Dec. 10, 1968 C. H. CRAWFORD ET AL 3,415,103

STRAIGHTENING APPARATUS AND METHOD

Filed Sept. 20, 1965 4 Sheets-Sheet 1

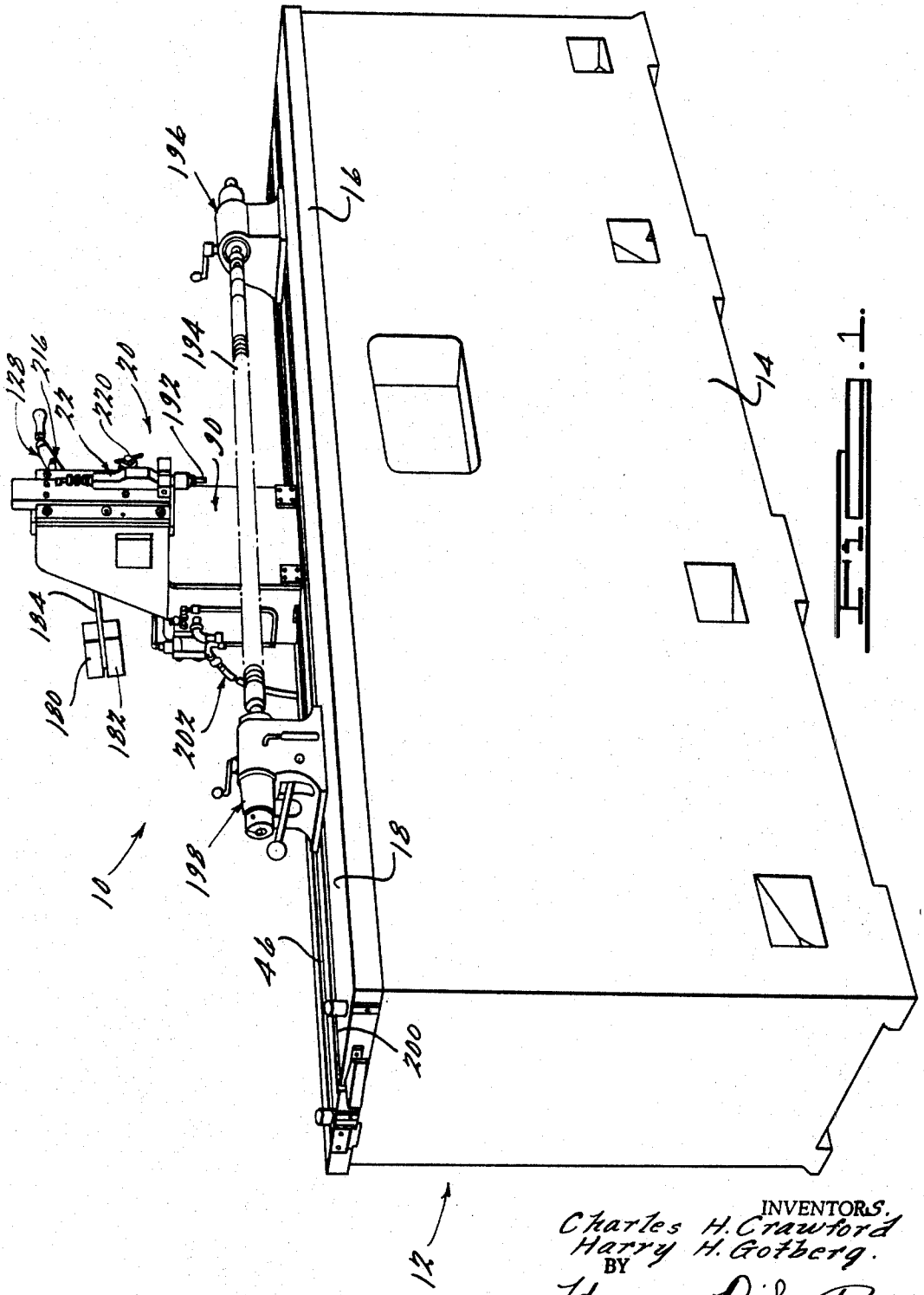


Fig. 1.

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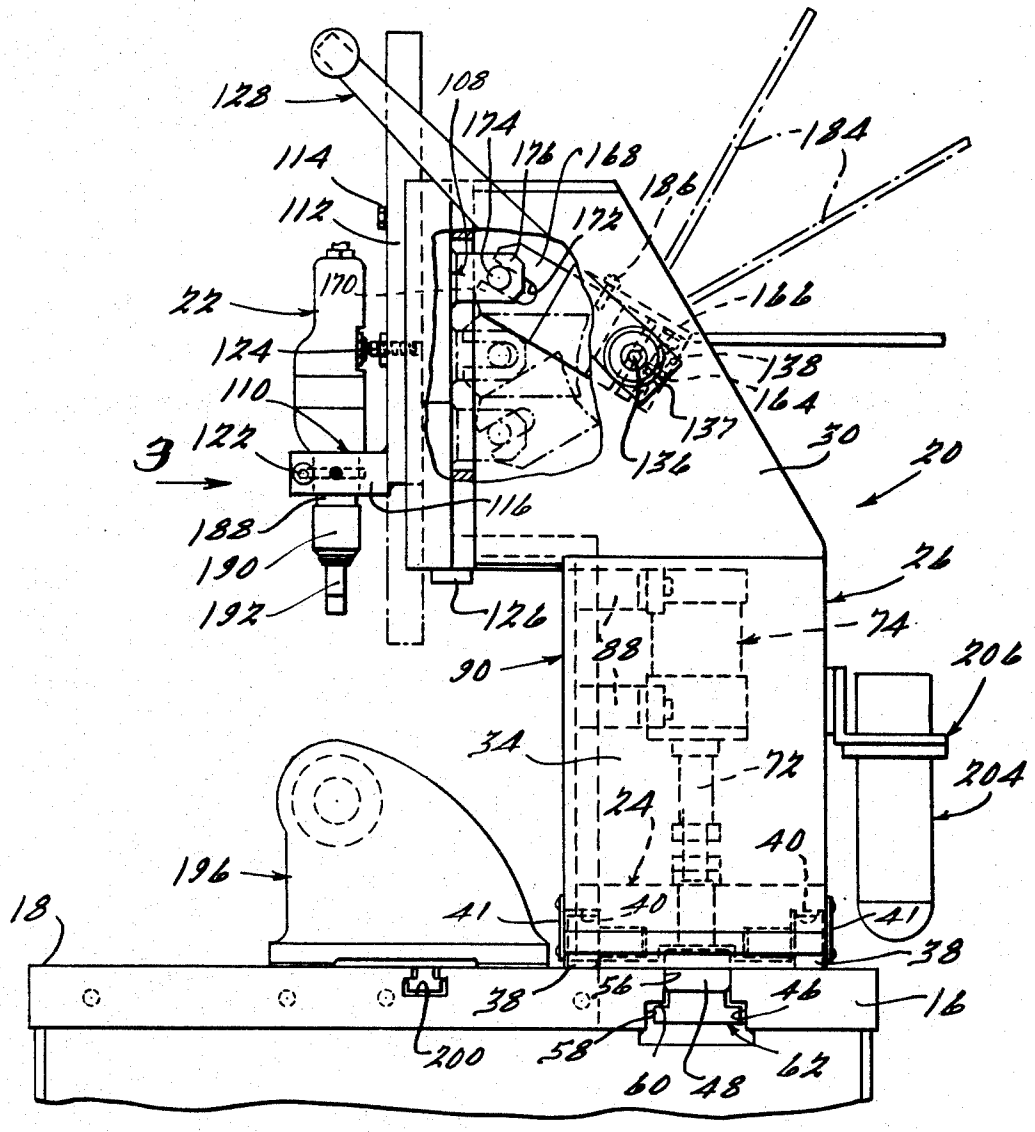


FIG. 2.

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STRAIGHTENING APPARATUS AND METHOD

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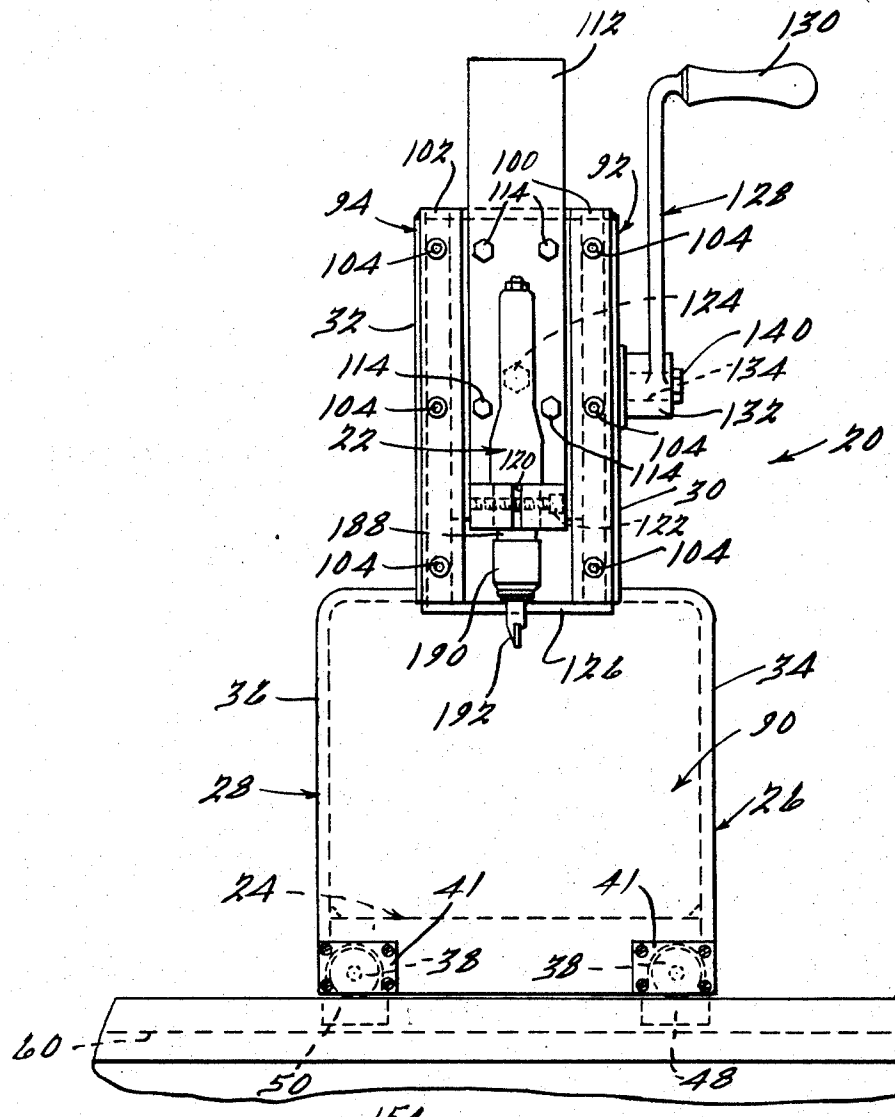


FIG. 3.

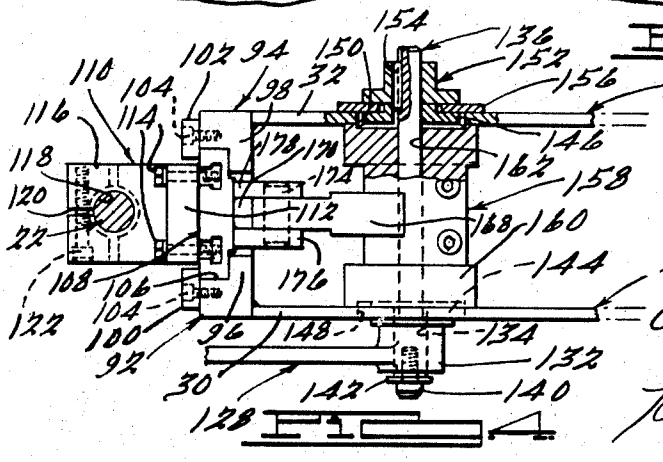


FIG. 4.

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STRAIGHTENING APPARATUS AND METHOD

Filed Sept. 20, 1965 4 Sheets-Sheet 4

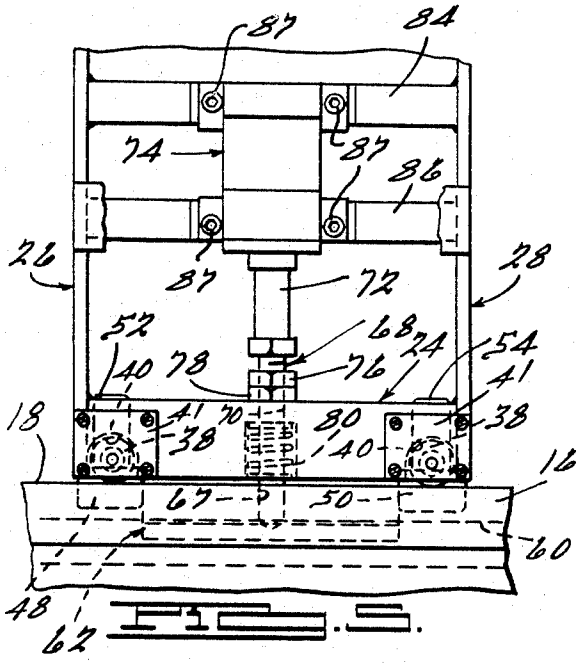


FIG. 5.

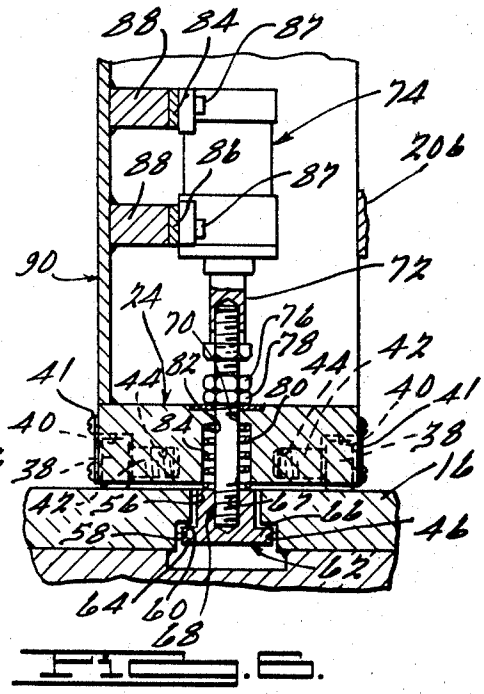


FIG. 6.

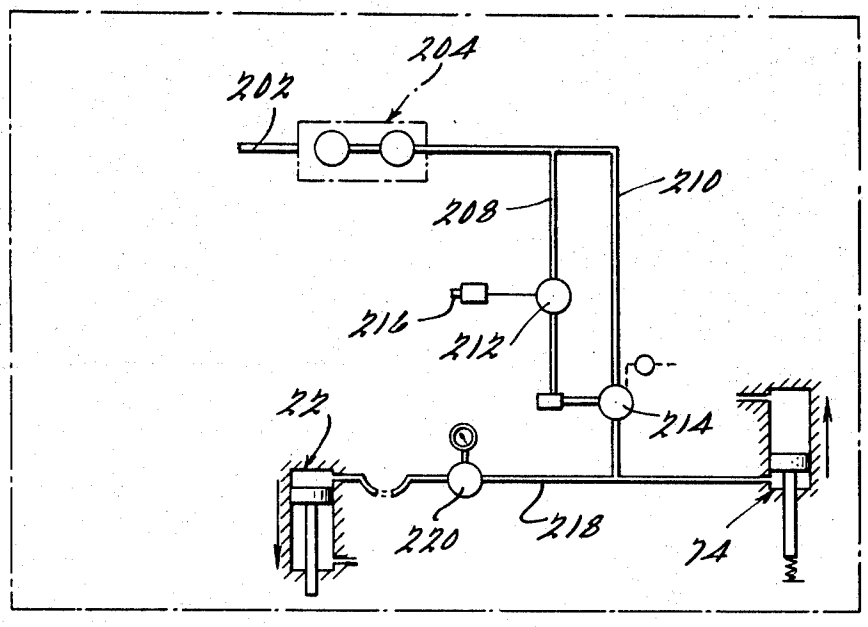


FIG. 7.

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United States Patent Office 3,415,103 Patented Dec. 10, 1968

3,415,103

STRAIGHTENING APPARATUS AND METHOD

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Filed Sept. 20, 1965, Ser. No. 488,475
9 Claims. (Cl. 72—389)

ABSTRACT OF THE DISCLOSURE

An apparatus and method for straightening bent elongated workpieces and having means for supporting the workpieces and a movable pneumatically actuated impacting head adapted to repeatedly impact the concave sides of the bends in the workpieces for relieving the structural stress in the workpieces for enabling the workpieces to spring back to their original shape.

This invention relates generally to apparatus for forming metallic workstock and, more particularly to a pneumatically actuated apparatus for straightening metal cutting tools and the like.

It is a general object of the present invention to provide a new and improved apparatus for forming or straightening metallic workstock.

It is a more particular object of the present invention to provide a new and improved apparatus or press for straightening metal cutting tools such as metal broaches and the like.

It is still a more particular object of the present invention to provide a new and improved apparatus of the above character that is pneumatically actuated and which is adapted to straighten cylindrical tools such as conventional broaches and the like, as well as flat or planar tools such as keyway broaches, wear plates and the like.

It is another object of the present invention to provide a new and improved tool straightening machine of the above character which, in addition to being adapted to straighten hardened parts such as metal cutting tools and the like, is adapted to straighten non-hardened machine parts such as mandrels, spindles, arbors, shafts and the like.

It is still another object of the present invention to provide a new and improved straightening apparatus which is adapted to straighten tools to within 0.001 inch tolerances.

It is a further object of the present invention to provide a new and improved tool straightening apparatus which transmits vibratory impacts or impulses to the concave side of the bend in a tool or the like being straightened in a manner such that "peen" marks are minimized to the extreme and in many instances are virtually eliminated.

It is another object of the present invention to provide a new and improved apparatus of the above character which includes an air operated vibratory head that is supported for sliding movement along the axis of the tool being straightened for ease in positioning the head adjacent the particular sections of the tool requiring straightening.

It is yet another object of the present invention to provide a tool straightening apparatus of the above character which includes means for easily maneuvering the vibratory head section thereof toward and away from the tool to be straightened, along with control means for selectively adjusting the force in which the impact head engages the tool.

It is yet a further object of the present invention to provide a tool straightening apparatus of a relatively simple

design that is easy to assemble and economical to commercially manufacture.

The foregoing and other related objects and advantages of the present invention are achieved through the provision of a novel tool straightening apparatus or press which comprises a tool supporting base section upon which a pneumatically energized head assembly is mounted for longitudinal movement along the axis of a tool or the like to be straightened. The head assembly comprises a tool engaging impactor or hammer which is movable to and from a position adjacent the tool or similar article to be straightened, the impactor or hammer being suitably counterbalanced so that it may be biased into engagement with the tool with a minimum effort on the part of the operator.

A more complete understanding of the present invention and other objects and features thereof will be obtained from the following detailed description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is an elevated perspective view of the tool straightening apparatus of the present invention;

FIGURE 2 is an enlarged side elevational view of the head assembly incorporated in the tool straightening apparatus of the present invention;

FIGURE 3 is a front elevational view of the structure illustrated in FIGURE 2, taken in the direction of the arrow **3** thereof;

FIGURE 4 is a top elevational view, partially broken away, of the structure illustrated in FIGURES 2 and 3;

FIGURE 5 is a fragmentary side elevational view of the back side of the structure illustrated in FIGURE 3;

FIGURE 6 is a fragmentary cross-sectional view of a portion of the structure illustrated in FIGURE 2; and

FIGURE 7 is a schematic representation of the pneumatic system incorporated in the tool straightening apparatus of the present invention.

Referring now to FIGURE 1 of the drawings, a tool straightening apparatus or press **10**, constructed in accordance with a preferred embodiment of the present invention, is shown as comprising an elongated rectangularly shaped base structure, generally designated by the numeral **12**, comprising a lower enclosed support section **14** and a flat or planar horizontally extending top section **16** which defines a work surface **18**. Disposed intermediate the opposite ends of the base **12** and adjacent the rear edge of the top section **16** thereof is a head assembly, generally designated by the numeral **20**, which comprises a pneumatically energized vibratory impactor or hammer mechanism **22** that is adapted to be selectively engaged with a tool or the like that is supported upon the work surface **18** to effect straightening of the tool, in a manner later to be described.

Referring now in detail to the construction of the head assembly **20**, as best seen in FIGURES 2 through 6, the assembly **20** comprises a rectangular configured base plate **24** and a pair of spaced parallel side members **26** and **28** which extend vertically upwardly from the opposite sides of the base plate **24**, the side members **26** and **28** being rigidly secured to the plate **24** by welding or the like, as seen in FIGURE 3. The side members **26** and **28** comprise spaced parallel upper sections **30** and **32** respectively, and spaced parallel lower sections **34** and **36**, respectively, the upper sections **30** and **32** being spaced laterally inwardly from the lower sections **34** and **36**, as seen in FIGURE 3. The entire assembly **20** is supported slightly above and is movable relative to the top section **16** of the base structure **12** by means of a plurality of rollers which are mounted on the base plate **24** of the assembly **20**. More particularly, the base plate **24** is provided with a plurality (4) of rollers, generally designated by the numeral **38**, which are mounted one in each of four semi-circular

shaped recessed sections **40** that are formed one at each corner of the base plate **24**. Suitable cover plates **41** are provided to enclose the rollers **40** and are preferably secured to the sides of the base plate **24** by conventional screws, bolts or the like. As best seen in FIGURE 6, the rollers **38** are journaled on associated axles or the like **42** which have their inner ends rigidly secured to the base plate **24** by being threadedly secured within suitable bores **44** that are formed in the base plate **24** adjacent the recessed sections **40**.

The top section **16** of the base structure **12** is formed with a longitudinally extending groove or recess **46** which is adapted to receive a pair of rollers **48** and **50** that are rotatably mounted on the lower side of the base plate **24** of the assembly **20**, the groove **46** acting as a guide means in limiting movement of the assembly **20** to a direction longitudinally of the base structure **12**. As seen in FIGURE 5, the rollers **48** and **50** are respectively mounted on vertically extending axles or shafts **52** and **54** which have their upper ends rigidly secured to the lower side of the base plate **24** at the opposite ends thereof. The longitudinally extending groove **46** is generally T-shaped in cross section and is formed with upper and lower sections **56** and **58** which define a horizontally extending shoulder section **60**, the upper section **56** being slightly smaller in cross section than the lower section **58**, as seen in FIGURES 2 and 6. The size of the groove's upper section **56** is perferably such that the rollers **48** and **50** snugly peripherally engage the opposite sides thereof, whereby to minimize any lateral movement of the assembly **20** relative to the base structure **12**.

Referring now to FIGURES 5 and 6, the head assembly **20** is adapted to be fixedly secured at any preselected longitudinal position along the top section **16** of the base structure **12** by means of a generally T-shaped clamping member **62** which extends longitudinally within the groove **46** and is adapted to be biased upwardly such that a pair of outwardly projecting shoulder sections **64** and **66** on the opposite sides of the clamping member **62** firmly engage the horizontally extending shoulder section **60** defined by the groove **46**, as will be described. As best seen in FIGURE 5, the clamping member **62** is formed with a central bore **67** within which is threaded the lower end of a vertically extending stud member **68** that projects through a central opening **70** in the base plate **24**. The upper end of the stud member **68** is threadably mounted within the lower end of a piston rod member **72** of a pneumatically energized piston and cylinder assembly **74**, a pair of jam nuts **76** and **78** being threaded on a medial portion of the stud member **68** to limit the movement thereof through the opening **70** in the base plate **24**. A helical coil spring **80** is mounted circumjacent the stud member **68** and extends between the top of the clamping member **62** and a shoulder section **82** defined by an annular recess formed in the lower side of the base plate **24**, the spring **80** normally biasing the clamping member **62** downwardly out of engagement with the shoulder section **60**. The piston and cylinder assembly **74** is mounted intermediate the side members **26** and **28** of the assembly **20** by means of a pair of vertically spaced, horizontally extending mounting bars **84** and **86** to which the assembly **74** is secured as by suitable screws, bolts or the like **87**. The opposite ends of the bars **84** and **86** are secured as by welding to the inboard sides of the side members **26** and **28**, as seen in FIGURE 6. A plurality of reinforcing members, generally designated **88**, extend between the forward sides of the bars **84**, **86** and the inner side of a front cover plate **90** that extends between the forward sides of the lower sections **34** and **36** of the side members **26** and **28**, the cover plate **90** being secured to the assembly **20** by having its opposite side edges welded to the inboard sides of the side members **26** and **28**. Suitable controls which will later be described are provided on the assembly **20** for selectively energizing the piston and cylinder assembly **74** which results in the clamping member **62** being forced upwardly so as to tightly engage the shoulder section **60** defined by the groove **46**, thus fixedly securing the assembly **20** at a preselected longitudinal position along the base structure **12**. Upon deenergization of the piston and cylinder assembly **74**, the spring **80** will bias the clamping member **62** out of engagement with the shoulder section **60** to permit the assembly **20** to be freely moved longitudinally of the base structure **12** so that it may be adjusted or slid to a position adjacent the portion of the tool or the like which is to be straightened thereby, as will be described.

The upper sections **30** and **32** of the side members **26** and **28**, respectively, extend forwardly over the front edges of the lower sections **34** and **36** and have a pair of vertically extending slideways **92** and **94** rigidly secured, as by welding or the like, to the front edges thereof, as best seen in FIGURES 2 and 4. The slideways **92** and **94** respectively comprise inwardly projecting shoulder or flange sections **96** and **98** which, together with a pair of gib plates **100** and **102** that are fixedly mounted to the forward sides of the slideways **92** and **94** respectively, by suitable bolts, screws or the like **104**, define a vertically extending, rectangularly shaped channel **106**. Disposed within the channel **106** is a vertically slidable carriage plate **108** to which the pneumatically actuated impactor mechanism **22** is attached by means of a suitable support bracket or the like **110**. As seen in FIGURES 2 and 4, the bracket **110** comprises a vertically extending plate **112** which is rigidly secured to the forward side of the carriage plate **108** by suitable bolts, screws or the like **114**. Secured to the lower end of the plate **112** as by welding is a horizontally extending support plate **116** which is formed with a central annular opening **118** which is adapted to receive the lower end of the mechanism **22**, the support plate **116** being cut away as seen at **120** in FIGURE 3 such that a suitable draw bolt or the like **122** which extends horizontally through the plate **116** may be tightened to secure the lower end of the mechanism **22** within the bracket **110**. As seen in FIGURES 2 and 3, the upper end of the mechanism **22** is adapted to be vertically aligned relative to a medial carriage plate **108** by means of a suitable bolt or the like **124**. It will be seen from the above described structure that as the carriage plate **108** is biased upwardly within the channel **106**, the impactor mechanism **22** will move upwardly or away from the workpiece supported on the base structure **12**. Similarly, as the carriage plate **108** is biased downwardly within the channel **106**, the impactor mechanism **22** will move downwardly or toward the aforesaid workpiece. A suitable stop plate **126** is welded across the lower end of the channel **106** to limit the downward movement of the carriage plate **108** and thus prevents the impactor mechanism **22** from moving more than a predetermined distance toward the workpiece supported on the base structure **12**.

The carriage plate **108** and hence the impactor mechanism **22** which is secured thereto is adapted to be biased upwardly and downwardly within the head assembly **20** by means of an elongated handle member **128** whose upper or forward end is provided with a gripping section **130** and which has a hollow cylindrical sleeve-like section **132** provided on its lower or rearward end. The sleeve section **132** defines a central bore **134** which is adapted to receive one end of a cylindrical pivot shaft **136** that extends between the upper sections **30** and **32** of the side members **26** and **28**, as best seen in FIGURE 4. The section **132** of the handle **128** is cut away, as seen at **137** in FIGURE 2, and is provided with a draw bolt, screw or the like **138** which is adapted to be tightened and thereby prevent any radial movement of the handle **128** relative to the shaft **136**. A retaining bolt **140** is threaded into a suitable axially extending bore in the end of the shaft **136** adjacent the handle section **132** which, together with a retaining washer **142**, is adapted to prevent any axial movement of the handle **128** relative to the shaft **136**. The shaft **136** is rotatably supported within the side members **26** and **28** by means of suitable anti-friction bushings or the like **144** and **146** which are disposed within suitable

openings 148 and 150, respectively, that are formed in the upper sections 30 and 32 of the side members 26 and 28. The end of the shaft 136 opposite that upon which the handle 128 is secured is provided with a suitable clutch mechanism, generally designated 152, which is secured to the end of the shaft 134 by means of a suitable keyway 154 and comprises an annular friction plate 156 which is disposed adjacent the outboard side of the side member 28, as seen in FIGURE 4. The mechanism 152 is adapted to control relatively free movement of the shaft 136 such that the carriage plate 108 and impactor mechanism 22 which are connected to the shaft 136 in a manner to be described will not move downwardly within the channel 106 under the influence of gravity. Although in the illustrated embodiment of the apparatus 10 of the present invention the handle 128 is mounted on the right side of the head assembly 20, it may be noted taht the handle 128 is readily adapted to be mounted on the opposite (left) side of the assembly 20 so as to best accommodate the operator of the apparatus 10.

Rigidly secured to the medial portion of the shaft 136 is a clevis member, generally designated by the numeral 158, which comprises a rectangular shaped rear end section 160 through which a central bore 162 is formed, the bore 162 having the aforesaid medial portion of the shaft 136 extend coaxially therethrough. The section 160 is cut away at 164 (see FIGURE 2) so as to permit suitable draw bolts, screws or the like 166 to be tightened and thereby rigidly secure the member 158 to the shaft 136. The clevis member 158 comprises a forwardly projecting section or arm 168 which is welded or similarly secured to the forward face of the section 160 and which has a bifurcated forward end portion 170 that defines an elongated recess or slot 172. As best seen in FIGURES 2 and 4, the recess 172 is adapted to receive a transversely extending pin member 174 which is secured at its opposite ends to the rear face of the carriage plate 108 by a pair of rearwardly extending bosses 176 and 178. It will be seen that as the handle 128 is biased downwardly, the clevis member 158 will rotate in a counterclockwise direction in FIGURE 2, thereby forcing the pin member 174 and hence the carriage plate 108 and impactor mechanism 22 downwardly toward a tool or the like that is supported upon the work surface 18. A counterweight assembly comprising a pair of weighted blocks 180 and 182 (see FIGURE 1) and an elongated counterbalance arm 184 is provided on the head assembly 20, the forward end of the arm 184 being secured by suitable bolts, screws or the like 186 to the top of the section 160 of the clevis member 158, as illustrated in FIGURE 2. At such time as the operator relieves the force on the handle member 128, the aforesaid counterbalance is adapted to pivot the clevis member 158 in a clockwise direction in FIGURE 2, thereby biasing the carriage plate 108 and impactor mechanism 22 upwardly or away from the tool or the like support on the base structure 12.

The impactor mechanism 22 may be of any suitable construction which is adapted to apply a vibratory force to the tool or the like to be straightened on the apparatus 10; however, the mechanism 22 preferably comprises a pneumatically energized air hammer which includes a reciprocating piston rod, representatively designated 188, upon which is mounted a suitable chuck or the like 190. Upon energization of the mechanism 22, the chuck 190, together with a suitable workstock engaging tip 192 which is detachably secured therewithin, is vibrated or reciprocated at a predetermined speed. It will be apparent, of course, that the type of tip 192 which is mounted in the chuck 190 will depend upon the type of tool or the like being straightened by the apparatus 10, for example, a carbide, chisel-like tip would most likely be used when the apparatus 10 is used to straighten a broach of the type illustrated in FIGURE 1 and designated by the numeral 194.

Referring again to FIGURE 1, cylindrical workstock such as the broach 194 is adapted to be supported upon the base structure 12 by means of a pair of longitudinally spaced tail stock assemblies 196 and 198 which are of a conventional design well known in the art and are longitudinally slidable along a longitudinally extending groove 200 that is formed in the top section 16 of the base structure 12. As best seen in FIGURE 2, the groove 200 extends parallel to and is spaced forwardly of the groove 46 along which the head assembly 20 is longitudinally movable, the groove 200 being oriented relative to the head assembly 20 such that the longitudinal axis of the workstock supported between the tail stock assemblies 196 and 198 is aligned with the vertical axis of the impactor mechanism 22. In the event that flat or planar tools such as keyway broaches, wear plates or the like are to be straightened on the apparatus 10 of the present invention, suitable anvil type clamping members (not shown) of a design well known in the art may be used to secure these workpieces on the base structure 12.

Referring now to the control means for selectively energizing the impactor mechanism 22 and piston and cylinder assembly 74 and, in particular, to the pneumatic system schematically illustrated in FIGURE 7. Pressurized air as is commonly available in factories and the like is transmitted to the apapratus 10 through an air inlet conduit 202, which air is transmitted through a suitable air filtering and pressure regulating mechanism 204 that is preferably mounted on the rear side of the assembly 20 on a suitable support bracket 206 that extends between and is welded or similarily secured to the lower sections 34 and 36 of the side members 26 and 28. Pressurized air is transmitted from the mechanism 204 through suitable conduits 208 and 210 to a pair of valve mechanisms 212 and 214, respectively, the former of which comprises manual actuating button 216 which is mounted adjacent the handle 128 and is adapted to selectively communicate pressurized air to the impactor mechanism 22 through an air conduit 218. The valve 214 is adapted to communicate pressurized air to the piston and cylinder assembly 74 and includes suitable control means (not shown) which may be mounted on the side of the head assembly 20. An adjustable air pressure regulator mechanism 220 is also mounted on the side of the assembly 20 and is adapted to be adjusted to vary the pressure of the air being transmitted to the hammer mechanism 22, as will be described.

In operation of the tool straightening apparatus 10 of the present invention, a tool such as the elongated cylindrical broach 194 is initially supported between the longitudinally spaced tail stock assemblies 196 and 198. It has been found that tools such as the broach 194 are most easily straightened by having the concave side of the bent or deformed portion thereof facing upwardly and vertically aligned with the vertical axis of the impactor mechanism 22. Accordingly, the broach 194 is rotated between the tail stock assemblies 196 and 198 until the concave side of a particular bent or deformed section thereof faces upwardly. Thereafter, the head assembly 20 may be longitudinally adjusted along the base structure 12 until the mechanism 22 is positioned directly at the center of the bent section of the broach 194, the piston and cylinder assembly 74 being subsequently energized to force the clamping member 62 into engagement with the shoulder section 60 to positively anchor the head assembly 20 in the position to which it has moved. The handle member 128 is then biased downwardly by the operator until the tip 192 of the impactor mechanism 22 is directly above the surface of the broach 194, the actuating button 216 thereafter being actuated to cause pressurized air to be transmitted to the mechanism 22, resulting in vibratory movement of the chuck 190 and tip 192. The air pressure regulator mechanism 220 may be adjusted so that the air pressure being transmitted to the impactor 22 is at a predetermined level such that the force in which the tip 192 engages the surface of the broach 194 does not exceed a predetermined amount. The handle 128 is then pivoted

further downward, thereby biasing the tip **192** into engagement with the surface of the broach **194** for sufficient time to effect straightening of the aforesaid bent or deformed section thereof. A suitable dial indicator or the like (not shown) may be mounted on the work surface **18** for checking the straightness of the broach **194** without requiring removing the broach **194** from between the assemblies **196** and **198**. At such time as the bent portion of the broach **194** has been straightened the handle **128** may be moved upwardly thus biasing the mechanism **22** away from the broach **194**. The broach **194** may then be rotated upon the assemblies **196** and **198** such that another bent or deformed portion thereof faces upwardly, the head assembly **20** thereafter being longitudinally adjusted upon the base structure **12** so that the impactor mechanism **22** is vertically aligned with the concave portion of the broach **194**, the above described straightening technique then being repeated as may times as is necessary to effect complete straightening of the broach **194**.

A particular feature of the tool straightening apparatus **10** of the present invention resides in the fact that an experienced operator can straighten tools such as the broach **194** or the like to within 0.001" tolerance in a relatively short period of time (approximately 3–5 minutes). Another feature of the present invetnion resides in the fact that the apparatus **10**, in addition to being adapted to straighten cylindrical parts such as the above-described broach **194** and the like, is readily adapted to straighten flat workpieces by the above-described technique. Furthermore, the tool straightening apparatus **10** of the present invention is adapted to straighten relatively "soft" machined parts such as mandrels, spindles, arbors, shafts and the like, along with relatively hard machined parts, such as the above-described broaches **194**, merely varying the impactor force of the mechanism **22** by suitable adjustment of the valve **220**. Moreover, by careful control of the impact force of the mechanism **22**, "peen" marks on the tool or the like being straightened will be minimized to the extreme and, in many instances, may be virtually eliminated.

Contrary to conventional workpiece straightening apparatus and methods, a bent workpiece is straightened by way of the apparatus and method of the present invention by repeatedly impacting at a rapid rate the concave or "low" side of the bend of the deformed portion of the workpiece. As a result of such repeated impacting or peening of the concave or low side of the bent portion, the stress that had been imposed upon the material of the workpiece and which caused the deformation of the workpiece to occur is relieved and the workpiece springs back to its original unbent shape.

While it will be apparent that the exemplary embodiment herein illustrated is well calculated to fulfill the objects above stated, it will be appreciated that the tool straightening apparatus **10** of the present invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In the method of straightening elongated metal workpieces having bent portions, the steps which include

supporting the workpiece at the opposite ends of the bent portions, and

repeatedly striking the workpiece with a workpiece engaging tool on the concave side of the bent portion.

2. In the method of straightening elongated metal workpieces having at least one bent portion defining a substantially concave side, the steps which include

supporting the workpiece at positions spaced longitudinally away of the bent portion, and

transmitting repetitive impulses to the concave side of the bent portion.

3. In the method of straightening elongated cylindrical tools and the like having one or more bent portions, the steps which include

supporting the tools between centers, and

engaging means for transmitting repetitive impulses against the concave sides of the bent portions of the tools.

4. In an apparatus for straightening elongated cylindrical workpieces,

means defining a base structure,

means for detachably supporting workpieces on said structure,

an impactor assembly,

means movably securing said assembly to said structure,

at a preselected position on said structure,

means on said assembly defining a slide channel,

carriage means slidable within said channel toward and away from workpieces supported on said structure,

locking means for fixedly securing said assembly

means for selectively biasing said carriage means along said channel, and

means mounted on said carriage means for transmitting repetitive impulses to the workstock supported on said structure for straightening said workstock.

5. The invention as set forth in claim **4** wherein said means for biasing said carriage means along said channel comprises handle means pivotably mounted on said assembly and clevis means interconnecting said handle means and said carriage means.

6. In a tool straightening apparatus,

an elongated base structure comprising a lower support section and an upper section defining a work surface,

means for supporting a tool on said surface, an impactor assembly mounted on said surface,

means including a longitudinally extending groove on said surface and clamping means secured to said assembly and disposed within said groove for securing said assembly at a preselected position on said surface,

roller means secured to the lower end of said assembly for providing relatively free sliding movement of said assembly along said work surface,

means including pressure responsive means for actuating said clamping means,

means defining a vertical channel on said assembly,

carriage means slidable within said channel,

a pneumatically energized vibratory compactor mechanism mounted on said carriage means and engageable with the tool supported on said surface, a pivot arm movably secured to said assembly, and

means interconnecting said arm and said carriage means whereby said impactor mechanism is biased toward the tool when said arm is pivoted in one direction and said impactor mechanism is biased away from the tool when said arm is pivoted in the opposite direction.

7. In a tool straightening apparatus,

an elongated rectangularly shaped base structure comprising a lower support section and an upper section defining a work surface,

means including a pair of tailstock assemblies for supporting a tool adjacent said work surface,

said upper section having a longitudinally extending T-cross-sectional groove formed therein,

an impactor assembly mounted on said work surface,

said assembly comprising a base plate and upwardly extending spaced parallel side members,

first roller means mounted at each end of said base plate and engageable with said work surface for movably supporting said assembly thereon,

second roller means mounted on said base plate and engageable with said groove whereby to limit lateral movement of said assembly relative to said groove,

a T-shaped clamping bar disposed within said groove below said base plate,

a pneumatic actuated piston and cylinder assembly mounted adjacent said base plate and adapted to selectively engage said bar with a portion of said groove to secure said assembly at a preselected longitudinal position along said work surface,

a pair of spaced parallel vertically extending slideways mounted one on the upper end of each of said side members,

a carriage plate supported between said slideways and vertically slidable relative thereto,

a pneumatically energizing vibrator impactor mechanism mounted on one side of said carriage plate,

a pivot shaft extending between and journal supported on the upper ends of said side members,

handle means for selectively rotating said shaft,

a clevis member comprising a bifurcated end portion secured to said shaft,

said end portion being engageable with a pin member secured to the side of said carriage plate opposite said impactor mechanism, whereby pivotal movement of said handle means in one direction biases said carriage plate toward said work surface and pivotal movement of said handle means in the

opposite direction biases said carriage plate away from said work surface, and

control means including valve means adjacent said handle means for selectively energizing said impactor mechanism.

8. The invention as set forth in claim **7** which includes counterbalance means secured to said clevis member for biasing said carriage plate and said impactor mechanism relative to said work surface.

9. The invention as set forth in claim **7** wherein said impactor is vertically aligned with the longitudinal axis of the tool supported on said work surface.

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