H. KLECKLER.

AEROPLANE CONTROL BRIDGE.

APPLICATION FILED JULY 18, 1917.

1,298,516. Patented Mar. 25, 1919.

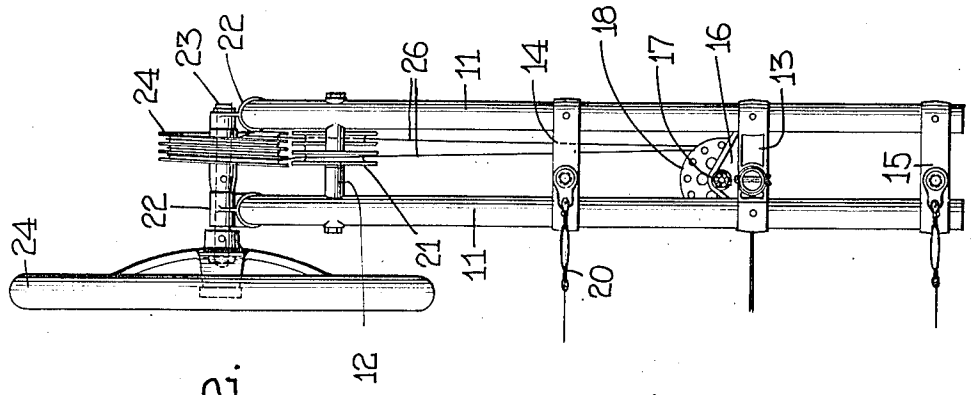

FIG. 2.

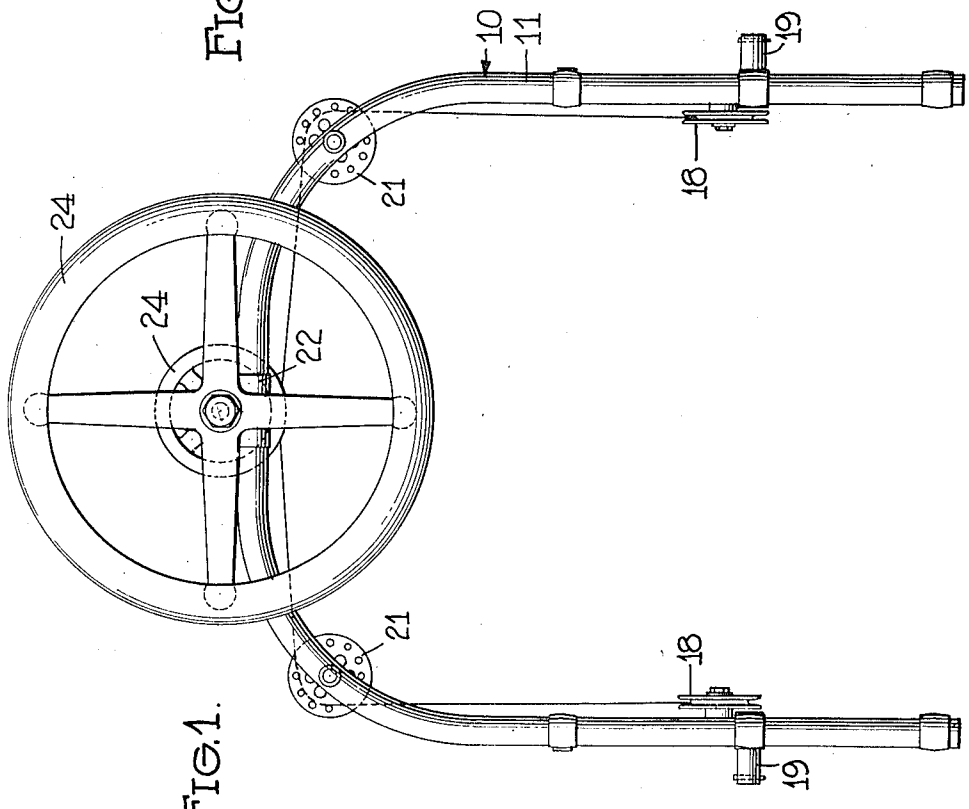

FIG. 1.

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By

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AEROPLANE-CONTROL BRIDGE.

1,298,516. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed July 18, 1917. Serial No. 181,263.

To all whom it may concern:

Be it known that I, HENRY KLECKLER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Aeroplane-Control Bridges, of which the following is a specification.

My invention relates to aeroplane control mechanism and more particularly to improvements in control bridge construction. The invention is characterized principally by the use of spaced bridge-pieces appropriately interconnected by means of cross braces arranged respectively adjacent the ends of the bight portion of the bridge and intermediate the ends of the legs. The relative arrangement of these cross braces is such that the cable lead guides supported by them tend to hold the cable leads taut. Moreover, the arrangement of the bridge pieces is such that the cable drum shaft is effectually journaled in bearings mounted upon the respective bridge pieces preferably equidistantly spaced from the upper cable lead guides.

Of the drawings:

Figure 1 is a front elevation of the control bridge, and

Fig. 2 is a side elevation thereof.

The control bridge I have designated as an entirety by the numeral 10. It is constructed of spaced parallel bridge pieces 11—11 of substantially inverted U-form arranged with the bight portion of the bridge uppermost so that the operator may be accorded ample space between the legs of the bridge. Metal cross braces 12—12, 13—13, 14—14 and 15—15 interconnect the bridge pieces at points hereinafter pointed out. The cross braces 12—12 are of tubular form and interconnect said bridge pieces respectively adjacent the ends of the bight thereof. The cross braces 13 are disposed intermediate the ends of the legs of the bridge and exactly midway between the cross braces 14—14 and 15—15 which are located respectively above and below. That portion of each cross brace 13 intermediate the bridge pieces 11 is enlarged as at 16 to afford an appropriate mounting for a shaft 17. The shaft 17 carries a guide pulley 18, the axis of rotation of which is offset from the plane of the axis of oscillation of the control bridge although parallel therewith. The guides 18, of which there are two (one guide supported by each leg of the bridge upon the inside thereof) serve as cable lead guides. Their disposition out of axial alinement with the bridge axis is such that the cable leads may extend out from the bridge in the plane of said axis to obviate slack through bridge manipulation.

Trunnions 19 extend out oppositely from the cross braces 13 to engage in bearings (not shown) suitably supported interiorly of the body of the craft in connection with which the bridge is used. These trunnions mount the bridge for suitable oscillation, preferably fore and aft. The mounting of the cross braces 14—14 and 15—15 respectively above and below the trunnions 19 is such that the legs of the bridge are effectually intermediately braced and suitable anchorages for the elevator control leads, designated 20, provided. Through this arrangement, fore and aft oscillation of the bridge will impart to the elevator flaps (not shown) the desired vertical movement.

The location of the cross braces 12—12 adjacent the ends of the bight portion of the bridge is such that guides 21—21 supported by them operate between the bridge pieces and about axes which extend at substantially right angles to the axes of the guides 18. The cross braces 12—12 are of appropriate form to function as guide or pulley shafts. Intermediately the bight portion of the bridge is equipped with bearings 22—22 mounted upon the bridge pieces (one bearing upon each piece) in alined relation. The cable drum shaft 23 is journaled in said bearings 22 and extended forwardly beyond said bearings to support upon its extended end the control wheel 24. The cable drum 25 is mounted on the shaft 23 between said bearings.

The spacing of the bridge pieces 11—11 is such that the cable drum 25 and the guides 21 both operate between them. Each bridge piece also serves as a support for one of the bearings 22. Moreover, the construction of the cross braces in shaft form provides for the mounting of the guides 21 at the ends of the bight portion, between the bridge pieces and for rotation about axes extending parallel to the axis of the cable drum.

By rotation of the control wheel 24 to either the right or left, the ailerons (not shown) are manipulated. Proper manipulation or control of the balancing surfaces is thus effected, aileron leads 26 being utilized

in this connection. The leads 26 follow the lines of the bridge upwardly from the guides 18 to the guides 21 and thence inwardly to the cable drum 25 which they embrace. The guides 21, it will be noted, are dissymmetrically arranged so that the leads 26 may extend out right and left from the drum to each without undue angularity. Furthermore, the guides 18, although located, one about the extended axis of the other, lie beneath the respective guides 21 in such manner that a vertical line extending tangentially from the base of the guide groove will intersect a line extended horizontally from one to the other of the cross braces 12 so as to lie midway between the dissymmetrically arranged guides mounted thereon.

Aluminum tubing is used preferably in constructing my improved bridge. The materials, however, used in the bridge connection may be varied. Also, the shape of the bridge and the spacing of the bridge pieces may be modified considerably without departing from the spirit of the invention as claimed. The constructional idea, however, and the guide and cable drum arrangement as herein proposed should be adhered to in so far as practical that the advantages enumerated may be gained. Particularly is the utilization of cross braces for the dual purpose of mounting the guides and interconnecting the bridge pieces believed to be new.

What is claimed is:

1. A control bridge for aeroplanes including spaced parallel bridge-pieces of substantially inverted U-form, the over-all length of the bridge pieces being substantially equal to the over-all length of the control bridge, connections between the bridge-pieces arranged respectively adjacent the ends of the bight portion of the bridge, a guide mounted upon each connection, bearings mounted upon the respective bridge-pieces intermediate said connections, a shaft journaled in said bearing, a drum carried by said shaft, and cable lead connections arranged to encircle said drum and to extend out right and left therefrom for engagement with said guides, the cable lead connections for the major part being confined to the space between the legs of the bridge.

2. A control bridge for aeroplanes including spaced parallel tubular bridge-pieces of substantially U-form, shaft connections between the bridge-pieces arranged respectively adjacent the ends of the bight portion of the bridge, although remote from the ends of the bridge pieces, guides mounted respectively upon said connections between said bridge-pieces, a cable drum supported intermediately upon the bight portion of the bridge, and cable lead connections arranged to encircle said drum and to extend out right and left therefrom between the bridge-pieces for engagement with said guides, the control lead connections again passing between the bridge pieces for continuation beyond the guides within the space definied by the legs of the bridge.

3. A control bridge for aeroplanes including spaced coextensive bridge pieces of substantially inverted U-form, connections between the bridge pieces arranged respectively adjacent the ends of the bight portion of the bridge, other connections between the bridge pieces arranged respectively intermediate the ends of the legs of the bridge, guides mounted upon said last mentioned connections with their axes extending at substantially right angles to the axes of guides mounted upon said first mentioned connections, the guides in one instance lying between the bridge pieces and in the other instance between the legs of the bridge, a cable drum mounted intermediately of the bight portion of the bridge, and cable lead connections arranged to encircle said drum and to extend out right and left therefrom for engagement successively with the guides at opposite sides of the bridge.

4. A control bridge for aeroplanes including spaced coextensive bridge pieces of substantially inverted U-form, connections between the bridge pieces arranged respectively adjacent the ends of the bight portions of the bridge, connections between the bridge pieces arranged respectively intermediate the ends of the legs of the bridge, a cable drum mounted intermediately upon the bight portion of the bridge, guides mounted upon the first mentioned connections with their axes extending parallel with the axis of the cable drum, guides mounted upon the second mentioned connections with their axes extending at right angles to the axis of said drum, and cable lead connections arranged to encircle said drum and to extend out right and left therefrom for successive engagement with the guides mounted at opposite sides of the bridge.

5. A control bridge for aeroplanes including spaced coextensive bridge-pieces of substantially inverted U-form, connections between the bridge-pieces arranged respectively adjacent the ends of the bight portion of the bridge and intermediate the legs thereof, guides mounted upon said connections with their axes extending respectively at right angles to each other, trunnions mounted upon the leg-supported connections to extend out from the bridge, a cable drum mounted intermediately upon the bight portion of the bridge, and cable lead connections arranged to encircle said drum and to extend out right and left therefrom between the bridge-pieces for engagement successively with said guides.

6. A control bridge for aeroplanes including spaced parallel bridge-pieces of substantially U-form, connections between the

bridge-pieces arranged respectively adjacent the ends of the bight portion of the bridge and intermediate the extremities of the legs thereof, guides mounted between the bridge pieces upon the connections at the ends of said bight portion, guides mounted between the legs of the bridge upon the connections intermediate the ends thereof, the axes of the last mentioned guides extending at right angles to the axes of the former, trunnions mounted upon the leg-supported connections to extend out from the legs of the bridge at opposite sides thereof, a cable drum mounted intermediately upon said bight portion for operation between the bridge-pieces, and cable lead connections arranged to encircle said drum and to extend between said bridge-pieces for engagement successively with said guides.

7. A control-bridge for aeroplanes including spaced bridge-pieces of substantially inverted U-form, connections between the bridge-pieces arranged respectively intermediate the ends of the leg thereof, guides carried by said connections, and trunnions carried by said connections with their axes spaced from the axes of the guides a distance approximately equal to the radius thereof.

8. A control bridge for aeroplanes including bridge-pieces of substantially inverted U-form, spaced connections between said bridge-pieces arranged, three upon each leg of the bridge, a trunnion carried by the intermediately located connection of each leg, and anchorages for control leads carried respectively by any two of said connections of each leg as are equidistantly spaced from said trunnions above and below.

In testimony whereof I hereunto affix my signature.

HENRY KLECKLER.