



UNIVERSAL
CUTTER, REAMER
AND TOOL
GRINDING MACHINE

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"VERKSTADEN"

KÖPING, SWEDEN.



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CUTTER, REAMER
AND TOOL

GRINDING MACHINE

MADE BY THE

*Köpings Mekaniska Verkstads
KÖPING, SWEDEN. Aktiebolag*

TELEGRAPHIC ADDRESS

"VERKSTADEN"

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Specimen

1891

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Köpings Mekaniska Verkstads Aktiebolag
KÖPING, SWEDEN.

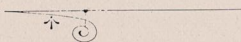
UNIVERSAL

CUTTER, REAMER AND TOOL

GRINDING MACHINE

Telegraphic Address

"VERKSTADEN", KÖPING, SWEDEN



NOV. 1895.

STOCKHOLM
CENTRAL-TRYCKERIET 1895.

Terms.

We deliver the machine free of packing charge on board Steamer in Stockholm or Gothenburg.


Prices quoted are net cash.

Ciphers for Telegrams.

Frame: The machine complete with attachment for grinding between centres and attachment for grinding tools.

Frank: The same but without the attachment for grinding tools.

Frap: The same but without either the attachment for grinding between centres or the attachment for grinding tools.



Universal Cutter and Reamer Grinding Machine.

After having experienced difficulty in obtaining a convenient Cutter Grinding Machine, especially for grinding cutters which have special forms, we constructed the first of these machines in the year 1889, upon entirely new principles.

Since that time we have built more than 30 machines. We have improved the machine and used it extensively in our workshops and found it most valuable especially for shaping and grinding Gear Cutters.

As far as we know there is no machine in the market, that will grind the teeth of a cutter, after it has been hardened, exactly to the shape of a certain curved line or template. This is done most easily, and with exact results, in this machine. In fact cutters of irregular shape are ground with the same facility as ordinary straight or angular cutters.

Most makers make their gear and other formed cutters, with relieved teeth and the grinding is done on the wrong side of the tooth. To make good cutters in this way is not practicable as the tool for turning is apt to change its shape in hardening and as the cutter must be made to the exact size and shape, before being hardened, it is liable to get a little out of shape during the hardening process. Relieved cutters cannot have more than half the number of teeth of ordinary cutters and the want of a uniform clearance at all parts of the cutting edge make them cut slowly and usually with greater strain on the milling machine.

Formed cutters ground by this machine have a larger number of teeth of the proper shape, which make them feed through the metal at the highest possible rate of feeds. Each tooth is profiled and ground, after the cutter has been hardened, from the same template. This enables each of the teeth to cut well and to produce a fine and smooth surface.

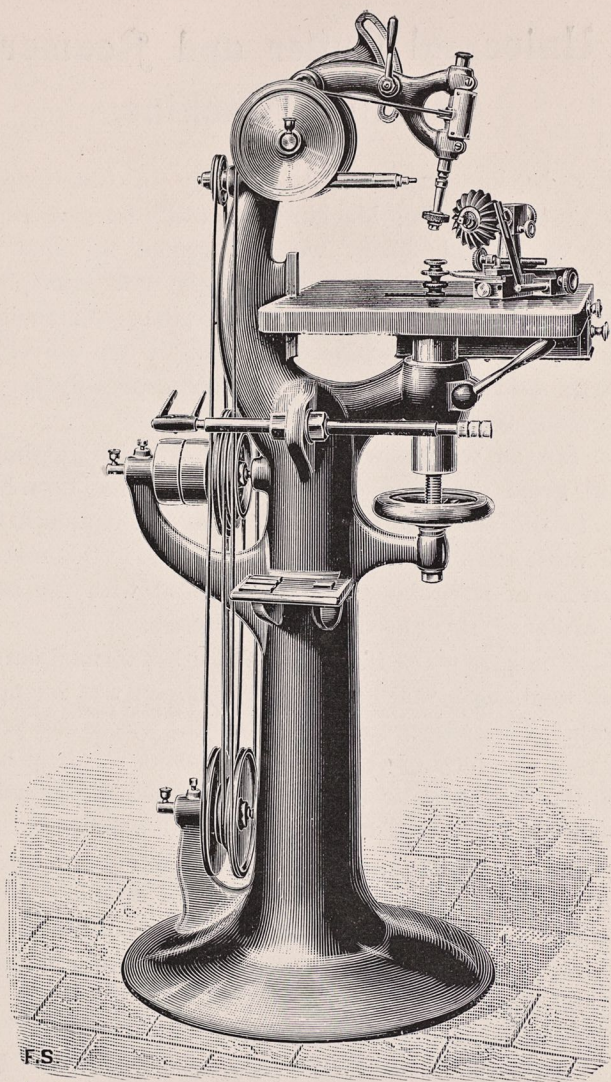


Fig. 1.

Universal Cutter, Reamer and Tool
Grinding Machine.

Description and Price.

The machine carries two spindles for the emery wheels, one horizontal and the other vertical. The latter can be placed at different angles. The spindles are driven by round leather cords which work well, give a smooth motion, and last a long time.

A loose stand which we may call the sliding carriage, rests on the table. On this carriage, the cutter to be profiled or ground, as well as the template are fastened. The grinding is then done by simply holding the carriage by the hands and sliding it on the table like a surface gauge.

A valuable feature in this machine is the great facility with the work can be examined during the grinding. The sliding carriage not being fastened in any way, may be lifted up at any time during the grinding and held up for testing against proper light, as shown in the engraving on the following page.

Cutters up to 155 mm. in diameter can be ground.

An extra attachment for grinding reamers, taper as well as parallel, up to 375 mm. in length is furnished with the machine at extra price.

An extra attachment for grinding tools may also be had at extra price.

The overhead motion should be driven 500 revolutions per minute. Diameter of pulleys 100 mm. for a belt 50 mm. wide.

In the price is included, the overhead motion, screw keys, two wooden drawers, leather cords and 8 emery wheels.

Weight included the overhead motion, complete, Kg. 250.

Price

Attachment for grinding pieces between
centres, extra

Attachment for grinding tools extra



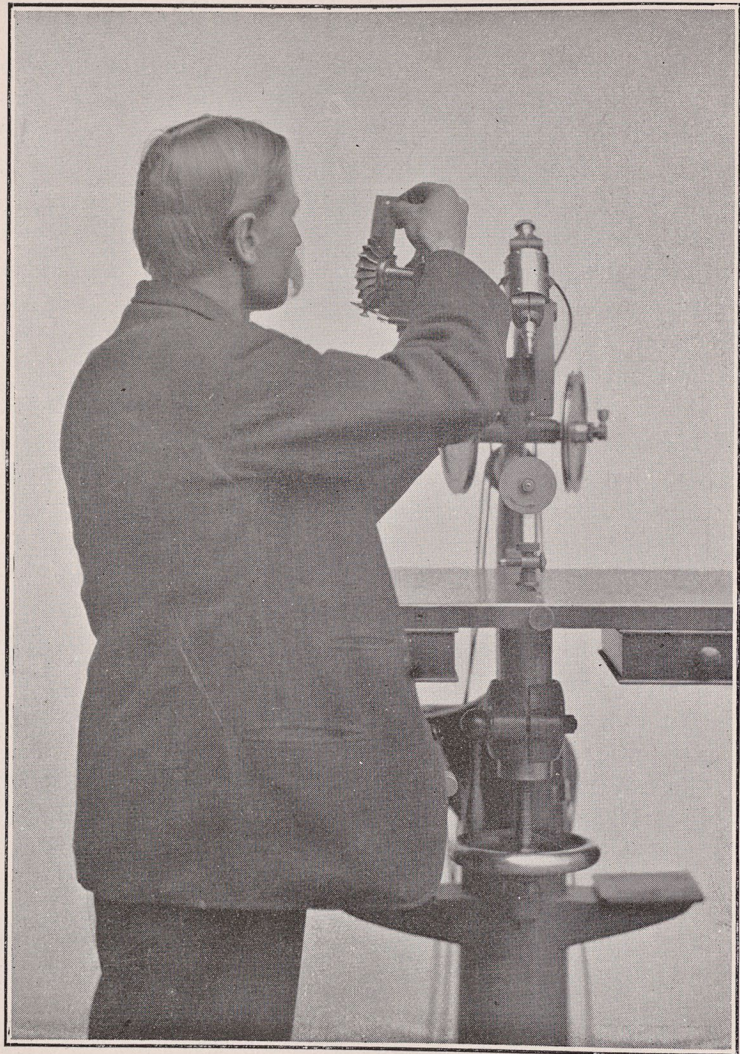


Fig. 2.

Showing method of examining the work by holding up the sliding carriage and cutter.

On making, profiling and grinding cutters.

After the cutter is turned, the teeth are cut as usual and the cutter is hardened without any filing being done to it. We recommend that the teeth be milled in one cut and to have as many teeth as possible.

From a suitable piece of sheet steel a template is made to exactly the required shape of the teeth on the cutter. For straight or angular cutter a template with a straight side is enough. The template is clamped to the sliding carriage and the cutter is fastened on the mandrel of the same carriage and adjusted to the template by the screws, with the help of a try-square.

In grinding, either the horizontal or the vertical spindle may be used, but in most cases the horizontal one will be found better. When using this, the emery wheel must be thinner than the rounded end of the screw in the middle of the table, but need not be of the same shape. The screw is placed nearly under the wheel, so that when the template under the cutter is brought in contact with the end of the screw, the emery wheel will just touch one tooth of the cutter.

By means of one of the screws the cutter is then moved forward a little, or as much as is to be ground of. The grinding is then done by simply holding the carriage with the hands and sliding it on the table so that the template always bears against the end of the screw.

In using the vertical spindle a round disk is used instead of the screw. This disk must be larger in diameter than the wheel.

By rising or lowering the table, more or less clearance is obtained.

We wish it to be closely observed that the grinding is perfectly independent of the shape and size of the emery wheel, even the wear on the wheel is of no consequence as it has been proved that in careful grinding, no difference can be found, by the finest measuring, between the first and the last tooth ground.

The principal advantages obtained with this machine may be summed up thus:

1. Most cutters may be made without any filing being done on them and the right shape of each tooth is obtained in the grinding, even if the cutter is not exactly turned.
2. The exact shape of the tooth is obtained after hardening.
3. All grinding is done on the same system and with the same details on the table.
4. A cutter is completely ground without changing or reversing it on the mandrel.

Exemples of Shaping and Grinding various Cutters and Tools.

In order to show the great simplicity of the different operations, we have photographed a number of examples of actual grinding of Cutters and other Tools. These photographs are reproduced in the following pages and give a better idea of the machine than is possible by any actual description.

In grinding we recommend thin wheels, 2 mm. or 3 mm. in thickness being quite sufficient.

The arrow on the wheel in the engravings shows the proper direction of cutting in order to obtain a strong and clean edge.

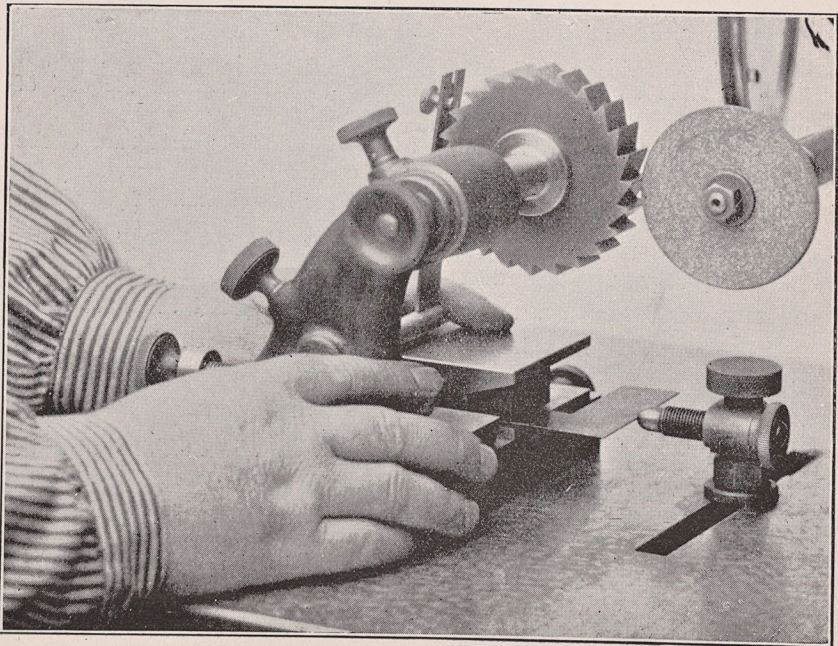


Fig. 3.

Grinding an ordinary straight Cutter.

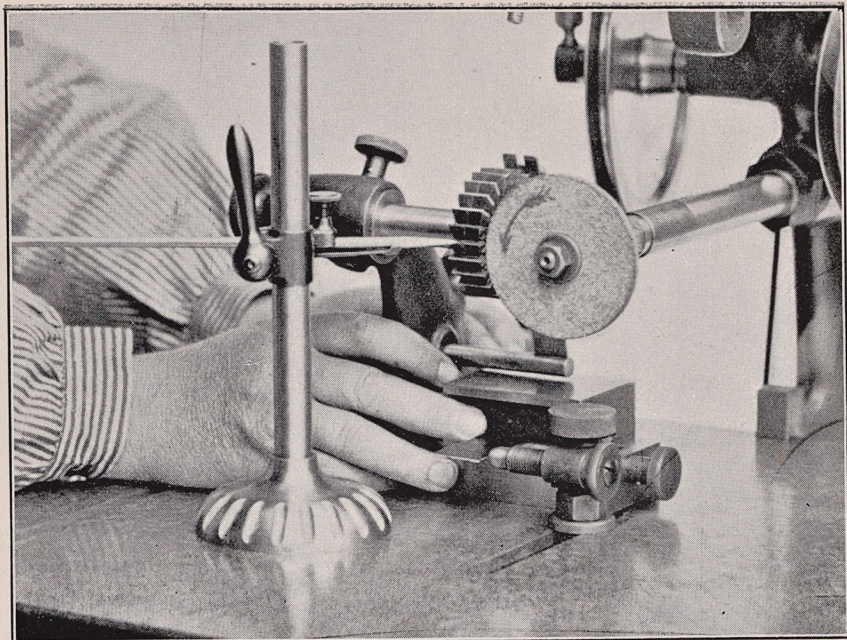


Fig. 4. Grinding a Side Milling Cutter.

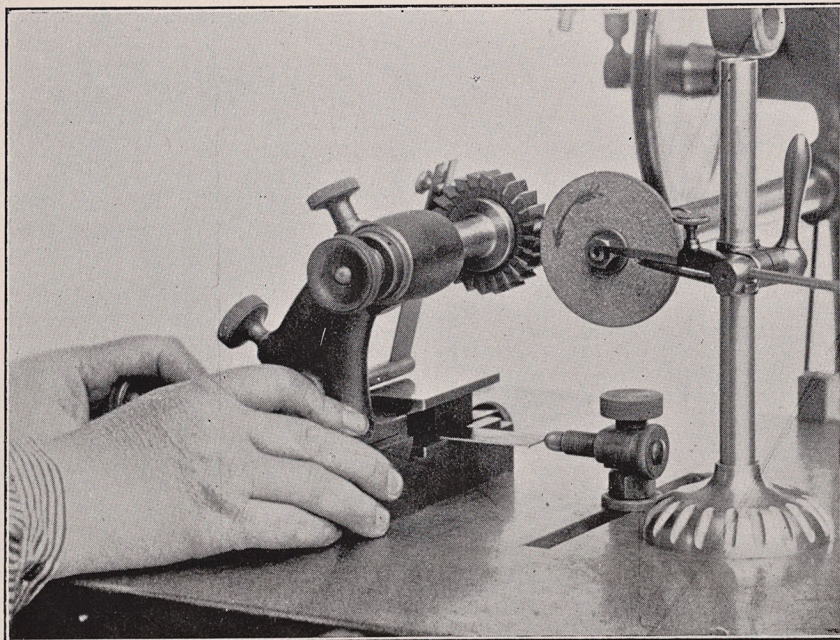


Fig. 5. Grinding same cutter as in Fig. 4 and showing way of measuring the clearance.

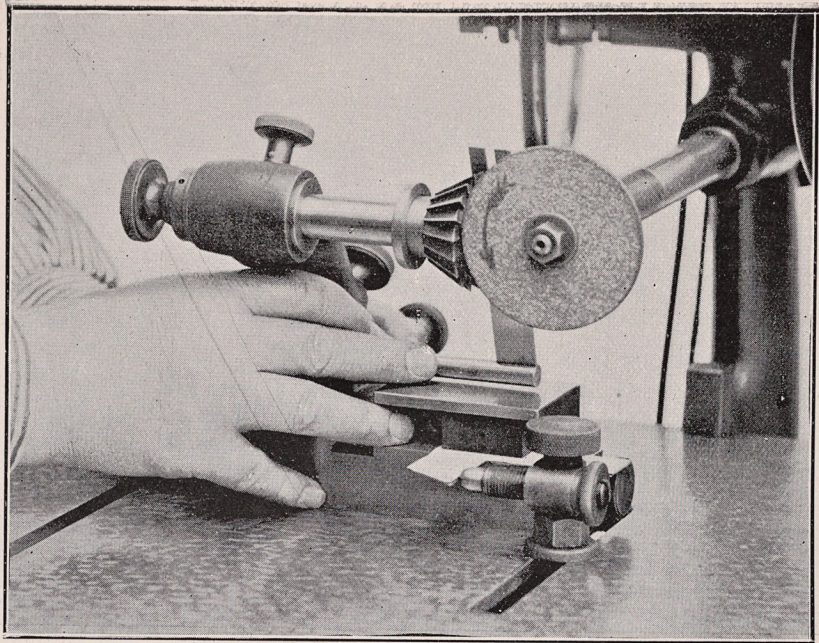


Fig. 6. Grinding an Angular Cutter.

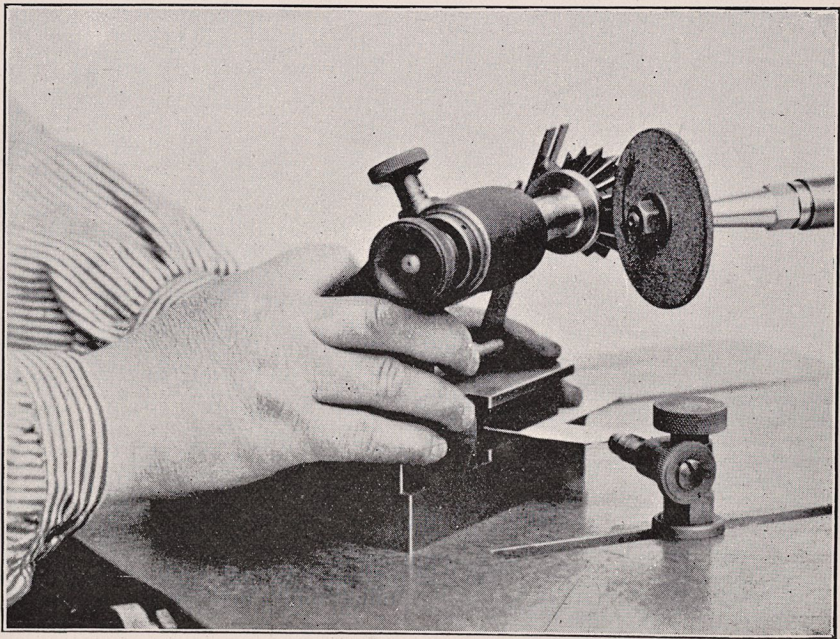


Fig. 7. Grinding same Cutter as in Fig. 6.

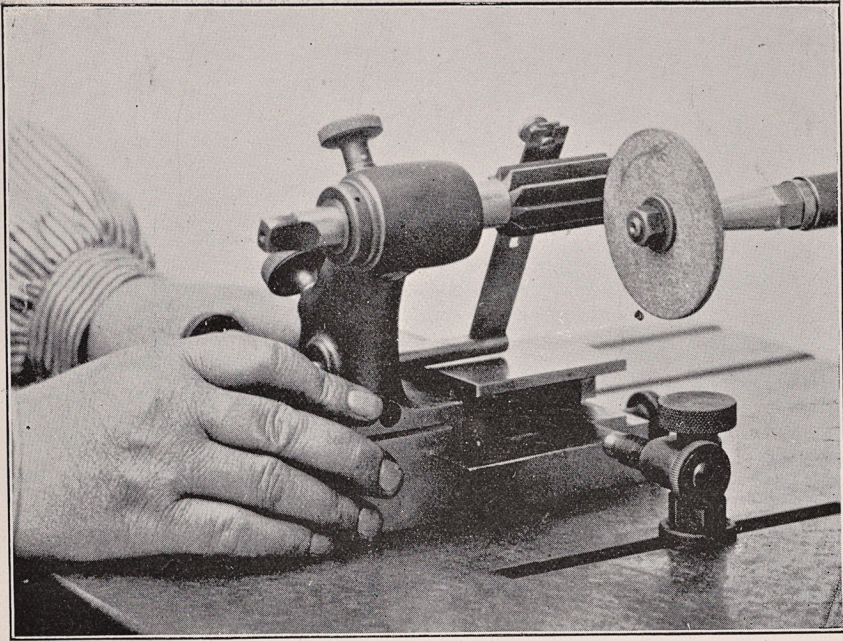


Fig. 8. Grinding an end mill.

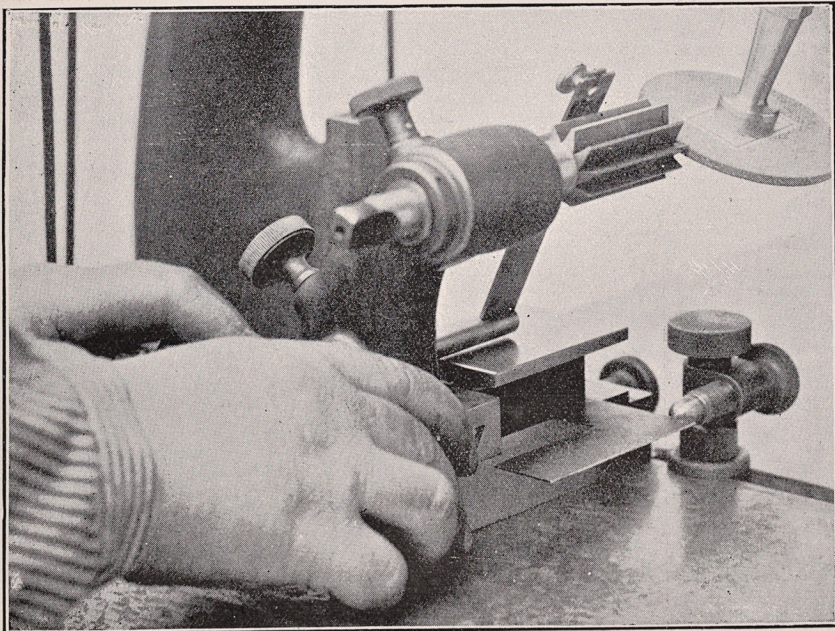


Fig. 9. Grinding same end mill as in Fig. 8.

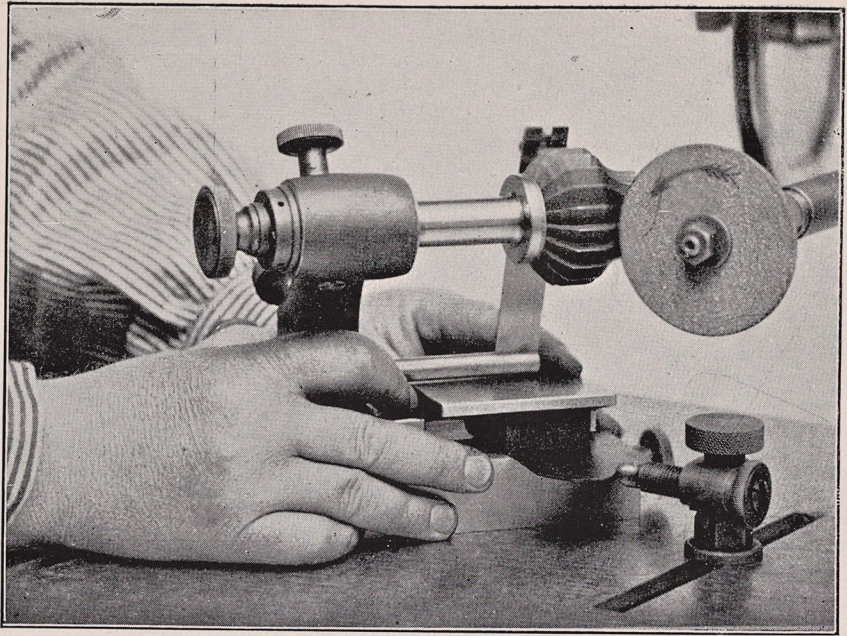


Fig. 10. Grinding an irregular shaped Cutter.

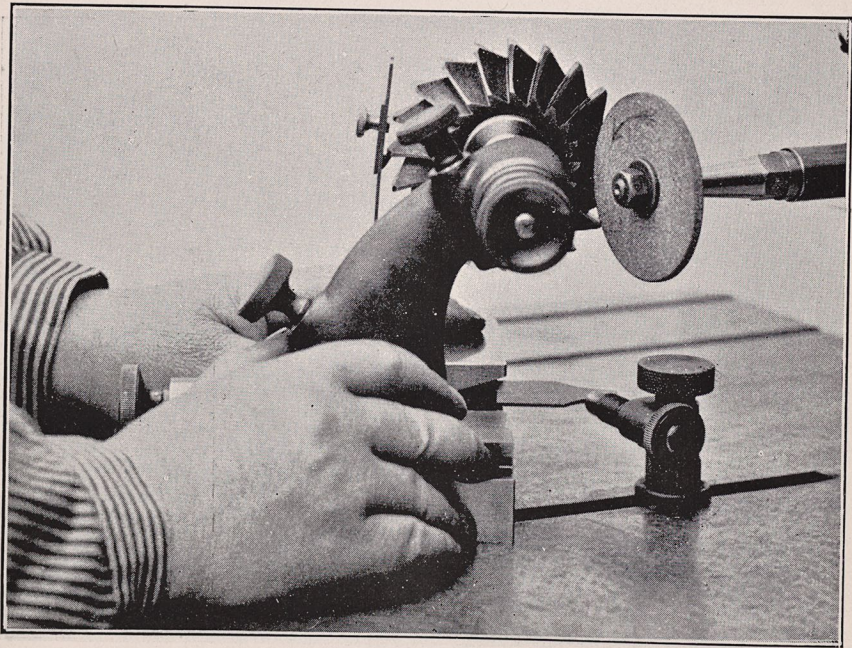


Fig. 11. Grinding a Gear Cutter.

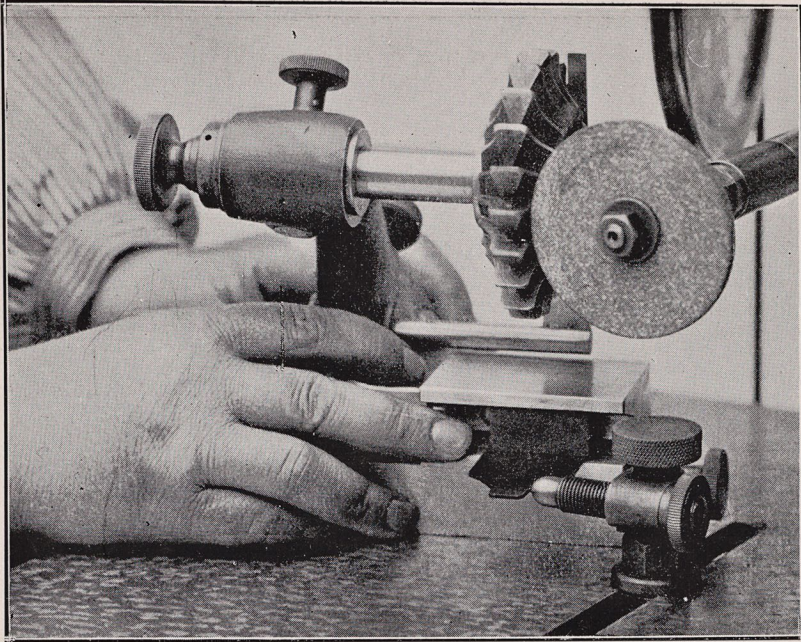


Fig. 12. Grinding a Gear Cutter same as in Fig. 11.

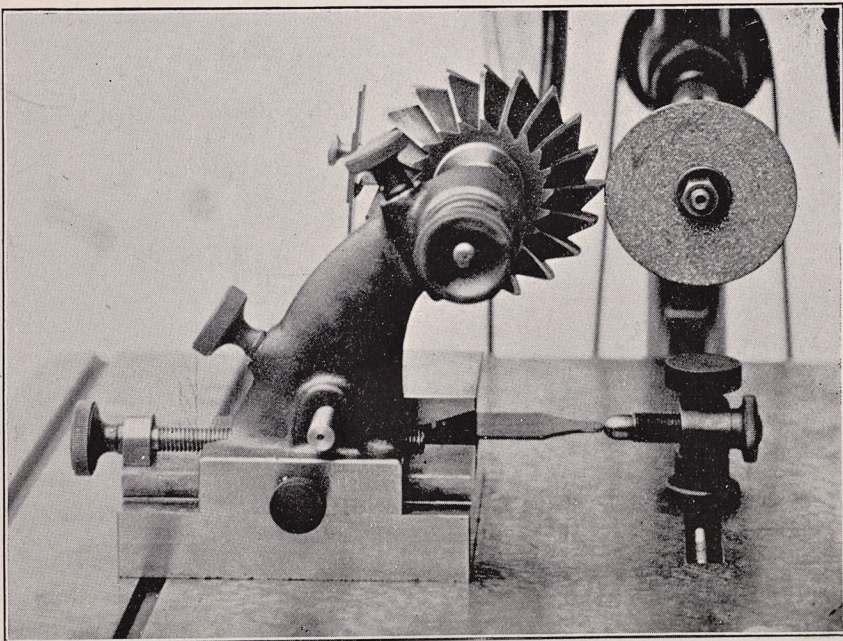


Fig. 13. Grinding a Gear Cutter same as in Fig. 11.

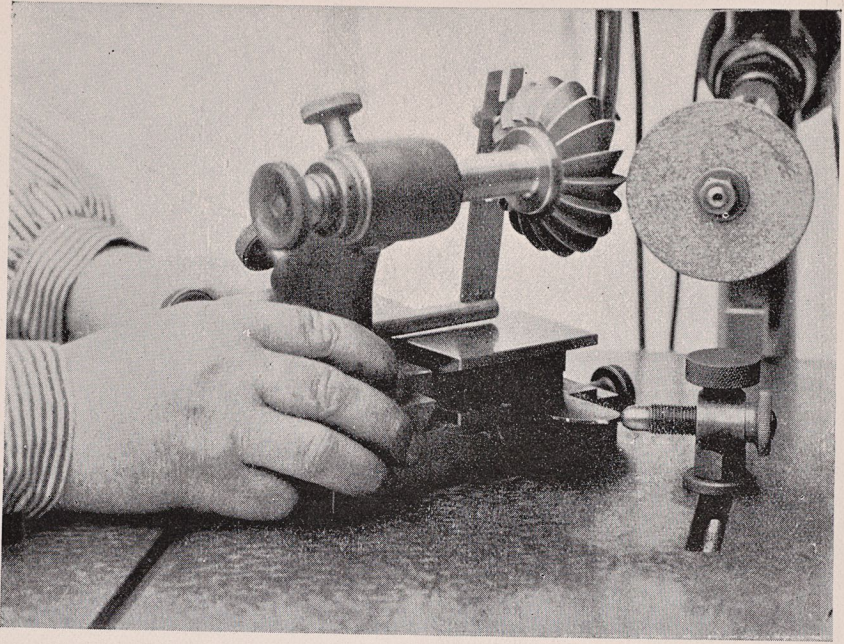


Fig. 14. Grinding a Cutter, used for fluting Twist Drills.

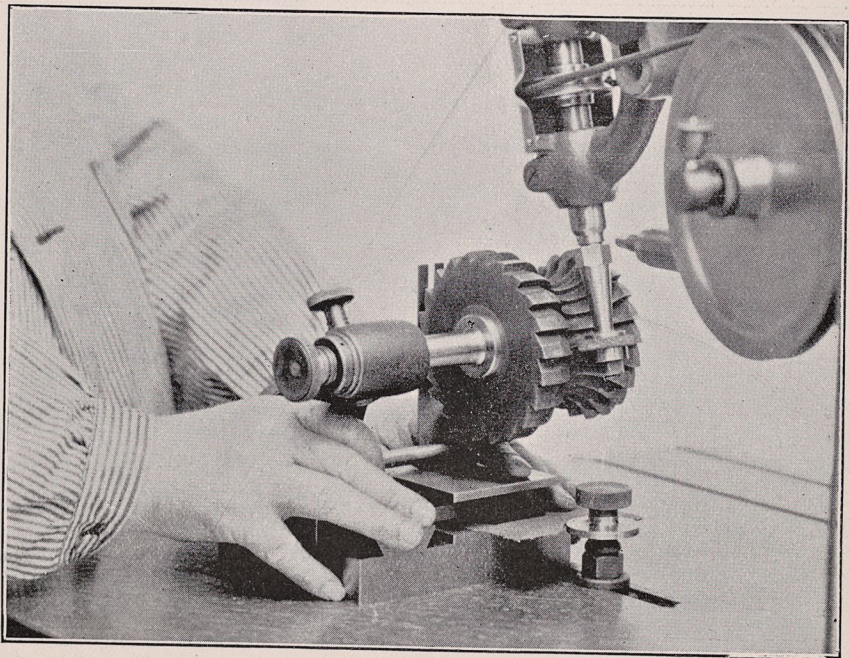


Fig. 15. Grinding a large formed Cutter.

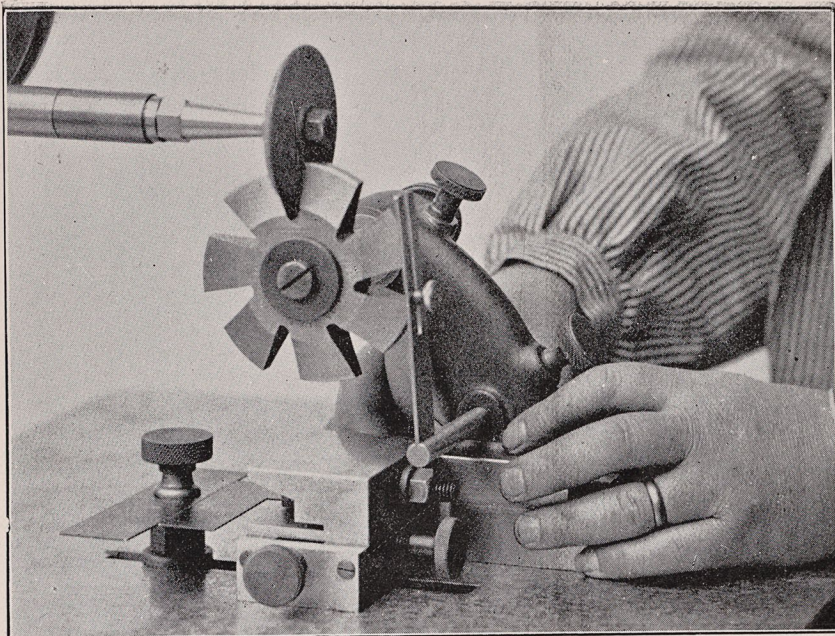


Fig. 16. Grinding an ordinary relieved Gear Cutter.

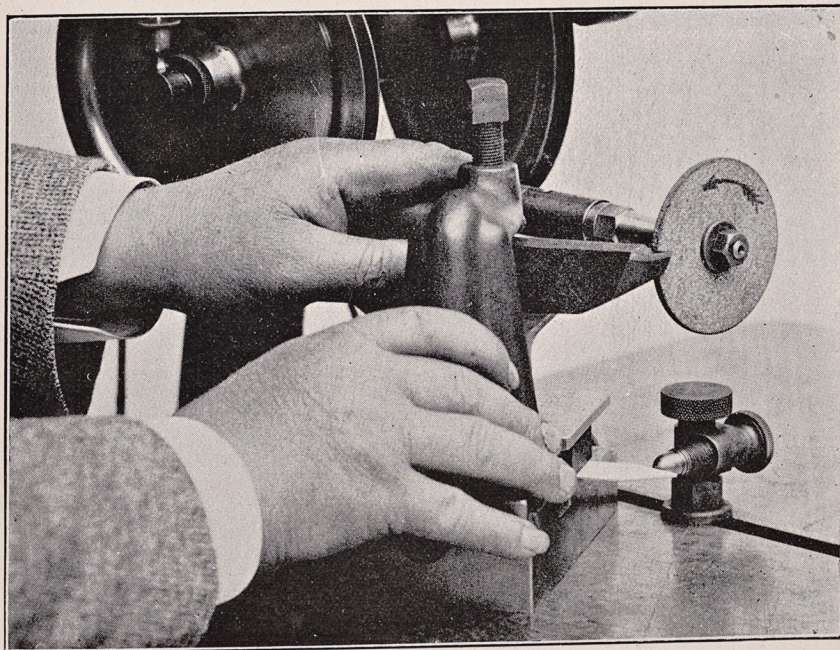


Fig. 17. Grinding a Lathe Tool for cutting V threads.

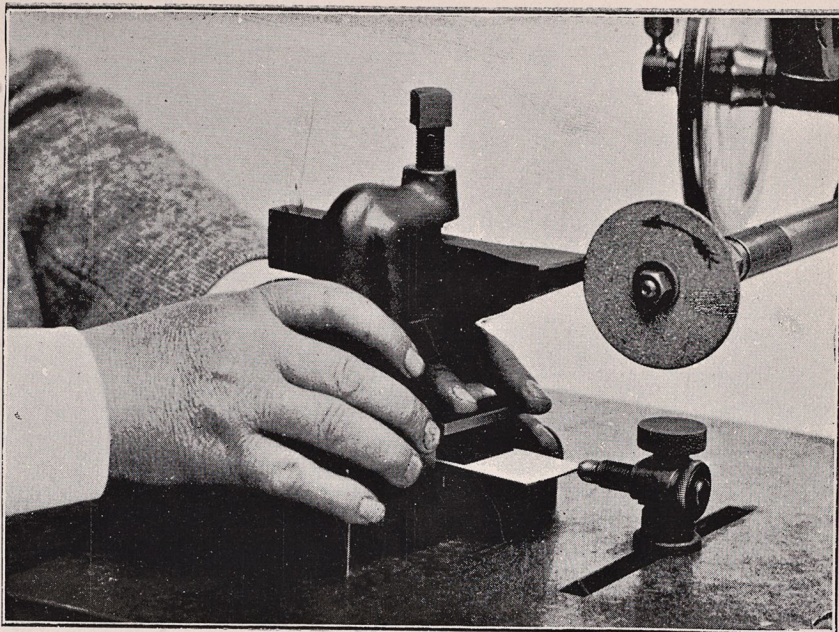


Fig. 18. Grinding a Planing Tool for taking broad cuts.

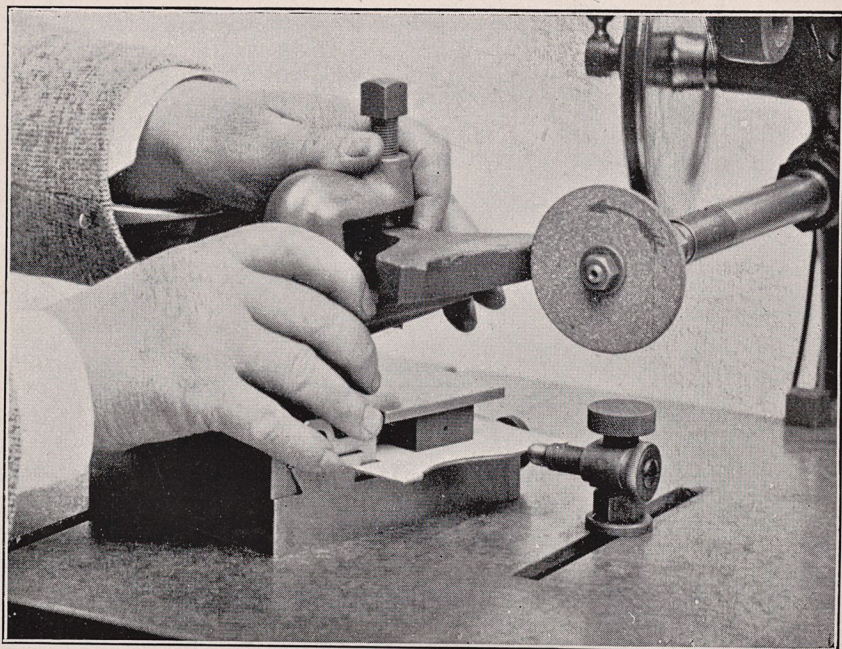


Fig. 19. Grinding a large formed Tool.
The one shown is used for finishing handles.

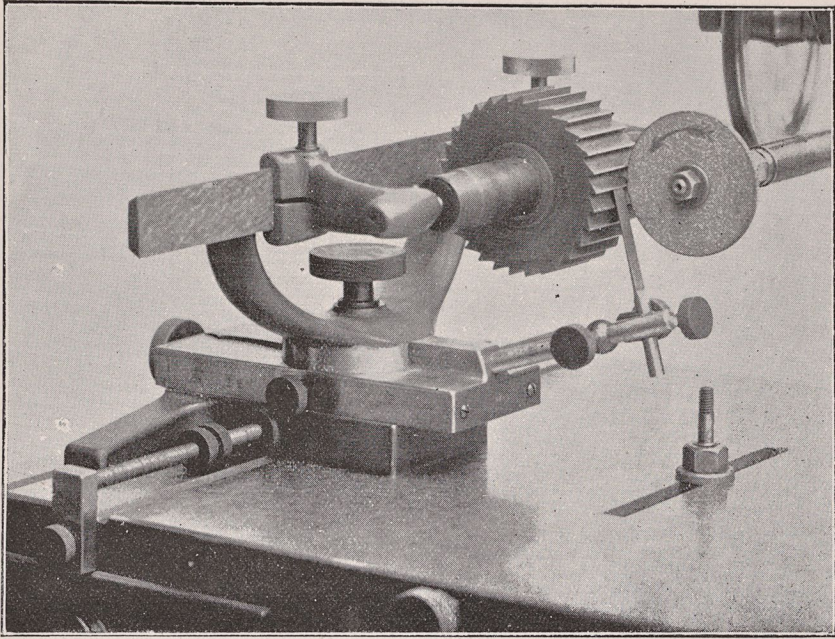


Fig. 20. Grinding an ordinary straight Cutter.

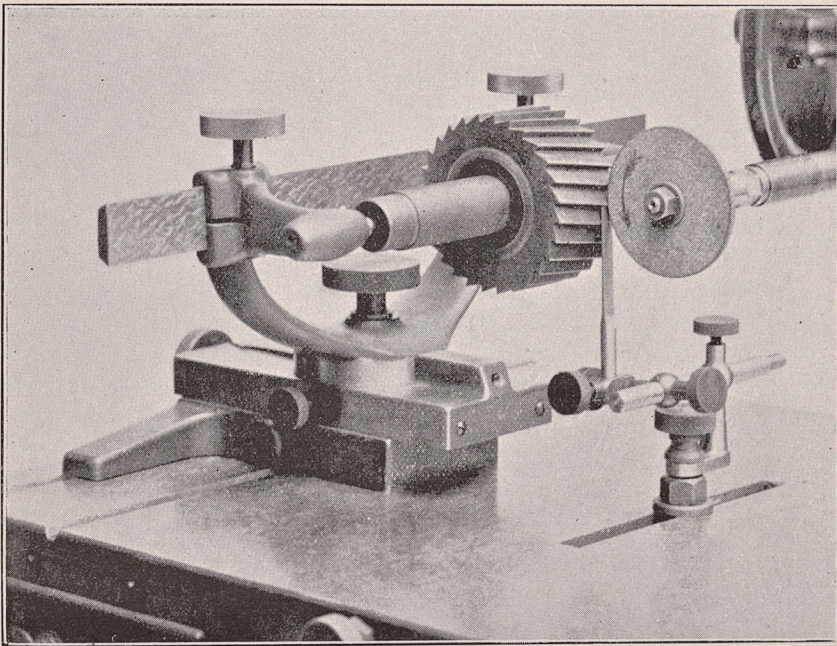


Fig. 21. Grinding an ordinary spiral Cutter.

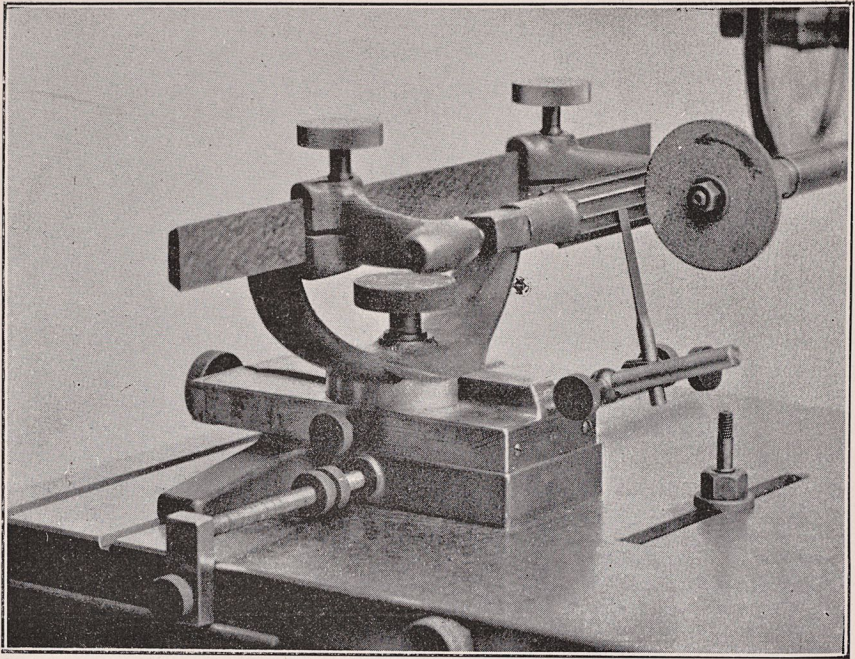


Fig. 22. Grinding a Reamer.

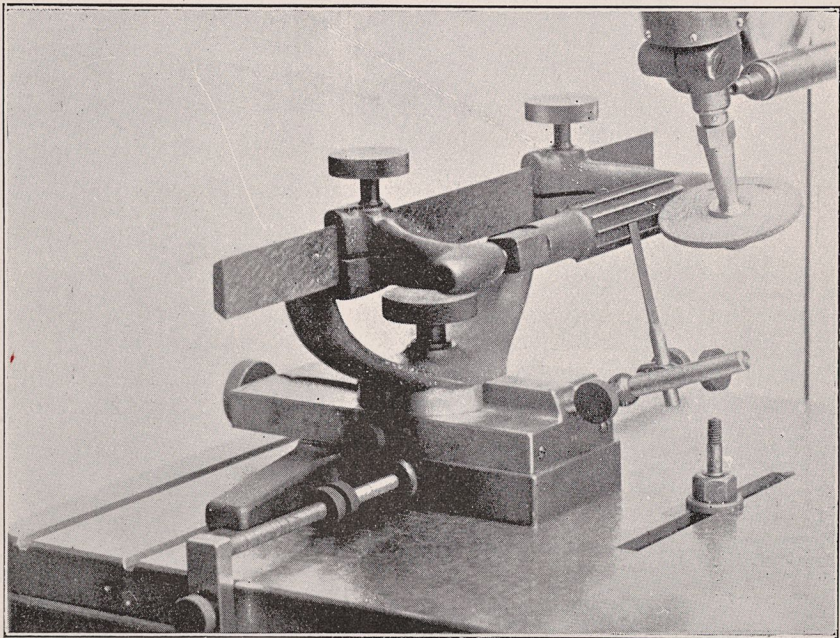


Fig. 23. Grinding a Reamer.

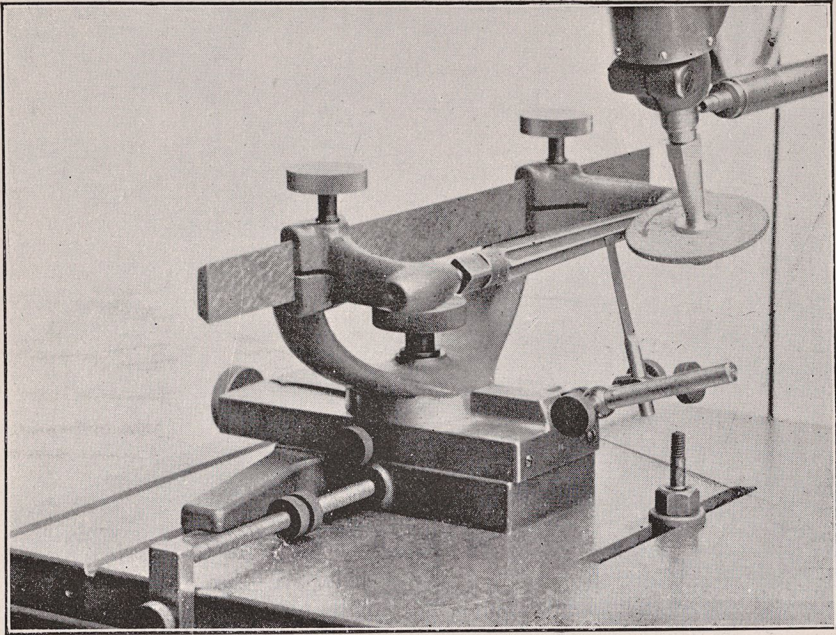


Fig. 24. Grinding a taper Reamer.

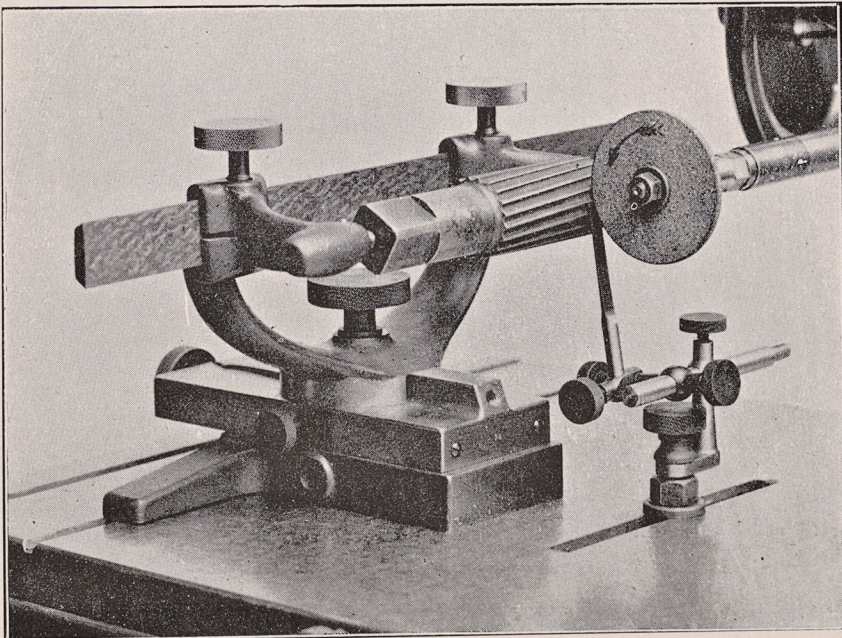


Fig. 25. Grinding a spiral Reamer.

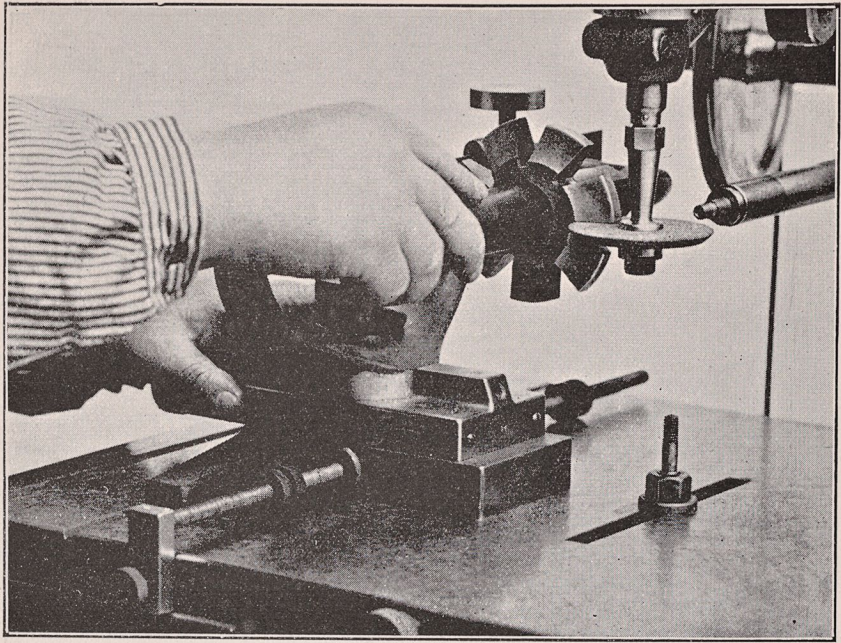


Fig. 26. Grinding an ordinary relieved Gear Cutter.

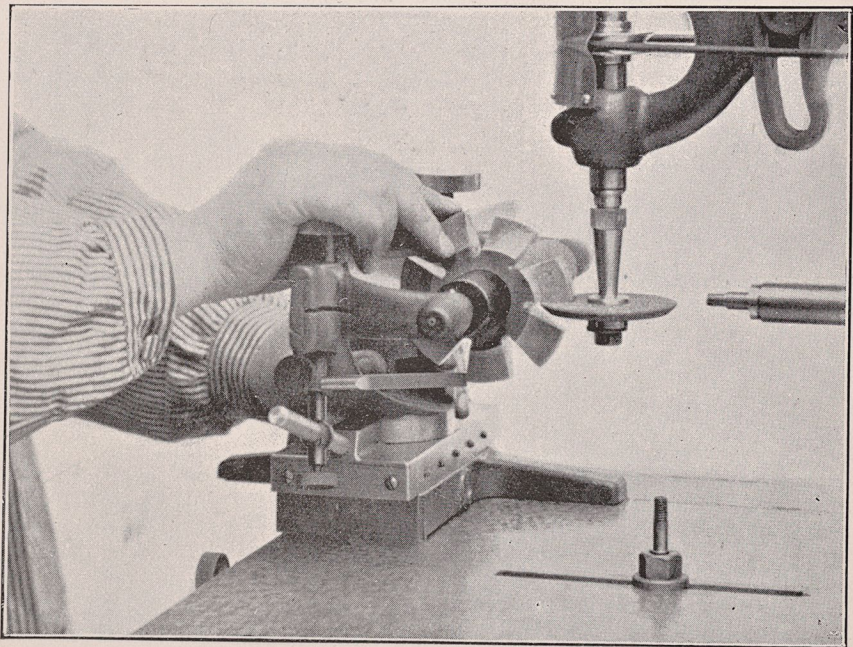
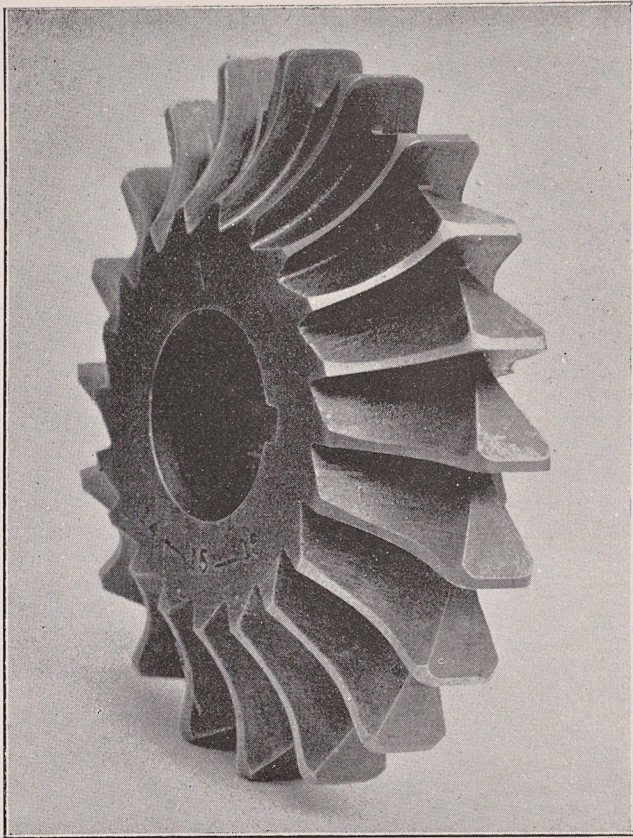
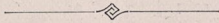


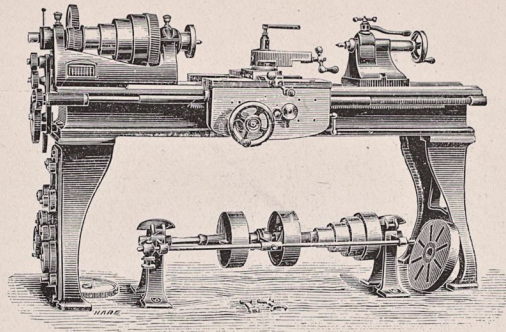
Fig. 27. Grinding the same class of Gear Cutter.



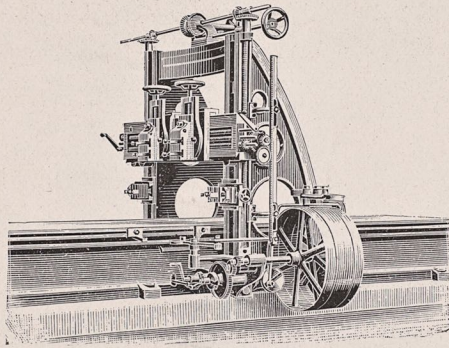
One of our standard Gear Cutters.



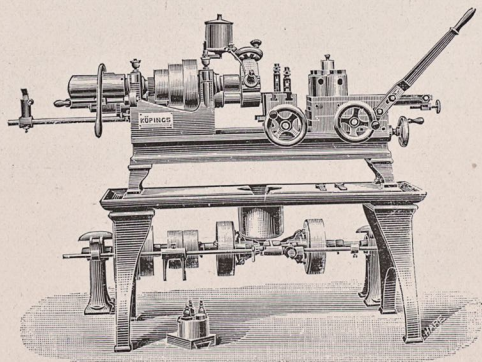
Specialities.



Lathes.

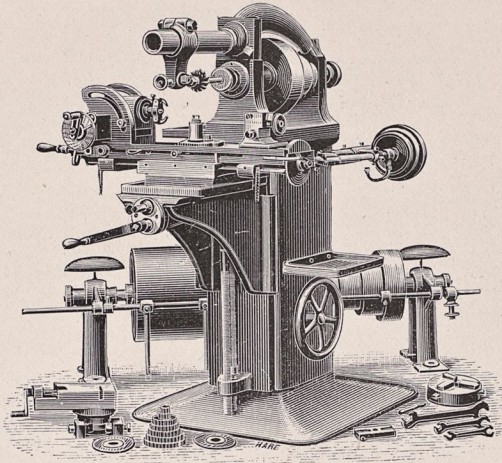


Planing machines.

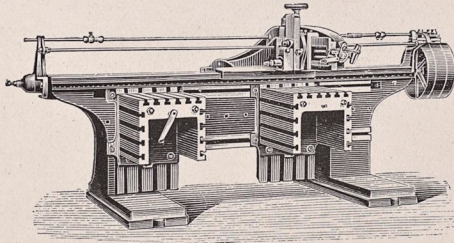


Screw machines.

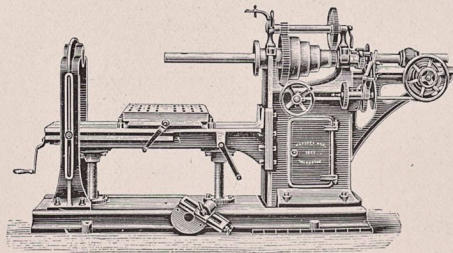
Specialities.



Milling machines.



Side planing machines.



Horizontal boring and drilling machines.

