

Jan. 1, 1924

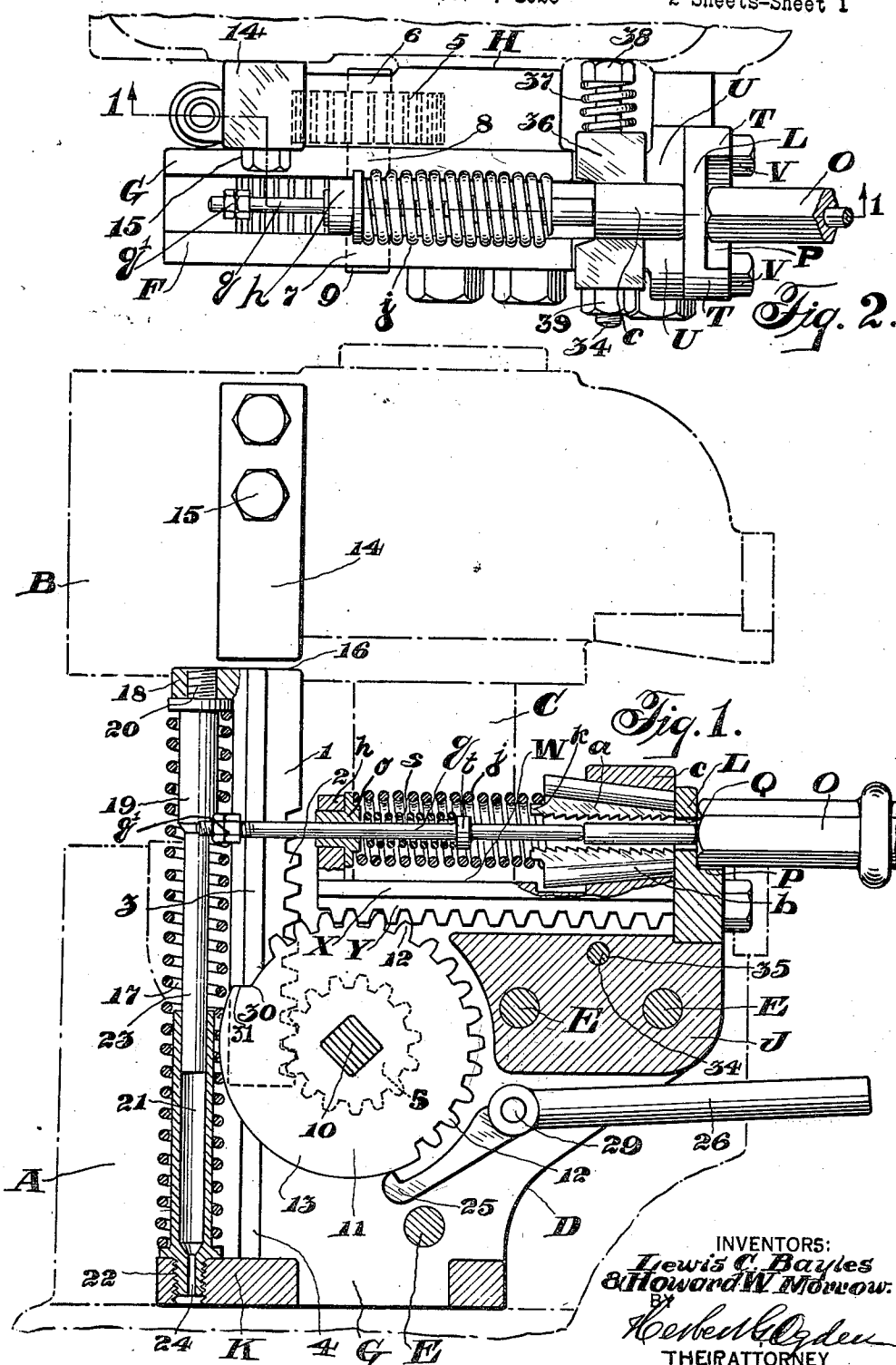
L. C. BAYLES ET AL

1,479,357

PIN PULLER

Filed Feb. 3, 1923

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

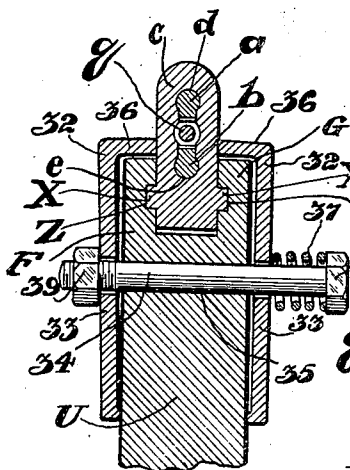


Fig. 5.

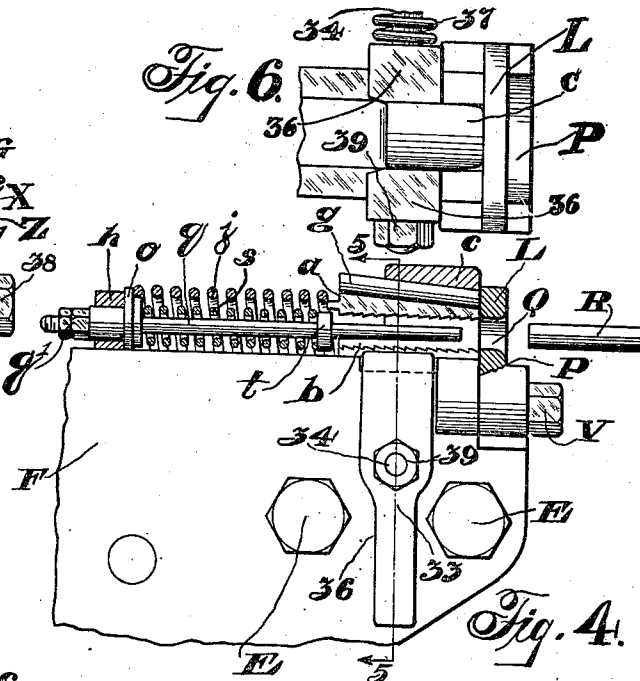


Fig. 4.

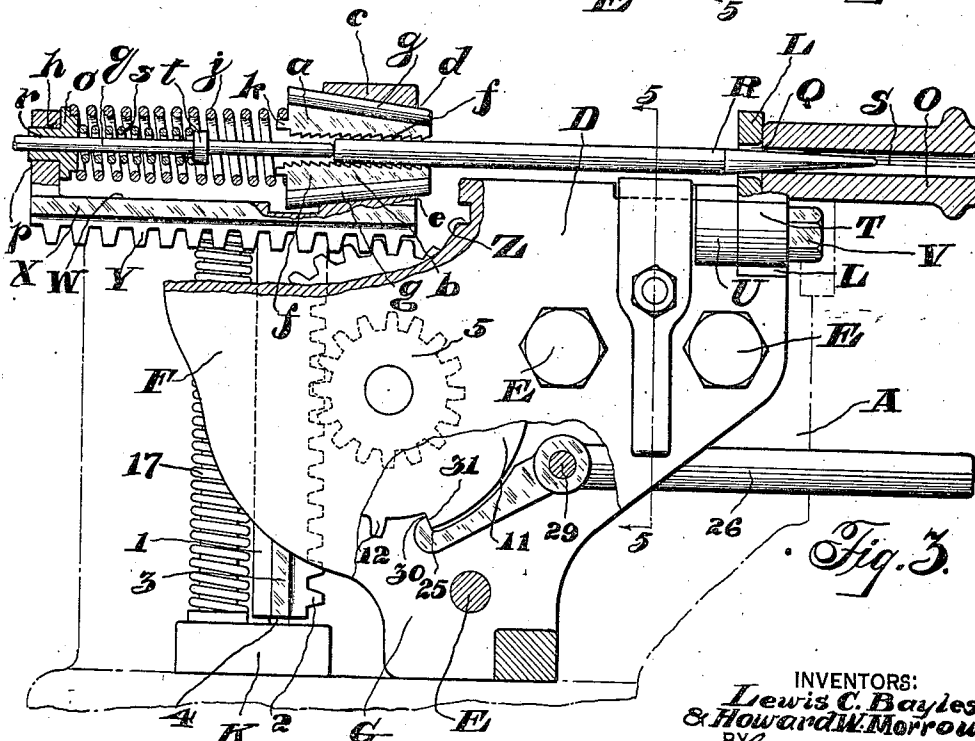


Fig. 3.

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UNITED STATES PATENT OFFICE.

LEWIS C. BAYLES, OF EASTON, PENNSYLVANIA, AND HOWARD W. MORROW, OF PHILLIPSBURG, NEW JERSEY, ASSIGNORS TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PIN PULLER.

Application filed February 3, 1923. Serial No. 616,730.

To all whom it may concern:

Be it known that we, LEWIS C. BAYLES, a citizen of the United States, a resident of Easton, Northampton County, and State of Pennsylvania, and HOWARD W. MORROW, a citizen of the United States, a resident of Phillipsburg, Warren County, and State of New Jersey, have invented a certain Pin Puller, of which the following is a specification, accompanied by drawings.

This invention relates to pin pullers and particularly to a device of this character adapted to operate in conjunction with a drill sharpening machine to withdraw the pin from a hot drill steel, usually inserted into the bore of the steel to maintain the bore at its proper diameter.

Pin pullers of various types are at present used for performing the operation of removing the pin from the bore of the steel, which operation usually requires considerable force because the pin becomes tightly wedged in the hole. Such pin pullers have been provided either as separate machines or as an adjunct to the drill sharpening machine proper, operated independently, either by hand or foot power, or by separate mechanical means. The pins themselves are also used in various forms some being provided with heads and others being substantially straight or headless, the latter being more difficult to handle.

The primary object of this invention is to enable a pin puller to be conveniently mounted on or built in a stationary portion of a drill steel sharpening machine and operatively connected to a movable member of the drill sharpener so that the pin puller is operated by said movable member of the drill sharpener, instead of by separate or independent manual means, and is adapted to accommodate substantially straight pins without heads or other projecting portions. A further object of the invention is to simplify and improve the operating mechanism of the pin puller and to permit the pin grasping means to be automatically locked in inoperative position when not in use, manually operated means adapted to function independently of the movable jaw of the drill sharpener being provided for re-

leasing the operating mechanism when it is desired to return the pin grasping means to operative position.

A still further object is to operate the pin puller by simple and rugged mechanism employing a rack and pinion to effect relative movement of the drill steel and the pin to be removed or withdrawn therefrom, the pin being securely held between clamping jaws. Further objects of the invention will later appear and to all these ends the invention consists of the combination of elements and arrangement of parts substantially as hereinafter fully described and claimed in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation partly in section along the line 1—1 of Figure 2 looking in the direction of the arrows showing a portion of a drill sharpener having the pin puller operatively mounted thereon preparatory to pulling a pin from the drill steel.

Figure 2 is a top plan view of the pin puller,

Figure 3 is a side elevation partly broken away of the pin puller showing the device in the act of completing the pin pulling operation,

Figure 4 is a detail view of the pin grasping means after completing the pin pulling operation, showing the ejector in the act of discharging the pin,

Figure 5 is an enlarged detail sectional view taken on the line 5—5 of Figure 4, and

Figure 6 is a top plan view of the pin puller jaw housing and retarding device.

Referring to the drawings, the base or cylinder A of a drill sharpener has a movable jaw member or crosshead B carried by the plunger rod C which is adapted to be actuated by a piston (not shown) operating in the base or cylinder.

The pin puller shown in this instance comprises the frame D, which may be secured at the side of the base A in any suitable manner, as by the bolts E. The frame D preferably includes an outer portion F, a central filler portion G and an inner portion H which rests against the base A. A bracket member J is interposed between the portions F and G at the upper part of the frame and

another bracket K is located at the bottom of the frame D. These brackets J and K may be formed integrally with the opposing frame portions F and G or may be secured
 5 between the frame portions in any suitable manner. The bracket J acts as a support for a stationary member shown in the form of an abutment L forming a work support against which a drill steel O is adapted to
 10 rest. This abutment may be provided with a recess P for receiving the end of the drill steel O, and also with an aperture Q adapted to receive the pin R which has been driven into the end of the steel to maintain the di-
 15 ameter of the central bore S and which pin R is to be removed. The stationary abutment L may be provided with lugs T at its sides adapted to register with similar lugs U formed on the sides of the portions F and
 20 G so that bolts V may pass through these lugs to rigidly secure the stationary abutment L to the frame D.

A toothed reciprocable pin puller rack W having longitudinal side ribs X and teeth
 25 Y is mounted to slide horizontally in guides Z between the frame portions F and G, the ribs X traversing the guides Z. This pin puller rack W carries pin grasping means shown as a pair of upper and lower toothed
 30 jaws *a* and *b* suitably mounted within a cap or housing *c* which is preferably formed integrally with the movable pin puller rack W. In this instance the housing *c* is located at the end of the rack W adjacent to the sta-
 35 tionary abutment L. The housing *c* is provided with upper and lower backwardly and outwardly inclined jaw guides here shown as grooves or sockets *d* and *e* respectively.

The jaws *a* and *b* have opposite parallel
 40 toothed surfaces *f* and backwardly inclined bulb-shaped guiding ribs *g* so arranged that the jaws *a* and *b* are movable toward and away from each other in the guides *d* and *e*, the toothed surfaces remaining parallel.

A stop *h* is provided at the rearward end of the pin puller rack W, and resilient re-
 45 turning means shown herein as a coiled spring *j* are adapted to be interposed between the stop *h* and the jaws *a* and *b*. This
 50 spring *j* is retained at one end by flanges *k* provided on the rearward ends of the jaws *a* and *b*, and at the opposite end by a seat *o* secured in an aperture *p* formed in the stop plate *h*. The spring *j* tends to move the
 55 jaws *a* and *b* forwardly, thus causing the toothed surfaces *f* to approach each other.

Suitable ejecting means are preferably provided for ejecting a pin which has been
 60 pulled, and in the present instance, we have provided an ejector pin *q* which is adapted to be moved forwardly between the jaws *a* and *b* independently of the jaws and which extends through and is guided in an aper-
 65 ture *r* located in the stop *o*. Nuts *q'* on the pin limit its forward travel. Resilient

means in the form of a second spring *s* are provided for urging the pin *q* forward be-
 70 tween the jaws *a* and *b*, this spring *s* surrounding the ejector pin *q* and being retained between the stop *h* at the rearward end and a lug *t* formed on the ejector pin *q* at a point intermediate its length. The
 75 ejector pin *q* and spring *s* are surrounded by the larger returning spring *j*. The ejector pin *q* is aligned with the aperture Q of the stationary abutment L.

Suitable operative devices, shown in this instance as rack and pinion mechanism op-
 80 erated by the crosshead, are provided for causing relative movement between the station- ary abutments and the pin grasping means to effect removal of the pin from the steel. The rack and pinion mechanism in-
 85 cludes preferably a vertically reciprocable actuating rack 1 having teeth 2 and longitu- dinal ribs 3 on its opposite sides, these ribs 3 being adapted to slide in grooves 4 in the
 90 opposing faces of the frame portions G and H. The teeth 2 of the rack 1 intermesh with a pinion 5 also located between the portions G and H. The ends 6 and 7 of the shaft 8
 95 of the pinion 5 are supported in the frame portions G and H, and the end 7 of this shaft 8 extends to the side F, as shown at 9, and is preferably provided with a squared
 100 portion 10 between the portions F and G. A partial gear 11 having a series of teeth 12 on a portion of its periphery and a non- toothed portion 13 is rigidly secured on the
 105 squared portion of the shaft 8. The teeth 12 of the gear 11 are adapted to mesh with the teeth Y of the pin puller rack W, and as the gear 11 is fast to the pinion 5 which in turn
 110 meshes with the teeth 2 of the vertically re- ciprocable actuating rack 1, the pin puller rack W carrying the pin grasping means in- cluding the jaws *a* and *b* will be moved back
 115 and forth in accordance with the reciprocatory movement of the actuating rack 1, the jaws *a* and *b* being closed to engage the pin O on the backward movement of the pin
 120 puller rack, and opened on the forward movement into the position to receive the pin. As soon as the pin O is released by the jaws *a* and *b* the ejector spring *s* will move
 125 the ejector pin *q* forward, ejecting the pin R through the aperture Q. A bearing member 14 secured on the movable crosshead B of the drill sharpener by bolts 15, is adapted
 130 to engage the top 16 of the actuating rack 1 as shown in Figure 1, and will move the rack downward as the crosshead B is lowered to the position shown in Figure 3.

Resilient means are preferably provided for effecting movement of the actuating rack
 135 1 in the opposite direction. These means may include a coiled spring 17 which is adapted to be secured between the project- ing top portion 18 of the rack 1 and the
 140 bracket K which is rigidly located at the

base of the guides 4, and this spring 17 is compressed with each downward movement of the crosshead when the pin puller is in operation. The spring 17 is provided with suitable guiding means to maintain its alignment and prevent buckling. In the present instance, the spring 17 surrounds and is guided by a plunger 19 which is screwed into the projecting portion 18 as shown at 20, and a cylinder 21 of substantially the same diameter as the plunger 19, screwed into or otherwise suitably fixed to the bracket K, as shown at 22. The plunger 19 has a smaller diameter portion 23 which is supported and guided in the cylinder 21, and the cylinder 21 is preferably provided with an aperture 24 at one end to maintain atmospheric pressure within the cylinder 21, thus preventing the building up of air cushions which would tend to impede movement of the plunger 19, and hence the rack 1.

When the crosshead has been lowered and the pin puller rack moved to the position illustrated in Figure 3, the gear 11 will be automatically caught and held against return movement by securing means which may include a pallet or catch 25 secured to a handle 26 and pivoted between the frame portions F and G as shown at 29, so that the weight of the handle 26 normally causes the pallet 25 to bear against the non-toothed surface 13 of the gear 11 until the gear 11 reaches a point where the pallet 25 enters the notch 30 adjacent to the last tooth 31 which will be when the crosshead B has practically descended to the limit of its movement. The pin pulling apparatus is thus held in inoperative position against the force of the spring 17 with the movable pin grasping means and pin ejector retracted so that the drill sharpening machine may be freely used for other operations without actuating the pin puller. When it is desired to restore the pin puller to operation, the handle 26 is manually raised slightly, turning the pallet 25 on its axis 29 so that the pallet leaves the tooth 31, whereupon the gear 11 will be released and the spring 17 will cause the vertically reciprocable actuating rack 1 to rise. This reverse movement of the actuating rack results in corresponding reverse movement of the pinion 5, gear 11, pin puller rack W, cap c pin grasping jaws *a* and *b* and pin ejector *g*, and the rising movement of the rack continues until the pin grasping jaws *a* and *b* return to initial position against the abutment L. After each pin pulling operation, the crosshead B and handle 26 are preferably raised to permit the pin puller rack W to return to initial position after the pin has been pulled from a steel. During such forward movement the pin ejector will engage the pin, the pin will be carried to the front of the machine, and automatically ejected.

The pin puller is locked in its inoperative position by a succeeding descending movement of the crosshead.

We have found it desirable in practice to provide a retarding device or retainer to insure the proper operation of the clamping jaws *a* and *b*. The spring 17 which returns the crosshead actuating rack and pin puller rack to operative position when released, must necessarily exert considerable force. It is also desirable that the jaw closing spring *j* should possess considerable strength. However, under such circumstances it becomes necessary to prevent one spring from counteracting the force exerted by the other. As seen in Figure 1 the jaws *a* and *b* must be practically fully retracted to receive the pin and the housing *c* must be against the stationary abutment L to prevent the spring *j* from closing the jaws *a* and *b*. When in this position, however, the spring *j* is held against the jaws and acts upon the stop plate *h*. This has a tendency to overcome the force of the spring 17, moving the pin puller rack W away from the stationary abutment L, and the jaws close. A suitable retarding device is therefore provided to exert sufficient restraint upon the housing to prevent the spring *j* from causing premature movement of the pin puller rack. In the present instance, we employ a pair of clamps 32, the vertical sides 33 of which are mounted on opposite sides of the pin puller frame and are secured by a bolt 34 passing through a transverse hole 35 in the bracket J. The tops 36 of the clamps 32 project over the frame portions F and G and the space between the opposite ends of the top portions 36 in the path of travel of the housing *c* is normally slightly less than the width of the housing, and resilient means, which may be a spring 37, are preferably interposed between one of the sides 33 and the bolt head 38 at one side of the frame to cause the clamps 32 to exert a certain degree of pressure upon the housing. Adjustment of the tension of the spring 37 is effected by screwing of the nut 39 located against the clamp at the opposite side of the frame. The housing *c* passes between the clamp portions 36 when returning to position against the stationary abutment and is held under just sufficient pressure to overcome the tendency of the spring *j* to counteract the force of the spring 17.

The diameter of the gear 11 is preferably greater than that of the pinion 5 in order to transmit motion which will result in the pin puller rack W obtaining a greater length of travel than the distance traveled by the crosshead B. This is necessary because in practical use the pins R are generally of considerable length, while the movement of the crosshead B is comparatively slight. In the present instance the diameter of the gear

11 is substantially twice that of the pinion 5 which enables the rack W to move substantially twice the distance traveled by the crosshead B in its raising and lowering movement.

We claim:

1. A pin puller for a drill sharpener having a stationary base and a movable crosshead, said pin puller comprising means for holding the drill steel, clamping means adapted to securely grasp the pin, and rack and pinion mechanism actuated by the crosshead for effecting movement of said clamping means relative to the steel to withdraw the pin from the steel.

2. A pin puller for a drill sharpener having a stationary base and a movable crosshead, said pin puller comprising means for holding the drill steel, clamping means adapted to securely grasp the pin, rack and pinion mechanism actuated by the crosshead for effecting movement of said pin grasping means relative to the steel to withdraw the pin from the steel, and means adapted to retain said pin puller in inoperative position.

3. A pin puller for a drill sharpener having a stationary base and a movable crosshead, said pin puller comprising means for holding the drill steel, means for grasping the pin, rack and pinion mechanism operated by the crosshead for effecting movement of said pin grasping means relative to the steel to withdraw the pin from the steel, means adapted to retain said pin grasping means in inoperative position, and means for restoring said pin grasping means to operative position.

4. A pin puller for a drill sharpener having a stationary base and a movable crosshead, said pin puller comprising means for holding the drill steel relatively movable, jaws adapted to grasp the pin, rack and pinion mechanism operated by the crosshead for effecting movement of said pin grasping means relative to the steel to withdraw the pin from the steel, and automatic means adapted to retain said pin grasping means in inoperative position.

5. A pin puller for a drill sharpener having a stationary base and a movable crosshead, said pin puller comprising means for holding the drill steel, relatively movable jaws adapted to securely grasp the pin, rack and pinion mechanism operated by the crosshead for effecting movement of said pin engaging means relative to the steel to withdraw the pin from the steel, automatic means adapted to retain said pin grasping jaws in inoperative position, and manually released means for restoring said jaws to operative position.

6. A pin puller adapted to be associated with a drill sharpening machine having a movable crosshead, said pin puller compris-

ing a stationary member, relatively movable pin grasping jaws and means for effecting relative movement of said elements to cause the removal of the pin from said steel, said last mentioned means being actuated by movement of the movable crosshead of the sharpening machine, and means independent of the crosshead for positively retaining said crosshead actuated means in inoperative position.

7. A pin puller adapted to be associated with a drill sharpening machine having a movable crosshead, said pin puller comprising a stationary member, relatively movable pin grasping jaws, and means for effecting relative movement of said elements to cause the removal of the pin from said steel, said last mentioned means being actuated by movement of the movable crosshead of the sharpening machine, means independent of the crosshead for retaining said crosshead actuated means in inoperative position, and means for causing said crosshead actuated means to return to initial position.

8. A pin puller adapted to be associated with a drill sharpening machine having a movable crosshead, said pin puller including a stationary member and relatively movable pin grasping jaws, a pin puller rack and a pinion adapted to effect movement of said pin grasping jaws to cause the removal of the pin from said steel, said pin puller rack and pinion being actuated by movement of the movable crosshead of the drill sharpening machine, and means for retaining said pin puller rack and pinion in inoperative position.

9. A pin puller adapted to be associated with a drill sharpening machine having a movable crosshead, said pin puller comprising a stationary abutment, relatively movable clamping jaws, a pin puller rack and pinion adapted to effect movement of said jaws relative to the steel to cause the removal of the pin from said steel, said pin puller rack and pinion being actuated by movement of the movable crosshead of the drill sharpening machine, means for retaining the jaws in withdrawn position, and means for causing said jaws to return to initial position.

10. A pin puller adapted to be associated with a drill sharpening machine having a vertically movable crosshead, said pin puller comprising a stationary member and relatively movable pin grasping jaws, rack and pinion mechanism actuated by said crosshead for moving said jaws to cause the removal of the pin from the steel, automatic means for retaining said jaws in the moved position, and manually released means for returning said jaws to their initial position.

11. In a pin puller for pulling a pin from an object, a stationary base, a movable

crosshead, a stationary abutment against which the object is adapted to rest, and relatively movable jaws adapted to grasp the pin, said abutment being mounted on said stationary base, rack and pinion mechanism actuated by the crosshead for moving the jaws away from the stationary abutment to cause removal of the pin from the object, and means independent of the crosshead adapted to retain said rack and pinion mechanism in inoperative position.

12. In a pin puller for pulling a pin from an object, a stationary base, a movable crosshead, a stationary abutment against which the object is adapted to rest, and relatively movable pin grasping jaws, said abutment being mounted on said stationary base, rack and pinion mechanism actuated by the crosshead for moving the jaws away from the stationary abutment, means independent of the crosshead adapted to retain said rack and pinion mechanism in inoperative position and means for restoring said rack and pinion mechanism to operative position.

13. In a pin puller for pulling a pin from an object, a stationary base, a vertically movable crosshead, a stationary abutment against which the object is adapted to rest, a horizontally movable jaw carrier, and jaws adapted to grasp the pin, rack and pinion mechanism actuated by the crosshead for moving the jaw carrier away from the stationary abutment, and means adapted to retain said rack and pinion mechanism in inoperative position and to cause the same to return to operative position.

14. A pin puller adaptable for association with a drill sharpening machine having a stationary base and a movable crosshead, said pin puller including a stationary member and movable pin grasping means, rack and pinion mechanism actuated by the crosshead for effecting movement of said pin grasping means to cause the removal of the pin from the steel, and automatic means independent of the crosshead for retaining said rack and pinion mechanism in inoperative position.

15. A pin puller adaptable for association with a drill sharpening machine having a stationary base and a movable crosshead, said pin puller including a stationary member and relatively movable pin grasping jaws, rack and pinion mechanism actuated by the crosshead for effecting movement of said pin grasping jaws to cause the removal of the pin from the steel, automatic means independent of the crosshead for retaining said rack and pinion mechanism in inoperative position, and manually actuated means for permitting said rack and pinion mechanism to return to operative position.

16. A pin puller adapted to be mounted at the side of a drill sharpening machine

having a stationary base and a vertically movable crosshead, said pin puller comprising a stationary member and a horizontally movable pin grasping jaw carrier, rack and pinion mechanism actuated by the crosshead for effecting movement of said jaw carrier, automatic means independent of the crosshead for retaining said jaw carrier in inoperative position, means permitting said jaw carrier to return to operative position, and means for preventing unintentional movement of said jaw carrier.

17. A pin puller adapted to be mounted at the side of a drill sharpening machine having a stationary base and a vertically movable crosshead, said pin puller comprising a stationary member and horizontally movable pin grasping means, rack and pinion mechanism actuated by the crosshead for effecting movement of said pin grasping means to cause the removal of the pin from the steel, automatic means independent of the crosshead for retaining said pin grasping means in inoperative position, manually released means permitting said pin grasping means to return to operative position, and means for ejecting the pin.

18. A pin puller adapted to be mounted at the side of a drill sharpening machine having a stationary base and a movable crosshead, said pin puller comprising a stationary member and movable pin grasping means, rack and pinion mechanism actuated by the crosshead for effecting movement of said pin grasping means to cause removal of the pin from the steel, automatic means independent of the crosshead for retaining said pin grasping means in the moved position, manually released spring actuated means for causing said movable pin engaging means to return to operative position, and means for preventing unintentional movement of said pin grasping means.

19. A pin puller for pulling a pin from an object comprising a stationary base, a movable crosshead, a stationary abutment against which the object is adapted to rest, a reciprocable pin puller rack, a jaw carrier on said rack having jaws adapted to grasp the pin, a mutilated gear adapted to engage the teeth of said pin puller rack, a pinion fast to said gear, a reciprocable actuating rack adapted to actuate said pinion, bearing means on the movable crosshead adapted to engage and depress said reciprocable actuating rack when the crosshead is lowered, causing movement of said jaw carrier and jaws away from the stationary abutment, automatic means adapted to retain said jaws in inoperative position and manual means for releasing said automatic means to cause the jaws to be returned to their initial operative position when the movable crosshead is raised.

20. A pin puller adaptable for association

with a drill sharpening machine having a stationary base and a vertically movable crosshead, said pin puller comprising a stationary abutment against which the object
5 is adapted to rest, and movable clamping jaws adapted to grasp the pin, a horizontally reciprocable toothed pin puller rack carrying said clamping jaws, a mutilated gear adapted to engage the teeth of said pin
10 puller rack, a pinion fast to said gear, a vertically reciprocable actuating rack adapted to actuate said pinion, resilient means tending to urge the reciprocable actuating
15 rack to its operating position, bearing means on the movable crosshead adapted to engage and depress the reciprocable actuat-

ing rack when the crosshead is lowered, causing movement of the clamping jaws away from the stationary abutment, a pallet adapted to engage a tooth of the mutilated gear to retain said clamping jaws in
20 inoperative position against said spring, means for releasing said pallet to permit the spring to effect the return of the movable clamping jaws to their initial operative
25 position when the movable crosshead is raised, and resilient means for ejecting the pin.

In testimony whereof we have signed this specification.

LEWIS C. BAYLES.
HOWARD W. MORROW.