

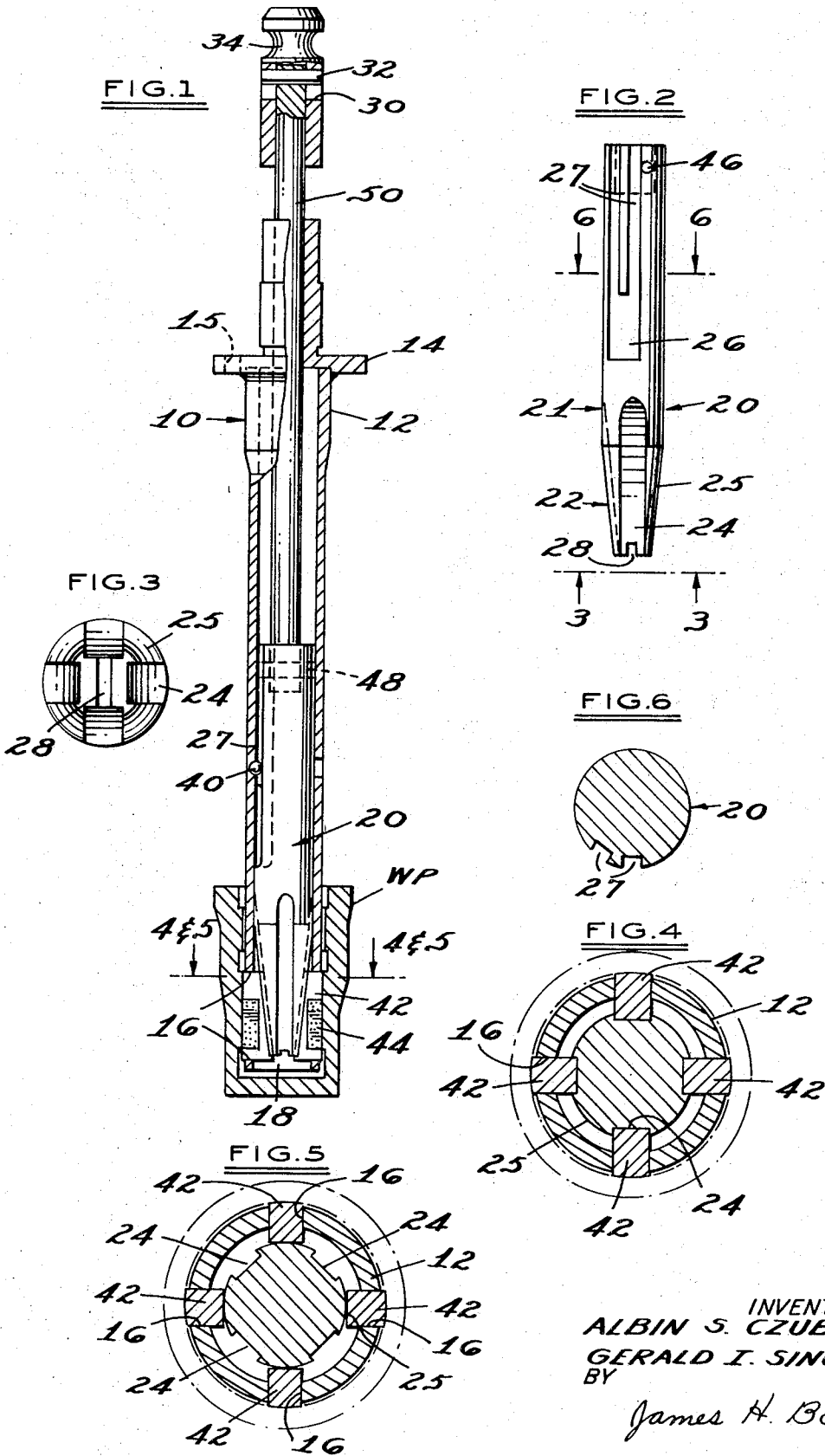
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HONING TOOL HAVING ANGULAR CONE SLOTS

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**HONING TOOL HAVING ANGULAR CONE SLOTS**  
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3 Claims

## ABSTRACT OF THE DISCLOSURE

A honing tool having a cone with a plurality of circumferentially spaced slots, each of said slots separated by a cam surface. The cone is adapted to be adjusted so that the abrasive stone is first guided in the cone slots, then by rotating the cone, having the abrasive stone guided on the cam surface.

## BACKGROUND OF THE INVENTION

### Field of the invention

The honing tool of the present invention is of the type utilized in the finishing of cylindrical surfaces such as cylindrical bores. Such honing tools generally include a metal body having a plurality of radially adjustable abrasive stones spaced circumferentially about the periphery thereof. During the honing operation the honing stones are advanced radially outwardly to compensate for the material abraded from the working face thereof and to increase the diameter of the work bore. During the honing operation the honing tool is unidirectionally rotated and is also reciprocated to evenly hone all locations on the work surface. Over a period of time, the abrasion and wear of the abrasive stones is at its maximum because of the fullest extent of the cone. This invention is particularly concerned with the extended use of the abrasive stones.

## SUMMARY OF THE INVENTION

According to the present invention the honing tool is incorporated with a cone having tapered slotted means interspaced around the angular circumferential portion and spaced from each other by tapered cam portions of the cone. New abrasives are expanded outwardly by the angular cone slots, the cone being guided in one of the cone guide slots to a predetermined position. To increase stone wear the cone is collapsed until its cone rotating slot is over the ball guide and using the cone screw driver slot it is rotated until the other cone guide slot is over the ball guide. Thus the abrasives are now being expanded outwardly by riding on the tapered cam surface of the cone.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view, partly in section and partly in elevation of a honing tool embodying the principles of the present invention;

FIG. 2 is a elevational view of the cone;

FIG. 3 is the end view showing the cone screw driver slot;

FIG. 4 and FIG. 5 show the relation of the cone with respect to the abrasive stone assembly taken along a line 4—4 and 5—5 shown in FIG. 1;

FIG. 6 is taken along line 6—6 of FIG. 2 and shows the relationship of the ball guide channel.

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## DESCRIPTION OF THE EMBODIMENT

Referring now to the drawings, FIG. 1 illustrates a honing tool 10 having a cylindrical shaped body 12. The honing tool body 12 has a central axial bore 18 and a plurality of slots 16 spaced circumferentially around the honing tool body 12. The honing tool body 12 is integrally connected with a flange 14.

In this embodiment a single cone 20 is shown however, it is readily aparent that a double cone can be utilized in a similar form or different embodiment. The cone 20 has a main straight portion 21 and a angular or tapered portion 22. The front angular or tapered portion 22 of the cone body 20 has circumferentially spaced tapered cone slots 24 that are separated or spaced from each other by the tapered cam portions 25 of cone 20.

Integral with the main portion 21 of cone 20 are parallel guide channels 27 with a guide channel bight portion 26 for the purpose to be explained hereinbelow. The cone 20 has on its end a cone screw-driver slot 28 whereby the cone is adapted to be partially rotated.

The cone 20 is connected to a cone rod 50 by means of a pin 48 inserted through the bore 46 in cone 20. This unit then is inserted into the axial bore 18 of honing tool body 12 and the cone rod 50 is connected to an upper spool member 30, by means of a pin 32 inserted there-through. The upper spool 30 has a circumferential groove 34 that is adapted to be connected to a honing machine which controls the expansion and collapse of the abrasive stone assembly 42, by means of the axial movement of the cone and cone rod assembly. As shown in FIG. 1 a ball 40 is seated in body 12 and protrudes into one of the parallel guide channels 27 of cone 20 such that it determines whether the abrasive stone assembly 42 is in the tapered cone slots 24 or on the tapered cam portion 25 of cone 20. It is readily seen that as the abrasive stones keep wearing away the inner surface of the workpiece the cone is extended until the cone 20 is to its fullest extent. However, especially in small bores, there remains a portion of the abrasive that is not worn away. Therefore, to increase the stone wear of the abrasive stone assembly 42 the cone is partially rotated in a manner herein described. The cone 20 is moved upward until the ball 40 is in the area of the guide channel bight portion 26, and using a screw driver inserted into the cone screw-driver slot 28 the cone 20 is rotated, whereby the ball 40 is adapted to be guided in the other cone guide slot 27. Thus as the cone 20 is moved axially downward the abrasive stone assembly 42 is now riding on the tapered cam surface of the angular portion 22 as shown in FIG. 5. Thus the abrasives are adapted to be expanded to its fullest extent by now riding upon the outermost tapered cam portion 25 of cone 20.

While certain specific constructions have been disclosed herein to illustrate the invention, it will be understood that other embodiments are within the spirit and scope of the invention as set forth in the claims set forth herein.

What is claimed is:

1. In a honing tool adapted to be reciprocated and rotated having a body member with a plurality of angularly spaced radially extending outwardly opened slots, radially adjustable honing abrasive means disposed in each of said slots adapted to abrade the working face of a workpiece, the improvement comprising:

(a) means for radially adjusting said abrasive means;

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- (b) said adjusting means having a main body portion and a cone-shaped end portion;
  - (c) said cone-shaped end portion having first and second cam surfaces;
  - (d) one of said cam surfaces being tapered slot means extending along the surface of said cone-shaped end portion; and
  - (e) the other of said cam means being the tapered surfaces between said tapered slots.
2. The invention as defined in claim 1 wherein, said

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main body portion includes guide channel means integral with said main portion.

3. The invention as defined in claim 1 wherein, the end of said cone means has a slot whereby said cone is partially rotated.

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