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H. J. ANDREW

2,285,892

PLANETARY GEARING

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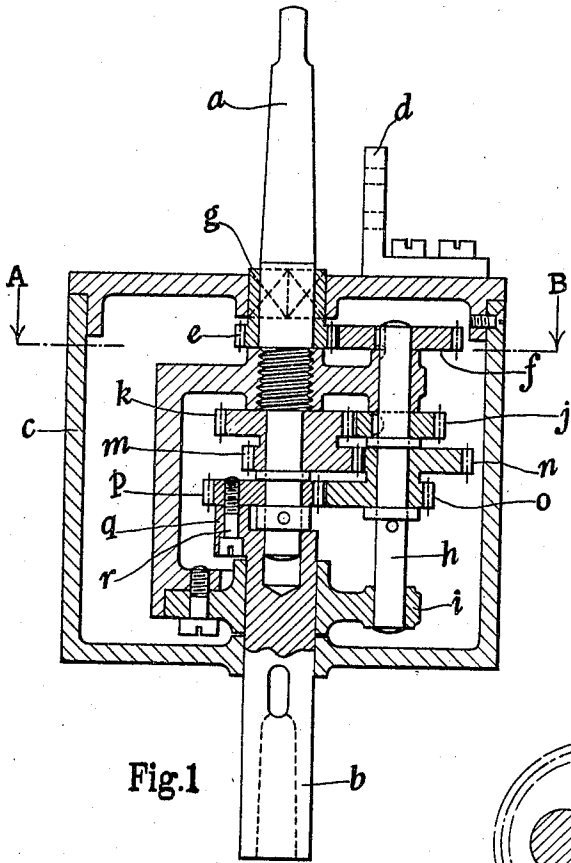


Fig. 1

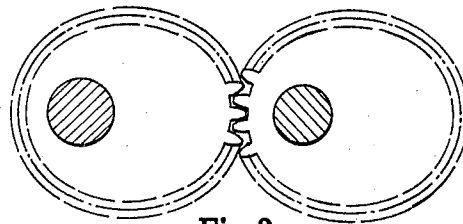


Fig. 3

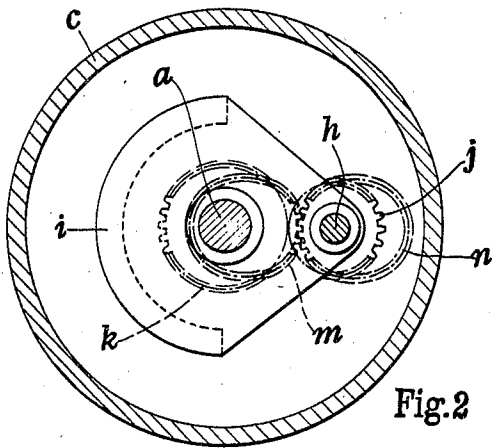


Fig. 2

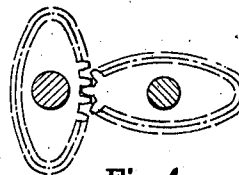


Fig. 4

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PLANETARY GEARING

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2 Claims. (Cl. 74—394)

This invention relates to appliances for the machine tapping of articles and has for its object to provide simple and efficient means which ensure that the chips formed during the tapping operation are broken up, and are therefore not liable to damage the threads being produced.

My invention comprises the provision in the drive to the tapping tool of means which cause automatically positive and negative acceleration of the tool with relation to the driving means.

Referring to the accompanying sheet of explanatory drawing—

Figure 1 is a sectional elevation showing the drive to a tapping tool holder constructed in one convenient form in accordance with this invention.

Figure 2 is a sectional plan view on the line AB of Figure 1.

Figures 3 and 4 are plan views showing different forms of gear wheels which may be employed in the drive shown in Figure 1.

a is the spindle by which the tapping-tool-holder b is driven by the gearing to be herein-after described. Such gearing is enclosed within a fixed or non-rotary casing c which also forms an oil bath for the gearing. The bracket d on the top of the casing c is for attachment to a fixed part of the machine which drives the tapping tool. There is a stationary gear wheel e (which is a sun wheel with respect to a planetary wheel f) upon which is a hollow extension piece g fitting into a square hole in the cover of the casing c , so that the wheel e is fixed. Any other method of fixing the sun wheel e in position may be employed if desired. The wheel f is keyed upon a spindle h carried in bearings in a frame i which is secured upon and revolves with the spindle a , so that the wheel f is carried around the fixed wheel e and rotated thereby. Upon the spindle h is keyed a spur wheel j which meshes with the wheel k free upon the spindle a . The wheel k forms part of a double wheel, the other part m of which is an excentric or elliptical gear wheel which meshes with a similar wheel n free upon the spindle h . The wheel n is part of a double wheel, the other part o of which is also excentric or elliptical and gears with an excentric or elliptical wheel p free upon the spindle a but secured by the part q and screw r to the tool holder b .

In order to facilitate manufacture, the order of the train of gears may be varied and the concentric wheels k and j arranged as the final pair of wheels in the drive, in which case the last

member k in the gear train is attached to the tool holder b .

The pairs of gear wheels m and n or o and p of elliptical form may be shaped as shown in Figure 3 or in Figure 4.

The two pairs of excentric or elliptical gear wheels give a compound effect with relation to the increase and reduction in the gear ratio between the spindle a and the tool holder b .

It will be appreciated from a consideration of the construction and arrangement of the drive to the tool holder that with a uniform rate of rotation of the spindle a , the tool holder will at one time be turning at a more rapid rate than a and at another time at a much lower rate. The length of time taken by the positive and negative accelerations and at the highest and lowest speeds is determined by the gears n , m , o and p .

I may employ further pairs of excentric or elliptical gear wheels in the transmission to the tool holder and so render unnecessary any large variation in the gear ratio at each pair of gear wheels.

Instead of the wheel f meshing with a fixed sun wheel as shown, it may mesh through a train of speed reducing gears with an internal wheel upon the stationary casing c . These speed reducing gears are necessary to bring down the speed of the wheel f to a similar speed to that obtained in the arrangement shown in the drawing, otherwise the correct motion will not be obtained at the tool holder b .

By reason of the positive and negative accelerations of the tool holder with relation to the uniform speed of the driving spindle, I am able to cause the breaking up of the metal removed during the tapping operation which as is well known, is very advantageous and prevents damage to the threads being tapped or breakage of the tap.

A screwing die may be used in place of the tap, for forming external threads.

The invention has been described in the form of an attachment for fitting to existing tapping machines, but the device may be incorporated in the tool head itself in the case of new machines.

What I claim is:

1. Means for driving a tapping tool in a machine for forming screw threads on articles, comprising a fixed casing, a sun wheel fixed to the casing, a tool holder journaled in the casing, a driving spindle journaled in the casing, a frame fixed to the spindle and enclosed in the casing, a shaft mounted in the frame, a planetary wheel keyed to the shaft and meshing with the sun

wheel and thereby rotating the shaft, a spur wheel keyed to the shaft, a second spur wheel free on the driving spindle and driven by the first-mentioned spur wheel, a gear wheel secured to the second spur wheel, a second gear wheel 5 secured to the tool holder and two gear wheels free on the shaft but secured together, of which one is driven by the first gear wheel and the other drives the second gear wheel and through it the tool holder, these four gear wheels each 10 being of the type in which the distance from the periphery to the axis of rotation varies from point to point around the periphery, for the purpose of causing automatically alternate positive and negative acceleration of the tool holder with 15 reference to the driving spindle, and thereby producing periodic reversals of the direction of rotation of the tool holder.

2. Means for driving a tapping tool for forming screw threads comprising a driving spindle, a tool holder in axial alignment therewith, planetary gearing comprising two sun wheels and two planetary pinions in the driving transmission to the tool holder, the said wheels being of the type in which the distance from the periphery of each wheel to its axis of rotation varies from point to point around its periphery, a shaft carrying said planetary wheels revolved about the axis of the driving shaft by the latter, one sun wheel being coupled to the tool holder and the other to a gear wheel meshing with a gear wheel keyed to the shaft carrying the planetary wheels, a further gear wheel keyed upon said shaft, and a fixed wheel co-axial with the driving spindle meshing with said further gear wheel.

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