

March 4, 1930.

E. H. DAVIS

1,749,021

AEROPLANE

Filed Feb. 22, 1929

2 Sheets-Sheet 1

Fig. 1.

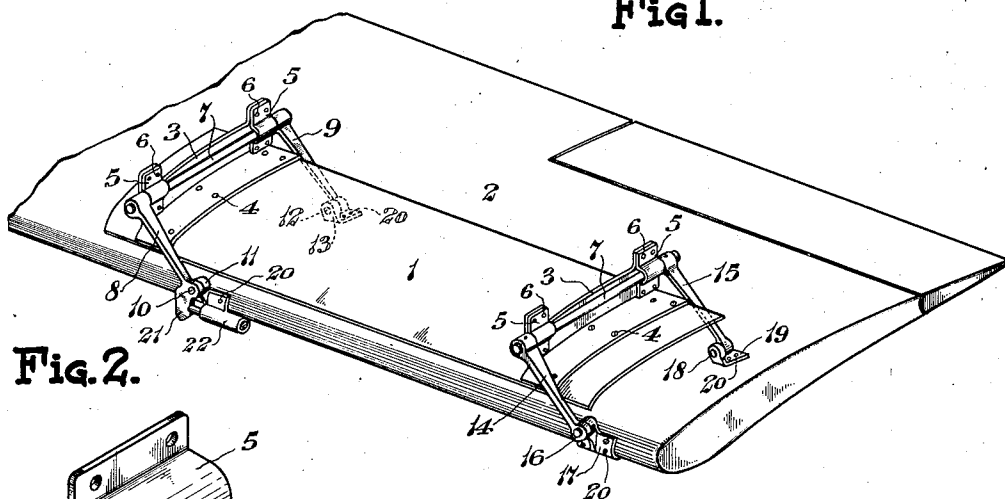


Fig. 2.

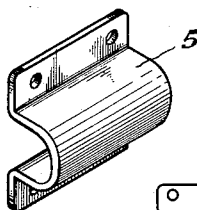


Fig. 3.

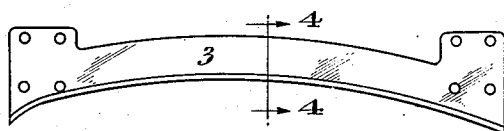


Fig. 4.



Fig. 6.

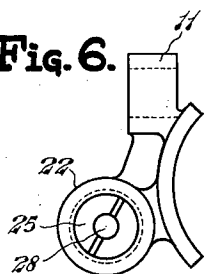


Fig. 5.

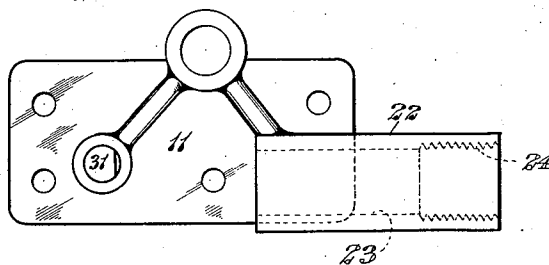
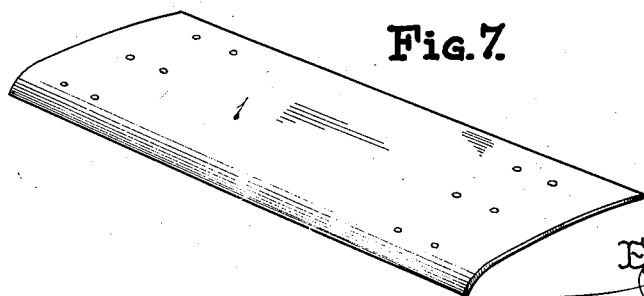


Fig. 7.



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Fig. 8.

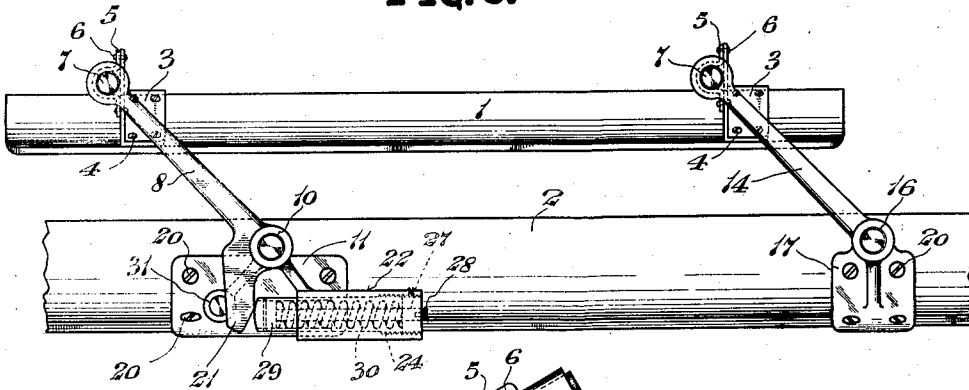


Fig. 9.

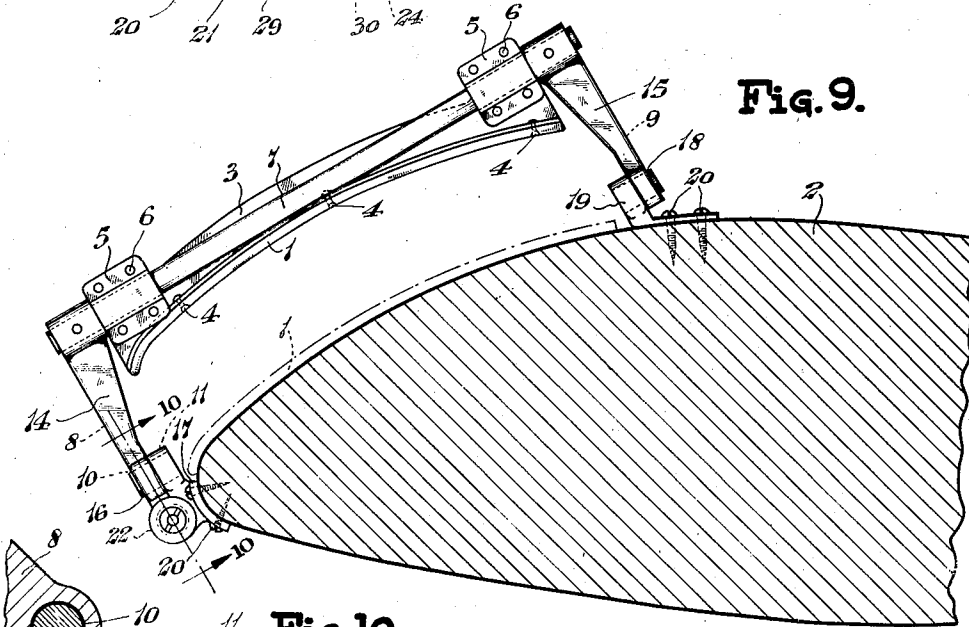
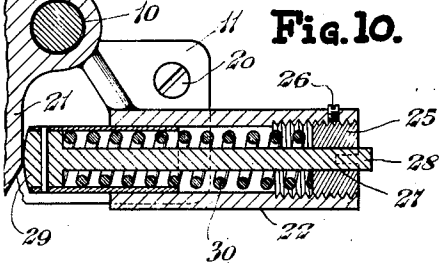


Fig. 10.



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AEROPLANE

Application filed February 22, 1929. Serial No. 341,861.

This invention relates to aeroplanes and more particularly to an automatic attachment adapted to be mounted in close proximity to the entering edge of the aerofoil.

The objects of my invention are to provide an air deflector, movably mounted in close proximity to the entering edge of the aerofoil of an aeroplane and which automatically helps to retain control of the plane at stalling speeds; to provide automatic and positive means whereby said deflector is opened when flying speed is nearly lost, said deflector being held in a closed position by air pressure during high speed.

Another object of my invention is to provide means of the character described above that can be readily installed upon planes now in use without the necessity of remodeling the present aerofoils.

Other objects of my invention are to provide air deflectors for aerofoils which are simple, efficient, economical to manufacture, easily installed and entirely automatic in their operation.

My invention consists in an auxiliary wing structure movably mounted with respect to the leading edge of an aerofoil and automatic means for holding said auxiliary wing in spaced apart relation from said aerofoil until the pressure of the wind closes it flat against said aerofoil at which time a safe flying speed has been obtained.

My invention further consists in the construction, combination, location and arrangement of parts as herein fully set forth and claimed.

Referring to the drawings:

Fig. 1 is a perspective view of a portion of an aeroplane wing or aerofoil equipped with my invention, which is shown in open or operative position;

Fig. 2 is an isometric view of one of the bearing straps;

Fig. 3 is an elevational view of one of the deflector brackets;

Fig. 4 is a cross section thereof on the line 4—4 of Fig. 3;

Fig. 5 is a front elevational view of the fitting 11;

Fig. 6 is an end view thereof;

Fig. 7 is an isometric view of the deflector or vane 1;

Fig. 8 is a front view of my invention installed upon a portion of an aeroplane wing;

Fig. 9 is a side view thereof, the wing being shown in cross section and the closed position of the deflector shown by broken lines; and

Fig. 10 is an enlarged sectional view through the plunger on the line 10—10 of Fig. 9.

In the embodiment of my invention as illustrated and which shows a preferred construction I provide an automatically operated deflector for aeroplanes comprising, generally, vane 1, the contour of which corresponds with the contour of aerofoil 2 and which is provided with brackets 3—3, said brackets being securely fixed to the upper surface of vane 1 in spaced apart relation by rivets 4. These brackets are preferably located near the ends of said vane 1, as shown in Fig. 1, and carry bearing straps 5—5 which are attached thereto by rivets 6. A shaft 7 is provided for each bracket 3, as shown in Fig. 1, each being rotatably received by its respective bearing straps 5, the ends of said shafts extending outwardly beyond said bearing straps. The upper end of levers 8 and 9, respectively, pivotally receive the ends of shaft 7, while the lower end of lever 8 is pivotally mounted at 10 upon fitting 11 and the lower end of lever 9 is pivotally mounted at 12 upon fitting 13. The upper end of levers 14 and 15, respectively, pivotally receive the ends of shaft 7 while the lower end of lever 14 is pivotally mounted at 16 upon fitting 17 and the lower end of lever 15 is pivotally mounted at 18 upon fitting 19. All of said fittings are secured to the aerofoil 2 by screws 20, as clearly shown in Figs. 8 and 9.

Lever 8 is also provided with downwardly extended arm 21 and fitting 11 is provided with an integral tubular member 22, which member is provided with a central opening 23, a portion of which is provided with internal threads 24, as clearly shown in Fig. 5. Plug 25 is screwed within said tubular member 22 and is adapted to be held therein by lock screw 26. Said plug 25 is provided with a central opening 27, which opening is adapted to re-

ceive the stem 28 of plunger 29. An expansion spring 30 is adapted to be received within the member 22, one end of said spring bearing against the inner surface of plug 25 and the other end of said spring bearing against the outer end of plunger 29, as clearly shown in Fig. 10.

A stop-pin 31 is also mounted upon the fitting 11 and limits the outward travel of plunger 29.

Referring to the operation of my device, it will be clearly apparent that the spring 30 normally forces the plunger 29 outwardly against arm 21 of lever 8, thereby causing said lever 8 to be held in an upward position, as shown in Figs. 1, 8 and 9, respectively. Therefore, it will be apparent that the vane 1 will also be held in an upward position by means of the levers 8, 9, 14 and 15, respectively. Said vane is held in this upward position until the aeroplane gathers sufficient speed at which time the pressure of the air against the top surface of the vane 1 will overcome the tension of spring 30, thereby closing said vane 1 so that it rests flat against the upper surface of the aerofoil 2. Whenever flying speed is nearly lost the air pressure against the vane will be decreased, thereby allowing the spring 30 to raise said vane 1, thus causing the space 32 between said vane and the leading edge of aerofoil 2 to create the necessary vacuum above said aerofoil to maintain flight at low speeds.

Thus it will be seen that the vane 1 is opened or lifted by the spring 30 and is closed flat against the aerofoil 2 by the pressure of the air, thus requiring no attention from the pilot. At high speeds the air pressure keeps it closed but as flying speed is lost this pressure decreases to a point where the spring and plunger mechanism forces the vane to an open position.

Since my automatic air deflector opens up at low speeds it will be realized that the normal position, when the plane is on the ground, is open. This means that the wings begin to produce lift at a relatively low speed and the plane can get into the air with a shorter run. The plane will not only get off the ground quicker, but once it takes off, the nose of the plane will rise in a direction more nearly vertical than would be possible with a plain aerofoil.

An advantage of my invention is that although the plane, equipped with one or more of my novel deflectors, climbs no faster and takes just as long to rise to, say 100 feet, it will climb so much more vertically that trees and wires at the end of a short field can be cleared, which would absolutely prevent the operation of an ordinary plane from that field.

Another advantage of my invention is that a plane equipped with my improved automatic air deflector is capable of landing at

slower speeds than is possible with a plane having plain aerofoils.

Still another advantage of my invention is that I have produced a fully reliable operating mechanism which is strong and at the same time light enough so that its added weight does not materially increase the stalling speed of the plane when the deflectors are closed.

Having thus described my invention, it will be understood that certain changes and modifications can be made without departing from the scope or spirit thereof as defined in the claim.

What I claim as new and desire to secure by Letters Patent is:

In combination with an aerofoil for aeroplanes, an automatic air deflector comprising, in combination, an elongated vane, right angle brackets carried by said vane, bearing straps carried by said brackets, a pair of shafts rotatably mounted in said bearing straps, a pair of levers pivotally mounted on the ends of each shaft, means for pivotally mounting the lower end of each lever to the upper surface of said aerofoil, and positive means for raising said levers comprising a tubular member anchored to the aerofoil, a plunger movably mounted within said tubular member, a spring to normally move said plunger outwardly from said tubular member, and an arm fixed to one of said levers and adapted to engage said plunger, for the purposes specified.

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