May 20, 1958 C. F. DAME 2,835,073

ROTOR-TYPE FLYING DEVICE

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FIG. 1

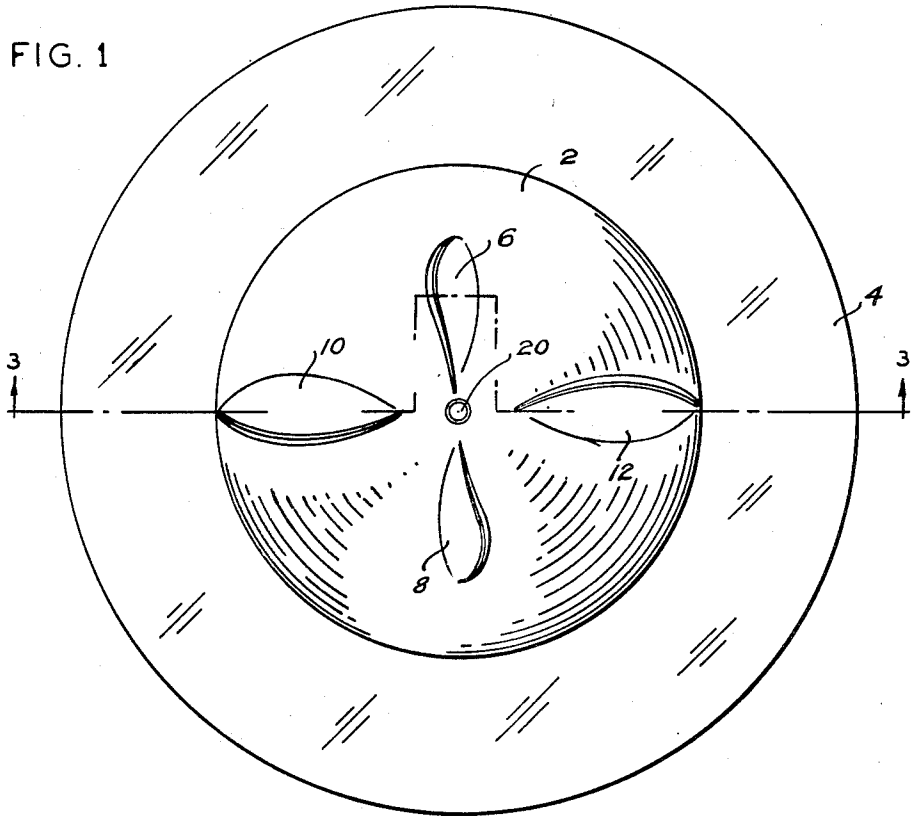
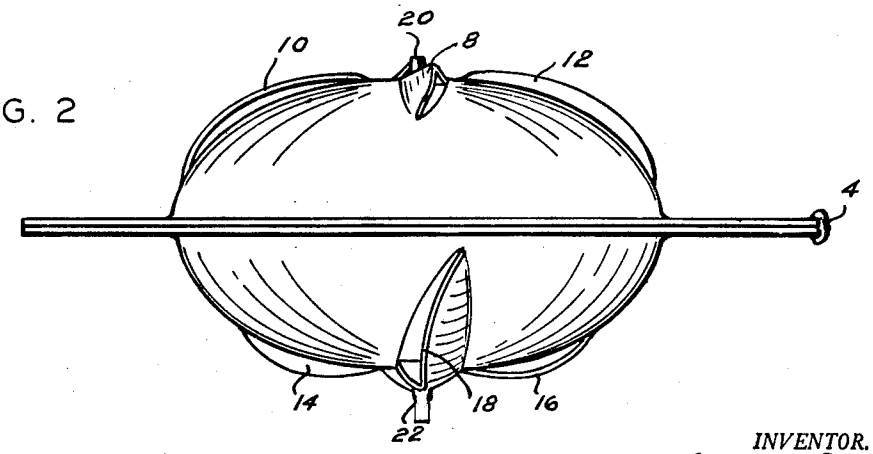


FIG. 2



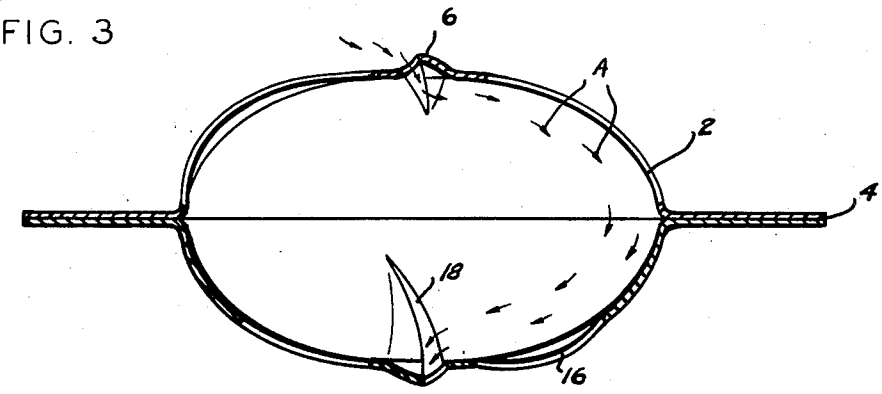
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FIG. 3



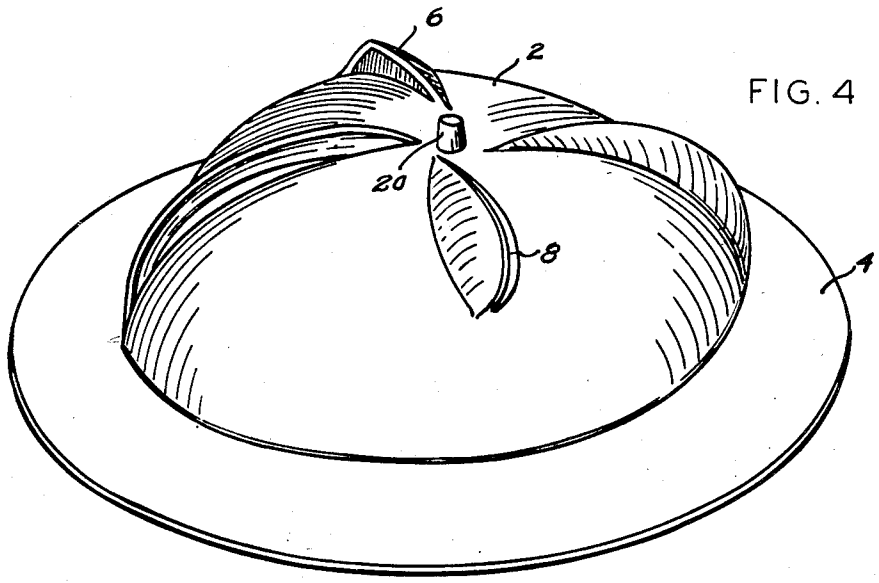


FIG. 4

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ROTOR-TYPE FLYING DEVICE

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4 Claims. (Cl. 46—76)

This invention relates to a flying device of the class which is adapted to be rotated about its own axis and, in so doing, caused to travel in vertical and horizontal directions in the manner of rotating devices commonly referred to as "flying saucers."

In one preferred embodiment, the flying device of the invention is exemplified by a hand-propelled toy which may be thrown outwardly with a twirling motion so that it is caused to rotate rapidly about its own axis. However, it should be understood that, while the invention will be described specifically with reference to a hand-propelled toy, it is not intended that the invention be limited to a hand-propelled toy but may be equipped with various mechanical means for inducing rotative movement and, moreover, the structural features which are hereinafter disclosed and described with reference to operation of a toy may also be embodied in various other classes of flying devices, such as missiles, aircraft and the like.

It is an object of the invention to provide an improved flying device of the general nature indicated and, specifically, to devise a hollow, saucer-like structure which, when subjected to rotative movement, is capable of developing unusual and desirable displacement along different directions of travel. It is also an object to provide a flying device particularly suitable for use in comprising a novel hand-propelled toy. Another object of the invention is to devise a rotor-type device, in toy form, which includes unique lift surfaces whereby a vertical take-off and descent characteristic may be developed and, at the same time, there may be induced a predetermined horizontal travel in substantially balanced relationship. Still another object is to devise a rotor-type flying device of transparent nature with which may be combined devices for producing light and sound in order to create attractive toy effects when the hollow body is rotated.

These and other objects and novel features may be more clearly understood and appreciated from the following description of a preferred embodiment of the invention selected for purposes of illustration and shown in the accompanying drawings, in which:

Fig. 1 is a plan view of the flying device of the invention;

Fig. 2 is a side elevational view of the flying device more clearly indicating the arrangement of a hollow ellipsoidal body portion with a wing member;

Fig. 3 is a cross-section taken approximately on the line 3—3 of Fig. 1; and

Fig. 4 is a perspective view looking down upon the flying device rotated into a position in which two sets of air intake blades may be readily seen.

In the structure shown in the accompanying drawings, numeral 2 denotes a hollow body of the class having a double curved surface of revolution. This hollow body 2, in one preferred form, may comprise an ellipsoidally shaped member constructed from two halves of translucent material, such as, plastic for example. Various

other materials and shapes may, of course, be employed. The two halves shown are joined together in some convenient manner to comprise a symmetrical enclosure and, in securing the halves, various fastening means such as mechanical fastenings, cement and the like may be utilized.

Located centrally around the hollow body 2 is an annular wing member 4. The wing member may be comprised of flanged portions of the two halves of the hollow body, as shown in Fig. 3, or of a separate element independently formed and secured in place. The wing member 4 serves two purposes. In the case of a toy structure, it functions as a gripping surface by which the toy may be conveniently held in the hand and then thrown outwardly with a twirling motion to impart rotative movement to the hollow body. Secondly, the annular wing member may comprise an air lift surface for aiding in supporting the body in motion in air and maintaining stability.

In accordance with the invention, I provide, in the hollow body described, specially designed air intake means and air exhaust means. Considering first the air intake means, I provide two pairs of curved blade elements struck out at the upper side of the hollow body. One pair of blades is denoted by the numerals 6 and 8 and, as shown in Figs. 1–4, inclusive, this pair of blade elements are arranged in opposed relationship at the top of the hollow body with the blades projecting outwardly from the surface of the body in a position to conduct a stream of air into the hollow body when rotative movement is imparted thereto, as indicated by the arrows A in Fig. 3. The two blades, 6 and 8, being disposed in opposed relation at two opposite sides of the hollow body, are thus arranged in a balanced relationship which permits equal amounts of air to be introduced simultaneously on two sides of the hollow body.

Also included in the air intake means of the invention is a second pair of curved blade elements 10 and 12, also struck out of the hollow body and which are arranged in opposed relationship to one another on opposite sides of the hollow body at points somewhat below the said first pair of blades. The second pair of blades 10 and 12 extend downwardly toward the annular wing and are further located in a position 90° removed from the respective positions of the two blades 6 and 8.

The purpose of these two sets of blades is to provide for two different directions of travel. Thus, in the case of the uppermost blades 2 and 8, the points of entry of air are chosen so that a lifting effect may be achieved and vertical travel thus provided for. In the case, however, of the second pair of blades 10 and 12, the entry of air is caused to occur farther down along the side portions of the hollow body and there is developed an activating force for producing horizontal travel. Moreover, in addition to horizontal travel, the second pair of blades 10 and 12 function to impart a very desirable stability to the hollow body as a whole during rotation about its own axis while moving in a vertical path.

The air exhaust means above referred to includes two additional sets of blades arranged to cooperate with the two sets of air intake blades in a novel manner. Considering first the lowermost set of blades, it will be observed from an inspection of Figs. 2 and 3 that these blades, as indicated by the numerals 14 and 16, correspond in shape and location to the blades 6 and 8, only being at the bottom of the body 2 instead of being at the top, and being removed 90° with respect to the blades 6 and 8 at the top of the hollow body. These blades 14 and 16 comprise means for releasing a spiralling current of air which has been introduced into the hollow body by means of the blades 6 and 8. In effect, blades 14 and 16 define outlets for propelling jets of air which, when

of sufficient intensity, operate to displace the hollow body vertically upwardly.

Similarly, a second set of blades at the lower side of the hollow body 2, of which one blade 18 is shown in the drawings, are located symmetrically and removed 90° with respect to the blades 14 and 16 and these blades define exhaust outlets for air which is taken in through the inlet blades 10 and 12.

When this device is rotated rapidly about its own axis by being thrown outwardly into space, it quickly reaches a state of equilibrium in which the wing member seeks a horizontal position and vertical ascent takes place. As the rotation of the body decreases in speed, the body will eventually drop to a landing position while maintaining its horizontally stabilized position. By increasing or decreasing the size of the lateral blades as 10 and 12, there may further be induced, when the body is rotated, a horizontal travel which depends upon the speed of ascent and descent of the body at any particular time. The blades 10 and 12 may be used either separately or in conjunction with the blades 6 and 8 and it is contemplated that means may be provided for adjusting any one of the sets of blades from an open to a closed position. Various effects and flying paths may be induced by controlling these different sets of wing members.

It will be obvious from the foregoing description that I have provided a novel toy structure of the flying saucer type. I may also include in this hollow body lighting means which may be energized while the flying device is in motion to produce unique appearance, particularly when the flying device is twirled into the air during the hours of darkness. In addition, I may also restrict some of the openings which are formed adjacent to the blades to induce sound effects of various types which may enhance the attractiveness of the device as a toy. In order to protect the several sets of blade members, I may further form the body 4 with a socket and post arrangement 20 at the top thereof and, likewise, I may provide a similar socket and post arrangement 22 at the bottom so that these members may be retained or removed if desired.

While I have shown preferred embodiments of the invention, it will be understood that various changes and modifications may be resorted to within the scope of the appended claims.

Having thus described my invention, what I claim is:

1. A rotor-type flying device comprising a hollow body of the class having a double curved surface of revolution, an annular wing section located centrally around the hollow body, air intake means consisting of opposed projecting blades occurring at two different levels above the annular wing section for conducting a stream of air into the hollow body when rotative movement is imparted thereto and air exhaust means located at an opposite side of the hollow body for releasing propelling jets of air.

2. A rotor-type flying device comprising an ellipsoidal hollow body, an annular wing section located centrally around one axis of the hollow body, air intake means consisting of an upper pair of projecting blades and a second lower pair of projecting blades arranged at 90° to the said first pair of blades for conducting a spiralling stream of air into the hollow body when rotative movement is imparted thereto, and air exhaust means located at an opposite side of the hollow body for releasing propelling jets of air operative to displace the hollow body in predetermined directions of travel.

3. A rotor-type flying toy comprising a hollow body of the class having a double curved surface of revolution, an annular wing member located centrally and externally of the hollow body, air intake means located at one side of the hollow body for conducting streams of air into the hollow body when rotative movement is imparted thereto, air exhaust means located at an opposite side of the hollow body for releasing propelling jets of air, said air intake means including a pair of blade elements projecting outwardly from the top surface of the hollow body at opposite sides thereof, said blades being adapted to produce vertical travel of the body when rotated, said air intake means further including a second set of blade elements projecting outwardly from the surface of the hollow body at two opposite sides thereof and at points lying between the said first set of blades and the annular wing member, said second set of blades being arranged at 90° spacing to the said first pair adapted to produce horizontal travel when the body is rotated, said exhaust means including a set of blades projecting from the bottom surface of the body at two opposite sides thereof, said bottom set of blade elements being adapted to cooperate with the said top set of blade elements to release propelling jets of air and induce vertical displacement of the hollow body, and said air exhaust means further including blade members projecting from the bottom of the body at points between the annular wing and the said lowermost blade.

4. A structure according to claim 1 in which the air intake means is restricted in shape and arrangement to produce sound effects when the hollow body is rotated.

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