

TORSIONAL HOLDING POWER (lb/in) FOR CUP POINTED  
SET SCREWS, TABLE 3.

Shaft Diameter	SCREW SIZE.					
	B.A.	10	8	6	4	2
	U.N.C.	0	2	4	6	10
	Seating Torque lb/in	0.5	1.5	5.0	9.0	33
$\frac{3}{32}$	2.5	4	7.5			
$\frac{1}{8}$	3	5.5	10			
$\frac{5}{32}$	4	6.6	12.5	19		
$\frac{3}{16}$	5	8	15	23	31	
$\frac{1}{4}$	6	11	20	31	68	
$\frac{5}{16}$		13	25	39	84	
$\frac{3}{8}$		16	30	47	101	
$\frac{7}{16}$			35	55	118	
$\frac{1}{2}$			40	62	135	

Two screws do not give twice the holding power of a single screw unless they are positioned on the same axial centre line.

Values in Table 3. should be multiplied by a factor obtained from Fig. 1 in order to obtain the holding power of two screws positioned circumferentially with angular separation. From Fig. 1. it can be seen that two screws spaced at  $120^\circ$  have combined holding power of 1.5 times those shown in Table 3.

between maximum holding power and minimum metal between tapped holes.

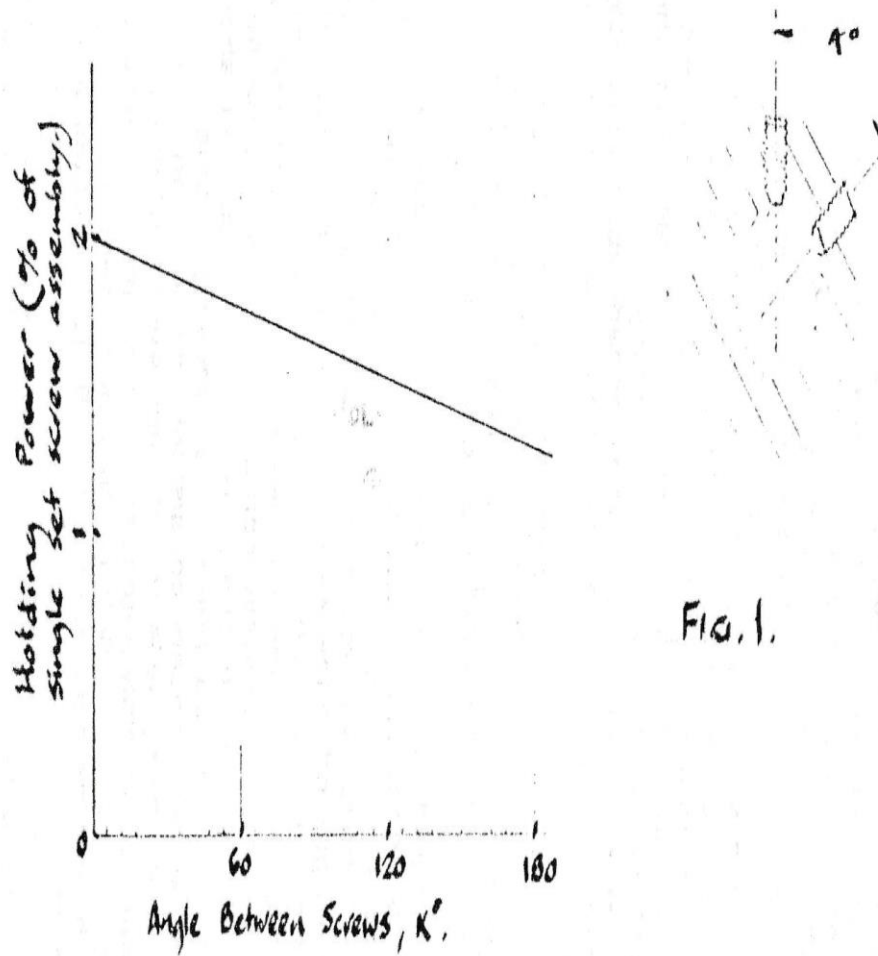


Fig. 1.

GRAPH SHOWING THAT THE ANGLE BETWEEN TWO SET SCREWS HAS A STRAIGHT-LINE EFFECT ON TORSIONAL HOLDING POWER.

Ray Smith

I first saw this in the Journal of the Model Engineers Society of Northern Ireland and the source is gratefully acknowledged. Others may have seen it elsewhere.

### **A STEAM DINOSAUR**

#### **The world's oldest steam traction engine found buried in a coal mine.**

In January 1993 British Coal's Open cast Mining Executive were working out the site of the former Brindley Colliery at Stoke-on-Trent when at the foot of the 200' high working face they reached the bottom of one of the old colliery's vertical shafts. At the base of the shaft they found an underground room with a steam engine and winding drum in-situ. Most such discoveries are tipped back into the open cast but this appeared different so the engine was hastily recovered to avoid holding up production and was dumped upside down in the mine car park. British Coal offered the engine to a local mining museum who on viewing the rusty relic at least one member of the museum staff suggested it be scrapped! Fortunately the museum's director and chief engineer felt there was more to the engine than at first appeared although they could not identify it.

A photograph of the find, upside down in British Coal's car park, appeared in Old Glory and one person realised that the engine was not a winding engine but an Aveling & Porter chain engine.

Closer investigation confirmed that the characteristics were consistent with an early chain driven traction engine or chain drive tram locomotive built during the 1860's. The design was quickly abandoned as technology advanced and of the several hundred built only one, built in 1872, was known to exist before this discovery.

The recovered engine appeared to have been purchased in 1886 from an adjacent colliery where it had been used as a surface-winding engine up to 1879 having been converted to a stationary engine some time before. On its installation underground the boiler was reduced to a shell and steam pipes installed from a boiler above ground to the engine room and these pipes were seen in the workings. How much the engine was used underground is not clear as the workings were abandoned soon afterwards leaving the engine entombed. The question of where the engine originally came from has yet to be fully resolved. The bearings of the second shaft are still in place and show considerable wear so the engine had been a self moving engine before conversion. The 10hp engine size appears consistent with very early Aveling products and it is possible that the engine is from the first Aveling of about 1865 which disappeared soon after, or possibly purchased from contractors who used 10hp engines on railway construction. Nothing has been confirmed as yet although it is certain that the engine belongs to the 1860 era of production and is almost certainly the oldest self moving engine still extant.

Restoration will be a slow process and the final form of the engine when restored has yet to be decided and no doubt will be the cause of debate for some time to come!