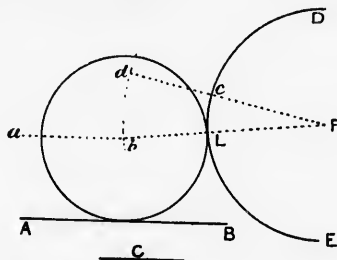


PROBLEM 46.—TO DESCRIBE A CIRCLE OF GIVEN RADIUS C , WHOSE CIRCUMFERENCE SHALL TOUCH A GIVEN CIRCLE DEL AND A GIVEN LINE AB .



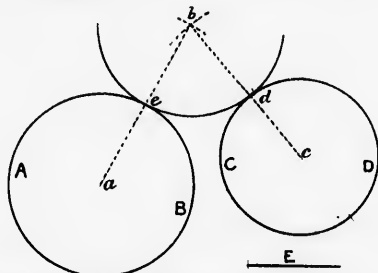
Draw a line ab parallel to the given line AB and at the distance C from it. (Prob. 7).

Draw any radius Fc and produce it, making cd equal to C .

From F as centre with radius Fd , describe a circle meeting the line ab in b .

Join bF , cutting the given circle in L , which will be the point of contact of the given and required circles. b will be the centre of the required circle and bL a radius.

PROBLEM 47.—TO DRAW A CIRCLE OF GIVEN RADIUS E AND TOUCHING TWO GIVEN CIRCLES AB , CD , HAVING CENTRES a AND c , RESPECTIVELY.

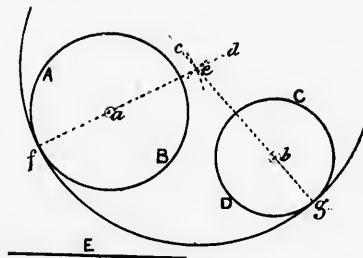


With a as centre and a radius equal E plus the radius of AB , describe an arc.

With c as centre and a radius equal to E plus the radius of CD , describe a second arc meeting the former in b .

Join ba and bc . The circle described with b as centre and E as radius, will be that required.

PROBLEM 48.—TO DESCRIBE A CIRCLE OF GIVEN RADIUS E , WHICH SHALL TOUCH TWO SMALLER CIRCLES AB , CD , AND INCLUDE THEM.



From the centre a , with a radius equal to the given radius E less the radius of the circle AB , describe an arc ce .

From the centre b , with a radius equal to the given radius E less the radius of the circle CD , describe an arc ed , meeting the former arc in e .

From e as centre with a radius equal to E , describe the required circle touching the given circles in f and g .