Dec. 2, 1947. M. A. HALL 2,431,931

ENGINE MOUNTING

Filed Sept. 14, 1944 2 Sheets-Sheet 1.

Fig. 1.

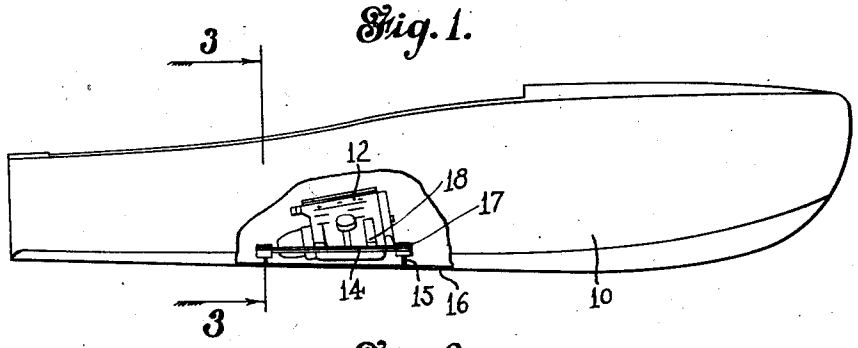


Fig. 2.

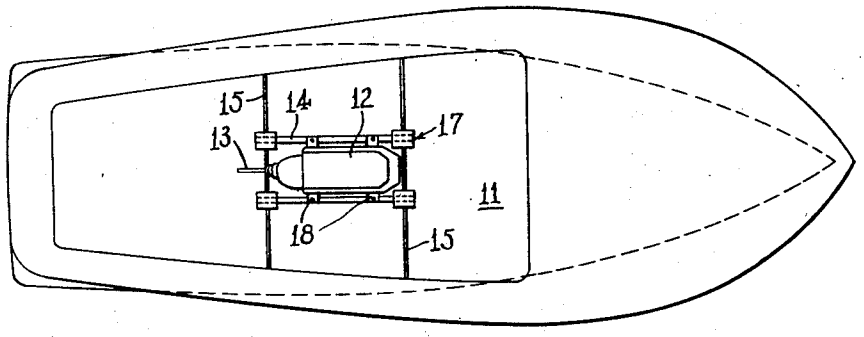
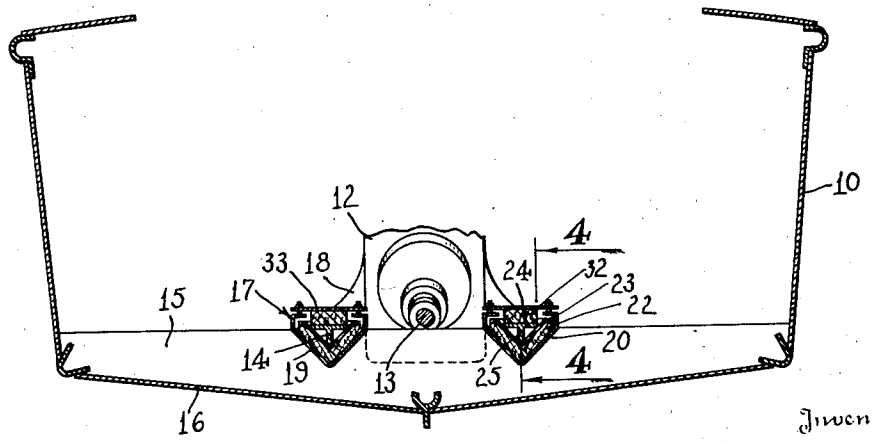


Fig. 3.



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Dec. 2, 1947. M. A. HALL 2,431,931

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Filed Sept. 14, 1944 2 Sheets-Sheet 2

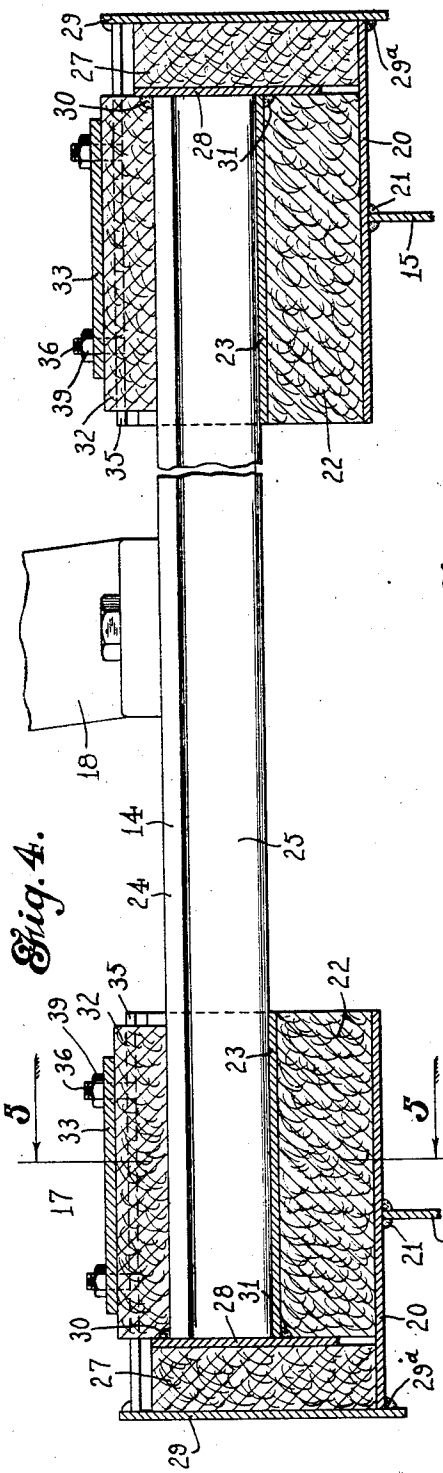


Fig. 4.

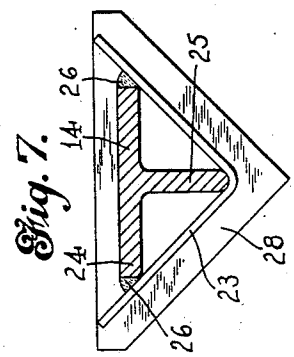


Fig. 7.

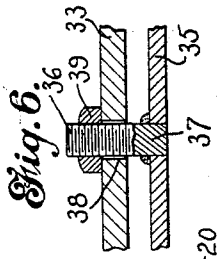


Fig. 6.

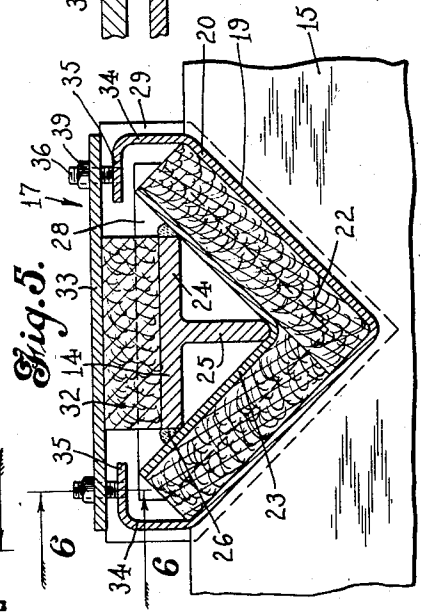


Fig. 5.

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Patented Dec. 2, 1947

2,431,931

UNITED STATES PATENT OFFICE

2,431,931

ENGINE MOUNTING

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Application September 14, 1944, Serial No. 554,026

3 Claims. (Cl. 248—9)

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This invention relates to engine mountings, and while not limited to that application, it is particularly concerned with provisions for mounting inboard motors or engines of water craft.

One of the objects is to provide satisfactory means whereby the vibration of the engine is prevented from being transmitted to the hull of the craft.

Another object is to provide an improved engine mounting for speed boats.

A further object is to furnish a simple, effective and relatively inexpensive mounting constructed so as to damp the vibrations of an engine set within the hull of a speed boat or other craft.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and finally pointed out in the claims.

In the accompanying drawings:

Fig. 1 is a side elevation, partly broken away, of a boat equipped with an engine mounting embodying my improvements;

Fig. 2 is a top plan view;

Fig. 3 is an enlarged section on line 3—3 of Fig. 1;

Fig. 4 is an enlarged section on line 4—4 of Fig. 3;

Fig. 5 is a section on line 5—5 of Fig. 4;

Fig. 6 is a section on line 6—6 of Fig. 5; and

Fig. 7 is a detail showing one of the engine girders in section and the adjacent parts in elevation.

In the drawings, a hull 10, which may be assumed to be a speed-boat hull constructed of metal, is shown as having a cockpit 11 on the floor portion of which an internal combustion engine 12 is mounted. The engine drives a shaft 13 carrying a propeller, but as the propeller mechanism forms no part of the invention it is not shown in the drawings. The engine is carried upon longitudinal girders 14, one at each side. The two girders are mounted at their ends from transverse supports 15 rising a certain distance from the bottom 16 of the hull. On each end of a girder 14 the same has a vibration-absorbing mounting 17 between it and the corresponding transverse support 15. The engine 12 may rest on each girder or longitudinal support by means such as two brackets 18 projecting laterally from the engine at different points in its length, but this means for supporting the engine on the girder is shown merely by way of example.

As all of the mountings 17 in this particular form are similar, a description of one will suffice. The mounting shown at the left of Fig. 4 is one of the mountings disposed at the rear of the engine, and this mounting, which is shown in transverse section in Fig. 5, may be considered as an example of the mounting structure.

Adjacent the mounting 17 the transverse support 15 is provided with a receiving notch 19 in the upper edge portion. Preferably the support 15 is constituted by a metal plate in an upright plane, and the notch 19 is of V shape. In this notch is received a plate 20 which is of substantially V-shaped cross section, said plate fitting the recess and projecting forwardly and rearwardly thereof (with reference to the boat hull) and fastened rigidly in place by suitable means, as, for example, welds 21. Within the V-shaped plate 20 is received a V-shaped layer 22 of felt or other vibration-damping material, and above the felt layer is a V-shaped plate 23 that is rigidly fastened to the end portion of the girder 14. The girder 14 is preferably of T-shaped cross section, having a relatively wide horizontal web 24 and a relatively short depending flange 25. The arrangement is such that the girder fits within the V-shaped plate 23, and the plate can be rigidly attached to the girder by means such as welds 26 at the side edges of the girder web, the lines of welding being adjacent the upper edges of the plate. The plate 23 extends substantially from a plane adjacent the free extremity of the girder to a point well along the girder in the direction of the engine. On the other hand, while the girder extends within the lower and larger plate 20 a considerable distance, the free extremity of the girder is spaced inwardly to some extent from the vertical plane in which the left-hand end (Fig. 4) of plate 20 is located, thereby leaving space for a vertical layer 27 of felt or like material which takes up end thrust in one direction. The layer 27 is interposed between a transverse plate 28 attached to the free end of the girder and a plate 29 attached to the free end of the plate 20.

In Fig. 7 a part of the structure at the end of the girder is shown, and it will be seen from this view how the girder is received in the smaller V-shaped plate 23. The plate 28 is illustrated in Fig. 7, and it will be seen that this is of approximately triangular shape. It may be fastened in place by means such as a weld 30 between it and the upper part of the girder (Fig. 4), and a weld 31 between it and the lower surface of the plate 23. The plate 28 is of approximately triangular shape, as shown in Fig. 5, and is fastened to plate 20 by means such as a weld 29a. The felt layer 27 is located in the space between the end of the girder and the end wall (29) of the chamber in which the girder extends longitudinally.

Above the girder a layer 32 of felt or the like is employed, the same being located between the upper face of the girder web and the lower face of a cross plate 33, which extends across the chamber previously mentioned and is attached to the upper edge portions of the plate 20. This plate 20 has at each side a short upper vertical portion 34, and at the summit of the portion 34 an inwardly turned flange 35, and preferably the

flanges **35** are connected to the cross plate **33** by means such as bolts **36**. The flanges **35** are located under the respective marginal portions of the plate **33** and spaced downwardly therefrom to a certain extent. The preferred arrangement of each of the bolts **36** is as shown in Fig. 6, and it will be noted that each bolt has a shank **37** welded or otherwise attached to the flange **35** and extending upwardly therefrom and passing with clearance through a hole **38** in the plate **33**. The shank **37** is threaded and a nut **39** engaging the threads at a point above the plate **33** enables the members **20** and **33** to be approached toward each other to the desired extent so as to place the felt layer **32** under compression to the desired degree, and also to adjust the compression of the layer **22**.

As will be evident from Fig. 4, the uprightly disposed layer **27** and its associated parts operate to receive thrust from the girder horizontally in one direction, whereas the corresponding layer at the opposite end of the girder serves to receive thrust in the opposite direction. By this arrangement the girder is mounted for cushioning in opposite directions lengthwise.

It will be understood from the foregoing description that the girder is cushioned to permit a slight amount of movement in a lateral direction, or in an up-and-down direction, by the supporting effect of the V-shaped layer of compressed damping material held between the lower and upper plates of each end mounting of the girder, the lower plate being attached to the fixed transverse support and the upper plate being fixed to the girder itself. Such a mounting is very effective in preventing shocks and vibrations from being transmitted from the prime mover to the main engine support and to the boat hull. It will be evident also that upward movement of the girder end is under the control of the overlying layer **32** of damping material, the latter being held in position by the overlying cross plate forming a part of the girder-receiving chamber. By this arrangement the possibility of the girder end rising more than a predetermined amount from its normal setting is prevented, and the girder is held down under proper control in generally the same manner as the girder is held under control in a lateral direction and in a generally upward direction. The effect is to provide the girder end with a floating mounting which permits it to move in any direction, but to a slight extent only. The movements in a lateral direction and in a generally up-and-down direction are obviously capable of variation by the manipulation of the adjusting devices between the cover plate **33** and the plate **20**, which latter plate may be referred to as the main casing plate.

It will be apparent that the structure described can be provided at comparatively low cost, and that it acts very effectively in mounting the engine so that vibrations will not be transmitted to the boat hull or other support or foundation.

It will be apparent that the described construction provides an assembly in which an end portion of the longitudinal supporting member projects longitudinally into a casing or body, with the extremity of the longitudinal support spaced from a closed end of the casing or body, with damping material intervening, and that the casing or body has a lower angular portion accommodating between it and a correspondingly shaped member fixed to the longitudinal support a layer

or body of damping material controlling lateral movement and also up-and-down movement, there being also an additional layer of damping material between a cover on the body and the upper part of the longitudinal support. By manipulation of adjusting means between the cover and the casing, the compression of the lower angularly disposed damping layer and also of the upper horizontally disposed damping layer can be controlled within certain limits.

While only a single embodiment of the invention is illustrated herein, it will be understood that the invention can take many different forms, and that various modifications and changes in the details may be made without departing from the principles of the invention or the scope of the claims.

What I claim is:

1. In a device such as described, a casing having a lower V-shaped part, an inner layer of vibration-damping material conforming to said V-shaped part, and an engine-supporting girder having an end portion supported by said layer of material, said girder being of T-shaped cross section and having a V-shaped plate applied to the lower part thereof which rests on said layer.

2. In a device such as described, a casing having an open end and a V-shaped lower portion, an engine-supporting girder extending into said casing through said open end and spaced from the bottom of the casing, a layer of material which is of V-shaped cross section disposed in the lower part of the casing, a V-shaped plate fastened to the girder and disposed at the underneath portion of the latter and resting on said layer, a second layer of vibration-damping material disposed in the casing above the girder, and means for adjusting the compression of said layers.

3. In an engine mounting for marine engines, the combination of longitudinal girders supporting the engine at the respective sides, transverse members underlying the girders and having upwardly facing recesses immediately beneath the girder ends, and vibration-damping members set in the respective recesses, each of said members comprising a casing with a V-shaped bottom, said casing being closed at one end at some distance from the extremity of the girder and being open at the other end in order to receive the girder lengthwise, and said casing having a vertically adjustable cover member, the lower girder portion disposed within the casing being of V shape, a layer of cushioning material between said portion and the casing bottom, another layer of cushioning material between the casing cover and the upper part of the girder, and a further layer of cushioning material in the space between the girder extremity and the closed end of the casing.

MARCUS A. HALL.

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