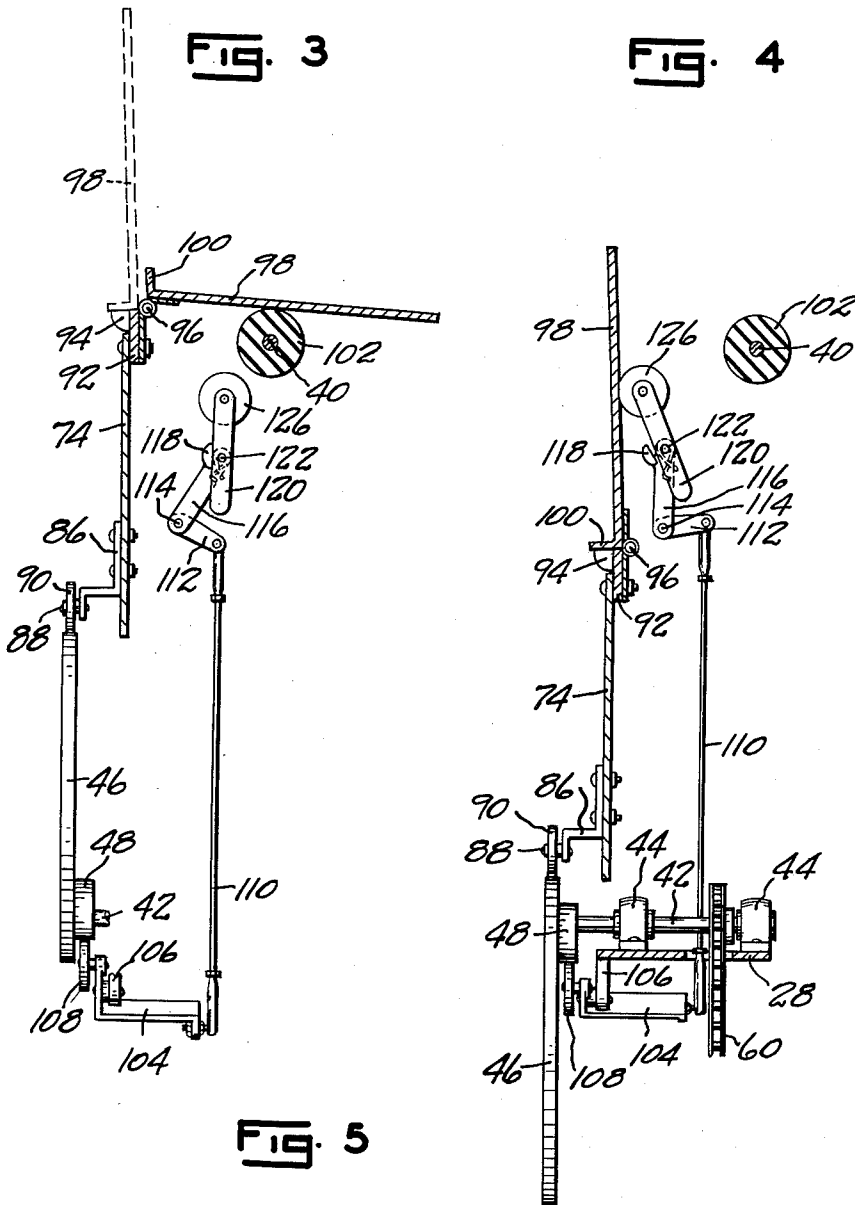
O. A. KUHN

3,064,976

TARGET DEVICE FOR AMUSEMENT PARKS

Filed Nov. 9, 1959

3 Sheets-Sheet 2



OTTO A. KUHN.
INVENTOR.

BY *Ernest C. Knoblock*
ATTORNEY

Nov. 20, 1962

O. A. KUHN

3,064,976

TARGET DEVICE FOR AMUSEMENT PARKS

Filed Nov. 9, 1959

3 Sheets-Sheet 3

FIG. 6

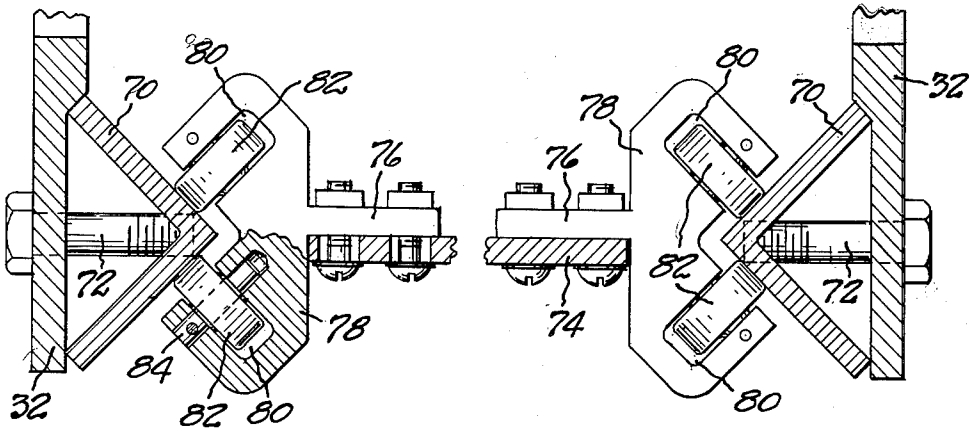
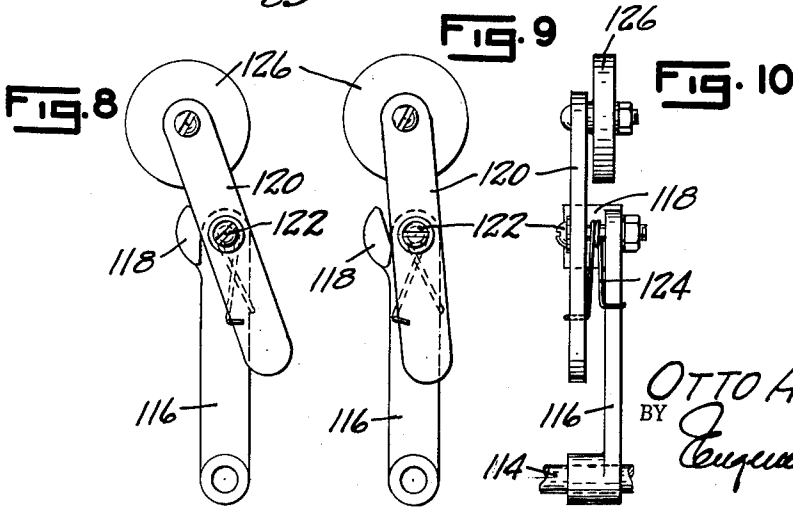
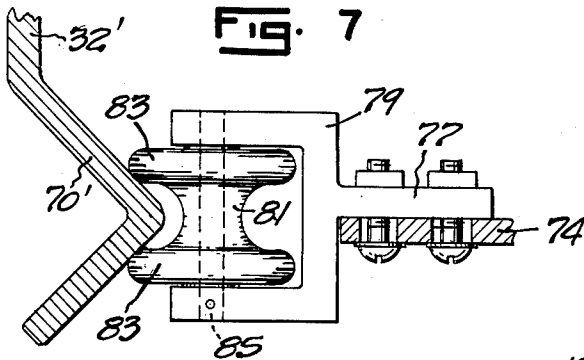


FIG. 7



INVENTOR.

OTTO A. KUHN

BY

Ernest C. Fairbank

ATTORNEY

1

3,064,976

TARGET DEVICE FOR AMUSEMENT PARKS

Otto A. Kuhn, 513 W. Jefferson Blvd., Mishawaka, Ind.

Filed Nov. 9, 1959, Ser. No. 851,715

6 Claims. (Cl. 273-102.1)

This invention relates to improvements in target devices for amusement parks.

The primary object of this invention is to provide a moving target device adapted to be felled from an operating position when struck by a ball or other object, thrown or shot by a player, wherein novel means are provided for restoring the operative position of the felled target as the same is moved along a predetermined path of movement.

A further object is to provide a device of this character which is simple in construction, trouble-free in operation, easy to repair, rugged and sturdy, and which constitutes a unit adapted to be positioned with like units in a target area and to be individually operable and readily removable from the target area without interference with adjacent units.

A further object is to provide a device of this character which is light in weight, which has a unitary drive for all operative parts, including multiple cams mounted upon a common shaft for operating different parts of the device in proper sequence, which is counterbalanced to provide rotation of cam members without producing vibration, which has novel guide means for controlling the operation of moving parts, and which has novel guide follower means.

Other objects will be apparent from the following specification.

In the drawings:

FIG. 1 is a view of the machine in front elevation with parts broken away;

FIG. 2 is a view of the machine in side elevation;

FIG. 3 is a schematic view of the operative parts of the device, showing the target in felled position in full lines, and in operative position in dotted lines;

FIG. 4 is a schematic view of the operating parts of the device, illustrating the same in another operative position and illustrating the manner in which the target righting or repositioning device operates;

FIG. 5 is a perspective view of one of the cam follower units employed in the device;

FIG. 6 is a fragmentary enlarged transverse sectional view taken on line 6-6 of FIG. 1;

FIG. 7 is a fragmentary sectional view similar to FIG. 6 but illustrating a modified embodiment;

FIG. 8 is a view of a part of the target repositioning mechanism in normal position, as viewed in side elevation;

FIG. 9 is a side view of the mechanism illustrated in FIG. 8, as seen in a different position; and

FIG. 10 is an edge view of the device shown in FIGS. 8 and 9.

Referring to the drawings which illustrate the preferred embodiment of the invention, the numeral 20 designates the upper part of a frame, and the numeral 22 designates the lower part of a frame. The lower frame part 22 has a base 24, a plurality of uprights 26, a transverse upper member 28, and a pair of outwardly projecting flanges 30 at its upper end. The upper frame portion 20 preferably constitutes a pair of spaced vertical castings, each having spaced uprights 32 and transverse parts 34 and a bottom flange 36 bearing on a flange 30 of the lower frame unit 22 and secured thereto by bolts or other securing means 38. The two frame units 32 are preferably similar and are rigidly interconnected by a plurality of cross-members 40, such as rods having nuts threaded on

2

the end portions thereof bearing against the inner and outer faces of the side frame members to accurately space and firmly position them to constitute a rigid unit. It will be understood, however, that the frame construction herein illustrated and described is illustrative and is not intended to be limiting, and that any suitable skeleton frame capable of supporting the various operating parts and providing for the required movement of parts may be employed.

A cam shaft 42 is journaled intermediate the height of the frame as by means of bearings 44 mounted upon frame part 28, as illustrated in FIG. 4. Shaft 42 mounts cam members 46 and 48 fixed thereon and of selected size and configuration. As shown, the cams 46 and 48 are preferably located outside of the outline of the frame 20, 22. The cam 46 is preferably large and rotates about a part thereof near one marginal edge so that substantial dynamic unbalance may accompany rotation thereof. A bracket 50 is carried by and projects from cam 46 and mounts a counterbalance weight 52, here illustrated as substantially arcuate and elongated. The counter-weight 52 and its bracket 50 serve to counteract the unbalance of the cam 46 dynamically, so that vibration and shock incident to rotation of the cam shaft 42 is avoided.

The cam shaft 42 has a drive connection with a drive motor 54. Motor 54 is preferably of the gear head type having speed-reducing gearing within a housing portion 56 journaling a drive shaft 58 upon which may be mounted a drive element, such as a sprocket or pulley, having an endless drive-transmitting member 60 trained therearound, said drive-transmitting element 60 preferably being a chain as shown, or a belt if desired. The drive transmission member 60 is trained around a cooperating drive element on the shaft 42, such as a sprocket or pulley. The motor 54 is preferably mounted upon a supporting plate 62 pivoted at 64 to a part of the base 24, such as a lug. The free end of the support base 62 has adjusting means 66 cooperating therewith and connecting the same to the base, said adjusting means preferably constituting a bolt pivoted to a lug upon the base 24 and having a pair of nuts threaded thereon and engaging the top and bottom faces, respectively, of the plate 62, or engageable with said faces to define limits between which the plate 62 pivots.

Two of the upright portions 32 of the upper part 20 of the frame carry a pair of spaced guide tracks 70 which extend in parallel vertical relation at the side of the frame adjacent to the cam 46. The guide tracks 70 may constitute angle members, as illustrated in FIG. 6, having their flange edges abutting the frame part 32 and anchored by means of machine screws 72 passed through openings in the frame parts 32 and screw-threaded in apertures thereof. Alternatively, the track parts may constitute members 70' of angle shape in cross-section formed integrally with upright parts 32' of a frame as illustrated in FIG. 7. The guide tracks 70 or 70' project inwardly from the associated frame parts with their constituent angle flanges or legs converging inwardly. A target-carrying plate 74 has two or more vertically spaced brackets 76 secured to each vertical margin thereof and projecting outwardly therefrom at a bracket head portion 78. Each head 78 is slotted or grooved at 80 at its outer faces, said slots extending substantially at right angles to each other and accommodating rotatably therein rollers 82 journaled upon shafts 84 carried by the bracket head 78 and each substantially parallel to a face of tracks 70. The rollers 82 are so spaced and positioned as to bear upon angularly disposed faces of the adjacent tracks 70 so as to accommodate guided vertical reciprocation of the target carrier plate 74.

Target carrier plate 74 mounts a bracket 86 at the lower central portion thereof, upon which is mounted a projecting shaft 88 which serves to journal a cam following roller 90 bearing upon the upper part of cam member 46 in substantially vertical alignment with the cam shaft 42. Thus as the cam 46 is rotated with the weight of the target carrier plate 74 and associated elements transmitted to the cam following roller 90, a gravital cam following action occurs as the cam 46 revolves, which produces a reciprocation of the target carrier plate 74 vertically. It will be observed that the cam 46 is illustrated as of irregular shape or outline and this shape or outline will determine the stroke of the target carrier 74 and the speed thereof at different parts of the stroke so as to effect an irregular reciprocation of said parts.

The target carrier 74 preferably mounts a stop member 92 at its upper end provided with projecting abutment lugs 94. A hinge 96 is carried by stop member 92 and mounts the lower end of a target plate 98, preferably provided with a flange or foot portion 100 engageable with a stop lug 94 in the operative position of the parts illustrated in dotted lines in FIG. 3 and in full lines in FIG. 4. The stop or flange 100 is so correlated to the target plate 98 and to the abutments 94 that the target plate 98 is slightly inclined, as best seen in FIG. 4, in a direction opposite that in which it is free to pivot to the felled position illustrated in FIG. 3, in full lines. One of the cross-rods 40 of the upper frame mounts a member 102 preferably formed of rubber or other resilient material and adapted to support and limit the pivotal movement of the target plate 98 as it moves toward felled position illustrated in full lines in FIG. 3 and in dotted lines in FIG. 2, after the same has been struck by a ball or other game piece thrown or projected by a player.

It will be understood that in use the device is located behind a wall of a height substantially equal to the height of the frame so that the target plate 98 will be exposed to the view of a player during the time that the carrier 74 is positioned adjacent the upper end of the frame 20 by contact of the roller 90 with the cam 46 when the latter has a substantial proportion thereof located above the level of the cam shaft 42. Thus, when the target plate 98 is located at or adjacent the top of its stroke and is felled by a projectile, it falls to a substantially horizontal position, as illustrated in FIG. 3, and subsequent lowering movement of the target carrier and the target tend to swing the target plate 98 toward upright position.

A cam follower arm 104 is pivoted intermediate its ends to a bracket member 106 carried by a frame, as by the frame part 28. At one end the arm or lever 104 journals a roller 108 which engages the periphery of cam 48 preferably at the lower portion thereof as illustrated. The opposite end of the arm or lever 104 is pivotally connected to the end of an elongated connecting arm or link 110 which is pivoted to the free end of an arm or projection 112 fixedly mounted upon a cross-shaft 114 suitably journaled in the frame 20. Shaft 114 fixedly mounts an arm 116 preferably positioned centrally between the two side parts of the frame 20. Arm 116 preferably carries a laterally projecting lug 118 at its upper or free end. An elongated arm 120 is pivoted at 122 intermediate its ends to the upper end of the arm 116, and a spring 124 having a central portion coiled around the pivot member 122 and opposite end portions engaging, respectively, the parts 116 and 120, serves normally to urge the arm 120 into contact with the abutment 118, as illustrated in FIG. 8, at which time the parts 116 and 120 extend in angular relation to each other. A roller 126 is journaled on the free end of the arm 120.

The cams 46 and 48 are so arranged and oriented with respect to each other that during the portion of each rotation of the shaft 42 at which a substantial part of the cam 46 is positioned above the shaft 42 so as to position the target carrier 74 above its lowermost position, the cam 48 will serve to hold the arm 116 in a retracted

position as illustrated in FIG. 2 adjacent to the stop or abutment 102 and spaced from the path of vertical reciprocating movement of the target carrier 74. As the shaft 42 rotates to a position substantially 180 deg. displaced from that shown in FIG. 1 so that the major portion of the cam 46 is below the shaft 42 and the major portion of the cam 48 is similarly below the shaft 42, the roller 108 will be depressed so as to swing upwardly the end of the lever 104 connected to the rod 110, and thereby rock the shaft 114 in a manner to swing the arm 116 forwardly, that is, to the left as viewed in FIG. 2, for the purpose of bringing the roller 126 into contact with the target plate 98. As this movement occurs, the roller 126 will carry with it the target plate 98 if the same has previously been felled, thus returning or setting the target to operative position as illustrated in FIG. 4.

The stroke of the target-setting mechanism produced by the cam 48 will preferably be slightly greater than is required to swing the target 98 counter-clockwise, as viewed in FIGS. 3 and 4, to the slightly over-center position illustrated in FIG. 4, at which its flange 100 bears against the stop 94 upon the target carrier 74. This arrangement permits firm and positive return of the target plate 98 to operative position and maintenance thereof in operative position during the initial portion of the return stroke of the target carrier in an upward direction. In other words, since arm 120 is free to pivot relative to the arm 116 and is pressed upon by the spring 124, the terminal portion of movement of the carrier arm 116 toward the target will be lost motion and will entail relative pivotal movement of the parts 116 and 120 between the FIG. 8 and FIG. 9 positions. Thus accurate correlation of the shape of the cam 48 with the desired movement of the roller 126 is not required, and, furthermore, a firm spring pressure can be exerted by the roller 126 against the target plate 98 during that interval of time required for the cam follower roller 108 to traverse that part of the cam 48 spaced from the shaft 42 the greatest distance. It will be understood that the cams 46 and 48 will be so correlated in angular relation to each other, and each will be so shaped or contoured, that shortly after the target plate commences its upward movement to be exposed to the view of a player, the arm 116 will be swung toward the FIG. 2 position free and clear of the target plate so as to permit the target plate to be felled if it is struck by properly directed projectile delivered by a player.

In the embodiment of the invention illustrated in FIG. 7, a modified construction of guide track and follower is illustrated. Thus the bracket 77 carried by the target carrier plate 74 mounts a yoke type bracket 79 spanned by a cross-shaft 85 which journals a roller 81 characterized by a central portion of small diameter and a pair of spaced end portions 83 of large diameter and of rounded contour adapted to engage angularly disposed faces of the V-shaped track 70'.

While the preferred embodiments of the invention have been illustrated and described, it will be understood that changes in the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A target device comprising a frame having elongated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier engaging one cam for shifting said carrier on said guide means, target-setting means shiftable on said frame adjacent said guide means toward and from the path of said shiftable target and a follower engaging the other cam and connected to said target setting means.

2. A target device comprising a frame having elon-

5

6

gated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier bearing on one cam, target-setting means shiftable on said frame adjacent said guide means toward and from the path of said target and a follower engaging the other cam and connected to said target setting means, said cams being mounted on a common shaft.

3. A target device comprising a frame having elongated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier bearing on one cam, target-setting means shiftable on said frame adjacent said guide means toward and from the path of said target a follower engaging the other cam and connected to said target setting means, and counterbalance means carried by and offset laterally from said cams.

4. A target device comprising a frame having elongated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier bearing on one cam, target-setting means shiftable on said frame adjacent said guide means toward and from the path of said target and a follower engaging the other cam and connected to said target setting means, said target-setting means including a first arm, and a second arm pivoted to and projecting from said first arm, and normally spring urged to a limit position, said arm being swung from said limit position against the action of the spring upon contact with said target.

5. A target device comprising a frame having elongated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end

of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier bearing on one cam, and target-setting means shiftable on said frame adjacent said guide means, and a follower engaging the other cam and connected to said target setting means, said target-setting means including a pivoted arm having a stop, a second arm pivoted to said first arm and projecting therefrom, and a spring normally urging said second arm against said stop, said second arm swinging free of said stop upon engagement with said target.

6. A target device comprising a frame having elongated vertical guide means, a target carrier shiftable along said guide means, a target member pivoted to the upper end of said carrier, stop means normally positioning said target member substantially upright on said carrier, a pair of rotatable cams, drive means rotating said cams, a cam follower on the lower part of said carrier bearing on one cam, target-setting means shiftable on said frame adjacent said guide means, and a follower engaging the other cam and connected to said target setting means, said target-setting means including a pivoted arm having a stop, a second arm pivoted to said first arm and projecting therefrom, a spring normally urging said second arm against said stop, and a target-engaging roller rotatably carried by and projecting from the free end of said second arm, said second arm swinging clear of said stop against said spring when said roller engages said target.

References Cited in the file of this patent

UNITED STATES PATENTS

766,112	Murray	July 26, 1904
855,455	Greer	June 4, 1907
1,195,185	Corbett	Aug. 22, 1916
2,231,049	Berman	Feb. 11, 1941
2,572,146	Henry	Oct. 23, 1951

FOREIGN PATENTS

12,118	Great Britain	1891
29,551	Great Britain	1912