Jan. 8, 1935. V. J. BURNELLI 1,987,050

TAILLESS AIRPLANE

Filed Feb. 23, 1933 2 Sheets-Sheet 1

Fig. 1

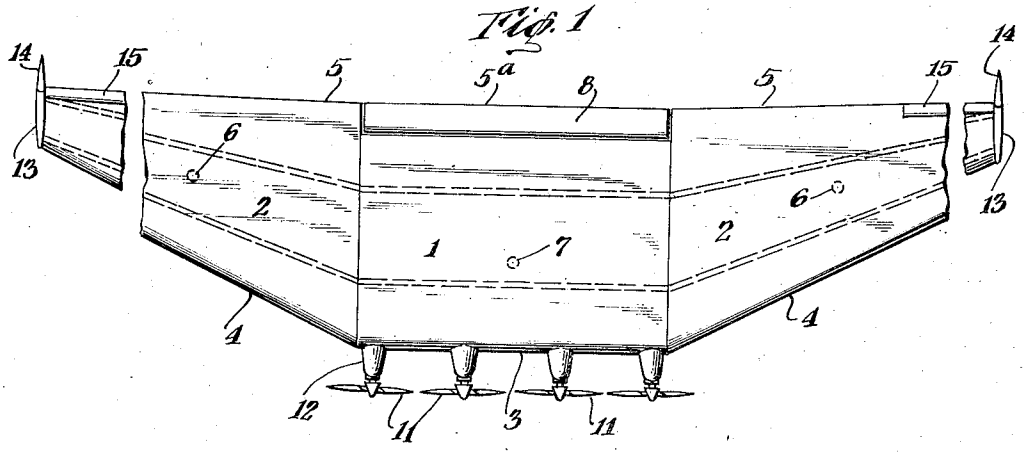


Fig. 2

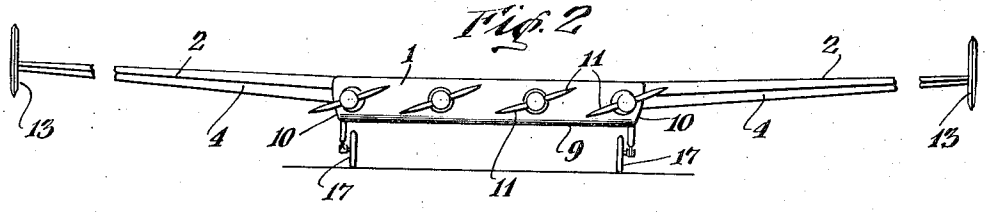


Fig. 3

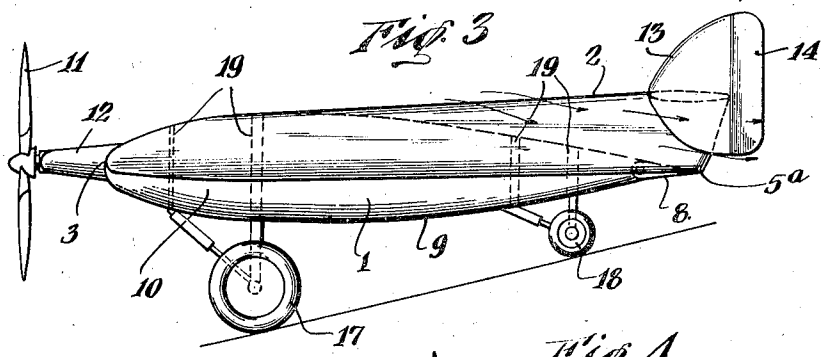
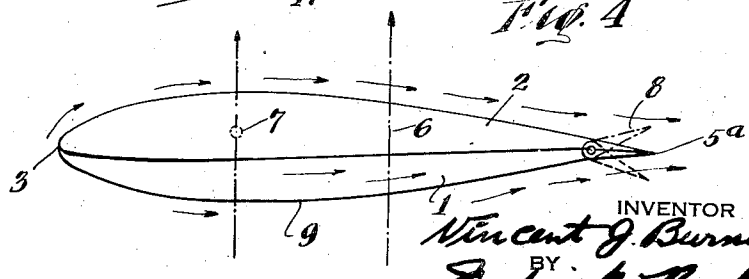


Fig. 4



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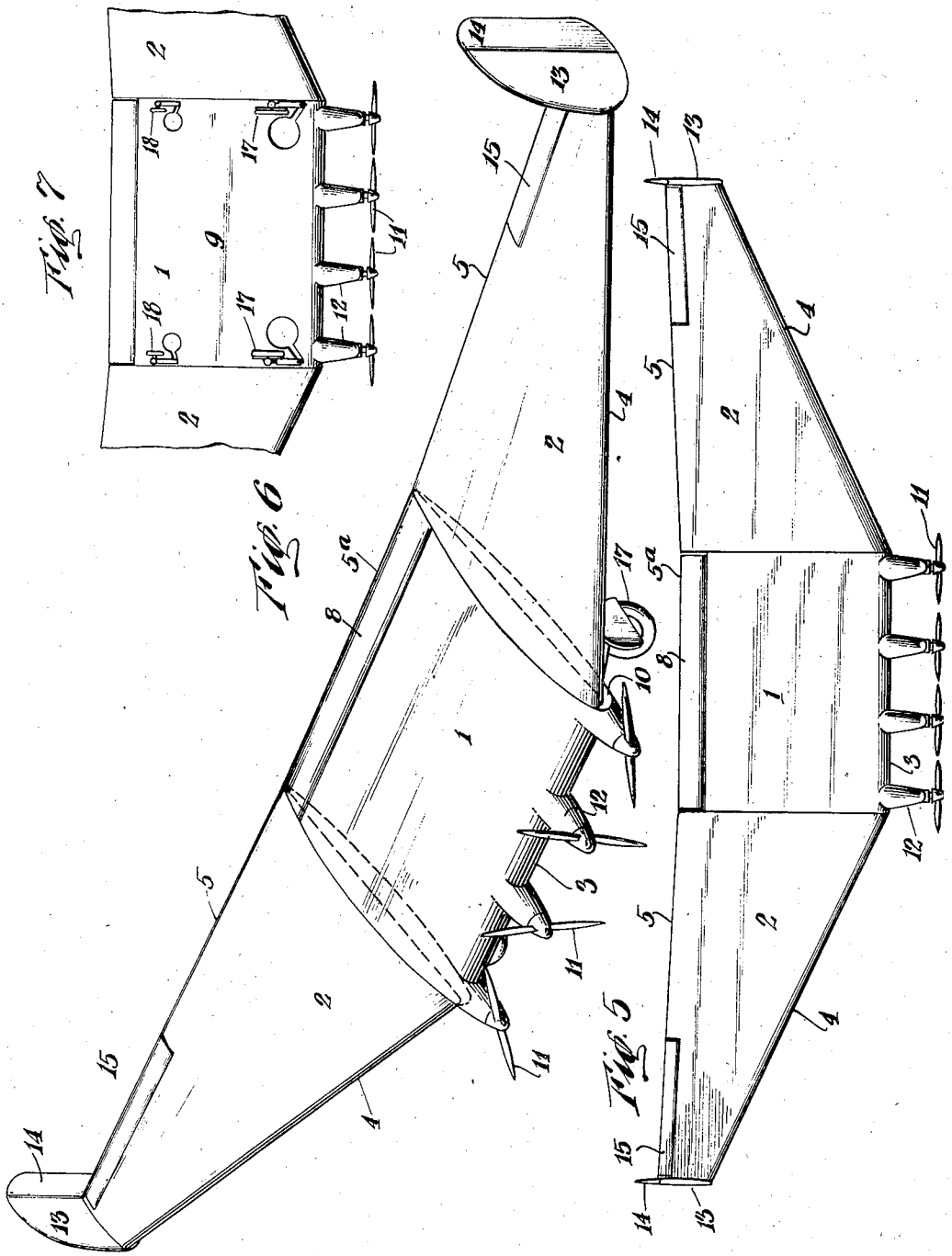


Fig. 7

Fig. 6

Fig. 5

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TAILLESS AIRPLANE

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Application February 23, 1933, Serial No. 658,118

4 Claims. (Cl. 244—14)

This invention relates to airplanes and my present improvements are directed particularly to the production of an all-wing tailless machine which is characterized as having a large amount of inherent stability, and which possesses a minimum of drag inducing features.

Primarily my improvements are intended to be applied in the embodiment of a large sized airplane, capable of carrying an unusual number of passengers, or other considerable load, and to be powered by a plurality of engines and propellers.

The general idea involved comprehends the provision of a wing composed of a wide central section, and lateral extending sections whose leading edges are swept-back, and have dihedral angle, while the trailing edge of the sections is in a continuous, unbroken line. The sections are unified to constitute a single wing, whose upper surface is unbroken and has continuous airfoil contour throughout its span and chord.

The undersurface of the wing, at its central section, is lowered to increase the depth of said section, for load accommodation, whilst enabling the lateral sections to be of less height at their roots and to taper outwardly, for high speed purposes.

The lateral sections, being swept-back at their leading edges have their centres of pressure rearwardly of the centre of pressure of the central section in normal flight, thus providing a righting couple that imparts a degree of longitudinal stability to the wing, without the use of a longitudinally outrigged stabilizer.

Included in and forming part of the trailing edge, at the rear of the central section, is an elevator for vertical control, and vertical rudders are placed at the wing tips, for lateral control, the usual ailerons being included in the trailing edge.

Other features and advantages of my invention will hereinafter appear.

In the drawings:

Figure 1 is a plan view of my improved tailless airplane, partly broken away.

Fig. 2 is a front elevation thereof.

Fig. 3 is a side view.

Fig. 4 is a diagrammatic view, explanatory of the relative positions of the centres of pressure.

Fig. 5 is an unbroken plan view.

Fig. 6 is a perspective view, in full, and

Fig. 7 is a bottom plan view of the central wing section.

In said figures let 1 indicate the central wing section and 2 the lateral wing sections, the latter being here indicated as having a degree of dihedral angle.

Whilst the central section, whose span and chord may encompass a lift area in excess of the combined lift areas of the lateral wing sections, has a leading edge 3 that is at right angles with the longitudinal centre through the wing, the leading edges 4 of the lateral sections 2 are rearwardly inclined, to have a swept-back effect, and, since the trailing edge 5 for the entire wing is approximately parallel with the leading edge 3 it follows that the lateral sections 2 have an outwardly diminishing chord, whereby the centre of pressure for said lateral sections, indicated at 6, is in normal flight attitude of the wing, rearward of the centre of pressure 7 for the central section. By these means a righting couple is provided that accords a degree of longitudinal stability which enables the airplane to dispense with the usual outrigged stabilizer.

The horizontal rudder or elevator indicated at 8 is provided at the trailing edge of the central section 1, and its trailing edge 5a is conterminous with the trailing edge 5.

It will be noted that the base 9 of the central section is depressed below the under surface of the lateral sections 2 to deepen said central section so that it may have sufficient height for passenger and load accommodation, and the thus deepened portion is provided with side walls 10 that may have windows and doors (not herein shown).

Plural engines, (not shown) may be housed within the leading edge of the wing, and operate propellers 11 in advance of said leading edge, housings 12 supporting the propeller shafts.

Vertical stabilizers 13 are shown as carried by the wing tips and vertical rudders 14 for lateral control, are mounted on said stabilizers. Ailerons 15 are also provided.

The plan view of Fig. 5 and the perspective view of Fig. 6 have been drawn to clearly illustrate the formation of my improved tailless airplane in its complete formation and appearance.

A fundamental principle involved in my conception of a tailless airplane, devised along the lines of the body or central portion itself being a wing, as announced in my earlier Patent No. 1,758,498, is that wherein the central or body portion in my all-wing tailless airplane has a surface of sufficient area to provide the main lift for the airplane in flight, and so that the lateral wing sections may function particularly in according additional lift for take-off, landing purposes, and for stabilizing.

Actually, while in the drawings the central and lateral wing sections may not appear so related, it is my purpose to provide the central wing section with sufficient area for support of the airplane during flight, as stated. To this end the central or body section may comprise an area which may be equal to at least one half that of the entire wing. In practice I intend to accord the central or body section a lift area exceeding that of the combined areas of the lateral wing sections.

In the plan view of Fig. 7 I have shown the body or central section as provided with a pair of forward, retractible wheels 17, and with a pair of retractible rear wheels 18, to afford 4-point wheel supports, both the forward and rear wheels being connected to the under side of said body section in the vertical planes of respective bulkheads 19.

Variations within the spirit and scope of my invention are equally comprehended by the foregoing disclosure.

I claim:

1. A tailless airplane comprising a continuous wing having a central section with plural engines at its entering edge, said section at cruising and high speeds providing the major lift, and fixed, lateral, swept back stabilizing sections whose centre of pressure is located rearwardly of the centre of pressure of the central section.

2. A tailless airplane comprising a continuous wing having a central section with plural engines at its entering edge, the under surface of said central section being depressed equally throughout its width, said section at cruising and high speeds providing the major lift, and fixed, lateral, swept back stabilizing sections whose centre of pressure is located rearwardly of the centre of pressure of the central section.

3. A tailless airplane comprising a continuous wing having a central section with plural engines at its entering edge, said section at cruising and high speeds providing the major lift, and fixed, lateral, swept back stabilizing sections whose centre of pressure is located rearwardly of the centre of pressure of the central section, said wing having a continuous trailing edge, and an elevator, which forms the trailing edge of said central section, included in said continuous trailing edge.

4. A tailless airplane comprising a continuous wing having a central section with plural engines at its entering edge, said section at cruising and high speeds providing the major lift, fixed, lateral, swept back stabilizing sections whose centre of pressure is located rearwardly of the centre of pressure of the central section, and an elevator which forms the trailing edge of said central section.

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