

G. VOIGT.
FLYING APPARATUS.

APPLICATION FILED JAN. 18, 1912.

1,054,374.

Patented Feb. 25, 1913.

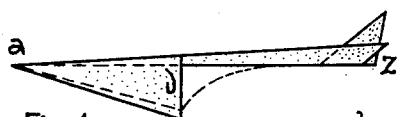


Fig. 1.

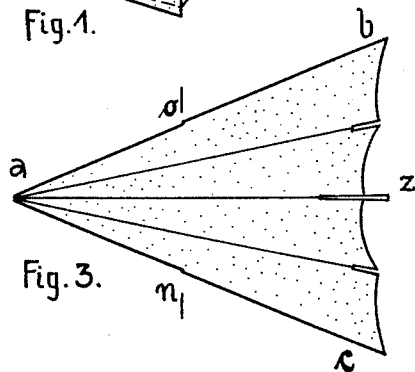


Fig. 3.

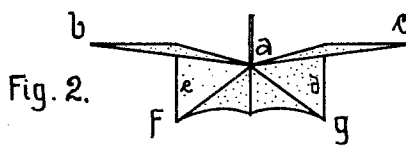


Fig. 2.



Fig. 4.



Fig. 5.

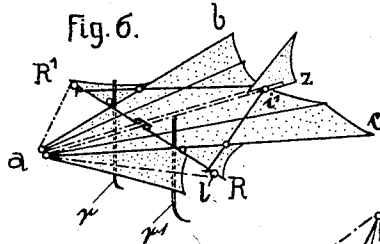


Fig. 6.

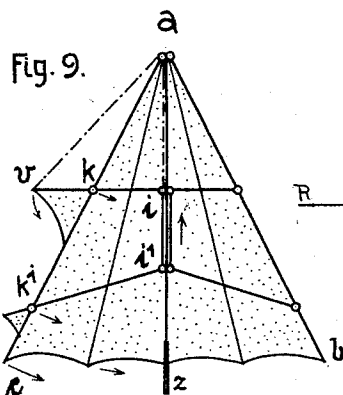


Fig. 9.

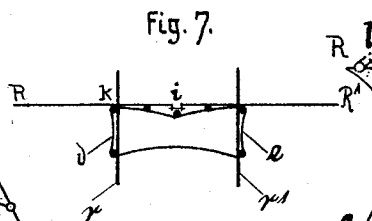


Fig. 7.

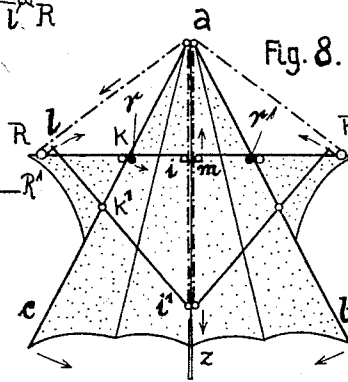


Fig. 8.

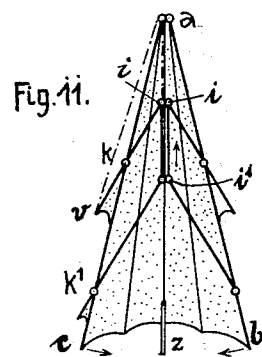


Fig. 11.

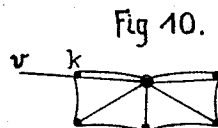


Fig. 10.

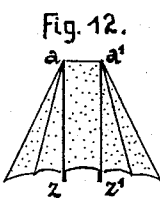


Fig. 12.

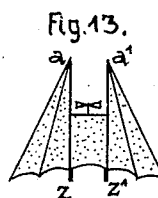


Fig. 13.

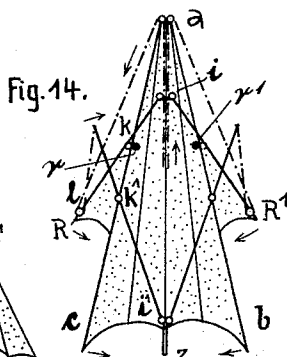


Fig. 14.

Witnesses:
N. Grelashausen
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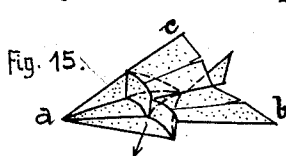


Fig. 15.

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UNITED STATES PATENT OFFICE.

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FLYING APPARATUS.

1,054,374.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed January 16, 1912. Serial No. 671,513.

To all whom it may concern:

Be it known that I, GUSTAV VOIGT, a subject of the King of Prussia, residing at No. 13^B Barnimstrasse, Stettin, Germany, have
5 invented new and useful Improvements in Flying Apparatus, of which the following is a specification.

My invention relates to an improved flying-apparatus, which may be employed
10 either in the same manner as a kite, being lifted and kept floating by the resistance of the supporting current of air, and thus may serve for sporting purposes or for meteorological or aerological observations, or which
15 may be constructed to a size which enables the apparatus to carry one or more persons, or a load, or a motor and means for propelling the apparatus.

The principal object to be obtained by this
20 invention is to provide a construction of parts by which the flying apparatus is maintained, while being used, in a state of equilibrium, thereby preventing the apparatus from tilting over or swerving from its true
25 direction, the forward movement of the apparatus being steadily maintained in a straight line without deviations in the horizontal or in the vertical plane.

The bulk of the apparatus, according to
30 this invention, may further be so constructed as to be collapsed at will and opened again to display its supporting surfaces, much in the same manner as an umbrella, thus obtaining a considerable economy of space
35 when the apparatus is out of use.

To make my invention perfectly understood, I have illustrated the same in the accompanying drawings, in which:

Figure 1 represents a side elevation of the
40 flying apparatus constructed according to this invention; Fig. 2 is a front-elevation of the same. Fig. 3 is a top-plan of the same; Fig. 4 is a cross-section drawn on line *b—c* of the same; Fig. 5 is a cross-section drawn
45 on line *n—o* of the same; Fig. 6 is a perspective view of the apparatus drawn to a reduced scale. Fig. 7 is a cross-section of the apparatus, drawn along the line indicated by the rod *R—R¹* in Fig. 6. Fig. 8 shows
50 the skeleton frame of the apparatus, the supporting surfaces carried by the said skeleton frame being in place and displayed. Fig. 9 is a plan similar to Fig. 8, showing a modification of the skeleton frame. Fig.
55 10 is a cross-section of the apparatus ac-

cording to Fig. 9, with radially extending stretchers of the collapsible skeleton frame. Fig. 11 shows the skeleton frame according to Fig. 9 in a nearly collapsed state. Figs. 12 and 13 are plan views, drawn to a reduced
60 scale and showing two other modifications of the flying apparatus, which, in these modifications, consists of two skeleton frames and supporting surfaces so combined to each other, to support a motor or other
65 load. Fig. 14 shows the skeleton frame according to Fig. 8 in a nearly collapsed state, and Fig. 15 is a perspective underside view of the apparatus drawn to a reduced scale.

Referring to Figs. 1 to 8, the bulk or body
70 of the flying apparatus comprises an upper or main supporting surface *a, b, c*, as shown in Fig. 3, a lower surface *a, f, g*, as shown in Fig. 2, downwardly inclined from the
75 point *a* of the apparatus toward the rear, and two side surfaces *d, e*, laterally closing the triangular or funnel-shaped space between the two diverging surfaces *a, b, c*,
80 and *a, f, g*, the said triangular space being open at the rear. The said lower surface *a, f, g*, and sides *d, e*, are inferior in length to the said upper surface *a, b, c*, the length of said two surfaces *a, b, c*, and *a, f, g*, being so proportioned, that the lower surface
85 measures about one half of the said upper surface, but the said proportion may vary within certain limits; Figs. 1 and 15 clearly show the relation between the upper and lower surfaces of the apparatus.

Owing to the peculiar arrangement of
90 the supporting surfaces with relation to each other, the current of air flowing to the rear as the apparatus in its forward movement cuts through the air, is directed below the rear part of the upper surface *a, b, c*, which
95 extends beyond the lower surface *a, f, g*, and sides *d, e*. The air-filled space at the front of the apparatus, inclosed between the said upper surface, the lower surface and the two side-surfaces, so coöperates with the
100 rearward extension of the said upper surface, that it will keep the apparatus at a permanent state of equilibrium, thereby preventing it from tilting in the forward as well as in the rearward or in either lateral
105 direction. The downward currents of air which may bear against the upper surface of the apparatus, and the upward current, which may come to strike against the lower supporting surface are so distributed by the
110

combination of the larger upper surface and the shorter lower surface, that all lines of resistance will meet in one point and no tendency of turning or tilting will be occasioned. The apparatus will automatically take and retain its true position in the air against any varying currents of air.

The tapering construction of the frame or skeleton to which the covering surfaces of the apparatus are secured, offers the particular advantage, that the said frame or skeleton may be folded up or collapsed, much in the manner of an umbrella, thereby affording great facility and economy of space in housing and transporting the apparatus.

The stretchers or rods of the skeleton frame, to which the supporting surfaces of the apparatus are secured, may be opened and closed by a runner to which said stretchers are hinged as usual.

In constructing a collapsible frame of the kind, I prefer to employ a skeleton of the kind shown in Figs. 8 and 14, or of the modified kind illustrated by Figs. 9, 10 and 11.

As shown in Fig. 6, a triangular frame of rods, $R-R^1$, $R-i^1$, and R^1-i^1 , is raised upon the main or upper supporting surface a, b, c , of the apparatus, the rod $R-R^1$ extending horizontally across the triangular forward portion of the said surface a, b, c , and the rods $R-i^1$ and R^1-i^1 , extending to the rear in a horizontal plane. The covering surface of the apparatus is secured to the cross-bar $R-R^1$, and to vertical rods r , and r^1 , connected to said cross-bar $R-R^1$, the said vertical rods extending downward through the upper and lower surfaces of the apparatus and also upward beyond the horizontal rod $R-R^1$. The length of said rod $R-R^1$ extends at both ends beyond the edges of the upper surface a, b, c , which is connected to said rod.

Two pairs of stretchers $i-k$, and i^1-k^1 , are adapted to slide upon the main or central rod $a-z$ of the skeleton-frame. The runner to which the stretcher $i-k$ is hinged as at i , is liable to be shifted in the forward direction, and the runner to which the stretcher i^1-k^1 is hinged as at i^1 , is adapted to be run downward, as shown in Fig. 14. The supporting surfaces of the flying apparatus are secured to the said stretchers as at k , and k^1 . A cord l , guided by loops or eyes at the front point a of the apparatus, and through loops or eyes at or near the ends of the rod $R-R^1$, serves to connect each pair of stretchers $i-k$, and i^1-k^1 , as indicated by dash-and-dotted lines in Figs. 8 and 14. On pulling the free inner ends of the cords downward from the position of Fig. 14 toward the hinges i^1 , the frame will be opened to take the position of Fig. 8, and on releasing the said inner ends of the cords l , the stretchers $i-k$, and i^1-k^1 may again be

collapsed as indicated by Fig. 14. On opening the skeleton frame, the two runners will approach each other, as in Fig. 8, and on closing the frame, the said runners will move in opposite directions, as shown in Fig. 14. The edges of the covering fabrics, being secured to the stretchers, will be unfolded, as in Fig. 8, or folded against the main or central rod $a-z$, as in Fig. 14.

While in the arrangement described with reference to Figs. 8 and 14 the two sets of stretchers $i-k$, and i^1-k^1 take a position opposite to each other so as to make the free ends of said stretchers cross each other, the arrangement shown in Figs. 9 and 11 is different in that the said two sets of stretchers take a position parallel to each other and maintain their parallelism while being folded or unfolded. The two runners to which the two sets of stretchers are hinged are rigidly connected to each other by rods or by a tubular runner, to which both sets of stretchers are hinged. As shown on the left hand side of Figs. 9 and 11, the stretchers $i-k$ and i^1-k^1 may extend beyond the covering surface a, b, c connected to said stretchers as at k , and k^1 . A cord, indicated in Fig. 9 by a dash-and-dot-line, is connected at or near the outer end of the stretchers $i-k$, said cord leading over a guide-roller or lug at the forward end a of the apparatus, thence down along the central rod $a-z$ to the hinged end i^1 . The runner may be locked to the central rod by a spring-clasp of the kind usually employed with umbrellas. On releasing said locking clasp or catch and on sliding the two runners rigidly connected to each other toward the front end, the stretchers will be folded down as shown in Fig. 11. The portion $k-v$ of the stretchers extending beyond the covering fabrics may serve for connecting to it additional or enlarging surfaces of covering fabrics by which the total area of the supporting surface is increased.

The means for collapsing the skeleton frame of the apparatus as before described with reference to Figs. 8 to 11 of the drawings are particularly applicable with flying apparatus of the lighter kind not adapted to be motor-driven.

If a collapsible frame is desired to be employed with a motor-driven flying apparatus, a construction may be adopted as indicated by Figs. 12 and 13. The skeleton or collapsible frame, in this case, is composed of two skeleton frames similar to either one or the other of the collapsible frames before described, the said two frames being juxtaposed and connected to each other by an intermediate frame adapted to carry the motor or load. Each of the two lateral collapsible frames has a main or central rod with runners and stretchers as described and adapted to be folded and unfolded inde-

pendently, or means might be provided to simultaneously fold and unfold the two lateral frames.

I claim as my invention:

- 5 1. In a flying apparatus, the combination, with an upper supporting surface, of a lower supporting surface inferior in length to the said upper surface, the said lower surface having a downwardly inclined position to-
 10 ward the rear with relation to the upper supporting surface, side surfaces connecting the edges of the said lower surface to the said upper supporting surface, a rearward extension formed to the upper supporting
 15 surface and extending in the plane of the same, and a skeleton frame to which the said surfaces are connected, substantially as and for the purpose set forth.
2. In a flying apparatus, the combination,
 20 with an upper supporting surface, of a lower supporting surface inferior in length to the said upper surface and having a downwardly and rearwardly inclined position with relation to the said upper surface, side
 25 surfaces connected to the said upper and lower surfaces closing the space between the said upper and lower surfaces except at the rear, a rearward extension formed to the said upper supporting surface, a skeleton
 30 frame to which said supporting surfaces are

connected, and means for collapsing said frame and surfaces secured thereto, substantially as and for the purpose set forth.

3. In a flying apparatus, the combination, with an upper supporting surface, of a 35 lower supporting surface inferior in length to the said upper surface and having a downwardly and rearwardly inclined position with relation to the said upper surface to which said lower surface is secured in front 40 at an acute angle, collapsible sides connecting the said upper to the said lower surfaces and forming a space between the same open only at the rear, an extension to the rear of the said upper supporting surface, 45 a skeleton frame to which said supporting surfaces are connected, a central rod forming part of the said skeleton frame, runners slidably carried by said central rod and stretchers carried by said runners for col- 50 lapsing the skeleton frame and the covering surfaces of the same, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of 55 two subscribing witnesses.

GUSTAV VOIGT.

Witnesses:

K. GRZELACHOWSKI,
 FRITZ LEAVY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."