United States Patent

Croll et al.

[15] **3,645,050**

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[54] CUSHION MEANS BETWEEN ABRASIVE AND EXPANDERS

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[73] Assignee: **Micromatic Hone Corporation**, Detroit, Mich.

[22] Filed: **June 17, 1969**

[21] Appl. No.: **833,928**

[52] **U.S. Cl.** **51/338**, 51/346, 51/206

[51] **Int. Cl.** **B24b 9/02**

[58] **Field of Search** 51/330, 331, 338, 346, 332, 51/333, 339, 343, 206, 354, 355, 211, 214

[56] **References Cited**

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Primary Examiner—William R. Armstrong

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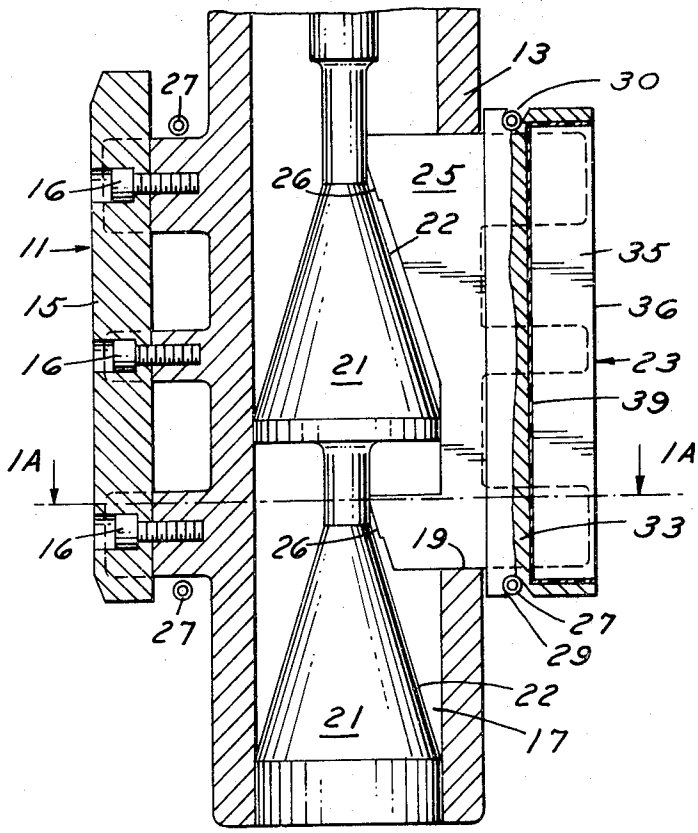
[57] **ABSTRACT**

In an abrading or honing tool environment, a resilient material, such as epoxy, urethane, cement, cork, neoprene or synthetic substance is applied between the abrasive means and the abrasive holder, or between the abrasive holder and the expander, or between the expander and the cone means, or any combination thereof, to reduce shock and decrease chatter.

5 Claims, 15 Drawing Figures



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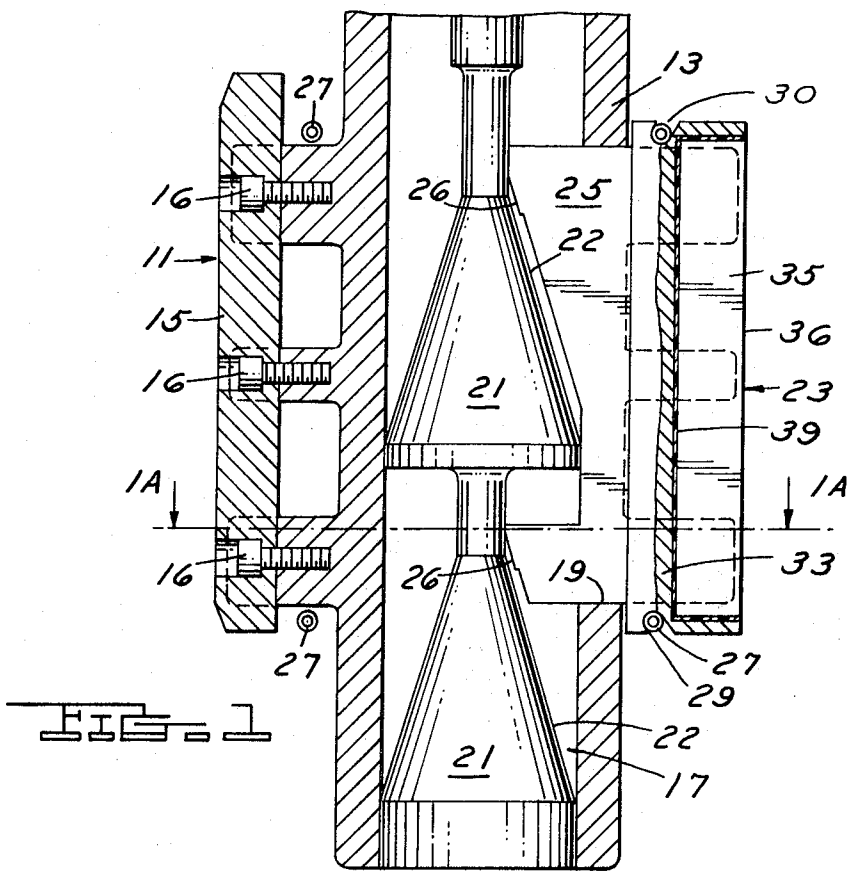

FIG. 1

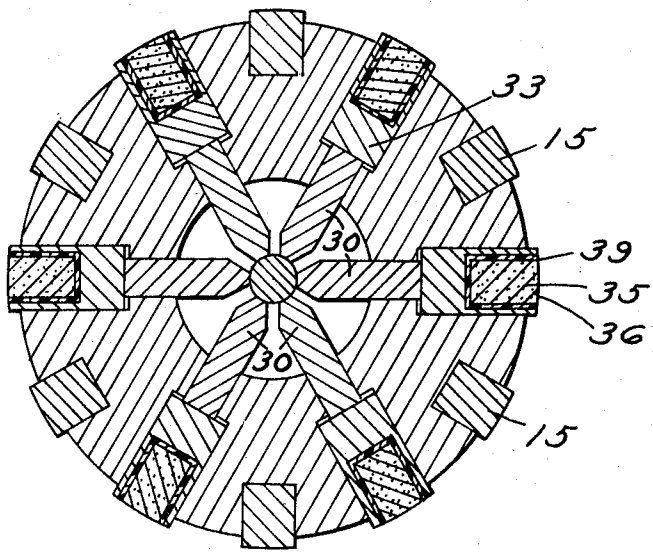

FIG. 1A

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FIG. 2

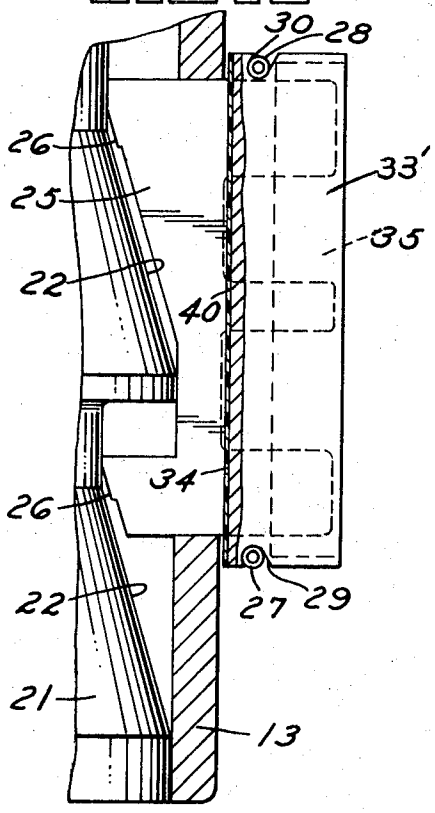
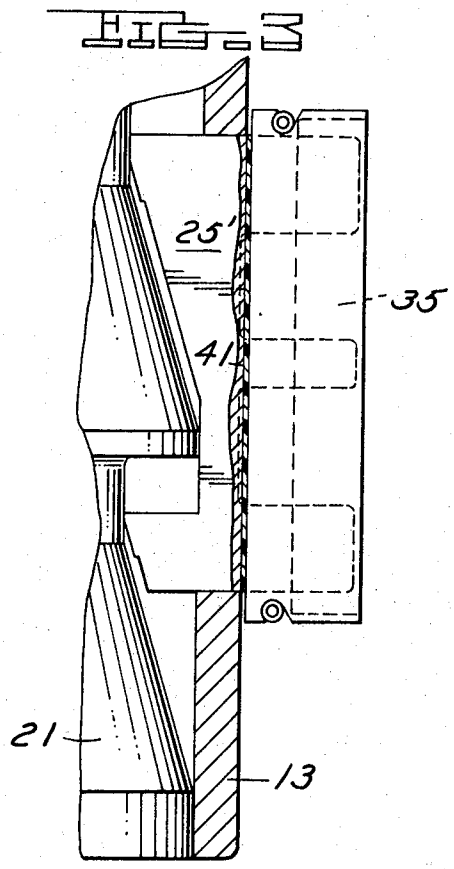


FIG. 3



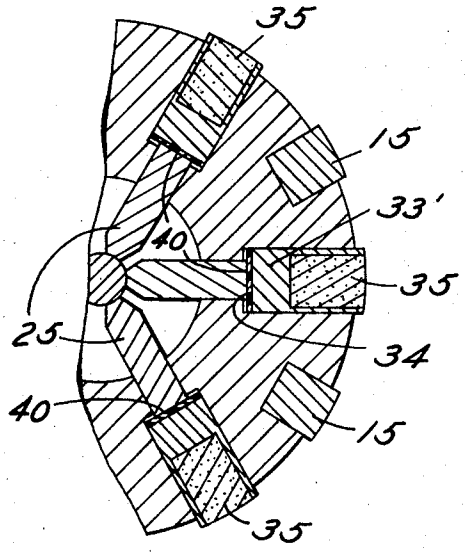


FIG. 2A

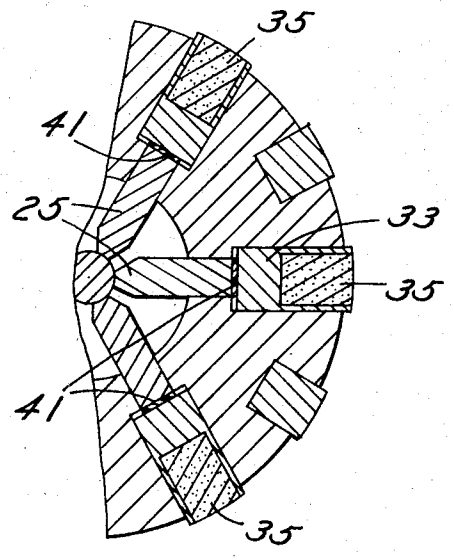


FIG. 3A

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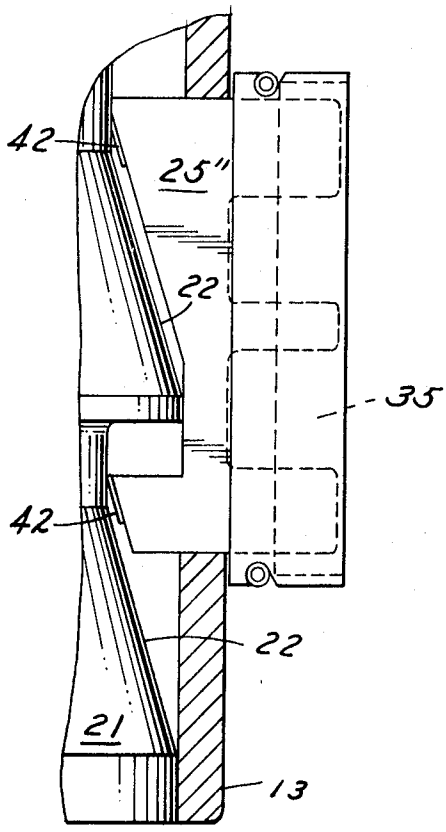

FIG. 4

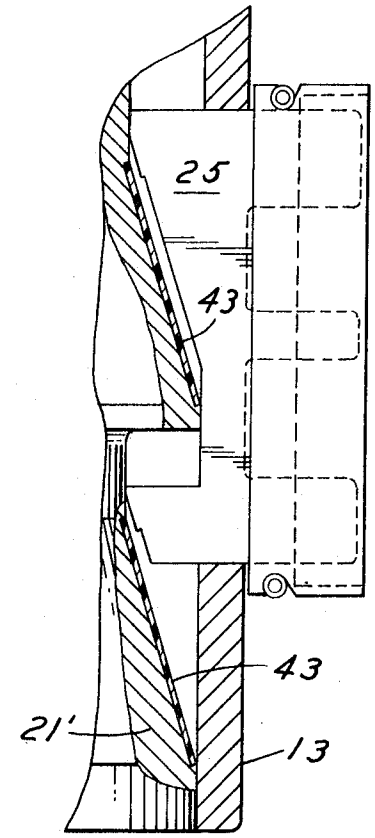

FIG. 5

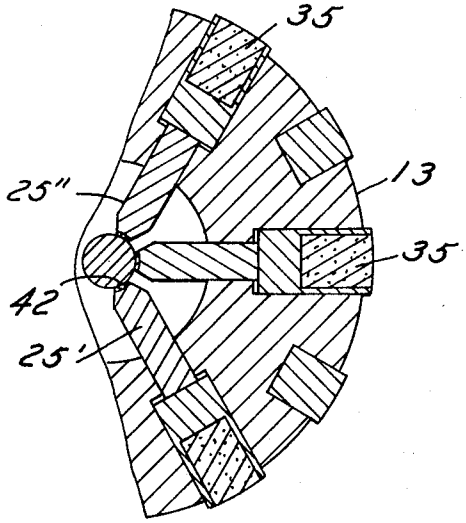

FIG. 4A

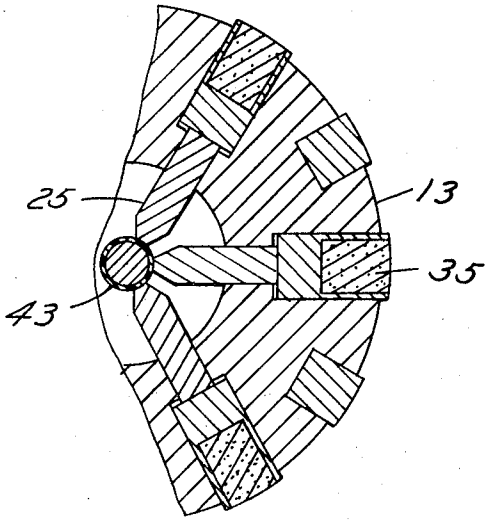

FIG. 5A

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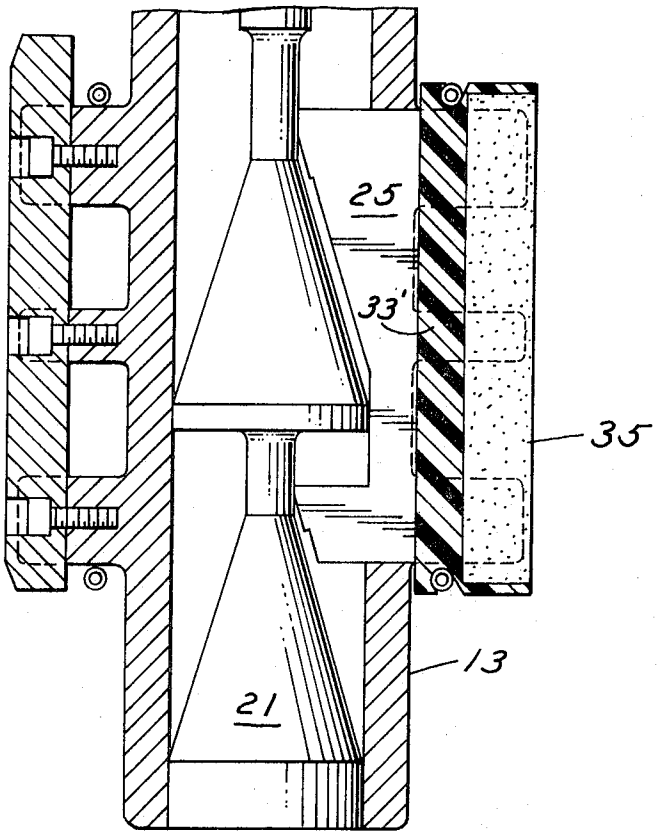

FIG. 6

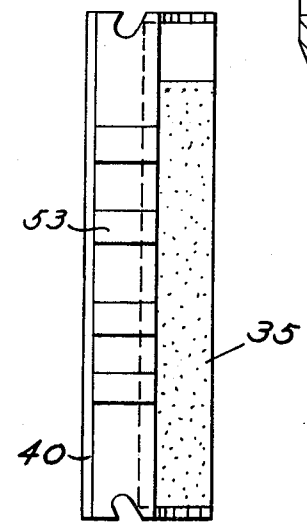

FIG. 7

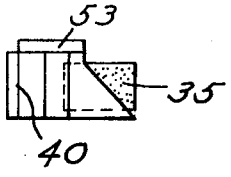

FIG. 7A

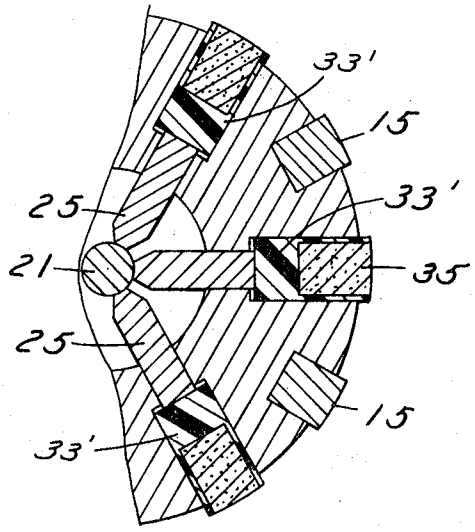

FIG. 6A

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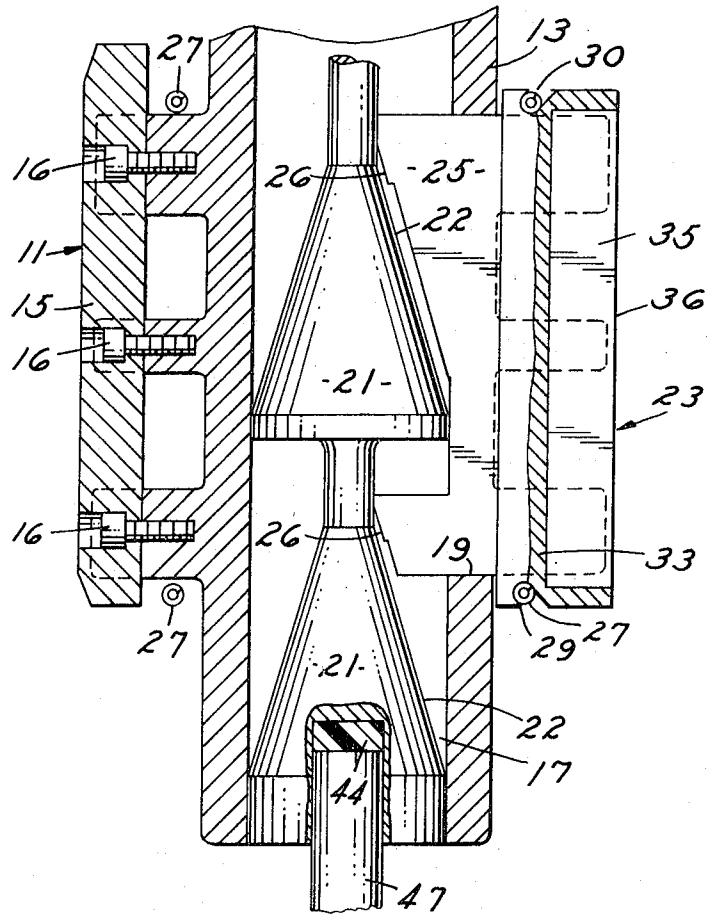

FIG. 8

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CUSHION MEANS BETWEEN ABRASIVE AND EXPANDERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to applying a resilient material such as epoxy, urethane, cement, cork, neoprene or synthetic substance between the honing tool abrasive and the cone means.

2. Description of the Prior Art

It is known to attach or connect abrasives directly to a holder, in various fashions and ways; namely, by gluing the abrasive directly onto a holder. However, applicant's innovation is in applying a layer of resilient material between the abrasive and the tool to absorb shock and reduce chatter.

SUMMARY OF THE INVENTION

According to the invention, the resilient material is applied either directly between the abrasive and abrasive holder, or between the abrasive holder and the expander plate, or between the expander plate and the cone means, or any combination thereof, for the purpose of reducing shock and chatter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial cross-sectional view of a honing tool.

FIG. 1A is the partial cross-sectional end view of FIG. 1.

FIG. 2 is a partial cross-sectional view of a honing tool with a modified embodiment of same.

FIG. 2A is the partial cross-sectional end view of FIG. 2.

FIG. 3 is a partial cross-sectional view of another embodiment.

FIG. 3A is a cross-sectional end view of FIG. 3.

FIG. 4 is a partial cross-sectional view of a fourth embodiment.

FIG. 4A is a partial cross-sectional end view of FIG. 4.

FIG. 5 is a partial cross-sectional view of a fifth embodiment.

FIG. 5A is a partial cross-sectional end view of FIG. 5.

FIG. 6 is a partial cross-sectional view of another preferred embodiment.

FIG. 6A is a partial cross-sectional end view of FIG. 6.

FIG. 7 and FIG. 7A show an abrasive holder having a layer of resilient material on the bottom surface thereof.

FIG. 8 shows a cross-sectional view of a honing tool with the cone rod pushing to expand the honing abrasives.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The honing tool, in FIG. 1 and 1A generally indicated at **11**, comprises a honing tool body **13**, with a guides **15** attached thereto by conventional screws **16**.

The body **13** comprises an axial bore **17** and circumferentially spaced slots **19**. A cone means **21** is slidably movable within the bore **17** thereby providing radial movement of the abrasive means **23**.

The abrasive means comprises an expander plate **25**, which is adapted to be moved by cone means **21**, by virtue of axial movement of the cone means thereby providing contacting bevelled surface **22** of the cone means **21** to contact edge **25** on expander plate **25**. The abrasive means **23** is restrained in its normal radial position by garter springs **27** and **28** which encircle the honing tool body holding the abrasive means.

The springs **27** and **28** are seated in recess **29** and **30** respectively, of abrasive holder **33** in order to prevent the abrasive holders from falling out of the slots **19**. The abrasive holder **33** comprises an abrasive **35** applied to a resilient material **39**, such as epoxy, urethane, cement, cork, neoprene, or synthetic substance. The resilient material reduces shock and prevents or decreases chatter, when the honing tool is reciprocated and rotated with surface **36** of the abrasive pressed against the surface of a workpiece for abrading purposes.

FIG. 2 and 2A show a modification, in which the basic parts of the tool are the same, however, the modification will be

denoted by a prime number. The resilient layer **40** is applied to the bottom surface **34** of abrasive holder **33**; i.e., between the abrasive holder **33'** and the expander plate **25**, for the reasons set forth above.

FIG. 3 and FIG. 3A show another embodiment in which the resilient layer **41** is applied to the expander plate **25'**, for reasons set forth hereinabove.

FIG. 4 and FIG. 4A show another embodiment in which the resilient layer **42** is applied to the surface of the expander plate **25''** which comes in contact with the cone surface **22**.

FIG. 5 and FIG. 5A show another embodiment in which the resilient layer **43** is applied to the surface of the cone **21'**.

FIG. 6 and 6A show another embodiment in which the abrasive holder **33'** is made of resilient material to reduce chatter and shock when used in honing and abrading applications.

FIG. 7 and FIG. 7A show a modified abrasive holder **53** with a layer of resilient material **40** attached to the bottom surface thereof.

FIG. 8 shows a final embodiment with a cone rod **47** having the resilient material **44** applied between the cone rod **47** and the cone **21**. This embodiment covers the tool in which pressure is applied in a pushing direction against the cone means to expand the honing stones.

It is to be understood that besides the independent use of the resilient material, of the plastic or epoxy layer, it is conceivable and apparent that combinations of its use are advantageous. For example, an epoxy abrasive holder combined with a layer of epoxy applied also to the surface of the cone would reduce chatter and shock and still maintain normal honing characteristics.

We claim:

1. In an abrading tool, comprising:
   a. a tool body, said tool body having an axial bore therein;
   b. a cone means, said cone means adapted to be slidably movable within the axial bore of said tool body;
   c. an expander plate, adapted to be radially movable inwardly and outwardly when said cone means is moved axially;
   d. a plurality of abrasive holders;
   e. a plurality of abrasives, each of said abrasives mounted in said abrasive holders respectively; and
   f. resilient layer means applied between said expander plate and said cone means.

2. In an abrading tool, comprising:
   a. a tool body, said tool body having an axial bore therein;
   b. a cone means, said cone means adapted to be slideably movable within the axial bore of said tool body;
   c. an expander plate, adapted to be radially movable inwardly and outwardly when said cone means is moved axially;
   d. a plurality of abrasive holders;
   e. a plurality of abrasives, each of said abrasives mounted in said abrasive holders respectively; and
   f. resilient layer means applied to the surface of said cone means.

3. In an abrading tool, comprising:
   a. a tool body, said tool body having an axial bore therein, and circumferentially spaced slots thereon;
   b. cone means, said cone means adapted to be axially slidable within said bore of said tool body;
   c. an abrasive means, said abrasive means adapted to be moved radially inwardly and outwardly by virtue of axial movement of said cone means;
   d. an expander plate, interposed between said cone means and said abrasive means; and,
   e. resilient layer means, applied between said expander plate and said cone means for the purpose of reducing chatter and shock when the tool is reciprocated and rotated against the surface of a workpiece.

4. In an abrading tool, comprising:
   a. a tool body, said tool body having an axial bore therein, and circumferentially spaced slots thereon;
   b. cone means, said cone means adapted to be axially slidable within said bore of said tool body;

c. an abrasive means, said abrasive means adapted to be moved radially inwardly and outwardly by virtue of axial movement of said cone means;
d. an expander plate, interposed between said cone means and said abrasive means; and,
e. resilient layer means, applied to the surface of said cone means for the purpose of reducing chatter and shock when the tool is reciprocated and rotated against the surface of a workpiece.

5. In an abrading tool, comprising:
a. a tool body, said tool body having an axial bore therein;
b. a cone means, said cone means adapted to be slidably movable within the axial bore of said tool body;
c. an expander plate, adapted to be radially movable inwardly and outwardly when said cone means is moved axially;
d. a plurality of abrasive holders;
e. a plurality of abrasives, each of said abrasives mounted in said abrasive holders respectively; and,
f. resilient layer means applied to the bottom surface of each of said abrasive holders for the purpose of reducing chatter and shock when the tool is reciprocated and rotated against the surface of a workpiece.

* * * * *