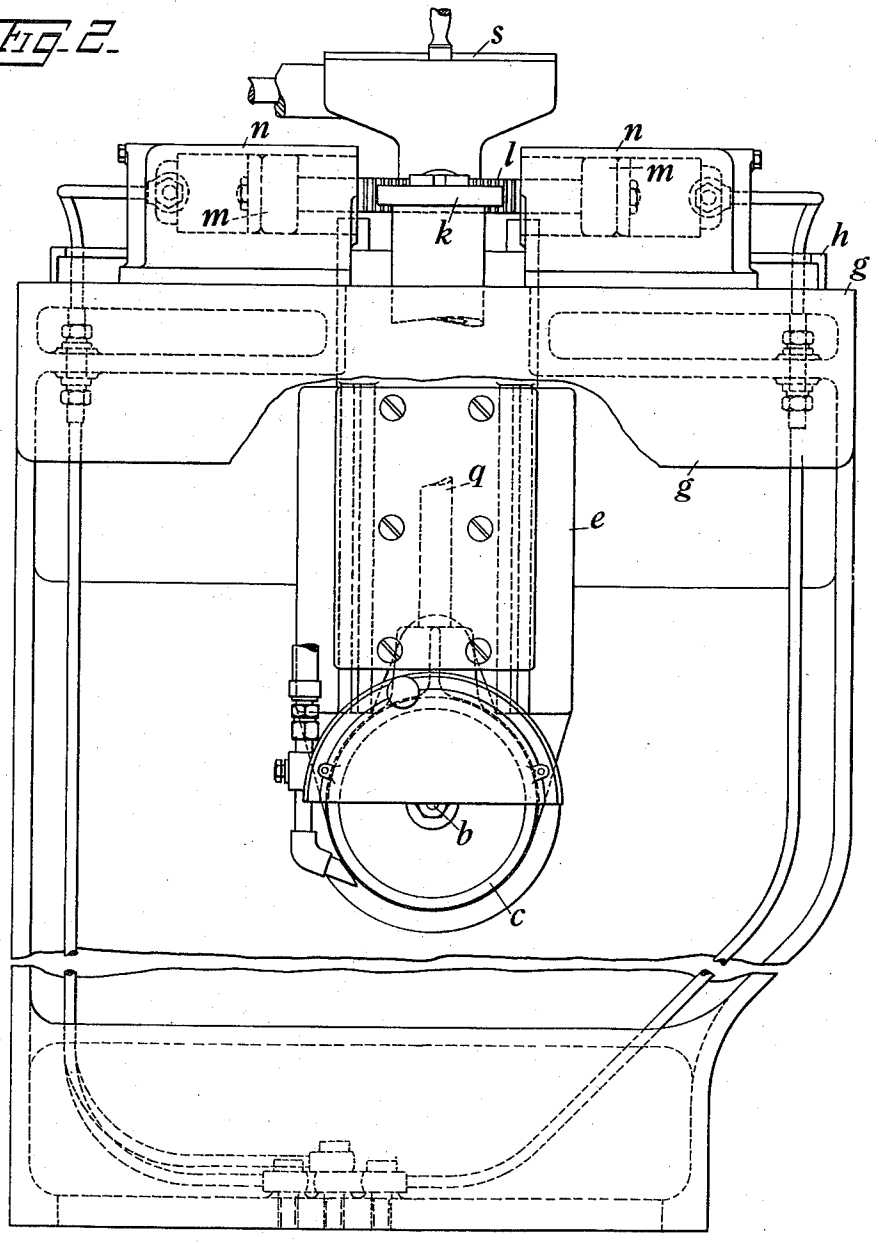
July 21, 1936. A. H. ORCUTT 2,048,462

MACHINE FOR GRINDING GEAR WHEELS

Filed Oct. 23, 1935 5 Sheets-Sheet 2

Fig. 2.




A. H. Orcutt
INVENTOR

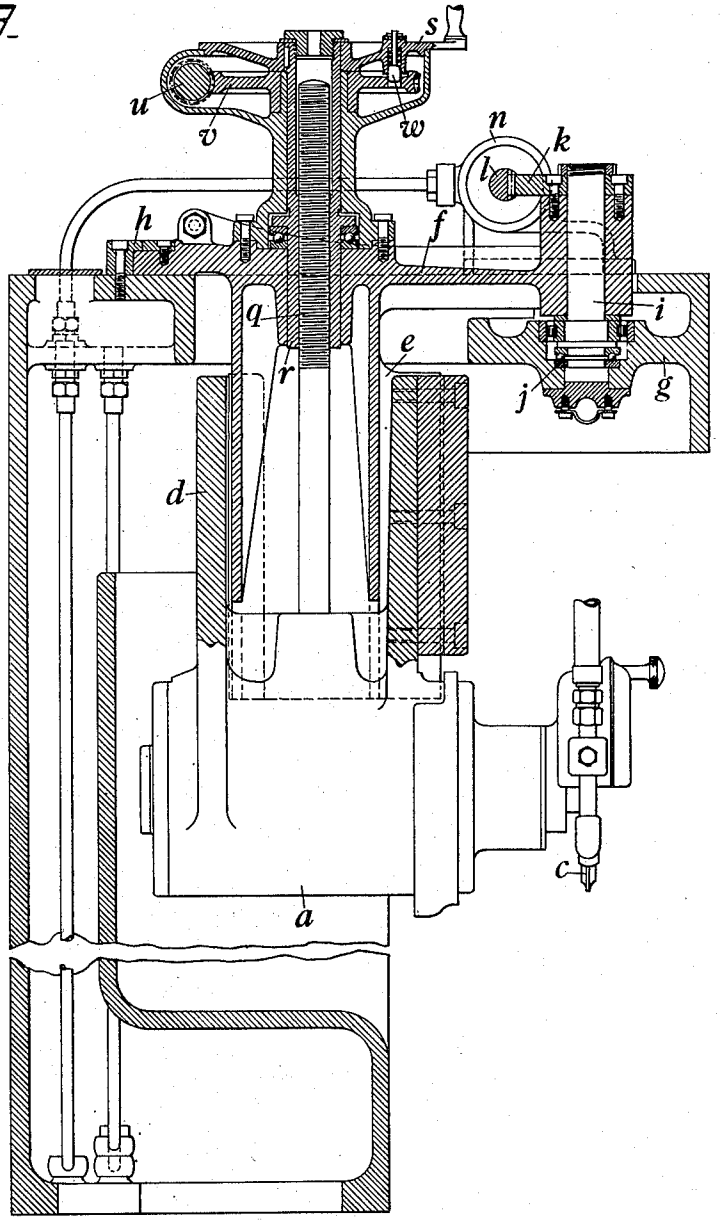
By: Glascock Downing & Seebold
Attys.

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MACHINE FOR GRINDING GEAR WHEELS

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Fig. 3.




A. H. Orcutt
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MACHINE FOR GRINDING GEAR WHEELS

Filed Oct. 23, 1935 5 Sheets-Sheet 4

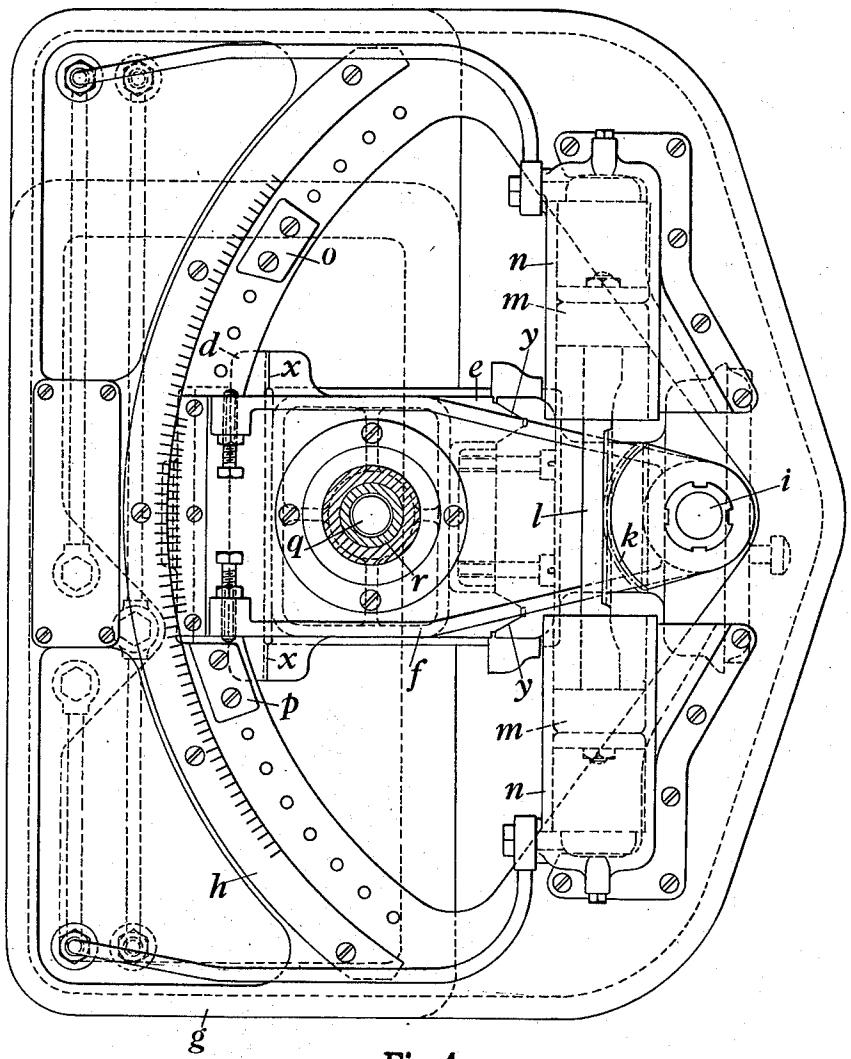



Fig.4

A. H. Orcutt
INVENTOR

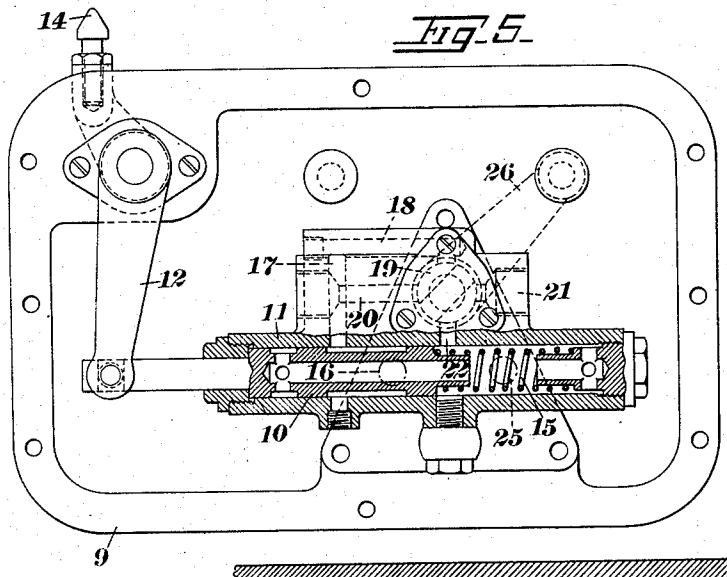
By: Glascock Downing & Seebold
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July 21, 1936. A. H. ORCUTT 2,048,462

MACHINE FOR GRINDING GEAR WHEELS

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Fig. 5



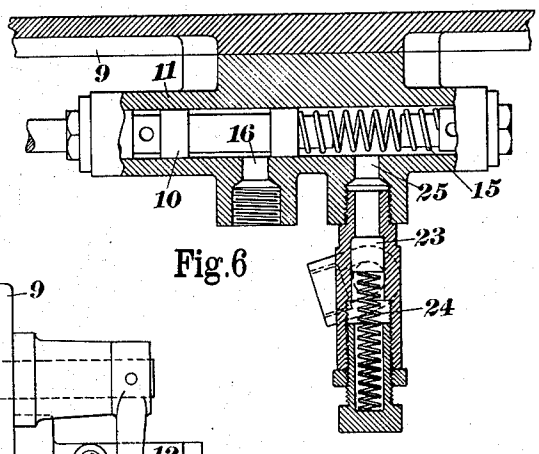




Fig.6

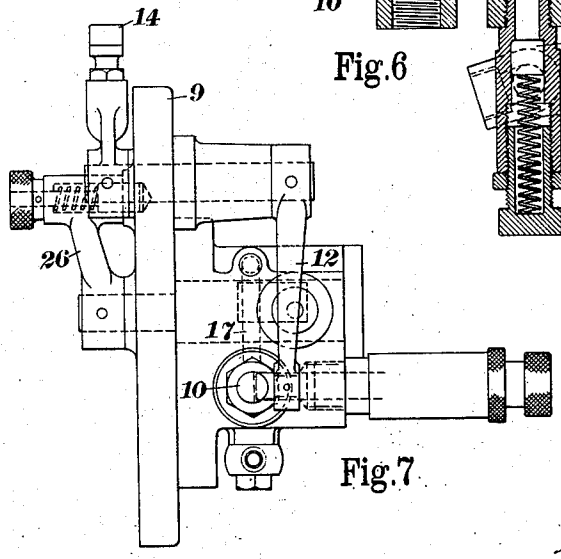



Fig.7

A. H. Orcutt
INVENTOR

By: Glascock Downing & Seebold
Attys.

Patented July 21, 1936 2,048,462

# UNITED STATES PATENT OFFICE

2,048,462

## MACHINE FOR GRINDING GEAR WHEELS

Arthur Hitchcock Orcutt, Handsworth, Birmingham, England, assignor to The Gear Grinding Company Limited, Birmingham, England

Application October 23, 1935, Serial No. 46,422
In Great Britain October 26, 1934

7 Claims. (Cl. 51—123)

This invention relates to machines for grinding teeth of so-called helical gear wheels, that is to say wheels in which the teeth are disposed at an angle to the axis of revolution. The machines with which the invention is concerned are of the type in which two adjacent faces of the wheel teeth are ground simultaneously by a rotary wheel having a suitably shaped periphery, the work piece (or the grinding wheel) being given a combined sliding and rotational movement during the grinding operation to bring the whole length of the tooth faces under the action of the grinding wheel.

The object of the present invention is to facilitate the intermittent trimming of the grinding wheel for maintaining its form.

The invention comprises a head or mounting for the grinding wheel whereby the latter can be moved to and from a position in which its central plane is at an angle to the axis of the work piece or is coincident therewith.

In particular the invention comprises the combination and arrangement of parts hereinafter described.

In the five accompanying sheets of explanatory drawings:—

Figure 1 is a diagrammatic front elevation illustrating a machine for grinding the teeth of helical gear wheels and provided with this invention.

Figure 2 is a front elevation of the head or mounting which carries the grinding wheel, and Figure 3 is a sectional side elevation.

Figure 4 is a part sectional plan of the said mounting.

Figure 5 is a part sectional rear elevation, Figure 6 a sectional plan and Figure 7 an end view of a valve mechanism for controlling the fluid actuated mechanism used for moving the part carrying the grinding wheel.

In carrying the invention into effect in the manner shown, I arrange an electric driving motor *a* (Figure 3) in direct connection with the horizontal spindle *b* of a grinding wheel *c*, and I mount the motor on a vertical slide *d* which allows the wheel to be raised or lowered. The guide *e* which carries the slide depends from a horizontal arm *f* which at one end is pivoted to a part of the machine frame *g* and at the other end is guided by a segmental guide *h*. The pivot is formed by a spindle *i* secured to one end of the arm *f* and carried at its lower end in bearings *j* in the upper part of the machine frame *g*. In association with the pivoted end of the arm *f* is arranged a toothed quadrant *k*, and this is engaged by a rack *l* which can be moved in either direction from a central position by a pair of fluid operated pistons *m* contained in fixed cylinders *n*, these latter being carried on the frame *g*.

The segmental guide *h* above-mentioned has provided on it a graduated scale (Figure 4) for use in the setting of the arm *f*. It also has combined with it suitably arranged adjustable stops *o*, *p*.

For raising and lowering the slide *d* on the guide *e*, I secure to the slide a screw *q* which engages a rotatable nut *r* carried on the arm *f*. Rapid rotation of the nut *r* is effected by a hand wheel *s* secured directly to the nut. Slow rotation for giving fine adjustment of the slide, is effected by another hand wheel *t* which operates a worm *u* engaging a worm wheel *v* which can be detachably engaged with the hand wheel *s* by a catch *w*.

It will be noticed in Figure 4 that the guide *e* is arranged to lie between the front and rear sides of the slide *d*. On the side of the slide *d* remote from the grinding wheel, the slide and guide are provided with a pair of flat interacting surfaces *x*, and on the side adjacent to the grinding wheel a pair of V pieces *y* on the guide engage corresponding grooves in the slide. This construction enables me in a convenient manner to mount the slide on the guide in a manner which is free from slackness.

The structure above described is mounted on the upper side of a hollow bed **2** as shown in the diagram at Figure 1. On the upper side of the bed is carried a slide **3** which forms no part of the present invention and which is reciprocated by any convenient means. This slide 3 carries an indexing headstock **4**, a back centre **5**, and a trimming mechanism **6** for the grinding wheel. The work piece **7** is carried on a mandrel **8** supported between the parts **4** and **5**. Also in the bed of the machine is arranged a valve mechanism, situated behind the plate **9**, for controlling the supply of operating fluid from any convenient source to the aforesaid cylinders *n*.

The arrangement is such that by means of fluid pressure acting on one of the pistons *m* the arm *f* is moved against the stop *p* as shown. In this position the central plane of the grinding wheel *c* is coincident with the axis of rotation of the headstock **4**. By moving the slide **3** to the right the trimming mechanism **6** is brought into position for trimming the grinding wheel. After the trimming operation has been completed, the slide is moved to the left, and then fluid is admitted to the other of the cylinders *n* causing the

frame, a support for the grinding wheel, a horizontal arm pivoted on the frame and having the said support depending from its underside so that the grinding wheel can be moved to and from a position in which its central plane is at an angle to the axis of the work piece or is coincident therewith, a toothed member on the arm, a rack engaging the said member, pistons on the opposite ends of the rack, and cylinders containing the pistons, the cylinders being carried on the frame, substantially as described.

5. In machines of the type specified for grinding wheels having teeth which are inclined to the axis of revolution, the combination of a fixed frame, a depending support for the grinding wheel rotatably mounted on said frame so that the grinding wheel can be moved to and from a position in which its central plane is at an angle to the axis of the work piece or is coincident therewith, a pair of adjustable stops for determining the angular positions of the said support, fluid operated means for moving the support against either of the stops, and a valve for controlling the movement of fluid to and from the said fluid operated means, substantially as described.

6. In machines of the type specified for grinding wheels having teeth which are inclined to the axis of revolution, the combination of a fixed frame, a depending support for the grinding wheel rotatably mounted on said frame so that the grinding wheel can be moved to and from a position in which its central plane is at an angle to the axis of the work piece or is coincident therewith, a pair of adjustable stops for determining the angular positions of the support, fluid operated means for moving the support against either of the stops, a valve for controlling the movement of fluid to and from the said fluid operated means, and a reversing valve for altering the direction of fluid flow between the first valve and the fluid operated means, substantially as described.

7. In machines of the type specified for grinding wheels having teeth which are inclined to the axis of revolution, the combination of a bed, a slide carried on the bed, a support for the work piece on the slide, a grinding wheel trimming mechanism also mounted on the slide, a frame arranged above the bed, a depending support for the grinding wheel rotatably mounted on said frame so that the grinding wheel can be moved to and from a position in which its central plane is at an angle to the axis of the work piece or is coincident therewith, a pair of adjustable stops on the frame for determining the angular positions of the said support, fluid operated means for moving the support against either of the said stops, and a valve mechanism for controlling the flow of fluid to and from the said fluid operated means, substantially as described.

ARTHUR HITCHCOCK ORCUTT.

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STORM WINDOW

Filed July 30, 1934 2 Sheets-Sheet 1

FIG. 1.

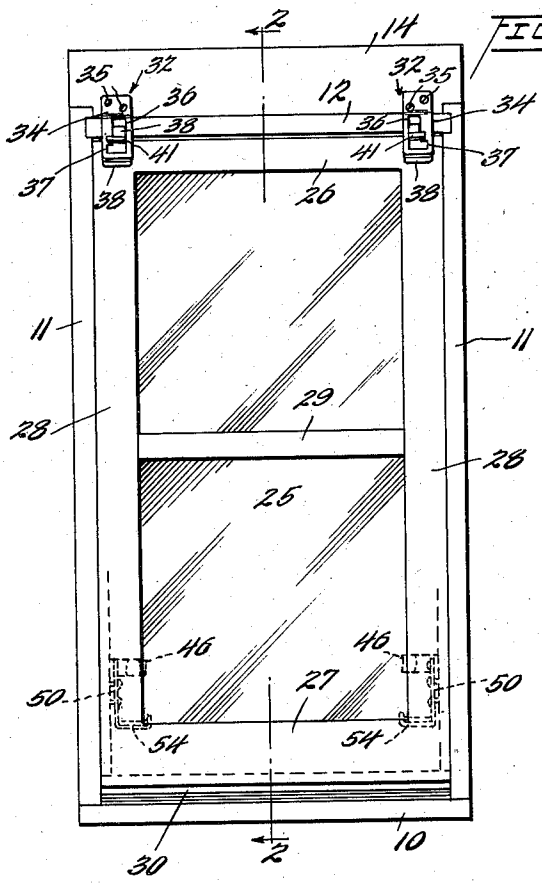



FIG. 2.

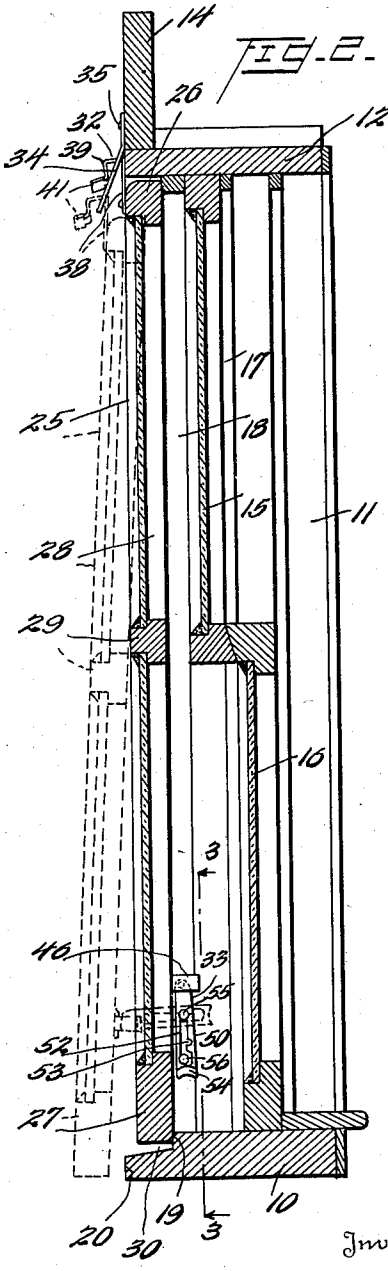
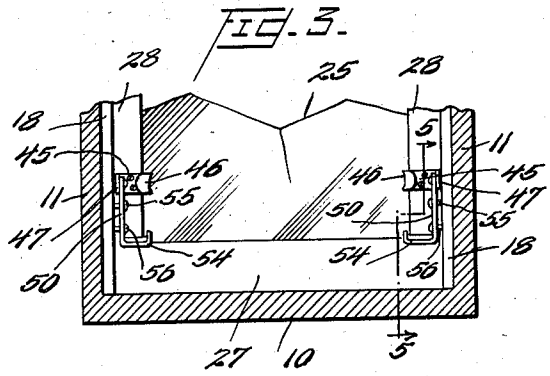



FIG. 3.




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