

July 24, 1928.

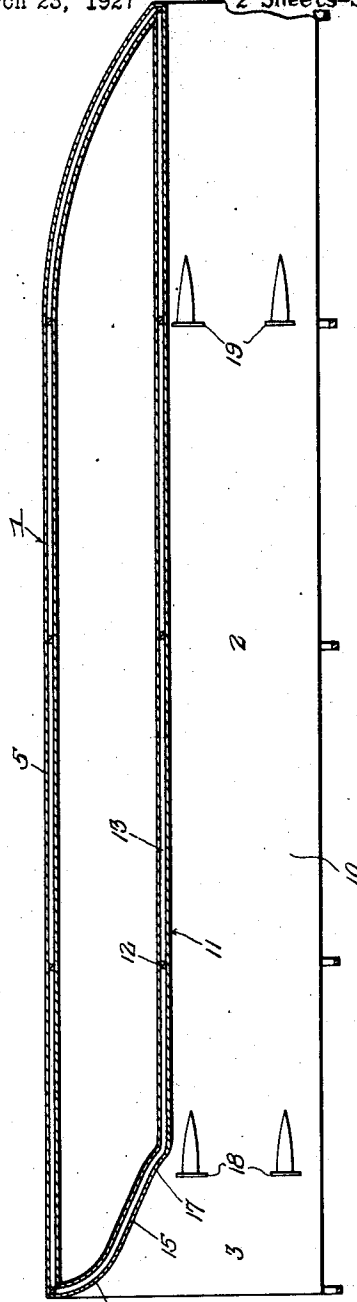
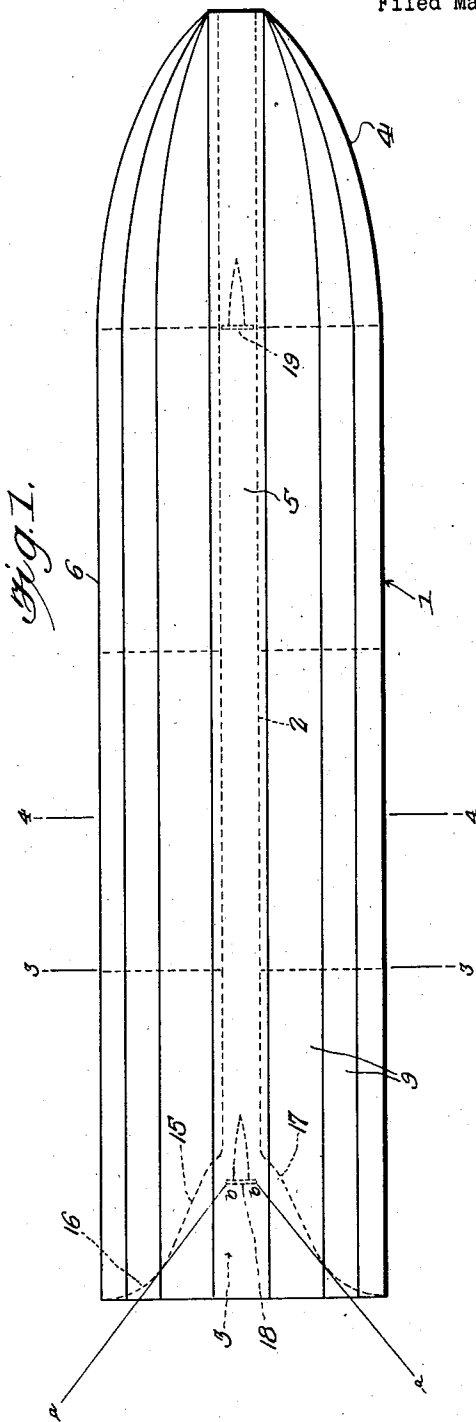
1,677,962

T. M. FINLEY

FLYING MACHINE

Filed March 23, 1927

2 Sheets-Sheet 1



Inventor

T.M. Finley,

By *Harry F. Riley*
Attorney

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Fig. 4.

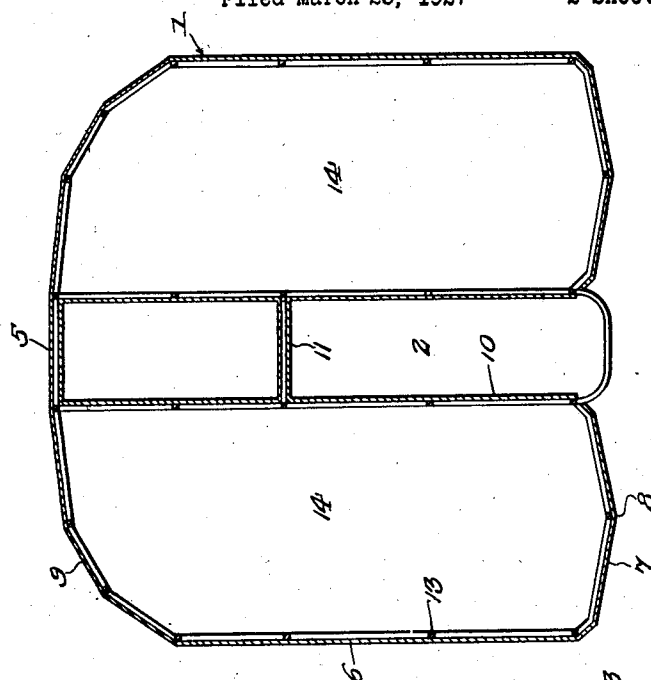
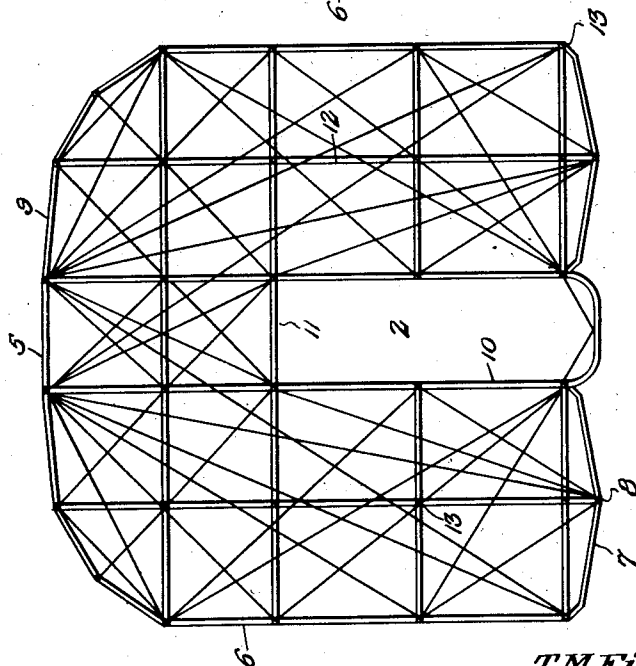


Fig. 3.



Inventor

T. M. Finley,

By

Harry F. Riley
Attorney

Patented July 24, 1928.

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UNITED STATES PATENT OFFICE.

THOMAS M. FINLEY, OF ST. LOUIS, MISSOURI.

FLYING MACHINE.

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The invention relates to improvements in flying machines.

The primary object of the invention is to improve the construction of flying machines by eliminating head resistance, back-lash resistance, and vacuum resistance and to replace the head resistance ordinarily encountered by flying machines with a vacuum suck at the front end and a siphon effect at the rear end.

Large lighter than air dirigible machines of the present known types have three main resistances to which may be attributed their lack of successful operation.

What is meant by head resistance is the air that banks up in resistance at the front of the machine's body. The body, being necessarily very thick, naturally, at any degree of speed will collect tremendous volumes of air, which creates great resistance and causes the machine to be slow. Further, its resistance, in opposition to the propelling power, throws an enormous strain on the framework of the body of the machine. It also causes the body of the machine to pivot at the front or contact end which gives a wrong action to the means of control, making the machine very slow in its movement under the operation of its controlling means.

The back-lash resistance is caused by the displaced air from the tremendous body accumulated at the front end of the machine. This air flows back over the shoulders of the machine and leaves the machine's body flying out away from the machine as snow flies from the runners of a sleigh, but, unlike the snow, it turns again and strikes inwardly and forwardly until it comes in contact with the body of the machine again. The air coming into contact with the body causes an impact which creates a resistance to the forward movement of the machine. Then the air rebounds, leaving the body again, forming an arc and coming back and striking the body again and again until the air leaves the rear end of the machine. At each point where the air strikes the machine's body this impact or back-lash resistance results.

At points between where the back-lash air strikes the machine and where it again comes into contact with the machine are rings that are clear of air encircling the body and are therefore vacuums. These vacuum rings are formed all the way around the machine's body and create the tremendous resisting forces known as vacuum or such resistances.

The vacuum as it occurs in aeronautics is known but not fully appreciated. A vacuum may be of the greatest benefit to a machine or the greatest obstacle conditioned upon its location. In aeroplanes it is found that the vacuum above the wings accounts for 75% of its lift, and without it the aeroplane could not fly. Therefore, it is of the greatest advantage to the aeroplane. In the cigar-shaped lighter than air machine the vacuums occur around the body and in its immediate wake in opposition to its flight, and no benefit to the machine is obtained from such vacuums. This vacuum resistance is the greatest obstacle to the progress or speed of the machine.

The present invention is designed to eliminate all of the foregoing disadvantages and to transfer the vacuum suck from the back of the machine to the front thereof and thereby convert what has heretofore been an obstacle to the forward progress of the machine into a means of assisting the forward movement of the machine.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—

Figure 1 is a plan view of a flying machine embodying the improvements of the present invention and illustrating in dotted lines the arrangement of the longitudinal channel and the flaring mouth or entrance.

Fig. 2 is a longitudinal sectional view of the same.

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 of Fig. 1.

Fig. 4 is a similar view on the line 4—4 of Fig. 1.

In the accompanying drawings in which is illustrated the preferred embodiment of the invention the flying machine comprises in its construction a body 1 provided throughout its lower portion with a central longitudinal channel 2 having a flaring or substantially funnel shaped mouth or entrance 3 and extending the entire length of the

body 1 to the rear end thereof. The rear end portion 4 of the body of the machine is tapered and curved longitudinally as shown to afford the desired stream line formation. The body which is approximately rectangular in exterior outline is arched at the top 5 and has straight vertical outer side walls 6 and the bottom walls 7 at opposite sides of the channel 2 are oppositely inclined to form slight longitudinal ridges 8. The arched top 5 of the body is provided at opposite sides of the center with panels or portions 9 which are laterally inclined and arranged at a slight angle to each other. The side walls 10 of the channel are straight and vertical and present plane faces and the top wall 11 is horizontal and presents a plane surface. These angularly related sections or portions of the exterior outline of the body enables the material to be stretched and properly secured on the framework which consists of a series of transversely disposed frames 12 arranged at suitable intervals and connected at the periphery of the body by suitable longitudinal frame members 13. As the particular construction of the framework of the body of the machine does not constitute a portion of the present invention and as any desired construction of framework may be employed a detailed description of the construction of the framework and illustration thereof are deemed unnecessary. The gas chambers 14 are arranged in the spaces between the transverse frames 12 and at the front and rear ends of the body and may be of any desired construction as will be readily understood.

The approximately funnel shaped mouth 3 which is open at the bottom of the channel has top and side walls 15 of uniform configuration and of approximately sigmoidal contour consisting of convex outer portions 16 and concave inner portions 17, which as indicated in Fig. 1 of the drawings recede from the straight lines *a b* indicating the direct path of the air drawn into the funnel shaped entrance by the front propellers 18 which may be one or more in number and which are arranged adjacent the inner end of the funnel shaped entrance approximately in the position illustrated in Figs. 1 and 2 of the drawings. The machine is also equipped with one or more rear propellers 19 located in the longitudinal channel as indicated in Figs. 1 and 2 of the drawing. Any number of the propellers, may of course, be employed and they may be arranged at any desired points along the longitudinal channel. The air which ordinarily packs at the front of the body of machines of the cigar type is drawn into the funnel shaped entrance to the channel 2 and will travel in a direct line substantially as indicated by the lines *a b*, thereby removing the head resistance caused by air banking at the front

of the machine and at the same time producing vacuums at the convex and concave portions of the walls at the funnel shaped entrance. This will be clear from the fact that the convex wall at the outer portion of the funnel shaped entrance recedes from the straight line *a b*. Also at the inner portion of the wall of the funnel shaped entrance the concave portion 17 recedes from the straight line *a b* producing a vacuum. These vacuums result in a forward suck on the body of the machine and exert a positive forward pull or rather a forward push assisting and accelerating the forward progress of the machine instead of resisting and impeding the machine in its progress as is the case where the air packs and banks in front of the machine producing what is known as the head resistance in flying machines having a body of the cigar type.

The air drawn into the funnel shaped entrance to the channel travels rapidly through the channel and escapes at the rear end thereof and results in a siphoning effect of the air at the air surrounding the rear end of the machine. This eliminates the rear vacuum suck and prevents the shocks and jars incident to back-lash and vacuum or suck resistance and prevents the drag incident to the vacuum suck at the rear end of the ordinary flying machine having a body of the cigar type. The stream line curvature of the rear portion of the body cooperates with the channel in causing the siphoning effect and the smooth passage of the air along the exterior of the body.

It will be clear that the present invention is designed for the express purpose of getting away from the pack of head-resisting air, and the rolling air around the exterior of the body of the machine and thereby removing head-resistance, back-lash and vacuum resistance. The present invention not only eliminates the above mentioned resistance by compressing the air by virtue of its propellers before the air reaches the contact or front end of the machine but creates at this contact end of the machine two different sets of vacuums that suck the machine forward with the same powerful force which sucks an aeroplane up into the air. A large body moving at a high rate of speed through the atmosphere will create a bumpy condition of air along its surface, even though there be no displaced air from the front of the machine moving along the body. This bumpy condition of air is not conducive to smooth running, but will cause little eddies and whirls of air, creating small vacuums that give more or less resistance and creates local strains and stresses that it is very desirable to avoid. In order to get away from this condition around the outer walls of the machine and to eliminate any possibility of a vacuum in the immediate

wake of the machine, a reverse or obverse siphon end is produced by the tapered curved rear end and the longitudinal channel. The air passing through the channel from the propellers creates a large current with great momentum. This draws the air from around the outer surface of the body over the siphon shaped or stream line end and by test shows that it straightens out the air around the walls throughout the entire distance from the front to the rear end of the machine, thereby correcting the bumpy conditions which would otherwise exist.

What is claimed is:

1. In a flying machine, a body having a longitudinal channel open at the bottom and provided with a substantially funnel-shaped entrance, the walls of the entrance having receding concave inner portions arranged to form a vacuum or suck when air is drawn into the funnel-shaped entrance whereby head resistance is eliminated and a forward impulse created.

2. In a flying machine, a body having a longitudinal channel open at the bottom and provided with a substantially funnel-shaped entrance, the walls of the entrance being provided with receding convex outer portions and receding concave inner portions arranged to form vacuums when air is drawn into the entrance by propellers whereby head resistance is eliminated and a forward impulse created.

3. A flying machine having a body provided with a longitudinal channel having a substantially funnel-shaped entrance provided with a convex outer portion and a concave inner portion adapted to form vacuums when air is drawn into the entrance, said body being also provided with a tapered rear end curved longitudinally to produce a siphoning effect on the exterior of the body longitudinally thereof when air is driven through the said channel.

In testimony whereof I affix my signature.

THOMAS M. FINLEY.