Sept. 28, 1954 T. B. HALL 2,690,339

FLYING DISK AND CATCHER

Filed Dec. 15, 1950

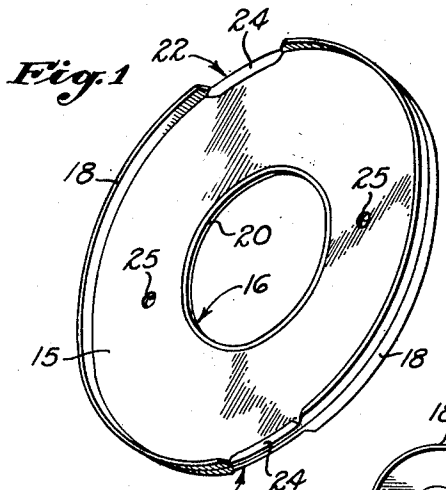


Fig. 1

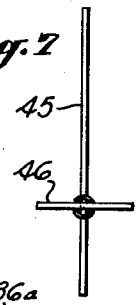


Fig. 7

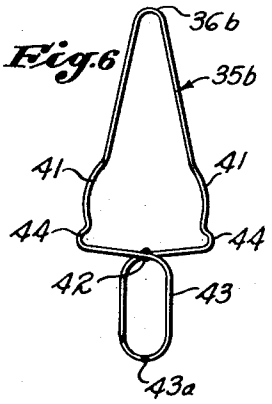


Fig. 6

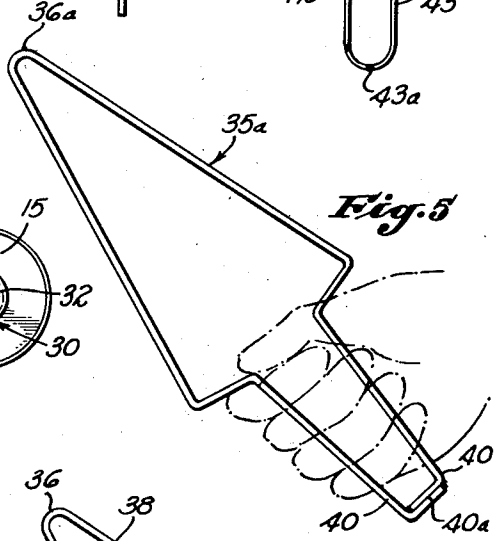


Fig. 5

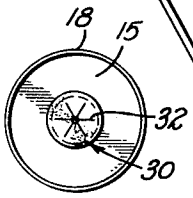


Fig. 10

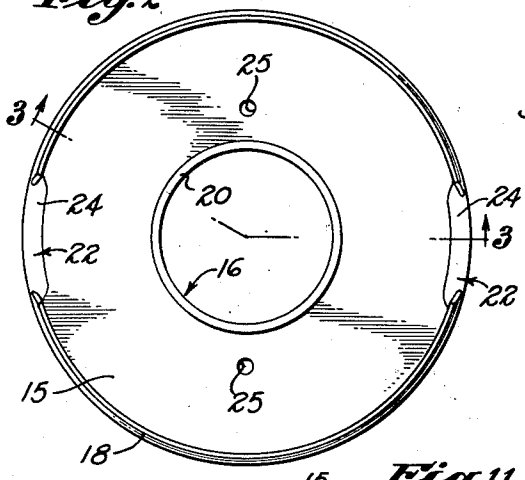


Fig. 2

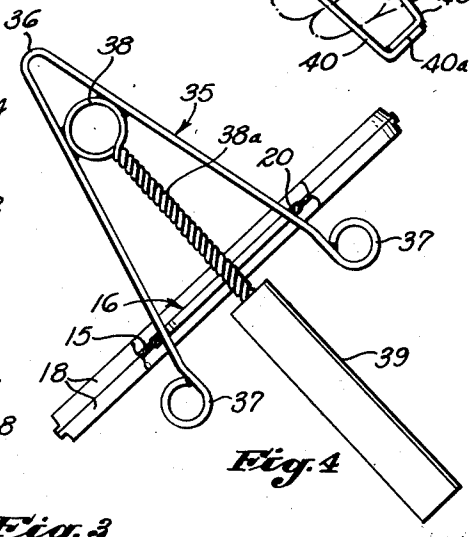


Fig. 4



Fig. 11

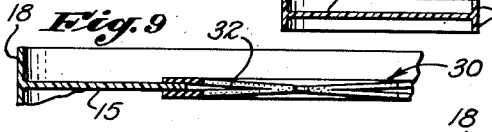


Fig. 9



Fig. 3

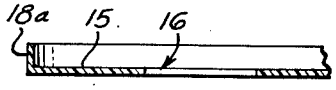


Fig. 8

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FLYING DISK AND CATCHER

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2 Claims. (Cl. 273—96)

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This invention relates to toys and playing devices and more particularly to specially constructed discs which may be employed in the playing of games both for pleasure and for exercise.

Although disc-like structures have been employed in the past to provide amusement apparatus in various forms, no such structure has heretofore been developed which has been so balanced or stabilized that it could be thrown through the air by a player in such a manner that it would progress on an even keel without dipping to one side or another. As a consequence, devices of this type have not lent themselves to the playing of games wherein such devices have been thrown by one player to another, such other player being expected to catch the device upon any appropriate stick or other receiver.

The object of the present invention is to produce a disc type of toy or game structure which may be easily thrown by a player so that it will perform rather closely in accordance with a known pattern of procedure. In other words it is an object of the invention to provide a disc, the movement of which through the air may be reasonably accurately controlled by the player who casts the disc into the air.

It is a further object of the invention to provide a disc type of amusement structure which may be thrown against a breeze by a player having a limited amount of experience, so that the disc will be returned to the player by the breeze.

It is also an object of the invention to provide a disc-like playing device presenting a flat, relatively thin body or airfoil face which is adequately weighted at its periphery by a flange or skirt means extending from both faces of the disc so that the flight of the disc is stabilized and so that its movements may be controlled whereby to avoid plunging of the disc to one side or the other of the projected line of flight and out of control.

It is an additional object of the invention to provide in a flanged playing disc of the indicated nature a central opening therethrough of substantial diameter whereby to make it possible to rely upon air movements through such opening as aids in controlling flight.

As pointed out hereinafter in this specification, I have discovered that a thoroughly stabilized or balanced disc structure may be produced from a thin, flat disc body, preferably with a central air passage, wherein peripheral flanges projecting from the opposite faces are provided, these flanges serving as controls operating upon the resultant air currents so that the disc is stabilized in flight, especially in conjunction with the opening at the

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center thereof, and whereby the player may control flight movement. By reasonably careful proportioning of dimensions, almost perfect flight control may be obtained. By less accurate proportioning, somewhat less accurate control will result, whereby to add greater zest to the game by reason of inability to attain full flight control. The invention therefore extends to playing structures of the disc type constructed and proportioned to operate through a range between full control and only partial but substantial control as distinguished from absence of control represented by a simple, flat disc.

Another object is to provide, in the disc structure, recesses in the flange, for the purpose of providing a hold with the index finger and thumb so that the disc can be thrown more readily, and still have the disc in balance in flight.

It is also an object of the invention to provide a novel combination of a centrally apertured flying disc and catching or receiving means for capturing the disc at a goal.

A further object is to provide a disc catcher made in such a way that the disc's center aperture is easily engaged on dropping over the catcher, and is then trapped and does not readily bounce off. This makes the game more aggressive and therefore more pleasurable.

Other objects of the invention and the various features of construction thereof will become apparent to those skilled in the game and toy arts upon reference to the following specification and the accompanying drawing wherein certain embodiments of the invention are illustrated and described.

In the drawing:

Fig. 1 is a perspective view of a double flanged flying and playing disc constituting a preferred form of the invention;

Fig. 2 is a face view of the playing disc as viewed from either side of Fig. 1;

Fig. 3 is a cross section taken on the line 3—3 of Fig. 2;

Fig. 4 illustrates a preferred form of receiver or catcher as used by a player for the purpose of capturing a disc approaching him, although ordinarily the disc apporaches the player in a plane approximating the horizontal when properly thrown by an opposing player;

Fig. 5 is a view illustrating a modified form of receiver;

Fig. 6 is a face view of another form of receiver;

Fig. 7 is an elevation of a simple form of receiver;

Figs. 8 and 9 are fragmentary cross-sectional

views of modified forms of the disc of this invention which are not a preferred form;

Fig. 10 is a face view on a reduced scale of the form of Fig. 9; and

Fig. 11 is a cross section through a further modified form of disc which likewise is not a preferred form of the invention but illustrates a possible variation.

As seen in Figs. 1, 2, 3, and 4, the preferred form of flying game device of this invention comprises a thin disc body 15 provided with an appropriately proportioned central opening 16 and with a peripheral skirt or flange 18 which is double in the sense that it projects from both sides of the disc body 15 in a generally perpendicular or axial direction. If desired, the annular wall of the opening 16 may be reinforced slightly to form a bead 20 should such a construction be deemed necessary. However, this bead 20 does not greatly increase the effective thickness of the body member 15 at the edge of the opening 16 and therefore does not interfere materially with the movements of air currents working against the respective faces or airfoils of the disc body 15. Desirably, the skirt or flange portions at one point of the edge of the disc body 15 are omitted for a short distance along the periphery as indicated at 22 to provide a finger grip, and it may be deemed preferable that such provision be made at diametrically opposite points as illustrated in Figs. 1 and 2. In order to maintain symmetrical weighting around the periphery of the disc structure, the material which would otherwise have constituted corresponding portions of the double flange 18 may be molded into the disc structure to provide thickened inwardly sloping finger grip sections 24. Since the disc in a preferred form is produced from a somewhat flexible or yielding plastic, such as appropriate natural or synthetic rubber, currently popular synthetic plastic resins, including various polymers and copolymers, exemplified by polymerized ethylene and plasticized vinyl type polymers, such molding to produce the indicated configuration may be readily attained.

The construction described yields a perfectly symmetrical disc-like playing device whose periphery is weighted by the double flange 18 and the thickened sections 24 to provide required balance. For a nicely balanced, perfectly operating structure with an opening 16 of appreciable diameter I have found that the double flange 18 should approximate in total width about 7% to about 7.5%, or between about 7% and about 8% of the total diameter of the disc, especially where adequate finger grip sections 24 are used and the opening 16 has a diameter of about 30% to 40% of the diameter of the disc. If the finger grip sections 22, 24 are entirely omitted, the flange width may be reduced to 5% or 5.5% for good balance, but casting of the disc is then more difficult. Thus, total flange width may vary between about 5% and 10% of the disc diameter. It will be appreciated also that the diameter of the opening 16 may be varied within limits of about 20% to 50% of the diameter of the disc with corresponding variation in the flange width or with corresponding loss of balance and flight control. The provision of additional small holes such as indicated at 25, for use in assembling for packaging and shipping, produces no adverse effect. The members of the double flange 18 may extend absolutely perpendicularly from the airfoil faces of the disc body 15, somewhat as indicated at the left of Fig. 3, or, if greater travel speed is desired, the flange cross section may show substantial curvature somewhat as indicated in Fig. 3. Disc thickness may be about $\frac{1}{32}$ inch to $\frac{1}{4}$ inch or about 0.3% to 2.5% of disc diameter.

As specific examples of symmetrical, somewhat flexible discs of the character of Figs. 1, 2, 3, and 4, a two-ounce disc of the indicated plastic or synthetic resin has a thickness of approximately 0.05 inch (about $\frac{1}{16}$ inch) and a diameter of about 12 inches with the central opening 16 about 3½ inches in diameter, the total or combined width of the double flange portions 18 being ⅞ inch. A variation of the flange width by $\frac{1}{16}$ inch narrower or wider yields a disc having good balance and good control. Again, a 10-inch disc with a 3½-inch opening and a ¾-inch total flange width has good control, as does a 9-inch disc with a 3½-inch opening and a flange width of about $\frac{11}{16}$ inch, these flange widths being also capable of a variation of $\frac{1}{16}$ inch narrower or wider. In general the larger the opening 16, the narrower the skirt or flange 18 will be, for good balance. With the double flange 18 enlarged, fairly good results were obtained when the opening 16 was entirely eliminated, such a structure being illustrated on a small scale in Fig. 11. Here the skirt or flange 18 was increased about $\frac{1}{16}$ inch in width on each side. Flange widths given have been calculated on an overall basis with a disc body thickness of about $\frac{1}{16}$ inch, which is a good thickness because it is strong enough and not heavy. The body thickness could be less if sufficiently strong. Flange thickness is similar. If the body were to be made thicker, the overall flange width desirably would be increased accordingly. Thus, if body thickness were ¼ inch in a 10-inch disc, optimum flange width would be about $\frac{15}{16}$ inch (¾ inch + $\frac{3}{16}$ inch) ± $\frac{1}{16}$ inch. A body thickness of ¼ inch probably would be a practical maximum. Disc thicknesses for discs described may, however, run somewhat thinner, and therefore run from about $\frac{1}{32}$ inch to about ¼ inch or from about 0.3% to 2.5% of their diameters.

It has been found possible to produce another fairly satisfactory structure by placing all of the flange portions 18*a* at the top of the disc 15, as illustrated in Fig. 8.

Another moderately satisfactory construction is illustrated in Figs. 9 and 10 where the opening 16 is spanned by a rubber diaphragm 30 provided with six or eight slits 32 so that, in flight, the triangular fingers of the diaphragm 30 may yield for passage of air in controlling the flight and for reception of a catcher or receiver such as illustrated in Figs. 4 to 7.

Suitable forms of catcher or receiver, shown in Figs. 4, 5, and 6, are of skeleton type, each comprising a spring wire frame 35 capable of yielding somewhat as indicated by the broken lines of Fig. 4. This wire frame 35 is set into a tapered configuration so that it provides a pointed portion 36 to enter the opening 16 of a disc 15. In the preferred form of receiver, shown in Fig. 4, the ends of the wire are free and are curved into loops 37 which act as stops for the disc as it is received, the spring wire yielding somewhat to cushion the reception. A handle welded or soldered to the frame 35, comprises a wire ring 38 affixed to the frame strands as indicated, extensions 38*a* of the ring 38 being twisted to form a rigid shank which is held by a wooden or other grip member 39. In the form of Fig. 5, the ends of the wire frame 35*a* are bent inward and then downward to form a hand grip of spaced

strands **40** overlapped at **40***a* and welded together. Here a captured disc will be released by squeezing the upper portions of the strands **40** sufficiently to permit free dislodgment. If desired, the receiver may be shaped as shown in Fig. 6 where, again, the wire frame **35***b* is tapered to form the receiving tip **36***b*, the spaced lower portions **41** of the wedge-shaped section being bulged somewhat so that they will themselves yield and compensate for a rigid welded connection **42** at the upper end of the handle portion **43**. Here also, the wire extremities are welded as indicated at **43***a*. Detent or abutment portions **44** insure disc retention.

A less desirable receiver is that shown in Fig. 7 where a simple stick **45** has secured thereto a foil or disc **46** against which the body **15** of the flying disc engages and by which the hand of the player is protected.

In playing singly, the player throws the disc upward at an angle against a stiff breeze or wind, as a consequence of which, when the disc reaches the limit of its flight, the air currents cause the disc to be returned to the player.

When playing in pairs or groups, the disc is thrown by one player toward another, the disc being poised in a substantially horizontal plane as it is cast. A disc constructed to reasonably careful dimensions as above indicated will, if carefully thrown by an experienced player, travel evenly and on a substantially level keel to the exact goal which the thrower has selected. To impart a trifle of uncertainty in play, the combined width of the double flange **18** or **18***a*, may be reduced or increased, for example by ⅛ inch, in which case controlled flight is less positive and accurate. Greater variations in flange width result in still less accuracy of control, but nevertheless make it possible to play a very interesting and exciting game. The yielding or flexible character of the material of which the discs are usually made resists permanent deformation, breakage, injury to players, and damage to objects accidentally struck when the discs are thrown. Beside materials previously mentioned, other appropriate substances may be used such as heavy paper, cardboard and similar materials.

It is intended to cover all such modifications of the generic invention disclosed herein as fall within the scope of the patent claims.

I claim as my invention:

1. In combination in a game device: a thin

symmetrical disc having a balanced weighting flange at its periphery and a central opening whose diameter is between about 20% and 50% of the diameter of the disc; and a catching device having a handle carrying an elongated tapered receiving member providing a reduced outer end to enter said opening readily, and also providing yielding sides for frictionally engaging the edges of said opening and flaring to a broad section adjacent said handle having a width normally greater than the diameter of said opening for engagement and retention of said disc, said tapering yielding sides frictionally receiving the edges of said opening.

2. In combination in a symmetrical stabilized flying-disc playing device: a symmetrically formed thin disc body of yielding material and provided with a circular central opening having a diameter between about one-fourth and one-half the diameter of the disc; a flange disposed substantially around the periphery of the disc and extending from at least one face thereof to stabilize the flight of the disc, the width of such a flange being about 5% to 10% of the diameter of the disc; and a catching device having a handle carrying an elongated, tapered member providing a reduced outer end to enter said central opening, and also providing yielding sides for frictionally engaging at the edges of said opening and flaring as they extend rearward and providing means to retain the disc edges thus frictionally received.

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