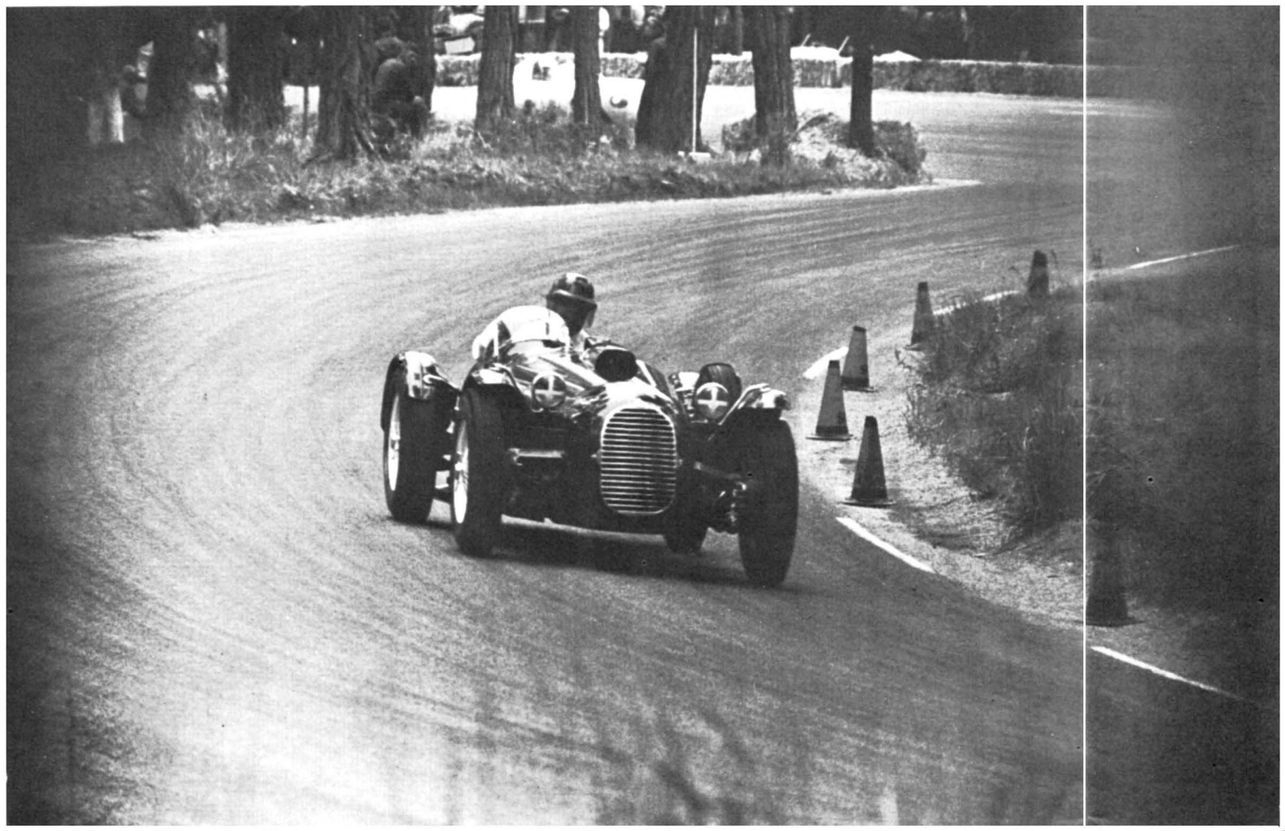
TOM CARSTENS and the sizzling STOVEBOLT

The Carstens Cad-Allard swept the West Coast for two years running—his latest machine combines a red-hot Chevy V-8, an HWM chassis and pure quality in a package that just might repeat the performance of the fabulous Number 14.



Bill Pollack coming through the esses at Pebble Beach keeps the turns tight placing left wheel close to course markers.

By *EUGENE JADERQUIST*

THERE was this dog and it belonged to a beautiful ballet dancer. Well, the dancer was not bright enough to keep the dog away from the race track and her grip was not strong enough to control the leash and the writers were grasping at any idea, however unlikely, to bring the beautiful ballet dancer and the handsome racing driver together. So the dog took what should have been the last step of his short but eventful existence and stepped in front of an HWM which was being driven flat out by the handsome racing driver.

The suspense was tremendous. In a split second the handsome racing driver had to choose between canicide and disaster. If he'd chosen the former, the girl would have been heartbroken and half the plot would have ended in the wastebasket. So instead, the HWM was jerked over a curbing, hurtled out of control along the sidewalk, and finally smashed to scrap metal against an ornate balustrade.

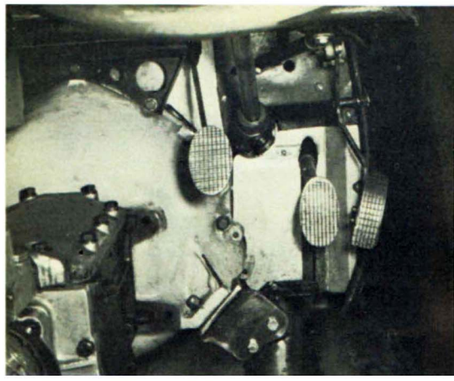
No one was more deeply moved by this scene in 20th Century Fox's *The Racers* than a bluff, burly Tacoma, Washington executive named Thomas Carstens. It wasn't the fate of the dog – or, for that matter, of Kirk Douglas, the handsome racing driver – that concerned him, but the spectacular wrecking of the HWM. This was a machine very much after Mr. Carsten's heart, a simple, solid competition car that bulged with visible muscles. For the other, sleeker cars in the movie – two new Ferraris and two new Maseratis – he cared not.

This he proved after *The Racers* was finished, when he negotiated for the HWM. (It hadn't been wrecked after all. The involvement with the balustrade was simply a superb example of the use of miniatures.) Twentieth insisted the five cars go as a package. Carstens bought them all, then dumped the Farraris and the Maseratis as soon as he could. Alone at last with the HWM, he began the intricate and costly job of modification. His goal was a car that could beat the best Ferraris in the United States on a road course. It turned out to be a staggering job, and one that is not yet complete.

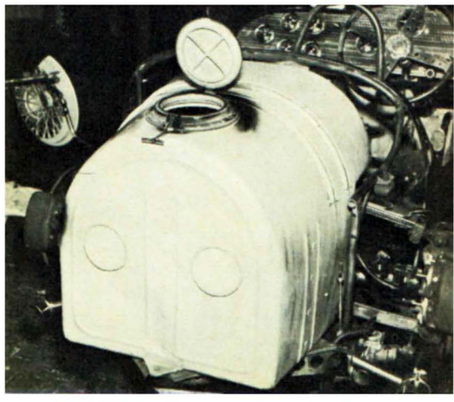
What Carstens wanted from the original car were its body and chassis. Stirling Moss, who drove the HWM in 1950, its first year, had praised its handling qualities. He'd managed a third place in a Formula I Grand Prix, and this in a year when the blown Alfa-Romeos were still in circulation and Farina and Fangio were driving them.

All four wheels are independently suspended. In the front

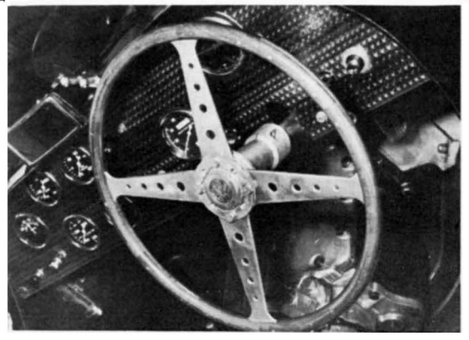
Second steering universal is near fire wall. Note rear engine mount protrudes into driver's compartment below pedals.



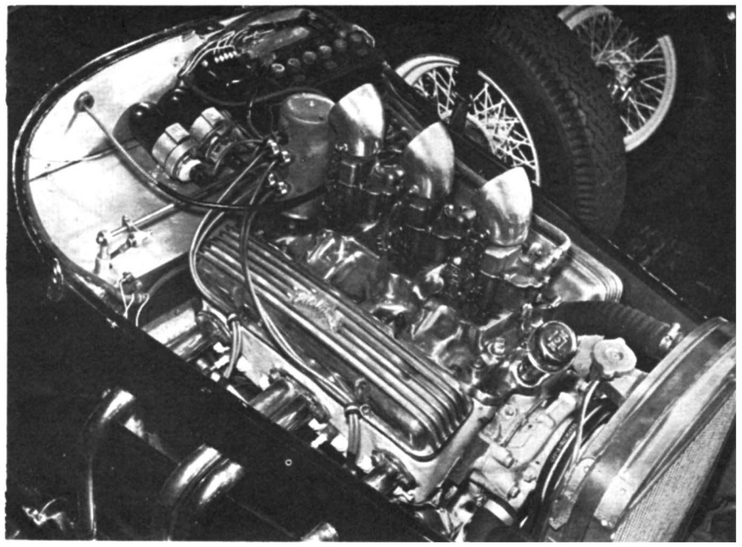
Capacious aluminum gas tank mounts on rear extension of car's frame which was padded in rubber with leather overlay.



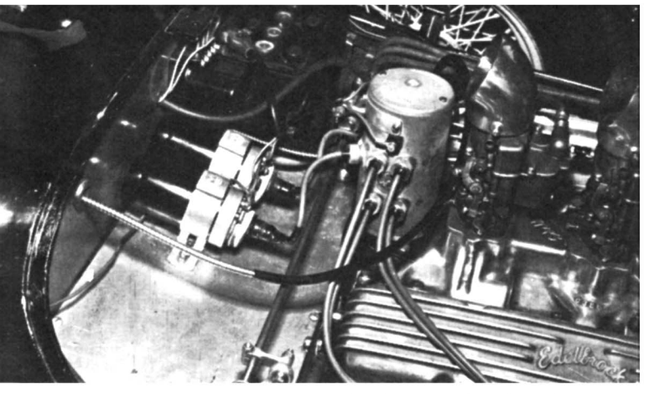
Photos by Sukalac, Borgeson, Christi



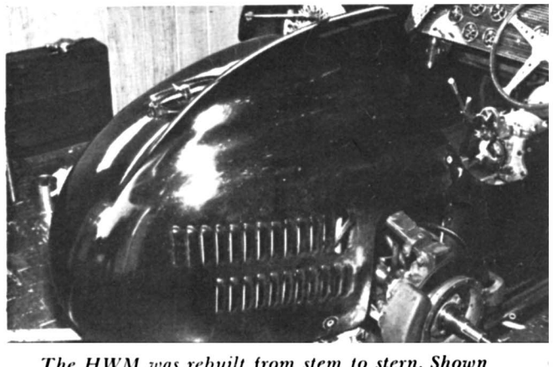
The wooden rimmed steering wheel shown here was replaced with a larger plastic rimmed wheel for better leverage in tight turns.



Engineered by Edelbrock, the Chevy engine cranks practically 1 hp per cubic inch. At maximum revs, the 482 pound mill is virtually vibrationless.



Mallory coils and Spalding ignition fire the Edelbrock-mastered mill to 7200 rpm without falter. Double coil setup allows saturation of each unit.



The HWM was rebuilt from stem to stern. Shown here is the tail which was remolded to take a headrest, and to cover the roll bar.

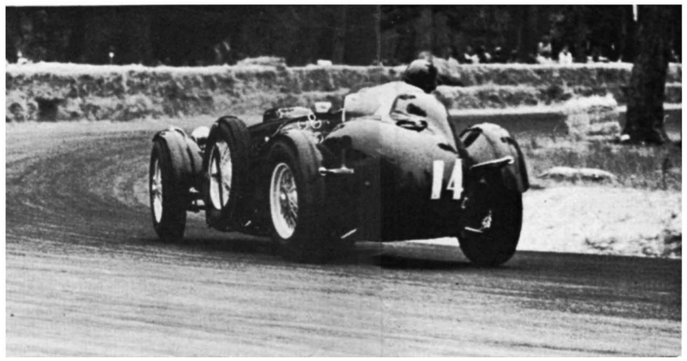
the transverse leaf spring runs along the bottom and the wishbones are above; in the rear the situation is reversed. The rear end, originally, was bolted to a box-section frame crossmember and each rear axle had two universal joints to give the wheels plenty of freedom. Steering is rack and pinion, and all who have driven the car consider it excellent.

Carstens knew the engine would not make the grade. Originally, the HWM had a 2-liter, twin-overhead-cam, four-cylinder alternating engine designed to run either on alcohol or gasoline, the compression ratio being varied by the use of special pistons. In its normal Formula II alcoholic state it produced about 130 bhp and about the same number of miles per hour. On gasoline there was not that much. Since even the alcohol version couldn't ride with the Ferraris today, something different was necessary.

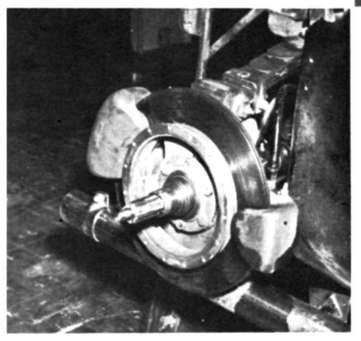
Carstens drew on his own background and selected an American engine. He's been in racing in one form or another since the end of World War II, and in 1946 and 1947 he, with his associates, held the Oregon and Washington midget championship. In 1951 and 1952, Carstens invaded California sports car tracks with a Cadillac-Allard that was virtually unbeatable. In it Bill Pollack won the Pebble Beach event both years. Not till 1953, during a wildly exciting tangle with Phil Hill's 2.9-liter Ferrari, was it beaten.

From the Cad, Carstens learned that the American engines can be both reliable and fast. From the same source, he knew that too many inches can be as bad as too few. For the HWM he chose the Chevy V-8. This, of course, is one of the thoroughly remarkable engines of the "overhead" era in this country. Hot rodders have proved it, stock-car races have proved it, the Corvette has shown promise of proving it.

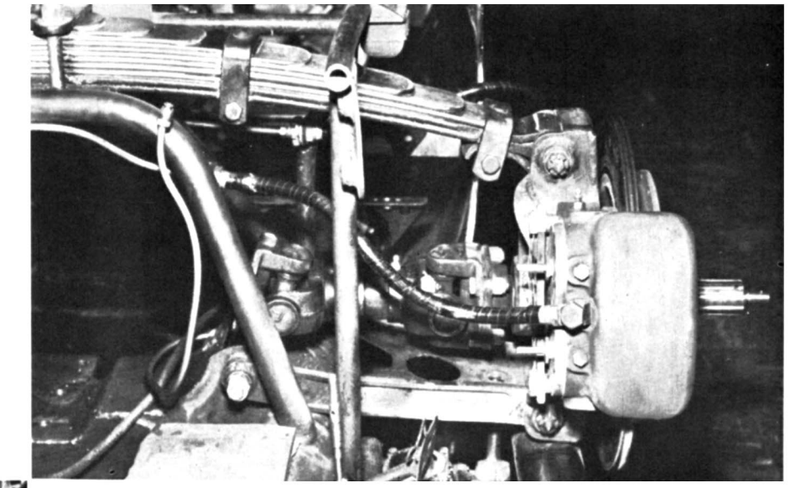
The '55 Chevy V-8, which is the basic engine in Carsten's car, comes from the factory with a bore of 3.75 inches, a stroke of three inches, a displacement of 265 cubic inches, a



Pollack had to be extra cautious on turns like this because of the slippery rear which broke loose more than once at Pebble Beach.



LEFT: Halibrand spot brakes are one of the car's chief assets. Pollack claimed brakes improved with hard use. Big independent axle is not part of the original equipment, but was made larger by Carstens to take extra thrust of the potent Chev engine.



In order to clear the new quick change rear end , the transverse rear spring was arched one and half inches from its original position. Note lever type shock absorber below lower control arm.

compression ratio of 8:1, and an advertised horsepower rating of 162 without the power pack. (Actual dyno rating was only 130 hp on Carstens' particular engine.) Its most unusual feature is the rocker set-up, there being no rocker shaft for the arms. Instead each arm pivots on its own bearing. No one is yet quite sure whether this is restrictive at high engine speeds or not, but there is very good evidence that you can hold 6,000 to 6,500 rpm with the stock set-up. Otherwise, the engine's very low stroke/bore ratio, its solid five-main bearing lower end, its good breathing combine to make it ideal for competition use.

But you don't win races with 162 horsepower or 130. Carstens turned the engine over to Vic Edelbrock, one of the nation's most famous hot rod engine builders. Vic had done much of the work on the Carstens' Cad-Allard. In Vic's shop, Bobby Meeks was turned loose on the new Chevy engine.

Meeks bored the Chevy 1/8 inch, stroked it (welding method) .200 inch. This brought the bore out to 3.875 inches, the stroke to 3.2 inches. The new displacement would have been 5,024 cc, but the boring was held down just enough to keep displacement under the 5,000 cc limit of Class C. Carstens reports that the actual measured displacement is 4,994 cc.

Special JE pistons were made up. They're solid-skirt, racing type. Clearance is .010 inch. The other stress parts — pins, rods, rod bearings, main bearings — are stock. According to Meeks, the bearing clearances were set at stock, too, though this is contrary to the usual freeing-up technique most competition engine builders use.

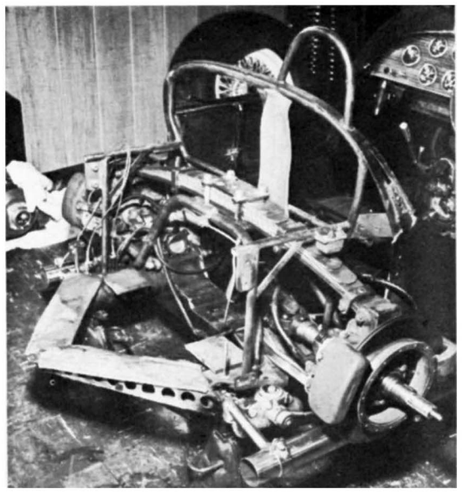
The heads were milled .060 inch. This, combined with the boring and stroking, raised the compression ratio to a conservative 10.5 to 1. The heads were also ported, but not to an extreme. Most of the work was simply polishing, and depth of cut in porting was kept to a minimum. The combustion chambers were polished and evened out so that all the cylinders would be pulling the same compression pressure.

In the valve train, there is still a veil of secrecy. Edelbrock refused to release the information on the lift and duration of the cam. Suffice it to say that it is a full-race cam with radical duration and timing. Edelbrock sells it as a part of a kit that includes cam, valve springs, lifters, spring seats, special lightweight pushrods. The valve train is one of the critical points in modifying any pushrod engine, since the weight of the working parts limits rpm. In the HWM, the Chevy is good for as much as 7,000 rpm without falter.

The intake manifold is also an Edelbrock design. There are three Holly carburetors with 15/16 inch venturis and they run close to stock jets for most purposes. The carburetor linkage is reminiscent of the great classics, precision-built by Carstens and his own crew, solid, almost indestructible and dead accurate.

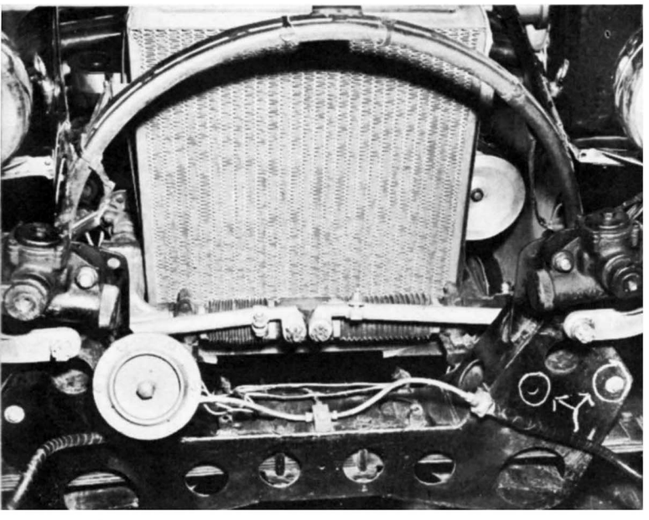
The ignition system is Spalding, utilizing twin coils and dual points. It worked well with Champion J-6 plugs, but this, like the carburetor jetting, is one of those things that can change from race to race.

Once the engine was built, there arose the problem of



Exposed back of HWM shows rear cross-member which was cut and faced to take Halibrand quick change drive. Also note roll bar strut.

Tom and crew prepare the car for race at Tillamook, Oregon. L. to R. Bob Jeffcot, Tom, Dave Fogg (on header), Al Fullerton (white shirt), Dave Schrieb (in cockpit), and Gene Tomasie. In background is Bill Lack.



Radiator which once mounted atop front girder was placed further back and behind rack and pinion steering mechanism. Alta oil cooler in same area was discarded.

installing it in a chassis built for a small four. The old engine mounts had to be cut out and new ones installed. The Chevy was put on a four-point mounting and, in Carstens' words, "bolted down tight so you can feel it." The firewall was moved back and a special radiator was made. Later, the rear engine mounts were lowered to accommodate the quick-change rear end. Since Carstens wanted to keep the rack-and-pinion steering, it was hooked up through a U-joint at the firewall so it could clear the engine. This is a Spicer joint and is common on U. S. track racing cars.

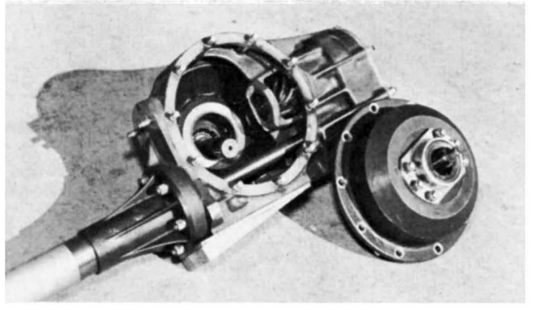
All this work in adapting the engine to the engine compartment was done by Eddie Kuzma, one of the top U. S. Indy car builders. He also had to fabricate a new hood, modeled after the old one, with a blister to accommodate the three-carb manifold and also to scoop air into the carburetors. On the rest of the body, he made new panels to replace badly wrinkled old ones and repaired those old ones that could be brought to top condition. His final job was the headrest visible in the photos.

This work by Kuzma and Edelbrock was less than half the total. Through all this sequence of helpers, through the entire history of the car since it came into Carstens' possession, there is one notable item. This is the quality that is practically a Carstens trademark. Tom likes to win races, but if he's faced with a choice between losing and finishing, and losing by dropping out for mechanical failure, he'll always prefer to finish. He's established some records for this. The midget he took to two consecutive championships in Oregon and Washington held the fantastic record of 21 consecutive clean sweeps. This means that in 21 consecutive races, the midget won three events – heat, race, trophy dash, main event. The Cadillac-Allard *never* failed during a race.

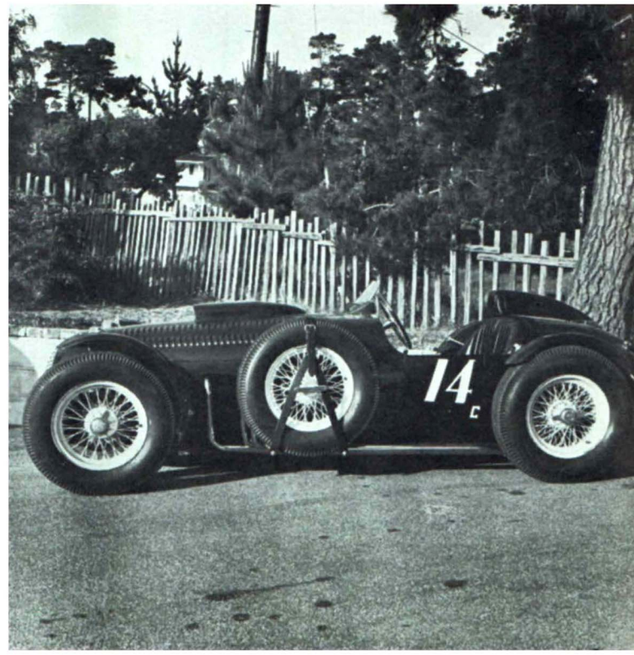
(Continued on page 52)

Due to accidentally locked rear, turns like this became precarious problems for Pollack who had to walk through them.

Jag box is mounted to engine by special adaptor. Note emergency brake system. Main brake system is alongside engine on right side. Master cylinder is from Chevrolet truck.

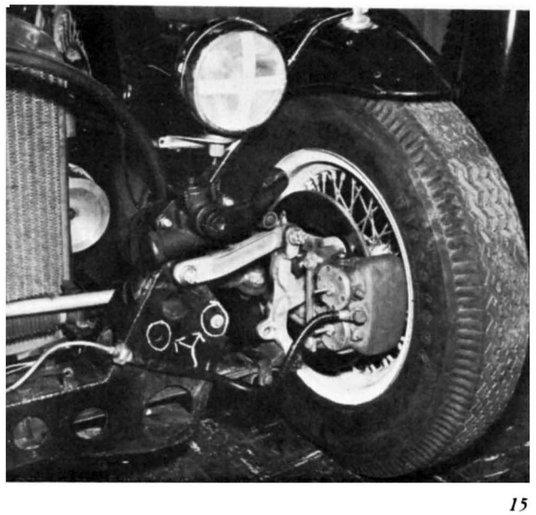


Quick change final drive unit. Drive shaft passes through banjo housing, past ring gear (not shown here), to gears which drive pinion. These gears at rear can be replaced in minutes.



Profile of HWM in one of its quieter moments. Built so that every inch of space is utilized, spare tire has to be carried portside.

Front suspension is reverse of rear with transverse spring acting as lower control arm. Old shock mounts are circled in chalk. Girlings now sit above A-arm.



Stovebolt

(Continued from page 15)

In Kuzma and Edelbrock he cornered the best talent available. He continued to do this. The car was shipped across Los Angeles to Ted Halibrand's shop.

Halibrand is not the inventor, but he is the foremost builder, in this country, of spot brakes and quick-change rear ends. He stripped the HWM of its shoe-type brakes and installed his own two-spot, disk brakes. This was a rough job because there was so little room to put them in. The master cylinder was installed in the usual place on the frame rail beside the engine. An entirely separate system was installed for the emergency brakes. The master cylinder for this system was installed alongside the transmission. It actuated one spot on each of the rear disks.

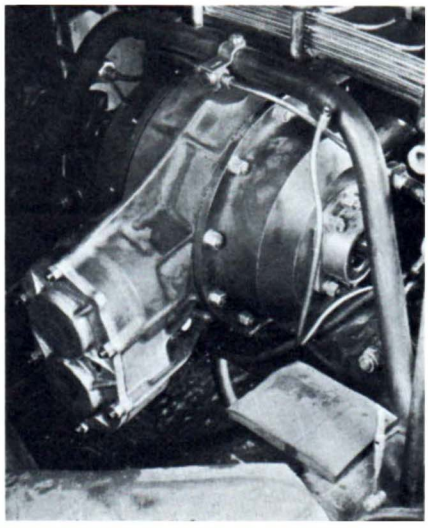
Biggest headache on the car was the quick-change rear end. Halibrand rear ends are usually installed on autos or race cars that have free rear ends. The casing is rounded on the bottom. On the HWM, the rear end is bolted to the frame. Halibrand had to make up special castings for the side plates and the bottom plate. The side plates were special because they had to hold the first U-joint on each side; the bottom plate was special because it had to be bolted in place. Both side plates and the bottom plate were made of magnesium.

The quick-change rear end utilizes a Ford-V8 ring gear and a '56 Lincoln differential. These are bigger than the original equipment. They didn't fit in the small space alloted to the rear end in the old HWM design. So, the box section on which the rear end rests was cut out, re-modeled, and installed again. Troutman and Barnes (Troutman works for Frank Kurtis of Kurtis-Kraft, builders of most of the Indy cars) added a bit by re-making the tubular-steel clamp that holds the entire rear-end set-up in place. The rear transverse spring was arched up 1½ inches to clear the top of the new rear end. (Remember, the *rear* spring on the original HWM is on top.)

Carstens' most interesting experiment with the HWM was the transmission. As he learned with the Cad-Allard, an American three-speed box is a liability on any kind of road course. At Pebble Beach, where Carstens likes to run, the three-speed box is all but impossible. There are six listed turns and three fast bends in the two miles, making such a tight and twisting course that the under-1500 cc cars put up lap times very close to those of the big cars. Only a good, close-ratio gear box has proper control at Pebble Beach.

This indicated a European transmission for the HWM, but there was an additional problem. The Chevy engine puts out more low-speed torque than most imported sports cars, and it's torque that mashes transmissions. One possible out — the Ferrari 4.9 box was too expensive. The only reasonable solution was to experiment with the D Jaguar competition transmission and hope it could hold the Chevy torque.

Adapting the Jag box to the bell housing was done at Edelbrock's shop by Fran Hernandez. He designed and machined a special piece to fit between the transmission and the bell housing. Inside this piece he installed a special bearing similar to the type used in Ford transmissions. The Jag pilot shaft fitted the Buick clutch, but a new pilot bearing had to be made. The clutch was beefed up with stronger springs. The block flywheel was replaced by an 11-pound aluminum Albro competition flywheel. (Later the Buick clutch failed in tests and a '56 Chevrolet Corvette clutch was installed.)



Halibrand quick-change rear end nestles on special pad cut in rear crossmember.

The bell housing, transmission, and special connecting piece compose a unit. It required one attempt to install this unit behind the Chevy engine which is longer than the old four. This brought the shift lever back to the driver's spine, not the easiest position for fast and effective box work. Fran Hernandez opened up the Jag transmission, removed the rails, and chopped four inches off their length. The rails were then welded back together and retempered. Another alteration was made later — the shift lever was doglegged to the left. Tom Carstens is a burly man and Pollack is no dwarf.

One of the tightest binds during the building occurred between April 2, when the car finally reached the Carstens home in Seattle after Kuzma, Edlebrock, Troutman, Barnes, Hernandez, Meeks and Halibrand had done their work, and April 21, practice day for the Pebble Beach race. Carstens and his thoroughly remarkable pit crew, working in the equally remarkable machine shop in the basement of the Carstens' home, did all the finish work by spending a minimum of six hours per day, every day, painting, wiring, detail ing, polishing, tuning, testing, fabricating. This pit crew is a classic example of the true amateurs in sports car racing. Only one is a mechanic by trade. The others are: steamfitter, president of a land title company, full colonel in the army, and an executive. They get no money for their work. They pay their own way from Seattle to Pebble Beach for the races. They never drive the car in competition, just get their enjoyment watching it run.

The job almost didn't get done. When I first saw Tom Carstens at Pebble Beach Saturday morning, there were circles under his eyes and deep worry lines on his forehead. He had put exactly 10 racing miles on the HWM and he didn't have any idea what it needed or didn't need to run properly. Bill Pollack, who had driven the old Cad-Allard to its California victories, had never even seen the HWM, let alone driven it. Facing the HWM in the field at Pebble Beach were more Ferraris than had ever been collected at one event in California before. Driving the Ferraris were Phil Hill, Jack McAfee, Ernie McAfee, Carroll Shelby and others.

It was early afternoon before Bill Pollack pulled the HWM on the course for the first practice session, almost six p.m. before the HWM was retired to Alton Walker's garage for last-minute, pre-race corrections. In the interim Pollack had: set the fastest lap time of the practice record, one minute, 40.6 seconds; decided that the car didn't feel at all right to him; been partially coated by oil blown out through a faulty oil-pressure-gauge line; been photographed and interviewed as intensively and often as if he'd been Marilyn Monroe in a negligee; and brought down on his head the wrath of course officials because of the way he blasted through corners.

On race day Pollack demonstrated the car. The starter flagged the field off for the major event and Bill stood on the accelerator. The HWM stampeded past every Ferrari in the field and made

the first turn in splendid isolation.

"I made a boulevard stop at the first turn," Pollack told me later. "There was more acceleration than I could handle. The engine was supernatural."

But at the first turn Pollack learned the horrible truth. He went into the turn way in the lead, got set, then the rear end broke into its own version of the corner. There was no way the car could be handled except to slow it down for the corners. This was the story of the race. The HWM could take any Ferrari in the race acceleration and match it on usable top speed, but it couldn't stay in the corners with it. On the third turn of the first lap, Phil Hill passed the HWM. By the end of the race, Pollack was one lap behind. He finally placed sixth overall, third in the crowded C Class. His final gesture was a good one. He deliberately slowed down so he would be coming out of the last turn with Phil Hill on Phil's last lap and his own penultimate lap. Once out of the turn he stood on the Chevy. It beat Phil's 3.5-liter Ferrari to the finish line.

Pollack's later thoughts are interesting. He loves the engine – he didn't use all the throttle at any time because there was just too much power. He loves the transmission – there's only 1000 rpm between second, third and fourth, thus giving him optional gears for difficult situations. He couldn't drive the rear end – it was too squirrelly in corners. The rear end broke loose so quickly that there could not be normal drift set up on the corners. As Pollack phrased it, he couldn't go into the corners with the Ferraris without feeling "terribly busy." He calls the steering "fabulous." He loves the brakes, particularly the way they improve with heat rather than fade.

After the race, the cause of the slippery rear end, or at least a major part of it, was found on the teardown that is S.O.P. with Carstens' cars. The differential spider gears were a complete mess. One had frozen on the cross-shaft and disintegrated. The others locked up solidly. The way the unit was made was the only thing that kept the pieces from fouling the ring and pinion. At sometime during the final assembly the bronze thrust washers had been left off the spiders, complicating matters considerably. The end result was that the car behaved exactly as if it had a dirt-track solid-bar rear axle with all the oversteer characteristics this implies. A self-locking (and releasing) differential is one thing on a road course; a solid lock is quite another. With this fault discovered and a revamping of the rear spring rate, the car may well be on its way to complete recovery and a place alongside the famous Number 14 Allard and the midget. #

Safety Bulletin No. 2

Editor's Note:

Following the publication of our first safety bulletin on seat belts, we received the following letter. We feel that the information it contains is of the utmost importance to all of our readers. Ray Brown was the first manufacturer of automobile belts, and as such can be considered the top spokesman for the industry. We have answered his letter below.

As an officer and director of The Automobile Seat Belt Institute, I take exception to your Seat Belt Safety Bulletin which appears in the June issue, page 58. Paragraph 5 of your Safety Bulletin states, "On March 9 the Patrol announced the results of its first tests of seat belts that are available to the motoring public. The results were shocking in that out of more than 70 belts now being marketed only 13 passed the basic CAA test."

With your permission, I will correct this statement and clarify the actual situation.

On March 9, 1956 the California Highway Patrol issued a list of 12 manufacturers of 18 safety belts.

The two that you failed to list are: Star-Lite Mfg. Co. and San Joaquin Parachute Loft Co. whose names also appeared on the first published list. These 12 manufacturers, together with the very few that were rejected for one reason or another, submitted their seat belts units for testing to the California Highway Patrol prior to 15 January 1956.

There were upwards of 100 automobile safety belts submitted and waiting for testing at the agency between January 15 and the present date which are neither approved nor disapproved, simply because there was not sufficient time and manpower to conduct and rapidly process tests and reports.

The reputable manufacturers, the National Association, and the California Highway Patrol became cognizant of the fact that certain companies and individuals were using this initial list incorrectly and unfairly.

On March 20, 1956 the California Highway Patrol issued a Bulletin Ref. 3.87.19 which clarified the misinformation which had been circulated. Paragraph #1 of that Bulletin is as follows:

"Statements to the effect that all belts not on the first bulletin have been rejected are unfounded. The testing is being conducted on a continuing basis and supplemental bulletins will be issued as results become available on additional models. The standing of belts recently submitted will not be determined until the test results are available from the testing agency at the University of California."

Our Impact Saf-Tee Belt was designed and manufactured in 1951 and was the first and original safety belt ever produced and marketed specifically for automotive use.

It was submitted to the California Highway Patrol for testing on February 17th, 1956 and was passed and approved upon initial testing on May 7th, 1956.

Yours very truly,
Ray Brown
Ray Brown Automotive
Los Angeles, California

The deletion of the Star-Lite and San Joaquin belts was completely unintentional and was caused by the fact that they were by themselves on the second page of the CHP bulletin. The material for the story was from a personal interview with a Highway Patrol official given one of SCI's West Coast staff members and was, at the time of writing, accurate except for the two unintentional omissions. Since the first bulletin, several other belts have passed, including the Ray Brown Impact-Saf-Tee and Security belts. We regret the impression that all others than those listed failed, but felt that the phrases "first tests" and "acceptability will be announced" implied that the tests were continuous and not as yet completed. At the time of the interview, according to our information, 70 belts had been tested and all but the ones listed, together with the Star-Lite and San Joaquin belts, found wanting. We know and you know that there are some very inferior belts on the market, and that these are capable of killing our readers and the business of the reputable manufacturers. We are delighted to pass on the names of accepted belts as they come through from the CHP as a service to our readers and to the manufacturers. Nothing would make us happier than to see the name of every seat belt manufacturer on the approved list.—The Editors. #