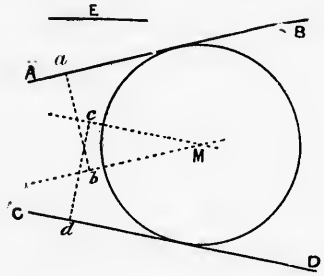
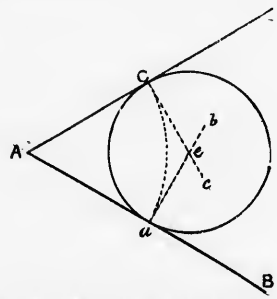
PROBLEM 42.—To Describe a Circle Having a Given Radius E and Touching Two Given Straight Lines A B, C D.



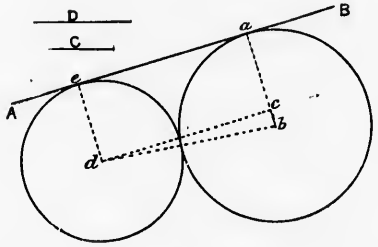
At any points **a** and **d** erect perpendiculars **a b** and **c d** to the lines **A B** and **C D** respectively, and both equal to the given radius **E**.
Through **b** and **c** draw lines parallel to **A B** and **C D**, respectively.
The circle described from the point of intersection **M** as a centre, with radius **E**, will touch the given lines **A B**, **C D**.

PROBLEM 43.—To Describe a Circle Touching Two Given Straight Lines **A B**, **A D**, and Containing a Point **C** in One of the Lines.



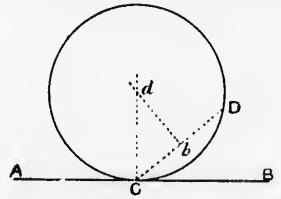
From **A** as centre with radius **A C**, describe an arc cutting **A B** in **a**.
At **C** and **a** draw perpendiculars **C e** and **a b**, to **A D** and **A B** respectively, meeting in **e**.
From the centre **e**, with the radius **e C** or **e a**, describe the required circle.

PROBLEM 44.—To Describe Two Circles with Given Radii **C** and **D**, Touching Each Other and a Given Line **A B**.



Draw any perpendicular **a c b** to the line **A B**, and make **a b** equal to **D** and **a c** equal to **C**.
Through **c** draw **c d** parallel to **A B**, and from the centre **b** with radius **b d** equal the sum of the given radii **C** and **D**, describe an arc cutting the line **c d** in **d**.
About **b** and **d** as centres, describe the required circles with radii respectively equal to **D** and **C**.

PROBLEM 45.—To Draw a Circle, the Circumference of which shall Pass Through a Given Point **D** and Touch a Given Straight Line **A B** at a Given Point **C**.



Join **C D** and bisect it in the point **b**.
At the points **C** and **b**, erect perpendiculars to the lines **A B** and **C D**, respectively.
The point **d**, where the perpendiculars meet, will be the centre of the circle to be described with the radius **d D** or **d C**.

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