launching load, the trailing edge of joint between the centre wing 101 and the outboard wing 103 tends to twist outward in a span wise direction of the wings 101, 103.

Furthermore, the dihedral angle of the outboard wing 103 depends on the molded dihedral angle of both the centre wing 101 and the outboard wing 103. i.e. the angles at which the outboard edges 102 of the centre wing 101 and the inboard edges 104 of the outboard wing 103 are molded, determine the dihedral angle. Therefore, the centre wing 101 and outboard wing 103 are custom built for a particular dihedral angle.

There is thus a need to provide a collapsible wing that seeks to address one or more of the above disadvantages.

SUMMARY

According to a first aspect of the present invention, there is provided a collapsible wing assembly of an unmanned aerial vehicle (UAV) having a fuselage, the assembly comprising: a centre wing adapted to be attached to the fuselage; and a pair of outboard wings, wherein each outboard edge of the centre wing comprises a first attachment structure comprising at least a pair of L-shaped profile locks, and each inboard edge of the outboard wings comprises a second attachment structure comprising at least a pair of locking pins, wherein each of the L-shaped profile locks of the first attachment structure is operable to engage with a respective locking pin of the second attachment structure and displace the locking pin to a captive position towards a trailing edge of the centre wing.

The centre wing may comprise a body and a centre wing adaptor mounted to an outboard edge of the body, and wherein the outboard wing comprises a body and an outboard wing adaptor mounted to an inboard edge of the body of the outboard wing, wherein the first attachment structure is provided on an end face of the centre wing adaptor, and the second attachment structure is provided on an end face of the outboard wing adaptor.

The airfoils of the centre wing adaptor and outboard wing adaptor matches respectively to the body of the centre wing and the outboard wing.

In a locked position, the stepped portion may be operable to grip the stem of the an adjacent locking pin in order to lock any relative movement of the centre wing and the outer wing, and the base of the locking key locks with the opening found on the bottom surface of the centre wing adaptor.

The body of the locking key may comprise a slot for inserting a securing pin in order to secure the locking pin to the centre wing adaptor.

According to a second aspect of the present invention, there is provided a method of locking a collapsible wing assembly of an unmanned aerial vehicle (UAV) having a fuselage, the method comprising the steps of: providing a centre wing adapted to be attached to the fuselage; providing a pair of outboard wings; providing a first attachment structure to each outboard edge of the centre wing, the first attachment structure having at least a pair of L-shaped profile locks; providing a second attachment structure to each inboard edges of the outboard wings, the second attachment structure having at least a pair of locking pins; engaging each of the L-shaped profile locks of the first attachment structure with a respective locking pin of the second attachment structure; and displacing the locking pin to a captive position towards a trailing edge of the centre wing.

In the above method, the centre wing may comprise a body and a centre wing adaptor mounted to an outboard edge of the body, and wherein the outboard wing comprises a body and an outboard wing adaptor mounted to an inboard edge of the body of the outboard wing, wherein the first attachment structure is provided on an end face of the centre wing adaptor, and the second attachment structure is provided on an end face of the outboard wing adaptor.

The method may further comprise a step of inserting a locking key into a slot provided on the centre wing adaptor to lock the relative movement of the centre wing and the outboard wing.

According to a third aspect, there is provided a method of unlocking the above collapsible wing assembly locked by the above method, the method comprising the steps of: releasing

CLAIMS

1. A collapsible wing assembly of an unmanned aerial vehicle (UAV) having a fuselage, the assembly comprising:

a centre wing adapted to be attached to the fuselage; and

a pair of outboard wings,

wherein each outboard edge of the centre wing comprises a first attachment structure comprising at least a pair of L-shaped profile locks, and each inboard edge of the outboard wings comprises a second attachment structure comprising at least a pair of locking pins,

wherein each of the L-shaped profile locks of the first attachment structure is operable to engage with a respective locking pin of the second attachment structure and displace the locking pin to a captive position towards a trailing edge of the centre wing.

2. The assembly of claim 1, wherein the centre wing comprises a body and a centre wing adaptor mounted to an outboard edge of the body of the centre wing, and wherein the outboard wing comprises a body and an outboard wing adaptor mounted to an inboard edge of the body of the outboard wing, wherein the first attachment structure is provided on an end face of the centre wing adaptor, and the second attachment structure is provided on an end face of the outboard wing adaptor.

3. The assembly of claim 2, wherein an airfoil of the centre wing adaptor matches to the body of the centre wing, and wherein an airfoil of the outboard wing adaptor matches to the body of the outboard wing.

4. The assembly of claim 2 or 3, wherein the centre wing adaptor is removably mounted to the centre wing, and wherein the outboard wing adaptor is removably mounted to the outboard wing.

5. The assembly of any one of claims 2 to 5, wherein one of the L-shaped profile locks is located proximate to a leading edge of the centre wing adaptor and the other is located proximate to a trailing edge of the centre wing adaptor,

wherein one of the locking pins is located proximate to a leading edge of the outboard wing adaptor and the other is located proximate to a trailing edge of the outboard wing adaptor.

6. The assembly of any one of claims 2 to 5, wherein each of the L-shaped profile locks comprises a hollow channel formed on the end face of the centre wing adaptor,

wherein the hollow channel comprises a first arm pointing towards a bottom surface of the centre wing adaptor, and a second arm, inclined to the first arm, pointing towards the trailing edge of the centre wing.

7. The assembly of claim 6, wherein the first arm is substantially perpendicular to the second arm.

8. The assembly of claim 6 or 7, wherein the bottom surface of the centre wing adaptor has a pair of openings corresponding to respective openings of the first arm.

9. The assembly of claim 6, 7 or 8, wherein a top surface of the centre wing adaptor has a slot, positioned above the first arm of the L-shaped profile lock, for receiving a locking key to lock any relative movement of the centre wing and outboard wing in the captive position.

10. The assembly of claim 9, wherein the dimension of a head of the locking pin matches with that of the opening of the first arm of the L-shaped profile lock, and the dimension of a stem of the locking pin matches with that of the hollow channel of the second arm of the L-shaped profile lock.

11. The assembly of claim 10, wherein an opposing face of the centre wing adaptor comprises one or more anchors for mounting the centre wing adaptor to an outboard edge of the centre wing, and wherein an opposing face of the outboard wing adaptor comprises one or more anchors for mounting the outboard wing adaptor to an inboard edge of the outboard wing.

12. The assembly of claim 10 or 11, wherein the locking key comprises a head and a base, wherein a top surface of the head has an inclination to match the top surface of the centre wing adaptor, wherein the base has a slit and a resilient arm, and wherein the resilient arm comprises a stepped portion comprising a plurality of inclined steps terminating at the head.

13. The assembly of claim 12, wherein in a locked position, the stepped portion is operable to grip the stem of the an adjacent locking pin in order to lock any relative movement of the centre wing and the outboard wing, and the base of the locking key locks with the opening found on the bottom surface of the centre wing adaptor.

14. The assembly of any one of claims 9 to 13, wherein the body of the locking key comprises a slot for inserting a securing pin in order to secure the locking pin to the centre wing adaptor.

15. A method of locking a collapsible wing assembly of an unmanned aerial vehicle (UAV) having a fuselage, the method comprising the steps of:

providing a centre wing adapted to be attached to the fuselage;

providing a pair of outboard wings;

providing a first attachment structure to each outboard edge of the centre wing, the first attachment structure having at least a pair of L-shaped profile locks;

providing a second attachment structure to each inboard edge of the outboard wings, the second attachment structure having at least a pair of locking pins;

engaging each of the L-shaped profile locks of the first attachment structure with a respective locking pin of the second attachment structure; and

displacing the locking pin to a captive position towards a trailing edge of the centre wing.

16. The method of claim 15, wherein the centre wing comprises a body and a centre wing adaptor mounted to an outboard edge of the body of the centre wing, and wherein the outboard wing comprises a body and an outboard wing adaptor mounted to an inboard edge of the body of the outboard wing, wherein the first attachment structure is provided on an end face of

the centre wing adaptor, and the second attachment structure is provided on an end face of the outboard wing adaptor.

17. The method of claim 16, further comprising a step of inserting a locking key into a slot provided on the centre wing adaptor to lock relative movement of the centre wing and the outboard wing.

18. A method of unlocking the collapsible wing assembly locked by the method of claim 17, the method comprising the steps of:

releasing the locking key;

holding the centre wing and moving the outboard wing towards a leading edge of the centre wing; and

moving the outboard wing downward to release the outboard wing.