Oct. 11, 1932. E. S. MacPHERSON 1,881,777

ENGINE MOUNTING

Filed Dec. 2, 1929 2 Sheets-Sheet 1

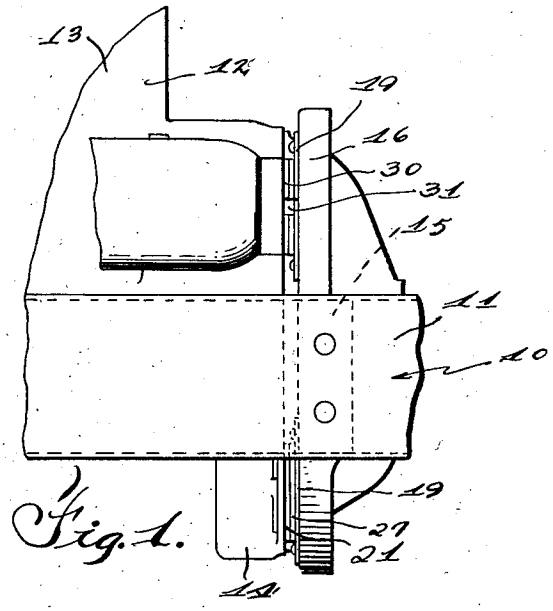


Fig. 1.

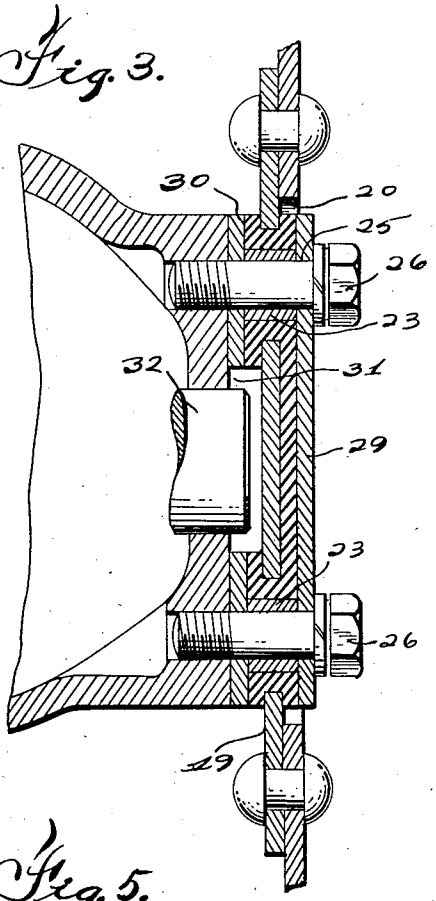


Fig. 3.

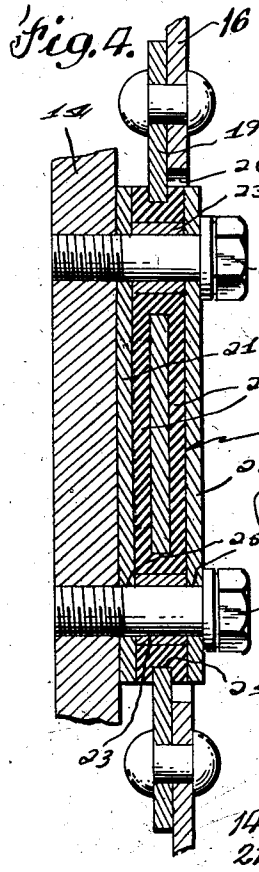


Fig. 4.

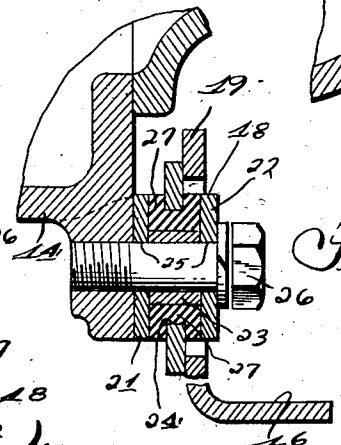


Fig. 5.

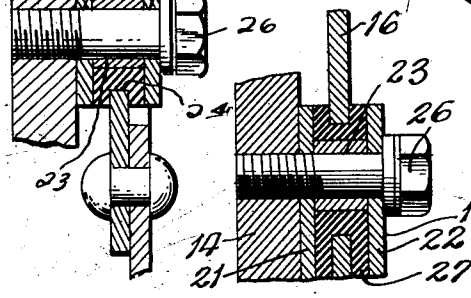


Fig. 7.

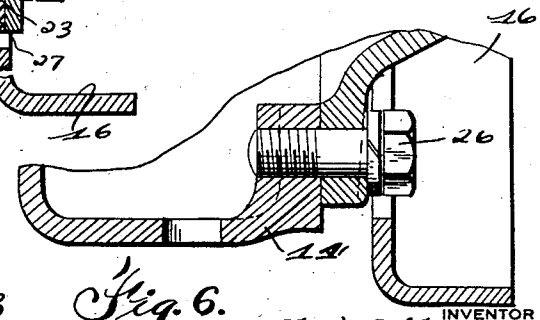


Fig. 6.

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ENGINE MOUNTING

Filed Dec. 2, 1929 2 Sheets-Sheet 2

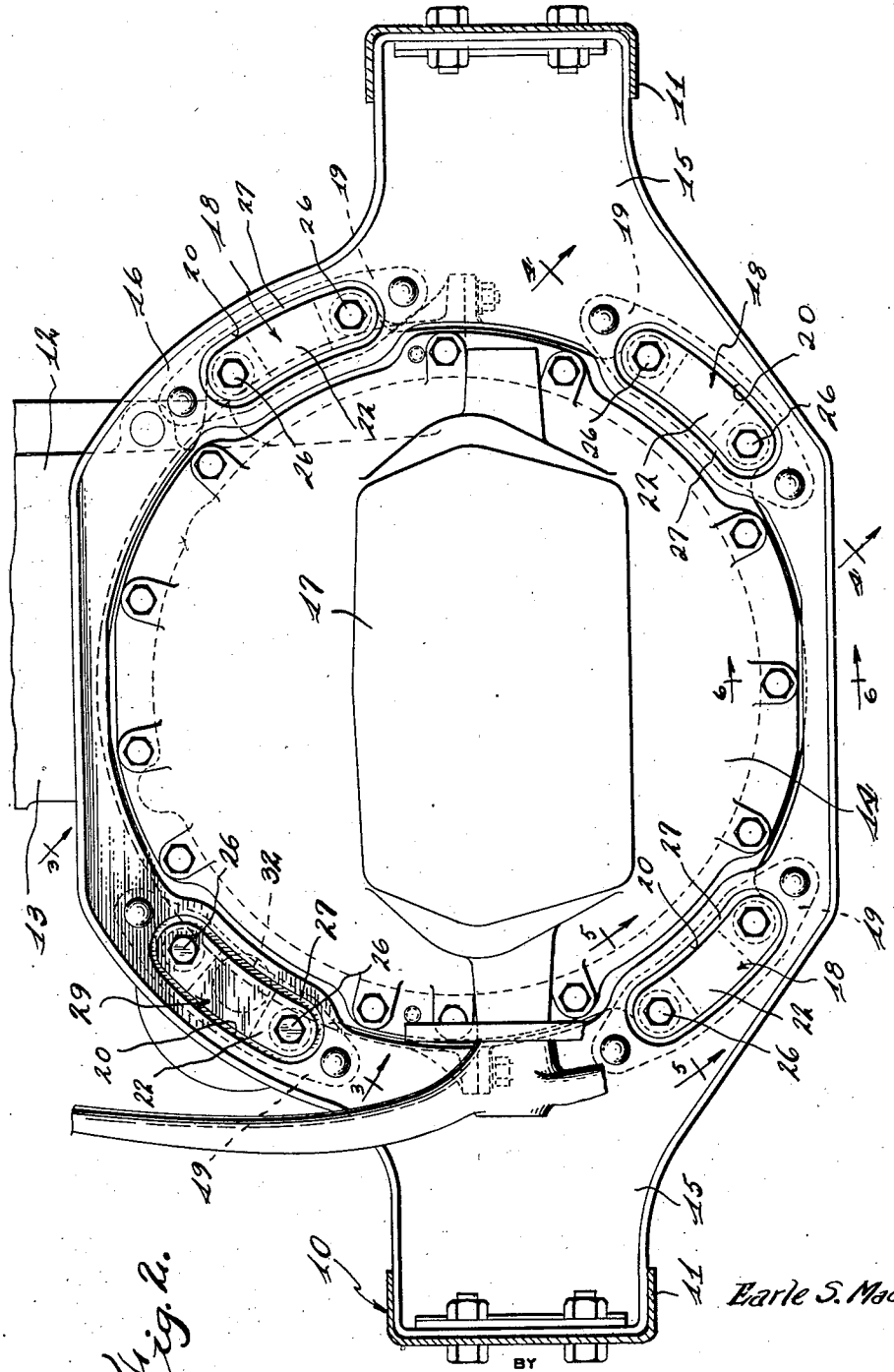


Fig. 2.

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UNITED STATES PATENT OFFICE

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ENGINE MOUNTING

Application filed December 2, 1929. Serial No. 411,167.

This invention relates generally to improvements in motor mountings and more particularly to means for mounting internal combustion engines upon vehicle frame members in such a manner that the vibration and pulsations set up by the motor will be absorbed prior to being transmitted to the frame.

In the present state of the art vibration and engine pulsations are absorbed prior to reaching the chassis frame by rubber mountings interposed between the ends of the motor supporting crossbar and the frame sills in such a manner that the rubber is under tension or shear. While this method of mounting the engine has been found satisfactory for absorbing vibrations set up by the engine, nevertheless it is objectionable since it permits weaving of the frame sills relative to the crossbar and accordingly prohibits utilizing the motor supporting crossbar as a frame brace. As a consequence it is necessary to provide a separate crossbar for bracing the frame which not only increases the cost of production but adds to the weight of the vehicle.

The present invention contemplates eliminating the foregoing disadvantages by providing a mounting for the engine which not only effectively absorb shocks or vibrations set up by the motor but also permits the motor attaching arms to function efficiently as a rigid cross-brace for the frame.

With the foregoing as well as other objects in view the invention consists in novel features of construction illustrated and about to be described.

In the drawings:

Figure 1 is a fragmentary side elevational view of the chassis having a motor supported thereon in accordance with the teachings of this invention.

Figure 2 is a sectional end elevation of the power unit mounted on the chassis.

Figure 3 is a sectional view taken on the plane indicated by the line 3—3 of Figure 2.

Figure 4 is a sectional view taken on the plane indicated by the line 4—4 of Figure 2.

Figure 5 is a sectional view taken on the plane indicated by the line 5—5 of Figure 2.

Figure 6 is a sectional view taken on the plane indicated by the line 6—6 of Figure 2.

Figure 7 is a fragmentary sectional view showing a slightly modified form of construction.

Referring now to the drawings it will be noted that there is illustrated in Figure 1 a chassis frame 10 comprising laterally spaced sill members 11 held in assembled relation to each other by means of suitable cross-members and adapted to support a power unit 12. The latter preferably comprises an internal combustion engine 13 having a clutch housing 14 and having laterally extending attaching arms 15 joined together at the inner ends by means of an annular portion 16 formed integral with the arms. The annular portion is secured to the clutch housing in a manner to be presently described and surrounds the transmission 17. The motor arms are adapted to be secured to the sill members and in addition to supporting the power unit upon the frame also serve as a rigid cross-brace for the frame.

In order to permit the motor arms to function as a rigid cross-brace for the frame and at the same time provide means for absorbing vibrations set up by the engine prior to reaching the frame, suitable insulating means is interposed between the power unit and motor attaching arms. In detail the clutch housing 14 is secured at circumferentially spaced points to the annular portion 16 of the arms by means of mounting units 18. Each unit comprises a central elongated plate 19 riveted or otherwise suitably secured to the annular portion 16 of the brace and adapted to bridge an elongated opening 20 therein. Extending longitudinally of the plate 19 and spaced laterally from opposite sides of this plate are a pair of elongated plates 21 and 22 comparatively shorter than the plate 19 and so arranged that the plate 22 extends within the elongated opening 20 in the annular portion 16 free from contact therewith. The plates 21 and 22 are held in proper spaced relation to each other by means of spacers or sleeves 23 extending between the plates 21 and 22 and adapted to extend through enlarged openings 24

formed in the plate 19 adjacent the ends thereof. As shown in Figure 4 the plates 21 and 22 are provided with comparatively smaller openings 25 arranged in alignment with the openings 24 in the plate 19 and adapted to register with the opening in the sleeve. The openings through the sleeve and plates 21 and 22 being sufficiently large to permit the passage therethrough of bolts or other fastening elements 26 while the openings 24 in the plate 19 are large enough to afford considerable space between the edges thereof and the sleeves. The shank portions of the bolts 26 are adapted to be threaded within the clutch housing 14 and serve to rigidly secure the sleeves 23 and plates 21 and 22 to the clutch housing. The heads of the bolts extend through the opening 20 in the portion 16 of the brace so as to be readily accessible.

In order to prevent the central plate 19 from contacting with the plates 21 and 22 and with the sleeves 23 I provide a solid insulator block 27 formed of resilient material such as rubber. The resilient material is preferably molded in place and is vulcanized to the plates, 19, 21 and 22. As shown in Figure 4 the insulator block 27 completely fills the space between opposite sides of the central plate 19 and the plates 21 and 22 and also fills the space between the sleeves 23 and the edge portions of the openings 24 in the plate 19. Thus it will be observed that while the attaching plate 19 is rigidly secured to the annular portion 16 of the motor arms it is free from metallic contact with the power unit so that any vibrations set up therein are absorbed prior to reaching the frame. It will further be seen that the resilient material interposed between the motor arms and power unit is under shear and the resiliency of this material is not effected by clamping the attaching unit to the clutch housing since the sleeves 23 prevent compressing the resilient material during the clamping action.

While in describing the invention reference is made to only one elongated opening in the annular portion 16 of the arms and only one motor mounting unit, it should be understood that any number of these units may be utilized as found necessary for effectively attaching the power unit to the arms. In the illustrative embodiment of the invention four motor mountings are utilized for performing the attaching function and these mountings are identical in construction to the one hereinbefore set forth with the exception of the mounting opposite the starting motor designated in Figure 2 by the character 29. This mounting is illustrated more clearly in Figure 3 and differs from the one hereinbefore set forth in that the plate 30 corresponding to the plate 21 in the above described mounting is provided with an enlarged central opening 31 adapted to receive the projecting end of the starting motor shaft 32.

Thus from the foregoing it will be apparent that I have provided a motor mounting wherein the arms for attaching the power unit to the frame construction constitute a part of the power unit assembly but are insulated from metallic contact therewith and also one which permits the motor arms to function efficiently as a brace for the frame. It will further be observed that the insulating material is interposed between the power unit and motor arms in such a manner as to be under shear, thereby rendering it possible to obtain the maximum absorbing qualities from the material.

While in describing the invention particular stress has been placed upon the association of a specific type of mounting for attaching the power unit to the frame, it should be understood that various types of mountings may be utilized for accomplishing this purpose without departing from the spirit and scope of the invention. For example, the central plate 19 and elongated opening 20 may be eliminated and portions of the cross-brace substituted for the plate 19. I prefer the mounting illustrated herein however for practical purposes since it forms a unit in itself and may be more readily and inexpensively installed.

What I claim as my invention is:

1. Means for mounting a power unit upon a vehicle chassis frame having laterally spaced sill members, comprising a crossbrace for the frame having the opposite ends rigidly secured to the sills and having an annular portion intermediate the ends for receiving a part of the power unit, a pair of laterally spaced plates rigidly secured to the power unit, a resilient material disposed between the said plates under tension and a member embedded within the resilient material free from metallic connection with the plates and power unit, and means for rigidly securing said member to the crossbrace.

2. Means for mounting a power unit upon a vehicle chassis frame having laterally spaced sill members, comprising a crossbrace having the opposite ends rigidly secured to the sills and having an annular portion intermediate the ends for receiving a part of the power unit, said annular portion of the crossbrace having a plurality of concentrically arranged spaced openings therein, means located within each of said openings establishing a connection between the power unit and crossbrace including a pair of laterally spaced plates positioned free from metallic contact with the crossbrace and rigidly secured in spaced relation to each other to the power unit, a resilient material arranged under tension between the plates, a member embedded within the resilient material free

from contact with the plates and power unit, and means for rigidly securing said member to the annular portion aforesaid of the crossbrace.

3. Means for mounting a power unit upon a vehicle chassis frame having laterally spaced sill members, comprising a crossbrace for the frame having the opposite ends rigidly secured to the sills and having an annular portion intermediate the ends for receiving a part of the power unit, a pad of resilient material arranged between a portion of the power unit and the annular portion of the crossbrace, a plate embracing the outer side of the resilient pad free from metallic contact with the crossbrace, a clamping bolt extending through the plate and resilient pad and having a portion secured to the power unit, a spacer surrounding said clamping bolt between the plate and power unit permitting said plate to be rigidly clamped to the power unit without compressing said pad, a member embedded within the pad free from metallic contact with the plate and power unit, and means rigidly securing said member to the annular portion of said crossbrace.

4. Means for mounting a power unit upon a chassis frame having laterally spaced sill members, comprising a crossbrace for the frame having the opposite ends rigidly secured to the sills and having an annular portion intermediate the ends, a plate disposed within an opening formed in the annular portion free from metallic contact therewith and in lateral spaced relation with a portion of the power unit adjacent the opening, a pad of resilient material interposed between the plate and power unit under tension, means for rigidly clamping the plate to the power unit without compressing said resilient material, a member embedded within the resilient material free from metallic contact with the plate and power unit, and means for rigidly securing said member to the annular portion of the crossbrace.

5. Means for mounting a power unit upon a chassis frame having laterally spaced sill members, comprising a crossbrace for the frame having the opposite ends rigidly secured to the sills and having an annular poriton intermediate the ends for receiving a part of the power unit, a pad of resilient material positioned opposite a portion of the power unit and extending into an opening formed in the annular portion aforesaid of the crossbrace, a plate embracing the outer side of the pad, means for rigidly clamping the plate to the power unit without compressing said pad, and means integral with said crossbrace and embedded within the pad free from metallic contact with the power unit and plate.

In testimony whereof I affix my signature.

EARLE S. MacPHERSON.