NEW BREED FOR INDY CHEVY

Low-slung car achieves minimum wind resistance through use of specially designed wide-based, 12-inch Firestones.

Crossbreeding of sports car chassis and Detroit engines has produced revolutionary hybrid racers that have the Indianapolis railbirds talking to themselves

by ERIC RICKMAN

This year's Indianapolis 500 will see a new breed of car which should go far toward revolutionizing the field of race car building. To date, two of these little machines have accomplished feats during practice that most cars have been unable to match while in competition.

We are, of course, referring to the Thompson-Chevrolet and the Ford-Lotus cars. During the latter part of March, both were able to get in some time on the Indy track for tire tests and fuel consumption runs. To say the results were spectacular would be the understatement of the year. Dan Gurney toured the track in the Ford-Lotus at speeds in excess of 150 mph with apparent ease. Krause, in one of the new Chevrolet-powered Harvey Aluminum Specials, racked up a 146-plus lap easily with power to spare. Billy, it must be remembered, had just passed his driver's test in a completely new and unfamiliar car. What Graham Hill, 1962 Grand Prix world champion driver, will be able to do in one of these machines is an interesting thought to contemplate. Bill Cheesbourg, a veteran Indy driver, turned a 148 in one of last year's Thompson-built Harvey Aluminum cars.

Colin Chapman, "Mr. Lotus" of England, is now in the process of building two more cars based on experience gained from the prototype work car. This will give Ford-Lotus a possibility of three entries. With last year's two cars now running Chevys, and three new Chevy-powered cars, the Harvey stable will total five.

With eight of the new breed entered we should expect to see at least three of them in the front row. This is the only place to be in one of these little bombs. Riding along with your eyes only 23 inches above the track, looking around one of those big Offy-powered machines is going to be a bit like following a truck on a California freeway.

The new breed of machine is rear-engined, and extremely low slung. At this point, all similarity ends.

After last year's successful qualification of the rear-engined, Buick-powered car, Mickey Thompson chose to stick to the same basic design, but go lower, lighter, and add more horses to the 1963 Harvey Aluminum cars. The most controversial aspect of these machines is their 12-inch wheels, a size never before seen at Indy. Thompson and Firestone collaborated on these new, small Indy tires. With a rolling diameter of 22 inches front, and 24 inches rear, Mickey was able to get the spindles down to 11 and 12 inches off the track. This, in turn, permitted construction of an extremely low machine. A track width of 55 inches and an overall height of only 33 inches make up a rather broad and low silhouette. Twelve-inch tires with a tread width of 7 inches front, 9 inches rear, make the car look like an overgrown kart.

Two of the cars have mild steel tubular chassis and weigh around 1050 pounds dry. The third new car now under construction will be a super-light version; builders are trying to get under 1000 pounds. This chassis is entirely

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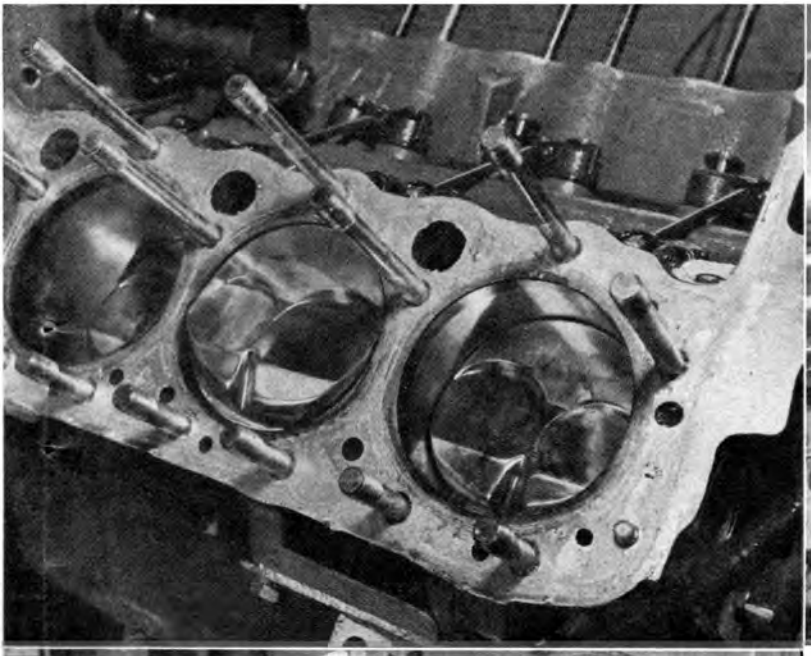
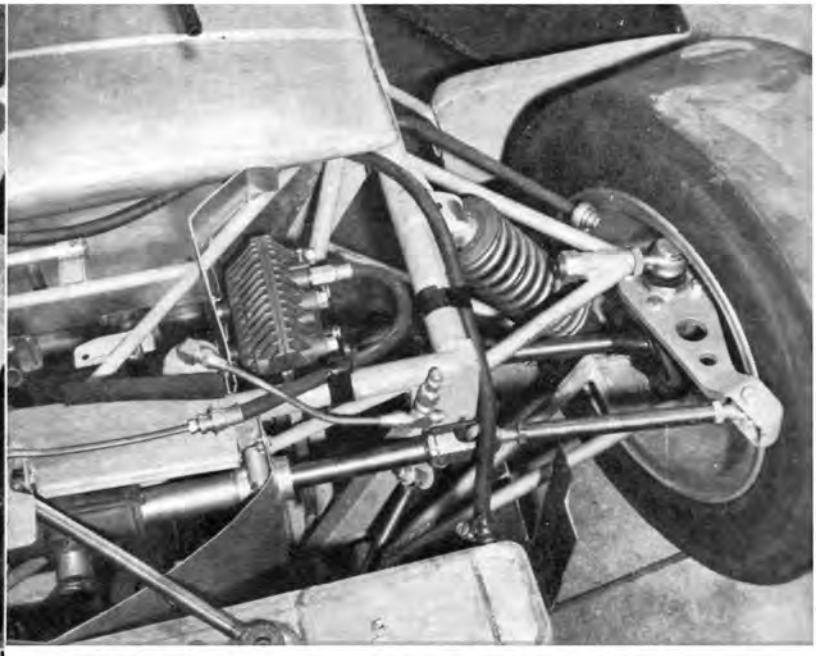
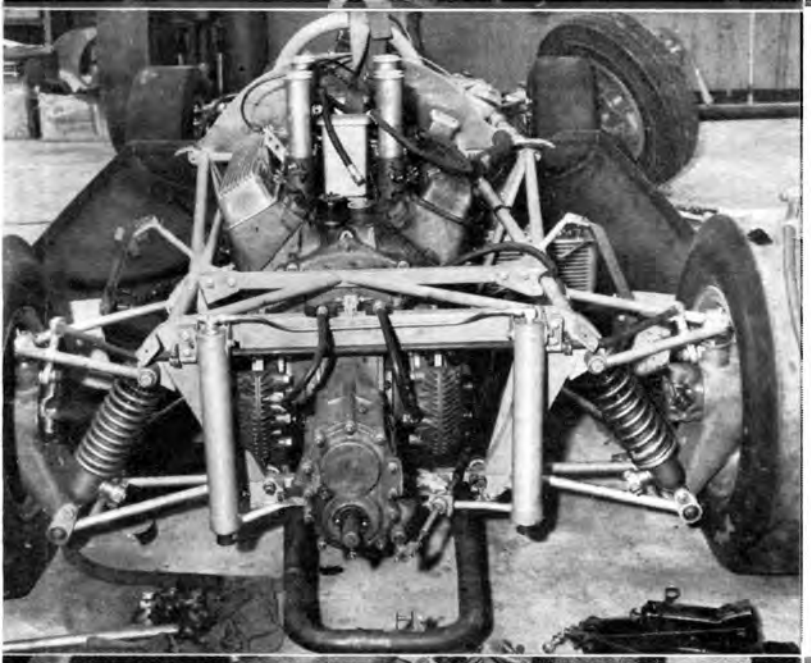






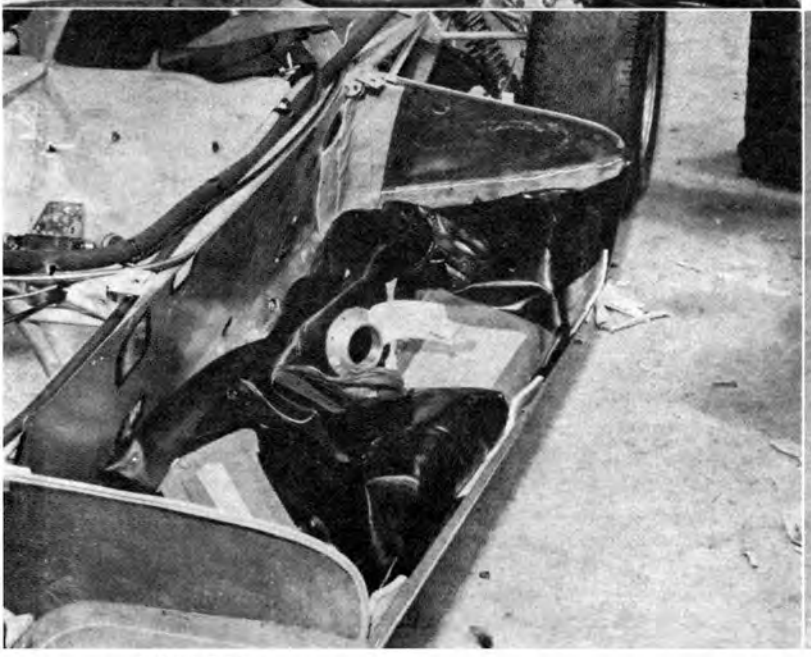
ABOVE – Small diameter of wheels required brakes be mounted inboard. Airheart spots are mounted on chassis. Rack and pinion steering by Thompson has 2 turns lock to lock. Note the air jack fitting at corner of frame.

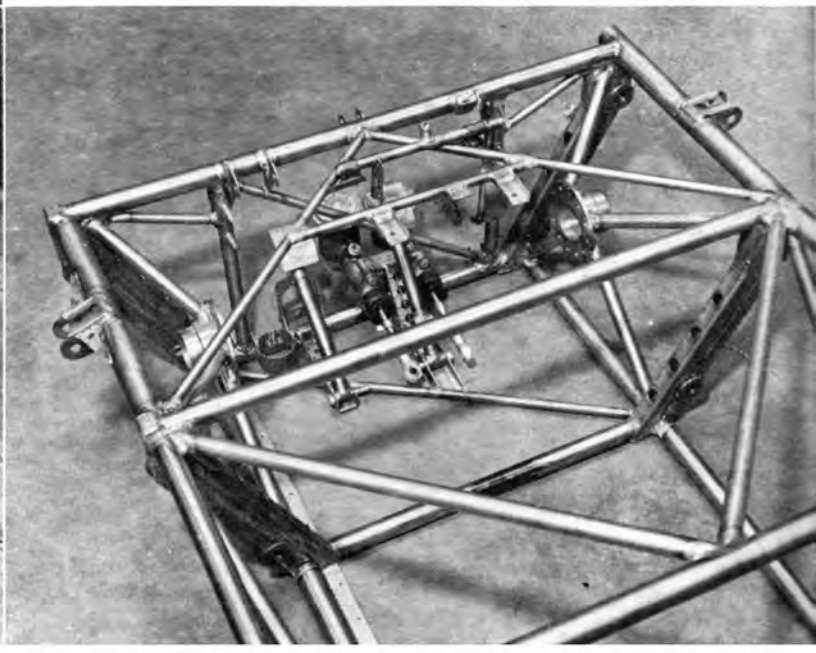
ABOVE LEFT – Getting high compression in a short stroke, over-square engine poses quite a problem. The pistons must almost fill the combustion chamber. This requires notched piston crown to promote flame travel.

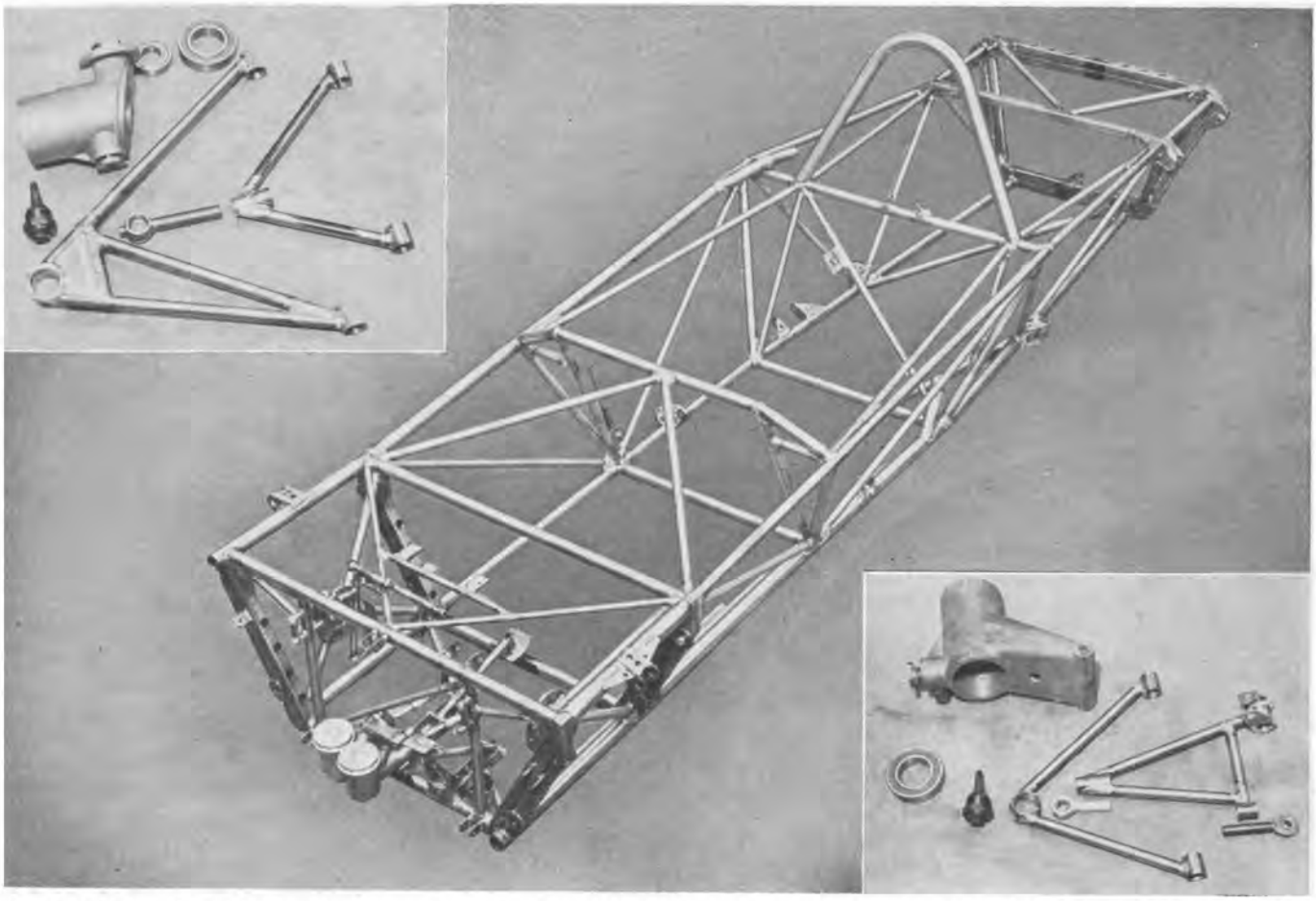
LEFT – Starter motor will be used on spline shaft protruding from lower portion of Halibrand two-speed quick-change. Note air jacks at sides of frame. Rear axles utilize ball and trunnion U-joints instead of splines to absorb length change as suspension works.

BELOW LEFT – An aircraft-type Firestone 47-gallon fuel cell will fill fiberglass body compartment between the wheels on driver's left. Weight is toward the turn. As fuel is used, handling won't be seriously affected.

BELOW – Front end of the new, super-light titanium chassis reveals the spot brake carriers extending inward from sides. Dual master cylinders, lower center.







The chassis for the fifth car, the Harvey Titanium Special will be just that. Entire chassis is .050-inch wall titanium tube. Titanium is 40% lighter than its equivalent in steel. This chassis weighs 55 pounds. Thompson hopes to keep the entire car's weight under 1000 pounds. Inset photos are: upper left, front A-arms, hub; lower right, rear A-arms, bearing carrier. Castings are hollow-cored magnesium for extreme lightness. The A-arms are titanium. The ball joints are Chevrolet Corvair. Cooling water flows forward to aluminum Harrison cross-flow radiator through upper right frame tube, returns lower left.

NEW BREED FOR INDY . . . CHEVY *continued*

Mickey confers with Billy Krause after a test run. Air turbulence is minimized by extending body to fill space between wheels. Fuel is on left, right compartment is empty except for small oil cooler and its air duct. Tires are 7 inches wide front, and 9 inches wide at rear. Track width is 55 inches.

of titanium .050-inch wall tubing specially formed by Harvey for this project. Titanium weighs approximately 40 percent less than mild steel. This super-light chassis weighs only 55 pounds. The car will be named Harvey Titanium Special and will carry number 81. Wherever possible, components will be made up entirely from titanium, aluminum and magnesium. With a fiberglass body the car should weigh in well under the 1000-pound mark.

All five cars will be powered by 225 cubic inch, all aluminum Chevrolet engines. Engines will, of course, utilize as many of Mickey's M/T products as possible. Rods, rings, pistons, rocker arms and, of course, a ductile-iron crankshaft will all be of Thompson manufacture. Schiefer is supplying flywheel and clutch assemblies plus the cams and his new magneto ignition. Airheart dual spot brakes are used all around. Halibrand is furnishing the rear end.

The Ford-Lotus entry marks the first time an English car builder, Colin Chapman, and an American factory, Ford, have collaborated in producing a car to run in an event of this nature. Chapman's Lotus is a slightly stretched version of the Lotus 25 Grand Prix. This type of car utilizes the monocoque principle of construction; body and chassis become one with a stressed skin riveted over all. This may be compared to the aeronautical stressed skin type of construction. The cars are equally low. In fact, the Lotus is only 30.5 inches high with a track width of 56 inches (one inch wider than the Thompson car). Ground

NEW BREED FOR INDY FORD

Dan Gurney of Riverside, Calif., at the wheel of the Ford Lotus work car. Dan has turned some phenomenal 150-mph-plus laps in this car. Ground clearance is 3.75 inches, even lower than Thompson's. Wheels are 15-inch Dunlop alloy, peg-drive knock-off.

photos by Eric Rickman, Ford Motor Co.

clearance at 3.75 inches is even less than Thompson's 4.5 inches. The Lotus is slightly longer, too; 150 inches to Thompson's 135 inches. The Ford-Lotus has a clean, torpedo-like body, and looks a good deal like an open-wheel belly tank streamliner. Right here is where the two lines of thinking begin to diverge. Thompson went to small tires and wheels; Chapman stuck to the more conventional 15- and 16-inch diameter wheels with 6- and 8-inch rim widths front and rear, respectively.

With such a small and clean body the wheels and tires are the first thing one tends to notice about the Lotus. On such a small car they appear huge, but don't seem to handicap the car's speed too much. The suspension is fully independent unequal length wishbone front, with independent unequal track control arms rear. After a very successful test run, both in Arizona and at Indy, the only change contemplated in the two new cars will be to offset the chassis slightly to the left to get more weight inside the turn. With a chassis-less car this is going to have to be done by using shorter suspension members on the left.

Ford Motor Company did all engine development work, then made the engines available to Mr. Chapman. The Ford, too, is an all aluminum job based on the current Fairlane V8 engine. The primary difference between the Ford and Chevy engines will be the use of four Weber down-draft carbs on the Ford. Thompson will be using Hilborn injectors. Ford ignition will be a battery powered transistor unit. There was also an overhead cam version in the works, but it apparently wasn't completely prepared in time for this year's race. Ford will admit to horsepower in excess of 350 at 6000 to 8000 rpm's. The grapevine says it is as high as 370 horses on gas. Thompson claims to be developing almost equal horsepower. An Offy puts out about 400 horses on alky so it would appear that the "new breed" is giving away a lot in the horsepower department. Not so. They get it all back as free horsepower in greatly reduced frontal area and much lower weight. This brings up one of the first of the interesting points to ponder. The Ford, with carburetors, is getting almost 7.5 miles per gallon. With a fifty-gallon tank, they figure to be able to go the distance on only one fuel stop. Thompson's injectors won't be able to give him this economy. He has a 47-gallon fuel tank. If he can make 6 miles per gallon he could theoretically cover 282 miles before having to refuel. This, then, would let him cover the distance with only one mid-point fuel stop also. The tire wear problem is quite interesting, too. Thompson's thinking is along the lines of getting more area in contact, thereby reducing the load per square inch and reducing tire wear. With an equally light car, Chapman apparently didn't concern himself with this aspect and trusted to the much lighter loading of the larger tires' contact area. Five hundred miles from now we will know the answer to this one. Both cars

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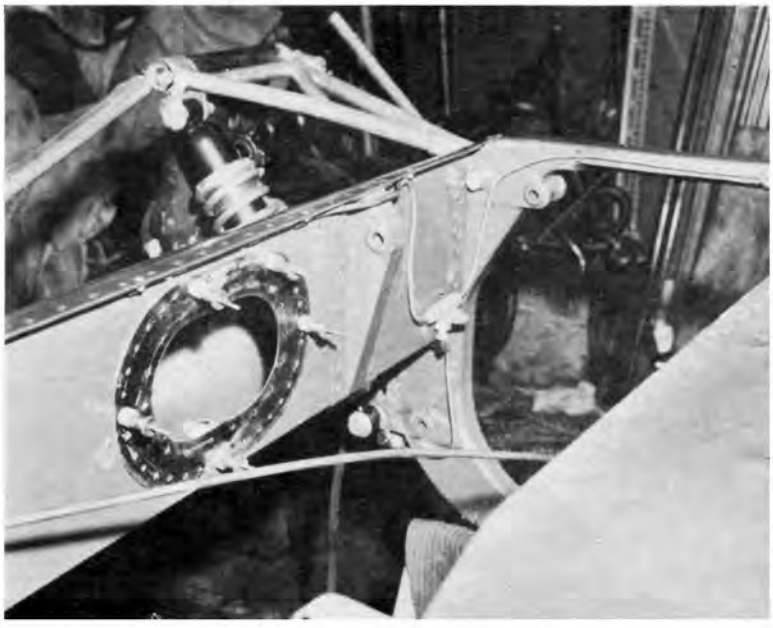
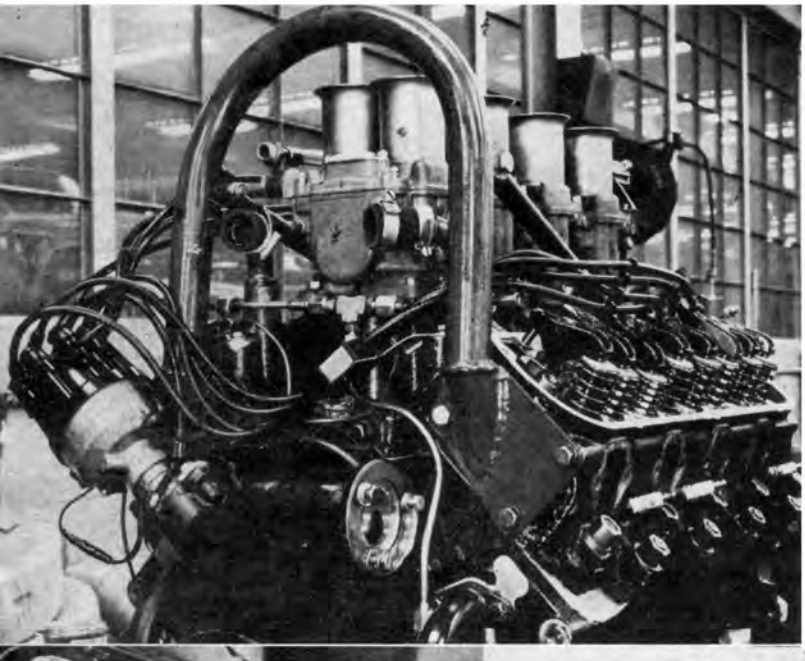
showed almost negligible tire wear in their trials. Gurney turned his fantastic 150-plus mph practice lap on some rather soft Dunlop tires. He later turned 148 mph on some slightly larger, conventional Firestone Indy tires of a harder composition. Chapman felt that they could have made 150 on the Firestones, given more time to experiment with gearing. Dunlop is now in the process of making up some new tires with a composition equal to the Firestone tires. Chapman hopes to start at least two cars, one on Dunlops and one on Firestones.

We are forced to consider the faster cornering possibilities of lighter cars, and in Thompson's case, not only a lighter car but one with almost twice as much tire area in contact with the track. Jack Brabham proved this point in '61 when he brought a greatly under-powered car home in 9th position. Jack had only 225 horses to work with. Gurney admits that their goal is to sit on the pole with a qualifying time of 153 mph plus. Thompson hopes to have one of his cars there, too, preferably on Dan's left.



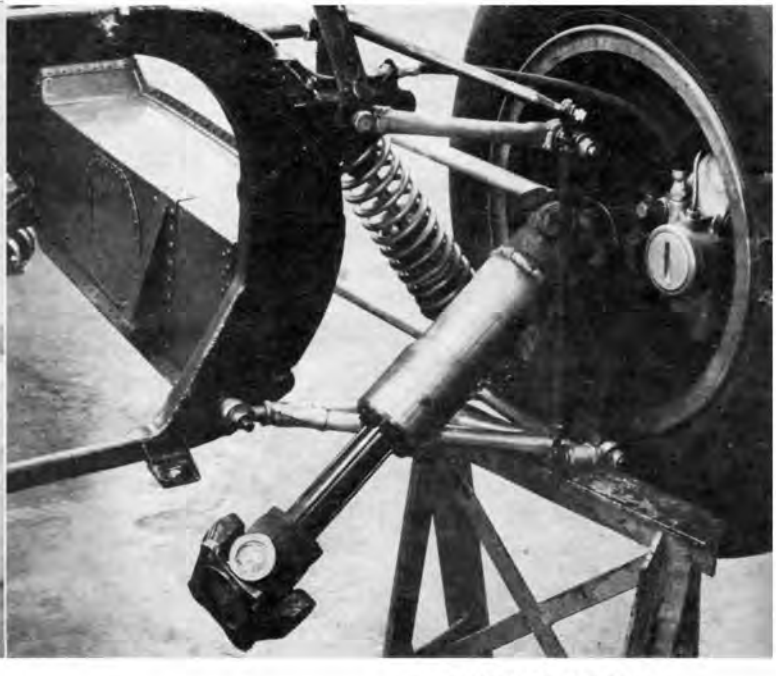


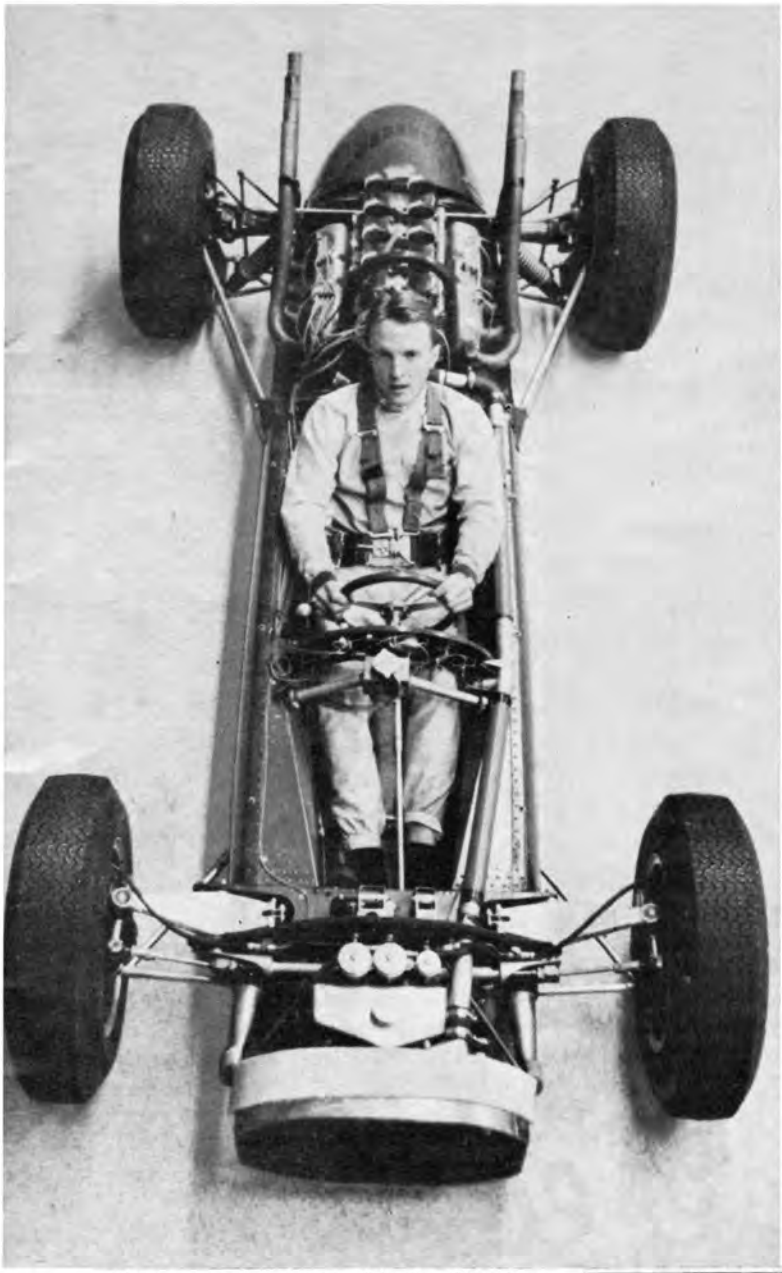
ABOVE – The Lotus chassis monocoque method of construction becomes apparent here. Body and chassis are one piece, being formed by stressed skin riveted sections. Compartment will hold 50-gallon fuel cell.

LEFT – This is a neat solution to the problem of where to attach the roll bar in a monocoque type machine. Note the four, dual-throat 58 mm downdraft Weber carburetors. These give engine almost 7.5 mpg on gasoline.

BELOW LEFT – Unequal length wishbone type suspension gives a 2-inch roll center up front. Cantilever upper arm operates inboard co-axial, coil spring Armstrong shock. Girling spot brakes on 10½-inch discs.

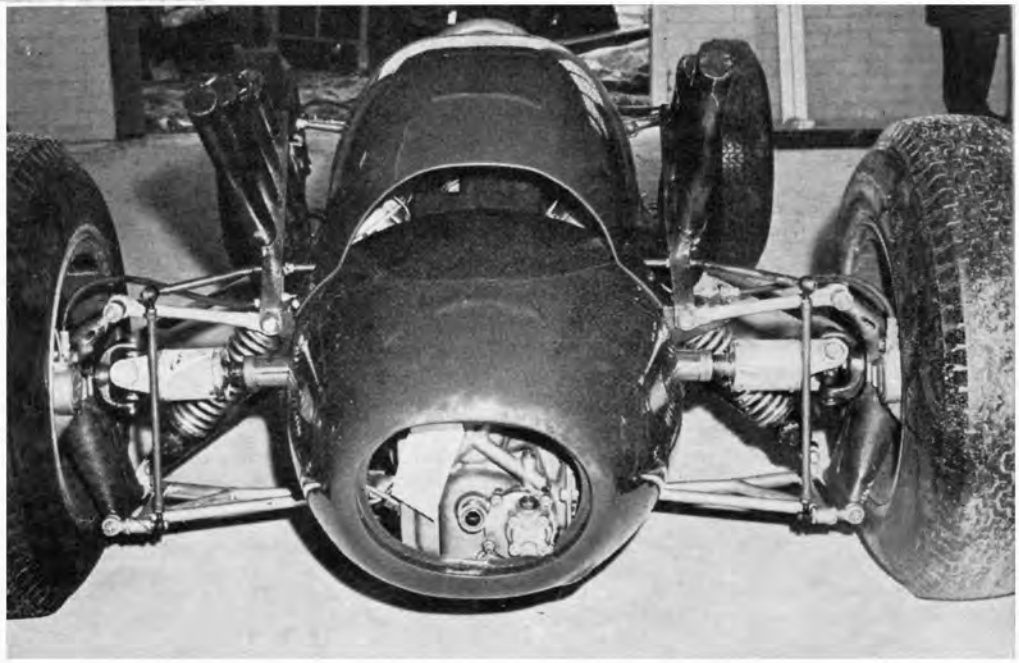
BELOW – Rear suspension is by long radius rods with short upper single rod arm to chassis and longer A-arm at bottom. Saginaw recirculating ball bearing spline in axle absorbs length change as the suspension works.





UPPER – Left to right: Jim Clark, driver of the second car; Dan Gurney, idea man behind the project; and Colin Chapman, builder of Lotus Grand Prix cars, in a pensive moment. LOWER – Well-filled dash panel becomes a structural bulkhead in monocoque construction. Driver will be too busy to monitor all these instruments. Steering is rack and pinion with 2¼ turns lock to lock of the light alloy 12-inch wheel.

Gurney seems to wear this car. Quarters will be a bit cramped for 500 miles. When upper half of body shell is in place the car looks more like a belly tank lakester. One hundred fifty-inch length increases the likeness. Cooling water tube passes on driver's left. Fuel filler over knees appears rather small. Fuel cells are in tanks at sides of car.



Hookes-type universal joints are used outboard. Note vertical rods to cross-mounted stabilizer bar. All-aluminum Ford engine drives 4-speed type 37A Collotti transmission and rear-end assembly. Armstrong co-axial coil spring shock is mounted outboard at rear. All weight carried by coil-wound shocks.