

FAZZA

COMPETITION
MANUAL
FIAT
850



FIAT

Mirafiori Works, Turin.

FIAT 850 COMPETITION MANUAL

INTRODUCTION

Fiat of Torino, Italy currently produces the finest automotive values on the market. Automotive writers both here and in Europe are in unanimous agreement on this fact, as are Fiat owners. People and the press compare the Fiat 124 Coupe and Spyder to the Alfa, Porsche and Jaguar for quality, and to two liter and 2500cc automobiles for performance. The Fiat 850 evokes the same type of response, with handling being compared to that of the Porsche. Some people have expressed the opinion that the 850 should be a little faster, but nevertheless admit that it's quicker than most 1000 and 1300cc cars.

As far as racing goes, Fiat has had the benefit of sharing in the development work of Abarth and now Ferrari, making them sports car racing's biggest spenders. Abarth & Co., is the only race car factory providing special parts and technical data directly related to both production cars and sports racing machines. Fiat benefits from design experimenting and innovations developed through Abarth & Co.'s racing and their victories.

Here in the U.S., we have our problems with classification of Fiat and Abarth automobiles in SCCA's production classes. The powers that be aren't interested in giving these cars a chance. The H-Production Fiat 850 Spyder, in 903cc form, is finally going to be able to be competitive for everyone in its class. It's too bad the Fiat 124 Spyder dubbed by well known Porsche driver Peter Gregg as a far superior handling race car than his Trans-Am Championship Porsche 911 can't be competitive. The Fiat 124 Spyder is classed where it doesn't have even a remote chance of winning in national level events. If it did, I wouldn't have refused one from Fiat Roosevelt in November 1968.

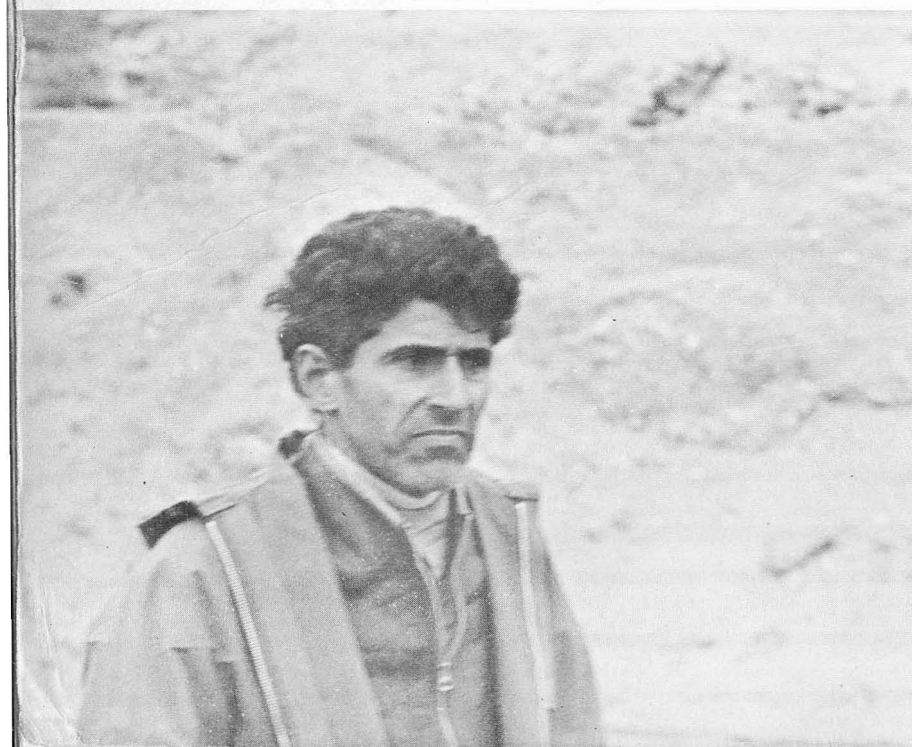
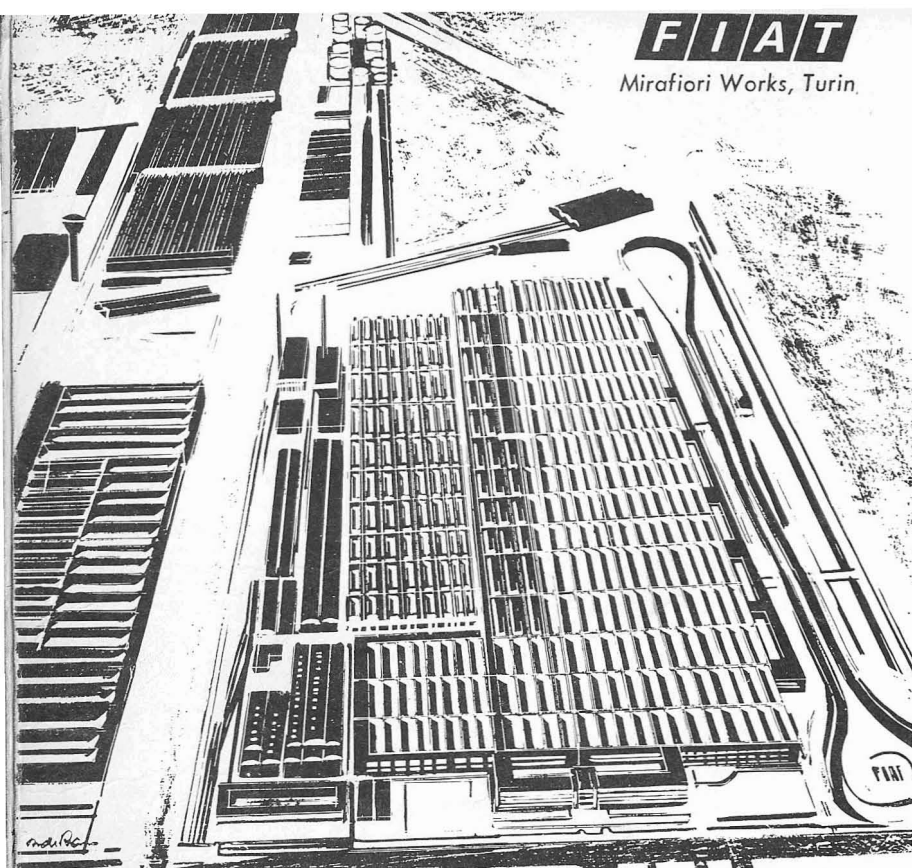
In this manual, you will see all the parts we use in our 850 race car illustrated and listed. We sell and use only the best quality parts. Cheap parts mean low quality, poor performance and reliability, which in the long run costs more money. Over the last five years, our victorious Fiat Abarth 1000 Corsa Sedans have cost us less than \$200. per year for parts. The same superb Abarth parts used in the Corsa are available for your H-Production Fiat 850.

My intent is to make this manual informative, interesting and original. It is written especially for the driver who intends to do most of his own preparation. I would like to add the word "work". In my particular case it happened in spades (see photo). This was taken at the "Bridge" (Bridgehampton Raceway) with my wife as my only pit crew, and a bus load of Fiats. Racing is not the glamorous pastime portrayed by many automotive journalists and even drivers themselves. The actual driving itself is usually the easiest part of the racing business and the most fun. If racing is to be successful and enjoyable, however, all of it must be taken seriously. This applies to everyone concerned, track manager, race officials, tech inspectors, corner workers, mechanics, and the driver himself.

This book can be important to competition minded Fiat & Abarth owners and participants. I certainly have enjoyed doing the preparation, layouts, and mechanical paste ups. Craig Fisher, John Nowosadko Jr. and myself are responsible for the text, for typography Everton Bell; for art, Mrs. Penny Cosentino; for photos Pat, Penny, Al, John, Craig, Photo Torino, and Abarth & Co. COVER; Craig Fisher and Al Cosentino.

Sincerely
Al Cosentino

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THE 1970 FAZA TEAM CARS WILL BE DRIVEN BY CRAIG FISHER AND AL COSENTINO IN SCCA.



FAZA FIAT

Following is a complete comprehensive report covering everything we have done and learned racing the Fiat 850 Spyder. This includes all the failures on the cars in detail, not to mention our own. All this is provided in the hopes that it will eliminate a lot of unnecessary problems to so many enthusiastic, competition minded Fiat 850 owners. The first preparation began in February, 1968 with the 843cc Fiat 850 Spyder. All the development was done at FAZA in Brewster, N.Y. Abarth & Co. does not have a Fiat 850 racing engine built with the same basic Fiat 850 block, cylinder head, carburetor, crankshaft, etc. The nearest racing engine with similar Fiat 850 parts is the 1000cc (65x74) OTS engine. This engine is used for mountain climbs and circuit racing in the Fiat Abarth 1000 OTS (850 Fiat Coupe body) in the GT class. The Abarth 1000 OT-SS engine uses the Fiat 850 cylinder head with valves, cylinder block, modified connecting rods, and a few other internal and external parts. HP from the Fiat Abarth 1000 OT-SS engine is 100 HP, slightly higher than the Fiat Abarth 1000 Corsa engine (96 HP) used in the Fiat 600-D Sedan body. Our Fiat 850 Spyder racing engine is exactly the same as the Fiat Abarth 1000 OT-SS racing engine except for the following specifications and parts:

- Valve springs, the same
- Cylinder head, the same
- Cylinder block, the same
- Connecting rods, the same
- Camshaft, the same
- Alum. sump the same
- Complete rocker arm assembly, the same
- Exhaust headers & stinger, the same

1000 OT-SS Abarth engine parts not legal in this engine are the crankshaft stroked to 74MM, and the 36MM Weber down draft carburetor. Remember that the bore size of both engines remains the same but the 1000 OT-SS pistons cannot be used with the 843cc/817cc 63.5MM and 68MM 903cc crankshafts.

I have never dyno tested the engines we have built for our cars. I can only estimate the horse power, and just how I arrive at this is rather complicated to explain. Currently our engines are producing 75 HP. We began racing two Fiat 850 Spyders in 1969. The 843cc engine was initially approved by S.C.C.A. for H-Production in 1968. This engine has a 63.5MM stroke and 65MM bore. Originally, we started racing in 1968 with the 843cc engine, over boring 1MM allowed by S.C.C.A., the pistons being 66MM while the stroke remained standard at 63.5MM. For a full two year period we have retained the same engines and internal parts. The only basic changes made were with the camshafts and pistons/cylinder head combination. Originally, I started racing with the wrong camshaft, and very low piston compression. Then we went to a standard Abarth 1000-OT camshaft, and we had plenty of compression but not enough racing horse power. By mid season we installed the Abarth 1000 OT-SS camshaft and have been using the same camshaft since. The only engine development work we have ever done has been involved with piston & valve clearance. In 1969, when the 850 Spyder team car was prepared, we built the engine and the first spare engine with the same parts as we had in the existing engine. All parts were identical in both engines, but the pistons and the cylinder heads were milled .020" and .040". I want to make it clear as to what extent our engines have been modified and developed other than the Abarth parts we have installed.

There are several areas we plan to develop further in the engine to get more horsepower, such as lightening the valve train and more cylinder head and carburetor work, now that we have finally solved the piston to valve clearance problem and have some decent piston compression. I just removed the cylinder head off the 1969 Daytona A.R.R.C. engine and found no valve marks on the pistons. This is the 5th race since we started racing in 1968 that the valves haven't touched the pistons, and the fourth race in a row now that valves haven't touched the pistons. The tell tale showed the engine was up as high as 9200 RPM. With this formula we should be quite safe.



S.C.C.A. APPROVES 903 ENGINE FOR 1970

We'll have about another 8 horsepower increase in our current engine this year due to the larger 903 engine, the 68MM crankshaft being legal. We should be able to get 85 SAE HP from our engine now. The bore will remain 66MM and the stroke increased from 63.5 to 68MM. The 903 engine block is not the same as the 843 & 817 engine block but the crankshaft, heads, etc. can all be interchanged. Technically, the new 903cc Fiat 850 engine has only a couple of advantages over the smaller 850 engine. Both the primary and secondary venturis are 23MM whereas the primary venturi is only 21MM on the smaller engines. The engines come equipped with a larger aluminum sump (but only holds four quarts which is not enough for racing). However, the sump is very nicely baffled. An alternator has been substituted for the generator.

S.C.C.A. has available "Production Car Specifications" and General Competition Rules", two very important handbooks. Both books sell for \$1.50 and total about 160 pages each. These books are a must so don't wait to get them if you are going to prepare your car. Send \$1.50 to Competition Director Club Racing, S.C.C.A. P.O. Box 719, Westport, Conn. 06880.

I'm not going to cover most of the do's and don'ts they cover.

ASSEMBLING CYLINDER HEAD

Always use the best quality head gasket. The thicker the gasket, the better the seal which can be obtained. Copper gaskets don't seal as well as the newer asbestos type materials (Diring, Sector, etc.). Make sure the cylinder head is not warped. It's a good idea to have the top of the block checked also. Make sure the cylinder head is as perfect as you can make it. If you have any question about the A-1 requirements of the cylinder head, see page 53 to 68 of the official Fiat 850 Shop Manual. Make sure the surface area of the cylinder block is clean; the same goes for the cylinder head. Place the head gasket on the bare block. Do not use any gasket sealer, compound or paint, a light coat of engine oil should be applied to the head gasket. Bolt the bare cylinder head to the gasket against the bare block. Never use two head gaskets, never over torque the head bolts, never torque the head bolts when the engine is warm, always retorquer the cylinder head, the sooner the better. (See illustration for torquing sequence).

On some occasions we torque the head bolts after two or three hours of running. We always try to get the engine to at least 200° before we retorquer.

Try to avoid any practice session before retorquing the head bolts. We generally torque the head bolts to 36 foot lbs. When retorquing, we go to 38 foot lbs. This same, simple procedure has been 100% fool proof.

Since my first race car, a Fiat Abarth 850 TC Corsa (based on Fiat 600-D) in 1964, we have never blown a head gasket. I have since seen and heard of many Fiat & Fiat Abarth owners who have. If a head gasket blows there has to be a reason. However, I have observed that the cylinder head gasket is replaced nine out of ten times with another head gasket and the actual cause of the trouble never investigated. Once you've blown a head gasket and don't correct the cause and after effects, it will blow again. Each time it does, the problem gets worse. Eventually the cylinder head is ruined, and if too much water gets into the oil it may ruin the bearings and score the crankshaft. About 99% of the reasons for head gasket failure is lack of water. Pay particular attention to the plumbing in the Fiat 850, make sure there are no leaks. A loss of less than 2 quarts of water is all it takes to overheat the engine. If the engine boils for a minute or at speed for less than a mile, the cylinder head warps and should be resurfaced before further damages can take place. Remember, just replacing the head gasket will not solve the problem.

Al is holding a balanced, lightened, polished 68MM crankshaft. A tremendous amount of time and effort is involved in preparing one of these cranks for competition use. The stock crankshaft, good as it is, won't stand up under the consistent 8000 RPM plus this engine is required to turn in H-Production racing. Al's wife, Penny, is holding an 850 head with flowed combustion chambers.

ROCKER ARM ASSEMBLY

The only problems we had with the rocker arm assembly were our fault. We broke two rocker arm screws (Abarth hardened ones). Both times it happened at Lime Rock and both times, oddly enough, the car was in the identical spot in the paddock. The rocker arm screw broke in a closed practice session at Lime Rock. This was the first practice session for the 850 in April 1968. However, what we had done was to allow the rocker arm adjusting screw to extend too far below the heel of the rocker arm. The geometry angle with the high lift 330 degree camshaft was too great for the stock set up. To correct this, .060" was milled off the bottom of the rocker arm stands and different length push rods from the Fiat 600 series were substituted. The extremely long duration camshaft was affecting the geometry too much. The maximum amount of rocker arm screw thread that should be exposed under the heel of the rocker arms should be about 5 turns or $\frac{1}{4}$ ". (see illustration)

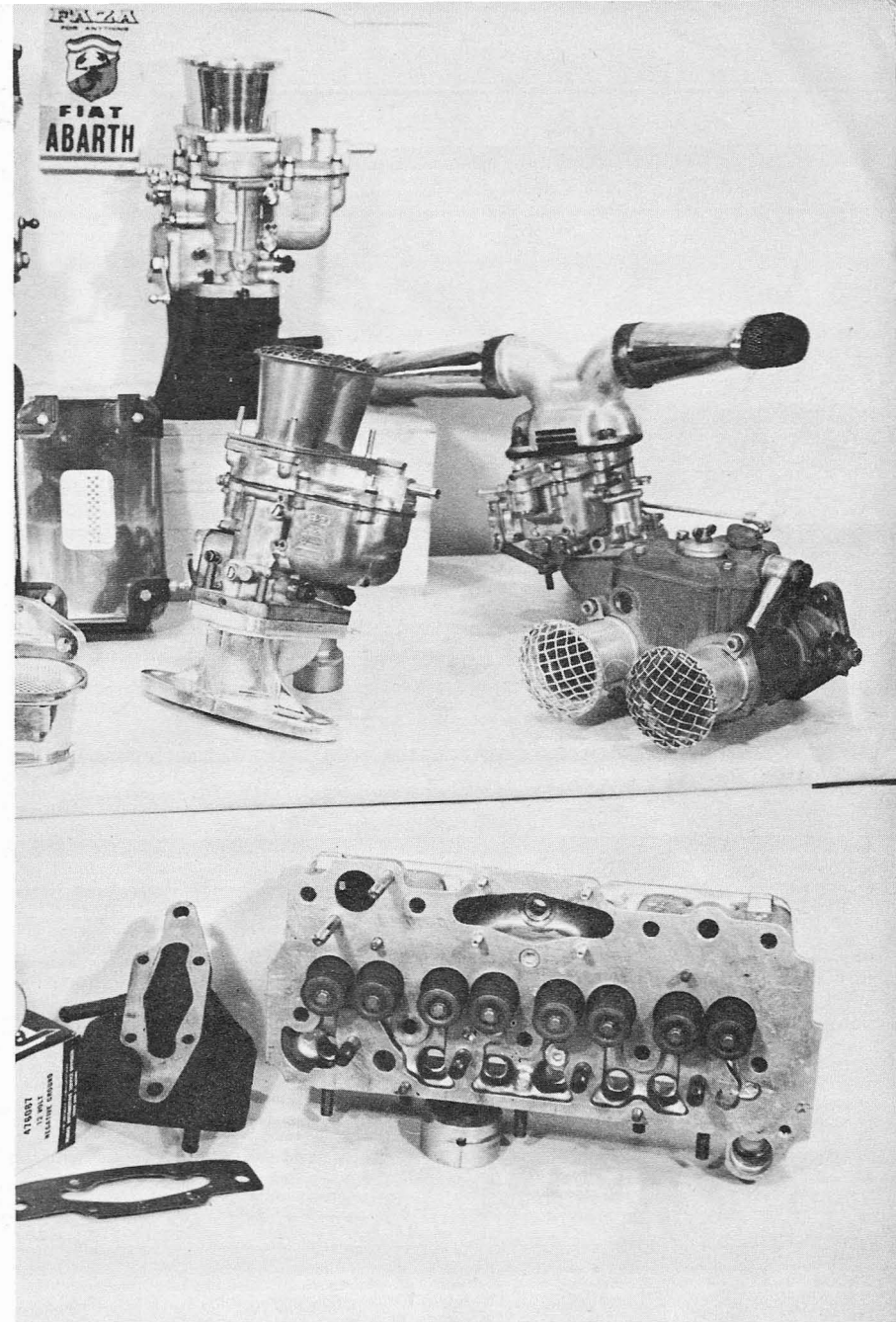
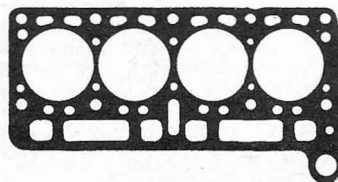
A month later we were at Lime Rock for an Area One race. We had since replaced the Formula Fiat 8 $\frac{1}{2}$ camshaft (340° duration) with a milder camshaft. The 850 was in the same spot in the paddock and again we discovered a rocker arm adjusting screw had broken! We hadn't learned our lesson yet. It only takes half an hour to correct this kind of problem. However, try to learn from our mistakes. Each time a different type camshaft is used the rocker arm screw location must be checked. The Fiat 600 & 600-D engines use the same style push rods and have about three or four different lengths. With the various push rods and the option of milling the rocker arm stands, everything will stay together.

Be sure to allow for at least .040" clearance between the top of the push rod and the bottom part of the rocker arm heel. (see illustration). At the 1969 Cumberland National race Craig Fisher was in second position very close behind Canfield's Sprite when a camshaft follower broke. I found the push rod had caused the camshaft follower to break. The top of the push rod was making contact with the heel of the rocker arm. The rod binding under the rocker arm heel split the camshaft follower like a knife.

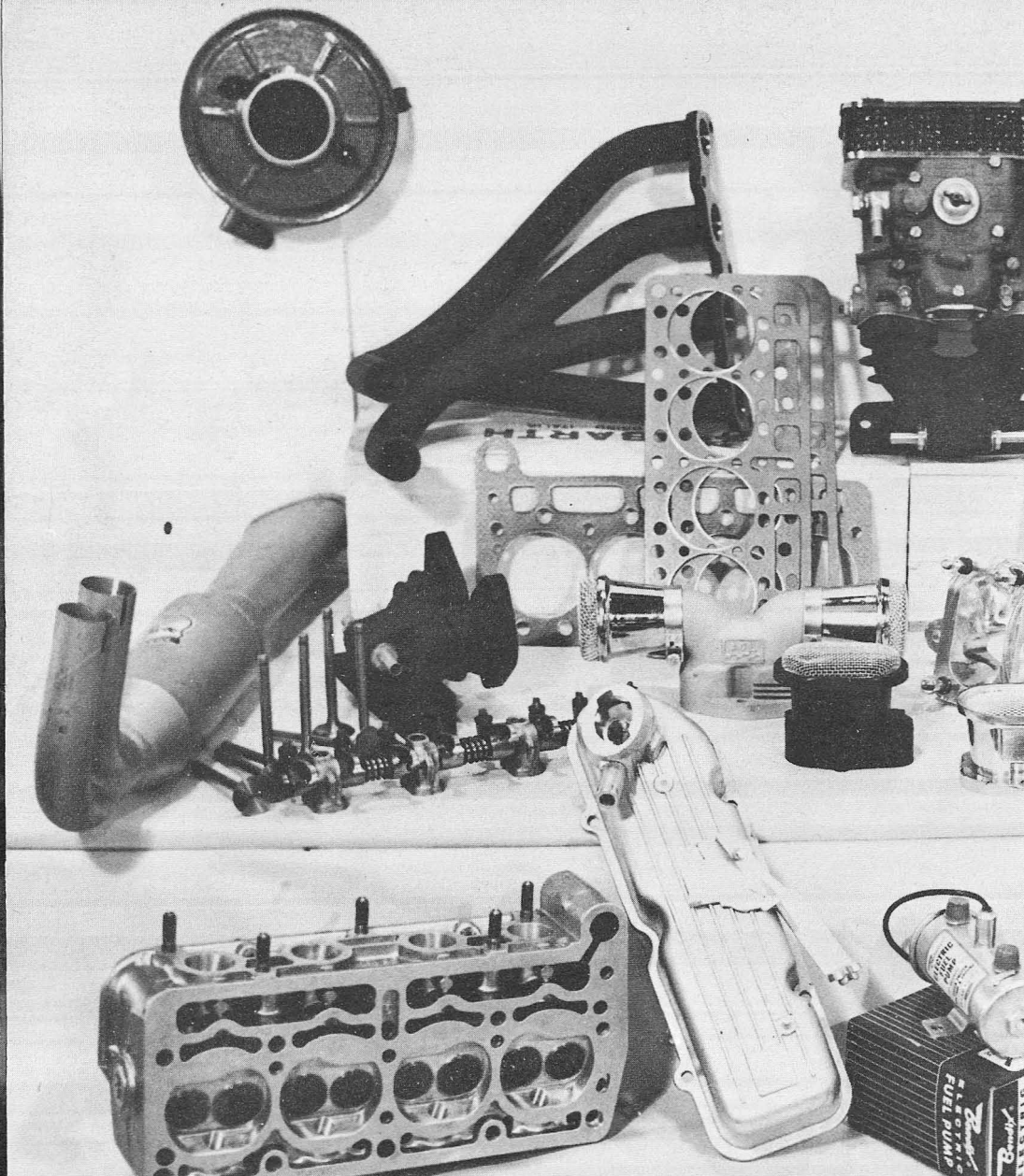
Always check the location of the rocker arm in relation to the valve stem tip. The rocker arm should make contact as close to the center of the valve stem as possible. This prevents valve guide wear. I have also replaced the Fiat 850 guides with Fiat 600 guides. The Fiat 600 guides wear longer and they also require less work to grind flush with the intake and exhaust chambers because they are shorter.

At Thompson National practice in 1969, a rocker stand stud came loose and bent the rocker arm shaft. No other damage occurred, but be sure to check these studs for tightness at least once. The standard cylinder head and valve train parts are all exceptionally reliable. In the 1968 season we used an 8000 RPM redline. In 1969 we kept the same redline with one Fiat 850 Spyder. With Craig Fisher's Fiat 850 we finished the season with a redline as high as 8700 RPM. We started with 8200 RPM., then at 8300 a crankshaft broke at Mid Ohio National race in July, 1969. Craig Fisher was half way thru the race with a 21 second lead at the time. Up until this time our engine had never been balanced as one unit. Once the engine was balanced, we moved up to 8500 RPM redline. In a few races 8700 RPM was used to stretch the gearing. We have tested and proven the Fiat 850 cylinder head beyond the average requirements. The same cylinder head has had 3 crankshafts broken under it. Twice piston to head clearance wasn't enough and all four pistons hit the head both times causing all rod journals to crack. At Riverside California Nov. 1968 ARRC warmup this happened for the first time. The very next race was at Texas, Green Valley National in Feb. 1969, and another repeat performance. .023" piston to head clearance is just not enough. You need at least .035" deck clearance. The third crankshaft broke at Mid Ohio National in 1969, right through the counterweight on the flywheel end of the crankshaft. It messed up the piston but still no damage to cylinder head around number 4 cylinder. At least 100 intake and exhaust valves were bent in this same cylinder head. Our only problem with the 850 has been all in one area, valve to piston clearance. In using high revving long duration camshafts, valve to piston clearance becomes a problem.

The Abarth head gasket is the finest available for the 850. We have yet to blow an Abarth head gasket on any of our race cars. Our 850 engines are probably run harder than any 850's in S.C.C.A. racing. It doesn't make sense to build a hot engine and then hamper its reliability by installing inferior head gaskets. Abarth head gaskets are made of special materials in several thicknesses to suit every engine's compression ratio and valve to piston clearance.



In the upper part of this photo are different carburetor and manifold combinations for the 850. Upper left, Weber 36DCD7 on Abarth manifold. In the center is a 36DCD7 on an AL-1 manifold. Far right is a 40 DCOE Weber. The carb. at right rear is a 30 DIC2 with banana style velocity stack modified to fit 850 Spyder. Lower part of photo shows intake manifold area of 850 head enlarged to accept Abarth manifold with 36DCD7 carb.



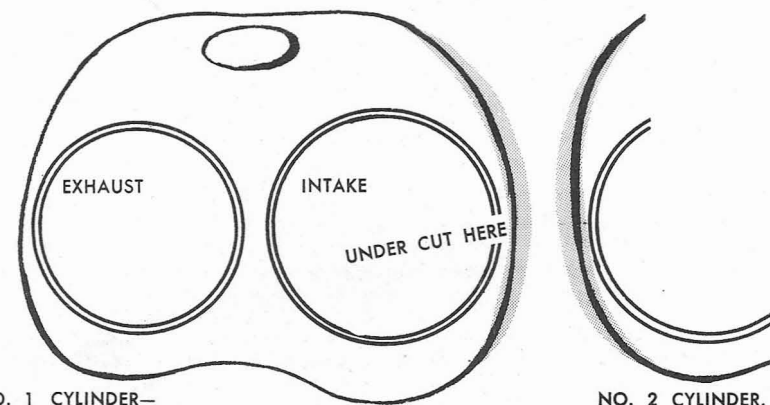
This photo shows some of the breathing modifications available for the Fiat 850. Clockwise, from top, Abarth4 into 2 manifold, Weber 40 DCOE carb on sidedraft manifold with water jacket. Below the big Weber are 3 velocity stacks (from rear), banana type, black plastic, polished aluminum. In lower left corner is an Abarth 1000-OT head showing flowed combustion chambers. Behind the head are a needle bearing rocker arm assembly, large valves (30MM intake, 28MM exhaust), and the Abarth stinger exhaust. Hanging on wall is a pancake free flow air filter for stock carb. In center of photo are several Abarth head gaskets. At lower right are Bendix electric fuel pump and aluminum valve cover.

VALVE ADJUSTMENTS

With most racing camshafts I have found the following clearances and procedures to be the best:

Intake valves .008" cold	Exhaust valves .009" cold
Distributor Advance 60° at 3800 RPM	
More low end torque:	
Intake valves .012" cold	Exhaust valves .014" cold
Distributor Advance 58° at 3800 RPM	
More top end torque:	
Intake valves .006" cold	Exhaust valves .007" cold
Distributor Advance 63° at 3800 RPM	

Regarding lighter valve train parts (valves, rocker arms, push rods and cam followers), we haven't used any lightened parts yet in our Fiat 850 engine. We plan to eventually. I have to take the word of the Abarth engineers regarding lighter push rods. They claim that anything other than the stock Fiat 600 & 850 series push rods begin to flex at high RPM. This flexing changes the valve adjustment. I have never seen any of these aforementioned parts lightened in any of the factory Fiat Abarth 600, 850 series, racing engines, or Radiale engines. When they need more horse power they don't sacrifice reliability. They immediately experiment with pistons, camshaft and carburetion.



PROPERLY DONE THIS MODIFICATION WILL INCREASE YOUR H.P. BY 4%. ACTUAL SIZE FLOWED COMBUSTION CHAMBER PATTERN FOR FIAT 850 HEAD—MAKE A TRACING OF THIS, THEN CUT OUT AND USE IT TO SHAPE FLOW THE CHAMBERS. AABARTH JUST UNDER CUTS THE INTAKE AREA.

CYLINDER HEAD Fig. 1 flowing combustion chambers. The Fiat 850 head in some ways makes up for the small carburetor. It cools the engine better than the 600-D head cooled the 1000 Corsa engine. Remove the thermostat from the housing at the back of the head. The cylinder head requires about fourteen to eighteen hours of grinding, porting and polishing. The bottom of the valve guides should be ground down flush with the chambers, plus the chambers should be enlarged. Be careful not to grind through the exhaust ports to the push rod holes in the head. These exhaust ports can be opened up very little on the sides. There is plenty of meat on the top and bottom of the 4 ports which should be opened up. Remember to open up the flange on the exhaust header steel manifold to match. A very effective grinding modification called flowing the combustion chambers should be made. This takes about one hour per combustion chamber. See the drawing and photo. Additional grinding and removing of aluminum head material should be made in the intake area of the head below the carburetor stand. This takes about four hours and should be opened up as large as possible. This is probably the most important modification that can be done to the head in conjunction with grinding the valve guides and flowing the combustion chambers. Along with flowing the combustion chambers, I had special dual domed pistons designed. Full advantage of the flowed combustion chamber effect can be had only with the dual dome design piston! Abarth engineer Michael Ruggero, in charge of push rod engine testing, says this style piston dome and combustion chamber shape gives a 4 % HP increase. In the three engines we used for the two cars in two years, I have experimented with 10 different types of piston design. I'm very satisfied with the present 843cc series and have the same style for the 903cc series.

As of yet, we haven't had any reason to change or modify the valves. The intake valve is 29MM and the exhaust 26MM. According to S.C.C.A. rules, valve size cannot be changed. Valves hit the pistons in our first car, the one that Ray Cuomo drove in 1968, every race but the first one. Craig Fisher drove this car in 1969 and every race up till Bryar National on Aug. 31, the valves hit the pistons.

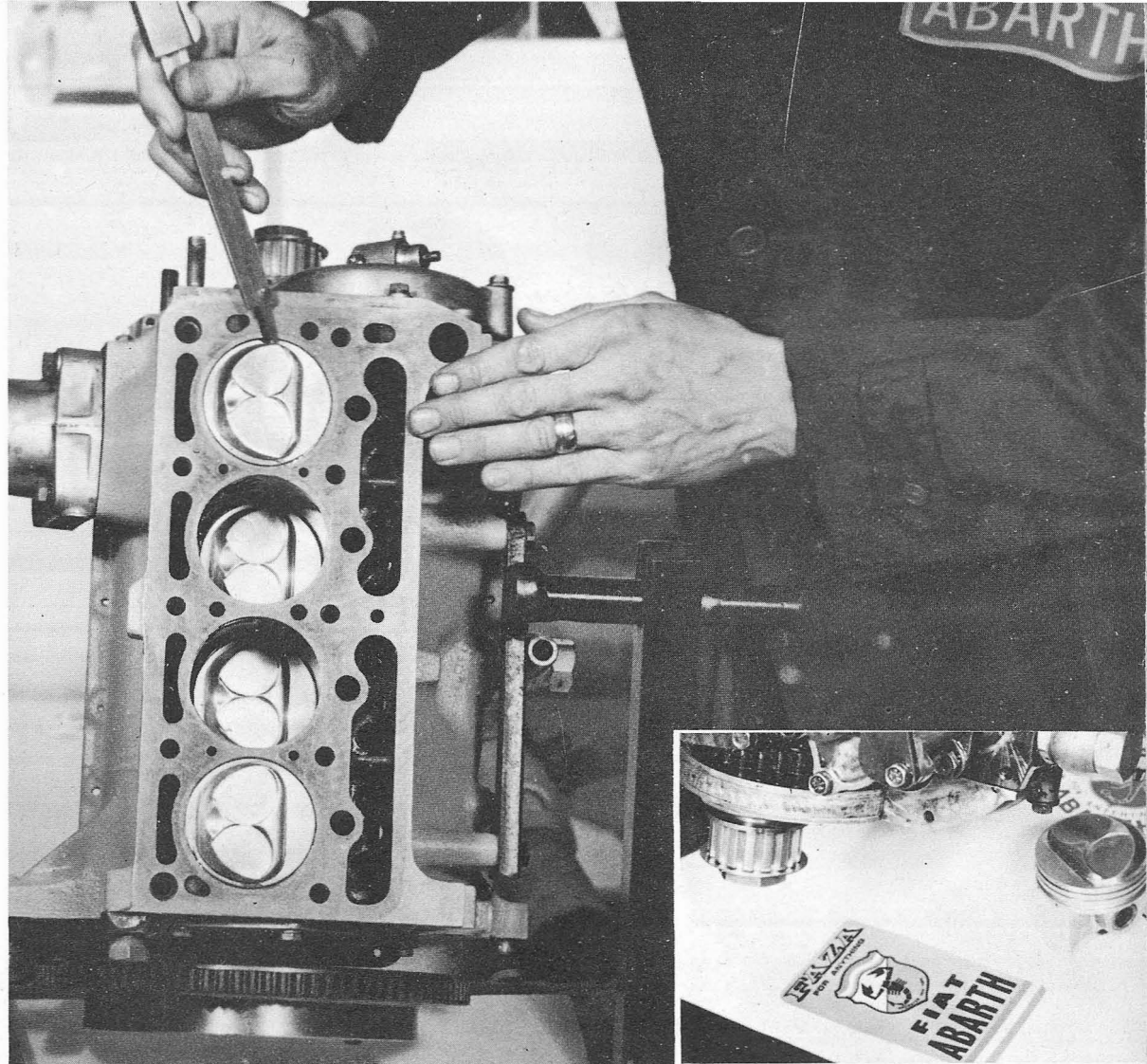
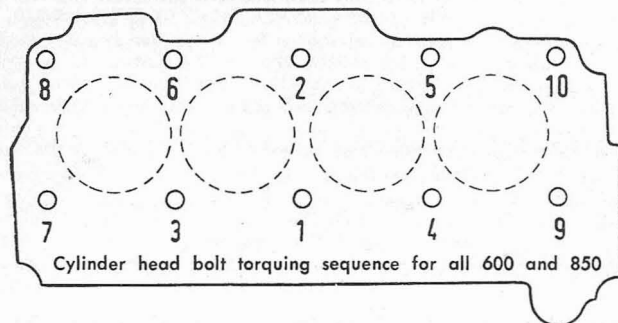
The high lift and long duration of the cam caused this. We recessed the valves further into their seats by removing .025" from both the seats and the portion of the valve heads which contact the seats. As mentioned under "flowing combustion chambers," we also ground the valve guides down. However, the problem still existed, since the valves were still open too far as the pistons came up. We began to fly cut the piston domes for the valves to clear, and this cured the problem. However, we lost a lot of the dome area this way, which resulted in a compression loss. Compression is a big factor in getting more HP and torque from this engine. Without high compression this engine will not be competitive in H-Production. Even with the deep fly cuts in the piston domes, valve clearance was minimal, checking out at .025" to .030" compared to .160" for the 1000 Corsa engine. The only significant differences between the Fiat 600-D head and the Fiat 850 head are chamber configuration and valve size. The combustion chamber in the Fiat 850 is very shallow compared to the combustion chamber in the Fiat 600 series heads. Actually all parts can be interchanged, block, connecting rods, crankshafts, push rods, cam followers, timing chain, (gear and cover,) seals, sump. The cylinder heads require a little modification and the camshafts turn in opposite directions. However, all these are minor problems. With the wildest camshaft and piston combination for the Fiat 600 series engines (1000 Fiat Abarth Corsa), we have never had to fly cut the piston domes.

With any strong combination of high compression domed pistons and longer duration camshaft, strict attention should be given to the clearance between the valves and the pistons. You should have a minimum of .060" clearance for an RPM limit of 8000 and .080" for 8700 RPM.

In spite of the valve marks on the pistons after every race, on occasion we did not change all the valves that touched the pistons. The first year we changed valve guides only once.

Of couses, with this combination we ran very slow for our first race but we ran. At the time the only camshafts I had left were designed for use in Formula Fiat 8½ with the very high lift and extreme overlap. This camshaft was over 2MM (.080") higher in lift than the camshaft we ran the rest of the season. It degreed in at 62°/98° with intake set at .008" and exhaust at .009", both cold. I assumed that somewhere around 6000 RPM we were getting about 165 lbs. combustion chamber compression. The power started to come in at 7000 RPM. This is OK for a Formula Fiat but not the weight of a production Fiat 850 Spyder. This camshaft develops its peak power around 8500 RPM and maintains it to 9000 RPM. I hope to go back to this camshaft eventually and make it work for us. Right now, high lift, long duration camshafts are very impractical. The power curve must be kept between 3600 RPM and 7800. We changed camshafts to a 50/80-90/40 with 1.3 MM less lift (.050") and with a new set of the same pistons we were in business. These pistons still had to be fly cut for the valves but not as much as with the first camshaft.

Each race we would increase the red line by an additional 200 to 300 RPM. The first season, after each race, we inspected various parts throughout the car but never had the engine out. We were mostly concerned with the top of the engine, checking the carburetion, jetting and plugs for leanness or richness, and valves and piston clearance. The bottom end of the engine never gave us any problems. Slightly irregular wear was noticed on a few of the camshaft lobes. This was due to running low on oil in two races. The connecting rod bearings never showed signs of wear at all. The main bearings, after several races using an 8000 RPM red line, showed just a little wear but not enough to mean any thing.



When using high compression pistons and a high lift, long duration cam, it is imperative that valve to piston clearance be carefully checked during engine assembly. The 850 combustion chambers are relatively shallow, which adds to the problem. Valve to piston clearance should be one of the top items on your checklist. It's just as important as rod bolt torque, head bolt torque, etc.

As you can see, we have not ringed the top of the block around the cylinders. However, if you don't use an Abarth head gasket, you should perform this modification. We've never had a failure with Abarth head gaskets, so have never felt the need to ring the tops of the cylinders. We recommend these gaskets for all 850's, both street and track.

Shown in the inset above is a special H-design piston grooved for flat rings. All Abarth competition engines now use flat rings. L rings (Dykes) lack reliability in the 8000 RPM range. A full race 850 engine will turn over 8500 RPM. We use flat rings exclusively, and have never experienced a ring failure in any of our 850 race cars, which have been revved as high as 8700 RPM.



In this view of the Fiat 850 engine on the stand, you can see the Abarth lightened, balanced flywheel. On the right side of the block are the banjo oil fittings used with the full flow oil filter and cooler. The upper fitting carries the fresh oil to the center main bearing via the special hole drilled as part of the block modification for the full flow lubrication system. The high capacity Abarth oil pump has extra large pickup to ensure adequate oil flow. Connecting rods shown in this photo are standard 850 rods racified by Abarth.

At the tip of the micrometer (being used as a pointer) is the Abarth cam gear oiler tube. This tube provides needed lubrication for the camshaft gear and oil pump/distributor driveshaft gear, virtually eliminates wear on these parts.

ASSEMBLY OF CRANKCASE

Refer to the Fiat 850 Shop Manual for general procedure, illustration, basic information and technical specifications. Make certain all parts are spotless. Don't forget to clean the oil galleries in the block and crankshaft. Install the camshaft first, making sure the camshaft turns very freely. Clearance should be .002" to .003" between bushings. Pay particular attention that the center bushing is in position and has at least .0025" to .003". The center bearing is the one to be careful with.

Next put the main bearings in the block. I drill two additional holes similar in size to the standard oil hole, evenly spaced, in all three top bearings. (see drawing). Then we use a little "STP" on the crankshaft main journals and shells, but not between the bearing and the saddle. Lay the crankshaft in the block. Put a small piece of "Plastic Guage" on each journal. Torque up the main caps one by one to 45 lbs. Check the main bearings one at a time for the proper clearance. The closer your readings are to .003" the better. New Fiat Abarth Corsa engines are set up with .00325" to .00350" main bearing clearance.

After you have the proper main bearing clearance, repeat the same procedure with the plastic guage on the rod bearings. There's no need to assemble the pistons to the connecting rods until all the rod journals are individually plastic guaged. Clearances should be closer to .002". If the clearances are not consistent get them ground by an expert crankshaft grinder! Always keep a record of the clearances.

Now the crankshaft is ready to lock up. Be sure to turn the crankshaft several revolutions after each main cap is torqued to 50 foot lbs. The crankshaft should always be lubricated with one part of the oil you intend to use in the engine and one part of STP. The crankshaft must always turn freely. If it doesn't, take it apart. Connecting rod bolt torque should be 27 ft. lbs. When assembling the pistons in the engine, be sure that the piston is mounted the right way on the rod. Be absolutely certain the piston rings are not broken in installation. I get a lot of reports of broken rings during installation. One out of every 3 sets of pistons sold are installed improperly or damaged. This is due to improper assembly of the connecting rods or broken rings in installation. Be very careful of these two steps. The pistons should be installed with the Fiat tool (a steel band clamped together by a pliers, see Fiat 850 Shop Manual) this is almost a fool proof method and allows excellent control and feel. However, the best method I find is installing the piston rings one at a time using educated finger nails. This is a fool proof system. However, it takes patience plus a few broken finger nails to acquire the technique. It's well worth it. On the subject of piston rings, I very rarely hone the bore of any block. We use cast iron rings that have never failed to seat. This holds true regardless of the mileage on the engine and whether it needed one ring or a complete set of new pistons and rings. Don't forget to add oil and STP to the rings and pistons, including every moving part, as you assemble the engine.

Once the cylinder head and block are assembled be sure the engine turns freely (without the rocker arm assembly and spark plugs). Before you put the valve cover on, saturate the rocker arm assembly and valve springs with oil.

Also take a last minute look to be sure you haven't left a washer or nut laying around on top of the engine. Check with a pencil magnet that you haven't left something small in the carburetor intake area of the head. Very often you'll come up with a washer or 10MM nut. If they get between the piston and the flat part of the head—it will raise the head and warp it.

I generally pull start the car with a new engine. It saves so much time and frustration. Try to have some help around at this time to spot any trouble. Be sure to keep the RPM very low for at least 10 minutes. Then dump the oil to get rid of all the metal particles. This is a must, unless you are using the bearings for breaking in and plan to change them after three or four hours of running. Get the car on the road and run it under load as soon as you can. Generally it takes about 20 to 30 minutes to check the timing, temperature, etc. Before running under load get at least 4000 to 5000 RPM's out of the engine. During this time you'll probably lay a smoke screen twenty feet long. Our engines do this a lot. Don't take it higher than 4000 to 5000 RPM for the first 30 or 40 minutes. The same holds true for running under load. After about one and one half hours start to wind it up. As the rings begin to seat wind it some more. After about the 3rd hour point, take a compression test as a compression reading generally tells all. Look for equal readings within 10 to 15 lbs of each other! Once you have practiced the car take another reading. The compression by this time should be no more than 5 lbs. off at the most in each cylinder. On some occasion one or two cylinders may take longer to seat. However, if after about 4 hours compression readings vary as much as 30 lbs. take the head off. I say first its a broken ring, second cheap head gasket, third improper installation of the head.

LUBRICATION SYSTEM

To use the free flow lubrication system the following block modifications should be made:

1. Drill a 3/16" hole in the center main bearing housing of the block. Drill at an angle directly towards the bottom of the main cap bolt hole. Next, drill a hole from the outside of the block (first remove the oil pressure sending unit), with a long drill through to the open area provided for the main cap bolt. This gives you a direct oil feed to the center main bearing, which is very important on this engine.
2. The oil galley hole in the block that matches up with the base of the oil pump should be drilled out to maximum size of 3/8" to the depth of the existing hole in the block.
3. This Abarth modification idea is over 11 years old and works as well for the Fiat 850 series blocks as it does for the 600 series. A copper oiler tube is used to oil the gear on the oil pump and distributor drive shaft. This is a simple but very important modification. Tap the crankcase through the parallel oil galley adjacent to the dipstick hole. Bend the copper oil line to point in between the camshaft gear and the oil pump drive gear. Keep it about 1/8" away from the contact point of both gears. Pay close attention to the movement of the two gears after the camshaft is completely assembled. Be sure the timing chain gear and chain are connected to the crankshaft. Then turn the crankshaft back and forth slowly. Watch the action of the oil pump drive gear, being sure that it doesn't ride up and down, bind or make the crankshaft harder to turn. Also be sure the brass bushing in the block that the oil pump drive shaft turns in is not worn. A worn bushing can cause the gear to wear. Without this oiler asset the drive gear on the camshaft eats up the softer gear on the oil pump drive shaft. There is also a special Abarth hardened steel drive gear unit as a replacement which is recommended with the oiler modification. See illustration for installation.

FREE FLOW OIL COOLER SYSTEM The oil cooler system we used functioned like a dream with never any failures. This same system is also adaptable to all Fiat 600 series engines. To use this system complete the oil modification to the block described previously.

1. Braze up the hole in the block that's used by the oil pressure relief valve to return oil to the crankcase. (see illustration).
2. Do away with the oil pipe line running from the main bearing cap to the oil pump. (see illustration)
3. Seal up the opening at the top of main bearing cap, and the oil pump housing. we can supply the plate to seal up the oil pump or the complete Free Flow Oil Cooler Kit, both manufactured by Abarth.
4. Braze up the internal oil hole at the front of the crank shaft. The standard Fiat 850 centrifugal oil filter can be used. However, a smaller racing pulley should be used in its place. The best pulleys are cog belt pulleys. A complete cogbelt pulley set is available for the crankshaft, generator and water pump. We have never had a failure with cog belt pulley assemblies supplied to us by Abarth & Co. (see illustration). Due to the higher RPM range with this racing engine, a small crankshaft pulley is necessary. A conventional type Abarth aluminum pulley with steel insert is also available. The Fiat 600 crankshaft pulley can also be used. This is a steel pulley smaller and lighter than the standard Fiat 850. To eliminate trouble throwing fan belts use only original Fiat fan belts and make sure pulleys are in proper alignment.

CRANKSHAFT

We use extensively modified Fiat 850 crankshafts which are magnafluxed first to check for cracks. The crankshaft is then lightened considerably, balanced, polished, additional holes are cross drilled in the mains, then hard chromed along with the connecting rod journals. We never balanced the crankshaft and clutch assembly together. Con rods and pistons are balanced together.

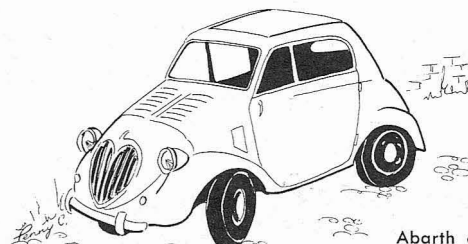
Maximum main bearing and connecting rod bearing clearance is important. Main bearing clearance should be between .0025" and .0030", connecting rod bearing clearance anywhere from .0017" to .0025". The more clearance between the bearing and the crankshaft the better. The crankshaft should actually float in the oil between the bearings. If you find the clearance between con rod bearings are from .001" to .0015" and the mains .0015" to .002", I suggest you have the crankshaft ground an additional .001". Always "Plastic gauge" your crankshaft to be sure what the clearances are. Too little clearance will create friction causing the oil to break down. Once this happens the crankshaft will score very easily.

PISTON & CONNECTING RODS

We have several types of pistons available in various compression ratios and compression dome shapes. We haven't had the opportunity to try the latest dome type pistons with camshaft and combustion chamber combination. However, this is the same combination used in the Fiat Abarth 1000 Corsa engine. It should be the best combination for the Fiat 850 engine. The best quality pistons are available from 10:1 to 13.5:1. Forged pistons are available in two compression ratios only, 12.5 & 13.5 to 1. All pistons are available in sizes 64MM to 67MM. Piston to cylinder bore clearance should be between .0035" & .004", & piston ring end gap .008" to .015".

When installing new pistons be certain to heat the connecting rod and piston to 600° F. For complete instructions see your Fiat 850 Shop Manual. Use a press to remove the pin (from the connecting rod) and repeat the heating process for re-assembly. Connecting rods should be lightened on both ends. (see drawing) Fiat has two large counter weights on each end of the connecting rod. The top one on the small end of the rod can be removed completely. The large one on the cap should be cut down but part of it left to reinforce the cap. (see drawing) Also we suggest you pin the connecting rod caps on both sides with dowel pins. We use Fiat 850 connecting rods modified by Abarth as described above. These same connecting rods are used in the Fiat Abarth 1000-OT Radiale street engine rated at 90 HP. Connecting rods in our engines have always been trouble free and have worked like a charm.

Bear in mind that our preparation of the Fiat 850 is far from experimenting. We have done these things before, only not with the 850 basic engine components. Basically, the preparation of this engine is nothing new. Of course, there are a few areas which differ from the Fiat 600 series engines, such as the shallow combustion chamber and the absence of a cartridge oil filter in the Fiat 850 engine. Any new development is actually a direct result of not being able to use Abarth parts and methods because of the rules. The Fiat 850 engine is the third version of the Fiat 600 engine produced by Fiat since Abarth & Co. began working with it in 1955. The first two versions, Fiat 600 and Fiat 600-D, had different cylinder heads and cylinder blocks but could be interchanged. The Fiat 600 engine originated in 1936 and originally was a 500cc 4 cylinder in line engine with valves in the block! This 500cc engine was used in a Fiat front engine car called the Topolino



Abarth came on the scene in late 1955, when the engine was produced in a new 633cc version Fiat installed in a completely new chassis, the Fiat 600. Some of Abarth's first conversions and modifications and influence on the 600 series engines can be found in the Fiat 850 engine. Most of Abarth's modifications to the Fiat 600 and 600-D engine can also be applied to the Fiat 850 engine!

Camshaft lift on the street Abarth 1000-OT is 9.15MM and the same for 750, 850 & 1000 TC Monomille camshaft (built on 600 series blocks). Street 1000-OT Camshaft timing is 26/75-67/30. Street TC camshaft timing is 30/70-70/30. Camshaft lift on the full racing Abarth 1000 OTSS camshaft is 11.35MM, timing is 51/85-94/44. Valves tappet clearances for all camshafts are the same, set cold:

Intake valve .008"

Exhaust valve .009"

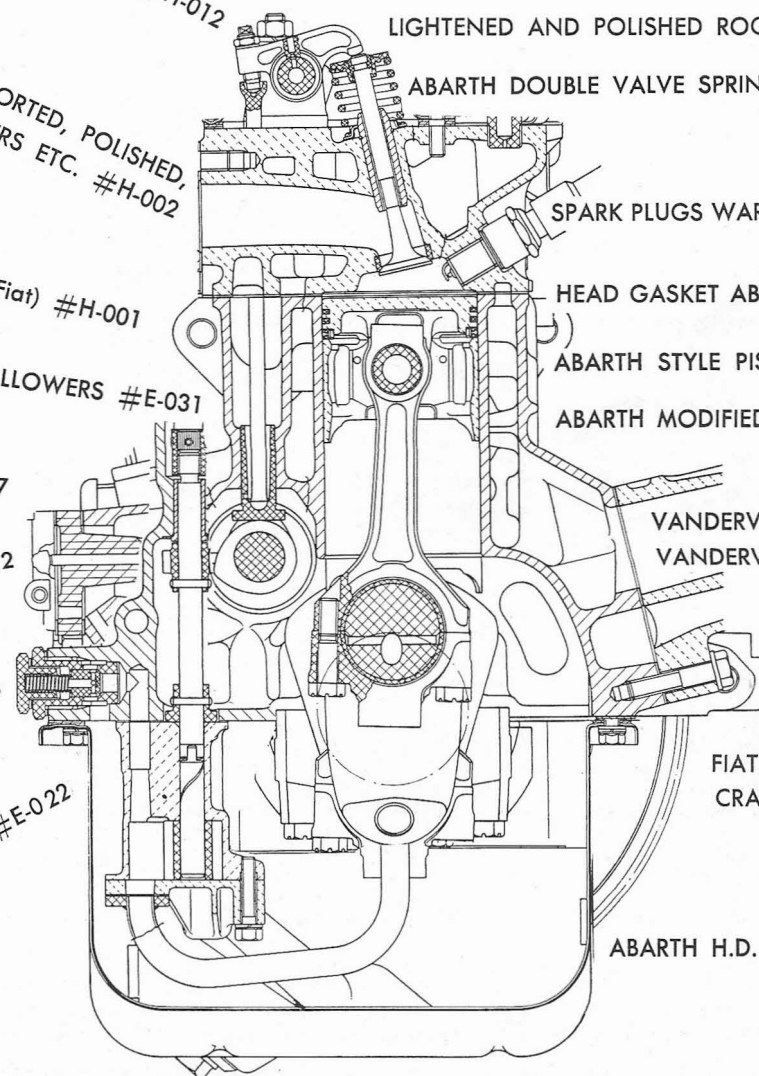
An interesting point here is the difference in weights. The stock 850 camshafts weigh 4 lbs. and the Abarth full race camshaft 2 1/2 lbs.

CONNECTING RODS

Double check the connecting rods before attempting to lighten them. Make sure the small and big end bores are in parallel. Generally, a straightened con rod will return to its original form in the engine once it reaches operating temp. Special care should be taken when installing the piston pin in the con rod. I suggest that you follow the instructions laid out in the Fiat Shop Manual. This assembly is a very critical procedure. Improper procedure can result in damage to the piston or pin, rings and cylinder bore. Placement of wrist pin bushings in the con rods will make more practical assembly.



THIS CUTAWAY VIEW WITH CAPTIONS SHOW HOW OUR 850 ENGINE HAS BEEN RACIFIED, USING ABARTH PARTS. THE PART NUMBERS ARE KEYED TO THE PARTS LIST WHICH APPEARS IN THIS MANUAL.



REPLACE ROCKER ARM SCREWS WITH HARDENED ABARTH #H-012

ABARTH CYLINDER HEAD AVAILABLE FULLY PORTED, POLISHED, WITH FLOWED COMBUSTION CHAMBERS ETC. #H-002

PUSH ROD LIGHTENED (Std. Fiat) #H-001

ABARTH CAMSHAFT FOLLOWERS #E-031

ABARTH CAMSHAFT #E-013 thru E-017

ABARTH STEEL OIL PUMP DRIVE GEAR #E-012

ABARTH H.D. OIL PRESSURE RELIEF VALVE #E-023

ABARTH CAMSHAFT GEAR OIL FEEDER TUBE, #E-022

LIGHTENED AND POLISHED ROCKER ARMS (Std. Fiat) #H-007

ABARTH DOUBLE VALVE SPRINGS #H-004

SPARK PLUGS WARM & COLD BOSCH 225, #I-005.1 240 #I-005.2

HEAD GASKET ABARTH INOX #H-014 thru #H-019

ABARTH STYLE PISTONS #E-018 thru E-021

ABARTH MODIFIED CON ROD (Std. Fiat) #E-004

VANDERVELL CON ROD BEARINGS #E-025

VANDERVELL MAIN BEARINGS #E-026

FIAT LIGHTENED, BALANCED, POLISHED & CHROMED CRANKSHAFT 63.5 MM, #E-007 68 MM, #E-009

ABARTH H.D. OIL PUMP WITH LARGER PICKUP #E-010 & E-011

IGNITION

In 1968, with the one Fiat 850 Spyder, we never had the slightest ignition problems or failures. We kept the same stock distributor, coil was originally changed to Competition Marelli high output model with resistor. The Motorola Alternator never gave us any problems. At the start of the 1969 season we replaced the distributor with another stock unit. After our second full season, our only failure has been a set of points. One of the contact tips broke in half. No modifications were made to the distributor at any time. However, timing was advanced considerably from that recommended for the stock engine. I have been using Bosch spark plugs exclusively since 1965, and as a result have never had a failure in any of my cars. For the Fiat 850 we use the Bosch W225 T2 for warm up and Bosch 240, 270 or 290 T-17 pre-gapped racing plugs. Racing plug heat range depends on the condition of the engine, carburetion, and weather.

CARBURETOR

Everything possible should be done to open up the venturis in the carburetor. The venturis are fixed, so not much can be done. Both butterflies and shafts should be lightened and modified to open together rather than progressively. Solder or braze the butterflies to the shaft to eliminate the restriction caused by the screws. Selecting main jets and air correction jets depends a lot on the piston and camshaft selection. In a racing engine, 140 main jets and 190 air correction jets are a good starting off point (which is exactly what we have now in our engine). We are still experimenting a bit with velocity stacks. The problem is lack of room between the top of the carburetor and deck lid. We have found that the shorter stacks are better for low end torque and the longer ones, banana type, are better for higher revving engines (we use the banana type velocity stack). Be sure to use the Weber 30 DIC 2 carburetor, standard on the 903 engine, because it has larger venturis than the earlier 30 DIC 1.

GUAGES & INSTRUMENTS

We have found all the standard Fiat 850 guages and instruments very useful and reliable. I have replaced the speedometer with an Abarth mechanical tell-tale tachometer. The Fiat electrical tachometers are generally not accurate at high R.P.M. I have kept the Fiat electrical tach in the event the mechanical one fails. The mechanical tach at 8000 RPM shows the electrical tach reading 8300 RPM, 300 RPM higher. This year S.C.C.A. has finally done away with the headlight requirement rule. This means you can get rid of the light switches galore. I suggest you remove all the wiring and put back just what you need. Water temperature, fuel guage, alternator light, oil pressure light and guage, electrical and mechanical tach should be all you need. I added the Abarth oil temperature and mechanical oil pressure unit. This mounts very nicely under the dash beneath the ash tray. Our electrical sending unit never let us down, but considering how important it is it's good insurance.

We use Abarth heavy duty Hauserman clutch assembly, the same as used in the 850-1000 Corsa Radiale and DOHC racing engines. Same for the flywheel and throw out bearing. The disc, however, is a standard Fiat with Ferodo material and has never given any problems. The ring gear is Fiat 600 on the Abarth flywheel. Heat the flywheel and replace it with the std. Fiat 850 ring gear. I have never experienced any clutch disc, pressure plate or throw out bearing problems with these special parts. These are the same design Abarth parts I started using in 1965.

There are several differences between the early 843 and 817cc Fiat 850 engines and the new 903cc engine. The only significant difference between the 843 and 817 engines was in the bore (64MM in the 817 and 65MM in the 843). The big difference in the 903 is the stroke, which is 68MM compared to 63.5MM in the early engines. The 903 block is 5MM taller than the early block, measured between the crank centerline and the top of the block. The 903 carb is a Weber 30 DIC2 with 23MM venturis in both primary and secondary throats, compared to the 21x23 venturis of the early model. Water pump capacity has been greatly increased in the 903 engine. A finned, baffled aluminum oil sump, which holds four quarts, is standard equipment. The generator has been replaced by an alternator. These changes will not only make the 850 Sports Coupe and Spyder quicker, but will increase their reliability and engine life, too, keeping in mind that the early engines are very reliable and their life span has yet to be determined! The connecting rods in the 903 engine are longer, however the engines use the same piston as the 843cc engine. You can use the 903 engine's 68MM stroke crankshaft in the 843cc or 817cc block with 843cc con rods. The 903 water pump and push rods do not interchange with 843 and 817cc engines.

FACTS—TECHNICAL INFORMATION

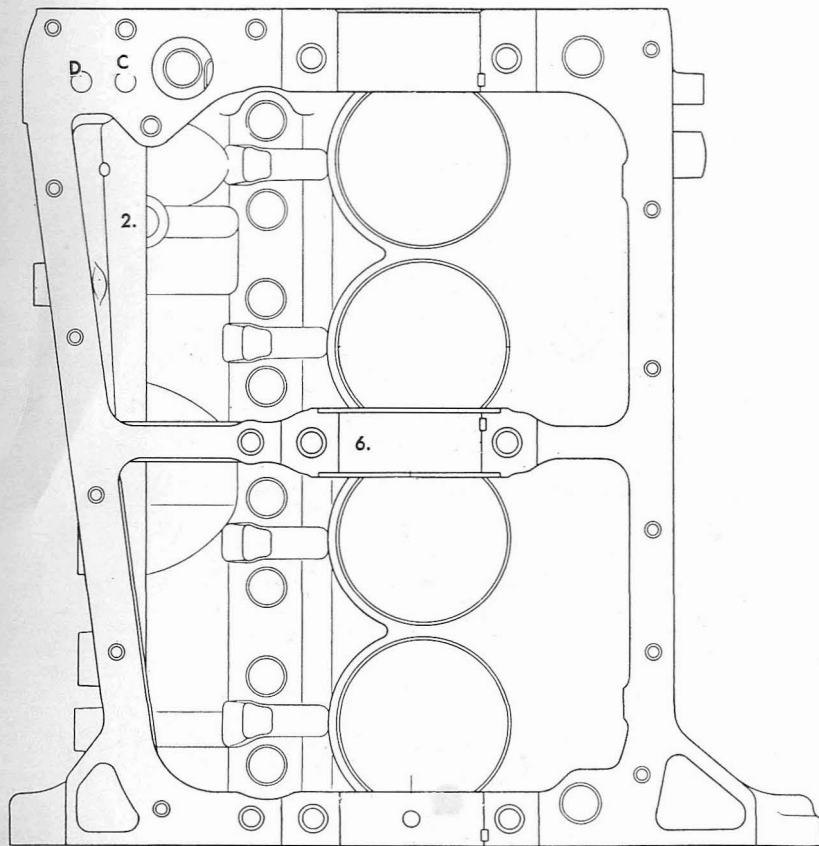
	850 SPORT	1000-OT	1000-OTS	1000 Radiale	1300/124	124 DOHC
Motor Number	100 GC	202B	202B	200	204	124 AC
Cylinders	4 in line	4 in line	4 in line	4 in line	4 in line	4 in line
Rotation	LEFT	LEFT	LEFT	LEFT	LEFT	RIGHT
Block	FIAT 850	FIAT 850	FIAT 850	FIAT 850	FIAT 124	FIAT 124
Bore & Stroke	64x63.5	65x74 MM	65x74 MM	65x74 MM	75.5x71.5 MM	80x71.5MM
Displacement	817	982.20	982.20	982.20	1280cc	1438cc
Horse Power	52 SAE @ 6400	72 SAE 6150	78 SAE 6400	86 SAE 6500	88 SAE 6000	96 SAE @ 6500
Ft. lbs Torque	45 @ 4000	64 @3500	68 @3700	72 @4200	74 @3500	82 @ 4000
Comp. Ratio	10 to 1	9.5:1	11.5:1	10.5:1	10.5:1	8.9 to 1
Weight	1587	1575	1590	1664	1680	2030
Tires	155x13"	155x13	155x13	155x13	155x13	165x13"
Suspension	FIAT 850	FIAT 850	FIAT 850	FIAT 850	ABARTH	124 Sport
Transmission	FIAT 850	FIAT 850	FIAT 850	FIAT 850	FIAT 850	124 Sport
Top Speed	Over 85 MPH	97 MPH	over 100 MPH	over 105 MPH	over 110 MPH	105 MPH
Gear Ratio	8/39	8/37	8/37	9/37	10/37	10/41
Carburetor	Weber 30 DIC1	Weber 30 DIC	Weber 30 DIC	Weber 30 DIC	32 dual Weber/S	Weber 34 DFH
Brakes	Disc/Drum	Disc & Drum	Disc & Drum	Disc & Drum	Disc & Drum	Disc/Disc
Cooling	Rear Rad.	Rear Rad.	Front Rad.	Front Rad.	Front Rad.	Front Rad.
Fuel Pump	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Camshaft	25/51-64/12	26/75-67/30	26/75-67/30	27/65-67/25	Std. Fiat	26/66-66/26
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Static Advance	10°	8°	8°	8°	10°	10°
Auto Advance	28°	14°	14°	18°	20°	24°
Valve Gap	.006 in. .008 exh.	.008 Cold	.008 Cold	.009 in .010 ex	tight .008 Cold	.017 in. .019 exh.
Oil Pressure						(cold)
(Hot 5000 RPM)	50	50 Ft. lbs	50 Ft. lbs	60 Ft. lbs	65 Ft lbs	65
Plug Gap	.024	.024	.024	.024	.024	.022
Point Gap	.017	.016	.016	.016	.016	.017
RED Line	6500 RPM	7200 rpm	7400 rpm	7600 rpm	6800 rpm	7000 RPM
Main Bearings	FIAT	ABARTH	ABARTH	ABARTH	FIAT	FIAT
Rod Bearings	FIAT	FIAT	FIAT	FIAT	FIAT	FIAT
Oil Capacity	3.75 QTS.	5 Quarts	5 Quarts	5 Quarts	5 Quarts	5 QTS.
Gas Tank	7.9	7.9	7.9	7.9	7.9	11.9
Gear Box	4.4 Pints	4.4 Pints	4.4 Pints	4.4 Pints	4.4 Pints	3.5 Pints
TORQUE:						
Head Bolt Torque	28 to 36 Ft. lbs.	28 to 36 Ft. lbs	28 to 36 Ft. lbs	36 to 42 Ft. lbs	49 Ft. lbs	55-56 Ft. lbs.
Rod Bolt Torque	25 Ft. lbs.	25 Ft. lbs	25 Ft. lbs	25 Ft. lbs	38 " "	37-38 Ft. lbs.
Main Caps Torque	45 Ft.lbs.	45 " "	45 " "	45 " "	58 " "	59-60 Ft. lbs.
Rocker Shaft "	16 Ft. lbs.	16 " "	16 " "	16 " "	29 " "	
Camshaft Bolt "	37 Ft. lbs.	37 " "	37 " "	37 " "	36 " "	N/A
Fly Wheel "	27 Ft. lbs.	27 " "	27 " "	27 " "	43 " "	58-59 Ft. lbs.
Crankshaft "	72 Ft. lbs.	72 " "	72 " "	72 " "	72 " "	88 Ft. lbs.
Spark Plug "	20 Ft.lbs.	20 " "	20 " "	20 " "	20 " "	29 Ft. lbs
CLEARANCE:						
Piston	.0024-.0031	.0035-.0045	.0039-.0045	.0035-.0045	.0033-.0038	.0031-.0039
Main Bearings	.0008-.0024	.0020-.0024	.0020-.0024	.0020-.0024	.0024-.0031	.0019-.0037
Rod Bearings	.0010-.0028	.0018-.0022	.0018-.0022	.0018-.0022	.0020-.0028	.00102-.00299
Cam Bearings	.0010-.0028	.0016-.0028	.0016-.0028	.0016-.0028	.0016-.0028	.0011-.0027
Main Bearings	1.9994	2.122-2.123	2.122-2.123	2.122-2.123	1.9992	1.9992
Rod Bearings	1.5742	1.5734-42	1.5734-42	1.5734-42	1.7917	1.7917

For those of you having a pre-1970 small displacement Fiat 850 which you desire to modify, the following information is provided. Since some 1968 850 Spydres with the 817cc engine were produced with the old style body, check your serial number to determine which engine you have. For the Spyder, the 817cc engine type was 100 GS 3040, and began with serial number 021097. The 850 Coupe 817cc engine type was 100 GC 3040, and began with serial number 147146. The 850 Sedan 817cc engine type is 100 G 002, and began with serial number 867880.

Any Fiat 850 with a serial number lower than those listed for each model will have the 843cc engine with 65MM bore and 63.5MM stroke. Those having the above listed serial numbers or higher have the 817cc engine with 64MM bore & 63.5MM stroke, up to the 1970 models. All 1970 and later Coupes and Spydres have the 903cc engine with 65MM bore and 68MM stroke. The Sedan still retains the 817cc engine.

Our lubrication system and how to modify the standard Fiat 850 block to a direct Free Flow system with a filter and cooler.

No modifications were necessary to the oil flow lubrication of the valve train. The major change made to the standard 850 oil lubrication system was to feed the oil directly thru the block to the crankshaft. The Fiat 850 crankshaft feeds the block the same way the Fiat 600-D engine does. Abarth has been developing this basic engine since it was first introduced in 1955. Today's Abarth racing engines under 1000cc are built with Fiat 600 blocks using the same lubrication technique. To modify your lubrication system the way we have, do the following:



1. Replace the oil pump drive shaft gear with a one piece Abarth steel gear.

2. Tap the block adjacent to the dip stick hole to take the Abarth oiler pipe line which squirts a small stream of oil on the oil pump drive gear and the camshaft gear. With this modification the camshaft gear is protected from serious wear.

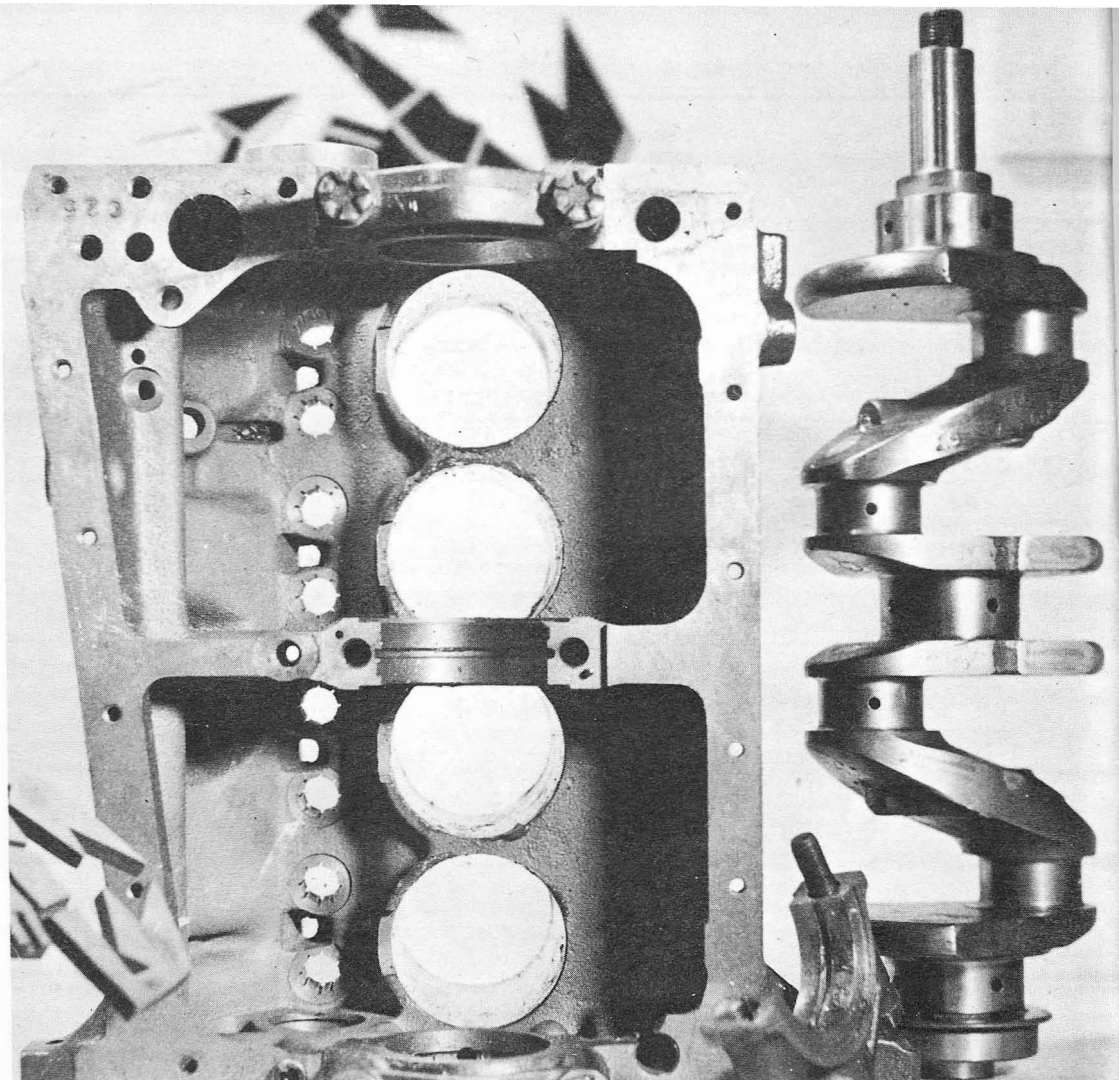
3. Replace the oil pump with Abarth HD oil pump. This has a deeper and larger pick up screen.

4. Block off the hole in the housing of the oil pump which feeds the oil into the oil delivery pipe. This pipe is connected to the bottom of the front main bearing cap. Keep the oil delivery pipe but put it out of commission. I say keep the pipe because the front main bearing cap is tapped for the pipe in a very vital stress area.

5. The pulley end of the crankshaft has a hole thru it which must be brazed closed. The same pulley can be used. However, I strongly recommend the small Abarth racing pulley.

6. (a) To enable you to complete the modifications drill a 3/16" hole in the center main bearing housing of the block. Drill at an angle directly towards the bottom of the main cap bolt hole.

(b) The oil is brought directly to the



Shown above is an Abarth Fiat 850 racefied block, line bored for the big main bearing crank. Steel main caps are used, and have dowel pins added for greater strength. The dowel pins can be seen in the center main saddle and cap, as can the 360° oil groove (both the cap and saddle are grooved). The pushrod holes have been broached (grooved) to provide better lubrication to the cam followers & cam lobes. In this block, the fresh oil is carried to the special steel center main cap. Performing the modification described under step 6 on this page to any Fiat 850 block will give the same results.

The 74MM crank shown is a nitrided Abarth crank with big mains. However the width of the connecting rod and main bearing journal sizes have been reduced considerably from the Std. Fiat 850 sizes. It is used in the Abarth 1000 Corsa, Radiale, and DOHC engines.

center main bearing. Remove the oil galley plug and drill a 3/16" hole thru from the outside of the block. The drill will break thru at the bottom of the main cap bolt hole. You'll find that the block is very soft and drills easily. Just be careful not to drill off center. Enlarge the hole on the outside of the block for an oil fitting. This is where the fresh oil enters the block.

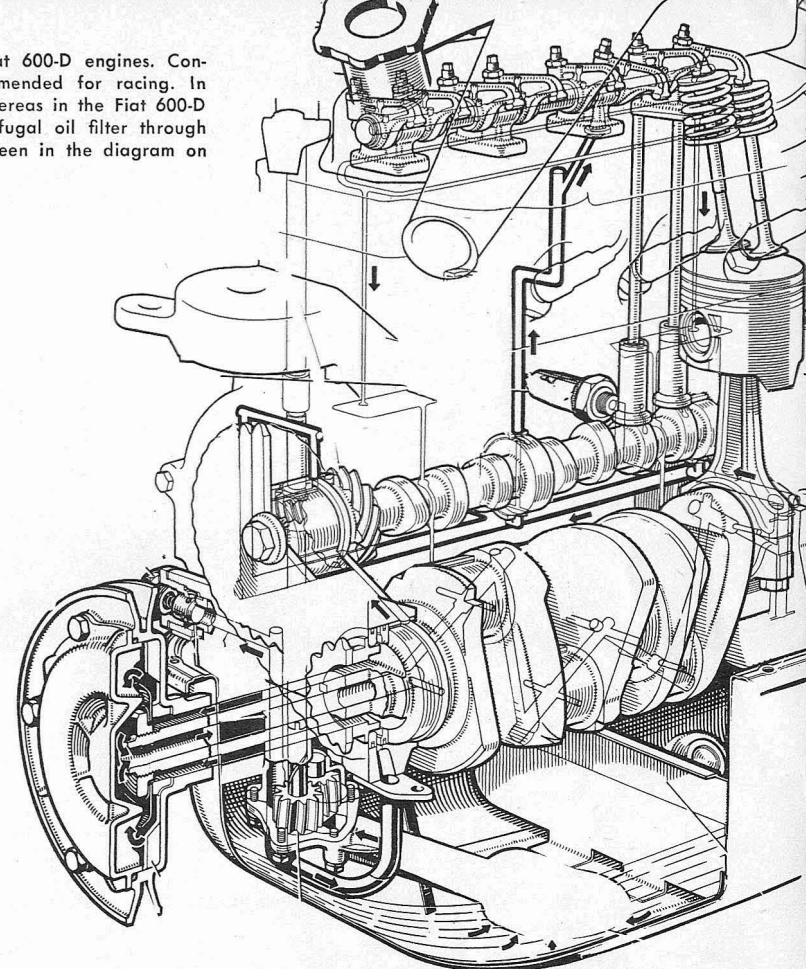
(c) Enlarge the oil hole in the block to 3/8" where the oil pump bolts to the block.

(d) Braze the hole in the block closed just outside the flange of the oil pump housing. This is the overflow hole for the oil pressure relief valve. The oil is going out of the engine here where the pressure relief valve is (was). The pressure relief valve is now located in the special Carello oil filter unit mounted in the rear compartment under the overflow tank.

ABARTH Lubrication



Standard lubrication system for all Fiat 850, 903 and Fiat 600-D engines. Conversion to the Fiat 600 lubrication system is highly recommended for racing. In Fiat 600 engines, the crankshaft is fed oil from the block, whereas in the Fiat 600-D and Fiat 850 the main supply of oil is fed from the centrifugal oil filter through the center of the crankshaft at the front of the engine, as seen in the diagram on the right.



Fiat 850 and 600-D engine lubrication diagram. The heavy black lines indicate the oil flow areas. The front pulley unit serves as a filter to catch the sludge. The oil is forced into the centrifugal pulley along two sides of the pulley end of the crankshaft. The oil still under pressure goes thru the hole in the nose end of the crankshaft to the main and rod bearings. Then to the camshaft and up the block to the valve train. I strongly recommend you change the standard lubrication system to the full flow system.

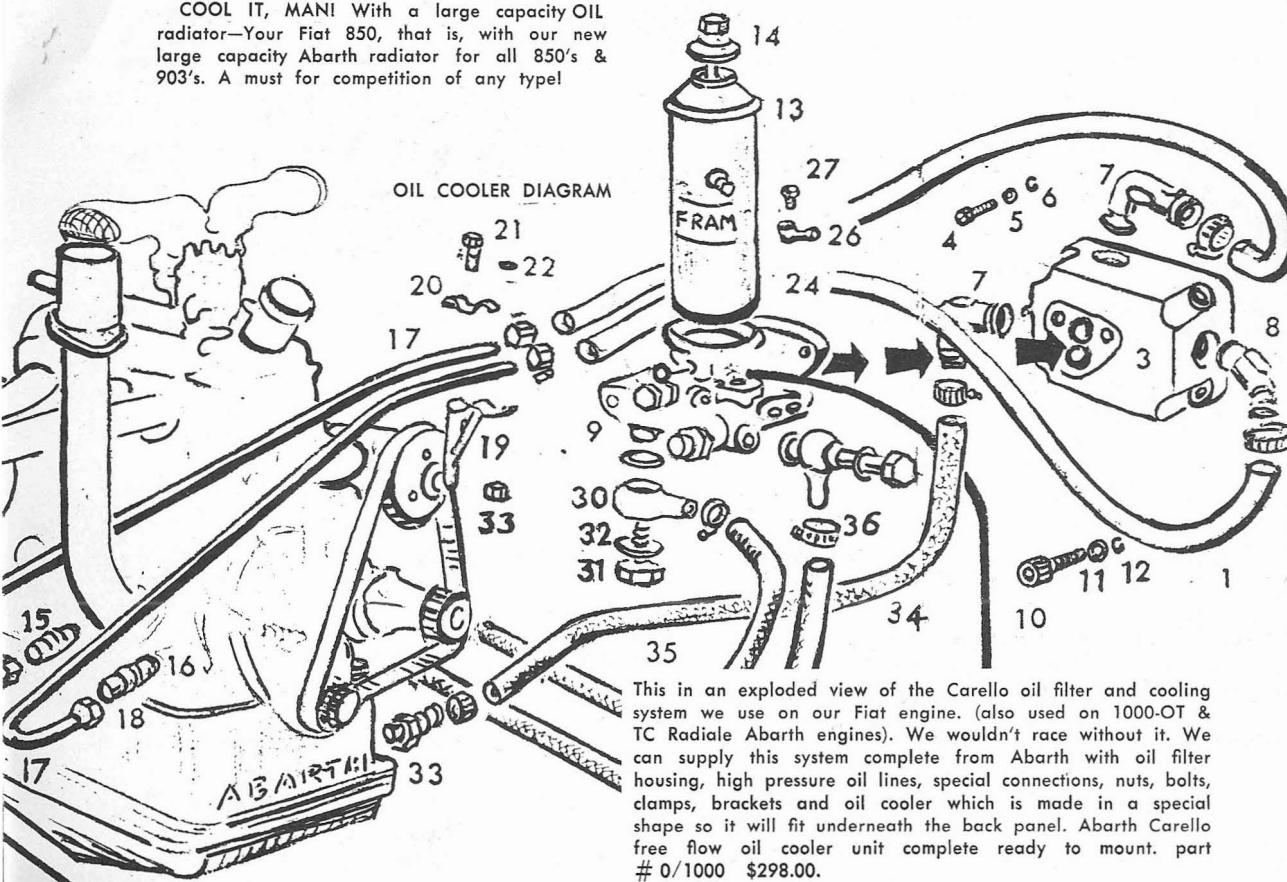
I honestly feel the Abarth method of racing the oil lubrication system of our Fiat 850 engines has been mostly responsible for our extremely successful reliability between 8000 and 8500 RPM range. Hats off to Shell and their super racing oil. We use the same Shell racing oil used by Abarth, Ferrari and Alfa. The oil is 50% castor oil, 25% synthetic, 10% mineral oil, and various other additives. Shell Racing Oil is extremely difficult to obtain here in the States. I recommend Castrol-R racing oil as an excellent substitute.

Shown here are some of the lubrication modification components available for the Fiat 850. At lower left are various gauges. Behind the gauges is a 5 quart finned, baffled Abarth oil sump. Next to the sump is the special Abarth oil filter unit used with the full flow lubrication system. In front of filter are heavy duty oil pressure relief valves and cam gear oiler tubes with fittings made by Abarth. The oil pump laying on the bench is the Abarth 1000-OT version. Resting against the 7 quart Abarth 2 piece sump is an Abarth Corsa oil pump used with this sump. On top of the 7 quart sump is the Abarth dual oil pressure-oil temperature cluster. At extreme right is an Abarth oil cooler, shown with lines and fittings. Directly behind the 5 quart sump is the oil cooler portion of the Abarth combination oil/water front mounted radiator.

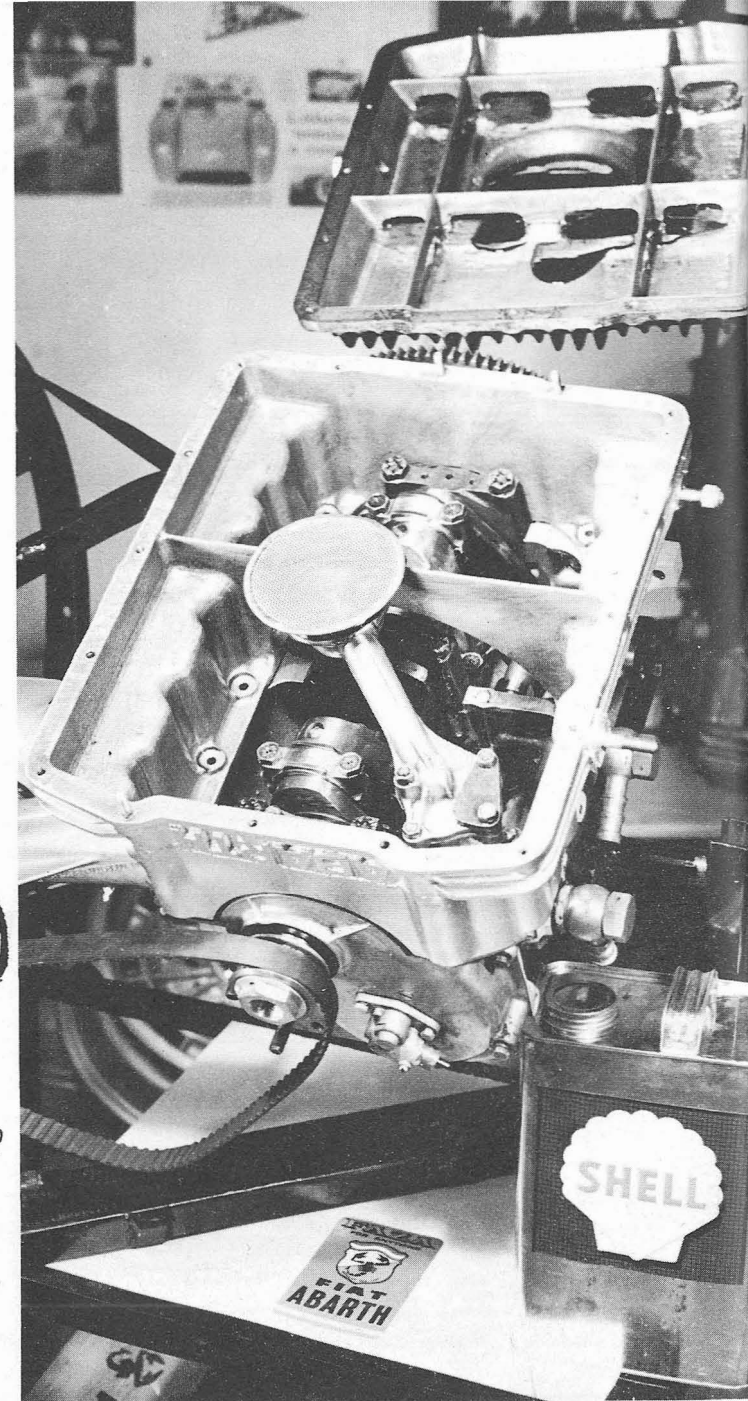


FREE FLOW OIL COOLER SYSTEM

COOL IT, MAN! With a large capacity OIL radiator—Your Fiat 850, that is, with our new large capacity Abarth radiator for all 850's & 903's. A must for competition of any type!



This is an exploded view of the Carello oil filter and cooling system we use on our Fiat engine. (also used on 1000-OT & TC Radiale Abarth engines). We wouldn't race without it. We can supply this system complete from Abarth with oil filter housing, high pressure oil lines, special connections, nuts, bolts, clamps, brackets and oil cooler which is made in a special shape so it will fit underneath the back panel. Abarth Carello free flow oil cooler unit complete ready to mount. part # 0/1000 \$298.00.



In the upper part of this photo you see the lower section of the Abarth 7 qu two-piece sump. The baffle configuration insures that the oil pump always has sufficient oil in the pickup area, even under hard cornering, acceleration, and deceleration. Notice how the two-piece construction of this sump allows for easy access to the crank, to check the bearings.



MODIFICATIONS FOR FULL COMPETITION RACING ENGINE
THESE MODIFICATIONS ARE THE SAME ONES WE ARE
CURRENTLY USING IN OUR RACE CAR

VELOCITY STACKS #'s F-004 THRU F-006

AIR AND MAIN JETS, #F-008 AND #F-009

WEBER CARBURETOR, 30 DIC 2, #F-001

ALUMINUM VALVE COVER, #H-011

ABARTH CYLINDER HEAD #H-002

IGNITION WIRES,
ABARTH HEAVY DUTY #I-006

ABARTH CAMSHAFT TACH DRIVE GEAR
MECHANICAL #EA-008†

ALTERNATOR #I-007

COG BELT PULLEY SET ABARTH #EA-001

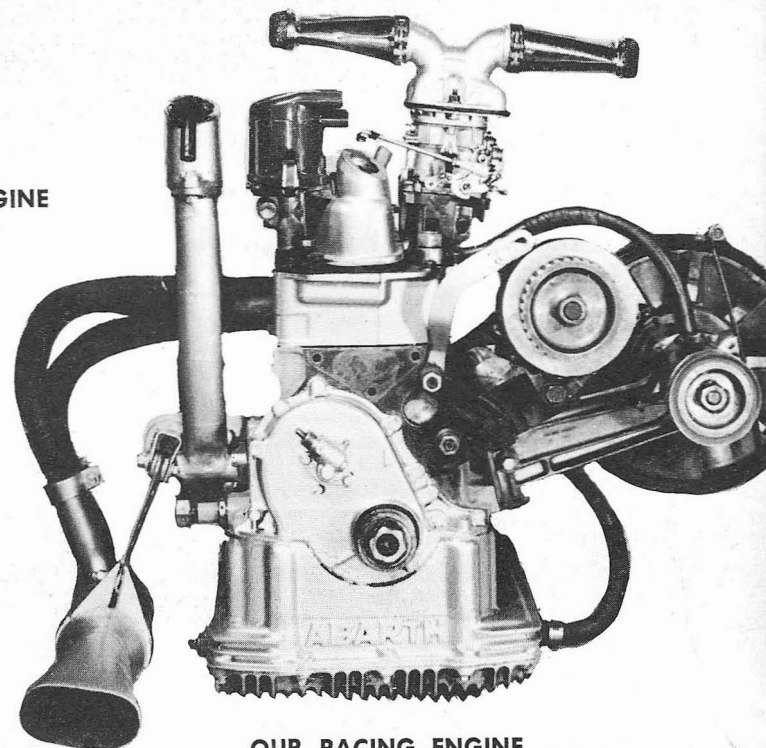
CRANKCASE BREATHER, ABARTH, BOLTS ON MECHANICAL FUEL
PUMP MOUNT (REPLACED WITH ELECTRICAL PUMP) #E-032

HEADER, 4 INTO 2, ABARTH #EA-003

FINNED, BAFFLED ALUMINUM SUMP, ABARTH 5½ QT. #EA-005

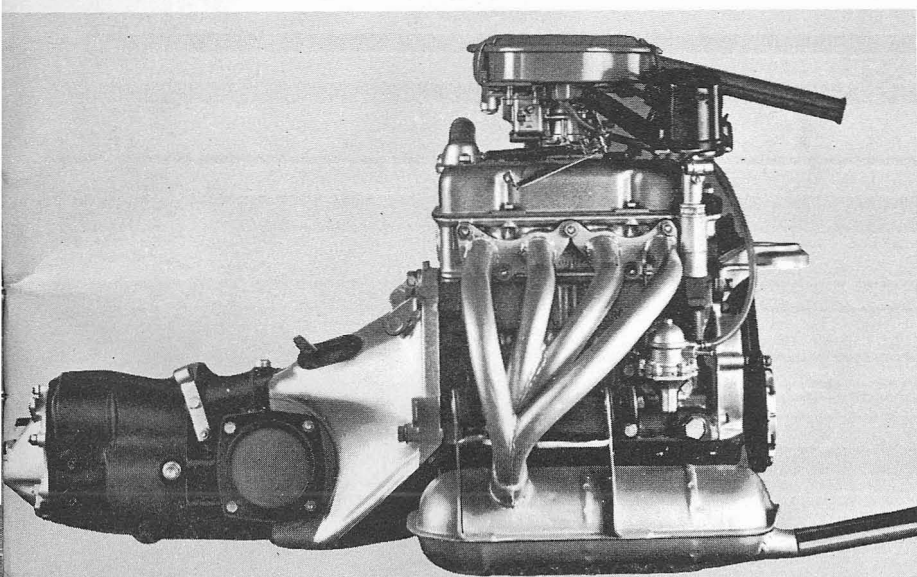
FINNED, BAFFLED ALUMINUM SUMP, 2-PIECE ABARTH 7 QT.
#EA-006

STINGER EXHAUST, ABARTH #EA-004



OUR RACING ENGINE

**FIAT
850**



Above is a stock 903cc Fiat 850 engine. At right is our racified 903cc 850 engine all ready for the 1970 season. We stock all parts needed to turn your 850 into a full race screamer, mildly improved street car, and anything in between.

FORGED, PRESSURE DIE CAST & MOULDED HIGH COMPRESSION PISTONS

Take a good look at our pistons described on page 34 of our master catalog. We probably have the largest stock of special Fiat & Abarth pistons of anyone in the world. We carry the most complete line of "free floatin pistons" (pins that allow slip type fit thru connecting rod bushings). However, remember that up to date Fiat 850 connecting rods are press fitted (after baking the rods in an oven). The pins measure less than 20MM and float free in the piston but not in the connecting rod. We represent Borgo Pistons and Alloylit pistons of Torino!

FIAT 850 RACING PISTONS

We have a new type racing piston, super light (weighs 4 ozs less per piston than stock—our Abarth prepared Fiat 850 rods are more than 4 ozs less than stock). I have gone back to flat rings because I found that over 8000 RPM the "L" (Dykes or step) rings were not as reliable. The Abarth engineers discovered the same thing, i.e., the "L" ring would break, especially the top ring and where the two ends came together. I discovered this in the 850 engine. At Abarth they discovered this turning the Radiale engines over 8000 RPM. Previously, up to two years ago they had limited their 850 & 1000 racing engines to 8000 RPM.

Since I switched to flat rings (1.2 & 1.5MM) almost two years ago we haven't broken a ring. Our last race with the Fiat 850 Spyder was at Pocono International Raceway. Craig Fisher drove the Fiat 850 Spyder in the National race, shifting at 8500 RPM & stretching the revs to 8700 in 4th gear. His best time was still a high half second slower than Randy Canfield's Sprite. While speaking of times, I'd like to point out that our Fiat 850's, especially with Craig Fisher driving, have almost always turned faster lap times than our Fiat Abarth 1000 Corsa sedan.



Here's a variety of engine components. The crankshaft at left rear is a polished, lightened, balanced Abarth jewel. At right rear is a lightened, balanced, polished Fiat 843cc crank (63.5MM stroke). The crank standing upright on the flywheel is a lightened, balanced, polished 68MM stroke version from the 903cc engine, now legal in H-Production. In front of the flywheel is a nitrided camshaft for an Abarth Radiale engine. At lower right are cylinder sleeves, for use with big pistons in the 600 and 850 series blocks. At center front are lightened, balanced, polished rocker arms. Every high revving full race 850 engine should have these. At left rear is an Abarth bronze trophy awarded to Al Cosentino.

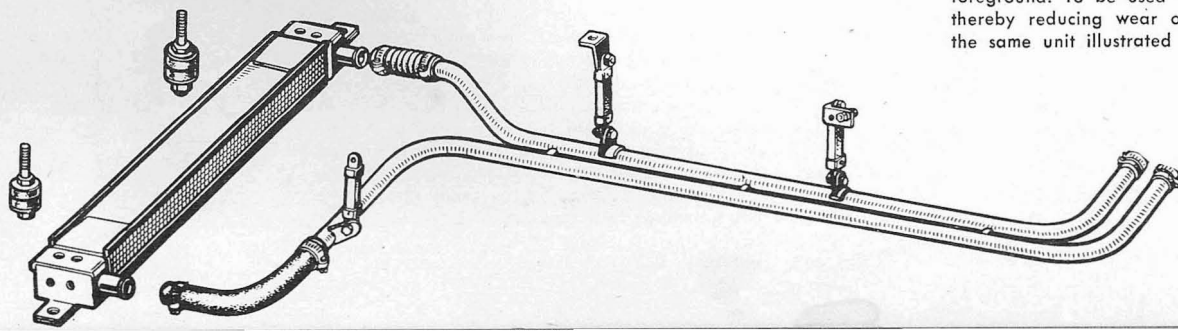


COOL IT, MANI With a large capacity water radiator—Your Fiat 850, that is, with our new large capacity water radiator for all 850's & 903's. A must for competition of any type! This radiator also lets your engine run much cooler during summer, when you're running at high speeds on the turnpikes. Fits existing brackets, legal for SCCA racing.

Fiat's suggested retail for an 850 radiator is \$94.12

AUXILIARY RADIATOR

If you drive your 850 hard and are worried about it overheating, fret no more. This radiator mounts under the body in front of the transmission, away from all the heat in the engine compartment. Besides being in a better cooling position, this also increases the coolant capacity for better heat dispersion. Overheating can cause blown gaskets, warped head, cracked rings, etc. Why take a chance? Comes complete with all hoses, hangers and pipes.



The above photo shows some of the parts available for the Fiat 850 for better cooling. At left is a 903 water pump with an Abarth cog pulley mounted on it. For serious competition, cog belts are a must, as they eliminate belt slippage at high RPM. The single gauge at left is a water temperature unit. Next to it is a cluster consisting of oil pressure, ammeter, and water temp. Behind the cluster is an Abarth expansion tank for the cooling system. The same expansion tank is shown in a different view, hanging on wall.

At center is an Abarth front mounted combination oil and water radiator. In front of it are two Abarth water pumps with large impellers for better water circulation. Surrounding the pumps are Abarth aluminum pulleys for cog belts, and standard belts. A complete set of pulleys (crank, generator, & water pump) is available in either type. Of special interest here are the two generator pulleys in the center foreground. To be used with standard belts, these pulleys reduce generator RPM at high engine speeds, thereby reducing wear of generator components. At right is an Abarth auxiliary radiator with fittings, the same unit illustrated and described at left.

Replace the standard gas tank with a front mounted fuel cell. The fuel cell is mounted up front to the left of the battery. This is a simple installation and helps in a couple of ways. First, it gives better weight distribution. Also, our experience over the past two seasons shows it leaves a lot more room to work under the rear of the car, especially when changing the gearbox to one with different ratios, etc. It saves a lot of time! Part #F-010

Replace stock shocks with Aristons, Part #S-005

Clutch cable bowden bracket tends to bend and weaken after awhile. Reinforce or replace with HD Abarth style, Part #E-033

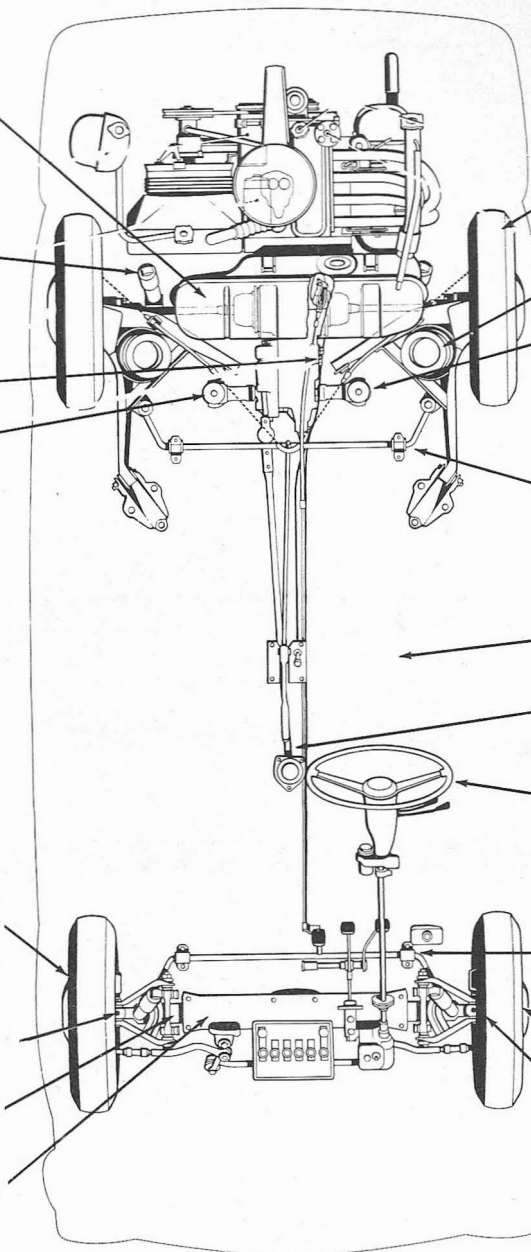
The transmission mounts may crack. Reinforce them or replace with Abarth, Part #T-6

Use Abarth Campagnolo Elektron wheels. These wheels have been race tested and proven throughout the world, and have been perfected to the point that a wheel failure is unheard of. These wheels are the choice of the front runners on such European courses as Nurburgring, Targa Florio, the European Championship mountain climb series, etc., where a wheel failure can mean an instant trip into space followed by a horrible crash. On these courses, Campagnolo wheels are subjected to several times the strain encountered in U.S. style road racing. We have never experienced or heard of a wheel failure with Campagnolo wheels. In a rigorous test by the automotive safety bureau of the German Government, Campagnolo Wheels received the highest rating ever recorded. The Safety and Peace of Mind these wheels give you make them a bargain.

Use Ariston shocks, Part #S-004

Install Abarth 1300/124 Front leaf spring. This spring and the front end lowering block will give you a tremendously strong front suspension, Part #S-003

Install Front end lowering block, Part #S-006



Change to racing tires. The two pacesetters in this field are Goodyear and Firestone, with Goodyear having the better dry tire for the Fiat cars, although right now Dunlops are admitted to be the best rain tire by other tire manufacturers.

Heavy duty rear coil springs, Abarth 1300/124, Part #S-002
Remove top spacer for coil springs.

Modify the rubber transmission mount cushion/bolt assemblies. Cut the rubber tits off the cushion end. Also, cut off half of the shaft end, to include the metal sleeve (insert). This will stiffen up the engine/transmission, thereby eliminating a lot of vibration.

Replace rear stabilizer bar with camber compensator, Part #S-001. Use the rear bar in place of the front one, as it has a larger diameter.

Replace seat with Abarth competition seat, really holds you, Part #CA-002

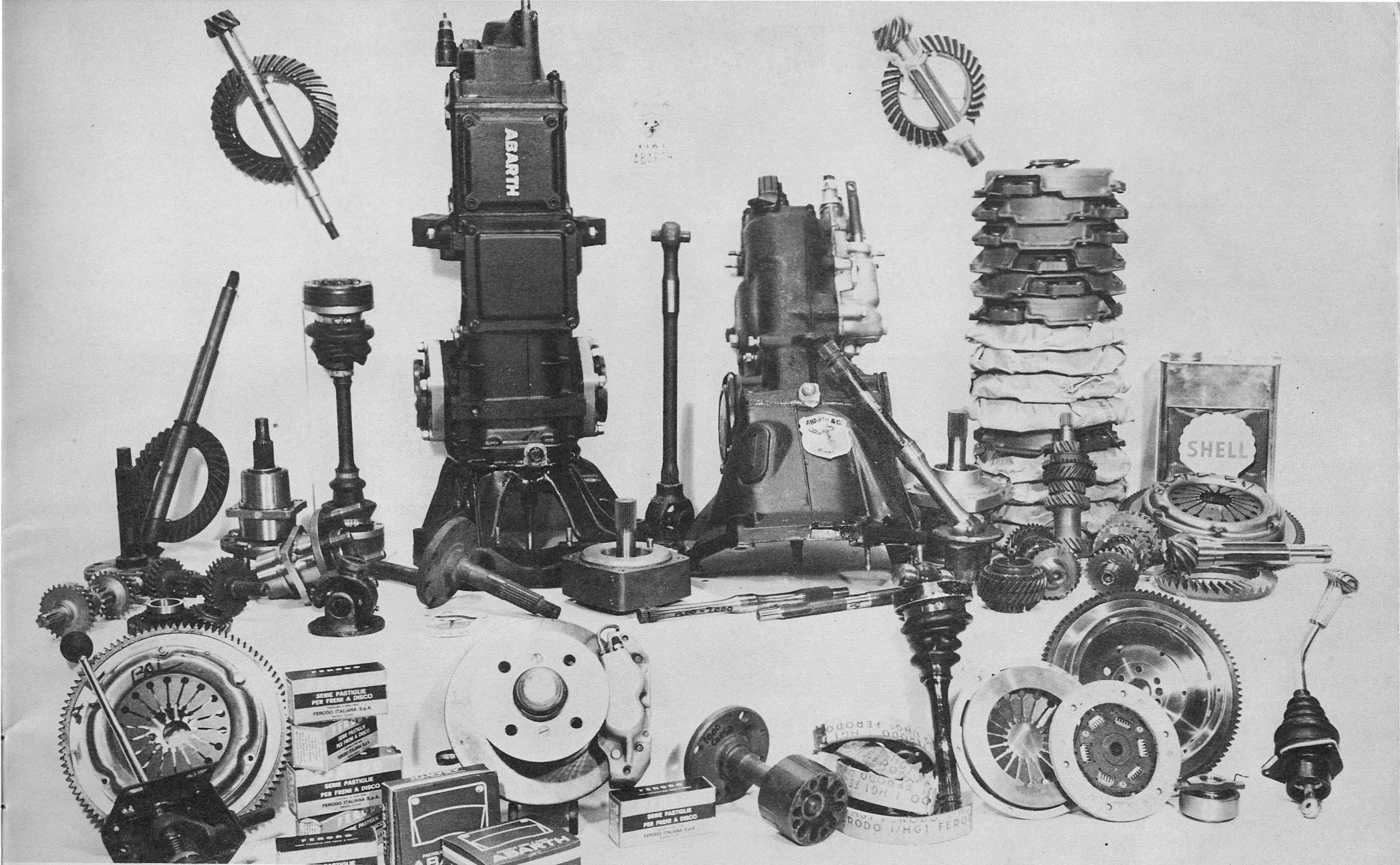
Install sport stick shift. This inexpensive item adds immensely to driver comfort, as it eliminates the long reach into 3rd gear, Part #CA-001

Replace the large diameter steering wheel with a comfortable, easy steering Abarth or Ferrero wheel, Part #'s CA-003 thru CA-005

Replace with rear stabilizer bar.

Use double-ended (thread on both ends) studs instead of Fiat bolts for securing wheels. These are stronger and easier to work with, made by Abarth, Part #S-014

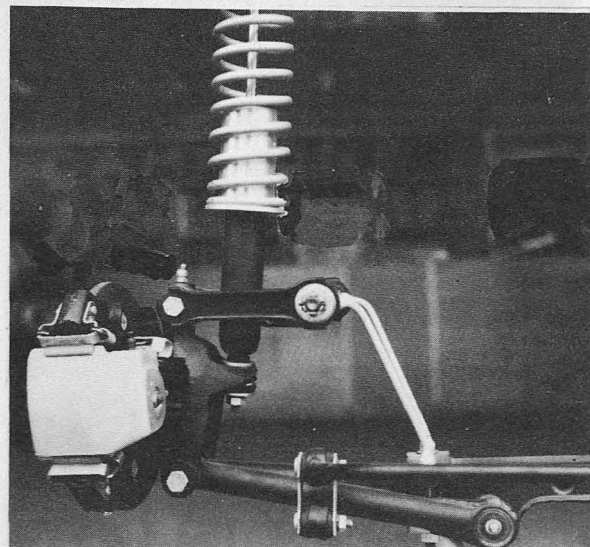
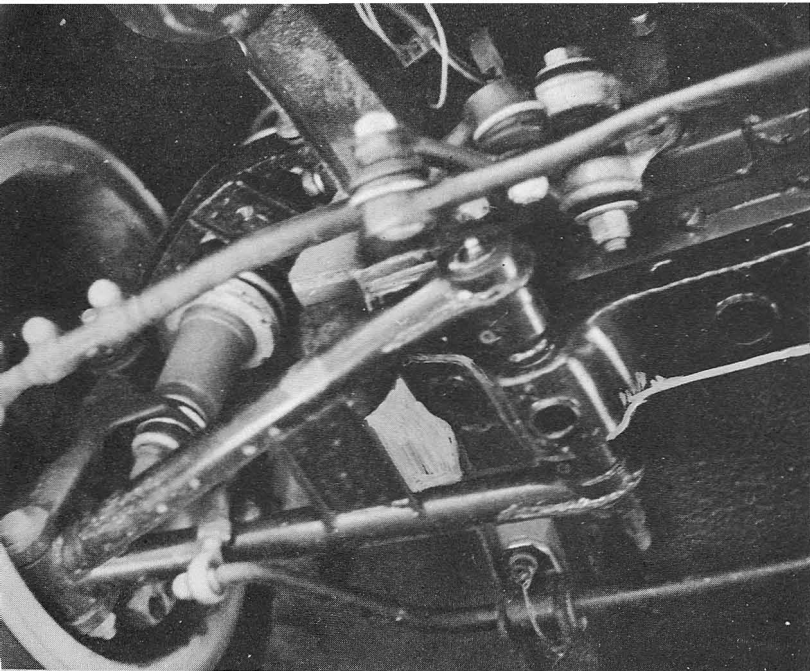
Use Girling disc brake caliper, Part #S-009



Shown above are various drive train and brake components for Fiat 600 and 850 series cars. In the rear (from left) are close ratio gears for the 600 series gearbox and a ring and pinion for the 5 speed gearbox. The axle standing on end (with dust boots) is from a 1000 Corsa Radiale. Next to the axle is a 5 speed Abarth close ratio gearbox. The other transmission is from a Fiat 850. It has close ratio gears, a must for serious racing in H-Production. Next to the 850 gearbox is a stack of Abarth heavy duty pressure plates, as used in the 1000-OT. In front of the pressure plates are close ratio gear sets for the Fiat 850. We can provide either the gears alone or the complete gearbox.

On the wall, at left, is a ring and pinion for the early 600 series gearbox. We have all ratios in stock. On the wall at right, behind the Abarth pressure plates, is an 850 style ring and pinion. Without the proper ring and pinion, you can't utilize your engine's power to best advantage.

On the lower left, in boxes, are Abarth and Ferodo disc brake pads. Next to the pads is a Girling disc brake complete with caliper. This is an S.C.C.A. approved option for H-Production Fiat Spyderys. The Spyder should have these brakes for hard racing—they can improve lap times. Ferodo competition brake shoes (next to stub axle) should be used in place of the standard rear shoes. Next to the Ferodo shoes is a complete Abarth flywheel assembly. Behind the clutch disc, you see the flywheel side of the Abarth pressure plate. In front of the flywheel is the Abarth throwout bearing. On the far right is a Sport Shifting Stick, installed on the Fiat 850 lever.



The working end of the Abarth front suspension for Fiat 850 cars is shown above. This assembly replaces the leaf spring, and results in a lighter and stronger front end. It comes complete with competition shocks (with coil springs). This suspension is used on several Abarth race cars. Installation is very easy.

At left are Ariston competition shocks for the Fiat 850. For racing use, there is no finer shock absorber. The knurled nut permits adjustment of these shocks without removing them or disconnecting one end, which is a great time saving feature. These shocks are ideal for sports racing and formula competition automobiles.



The large "T" shaped object shown above is a trailer hitch for the Fiat 124 Sport Coupe. It is available for all 124's and 850's. Various suspension components make up the remainder of the items in this photo. At left is an Abarth 8 bolt wheel spacer. Resting against wall next to Fiat 850 Spider poster is a camber compensator for all Fiat 850's. This item is the biggest bargain available for the 850. It prevents the inside rear wheel from lifting off the pavement on tight turns, which is extremely important for all types of competition, as well as normal street use. This amazing accessory also acts as a stiffer anti-sway bar and helps locate the engine/transaxle assembly more firmly. In foreground is an Ariston adjustable shock for Fiat 850's. Behind it are spacers used for adjusting rear wheel camber. These are used in conjunction with the Abarth coil springs, against which they are resting. At right are competition Koni shocks with coil springs, used on the Fiat Abarth 1000 Corsa. In background is the heavy duty Abarth leaf spring, used for lowering the front end of Fiat 850's.



These are the finest wheels available for street and racing. We handle only the best quality steel and alloy wheels. Clockwise, from bottom left, is an offset Campagnolo wheel. Behind it are offset $5\frac{1}{2} \times 13$ " steel wheels. At upper left is a Bertone $5\frac{1}{2} \times 13$ " steel wheel with normal offset. Next to it is an Abarth $5\frac{1}{2} \times 13$ " deep dish steel rim. In front of the Abarth wheel is a Campagnolo wheel with Abarth design. In center rear are Campagnolo offset, Stil Auto (star pattern), Campagnolo with Bertone design, and a polished Stil Auto. In the center foreground is another Campagnolo wheel with Bertone design, 6×13 ".

None of the wheels we sell require anything but the standard Fiat wheel bolts to secure them. Additionally, all the wheels we sell are manufactured in Fiat country, specifically for discriminating and knowledgeable customers. We have selected the best wide rim steel wheels and alloy wheels available. All the Fiat wheels we sell up to 6" width will fit all Fiat 850's, 124's, 128's. As the main distributor of Campagnolo Elektron rims in America, we are proud to represent them and be associated with their fine products. $5\frac{1}{2} \times 13$ " Elektron rims to fit all Fiats, \$68 (Bertone design). $5\frac{1}{2} \times 13$ " Elektron deep offset (Abarth design) \$82.50 (cannot be used with spacers on Fiat 850 models). $6J \times 13$ " Bertone design \$76.50.

"Stil Auto wheels Milano"

We are exclusive representative for this excellent low pressure cast alloy wheel. 6×13 " are available in three finishes—plain & aluminum \$56.50 each; polished \$58.50 each; and Gold paint \$60 each. This wheel has the offset already built in, no need for wheel spacers. Will fit all Fiat 850's 124's, 128's, and all Fiat Abarth OT versions. 7×13 " Stil Auto wheel in same star design will fit all Fiat 124, 125 and 128 (rear only) plain \$62.50. painted \$67.

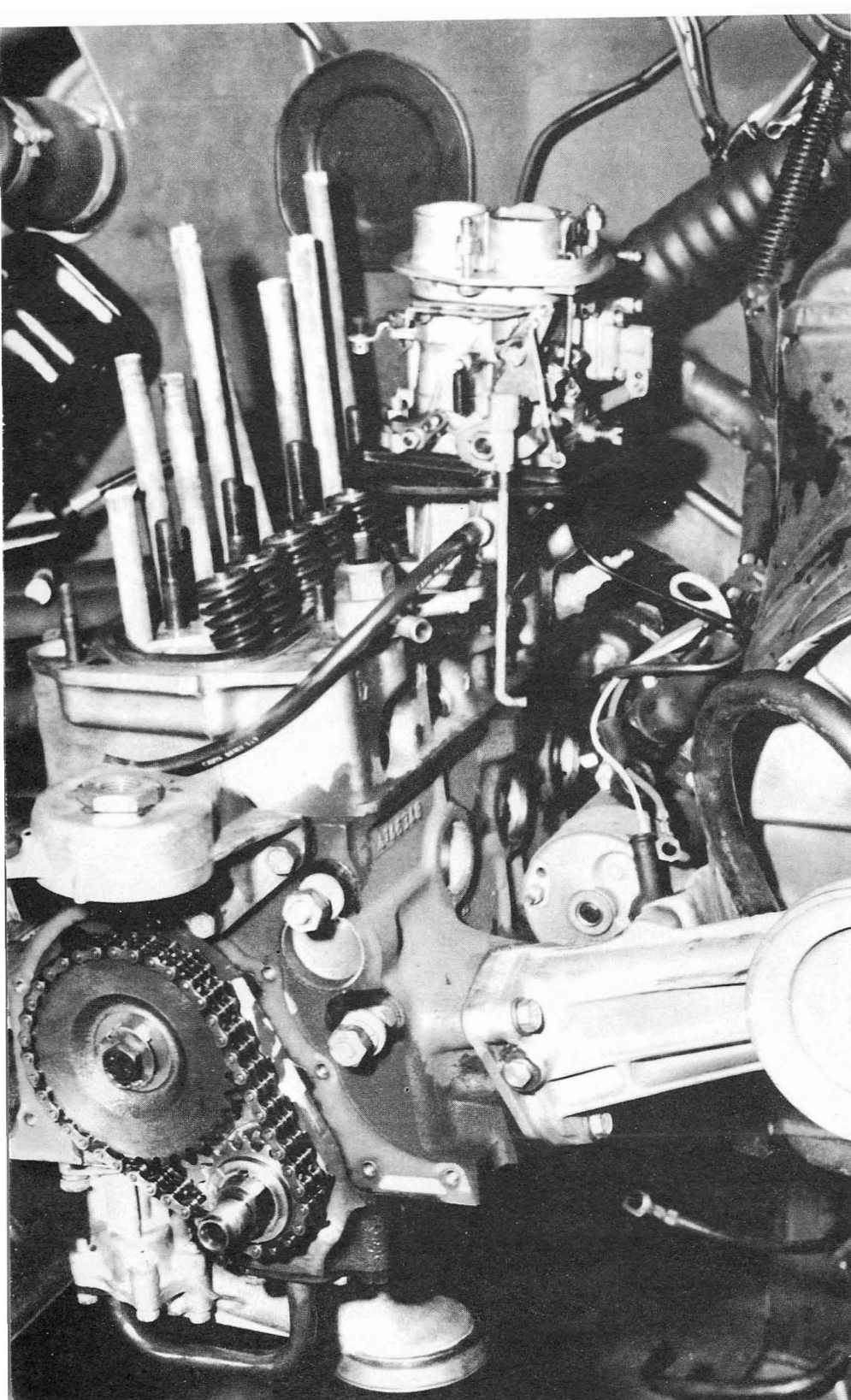
DEEP DISH STEEL WHEELS

These are the finest quality deep dish steel wheels available $5\frac{1}{2} \times 13$ " offset built in to fit all Fiat 850, 124, 125, 128, Fiat Abarth OT series and Simca Bertone 1200 \$26.50 each. Same steel wheel as above with offset built in 6×13 " \$29.50 each. Will fit all above cars. 6×13 " aluminum rim with steel center, five lbs. lighter, deep offset, same design as above wheel. Fits all Fiat 850, 124, 125, 128, Fiat Abarth OT series and Simca Bertone 1200. \$36.75.

SAIN ALLOY WHEEL—This wheel has been reduced in price as a result of larger production and a newly developed low pressure die cast system. The quality of this wheel has been good. Available with moderate offset. $6J \times 13$ " fits all Fiats, \$39. each.

The same SAIN WHEEL available in $5\frac{1}{2} \times 13$ " with deep offset will fit all Fiats, \$44.50 each.

CROMODORA FERGAT ALUMINUM ALLOY WHEELS The magnesium composition wheels first produced by Cromodora Fergat have been withdrawn. Their wheels are now made of aluminum alloy. Available in 5×13 ", \$48. each, to fit all Fiats.



Any Fiat 850 can be transformed into a Fiat Abarth 1000 OTS like the one shown below screaming away from the starting line at a mountain climb in Italy. This conversion results in a very reliable, economical automobile with a top speed in excess of 100 MPH. High compression 65MM pistons and an Abarth 74MM crank bring the displacement up to 982cc. The camshaft used is the same as in the Abarth 1000-OT, which gives good power, but doesn't cause the engine to stumble at low speeds. Abarth heavy duty double valve springs are used in conjunction with this cam. The block is line bored to accept the large mains of the special crank. An Abarth 5 quart finned, baffled sump and heavy duty oil pump insure good lubrication at high RPM, & under hard cornering, deceleration & acceleration.

To take advantage of the cam, the breathing is vastly improved. The carburetor is rejiggered to capitalize on the higher lift and longer duration of this cam. A free flow exhaust system lowers back pressure, giving better scavenging of exhaust gases. The big improvement in breathing comes from the ported, polished cylinder head with flowed combustion chambers. Flowing the combustion chambers entails opening up the area around the intake valve to permit better flow of the fuel air mixture. This engine develops 78 strong, reliable horsepower.

To derive the maximum benefit from this extra power, the suspension should be improved. The front end should be lowered, and the rear wheels decambered by the use of Abarth coil springs. A camber compensator should be fitted to the rear suspension. Wider wheels and/or wheel spacers should be installed for flatter cornering. A set of good shocks is a must, especially if you've gone over 12,000 miles on the standard ones.

For further information, prices for these parts, send a self addressed, stamped envelope.



STREET USE

How to apply the information and recommendations in the manual for your street Fiat 850 or other similar Abarth, Giannini and Siata. Basically, all the steps described for racing can be applied to street use, the exceptions being piston compression, camshaft timing, and gear ratios. Too high a compression makes the car hard starting, especially in cold weather. The full race camshaft limits the low end power and also makes for harder starting. The gearing should be left alone for street use but the ring and pinion should be changed from 8/39 to an 8/35 or 9/37. The standard ring and pinion ratio in all Fiat 850's is too low for our cruising speeds. Instead of high speed cruising in 4th gear at 6,500 RPM, the engine should be turning 5,500 RPM. The close ratio 3rd & 4th gears are not recommended for street use but would account for several seconds in Gymkhana and Autocross events.

It's really not necessary to do the cylinder block modification or install the special Carello Abarth oil filter, free flow pressure lubrication system and oil cooler. Suspension preparation can be done the same for street use as it is for racing. If you don't want the suspension as stiff and as low as the race car, install either the front end lowering block or the Abarth 1300/124 front leaf spring. Leave the std. Fiat spacer above the Abarth 1300/124 coil springs in the rear.

The photo at left shows an 850 about to have the cam changed without removing the engine from the car. To accomplish this, you need not disassemble your engine any further than shown. Wooden dowel sticks are pushed down into the tappets, and then pulled up. This holds the tappets up out of the way when the cam is removed and the new one installed.

REMOVING THE ENGINE

A. Removing the engine usually takes two people about 1 hour. I wouldn't follow the Fiat Shop Manual here.

1. Put the rear of the car up on jack stands.
2. Do not remove the back panel.
3. Remove all belly pans.
4. Remove the distributor and carburetor.
5. Disconnect all necessary cables, ignition wires, hoses, etc.
6. Remove the rear engine mount.
7. Working with a small hydraulic jack (with the engine free from the transmission), lower the engine.

B. REMOVING THE ENGINE AND TRANSMISSION

Jack up the rear of the car the same way.

1. Remove the rear engine mount.
2. Place the jack where the engine & transmission will balance nicely.
3. Don't remove bolts between engine & transmission.
4. Remove anti-roll over bar or stabilizer bar.
5. We don't remove the rear panel because we have more accessories oil lines, etc. on and around it. However, if you don't have a small hydraulic jack, it may be easier for you if you remove the back panel. Then you can remove the engine without lifting it or jacking up the car. You can always handle the engine and transmission as one unit this way very easily.

PIN/PISTON FITTING

For many years the problem of the Piston/Gudgeon-Pin fitting has been the main object of discussions and articles.

Even now, some people believe that an assembly of the forced fit type is the best for all purpose including to avoid noise.

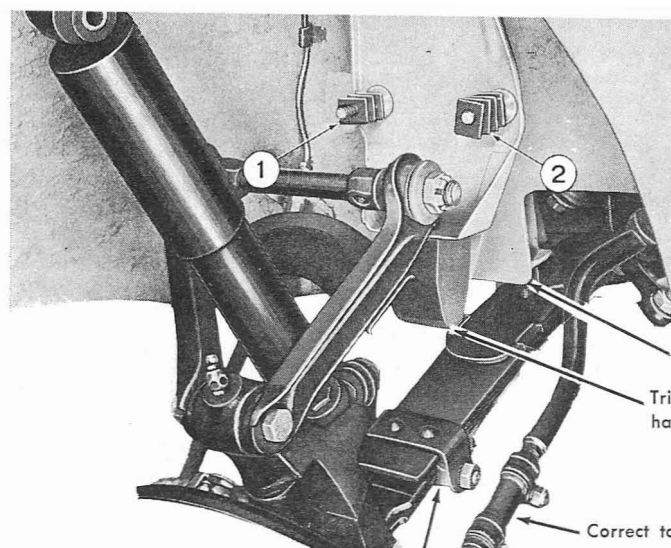
By means of electronic equipment it has been possible to identify the two types of noise, Gudgeon-Pin/Piston and Gudgeon-Pin/Con Rod. It has been proven that the Gudgeon-Pin/Piston-slap—is heard only in instances when the clearance is more than 0.025MM at the temperature of 20° C.

The Gudgeon-Pin/Piston should have a free type fitting with a clearance generally varying from 0 to 0.006MM at 20° C temperature. Any possible noise could be caused by other defects of the engine.

In these conditions the Gudgeon-Pin is free in the piston. When held in a vertical position the pin will fall out of the piston without being pushed.

Another reason why this type of fit is important is that this allows for easier lubrication, thus avoiding any seizure between the two surfaces, steel and aluminum.

A sure winner in SCCA's G Production class is the Fiat Abarth 1000 OT. There is a long list of Homologated Abarth equipment for this car, including 5 speed gearbox, which will result in performance akin to that of the all winning Fiat Abarth 1000 Corsa. Any Fiat 850 version can be brought up to OT specifications, using the same Abarth parts that have carried the Fiat Abarth 1000 Corsa to countless victories throughout the world. To find out more about this automobile, send a stamped, self addressed envelope.



INSTRUCTIONS FOR ASSEMBLING FRONT END LOWERING BLOCK FOR COMPETITION.

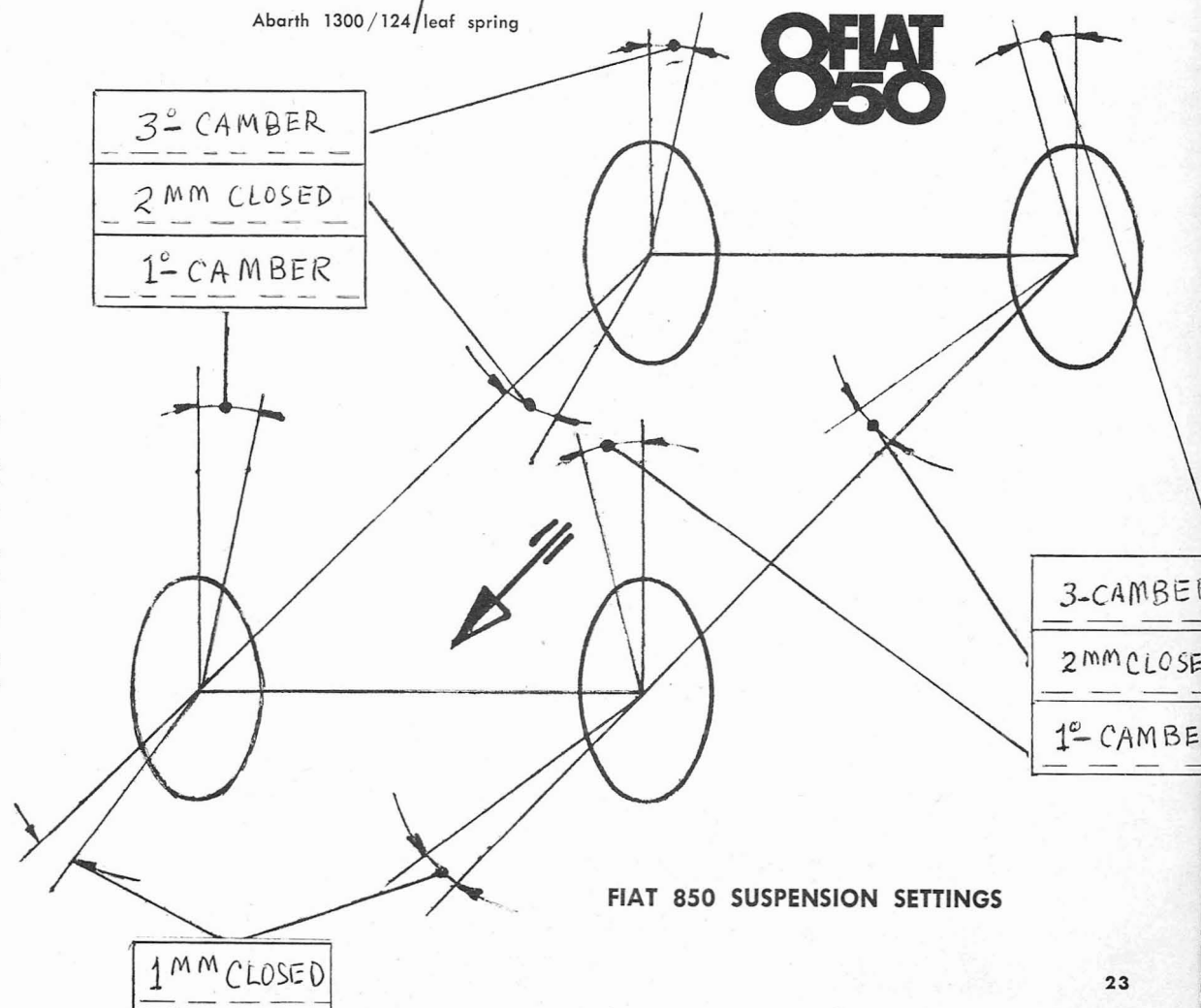
After installing front end lowering block, remove shims from studs 1 and 2 to get correct camber. Remove the same number of shims from each stud.

Hammer body bead back so leaf spring can flex properly.

Trim the rubber stop with a hacksaw so that the leaf spring has about 1" travel

Correct toe in by turning the short sleeve

Abarth 1300/124 leaf spring



BEARINGS

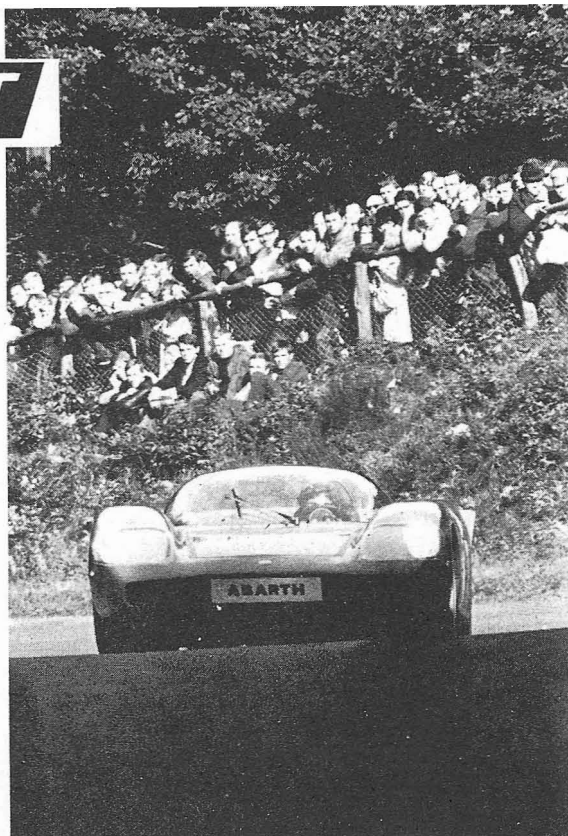
Keep in mind that the basic racing type bearings, required for the high revving Fiat Abarth 1000 Corsa engines, do not serve as well for a high performance street engine like the Fiat Abarth Monomille. The same holds true for bearings in street engines that have a still lower RPM red line, such as the Fiat 600 Multipla or the Fiat 850 Buses and Vans. All of these engines have basically the same engine block; however, the crankshaft bearings that work well in the Fiat 850 Bus could not be expected to serve the 1000 Corsa engine. For example, the con rod bearings are the same outside diameter for both engines but the type of bearing materials differs. The perfect bearing has yet to be developed that has all the requirements to meet the use of any one engine, so be sure you know what your most important requirements are before you select your bearings. Then, select the bearing material that will do the most for your engine.

Harder bearings, such as the aluminum type, do not have the embeddability to absorb dirt and metal particles, but it is more important that they wear longer. Secondly, non racing type bearings have a slippery quality to resist seizing or scoring in cases where metal to metal contact exists. When the trimetal babbitt layer is consumed, and metal to metal contact exists at high RPM, the copper does not have the slippery quality. On the contrary, it expands and will tend to grab the crankshaft. The racing engine most naturally has a much more expensive crankshaft which therefore must be preserved. Racing engines have no air filters. In addition, the extremely high RPM of racing engines contributes heavily to bits of metal deposits in oil galleries. Thus, it's a good idea to use bearings which have the embeddability quality. The babbitt should be thick enough and soft enough to absorb metal deposits and foreign materials before they scratch the crankshaft. It is a good idea in general to replace bearings after the engine break in period. You will find that the bearings get loaded up considerably after any engine rebuild involving reboring or crankshaft regrinding. It is not wise to leave bearings in the engine because they don't show wear.

Check the bearings very closely, even with a magnifying glass if you don't know what you're looking for the first time. You will see flecks, dots, and all types of small irregular shapes which represent what were once foreign materials in the oil system. The best filter manufacturers admit it is impossible to catch all the tiny particles. This is true even in the case of the 1000 Corsa engine which has two very large oil filter units. To emphasize a point: Sal Bossi assembles competition push rod engines at Abarth works. He showed me a demonstration with a hand tool on a used main bearing shaft which was loaded up. After stropping the bearing very much the same way you would a straight edge razor, most of the foreign matter was eventually worked out of the bearings and then cleaned off with another tool. These reconditioned bearings are used over again in test engines or engines that have been rebuilt. You can do this yourself in a rebuilt engine. Instead of using a new set of crankshaft bearings, use a reconditioned set. Then, after the break-in period, take the used set out and install the new set of bearings. Now you can be almost 100% sure that you have done all you can to save the embeddability life of your bearings for any misfortune that might occur.

Crankshafts must have bearings that give slightly when sudden whip occurs. Bearings must be able to conform to the movements of the crankshaft when metal to metal contact exists. When the crankshaft comes in contact with the bearing, any of four things can happen: 1. The babbitt will disappear. 2. The crankshaft will score. 3. The journal may seize up, especially when metals under the babbitt lack the slippery quality. When this situation exists, friction heat is so great that the bearing actually expands from the heat. This action reduces the clearance even more, and eventually the rod seizes on the crankshaft. It has been my experience that the trimetal babbitt over copper lead and nickel are the best bearing application for our racing engines. However, the harder trimetal, tri-Base, Lead-Base, Cadmium Base Alloy and Aluminum Alloys serve better in our street engines.

On this page you will find bearing sizes for Fiat and Abarth engines built around the 600 & 850 series blocks. When ordering bearings, always give year and model, and state whether you want standard or undersize bearings.

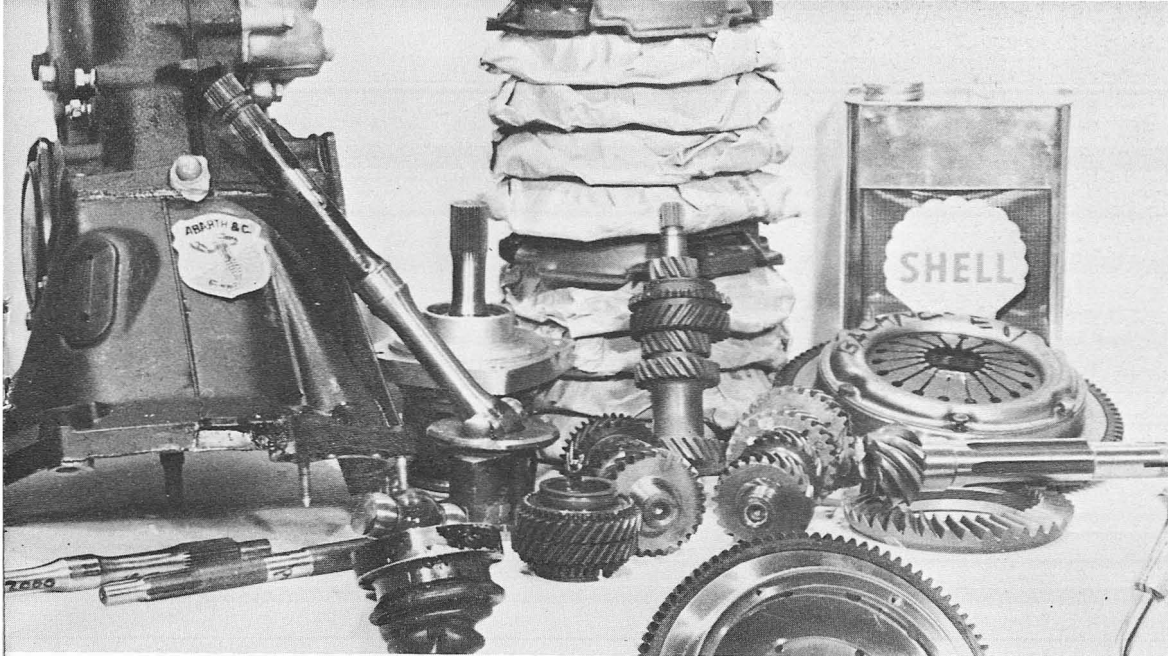


Schetty at 1000 Km Nurburgring.



Fiat Boss Agnelli with Rodriguez and Amon. Fiat is one of racing's biggest spenders right now, but we'll never see any of this support here in the United States if Fiats don't get fairer treatment in car classification. The new Fiat 850 with 903cc engine was placed in H-Production and should effectively end the near strangle hold the antiquated bug-eyed Sprites have had on this class for several years. However, until the larger Fiats like the 124 Spyder are given a fair shake, it's going to be difficult to get Fiat interested in U.S. road racing.

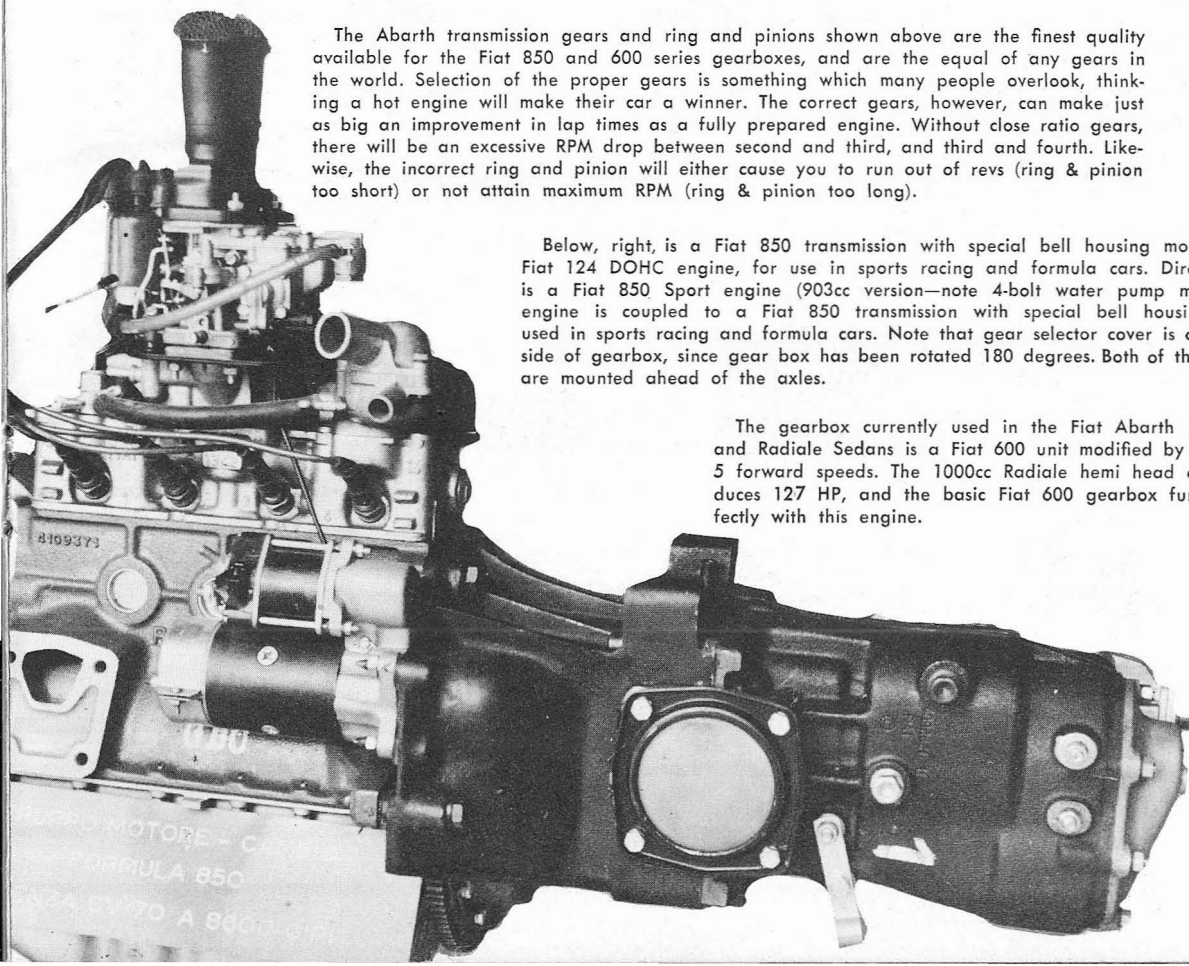
Cyl.	Cyl. bore	Part	Prs./Set	Crankshaft dia. standard size inches/mm	Housing dia. inches/mm	Bearing length or thrust washer thickness inches/mm
Fiat						
600 Model and "Multipla" Engine 100, '633 c.c. "Berlina" Taxi, Mains to Engine No. 302352						
4	mm 60 2-362"	C.R.	4	1-37747/34-987 1-37826/35-007	1-50023/38-105 1-50074/38-118	-828/21-031 -838/21-285 -802/20-370 -812/20-624
		F. & R.M.	2	1-9996/49-990 2-000/50-800	2-146/54-508 2-1465/54-521	-887/22-529 -897/22-783
		C.M.	1			
		T.W.	2	2-150/54-610 2-160/54-864 I.D.	2-740/69-596 2-750/69-850 O.D.	-091/2-311 -093/2-362
		C.	††	1-2218/31-033 1-2228/31-059 I.D.	1-4142/35-920 1-4154/35-951	-580/14-732 -600/15-240
			††	1-4971/38-020 1-4981/38-051 I.D.	1-6504/41-920 1-6516/41-950	-580/14-732 -600/15-240
Fiat						
600D, 600T, "Multipla" Type 100D, "Berlina" 1960 on Type 100D, Type 200, 767 c.c.,						
4	mm 62 2-441"	C.R.	4	1-5743/39-987 1-5751/40-007	1-7188/43-657 1-7193/43-670	-642/16-307 -652/16-561
		F.M.	1			-802/20-371 -812/20-625
		C.M.	1	1-9996/50-790 2-0003/50-810	2-146/54-507 2-1465/54-520	-887/22-530 -897/22-784
		R.M.	1			-802/20-371 -812/20-625
		T.W.	2	2-150/54-610 2-160/54-864 I.D.	2-740/69-596 2-750/69-850 O.D.	-091/2-311 -093/2-362
		C.	††	1-2218/31-033 1-2228/31-059 I.D.	1-4142/35-920 1-4154/35-921	-580/14-732 -600/15-240
			††	1-4971/38-026 1-4981/38-051 I.D.	1-6504/41-920 1-6516/41-950	-580/14-732 -600/15-240
Fiat						
850 Saloon, 850 Coupe, 850 Spider, 843 c.c., 850 Sport 903 c.c.,						
4	mm 65 2-56"	C.R.	4	1-5743/39-987 1-5751/40-007	1-7188/43-657 1-7193/43-670	-642/16-307 -652/16-561
		F.M.	1			-723/18-364 -735/18-618
		C.M.	1	1-9996/50-790 2-0003/50-805	2-146/54-520 2-1465/54-521	-887/22-530 -897/22-784
		R.M.	1			-802/20-371 -812/20-625
		T.W.	2	2-150/54-610 2-160/54-864 I.D.	2-740/69-596 2-750/69-850 O.D.	-091/2-311 -093/2-362
Abarth						
"Bialbero" 220, 228 Engines 250 Scorpion Coupe 1959 700 "Bialbero", 1000 "Bialbero"						
4	mm 62-5 2-46"	C.R.	4	1-5734/39-964 1-5742/39-985	1-7188/43-657 1-7193/43-670	-670/17-018 -680/17-272
	mm 65 2-559"	F. & R.M.	2	2-122/53-899 2-123/53-924	2-2665/57-569 2-267/57-582	-725/18-415 -735/18-669
		C.M.	1			-830/21-082 -840/21-336
		T.W.	2	2-340/59-436 2-350/59-690 I.D.	2-865/72-771 2-875/73-025 O.D.	-091/2-311 -093/2-362
850 Scorpion, 850 S, 850 SS, 850 TC, 214 D Engine, 847 c.c., 1962 on						
4	mm 62-5 2-46"	C.R.	4	1-5743/39-988 1-5751/40-008	1-7188/43-657 1-7193/43-670	-642/16-307 -652/16-561
		F.M.	1			-802/20-370 -812/20-624
		C.M.	1	1-9996/50-790 2-0003/50-810	2-146/54-507 2-1465/54-520	-887/20-371 -897/20-625
		R.M.	1			-802/20-370 -812/20-624
		T.W.	2	2-150/54-610 2-160/54-864 I.D.	2-740/69-596 2-750/69-850 O.D.	-091/2-311 -093/2-362



The Abarth transmission gears and ring and pinions shown above are the finest quality available for the Fiat 850 and 600 series gearboxes, and are the equal of any gears in the world. Selection of the proper gears is something which many people overlook, thinking a hot engine will make their car a winner. The correct gears, however, can make just as big an improvement in lap times as a fully prepared engine. Without close ratio gears, there will be an excessive RPM drop between second and third, and third and fourth. Likewise, the incorrect ring and pinion will either cause you to run out of revs (ring & pinion too short) or not attain maximum RPM (ring & pinion too long).

Below, right, is a Fiat 850 transmission with special bell housing mounted to a Fiat 124 DOHC engine, for use in sports racing and formula cars. Directly below is a Fiat 850 Sport engine (903cc version—note 4-bolt water pump mount). This engine is coupled to a Fiat 850 transmission with special bell housing, and is used in sports racing and formula cars. Note that gear selector cover is on opposite side of gearbox, since gear box has been rotated 180 degrees. Both of these engines are mounted ahead of the axles.

The gearbox currently used in the Fiat Abarth 1000 Corsa and Radiale Sedans is a Fiat 600 unit modified by Abarth for 5 forward speeds. The 1000cc Radiale hemi head engine produces 127 HP, and the basic Fiat 600 gearbox functions perfectly with this engine.



The following are approximate speeds (in MPH) for the Fiat 850 Spyder, using the various ring and pinions which are available. The Abarth close ratio gearbox was used. This gearbox has an 11×40 1st gear, 18×39 2nd gear, 21×31 3rd gear, and 24×28 4th gear. The speeds were computed using both Goodyear (22" diameter) and Firestone (23.4" diameter) as the tires, to give an idea of how the tires can be used to change the gearing.

Using 8000 RPM as the redline and Goodyear tires:

RING & PINION

GEAR	7/39	8/41	8/39	8/37	8/35	9/37	9/35
2nd	44	48	51	53	55	59	63
3rd	64	70	73	77	82	87	93
4th	83	89	95	98	104	110	118

Using 8000 RPM as the redline and Firestone tires:

RING & PINION

	7/39	8/41	8/39	8/37	8/35	9/37	9/35
	48	52	54	57	60	63	67
	68	74	78	82	87	93	99
	89	95	101	104	111	117	126

Using 8500 RPM as the redline and Goodyear tires:

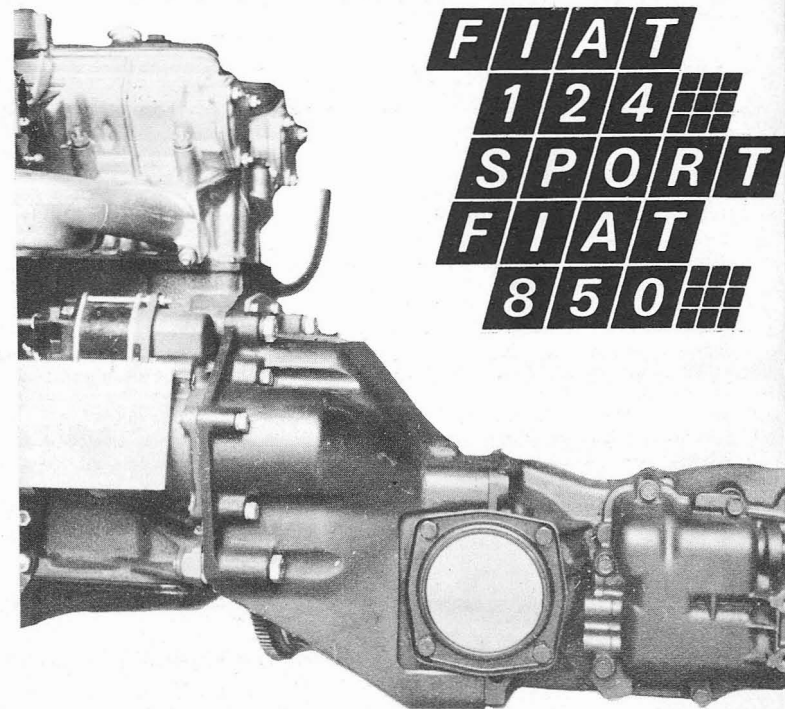
RING & PINION

GEAR	7/39	8/41	8/39	8/37	8/35	9/37	9/35
2nd	47	52	54	57	59	63	67
3rd	68	74	78	81	86	93	99
4th	88	96	101	105	110	117	126

RING & PINION

Using 8500 RPM as the redline and Firestone tires:

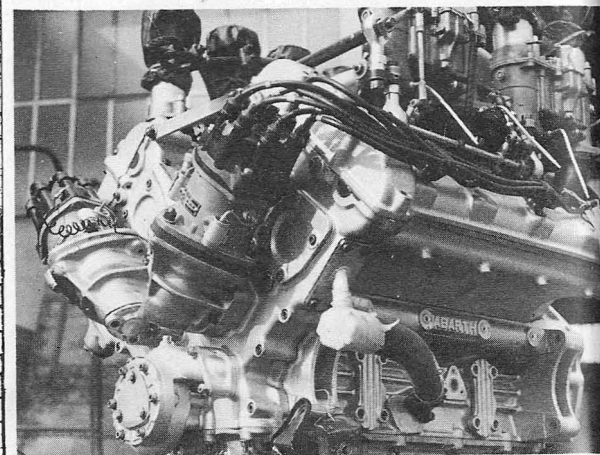
	7/39	8/41	8/39	8/37	8/35	9/37	9/35
	51	55	58	61	64	67	72
	73	79	84	88	93	99	105
	95	102	107	112	118	125	134





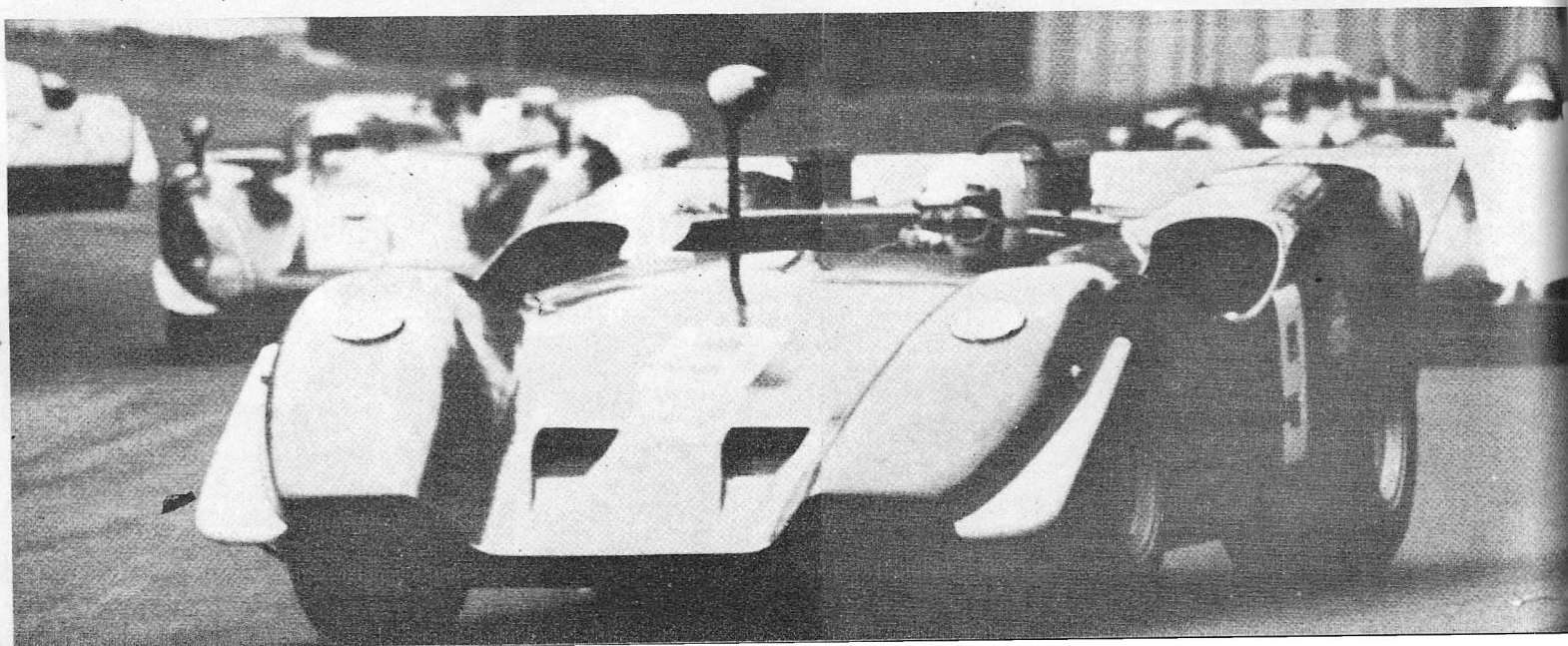
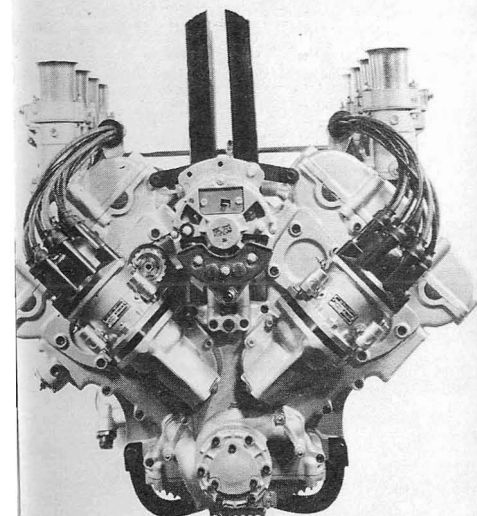
mtr.#	PUSH ROD ENGINES	Bore &	Cil. unit	Cil. tot	BLOCK MFR.	mtr.#	DOHC ENGINES	Cil. unit	Cil. tot	BLOCK MFR.	
200	1000 "OTR"	55x74	245,554	902,218	Der. 850 FIAT	220	850 Bialbero	525x69	244,69	846,35	Der. 600 FIAT
201	850 Berlina	55x63.5	210,312	842,848	" " "	221	750 Record Monza	61x66	106,543	247,772	" " "
202	1000 OT Berlina	55x74	245,554	902,218	" " "	222	700 " "	51x59.5	173,60	695,65	" " "
203	850 "OTR"	55x63.5	210,312	842,848	" " "	225	1600 Spyder	80.5x78	396,72	1587,14	" 1500 F.O.
204	1300 Coupe	75.5x71.5	329,105	1289,64	Der. 124-Corsa 850	227	850 Sport	65x63.5	211,708	846,83	" 600 FIAT
205	595 Berlina	43.5x70	226,053	513,307	" 500 FIAT	228.5	" " (RS)	" " "	" " "	" " "	" " "
206	695 "	52x73	244,354	909,538	" " "	229	1000 Bialbero	65x74	245,55	932,22	" " "
207	1150 "	69x76	284,13	1136,16	" 1000 SIMCA	229A	" " (RS)	" " "	" " "	" " "	" " "
208	1000 "	65x65	244,663	905,854	" " "	229B	" " (Cofpa MM)	" " "	" " "	" " "	" " "
210	1000TC Berlina	65x74	245,554	902,218	" 600 FIAT	230	1300 Sport Abarth-S	76x74	322,09	1208,36	ABARTH
210A	1000 Corsa Berlina	65x74	"	"	" " "	230B	1300 (5 subb)	" " "	" " "	" " "	" " "
210F	1000 F3	65x74	"	"	" " "	230S	1300 Abarth-Simca	" " "	" " "	" " "	" " "
210G	1000 TCR	65x74	"	"	" " "	231	1150 Sport Abarth-S	76x63.3	287,16	1148,64	"
213	800 Berlina	62.5x66	195,352	783,40	" " "	232	1000 F2	76x55	249,50	998,33	"
213A	800 Sestriere	62.5x64	195,352	783,40	" " "	232B	1000 Sport (5 subb)	" " "	" " "	" " "	"
214	850 SS Scorpione	62.5x69	211,690	846,75	" 600D FIAT	234	1450 Sport	76.2x60	354,032	1459,33	"
214A	850 S	62.5x69	"	"	" " "	235	1600 Sport	86x68.5	397,92	1594,64	"
214B	850 Berlina	62.5x69	"	"	" " "	235A	1600 Moncalbero	" " "	" " "	" " "	"
214D	850 TC normale	62.5x69	"	"	" " "	236	2000 Sport	88x80	426,565	1946,27	"
214D/A	850 Murb. in	62.5x69	"	"	" " "	236A	2000 Sport (RS)	" " "	" " "	" " "	"
214D/B	850 TC SS	62.5x69	"	"	" " "	236B	2000 4 valvole	" " "	" " "	" " "	"
214D/C	850 Murb. Corsa	62.5x66	"	"	" " "	236C	2000 Moncalbero	" " "	" " "	" " "	"
214D/D	850 TC Murb. Corsa MO	62.5x69	"	"	" " "	236D	2000 Sport 4 val.	89x80	497,698	1990,75	"
214D/E	850 TC Corsa	62.5x69	"	"	" " "	236S	2000 Abarth-Simca	88x80	426,548	1946,27	"
214D/G	850 TCR	65x63.5	211,707	846,83	" 600 FIAT	237	1300 OT	86x55.5	223,888	1289,55	"
215	750 Sestriere	61x64	183,04	748,16	" " "	237A	1300 Moncalbero	" " "	" " "	" " "	"
216	2200 Spyder-Coupe	73.5	360,05	2160,54	" 2100 FIAT	237B	1300 valvole radde	" " "	" " "	" " "	"
216A	" Berlina	79x73.5	"	"	" " "	237C	1300 4 valvole	" " "	" " "	" " "	"
217	833 Scorpione	62x69	208,317	833,272	" 600 FIAT	237D	1300 4 valv. inctoc	" " "	" " "	" " "	"
219	750 Berlina	61x64	183,04	748,16	" " "	238	2000 8 V a 90°	78x52	248,478	1987,81	"
219A	750 "	61x64	"	"	" " "	240	6000 12 V a 120°	92x75	597,57	5982,84	"
219B	750 " MM	61x64	"	"	" " "	245	3000 8 V a 90°	88x61	371,008	2963,06	"
						250	2000 4 valvole	96x69	499,184	1996,74	"

This is not two engines put together, but was originally designed like this for 2000cc. However, in 1967 the liners were enlarged to 3000cc. The Abarth 4OHC engine develops 395 HP now. Combined with the Abarth chassis and drivers Shetty, Ortner and Merzario it has put down the best 3 liter cars of Alfa and Porsche. Remember, all Abarth parts are of the finest quality available in Italy. The same caliber machinists and designers who work for Ferrari and Alfa work for Abarth & Co. Pictures like the one below of Merzario leading the best Porsche and Alfa 3 liters prove these statements and then some.



Below, at Imola 500KM, Merzario (an Abarth discovery) leads Europe's finest 3 liter cars with a two year old 3 liter Abarth! The course is dry and full of old pros like De Adamich (Alfa 33-3 liter), Giunti (Alfa 33-3 liter), Galli (Alfa 33-3 liter), Ahrens (Porsche 908-3 liter), R. Lins (Porsche 908-3 liter), V. Elford and Hans Hermann (Porsche 908-3 liter), Dechent and Koch (Porsche 908-3 liter), Gardner (Lola T-70). In the under 2 liter competition, Lennep and Hezemans drove Fiat Abarth 2000's.

They qualified a full three seconds faster than a swarm of Porsche 907's, 910's, 906's, Alfa 33's Chevrons and Dinos. The 3 liter Abarth had to retire when the tread peeled off the tires. Ickx was first in the 5 liter Mirage, 2nd overall was an Alfa 33-3 liter, 3rd overall was the Fiat Abarth 2 liter of Hezemans, and 4th overall was the other factory entered Fiat Abarth 2000 of Van Lennep and Ortner. The other Abarth cars entered were two private entry 2000's that finished 8th and 9th overall.





CRAIG FISHER IN THE NUMBER 77 FIREBIRD MADE A HOME FOR THIS CAR IN TRANS AM RACING. TOP RIGHT, HE CO-DROVE IN BOTH ROGER PENSKE CAMAROS AT SEBRING IN 1969. THE CAR HE SHARED WITH MARK DONOHUE FINISHED THIRD OVERALL AND FIRST IN SEDANS..

8 FIAT FUN REASONS TO GO RACING

By CRAIG FISHER

Ed. Note: Craig Fisher is without doubt one of the most versatile and talented sportscar drivers. Although he enjoys driving big cars, he likes the close competition found in the small car classes. In this article, he describes his impressions of driving a racified Fiat 850 Spyder. We at FAZA feel fortunate to be associated with such an outstanding sportsman and gentleman.

SEAT, WHEEL AND MIRROR POSITION MENTIONED BY CRAIG. THE CORRECT POSITIONING OF THESE ITEMS ALLOW THE DRIVER TO CONCENTRATE ON HIS NUMBER ONE TASK—THAT OF DRIVING.



In early 1969, when Al first suggested the idea of racing for him in SCCA National racing, our discussions centered mainly around the Abarth 1300 Sports-racer. The idea was that I was to run this car in the Northeast division and qualify it for the Run-offs in Daytona. At the same time, in that I was at the track anyway, I could run the Fiat 850 Spyder and now and then the Abarth 1000 Corsa Sedan.

Well, as the old quote goes—"The best laid plans of mice and men, oftimes go awry—" and they did, so what started out as a season of Sportracer racing quickly sublimed into Fiat 850 racing, with a smattering of Abarth 1000 Corsa for good luck.

I must say that I approached my first race with mixed feelings. The car I was to drive was one that was on loan to FAZA from Fiat Roosevelt. It was untried and obviously had been prepared in a rush, so the fact that my first race ended with the carburetor linkage falling off was really no surprise at all.

One of the first rules in racing is to arrive at the track in a well organized state. This includes having all necessary licences, room reservations if necessary, a proper race entry submitted on time and paid for, and a car that is ready to pass pre race tech inspection with flying colors.

Due to the fact that I had been unable to be in Brewster beforehand for a fitting, I was now paying the full price in that the car was very uncomfortable for me to sit in. I am an even six feet tall and trying to coil that long frame into the Fiat was almost torture. We adjusted the Abarth racing seat in width and distance from the Abarth steering wheel and foot pedals as best we could and entered the car in the tech inspection line, which by now was approaching the proportions of a lineup for a Washington's Birthday Sale.

I try to have the car adjusted in such a way that I have full use of the pedals without my knees interfering with the steering wheel, gearshift mechanism or framework of the car, and at the same time try to maintain a slightly "bent-arm" position of the arms without either forcing myself into an unnatural position in the seat or having to "reach" out from the seat which would pull ones sholders away from the important support of the seat-back. This "bent-arm" position of the hands on the steering wheel and the ease with which ones gearshifting hand can fall onto the gearshift are very important.

Presuming that the car is perfect, it is the driver that wins or loses a race. The driver wins or loses against other drivers by going faster than his competitors. He goes faster for three reasons: (1). The controls of the car are situated in such a way that use of the controls does not have to be thought about. A gearshift

lever becomes a natural extension of the hand etc. If you have to reach to odd places for things, then you have just one more thing to distract you from the race track. Simply this can be classified as preparation. (2) The driver who can analyze the course as to what the quickest route around should be, is also a winner. A novice can have the natural ability to "see" the quickest way around a track, whereas someone who has been at it for ten years could spend five hours going around the track and still not "learn it". For people like myself, I depend on experience to let me be like that lucky novice and protect me from our fictional ten year veteran. This premise presumes that as our car is perfectly prepared we can all handle the car's controls with the same dexterity. Simply, this can be classified as "driver ability". (3) This point has to cover the "state of courage" for want of a better expression. Early in one's racing endeavours, courage can be a dangerous thing, whereas when one is accomplished and vying for top honors—courage is about what it comes down to. Many drivers can go faster and don't know it, just because their threshold of "common sense" is at a different level from someone else's. Some drivers go too fast for their capabilities. This is an example of the "common sense" level being above the "ability level" or "preparation level". When I take students thru a driver school, I try to stress car preparation (safety) and the important fact that when learning a race course it is far better to go relatively slow and with great technical accuracy, than to put in a good lap time and be all over the place on the track or abusing the car in reaching this result. I always say that "speed" will come by itself if the other factors are adhered to. Of course, with any of these glib rules there are exceptions, so I hope that anything I say will be taken as suggestion and not as a guaranteed plan of "how to beat Mario Andretti".

Getting back to the Fiat, or any other car for that matter, before I go out to practice I make sure that I am comfortable with the seat-belt and safety shoulder harness "tightened-up" and that the mirrors are correctly positioned. I always adjust the mirrors so that the left hand mirror and the center or right hand mirror cover the whole panorama behind me with very little or no overlap. Depending on the region, one can be practising with anything from Subarus to Scarabs, so if you plan on being passed a lot you can emphasize the passing areas on both sides of the car when you adjust the mirrors. It is very seldom that someone drives right over your rear deck lid, so although it may give a picturesque view, a center rear view is of very little importance. If you are warming up the car on the race track, it is common courtesy to stay out of the way of the other competitors, and it's a lot safer.

I always take the first few laps to warm up the transmission and rear end (the engine is usually warmed up in the paddock area on warm-up plugs) and at the same time I try to make mental notes of any new changes in the course. This can run anywhere from a patch of oil with cement powder on it to missing pieces of track surface, or debris on the track. The next few laps are spent relearning the track and finally with trying to put in a good lap time. This sometimes bares faults in the car which did not appear when the car was going more slowly. I then pull into the pits and try to remedy any problems in the car, or sometimes a change in tire pressure is called for. Changes in suspension or tire changes are best left to the time available between practice sessions. There is one rule that I try to stick to however; I don't like changing anything on the car that is untried, just before the race. I don't change oil or filter or plugs or ignition timing, in short, race time is no time to do experimenting. This does not mean, of course, that if you discover something wrong with the car that you should not remedy it.



If you are learning a new race track, it is a good idea to talk to someone who has raced there before. The other competitors are usually most glad to tell you of any pitfalls or sometimes "secrets" that could take you many sessions to find out on your own. Another method is to follow someone who seems to be doing a good job of driving out there. The usual method is to analyze the track yourself and follow what you think is the quickest route. Following other people will come naturally and you will learn the track quickly. Incidentally, the quickest way around the course is not necessarily the technically correct one. With the smaller, lower powered cars, the path of least friction is the quickest. In other words when you go into a corner, a good line for a large car is not necessarily the best route for the small car. You want to avoid scrubbing off power and speed by cornering too sharply, or driving into a corner at excessive speed and then overbraking you will find that there is no power to spare and that analyzing the course to a point, you will find that there are several choices for each corner. In the final touches of driving most cars, you will find that what amounts to gimmickry is the secret. I am talking of production cars all the time, not formula cars.

The cars are gridded for the start of the race in order of

their qualifying times. Other than the fact that the car should be race ready, it's hard to make any constructive comments. Depending on your personal health and habits, I usually try to avoid eating before a race, but this is true of any sport. If there are other races before mine, I try to watch them, and in so doing see how the starter starts the race (not all starters start the same way) and if anything unusual happens to the track surface during the race. Most race tracks make all the cars shut off their engines on the grid. As the Fiat runs cool, I try to keep it running as long as possible before the race. The starter walks across the track and signals everyone to start his engine, and then walks slowly back to the starters box, all the time watching for someone to raise his hands in the air, signifying that something is wrong that stops him from starting the race. Presuming that everything is OK (and this is where if you've got butterflies, they'll start chasing each other) the starter raises the flag, and depending on how well you have learned his style this is where you can anticipate him by a few hundredths of a second and presumably gain a

few feet on the next guy. But remember everybody is thinking the same way.

The start and the first corner are the most dangerous times of any race. Everyone wants to be in the corner first, and some in their excitement can stall on the grid; the rest go "hell bent for election" towards the first corner, jockeying for position, threatening for position, sometimes accidentally nudging for position, but mostly driving for position. Here is where you discover how well you learned the course and "your fellow competitors".

If it is at all possible, I go to the first corner with a minimum of braking, trying to let the car slow itself down. Fiat 850's tend to be oversteering cars if they are set up correctly and will readily scrub off enough speed in most corners so that it is really almost unnecessary in most instances to do any braking. The exception is of course a very tight corner or someone braking ahead of you. The start of the race (meaning the early laps) is when you stand to gain the most ground. The rest is either gained through other peoples unreliability in machine or driving technique. If the car is up to it, I try to go "flat out" from start to finish, driving right into corners and using the brakes as little as possible. I even find myself holding back when trying to pass someone with superior

top speed, because with the Fiat's phenomenal cornering potential, I can charge the other person approaching a corner and perhaps be going five or more miles an hour quicker out of the corner. This enables me to gain just that little bit necessary to pass them at the end of the straight. This doesn't mean that I never use the brakes. I most certainly do, and with the Fiat's disc brakes I am able to out-brake a lot of cars. Of course you only brake just enough to get ahead. If you over-brake then the other fellow can repass with superior power. Even with the relatively low speeds attainable with the Fiat (the Penske Chevrolet Camaro I co-



Here's Craig at the 1969 Daytona ARRC. Although our 850 Spyder was an alternate, and we knew we didn't have any chance of starting, we decided to go just to prove we could be one of the fastest cars. On the first day of practice, Craig set the fastest lap, a full second ahead of the next fastest car of Randy Canfield. We were on top of the world that day! It was the highpoint of two years racing with the Fiat 850 Spyder. At the time, we were still using the small 843cc engine, plus the practice was run in the dry!

1969 VIR National, left, Craig Fisher finished second in class.

Below, Craig is trying to avoid scrubbing off speed as he shows the fastest way around the course.



drove with Mark Donohue to a class win at the Sebring 12 hour race in 1969 is at least 100% faster), slip streaming can pay off.

I can remember dicing with a fellow in a Sprite and following him so closely down the straight that we were both going quicker. Finally I popped out past him approaching a corner and was able to pass him. He stayed behind me all the way around and then going down the straight did the same thing to me. We alternated a few times like this, but finally I outbarked him going into the upcoming corner so that his popping out from behind was of no benefit. After that I was able to lose him or perhaps

he just gave up. By the way, slipstreaming well done is possibly hard for a marshall to discern from blocking, for when you are being slipstreamed or "drafted" you try to take away the other person's gain by moving out of his way. He then receives the full brunt of the wind, unless he is really on the ball and zaps right in behind you. So, you can see that two cars playing this game and weaving down the straight trying to lose each other could look like blocking.

I think that considering the fact that we were down on power from many cars, and that ours was a physically smaller engine, we put up pretty good lap times. However, the new rules now allow the use of the larger 850 Sport engine. This engine has 903cc's, making it more than 60cc larger than our current 843cc engine. The only reason we failed to win was mainly due to lack of maintenance and missing a few races (apart from the power factor). We won the races held in the rain. This is where handling really pays off. National races outside of our division were not difficult to win, but in our Division we have most of the fastest cars in the country. I must say that I really enjoyed the car immensely, and had really intense and enjoyable races with the excellent competition that I experienced from the other competitors of the Northeast Division.

All hail Randy Canfield!

Tires by Prof. GOODLOPSTONE

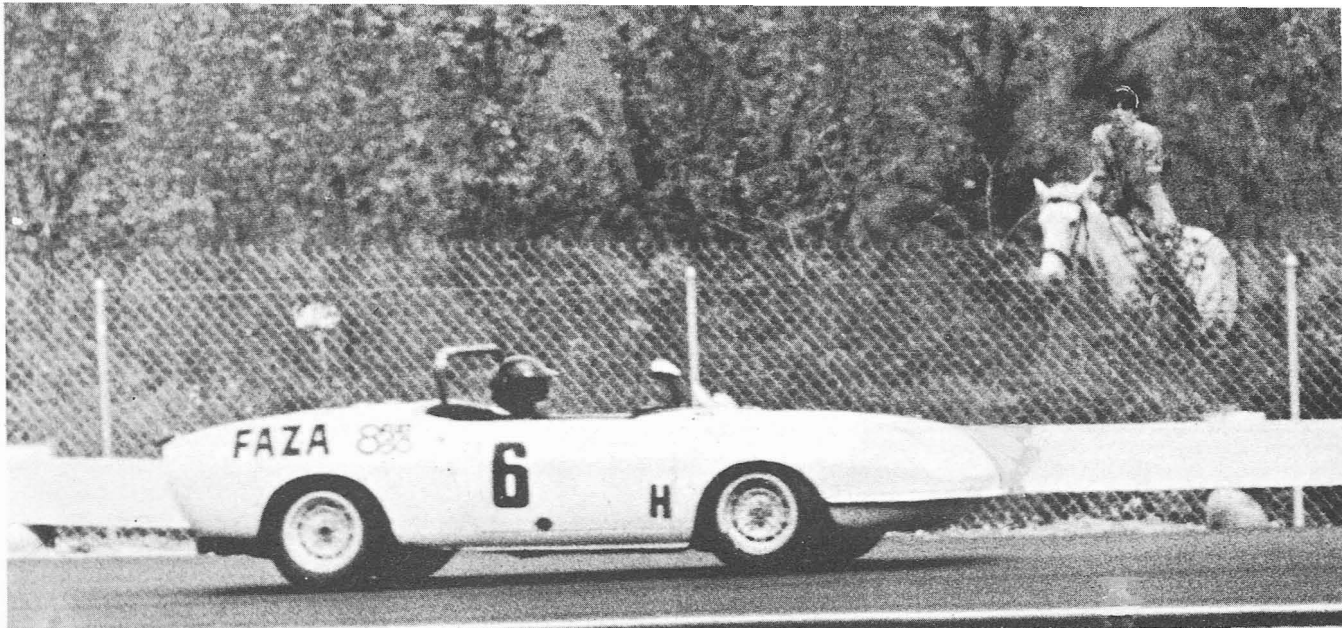
There are a few things to watch regarding tires. As these are an important investment in any car, but moreso with a small car (because a set lasts you so long) it is important to choose the correct tire for the proper occasion. Altho we ran on Goodyear in all our dry track races, it was more a matter of convenience than any thing else, for Firestone would have served us equally well, who knows, even better maybe. I run Firestone tires on my Trans/Am car and have enjoyed many years of friendly service from both companies.

We ran 4.50/750×13scs Speedways y-6 in the front, and the rear. Toward the end of the year we ran wider 4.75/850 rear tires to improve high speed cornering stability, but I think there are only a few tracks where these are applicable with our present power available.

The danger in over width tires is they will slow the car down and that they are slightly heavier. On the other hand they can give you an improvement in final gearing that can overcome the disadvantages. You can only find out for sure by trying them.

In rain racing we used Dunlop sizes 4.50×13 L all around. As I remember, we were unbeaten in the rain racing except for one mechanical failure at Mid Ohio. The other tire manufacturers make equally good tires. Some are better suited to special conditions varying anywhere from damp to flood conditions.

Tire pressure is another area that gives many people worries. With the low profile tires, as a rough rule, presuming that you have been practising at the recommended pressures, you increase pressure to promote sliding (as this tends to give the tire a crown in the center, therefore decreasing the "tire-patch") and decrease



pressure to decrease slidability. Over underinflation can of course make the tire slide worse. Al ran our dry tires pressure at 19 front and 21 rear on warm days, cold days 2 to 3 lbs more. I tend to use about 4 psi more, especially in the 1000 Corsa Sedan. To a certain extent you can change the apparent handling characteristics of the car just by altering the front to rear pressure ratio. The ideal way to go about it is to have your own tire pyrometer and take readings on the tire tread temperature. Temperature can tell about overinflation, underinflation and even suspension geometry and suspension set-up. We never had the time to get into this, but if you are out for the best, this is the way to do it. Results cost time and money.

CRAIG FISHER

Above, Craig is shown at the inaugural (1969) National race at the new Shelby County Raceway in Memphis, Tenn. He held the pole position and led all 19 cars in his class from start to finish. He then climbed out of the 850 Spyder into our Fiat Abarth 1000 Corsa Sedan, and finished first overall in the C & D Sedan race, shaking up the Mini Cooper 1300's and Alfa GTA Juniors in the process.

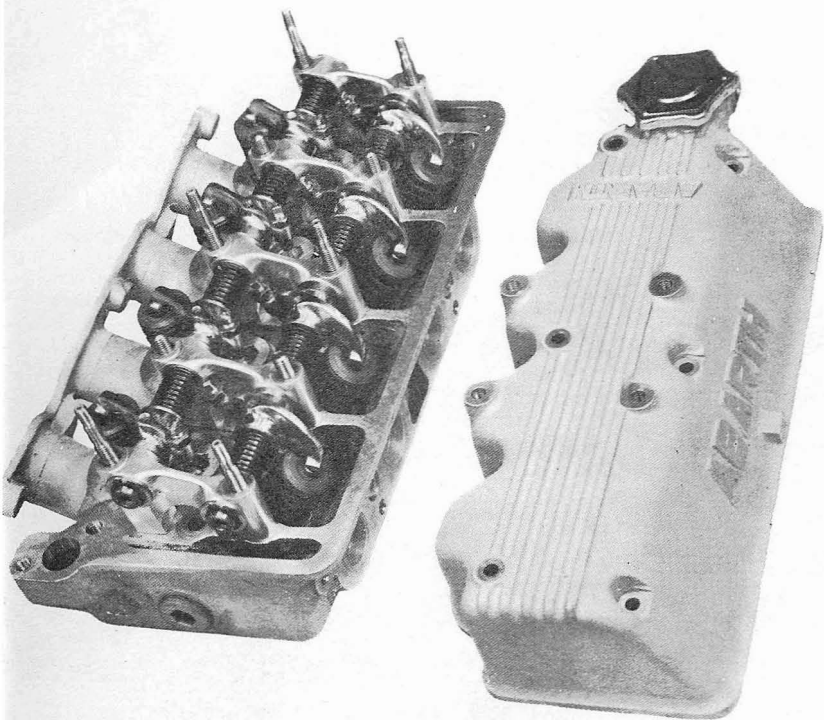
Below, at the 1969 Mid Ohio National (in the rain), Craig had a 21 second lead on the fastest H Production cars in the country when beset by mechanical difficulties, as described elsewhere. This was a combined race for H Production and D/Sports Racing.



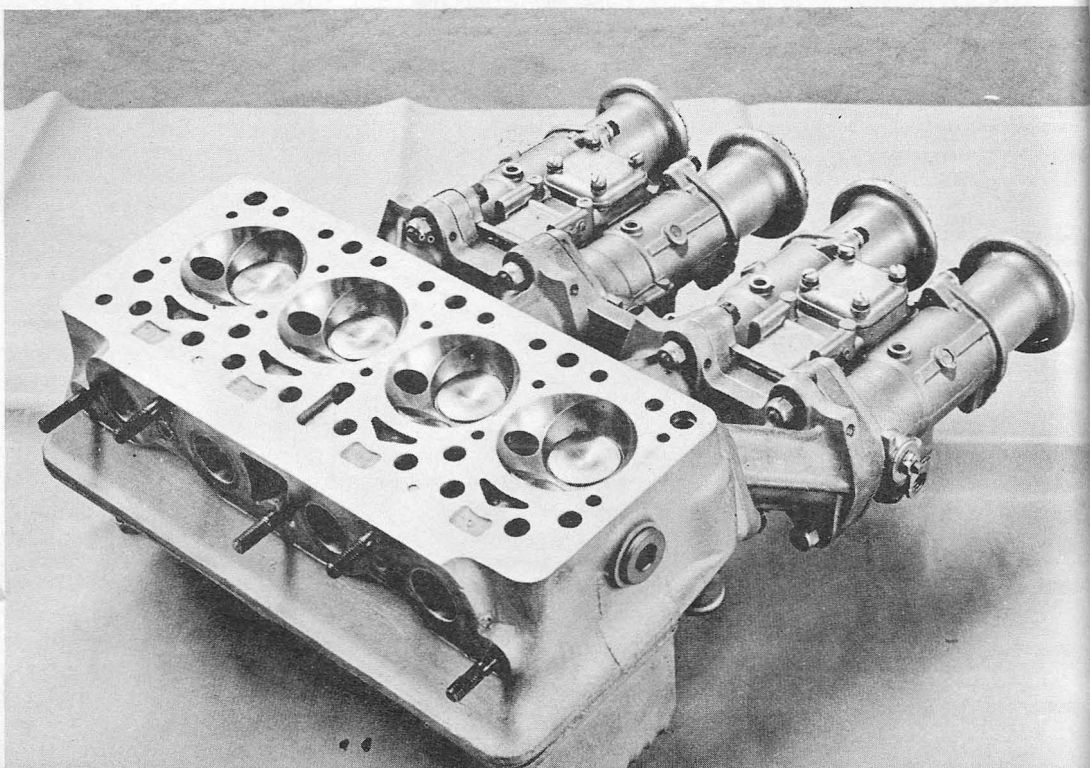
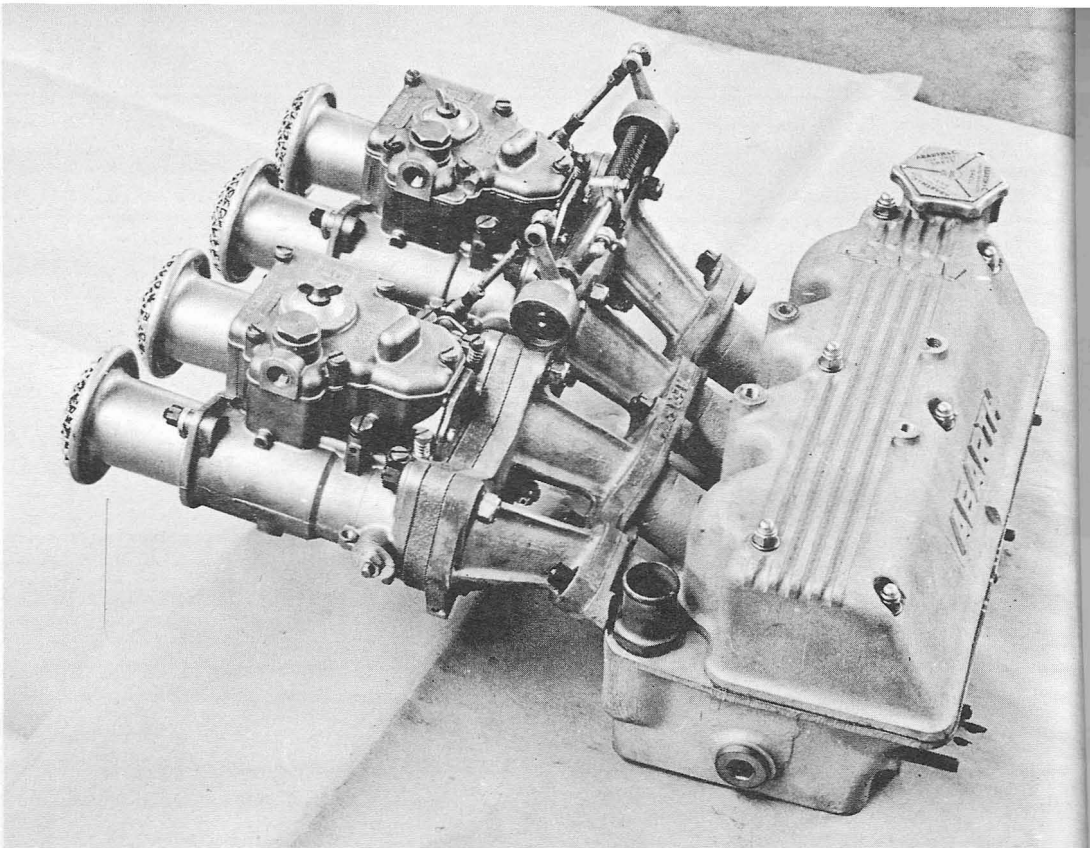
FIAT 850 ENGINE POWER FOR S.C.C.A.—D SPORTS

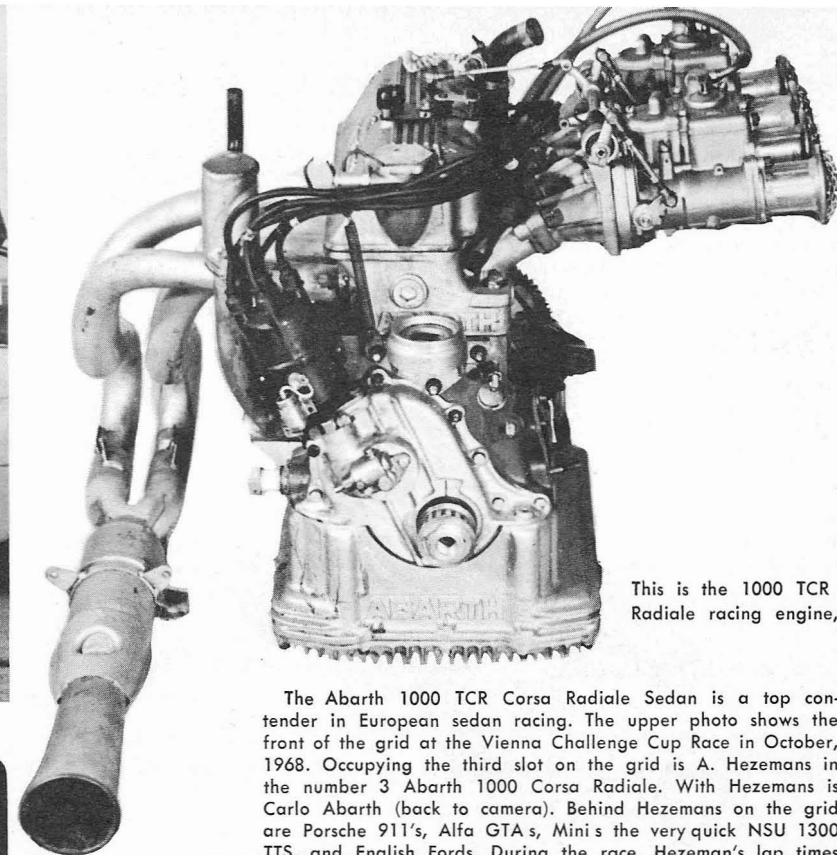
As you probably know, this engine can also be used in S.C.C.A. sports racing class D category. There are many carburetion and cylinder head combinations available to boost the H.P. of this engine up to 100 H.P. The full competition Fiat Abarth 850 Group 5 racing engine develops over 105.H.P. S.A.E. with the Radiale cylinder head (Bore and stroke 65MM×63.8MM). Two dual throat 40MM Weber side draft carburetors feed the cross flow head of the Radiale. The basic Fiat 850 engine with its standard 30MM dual throat Weber carburetor is under carbureted. The rules in S.C.C.A. say you can use any cylinder head, carburetor, crankshaft, block, even dry sump components to power your 850 Fiat engine. Abarth has all kinds of combinations—DOHC, PUSH-ROD and HEMI for your 850 engine. See our master catalog for full details prices of these competition parts.

FIAT ABARTH TCR RADIALE RACING ENGINE



There are quite a few Abarth 1000 Radiale engines in the U.S. The owners of these engines are constantly telling us about the amazed reaction on the part of speed shop mechanics when they see the working parts of these engines. The high degree of quality and workmanship exhibited by them is virtually unknown in most other engines. The camshaft, crankshaft, and connecting rods are all made of forged steel. All internal areas of the block are carefully polished. All moving parts are balanced. The Radiale racing engine develops 127 reliable, steady horsepower from 982cc. It is this type of devotion to perfection that has enabled Abarth cars to dominate their respective racing classes for many years.





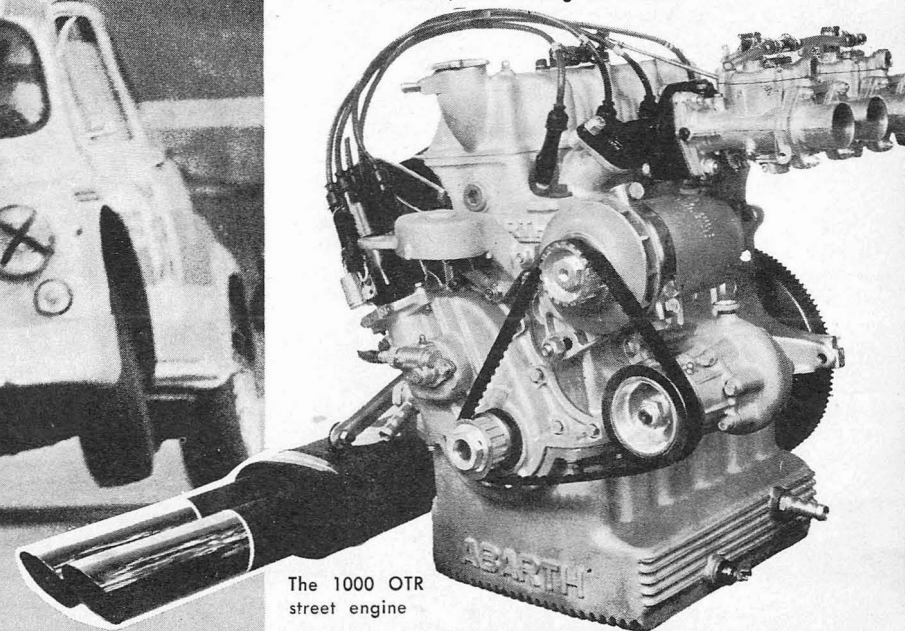
This is the 1000 TCR
Radiale racing engine,

Akrobaten von Thruxton

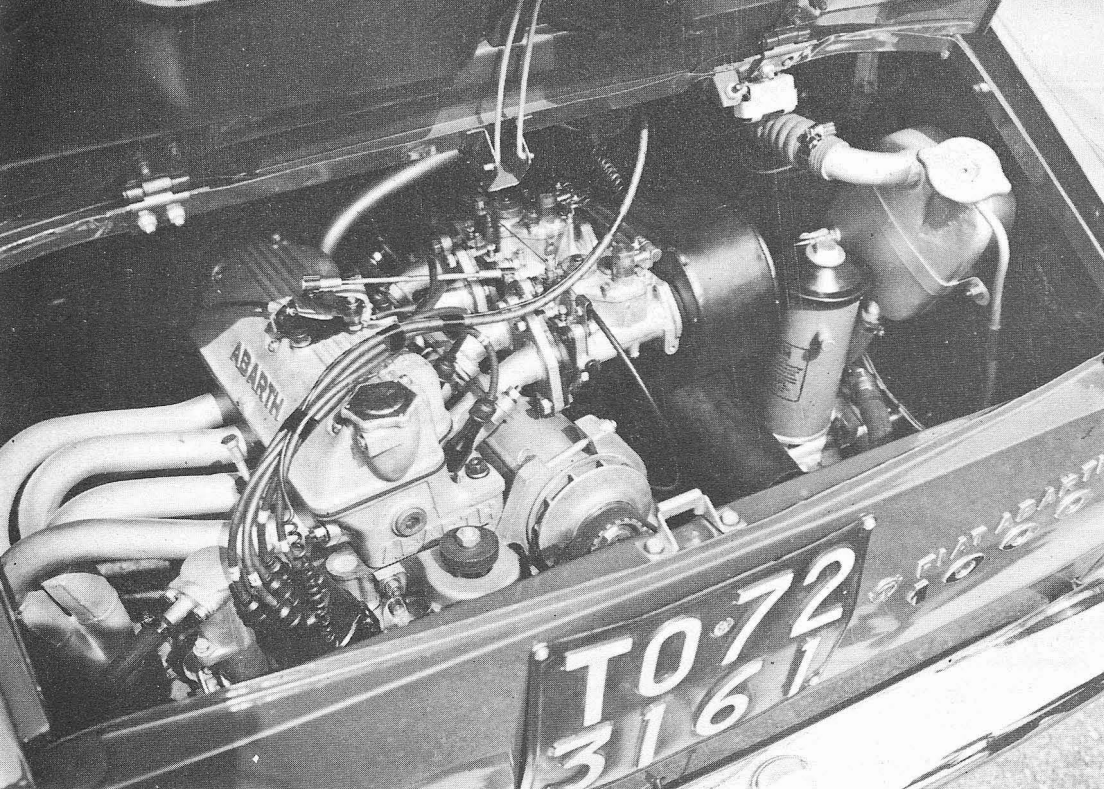


The Abarth 1000 TCR Corsa Radiale Sedan is a top contender in European sedan racing. The upper photo shows the front of the grid at the Vienna Challenge Cup Race in October, 1968. Occupying the third slot on the grid is A. Hezemans in the number 3 Abarth 1000 Corsa Radiale. With Hezemans is Carlo Abarth (back to camera). Behind Hezemans on the grid are Porsche 911's, Alfa GTA's, Mini's the very quick NSU 1300 TTS, and English Fords. During the race, Hezemans' lap times matched the faster two liter sedans.

The lower photo shows two Abarth 1000 Corsa Radiale Sedans in action at the Thruxton, England Challenge Cup Race. In the number 34 (lead) car is E. Swart, two time winner of the European Challenge Cup (1965 & 1968). Right on Swart's tail is Arturo Merzario, now driving for Ferrari.

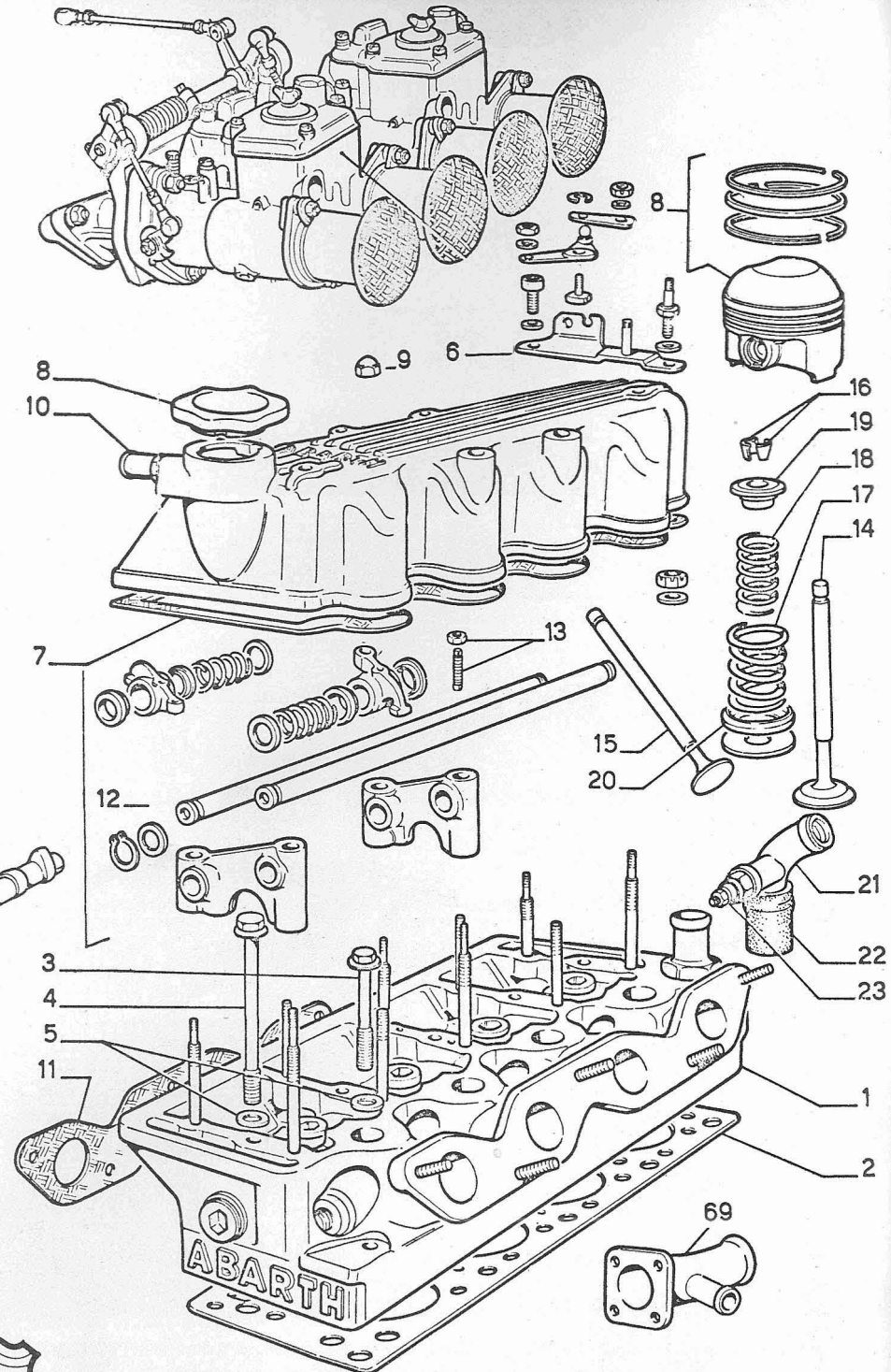
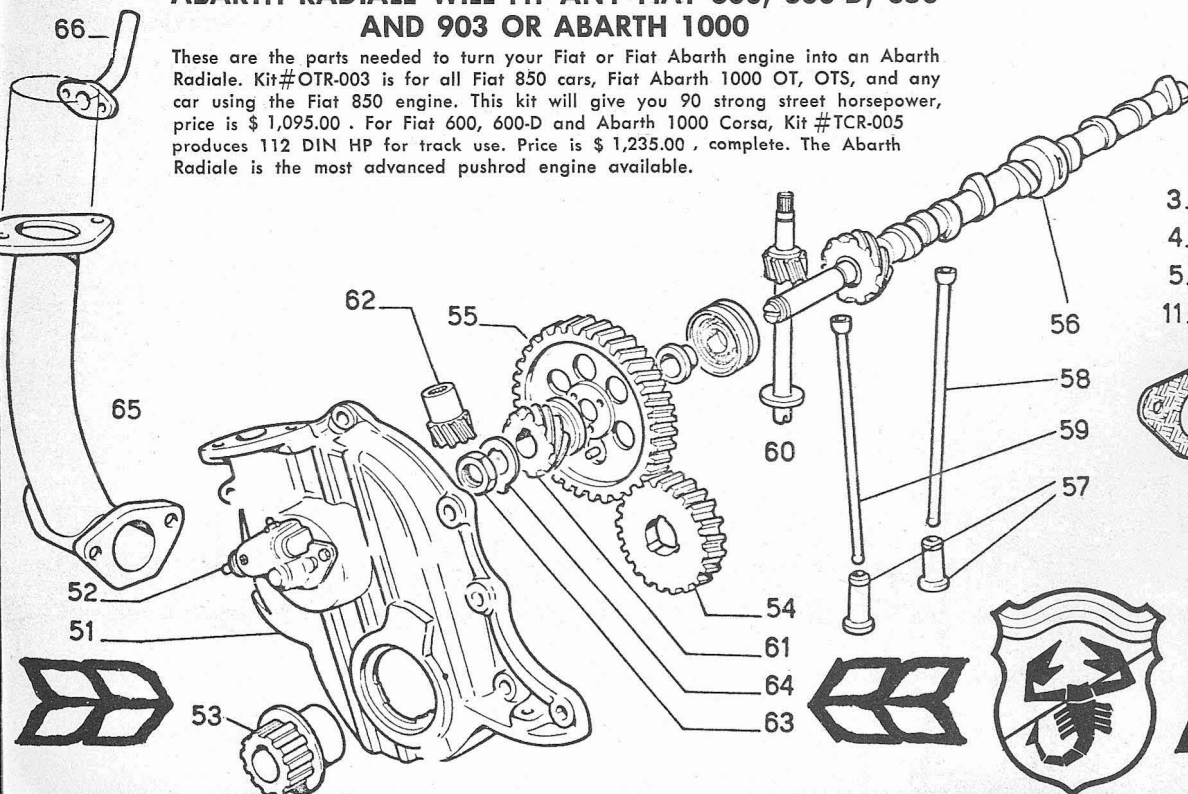


The 1000 OTR
street engine



ABARTH RADIALE WILL FIT ANY FIAT 600, 600-D, 850 AND 903 OR ABARTH 1000

These are the parts needed to turn your Fiat or Fiat Abarth engine into an Abarth Radiale. Kit #OTR-003 is for all Fiat 850 cars, Fiat Abarth 1000 OT, OTS, and any car using the Fiat 850 engine. This kit will give you 90 strong street horsepower, price is \$ 1,095.00 . For Fiat 600, 600-D and Abarth 1000 Corsa, Kit #TCR-005 produces 112 DIN HP for track use. Price is \$ 1,235.00 , complete. The Abarth Radiale is the most advanced pushrod engine available.



ABARTH

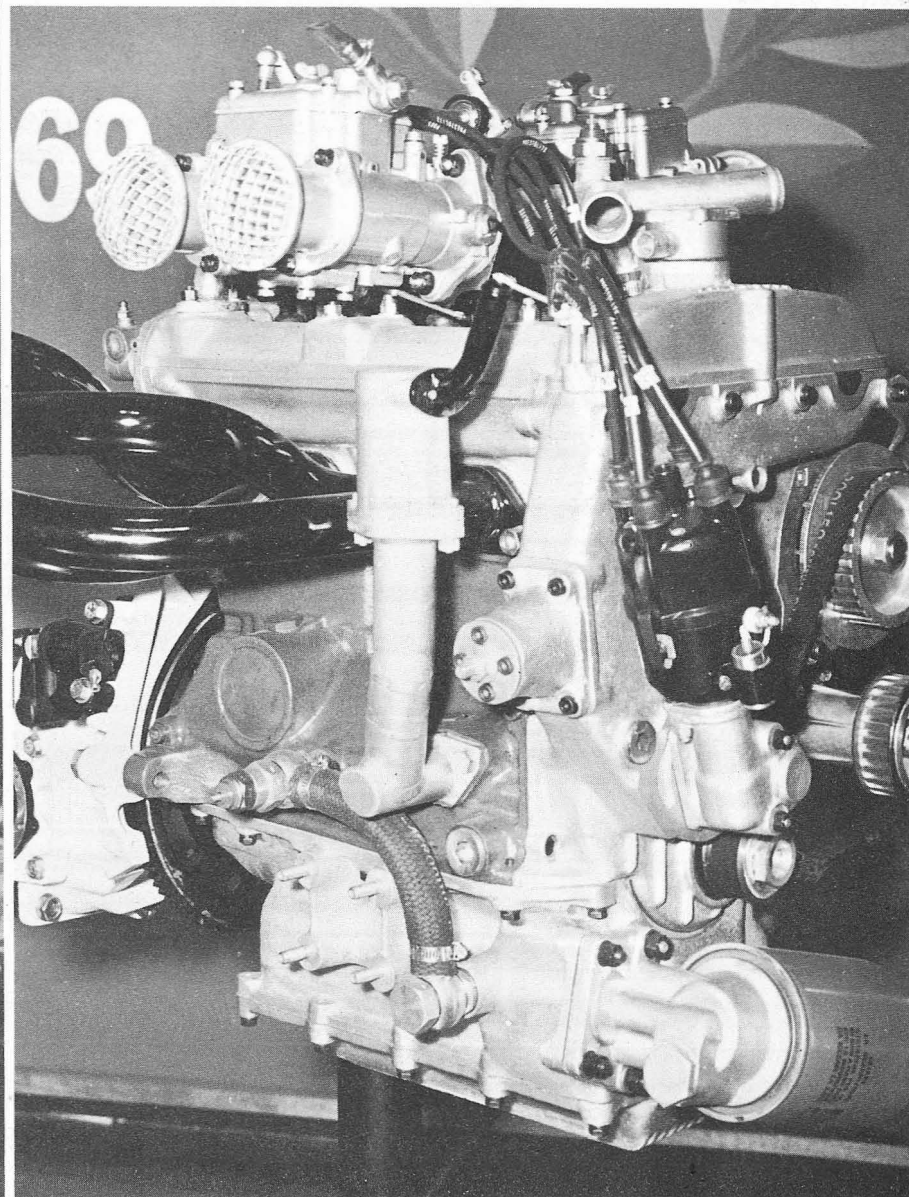
1969

FIAT ABARTH

oltre 815 vittorie
assolute o di
classe



The 1970 Torino Race Car Show. Abarth's latest Sports Racing engine, the 1000 DOHC producing 120 HP (DIN) @ 8200 RPM. The caption inside the wreath (background) notes that in 1969, Abarth won over 815 absolute and class victories. During the racing season two of Abarth's secretaries do nothing but record race victories. They maintain a complete library of record books, papers, and clippings concerning Fiat Abarth victories. Victories are recorded at Abarth & Co. only when official results are received. It is doubtful that any other manufacturer can match the victories recorded by Fiat Abarth automobiles each year.

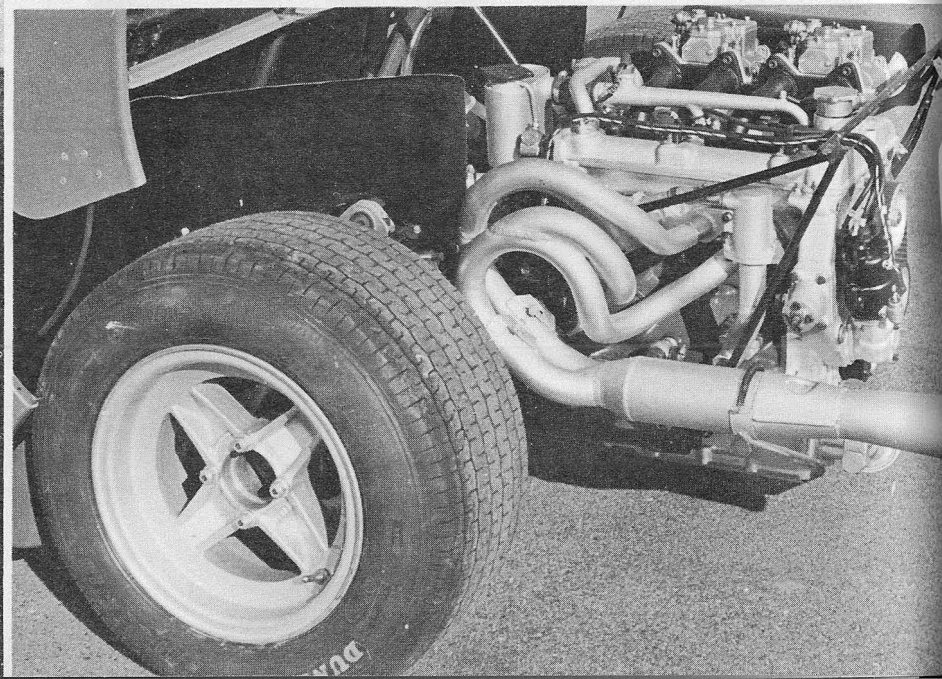
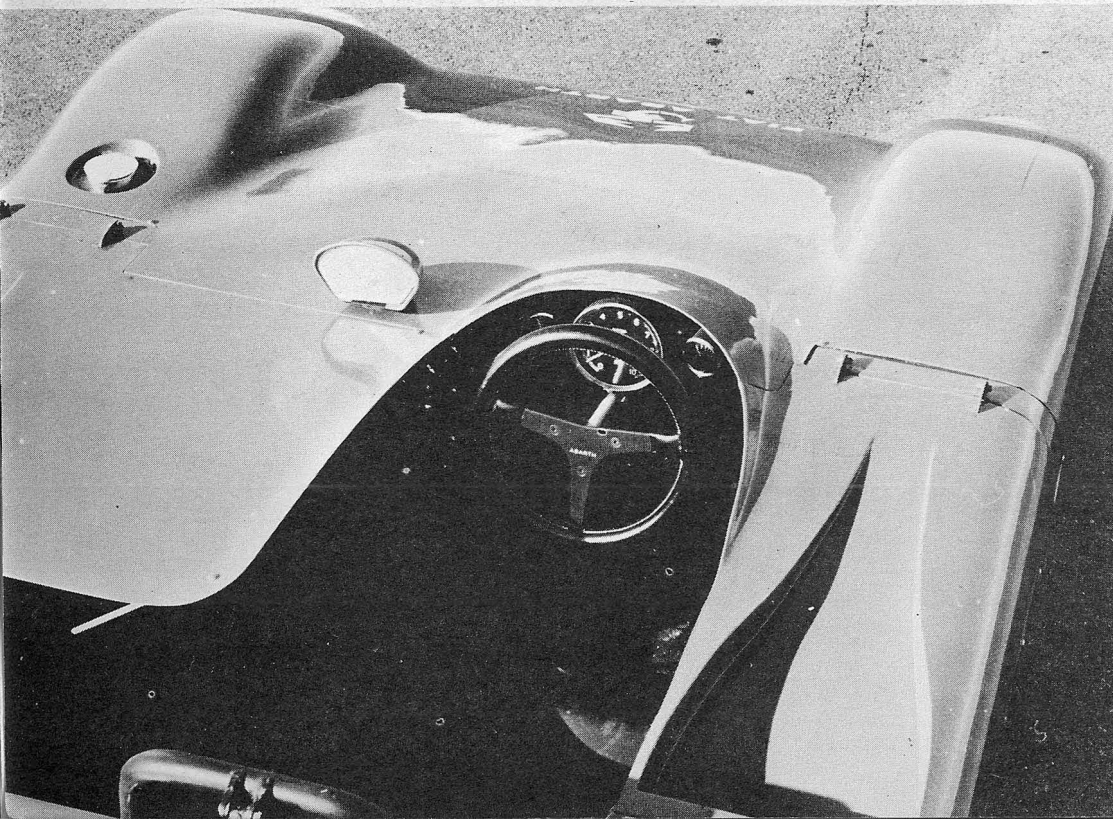


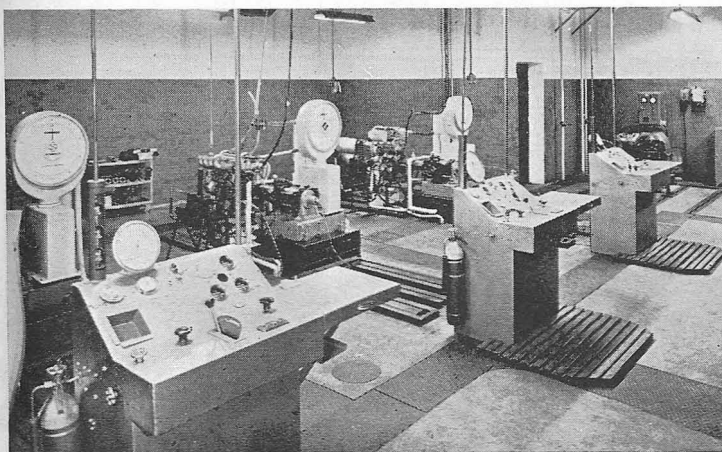


Abarth's latest masterpiece is this 850 DOHC sports racing engine, also produced in a 1000cc version. The 850cc engine develops 104 HP (DIN) @ 8200 RPM, while the 1000cc pumps out 120 DIN horsepower at the same engine speed. A dry sump lubrication system is used for this engine. Bore and stroke of the 850 engine is 65x63.8MM. Transmission is an Abarth 5 speed, using a Fiat 850 case. This engine is mounted in a new sports racer body and chassis

which is very similar to those of the two and three liter sports racers. This engine is mounted behind the axle. This may sound strange in a period when the prevailing practice is to mount the engine ahead of the axle, but remember that the Abarth 2000 Sports Racer, with same engine location, continues to defeat all comers for years in the two liter category, plus many larger cars. The chassis is of tubular construction. The body, wheels, seat, pedals and steering wheel were designed and manufactured by Abarth as is almost 99% of the entire car. The wheels are of a new Abarth design and are 10 inches wide front and rear. Disc brakes on all four wheels are the same as those used on the two liter sports racer. There are two oil coolers, one on top of each rear wheel well.

These beautiful sports racing machines represent the combined efforts of Carlo Abarth and Ing. Colucci. Price is \$8,000. F.O.B. Torino, Italy.



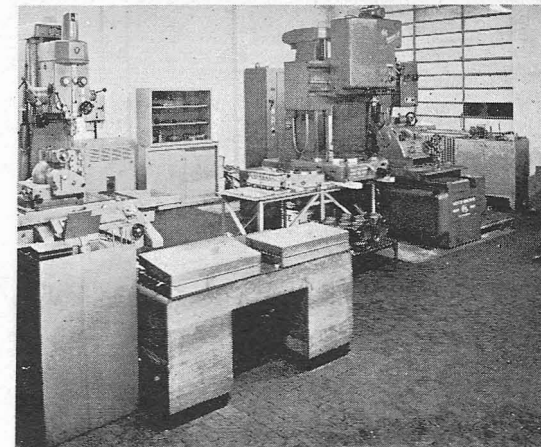


ABARTH TORINO

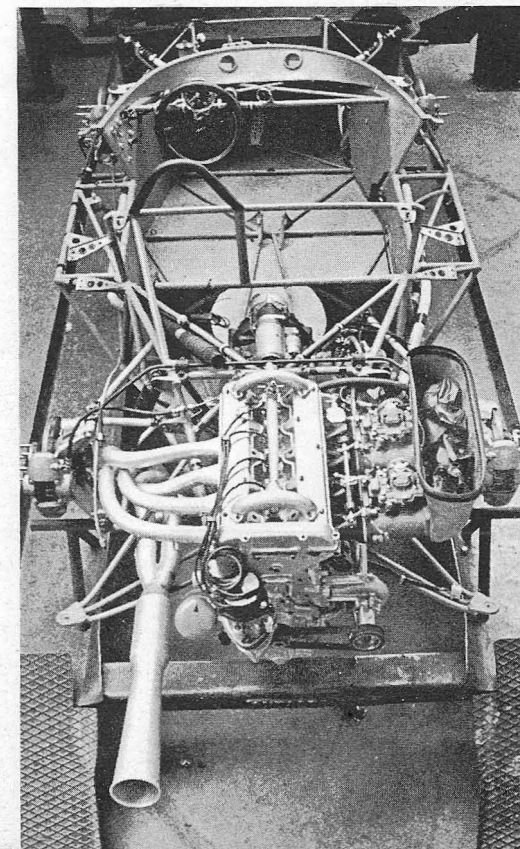
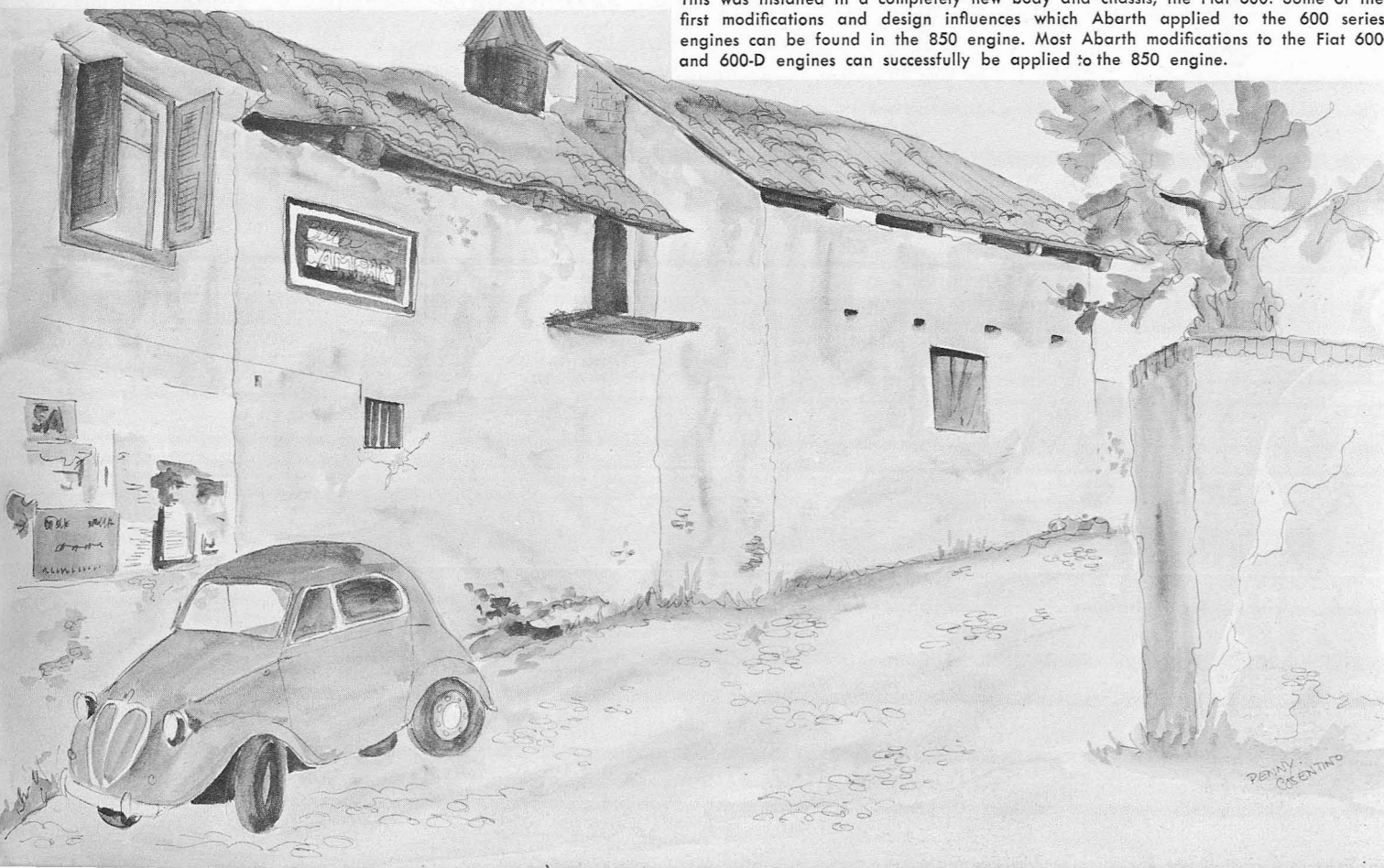
Bear in mind that our preparation of the Fiat 850 is far from experimenting. We are working with almost the same engine as the Fiat Abarth 1000 Corsa, which we have raced to more victories in Sedans than any other single car in S.C.C.A.! As a result, the preparation of this engine is nothing new to us. We have had the benefit of the fabulous world of technical advice, parts resources, and development work made available to us by Abarth & Co. of Torino, Italy. I make a point of being the number one Abarth representative outside of Italy. Of all the Abarth representatives, I doubt that any spend more time at the factory than I do. My time at the factory is spent examining the latest developments in both street and competition cars and parts, conversing with the engineers, workers, drivers and crew members and learning more about how the specific competition requirements of the 850 can be satisfied. Of course, there are a few differences between the 600 series and the 850 series engines, such as the shallower combustion chambers of the 850. However, any new development we have done on this engine has been because of the S.C.C.A. rules, which do not permit the use of certain Abarth parts.

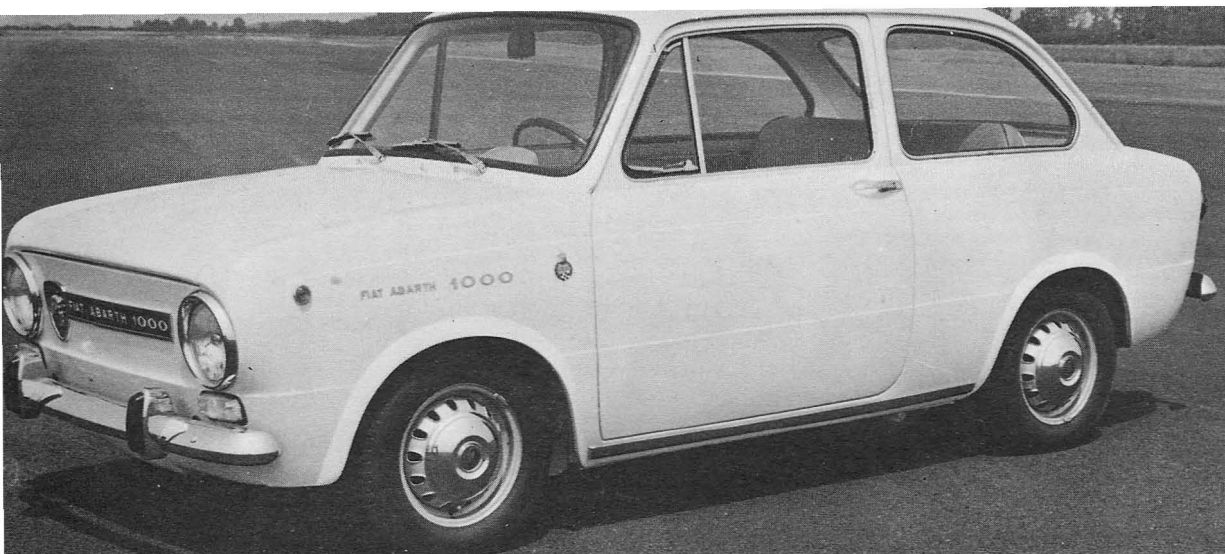
The Fiat 850 engine is the third version of the Fiat 600 engine to be produced by Fiat since Abarth & Co. began working with it in 1955. The first two versions, Fiat 600 and 600-D, had different cylinder heads and blocks, but could be interchanged. The Fiat 600 engine was originated in 1936 and originally was a 500cc four cylinder in line engine with valves in the block! This 500cc engine was used in a Fiat front engine car called the Topolino. (Photo & Drawing) Abarth came on the scene in late 1955 when the engine was produced in a new 633cc ohv version. This was installed in a completely new body and chassis, the Fiat 600. Some of the first modifications and design influences which Abarth applied to the 600 series engines can be found in the 850 engine. Most Abarth modifications to the Fiat 600 and 600-D engines can successfully be applied to the 850 engine.

This is one of the several dyno rooms at the Abarth factory. All engines for all cars produced by Abarth are dyno tested, regardless of whether they will ultimately be used for street or racing. Every completed Abarth automobile undergoes a complete inspection and is road tested before it is permitted to leave the factory.



Shown above is some of the modern equipment used at Abarth & Co. to manufacture the most complete line of race cars in the world. Each Abarth racing machine is hand crafted, the end product being the most beautiful competition cars available. A completed Abarth 2 liter sports racing chassis and engine (below) awaits its body and wheels.

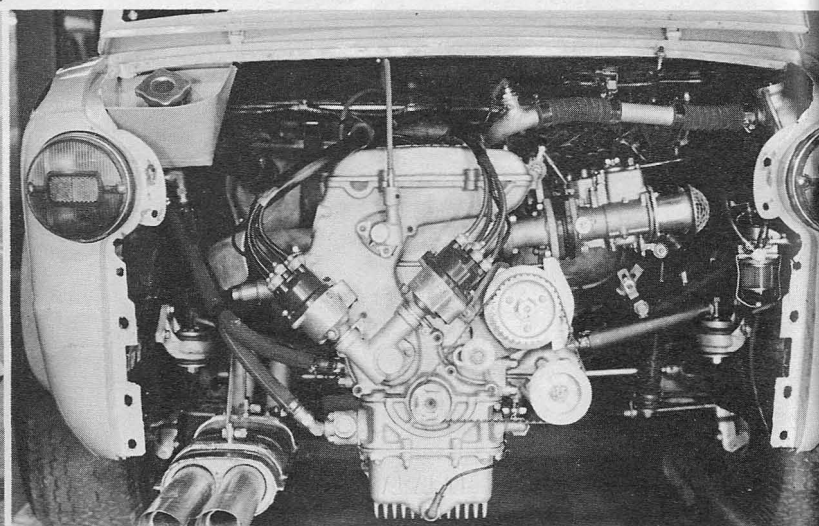




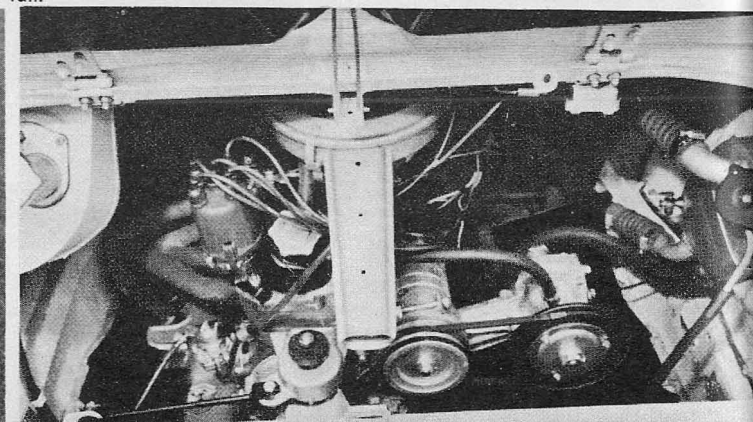
FIAT ABARTH

850
1000

At left is a Fiat Abarth 1000 OT, Sedan version. This car is also produced in 850cc form. Below, left, is an Abarth 1600-OT, built on a Fiat 850 Sedan chassis. Directly below is the engine compartment of this unique automobile. Producing 177 horsepower, it pushes the car to a top speed of 140 MPH. All 850 Sedan owners can benefit from the wide variety of Abarth parts available for their cars.



At bottom left are a Fiat Abarth 1000 OT Coupe & Spyder. Producing 72 horsepower, these cars give the Fiat 850 that extra push needed to qualify as 100 MPH automobiles. Shown below is the engine compartment of an Abarth 1000 OTS Coupe. The OTS is a hotter version of the 1000-OT and has a front mounted radiator and fan.



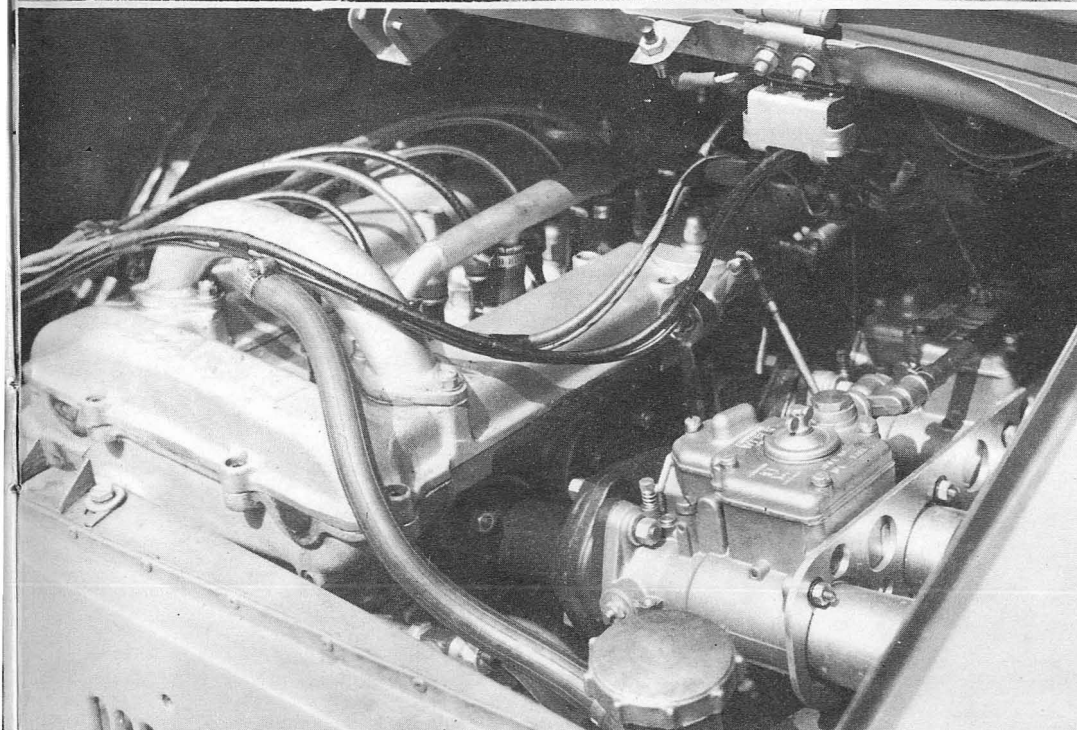
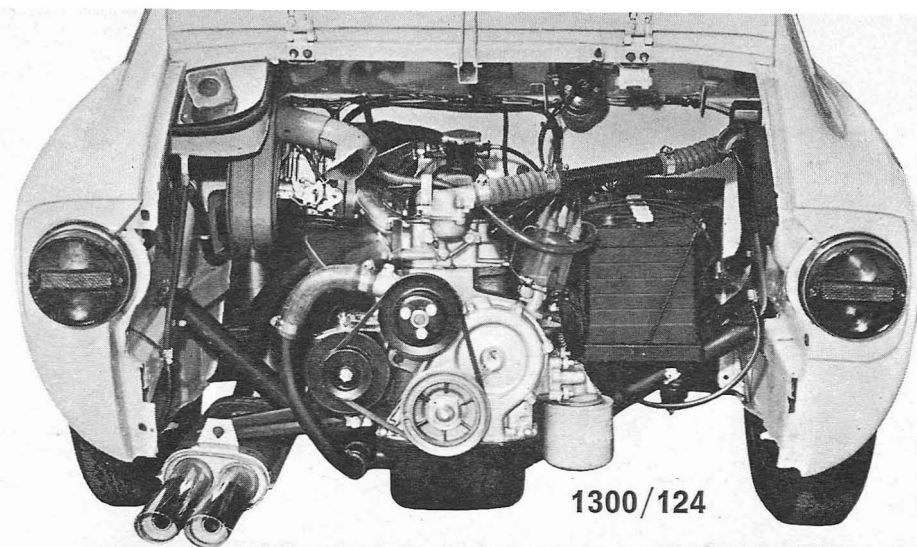


Photo above is the Abarth 2000-OT, which is based on the Fiat 850 Coupe. This hairy machine gets its urge from an all-Abarth 2 liter engine which produces 204 HP (DIN). The suspension has been extensively modified by Abarth to handle the greatly increased power, and keep the car stable all the way up to its top speed of 145 MPH.

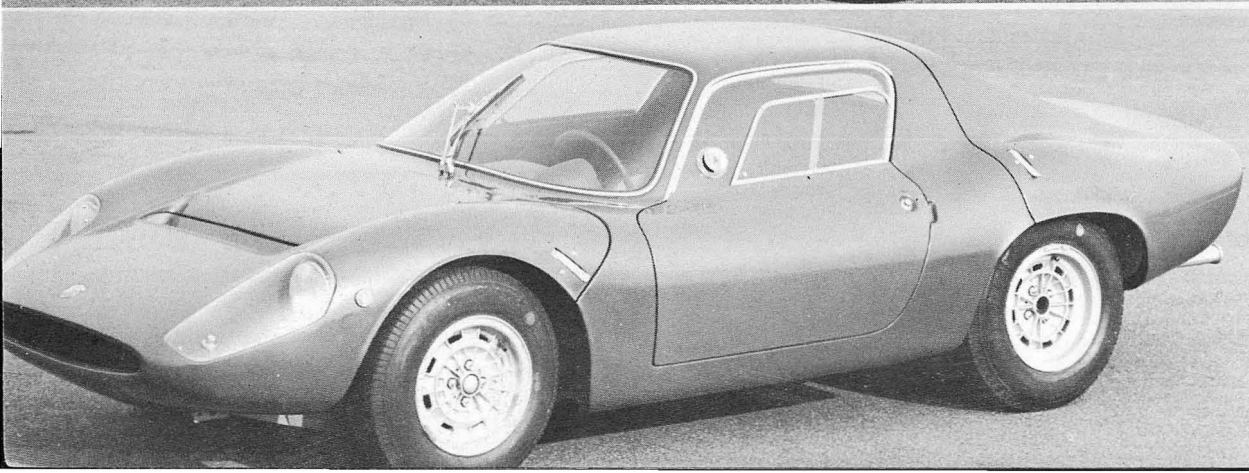
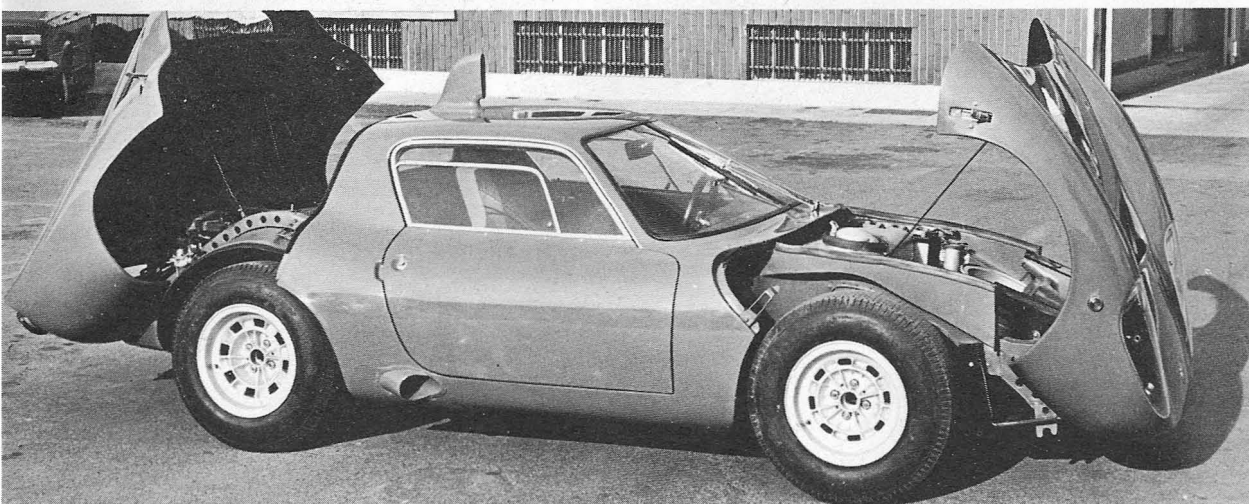
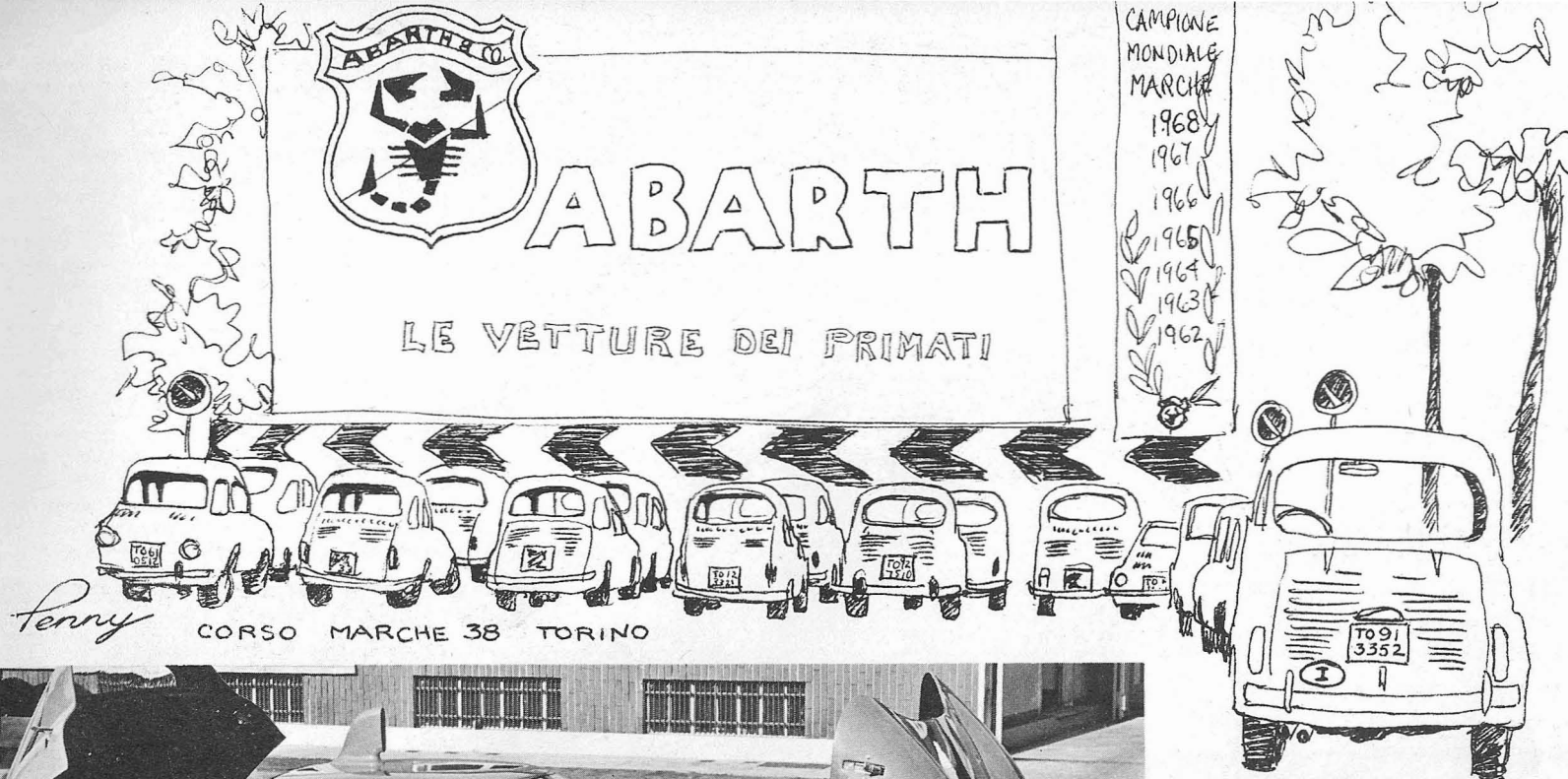


The Fiat Abarth 1300/124 is the baby brother of the 2000-OT. Using a mildly tuned 1300cc pushrod engine of 88 HP (SAE) it is a beautiful GT car for everyday use. The engine has extremely good torque at all speeds. As can be seen, the engine fits nicely in the 850 engine bay. The battery is mounted where the radiator originally was, and an Abarth front mounted radiator is used. The suspension has been reworked by Abarth.

The Fiat 850 in its various Abarth forms is probably the most raced production car ever built. These cars run the gamut from the Fiat Abarth 850 OT to Abarth two liter race cars. Over the years, these 850 based machines have won many World Manufacturers Championships for Abarth & Co. The Fiat Abarth 1300 OT was virtually unbeatable, and won the Division I World Championship each year until its class was dropped by the FIA. The latest Abarth road machine the Scorpione 1300, is built on the 850 chassis and uses the 850 transaxle. The new Abarth 1600 GT, currently based on the 600-D chassis, will probably use the 850 chassis when it goes into production toward the end of 1970.

The Fiat 850 also provides the nucleus for the Formula 8½ racing cars. This car utilizes the Fiat 850 Spyder engine and transaxle as well as many drive train components. Unlike the ugly crude formula Vee, this is a car which goes when you put your foot in it! This is an extremely popular race car in Italy, providing performance at a reasonable price.

The most popular street conversion of the Fiat 850 is the Abarth 1300/124. Using an Abarth modified 1280cc version of the Fiat 124 Sedan pushrod engine, this car not only has more horsepower, but also an amazing increase in flexibility & low speed torque. High performance versions of the 1438cc 124 special pushrod engine are also available for those who want still more horsepower. These conversions are available for all Fiat 850's including the Spyder.



At left is the Fiat Abarth 1300 OT, based on Fiat 850 chassis, winner of the Division I World Manufacturers Championship in 1966, 67, & 68. These cars ran away from everything in their class, plus a lot of bigger cars, in all types of competition from Nurburgring enduros to breath taking hillclimbs. Below is the Fiat Abarth 1600 Sports Racer driven by Leo Cella and Hans Hermann to a class victory and 6th overall in the 1965 Targa Florio. This was built on a Fiat 850 chassis also.





The Abarth Scorpione 1300 is the most exciting new GT to appear in many years. Constructed on the Fiat 850 chassis, it employs the flawless 850 transmission mounted to a Fiat 124 pushrod engine which has been suitably breathed upon by Abarth & Co. The result is a 1280cc high compression engine producing 88 SAE horsepower, sufficient to give the Scorpione a maximum speed of over 115 MPH. The engine is one of the nicest features of the Scorpione. It's amazingly flexible, enabling the car to climb virtually any hill in top gear, run smoothly at 25 MPH in top and yet it revs easily and smoothly to 7000 RPM.

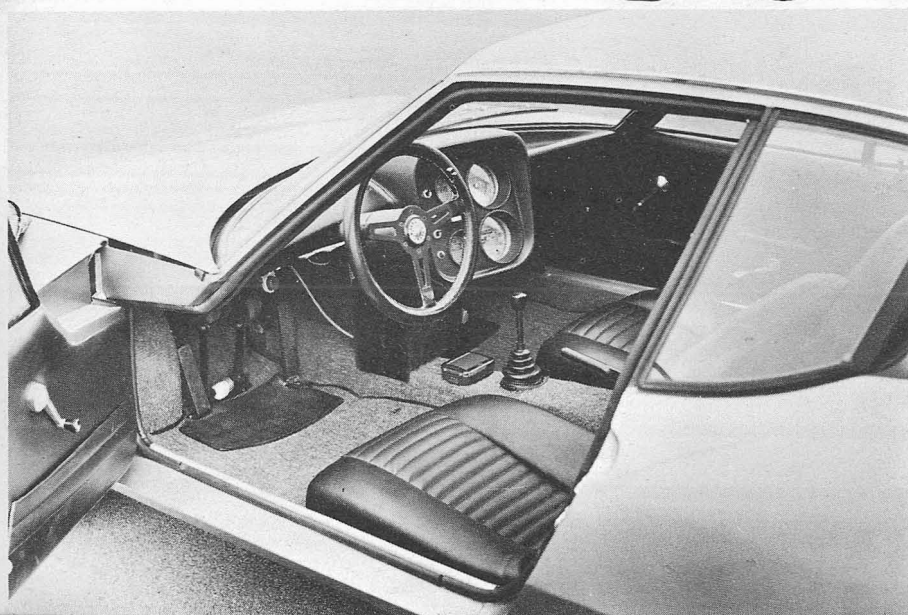
The roadholding ability of this 1470 pound, steel bodied automobile brings raves from all those who have driven it. The suspension is basically that of the Fiat 850, reworked by Abarth. Kleber Colombe radial tires are mounted on 5½ inch deep offset rims. The beautiful, lightweight Campagnolo wheels shown here are available as an option. The Fiat 850 disc front/drum rear brake setup assures rapid, non swerve stopping. For those contemplating serious competition with the Scorpione, a special version with four wheel disc brakes and all-Abarth suspension is available.

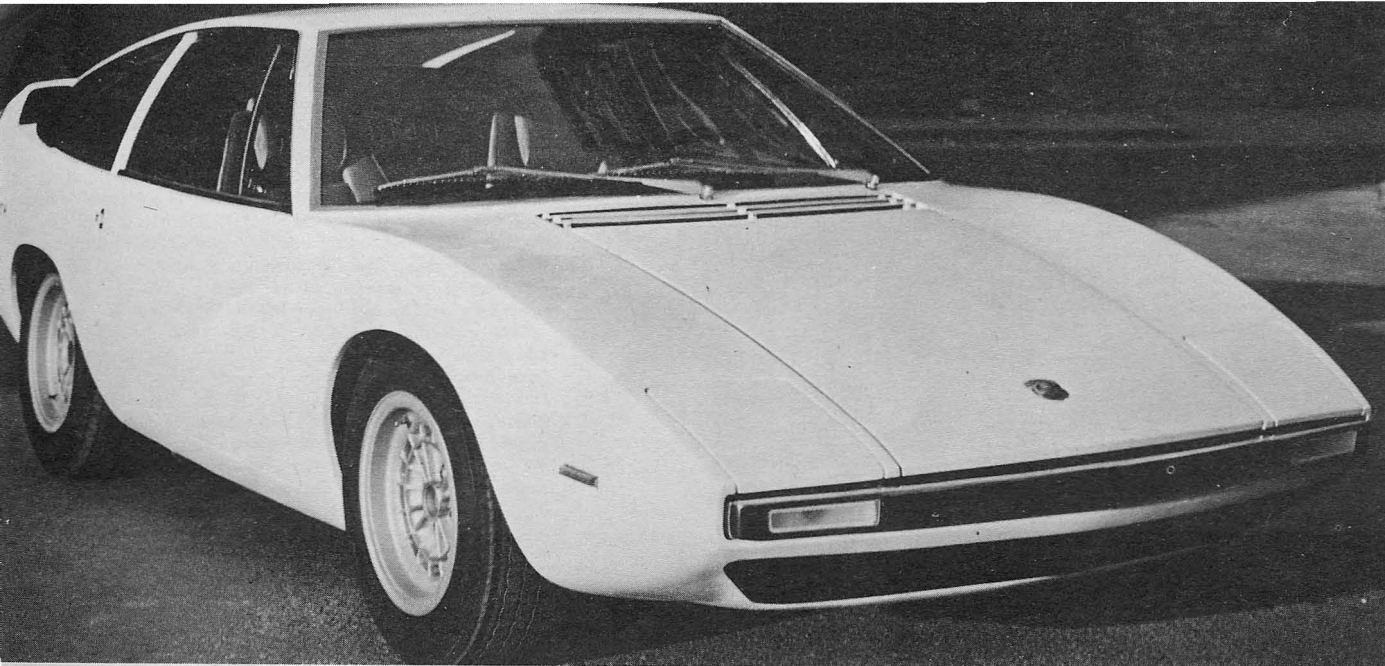
Shown below are Ing. Colucci and Ing. Tomaninni of Abarth & Co., examining the engine installation in an Abarth Scorpione. Every Abarth automobile is checked out in detail before it leaves the factory.

FIAT ABARTH OT 1300

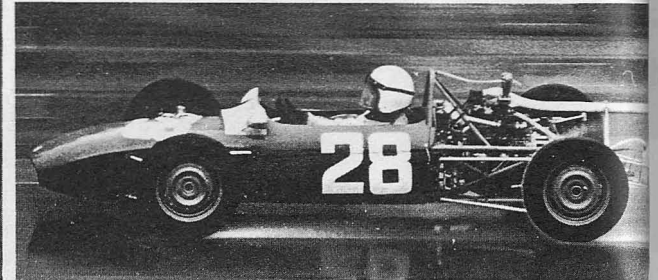
Shown below is what the driver sees as he enters the Scorpione. The semi reclining bucket seats, Abarth leather steering wheel, rest for left foot, easy to read offset instruments (now with white on black dials), all allow the driver to devote his full attention to driving and enjoying the car. The gearshift lever is positioned perfectly. The heater is the same one used in the Fiat 850, meaning the car is a pleasure to drive in even the coldest weather.

LO SCORPIONE

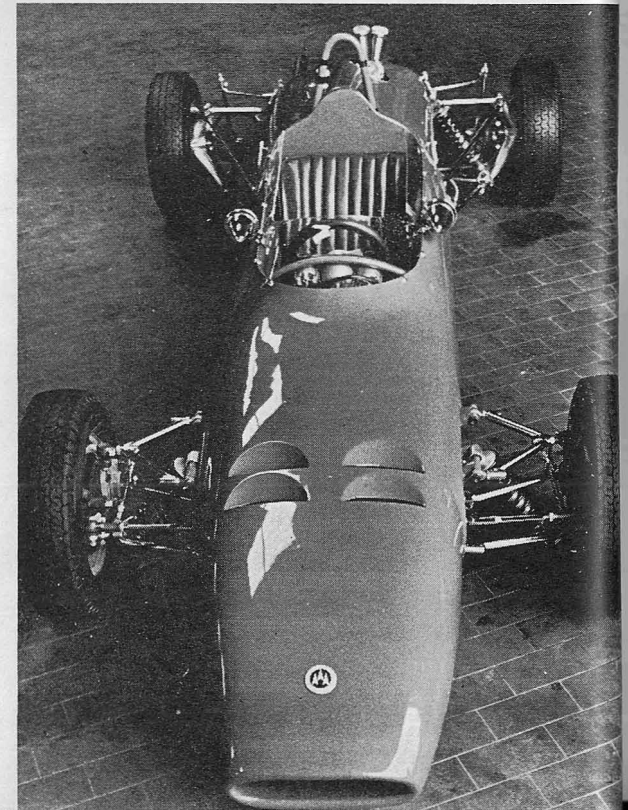




Abarth's new production car, due in late 1970, is the 1600 GT, shown at left. Autobianchi's A112, lower left, has a Fiat 850 Coupe engine in its production form. This special Abarth version, shown at the 1970 Torino Race Car Show, has an Abarth 1000 Radiale engine producing 109 HP (DIN). Below, is a Tecno formula Fiat 8 $\frac{1}{2}$, winner at a recent Monza race. This car has an 850 engine and gearbox.



Shown below is a De Sanctis formula 8 $\frac{1}{2}$. These are very popular racing cars in Italy. Using the Fiat 850 engine and gearbox, they have 4 wheel disc brakes. Over 20 different constructors are currently selling these cars in Italy.



**CRAIG FISHER HAS WON EVERY RACE ENTERED
IN THE FAZA FIAT ABARTH 1000 CORSA SEDAN**

Here Craig is shown qualifying in the dry at the 1969 Mid Ohio National. 35 cars ran in the race for D Sedan, C Sedan, and F Production. Driving the FAZA Fiat Abarth 1000 Corsa, Craig tied William Koch (F Production MG Midget) for second fastest in qualifying, only .8 second slower than Jerry Truitt's F Production car. NSU 1000 TTS's of Ray Wojik and Ray Walle qualified over 8 seconds slower than Craig.





MOSPORT

TRILLIUM TROPHY RACE

THIS WAS THE KIND OF SMALL BORE VERSUS BIG BORE EVENT THAT RACE FANS REALLY ENJOY. CRAIG FISHER USUALLY DRIVES BIG TRANS-AM FIREBIRDS AND CAMAROS. DRIVING THE NUMBER 6 FAZA FIAT ABARTH 1000 CORSA, HOWEVER, HE DIDN'T NEED A BIG CAR TO PUT

ON A TERRIFIC SHOW, FINISHING SIXTH OVERALL AND LAPS AHEAD OF ANYTHING IN HIS CLASS, NOT TO MENTION 3 LAPS AHEAD OF THE LEAD 1300 MINI COOPER, (see results on page 43).





Craig Fisher

Craig Fisher drove the FAZA Fiat 850 Spyder with the 843cc engine at Mosport Trillium Trophy Race, qualifying third and finishing third overall.

FEATURE FORTY FIVE LAP RACE FOR SEDANS

Pos.	Car	Name of Driver	Car	Laps	Time	Class
1	93	Derek Johnson	Camaro	41	85.16.8	7
2	47	Gordon Dewar	Javelin	41	85.17.7	7
3	8	Maurice Carter	Camaro	41	85.30.7	7
4	146	Dick Hofman	Camaro	40	85.35.8	7
5	10	Fritz Hochreuter	Porsche 911	40	86.01.1	8
6	6	Craig Fisher	Fiat Abarth 1000	40	87.05.7	9
7	13	Al Mason	Camaro	39	85.29.2	7
8	22	Don Merriman	Lotus Cortina	39	86.05.7	8
9	31	Carl Engel	Mustang	38		7
10	30	Ted Powell	Cooper S	37		8
11	757	Dave Lawler	Camaro	37		7
12	29	James O'Connor	Cooper S	37		8
13	11	Bill Brownlee	Cooper S	37		8
14	36	Rod Bremner	Cooper S	37		8
15	176	Gerry Malloy	Corvair	37		7
16	201	Ron Shantz	Cooper S	37		8
17	61	Jean Guy Roy	Camaro	37		7
18	46	Bob Armstrong	Gordini 1300	37		8
19	218	Gord Gowland	Cooper S	37		8
20	43	Geoff Foster	Cooper	36		9
21	34	Leon Alain	Camaro	36		7
22	91	Richard Hylands	Cooper S	36		8
23	508	Tom Thompson	Toyota Corolla	36		8
24	88	S Ruys De Perez	Camaro	36		7
25	122	Don Cumming	Volvo 122S	36		8
26	48	George Ferland	Camaro	35		7
27	700	R Bordignon	BMW700	32		9
28	108	Bruce Popplow	Cooper S	31		8
29	109	Jim Davidson	Cooper	25		9
D.N.F.	66	Gil Stuart	Javelin			7
	40	Colin Jennison	Cooper			9
	155	George Comacchio	Fiat 124			8
	319	Adrian Peters	Cooper			9
	847	George Pepper	Cooper S			8
	79	H.J. Kerbel	Cooper			9
	360	Terry Fitzgerald	Cooper			9

The Canadian fans really were amazed at the performance of the Fiat 850 Spyder. It was the first time they had seen a well prepared Fiat 850 in competition, and they all wanted to know more about this fantastic car that ran away from just about everything on the track. It was the only Fiat in the race. Just imagine what their reaction would have been had there been as many Fiats as there were Austin Healy and Lotus cars. The results below show the caliber of automobiles the Fiat 850 outran. The "dune buggy" shown in fourth overall was powered by a Porsche engine

FEATURE RACE FOR SPORTS AND GT CARS

Pos.	Car	Name of Driver	Car	Laps	Time	Class
1	42	Max Nerriere	Lotus Elan	8	17.54.6	2
2	50	Cam Champion	MGB	8	18.15.3	5
3	7	Craig Fisher	Fiat 850 Spyder	8	18.20.2	6
4	505	Bill Heemsoth	Dune Buggy	8	18.40.5	2
5	9	Harry Bytze	Porsche 911S	8	18.43.2	4
6	116	Gil Baker	Morgan 8	8	18.49.1	4
7	98	Dale Neil	Lotus Elan	8	18.50.2	4
8	377	Gerhard Hirsch	Datsun 2000	8	18.57.3	4
9	70	Bob Griffiths	Lotus 47	8	18.59.2	2
10	296	John Powell	MGB	8	19.02.3	5
11	31	Bud Tucker	A.M.X.	8	19.17.0	3
12	39	Rainer Brezinka	P Carrera 906	8	19.32.0	2
13	105	Peter Findlay	Corvette	8		3
14	567	Mike Serveau	Sprite	8		6
15	92	Klaus Schonfeld	MGB	8		5
16	131	Eric Hodgson	Datsun 2000	7		4
17	741	Don Mason	Sprite	7		6
18	966	Gerry Baker	Lotus 15	7		2
19	62	Hugh MacGregor	Reptune GT	7		2
20	136	Michael Mattos	Spitfire	7		6
21	451	Gary Brown	Sprite	7		6
22	188	Paul Lambke	Sprite	7		6
23	127	George Wilkki	Sprite	7		6
24	21	Frank Leone	Aba-Simca 2000	7		3
25	811	Craig Rodwell	Aus Healey 3000	7		4
26	225	Al Souter	MG Midget	6		6
D.N.F.	19	Keith Arkley	Sprite			6
	74	Donald Horner	Dailu			1
	241	David Butler	Lotus Elan			4
	180	Doug Hoy	Lotus 23			2
	171	Walt McKay	Lotus Super 7			4

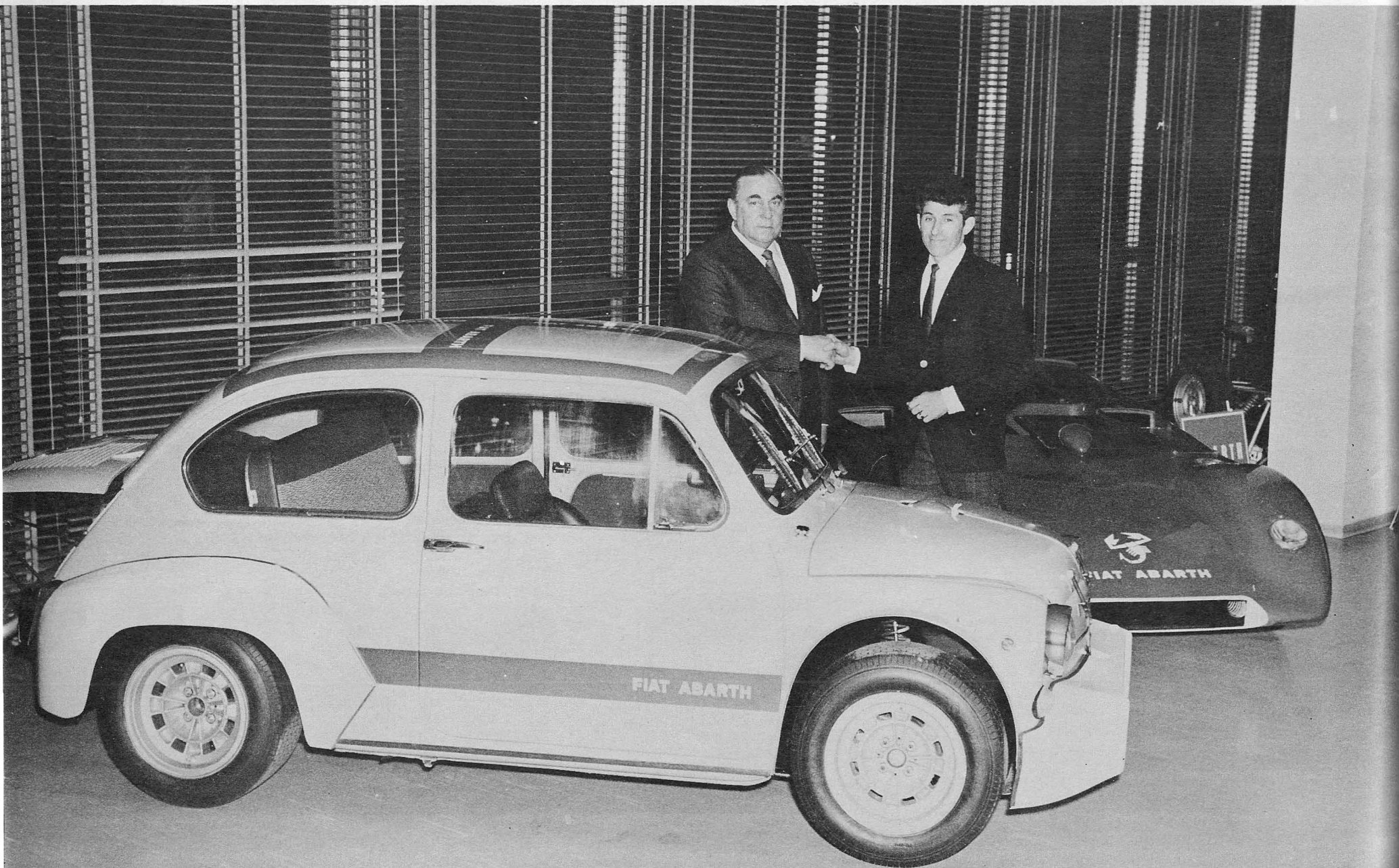


FIAT ABARTH 1000 SEDAN THE MOST WINNNING RACE CAR IN
SINCE 1965 35 NATIONAL RACES 34 NATIONAL VICTORIES

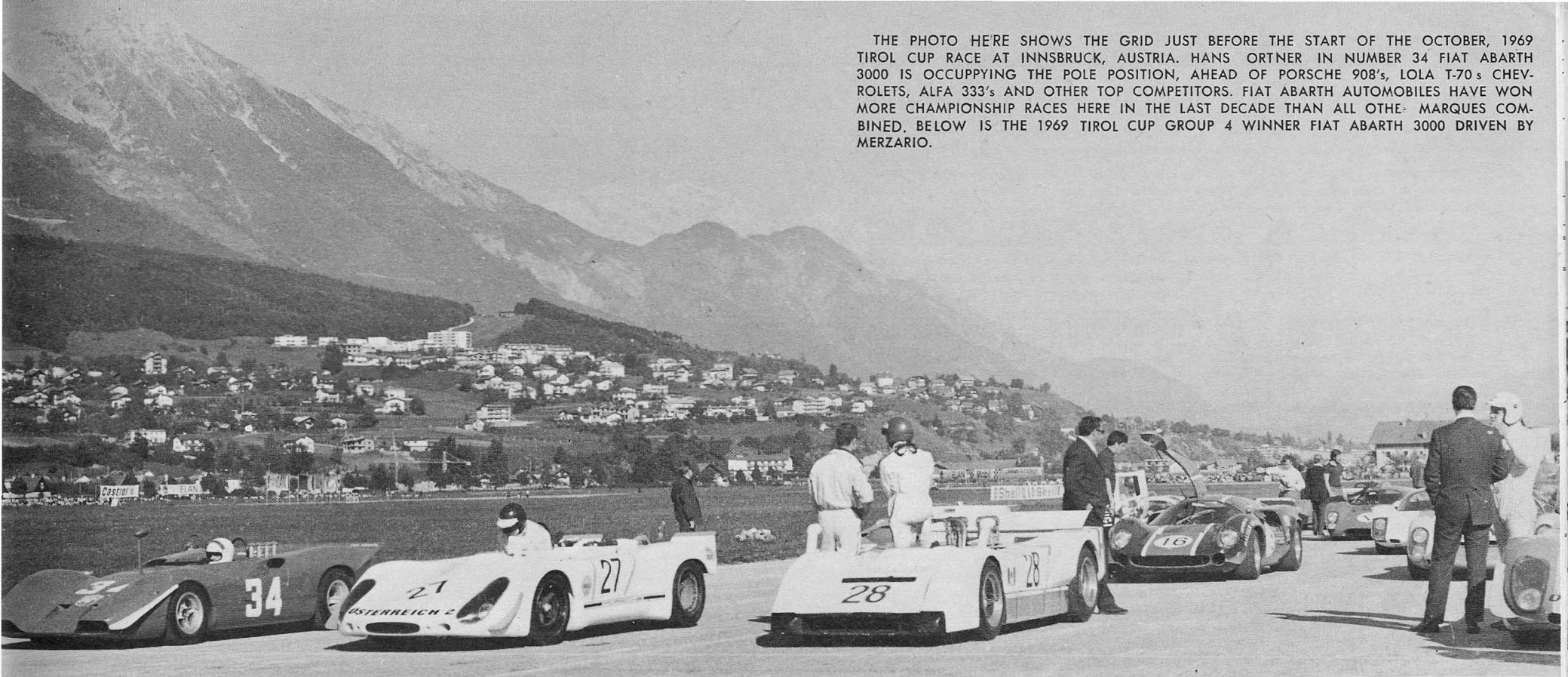
SCCA

AT THE MARCH 1970 TORINO RACE CAR SHOW, AL COSENTINO (right) WAS CONGRATULATED BY CARLO ABARTH FOR HIS RECORD NUMBER OF SCCA NATIONAL VICTORIES IN A FIAT ABARTH 1000 CORSA. THE FIAT ABARTH 1000 CORSA IN

FOREGROUND IS THE 1970 FAZA TEAM CAR, AND WILL BE DRIVEN BY CRAIG FISHER AND AL COSENTINO IN SCCA's D SEDAN CLASS. THE CAR IS POWERED BY A 95 H P PUSHROD ENGINE.



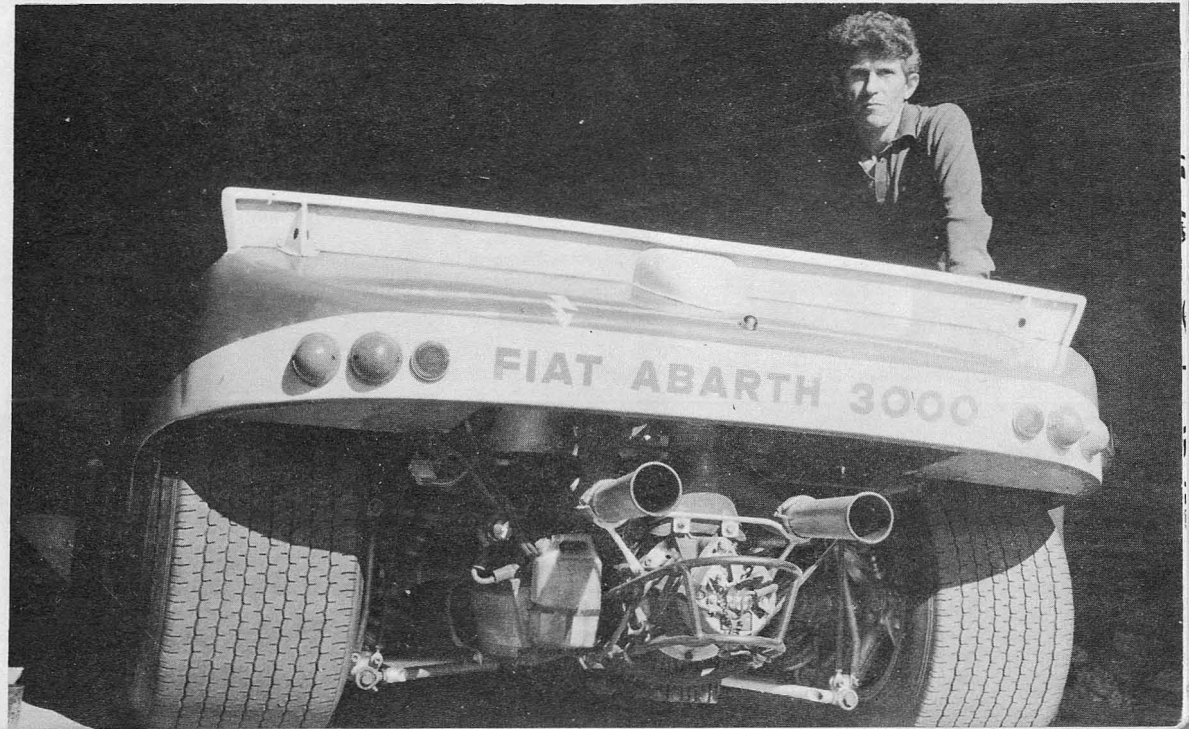
THE PHOTO HERE SHOWS THE GRID JUST BEFORE THE START OF THE OCTOBER, 1969 TIROL CUP RACE AT INNSBRUCK, AUSTRIA. HANS ORTNER IN NUMBER 34 FIAT ABARTH 3000 IS OCCUPYING THE POLE POSITION, AHEAD OF PORSCHE 908's, LOLA T-70's, CHEVROLETS, ALFA 333's AND OTHER TOP COMPETITORS. FIAT ABARTH AUTOMOBILES HAVE WON MORE CHAMPIONSHIP RACES HERE IN THE LAST DECADE THAN ALL OTHER MARQUES COMBINED. BELOW IS THE 1969 TIROL CUP GROUP 4 WINNER FIAT ABARTH 3000 DRIVEN BY MERZARIO.



FIAT'S ROLE IN RACING

Many people in the U.S. believe that FIAT does not take an interest in racing, due to the fact that there is no official factory backing of Fiat race cars here. This is simply not true. Fiat has recently acquired a fifty percent interest in Ferrari, so that Ferrari can continue to be the standard by which all other sports/GT cars are measured. Last year, a Ferrari 212, with a Fiat 12 cylinder 2 litre engine, completely ran away with the (always) hotly contested European Hillclimb Championship, devastating the old records set by the late Gerhardt Mitter in a special Porsche Spyder Hillclimb car. With Fiat's resources backing them, Ferrari will be able to come to the forefront again as the major power in big-bore FIA racing. The DOHC V-6 FIAT DINO engine provides the base around which Ferrari F-2 car is built.

For many years Fiat has contributed to and actively benefited from the racing endeavors of Abarth Corse, Carlo Abarth's official works team. Abarth cars always bear the name Fiat Abarth, like this 3 liter V-8 Sports Racer (See photo). This car is really coming on strong and has beaten the best Europe and England had to offer on several circuits. Everytime an Abarth car wins (which is very often) Fiat gets valuable publicity. Fiat's production cars also benefit from Abarth's racing experiences. The fantastic Fiat 850 incorporates many of the lessons learned by Abarth as a result of racing the 600 and 600-D. All the new Fiats strongly exhibit the influence of competition experience. Double valve springs are found on all U.S. models with the exception of the 850 sedan. Bottom ends are far stronger than they need be. The new 850 Sport models come with a finned, baffled alloy oil sump. These are just a few of the race proven components Fiat incorporates in their production cars, which are unchallenged for value on the automotive market. So, you can see that Fiat does have a large interest in racing and when you purchase a Fiat car, you know that it has, as standard equipment, many of the race proven and developed advances which others call extra cost options, or which they can't provide at any price. It is this dedication to meaningful production line improvements that has helped catapult Fiat into first place in European automotive production, and fourth place in the world.



FINALLY, after a long dry spell, Fiat drivers are going to receive some monetary recognition for their victories in SCCA's production class racing. FAZA is providing this money from its own resources to give some incentive to drivers who are considering racing a Fiat, or who may already be doing so. For a first in class in a race counting for National points, \$100.00 will be given, and for first in class in a Regional, \$75.00. The Fiat 850 Spyder can be successfully raced in H-Production. We proved this ourselves with the small engined 850 over the past two seasons. Of course, we had a lot going for us which the average competitor could neither muster nor afford. Such things as the two car team, direct consultation with Abarth & Co. engineers, Craig Fisher to drive for us, definitely made a difference. With the new 903cc engine, things are really looking up for Fiat in H-Production.

The 124 Spyder is another story. This car may be able to garner an occasional Regional win, but cannot hope to match the hotter lightweight Sprites, Spitfires, etc. in F-Production. The car is just too heavy for its engine size, which makes this class more than the 124 can handle. If SCCA ever decides to reclassify it in G-Production, it may stand a good chance. The 124 is one of the finest sports cars on the road, and should be raced, but its current classification is discouraging to most people. All the road test magazines both here and in Europe are unanimous about this car's advanced design, high quality, outstanding workmanship, etc.

Fiat is just not interested in racing here in the U.S. (although Fiat is currently racing's biggest spender) and most Fiat dealers compound this problem. Many people are so discouraged by their dealers' lack of interest in competition that they forget about racing or switch to another car. We at FAZA want to let you know that someone does indeed appreciate what you are doing. Our awards program is in no way sponsored by Fiat. Hopefully, though, our program will stimulate Fiat into giving some support to Fiat drivers who are racing their cars. Even Detroit knows what a good racing program can do to bolster a company's image & sales.

To be eligible for the prize money, certain requirements (aside from winning) must be fulfilled. Your race car must have two of our decals (see illustration) displayed, one on either side of the car so they can be easily seen by spectators. No decals or advertising from direct competitors may appear on the car. This does not preclude the use of decals from Goodyear, STP, Firestone, Champion, Bosch, Fram, Shell, Castrol, etc. All applications for prize money must be accompanied by a photo of the car in the track impound area after the race, showing the decals. A copy of the official race results must also accompany each application, and the name of your region must appear on the results. Address all applications to Competition Manager c/o FAZA, 82 No. Main Street, Brewster, N.Y. 10509

As a further aid to Fiat race drivers, we are offering a 10% discount on parts to all SCCA licensed drivers who are racing Fiats. All orders must be accompanied by your SCCA license number to be eligible for this discount. All of our driver assistance and award programs are valid only for SCCA Production class racing.


John Nowosadko Jr.
Sales Manager

In 1965 Peter Feistman won the ARRC H-Production race at Daytona in a Fiat-Abarth Allemano roadster. This was the last of a long string of national wins for Abarth cars in this class. Feistman's victory came as a surprise to most people, who thought the horde of Sprites would be more than the lone Abarth could handle.

Now' at last, the Fiat 850 Spyder will be able to carry on where the Abarths left off. The new 903cc engine gives the Spyder the extra poke it needs to eat up the straights. The 850 Spyder is without doubt the greatest sports car in its class. The all-synchro gearbox functions flawlessly, the engine revs willingly to 7000 RPM and more in stock form, it handles like a dream, stops quickly, and is a ball to drive. Now it will breathe some new life into H-Production.

FAZA

FOR ANYTHING



FIAT ABARTH

IMPORTERS
82 NO. MAIN ST. BREWSTER, N. Y.
10509 914 BR9-9555



PRODUCTION CAR CLASSIFICATION

SCCA

COMPETITION LICENSE INFORMATION

Class A

Abarth Simca 2000
AMX Sports Coupe 390 thru 1969
AMX Sports Coupe 360 1970
AMX Sports Coupe 390 1970
Corvette Sting Ray Roadster & Coupe 350 1970
Corvette Sting Ray 396
Corvette Sting Ray 427 thru 1967
Corvette Sting Ray Roadster & Coupe 427 1968, 1969
Corvette Sting Ray Roadster & Coupe 454 1970
Griffith 200
Porsche GTS/904
Cobra 427
Shelby GT 500 thru 1967
Shelby GT 500 1969 Coupe

Class B

AMX Sports Coupe 290 thru 1969
AMX Sports Coupe 343 thru 1969
Aston Martin DB5
Aston Martin DB5
Aston Martin DB4 GT & Zagato
Corvette 283
Corvette 327
Corvette Sting Ray 327 thru 1967
Corvette Sting Ray Roadster 327 1968
Corvette Sting Ray Roadster & Coupe 350 1969
Ferrari 250 GT
Ferrari 275 GTB
Ferrari Berlinetta Lusso
Ferrari 250 GT-SWB
Ferrari GT California Coupe & Cabriolet
Ferrari 2 + 2
Jaguar E 3.8 & 4.2
Porsche 911E Coupe/Targa Cabriolet 1969
Porsche 911S Coupe/Targa Cabriolet 1969
Porsche 911E Coupe/Targa Cabriolet 1970
Porsche 911S Coupe/Targa Cabriolet 1970
Cobra 283
Shelby GT 350 thru 1966
Shelby GT 350 1-4V 1967
Shelby Cobra GT 350 Coupe 1969

Class C

Abarth Simca 1300
Alfa Romeo TZ
Datsun SRL 311U (Mikuni)
Datsun 240Z Sports (Hitachi & Mikuni)
Ginetta G4-1500
Lotus Elan thru S-4 (Roadster, Coupe & Drophead)
Lotus Elan Plus Two
Mercedes Benz 300SL
MGC, MGC GT
Morgan Super Sports
Osca 1600 GT
Porsche 356B, C2000CS
Porsche Carrera 1500, 1600
Porsche 911, 911S, 911L (Coupes) thru 1968
Porsche 911T Coupe/Targa Cabriolet 1969
Porsche 911T Coupe/Targa Cabriolet 1970
Porsche 914/6
Sunbeam Tiger 260
Toyota 2000 GT
Triumph TR-250
Triumph TR-5
Triumph TR-6 (Stromberg)
Triumph TR-6 (F.I.)

Class D

AC Bristol, ACECA Bristol
Alfa Romeo 2600 Sprint & Spider
Alfa Romeo Duetto 1750
Arnolt Bristol
Austin Healey 3000
Daimler SP-250
Datsun SRL 311U (Hitachi)
Elva MK III 1800 & MK IV 1800
Elva MK IV T1800
Fairthorpe Electron
Fiat Abarth 1000 DOHC
Ginetta G-4 1000
GSM Delta
Jaguar XK 120, 140, 150
Lotus Super Seven
Lotus Europa MK 46 "54(65)"
Marcos GT 1000
Mercedes Benz 280 SL
Saab Sonnet V-4
Speedwell GT 2A, 2B
Triumph GT-6 Plus
Triumph TR-4
Triumph TR-4A IRS
Turner Climax
TVR Climax
TVR MK III 1800
Yenko Stinger

Class E

Alfa Romeo Duetto 1600
Alfa Romeo Giulia Spider Veloce 1600
Alfa Romeo Giulia GT & GTC
Alfa Romeo Sprint Speciale
Austin Healey 100-6
Elva Mark I, II, III, 1622
Elva Mark IV T Ford
Elva Mark IV 1622
Fairthorpe Electron Minor
Lotus Elite
Mercedes Benz 250 SL
MGB, MGB GT
Morgan + 4
Opel GT 1900
Porsche 356 1500/1600 A,B,C.
Porsche 356C/1600SC & 356B Super 90
Porsche 912 thru 1968 - Coupe
Porsche 912 Coupe/Targa Cabriolet 1969
Porsche 914/4
Triumph GT-6 thru 1968
Triumph TR 2, 3, 3A, 3B
Turner 1500
TVR MK III 1622
TVR Vixen 1600 Ford
Volvo 1800 (1990 cc) 1969, 1970
WSM GT

Class F

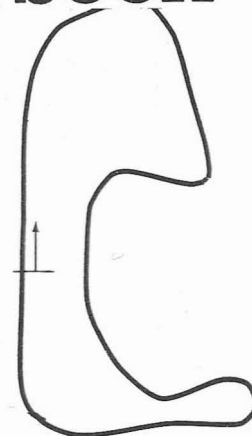
Alfa Romeo Giulietta Super 1300
Alfa Romeo Sprint Speciale
Alfa Romeo Giulia Sprint & Spider 1600
Alfa Romeo Spider 1300 Junior
Alpine A110 - 1100
Austin Healey Sprite 1275
Austin Healey 100-4
Datsun SPL 311 & SPL 311U
Fiat 124 Sport Spider thru 1970
Fiat Abarth OT 1300/124 Coupe
Glas GT 1700
Lotus 7 + 7 America
Mercedes Benz 230 SL
MG Midget 1275
MGA 1500, 1600, 1622
MGA Twin Cam
Morgan 4/4 MK V
Sabra Sport
Sunbeam Alpine
Triumph Spitfire MK III 1300 th 1970
Volvo P 1800, S (1780cc)

Class G

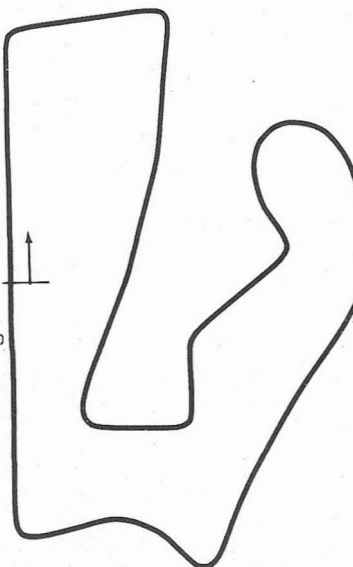
Alfa Romeo Sprint & Spider 1300
Alpine A-108-1000
Austin Healey Sprite 1100, AN8 (1100)
Datsun SPL 310U
Fiat 1500 Spider & Cabriolet
Fiat 1500 Spider DOHC
Fiat Abarth 700, 750 DOHC
Fiat Abarth 1000 Pushrod
Fiat Abarth OT 1000 Spider
Fiat Abarth OTS 1000 Coupe
Glas 1300 GT
Honda S800
Matra
MG Midget AN2, AN3
Porsche 1300
Rene Bonnet CRB
Siata Spring 850
Triumph Spitfire MK I & II
Turner 950S

Class H

Austin Healey Sprite 948 MK I & II
DB HDRS 851-954
Fiat 1200 Spider
Fiat 850 Spider & "Racer" thru 1970
Fiat Abarth 850S, 750GT, 750MM
Honda S600
MGTC, TD, TF 1250
MG TF-1500
MG Midget 948
Morgan 4/4 MK IV
NSU Wankel Spider
Opel GT 1100



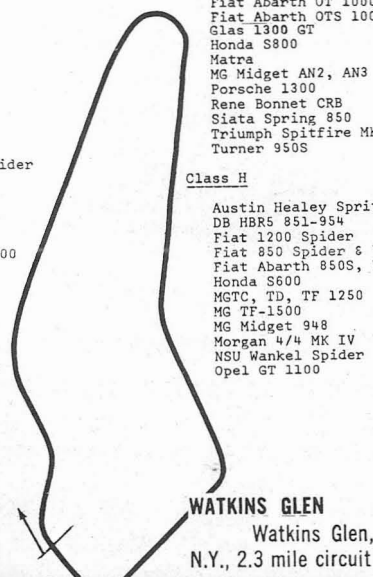
BRIDGEHAMPTON, Long Island, N.Y.,
2.85 mile circuit



ROAD AMERICA, Elkhart Lake, Wis.,
4.0 mile circuit



LAGUNA SECA,
Fort Ord Monterey,
Cal., 1.9 mile circuit



WATKINS GLEN
Watkins Glen,
N.Y., 2.3 mile circuit

Novice Permit and Log Book

A Novice Permit and Log Book is issued by an SCCA Region to enable student drivers to obtain the training and experience needed for a Regional Competition License.

Requirements

An SCCA member, over 21 years of age, who holds a valid operator's permit in his state of residence, applies for a Novice Permit only from his *home* Regional Executive (or designated representative such as Contest Board Chairman) by submitting the following:

1. Completed SCCA medical form;
2. Fee of \$4.50 payable to Region;
3. Two passport photographs.

The applicant will receive the Novice Permit, with one photo and the stub from the medical form attached, and also the CCR and PCS which will be provided by the Region. This Permit must be presented at drivers' school.

Holders of Novice Permits must meet the following minimum drivers' school requirements before they may participate in a speed event:

1. Obtain the signature of the chief steward attesting to participation at each drivers' school attended;
2. Complete total of at least 6 hours of in-car, on-course time at drivers' school events;
3. Complete at least two drivers' school events with a "Satisfactory" rating.

Upon completion of drivers' school requirements, the holder of a Novice Permit must:

1. Participate in two Regional events and obtain the signature of the chief steward attesting to satisfactory performance;
2. Complete the requirements for a Regional license within a *maximum* of two calendar years.

Medical Requirements

1. An applicant for an SCCA competition license or permit must submit a completed, current SCCA physical examination-medical history form.
2. Medical forms are available from Regions and from the SCCA Competition Director.

Regional Competition License Requirements

Holders of Novice Permits who have satisfactorily completed the drivers' school requirements and two Regional events may apply for a Regional License. Submit to:

SCCA

Competition License

P.O. Box 791

Westport, Connecticut 06880

1. Novice Permit with approving signature of the Regional Executive or his designated representative in the space provided;
2. Current medical form (see Medical Requirements). Applicants may use the current medical form on file with home Region;
3. Two passport photographs;
4. \$5.00 Regional license fee payable to SCCA, Inc.

Participation Requirements

These requirements, which are specified for each grade of license, must be met by participation in and completion of National, Regional, Restricted, or FIA-listed events which are sanctioned by the SCCA. The following will not be considered as meeting these requirements:

1. Hill climbs;
2. Drivers' schools;
3. Races held as part of drivers' schools;
4. Events not sanctioned by the SCCA;
5. Events resulting in a DNS or DNF.

GENERAL INFORMATION

Address inquiries to the Region or

SCCA

Competition License

Box 791

Westport, Connecticut 06880

FIA Information

ACCUS-FIA, Inc.

433 Main Street

Stamford, Connecticut 06901

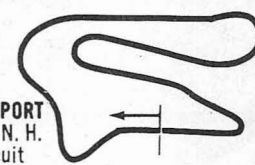
Available from Region or the SCCA Office

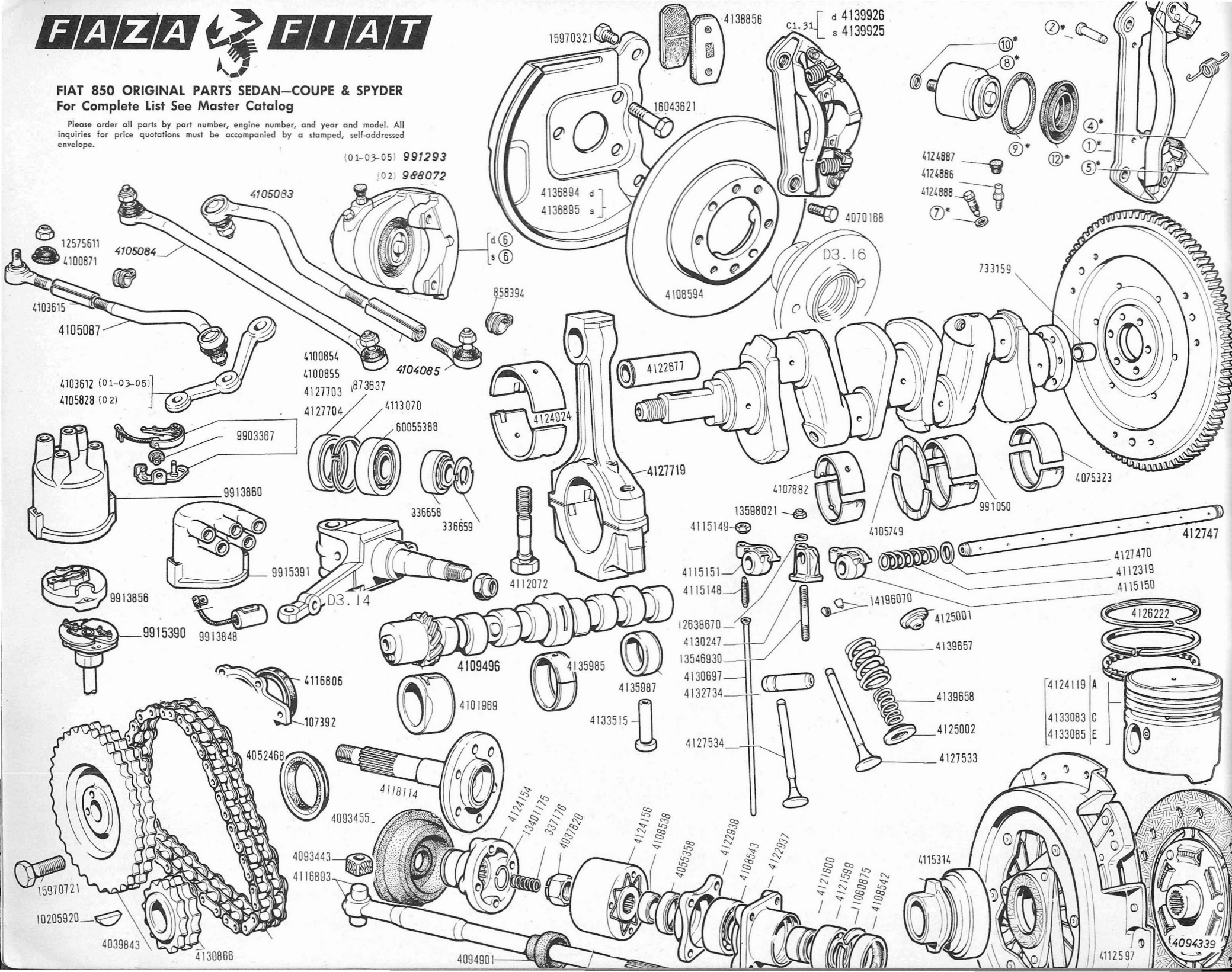
General Competition Rules \$1.00

Production Car Specifications50

RIVERSIDE INTERNATIONAL
RACEWAY, Riverside, Cal.,
2.6 mile circuit

BRYAR MOTORSPORT
PARK, Loudon, N.H.
1.5 mile circuit

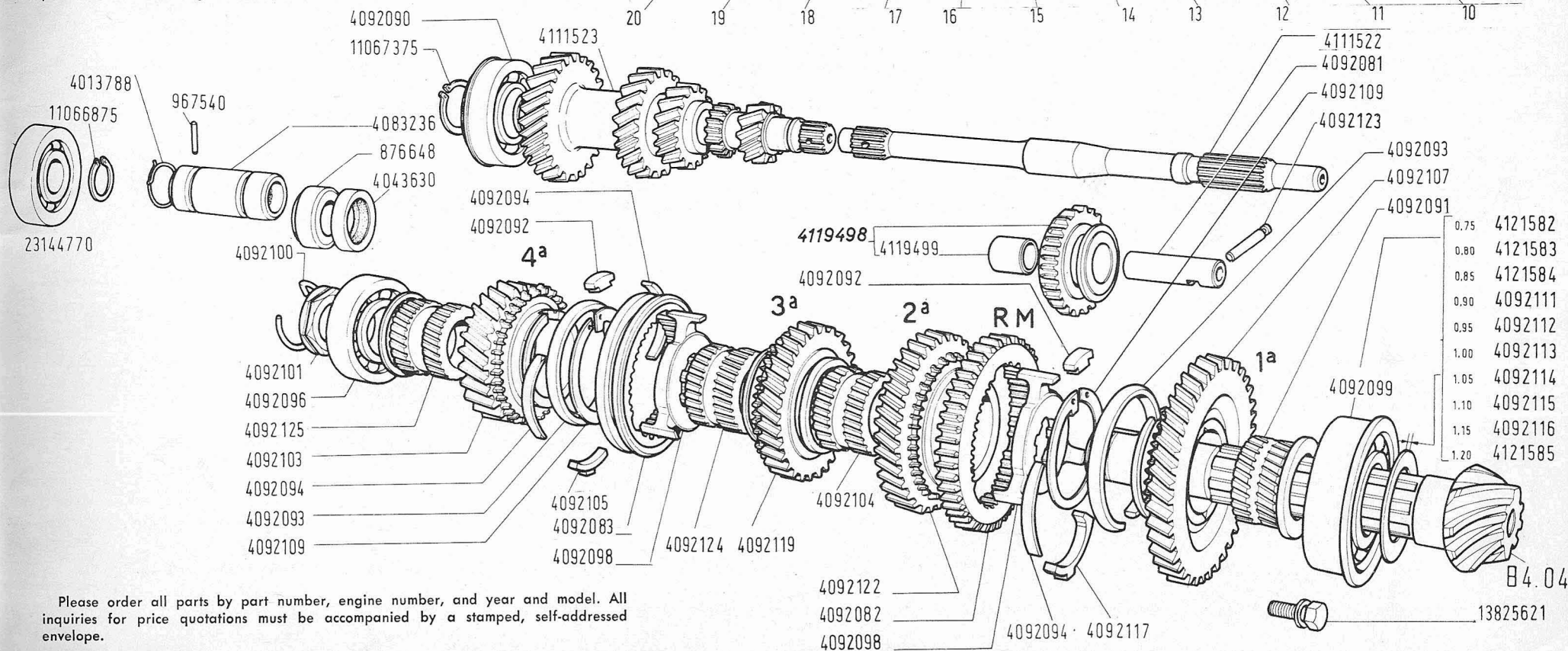
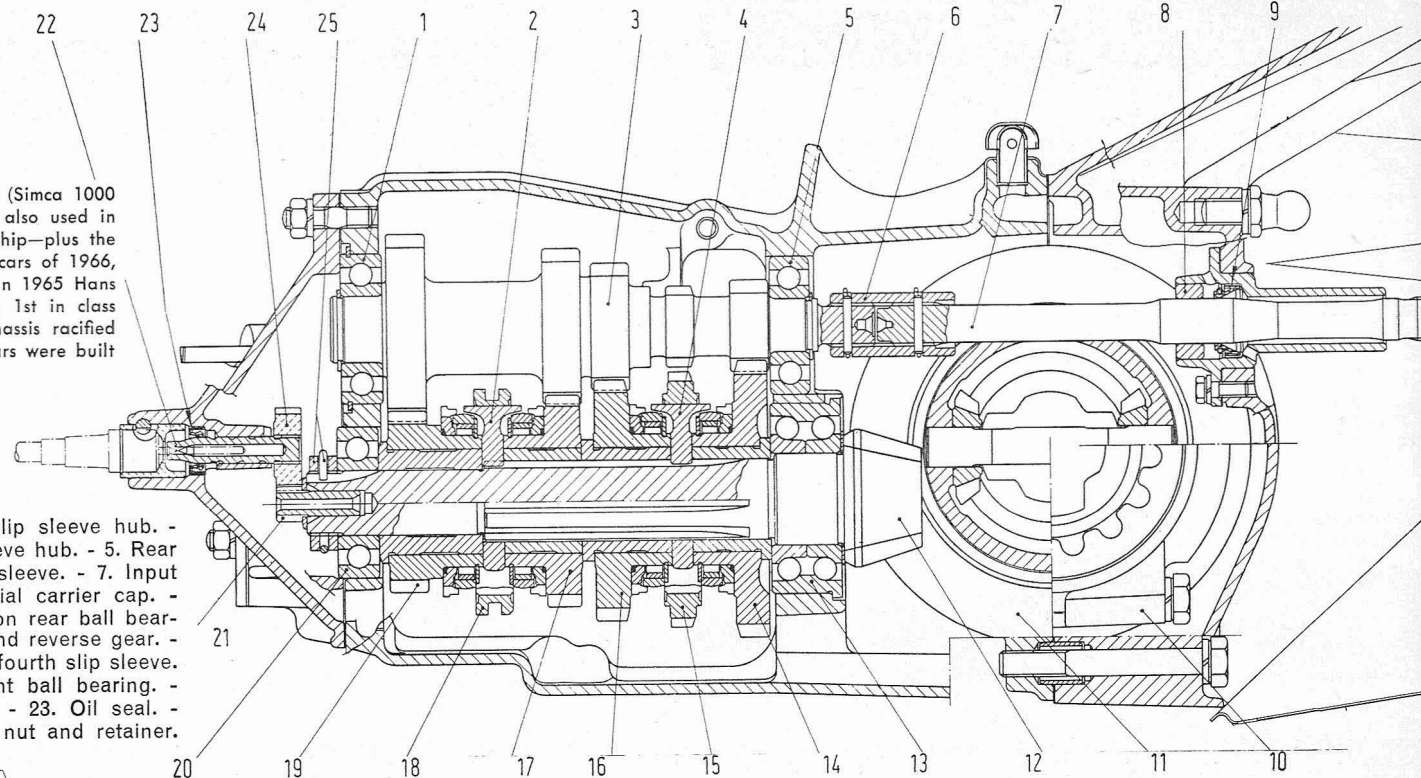




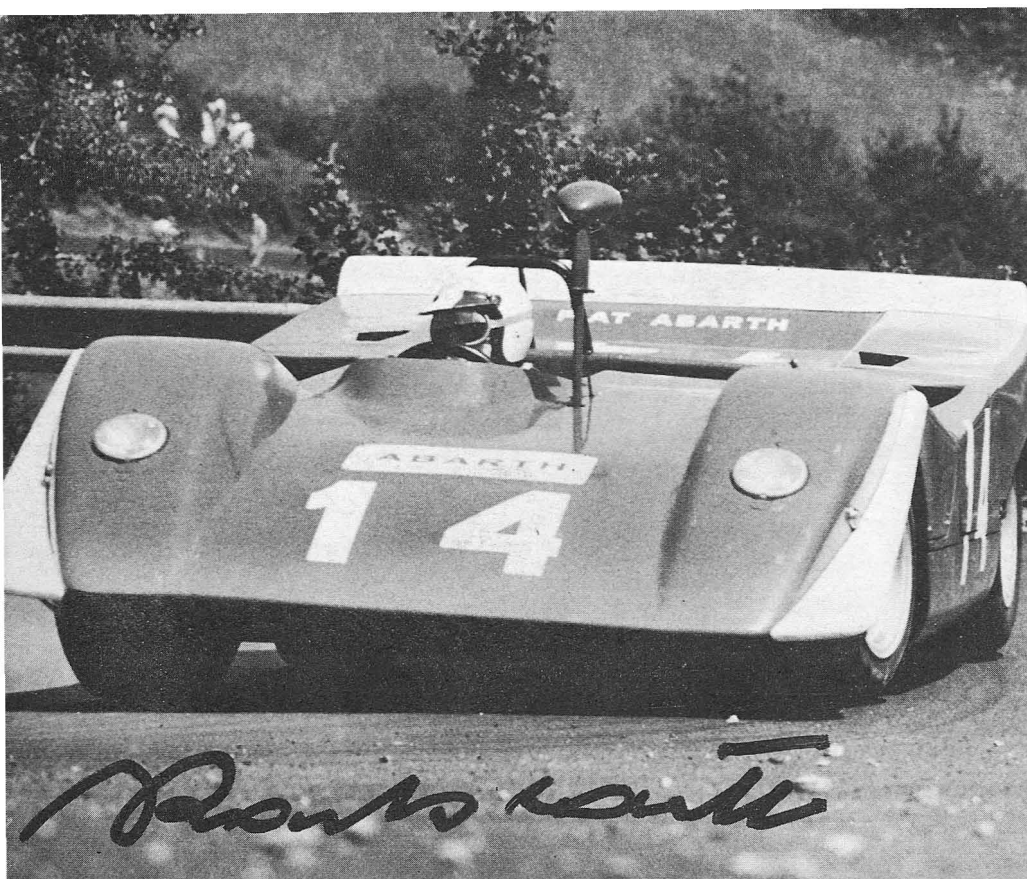
TRANSMISSION - DIFFERENTIAL

Fiat 850 basic 4 speed transmission was used in the Abarth 2000 GT (Simca 1000 chassis) in 1965, the last year of the GT category for the car. It was also used in the Abarth 1300 GT version that won the 1965 World Mfg. Championship—plus the 1966, 1967 and 1968 World Mfg. Championship. The Abarth 1300 GT cars of 1966, '67, & '68 had a 5 speed Abarth conversion of the Fiat 850 gearbox. In 1965 Hans Hermann drove the Fiat Abarth 1600-OT in the Targa Florio, finishing 1st in class and 6th overall. The car was a sports racer built on the Fiat 850 chassis racified by Abarth. The Division I 1966, 67 and 68 World Mfg. Championship cars were built on Fiat 850 chassis extensively racified by Abarth Corsa.

1. Front ball bearing of countershaft. - 2. Third and fourth slip sleeve hub. - 3. Countershaft with drive gears. - 4. First and second slip sleeve hub. - 5. Rear ball bearing of countershaft. - 6. Countershaft-to-input shaft sleeve. - 7. Input shaft. - 8. Input shaft bushing. - 9. Oil seal. - 10. Differential carrier cap. - 11. Ring gear. - 12. Drive pinion-output shaft. - 13. Drive pinion rear ball bearing. - 14. First driven gear. - 15. First and second slip sleeve and reverse gear. - 16. Second driven gear. - 17. Third driven gear. - 18. Third and fourth slip sleeve. - 19. Fourth driven gear. - 20. Output shaft-drive pinion front ball bearing. - 21. Speedometer drive gear. - 22. Speedometer driven shaft. - 23. Oil seal. - 24. Speedometer driven gear. - 25. Output shaft-drive pinion nut and retainer.



Please order all parts by part number, engine number, and year and model. All inquiries for price quotations must be accompanied by a stamped, self-addressed envelope.

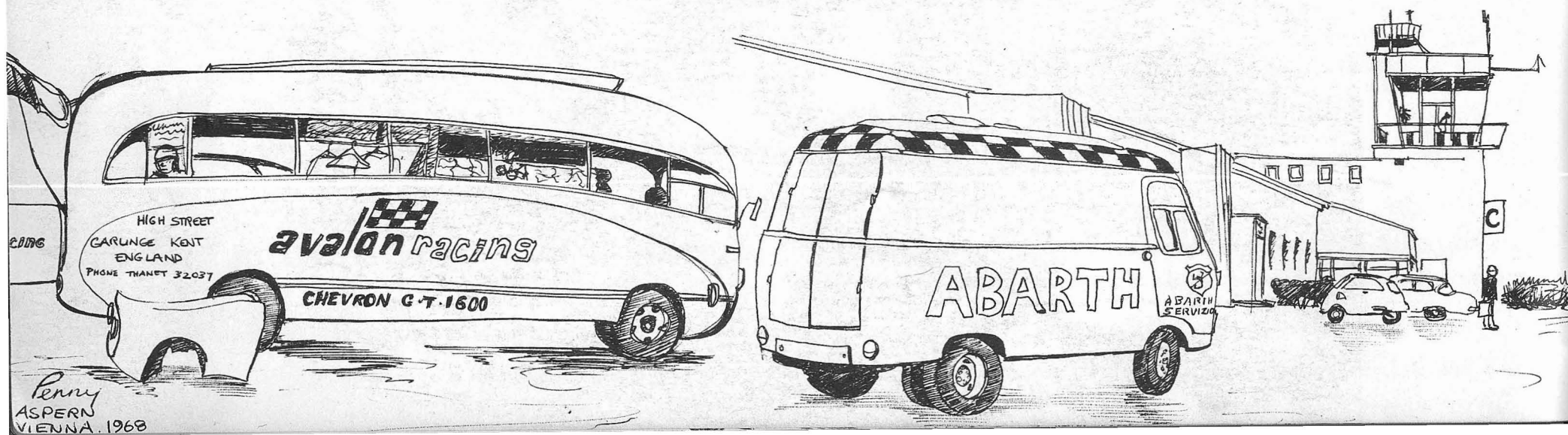


ABOVE Muggello 500KM 1969. Fiat Abarth 2000's finish way ahead of the competition. . . Alfa 33, 3 liters, Porsche 908's, Lola T-70. Merzario was first overall and Ortner 2nd. Abarth chose to run 2 liter bombs against Europe's best at Muggello, a rerun of the Targa Florio in the mountains near Florence, Italy.



Top right Aspern, Vienna 1968 Championship race left to right. 1000 Radiale Sedan, Fiat Abarth 2000, Shetty jumping into Fiat Abarth 3000, Merzario between two Fiat Abarth 2000's the 3 liter had a mid engine and 2 liters all complete rear engines.

Above, Aspern, Vienna 1968 11 Porsche 910, 907, & 906 never saw the Fiat Abarth 2000 of Merzario (first under 2000 Group 6 in qualifying and 2nd overall in race) or Ortner in a similar car until Ortner shift linkage snapped. Fiat Abarth's were running 1, 2, & 3 overall.

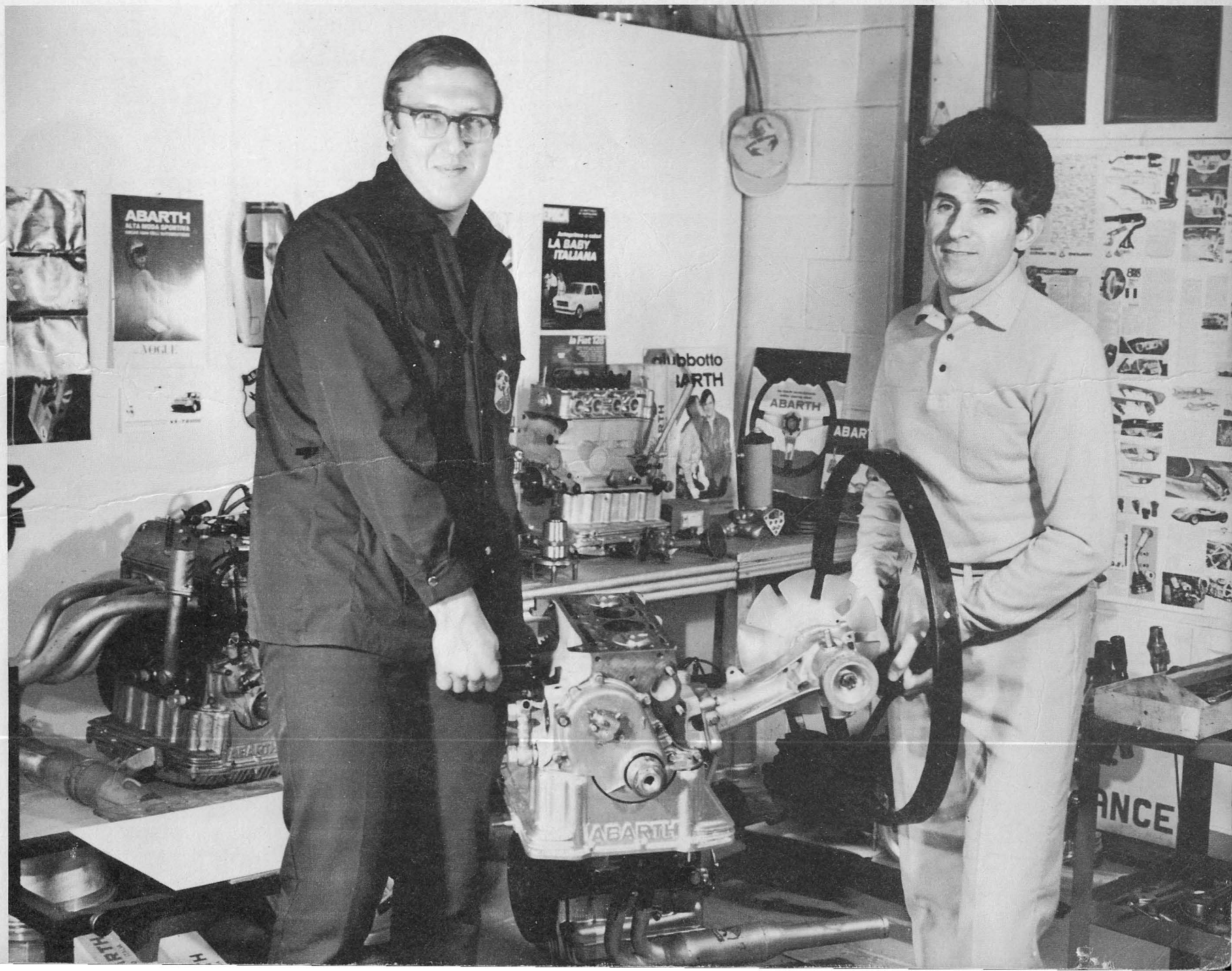


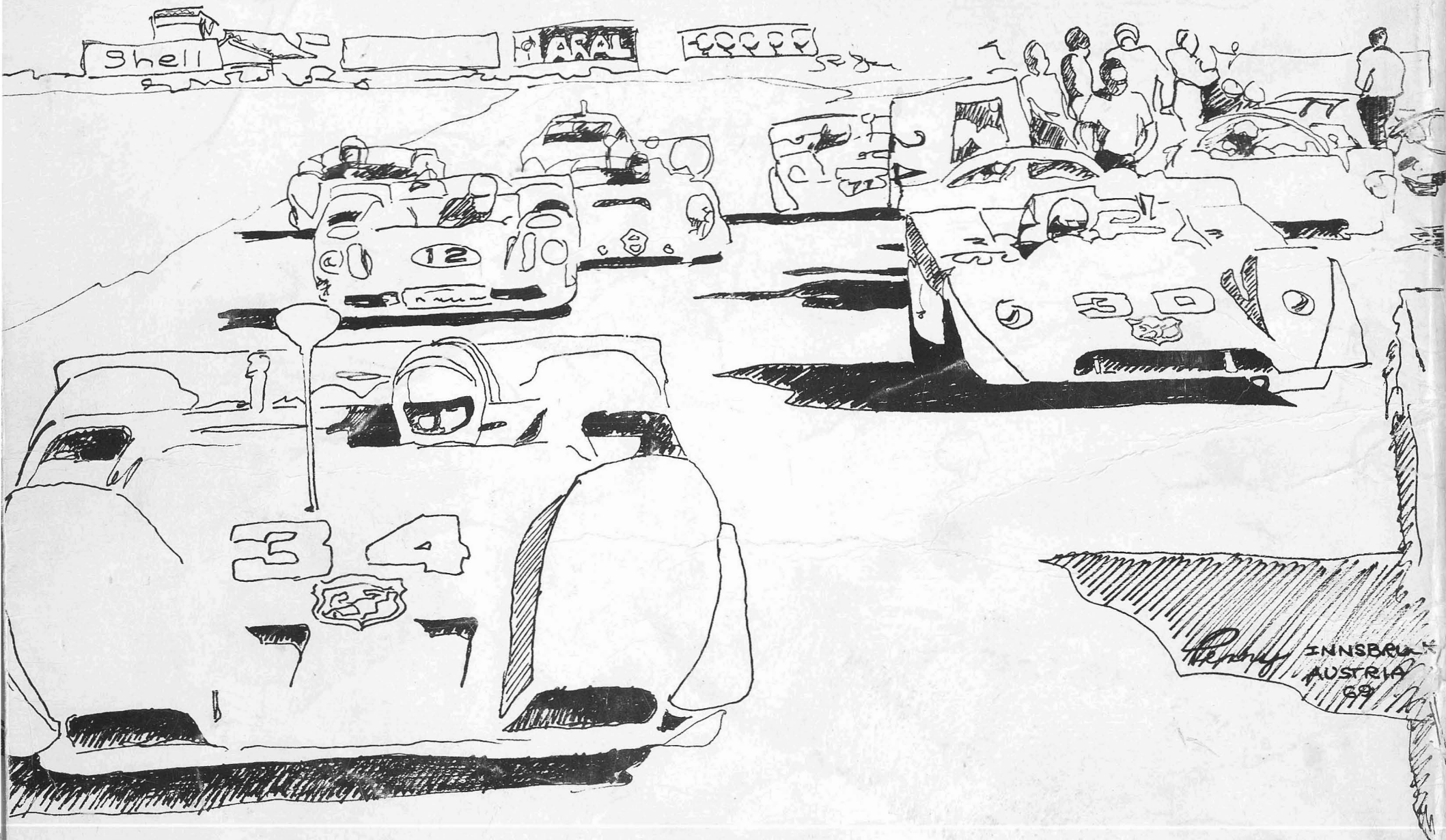
Penny
ASPERN
VIENNA 1968

FAZA FIAT

82 No. Main BREWSTER, N. Y. 10509 914 BR9-9555

At your service are John Nowosadko, general manager, and Al Cosentino, owner (on right). No matter what your requirements are for your Fiat 850, be they for a race engine like the one we're holding, or technical advice, we are always ready to assist you. We will be more than happy to pass along to you the lessons we have learned about preparing the 850 as a result of campaigning the Fiat-Roosevelt Team 850 Spyder in H-Production the past two seasons and racifying the new 903cc engine for this season. Please remember to include a stamped, self addressed envelope when requesting replies.





OCTOBER, 1969 TIROL CUP RACE AT INNSBRUCK, AUSTRIA, HANS ORTNER IN NUMBER 34 FIAT ABARTH 3000 GROUP 7 OCCUPIED THE POLE POSITION. IN NUMBER 30 GROUP 4 FIAT ABARTH 3000 IS MERZARIO THE FASTEST QUALIFIER. NUMBER 12 A FIAT ABARTH 2000, WHICH WAS THE FASTEST QUALIFIER IN UNDER TWO LITER.

FAZA



FIAT

82 No. Main BREWSTER,

N. Y. 10509 914 BR9-9555