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AILERON HINGE.

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1,394,464. Patented Oct. 18, 1921.

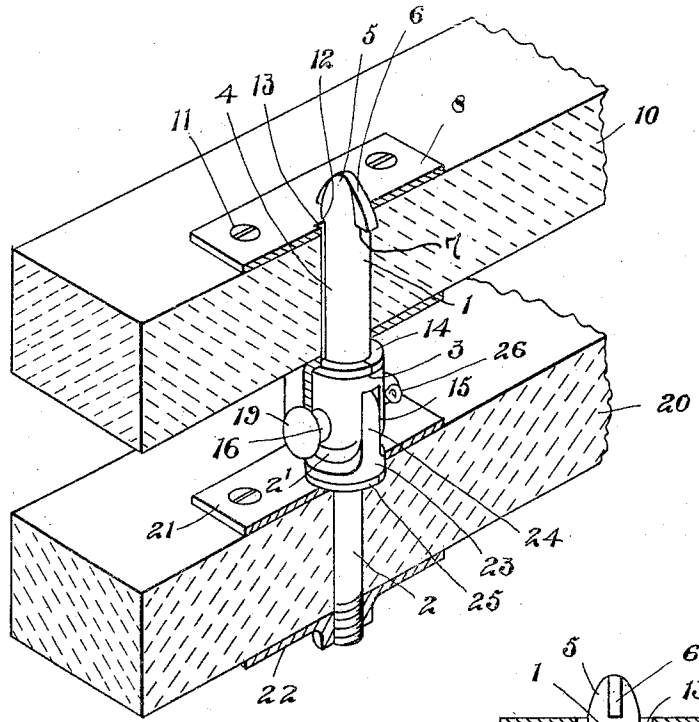



Fig. 1.

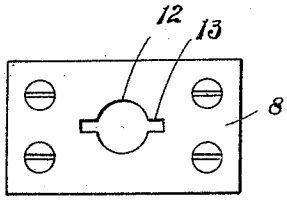



Fig. 3.

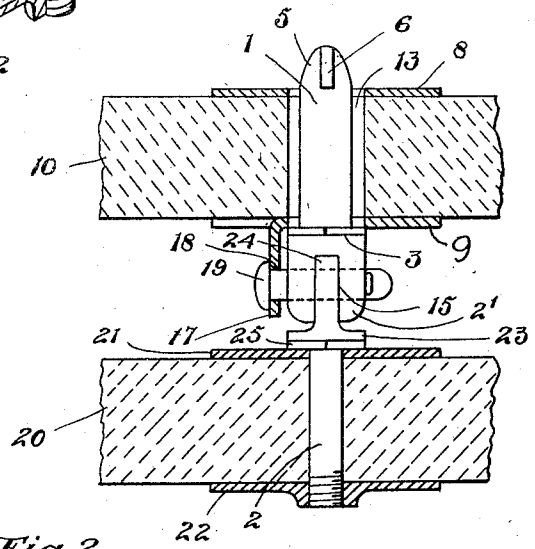



Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## AILERON-HINGE.

1,394,464. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed June 18, 1920. Serial No. 389,845.

*To all whom it may concern:*

Be it known that I, ALFRED DEVANPORT BENTLEY, a subject of the King of Great Britain, and resident of the city of Toronto, county of York, Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Aileron-Hinges, described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The principal objects of the invention are, to eliminate the dangers due to the loosening of the aileron hinges through the shrinkage of wood and the vibratory conditions, and to devise a simple form of hinge for ailerons which will enable the quick attaching or detaching and will maintain a secure connection.

The principal feature of the invention consists in the novel construction of the hinge members and the arrangement of the anchoring members whereby a pair of detachable hinge-connected members are rigidly secured in the frame of the machine and locked against accidental disengagement.

In the drawings, Figure 1 is a sectional perspective detail of a portion of the frame and aileron hinge showing my improved hinge connected to same.

Fig. 2 is a longitudinal sectional view showing the hinge members connected together.

Fig. 3 is a plan view of one of the key slotted holding plates.

It is well known that in the construction of aeroplanes it is very difficult to insure the maintenance of tight connections in the moving parts of the wings, on account of the strains and vibration to which they are subjected and also on account of the uncertainty in the dimensions of the wood parts which change considerably owing to shrinkage, and it has been the practice to bind the wood frame with metal bands, where the hinges are connected, in order to assist in securing them more reliably.

According to the present invention the hinge is formed of a pair of bolt members 1 and 2. The member 1 is provided with a head 2′ having a squared shoulder 3 surrounding the shank 4. The extremity 5 of the shank is of convergent shape and is formed with a pair of wing lugs 6 extending radially outward and having the inward edges 7 squared with the shank.

Plates 8 and 9 are secured respectively to the inner and outer sides of the wooden bar 10 of the frame of the aileron, said plates being fastened by means of suitable screws 11. These plates are formed with corresponding key hole slots 12 having the narrow portions 13 arranged diametrically opposite and preferably longitudinally of the bar. A hole corresponding in dimensions to the key slots is cut through the bar 10 and said key slots are of such dimensions as to allow of the insertion of the small end of the bolt 1, the wing lugs 6 slipping through the slot portions 13.

A tension spring washer 14 preferably encircles the shank 4 and fits between the shoulder 3 and the plate 9 so as to exert a constant tension longitudinally upon the bolt when in place. The bolt is inserted through the key slot hole and when turned a quarter turn is securely locked by reason of the wing lugs 6 engaging the plate 8.

The head 2′ is formed with a transverse slot 15 and a pin hole 16 is bored through the head transversely of the slot.

The plate 9 is split in from one end and the lug 17 is turned down into close proximity to the head of the bolt and is provided with a hole 18 adapted to register with the hole 16 in the bolt.

A hinge pin 19 is inserted through the hole 18 in the lug 17 and passed through the pin hole 16 in the bolt. This locks the bolt absolutely from removal as the pin hole prevents the bolt from turning and consequently prevents the wing lugs from being brought into register with the narrow portions of the key slots.

The other bolt member 2 is inserted through the bar 20 and metal plates 21 and 22 are secured to either side of said bar by means of suitable screws. The hole in the inner plate 21 is a snug fit for the bolt but the hole in the outer plate 22 is threaded to receive the threaded end of the bolt 2.

The bolt 2 is formed with a head 23 having a flat circular portion adapted to abut the plate 21 and a transversely flattened portion 24 is adapted to fit into the transverse slot in the head of the bolt 1. The head of the bolt 2 is provided with a pin hole therethrough adapted to register with the pin hole 16.

A spring washer 25 is inserted under the head of the bolt 2 to maintain a constant

pressure between the bolt and its face plates so that any shrinkage of the wooden bar will be automatically taken care of. The hinge pin 19 is secured from displacement by a suitable cotter pin 26.

It will be understood from this description that the bolt 1 may be very easily and quickly placed in position, it being merely necessary to insert the small end through the key slot and when the wing lugs have passed through, a quarter turn of the bolt insures the same being absolutely locked against removal unless turned and as the hinge pin is first inserted through the lug 17, which is part of the plate 9, the bolt cannot turn. It is also impossible when the bolt 2 is secured in the grooved slot of the bolt 1 to turn said bolt. The spring washers will keep both bolts tight and free from rattling and a very secure and effective hinge is thus produced. It may be very quickly attached or detached without disturbing any connections to the wooden bars, consequently the removal of the aileron for any purpose will not impair its connection and no kind of vibration can loosen the bolt.

What I claim as my invention is:—

1. An aileron hinge in combination with the aeroplane and aileron frames, comprising a pair of bolt members each inserted through the adjacent frame structures, a pivot pin connecting said bolts, and means secured to one of said frames and engaging said pin to lock the bolts from turning.

2. An aileron hinge in combination with the frame of the aeroplane having a key slot, comprising a bolt having lugs projecting from the shank adapted to pass through the key slot in said frame and when turned to engage the frame, means for locking said bolt from turning, and a bolt hinged to the aforesaid bolt and connected with the frame of the aileron.

3. An aileron hinge in combination with the aeroplane frame having a key slot therethrough, a bolt having lugs projecting from one end of the shank adapted to pass through said key slot and when turned to engage the frame, spring means for holding the bolt lugs in close contact with the frame, means for locking the bolt from turning, and a secondary bolt hinged to the first bolt and connected with the aileron frame.

4. An aileron hinge in combination with the aileron frame, comprising, a plate secured to one side of said frame and having a key slot, a registering key slot extending through the frame, a lug projecting from said plate, a bolt having a head engaging said plate and having a shank extending through the said key slot and provided with wing lugs at the outer end, a transverse slot formed in the head of said bolt, a secondary bolt secured in the aileron frame having a flat head extending into a slot in the head of the aforesaid bolt, a hinge pin extending through the lug on said plate and through said bolt heads to pivotally connect them together.

5. An aileron hinge in combination with the aeroplane and aileron frames, one of said frames having a key slot therethrough, comprising a bolt having lugs extending radially therefrom at one end and a head at the other end, a bolt pivotally connected to the head of the aforesaid bolt and extending through the other frame, a plate threaded on the latter bolt and secured to the frame through which it passes, and means for locking said bolts from turning.

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