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CRANK CASE SUPPORT FOR AUTOMOBILES.  
APPLICATION FILED JUNE 26, 1919.

1,377,857.

Patented May 10, 1921.

2 SHEETS—SHEET 1.

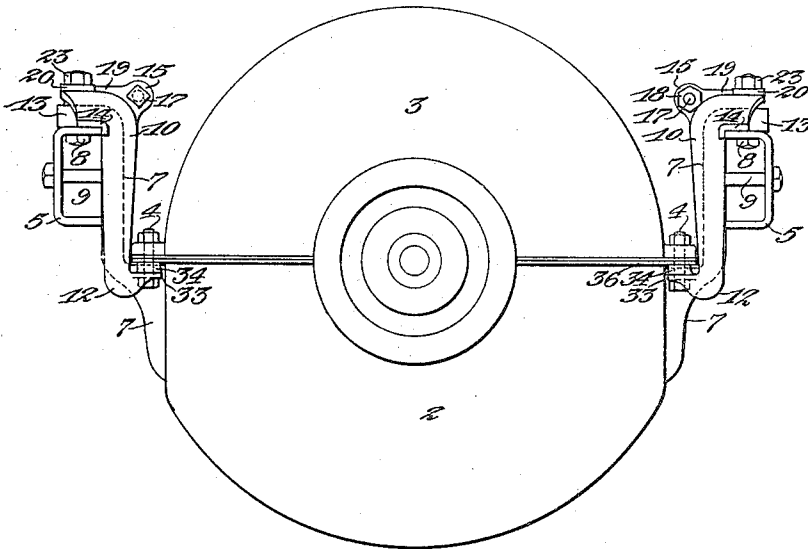


Fig. 1.

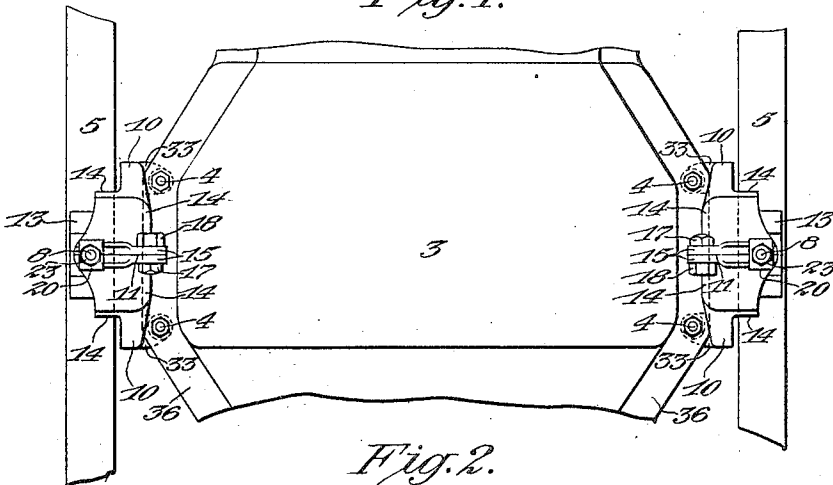


Fig. 2.

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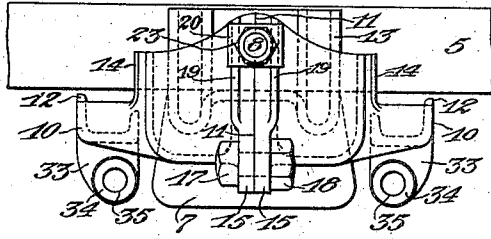


Fig. 3.

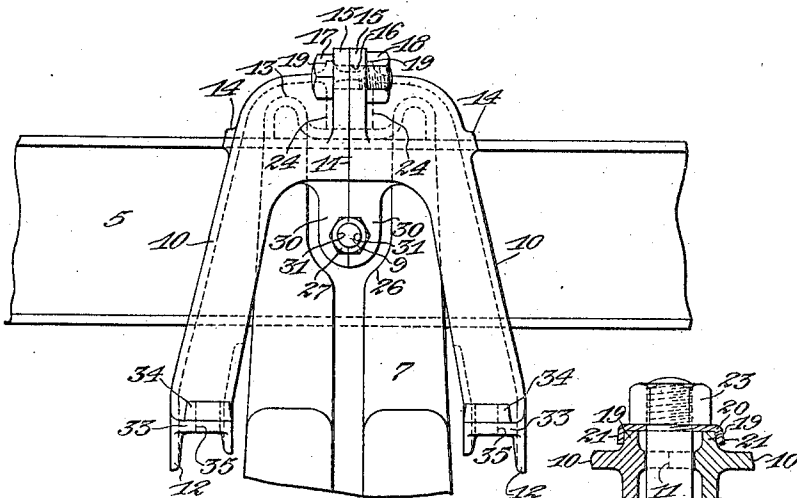


Fig. 4.

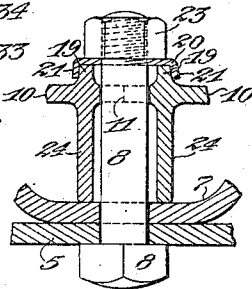


Fig. 6.

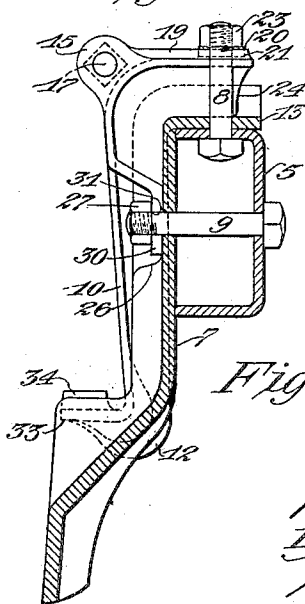


Fig. 5.

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# UNITED STATES PATENT OFFICE.

WILLIAM STORRIE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO APCO MANUFACTURING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

## CRANK-CASE SUPPORT FOR AUTOMOBILES.

1,377,857.

Specification of Letters Patent.

Patented May 10, 1921.

Application filed June 26, 1919. Serial No. 306,949.

*To all whom it may concern:*

Be it known that I, WILLIAM STORRIE, a subject of the King of Great Britain, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Crank-Case Supports for Automobiles, of which the following is a specification.

My invention is an improved reinforcing and support for the crank-cases or power-plant housings of automobiles. The object of my improvement is to provide a reinforcing device or repair part which may be applied to the lower section of a power-plant housing or crank-case to support it from the frame or chassis of the automobile. A particular object of the improvement is to provide a device of this type which may be applied to use with the original crank-case supports in place, for the purpose of reinforcing their structure; and also one which may be attached without dismantling the engine or other parts of the car and without the aid of repair experts or skilled labor. To this end a particular feature of my improvement consists in forming the support element in two complementary parts which may be readily slipped into place over the original crank-case arm to be held by bolts already in position.

The manner and means for carrying out the improvement are fully described in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts. In the drawings:—

Figure 1 is an end elevation of the power-plant housing of a usual type of automobile, illustrating the manner of applying my improved device thereto to support the crank-case from the sills or side-frames of the chassis;

Fig. 2, a plan view of a portion of the power-plant housing, showing my improved crank-case support applied to its sides;

Fig. 3, an enlarged plan view of the support, showing it in connection with the original crank-case arm and illustrating the method of bolting its parts together;

Fig. 4, an enlarged side view of the same;

Fig. 5, an end view showing one of the complementary halves of the support in place, and illustrating the original crank-case arm in section to show the relation of my improved support thereto; and

Fig. 6, a still further enlarged, sectional, detail view of the top portion of the support showing the means for tying its halves together at this point.

As usually constructed the power-plant of the automobile is inclosed within upper and lower housings, the lower one constituting the crank-case and, in some instances, also serving as a support and housing for the transmission-elements of the power drive. In Figs. 1 and 2 I have illustrated such a structure comprising the crank-case 2 which is surmounted by the upper housing 3, the two parts being flanged at the joiner of their edges and secured together by bolts 4. Usually the crank-case 2 serves as the base or main support for the engine, the cylinders being constructed integral with the upper portion 3 of the housing and in most cases provided with removable heads. According to the preferred practice, the crank-case 2 is supported from the chassis-frame by a three-point suspension, so-called; one point of support being centrally located at the forward end of the motor and the other two at the rear on opposite sides of the crank-case. In Figs. 1 and 2, 5—5 designate the channel-iron sills or longitudinal side-members of the chassis-frame and my improved supporting-members are arranged to rest upon the upper flanges of the sills to support the sides of the crank-case 2 therefrom.

In the type of construction herein illustrated the original design of the power-plant embodies the employment of two angle-shaped arms or lugs 7—7 which are attached to, or formed as a part of, the crank-case body and reach up across the top of the channel-irons or side-sills 5—5, being bolted thereto at 8 and 9 as shown at the right in Fig. 1. In some instances, particularly in low-priced cars, these arms 7—7 are constructed of sheet-metal, welded or riveted to the sides of the crank-case 2 and made hollow in cross-section to strengthen and stiffen their structure. It has been a common experience, however, that these sheet-metal parts are not strong enough to stand the stress and strain induced by the vibrations of the engine, the racking of the car over rough roads, and the twisting of its frame due to careless or hard driving. That is to say, it has been found that these parts frequently give way under the strain imposed

upon them and sometimes the break is gradual and may not be discovered until the crank-case is loosened on its supports and the parts of the transmission thrown out of  
 5 alinement. This necessarily results in abnormal strain on the driving parts, and the bearings may be ruined through this cause. To prevent this condition, or in other cases to provide for a quick and easy repair after  
 10 the supporting-lugs are broken, I have provided an auxiliary crank-case support which may be applied to use either initially as a reinforcement, or as a repair part when occasion requires. In other words, my improved  
 15 device may be applied as a reinforcement for the standard lugs already in position or may be used as the sole support for the crank-case when the original supports become broken.

20 Referring particularly to Figs. 3, 4 and 5, my improved crank-case arm or support comprises two complementary parts or arms 10—10 which are joined together at 11 in a vertical plane to form a bifurcated structure,  
 25 as shown most clearly in Fig. 4. The arms 10—10 are preferably constructed as castings having ribs 12—12 bordering their outer marginal edges, and are arched at the top and extended rearwardly, as shown in Figs.  
 30 3 and 5, to overlie the angle-portion 13 of the original lug or arm 7. Referring to Figs. 1 and 5, the side-ribs 12—12 are formed with outstanding ledges or feet 14—14 which rest on the top flange of the channel-irons or side-  
 35 sills 5—5 of the chassis-frame. The arms 10—10 are formed at their point of juncture with outstanding ears 15—15 which are provided with registering holes 16—16 through which is inserted a bolt 17 with a nut 18 applied to its end to draw the parts together.  
 40 Extending rearwardly from the ears 16—16 are relatively narrow ribs or flanges 19—19 across which is placed a clamp or cleat 20 having bent-down ends 21—21 which embrace the sides of the ribs to tie the parts together at this point. The clamp 20 is held  
 45 in place by the bolt 8 which reaches up through the side-sill 5 and passes through holes in the main arm 7, the supports 10—10, and the clamp itself, a nut 23 being applied to its upper end, see Fig. 6. The holes in the channel-iron 5 and arm 7 are provided for the original bolt which fastens the arm 7  
 50 in place, and this bolt is replaced by a longer one in applying my new device to position over the arm 7. Beneath the arched or crowned top of the arms 10—10 the opposite, parallel side-ribs 19—19 are extended downwardly at 24—24 to bear against the recessed  
 60 top of the standard arm 7, as shown in Figs. 4, 5 and 6, to provide a more extended rest for the support.

Referring to Figs. 4 and 5, the front of the original arm 7 is recessed or cupped inwardly at 26 to receive a nut 27 on the end

of the horizontal cross-bolt 9 which extends from the side wall of the channel-iron 5 through the arm. Projecting downwardly from the arched top of the arms 10—10 are  
 70 opposite ears 30—30 which are angularly offset to adapt them to rest against the front face of the recess 26. The ears 30—30 are provided with opposite slots or apertures 31—31 through which the cross-bolt 9 projects with its nut 27 set up against their  
 75 front face. The complementary arms 10—10 reach down alongside the original arm 7, and are spread apart toward the bottom and formed at their ends with outwardly projecting lugs or feet 33—33. On the top of the  
 80 lugs 33—33 are circular bosses 34—34 adapted to underlie the flange 36 of the crank-case 2, the bosses being formed with slots or apertures 35—35 for receiving the bolts 4 which clamp the crank-case 2 to the upper-housing  
 85 3.

My improved crank-case support is applied to use in the manner as next described: The bolts 8 and 9 are removed from the side-sill 5, but the original crank-case arm 7 is  
 90 left in place with its upper end resting on the top of the sill so that the crank-case 2 will be supported therefrom. It will thus be seen that it is unnecessary to disturb the engine or motor assembly, since its supporting lugs or  
 95 arms 7 are left in their original position and the new supports applied over them. To accomplish this the two bolts 4—4 which hold the crank-case 2 to the upper housing 3, on opposite sides of the arm 7, are removed and  
 100 the repair or reinforcing arms 10—10 of my improved support are then set in position as follows: The lugs 33—33 are first hooked in under the flange 36 of the crank-case 2, as shown in Fig. 1, and the arched upper portions of the arms placed over the top of the  
 105 original arm 7. The bolt 17 is next inserted through the holes 16 in the ears 15—15 and by screwing the nut 18 onto its ends the two parts 10—10 are drawn together with their opposite faces abutting at 11, see Figs. 3 and 4. The arched top of the arms 10—10 are thus caused to overlie the top of the main arm 7 with their ribs 24—24 resting against its central, depressed portion as shown in  
 115 Fig. 6. The bolt 9 is now inserted through the side of the channel-member or sill 5 with its end projecting through the front of the arm 7 and reaching through the openings 31 in the ears 30—30. The nut 27 is then  
 120 screwed onto the end of the bolt 9 to draw the ears 30—30 snugly into place against the face of the recess 26 in the arm 7 to clamp the parts thereto. The clamp 20 has meanwhile been placed across the ribs 19—19 on the top  
 125 of the arms 10—10 and the bolt 8 inserted from the underside of the top-flange on the sill 5 up through the hole in the clamp. Now when the nut 23 is applied to the end of the bolt 8 the arms 10—10 will be clamped firmly  
 130

in place with their feet 14—14 taking a firm bearing on the top of the side-sill 5. With the arms 10—10 secured together and clamped in place in this manner the holes 5 35—35 in their feet 33—33 will register with the holes in the flange of the crank-case 2, and the bolts 4 may be inserted therethrough and their nuts applied thereon to tie the parts together. It will be understood, of course 10 that the order of applying the bolts to place as above specified may be varied to suit the convenience of the operator, and since the bolt holes are enlarged to provide clearances, the parts of the device may be assembled 15 without fitting or machining.

When the original crank-case arm 7 is broken in such a way that it is preferable to remove it my replacement support is fastened to the side-sill 5 as follows: The feet 20 14—14 are set against the top flange of the sill and a washer of the required thickness is placed on the bolt 8 beneath the ribs 24—24. In some cases a bushing or block of the proper dimensions is set in back of 25 the ears 30—30, bearing against the web of the sill 5, with the cross-bolt 9 extending through it to further brace the arms 10—10 from the chassis-frame.

It will be observed that my improvement 30 provides an exceedingly staunch and strong support for the crank-case which may be applied to use as a reinforcement for the supporting-arms or lugs already in place, or which may be used to repair the latter 35 when they become cracked or broken. It is also called to attention that my improved repair device may be attached in place without removing the broken arm and without disturbing or dismantling the engine or 40 other parts of the car.

I am aware that it has before been proposed to provide a repair part or fitment for supporting the power-plant of an automobile from the side-sills of the chassis in 45 case the original supports are broken. Heretofore, however, the application of such a device has been more or less difficult owing to the awkward manner in which it must be attached and, furthermore, not hav- 50 ing the universal adjustability of my present improved device, in some instances it could not be made to fit properly. By forming the device in two complementary sections I render it much easier and handier 55 to apply, while also adapting it to meet all requirements as regards variations in the relation of the parts to be connected. At the same time the device is much stancher and more rigid in use, besides being held more 60 securely against displacement, due to its organization with the original crank-case arm and the side-sills of the chassis.

Various modifications might be made in the structure and arrangement of the parts 65 of my improved device without departing

from the spirit or scope of the invention; therefore, without limiting myself to the precise embodiment herein shown and described, what I claim is:

1. In a motor-vehicle construction, the 70 combination with the chassis-frame having longitudinal side-sills, and a flanged power-plant housing arranged therebetween, of a two-part support for said housing comprising right and left-hand complemental mem- 75 bers adapted to rest on the side-sills in joined relation and provided with arms reaching down beneath the flange of the housing to adapt them to be secured thereto.

2. In a motor-vehicle construction, the 80 combination with the chassis-frame having longitudinal side-sills, and a flanged power-plant housing arranged between said side-sills and supported therefrom by angle-shaped arms, of a two-part reinforcement 85 for said supporting arms comprising opposite complementary members adapted to fit over the original arm and to reach down beneath the flange of the housing to take 90 the load off from the main arm.

3. A power-plant housing support comprising right and left-hand complemental members having opposite parallel portions adapted to be fastened together to overlie 95 the side-sills of the chassis-frame and provided with arms extending downwardly and formed with offset feet at their ends for attachment to the flange on the housing.

4. A power-plant housing support comprising right and left-hand complemental 100 members having opposite arms arched at the top and joined together in a horizontal extension adapted to rest on the side-sill of the chassis-frame, said arms extending vertically downward with feet at their ends 105 adapted for attachment to the flange of the housing.

5. A power-plant housing support comprising two opposite vertical arms having 110 means at their lower ends for attachment to the side of the housing and provided at the top with right and left-hand complemental portions adapted to overlie the top of the side-sills of the chassis-frame and to be secured thereto in position overlying the 115 original crank-case support.

6. A power-plant housing support consisting in a two-part bifurcated structure comprising right and left-hand complemental members having a horizontal portion at 120 the top adapted to rest on the side-sill of the chassis-frame and opposite legs reaching downwardly therefrom with feet at their ends adapted to be fastened to the flange of the housing. 125

7. A two-part power-plant housing support comprising right and left-hand complemental members having opposite vertical arms adapted to be bolted together at the 130 top to overlie the side-sill of the chassis-

frame and provided with registering apertures for receiving the bolts of the original crank-case arm, said arms formed with apertured feet at the bottom for receiving the bolts of the housing flange.

8. A two-part power-plant housing support comprising right and left-hand complementary members having opposite vertical arms having horizontal arched portions at the top adapted to be fastened together over the top of the original crank-case arm, means for clamping said arms together, and horizontal extensions at the lower ends of the arms adapted to be fastened to the flange of the housing.

9. A two-part power-plant housing support comprising right and left hand complementary members having opposite vertical arms having arched upper portions adapted to fit over the top of the original crank-case arm and provided with offset aper-

ture ears adapted to set against the front of the original arm to receive the end of the bolt extending therethrough, and means at the lower ends of the arms for fastening them to the flange of the housing or crank-case.

10. The combination with a two-part power-plant housing support comprising right- and left-hand complementary members having opposite arms formed with arched portions at the top adapted to fit over the top of the side-sill of the chassis-frame, of a clamp-member extending across the top of the arched portions of the arms and engaging therewith, said clamp being apertured to receive a bolt extending up through the side-sill whereby to secure the parts of the support in place.

In testimony whereof I affix my signature.

WILLIAM STORRIE.