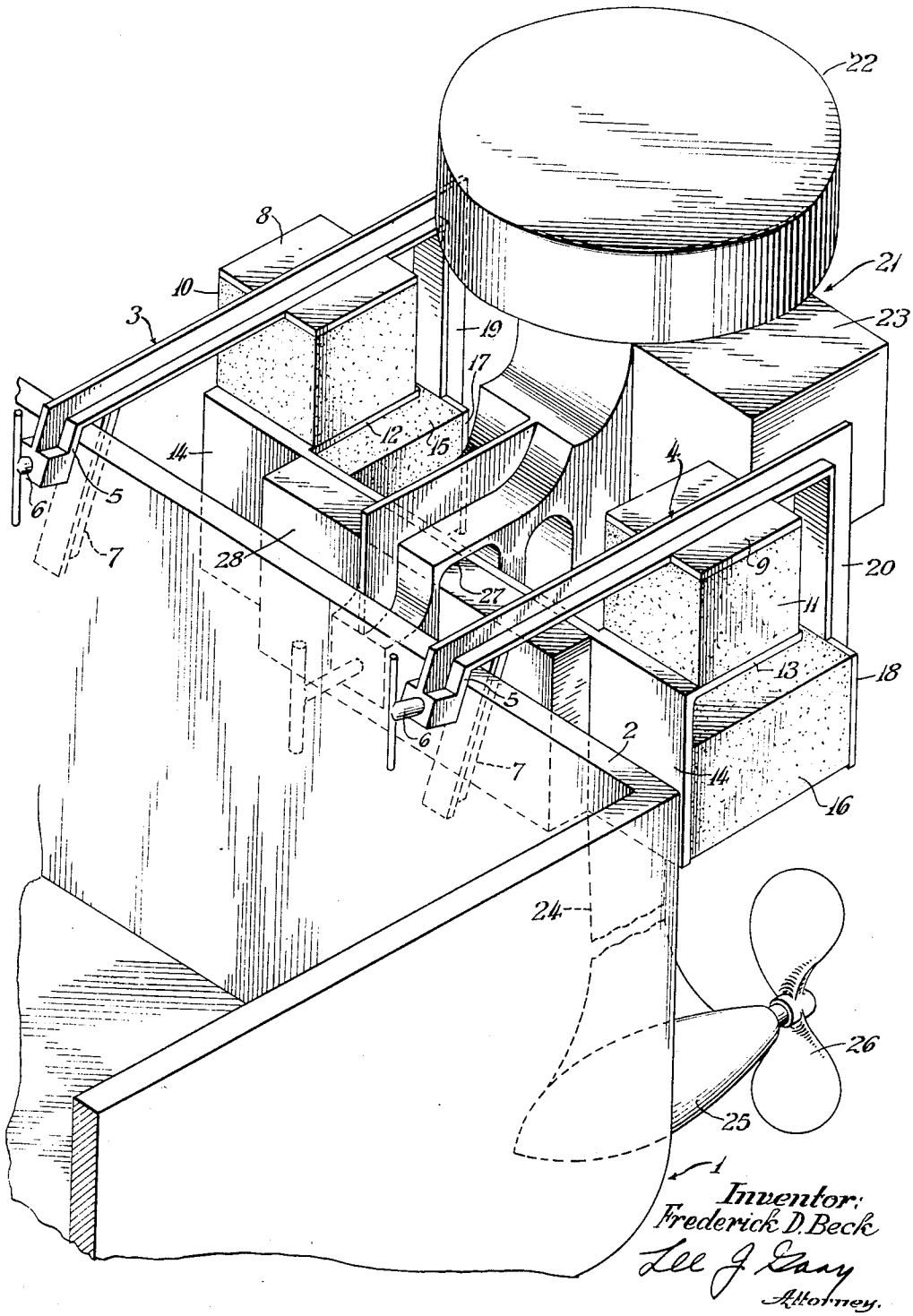
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VIBRATION ABSORBING SUPPORT

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VIBRATION ABSORBING SUPPORT

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6 Claims. (Cl. 248—4)

This invention relates to improvements in resilient mountings for devices which inherently vibrate, and refers specifically to a resilient mounting for an internal combustion engine of the "outboard" type.

Resilient mountings for motors, engines or other similar machines wherein vibration is an inherent characteristic have heretofore been employed. However, in substantially all cases the resilient agent is subjected by the vibration to stresses of compression or shear. The resilient agent is substantially never subjected to stresses of tension except when the agent is subjected to a compound stress or when effected by incidental stresses such as occur on rebounds. However, in substantially all instances the resilient agent is intended and designed to absorb compressive or shearing vibrations.

In my invention a resilient mounting is provided wherein vibrations are absorbed primarily by producing tension in the resilient agent, the mounting being further characterized in that the weight of the device supported is carried in a suspended manner by a resilient agent and the load that the device delivers, if a prime mover, reacts in tension upon a resilient agent.

In a specific embodiment of my invention I contemplate using the same in conjunction with an outboard motor, that is, a portable type of internal combustion engine, commonly employed by removably attaching the same to the rear end of a small boat. To utilize my invention in such an environment I provide a plurality of brackets which carry a plurality of pairs of resilient blocks, preferably rubber, one set of blocks being adapted to function as a suspending means for the engine, and the other set being adapted to serve as a reacting medium through which the boat is propelled, each set of blocks being primarily in tension during operation of the engine.

The objects and advantages of my invention will be apparent from the accompanying drawing and following detailed description.

In the single figure in the drawing, a perspective view is shown of my invention as applied to an outboard motor.

Referring in detail to the drawing, 1 indicates the rear portion of a relatively small boat such as the usual rowboat, said boat having a flat stern 2. Outboard motors are frequently employed to propel boats of this type and are removably mounted upon the stern 2 by means of a clamp or clamps constructed as part of the engine block. In the usual outboard motor design most attention is directed to lightness of construction and compactness and consequently said engines, having little inertia in themselves, tend to vibrate excessively. This, of course, is annoying to the operator and tends to injure the boat upon which the engine is mounted.

To suppress or absorb these annoying and injurious vibrations, I provide a pair of supports 3 and 4 which are attached to the stern 2 of the boat and upon which through resilient agencies hereinafter described, the outboard motor is suspended.

The supports 3 and 4 are identical and may be constructed of T-iron stock or any other structural shape. If desired the supports may be constructed of iron, aluminum or any of the strong light-weight alloys. The end of each of the supports may be turned downwardly as shown at 5, and may carry a clamping screw 6. An arm 7, formed rigid with each support, extends downwardly from the support in spaced relation with each of the downward extensions 5. The arms 7 together with the extensions 5 form clamps which embrace the stern 2 of the boat, said clamps being secured to the stern by means of the screws 6.

The supports 3 and 4 extend rearwardly from the stern of the boat in a spaced, substantially horizontal direction. Plates 8 and 9 are carried, respectively, upon an intermediate portion of the supports 3 and 4, said plates being welded or otherwise secured to the supports, or if desired the supports may be cast integral with said plates. The plates 8 and 9 are relatively flat and, although shown as square, may be of any desired shape. Each of the plates 8 and 9, although shown as comprising two half portions, may be constructed as unitary members which may be welded or otherwise secured to the bottom of the supports.

Blocks 10 and 11 of resilient material, preferably rubber, are secured to the lower faces of the plates 8 and 9, respectively, by vulcanization, by the use of adhesives, or by mechanical means which does not inhibit the resiliency of the blocks. The opposite faces of the blocks 10 and 11 are similarly secured to flanges 12 and 13, respectively, which are carried by plate 14 which extends from flange 12 to flange 13 and is disposed at an angle to said flanges.

Blocks 15 and 16 of resilient material, preferably rubber, are secured to plate 14, block 15 being positioned beneath and spaced from flange 12, and block 16 being similarly mounted beneath flange 13. The manner of securing blocks 15 and 16 to plate 14 is similar to that described in con-

junction with blocks 10 and 11. The opposite faces of blocks 15 and 16 are secured to plates 17 and 18, respectively, which in turn are carried by the downwardly extending arms 19 and 20 forming continuations of supports 3 and 4 respectively. Plates 17 and 18 are similar to plates 8 and 9, and may be formed integral with arms 19 and 20 or may be united thereto by welding or otherwise.

The mechanism hereinbefore described comprises the resilient mounting for an outboard motor, indicated generally at 21. The motor 21 is of the conventional type having flywheel 22, motor block 23, drive-shaft housing 24, propeller-shaft housing 25 and propeller 26. A bracket 27 is formed as a unitary portion of the conventional outboard motor whereby the motor can be mounted upon the stern of a boat. However, in utilizing my invention the bracket 27, instead of engaging the stern 2 of the boat, is mounted upon plate 14 between the supports 8 and 9. If the motor is provided with the usual bracket it will be necessary to insert a block 28 of wood or other similar material to augment the thickness of plate 14.

It can readily be seen that the entire weight of the engine 21 is supported primarily by the blocks 10 and 11 and secondarily by the blocks 15 and 16 which contribute to the support to a very limited extent. However, the motor 21 is resiliently suspended and makes no contact with the boat except through the cushioning rubber. Similarly, the force exerted by the propeller 26 in propelling the boat through the water is transmitted to the boat primarily through the blocks 15 and 16. Vibrations, therefore, set up by the engine are absorbed substantially entirely by the blocks 10, 11, 15 and 16 and are not transmitted to the boat.

By utilizing the vibration absorbing agents in tension rather than in compression or shear a greater range of vibrational frequencies is absorbed. In addition, noises set up by the motor 21 are not amplified by the boat, acting as a sounding board, since the rubber in tension readily absorbs the relatively high frequency sound-producing vibration. Further, the propeller 26 acts at a further distance from the hull of the boat by my arrangement whereby said propeller acts in less turbulent water, that is water that is not so affected by the wash of the boat. This is of particular importance at high boat speeds where excessive wash tends to dynamically unbalance the propeller which adds to engine vibration.

As shown and described the brackets 3 and 4 and the accompanying equipment are formed separately from the motor and form an intermediate link between the engine and boat. Of course, my invention contemplates that the bar 14, carrying the rubber blocks and brackets, may be formed, if desired, as a unitary part of the engine block.

I claim as my invention:

1. In combination with a prime mover for imparting horizontal motion to a conveyance, of means for insulating said conveyance from vibrations set up by said prime mover comprising a supporting member adapted to be secured to said conveyance a downwardly extending portion carried by said supporting member, a resilient element suspended from said supporting member, a bracket secured to the lower end of said resilient element upon which said prime mover is carried, a second resilient element secured at one end to said bracket, the opposite end of said second resilient element being secured to the downwardly extending portion of said supporting member, whereby the weight of said prime mover is supported by said first resilient element and horizontal motion is transmitted by said prime mover to said conveyance through the second resilient element.

2. A vibration absorbing support for an outboard motor which comprises, a supporting member adapted to be secured to the rear end of a boat and extend rearwardly therefrom, an arm extending downwardly from said supporting member adjacent its outer end, a resilient element suspended from said supporting member, a bracket for supporting an outboard motor carried at the lower portion of said resilient element, a second resilient element secured to said bracket, the opposite end of which is secured to the downwardly extending arm, whereby the weight of said motor is supported by said first resilient element and the thrust imparted to the boat by the motor is transmitted through the second resilient element.

3. A vibration absorbing support for an outboard motor which comprises, a pair of supporting members adapted to be secured to the rear end of a boat in spaced relation and extend rearwardly therefrom, an arm extending downwardly from each supporting member adjacent its outer end, a resilient element suspended from each supporting member, a bracket connecting the lower portions of said resilient elements, said bracket being adapted to carry an outboard motor between said resilient elements, a second pair of resilient elements secured to said bracket, the opposite ends of which are secured to the downwardly extending arms, whereby the weight of said motor places said first pair of resilient elements in tension, and the thrust imparted to the boat by the motor places said second pair of resilient elements in tension.

4. A vibration absorbing support for an outboard motor which comprises, a pair of supporting members adapted to be secured to the rear end of a boat in spaced relation and extend rearwardly therefrom, an arm extending downwardly from each supporting member adjacent its outer end, a resilient element suspended from an intermediate portion of each supporting member, a transverse bracket having its face in a vertical plane, horizontal plates carried at opposite ends of said bracket, said plates being connected to the lower portion of said resilient elements, a second pair of resilient elements, connected between the vertical face of said bracket and said downwardly extending arms, said bracket being adapted to support said outboard motor whereby the weight of said motor places said first pair of resilient elements in tension and the thrust imparted to the boat by the motor places said second pair of resilient elements in tension.

5. In combination with an outboard motor, of a bracket comprising a supporting member adapted to be secured to and extend rearwardly from the rear of a boat, an arm extending downwardly from said supporting member adjacent its outer end, a resilient element suspended from said supporting member, a second resilient element secured to said downwardly extending arm, means for securing the outboard motor block to the free ends of both resilient elements, whereby the weight of said motor is supported by said first resilient element and the thrust imparted to

the boat by the motor is transmitted through the second resilient element.

6. In combination with an outboard motor, of a bracket comprising a supporting member adapted to be secured to and extend rearwardly from the rear of a boat, means extending downwardly from said supporting member, a resilient element suspended from said supporting member, a second resilient element secured to said downwardly extending means, means for securing the outboard motor block to the free ends of both resilient elements whereby the weight of said motor is substantially supported by said first resilient element and the thrust imparted to the boat by the motor is substantially transmitted through the second resilient element.

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