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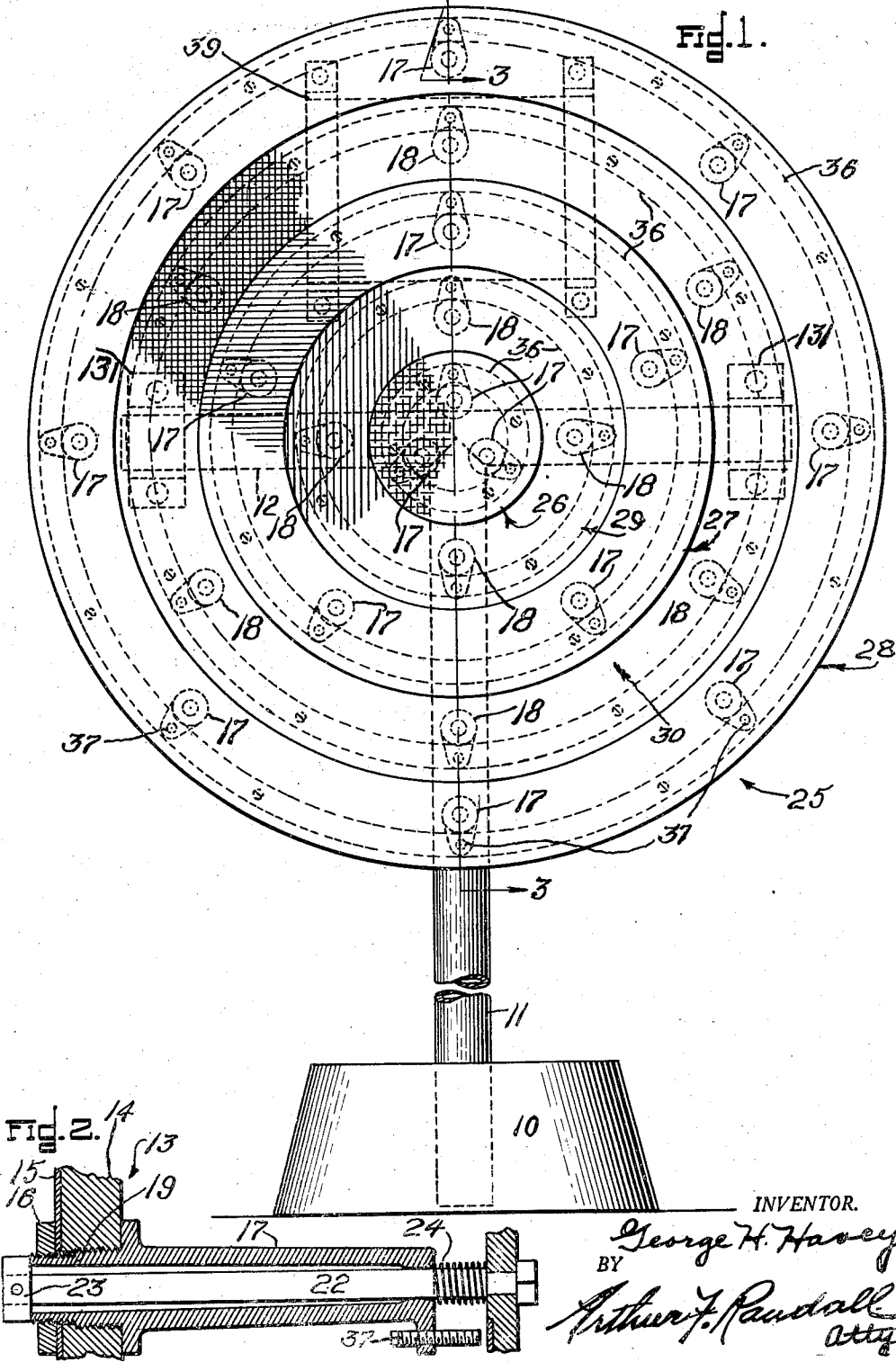
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INDICATING ARCHERY TARGET

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INDICATING ARCHERY TARGET

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3 Claims. (Cl. 273-102.2)

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This invention relates to targets and has particular reference to improvements in targets for use upon archery ranges.

Archery targets are made circular as viewed from the front and the front face of such a target is provided with concentric rings of different colors and having different scoring values. My invention has for its object to provide an improved target of this class which is associated with registering mechanism in such manner that when one of the target rings is struck by an arrow or other projectile said ring is actuated by the impact of the arrow or other projectile independently of all of the other target rings and acts through suitable devices or mechanism to operate said registering mechanism to cause the latter to indicate which of the target rings was struck by the arrow or other projectile. It is also an object of this invention to provide a target of this class which will be of durable, simple and efficient construction.

To these ends I have provided a target of the character described which, in its preferred form, may be constructed and operate as set forth in the following description, although it is to be understood that modifications thereof not herein shown are intended to be included within the scope of the appended claims by which the several features of the invention are separately pointed out.

In the accompanying drawings:

Figure 1 is a front elevation of an archery target constructed in accordance with this invention.

Figure 2 is a sectional detail relating to one of the brackets hereinafter referred to.

Figure 3 is a section on line 3-3 of Fig. 1.

Figure 4 is a diagrammatic view illustrating the electrical apparatus of the target shown in Figs. 1 and 3.

The illustrated embodiment of my invention comprises a pedestal 10 herein shown as a concrete monolith within which is embedded the lower end of a vertical post or stem 11 that is provided at its upper end with a horizontal cross-bar 12. The opposite end portions of cross-bar 12 fit within and are welded to brackets 13 which, in turn, are bolted to a circular base member that is indicated generally at 13, Fig. 3. Base member 13 comprises a wood disk 14 and a sheet metal disk 15, the latter being held in position upon the rear face of the wood disk by nuts 16 screwed into position upon the threaded shanks of the brackets 17 and 18.

As shown in Figs. 2 and 3 the threaded shanks 19 of the brackets 17 and 18 are screwed into

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holes provided through the wood disk 14 and also extend through holes provided through the sheet metal disk 15 beyond the latter to receive upon their threaded extremities the nuts 16. It will also be clear that all of the brackets 17 and 18 are grounded on the sheet metal disk 15 and that the latter, as shown in Fig. 4, is connected by a conductor 20 with the negative or ground wire of a current-supplying circuit 21.

The brackets 17 and 18 differ in construction only with respect to their lengths, the brackets 17 being made longer than the brackets 18. Each bracket is tubular and has loosely mounted within it a rod or spindle 22 provided at its rear end with a stop collar 23 abutting the rear end of the bracket and yieldingly held in position against the same by a coiled spring 24 mounted upon the forward end portion of said rod or spindle.

The two disks 14 and 15 and the brackets 17 and 18 all constitute parts of the target head that is indicated generally by the reference numeral 25. This head also includes two banks or groups of target elements all of which, with the exception of one, are in the form of rings, the exception being the bull's-eye element 26.

The two groups of target elements are disposed one in front of the other; the front group including the circular bull's-eye 26 and two annular elements or rings 27 and 28 and the rear group comprising two annular elements or rings 29 and 30. Each target element 27, 28, 29 and 30 is an annulated structure comprising a backing ring 31 of wood (Fig. 3), an intermediate ring 32 of cushioning material such as felt or rubber which serves as a barrier to stop arrows, and a relatively thick front ring 33 comprising an outer tubular sheath of canvas or other suitable textile fabric inclosing a filling of straw having the stems thereof disposed circumferentially. These three rings of each target element are confined between two sheet metal rings 34 and 35 (Fig. 3) which are nailed or otherwise rigidly fastened to the wood backing ring 31 of said element. The cushioning ring 32 is cemented or otherwise fastened to the wood backing ring 31 while the straw ring 33 is cemented or otherwise fastened to the cushioning ring 32. The bull's-eye element 26 is constructed approximately the same as the elements 27, 28, 29 and 30 except that the different layers are in the form of disks.

Between the bull's-eye element 26 and base member 13 (Fig. 3) three relatively long brackets 17 are provided whose spindles are rigidly fastened at their front ends to the backing disk 31 of said bull's-eye with their springs 24 under suf-

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sufficient tension to hold their stop collars 23 against the rear ends of said brackets. The base ring 31 of the annular target element 29 is rigidly fastened to the front ends of the spindles 22 of a circular series of relatively short brackets 18. The base rings 31 of the annular target elements 27 and 28 are rigidly fastened to the front ends of the spindles 22 of two circular series of relatively long brackets 17, while the base ring 31 of target element 30 is rigidly fastened to the front ends of the spindles 22 of a circular series of relatively short brackets 18. The springs 24 (Fig. 2) of all of the spindles are under sufficient initial stress to yieldingly maintain all of the collars 23 against the rear ends of their brackets, while said spindles are free to be moved endwise within their brackets and also to rock to some extent relatively thereto. Normally the springs 24 on the spindles of the relatively short brackets maintain the front faces of target elements 29 and 30 about three-eighths of an inch away from the rear faces of the target elements 26, 27 and 28.

Fixed in position within a groove provided upon the rear face of each target element 26, 27, 28, 29 and 30 is a contact ring 36 that is co-operatively disposed with respect to an adjustable fixed contact screw 37 provided upon each of the brackets by which said target element is supported. Normally each contact ring 36 is spaced away from its contact screws 37 about one-quarter of an inch.

As shown in Fig. 4 each contact ring 36 is connected by a conductor 38 with one end of the winding of a magnet *f* forming part of a relay. The relay for the contact ring 36 of the bull's-eye element 26 is shown at *a*; the relay for target element 29 at *b*; for target element 27 at *c*; for target element 30 at *d*, and the relay for target element 28 at *e*. These five relays are constructed alike and each comprises a magnet *f*, a fixed contact *g*, and an armature *h* co-operating with the fixed contact *g*. Armature *h* is connected with one end of a heating coil *i* whose opposite end is connected by a wire *j* with the negative wire of circuit 21. The heating coil *i* is mounted upon a thermostatic switch element *k* whereof one end is rigidly fastened to a suitable fixture or support and the opposite end is normally in engagement with a fixed contact *n*.

With the relays *a*, *b*, *c*, *d* and *e*, respectively are associated incandescent lamps *a'*, *b'*, *c'*, *d'* and *e'* each of which has one of its terminals connected by a wire *r* with the fixed contact *n* of its thermostatic switch and the other terminal thereof connected by a wire *t* with the positive wire of circuit 21. One end of the winding of the magnet *f* of each relay is connected by a wire *o* with the fixed end of the thermostatic element *k* while the opposite end of said magnet is, as pointed out above, connected by a conductor or wire 38 with one of the contact rings 36, said opposite end being also connected by a wire *x* with the fixed contact *g*.

The thermostatic switches *i-k-n* are of ordinary construction, the element *k* consisting of two strips of thin sheet metal riveted or otherwise fastened together, one of said strips being made from one kind of metal such as copper and the other being made from another kind of metal such as zinc. When this element is cold it maintains a straight form as shown but when heated by coil *i* the two metals expand differently and the element is warped away from

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fixed contact *n* thereby opening the circuit of lamp *a'*, coil *i* and magnet *f*.

The several lamps *a'*, *b'*, etc., may be mounted within a housing as indicated by dotted lines in Fig. 4 and placed in a position where the lamps may be seen from the shooting line of the range, preferably adjacent to the latter. The relays *a*, *b*, etc., and the thermostatic switches may be mounted within a container or box 39 fixed in position upon the rear side of the base 13 of the target head as shown in Fig. 3.

The front face of the bull's-eye target section or element 26 is colored golden or yellow as is also the lamp *a'*; the front face of the target element 29 is colored red as also is the lamp *b'*; the front face of target element 27 is colored blue as is also the lamp *c'*; the front face of the target section 30 is black while its lamp *d'* is provided with a bulb that is of a blackish transparent color, and the front face of target element 28 is white as is also the lamp *e'*.

When either element or section of the target head is struck by an arrow at any exposed point thereof said element or section is tilted rearwardly against the pressure of some of its springs 24 and its contact ring 36 is thereby caused to engage one or more of the contact screws 37 provided upon the brackets 17 or 18 by which said element or section is supported. This results in the illumination of the lamp of that section or element which lamp remains lighted for an appreciable period of time that is determined by the action of the thermostatic switch *i, k, n*. For example: The target section or element 26 is struck by an arrow and forced rearwardly as described thereby closing a circuit which is traced as follows: From the positive wire of circuit 21 through wire *t*, lamp *a'*, wire *r*, thermostatic element *k*, wire *o*, magnet *f*, the conductor 38 connecting that magnet *f* with the contact ring 36 of the target element or section 26, one or more of the brackets 17 supporting the latter, metal disk 15 and thence through conductor 20 to the negative wire of circuit 21. This energizes magnet *f* of relay *a* which lifts its armature *h* into position against fixed contact *g* thereby closing a second circuit which is traced as follows: From the positive wire of circuit 21 through wire *t*, lamp *a'*, wire *r*, fixed contact *n*, thermostatic element *k*, wire *o*, magnet *f*, wire *x* connecting the conductor 38 with fixed contact *g*, armature *h*, coil *i* and thence through wire *j* to the negative wire of circuit 21. Thus magnet *f* continues to be energized after the first circuit is broken at the contact ring 36 of target element 26 in order to continue the heating action of coil *i* until the thermostatic element *k* warps away from fixed contact *n* whereupon lamp *a'* is extinguished and all of the parts are restored to their normal conditions.

When a target section is struck by an arrow it is only momentarily displaced rearwardly since its springs immediately return said section to its normal position thereby opening the primary lamp circuit 20-38 at the target. Therefore, the second circuit with its thermostatic switch is provided to continue the illumination of the lamp for an appreciable length of time after the return of the target section to its normal position.

An important feature of my invention concerns the construction, arrangement and mode of operation of the target head elements 26, 27, 28, 29 and 30. As illustrated in the drawings, these elements are arranged in two banks disposed one

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in front of the other with the elements of one bank staggered relatively to those of the other and with the elements of each bank spaced apart so that the elements of the rear bank are exposed to view through the spaces separating the elements of the front bank.

It is also of importance that each element of the rear bank is made of greater width than that of the space between elements of the front bank behind which it is located with the result that no exposed cracks between elements exist within which an arrow can lodge. Thus it is not possible for an arrow to displace more than one target element and illuminate two lamps at the same time. Thus, each target element is independently movable under the impact of an arrow to illuminate its own lamp only.

What I claim is:

1. In a target, the combination with a hit-registering mechanism of a base, a plurality of brackets extending from and supported by said base, a bull's eye element and a plurality of concentric ring elements, and means for securing yieldingly each of said elements independently of said other elements to said brackets for universal tilting movement, said hit-registering mechanism comprising a first, normally open electrical circuit for each of said elements, means for closing one of said circuits upon hitting the corresponding element, an optical signal means in each of said circuits, a second electrical circuit for each of said elements, means in each of said first circuits for closing the corresponding second circuit, said second circuits including the said optical signal means and the said closing

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means, and means for maintaining said second circuit for a predetermined time period upon breaching the corresponding first circuit, thereby maintaining the optical signal for a predetermined time period after return of the said hit element, which caused the making of the corresponding first circuit, into its original position.

2. The target, as set forth in claim 1, in which said closing means in each of said first circuits comprises an electromagnet having a coil which is included in said first and said second circuit, while its armature is included in said second circuit.

3. The target, as set forth in claim 2, in which said means for maintaining said second circuit comprises a normally closed thermostatic switch which includes a heating coil electrically connected to said armature, thereby starting operation upon making said second circuit.

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