BUILDING THE AM-Healey

All-American Conversion Uses AM Parts Only To Produce Significant Performance Boost

By Carl Chakmakian

THE NASH-HEALEY IS A "NATURAL" for an American Motors V-8 engine installation. The added power and torque, accompanied by only a slight increase in weight, brings the Healey up to modern standards for sports cars and the swap points to the strong possibility that owners of older Ambasadors can follow suit with equal success (but with somewhat more difficulty).

The conversion job in the Healey was accomplished with a minimum of difficulty except for a few "trying" moments here and there. The swap, of course, was not a "first"—Pierce Venable, of Torrance, California was the first to stuff an AM V-8 into a N-H coupe and he was preceded by others who had found room for Cadillac, Buick, Pontiac, Chevrolet, and Mercury engines. No doubt the non-family conversions provided fine performance, but problems in matching bellhousings, transmissions and driveshafts were more complex.

Of the several American Motors V-8's that could have been used, the 327-cubic inch versions are the best choices. These engines mate perfectly with the three-speed Warner Gear transmission (with overdrive in the Healey) by using the American Motors 250-cubic inch V-8 bellhousing. The aluminum housing is AM part No. 3145020; the mud-pan steel stamping is AM No. 3145133; and these are used with two gaskets, AM No. 3145183.

The 630-pound '57 Rebel engine was used for this conversion.

Getting Started: Remove the entire seat assembly and carpets. Remove the center front section of the floor board, which is attached with hex head bolts. (A 10 mm socket or wrench is mighty handy in removing these bolts.) Remove the hood and radiator. Disconnect all wires connecting to the old six and mark the wires with tags if you don't want confusion later. Disconnect the bell-housing from the transmission and lift the engine out.

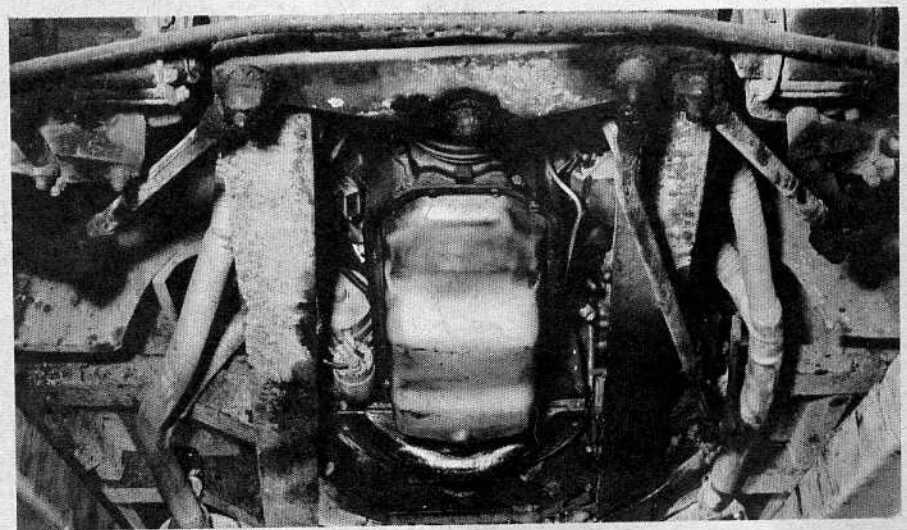
First step in the installation involved providing clearance for the starter. To do this, the bellhousing was attached to the transmission to permit a visual check of where and how much frame notching would be needed. Sufficient clearance was calculated to allow for removal of the starter without having to pull the engine. A section of the frame side and top was removed and a steel plate, fabricated from 5/64-inch stock was welded in place and boxed for strength.

Front engine mount work was next. Standard AM cushions attach directly to the block in the normal manner with four standard ⅜-inch diameter bolts and lock-washers on each side. Mounting bracket 3150393 (left), is used for the right side, and 3150394 (right) is used for the left side. These brackets can be welded directly to the frame, but this procedures requires that the single hole (for the 7/16-20 stud on cushion 3150303) be modified to facilitate engine removal due to the 45-degree angle of the mounting surface.

An alternate method was used which required two flat mounting plates made of ⅛-inch-thick steel plate. Two 7/16-20 hex-nuts (or weld-nuts) were welded to the plate to match the 3¼-inch hole centers of mounting brackets 3150393 and 3150394. To insure correct positioning of the plates, the new engine with front mounts and bellhousing attached was temporarily installed in position and bolted to the transmission. With the engine centered and the front brackets resting directly on the top of the frame (without the plates) the location of the bracket holes was carefully scribed on the frame.

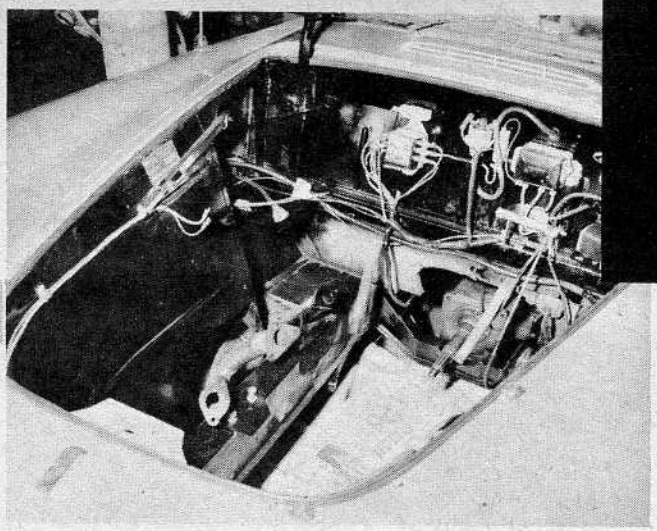
Then the engine was removed and 1⅛-inch holes were cut in the top of the frame, with a hole-saw, using the scribed marks as a guide. The holes provide clearance for the weld-nuts and permit flush-mounting of the plates. The plates, which distribute the load over a larger area than if the brackets were welded directly to the frame,

(*Continued on Page* 41)

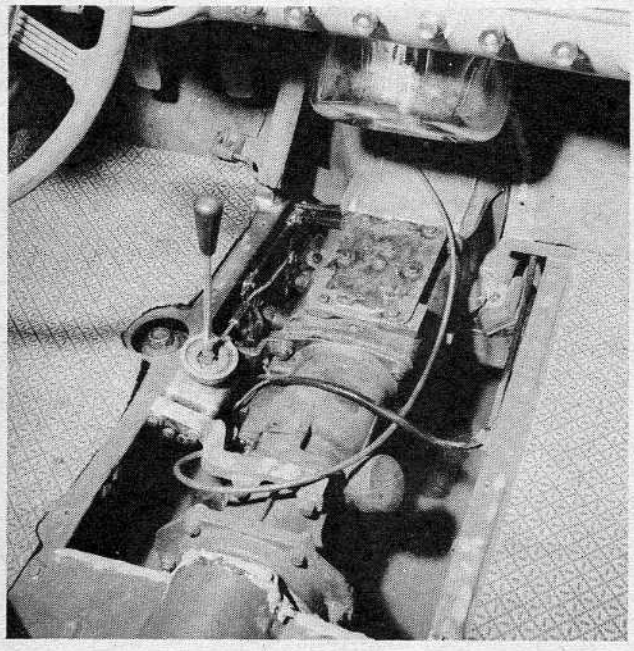


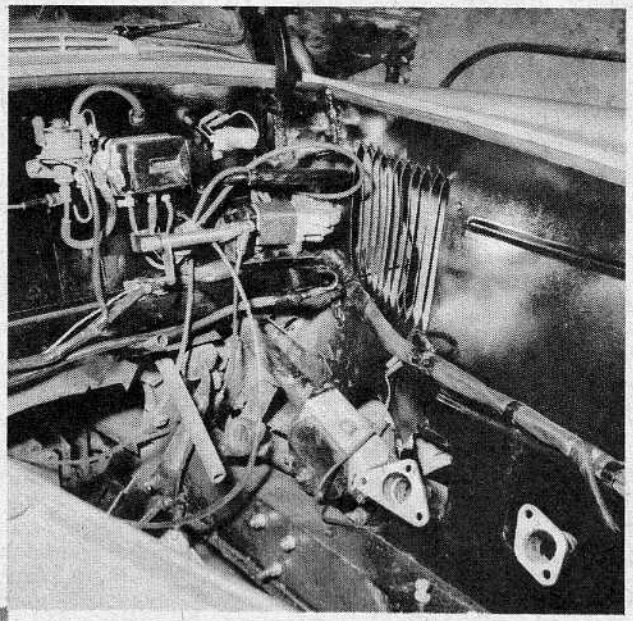
One of the reasons the Healey swap is relatively easy is due to the use of center-arm steering and outboard-mounted box. In stock Ambassador, swapper will have to contend with linkage that passes under engine (which requires pan sectioning and use of dropped link) and inboard box.

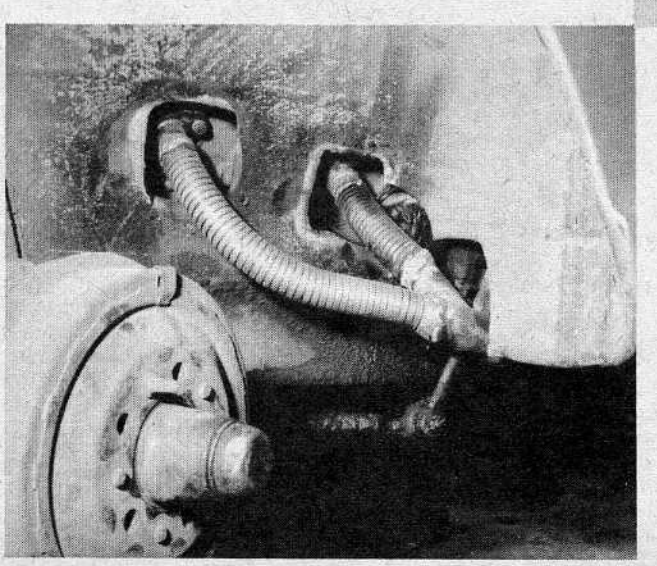
The WORLD of SWAP



Above: It was necessary to notch the right frame member (arrow) to allow removal of the starter when required without pulling the engine. Right-side header setup posed no major problems in construction or installation. Steel plate to distribute front mount stress was welded to top of frame member and can be seen between front and middle exhaust stack. Stock battery box platform was discarded and one suitable for a 12-volt unit was mounted in a new location after some fender panel cutting. Left: The AM 250-cubic inch V-8 bellhousing couples the late-model engine to the earlier Warner transmission without difficulty but the rear mounts had to be modified.







To obtain adequate left-side clearance, the steering box was moved outboard 1¼ inches on steel bar stock spacers; secured by longer bolts. Relocation of the box pivoted the steering column slightly, requiring fabrication of a new cover plate at the tow-board. Specially-made header system had a fairly tight fit about the steering box and some fender panel surgery was required. Special carburetor linkage is mounted on firewall just below voltage regulator. Stock 6-volt Lucas windshield wiper motor (next to carb linkage) was replaced by a 12-volt motor from a Metropolitan. Left: Header system, made of stainless steel flex tubing, feeds into stock N-H straight-thru mufflers. Another modification, yet to be made, is the installation of '55-'56 Nash Ambassador 11-inch brakes which up lining area from 171 to 192 square inches.

Building the AM-Healey

(*Continued from Page* 14)

were then positioned and welded. It should be noted that although the frame is an exceptionally-rugged design, both in torsion and bending, due to the large closed area cross-section, the frame material thickness is about 1/16-inch. This is further evidence of the value in welding the ⅛-inch flat plate over a large surface area. Engine removal is a simple matter with this design and gusseting was not found to be necessary.

While the engine is in position for the mount location, mark the distributor location and right-hand head location on the channel section that runs across the firewall. A ¼-inch deep by two-inch long indentation was made in the chanel for distributor clearance.

The rubber cushion pads used up front can also be used in the rear with modifications. The pad stud must be cut off flush, and the surrounding metal of the flange trimmed off. A 15/32-inch diameter hole is drilled clear thru, and then a 1⅛-inch clearance hole is provided on one side of the mount (including the rubber) which allows for a recessed 7/16-inch hex head bolt to attach the mount to the bellhousing.

Another 15/32-inch hole is drilled clear thru at a new location to provide fastening to the cross member. A ⅜-inch-thick steel shim-plate, cut to match the rectangular shape of the cushion, is used to obtain proper height for engine to transmission alignment.

The bell-housing pad-flange is trimmed off on the rear to provide clearance for the bolt head (2½ x 7/16) which attaches the mount to the rear cross member. A ⅛-inch steel plate about 1¼ x 2, with a 15/32-inch hole for the bolt is used on the bottom surface of the rear cross member as a double-plate for added strength.

At the transmission, no changes were required except to replace the six-volt overdrive solenoid. The AM number for the 12-volt solenoid is 3146816.

The heavy-duty clutch cover assembly AM No. 3151514 was used with "clutch driven plate" AM No. 3150449, and "throwout bearing sleeve" 3140867 (includes bearing). The flywheel was lightened and balanced, and then balanced as an assembly with the clutch.

The "clutch throwout lever" AM No. 3133036 from the Healey six-cylinder bell housing was used. This part is the same as AM No. 3125599 which is used for past Nash Ambassador-Six and present V-8 models except for a cut-off end and drilled pivot hole to provide a five-inch lever arm instead of a 6-1/16-inch arm.

The clutch linkage was used without modification although the V-8 clutch plate requires .11-inch additional travel for full release. For quicker clutch action (with a slight increase in pedal effort) the lever arm at the inboard side of the cross-shaft linkage could be lengthened ¾-inch by the addition of a silver-soldered (or brazed) section. This change was made as a matter of personal preference only.

The clutch cross-shaft is mounted in a tube which extends through the frame and is welded in place. Strange as it seems, this shaft operates in the tube without a lubrication fitting. I would suggest that a grease fitting be installed (I didn't, but I will)!

Relocation of the steering gear box was necessary. The aluminum cover plate for the steering column at the junction of the toe-board was removed and a duplicate plate was made with the steering column hole moved 13/16-inch to the left. For engine clearance, the steering box had to be moved outboard 1¼ inches and suitable spacers were made from ⅞-inch diameter steel bar stock having a 15/32-inch clearance hole for the 7/16-inch diameter bolts.

The three original 7/16 x 6¾ gear-box bolts were replaced with eight-inch long bolts. The lower bolt was slightly longer than necessary, but provided a handy anchor for the brake pedal return spring. The rear steering gear "stop" bolt was cut-off flush with the stop-nut to povide additional clearance for the rear exhaust header. The new steering gear-box location pivoted the steering post slightly but produced no adverse effects on steering wheel position.

The stock exhaust manifold could be used for the right side, but not for the left. Rather than use a manifold on the right and a header system for the left, it was decided to fabricate headers for both sides of a balanced system. The header exhaust flanges were fabricated from ⅜-inch steel plates to match the three exhaust ports on each side. A two-inch length of 1½-inch O.D. x 1/16-inch steel tubing was brazed to the front and rear flanges, and a 1⅝-inch O.D. x 1/16 wall size is used for the center flange. "Flexonics" stainless-steel flexible tubing, brazed directly to the stub tubes, was used for the head pipes, and it does not leak!

A certain amount of cutting of engine side compartment sheet metal was required to install the header system. The stock Nash-Healey straight-thru muffler (AM No. 3115335) was used for both sides, using a length of two-inch I.D. exhaust pipe between each muffler and header.

The right side exhaust header was rather easy, but the left side proved to be a bit tight for clearance on the rear flexible tubing which runs between the steering gear stop and the frame outrigger. Tail-pipe stubs exit in front of the rear wheels to eliminate the problem of routing extra plumbing back over the axle. The short pipes are 1¾-inch I.D. and bend 90 degrees in a large radius.

The stock battery box platform was discarded, louvered area on the right rear side was cut-off, and a 12-volt battery box platform bolted in place. The new location makes visual checking for water level difficult. The battery

(*Continued on Next Page*)

(Continued from Preceding Page)
must be released and moved to check water and then set back in the platform or specialty water-reservoir caps can be used to insure correct water level.

While the hood was off the car, it presented a good opportunity to relocate the tension rods that originally anchored to a bracket on the rear center of the hood. The anchor points were moved nine inches apart to clear the new air cleaner.

Final Details

I used the four-bladed fan AM No. 5305153. The five-bladed fan AM No. 3152275 also can be used. A hydraulic fan drive is available with a special five-bladed fan. The stock radiator was not moved from its original position which puts it 6⅛ inches ahead of the fan. The lower outlet, and the upper right inlet were replaced with 1¾-inch diameter radiator fittings and the left upper inlet was cut off and patched closed.

Overheating is not a big problem, but after heavy traffic driving in hot (over 85-degree F) weather and then idling for several minutes, it will boil. For this reason, I may move the radiator closer to the fan or use a fan shroud, similar to the design used for the '58 Rambler Ambassador V-8.

The stock Healey throttle cable had been replaced with a push-pull rod and bell-crank linkage a few years ago as the cable action was less than positive and this linkage was modified to continue providing excellent control for the V-8.

After carefully examining all the electrical possibilities, I decided to make the switch to 12 volts. The six-volt battery was replaced with a 12-volt, 60 amp-hour unit. Three instruments (fuel, water temperature, and oil pressure), and their original six-volt sending units, were retained. The single wire that feeds these gauges was cut and an Ohmite (25 ohm, 10-watt) resistor installed and the resistor's sliding bar adjusted with a voltmeter to obtain six volts. On the 12-volt side of the resistor, an additional wire was extended to the no-charge light.

The six-volt horns and relay were retained and the blast is much louder than stock, thanks to the 12-volt jolt they get. Although horn life is in question, their infrequent use reduces this to a minor problem. A one-ohm, 100-watt, 10-amp resistor was used in the line to the six-volt radio.

The switch to 12 was completed by changing all light bulbs and the turn-signal flasher unit to the proper voltage, by replacing the overdrive solenoid with AM No. 3146816, by installing a new voltage regulator and 12-volt cigarette lighter unit, and by replacing the six-volt windshield wiper motor with 12-volt motor AM No. 8112217, which is used on the AM Metropolitan. The six-volt heater motor was replaced by a '58 Rambler American 12-volt motor (AM No. 3154772) which was a perfect fit.

Because the 12-volt engine starter is energized by a starter solenoid, the original clutch-pedal floor switch was discarded. The three wires that connected to the floor switch were attached to "B" on the starter solenoid via a heavy wire (or cable) of suitable length. The stock three-pole ignition switch was replaced with a four-pole type, AM No. 3146191, which actuates the cranker by turning the key. A new wire was run from "S" on the new switch to "S" on the solenoid, and the original keylock cylinder was fitted in the new switch.

The Nash-Healey uses 10-inch Bendix brakes having 171 square inches of lining area. To accommodate the additional power supplied by the engine swap, use of '55-'56 Nash Ambassador 11-inch brakes is planned to increase lining area to 192 square inches. Preliminary investigation indicates that the new rear brakes will fit as is, but the front backing plates will require elongation of the lower bolt holes. The bigger brakes could prove well-worth their cost whether the car is driven in competition or not.

The V-8 Healey no longer takes a back-seat to the Jag, Corvette, T-Bird, and other hot Detroit iron. Handling and cornering ability seem to be definitely improved, thanks to the slightly better weight distribution and the semi-rigid rear engine mounts, which have a direct bearing on the torque-tube action.

Although the AM V-8 weighs about 30 pounds more than the Ambassador six, the farther aft position of the eight favorably relocates its center of gravity. The dual-exhaust system adds weight but the overall weight distribution is improved. Of the 102 pounds added to the car's weight due to the conversion, 38 pounds bear on the front end and 64 on the rear. This changed the fore-aft weight distribution from 52-48 in stock form to 51½-48½ converted.

This change, coupled with a significant difference in 0-60 times, makes the car a joy to drive. With the stock six-cylinder engine, acceleration from a stand-still to 60 mph required 13.2 seconds—with the V-8 churning away under the hood, 0-60 time is slashed to 7.2 seconds. What more can you ask of a swap than that it be relatively simple, measurable more powerful, and completely reliable? ♦♦