T. R. ALMOND.

Chucks.

No. 141,978. Patented August 19, 1873.

Fig. 2.

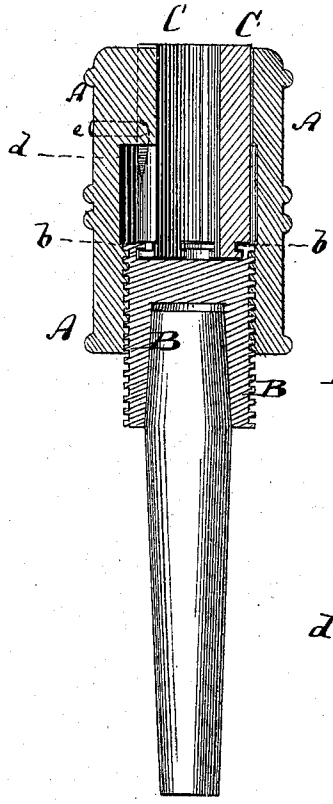


Fig. 1.

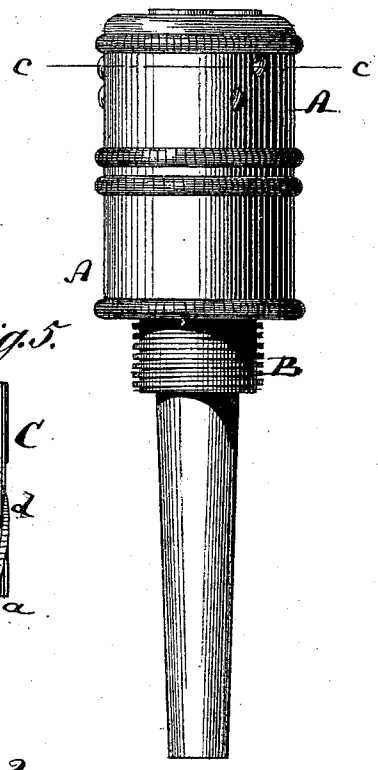


Fig. 4.

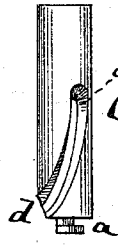


Fig. 5.

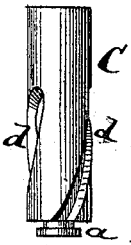
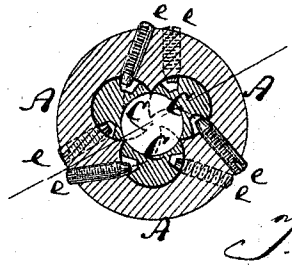


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS R. ALMOND, OF FITCHBURG, MASSACHUSETTS.

IMPROVEMENT IN CHUCKS.

Specification forming part of Letters Patent No. 141,978, dated August 19, 1873; application filed July 2, 1873.

To all whom it may concern:

Be it known that I, THOMAS R. ALMOND, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented an Improved Drill-Chuck, of which the following is a specification:

Figure 1 is a side view of my improved drill-chuck. Fig. 2 is a longitudinal central section of the same. Fig. 3 is a transverse section thereof on the line *c c*, Fig. 1. Figs. 4 and 5 are side views of the chuck-jaws.

Similar letters of reference indicate corresponding parts in all the figures.

This invention relates to a new construction of a drill-chuck, having for its object to simplify, as much as possible, the arrangement of the parts and their operation, and thereby to increase the durability of the chuck. The invention principally consists in the use of a series of jaws, which are partly cylindrical along their outer faces and concave on their griping or biting faces, and which are, on their outer faces, provided with spiral or bent grooves for the reception of pins that project into such grooves from the embracing-shell of the chuck. The lower ends of the jaws connect by a swivel-joint with a screw that enters the back of the shell, so that when said screw is turned the jaws will be longitudinally displaced within the shell, and during such displacement, by virtue of their spiral or bent grooves, they will be turned to bring their griping-faces nearer to or farther away from the axis of the shell, and be thereby adjusted to the exact size of the rod or drill to be held. I prefer to use two pins in the shell for each jaw, and to have two spiral or bent grooves in each jaw, the two pins projecting at an angle toward each other of ninety degrees, more or less, so that such pins may also be used for exactly centering the jaws, by being screwed up more or less from one side or the other. I also prefer to so shape the spiral or bent grooves of such jaws that there is less curvature in them where the pins enter them for holding the jaws of a larger drill than where the pins enter them for holding them in position for a smaller drill, so as to obtain a greater proportion of force for holding larger than for holding smaller drills. It will be observed that, by using these cylindrical jaws in connection with a simple embracing-shell and adjusting-screw, all the complex devices heretofore used for supporting and contracting the jaws with springs, wedges, &c., are dispensed with, and the construction of the apparatus is materially simplified, while, at the same time, the most absolute degree of strength will be obtained.

In the accompanying drawing, the letter A represents the shell of my improved chuck, having, at its lower or back end, a female screw-thread for the reception of a screw, B. On the upper part, the shell has on its inner side three or more partly-cylindrical recesses, which are parallel to its axis, and all equal in diameter to each other. These recesses are arranged for the reception of three or more jaws, C C, which jaws are also cylindrical in outline, at least sufficiently so as to fully fit the said recesses, as shown in Fig. 3. Those parts of the jaws which face the axis of the shell are made concave, so that when the jaws are in the position shown in Fig. 3, with their concave parts all in continuous line, the space between them will be cylindrical, and will be the largest space that can be formed between them. The several jaws are grooved transversely at their lower ends, as shown at *a* in Figs. 4 and 5, to receive an inwardly-projecting flange, *b*, that enters such grooves *a* from the recessed upper end of the screw B. Thus a connection is established between the screw and the jaws, as shown in Fig. 2, so that when said screw is turned it will cause the jaws to travel up and down with it. The outer sides of the jaws C C are provided each with one or more spiral or bent grooves, *d*, which are more clearly shown in Figs. 4 and 5. Into these grooves enter pins *e e*, which are screwed through the shell to enter said grooves, as shown in Fig. 3. When the jaws are lengthwise displaced by the motion of the screw B they will, owing to the spiral grooves and their connection with the pins *e* of the shell, also be turned all equally, because the grooves *d* are all alike, and when so turned will bring one of their edges nearer to, and the other farther away, from the axis of the shell A. Those edges of the jaws that are brought nearer toward the center of the shell, as indicated by dotted lines in Fig. 3, constitute the griping-

surfaces of the chuck, and bear against the drill or spindle introduced between them. The more, by turning the screws, the jaws are raised—that is to say, made to project out of the shell—the more will they be turned to fit and hold a smaller drill or spindle. The grooves *d* are, by preference, made straighter toward their upper ends, and more spiral or bent at their lower parts, as is shown in Fig. 4, for the purpose of giving more power or purchase to the holding devices *e e* when the jaws are held for larger drills than when the same are held in position for smaller drills, it being evident that a greater proportion of power is required for holding larger than for holding smaller pieces, and especially, also, in using them; and it being also evident that the more power is obtained the straighter the groove *d*. The pins *e* are screwed into the shell, as indicated. The two pins pertaining to each jaw stand at an angle to each other of about ninety degrees, more or less, as indicated in Fig. 3. When the jaws are in the position shown by full lines in Fig. 3—that is to say, for holding the largest-sized drill to which they are fitted—they can be exactly centered, if found not to be so, by turning one of the pins *e* more inward and relieving the other proportionately, and thereby slightly turning each jaw in its socket. For this reason, being able to adjust the jaws and centering the same, I prefer to use two pins, *e*, for each jaw, although I may produce a substantial and reliable chuck by having but one pin, *e*, for each jaw. It is also clear that, instead of grooving the jaws and having the pins *e* in the shell, substantially the same results will be reached by grooving the inner faces of the shell-sockets, and providing projecting pins or feathers on the jaws; and I do not confine myself to either construction.

What I claim as my invention is—

1. The improved drill-chuck, consisting of a shell, A, partly-cylindrical jaws C C, adjusting-screw B, and of the pins *e* to fit the spiral grooves *d*, substantially as herein shown and described.

2. A spiral groove, *d*, for the jaw of a drill-chuck, when made straighter toward the outer and more spiral toward the inner end, substantially as described.

3. The arrangement of the two pins *e* in the shell A to bear against and enter opposite sides of the same jaw C, substantially as described.

THOMAS R. ALMOND.

Witnesses:
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