

March 11, 1930.

T. M. FINLEY

1,750,097

FLYING MACHINE

Filed Oct. 13, 1928

2 Sheets-Sheet 1

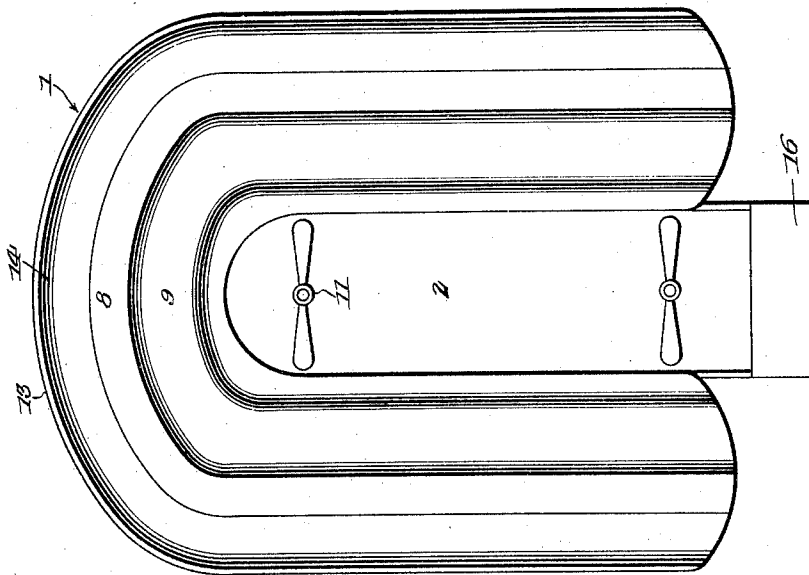


Fig. 1.

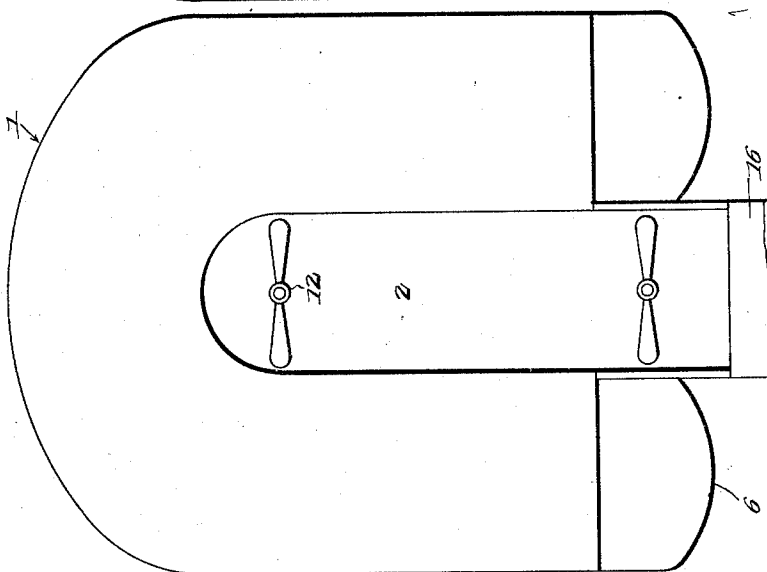


Fig. 4.

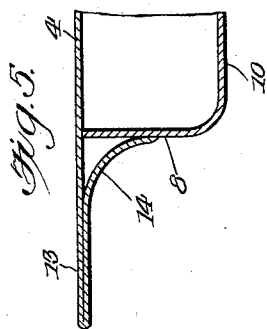


Fig. 5.

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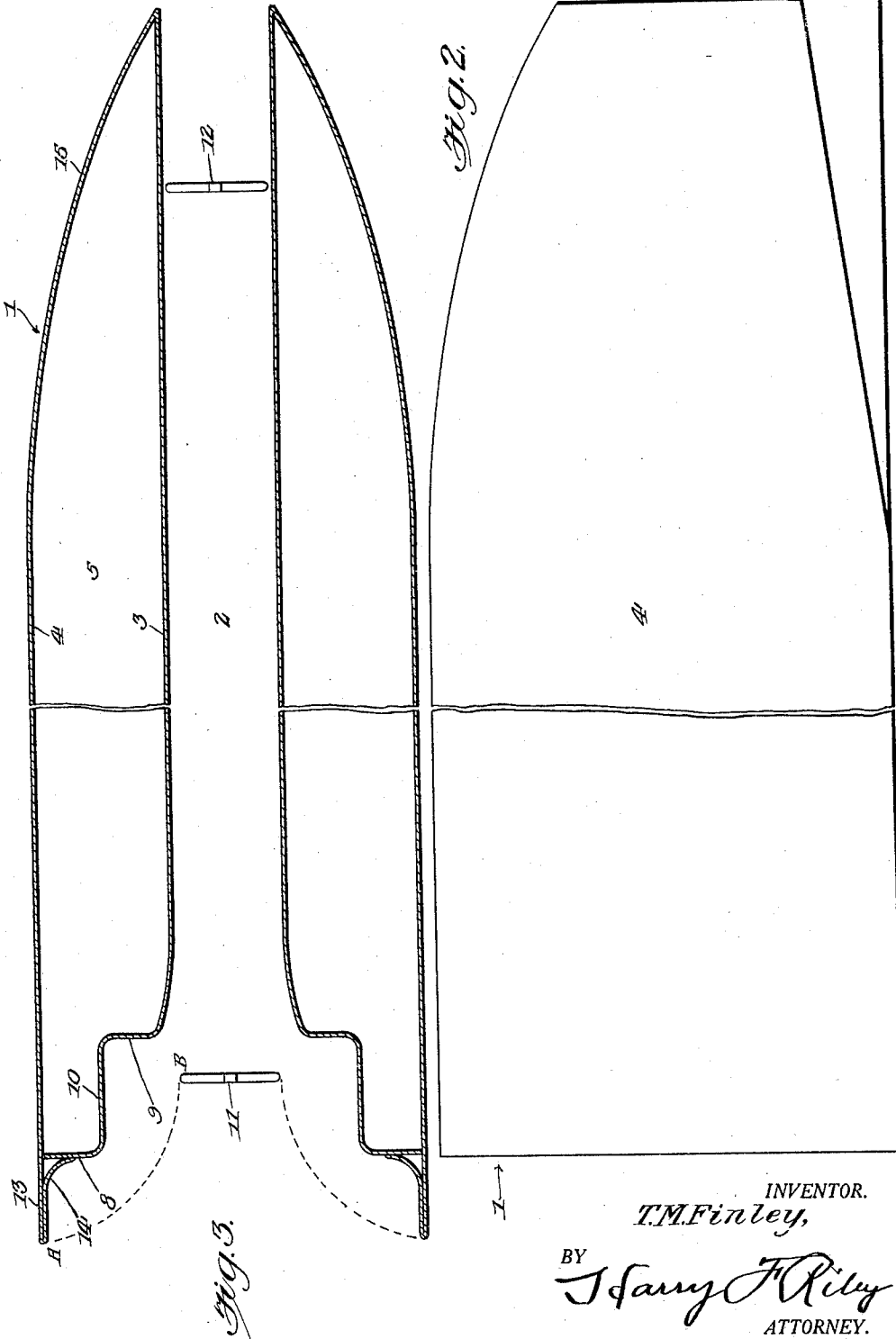
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UNITED STATES PATENT OFFICE

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FLYING MACHINE

Application filed October 13, 1928. Serial No. 312,341.

The invention relates to improvements in flying machines.

The primary object of the invention is to improve the construction of flying machines by eliminating as far as possible air packs at the front or contact end of the body of the machine and vacuum resistances around the outer surfaces of the body and at the rear end thereof, all of which are common to the present types of flying machines.

A further object of the invention is to improve the construction of the flying machine shown and described in Patent No. 1,677,962, granted to me July 24, 1928, and comprising a body provided with a longitudinal channel or passage open at the bottom and having a tapered 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 or passage.

It is also an object of the invention to improve the construction of the flying machine disclosed in my copending application filed April 30, 1928, Serial No. 273,998 which discloses a flying machine body of the cigar shaped type provided with a longitudinal tunnel having top, bottom and side walls and provided with a substantially tapered or funnel shaped mouth or entrance of step-like formation consisting of inner and outer shoulders and a longitudinal connecting portion and adapted to form suction pockets when air is drawn into the tunnel or passage.

In this form of the invention the rear end of the body is also shaped to cooperate with the funnel to produce the said siphoning effect at the rear end. The said shoulders form offsets in the wall of the mouth which connects the channel wall or tunnel wall to the outside surface wall of the body. These off-

sets or shoulders which are preferably two in number are arranged one in advance of the other, the one in advance is the contact shoulder and the other which is located in rear of the contact shoulder is the secondary shoulder. In the said flying machines of the patent and application the propellers have been placed immediately back of the secondary shoulder in such position so that in their operation of drawing the air to them they would dispose it around the two shoulders, thereby creating a vacuum effect ahead of the shoulders.

The tests of this arrangement show very clearly and accurately that the desired result is obtained up to a certain speed of the machine, when it begins to ease off or lessen and is not so good, however, still greatly beneficial thereafter. In experimenting with other arrangements it has been found, first, by advancing the propellers to a location in advance of the secondary shoulders and in rear of the contact shoulders, and second, by adding to the machine's body at the front end thereof a contact shield the desired good effects on the secondary shoulder may be preserved up to all speeds while the desired beneficial results on the contact shoulder are preserved to speeds far in excess of what are obtained with the original arrangement of the propellers with relation to the said shoulders.

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 front elevation of a flying machine constructed in accordance with this invention.

5 Fig. 2 is a side elevation of the same.

Fig. 3 is a horizontal sectional view of the same.

Fig. 4 is a rear elevation of the flying machine.

10 Fig. 5 is an enlarged detail sectional view of the contact shield taken longitudinally of the machine.

In the accompanying drawings in which is illustrated the preferred embodiment of 15 the invention the flying machine comprises in its construction a body 1 provided throughout its lower portion with a central longitudinal channel or passage 2 having a substantially flaring mouth or entrance and extending 20 entirely through the body 1 from the front end to the rear end thereof. The body 1 is composed of inner and outer walls 3 and 4 connected at their front ends with each other. The inner wall defines the longitudinal channel or passage and the intervening 25 space 5 between the inner and outer walls 3 and 4 constitutes the gas chamber and will in practice contain the supporting framework which may be of any desired construction as will be readily understood. 30

The body is approximately rectangular in exterior outline and is arched at the top and has straight vertical outer side walls and bottom 35 walls 6 which connect the inner and outer walls 3 and 4 at the lower edges thereof at the bottom of the body. The side walls of the channel are straight and vertical and the top wall is arched transversely as shown and substantially concentric with the arched 40 top of the body. The flaring mouth or entrance of the longitudinal channel forms a front or outer contact shoulder 8, an inner or secondary shoulder 9 and an intermediate longitudinal connecting portion 10 extending 45 from the outer contact shoulder to the inner shoulder. The shoulders may be either approximately plain faces or convex or concave as may suit the purpose of the designer.

50 The body is equipped with a plurality of front propellers 11 which may be of any desired number and which are located at the upper, lower and intermediate portions of the channel. The body is also provided at 55 the rear portion with a plurality of propellers 12 which may be of any desired number, but which are preferably of the same number as the front propellers and located at the upper, lower and intermediate portions of 60 the channel.

In order to prevent a front air pack and draw the air into the tapering mouth of the channel from points in advance of the contact shoulder and form suction pockets at 65 both the outer contact shoulder 8 and sec-

ondary shoulder 9 the body 1 is equipped at the front marginal portion with a contact shield 13 presenting an outer surface forming an extension of the outer wall 4 of the body and arranged in substantially flush 70 relation with the arched top and straight sides of the said outer wall 4 and projecting a sufficient distance in advance of the front contact shoulder 8 to cause the air drawn by the front propellers into the tapering or funnel shaped entrance to take substantially the path indicated by the dotted 75 lines A—B and clear the front contact shoulder and also the secondary shoulder and form suction pockets in the angles formed by the said shoulders 8 and 9 and the longitudinal 80 connecting portion 10 and the shield 13 which is preferably provided at the rear portion of the inner face with a concave surface 14 curved longitudinally of the body as clearly 85 illustrated in Figs. 3 and 5 and extending around the margin of the mouth of the channel and constituting a bracing wall or member in addition to presenting the curved concave surface at the angle or corner formed 90 by the shoulder 8 and the contact shield.

The outer portion of the contact shield is straight with the longitudinal section beyond the curved member or wall 14 and may be of any desired length to secure an air path 95 which will cause the air in passing from the extreme front edge of the contact shield to clear the front and secondary shoulders 8 and 9 to remove the air pack and to produce at the front of the machine a vacuum suck 100 at each of the said shoulders. The location of the propellers in advance of the rear shoulder 9 and between the same and the outer or contact shoulder preserves the vacuum suck or suction pocket at the shoulder 9 105 and also at the shoulder 8 and enables the propellers to prevent any air pack at the front of the machine when the same is traveling at high speeds. The air lines occurring adjacent the extreme edges of the shoulders 110 sucks out the air from in front of the shoulders and thereby creates a forward drawing vacuum. This vacuum effect occurs at both of the shoulders. This contact shield consists of a thin extension of the outer wall 115 of the body of the machine and the inner curved member 14 which is arranged at an acute angle to the extension of the outer wall and strengthens and supports the said extension and provides a radius connection 120 which will give to the front contact shoulder the effect of a concave surface similar to the concave surface shown at the juncture of the longitudinal connecting portion 10 and the secondary shoulder 9. 125

The rear portion of the body is tapered as shown at 15 and the air passing through the tunnel not only produces the vacuum effect at the front end of the body, but also produces 130 a siphon effect at the rear end of the body.

The reverse siphon effect at the rear end of the body makes it possible to shorten very materially the slope or taper of the machine at the rear end over what is considered necessary with the stream line of the ordinary flying machine of the cigar shaped type and thereby gives larger gas space for a given length over that of the ordinary stream line bodies.

This is caused by virtue of the fact that the siphon moving body of air expelled at the rear of the tunnel draws the air from around the body of the machine over the comparatively short slope or tapered portion 15 to the tunnel air, thereby effectively preventing a vacuum in the immediate wake of the machine and at the same time obviating the necessity of a long tapering gas space reducing stream line which has a vacuum of great proportions. The siphon effect at the rear end is no less important to successful flight than is the vacuum effect at the contact end and the combined effect of the two makes a powerful machine, compact in size, strong in body, 25 swift in flight and easy in control because of the fact that such a machine will pivot at the center rather than at the contact end as is the case with all cigar or stream line shapes.

The body is designed to be equipped with a suitable cabin 16 which is preferably arranged at the bottom of the body as shown, but a cabin or cabins of any preferred construction may be employed as will be readily understood.

What I claim is:—

1. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation 40 forming a plurality of shoulders providing suction pockets, said body having at the front of the mouth a relatively thin contact shield projecting in advance of the body and adapted to cut the air.

2. In a flying machine, a body having a longitudinal air passage or channel provided with a flaring mouth of step-like formation forming a front contact shoulder and a rear secondary shoulder, said body being provided 50 at the marginal edge of the mouth with a forwardly projecting contact shield adapted to cut the air and forming with the contact shoulder a suction pocket in advance of the said contact shoulder.

3. In a flying machine, a body having a longitudinal air channel or passage open at the bottom and having top and side walls and provided with a flaring mouth of step-like formation forming a plurality of shoulders, 60 said body being provided at the margin of the mouth with a forwardly extending contact shield adapted to cut the air and arranged to form with the front shoulder a suction pocket located in advance of the said shoulder.

4. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation forming a front contact shoulder and a rear secondary shoulder, said body being provided 70 at the front contact shoulder with a thin forwardly extending marginal contact shield arranged at the top and sides of the body in substantially the planes of the said top and sides.

5. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation forming a front contact shoulder and a rear secondary shoulder, said body being provided 80 at the front contact shoulder with a thin forwardly extending marginal contact shield arranged at the top and sides of the body in substantially the planes of the said top and sides, and provided at the inner face with a concave surface and cooperating with the front shoulder to form a suction pocket.

6. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation 90 forming a front contact shoulder and a rear secondary shoulder, said body being provided at the front contact shoulder with a thin forwardly extending marginal contact shield arranged at the top and sides of the body in 95 substantially the planes of the said top and sides, and provided at the rear portion of its inner face with a longitudinally curved surface located adjacent to the front shoulder and cooperating therewith to form a suction 100 pocket.

7. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation 105 forming a front contact shoulder and a rear secondary shoulder, said body being provided at the front contact shoulder with a thin forwardly extending marginal contact shield arranged at the top and sides of the 110 body in substantially the planes of the said top and sides, and provided at the rear portion of its inner face with a longitudinally curved surface located adjacent to the front shoulder and cooperating therewith to form 115 a suction pocket, the front or outer portion of the shield being straight in longitudinal section.

8. In a flying machine, a body having a longitudinal air channel or passage provided with a flaring mouth of step-like formation 120 forming a front contact shoulder and a rear secondary shoulder, said body being provided at the front shoulder with a thin forwardly extending marginal contact shield arranged 125 at the top and sides of the body, and a propeller located in the mouth of the channel and arranged between the front contact shoulder and the said secondary shoulder.

9. In a flying machine, a body having a longitudinal air channel or passage provided 130

with a flaring mouth of step-like formation forming a front contact shoulder and a rear secondary shoulder, said body being provided at the front with a thin forwardly extending marginal contact shield projecting in advance of the front contact shoulder and adapted to cut the air and forming with the front contact shoulder a suction pocket, and propellers located in the said mouth of the channel and arranged between the front and rear shoulders and cooperating with the shield to form suction pockets at the said shoulders.

In testimony whereof I affix my signature.

THOMAS M. FINLEY.