You Know Jethro, that just doesn't look right!

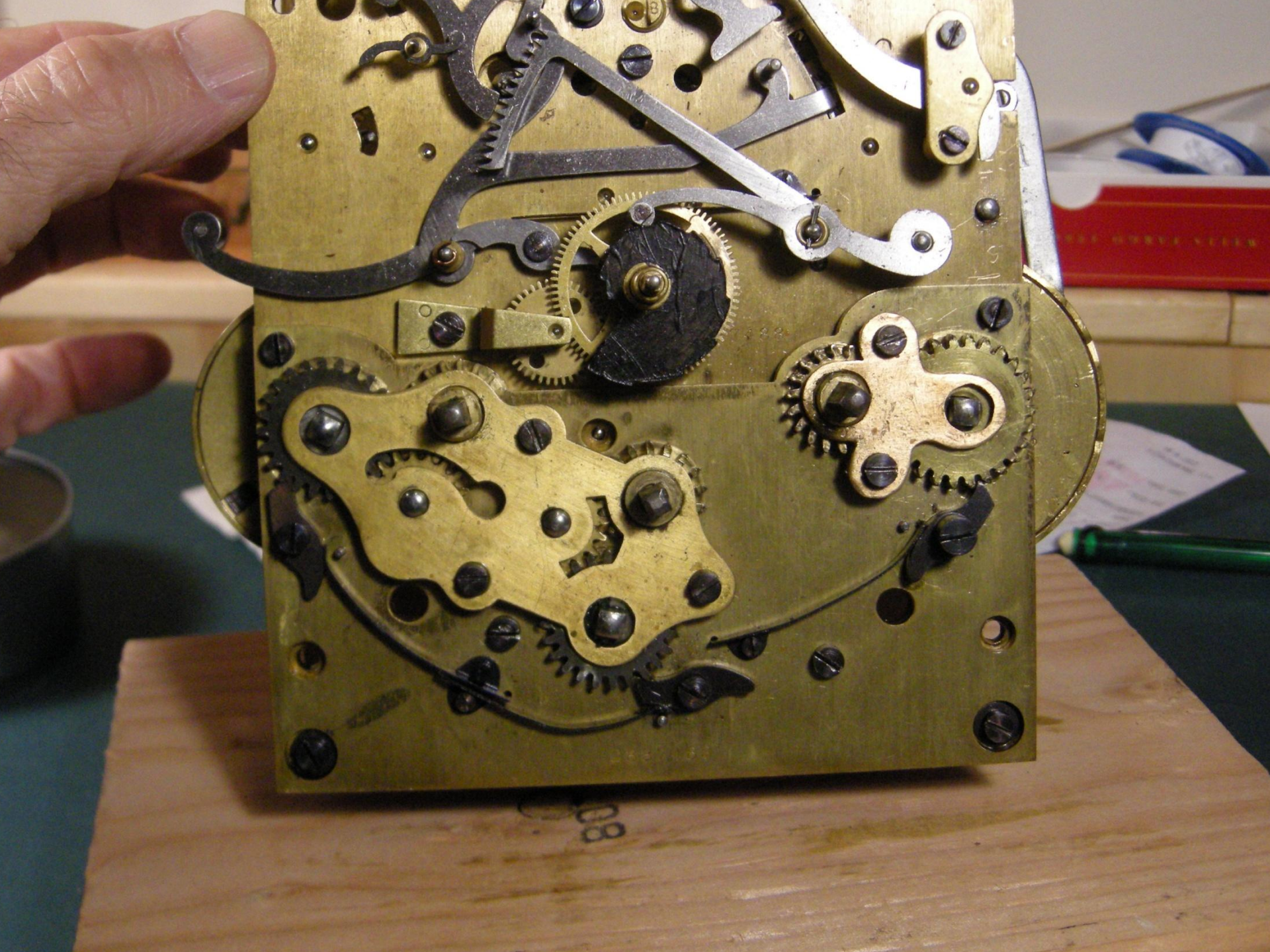
Marshall Fields and Co (now Macy's) Chicago, Ill

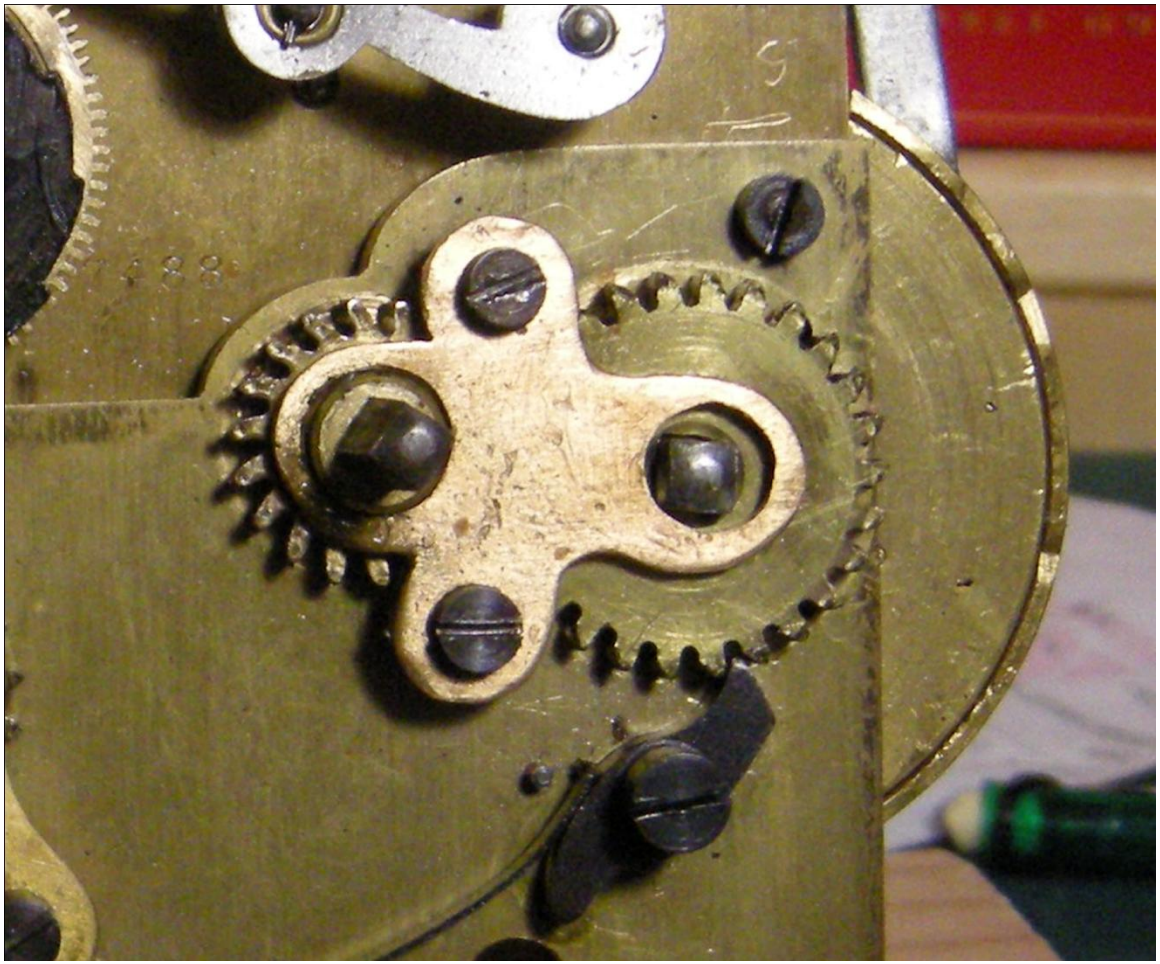
Gearing Up For A Challenge

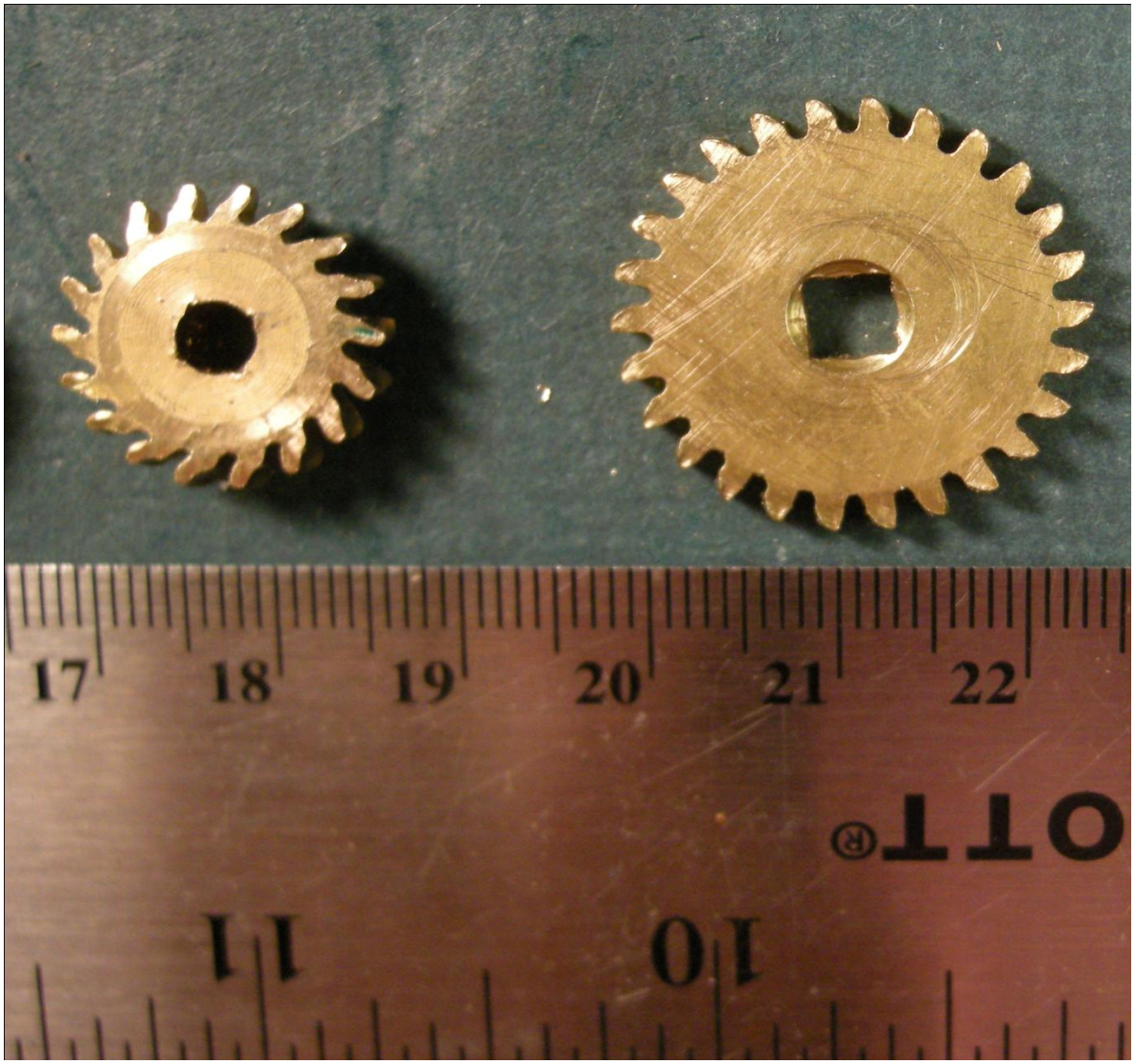
Rick Hubble

7/10/2011

Chapter 5 Presentation



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So Ron, what “kind” of brass should I make the new wheels out of??

3 Major Categories of Brass

1) Alpha brasses: <35% zinc, are malleable, can be worked cold.

2) Alpha-beta brass (Muntz metal) is between 35-45% zinc and is suited for hot working. It is harder and stronger then alpha brass.

3) Beta brasses: 45-50% zinc content can only be worked hot. Are harder and stronger and suitable for casting.

British Std (Obsolete)	ASTM std Designation	Name	Composition						Comments
			Copper	Zinc	Lead	Tin	Iron	Other	
	?	Gilding metal	95%	5%					softest brass commonly available-use for ammunition "jackets"
	C230	Red Brass	84-86%	15%	0.06%		min of 0.05%		only brass that is reddish in color, use for pipes, architectural applications
	C240	Low Brass	80%	20%					light golden color-used for flexible metal hoses
	C260	Cartridge or yellow Brass	68-71%	28-31%	0.07%		0.05% max		Shell casings. Machinability rating = 30. Good cold working properties
	C268	Yellow Brass	66%	34%					
	C272	Common Brass	63%	37%					
	C280	Muntz	60%	40%	0.09%		0.07%		Architectural applications, Signage, Condenser plates, lining on boats
	C314								
	?	High Brass	65%	35%					high tensile strength-use for springs, screws, rivets
	C330		65-68%	33.5%	0.2-0.8%		0.07% max		Fire poles
	C353	Engraving brass	61.5%	36.5%	2.0%				good for clock parts, gears. Machinability rating =90 (1)
CZ120*	C360	Leaded Brass	60-63%	35.5%	2.5-3.7%		min of 0.35%		highly machinable-easily cut and shaped. Machinability rating =100 (1)
	C385	Red Brass	55-60%	39%	2.5-4.5%				
	C464	Naval Brass	59-62%	39.2	0	0.5-1.0%	0.1% max		corrosion resistance. Machinability Rating=30
	C485	Leaded Naval Brass							
	C770	Nickel Silver	53-56%	27%	0.1% max	0	0	16-19% nickel	named for its silvery appearance
	C792	Nickel Silver							

	Red Brass	Cartridge or yellow Brass	Muntz			Engraving Brass	Leaded Brass	Red Brass	Naval Brass	Leaded Naval Brass	Nickel Silver	Nickel Silver
	C230	C260	C280	C314	C330	C353	C360	C385	C464	C485	C770	C792
Flat Bar/thickness range							0.125"-2.0"	0.125"-1.0"				
Round Bar (max diameter)				2"			12"	2"	2.75"	3"		
Sheet (thickness range)		0.016" to 1"				0.125"-1.0"			0.04" to 0.375"			
Square Bar							0.125" to 3.5"					

Typical Wheel thickness = 0.031 inches

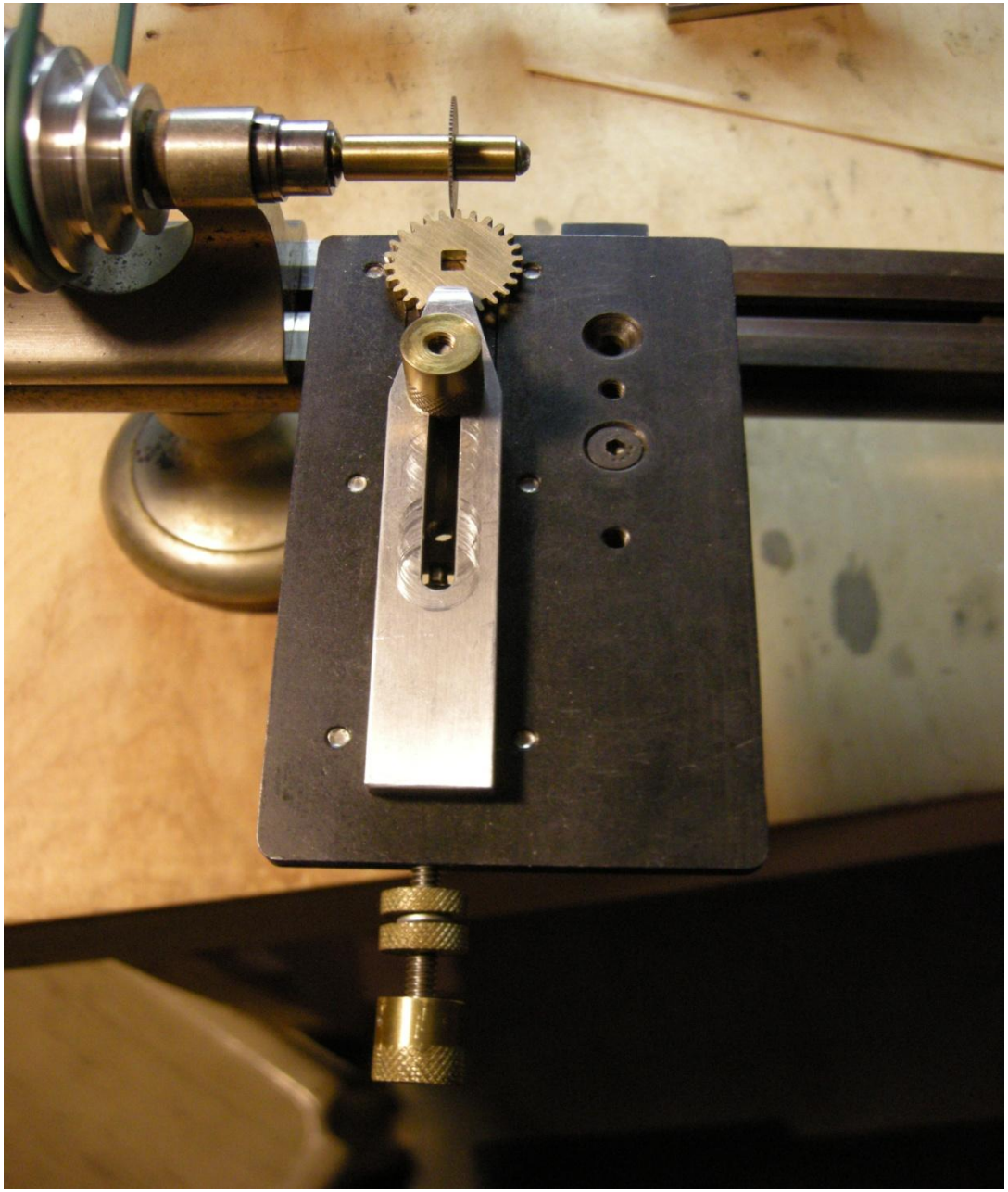
Typical Frame thickness = 0.056 inches

Sources: http://www.onlinemetals.com/
http://www.farmerscopper.com/
http://www.sequoia-brass-copper.com/
http://www.metalsdepot.com/
http://www.astm.org/Standards/B36.htm
Buy it by the Pound? (Sims, Allen Steel)

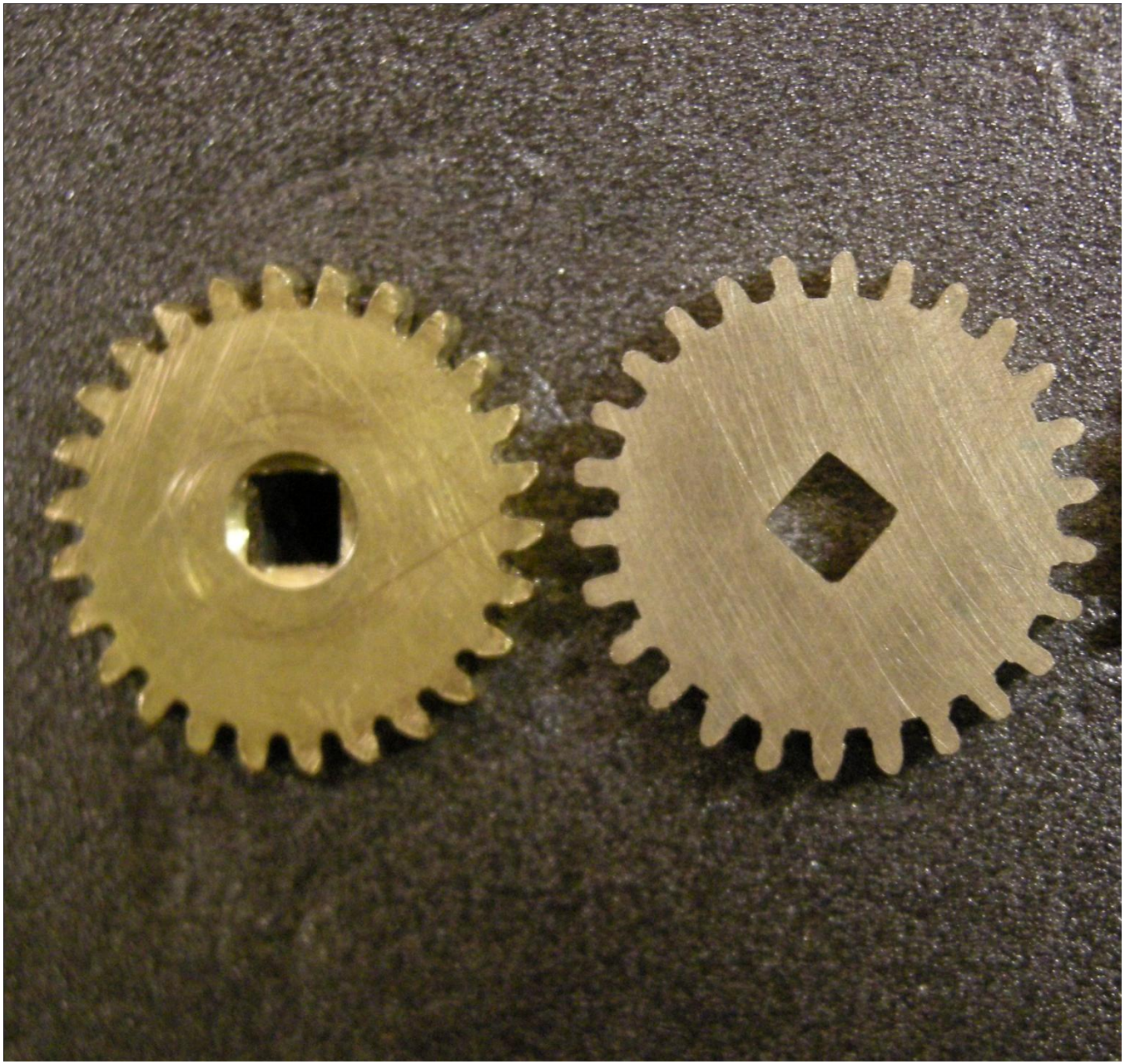
What type of Brass did the old Clock Makers Use?

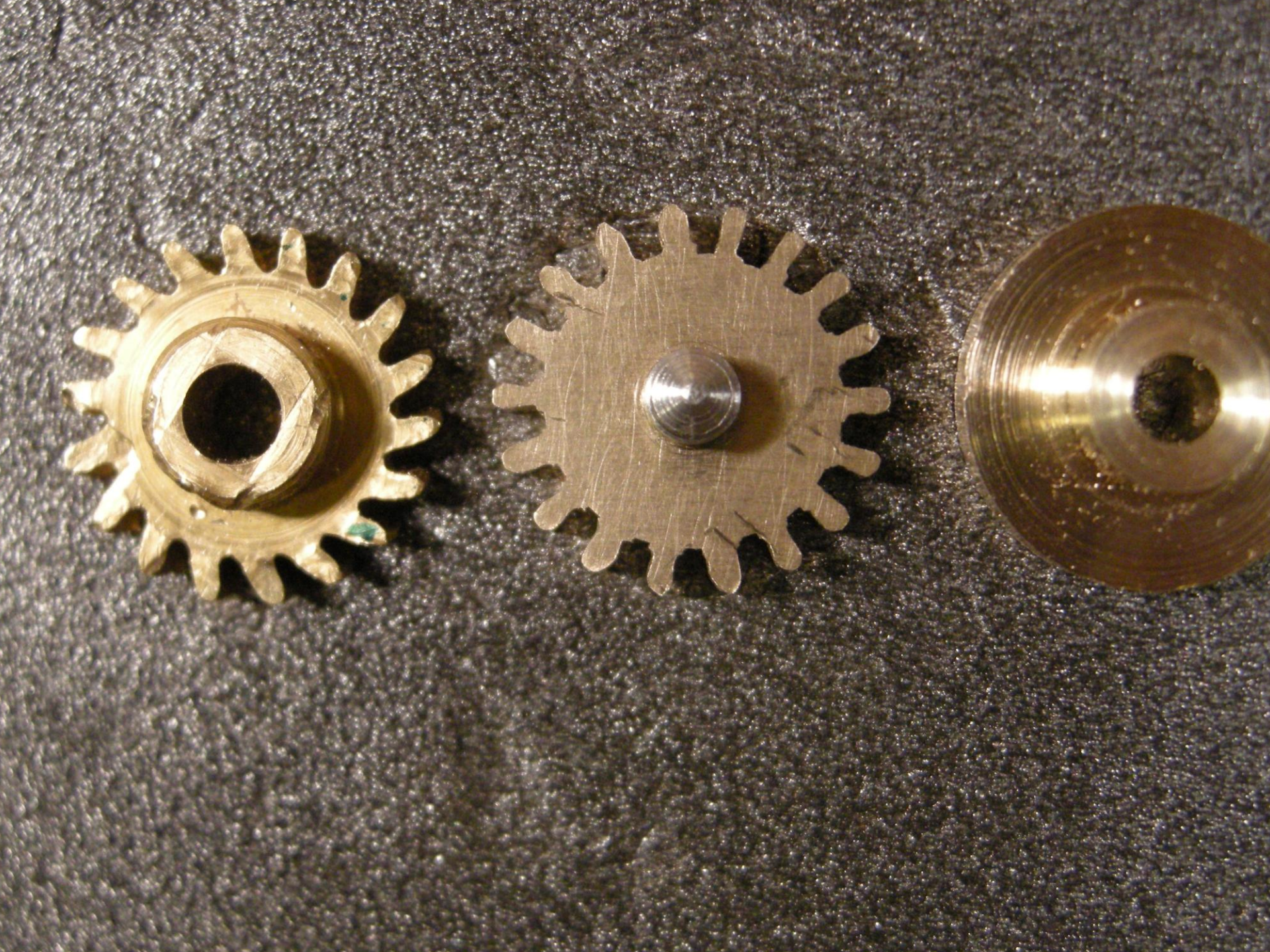
The Short Answer: I am not sure

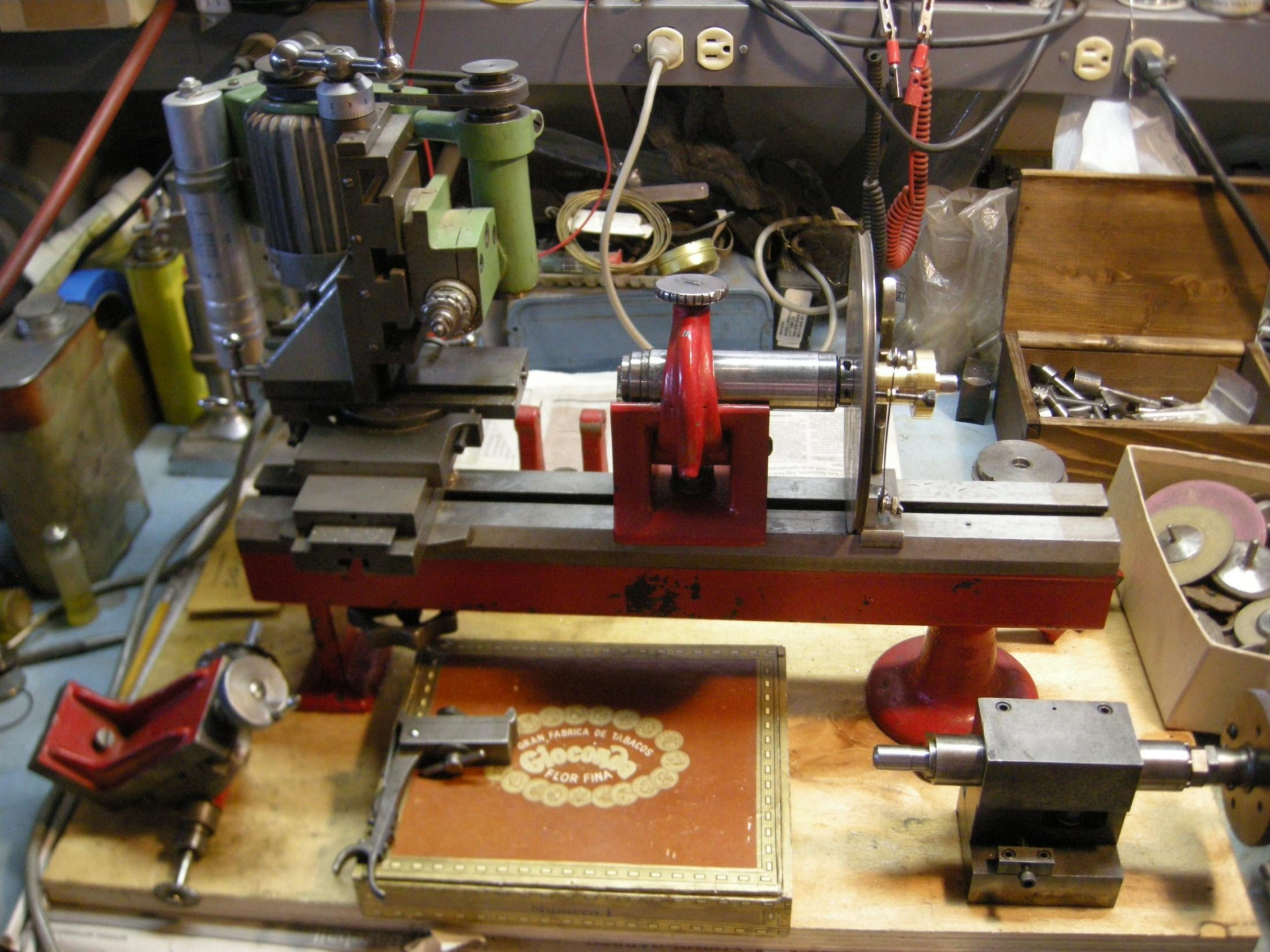
Downtown Chicago, Ill



Tooth Cutting Jig

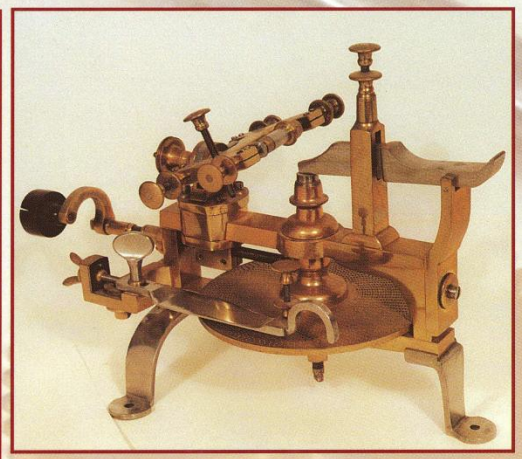




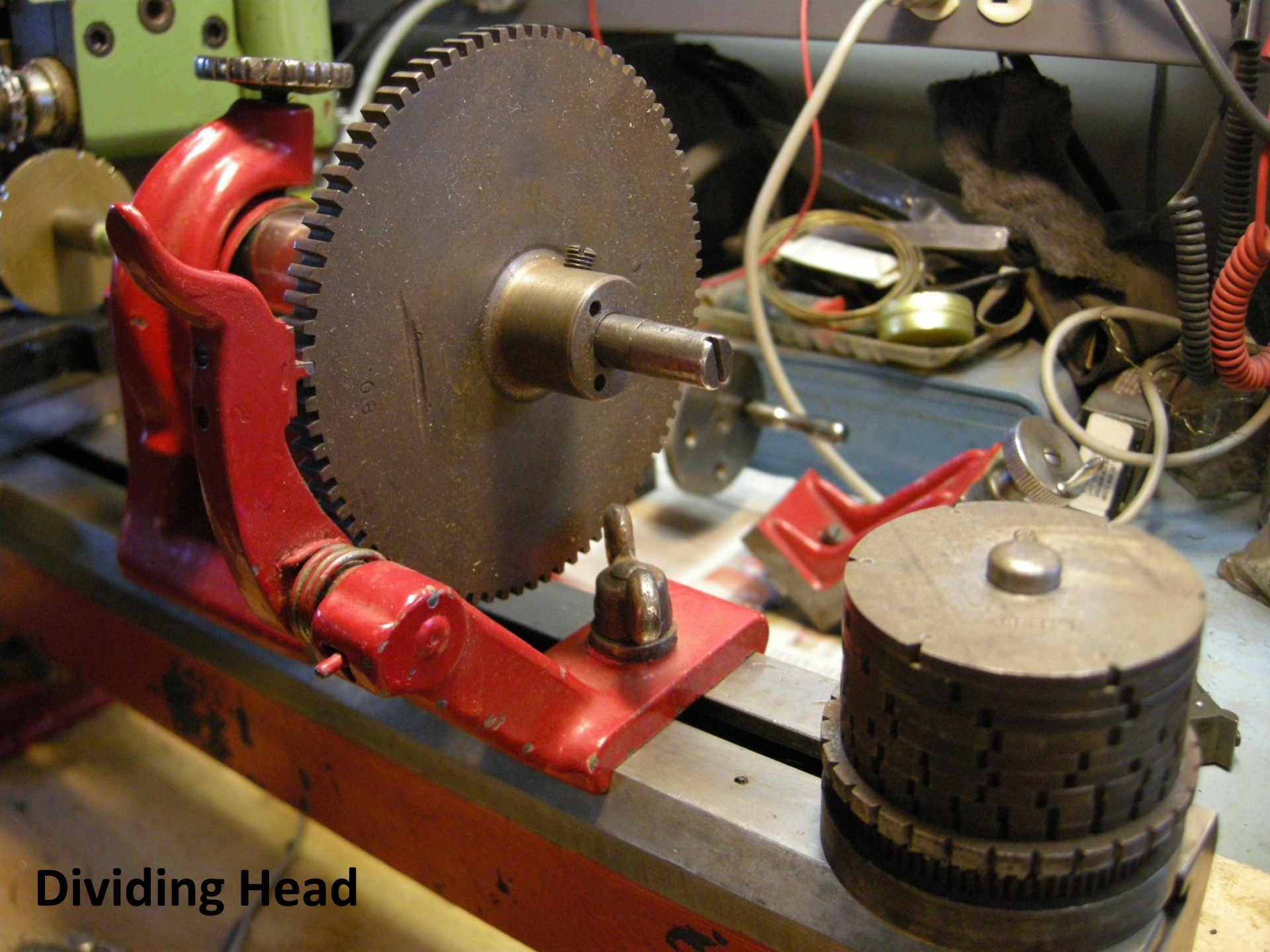

GRAN FABRICA DE TABACOS
FLOR FINA

Wheel and Pinion Cutting in Horology

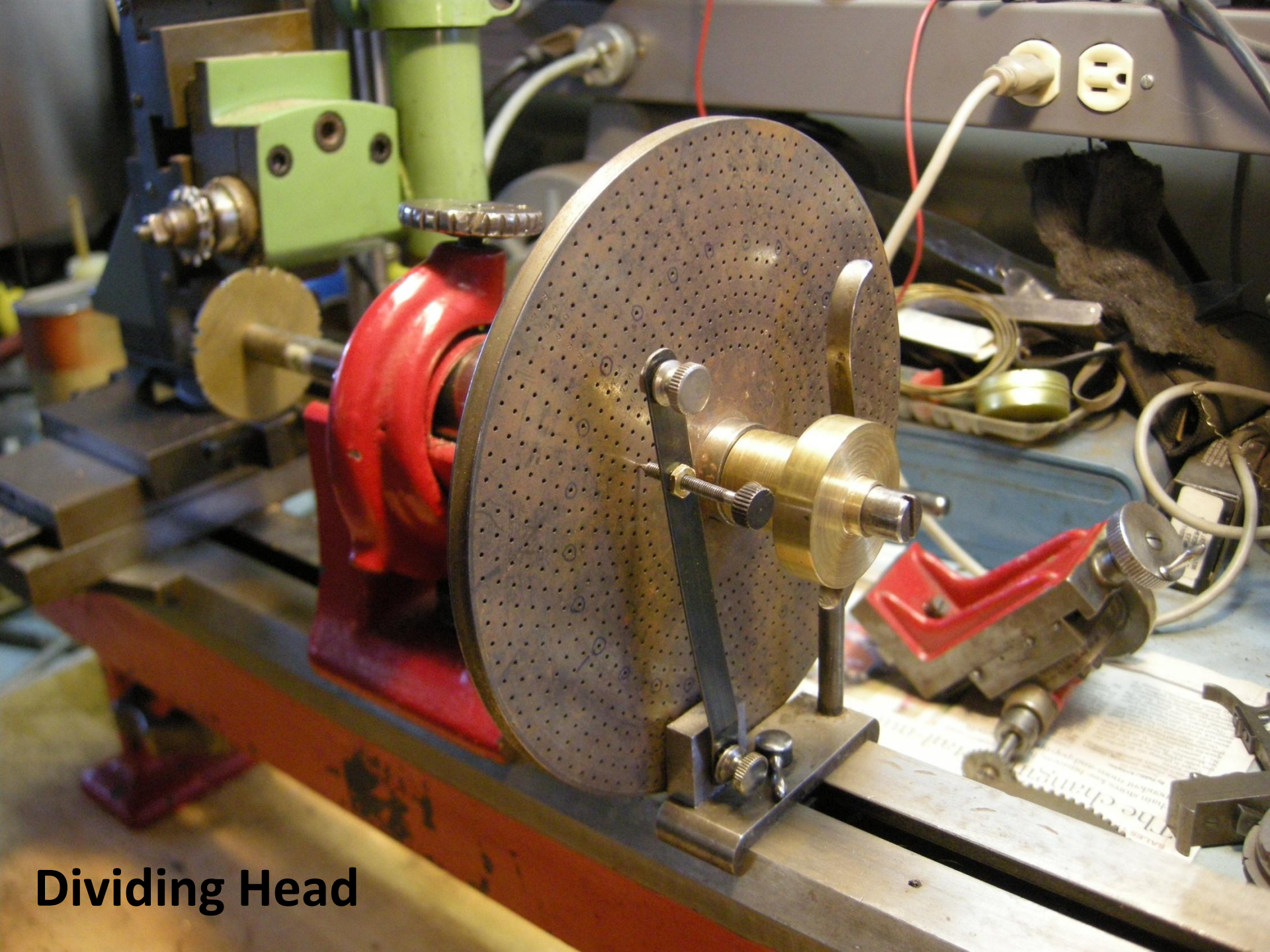
A historical and practical guide



J Malcolm Wild FBHI



Dividing Head



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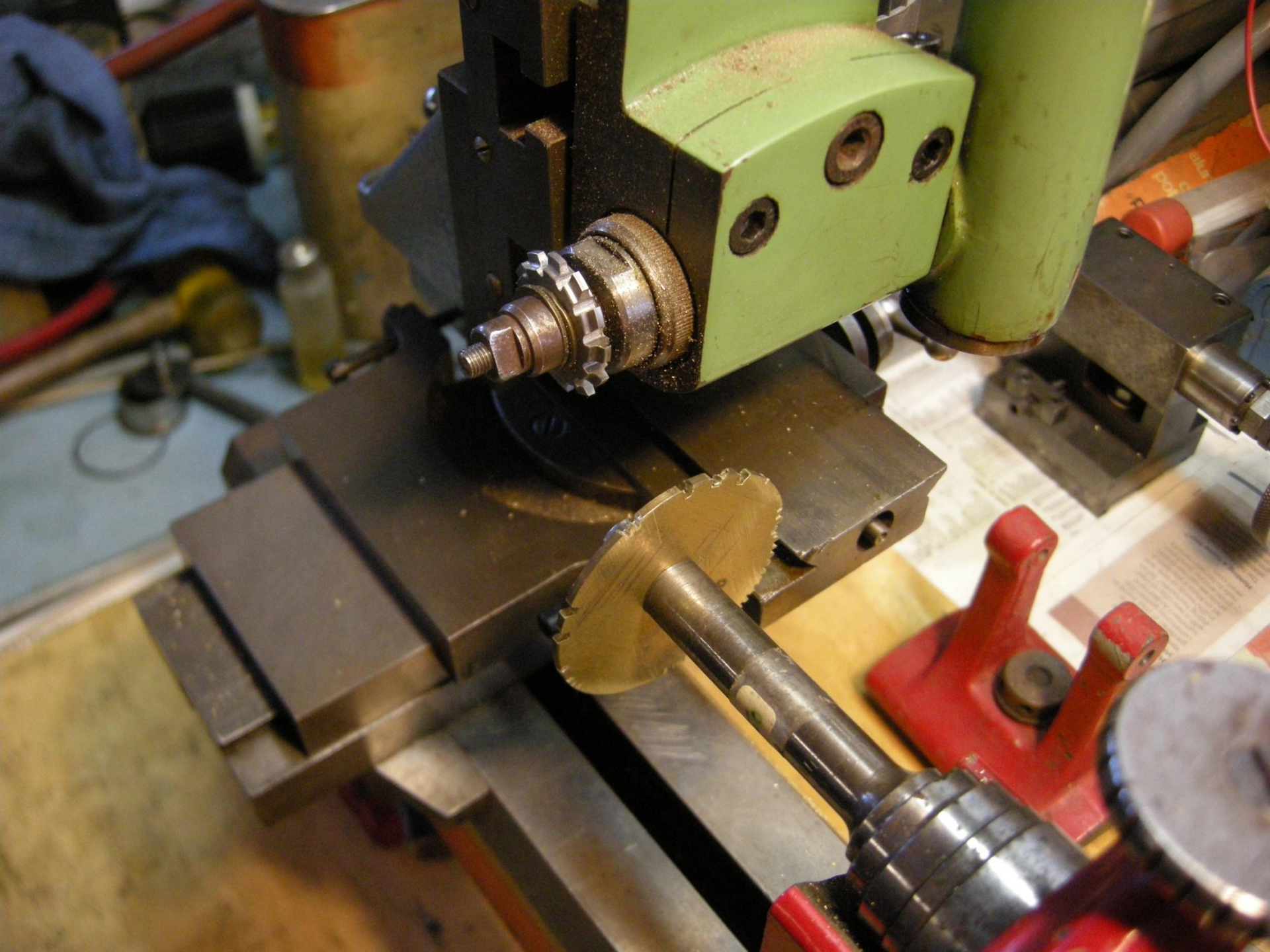
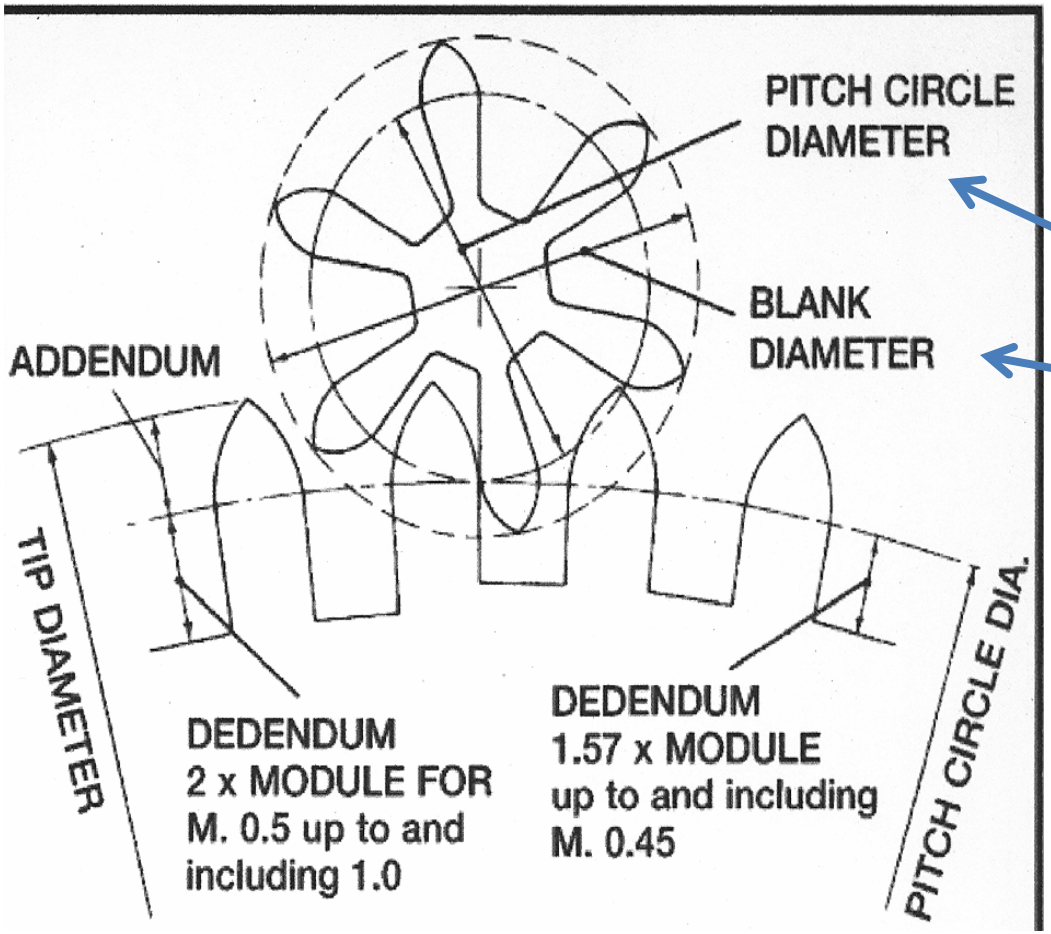


Cycloidal Wheel Cutters
Module System (metric)
M=

0.2	0.25
0.3	0.35
0.4	0.45
0.5	0.55
0.6	0.65
0.7	0.75
0.8	0.85
0.9	0.95
1.0	

How to Choose a Cutter



Definition of Terms

DP=Diametral Pitch (inches)
M=Module System (metric)

N=Number of Teeth in Wheel
PD=Pitch Diameter
TP=Tip Diameter equal to:
BC=Blank Diameter

Basic Formula:

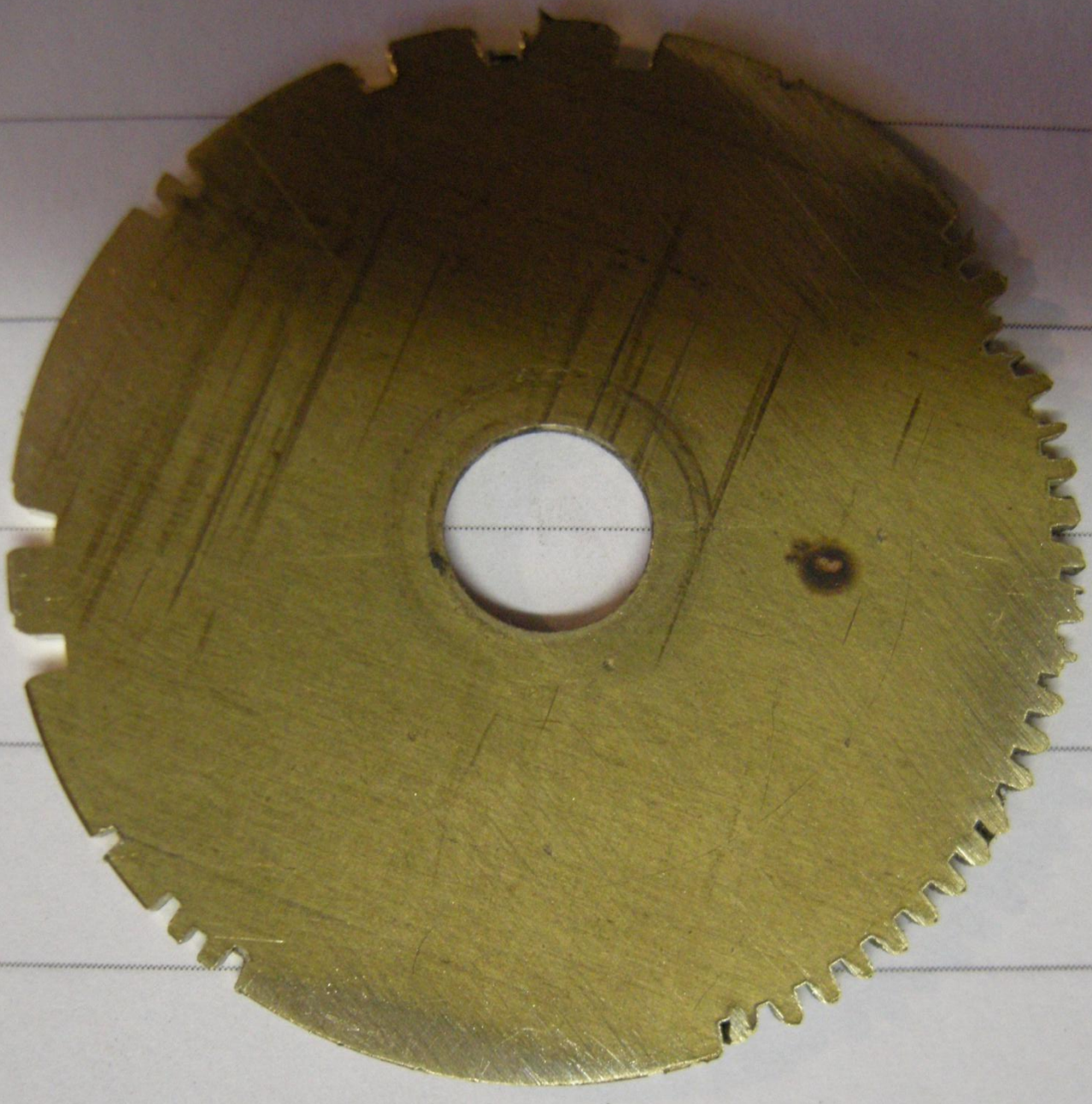
M=PD / N

Variant of Formula For Cutting New Wheels:

M = BC/N+2.76

Cutting A Blank Wheel

My Wheel: BC=25mm, N=26
M = 25 / 26+2.76
M = 0.87

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So, Now What?

Thanks to
Ron Bechler for the use of his shop, equipment and expertise

This is not Ron