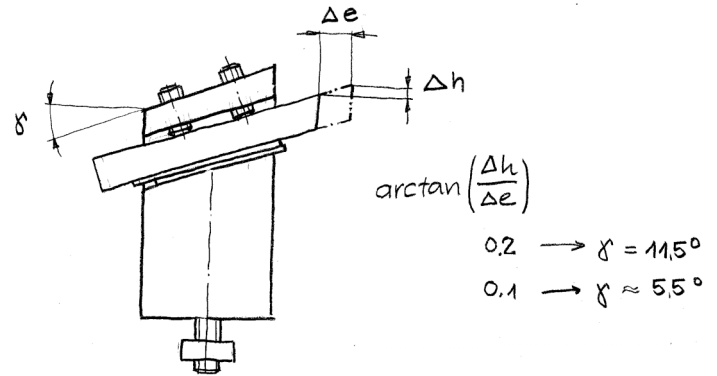


When working with a small machine like a TAIG Micro Lathe it is important to keep the tool bits sharp. That means frequent re-sharpening without wasting tool bit substance. The set angles of the tool rest of the bench grinder have to ,stay' during a whole workday. The idea is that just a shallow shave of the front of the tool bit removes the worn cutting edge.

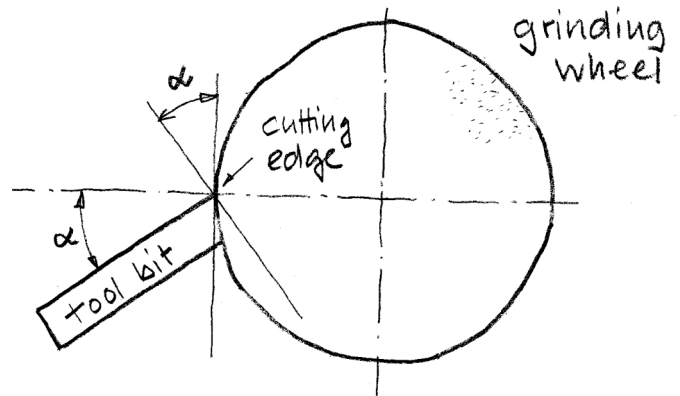
Being able to adjust consistently the tool rest's angle has the advantage to work with proven parameters - all the more important with small lathes.

Given the limited rigidity of a small lathe I'm preferring 6x6mm (1/4") or 3x6mm or 8x8mm (5/16") HSS bits. The bits are mounted in inclined toolposts, given rake angles of 11.5° and 5.5° without the need of grinding ,rake'. Moreover the height of the tip of the tool bits can be easily adjusted to the center of the spindle. Ratio 0.2 with 11.5° and 0.1 with 5,5°



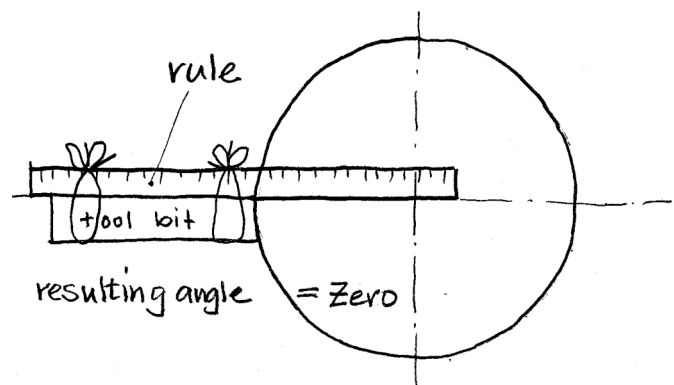
How to measure / adjust the inclination between tool bit and (circumference of) grinding wheel?
What is the relevant ,angle' anyway?

Given the the large variety of tool rest designs it makes no sense to invent scales for the tool rests.

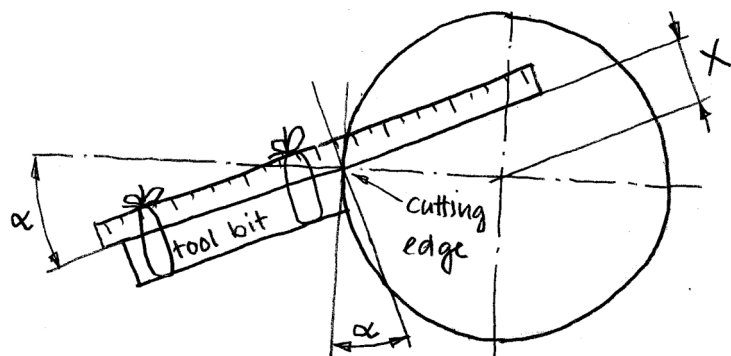


If we tie a rule on top of the tool bit and measure the distance to the wheel's center we get a readily understandable measure of the relevant angle.

here: Angle=Zero



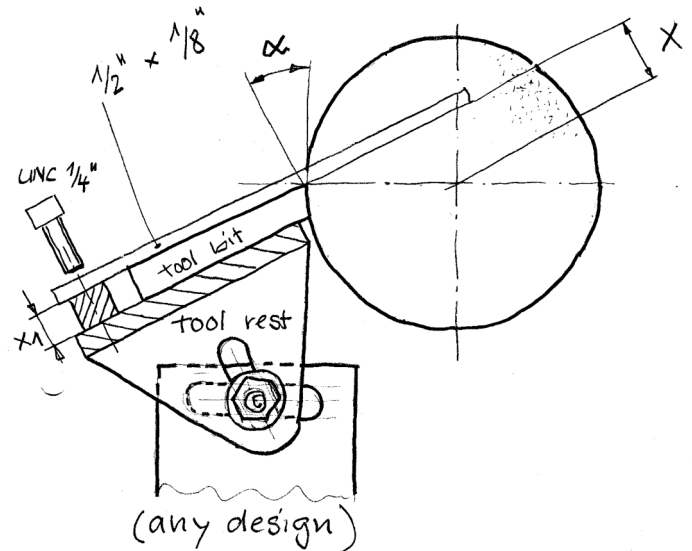
As long the cutting edge is near the circumference of the wheel there is no other parameter determining the angle. In this case we can deduce the ,angle' from distance x.
Or: we can set X to get a certain angle.



by Ulrich Viebahn

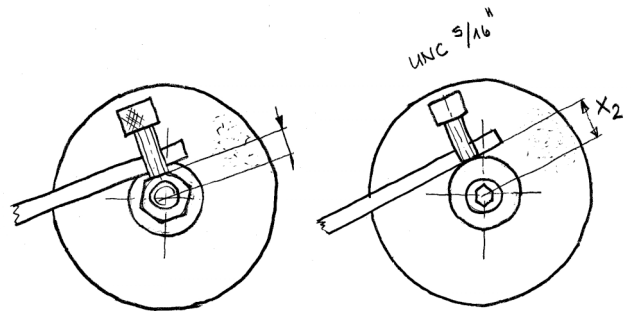
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Lets introduce the tool rest. In order to save our preciously simple relationship we must put a spacer between tool rest and rule.
Thickness x_1 = height of tool bit.

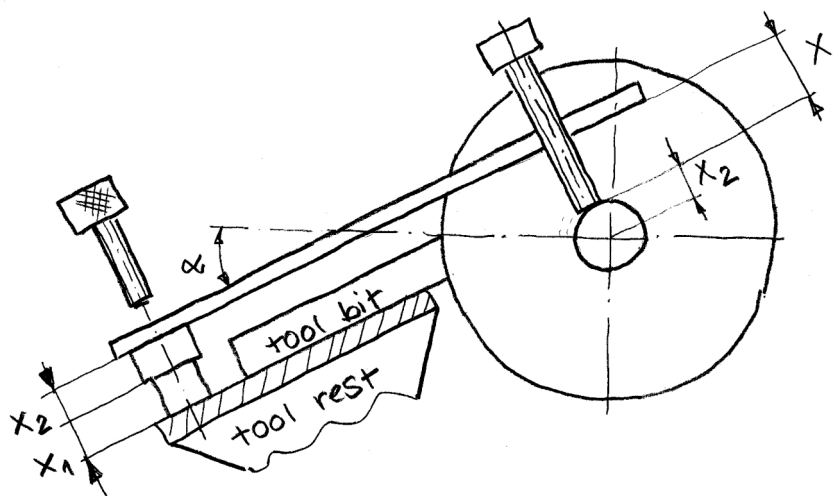


Now: it is not very convenient to measure the distance between rule and wheel center.

Idea: Put a screw with known pitch in rule touching a part of the hub of the wheel - be it a washer, a ring or the hexnut itself. Counting revolutions sets the distance x .
(A scale would be more convenient, though)



In order to compensate the trick with the hub lets not forget to put a second spacer under the rule with x_2 = radius of ring or hexnut.



The 2 spacers will become one and will be screwed together with the rule to your tool rest.

Rule, spacer and the 2 screws are the components of our precision angle setting gauge.

Bench Grinder: Angle setting gauge for tool rests

by Ulrich Viebahn

June 14th 2021

For each toolbit thickness you'll need an extra spacer (if not an extra gauge).

Lets check how our gauge works:

You should have already made a thread in the back part of your tool rest.

Screw in the gauge into the completely loose tool rest.

If you use the concept of the ,raking' toolpost than you have to add the rake angle (11.5° , 5.5°) to the desired clearance angle.

(5...7° for non industrial conditions)

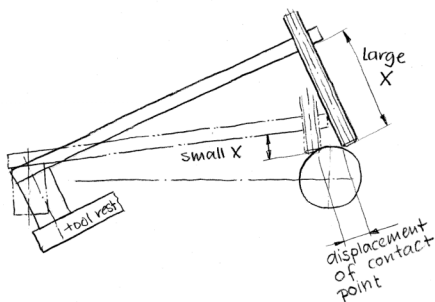
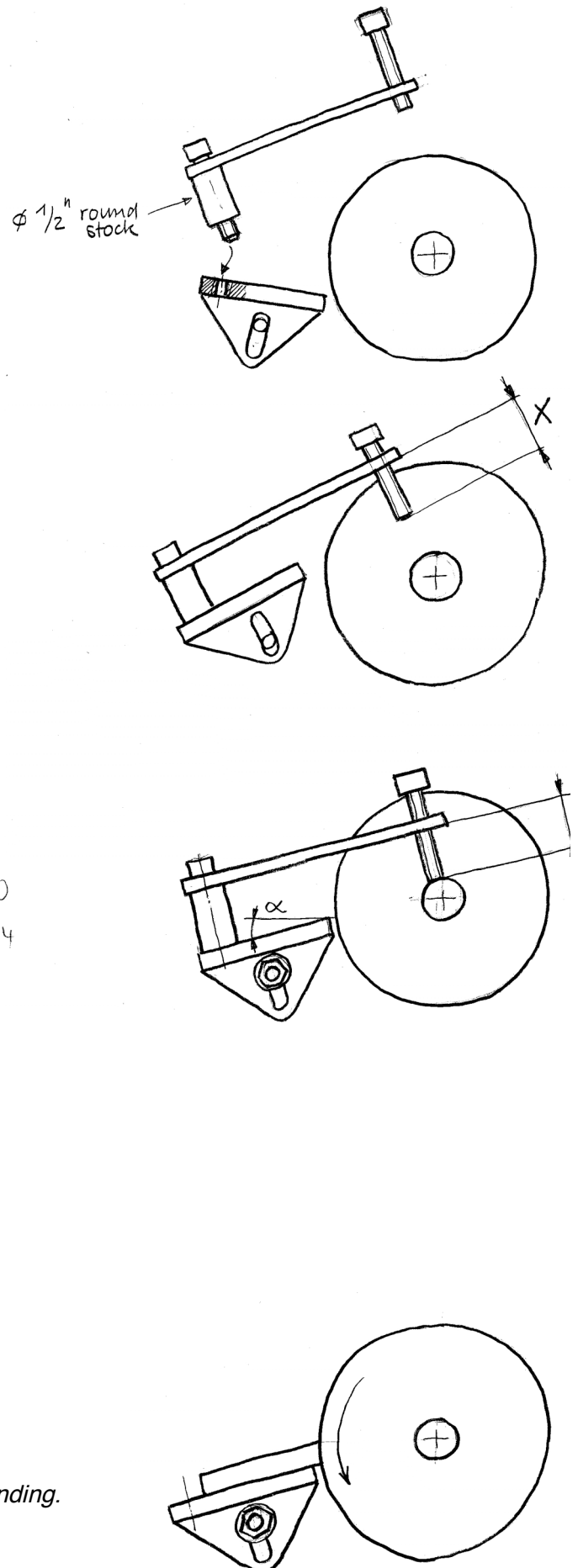
Set the screw to X
by measuring or
by counting turns from zero

Move or slide the tool rest into position

1. Measuring screw X touches hub
2. Front edge of tool rest with $1/16''$ distance to grinding wheel.

Tighten the tool rest nut or whatever.

By the way: Because of the pivoting movement of the gauge the X screw tip touches the hub in different points. You may compensate it with your good eye or invent a design with broad tip.



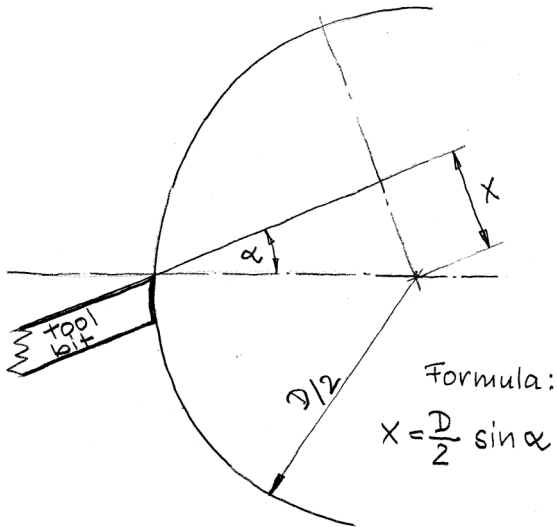
Remove the gauge and start grinding.

Bench Grinder: Angle setting gauge for tool rests

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Luckily the calculation of X is simple. It depends only from the diameter of the grinding wheel. Variations d to wear are not important.



Angle	Wheel diameter		
	5"	8"	10"
3°	3,3	5,3	6,6
4°	4,4	7,1	8,9
5°	5,5	8,8	11,1
6°	6,6	10,6	13,3
7°	7,7	12,4	15,5
8°	8,8	14,1	17,7
10°	11,0	17,6	22,1
12°	13,2	21,1	26,4
14°	15,4	24,6	30,7
16°	17,5	28,0	35,0