badge. These are in a very attractive blue, close to Great Eastern, a selection of sizes have been ordered and, depending on the demand for this first batch, further orders will be placed.

The price has been set at $£ 22$ which means that we should break even when we have sold 40 sweat shirts so please consider one - a great Christmas present to yourself!

## WORKSHOP TIPS 2

Hugh Mothersole
Wheel Quartering and Crankshaft setting.
Before you say "not another one" read on and if you are into keyways this is a technique I hadn't seen before I read it in another publication recently.
Most quartering is done with a jig and either press fit or Loctite and possibly dowelled afterwards and that is fine. A number of people do use keyways both for driving wheels and crankshafts and the usual technique has been to cut all the keyways in the wheel hubs in the same
 orientation to the crankpin, usually in line with it, and cut the keyways in the wheel seats at $90^{\circ}$ to each other. This is done either using a dividing set up or by mounting the axle in a square block and turning that over $90^{\circ}$. Again nothing wrong with that. $90^{\circ}$ is fairly straightforward, other angles less so)
Someone has however applied some lateral thinking to this process and proposed that if the wheels had the keyways placed at $45^{\circ}$, and both sides were cut in the same orientation, to the crankpin then by using an axle with both keyways cut in line the action of turning the second wheel round to fit it on the other end achieves the $90^{\circ}$ quartering. This works well and has the advantages that the keyways can be cut in the axle seats at the same setting and no axle rotation is needed, also if all the wheel seats have the keyways in the same position then any modest variance from $45^{\circ}$ is irrelevant as both sides must be the same.
The same technique can be applied to other quartering angles simply by making the keyways in the wheel seats at half the difference.
This technique is also relevant to crank axies which can be more of a nuisance than wheels at times.

TAIL LAMP
Hugh Mothersole
My thanks to contributors to this issue of LINK and Best Wishes to all members for 2003.


