

First of a Three-Part Series . . .

## Making the Vacumotive Clutch Work

by George A. Schmidt

Nothing new to learn; just less to do. Easy as rolling off a log. At least that's what the ads said, and we admit they had a point. Hudson's vacuum clutch system, especially when coupled with Drive-Master or Electric Hand, does add wonderfully to the ease and fun of driving, even today. As the ads explained, this arrangement (later called Super-Matic, when over-drive was included with it) combines the exact control of a standard shift with the convenience of an automatic.

When it works, that is.

Also, there's the inevitable look it brings to the faces of Brand X mechanics (and even fellow Hudsonuts) whenever the hood is raised for inspection. No other Hudson Approved Accessory ever offered quite the same Rube Goldberg-type visual wallop as this one does.

But is the system practical? From a dealer-service standpoint, no. Far too much time, tinkering, parts-changing, repeated comebacks, and sheer baling-wire ingenuity were often required to keep it in order, even when new. Yet for the mechanically-inclined owner—including today's hobbyist--

it can serve remarkably well. Not only does it add to the genuine special-interest value (and the everyday versatility) of a Hudson-built vehicle, but the fact that most of those lovely Rube Goldberg parts are conspicuously accessible—not buried deep within the car's vitals as on a modern automatic—means that the required tinkering is relatively easy. There is little need for special tools or facilities . . . just patience . . . and most important, no need to disable the car for ordinary manual operation while the project is underway.

Original literature on the subject could doubtless have been more thorough, but it's still the best starting point. Besides the Hudson factory service manuals (plus bulletins, dealer kit instruction sheets, and such), MOTOR's and some other books gave the system fairly good coverage in their prewar through early Fifties editions, with the earlier ones offering considerable detail. More recently, California member Jack Clifford has reprinted the factory manual's Drive-Master service section ('48 ed.) which covers the vacuum-gearshift components; and it is hoped that a similar reprint of the clutch-control or Vacumotive Drive portion will follow. The H-E-T Club Library in Ohio is another source, and readers should check also with their own local public (or even tech-school) library, which in some cases has MOTOR's or similar volumes on file for many years back.

A picture of the complete system (Vac. Clutch with Drive-Master) will be found in most manuals also in the Hudson parts book, with components duly identified by their factory names. About the only thing wrong with factory illustrations is that they nearly always seem to show six-cylinder devotees — including this writer — somewhat to their own devices. However, there are no real functional differences, the variations being only in linkage lengths and offsets, plus some details of mounting.

This article is hardly a substitute for the factory manual, but is intended mostly to offer some further usable suggestions where the factory manual leaves off. Though it is based entirely upon experience with the Step-Down models, mainly eight-cylinder, most of the suggestions will be found adaptable to earlier cars as well. The writer is not an ex-dealer or mechanic but simply a hobbyist, who has been driving his Hudson since 1964, and who in spring '65 must have been about the first Hudsonut (please correct me on this if wrong) to reinstall and restore a complete Vacumotive Clutch/Drive-Master system on his car. The project used 100% junkyard parts and was undertaken largely as a joke at first — the ultimate takeoff, so to speak, on characters who can't even do their own clutch pedaling or gear shifting and yet

are called drivers. The system's genuine convenience value wasn't noted until later. Overdrive (and a new cork disc) were added in '66.

Since that time the system has been kept in good working order, with only a moderate amount of extra maintenance being required from time to time. This article lists some of the trouble-shooting procedures which have proven helpful.

**IF SYSTEM HAS JUST BEEN INSTALLED OR RESTORED**, or the clutch assembly has been rebuilt (new corks, pressure springs, etc.), two basic adjustments which **MUST** be checked for sufficient free play before car is driven are a) pedal linkage (under car), and b) vacuum pull rod clevis (at firewall). These are to ensure that clutch can engage fully without slipping. Pedal should have about 1½ inches free play, and clevis about 1/8 inch. Also check the throttle linkage assembly for binding and stocking at any point, especially those parts of it which are added for clutch control. Car should now be road tested to be sure there will be no interference or other problems when it is driven in the conventional manner (using clutch pedal).

Next come three basic adjustments for the clutch-control linkage. These are the clutch cushion-point screw, the threaded-sleeve rod, and the throttle-adjustment screw (on linkage). All three should be made according to standard procedure outlined in manual (with brake set and engine running). All of them are easily accessible underhood, as shown in picture.

Then, assuming vacuum supply and electrical parts are OK, the car can be road tested with Vacuumotive Clutch in use. This should be done several times, noting performance when normally warmed up and also when cold. There will usually be a need for some further fine adjustments, which can be made using the following suggestions as a guide:

**IF CLUTCH GRABS MOSTLY WHEN COLD**: loosen threaded sleeve a turn or two (thus increasing length of clutch

piston stroke, unless it is already at maximum).

Recheck carburetor adjustments such as idle mixture, automatic choke, accelerator-pump stroke, and both idle speeds (fast and regular). Poor gasoline may be a major factor here, but most of these older carbs have enough adjustment range to allow for this. Anything that causes sluggish engine performance—including ignition troubles such as coil, plugs, wire breakdown, mistiming, etc.—will make vacuum clutch seem to grab prematurely and often stall the engine.

Look also for possible vacuum leaks—and for fluid leaks on clutch cover. Often it helps simply to add an extra ounce or so of fluid (without draining).

**IF CLUTCH GRABS MOSTLY WHEN HOT**: tighten clutch cushion-point screw (turn it downward, toward cam). A tag on earlier models advised: "Adjust ½ Turn at a Time." This should still leave a gap of more than ¼ inch between cam and screw head. If it doesn't, the valve rod (inside hollow piston rod) may have to be set 1 or 2 turns shorter than called for in manual. Then re-adjust the cushion-point screw as needed.

Also make sure that accelerator pedal springs back to its full height when released. It should have at least an inch of free movement at the top, before engine begins speeding up—and in addition, a quarter-inch or so at bottom (on wide-open throttle) for the overdrive kickdown switch.

Proper clearance at clutch pedal linkage (under car) and at clutch pull rod clevis has already been mentioned. Either of these points, if too tight, can cause clutch slippage—and if too loose may allow clutch grabbing, dragging, gear clashing, etc.

**IF CLUTCH SLIPS MOSTLY WHEN COLD**: tighten threaded-sleeve link (shorten it), generally 1 or 2 turns. This will also shorten the stroke of vacuum clutch piston somewhat. Do not shorten it too much, or clutch may not release fully when hot; nor will the Drive-Master (if used) work properly.

Check again (this time with clutch and

engine cold) for sufficient free play at BOTH the pedal linkage and the vacuum pull rod clevis. Both of these tend to run tighter, gradually, as the clutch disc wears. Readjust as necessary—perhaps every 5000 miles.

Next, be sure that clutch fluid is not too old, or the wrong type, or overfilled. Also be sure vacuum clutch cylinder is well lubricated (use shock-absorber fluid every 5000—10000 miles or as needed).

More often, clutch may begin to slip somewhat as external control linkage becomes sticky and sluggish. It is best to OIL all exposed working parts every 500 miles or so, and then allow oil to work in well (until next day, perhaps) before wiping up excess or making any serious readjustments.

There is also a "starting compensator" cam built into clutch control linkage (just above pull-rod clevis). It is designed to prevent clutch from slipping excessively on its first start each time when cold. It is activated by holding clutch pedal down while engine is being started, or (if already running) while "Vac.Clutch" or "Dr.Master" button is being turned on. Pedal can then be released as soon as vacuum takes up the load. This device is not meant to be adjustable, but car can also be started out without it, simply by keeping foot OFF clutch pedal during the above. Try both methods for first starts to see which works better. Some Hudson clutches, depending on condition of corks, fluid, etc., do not need this extra "starting compensation" as much as others.

**IF CLUTCH SLIPS MOSTLY WHEN HOT:** loosen clutch cushion-point screw slightly (moving it forward, away from cam). Retighten locknut. Also check for possible poor clutch fluid, and for corks which are burned or glazed—or worn out. Flush clutch with good kerosene (running engine and applying clutch lightly a few times) before putting in fresh fluid. Then test by driving car for a few miles using clutch pedal only (no vacuum). Include some quick starts, uphill gearshifting, etc. to see whether clutch itself is OK. Actually the vacuum system can be adjusted to work acceptably with clutch in almost any condition (unless very bad); but it does require readjustment more often when the corks are old and thin. Brand-new corks, on the other hand, also call for a few extra adjustments during

the first 1000 miles or so until they are properly compressed and run-in.

**IF CLUTCH SLIPS, BOTH HOT AND COLD** (and the engine races), loosen throttle-adjustment screw 1 or 2 turns (turn it forward or outward). It must not be loosened too much, however. Check to be sure that throttle still opens ALL THE WAY when accelerator is floored (just short of touching kickdown switch, if any). If this reveals that screw should not be turned out any further—and the engine still races before clutch takes hold—repeat adjustments 4 and 5 above instead.

Retest car on road (both cold and warm) to see whether any further fine adjustment is needed. If clutch overheats from excess slipping, do not try to make final adjustments until it has cooled.

A small amount of extra slippage when clutch is PARTLY warmed up seems to be normal. But if there is too much of it, the throttle-adjustment screw will have to be loosened a bit more, even though regular cold and hot starts may be a trifle less smooth that way.

**IF CLUTCH GRABS, BOTH HOT AND COLD** (and engine tends to stall or stagger upon clutch engagement), tighten the throttle-adjustment screw (turn inward) one or two turns, and retest on road.

At the same time, it may be necessary to recheck carburetor adjustment, ignition timing, spark plug gap, valve condition, etc., etc. Leaky intake valves, especially, can make clutch grabbing worse due not only to power loss but to an unsteady vacuum supply. This last can also be a problem on Sixes with radical cam grinds, even when perfect. In all cases the exact state of engine tune is likely to be far more noticeable with vacuum clutch than when using foot pedal.

In high gear, of course, the vacuum clutch takes hold much faster than in the other gears. It has two extra switches for this purpose—one on the linkage and one on gearbox. They seldom give trouble . . . but do not try to start car out in high gear without foot on clutch pedal, or engine will stall.

The above items should cover most of the commoner vacuum-clutch malfunctions; but there are, of course, other things which can also go wrong—governor, electric wiring, vacuum valves, and so on. We're planning to discuss some of those next month.