June 30, 1964 W. G. CROWE 3,138,902

STONE ASSEMBLY HOLDER

Filed Nov. 13, 1961

Fig. 1

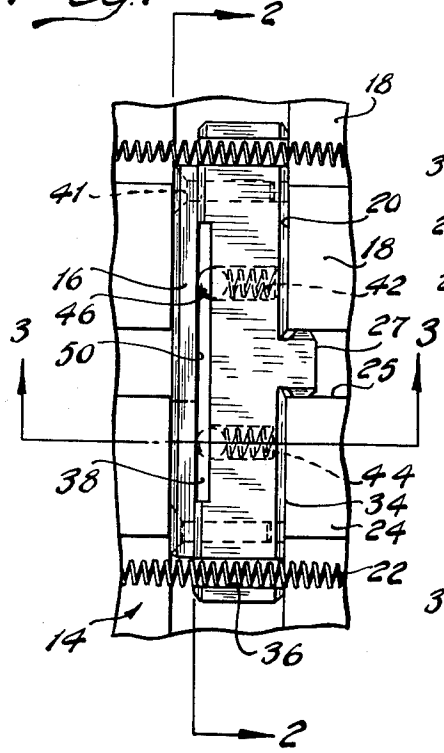


Fig. 2

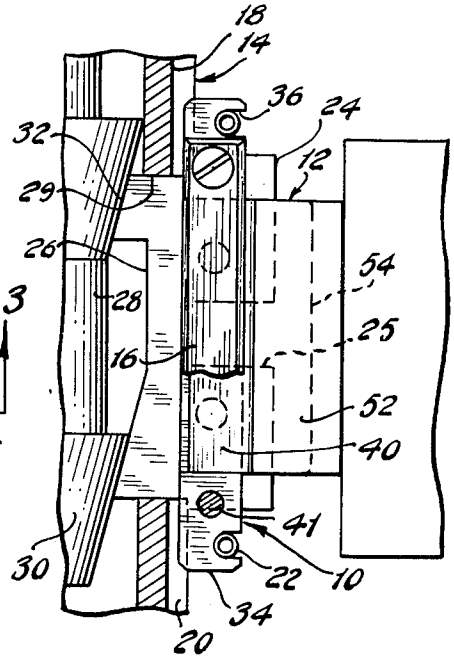


Fig. 3

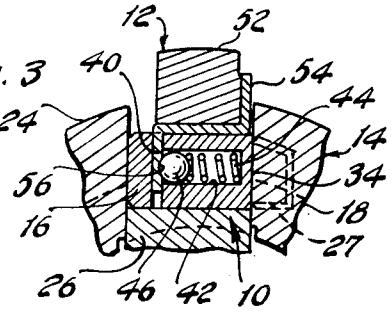


Fig. 4

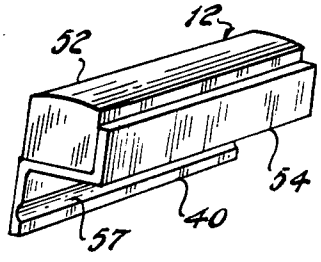
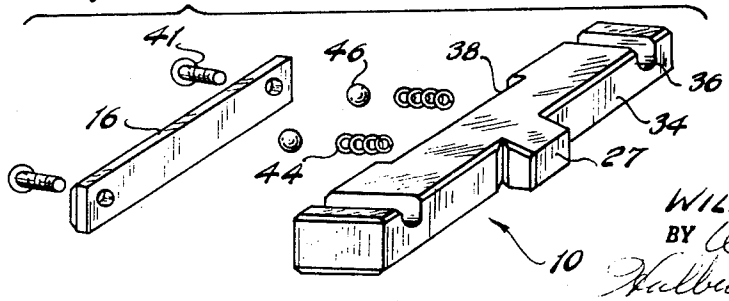


Fig. 5



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STONE ASSEMBLY HOLDER

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The invention relates to honing tools and refers more specifically to a honing stone assembly and a honing stone holder for holding the assembly in position on a honing tool which are constructed to provide control over the width of the stone holder and to permit rapid replacement of the stone assemblies in the stone holder.

In the past honing tools have generally been provided with honing stone holders which required removal of the stone holders from the tool body or head to permit replacement of a worn stone assembly. With such prior constructions the honing stone assembly has generally been press fitted into the holder or has been clamped therein either by means of set screws which must be loosened and retightened when replacing a stone assembly or by means of honing stone holder shoes for attaching the stone assemblies over stationary pins which must also be removed and replaced in changing stone assemblies.

In addition the honing stone holders of the past have generally been constructed without regard to replacement or adjustable control of the width thereof so that on becoming loose due to normal wear they have reduced the efficiency and quality of the honing and have generally been discarded or expensively plated with hard material which latter alternative causes excessive wear of the softer honing tool body. Further, with no control of the width of honing stone holders entirely separate holders must be provided for use in conjunction with each honing tool having different width tool holder slots.

Such methods of replacing honing stone assemblies in honing stone holders are undesirable since excessive operator and machine time are lost during tool maintenance. The reduced efficiency of honing stone holders due to wear thereof and the provision of separate stone holders for different honing tools is further uneconomical in that valuable materials are wasted due to less than maximum use being made of each tool holder.

It is therefore one of the objects of the present invention to provide an improved honing stone assembly adapted to be removed from and replaced in a honing stone holder mounted on a honing tool without removing the stone holder from the honing tool.

Another object is to provide a honing stone holder including adjustable means for controlling the width thereof such as replaceable honing stone holder members and shims for use with the honing stone holder members.

Another object is to provide a honing stone holder and honing stone assembly which are extremely rigid.

Another object is to provide a honing stone holder comprising an elongated body member having a longitudinally extending slot therein and adapted to fit within an axial slot in the body of a honing tool, means for radially adjusting the elongated member relative to the tool body and means for releasably securing a honing stone assembly to the stone holder.

Another object is to provide a honing stone holder and honing stone assembly as set forth above wherein the means for retaining the honing stone assembly within the stone holder comprises spring pressed ball detent means extending transversely of the slot in the stone holder and an elongated flange on the honing stone assembly secured in said slot by the spring pressed ball detent means.

Another object is to provide a honing stone holder as set forth above comprising a holder body member having

a longitudinally extending recess in one side thereof, and a retaining bar secured to said one side of the holder body to provide said longitudinal slot in conjunction with said longitudinally extending recess into which the flange on the stone assembly extends which retaining bar may be varied in size to adjust the width of the stone holder for normal wear or different honing tool stone holder slot widths.

Another object is to provide a honing stone holder and stone assembly which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, illustrating a preferred embodiment of the invention, wherein:

FIGURE 1 is a partial elevation of the head of a honing tool having the stone holder of the invention secured therein.

FIGURE 2 is a section view of the head of the honing tool and stone holder illustrated in FIGURE 1 taken substantially on the line 2—2 in FIGURE 1 and showing a stone assembly in position in the stone holder and in contact with a workpiece.

FIGURE 3 is a partial transverse section of the honing machine tool head, stone holder and stone assembly illustrated in FIGURE 2 taken substantially on line 3—3 in FIGURE 1.

FIGURE 4 is a perspective view of a stone assembly constructed in accordance with the invention.

FIGURE 5 is an exploded perspective view of a stone holder constructed in accordance with the invention.

With reference to the figures of the drawing one embodiment of the invention will now be disclosed.

As shown in FIGURES 1–3 a honing stone holder **10** is provided to secure a honing stone assembly **12** to the body **14** of a honing tool. The honing stone holder **10** is provided with a replaceable retainer strip **16** to permit controlling the width of the honing stone holder to correct for normal wear thereof and permit use of a single stone holder with honing tools having stone holder slots of different width. Further, as shown best in FIGURE 3, in accordance with the invention the stone assembly **12** and stone holder **10** are so constructed that the stone assembly may be easily removed from the stone holder and a new stone assembly replaced therein without removing the stone holder from the honing tool body **14**.

More specifically the honing tool body **14**, as best shown in FIGURE 2, includes the outer cylindrical sleeve **18** having longitudinally extending stone holder slots **20** therein spaced angularly thereabout. Annular flanges **24** are provided extending around sleeve **18** in axial spaced relation to receive the thrust lug **27** in the annular recesses **25** therebetween for holding the stone holder **10** in a predetermined axial position as shown best in FIGURE 1. Another slot **29** is provided axially of sleeve **18** within each of the slots **20** to receive the expansion plates **26** of the honing tool.

As shown best in FIGURE 2 an expansion plate **26** is provided radially inwardly of each stone holder **10**. The expansion plates **26** are adapted to move radially inwardly and outwardly of the associated stone holder slots **20** to radially position the stone holders **10** and therefore the stone assemblies **12** carried thereby on axial movement of the ram **28** having the conical portions **30** thereon due to engagement of the conical portions **30** of the ram and mating surfaces **32** on the expansion plate **26**. In operation it will be seen that on downward movement of the ram **28** as shown in FIGURE 2 each expansion plate **26** and therefore the stone holder **10** and stone assembly **12** associated therewith will be caused to move radially outwardly of the slot **20** in the tool head **14** in which it is positioned against the biasing force of the

garter springs 22 which tend to move the stone holders 10 radially inwardly of the slots 20.

The stone holders 10 as best shown in FIGURE 5 are each in the form of a body comprising an elongated bar 34 having transverse recesses 36 therein in which the garter springs 22 are received. A shallow recess 38 extending longitudinally of the tool holder bar 34 is also provided in the tool holder body member to provide an elongated socket or slot 50 in conjunction with the retainer plate or strip 16 to receive the flange 40 of the stone assembly. The cylindrical recesses 42 spaced axially of the stone holder bar receive the coil springs 44 and detent ball 46 operable to secure the stone assembly 12 to the stone holder 10.

The bar 34 of the stone holder 10 is further provided with a thrust lug 27 as best shown in FIGURE 5. Thrust lug 27 is adapted to extend into recess 25 in the sleeve 18 with the stone holder in position in a slot 23 to prevent axial movement of the stone holder assembly relative to the tool body 14 in operation.

A retainer strip 16 is secured to the holder bar 34 over the recess 38 by convenient means such as bolts 41 extending through the retainer strip 16 and into the stone holder bar 34, as shown best in FIGURE 1. Thus the stone holder bar 34 and retaining strip 16 form the elongated slot 50 to receive the flange 40 of the stone assembly 12.

In conjunction with the honing stone holder 10 it will be particularly noted that the retaining strip 16 may be removed therefrom on removal of the stone holder 10 from the slot 20 whereby the retaining strip may be replaced by one of greater width to compensate for wear of the stone holder in normal use or to permit the use of the stone holder with tool heads 14 having slots 20 of different widths. Alternatively of course the original retainer strip 16 once removed may be plated to provide the required width to compensate for wear of the stone holder.

The honing stone assembly 12, as shown best in FIGURE 4, comprises the honing stone 52 bonded or otherwise secured to the Z-shaped angle base member 54. As previously indicated the Z-shaped angle member 54 has one leg forming the flange 40. The flange 40 is provided with shallow spherical recesses 56 as shown in FIGURE 3 into which the ball detents 46 extend with the stone assembly 12 in assembly with the stone holder 10 to retain the stone assembly 12 in position on the tool body 14. The flange 40 may alternatively be provided with a longitudinally extending groove 57 therein into which the detents 46 may extend as shown in FIGURE 4. The groove 57 has the manufacturing advantage that it need not be longitudinally aligned with the detents 46 as is the cast with the recesses 56.

With such construction it will be readily apparent that the simple stone assembly 12 may be rapidly removed from the stone holder 10 without the necessity of removing the stone holder from the tool head 14 whereby worn stone assemblies may be replaced with a minimum of lost machine time and skilled labor.

Further, since the base member 54 of the stone assembly 12 and the entire stone holder 10 are constructed of metal such as steel the structure of the invention is much more rigid than known stone assemblies and stone holders constructed of plastic.

While one embodiment of the invention has been specifically disclosed it will be understood that other embodiments thereof are contemplated and it is the intention to include all such modifications as are suggested by the foregoing disclosure within the scope of the invention which is indicated by the appended claims.

What I claim as my invention is:

1. In combination, a honing stone assembly comprising an elongated abrasive element and an elongated flange projecting from said abrasive element, a holder for said honing stone assembly comprising a body adapted to carry said honing stone assembly on its front face, said body including an elongated bar of substantial width having an elongated front surface extending lengthwise thereof providing a seat for said honing stone assembly, an elongated strip removably secured to one side of said bar to increase the width thereof, the thickness of said strip being substantially less than the width of said bar, said bar having an elongated recess in the side thereof to which said strip is secured, said recess and strip cooperating to define an elongated slot open at the front of said body and shaped to receive said flange, and means for releasably retaining said flange in said slot including a second recess in said bar opening into said elongated slot and a spring-pressed ball in said second recess biased toward said elongated slot to frictionally engage said flange.

2. The combination defined in claim 1, wherein said flange has a depression therein so located as to be engaged by said ball when said flange is received in said elongated slot as aforesaid.

3. The combination defined in claim 1, wherein said retaining means includes a third recess in said bar opening into said elongated slot at a point spaced longitudinally from said second recess, a spring-pressed ball in said third recess biased toward said elongated slot to frictionally engage said flange, and said flange has an elongated groove therein extending lengthwise thereof and so located as to be engaged by said balls when said flange is received in said elongated slot as aforesaid.

4. A honing stone assembly holder adapted to releasably support a honing stone assembly in the slot of a honing tool, comprising a body adapted to carry the honing stone assembly on its front face, said body including an elongated bar of substantial width having an elongated front surface extending lengthwise thereof providing a seat for the honing stone assembly, an elongated strip removably secured to one side of said bar to increase the width thereof, the thickness of said strip being substantially less than the width of said bar, said bar having an elongated recess in the side thereof to which said strip is secured, said recess and strip cooperating to define an elongated slot open at the front of said body and adapted to receive a portion of the honing stone assembly, and means for releasably retaining said portion of the honing stone assembly in said elongated slot, said retaining means including a second recess in said bar opening into a side of said elongated slot, and a spring-pressed ball in said second recess biased toward said elongated slot.

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