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# Magic Dragon

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*John Schofield*

A number of people have asked me when I am going to write the second chapter about Magic Dragon, my half size puffer.

Ian Rutter's piece on oilfiring with a domestic/industrial burner in the Spring edition of Funnel, has propelled me into action.

After 14 years of building, I launched her two years ago and struggled up river from the Environment Agency wharf at Reading to Beale Park and then on to her mooring at Abingdon. So ....

## **Chapter 2**

Faultless is not a word that comes to mind when I describe Magic Dragon, although through evolution, she is now pretty reliable. She has proved herself to be really easy to control and operate and I have had a lot of satisfaction in ironing out the difficulties that occur with a new boat. The main reason that she is becoming more reliable is that I have a number of mentors who are ready at the end of the phone or in person to offer help and advice. Here I am naming names; John Winn (JW), Dick Bradford (DB), Paul Nicholson (PN), Ian MacAlpine (IM) and Ian Rutter (IR).

When new members join the Steam Boat Association they probably don't realise the abundant skill and talent that is available to them. If you have a problem or query all you have to do is lift the phone and you will get answers and then all you have to do is to select the right one. As DB will tell

you, 'Ask five engineers and you will get five different answers'.

Over last winter John Winn and I took out the engine, a Taylor 3¼ × 4 inch twin and took it to Ian Mcalpine. He checked and re-built it, removing a host of over generous tolerances, i.e. the knocks. This has meant the crew complain far less of headaches!

I designed Magic Dragon with the idea that she could go places. This year, I had intended to go to Ostende for the festival of Boats at Anchor with the brave JW but the weather has just been constantly against it. However, we steamed down to the Environment Agency at Reading to haul her out in order that I could look at the hull and re-apply the antifouling. Actually DB came over and did it, god bless his cotton socks. We then went on to Henley to take part in the Mini Pageant and then back to Beale Park for the Boat Show. The significance of the trip was that we had notched up our first 500 miles.

I designed the boat so that I could control her from the wheelhouse and would not need frequently to go down below to the engine room. I started by developing automatic boiler control and ended up with a large box of wires and relays which would have made the Space Shuttle's wiring pale into insignificance. When I looked at it I realised that one drop of salt water in it would mean a call to the RNLI so gradually the system became a lot simpler. My philosophy was to keep it simple and to

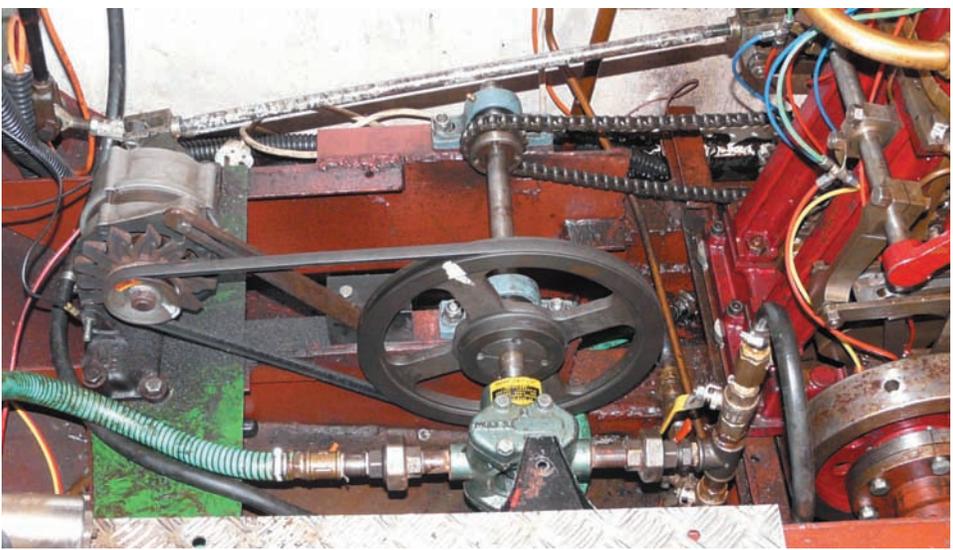


only use components that were readily available so that if anything gave up the ghost, it could be easily replaced.

A Beaver boiler, rated at 400lbs an hour, now boasts an electric pressure gauge which turns the burner on and off. A complicated electric water level system has been replaced by a reversing camera for a lorry which is the brilliant solution to the water level problem. It allows me to have the sight glass in constant view in front of me when I am at the wheel. It was IR who originally suggested a camera. The water level can easily be maintained by a switch next to the throttle lever. This opens a solenoid valve which allows water into the hotwell. When I first launched Magic Dragon not everything was correct but I found that PN's analytical mind helped sort many problems, including the solenoid valve which had been fitted the wrong way round. Boiler feed is by a Hypro pump and I also have an injector which JW fitted for those inevitable

moments of high drama. So I now have a boiler which works well and easily.

A Riello G10 burner is the heat source for the boiler. My wife Eileen originally suggested that Magic Dragon should be coal fired until I told her she was shovelling it. Surprisingly, this changed her mind so oil it is. Of all the problems that I have had, the burner has given me more than its fair share. Actually it is not the burner itself but the fuel system. The top of the fuel tank is about level with the bottom of the burner but it is about 20ft in front of the burner under the double bunk. I think I now have it sussed. The problem has been that if you don't use the boat for a while the fuel is inclined to seep very slowly back into the tank. This means the burner pump becomes un-primed and won't start. DB suggested a foot valve at the tank end which works pretty well, but JW brought a gallon can with a length of hose coming from the bottom. With a three way valve we plumbed this



into the system and I can now prime the burner and it starts first time. It looks awful but I have to grudgingly admit that it is the perfect answer to the problem but just in case he gets a bit swollen headed —the can leaks!

Now to the electrical part of the fuel system. I use a 35amp alternator which is from a Ford Fiesta. I have a lay shaft parallel to the engine which is chain driven from a taper lock sprocket on the engine crank, with a ratio of 2 to 1. So at this point, the revs are ideally suited to the Hypro feed pump which is attached at the after end. It runs at about 450 revs a minute, delivering about 2 galls per minute. However the alternator needs to run at a much higher speed and so just in front of the Hypro, there is a huge 15inch pulley which increases the revs on the alternator to about 2,200. This speed is just about on the cusp as to whether or not the alternator will 'start'. It seems that the lower the standing charge in the battery, the harder it is to get the alternator to fire up. Yet once it has done so, I can get 20amps out of it plus the 13amps or so required by the burner. I now get the burner fired up on

a little Honda generator and then switch over to battery power when I get steam up.

Currently, no pun intended, I have a Yuasa 75amp leisure battery. This seems pretty adequate for my electrical consumption. It also allows for use of the inverter/burner, cabin lights, fresh water and bilge pumps, shower drain pump and shower lights but if I am to have many 'overnights' I think I may get a larger battery.

As to the use of oil, I have a nozzle in the burner which is 2.75 gallons per hour. This allows me to operate the engine at a pressure of 100lbs which in turn gives me 5.5mph, a huge improvement over the initial speed when I launched her. Out of interest, the speed has increased by 0.3mph since her bottom was cleaned and new antifouling applied. The next burner nozzle down, a 2.5 gallons per hour, gives a speed through the water of about 4.9mph so the efficiency is still there but with fuel price going up, striving to achieve the maximum speed is getting costly. I use kerosene, central heating oil, which I buy at about 55p per litre and I am using about 10.5 litres an hour i.e. £5.86 per hour. Burner nozzles are rated

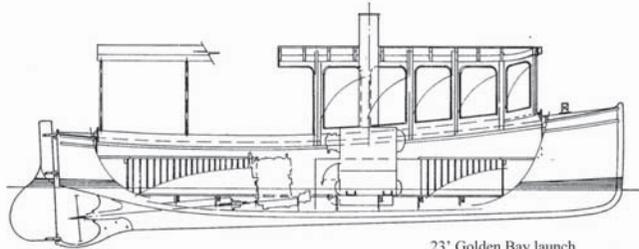
in US gallons which is about 3.75 litres as opposed to the Imperial gallon which is 4.54 litres (just thought I'd mention it). One of the problems of using kerosene is the availability. Although it gives a much lower cost to operate, the difficulty is getting the stuff to the boat. Manhandling five gallon drums is getting too much for Eileen even when I help out by carrying the picnic blanket. I don't want to use diesel as it is much more expensive and it also necessitates having to turn up the burner pressure from 8 to 12 bar although it is readily available along the Thames.

When I hauled her out for antifouling, I had the opportunity to change the propeller. I swing a 24 × 27 inch propeller but some steam buffs say I would be better having a larger one. I do have a brand new four-

bladed 27 × 33 inch prop and it has been suggested that I should fit this to use the boiler more efficiently, with the engine going at a lower speed. I have resisted this as I would have to change things such as the pulley on the lay shaft which, in turn, would mean re-engineering the lay shaft mountings. I would love readers to comment on the way I have done things if they can see ways to make improvements.

Magic Dragon is all I hoped she would be when I was designing and building her. Eileen and I have had a lot of fun coupled with a slug of achievement steaming her on the Thames. Running the boat has opened up a lot of new challenges and I think that if we get her to Ostende next year I will have plenty of stories for another article for Funnel! ■

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