

## **STROUDWATER CANAL CRANES (PART TWO)**

### **THE DUDBRIDGE CRANE**

Ray Wilson

#### **Introduction**

The first part of this article dealt with the history of the cranes erected by the Company of Proprietors of the Stroudwater Canal at their wharves at Wallbridge and Dudbridge between 1780 and 1854. [1] Today, the sole remaining crane is the one installed in 1854 at Dudbridge Wharf (grid reference S083470481). The crane lies within the yard of a firm of road transport contractors (H Wiggall & son) and is now separated from the canal towpath by a concrete block wall. It was manufactured by John Stevenson of Preston.

This final part of the article gives a description of the crane in its present state and considers briefly how it might be conserved and made more visible to the public in future.

#### **Basic Description**

The crane (Figure 1) is mainly of cast and wrought iron construction with a wooden jib. It is hand operated, non-luffing (fixed jib angle), but can be slewed (rotated). The

KEY

|   |                              |   |              |
|---|------------------------------|---|--------------|
| w | Winding handle               | g | Guide roller |
| b | Brake lever                  | c | Chain        |
| f | Cast iron frame              | y | Pulley       |
| p | Central pillar (not visible) | s | Shackle      |
| j | Jib                          | h | Hook         |
| t | Tie bars (2)                 | z | Weight       |

Winding Gear (not visible)

|   |                   |                       |
|---|-------------------|-----------------------|
| A | First pinion      | 160mm dia. 11 teeth   |
| B | First gear wheel  | 1220mm dia. 87 teeth  |
| C | Second pinion     | 200mm dia. 11 teeth   |
| D | Second gear wheel | 1520mm dia. 85 teeth  |
| E | Winding drum      | 330mm dia. 810mm wide |

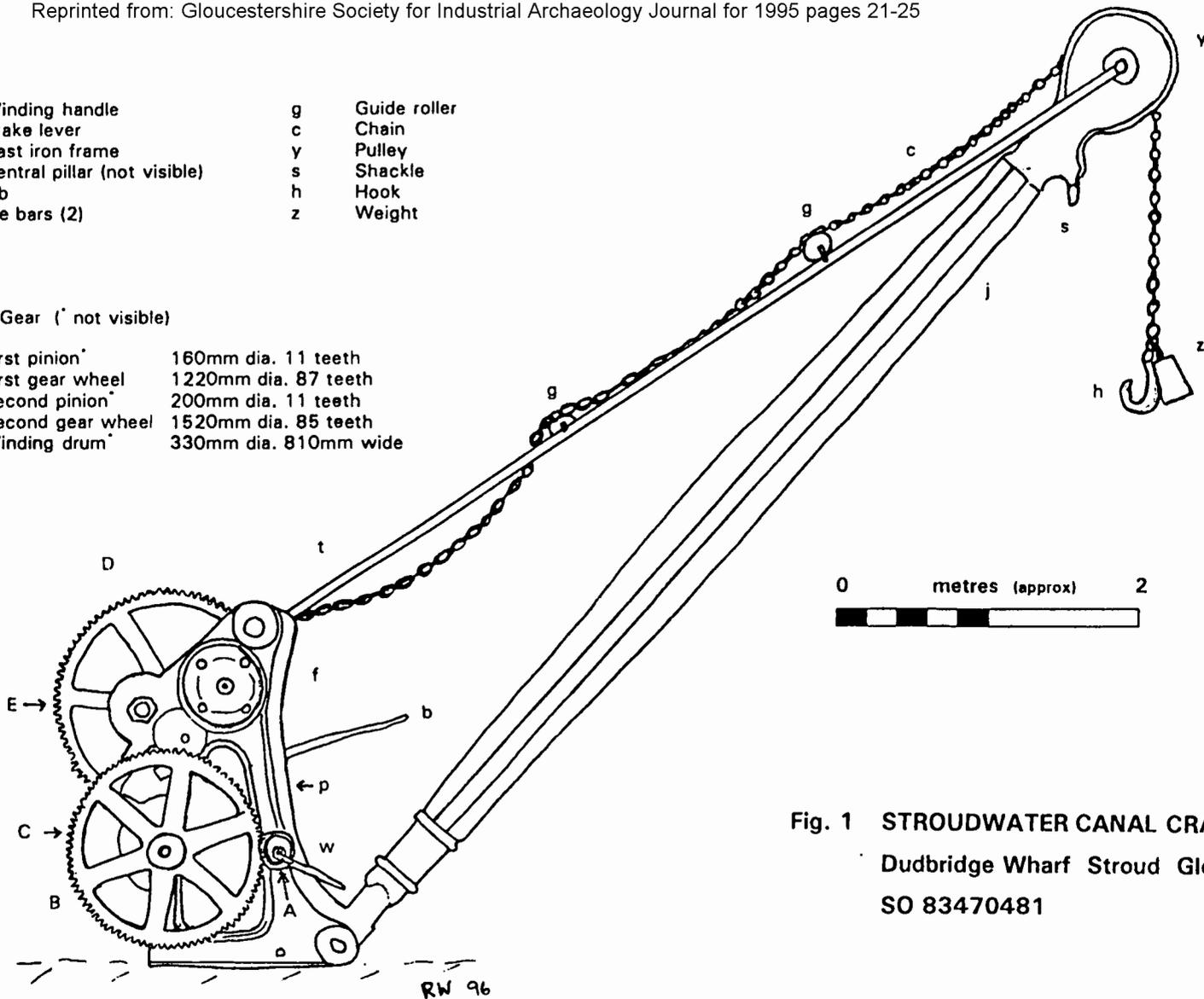


Fig. 1 STROUDWATER CANAL CRANE  
 Dudbridge Wharf Stroud Glos.  
 SO 83470481

load is carried on a 25mm wrought iron chain (i.e. links made from 25mm diameter bar). The safe working load was set by the Company at five tons. However, loads exceeding weight could be lifted if the user gave the Company the required indemnity. [1]

The crane has a fixed vertical central pillar attached to some form of base plate which is set in the ground. At present a thick layer of mud over the base plate prevents examination of the nature of this fixing. It is believed it must rest on a substantial buried foundation. The central pillar is tapered and has a maximum diameter of 530mm decreasing to 355mm at the top. The frame carrying the jib consists of a pair of side plates connected by cross members. The overall dimensions of the frame are approximately 2.4m in height by 1.5m by 1.5m. A number of wheels or rollers are fitted to the frame and run on suitable tracks on the central pillar and baseplate. These support the crane and resist the tendency for it to tilt when loaded and yet still permit the crane to be rotated.

The two main castings of the frame (the sides) bear the makers name JOHN STEVENSON CANAL FOUNDRY PRESTON. They are joined (from the top downwards) by the chain guide, the casting containing the "cap" that sits on the central pillar and takes the vertical load, the winding drum assembly for the chain and two drive shafts. A cross casting at the base carries one of the supporting wheels and three rollers. The other support roller is fixed to the winding drum assembly and runs on the central pillar near the top of the pillar which has a special profile to accommodate it. All the nuts are hexagonal and the thread forms may be Whitworth.

The jib is 7.3m in length and is inclined at an angle of  $47^\circ$  to the horizontal giving a top hook height of 5.4m and a working radius of 4.9m. It is probably made of pine and is an irregular octagon in section. The maximum diameter of the jib is about 0.44m and it tapers towards each end. Each end of the jib fits into a cast iron socket. The lower socket is fixed to the frame by pin joints and the upper socket casting is extended to carry the top pulley. The latter is unusual in that it is not an open pulley, but closed in across the flanges for the most part with two slots to accommodate the chain. A shackle is fitted to the head of the jib. An iron weight about 20kg is attached to the chain above the hook to pull the hook down against the resistance of the chain.

A pair of wrought iron bars connect the axle of the pulley to the top of the frame and are each about 50mm in diameter. They support two cast iron guide rollers for the chain. Loads are lifted by rotating the square ended shaft which projects from both sides of the frame. A pinion (A) on this shaft engages in the large gear wheel (B) which is mounted on the same shaft as the second pinion (C). The latter drives the largest gear wheel (D) which is attached to the winding drum (E). The

velocity ratio of the system is estimated to be about 175:1. The pinion (A) can be disengaged by lifting a retaining latch and sliding the shaft 100mm axially. The unloaded crane could be wound much more quickly using the handle on the square ended shaft of (B) rather than that of (A). In principle, it should not have been necessary to disengage pinion (A) to perform the faster winding but it is understood that it was common practice on winding gear of this type to do so. Indeed, if this was not done (A) would rotate quite fast and might be dangerous. Guards are in fact fitted where (A) engages the gear wheel (B) and between (C/D) but they appear to have been added later.

The brake wheel is 600mm in diameter and 90mm wide with a 25mm flange. Wooden brake blocks 25 x 76mm are each attached to the wrought iron brake band by a pair of nails. The brake lever can be latched to secure the brake in the off position. It appears it would need to be held on in use. The brake could then be released slowly to give good control when lowering the load. There is no apparent handle or lever for slewing the crane which was probably done by pushing on the jib.

### **Conservation Matters**

The crane has obviously not been painted for some years and there are small flakes of rust on all iron components. However, there does not appear to be any significant loss of metal section. There are a few places, for example on the drum, where some pockmarks have occurred. It is presumed that this is a result of water ingress in minor casting faults such as blowholes. It is likely that the frame was originally painted but it is not obvious that any paint now remains from then or any subsequent re-painting. Clearly it would require a large amount of wire brushing and rust treatment to prepare properly the ironwork for painting. Some parts are very inaccessible and some dismantling would be required.

One part of the inside of the frame shows more rusting and is bright orange colour. This region should be investigated and given appropriate treatment. Advice will be sought on conservation of the ironwork as a whole, but the most appropriate treatment would appear to be to leave it in its present state apart from the small area mentioned above.

The timber of the jib appears reasonably sound although the upper side of the jib shows some flaking. The underside shows the remains of a now matt black paint or tar treatment. It is understood that it has been treated with some form of timber preservative over the years. It would seem appropriate to apply a modern timber preservative paying particular attention to the upper side. If the jib is to be painted in the future the flaking timber would have to be removed or the cavities

filled, as it would not be sensible to paint over it. At present it would appear that the colour should be black. Old photographs might show an earlier colour scheme. Alternate black and white on the eight sides might have been used.

Most at risk are the baseplate and lower part of the frame which are submerged in the silt. It is intended to clear the silt so that these parts can be examined and recorded. At present, yard water runs into the base of the crane depositing silt and this water will need to be diverted. The winding gear and other moving parts will be greased and it is hoped that the crane will be movable again.

### Concluding Remarks

At the present time the crane is relatively secure in the transport yard but only the top of the jib is visible from the tow path. It has been suggested that the wall could be re-sited behind the crane (as seen from the towpath) and suitable railings erected to fence off the crane from the towpath. [2] An interpretation panel giving the history of the crane and wharf could be provided inside the enclosure. There would inevitably be some risk of vandalism but this might be reduced by the use of secure railings at the rear of the crane instead of the wall so that the crane would still be visible from the transport yard.

In many respects the 140 year old crane is in very good condition and appears to be in need of only minor conservation work at present. It is intended that the society will complete the investigation of what conservation work is needed during the summer of 1996 and then carry that out forthwith. The matter of making the crane more visible to the many walkers who use the towpath will take longer to resolve. However, the structure is the last surviving crane on both the Stroudwater and Thames and Severn canals so it is an option that is well worth exploring.

### References

- 1 Wilson, R., Stroudwater Canal Cranes (Part One) GSIA Journal for 1994 pages 57-62.
- 2 Ashley, D., 1993, Private Communication.