Motori Italiani d'Epoca

Progettista: **Italo MAGROTTI**

Via Calabria n. 5 27100 **Località: Pavia**

Profilo:

Uno sguardo a quel che successe dopo la data del 1960, in cui si chiude il periodo esaminato dal volume presentato, non guasta. Bisognò aspettare l'inizio degli anni 80 perché Italo Magrotti, sollecitato da Vittorugo Chiodo, presentasse il progetto di un piccolo motore modellistico (**43**). Eppure quel progetto, all'insaputa del progettista, era diventato un tema per autocostruzioni all'interno dei più avveduti Istituti Tecnici d'Italia (**44**). (Giacomo Mauro)

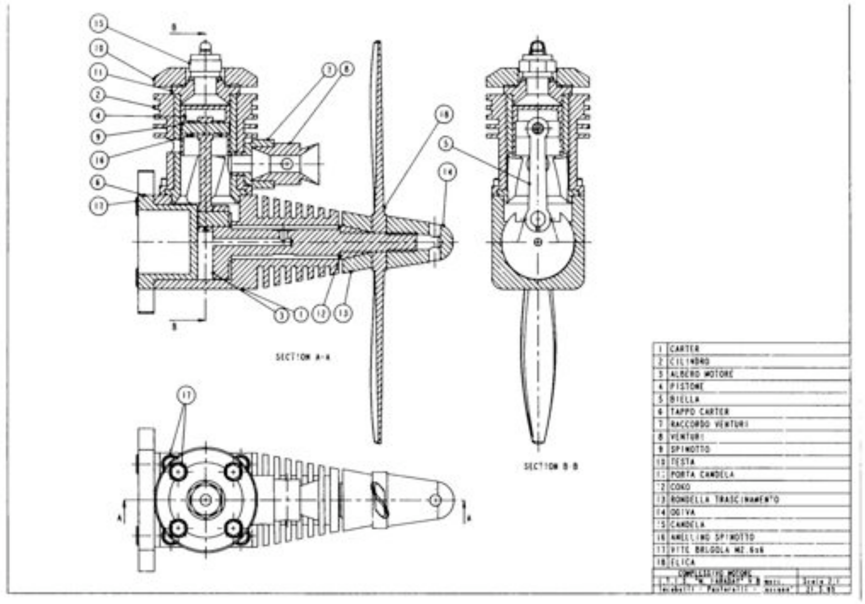
Produzione:

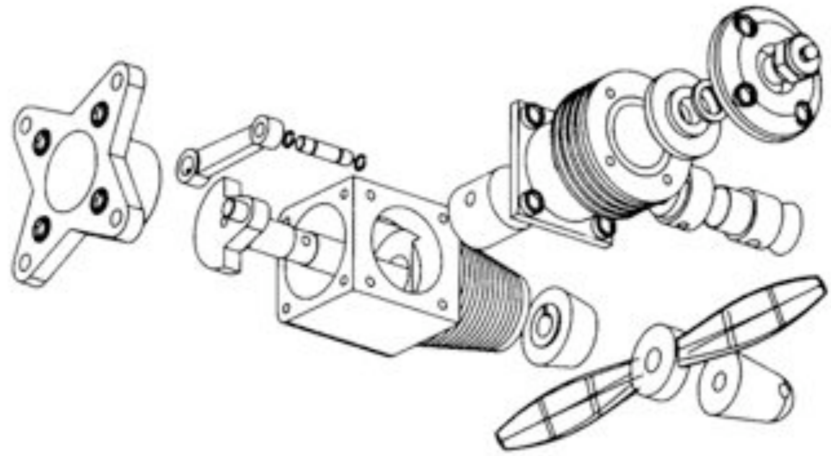
Victor	**1960**	**G**	**43-44**
Kosmic K 15D	**1974**	**D**	
Riduttore	**1969**		
Speed Piping	**1970**		

Biografia:

Fonti:

- **Giacomo Mauro - I Motori Italiani per Autocostruzione – Atti 1° Conv. Studi - Ott. 2005**

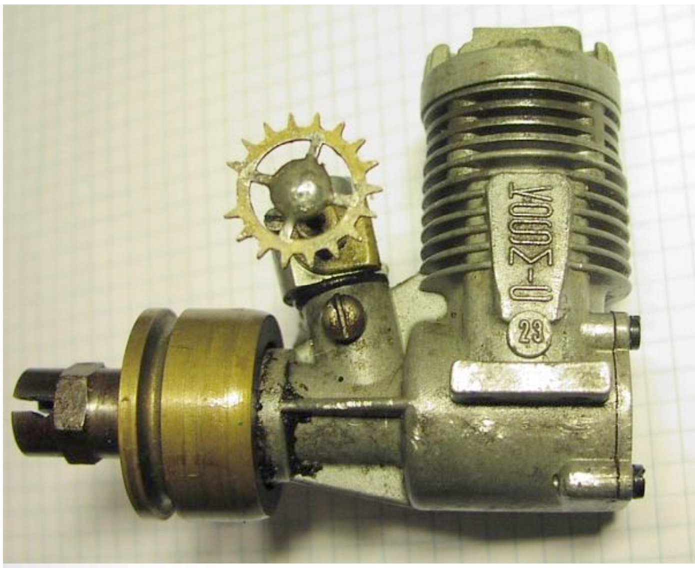


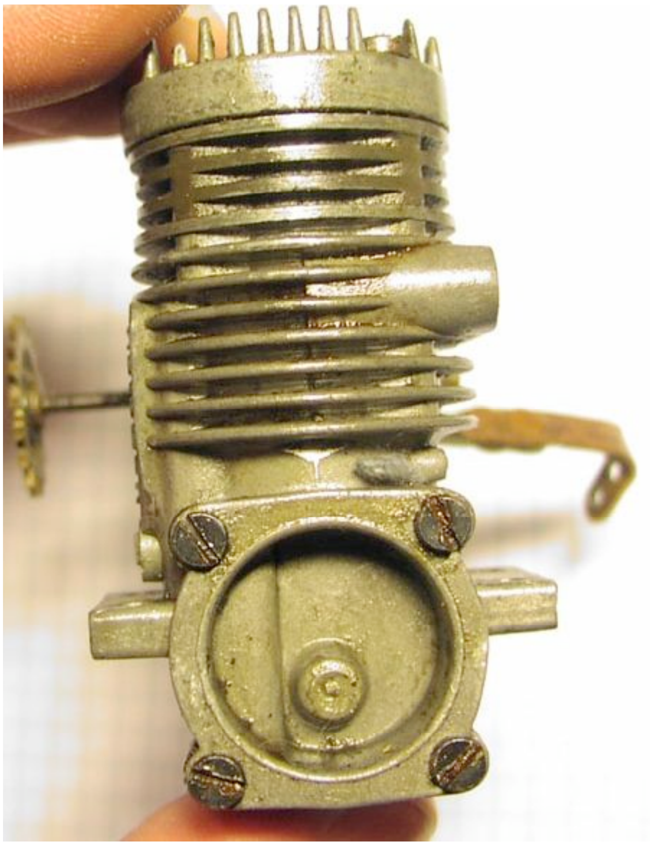


Kosmic 15 D Italy - Cesare Bossaglia, Italo Magrotti
1969-74 RD (rear disk)

KOSMIC .23 cubic inch (3.8 ccm)

Fuel Type normal nitro metane, This one is not testet yet,
This motor is dated to about ??.

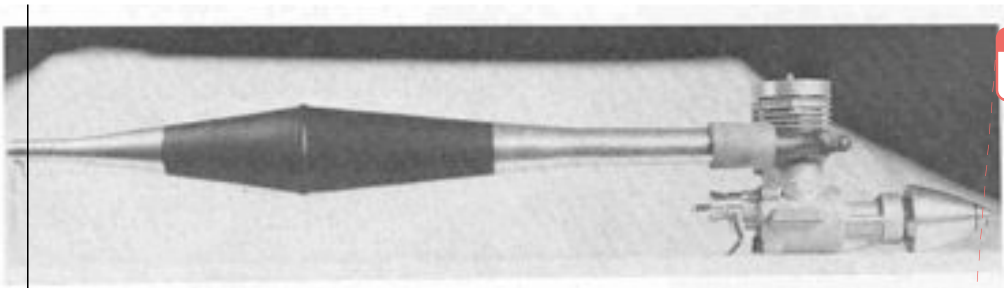




I found this one at a garage sale. K 15 cast on crankcase, and "Made in Italy", on the underside of the crankcase. Rear induction rotary valve, and the crank runs on 2 ball bearings. The finish is beautiful. Starts easy and really revs well with an 8X4. Any info on the maker, and what prop for control line?

Italian Kosmic .15. Nice engine. Made in the mid '70's. General purpose for FF, Speed, CL events. They came in both glo and diesel.
That Kosmic is more or less a speed type engine. It would be a waste in a scale ship.
I believe the Kosmic is collectible and you will see more glo versions available than the diesel.
In 1975 guys were running 7 X 5 props on the glo engines so the diesel would be good for another inch of wood.
Your Hawker will have a fairly large nose so you may want more prop in the wind or even a multi-blade prop.

Kosmic 23 glow engine and silencer. With a Perry carburettor. £ 27



Super Tigre G.21·29 'Grand Prix'

Modification techniques for speed tuning a popular Italian engine by I. MAGROTTI

THE motor chosen for tuning was the latest production version of the Super Tigre G21-29, which features an aluminium – filled flywheel and steel rotary valve. A powerful motor in standard production trim, these following modifications make a big improvement in power for speed flying, which underlines its good basic design. Running on standard F.A.I. fuel of 80-20 methanol-oil, the production engine turned a 9" x 4" Super Record propeller at 16,500 r.p.m., the modified unit achieving 19,500 r.p.m. – as will be appreciated a very significant power increase. Similar improvements were shown with a 7" x 9" propeller.

Would-be engine tuners are warned that these modifications are not possible unless one has fairly comprehensive workshop facilities, as well as the knowledge and skill to utilise them fully.

Crankshaft/Crankcase Assembly

Attention was first directed at reducing the work-load of the engine. If one compares the crankshaft, which has a diameter of 12 mm. with that of the racing Rossi 60, we see that this latter engine of double the capacity, has a shaft of only 9.5 mm. diameter. Obviously, the G.21 is stronger than necessary, and the additional weight gives an inertia which the motor has to overcome twice per revolution. Comparing the two types of ball races used in the two engines, the Rossi is better off having a 22mm. diameter, whereas in our G.21 the diameter is 28 mm which gives a noticeable difference in the peripherical velocity. So, to reduce the labour of the motor, we have to lessen the weight of the crankshaft by reducing its diameter, and substitute the rear ball bearing with one of smaller diameter. As is shown in figure I, it is necessary to reduce the diameter of the crankshaft to accept a Hoffman S3V2 bearing, which has a 9.5 mm diameter hole.

To fit this new bearing into the crankcase an aluminium spacer must be turned to the external dimensions of the original bearing, and the internal dimensions to fit the new one.

In order to maintain the pressure in the crankcase, a bush with an internal dimension .03 mm larger than that of the crankshaft diameter must be made. This bush must also have an oil-retaining groove machined upon it to coincide with the oilway on the crankshaft.

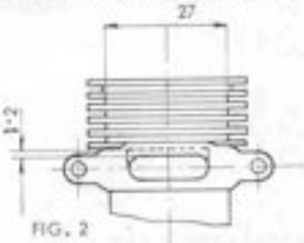


FIG. 2

Fig 2. Reduce the cooling fins to 27 mm diameter and extend the exhaust stack to match the increased exhaust port area.

To assemble, heat the spacer in hot water, then insert the bearing. Heat the crankcase in a similar fashion and insert this assembly, followed by the shaft with the bush. A little Loctite should be used to retain the bush and bearing in position, and to prevent their rotation. Check that the crankshaft revolves freely.

The only other modifications necessary to the crankcase are turning the cylinder head fins down to 27 mm diameter, and opening out the exhaust stack by 1.2 mm as shown in figure 2.

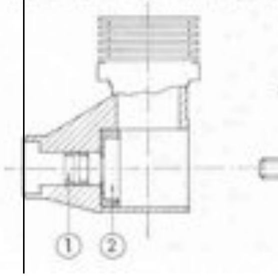


FIG. I

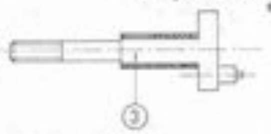


Fig 1. The bush (1) retains crankcase pressure, while the aluminium spacer (2) accepts the new ballrace. Reduce crankshaft diameter (3) to 9.5 mm.
Fig 3. The standard con-rod is shown on the left, the modified one at right. Note taper towards small end, radiused fairings, lubrication hole and oval section.

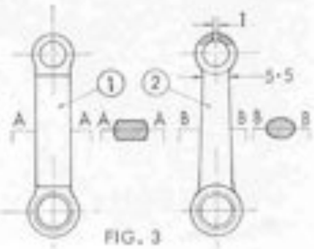


FIG. 3

All dimensions in millimetres

FIG. 4

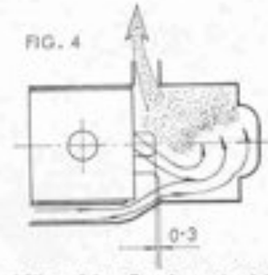


Fig 4. The addition of two flow 'correctors' leaning towards the wall opposite to the exhaust, compel the main flow to adhere to this wall so that the burnt gases do not mix with the fresh charge.

Connecting Rod

Lightening of the con-rod is most important, as a lowering in the weight of reciprocating parts enables higher r.p.m. to be achieved. The rod is tapered, given an oval section and has a 1 mm lubricating hole drilled in the small-end, see figure 3.

Piston/Liner

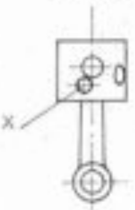
After several trials, the best results were obtained using 'Lubrisation' which is a thermal treating of the piston with 'Lubrite', and lapping-in. The piston retains an oil film on its porous surface, which is most important at the high r.p.m. of the modified engine. This treatment must be carried out by a specialist.

Our motor uses cross-flow scavenging. The main fault with this system is that the inlet ports are just in front of the exhaust ports, thus part of the fresh, incoming charge gets discharged with the previously burnt gases. To obviate this fault at least in part, it is necessary to add two flow 'correctors' which are simply two narrow ports cut in the liner, facing away from the exhaust outlet. These compel the flow of the fresh charge to adhere to the cylinder wall opposite the exhaust port, and without causing turbulence, nor mixing with the outgoing, burnt gases as illustrated in figure 4. These 'corrector' ports must open slightly later than the main transfer port so that the separate gas flows meet where the main flow has already begun to scavenge the combustion chamber. Modifications to the liner and piston are shown in figures 5, 6 and 7. To improve the gas flow, two additional ports must be cut in the sleeve, and a further two holes made in the piston to correspond with these when the latter lies at b.d.c. This modification, as well as freeing the gases trapped under the piston, also improves the lubrication and cooling of this item. See figures 8, 9 and 10.

Fig 5. Cut the two 'correctors', noting their direction. Fig 6. The fuel mixture passes through the holes (marked x) in the piston to the 'correctors' when the piston is at bottom dead centre.

FIG. 5

FIG. 6



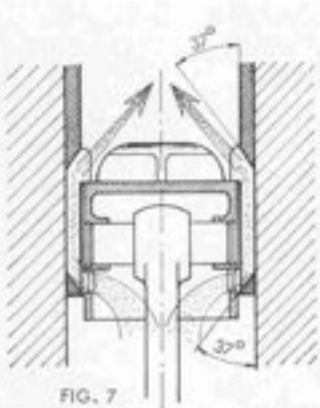


FIG. 7

Fig. 7. The flow of the 'correctors' goes through the holes of the sleeve entering the cylinder when the piston opens the ports. The drawing shows the angle of the openings.

FIG. 8

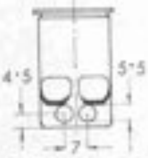


FIG. 9

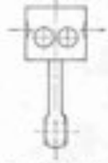
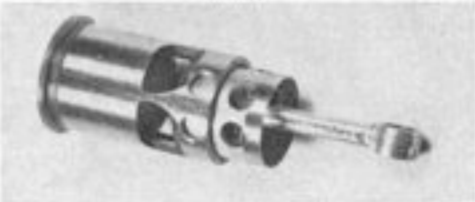


Fig. 8. Cut the sleeve as per drawing. Fig. 9. The flow of the 'correctors' pass through the two holes drilled in the piston, when the latter is at b.d.c.

The lower photo shows the 'corrector' ports and the corresponding holes in the piston, as described in figures 4 and 5, whilst above is shown the cylinder and piston modified as figures 8 and 9 to improve the flow of the fresh mixture.



Picture shows the modified Cox head within its adaptor placed in position. The modified cylinder head (seen alongside with a modified Cox head) clamps this new unit in position.

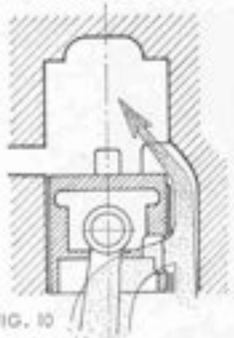


FIG. 10

Fig. 10. After these additional modifications, mixture trapped beneath the piston is led to the combustion chamber, cooling and lubricating the piston at the same time.

Combustion Chamber

Several different heads with varying combustion chamber shapes have been tried, but the most successful proved to be the ubiquitous Cox 2.5 c.c. glow head, modified as per figures 11 and 12. The head itself is turned down to the dimensions shown and an adaptor (part B) is turned from aluminium rod. Machining here must be really accurate, as the adaptor must be heated and shrunk onto the glow-head to produce a good seal. The existing head is then modified as shown, and is used to clamp the adaptor in position.

Timing

Only the exhaust timing has been altered, this being necessary due to the use of a resonant exhaust pipe. The exhaust timing is advanced to 162 degrees by increasing the height of the exhaust port as shown in figure 13.

Resonant Exhaust Pipe

The tuned pipe used is a modified version of the Italian MAPI unit, and is in fact the 'type A' designed to suit 2.5-4 c.c. engines. The pipe is modified by having an aluminium slat situated in the second cone, which acts as a gas 'brake' and helps the power at low r.p.m. This device was adopted after much trial and error and only modifies the power curve at the bottom end of the range, and does not affect full power at high revs. It is thus particularly useful for take-off with the necessarily rich setting required by the pipe.

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Fig. 11. The Cox head (above) is modified as shown, and the adaptor is machined from aluminium. Fig. 12 shows the alterations necessary to the existing head for it to act as a retaining clamp. Fig. 13. Extend the height of the exhaust port to suit the pipe requirement. Fig. 14. The 'tuned length' exhaust (a) Super Tigre 'elbow' or construct from 3 mm alum. flange and 14 x 16 mm alum. tubing. (b) Silicon rubber tubing. (c) aluminium tube 14 x 16 mm. (d) aluminium slat. (e) tail pipe from 8 x 10 mm. aluminium tube. Cones are .8 mm. alum., all joints soldered with 'Castolin' flux.

Completion

The various engine parts should now be thoroughly cleaned with petrol and an air jet, particular attention being paid to the cylinder/liner. Oil all parts with thin machine oil, and see that all parts fit without forcing. Run-in the motor with a 9" x 4" propeller on a rich setting, for a total of half an hour, then change to an 8" x 4" for the next thirty minutes. Do not use the exhaust pipe during this process.

When running-in is completed the engine is tuned by attaching the exhaust pipe and starting the engine on the 9" x 4" propeller, using the same rich setting. Lengthen or shorten the silicone rubber pipe connector until resonance is found, varying the needle valve setting at the same time.

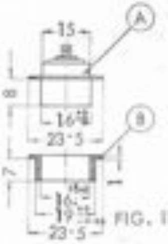

FIG. 11

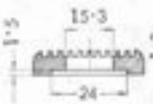

FIG. 12

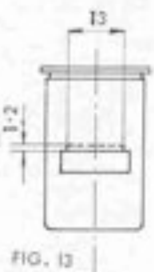

FIG. 13

FIG. 14.