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practical mechanics and machine design; with an  
introduction by John Perry**

*R. G. Blaine*

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# Elementary lessons with numerical examples in practical mechanics and machine design; with an introduction by John Perry

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This historic book may have numerous typos and missing text. Purchasers can usually download a free scanned copy of the original book (without typos) from the publisher. Not indexed. Not illustrated. 1896 edition. Excerpt: ...cent. 8. In the case of certain kinds of shafting it is possible to express  $M$  as a multiple of  $T$ . Thus  $M = k T$ . Rankine has found the following values of  $k$ :--For such cases as propeller-shafts  $k$  varies from 25 to 5. For ordinary light shafting in mills...  $k$  varies from 75 to 1. And for crank-shafts and other heavy For each of the cases above mentioned deduce the constant  $a$  in the simple formula for the diameter Note.--The values here found agree with values of the multiplier  $c$  given at page 99. 9. Find the two equal stresses (tensile and shear) which combined will produce a resultant tensile stress of 66,000 lb. per sq. inch. 10. A cylindric shaft transmits 30 HP at 150 revolutions per minute, and is subjected to a bending moment equal to the twisting moment; find the diameter of the shaft, if the safe shear stress of the material is 9,000 lb. per sq. inch. ANSWERS. 1. Yes. The resultant stress is 5 6 tons per square inch. 2. 6,057-8 lb. per square inch. 3. 6,428 lb. per square inch LESSON XXIV. OVERHUNG CRANK. CRANK-PINS. LENGTHS OF BEARINGS, ETC. A Very good illustration of combined twisting and bending actions is the case of an overhung crank (Fig. 58). Let  $P$  be the total push, or pull, of the connecting rod at right angles to the direction of the crank. Fig. 68. Then  $T = P \times AC$ , and  $M = P \times BC$ , the resultants of all the forces acting on the journal and crank-pin being assumed to pass through their centres respectively. Then using our rule for combining twisting and bending moments, we have-- $T^2 = (P \times BC)^2 + (P \times AC)^2 = P^2 BC^2 + P^2 AC^2$ . Hence we calculate the twisting moment for an overhung crank as if the crank were of a length equal to the horizontal distance  $BC$ , plus the sloping distance  $AB$ ....

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