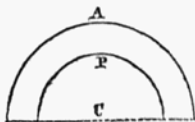


PROP. 15. *If n represent the ratio of the inner and outer diameters, the strength of the solid cylinder will be to that of a tube of the same exterior diameter as $1 : (1 - n^4)$.*

FIG. 29.



Let r = exterior radius, nr = interior radius, R = strain at A , then $r : nr :: R : nR$ = strain at P .

The resistance of the semicircle CA is $\frac{\pi r^3 R}{8}$. (See last problem).

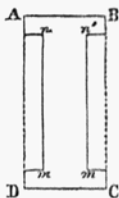
The resistance of the semicircle CP is $\frac{\pi n^4 r^3 R}{8}$.

The resistance of the ring is $\frac{\pi r^3 R}{8} (1 - n^4)$

$$\frac{\pi r^3 R}{8} : \frac{\pi n^4 r^3 R}{8} (1 - n^4) :: 1 : (1 - n^4).$$

PROP. 16. *To find the strength of a vertical rib with horizontal flanges on both sides.*

FIG. 32.



This case can be immediately deduced from that of a rectangular section, for the area is evidently equal to the rectangle AC — 2 rectangles nm , and as the neutral axis is in the centre, the strength will be equal to the difference of the strength