

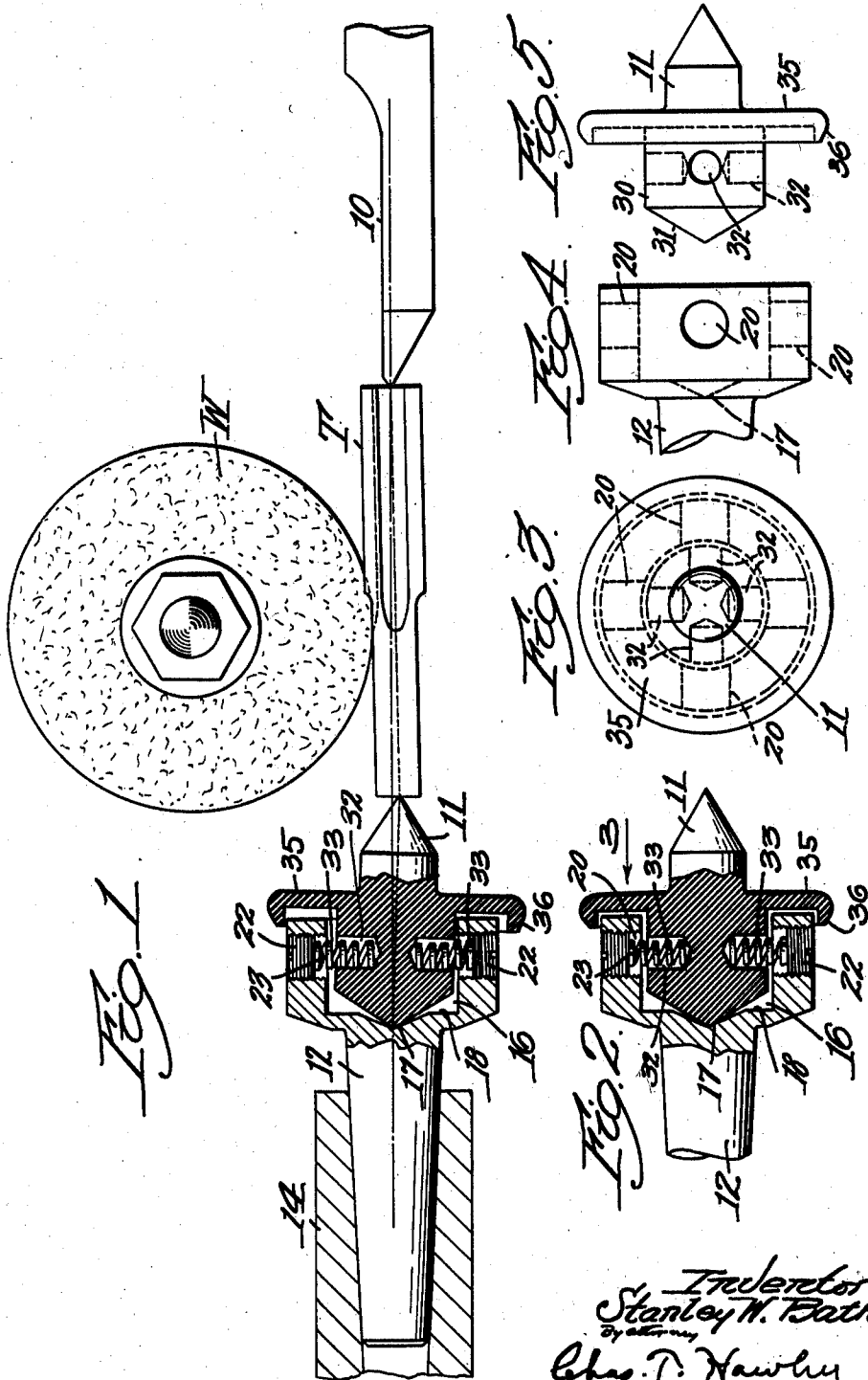
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YIELDING WORK CENTER

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YIELDING WORK CENTER

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This invention relates to centers for supporting a piece of work in a machine tool. The invention possesses special advantages when used in a grinding machine under conditions such that a slight yield of the work away from the wheel is at times desired, in order to protect the wheel from excessive wear or breakage. Such conditions arise, for instance, in the grinding of longitudinal flutes in taps or other similar tools.

It is the general object of my invention to provide a work center which will normally support the work in a predetermined axial position, but which on occasion will yield slightly in any radial direction to relieve excessive wheel pressure on the work.

A further object of my invention is to provide a construction in which the resistance of the center to yielding displacement may be regulated and adjusted as desired.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawing, in which

Fig. 1 is a front elevation, partly in section, showing my invention in operative relation to a grinding wheel and work piece;

Fig. 2 is a front elevation, partly in section, showing the parts in normal axial alignment;

Fig. 3 is an end view, looking in the direction of the arrow 3 in Fig. 2;

Fig. 4 is a partial side elevation of the holder; and

Fig. 5 is a side elevation of the yielding center. Referring to the drawing, I have indicated a tap T supported on a tail center 10 and a yielding head center 11, and engaged by a grinding wheel W. The tail center 10 is commonly mounted in fixed axial position in a suitable tail stock (not shown). The head center 11 is mounted in a holder 12 which is commonly inserted in a tapered opening in a work spindle 14 mounted for angular movement in a head stock, (not shown).

The holder 12 is provided with an axial recess 16 in its outer end, and also with an axially disposed conical depression 17 in the inner end wall 18 of the recess 16. The holder is also provided with a plurality of radially disposed openings 20, equally spaced angularly and threaded to receive headless set screws or plugs 22 preferably having small axial projections 23 at their ends.

The center 11 is provided with a cylindrical portion 30 which is very loosely received in the

recess 16, and with a conical inner end portion 31 adapted to be seated in the conical depression 17 in the holder. It will be noted, however, that the angle of the part 31 is more acute than the angle of the depression 17, so that the center 11 may rock freely about the point of the conical end portion 31.

The cylindrical portion 30 of the center 11 is also provided with radially disposed openings 32, equally spaced angularly and corresponding in number to the threaded openings 20 in the holder. In the drawing four such openings are shown but a larger or smaller number may be used if desired.

Relatively stiff coil springs 33 are mounted in the openings 32, after the holder and center are assembled, and the outer ends of these springs receive the projections 23 on the plugs 22 and are centered thereby. The plugs 22 are then relatively adjusted so that the springs cause the center 11 to assume its normal position in axial alignment with the holder 12. In this normal position, the springs 33 are held firmly but without substantial compression by the plugs 22.

The center 11 is also provided with an outwardly extending flange 35 having an offset edge portion 36 which loosely embraces the enlarged cylindrical portion of the holder 12 and assists in excluding dirt therefrom.

Having described the details of construction of my improved yielding center, the method of operation and advantages thereof are as follows:—

When producing fluted work such as taps, the flutes are commonly roughed out with a milling cutter before the taps are hardened and the flutes are then ground after the hardening operation. In grinding these flutes, the wheel enters at the small end of the tap (shown at the right in Fig. 1) and travels along the flute to the point where the milling cut terminates. This point is not very definitely fixed and varies somewhat in different taps.

When the grinding wheel W reaches the end of the flute, an excessive pressure will be thrown on the wheel if the flute is short. Under these conditions my improved yielding center will allow the work to be depressed by the wheel as indicated in Fig. 1, thus relieving the strain on the wheel and preventing excessive wear or damage thereto. As soon as the wheel pressure is removed, the center restores the work to normal axial position.

With the springs equally spaced angularly, the center will yield with substantially the same

resistance in any direction, so that the holder may be indexed to different angular positions without changing the yielding action.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. Work supporting means having a vertically fixed center for one end of a piece of work and a yielding work center for the other end of said piece of work, said yielding work center comprising a firmly supported holder having an end recess, a center element loosely mounted in said recess and having an outer end portion thereof abutting and supporting the adjacent end of said work piece, and yielding means to hold said center element in substantial axial alignment with

said holder and with said work-piece, the abutting portions of said center element and of said work piece being yieldable under pressure out of such axial alignment while said holder, fixed center and the other end of the work piece remain in original alignment, and said abutting portions being automatically returned to original alignment when the pressure is removed.

2. Work-supporting means as set forth in claim 1, in which the recess in the holder has a conical depression in its inner end wall and in which the center element has a conical end portion seated in said conical depression and has a second conical end portion engaging and supporting the adjacent end of the work piece.

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