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DEVICE FOR DISPENSING STACKED RETAINING RINGS

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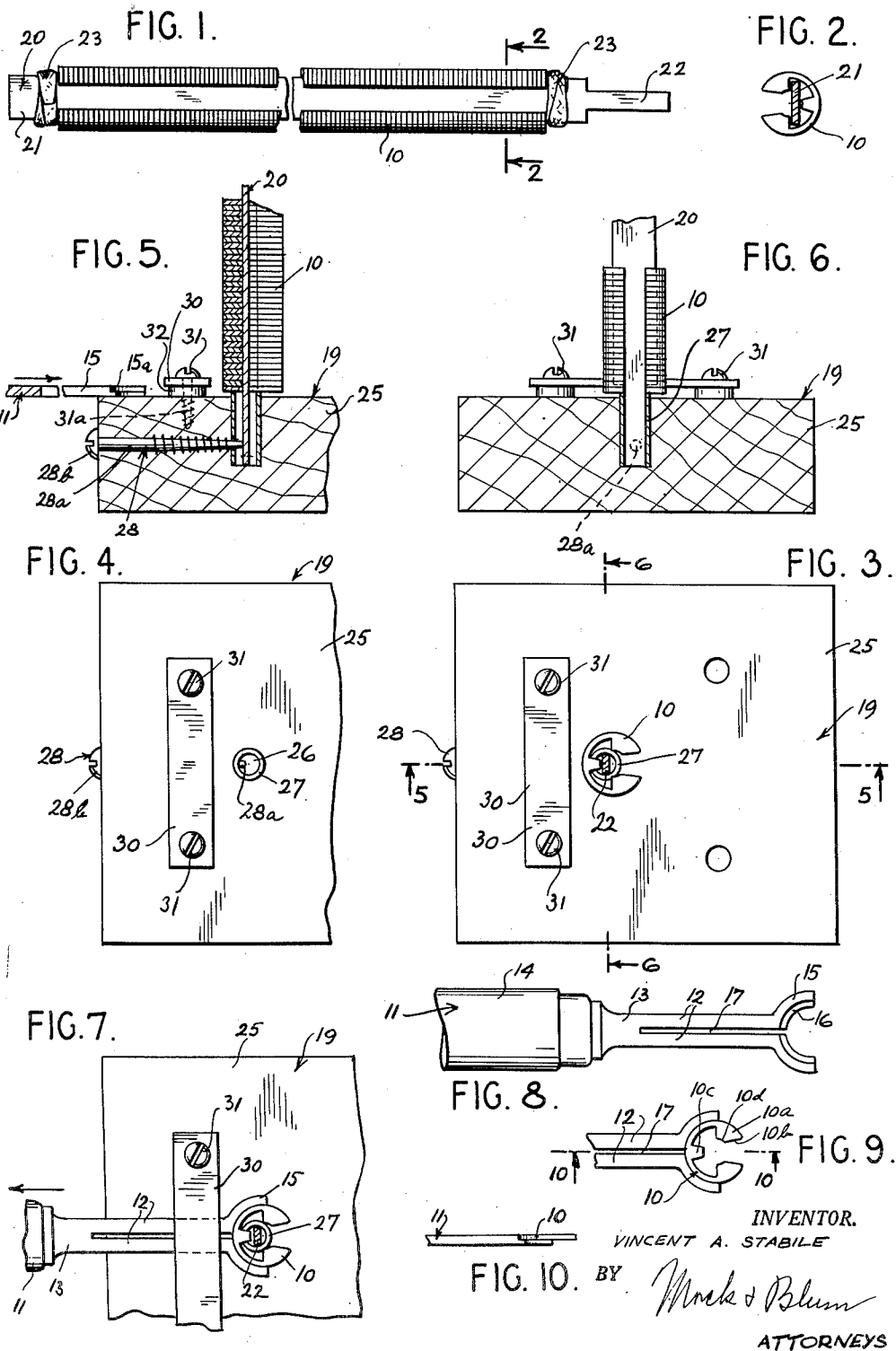


FIG. 10.

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DEVICE FOR DISPENSING STACKED
RETAINING RINGS

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This invention relates to a new and improved device for dispensing retaining rings directly onto the tool which is used to apply the rings to shafts or the like.

Retaining rings are well known and generally comprise a planar, annular member which is interrupted at one portion to provide resilient jaws. As an example, such a ring may be applied transversely to a circumferential groove of a shaft, with the jaws being forced apart by the widest portion of the groove seat and then coming together when the ring surrounds the shaft.

Since considerable force is required to force the ring upon the shaft, a tool is commonly employed. As one example, the tool may have a planar, longitudinally extending shank with arcuate resilient jaws at one end thereof. The ring is inserted longitudinally into the holder jaws with one face of the shank and one face of the ring in a common plane. Said jaws have flanges which abut the other face of the ring to help prevent buckling of the ring when the tool is used to mount the ring on a shaft.

In accordance with the invention, the retaining rings may be shipped in a stack mounted on a holder bar which extends through the respective central openings of said rings. A dispenser is provided upon which the holder is adapted to be mounted. Said dispenser is so designed in relation to the shapes of the rings and the tool that by the simple insertion of the tool into the dispenser in a selected direction, followed by the withdrawal of the tool, a ring is seated between the jaws of the tool.

One advantage of the invention is that it eliminates a relatively slow manual manipulation of the ring in order to insert it between the jaws of the tool. Furthermore, since the rings are mounted in a stack on the holder in order to make it possible to use the dispenser, the rings may be stacked on the holder prior to shipment, instead of being packed in complete disorder in a container. This eliminates the necessity of manual separation of entangled rings prior to the mounting of them on the holder. Rings of this type, shipped loosely in a container, frequently become entangled to a considerable degree.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the annexed drawings, in which preferred embodiments are disclosed.

In the drawings,

Fig. 1 is a plan view showing a plurality of retaining rings stacked upon a holder and secured thereon prior to use,

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Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a horizontal section of a holder mounted on a dispenser and ready for use, the section being taken through the holder just above the dispenser.

Fig. 4 is a top plan view, partly broken away, of the dispenser with the holder removed.

Fig. 5 is a section on line 5—5 of Fig. 3, partly broken away, showing a tool being inserted into the dispenser.

Fig. 6 is a section on line 6—6 of Fig. 3 and is partly broken away.

Fig. 7 is a view corresponding to Fig. 3, but showing a tool removing the bottom retaining ring.

Fig. 8 is a plan view, partly broken away, of the tool.

Fig. 9 is a view similar to Fig. 8 showing the tool holding a retaining ring.

Fig. 10 is a section on line 10—10 in Fig. 9.

Upon reference to the drawings in detail, it will be apparent that they illustrate a retaining ring 10 and an applicator tool 11 which are well known in the art. Retaining rings of the type illustrated are used for a variety of industrial purposes and may, for example, be mounted transversely on a shaft by snapping the rings into circumferential grooves provided in said shaft. An applicator tool is required in order to hold the ring in its transverse position while snapping it into a groove.

It will be apparent that ring 10 is substantially ring-shaped but is cut away at one portion to provide jaws 10a. The edges 10b of these jaws 10a converge inwardly from the periphery of ring 10. Said ring 10 is made of resilient material, so that the shaft forces jaws 10a apart while ring 10 is being forced into the groove of the shaft. This generally requires considerable force. Said ring 10 has an inwardly extending projection 10c opposite the opening between jaws 10a and additional inwardly extending projections 10d adjacent said jaws 10a.

Applicator tool 11 comprises handle 14 and planar shank 13. The lower end of shank 13 has a central slot 17 which defines two resilient prongs or legs 12. The lower ends of legs 12 are respectively formed as segments of a circle to provide thin, coplanar, arcuate jaws 15. Said jaws 15 are respectively provided at the lower edges of their inner faces 15a with inwardly extending, coplanar, arcuate flanges 16.

Ring 10 may be releasably seated upon tool 11 with the peripheral edge of said ring 10 abutting faces 15a of jaws 15, with the lower face of ring 10 resting upon flanges 16 and with the upper

face of ring 10 in substantially the same plane as the upper faces of jaws 15 and legs 12. Preferably, ring jaws 10a protrude beyond jaws 15. When ring 10 is thus seated upon tool 11, jaws 15 are spread apart slightly beyond their normal positions, and ring 10 is frictionally held in place by said jaws 15.

Said flanges 16 tend to hold ring 10 in alignment with shank 13 when tool 11 is applied transversely to a shaft in order to seat ring 10 in a circumferential groove. Jaws 10a exert sufficient force on the shaft to hold ring 10 in place while tool 11 is pulled away.

There have been difficulties in the use of tools such as tool 11. Frequently, the small rings 10 tend to become tangled with each other when placed in a container and can not be readily separated. Also, it has been necessary to exercise care in setting ring 10 on tool 11 by longitudinal insertion of said ring 10 between jaws 15, in order to prevent said ring 10 from buckling out of the plane of shank 13. Difficulties such as these have been overcome by the provision of a holder 20 which holds a plurality of rings 10 without entanglement, said holder 20 being designed to be mounted in a dispenser 19 which permits the mounting of a ring 10 in tool 11 without any necessity for handling said ring 10.

Said holder 20 comprises a thin rectangular bar 21 whose lower end has a central co-planar leg extension 22 of decreased width. This is clearly shown in Fig. 1. A plurality of rings 10 may be mounted on holder 20 with bar 21 positioned between the inner edges of projections 10d and projection 10c. This is clearly shown in Fig. 2. The width of bar 21 is greater than the opening between ring jaws 10a, and the distance between said inner edges of projections 10d and projection 10c is too great to permit turning of bar 21 so that it could slide edgewise between jaws 10a. However, rings 10 are slidable up and down on bar 20. During shipment, suitable strips of tape 23 or the like may be wrapped around bar 21 above and below the stack of rings 10 to prevent removal thereof.

The width of leg 22 is less than the distance between jaws 10a, so as to provide for the easy removal of any ring 10 which is permitted to drop below bar 21, even though the free end of said leg 22 may be blocked.

Dispenser 19 comprises a block 25 which may be made of wood, metal or the like and which may be substantially rectangular in shape. This block 25 has a transverse hole 26 in the upper face thereof, and this hole 26 is lined with a cylindrical metal sleeve 27. Said sleeve 27 extends above block 25 to an extent which is preferably substantially equal to the thickness of flanges 16 of tool 11.

A locking screw 28 which may be a wood screw, or a machine screw if block 25 is made of metal, is mounted within block 25. Said screw 28 has a shank 28a, which extends into the front face of said block 25, in a direction which may be taken as the longitudinal axis of block 10 and which is preferably perpendicular to the axis of sleeve 27. The free end portion of said shank 28a protrudes through a suitable opening in the wall of said sleeve 27 and extends partly into the interior of said sleeve 27. The head 28b of screw 28 is located in front of block 25.

Holder 20 may be removably mounted on block 25 with leg 22 positioned within sleeve 27, with the faces of said holder 20 extending laterally and with the axis of holder 20 extending trans-

versely. The position of holder 20 may be adjusted transversely so that leg 22 is positioned above sleeve 27 by a distance which is preferably slightly greater than the thickness of one ring 10 but less than the thickness of two rings 10. Screw head 28b may be manipulated so as to lock leg 22 between the free end of shank 28a and the wall of sleeve 27.

Holder 20 is adapted to be mounted on block 25 with projections 10c respectively positioned in front of said holder 20, as is clearly shown in the drawings. The lower tape 23 is adapted to be removed, so that the stack of rings 10 rests upon the top of sleeve 27. Said top of sleeve 27 abuts the lower faces of the projections 10d and 10c so as to keep the lowest ring 10 spaced from block 25 by the thickness of flanges 16. Preferably, only this lowest ring 10 is positioned completely below bar 21.

In order to prevent transverse movement of tool 20 during use, a laterally extending guide or spacer bar 30 is optionally mounted on the top of block 25 forwardly of sleeve 27. Said bar 30 is mounted on block 25 by means of a pair of wood screws 31 or the like, whose shanks 31a extend through respective openings in said bar 30 near the ends thereof and are embedded in block 25. Washers 32 are respectively mounted on said shanks 31a below bar 30 so as to space it above block 25 by a distance slightly greater than the thickness of holder shank 13.

Said guide bar 30 is preferably longitudinally spaced from the front of the lowest ring 10 by a distance considerably less than the diameter of said ring 10.

In the operation of the device, the lower face of holder shank 13 is placed upon block 25 in front of bar 30, and tool 11 is moved longitudinally rearwardly in the direction of the arrow of Fig. 5. Said shank 13 slides under bar 30, which serves as guide means to maintain shank 13 in substantial abutment with block 25. Shank 13 is thus moved longitudinally until the inner faces 15a of jaws 15 meet the periphery of the lowest ring 10 with flanges 16 slidably positioned between said lowest ring 10 and block 25. As shank 13 is moved further, jaws 15 are spread until the lowest ring 10 is fully seated therein. Sleeve 27 and flanges 16 below the lowest ring 10, together with the weight of the stack above, substantially prevent transverse or vertical movement of said lowest ring 10; and bar 30 substantially prevents transverse or vertical movement of holder shank 13. As a result, there is no buckling of said ring 10 with respect to holder 20, and ring 10 is fully seated in jaws 15 with its peripheral edge abutting the inner faces 15a thereof.

Tool 11 is then moved reversely or forwardly, in the direction of the arrow of Fig. 7, in order to remove the lowest ring 10. As said lowest ring 10 is moved from under the stack of rings 10, the weight of said stack tends to tilt the rear portion of said lowest ring 10 downwardly about the rear edges of the top faces of flanges 16, which rear edges serve as a fulcrum. However, bar 30 is sufficiently close to said stack so that the front portion of ring 10 is positioned beneath said bar 30 before the turning moment of the stack is sufficiently great to tilt ring 10. Ring 10 is then frictionally and slidably positioned between bar 30 and flanges 16, which prevent buckling of ring 10 with respect to holder 20. Tool 11 may then be fully withdrawn from dispenser 19.

Reference is made to the drawings, which are

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substantially to scale of a working embodiment of the invention, to complete the disclosure herein. It will be noted that the width of guide bar 30, as taken in the longitudinal direction, is only slightly less than the diameter of ring 10. The lowest ring 10 is substantially positioned directly under bar 30 when it is just clear of the stack.

Preferably, as shown in the drawings, the proper height above base 25 of the lower edge of bar 21 is obtained when leg 22 rests upon the bottom of opening 26. As a result, it is easy to replace holder 20.

While a preferred embodiment of the invention has been disclosed, and various possible changes, omissions and additions may be made without departing from the scope and spirit of the invention.

The dispenser is not limited to use with the exact tool 11 and ring 10 shown in the drawings. It will be apparent that the shapes of the ring and of the tool may be any shapes suitable for use with a holder and dispenser of the type disclosed herein.

Other means besides cylinder 27 may be provided for holding the stack of rings 10 spaced above base 25.

Optionally, cylinder 27 may be omitted if a tool without flanges 16 is to be used.

While the drawings show block 25 as having a planar upper surface, it will be apparent that said upper surface need not be planar. Therefore, in certain of the claims, reference is made to the dispenser base as having a working face, with the shoulder or lower edge of bar 21 being spaced above said working face by at least the thickness of a ring, and by less than the thickness of two rings. In this context, it will be understood that the working face of the base comprises the upper surface of block 25, together with the upper face of cylinder 27. The bottom ring rests upon the working face portion consisting of the upper face of cylinder 27, and the tool may be slid reciprocally upon the working face portion consisting of the upper surface of block 25, for withdrawal of said bottom ring.

In its broadest aspect, my dispenser comprises a base having a working face and having means extending from the working face thereof to receive the bar extension 22 and to maintain the bar 21 with its shoulder spaced from the working face by a distance between one and two rings in thickness, said dispenser having means including said bar extension permitting movement of the bottom ring of the stack mounted on said bar, along an axis transverse to the faces of said bar, only in a direction such as to clear said bar extension between the jaws of said ring, whereby a tool which is slid upon the working face in the opposite direction will operatively engage said bottom ring for withdrawal of same by reverse tool movement.

What is claimed is:

1. A dispenser for mounting retaining rings on a tool, each said retaining ring being substantially annular in shape with an interrupted portion to define a pair of jaws, said dispenser comprising a base which has a planar top surface which has a hole, a cylinder located in said hole and extending above said top surface, an elongated bar which has a central coplanar leg extension of decreased width, said bar being mounted above said top surface with said leg positioned and secured within said cylinder, said leg being spaced above said cylinder by a distance

at least equal to the thickness of a ring, said bar being adapted to receive a plurality of said rings in stacked registration with said bar extending through the central openings thereof and with the jaw openings thereof positioned opposite one face of said bar and with the lowest ring being supported by the top of said cylinder, and a guide bar mounted on said top surface opposite the other face of said bar, said guide bar being spaced above said top surface by a distance at least equal to the thickness of said ring together with the extent to which said cylinder extends above said support, whereby to define a tool access opening for sliding a tool on said support through said access opening into mounting engagement with said lowest ring and for then withdrawing said tool, said guide bar being spaced from said lowest ring when stacked by a distance less than the diameter of said ring.

2. A dispenser for mounting retaining rings on a tool, each said retaining ring being substantially annular in shape with an interrupted portion to define a pair of jaws, said tool having a planar shank which has at an end thereof a pair of jaws whose inner faces are substantially portions of a circle, said inner faces having at their lower edges inwardly extending flanges, said tool being adapted to hold said ring frictionally between said jaws with the periphery of said ring abutting said inner faces, with one face of said ring abutting said flanges, and with the other face of said ring located in a substantially common plane with the upper face of said shank, said dispenser comprising a base which has a longitudinal axis, said base having an opening in the upper face thereof on said axis, said opening extending transversely, a transverse sleeve in said opening and extending above said base by a distance at least equal to the thickness of said flanges, a guide bar mounted on said upper face of said base, said bar extending laterally across said axis and being positioned forwardly of opening and being spaced from said base by a distance at least as great as the thickness of said shank, a holder, said holder comprising a bar which has an axially aligned leg extension of a decreased width which is less than the distance between the jaws of a ring, said holder being adapted to receive a plurality of said rings with said bar extending slidably through the central openings thereof and with the jaws of said rings in stacked registration, said holder being adapted to be mounted on said block with said leg located in said sleeve, with the axis of said holder extending transversely upwardly, with the faces of said bar extending laterally and with the openings between said jaws of said rings located behind said bar, and means for securing said holder to said base with said bar spaced from said sleeve by a distance at least the thickness of one ring but less than the thickness of two rings, the lowest of said stack of rings being supported on the top of said sleeve when said holder is mounted on said block, said tool being adapted to be rearwardly longitudinally extended under said guide bar so that said flanges extend under said lowest ring in abutment therewith and the periphery of said lowest ring is frictionally gripped between said tool jaws and abuts the inner faces thereof, said tool being further adapted to be forwardly longitudinally withdrawn to remove said lowest ring, said guide bar being sufficiently close longitudinally to said stack so that the front portion of said ring is positioned under said guide bar before the rear portion of said ring is withdrawn from

said stack to a sufficient extent to permit the weight of said stack to tilt said ring out of said tool jaws.

3. A dispenser for storing retaining rings and for permitting one-by-one withdrawal of said rings, each said retaining ring being substantially annular in shape with an interrupted portion to define a pair of jaws, said dispenser comprising a base which has a working surface which has a hole, an elongated bar which has a leg extension of decreased width and defining a shoulder at the junction of said bar and said leg, said bar being mounted on said base with said leg positioned within said hole, said shoulder being spaced from said working surface by a distance at least equal to the thickness of a ring, said bar being adapted to receive a plurality of said rings in stacked registration with said bar extending slidably through the central openings thereof and with the jaw openings thereof positioned opposite one face of said bar and with the stack of rings resting upon said working surface.

4. A dispenser in accordance with claim 3, in which said base has mounted thereon means for spacing said stack of rings above said top surface, said leg being spaced above said top surface by at least the distance between the upper surface of said lowest ring and said top surface.

5. A dispenser in accordance with claim 4, in which a guide bar is mounted on said top surface opposite the other face of said bar, said guide bar being spaced above said top surface by an amount substantially equal to the distance between the upper surface of said lowest ring and said top surface, whereby to define a tool access opening for sliding a tool on said support through said access opening into mounting engagement with said lowest ring and for then withdrawing said tool, said guide bar being spaced from said lowest ring when stacked by a distance less than the diameter of said ring.

6. A dispenser in accordance with claim 3, in which a guide bar is mounted on said top surface opposite the other face of said bar, said guide bar being spaced above said top surface by an amount substantially equal to the distance between the upper surface of the lowest of said rings and said top surface, whereby to define a tool access opening for sliding a tool on said support through said access opening into mounting engagement with said lowest ring and then withdrawing said tool, said guide bar being spaced from said lowest ring when stacked by a distance less than the diameter of said ring.

7. A device for storing retaining rings and for permitting one-by-one withdrawal of said rings from said device by means of a tool, each said retaining ring being substantially annular in shape with an interrupted portion to define a pair of jaws, said tool having a planar shank which has at an end thereof a pair of jaws which are adapted to engage the periphery of a ring and to hold same in substantially the plane of said shank, said dispenser comprising a base which has a working face, a longitudinal bar which is adapted to receive a plurality of said rings in stacked registration with said bar extending longitudinally slidably through the cen-

tral openings thereof and with the jaw openings thereof positioned opposite one face of said bar, said bar being wider than said jaw openings, whereby to prevent withdrawal of said rings therefrom by movement of said rings in a direction transverse to said bar face, said bar having a reduced, longitudinal, ring-removing extension portion of less width than said jaw openings and defining a shoulder at its junction with said bar portion, said base having means extending from the working face thereof to receive the free end of said reduced ring-removing portion and to maintain the bar with its shoulder longitudinally spaced therefrom by at least the thickness of a ring and by less than the thickness of two rings, the bottom ring of said stack resting upon said working face and being movable away from said stack along an axis which is transverse to said bar face in the direction permitting clearance of said ring-removing portion between said jaws of the ring, said device having means including said ring-removing portion limiting movement of said ring in the axial direction opposite to the first-mentioned direction of movement, whereby said tool may be slid upon said working surface in said second-mentioned direction for engagement with said ring and then slid upon said working surface in said first-mentioned direction for withdrawal of said ring from said device.

8. A device for storing retaining rings and for permitting one-by-one withdrawal of said rings from said device, each said retaining ring being substantially annular in shape with an interrupted portion to define a pair of jaws, said dispenser comprising a base which has a top working face, a longitudinal bar which is adapted to receive a plurality of said rings in stacked registration with said bar extending longitudinally slidably through the central openings thereof and with the jaw openings thereof positioned opposite one face of said bar, said bar being wider than said jaw openings, whereby to prevent withdrawal of said rings therefrom by movement of said rings in a direction transverse to said bar face, said bar having a reduced, longitudinal, ring-removing extension portion of less width than said jaw openings, and defining a shoulder at its junction with said bar portion, said base having means extending below the working face thereof to receive the free end of said reduced ring-removing portion and to maintain the bar with its shoulder spaced therefrom by more than the thickness of one ring and less than the thickness of two rings, so that the bottom ring of said stack can rest upon said working face and is movable away from said stack along an axis which is transverse to said bar face, whereby said rings may be removed transversely one-by-one from said stack and may be engaged by a tool slid along said working surface in the direction of said transverse axis and toward said bar face.

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References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
2,242,502	Bangs	May 20, 1941