

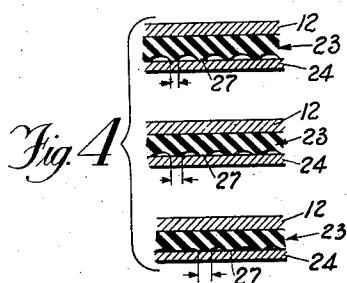
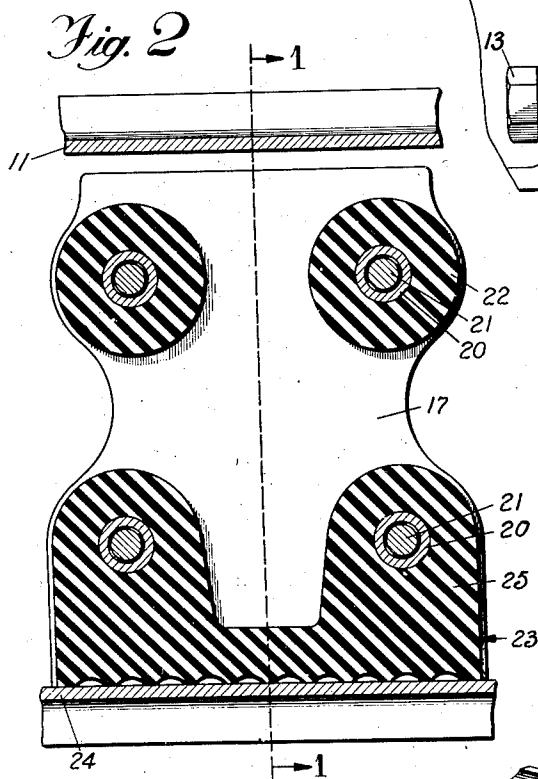
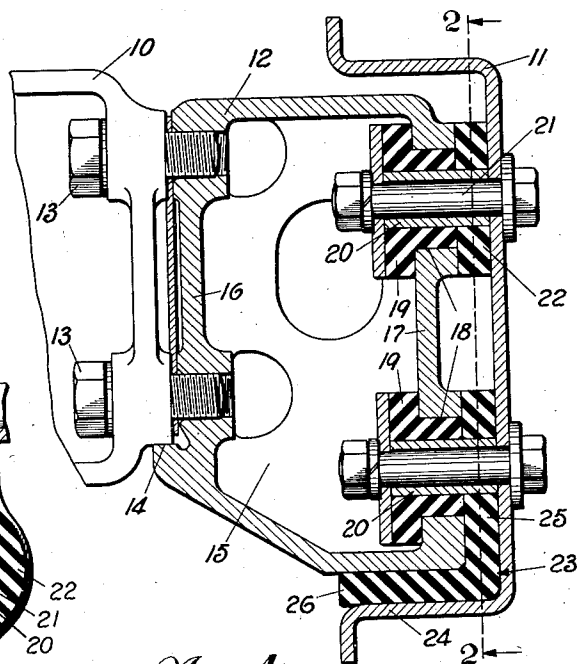
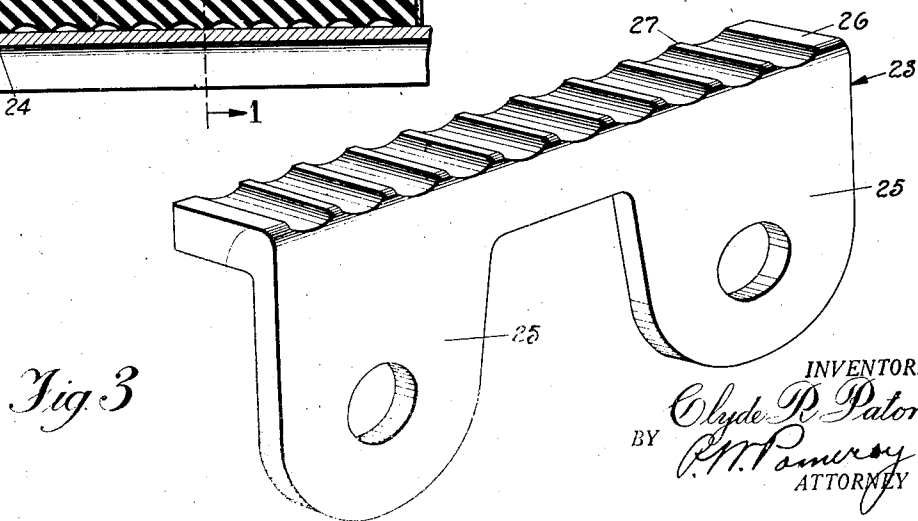
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MOTOR SUPPORT

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MOTOR SUPPORT

Application filed November 29, 1929. Serial No. 410,470.

This invention relates to insulated supporting means for internal combustion engines in motor vehicles and comprises an insulator, preferably L-shaped in cross section, positioned between the engine support and the vehicle frame to absorb or damp out engine vibrations and thus prevent the engine vibrations from being transmitted to the vehicle chassis.

Heretofore various forms of insulated or cushioned mountings between the engine and vehicle frame have been used to absorb or damp out the engine vibrations which may be caused from the unbalanced reciprocating or rotating masses in the engine, the natural engine torque variations, or the periodic application of torque to the engine crankshaft. The devices heretofore used have not been entirely satisfactory as it is obvious that for a given vibration amplitude of the engine that the forces transmitted from the engine to the vehicle frame are dependent upon, first, the thickness of the insulating material, second, the character or hardness of the insulating material, third, the degree of confinement of the insulating material and, fourth, the loaded area of the insulated material. It has been heretofore necessary to limit the amount of insulation used between the engine and vehicle frame so that the full benefit sought to be obtained by the insulation has not been possible because materials which would provide full and complete insulation under normal driving conditions would permit excessive engine movement relative to the frame on rough roads. Furthermore, the most satisfactory and available insulating materials have been rubber compounds and it is well known that it is commercially impossible to obtain such materials which are uniform and of the same composition thus preventing the uniform results desired.

It is, therefore, the principal object of my invention to provide an insulator having a low elastic deflection rate which will provide a maximum of insulation at normal loads and which is capable of rapidly increasing its resistance to deflection when subjected to increased loads such as caused by road shocks

encountered when traveling over rough roads or for other causes.

A further object is to provide a design of insulator which will not be affected by differences in hardness of the rubber compound and which will permit the insulator being loaded to the limit of its capacity to resist "cold flow" or permanent set.

A further object is to provide an insulator having an uneven or a corrugated surface permitting the effective area of the insulator to increase in proportion to the increased load thereon.

A further object is to provide an insulator having an uneven or a corrugated face formed so that the effective widths of the ribs or area under normal load will vary with the differences in rubber hardness to thus automatically compensate for such differences in the rubber compound in the assembly of the insulator in the vehicle and whereby uniform elastic properties of the insulator are thereby maintained.

A further object is to provide a design of insulator which will automatically increase its load carrying area as the insulator ages and tends to set or "cold flow" whereby the load carrying area of the same automatically increases to thus insure the maximum efficiency or effectiveness during the entire life of the device.

The above being among the objects of the present invention, the same consists of certain features and combination of parts to be hereinafter described, and then claimed, having the above and other objects in view.

In the accompanying drawings which illustrate a suitable embodiment of the present invention,

Figure 1 is a sectional view taken on the line 1—1 of Figure 2, showing the engine supported by the vehicle frame and the insulator positioned between the support and frame.

Figure 2 is a section taken substantially on the line 2—2 of Figure 1.

Figure 3 is a perspective view of the L-shaped insulator, the same being in inverted position.

Figure 4 is a diagram showing the in-

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insulator, first, in unloaded position, second, in normal loaded position, and third, in shock loaded position.

Referring to the accompanying drawings in which like numerals refer to like parts throughout the several views, an arm or bracket 10 extending from the internal combustion engine to be supported is carried by the channel shaped frame 11 as is clearly shown in Figure 1. The number of points at which the engine may be supported is immaterial and will not be described further herein, attention being called to applicant's copending application Serial No. 290,532 filed July 5, 1928, as illustrating a suitable means for supporting the engine on the frame.

A bracket 12 is preferably secured by four bolts 13 to the outer face of the engine arm 10, the bracket 12 preferably being provided with a projecting tongue 14 on which the engine arm 10 may seat. The bracket 12 is preferably a casting having the shape of a closed figure formed with a web 15 intermediate the ends thereof integrally connecting the walls 16 and 17 to give strength and added rigidity thereto. The wall 17 is formed with openings 18 therein adapted to receive the resilient bushings 19 having metal sleeves 20 extending therethrough through which the bolts 21 extend to clamp the bracket 12 against the frame member 11. Resilient washers 22 are positioned between the outer face of the wall 17 and the inner wall of the frame 11 to prevent metal to metal contact between the bracket 12 and the frame member 11. The members 19 and 22 are preferably formed from a rubber compound, however, other suitable materials may be used for the purpose described.

An L-shaped member 23, as shown in the several figures of the drawings, formed of rubber or similar non-metallic resilient material is seated on the lower flange 24 of the frame member 11 with the vertical legs 25 thereof seating against the inner face of the frame member 11 and secured in position by means of the lower bolts 21. The horizontal portion 26 of the L-shaped member 23 is preferably corrugated to provide the ribs 27 as shown in Figures 2 and 3 for a purpose to be hereinafter described.

The invention relates more particularly to the formation of the L-shaped member 23 as the value of this member in preventing noises and vibrations from being transferred from the engine to the vehicle is dependent upon the resilient properties of the insulating material and a construction wherein the maximum amount of insulation is obtained which will not permit undue movement between the engine and frame when the vehicle is subjected to shocks such as encountered when driving over rough roads.

As shown, the ribs 27 seat on the flange 24

and the depressed portions between the ribs normally prevent a full face contact of the portion 26 of the member 23 with the flange 24. As shown, in Figure 4 of the drawings, under normal loaded condition the area of contact of the insulating member with the flange is relatively small, whereas, under normal load condition the insulating member will be compressed to provide a greater area of contact. Further, when the vehicle is subjected to road shocks, the compression of the insulating member 23 will provide a still greater area of contact.

This construction permits of the use of insulating materials which may be formed within a large range of grades of material, it of course being evident that the softer grades of the rubber compound are more effective as insulators but that they have a greater "cold flow" than the harder, less effective insulators. It will be further evident that by the use of an insulator as herein shown that as the same ages and tends to have a permanent set, a greater portion of the corrugated face will come into contact with the flange of the frame member thus insuring that the effectiveness of the insulator will be maintained at its maximum value throughout the life of the insulator. It is further apparent that a greater amount of insulation may be used with the present device because the effective area thereof may be proportioned to the normal load carrying capacity of the same and that the capacity of the insulator is increased in direct proportion to the load which it is required to support.

Having thus described my invention the construction and its use will be clearly apparent to those skilled in the art and it is my desire to claim the invention broadly, as well as specifically, as is indicated in the appended claim.

What I claim is:

In a motor vehicle, the combination with a supporting channel section frame and an internal combustion engine to be supported thereby, of a relatively thin L-shaped rubber cushioning member engaging the side wall and lower flange of said frame, said rubber cushioning member having its lower face transversely corrugated to provide a series of transversely closely disposed ribs engageable with the lower flange of said frame, the area of the ribs being adapted to increase in proportion to the load on said cushioning member and tending to progressively increase resistance to the engine movement relative to the frame.

Signed by me at South Bend, Indiana this 26th day of November, 1929.

CLYDE R. PATON.