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## Britannia Return Crank Repair

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It was becoming evident that the seat carrying the return crank on one side of my Britannia was showing signs of distress. The taper pin securing the return crank to the crank pin kept working loose, allowing the return crank arm to “fidget” on the crank pin. This was undoubtedly affecting the performance of the valve gear and would inevitably lead to complete failure of the fixing. This was no doubt due to the number of times that the return crank had been re-positioned and fresh holes drilled through the seat to take the taper pin. During its thirty years life the locomotive had been in the hands of a number of previous owners who may also have made modifications.

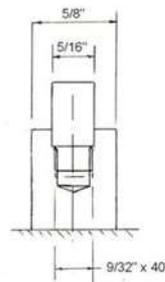


Figure 1. Crank Pin Modification



The driving axle was removed from the locomotive for the repair, which it became obvious, would have to be completed with the wheels still on the axle. Grub screws in the form of French keys secured the axle and crank pins to the wheels and they could not be moved. Dismissing, therefore, any thought that the crank pin should be pressed out of the driving wheel and replaced with a new one, a journey to the Frinton Locomotive Works (members workshop!) was made where an alternative solution was designed. It was decided that the damaged return crank seating should be removed and a new seating screwed into the end of the crank pin as shown in figure 1.



The seating was sawn off and the end of the crank pin cleaned up in the milling machine as seen in Photo 1. The end of the crank pin was then drilled and tapped to receive the new seating. Photo 2 shows the crank pin being located for drilling using the machines DRO. As an added precaution and to ensure that there was no danger of the drill wandering a simple drilling guide in the form of a cap to fit over the end of the crank pin was made.



This guide can be seen in photo 3. Photo 4 shows tapping of the 9/32" x 8 40 thread in progress. The mild steel return crank seating was turned up and screwed into the prepared crank pin after cleaning and applying a dose of Loctite 603. The finished job is seen in Photo 5



The work on the first crank pin took about 3 hours. Although the problem had only arisen on one side of the locomotive there was a high risk of the same fault developing on the other side since it had the same history. It was therefore decided to carry out the same modification on the other side of the axle. This took only an hour as the design and methodology were already to hand and the milling machine and lathe were already set up. As well as making an excellent repair this method did not require either heat or stress to be applied to the driving wheels which came through the whole process completely unmarked much to my relief.