

(No Model.)

# M. L. ANDREW. DRILL CHUCK.

No. 403,083.

Patented May 14, 1889.

FIG. 1.

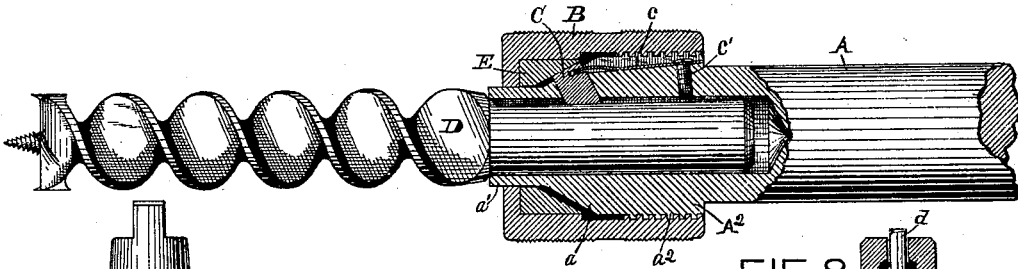


FIG. 2.

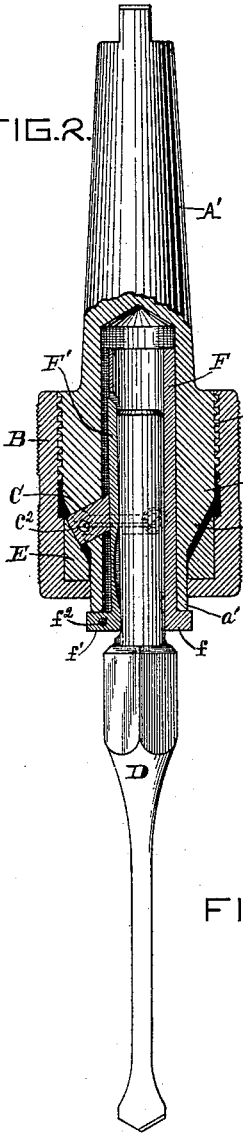


FIG. 3.

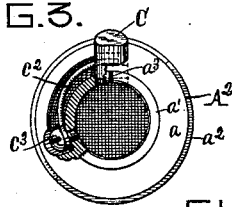


FIG. 4.



FIG. 6.

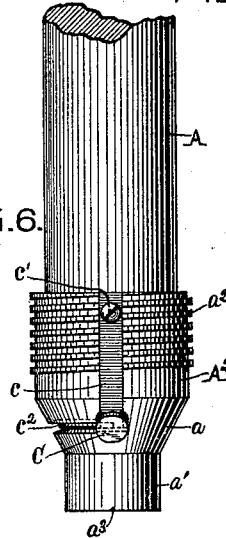


FIG. 8.

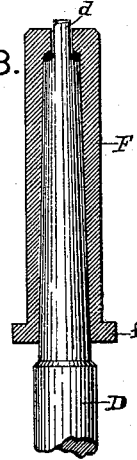


FIG. 7.

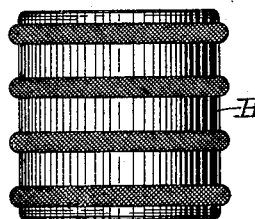


FIG. 9.

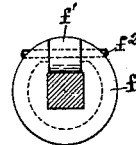


FIG. 5.

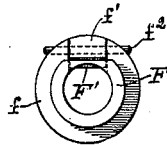


FIG. 10.

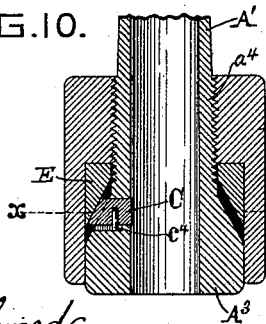


FIG. 11.

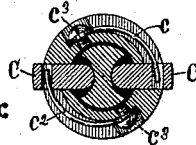
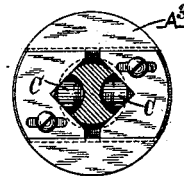


FIG. 12.



Witnesses

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# UNITED STATES PATENT OFFICE.

MOSES L. ANDREW, OF DELHI, OHIO.

## DRILL-CHUCK.

SPECIFICATION forming part of Letters Patent No. 403,083, dated May 14, 1889.

Application filed February 14, 1889. Serial No. 299,883. (No model.)

### *To all whom it may concern:*

Be it known that I, MOSES L. ANDREW, a citizen of the United States, and a resident of Delhi, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Drill-Chucks, of which the following is a specification.

My invention relates to chucks for holding drilling and boring tools. Its object is to provide a means whereby tools of different sizes may be used in the same chuck, and be rapidly inserted and removed by hand, dispensing with the use of wrenches or keys, and also set-screws, the projecting heads of which are liable to injure the operator's hands.

The invention will be first fully described in connection with the accompanying drawings, and will then be particularly referred to and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views; Figure 1 is an axial section of the end of a spindle constructed according to my invention, the auger-bit and part of the spindle being shown in side elevation. Fig. 2 is a similar view of a chuck provided with a taper-shank for use with any of the ordinary lathes or drill-presses, and also with the means for accommodating different sizes of bits. Fig. 3 is an end elevation of the chuck having the cap and flaring follower removed and a portion of the spindle or stock broken away to expose the spring and clamping-pin connected to it. Fig. 4 is an axial section of the flaring follower, which forces the set-pin on the bit-shank. Fig. 5 is an end elevation of one of the sleeves or bushings used to accommodate a smaller-sized bit. Fig. 6 is a side elevation of the end of the spindle, as shown in Fig. 1, but with both forms of springs for holding the set-pin. Fig. 7 is a side elevation of the screw-cap for tightening the bit or releasing it. Fig. 8 is a longitudinal central section of a bushing for use in my chuck when the taper-shank bit is used. Fig. 9 is an end elevation of the bushing similar to Fig. 5, but with the central opening square to receive a square shank-bit. Fig. 10 is an axial section of a modification of the form

shown in Fig. 2, showing the screw-cap arranged to travel in the opposite direction to force the flaring ring upon the set-pin. Fig. 11 is a transverse section of a modification adapted to receive the ordinary twist-drill, taken in the plane of line  $x x$  of Fig. 10. Fig. 12 is an end elevation of the same.

In Figs. 1 and 6, A represents the spindle of a wood-working machine, upon the end of which my improvements are formed; and A', Figs. 2 and 10, represents the chuck-shank, which fits into the bore of the spindle of a lathe or drill-press.

Referring first to Figs. 1 to 6, inclusive, the head A<sup>2</sup> of the spindle A or shank A' is beveled at  $a$  down to the reduced end  $a'$ , and has a screw,  $a^2$ , formed upon it to engage the interiorly-threaded cap B. The beveled or cone-shaped part  $a$  of the head is perforated through one side to the central bore to receive the set-pin C, which, as seen in Fig. 1, bears upon the flattened side of the shank of the bit D. The set-pin is held in place by a spring,  $c$ , which is seated in a longitudinal groove in head A<sup>2</sup>, and held in place by a screw,  $c'$ . The purpose of the spring is to hold the set-pin out when the bit is released and prevent it from dropping into the bore when the bit is removed.

E is a hardened-steel ring, the bore at one end of which fits over the reduced end  $a'$  of the head. The opposite end is bored counter to the beveled portion  $a$  of the head A<sup>2</sup>.

It will be seen that when the cap B, Fig. 1, is partially unscrewed the spring  $c$  will carry the set-pin C outward, pressing the ring E back and releasing the bit D, and that when the bit is inserted in place and the screw-cap B tightened up it forces the ring E onto the set-pin C, forcing it inward upon the flattened side of the bit-shank and securely holding the bit in place. To insure the proper insertion of the bit, a mark or notch,  $a^3$ , Fig. 6, is made in the front end of the part  $a$  in the same radial plane as the pin C.

The head A<sup>2</sup> is bored to receive the shank of the largest bit. In order to use a smaller bit in the same chuck, I provide for each chuck a set of bushings. These are turned the same size as the shank of the largest bit to fit into the bore of the head A<sup>2</sup>. The central

bores of these bushings are of different sizes to receive the shanks of the different bits required.

Referring to Figs. 2 and 5, I will describe one of the bushings, which is composed of the cylindrical shell or sleeve F, having an outwardly-projecting flange, *f*, and a latch or tongue, F'. The shell F is slotted through its front flange and back to near its inner end to receive the latch F', which is preferably made of flat spring-steel. The outer end of the latch has a segmental lug, *f'*, through which and the flange *f* a pintle-pin, *f*<sup>2</sup>, passes to hinge the latch to the bushing.

The flattened side of the bit-shank flares from the shoulder at a slight angle to the axis, and the latch F' is cut away upon its inner side, so that when the pin C is forced down upon the latch the inner end beyond the curved part will bear firmly its whole length upon the flat inclined portion of the bit-shank, thus locking it and the bushing firmly in place.

A modification of the spring for holding the set-pin is shown in dotted line, Fig. 2, and in full line, Figs. 3 and 6. This is a curved wire spring, *c*<sup>2</sup>, seated in a concentric groove formed in the periphery of the part *a*. One end of the spring *c*<sup>2</sup> is secured to the head A<sup>2</sup> by a screw, *c*<sup>3</sup>, and the opposite end enters a hole in the set-pin C. In Fig. 6 both forms of spring are shown, but only one is necessary, and indeed both may be dispensed with without impairing the efficiency of the chuck, as the set-pin would not fall out when the spindle is vertical, and if the improvement be applied to a horizontal spindle it would only require care to see that the spindle be turned to bring the set-pin upon the under side before the cap is unscrewed to release the bit. When the taper shank bits are used, as seen in Fig. 8, the latch F' may be dispensed with; but the diminished or flattened end *a* should extend beyond the inner end of the bushing, so that when the bit and bushing are removed a tap upon the end *a* will free the bit, thus dispensing with the drifts commonly used for this purpose.

The bushing shown in Fig. 9 differs in no respect from the one described, except that the central opening is square instead of round. The advantage of this form of bushing is that the drill may be made from a piece cut from a square bar of steel, and thus avoid the trouble of turning up the shank.

In the modification shown in Fig. 10 the head A<sup>3</sup> is reversed, the screw *a*<sup>4</sup>, to engage the interior screw-thread of the cap B', is formed on the shank A', and the ring E is slipped on from the rear instead of from the front, as in Figs. 1, 2, and 6. In this view I have also shown a modified means to hold the set-pin from falling out. This consists of a pin, *c*<sup>4</sup>, which is secured in the pin C and traverses a radial slot cut in the head A<sup>3</sup>.

In the form of my invention shown in Figs.

11 and 12 I employ two set-pins radially opposite each other and formed rounding on the inner ends to enter the spiral grooves in the ordinary twist-drill. In this form it is not necessary to form a shank on the drill, and should the drill break in use each part may be used until it wears out or becomes too short for use. The collar E, being of hardened steel and fitting snugly enough within the cap to turn with it until its flaring part is brought against the end of the set-pin, is not liable to be indented by the head of the pin and is liable to bear at a different point each time the cap is tightened.

It would be an inferior modification of my invention to form the ring E and cap B in a single piece. While the mode of operation would be the same in both instances, the latter method would be a more expensive one, and the inclined part which bears upon the pin would always stop at the same point when tightened up.

It is also evident that many mere mechanical changes may be made in the parts of the chuck without departing from the spirit or scope of my invention.

In the form shown in Fig. 10 the bit may be removed without stopping the machine by simply taking hold of the cap B', and the same would be accomplished by making the thread *a*<sup>2</sup> on Figs. 1, 2, and 6 a left-hand thread instead of a right-hand one, as shown.

What I claim is—

1. In a drill-chuck, the combination of the bit-holding head, the set-pin fitted to slide in said head, a screw-cap fitted over said head and pin, and a flaring ring within said cap to force the pin inward and clamp the bit-shank, substantially as set forth.

2. The combination, substantially as specified, of head A<sup>2</sup>, having screw-threaded part *a*<sup>2</sup>, inclined part *a*, and reduced end *a'*, the said part *a* being perforated, as shown, the pin C, fitted to slide in said perforation, the ring E, fitted upon part *a'* and having its end flaring counter to part *a* of the head, and the screw-cap B, fitting over the reduced part *a'* and screw-threaded interiorly to engage the thread upon the head A<sup>2</sup>, for the purpose set forth.

3. The combination, substantially as specified, of the chuck-head screw-threaded exteriorly and inclined at *a*, the pin *c*, fitted to slide through said inclined part, a spring having one end secured to the head and the opposite end secured to said pin, a flaring ring counter to the inclined part of the head, and a screw-cap to force said ring upon the pin for the purpose of securing the bit in the chuck.

4. In a lathe-chuck, substantially as described, the combination of the bushing F, adapted to fit the bore of said chuck and slotted upon one side, the latch F, fitted to play in said slot and hinged to the bushing, and a set-pin to force the latch inward, for the purpose set forth.

- 5 5. The combination of a chuck-head and a  
set-pin fitted to slide through said head, and  
means, such as shown, to force the pin inward  
and release the same, with a bushing having  
a hinged spring-latch, and a bit-shank having  
a flattened and inclined side upon which the  
latch presses and locks the bit against with-  
drawal when the set-pin is forced in, sub-  
stantially as hereinbefore set forth.
- 10 6. The herein-described bushing for drill-  
chucks, consisting of the cylindrical shell F,  
having the outwardly-projecting flange  $f$  and  
slotted upon one side, the latch F, having the  
lug  $f'$ , the pin  $f^2$ , passing through the flange  
 $f$ , and lug  $f'$ , hinging the latch to the shell, 15  
substantially as specified.

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Witnesses:

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