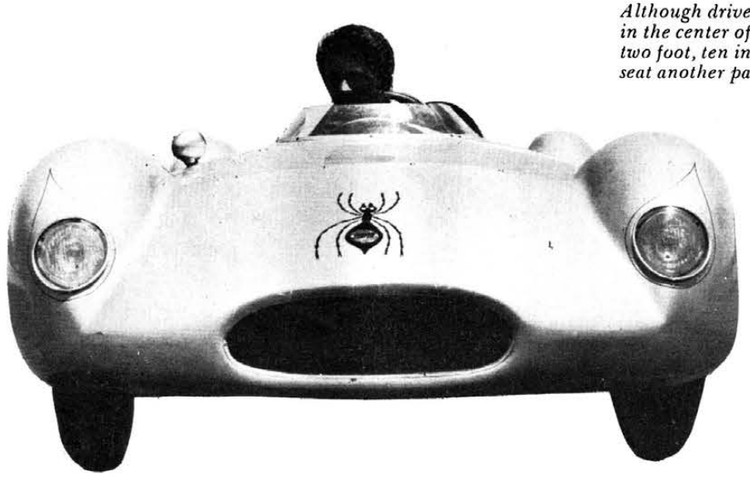
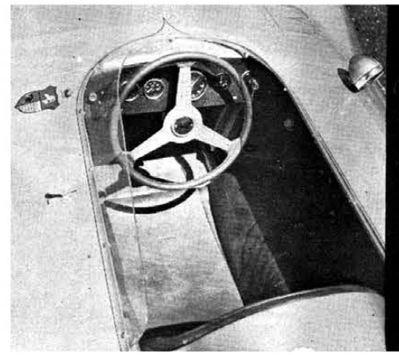


Although driver is seated smack in the center of the Cooper, the two foot, ten inch high car will seat another passenger on left.

Mr. Cooper's Fugitive From a Fire Pump

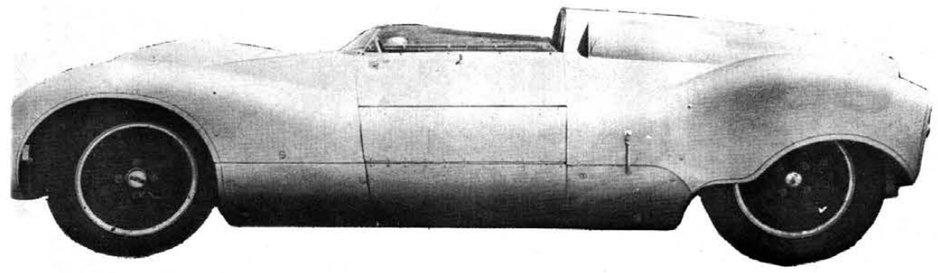
Most of the controversy about the Cooper Climax centers about the manx cat tail—as well it should since that's about all other drivers see of this latest small bore threat.

By RUSS KELLY



Cooper Climax cockpit requires a semi-reclining position for comfort. Dash carries a full line of instruments which can be read at a glance. Note angle of lever to right of steering wheel.

Front brakes have two leading shoes, and a brake drum that is liberally finned. Rear brakes, however, have one leading and one trailing shoe each.



Added weight of driver does almost nothing to change the weight distribution either laterally or longitudinally as can be seen in this silhouette.

FRANCIS BACON once said, "The finest things spring from adversity." Although an Englishman, he was around a little too early to have made this remark about English racing cars, but it certainly would apply. The miniature industries that produce these cars have to struggle to live in an economy that at best regards them as frivolous. The purchase tax threatens them, the steel they need ends up in dollar-earning MGs. After the war they fought desperately for a few courses to race on only to have the Italians come over regularly and beat them up. How could things be more adverse?

In 1953 came the first hint of some handwriting on the wall. English 500cc cars so completely dominated their class that the continentals refused to take their steady lumps and left the English to race themselves in Formula III. That same year the Formula II Cooper Bristol served its limited notice that finer things were to come. Last year the Connaught at Syracuse shook the Maserati team by winning handily. Early this year what the Vanwall and the lone BRM did to Fangio (Ferrari) at Silverstone was something he hadn't recovered from by the time Monaco rolled around.

The U. S. enthusiast is now getting a close look at some of these children of adversity in the form of 1100cc Coventry Climax-engined sports racing cars. When a few of the boys stretched the 1100 engine to 1500cc's by some austere modification, probably a rubber crankshaft, these cars gave all the English handicappers fits, to say nothing of what it did to big car drivers. They found themselves hard pressed to better the outright lap records put up on short English courses by these fugitives from a portable fire pump.

First of these 1100 cars to invade the U. S. in force was the Lotus Climax (SCI August '56), but now the Coopers are here in numbers to match them and U. S. race fans are in for some of the exciting battles that have delighted the British and astounded the Italians and Germans.

The first Cooper Climax delivered in the LA area by Warren Olson, the Cooper dealer, went to Lance Reventlow, a young man whose taste for fine machinery needs no developing. Reventlow cheerfully agreed to a test of the car by SCI and Willow Springs road course was selected as the test site.

The first good look at the Cooper Climax is a thought provoking one. Rear engines encountered in a new design always start the pros and cons of the old classic arguments boiling. Apparently the main objections to this layout are weight distribution and a subtle psychological matter for the driver that comes from a slightly forward seating position.

It is only reasonable that John Cooper should have decided to construct his 1100 on this engine-behind-the-driver principle. A satisfactory substitute for practical experience in racing car building has yet to be found. Cooper's long background in Formula III racing, where this seeming unorthodoxy of rear engine design predominates, made his choice a logical one. His bonus in saved weight and lessened frontal area by eliminating the driveshaft and corresponding high seating position of the driver is considerable, but it is doubtful if this had any direct influence on his decision.

From the race records it seems that Cooper has whipped the problem of weight distribution with this little car. But how about the driver adjustment problem? Racing sports cars have been built for prestige, sold for dollars and the handling justified by the statement, "Well, you know only three people in the world are capable of really driving this car." John Fox, the Cooper distributor for the Western U. S., assured me that the car was a dream to handle. I, for one, am happy to say that Foxy was right and that the car makes no greater demands on the driver's reflexes and judgment than any other fast car that I have ever driven.

Even the most hardened of those familiar with racing machinery would come a little unglued and show enthusiasm about this car. Just over ten feet long and less than two feet ten inches to the top of its headrest, it would seem to answer for the car world the question how small is small. The Mark II engine develops in excess of 80 bhp and weight full up without driver is less than 930 pounds, a creditable pounds per horsepower ratio.

When you enter the cockpit, the seat location calls for a long stretch of short legs to avoid leaning against the thin side panels of the body. Layout of the controls and the seat backrest is such that a semi-reclining position is necessary for comfort. Strange at first, this position is surprisingly easy to become accustomed to and does effectively protect you from wind buffeting. Brake, clutch, and acceleration pedal are all placed conventionally with the gear shift lever located on the right. The dash carries a full line of instruments that are no more difficult to read than most, and the fact that you're centrally seated means you have an excellent view of both front fenders.

Cooper Climax

SPECIFICATIONS

COOPER CLIMAX

PRICE:
$5380

ENGINE:

Cylinders	4, in line		
Bore and stroke	2.8 in x 2.6 in (72.39 mm x 66.6 mm)		
Capacity	1098 cc		
Firing order	1,3,4,2		
Compression ratio	10 to 1		
Output	Max. horsepower 75 @ 6200 rpm		
		Inlet	Exhaust
Valves:	Head dia.	1⅜ in.	1-3/16 in.
	Stem dia.	⅜ in.	⅜ in.
Carburetors	2 1½ SU semi downdraft		

IGNITION:
Coil and Distributor

Breaker gap	0.12–.014
Oil capacity	4 quarts

CLUTCH:
7¼ Borg and Beck

GEARBOX:

Ratios: 4th	1:1
3rd	1:1.29
2nd	1:1.9
1st	1:2.7
Rev	1:2.7

REAR AXLE:
Ratios: 4.5:1
4:1
3.7:1

WHEELS:
Cast magnesium 4.00 x 15 front, 5.00 x 15 rear

BRAKES:
Lockheed hydraulic, 2 leading shoe front, leading and trailing shoe rear
Drums: 10 in. dia. x 1¾ in. wide

STEERING:
Cooper rack and pinion, Turns lock to lock 1¼

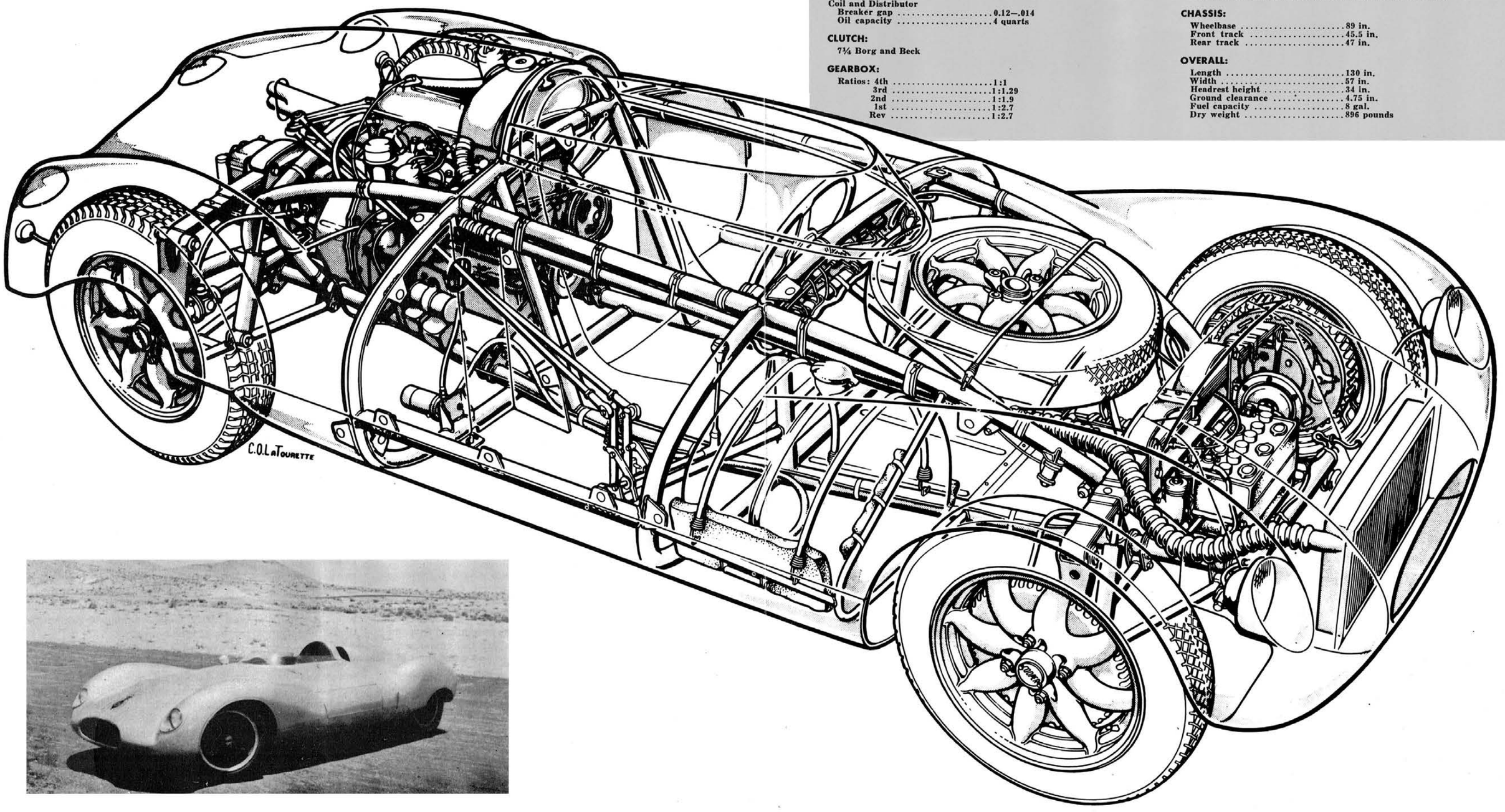
SUSPENSION:
Independent front and rear by transverse leaf springs and tubular steel "A" frames. Armstrong Telescopic shocks front and rear.

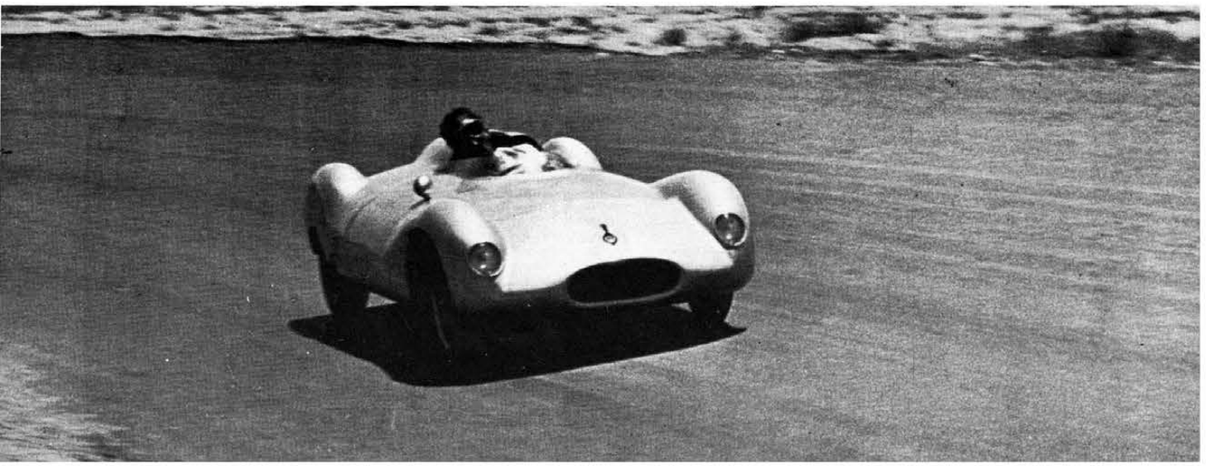
CHASSIS:

Wheelbase	89 in.
Front track	45.5 in.
Rear track	47 in.

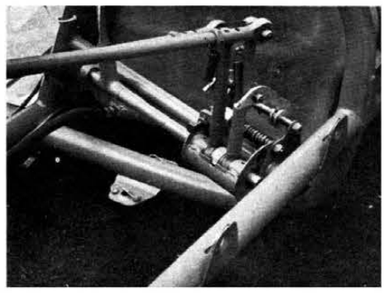
OVERALL:

Length	130 in.
Width	57 in.
Headrest height	34 in.
Ground clearance	4.75 in.
Fuel capacity	8 gal.
Dry weight	896 pounds



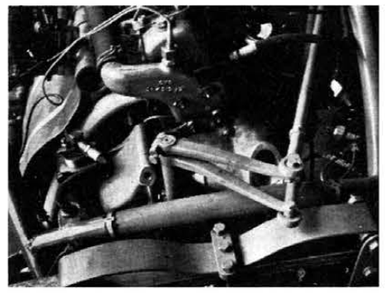


On test curve just out of the back straight at 85 mph. Car is actually drifting through turn.

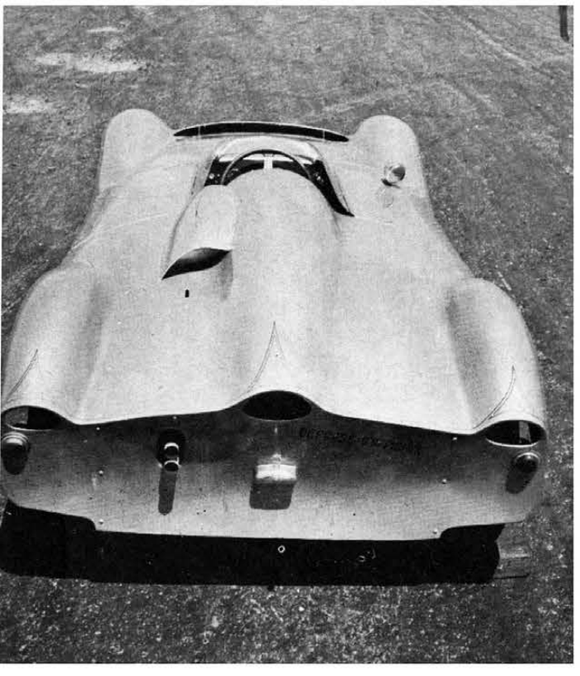


Abrupt back of Cooper causes comment. Turbulence effect at rear is negligible.

Gear mechanism has standard MG pattern. Little springs are of locking device to prevent 2 gear engagement.



Rear of shifting linkage. Despite levers, ball joints, and length of shifting rods, "feel" is light-positive.



A touch of the starter and the Climax engine fires and idles evenly and smoothly; the hydraulically operated clutch is light and engages firmly. The gear lever moves into a really new adventure in fast driving.

Testing a competition car has its little difficulties. Being at home on the course helps, but giving the car a chance to win your confidence is the main problem. If you don't have confidence in the car, it's almost impossible to relax. If you cannot relax, trying to go fast can be agonizing.

It is a real tribute to the Cooper Climax that less than three laps put me at ease and gave the distinct impression that only the crudest mishandling, the father of all boners, could cause trouble. The Cooper 1100 has been compared to the Cooper 500 in handling. This, a compliment to both cars, is not fair to either of them. The agility, the incredible quickness of the 500, is part of its handling and any other car would suffer in comparison with it.

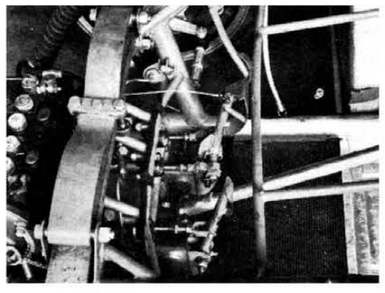
The Cooper 1100 is apparently neutral as far as oversteer or understeer are concerned. It has no discernable tendency to push its front wheels nor does it give you the feeling that you might have to cope with a back and that has decided to wander around to the front for no good reason. This is a car that sticks like glue and generates confidence at such a rate that you begin to think you're a lot better driver than anybody ever told you that you were.

The brakes are of the sort that once were called phenomenal, but are now commonplace on the latest designs and like the others, it seems as though it would be impossible to tire them. Acceleration in spite of the excellent lap times possible is not starting, though good for only 1100cc's. The added weight of the passenger during the acceleration tests imposes a real handicap on the car, but still does give an idea of how the car is capable of performance.

With chassis of this calibre available, the proposed Formula II using 1500 cc engines restricted to gasoline for fuel could prove to be tremendously popular. Cooper has already begun to build to the new formula and Maserati has ordered a Lotus Mark II chassis. Things are going to be interesting indeed.

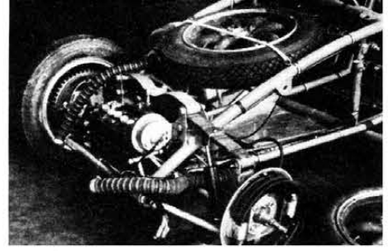
The Cooper practice of making the internals easily accessible applies to this model as well as the earlier ones. Other than the belly-pan which extends from front to rear, the body is made in only three sections, a nose piece, center section and tail piece. All sections are held in place by Dzus fasteners and hinges making it possible to strip the car to the chassis frame in a few minutes.

(Continued on page 60)

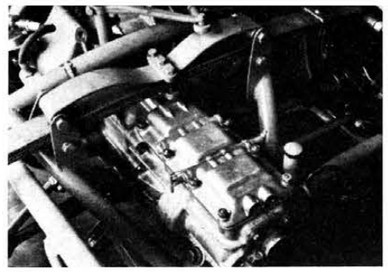


Brake, clutch, and throttle pedals. The clutch is hydraulic with slave cylinder at rear engine plate.

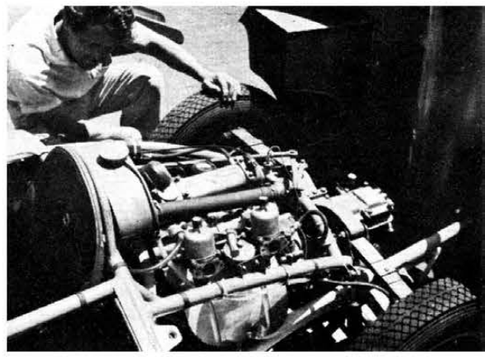
Wheels are cast magnesium. Tires are 4.00 x 15 front and 5.00 x 15 rear.



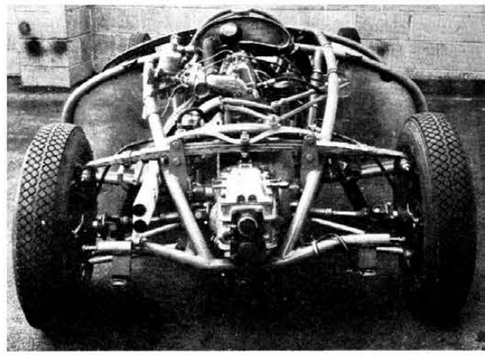
Open view of front shows battery, horn and spare tire location. Hoses connect to radiator.



Transverse springs pass through rollered channels which limit effective length under roll action.



Driver, engine almost sit in same compartment. Climax mill puts out 75 horses—drags only 896 lbs.



Inclination of wheels in rear view isn't perspective illusion. Wheel camber is part of the design.

Cooper Climax

(Continued from page 37)

The chassis frame itself follows generally that of the Mark IX Cooper. The two main side members fabricated of 18 gauge tubing 1.5 inches in diameter are roughly triangular in shape and are deepest in section in the cockpit area. Welded to the main side members just in front of the cockpit and serving as a mount for the instrument panel is an elliptical hoop section of 1.5 inch tubing that runs the full width of the car. This hoop section is duplicated just to the rear of the cockpit. The straight cross members are also tubing of the same gauge and section as the side members. This chassis frame with the welded on brackets for the engine mounts, springs, shocks and "A" frames is said to weigh only 65 pounds. It's interesting that Cooper has managed again here to avoid the use of fabricated "Box" sections to carry the suspension units. Considerable engineering time must have been spent to make this design possible, but it has obviously paid off in the saving of weight.

The driver's seat is inside and on the same level as the lower side member tubes, this being made possible by the absence of a driveshaft. The passenger seat is more or less out-rigged on the left hand side. The occasional passenger is no doubt encouraged to learn that an extra length of tubing was added to the chassis frame to accommodate his weight.

suspension

The regular Cooper practice of independent suspension for all four wheels is continued here. Again the method used is the well proven one of the lower "A" frame, transverse leaf spring. Development on this theme has come to be a Cooper specialty. In addition to passing the transverse leaf spring through rollered channels that limit its effective length under roll conditions, but still allowing the entire length to operate in suspension, the front spring is two inches shorter than that used in the rear. This concern with increasing the roll-stiffness and still maintaining a "soft" spring rate at static load, particularly at the front, may indicate that understeer, inherent with this type of suspension, may be a problem. It will be interesting to see if the drivers of these cars will find as their skill increases and their lap times go up, that the car has a tendency to push its front wheels, especially in the slower corners.

At the front the "A" frames and transverse spring are connected by welded-up steel king-pin carriers. This job is done at the rear by magnesium castings that also carry the bearings for the half-shafts and rear wheel hubs. The distance between spring eye and wheel center is two inches greater in the rear than at the front. The wheel deflection on bump and rebound is equal front and rear.

The steering as in all Coopers is by rack and pinion of Cooper design. On this car the cast housing runs the full width of the frame. Short adjustable track rods connect the rack ends with steel steering arms that are bolted to the stub axles. About one and three-quarter turns are necessary to go from lock to lock.

Gearbox

Gearboxes suitable for use in limited production sports-racing cars are hard to find. This particular problem handicapped the Cunningham cars throughout their manufacture. Cooper solves this problem very neatly by adapting a Citroën gearbox and front wheel final drive unit to the Climax engine. The difference in running position reversed the direction of rotation for the unit and made it necessary to fit a seal in the clutch and of the box to prevent oil from the gear case being pumped into the clutch housing. About the only part of the gearbox that is still stock Citroën is the gear case itself. E.R.S.A., Parisian supplier of *Les Recharges Hot* to French hot rodders, makes the non-standard internal ratios. All speeds, four forward and reverse are crash-type as opposed to a synchromesh third and fourth in a standard Citroën box. The gear layout in the box is conventional. Helically cut, constant mesh gears are carried on two shafts, the primary, or input, shaft passes over the differential unit and alongside the ring gear, carrying the free gears and selector dogs. The secondary shaft and final drive pinion are machined together from a forging, the pinion is of course the forward end, and all gears on this shaft are fixed. The ring gear and differential carrier bearings are mounted to the gear case by means of caps.

A 7.25 inch Borg and Beck single plate clutch transmits the drive from engine to gearbox, the clutch housing serving as a connection between the two units. The absence of the usual drive shaft and the extensive use of light alloys gives this 1100 a clutch, transmission and final drive unit that weighs less than 115 pounds.

Power train

The power and drive unit has six points of attachment to the frame. The front engine mount is similar to that of the TC MG in that it is a transverse

plate bolted up with the timing cover and attached at its ends to the frame. The rear engine mounts are small plates on each side of the clutch housing. The two gear box mounts serve only to locate the unit laterally. All these mounts are rubber bushed to cut vibration.

The rear wheels are driven through universally jointed telescopic shafts that bolt up to flanges on the gearbox and the rear wheel half-shafts. Clutch operation is hydraulic, the slave cylinder being mounted on the rear engine plate and connected to the clutch release shaft.

The shifting linkage to the remote gearbox looks like a mechanical arm for the man from Mars, but is beautiful in operation. Located on the driver's right, the short lever actuates two long rods connected to levers on the gearbox that in turn operate the internal selector rods. The shift pattern is of the standard "H" type with reverse being gained by overriding a spring-loaded stop in the first gear position.

The 10 inch diameter, 1.75-inch-wide brakes are actuated by dual linked master cylinders mounted on the front cross tube of the chassis. The cast magnesium drums incorporate steel liners and are liberally finned. The usual practice of two leading shoes in front with one leading and one trailing shoe is followed here. The hand brake operates the rear system by means of a steel cable to the master cylinder for the rear wheels.

The power plant is the Mark II version of the 1100 Coventry Climax unit for which over 80 bhp is claimed. Externally, the intake manifold is slightly different from the other Climax engines we have seen; internally, other than a slightly higher compression ratio, nothing has been discernably changed. The cam timing is unchanged from the earlier models.

An eight gallon fuel tank is mounted to the right and slightly ahead of the driver's seat in the outrigged portion of the frame. Held in place by rubber shock cords, there is plenty of room for a larger tank, if entry in long distance events should make it desirable. The radiator is mounted in the nose piece shell with a series of tubes and hoses carrying the water back along the chassis tubes to the engine-mounted water pump and back to the radiator from the header tank. The header tank is of small capacity and is mounted over the engine just to the rear of the driver's head.

From the rear of the cockpit the complete tail section hinges upward and back, exposing the entire engine and final drive unit. The nose piece is hinged in the front and lifts from just forward of the cockpit to expose the controls and battery. Flexible rubber hoses make it possible to do this without disconnecting the radiator. The single side panel on the right is attached with Dzus fasteners and is also instantly detachable. On the left the metal tonneau cover for the passenger compartment is Dzus fastened to the door panel which is hinged along the bottom edge. The inner edge of the tonneau is fastened to a chassis tube with a locking handle and the upper edge of the door has small sliding locks on each end.

John Cooper's method of answering the problem of how to shape the tail on a car by just not putting one on is an admirable one, but it isn't fair to all the bench racers. Of all the theories advanced, I subscribe only to the one that attributes this manx cat tailed treatment to a fine sense of humor. Anyway the body shape seems perfectly adequate for the speeds that this car is capable of attaining.

Weight distribution with a full fuel tank and a 160 pound driver seems to work out the weight distribution at 45 percent on the front wheels and 55 percent on the rear.

All things considered, Cooper is marketing an amazing product in this 1100 and the possibility that these small manufacturers are ushering in a new era in automobile racing is not remote.

Russ Kelly