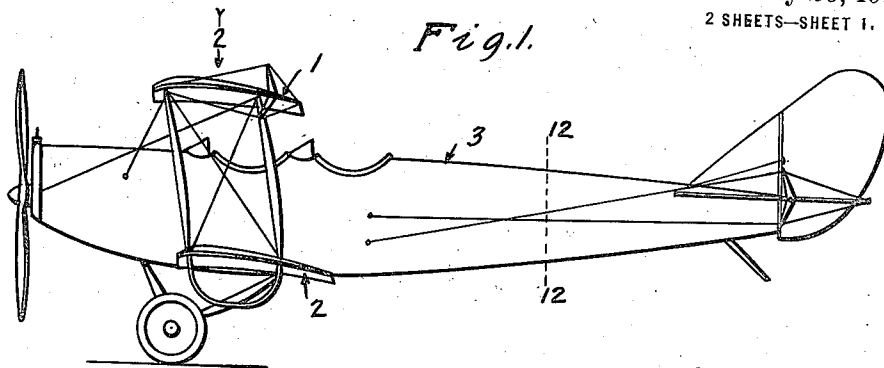
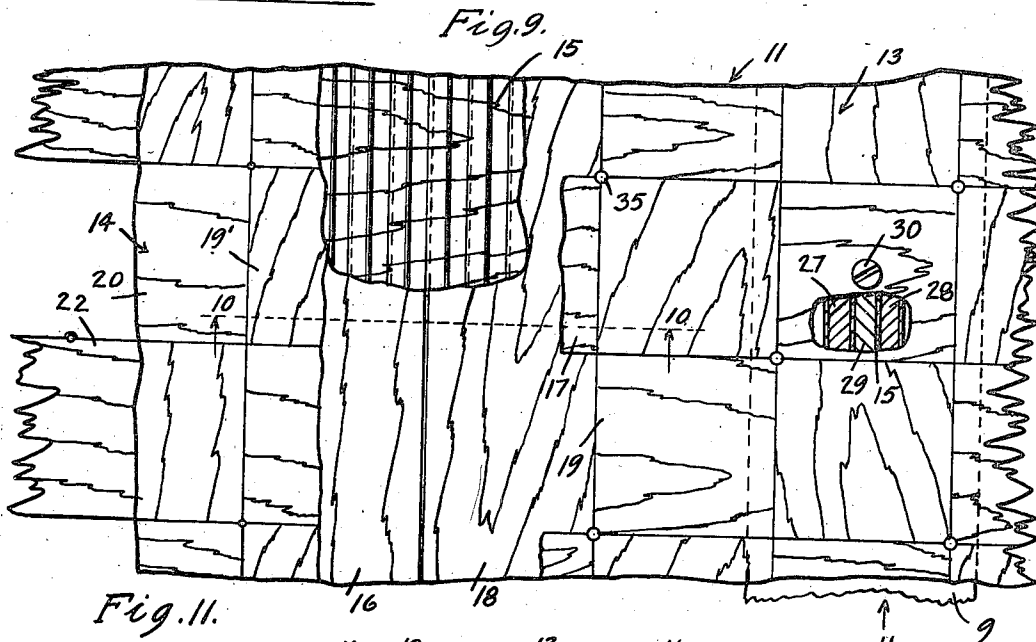
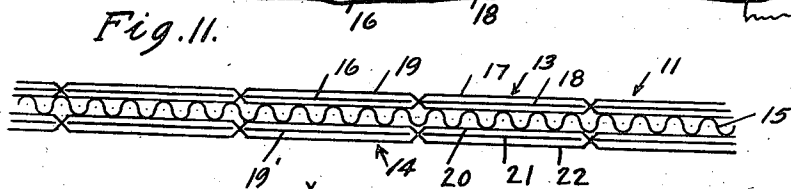
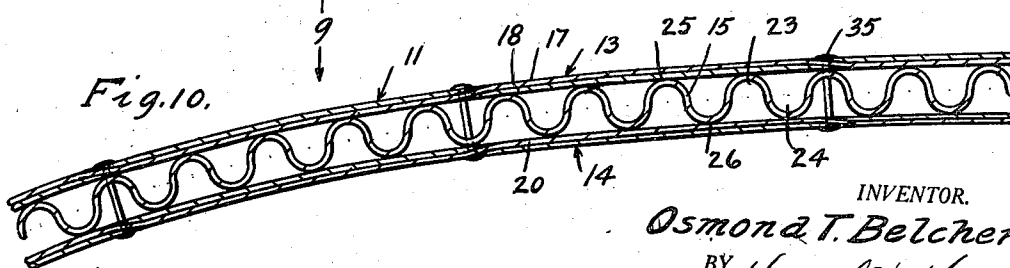


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APPLICATION FILED AUG. 26, 1918.

Patented July 29, 1919.
2 SHEETS—SHEET 1.

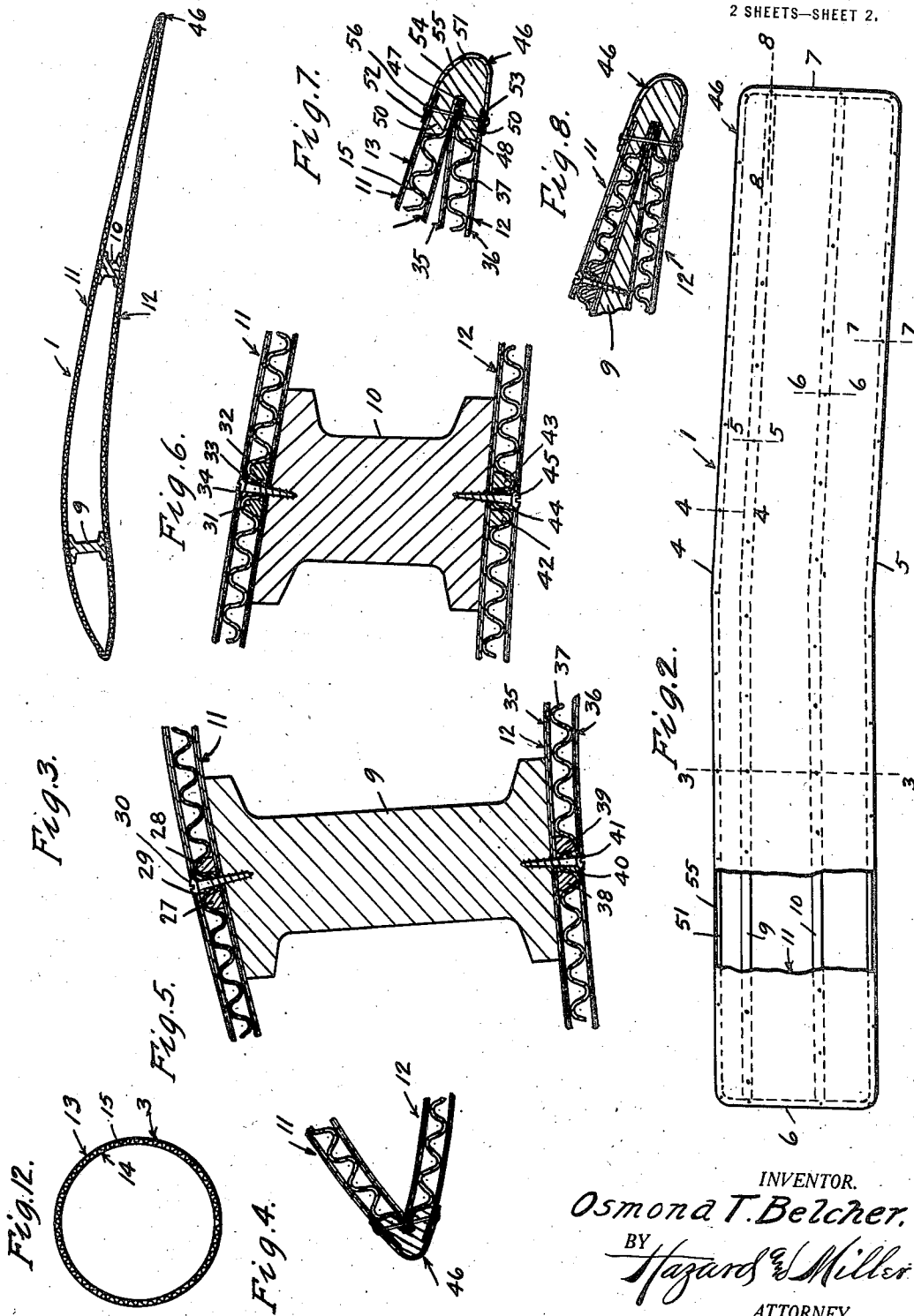


INVENTOR.
Osmond T. Belcher.
BY *Hazard & Miller*
ATTORNEY.

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ATTORNEY.

UNITED STATES PATENT OFFICE.

OSMOND T. BELCHER, OF LOS ANGELES, CALIFORNIA.

AEROPLANE CONSTRUCTION.

1,311,205.

Specification of Letters Patent.

Patented July 29, 1919.

Application filed August 26, 1918. Serial No. 251,553.

To all whom it may concern:

Be it known that I, OSMOND T. BELCHER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Aeroplane Construction, of which the following is a specification.

My invention relates to aeroplane construction, and consists of the novel features herein shown, described and claimed.

An object of my invention is to make a lifting plane or the like very rigid and efficient, and without the use of ribs, or cloth.

Another object of my invention is to make a covering for lifting planes, aeroplane bodies, and the like, which may be fabricated by machinery from wood, sheet metal and the like, and which will be very strong and reliable, and at the same time very light.

Another object of my invention is to make an aeroplane construction involving a covering which may be rapidly manufactured, easily applied, and used with confidence.

Figure 1 is a side elevation of an aeroplane constructed in accordance with the principles of my invention.

Fig. 2 is a top plan view of the lifting plane, and taken looking in the direction indicated by the arrow 2 in Fig. 1.

Fig. 3 is a vertical cross section upon an enlarged scale, and taken on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary sectional detail on the line 4—4, of Fig. 2.

Fig. 5 is an enlarged fragmentary sectional detail on the line 5—5 of Fig. 2.

Fig. 6 is an enlarged fragmentary sectional detail on the line 6—6 of Fig. 2.

Fig. 7 is an enlarged fragmentary sectional detail on the line 7—7 of Fig. 2.

Fig. 8 is an enlarged fragmentary sectional detail on the line 8—8 of Fig. 2.

Figs. 4, 5, 6, and 7 are cross sections, and might be upon the same plane as Fig. 3, the parts being greatly enlarged and necessarily broken away to economize space, and Fig. 8 is on a plane at right angles to Figs. 3, 4, 5, 6, and 7 and longitudinal of the supporting spars, and crosswise of the line of travel.

Fig. 9 is an enlarged fragmentary plan of

the fabricated wooden covering, the view being taken in the direction indicated by the arrow 9 in Fig. 10.

Fig. 10 is a sectional detail on the line 10—10 of Fig. 9.

Fig. 11 is a diagrammatic edge view upon the same plane as Fig. 10 and looking in the direction indicated by the arrow 11 in Fig. 9.

Fig. 12 is a cross section through the body of the aeroplane and taken on the line 12—12 of Fig. 1. The view being drawn to show the fabricated covering of the body, the other parts being omitted.

The main lifting plane 1, the secondary lifting plane 2, the body 3, and other parts of the aeroplane shown in Fig. 1 may be made in accordance with the principles of my aeroplane construction.

The main lifting plane 1 is of the desired width from the front edge 4 to the rear edge 5, and of the desired length from the side edge 6 to the side edge 7. The main spars 9 and 10 extend in parallel positions crosswise of the line of travel, and from the edge 6 to the edge 7, the lifting plane being about six times as long as it is wide, and the length being crosswise of the line of travel. The fabricated covering 11 is applied to the tops of the spars 9 and 10 and a similar fabricated covering 12 is applied to the bottoms of the spars. The fabricated covering 11 consists of the upper wall 13, the lower wall 14, and the corrugated filler 15. As shown, the upper wall 13 consists of wooden splints 16, 17, 18, and 19 preferably of spruce, the splints are shaved very thin like veneering, and splints are cut about an inch wide, and woven together so that one-half of the grain of the wood, runs at right angles of the other one-half of the grain of the wood, and the weave is made as tight as possible so that there are no spaces between the edges of the splints. In a like manner the wall 14 consists of similar splints 19', 20, 21, and 22. As the splints are woven glue is applied, and the section of the wall is passed between rollers to press the parts firmly together, and to make the walls flat and smooth. The corrugated filler 15 is made from a sheet of spruce veneer built up to the desired size, and run through a corrugating machine to produce even rounded corrugations 23 and 24. The walls 13 and 14 are cut to the desired size, and glue is applied to the apexes 25 and 26 of the corrugations, then the walls 11

13 and 14 are applied so that the glue will stick the walls to the filler. Spacing strips 27 and 28 are placed in two adjacent corrugations 23, upon the wall 14 and in place to come along the center of the upper face of the spar 9, and a similar spacing strip 29 is placed in a corrugation 24, between the strips 27 and 28, and against the wall 13, and as the strips are applied glue is applied to make a suitable foundation for inserting screws 30 downwardly through the wall 13, through the strip 29 and through the wall 14 into the spar 9. In a similar manner spacing strips 31, 32, and 33 are applied in position to come along the center of the upper face of the spar 10 and the screws 34 are inserted downwardly through the strip 33 into the spar 10. Small pins 35 are inserted through the fabricated covering, preferably at the alternate corners of the squares formed by the weave.

In a like manner the lower fabricated covering 12 consists of the upper wall 35, the lower wall 36 and the filler 37, the walls 35 and 36 being formed of splints woven together the same as the walls 13 and 14 and spacing strips 38, 39 and 40 are applied in place to extend along the center of the lower face of the spar 9 and the screws 41 are inserted through the spacing strip 40 into the spar. Spacing strips 42, 43, and 44 are placed in position to come along the center of the lower face of the spar 10, and screws 45 are inserted through the strips 44 into the spar.

The spars 9 and 10 are of suitable shape in cross section to form the desired shape of lifting plane 1, and the coverings 11 and 12 are curved to produce this desired shape. The edges of the coverings 11 and 12 are brought together all the way around that is along the edges 4 and 5, and along the edges 6 and 7, and the corners are rounded, and a continuous binding 46 is applied all the way around to hold the edges together.

The details of the binding 46 are as follows: A piece of suitable wood is formed with a slot 47 extending from its inner face 48 thereby producing flanges 49 and 50 and the outer face 51 is rounded. The edges of the covering 11 and 12 are brought together so that the tongues 49 and 50 fit under the wall 13 and over the wall 36, and the edges of the corrugated fillers 15 and 37 and the edges of the walls 14 and 35 fit in the slot 47. The stick of wood is built up to extend all the way around the lifting plane, and the outer faces 52 and 53 are cut away slightly, so that the walls 13 and 36 will be flush with the face 54, then a metal binding casing 55 is applied to cover the rounded surface 51 and overlap the edges of the walls 13 and 36, and small rivets 56 are inserted through the casing 55, through the flanges 49 and 50, and through the edges of

the wall 13, 14, 35 and 36, so that when the work is finished the plane has a smooth continuous outer edge all the way around. In order to bring the coverings 11 and 12 together at the edges 6 and 7 the spars 9 and 10 are tapered to a point as shown in Fig. 8.

In the construction of the supporting plane, waterproof glue should be used wherever glue is required, and then the entire work should be well varnished.

The splints forming the walls 13, 14, 35, and 36 are preferably cut about .017 of an inch thick, and the corrugated fillers 15 and 37 are cut about .020 thick. Of course, these thicknesses may be varied slightly. The spar 9 is somewhat higher in cross section than the spar 10, and the spar 9 is placed nearer to the front edge 4, thereby spacing the coverings 11 and 12 wider apart, just behind the front edge, and from this spar 9 the coverings continue backwardly with a constantly decreasing distance between. The spar 10 is located a short distance back of the center. The spacing of the coverings 11 and 12 apart sufficiently, as shown, makes substantially a truss formation, the upper covering serving as a brace for the lower covering, and the lower covering serving as a brace for the upper covering, and when supporting a load, the upper covering 11 is arched upwardly from its edges, and the lower covering 12 serves as ties to hold the edges down, and prevent crumpling.

Instead of the rivets or pins 35 and 56, a good linen thread may be used. The splint fabric forming the wall of the covering is preferably a plain square weave, and the fabric may be of any hard substance, such as wood, sheet steel, and the like. The fabric walls of the coverings are spaced apart by the corrugated fillers, and when the parts are firmly set with rubber cement or waterproof glue, one fabric braces the other, and makes a very stiff cover. The grain of the wood in the corrugated fillers runs crosswise of the corrugations, and these fillers may be of any stiff, hard material, such as wood and sheet steel. Of course, the stiffness of the covering may be increased by increasing the space formed by the corrugated fillers. As before stated the corrugated fillers preferably are not woven sheets, but are single thicknesses of veneer.

In Fig. 12 I have shown a cross section of the body 3, this cross section being a circle formed by the covering prepared and built up in the same way as the coverings 11 and 12.

The planes 2 may be constructed in the same way and this fabricated covering may be used any place that a stiff wall is desired, and is especially intended to take the place of the linen coverings heretofore and now in use. The coverings are especially adapted

for the lifting planes, the body, the stabilizers, the elevators, and the wings of an aeroplane.

Various changes may be made without departing from the spirit of my invention as claimed.

I claim:

1. In an aeroplane construction, a covering comprising a corrugated filler of hard material, and walls of hard material secured to the faces of the filler.

2. In an aeroplane construction, a covering comprising a corrugated filler of hard material, and fabricated walls of hard material secured to the faces of the filler.

3. In an aeroplane construction, a corrugated filler of wood, and walls fabricated of wood, and glued to the faces of the filler.

4. In an aeroplane construction, a corrugated filler formed from a sheet of thin wood, with the grain of the wood running

crosswise of the filler, and fabricated walls formed of wooden splints woven together and glued to the faces of the filler.

5. In an aeroplane construction a lifting plane comprising a plurality of spars, and coverings secured to the upper and lower faces of the spars, each of said coverings comprising a corrugated filler, and walls secured to the faces of the filler.

6. In an aeroplane construction, a lifting plane comprising a plurality of spars, coverings secured to the upper and lower faces of the spars, each of said coverings comprising a corrugated filler and walls secured to the faces of the filler, and a binding securing the edges of the coverings together all the way around.

In testimony whereof I have signed my name to this specification.

OSMOND T. BELCHER.