Jan. 5, 1926. 1,568,869

H. BOES

CLAMPING CHUCK

Filed March 28, 1925

Fig. 2.

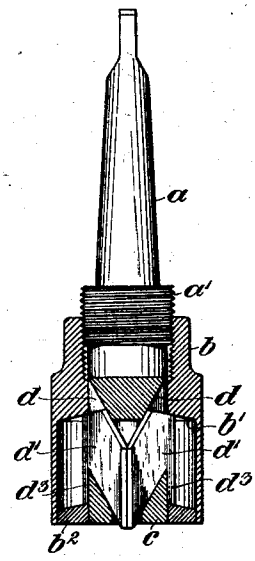


Fig. 1.

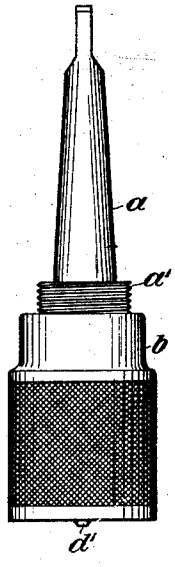


Fig. 3.

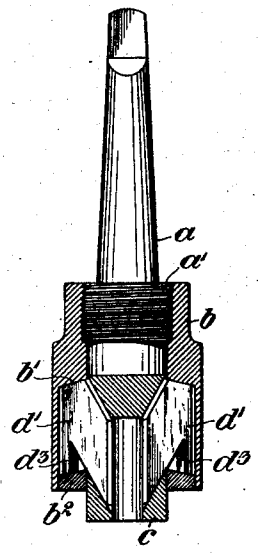


Fig. 7.

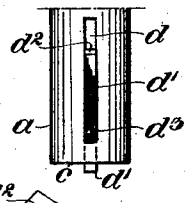


Fig. 4.

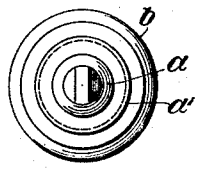
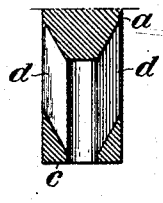


Fig. 8.



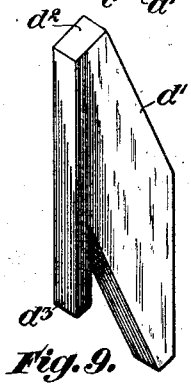


Fig. 9.

Fig. 5.

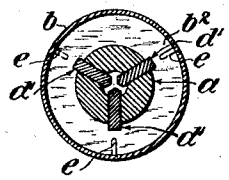
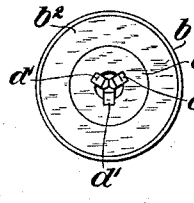


Fig. 6.



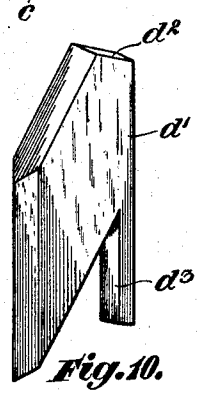


Fig. 10.

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Heinrich Boes.

By William C. Linton

Atty.

Patented Jan. 5, 1926. 1,568,869

UNITED STATES PATENT OFFICE.

HEINRICH BOES, OF BONN, GERMANY.

CLAMPING CHUCK.

Application filed March 28, 1925. Serial No. 19,161.

To all whom it may concern:

Be it known that I, HEINRICH BOES, a citizen of the German Republic, and resident of Bonn, Rosental Street 47, Germany, have invented a new and useful Improved Clamping Chuck (for which I have filed an application in Germany, Feb. 6, 1924), of which the following is a specification.

My invention relates to a clamping chuck intended for use especially in connection with drills and the like, and being distinguished with respect to the known chucks in which radially movable clamping cheeks are moved inwards and outwards by a rotatory sleeve adapted to be turned upon a mandrel extending through this sleeve by the facts that the clamping cheeks project laterally out of the mandrel-slots having said cheeks arranged within them, and that the sleeve-chamber enclosing these parts has an annular sloping bottom-face, and that an annulus closing the sleeve-chamber at its front-end has a correspondingly sloping inner face which contacts with the front faces of the projecting cheek-parts, whose rear faces contact with said sloping bottom-face of the sleeve-chamber, the arrangement being such that the clamping cheeks are actuated, i. e. moved radially, as well as axially, by turning the sleeve, the said sloping faces transmitting the motion to the cheeks, as is more fully described hereinafter.

My invention is illustrated diagrammatically and by way of example in the accompanying drawing in which—

Figure 1 is a side view of the complete chuck;

Figure 2 is in its lower part an axial section through the chuck, the radially adjustable clamping cheeks (d') thereof assuming their inner position, and the mandrel (a) being shown in side view, as in Fig. 1;

Figure 3 is an illustration similar to Fig. 2, but the clamping cheeks being shown in their outer position, and the mandrel being turned 90° relatively to Figs. 1 and 2;

Figure 4 is a rear view of Fig. 1, seen in the direction from the mandrel to the adjusting sleeve (b);

Figure 5 is a horizontal section through the chuck;

Figure 6 is a frontal view of the chuck, i. e. seen in the direction from the frontal face of the adjusting sleeve to the mandrel;

Figure 7 is a side view of the front end of the mandrel;

Figure 8 is an axial section through the front end of the mandrel;

Figure 9 is a perspective view of one of the (three) clamping cheeks, drawn to an enlarged scale relatively to the other figures, and being seen in the direction from its flat narrow outer face to the (wedge-shaped, Fig. 10) inner face; and

Figure 10 is an illustration similar to Figure 9, the clamping cheek being seen in the direction from its wedge-shaped inner face to its (flat narrow, Fig. 9) outer face.

The chuck consists of two main members which are the mandrel or, more precisely, holding mandrel a and the adjusting sleeve b, the rear end of which is threaded internally and screwed upon an external thread a' of the mandrel a; the chuck consists, further of three clamping cheeks d' which are located in three radially disposed slots d provided in the front end of the mandrel, i. e. that end which is located in the front half of the sleeve b and enclosed by it. The slots d are of rhomboidal shape; they converge towards the frontal face c of the mandrel where they communicate with one another and with an opening provided in that face c for the reception of the drill or the like, as appears from Fig. 8.

Each slot d contains a clamping check d', the particular shape of which appears especially from Figs. 9 and 10. The radial length of the checks d' is greater than the radial length or depth of the slots d so that each cheek projects beyond the outer end of the appertaining slot. The projecting part of each cheek forms a foot d^3 at its front end with which it abuts on an annulus b^2 secured in the front end of the sleeve b. The inner diameter of the sleeve is large enough to receive said projecting parts of the clamping cheeks, and the bottom of the sleeve-chamber forms a sloping circular shoulder b' with which contact the correspondingly sloping inner end faces d^2 of the clamping cheeks d', as appears from Figs. 2 and 3. The end-faces d^2 can slide radially upon said sloping circular shoulder b', and the frontal faces of the feet d^3 can slide upon the slightly conical inner face of the annulus b^2, the obliquity of which corresponds exactly to that of the said face b'. Figs. 2 and 3 show the two extreme positions of the clamping cheeks d' in that in Fig. 2 the wedge-shaped inner edges thereof contact, or contact nearly, with one another

(the feet d^3 contacting at their inner faces with the circumferential surface of the mandrel a), and in Fig. 3 the flat narrow outer faces of the cheeks contact, or contact nearly, with the inner circumferential wall of the sleeve b, i. e. with the chamber in the front part thereof.

The clamping cheeks can be moved into, and out of, the slots d of the mandrel a by turning the sleeve b upon the mandrel whereby the sleeve is moved axially upon the mandrel by means of the threads of both parts. Two of the possible relative positions of these parts are shown in Figs 2 and 3; those two positions are, in fact, the two extreme or end-positions, corresponding to the extreme positions of the clamping cheeks, as already mentioned. When the sleeve b is in the position shown in Fig. 2, and is being turned, the annulus b^2 presses against the frontal faces of the feet d^3 of the cheeks, and moves them, i. e., of course, not merely said feet, but the entire cheeks, axially, but owing to the rhomboidal configuration of the slots d of the mandrel a, as well as to the corresponding configuration of the clamping cheeks, these latter are moved also radially whereby the wedge-shaped clamping faces are separated from one another so as to provide the space necessary for the reception of the drill or other tool to be clamped fast by and in the chuck.

The position of the clamping cheeks in Figs. 5 and 6 corresponds to their position in Fig. 2.

The position of the mandrel in Fig. 4 corresponds to its position in Figs. 1 and 2.

The annulus b^2 is affixed in the sleeve b by screws e, Fig. 5, but, of course, any other suitable fastening means may be used instead of said screws.

The sleeve b is roughened on its circumferential outer surface so that it can be grasped firmly and turned easily.

The degree of obliquity of the sloping faces of the clamping cheeks and of the corresponding faces of the slots d is such that the drill or other tool clamped fast by and in the chuck can be retained in place solely by the sleeve, that is to say, without the assistance of a counter-nut or any equivalent thereof. The respective tool is held fast, firmly and reliably, even when subjected to great stress.

I claim:

A clamping chuck for drills and the like comprising in combination, a mandrel having radial slots formed in the tool receiving end thereof, each of said slots having their upper and lower faces converging and arranged in parallelism, an adjusting sleeve rotatably engaged over and adjustable with respect to said mandrel having an internal annular chamber therein, the upper end of said chamber being downwardly and outwardly inclined and the lower end of the chamber being open, an annulus engaged in the open lower end of the sleeve closing the lower portion of said internal chamber, the inner face of such annulus being downwardly and outwardly inclined and arranged parallel to the upper end of said internal chamber, clamping checks correspondingly shaped to said slots received in the same and movable therein, the upper and lower faces of these cheeks being slidably engaged with the adjacent faces of the slots and arranged in parallelism thereto, the upper end portions of said cheeks being extended laterally from the slots and formed with oblique faces slidably engageable with and parallel to the upper end of the annular chamber, and laterally positioned longitudinally extending feet on the outer sides of each of said cheeks arranged beyond and without the outer sides of said slots and received in portions of the internal annular chamber in the adjusting sleeve, the outer ends of each of said feet being obliquely formed and arranged parallel to the inclined surface of the inner side of said annulus and being slidably engageable thereover.

In witness whereof I have hereunto set my hand.

HEINRICH BOES.