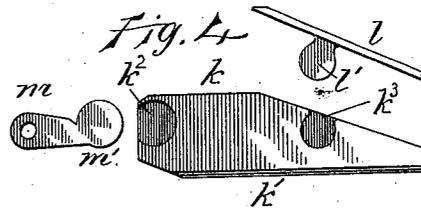
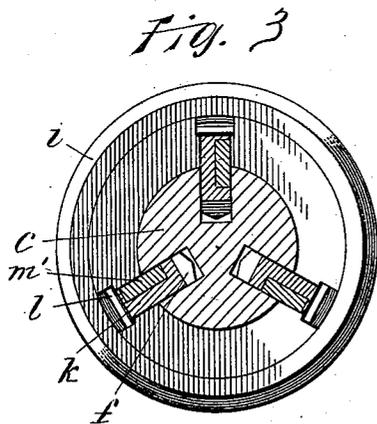
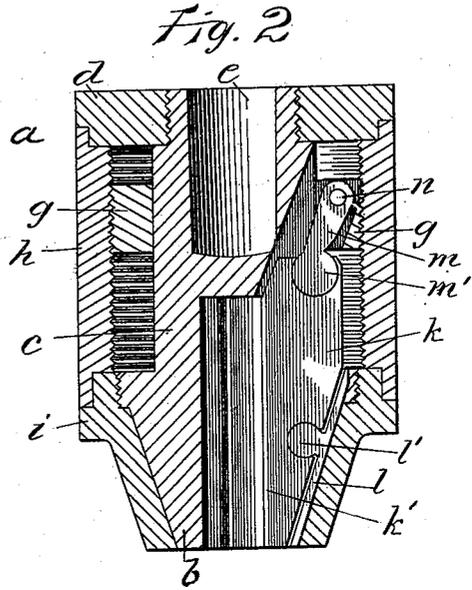
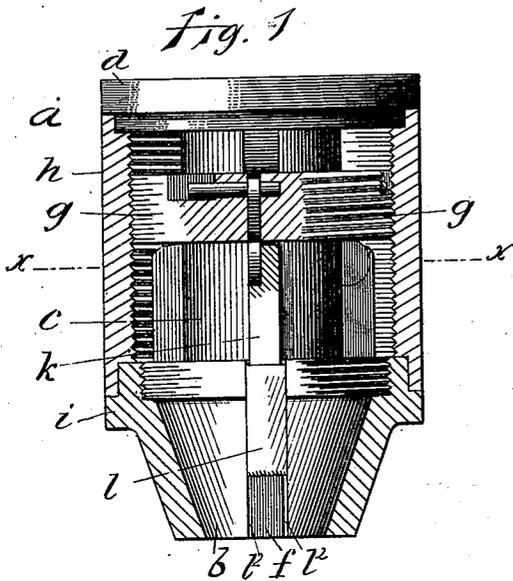


(No Model.)

D. WEIR.  
DRILL CHUCK.

No. 558,242.

Patented Apr. 14, 1896.



Witnesses:

Arthur B. Jenkins.  
C. E. Buckland

Inventor:

David Weir  
by Chas. L. Burdett,  
Attorney.

# UNITED STATES PATENT OFFICE.

DAVID WEIR, OF HARTFORD, CONNECTICUT.

## DRILL-CHUCK.

SPECIFICATION forming part of Letters Patent No. 558,242, dated April 14, 1896. .

Application filed September 12, 1895. Serial No. 562,348. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID WEIR, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Drill-Chucks, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a drill-chuck which is adapted to securely hold a twist-drill or a like tool with either a cylindrical straight shank or a tapered shank, the chuck-jaws automatically adapting themselves to the form of the drill.

To this end my invention consists in the details of the several parts making up the chuck-jaws and their operating mechanism and the combination of such parts, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a detail side view of the chuck with parts broken away to show construction. Fig. 2 is a detail view, in central lengthwise section, of the chuck. Fig. 3 is a detail view in cross-section of the chuck, taken on the plane denoted by line  $xx$  of Fig. 1. Fig. 4 is a detail view of the chuck-jaw, shoe, and the link forming part of the drill-clamping mechanism.

In the accompanying drawings the letter  $a$  denotes the chuck-body as a whole, terminating at one end in a cone  $b$  and having a stem  $c$  of smaller diameter than the cone, said stem being threaded to receive a cap  $d$ . This stem may be provided with an axial socket  $e$ , into which the tapered end of a drill-spindle may be inserted for the purpose of holding the chuck, or the stem may be elongated and tapered to fit a socket in a drill-spindle, it being merely essential that the chuck-body shall be provided with some means for attachment to a spindle.

In the form of the device as shown three radial jaw-sockets  $f$  are formed in the substance of the chuck-body, these sockets opening through the periphery of the cone and being regularly disposed at even intervals about the axis of the chuck-body.

In the space between the back of the cone  $b$  and the face of the cap  $d$  on the stem of the chuck-body a sliding ring  $g$  is fitted, the pe-

riphery of the ring having a screw-thread which meshes with the screw-thread on the inner surface of the sleeve  $h$ , this sleeve being held between a shoulder on the cap  $d$  and another shoulder on the conical shell  $i$ . The sleeve is held against lengthwise movement on the chuck-body, but is free to rotate, the outer surface being knurled or roughened to afford a proper grasp for the hand.

In each of the jaw-sockets there is located a jaw  $k$ , having a holding-face  $k'$  and fitted closely but sliding freely in the jaw-socket. The back of the jaw for a considerable part of its length from the nose back is tapered to conform to the slope of the surface of the cone, and on this part of the jaw there is mounted a bearing piece or shoe  $l$ , a rounded bearing  $l'$  about midway of the shoe resting in a properly-shaped socket  $k^2$  to enable the jaw to tilt on the shoe, the outer surface of which is in sliding contact with the inner surface of the shell  $i$ . By this construction of the parts the jaw is enabled to rock on the bearing piece or shoe and locate the grasping-face  $k'$  either parallel to or at an angle with the axis of the chuck-body, the position of the jaw being determined by the shape of the drill-shank introduced between the jaws when the latter are opened.

Each jaw is connected to the ring  $g$  by means which permit the free rocking movement of the jaw, but cause it to be moved lengthwise along the chuck-body in conformity with the sliding movement of the ring, which sliding movement is imparted by a rotary movement of the sleeve  $h$ , as described. The specific connecting means in the present instance consist of a link  $m$ , united to the ring  $g$  by means of a pivot  $n$  and having a flat rounded head  $m'$ , which fits within a rounded socket  $k^2$  in the chuck-jaw.

Each jaw-socket  $f$  in the cone  $b$  is preferably broadened near the surface of the cone and shoulders  $l^2$  formed for the support of the shoe, which is broader than the chuck-jaw.

The shoe  $l$ , being connected to the jaw  $k$  by the rounded bearing  $l'$  engaging the socket  $k^2$  in the back of the jaw in which it loosely fits, operates to hold the jaw from dropping radially inward into the drill-socket in the chuck-body. This function of the broadened shoe, resting, as it does, on the shoulders  $l^2$ , is clearly

illustrated in Fig. 3 of the drawings, and this feature of my improvement is of value in increasing the facility with which the tool can be used.

5 The shell is preferably provided with a left-hand screw and is screwed upon the front end of the cone, to which it is fastened by inter-engaging threads, although other means of fastening may be provided. The cap *d* is also provided with a thread, preferably left-handed, and engaging a thread on the stem.

10 The operation of the device is as follows: The chuck having been secured to a drill-spindle, the ring *g* is run back by a rotary movement of the sleeve *h* and the jaws *k* drawn inward until the distance between their holding-faces is sufficient to enable the shank of a drill to be inserted. A reverse rotary movement of the sleeve *h* then feeds the ring *g* along the stem of the chuck-body and thrusts the chuck-jaws outward until the faces *k'* of the chuck-jaws encounter the surface of the drill-shank and bind thereon, the loose mounting of each jaw on the shoe, on which it can rock lengthwise, and the pivotal connection of the jaw with the ring, which permits the rocking movement, aiding to cause the jaw to automatically adjust itself in proper position to bind firmly upon the shank of the drill whether the latter is cylindrical or is tapered. The pivotal connection of the ring and jaw by means of the link and the angular position of the latter with reference to the center line of the jaw gives a leverage by means of which an extremely firm grasping action of the jaw is obtained by the combination of the parts as described.

It is obvious that the particular means by which each jaw and bearing piece or shoe is united so as to permit a rocking action between the parts may be varied and also that the special construction of the link and its means of connection to the jaw and the sleeve may be varied without departing from the main feature of the invention, which is not limited to the specific and particular construction of the parts as described, other means within the skill of the artisan being obviously applicable in the embodiment of the main feature of the invention, which resides in the tilting jaw with the bearing-piece and the pivotal connection between the jaw and the jaw-feeding mechanism, substantially as hereinbefore described.

55 I claim as my invention—

1. In a drill-chuck in combination, a chuck-body having jaw-sockets, a bearing-piece having a tapered bearing-surface and fastened to the chuck-body on which it is firmly held against rotation lengthwise-sliding jaws located in the sockets, a rocking shoe interposed between the back of the jaw and the bearing-piece fast to the chuck-body, jaw-feeding mechanism, and pivotal connecting

means uniting each jaw, and the jaw-feeding devices, all substantially as described. 65

2. In combination in a drill-chuck, a chuck-body having radial jaw-sockets, reciprocating jaws mounted in said jaw-sockets, a rocking shoe interposed between the back of each jaw and the inner face of a non-rotary conical shell fast to the chuck-body, a sliding ring having a peripheral thread, a rotary sleeve mounted on the chuck-body and with an interior thread engaging the thread on the sliding ring, and a link pivotally connecting the ring and each chuck-jaw, all substantially as described. 70 75

3. In a drill-chuck in combination, a chuck-body having radial jaw-sockets, reciprocating jaws mounted in said jaw-sockets, a rocking shoe interposed between the back of each jaw and the inner face of a conical shell fast to the chuck-body, the said shoe having a socket in the chuck-body broader than the socket for the chuck-jaw, means for loosely connecting the bearing-piece and the chuck-jaw and holding the latter against any radial movement independent of the shoe, a sliding ring mounted on the chuck-body and having a peripheral thread, a rotary sleeve mounted on the chuck-body and held between fixed shoulders thereon with an interior thread engaging the thread on the sliding ring, and a link pivotally connecting each chuck-jaw and said sliding ring, all substantially as described. 80 85 90 95

4. In combination in a drill-chuck, a chuck-body terminating at one end in a cone, said cone having radial jaw-sockets extending through its periphery, shoulders in each of said jaw-sockets as a bearing for a shoe, a conical shell fitting and secured to the conical end of the chuck-body, a cap secured to the other end of the chuck-body and having an inward-facing shoulder, a rotary sleeve held between said shoulder on the cap and the end of the shell, a plural number of chuck-jaws each located in its respective socket and having a holding-face and a rounded socket in the tapered back of the jaw, a shoe having a rounded projection fitting said socket in the jaw with a space between the shoe and the back of the jaw whereby a rocking action of the parts upon each other is permitted, a rounded socket in one end of each jaw near its inner end, a link pivoted to a sliding ring at one end and having on the other end a rounded head fitting the said socket in the end of the chuck-jaw, and the sliding ring having a peripheral thread fitting the thread on the inner surface of the rotary sleeve, all substantially as described. 100 105 110 115 120

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Witnesses:

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