Aug. 9, 1932. A. M. DRAKE 1,870,718

RELIEVED SCREW THREAD GRINDING MACHINE

Filed June 16, 1930

Fig. 1.

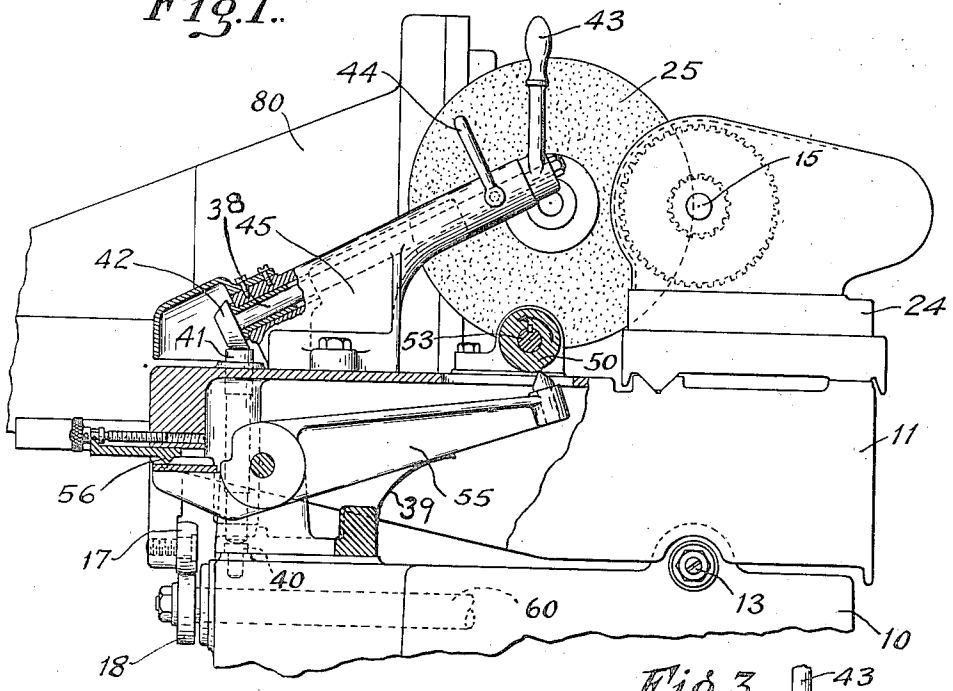


Fig. 2.

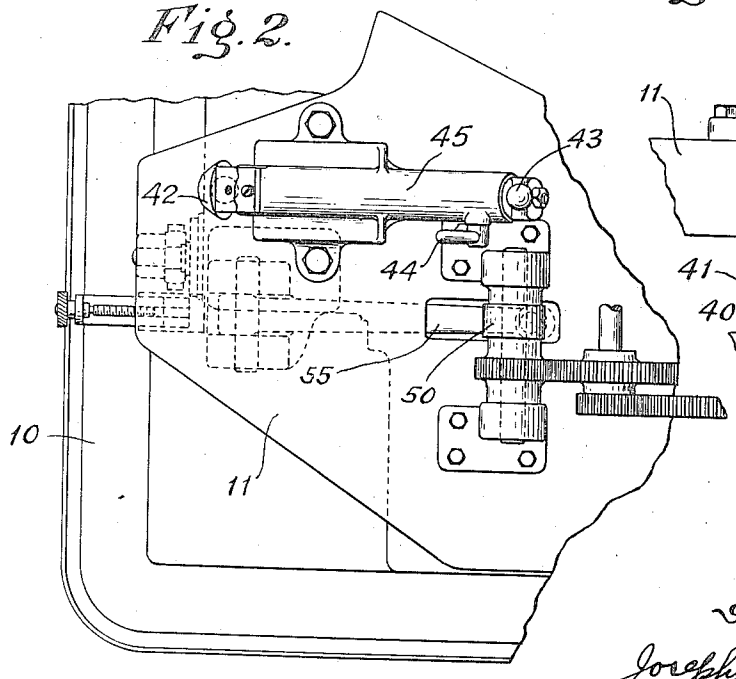
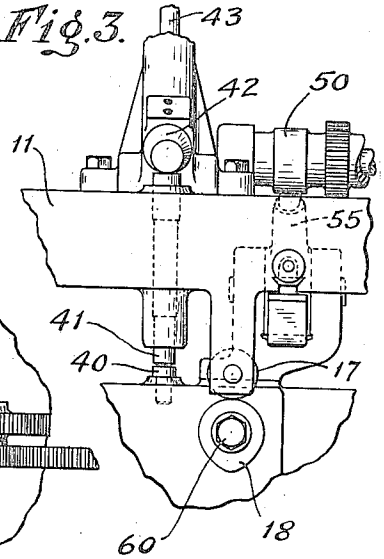


Fig. 3.



INVENTOR
Alden M. Drake
BY
Joseph H. Schlicher
ATTORNEY

Patented Aug. 9, 1932 1,870,718

UNITED STATES PATENT OFFICE

ALDEN M. DRAKE, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

RELIEVED SCREW THREAD GRINDING MACHINE

Application filed June 16, 1930. Serial No. 461,457.

This invention relates to thread grinding machines and particularly to a machine for relief grinding of taps, hobs and other threaded members.

An object of the present invention is to provide a thread grinding machine adapted for grinding relieved portions of threads, the machine having means for rendering the relieving mechanism inoperative during certain portions of the grinding operations of the threads.

A feature which enables me to accomplish the above object is that a stop is provided for limiting the position of the work holding frame during certain periods of grinding operations, means being provided to move this stop to another operative position, so that the work holding frame may be retained in another operative position.

In grinding threaded members having a slight amount of radial relief such as usually provided upon ground taps, it has heretofore frame during certain periods of grinding operation with relief movements of the work relative to the abrasive wheel. The grinding operations may be carried on, however, much more rapidly when no relief movements are given the work relative to the grinding wheel. Advantage of this latter fact is therefore taken by effecting substantially all of the grinding operations upon a tap or hob without effecting any relief movements of the work, then during a short final portion of the grinding operation the relief mechanism may be thrown into operation so that the work will be ground to its final form with the appropriate amount of relief.

The invention is shown applied to a construction shown and claimed in the patent to Durkee 1,624,933 granted April 19, 1927 but it will be understood that the invention may be otherwise embodied and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawing:

Figure 1 is a side elevation partly in section of the mechanism forming the present invention.

Fig. 2 is a plan view of a portion of the machine provided with the present improvements, and

Fig. 3 is a rear elevation, partly in section, showing features embodied in the present invention.

In the above mentioned drawing I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly and in its preferred aspect, my invention may include a thread grinding machine having some or all of the following principal parts: first, a base; second, a frame pivotally supported thereon for limited oscillatory movements; third, a work carriage including work rotating means mounted on the oscillatory frame, the table being adapted to be reciprocated and the work rotating means to be rotated in any preferred or well-known manner; fourth, an abrasive wheel supported on an appropriate slide and adapted to be adjusted relatively toward and from the work supporting and rotating means; fifth, a cam for oscillating the frame so that work mounted on the table will be moved into and out of operative relation with the wheel; sixth, a relief cam on the frame connected by an appropriate lever for slightly oscillating the oscillatory frame while work thereon is in contact with the wheel; seventh, a fixed stop on the base; eighth, an adjustable bar or rod slidably mounted on the frame, the lower end of which is adapted to engage the fixed stop; ninth, a cam engaging the upper end of the rod suitably supported within the frame; and tenth, manual means to adjust the cam and vary the position of the rod and lock the cam in predetermined operative positions.

Referring more in detail to the figures of the drawing, a bed 10 is shown having a pivot in the form of a longitudinally extending shaft 13 upon which a frame 11 may oscillate. On the frame 11 is mounted a table 24 adapted to reciprocate longitudinally along the frame upon suitably formed ways. On the table 24 is a work spindle 15 adapted to

rotatably mount the work being threaded. It will be understood that means are provided which may be similar to those in the above referred to Durkee patent for reciprocating the table 24 and for rotating the work spindle 15 in timed relation thereto. These means will not require further description.

Also mounted on the upper surface of the base 10 is a wheel slide 80 having upon its forward end a wheel 25 adapted to be rotated by any appropriate means at relatively high speeds. The means for rotating this wheel 25 and for manually adjusting the wheel 25 toward and from the work spindle 15 are not shown, as they may be of any desired form and do not form any part of the present invention.

In order to oscillate the frame 11 between its extreme positions, a cam 18 is provided in rear of the base 10 and engaged by a roller depending from the rear of the frame 11 which is rotated periodically through one-half revolutions. Means for rotating the cam 18 may be similar to the means described in the above mentioned patent so that further description is unnecessary.

It will be understood that in one position of the cam 18 the frame 11 will be oscillated to an extreme position moving the work spindle 15 away from the wheel 25 so that work mounted therein will be disconnected therefrom. In the opposite rotative position of the cam 18 it will be disengaged from its roller 17 and the frame 11 will be adapted to rest upon a stop 40 within the base. A rod 41, presently to be more fully described, in this position of the cam 18, bears against the fixed stop 40. The cam 18 is operated in timed relation to the movements of the table 24 and the rotating means 15, as described in the above mentioned Durkee patent. The work therefore is held in contact with the wheel 25 while rotating in one direction and away from the wheel while rotating in the opposite direction.

The mechanism above described and referred to is that employed for grinding screw threads without radial relief, but is not such as required for taps or hobs having relieved cutting edges.

A further means for oscillating the frame 11 is the cam 50 mounted on and rotated by shaft 53 within the frame 11 which is continuously rotated as by means described in the above referred to patent. Rotation of this cam 50 oscillates a lever 55 pivotally mounted upon a bracket fixed to the base 10 and having a short arm on the opposite side of this pivot adapted to be contacted by an adjustable member 56 on the frame 11. By adjustment of the member 56 the amount of oscillation of the frame 11 induced by the same amount of movement of the lever 55 and by the same cam 50 may be varied. The cam 50 is rotated a plurality of times during one rotation of the work and while the work is in engagement with the wheel 25.

By reference to the above mentioned patent, it will be seen that the oscillation induced by the cam 50 and its lever 55 is for the purpose of effecting relief grinding operations upon the work being ground and, in certain instances, where no relief is required, this mechanism may be omitted or moved to an inoperative position.

In order to slightly limit the oscillated position of the frame 11 in one direction in a position so that it will not be affected by cam 50, means are provided for vertically moving the rod 41 slidably mounted within the frame 11 a slight distance. In one position of this rod 41 the frame 11 is permitted to move to a position so that it is slightly oscillated by the cam 50. In the other position of stop 41 the frame 11 is withheld from a position where the short arm of lever 55 would contact with the adjustable member 56. The frame 11 therefore will not be operated by cam 50 but will remain stationary during the time work is engaged by the wheel 25. The oscillatory movements of the frame 11 will, as usual, be imparted by cam 18 at the ends of the stroke of the table 24 in opposite directions, but the cam 18 will run off the roller 17 leaving the rod 41 resting upon the stop 40 at a higher position.

To prevent oscillation of the lever 55 by the oscillatory movements of the frame 11 by the cam 18, a spring 39 may be interposed to retain the lever in its uppermost position and in contact with the cam 50. The spring 39 is shown as being of thin leaf form but it will be understood that any other form of spring may be employed.

In order to move this stop rod 41 to its two positions, its upper surface may be engaged by a suitable cam 42 preferably forming the frustum of a cone slightly eccentric relative to its supporting shaft 38. The shaft 38 supporting this cam or eccentric 42 is mounted in an oblique position for rotation within bearings provided in a housing 45 mounted on the upper surface of the frame 11. In order to move the cam 42 to its two positions to vary the limiting position of the frame 11, a handle 43 is mounted upon its upper and forward end and a clamping member 44 is provided for securing the shaft 38 in any position desired. The oblique disposition of the rod or shaft 38 positions the handle 43 within easy reach of the operator standing in front of the machine.

In operation the major portions of the grinding operations are performed with the rod 41 in a position holding the frame 11 slightly beyond a position where it would be affected by the oscillatory movements of the lever 55. When the work has been ground substantially to its final size and form the cam 42 is rotated manually to a

position permitting oscillatory movement of the frame 11 to be effected by the cam 50. The wheel 25 and its slide 80 are then adjusted for this new position of the frame 11 and the relief grinding operations are performed upon the work.

What I claim is:

1. A thread grinding machine comprising in combination, a base, a work supporting frame mounted thereon, a rotatably mounted abrasive wheel, cam means to move said frame to advance work mounted on said frame to and from said wheel, a cam for oscillating said frame toward and from said wheel while said work is in its advanced position toward said wheel, a rod slidable within said frame and engaging said base at one end, a cam mounted in said frame and engaging said rod at its opposite end, and manually operated means to rotate said cam to position said frame in two predetermined oscillated positions.

2. A thread grinding machine comprising in combination, a base, a frame mounted for oscillation thereon, a rotatably mounted abrasive wheel, a cam for periodically oscillating said frame in opposite directions, a cam for oscillating said frame a plurality of times while said first cam is in one operative position, and manually operated means to maintain said frame in positions whereby said frame may be affected or unaffected by said second cam while being movable toward and from said wheel by said first cam.

3. A thread grinding machine comprising in combination, a base, a frame mounted for oscillation thereon, a work supporting table having work rotating means, said table being mounted for reciprocation on said frame, an abrasive wheel supported on said base, a cam for oscillating said frame so that work on said rotating means will be periodically moved into and out of engagement with said wheel, a cam for oscillating said frame while work is in engagement with said wheel, a rod slidably mounted within said frame and engaging a portion of said base at one end, and means on the frame engaging the opposite end of said rod whereby operation of said means will render said second cam inoperative.

4. A thread grinding machine comprising in combination, a base, a frame mounted for oscillation thereon, a work supporting table having work rotating means, said table being mounted for reciprocation on said frame, an abrasive wheel supported on said base, a cam for oscillating said frame so that work on said rotating means will be periodically moved into and out of engagement with said wheel, a cam for oscillating said frame while work is in engagement with said wheel, stop means to limit the oscillated position of said frame, and manually operated means to vary the position of said stop means to oscillate said frame to two predetermined positions.

In testimony whereof, I hereto affix my signature.

ALDEN M. DRAKE.