G. A. SCHNELLER.

REINFORCED BEAM FOR WING PANELS OF AEROPLANES.

APPLICATION FILED MAR. 25, 1918.

1,335,609. Patented Mar. 30, 1920.

2 SHEETS—SHEET 1.

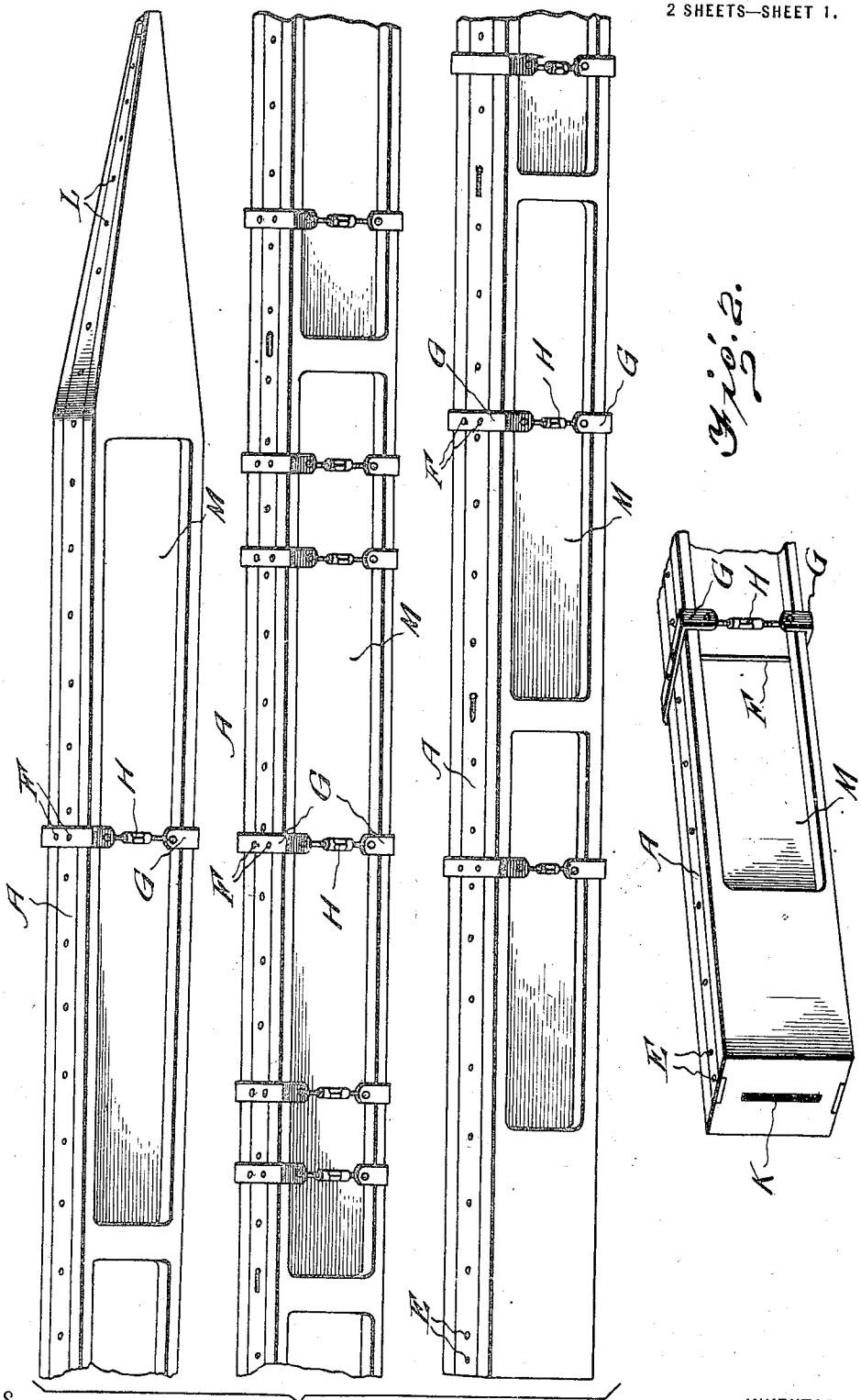


Fig. 2.

Fig. 1.

WITNESS

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INVENTOR

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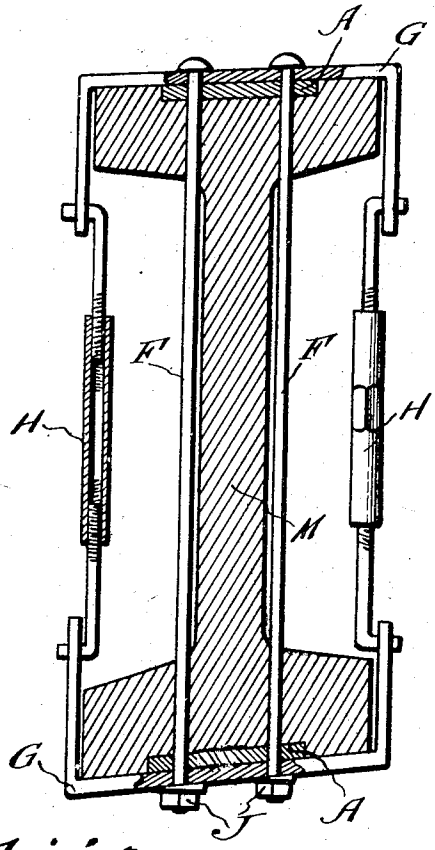


Fig. 3.

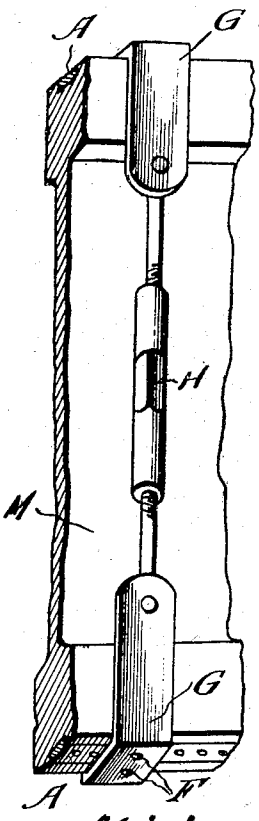


Fig. 4.

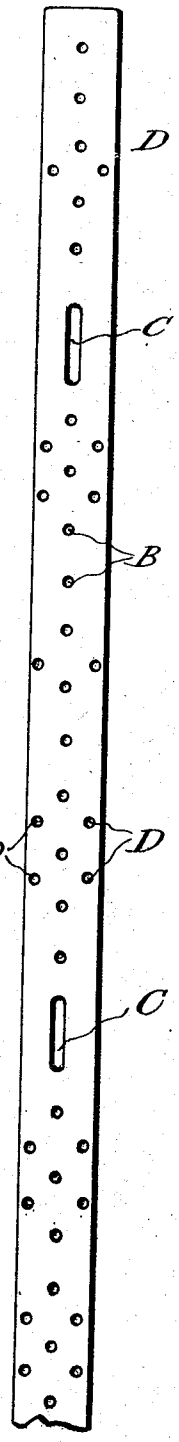


Fig. 6.

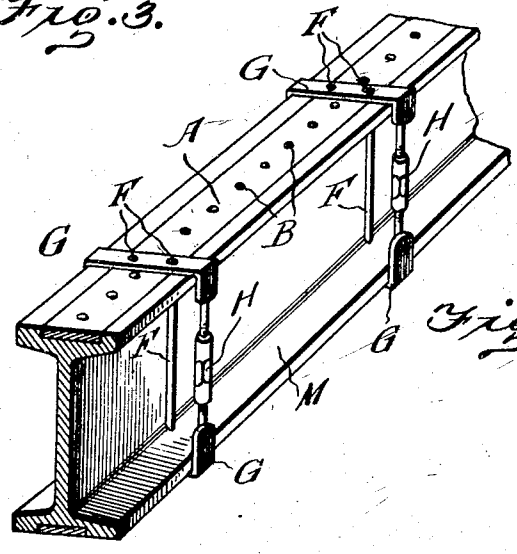


Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE A. SCHNELLER, OF BUFFALO, NEW YORK.

REINFORCED BEAM FOR WING-PANELS OF AEROPLANES.

1,335,609. Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed March 25, 1918. Serial No. 224,571.

To all whom it may concern:

Be it known that I, GEORGE A. SCHNELLER, a citizen of the United States, residing at Buffalo, in the county of Erie and the State of New York, have invented a new and useful Reinforced Beam for Wing-Panels of Aeroplanes, of which the following is a specification.

My invention relates to improvements in beams for wing panels of aeroplanes in which metal plates placed at the top and bottom of the beam in such a manner that the plates can be held in position with bolts, brackets and turnbuckles in conjunction with the wing post fittings, and the objects of my improvement are, first, to provide greater strength to the beam; second, to afford the same facilities for nailing, screwing and placing fittings such as cap strips, webs and bracing wires as the all wood beam affords in addition to the greater strength; third, to permit the use of my improvement in conjunction with the all wood beam as now used with the least possible change in detail and size until such a time as the present stock of all wood beams are utilized, when by the use of my improvement the sizes of beams can be reduced to the minimum to overcome the additional weight; fourth, to provide thinner wing panels to overcome a wind resisting feature since the larger aeroplanes require larger wing panels the all wood beam must be greater in size to furnish the greater strength, and fifth, to overcome the costly delay in securing the perfect lumber required for the all wood beam.

I attain these objects by mechanism illustrated in the accompanying drawings, in which,

Figure 1 is a perspective side view illustrating the complete spar in broken portions, the two end portions appearing above and below the central portion,

Fig. 2 is a perspective view of one end of the beam,

Fig. 3 is a transverse section,

Fig. 4 is a perspective view of a portion of the beam looking upwardly toward one side adjacent the point of the section of Fig. 3,

Fig. 5 is a sectional perspective view of a portion of the beam, and

Fig. 6 is a plan view of one of the metal plates.

Similar letters refer to similar parts throughout the several views.

The metal plates, A A, are bedded into the beam, M, at the top and bottom thereof by rabbeting the beam, M, to an exact fit as in Fig. 2, and are held in place with bolts, F F, passing through the beam, M, which also pass through brackets, G G, that are again secured by means of turnbuckles, H H, on both sides of beam, M, which constitute the parts required for a reinforced beam for wing panels of aeroplanes.

In the metal plate, A, a series of round holes, B, are bored at stipulated intervals to permit fastening the cap strips to the wooden part of the beam, M, also slots, C, as in Figs. 1 and 6, at stipulated intervals to permit the wing post fittings to pass through.

The smaller holes, D, bored at stipulated places are for bolts, F F, to pass through plates, A A, and through the wood beam, M; also, as in Fig. 3, two holes of proper size are bored E E, for two bolts which also pass through beam, M, and the fitting, K, while at the outer end of beam, Fig. 1, the plates A A, are tapered and secured to beam M, with a bolt L, as referred to hereinafter.

The wooden beam, M, is provided with a uniform flat surface on the top and bottom sides, being beveled however to conform with the sweep in wing panels, and on these flat surfaces in the construction of wing panels the cap strips pass over the various webs from the tail webs crossing the beams and nose webs and fastened to all, including beam, M. These cap strips project some distance above the flat surface of beam M; therefore permit brackets, G G, with heads of bolts, F F, and the nuts J J, to be placed at the top and bottom of the beam M, in the spaces between the cap strips without hindrance to the wing panel covering. I therefore provide beam M, with a groove in the top and bottom sides of sufficient width and depth for metal plates A A. which are of the ordinary band variety to fit snugly. The

grooves in beam M, are accomplished by rabbeting at the same time it is being surfaced on all four sides. The outer tip end as shown in Fig. 5, which is afterward tapered with a band-saw and made smooth by hand-planing, can be grooved by hand at the same time.

I prefer to have plates A A, go to the extreme end of beam M, as in Fig. 5, though not essential to reinforce the tapered end for reasons hereinafter specified.

Plate, A, in order to assure holes, B, D and E, and also slots, C, being of proper location, a templet should be used which is to be made from the top side of beam M, to show the location of each cap strip which are to be fastened to beam M, through holes, B, and show the location of wing post fittings which are to pass through slots C C, and at solid end as in Fig. 3, the two holes E E, for the fitting K, to fasten.

I specify plates, A A, to be wide enough to overlap the upright flange of beam M, sufficiently for bolts, F F, to fit closely to the upright flange and pass through plate A, so that bolts F F, can be held safely in position with brackets, G G, and by nuts, J J, as by so doing in addition to permitting the use of holes B, for cap strips to be fastened to beam M, through plates A A, permits the margin on either edge of plate A, a wooden surface of sufficient width for the purpose of gluing, nailing or screwing other fittings to beam M.

Brackets, G G, are to be shaped to fit snugly over the top and bottom sides of beam M, the ends of brackets G G, to be of length sufficient to have a small hole bored near the end to receive the right angled end of turnbuckle H, the portion of bracket G, crossing beam M, to have two holes, D, bored for bolts F F, to pass through after the bolts pass through plates A A, as in Fig. 2.

These holes, D, should be bored a trifle larger than bolts, F F, in order to offset the bevel of beam M.

Turnbuckles, H, are of the regular right and left thread with the ends at right angle with the threaded portion in order to enter the small holes at ends of brackets G G, and are to be inserted into these holes and drawn tight after the brackets G G, have been drawn tight with bolts, F F, through the beam M.

I prefer to have bolts F F, with the heads beveled on the side next to plate A, to conform with the bevel in the beam M, on the bottom side, as this also prevents bolts F F, from turning when the nuts, J J, are tightened.

To overcome the bevel of the top side of beam M, I prefer to use washers beveled to make a flat seat for nuts F F, to tighten against. This feature, however at a little more expense can be made even more secure by omitting the beveled washer and a seat milled in bracket G, of sufficient size to permit nuts, J J, to revolve and fit snugly against bracket G.

The nuts, J J, to fasten bolts, F F, are to be castellated to permit a split pin to pass through bolt F, after bolt F, is well tightened.

In Fig. 1, there is a series of brackets so arranged that two are close together, an interval with only one bracket then two more brackets close together. In this position I use my reinforcement in the event a splice is required to obtain the required length of beam.

The two brackets at ends as in Fig. 1, are placed at the ends of the splice, while the single bracket is at or near the center of the splice.

To prevent the vibration from loosening my reinforcement the split pins hold bolts, F F, and a fine wire through turnbuckle and holes at ends of brackets G G, will suffice.

In Fig. 2, which illustrates the hinge end of the beam, I have shown the beam as provided with an end recess or socket K by which to receive a hinge fitting (not shown), this fitting when in place, being secured by bolts extending vertically through the beam and through the openings E adjacent to the ends of the reinforcing strips.

I am aware that prior to my invention wing panels for aeroplanes have been made with beams. I therefore do not claim such a combination broadly; but

I claim:

1. An improved beam for the wing panels of aeroplanes having its upper and lower surfaces longitudinally grooved, reinforcing strips set into the said grooves, U-shaped brackets disposed transversely of and around the upper and lower portions of the beam at spaced points therealong, and connections between the said brackets, including members at the sides of the beam and members passing through the beam, reinforcing strips and brackets for clamping the reinforcing strips in position.

2. An improved beam for the wing panels of aeroplanes having its upper and lower surfaces longitudinally grooved, reinforcing strips set into the said grooves, U-shaped brackets disposed transversely of and around the upper and lower portions of the beam at spaced points therealong, and connections between the said brackets, at the sides of the beam, for clamping the reinforcing strips in position, said connections including turn-buckle rods engaged with the brackets and turn-buckle sleeves joining the said rods.

3. An improved beam for the wing panels

of aeroplanes having its upper and lower surfaces longitudinally grooved, reinforcing strips set into the said grooves, U-shaped brackets disposed transversely of and around the upper and lower portions of the beam at spaced points therealong, tension connections between the said brackets, at the sides of the beam, for clamping the reinforcing strips in position, said brackets and said reinforcing strips having openings to register with one another, and bolts extending vertically through portions of the beam and through the openings of the reinforcing rods and brackets, as described.

GEORGE A. SCHNELLER.

Witnesses:
ROBERT A. MERKLE,
JOHN KLING.