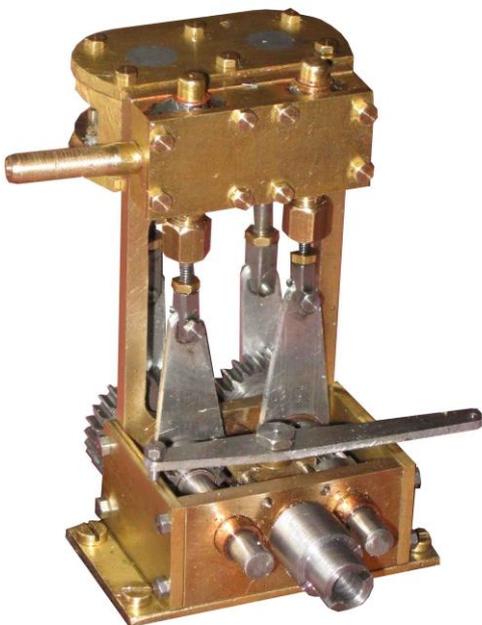


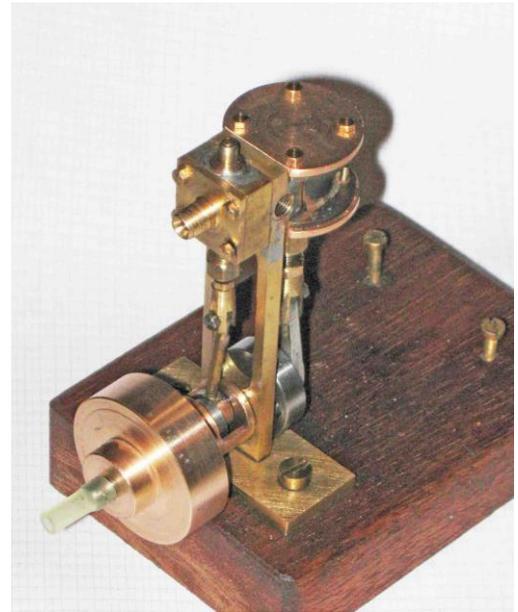
## A Couple of Short Stroke Steam Engines

A few years ago I built a steamboat powered by a small V twin oscillating engine. This worked quite nicely and during the intervening years I have been asked to make copies of this engine. Having resisted for a while, I finally set about making a few of them. Now the original engine had the cylinders made from some thin wall brass tube  $\frac{1}{4}$ " OD, giving a bore of about 0.22", (the stroke was  $\frac{7}{16}$ "). But I was having terrible trouble getting the pistons to seal decently. Eventually I gave up and decided to try something very different. I wanted to keep the swept volume of the engine about the same, but decided that I would find it much easier to get a seal on a larger diameter piston. Also, although I have made a number of oscillators, I don't like them too much and far prefer slide valve engines.

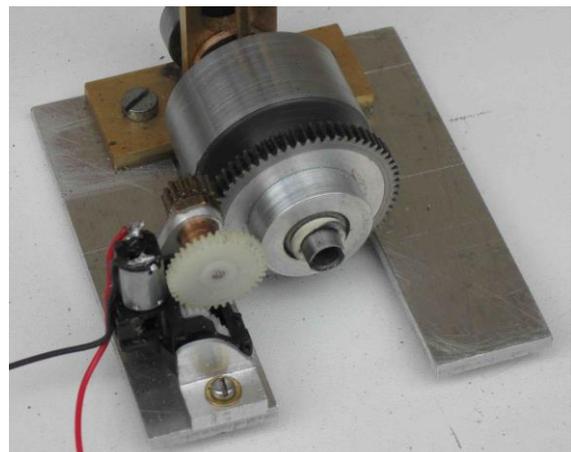
So I came up with a design for a single cylinder, double acting engine with a bore of  $\frac{1}{2}$ " and a stroke of  $\frac{1}{8}$ ". I had never come across anything with such an over square configuration before, but could see no reason why it should not work. I had other ideas for a twin with the cylinders side by side and the two cranks geared together by using the crank webs as gears, and I decided to go for a second engine with the same bore and stroke as the single.

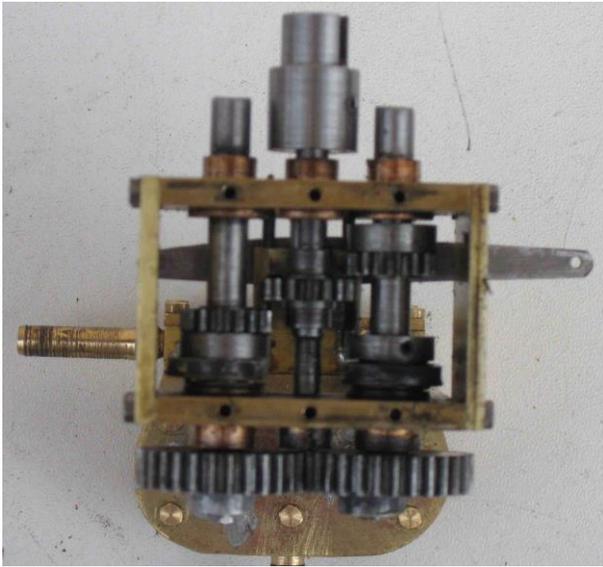


The single of course is not self starting, so a small geared electric motor is fitted to engage with a larger gear mounted on a roller clutch on the crankshaft.



No effort was made to keep the engines particularly compact. In particular I didn't try to make the height as low as I normally do. In this case, the con rod length is much longer in proportion to the stroke with the result that its angularity and hence the side thrust is much reduced. This was done in the hope that I could do away with a crosshead guide thus making for simpler construction. To partially compensate for the lack of a guide, the piston rod is fairly large (it would be anyway because of the larger diameter piston and greater thrust on it) and the length of the bearing in the bottom cover is longer than I would normally use to give a greater surface area.





On the twin, the output shaft lies between the two crankshafts. Each crankshaft has a small gear mounted on it and the output shaft has a sliding gear that will engage with either of the other gears to give forward, neutral or reverse. See the photo of the underside of the twin.

Everything works pretty well. The electric starter on the single works nicely, needing less than half a revolution to get started. And when it does, on 20psi it runs up beyond 6000 rpm. The twin self starts and forward, neutral and reverse are easy to select with the engine running.