

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in and relating to Aeroplanes

I, JOHN NELSON DUNDAS HEENAN, of 29, Clarges Street, Piccadilly, London, W.1, a British Subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to aeroplane fuselages of the kind which are built-up from two or more separate longitudinal sections adapted to be secured together in endwise relationship to form the complete fuselage. Such a fuselage construction is required when the aeroplane motor is accommodated in an intermediate longitudinal portion of the fuselage so that the rear longitudinal section of the fuselage requires to be detached from the front longitudinal section when it is desired to expose the rear end of the motor, the propeller shaft of which normally extends through the centre of the rear fuselage section to the propeller, the latter being mounted at the tail end of the fuselage. With such a fuselage construction it is essential that the fuselage sections should be securely held together in the assembled condition but can be readily disconnected when this is desired, as when access is required to be had to the motor.

The invention has for its object to provide a fuselage construction of the above kind with improved releasable securing means which enable the above stated requirements to be obtained in an efficient and satisfactory manner.

According to the invention the opposed joint forming edges of the longitudinally adjacent fuselage sections of an aeroplane fuselage construction of the above kind are adapted to be releasably held together by an internal locking ring which is capable of being expanded to lock the two fuselage sections together or of being released to permit the two fuselage sections to be disconnected from one another.

The fuselage, as will be understood, is of hollow circular cross section, and the retaining ring is preferably mounted within the fuselage so that when expanded the ring is concentric with the interior surface of the fuselage and overlaps the

joint between the two fuselage sections.

The invention also consists in a fuselage construction of the above kind wherein opposed edges of two longitudinal fuselage sections which require to be joined together in endwise relationship are provided with complementary flange portions which extend into the hollow interior of the fuselage so as to be engageable in a peripheral groove formed around a split spring-locking ring mounted with the fuselage and provided with means by which the ring can be either expanded into tight engagement with the said flanges, so as thereby to hold the adjacent fuselage sections firmly together, or be released to assume a partially collapsed condition, in which the fuselage sections are capable of being separated from one another.

The said means may consist of a hand lever pivotally connected near one end with that end of the split spring locking ring which is normally maintained outwardly against the said flange portions and also pivotally connected at a point intermediate its ends with that end of the locking ring which tends to spring inwards away from the flange portions, the arrangement being such that the hand lever can be swung outwardly to force this last mentioned end of the locking ring outwards and thereby expand the ring into the desired locking position, in which position the ring can be held by suitable retaining means, such as by screw or stud means secured between one of the fuselage sections and the outwardly swung hand lever and serving temporarily to hold the lever in such position.

Thus according to one form of the invention an aeroplane fuselage construction comprises two separately formed longitudinal sections adapted to be releasably secured together in endwise relationship by means of a split spring locking ring which is formed with a peripheral groove which is engaged by a composite rim projecting radially inwards from the opposed circular edges of the two fuselage

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sections when these two fuselage sections are brought together and the split locking ring is expanded to cause such engagement to take place, the rim being conveniently formed by complementary flanges provided at the outer extremities of a pair of ring members suitably connected, as by welding, one with the corresponding end of each fuselage section and the opposite radial walls of which rim (which is formed when the two flanges are brought together by the two fuselage sections being held in their intended endwise relationship) being conveniently tapered to provide for their engagement with the corresponding walls of the said groove with a wedge action.

One end of the split spring locking ring has one end of a hand lever pivotally connected therewith, as by means of a transverse pin extending through this end of the locking ring and carrying at its projecting ends on opposite sides of the ring the parts of a duplicated hand lever, and the said parts of the latter are also pivotally connected, intermediate their ends, with the other end of the ring by means of another transverse pin passed through

this end of the ring and engaged at its projecting ends in the duplicated lever parts. The construction and arrangement is such that when the hand lever is swung towards the centre of the ring the one end of the locking ring is freed to spring inwards and thereby release the ring from its locking engagement with the rim on the inside of the fuselage sections and the latter can therefore be separated. When however the hand lever is swung in outwardly from its point of pivotal connection at one end thereof with the one end of the ring and in the direction of the other end of the ring this last mentioned end of the ring is expanded outwards to cause the entire ring to have firm gripping engagement with the rim and the two fuselage sections can be held secured together, with the locking ring in this condition, by the hand lever being held in its thus outwardly swung condition by means of screw-studs passed through the fuselage sections and secured in their respective hand lever parts on either side of the joint.

Dated this 20th day of January, 1947.
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COMPLETE SPECIFICATION

Improvements in and relating to Aeroplanes

I, JOHN NELSON DUNDAS HEENAN, of 29, Clarges Street, Piccadilly, London, W.1, a British Subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to aeroplane fuselages of the kind which are built up from two or more separate longitudinal sections adapted to be secured together in endwise relationship to form the complete fuselage. Such a fuselage construction is required when the aeroplane motor is accommodated in an intermediate longitudinal portion of the fuselage so that the rear longitudinal section of the fuselage requires to be detached from the front longitudinal section when it is desired to expose the rear end of the motor, the propeller shaft of which normally extends through the centre of the rear fuselage section to the propeller, the latter being mounted at the tail end of the fuselage.

With such a fuselage construction it is essential that the fuselage section should be securely held together in the assembled condition but can be readily disconnected when this is desired, as when access is required to be had to the motor.

The invention has for its object to provide a fuselage construction of the above

kind with improved releasable securing means which enable the above stated requirements to be obtained in an efficient and satisfactory manner.

According to the invention, the opposed joint-forming edges of the longitudinally adjacent fuselage sections of an aeroplane fuselage construction of the above kind, are adapted to be releasably held together by an internal locking ring which is capable of being expanded to lock the two fuselage sections together or of being released to permit the two fuselage sections to be disconnected from one another.

The fuselage, as will be understood, is of hollow circular cross section, and the retaining ring is preferably mounted within the fuselage so that when expanded the ring is concentric with the interior surface of the fuselage and overlaps the joint between the two fuselage sections.

The invention also consists in a fuselage construction of the above kind wherein opposed edges of two longitudinal fuselage sections which require to be joined together in endwise relationship are provided with complementary flange portions which extend into the hollow interior of the fuselage so as to be engageable in a peripheral groove formed around a split spring-locking ring mounted within the fuselage and provided with means by which the ring can be either expanded

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into tight engagement with the said flanges, so as thereby to hold the adjacent fuselage sections firmly together, or be released to assume a partially collapsed condition, in which the fuselage sections are capable of being separated from one another.

The said means may consist of a hand lever pivotally connected near one end with that end of the split ring which is normally maintained outwardly against the said flange portions and also pivotally connected at a point intermediate its ends with that end of the locking ring which tends to spring inwards away from the flange portions, the arrangement being such that the hand lever can be swung outwardly to force this last mentioned end of the locking ring outwards and thereby expand the ring into the desired locking position, in which position the ring can be held by suitable retaining means, such as by screws or stud means secured between one of the fuselage sections and the outwardly swung hand lever and serving temporarily to hold the lever in such position.

The invention will be described further in detail and by way of example with reference to the accompanying drawings in which:—

Figure 1 is a broken view in front elevation of one construction showing certain of the operative elements in the locking and releasing position;

Figure 2 is a corresponding view in section on a plane indicated by the line II—II of Figure 1, viewed in the direction of the arrows;

Figure 3 is a fragmentary view in elevation of the ends of the ring, and

Figure 4 is a view in section on a plane indicated by the line IV—IV of Figure 3, viewed in the direction of the arrows.

In the construction illustrated, the fuselage comprises two separately formed longitudinal sections 1 and 1a adapted to be releasably secured together in endwise relationship by means of a split spring locking ring 2 which is formed with a peripheral groove 3 which is engaged by a composite rim providing two flanges 4 and 4a projecting inwards from the opposed circular edges of the two fuselage sections when these two fuselage sections are brought together and the split locking ring is expanded to cause such engagement to take place, the flanges being provided at the outer extremities of a pair of ring members 5 and 5a suitably connected, as by welding or by rivetting, one with the corresponding end of each fuselage section and the opposite faces 6 and 6a being inclined to provide for their engagement with the correspondingly formed

walls 7 of the groove 3 in the ring so that a wedging action is secured.

One end of the split locking ring has the adjacent ends of the duplicated hand levers 8 pivotally connected therewith by means of a transverse pin 9 passing through a hole 10 in the spring locking ring.

In the ends of this lever there are engaged eye bolts 11, a pin 12 passing through the eyes and through a hole 13 connecting them to the other end of the locking ring so that on moving the duplicated hand lever in the manner indicated in the drawings into the position shown in chain-dotted line, one end of the locking ring is drawn inward and upward, as shown in chain-dotted line.

To the ring member 5a there are secured a plurality of hook shaped members 14 to assist in retaining the locking ring in association with it when the duplicated hand lever is in the chain-dotted position and the ring released from engagement with the flanges.

The construction and arrangement is such that when the hand lever is swung towards the centre of the ring the one end of the locking ring is freed to spring inwards and thereby release the ring from its locking engagement with the rim on the inside of the fuselage sections and the latter can therefore be separated. When, however, the hand lever is swung outwardly from its point of pivotal connection at one end thereof with the one end of the ring and in the direction of the other end of the ring, this last mentioned end of the ring is expanded outwards to cause the entire ring to have firm gripping engagement with the rim and the two fuselage sections can be held secured together, with the locking ring in this condition, when the duplicated hand levers may be locked, for instance, by means of screws passed through the fuselage sections through a plate applied across or secured to the hand levers.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An aeroplane fuselage of the kind which is built up from two or more separable longitudinal sections adapted to be secured together in endwise relationship to form the complete fuselage, characterised in this that the opposed joint-forming edges of the longitudinally adjacent fuselage sections of an aeroplane fuselage construction of the above kind are adapted to be releasably held together by an internal locking ring which is capable of being expanded to lock the two

fuselage sections together and of being released to permit the two fuselage sections to be disconnected from one another.

2. An aeroplane fuselage as claimed in Claim 1 of hollow circular cross-section, the retaining ring being mounted within the fuselage so that when expanded the ring is concentric with the interior surface of the fuselage and overlaps the joint between the two fuselage sections.
3. An aeroplane fuselage as claimed in Claim 2, in which the opposed edges of the two longitudinal fuselage sections which require to be joined together in endwise relationship are provided with complementary flange portions which extend into the hollow interior of the fuselage so as to be engageable in a peripheral groove formed around a split spring-locking ring mounted within the fuselage and provided with means by which the ring can be either expanded into tight engagement with the said flanges, so as thereby to hold the adjacent fuselage sections firmly together, or to be released to assume a partially collapsed condition in which the fuselage sections

are capable of being separated from one another.

4. An aeroplane fuselage as claimed in any of the preceding claims in which the means for expanding and contracting the locking ring comprises a hand lever pivotally connected near one end with that end of the split ring which is normally maintained outwardly against the said flange portions and also pivotally connected at a point intermediate its length with that end of the locking ring which tends to spring inwards away from the flange portions, the arrangement being such that the hand lever can be swung outwardly to force this last mentioned end of the locking ring outwards and thereby expand the ring into the desired locking position, in which position the hand lever can be held by suitable retaining means.

5. An aeroplane fuselage as claimed in Claim 4, in which the hand levers are duplicated and are designed to be moved in unison.

Dated this 19th day of February, 1948.
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[This Drawing is a reproduction of the Original on a reduced scale.]

