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FLYING TOY

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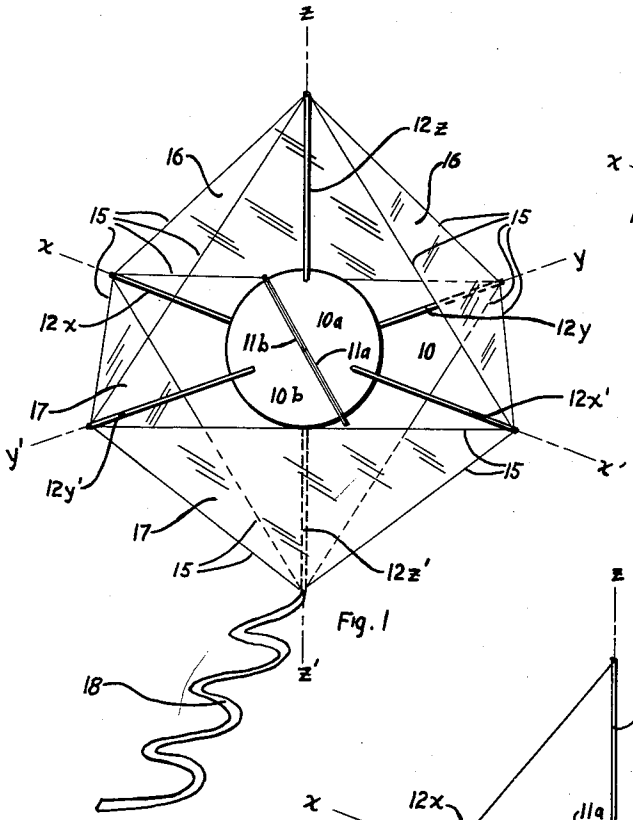



Fig. 1

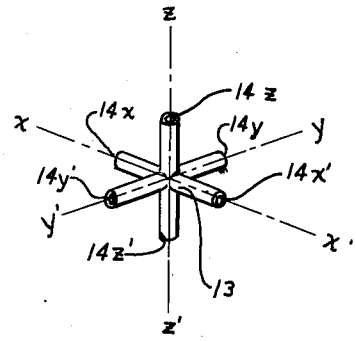



Fig. 3

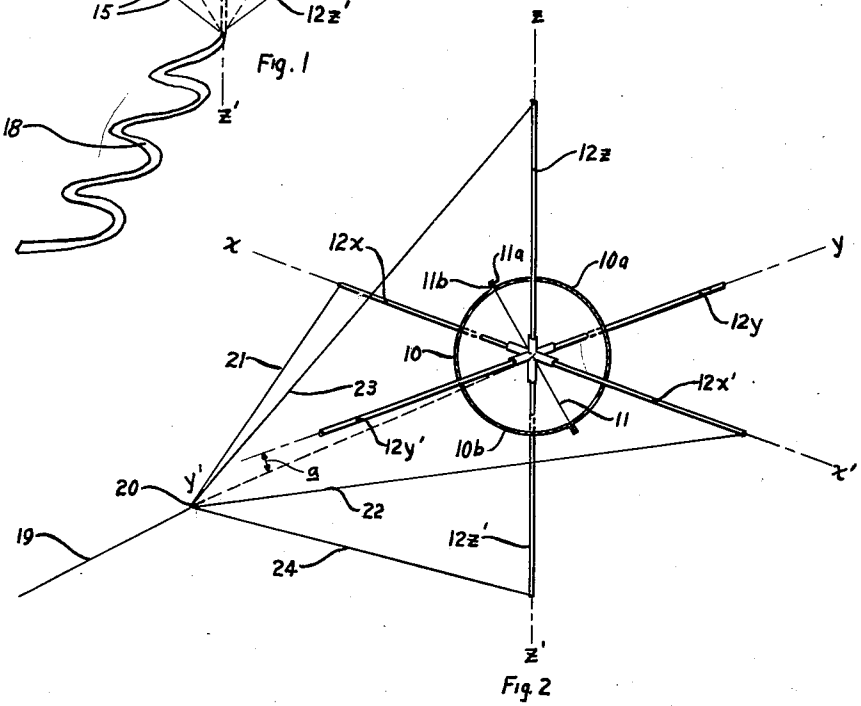



Fig. 2

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# FLYING TOY

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This invention relates to a flying toy or kite and has for a primary object the provision of such a toy which during flight resembles a man-launched satellite in appearance.

Another object is to provide a simply and economically fabricated and assembled kite-type toy comprising a number of struts radiating from a central spherical body and supporting sheet sail members arranged to lift the assembly into the air when subjected to the force of light wind currents.

Another object is to provide such a toy wherein the spherical body and struts are opaque and the sail members are colorless transparent sheet plastic, whereby the sail members are invisible from a distance and the spherical body and struts resemble an earth-launched satellite with affixed antennae.

Another object is to provide such a toy which can be readily assembled by a child and which provides simple and improved means within the spherical body for positively holding the struts in fixed relationship with respect to each other, whereby the spherical body can be feasibly made from lightweight non-load sustaining plastic material supported in place by the struts.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Figure 1 is a perspective view of the assembled toy, the guy strings for securing the toy to its restraining string being removed to facilitate recognition of the structure shown.

Figure 2 is a view similar to Figure 1, the aforesaid guy strings being rigged for flying, but the sail surfaces and supporting strings therefor being removed.

Figure 3 is a perspective view of the junction block employed to hold the struts in fixed relationship with respect to each other.

It is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the drawings, a kite-type toy is illustrated comprising a spherical body **10** formed in the present instance from thin lightweight semi-spherical bowls **10***a* and **10***b* having equatorial flanges **11***a* and **11***b* respectively which are preferably cemented together to assure optimum rigidity. Where desired, the body **10** can be fabricated from comparatively rigid lightweight material, as for example, glazed paper board, whereby the body **10** comprises the support for a plurality of struts or antennae **12** of lightweight material, such as wood or tubular aluminum. In the present instance, economy is achieved by forming the body **10** from comparatively



flimsy non-load supporting plastic which is held in position by the struts **12** passing therethrough as indicated, Figure 1. If the bowls **10***a* and **10***b* are of sufficiently rigid material, these need not be glued or cemented together because they will be held in fixed position by the struts **12**.

The six struts or antennae **12** illustrated radiate from the center of the spherical body **10** and extend therethrough along three orthogonal axes *x*, *y*, and *z* respectively, the struts being individually designated **12***x*, **12***x'*, **12***y*, **12***y'*, **12***z*, and **12***z'* in accordance with their respective axial directions. Where desired, each pair of oppositely directed antennae can be a single integral rod which passes the other two rods or paired integral antennae adjacent the center of the spherical body **10**, in which case the rods will be maintained in fixed relationship with respect to each other by the rigidity of the sphere **10** or by a central junction block of comparatively lightweight wood or plastic material for example. In the present instance, a junction block **13** is located within the center of the sphere **10** and comprises six plastic tubes **14***x*, **14***x'*, **14***y*, **14***y'*, **14***z* and **14***z'*, Figure 3, arranged along the aforesaid orthogonal axes and snugly containing therein the struts **12***x*, **12***x'*, **12***y*, **12***y'*, **12***z* and **12***z'*. If desired, the struts can be secured within the junction block by glue or other means, or merely by friction and the tension of guys or strings **15** joining certain of the ends of the struts **12** and supporting the edge of sail surfaces **16** and **17** as described below.

By virtue of the symmetry of the struts or antennae **12** with respect to the spherical body **10** described thus far, any pair of oppositely directed struts can be designated the *x*-axis struts, thereafter either of the remaining two pairs of oppositely directed struts can be designated the *y*-axis struts, and the remaining pair of oppositely directed struts will be designated the *z*-axis struts, without in any way affecting the following description of the arrangement of the strings **15** and sail surfaces **16** and **17**. With the axes designated as in Figure 1, the strings **15** tautly connect the outer end of each strut with the outer ends of each of the other struts except the oppositely directed strut.

The sail member **16** comprises a diamond-shaped sheet in its unfolded condition. In the assembled condition shown, the mid-line of the sail **16** folds over and extends along the length of the upper string joining the struts **12***y* and **12***z*. Opposite ends of the diamond-shaped sail **16** extend to the outer ends of the struts **12***x* and **12***x'*. Preferably the edges of the sail **16** are secured to the adjacent struts and portions of the strings **15**.

Sail **17** is formed and secured in position similarly to sail **16** and comprises a diamond-shaped sheet having its mid-line folded over the lower string **15** joining struts **12***z'* and **12***y'*. Opposite ends of the diamond-shaped sheet **17** extend to the outer ends of the struts **12***x* and **12***x'*. Where required for stability in gusty weather, a suitable tail **18** may be secured to the lower end of the strut **12***z'*. The sails **16**, **17**, and tail **18** are preferably formed from clear plastic material so as not to be visible from a distance. Thus the toy in flight will resemble a satellite or "sputnik."

In flight, the toy is controlled by a customary restraining string **19** having its lower end, not shown, under the manual control of a child or other operator of the toy. The upper end of the restraining string **19** is secured to the juncture **20** of four guy strings **21**, **22**, **23**, and **24**, the juncture **20** lying in the plane of the *y*—*z* axes somewhat below the *y*-axis and about twice the distance along the latter axis in the forward or leftward direction that the corresponding strut **12***y'* extends from the center of the sphere **10**. Thus the imaginary line through the juncture **20** and the center of the sphere makes an angle

$a$ of approximately 8 to 10 degrees with the $y$-axis. From the juncture **20**, the guy strings **21** and **22** extend to and are secured to the outer ends of the struts **12**$x$ and **12**$x'$. Similarly from the juncture **20**, the guy strings **23** and **24** extend to the outer ends of the struts **12**$z$ and **12**$z'$ and are secured thereto.

Although the precise proportions can be varied within moderate limits, it has been found that the toy flies satisfactorily when constructed with 18" struts (36" from end to end) radiating from a 10" diameter sphere **10** and with the juncture **20** located 40" from the center of the sphere **10** approximately along the angle stated below the $y$-axis. By virtue of the structure described, a novel flying toy which resembles a satellite in flight can be economically fabricated and stored and shipped in a knocked-down condition. Thereafter the toy may be readily assembled and flown by a child with a minimum of instruction or assistance.

I claim:

1. In a flying toy, a body, a plurality of struts projecting from said body and arranged in fixed relationship with respect to each other, wind engaging sail means supported by said struts, said sail means having opposing surfaces confronting each other and opposite sides of said body and spaced from said body for passage of wind between said body and opposing surfaces, and means for connecting said toy with a restraining string.

2. In a flying toy, a body, a plurality of struts projecting from said body and arranged in fixed relationship with respect to each other, wind engaging sail means supported by said struts, said sail means having opposing surfaces confronting each other and opposite sides of said body and spaced from said body for passage of wind between said body and opposing surfaces, and means for connecting said struts with a restraining string.

3. In a flying toy, a spherical body, a plurality of struts projecting radially from said body and arranged in fixed relationship with respect to each other, wind engaging sail means supported by said struts, said sail means having opposing surfaces confronting each other and opposite sides of said body and spaced from said body at said opposite sides for passage of wind between said body and opposing surfaces, and means for connecting said struts with a restraining string.

4. A toy according to claim 3 having six struts arranged approximately along three orthogonal axes designated $x$, $y$, and $z$ respectively, said sail means including sheet portions approximately coextensive with the two triangular areas determined by outer points on one of said struts on the $z$-axis, on one of said struts on the $y$-axis, and on both of said struts on the $x$-axis, said sail means also including sheet portions approximately coextensive with two other triangular areas determined by outer points on the other strut on the $z$-axis, the other strut on the $y$-axis, and on both struts on said $x$-axis.

5. A toy according to claim 4 wherein said points are approximately equidistant from the center of said body, and said axes extend to adjacent said center.

6. A toy according to claim 4 wherein said means for connecting said struts with a restraining string include guys connected to outer portions of said struts on said $x$ and $z$ axes and converging to a location spaced from the $y$ and $z$ axes and lying in the plane containing the latter axes.

7. A toy according to claim 6 wherein said two other triangular areas are located between said location and said body, and said location is on the same side of the plane containing said $x$ and $y$ axes as is said other triangular areas.

8. In a flying toy, a body, six struts projecting from said body and arranged in fixed relationship with respect to each other along three orthogonal axes designated $x$, $y$, and $z$ respectively, wind engaging sail means supported by said struts including sheet portions approximately coextensive with the two triangular areas determined by outer points on one of said struts on the $z$-axis, on one of said struts on the $y$-axis, and on both of said struts on the $x$-axis, said sail means also including sheet portions approximately coextensive with two other triangular areas determined by outer points on the other strut on the $z$-axis, the other strut on the $y$-axis, and on both struts on said $x$-axis, and means for connecting said toy with a restraining string.

9. A toy according to claim 8 wherein said axes pass each other adjacent the center of said body.

10. A toy according to claim 8 wherein said toy is arranged symmetrically with respect to the plane containing said $y$ and $z$ axes.

11. A toy according to claim 10 wherein said means for connecting said toy with a restraining string include guys connected to outer portions of said struts on said $x$ and $z$ axes and converging to a location spaced from the $y$ and $z$ axes and lying in the plane containing the latter axes.

12. A toy according to claim 11 wherein said two other triangular areas are located between said location and said body, and said location is on the same side of the plane containing said $x$ and $y$ axes as is said other triangular areas.

13. In a flying toy, a body, a plurality of struts arranged in fixed relationship with respect to each other, the axes of said struts crossing each other within said body, said struts extending outwardly beyond said body, a pair of wind engaging sails supported by said struts and having confronting surfaces spaced by said body and arranged for passage of wind around said body and between said confronting surfaces.

14. In a flying toy, a spheroidal body, a plurality of struts arranged in fixed relationship with respect to each other, the axes of said struts crossing each other within said body, said struts extending outwardly beyond said body, wind engaging sail means supported by said struts, said sail means including paired sail portions disposed at opposite sides of said body, said sail portions having surfaces confronting each other and also confronting said opposite sides of said body and being arranged for passage of wind between said opposite sides of said body and said surfaces.

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