

June 5, 1945.

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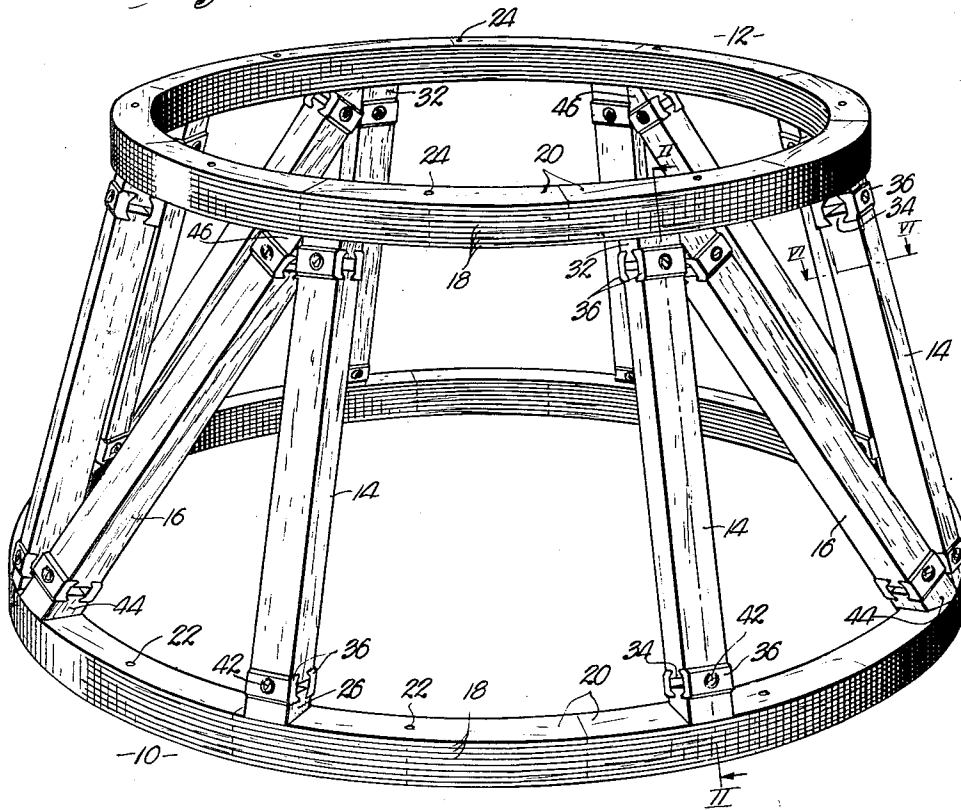
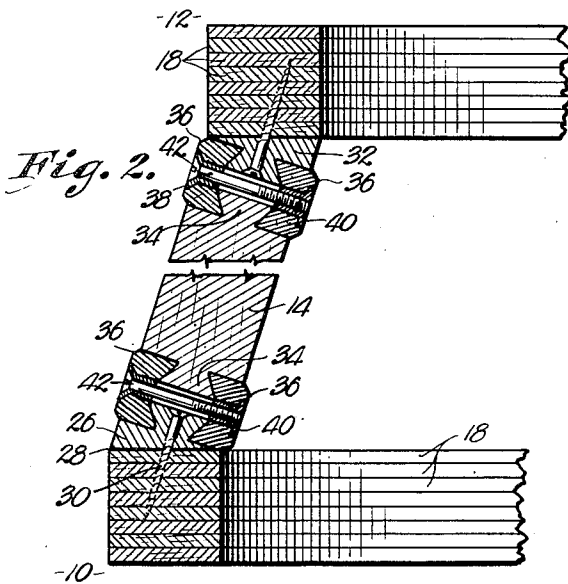
2,377,415

ENGINE SUPPORT

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3 Sheets-Sheet 1

Fig. 1.



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3 Sheets-Sheet 2

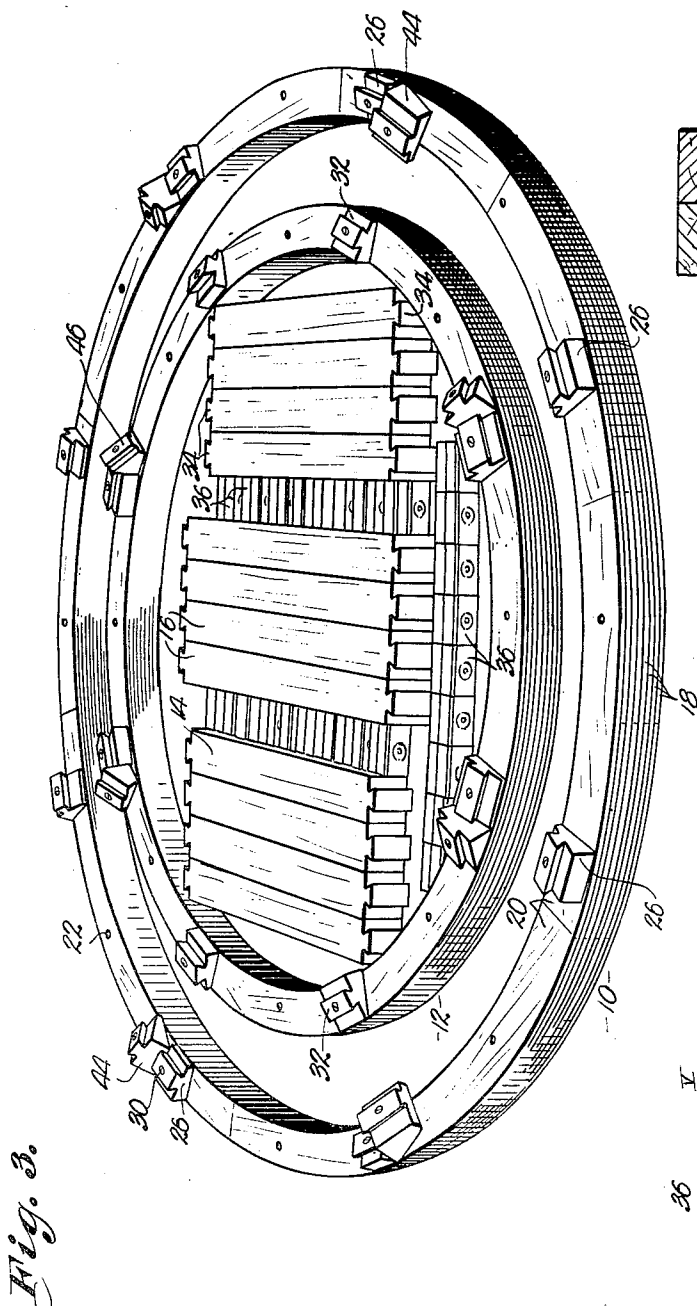
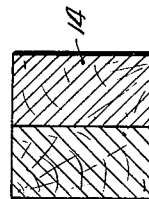


Fig. 6.



Fig. 5.

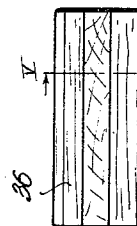


Fig. 4.

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3 Sheets-Sheet 3

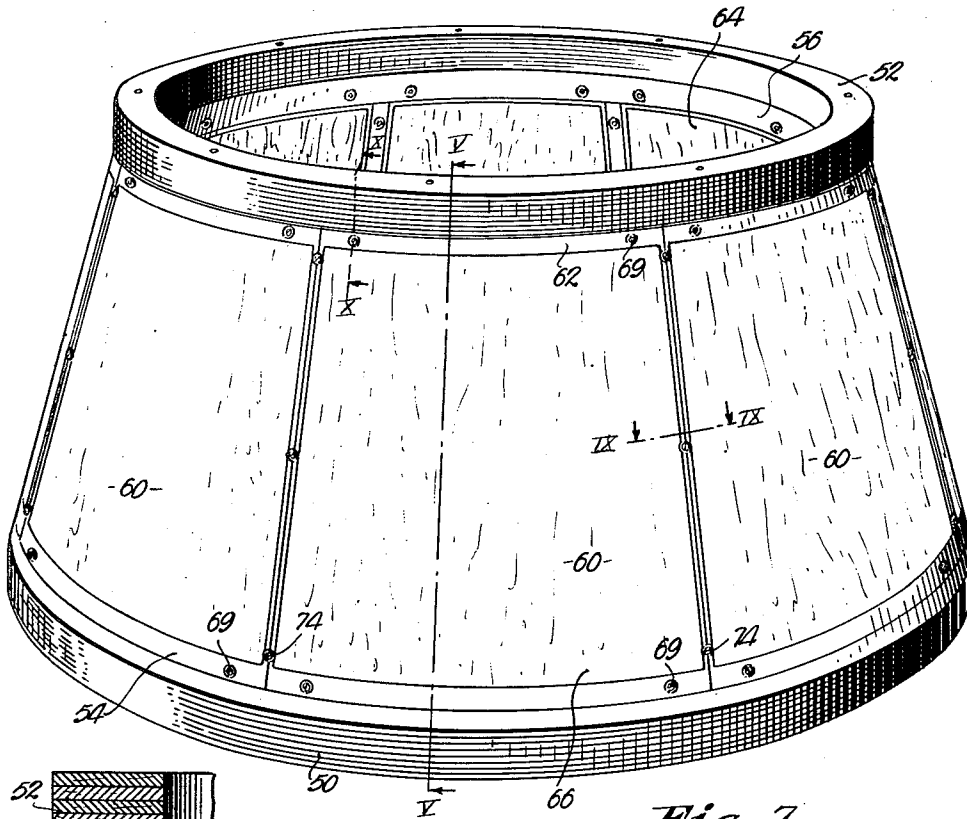


Fig. 7.

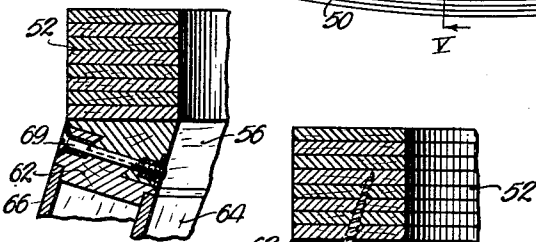


Fig. 10.

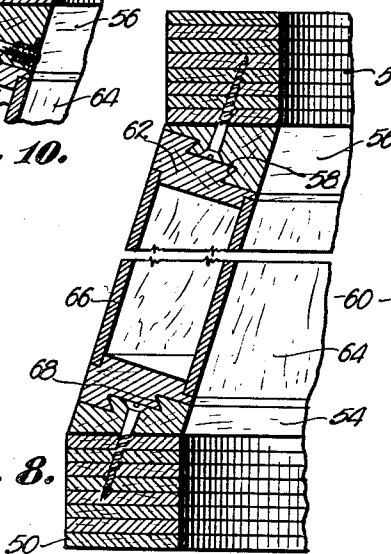


Fig. 8.

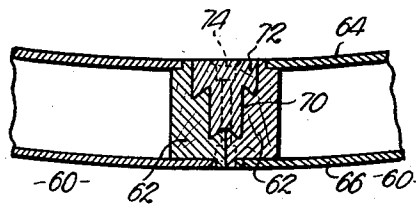


Fig. 9.

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UNITED STATES PATENT OFFICE

2,377,415

ENGINE SUPPORT

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6 Claims. (Cl. 248—2)

This invention relates to supports and particularly to devices of that character for supporting radial type airplane motors within shipping crates.

In preparing motors of the above type for shipment, and particularly for transportation via ships across the sea, numerous problems are encountered. The very high value of the engines makes it extremely important that they be amply protected against damage during shipment. It has become customary to crate such motors or engines with their crankshafts disposed in a vertical position. Supports of cylindrical formation are provided and secured to the bottom of the crate for holding the engine in sufficiently elevated condition within the crate to prevent engagement of the lower end of the engine crankshaft with the crate bottom and to further preclude striking of the peripheral extremities of the radial engine against the sides of the crate.

Since the center of gravity of an engine thus mounted within a crate is relatively high, and for the further reason that the weight of an assembled engine of the above character is comparatively great, the supports thus far provided are generally very heavy and of unitary construction. The resulting high cost of such supports makes it prohibitive to junk them after the motor has reached its destination, and therefore, these mountings are returned for further use. Their unitary construction, however, necessitates an excessive amount of space which, particularly on ocean freighters, is at a premium.

This invention has for its primary object therefore, the provision of an engine support of comparatively light, yet strong construction.

It is a further aim of the invention to provide a support capable of being quickly assembled and disassembled, and one which, when in the latter condition, will have its parts nested, one within the other, in such a manner that a minimum amount of space is required for originally stocking the supports and for returning them to the engine factory after each shipment of a motor to its destination.

Another object of the invention is to provide a support which can be built with a minimum amount of material to lower its initial cost.

Further objects of the invention will become apparent during the course of the following specification, referring to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a motor support constructed in accordance with the preferred form of this invention.

Fig. 2 is an enlarged, condensed, sectional view taken on line II—II of Fig. 1.

Fig. 3 is a perspective view of the support in disassembled condition with the parts nested together to indicate the small amount of space required for return shipment.

Fig. 4 is an edge elevational view of a laminated locking member.

Fig. 5 is a cross section of the locking member taken on line V—V of Fig. 4.

Fig. 6 is a cross section on an enlarged scale of a strut taken on line VI—VI of Fig. 1.

Fig. 7 is a perspective view of a modified form of support.

Fig. 8 is an enlarged, condensed sectional view taken on line VIII—VIII of Fig. 7.

Fig. 9 is a fragmentary horizontal section taken on line IX—IX of Fig. 7; and

Fig. 10 is a fragmentary section taken on line X—X of Fig. 7, illustrating the connection between a supporting section and an upper ring.

In the preferred embodiment of the invention illustrated in Figs. 1 to 6 inclusive, the support comprises a lower ring 10, an upper ring 12, struts 14, and braces 16. Rings 10 and 12 are preferably built up of laminations or layers 18 each formed of a plurality of segments 20, the segments of one layer being staggered with relation to the segments of an adjoining layer.

Lower ring 10 is provided with a series of apertures 22 for receiving suitable bolts to secure the ring to the bottom of a crate (not shown). Upper ring 12 is likewise provided with a series of openings 24 through which bolts or the like are passed for securing a motor on said ring. A plurality of dovetail projections 26 are fixed to the upper face of ring 10 by means of glue 28 and screws 30. In like manner, dovetail projections 32 are secured to the lower face of ring 12.

Since the lower ring 10 is considerably larger in diameter than upper ring 12, the projections 26 and 32 are in opposed angular relation to their respective rings for alignment with the struts 14 which are disposed at an angle to the rings and are provided with dovetailed ends 34, corresponding in shape to the dovetail portions of said projections.

Pairs of locking members 36, for engaging opposed faces of said dovetailed ends and projections, are respectively provided with sockets 38 and nuts 40 to receive bolts 42 for firmly clamping the locking members against the projections and the end portions of the struts. An exceptionally strong connection is thus provided making it

possible to quickly assemble or disassemble the support.

In order to further add to the strength of the frusto-conical engine support, the braces 16 are disposed at an angle between a pair of the struts 14 and connected to dovetail projections 44 and 46 on lower and upper rings 10 and 12 respectively in exactly the same manner as employed for securing the struts to said rings.

Although a support constructed as described, is relatively light, exhaustive tests have proven that it is capable of withstanding very severe torsional and tensional strains, as well as extremely heavy compression loads.

The locking members 36 have been shown in some of the views as being made of a single piece of wood, but a much stronger member is obtained if cross-grained layers are employed, such as are shown in Figs. 4 and 5. It is also desirable to form the braces and struts of two sections glued together, as illustrated in Fig. 6. Obviously, the entire support should be constructed of a good grade of seasoned hardwood, such as oak.

Fig. 3 clearly illustrates how the various parts of the support may be nested together, when disassembled, to occupy a minimum amount of space for storage or return shipment.

In the modified form of support shown in Figs. 7 to 10 inclusive, the lower and upper rings 50 and 52 respectively, are substantially identical with rings 10 and 12 of the preferred form. Instead of the series of dovetail projections of the latter, however, the former rings are provided with annular, lower projections 54, and upper projections 56. Their facing edges are formed with a series of offset surfaces producing inwardly inclined, annular shoulders 58. Wall sections 60, serving the same purpose as the struts 14 and braces 16 of the preferred form, each comprise a frame 62 and curved inner and outer panels 64 and 66 set into the frame, as illustrated. Offset shoulders 68 are formed on the periphery of the frame, those on the upper and lower edges of said frame being adapted to engage the shoulders 58, and to be drawn to firm engagement therewith by bolts 69 extended through frame 62 and projections 54 and 56, as shown in Fig. 10. The outer side edges of adjacent sections are in abutting relation to each other, but by reason of the stepped formation of frame 62, a T slot 70 remains between the inner side edges of the sections, and a lock strip 72 having a cross sectional configuration corresponding with that of slot 70, is seated in said slot, and fastening members, such as bolts 74, are used to draw strip 72 into the slot to lock the side edges of cooperating sections 60 together.

It will be seen that the modified form of invention also provides an extremely strong yet light support that can be quickly and easily assembled or disassembled.

While only two forms of supports have been illustrated and described, it is conceivable that further modifications might be made without departing from the spirit of this invention, and it

is desired therefore, to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a support of the character described, a lower ring; an upper ring; and means detachably secured to the lower and upper rings for holding said rings in parallel spaced relation, said upper ring being of a diameter to nest within the lower ring and said holding means being of a length to nest within the upper ring when the support is in knocked-down condition.

2. In a support of the character described, upper and lower rings having projections on their facing surfaces; supporting members for holding said rings in spaced relation to each other, said members having their upper and lower ends adjacent the projections of said upper and lower rings respectively; and means for detachably securing opposite ends of the supporting members to the adjacent projections.

3. In a support of the character described, a lower ring having an annular projection on its upper face; an upper ring having an annular projection on its lower face; arcuate sections for supporting the lower and upper rings in spaced relation to each other, said projections and the upper and lower edges of said sections having interengaging means for securing said sections to the projections said arcuate sections being adapted to completely fill the space between the rings to form an enclosing wall.

4. In a support of the character described, a lower ring having an annular projection on its upper face; an upper ring having an annular projection on its lower face; arcuate sections for supporting the lower and upper rings in spaced relation to each other, said sections having upper and lower edges adjacent the projections on the upper and lower rings respectively, said sections being sufficient in number and having adjoining side edges to form a continuous side wall, means for detachably securing said upper and lower edges of the sections to said projections; and means for detachably securing said adjoining side edges together.

5. In a support of the character described, a lower ring having a series of dovetail projections on its upper face; an upper ring having a series of dovetail projections on its lower face; a plurality of struts having dovetailed ends; and means for connecting the dovetailed ends of said struts to the dovetail projections of said upper and lower rings.

6. In a support of the character described, a lower ring having a series of dovetail projections on its upper face; an upper ring having a series of dovetail projections on its lower face; a plurality of struts having dovetailed ends; a plurality of braces having dovetailed ends; and means for connecting the dovetailed ends of said struts and braces to the dovetail projections of said upper and lower rings.

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