

Division Plates Without Tears

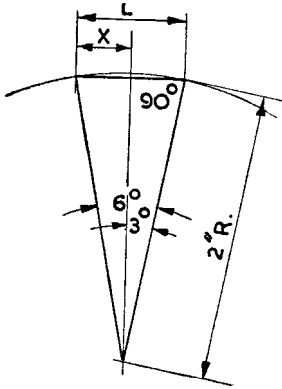
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MOST of us require at some time or other an accurate division plate, but the methods open to us for the production of this require a fair amount of skill and do not guarantee results.

For example, it is perfectly easy to "box off" the holes after calculating their positions by "trig," but it is another matter to drill them accurately to limits of less than .00025.

It is also easy to set up a change wheel as a division plate, but unless it is new and accurately cut the results cannot be guaranteed.

A simple but tedious method is as follows :- First? it is necessary to decide the number of holes required and the pitch-circle diameter, and then calculate the chordal pitch of the hole centres.



For the purpose of this article, say 60 holes on a 4-in. P.C.D. Next, divide 360 deg. by 60 ; this gives the angle of the segment between any two holes. From this can be calculated the chordal pitch.

Formula for Establishing the Chordal Pitch

(See diagram above)

L = Chordal pitch.

To find L , one must first find x .

$$x = \sin 3 \text{ deg.} \times 2$$

$$\sin 3 \text{ deg.} = 0.05234$$

$$\text{Therefore, } x = 0.05234 \times 2 = 0.10468$$

$$\text{Wherefore, } L = 0.10468 \times 2 = 0.20936$$

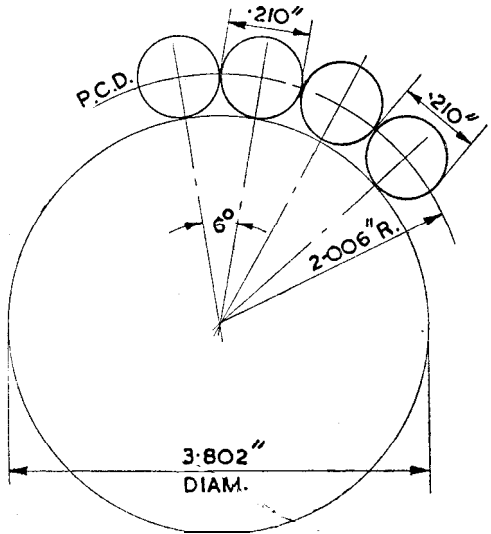
The chordal pitch is therefore 0.20936.

As 0.20936 is an awkward dimension, it can be called 0.210 and our pitch circle becomes 4.012.

Sixty drill bushes are now needed, 3/32 in. bore, 0.210 o.d. x 1/2 in. long, one bung to fit the bore of the division plate having a head 3.802 in. dia. x 1/4 in. thick and some plaster or "Cerro Matrix."

The next stage is to mark out the pitch circle on the division plate and divide it into 60 parts,

then drill and tap 10 B.A. at every division. Insert the bung and place a drill bush over a 10 B.A. hole, screw it down, ensuring that the bush is in contact with the bung, and follow on round the bung with the rest of the bushes. It is extremely important that all the bushes touch each other at the bung. The bushes must now be encased in plaster or "Cerro Matrix." If "Cerro Matrix" is used, the job must be warmed up so as to remove all traces of moisture ; failure to do so can result in a serious accident. The advantage of "Cerro Matrix?" however, is that it does not shrink on cooling and will hold the bushes as effectively as a jig-bored drill plate.



Layout of set-up (not to scale)

When whatever the bushes are set in has hardened, the screws should be removed and a 3/32-in. drill (very sharp) run through so as to open up the 10 B.A. holes. Note : After the first hole has been opened up, a 3/32-in. dowel should be inserted so as to stop the improvised drill-jig from "creeping."

Remove the improvised-but accurate-jig from the division plate and chamfer the edges of the 3/32-m. holes with a centre drill. You now possess an accurate division plate.

The point to remember is that, although tedious, this method is accurate and the only thing to equal it would be a jig borer.