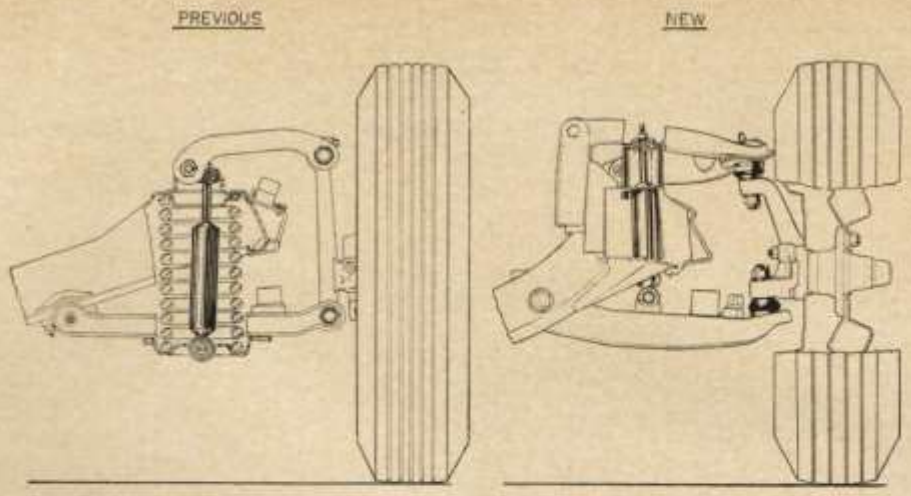
pension members, consequently it is regarded as unsprung weight. In any car, the ride, the manner in which the wheels follow or fail to follow the contour of the road surface and, to a certain extent, the roadability is a function of the ratio of sprung-to-unsprung weight. The higher the ratio, the better the ride, etc. By attaching a torsion bar to the frame in such a way that a twisting force is imparted to it, the bar itself does not move with the other suspension components and automatically becomes a part of the sprung weight, and only a part of the attached lever arm, which is relatively light in weight, is retained in the unsprung mass. Therefore, the wheel and suspension assembly is able to follow the road contour more closely because the static weight and the inertia of the assembly is reduced. The actual amount of weight reduction of the unsprung mass by the use of torsion bars varies with the installation but averages between 10 and 20 percent.

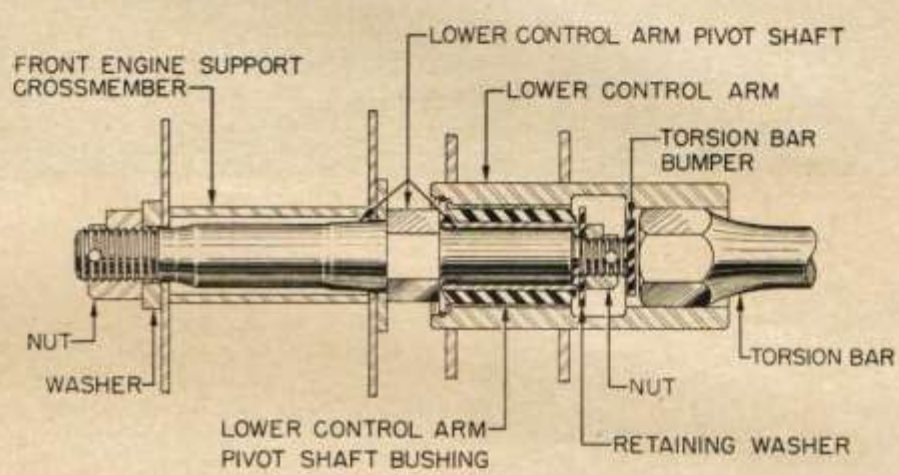
Plymouth has solved its suspension problems in a modern and expedient manner. The upper control arm, or A-arm, is pivotally attached to two mounting brackets, which are bolted to the inside top of each frame side rail. Both brackets and A-arms are heavy-gauge steel stampings. Each bracket straddles each inboard section of the A-arm but is isolated from direct contact by shouldered neoprene bushings. A pivot bolt passes through holes in each member and through the bushings, holding and locating the A-arm in relation to the frame. A self-contained ball joint unit is screwed into a threaded hole at the outer end of each A-arm. The ball joint has a tapered and threaded shank that is drawn into a matching tapered hole at the upper end of the spindle forging by a nut.

The lower control arm has lost its characteristic "A" shape and is now a single stamped "hat section" beam. The inner end of the arm is located by a pivot bolt extending from the back side of the front crossmember. Neoprene isolation bushings are also used at this point. A hexagonal socket, the axis of which is aligned with the pivot bolt, is welded to the back side of the control arm. The outer end of the arm is threaded to receive another ball joint, which secures and locates the lower end of the spindle in the same manner as the top of the spindle. The hex socket receives the forward end of the torsion bar. A bracket is welded to the arm for the vertically-mounted Oriflow tubular shock absorber. A tubular mount that extends vertically between the sections of the upper A-arm is welded to the frame and receives the upper end of the shock. An angularly-mounted strut, which is bolted to the lower control arm near its outer end, extends forward to the front crossmember where it is isolated by neoprene bushings. The purpose of the strut is to absorb braking torque and transmit the torque to the frame.



FRONT SUSPENSION

Comparisons of previously-used Plymouth front suspension, left, and '57 torsion bar and ball joint layout with 14-inch wheels.



FRONT SUSPENSION LOWER CONTROL ARM PIVOT

This sectional drawing of the front torsion bar hex mount and the lower control arm pivot shows details of assembly.

The back end of the longitudinal torsion bar is attached to a hex socket that is cradled in a bracket welded to the frame. An arm on the socket is secured by a simple nut and tension bolt adjustment. This permits quick and easy adjustment of front end height to allow for load variations, chubby drivers, passengers, etc., and should, by virtue of simplicity, have a great appeal to the "drive-in-mob" who prefer their front ends dragging the ground. There are no intermediate bearings, bushings or supports between the front and rear torsion bar sockets.

The torsion bars themselves are formed with hexagonal ends, which are larger in section than the bar diameter. Large fillet radii blend the hex ends and the round bar together. The use of hex ends in the "as forged" condition, as opposed to machined serrations or splines, greatly simplifies torsion bar production and lowers manufacturing costs. The Plymouth torsion bars are pre-loaded by twisting them until they take a permanent "set," introducing internal stresses, which increases the fatigue life of the bar.

In operation, the familiar unequal length control arm pattern of independent front suspension has been retained although it has been considerably lightened, modified and simplified. When the control arms are deflected by a bump or dip, the lower arm translates the disturbance into rotary motion to the torsion bar because the axis of the bar is an extension of the pivot axis of the arm. And because the hex ends of the bar are self-aligning in their hex sockets, the bar is subjected to only rotary (torsional) movement, bending and other foreign disturbing forces being eliminated.

A few other details of the layout are also worthy of mention. For example, the inner pivots of the upper A-arm are inclined so that the component of forces originating during severe braking counteracts a larger proportion of the forward weight transfer. In other words, less "nose-dive" during braking. The anti-roll stabilizer bar, the ends of which are attached via

(Continued on page 56)