

July 18, 1933.

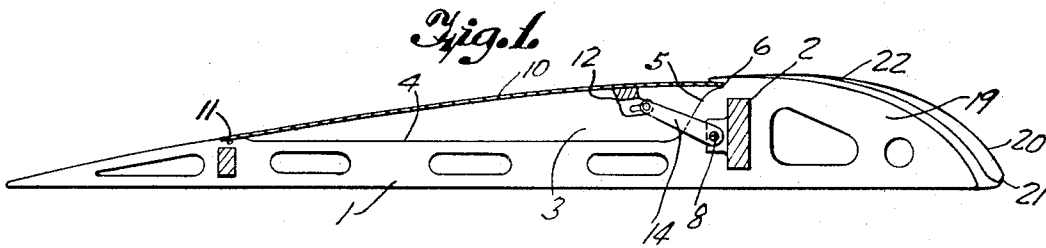
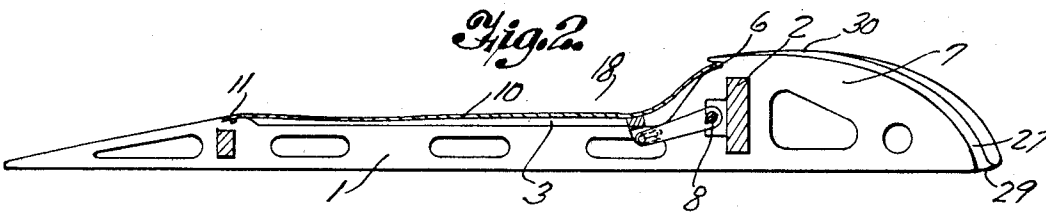
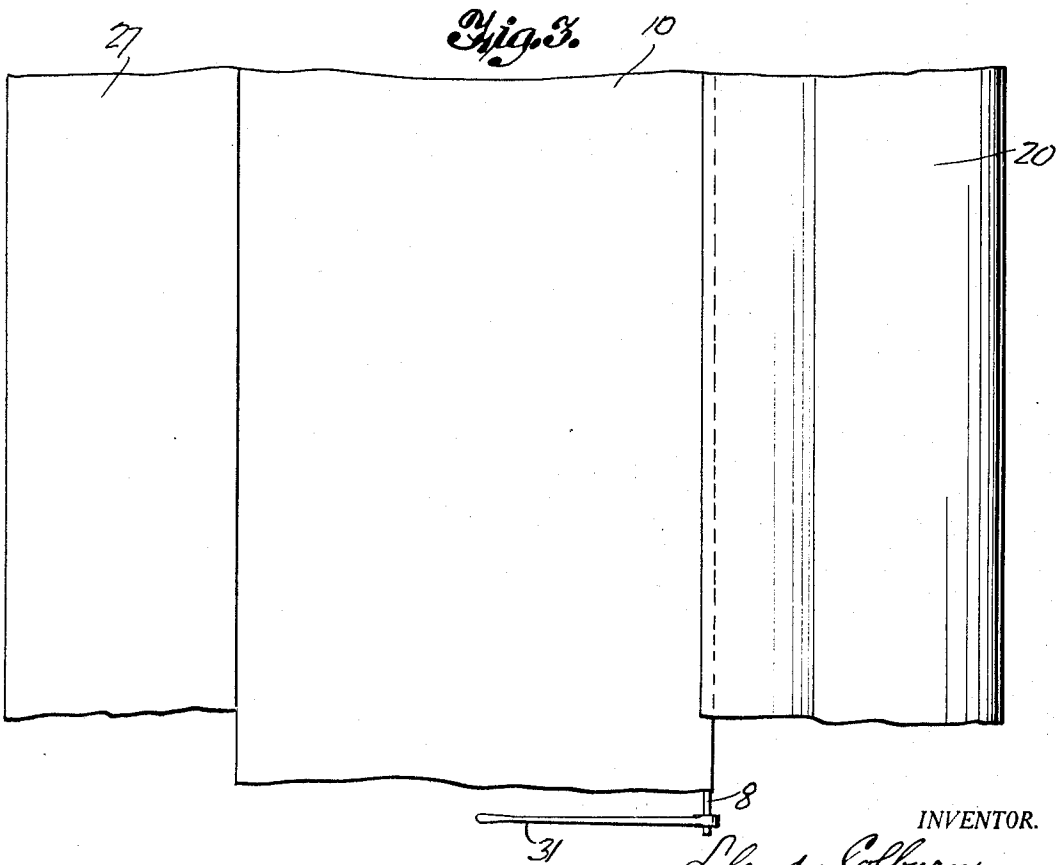
L. COLBURN

1,918,897

AIRPLANE WING

Filed May 16, 1932

2 Sheets-Sheet 1



INVENTOR.
Lloyd Colburn
BY *Adam E. Fisher*
ATTORNEY.

July 18, 1933.

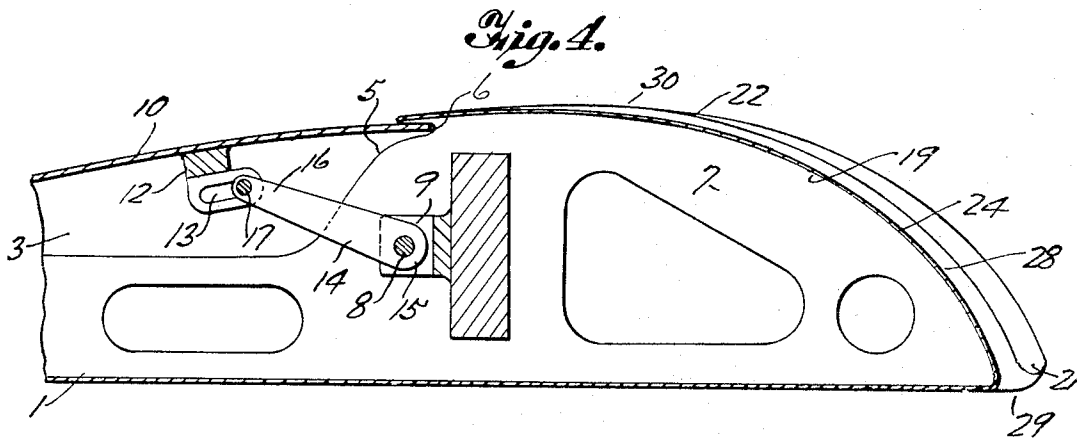
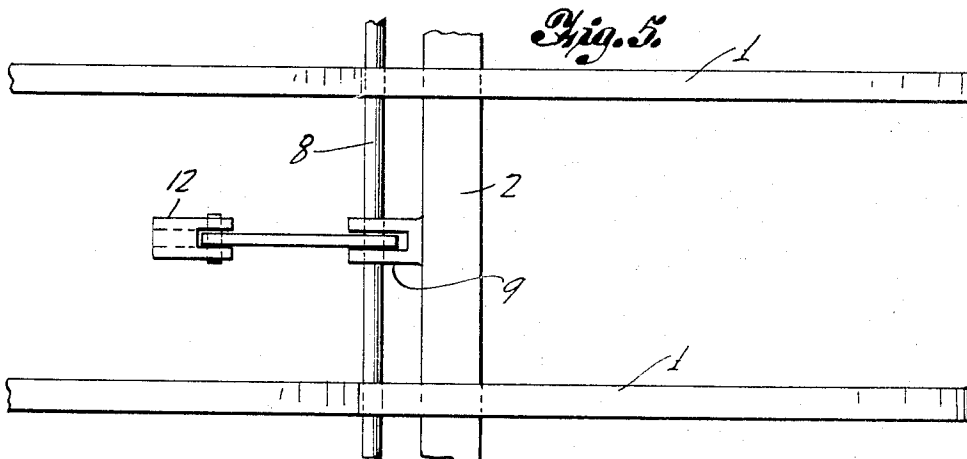
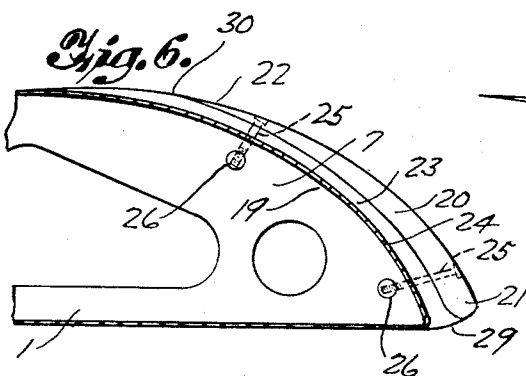
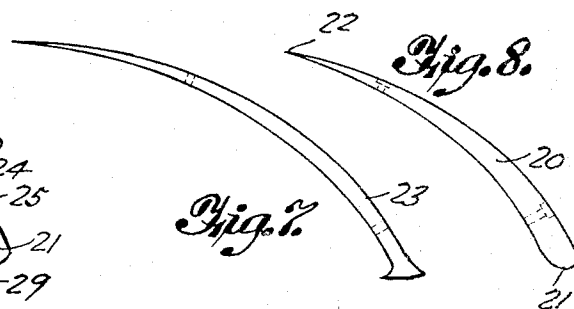
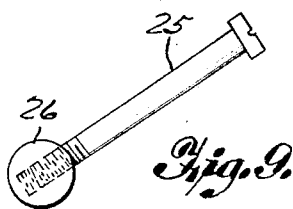
L. COLBURN

1,918,897

AIRPLANE WING

Filed May 16, 1932

2 Sheets-Sheet 2



INVENTOR.
Lloyd Colburn
BY Adam E. Fisher
ATTORNEY.

UNITED STATES PATENT OFFICE

LLOYD COLBURN, OF COOPERSVILLE, MICHIGAN

AIRPLANE WING

Application filed May 16, 1932. Serial No. 611,558.

This invention relates to wings for airplanes, and the principal object is to provide an improved form of wing having a medial, transversely extended, flexible "variable lift" panel, together with means for manipulating the same, and whereby by flexing or buckling the panel downwardly or inwardly, a concaved surface or hollow may be presented to the stream of air flowing over the top of the wing, thus creating a partial vacuum within the said hollow and facilitating the rising or "taking off" of the plane, as well as the landing thereof.

Another object is to provide an airplane structure, including a wing having a flexible, transversely arranged panel and means for manipulating the same and whereby a depression or hollow may be formed at will across the top of the wing, together with an air-way or air stream channel built in the nose of the plane, whereby an air stream is more effectively created and directed up over the said hollowed panel of the wing for the purposes aforesaid.

With these and such other objects and advantages in view as may be developed in the specification, attention is directed to the accompanying drawings as constituting a part of the specification and wherein:

Figure 1 is a side elevation of a wing rib as constructed in accordance with my invention, the medial flexible panel of my invention being shown in section. In this view the flexible panel is shown expanded to the level of the balance of the wing.

Figure 2 is a view similar to Figure 1, except that the flexible panel is shown as contracted or drawn down inwardly to form the required depression across the top of the wing.

Figure 3 is a top plan view of a medial portion of a wing constructed in accordance with my invention, the ends thereof being broken off.

Figure 4 is a relatively enlarged view of the structure of Figure 1, the rear portion of the structure being broken away.

Figure 5 is a detail of two adjacent ribs and connections, on the scale of Figure 4, the rear ends of the ribs being broken away.

Figure 6 is a detail to the scale of Figures 4 and 5, showing the manner of fastening on the nose ribs and nose panel.

Figure 7 is a detail of one of the nose ribs.

Figure 8 is an end view of the nose panel. 55

Figure 9 is a detail of one of the bolts used for securing the nose panel in place.

In the construction of an airplane wing embodying my invention, I provide a frame comprising a plurality of spaced ribs 1 tied together by spars 2. The ribs 1 are cut away or recessed medially at their upper sides, as shown at 3, the lower lines of cleavage lying substantially parallel to the bottom lines of the ribs, as shown at 4, while at the forward ends of the ribs, the lines of cleavage are directed abruptly upward, as shown at 5, and end in notches 6 formed immediately back of the heads 7 of the ribs. An operating shaft 8 is journaled through bifurcated brackets 9 extended rearwardly from the forward spar 2 between the ribs 1. A flexible, variable lift panel 10 is extended transversely across the wing over the recessed portions of the ribs 1, being fastened to the ribs at its rear margin, as shown at 11, and having its forward margin freely seated within the notches 6 of the rib heads. This panel 10 is of such material as will normally maintain itself in a symmetrically flat alignment with the balance of the wing, but will yield readily to a stress tending to flex or buckle the panel inwardly or downwardly. Brackets 12 are depended from the panel in transverse alignment with each other and in longitudinal alignment with the brackets 9. These brackets are bifurcated at their lower ends and the ends are slotted in transverse alignment, as shown at 13. Connecting arms 14 have their forward ends 15 rigidly joined to the shaft 8 inside the bifurcated brackets 9, while their rear ends 16 are slidably connected with the slotted ends of the brackets 12 by means of pins 17 passed through said ends and loosely through said slots 13. Thus as the shaft 8 is rotated in the proper direction, the arms 14 and panel 10 are drawn downward, and a depression 18 is formed transversely along the upper side of the panel immediately back of the head of the plane. 100

The nose of the conventional plane wing is curved downwardly and forwardly, as shown at 19, and in accordance with my invention, I provide a curved nose panel 20 tapered from its forward end 21 to its tail 22, the curvature of this panel conforming to that of the head. This panel is positioned over the head and is held in spaced relation thereto by curved nose ribs 23 which are positioned between the conventional wing covering 24 and the said nose panel 20. The ribs 23 are positioned immediately over or upon the forward ends of the main wing ribs 1 and are secured in such position by bolts 25 passed through the assembled structures and held by nuts 26 set within the nose portions of the ribs. The rear portion of the wing is also, of course, covered with a conventional covering, as shown at 27. The arrangement, positioning and spacing of the nose panel is such, that a number of air channels 28 are thus provided between the nose panel 20 and the regular covering 24 there being a separate channel between each pair of the nose ribs 23, each said channel being curved and somewhat tapered from their frontal openings or mouths 29 back to the rear openings 30.

An operating lever 31 is rigidly joined to the shaft 8 and is extended to the hand of the pilot.

In use and operation, as when the plane is in the act of taking off or landing, the pilot flexes or depresses the panel 10 by manipulation of the lever 31, thereby creating a concaved depression 18 along the back of the wing. In this operation the frontal margin of the panel moves somewhat out of the notches 6, as shown in Figure 2. Under the forward movement of the plane, streams of air enter the mouths 29 and flow rapidly back through the channels 28 out through the rear openings 30, and thence flow out over the depression 18. This action causes or creates a partial vacuum within the said depression 18, so that the upward pressure of the air at the under side of the wing acts to raise the wing bodily upward. As stated, this action is highly advantageous either in the process of taking off or in landing. After the plane is

raised to the required height, a simple turn of the shaft 8 will flatten out the panel 10 for straight away flight.

While I have herein described a certain specific manner and method of constructing and assembling the elements of my invention, it is understood that I may vary from the same in minor details, not departing from the spirit of my invention, so as best to construct a practical device for the purpose intended, as defined in the appended claims.

I claim:

1. An airplane wing having a medial portion of its covering cut away transversely of the wing, the underlying ribs being also correspondingly recessed at their top sides, a flexible panel secured in position over the said opening and adapted to be flexed down to form a depression along the upper side of the wing, means for so flexing the said panel, and separate means for causing an air stream to flow back over the said depression.

2. An airplane wing structure comprising in combination a conventional wing having an opening formed therein, the underlying supporting wings being correspondingly recessed at their upper sides, a flexible panel mounted in said opening and adapted to flex down thereinto, means for so flexing the said panel, and a nose panel mounted in spaced relation upon the nose of the wing for providing air channels adapted to cause currents of air to flow back over said flexible panel.

3. In an airplane wing recessed at its upper side and having a nose portion, the forward and rear portions of the frame being covered leaving an intermediate opening and there being a flexible panel mounted over said opening, an operating shaft journaled transversely through the frame below the panel, and connections between the operating shaft and the panel whereby the latter may be flexed in or out through the rotation of the shaft in one direction or the other, and a nose panel positioned over and in spaced relation to the nose of the wing for creating air channels directed backward towards said flexible panel.

LLOYD COLBURN.