F. E. BRIGHT.

CHUCK.

APPLICATION FILED APR. 23, 1917. RENEWED SEPT. 9, 1921.

1,420,682. Patented June 27, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

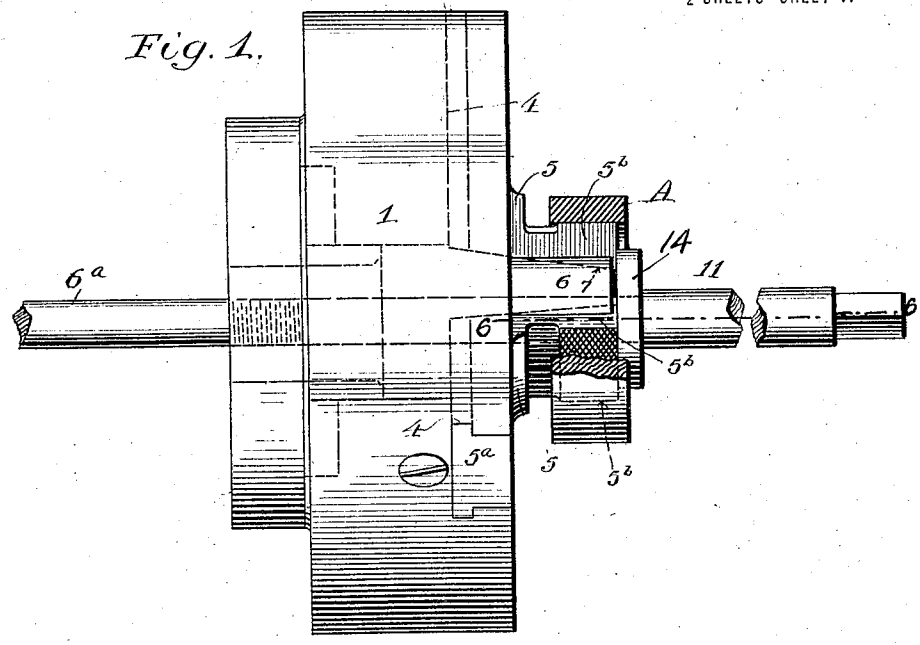
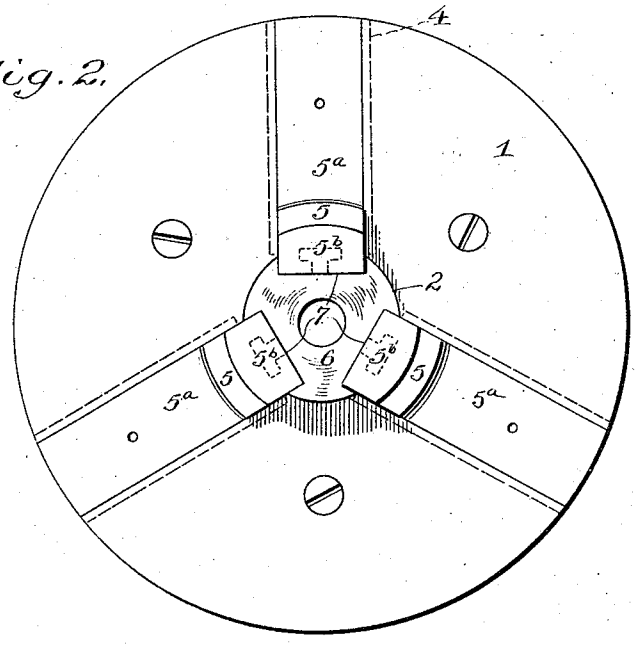


Fig. 2.



Inventor

F. E. Bright

By his Attorneys

Rogers, Kennedy & Campbell

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2 SHEETS—SHEET 2.

Fig. 3.

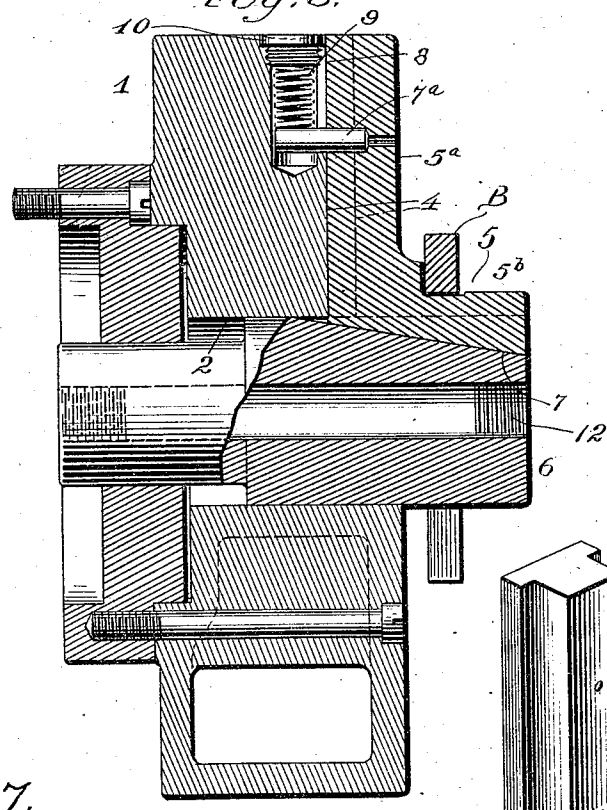


Fig. 5.

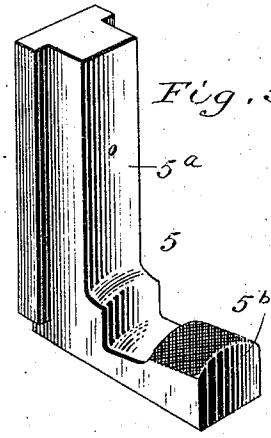


Fig. 7.

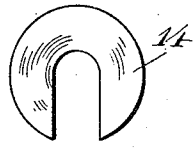


Fig. 4.

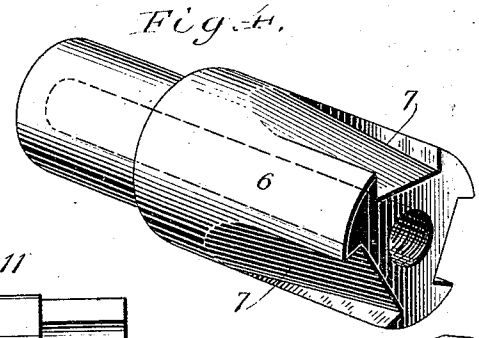
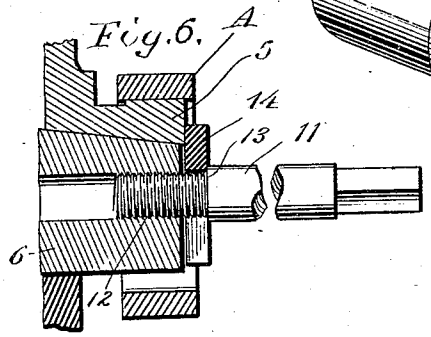


Fig. 6.



Inventor

H. E. Bright

By his Attorneys

Rogers, Kennedy & Campbell

UNITED STATES PATENT OFFICE.

FRED E. BRIGHT, OF NEW YORK, N. Y.

CHUCK.

1,420,682. Specification of Letters Patent. Patented June 27, 1922.

Application filed April 23, 1917, Serial No. 163,823. Renewed September 9, 1921. Serial No. 499,549.

To all whom it may concern:

Be it known that I, FRED E. BRIGHT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Chucks, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to work holding chucks and has reference more particularly to chucks for supporting or holding annular work forms such as rings, cylinders and the like in order that the external surface of the same may be subjected to forming, grinding, finishing and similar operations.

The invention is designed with special reference for use in handling the casing rings of antifriction bearings, the object being to provide a chuck in which the ring may be firmly and powerfully held against "spring," and in true centered position relative to the axis of rotation of the chuck.

With these and others objects in view my invention consists of a chuck comprising a body adapted to be mounted for rotation about an axis, a plurality of expanding holding jaws mounted therein and provided with axially extending projecting portions adapted to act on the interior of the work so as to expose its outer surface, and an actuating member for the jaws operable to expand and force the same outwardly in forcible engagement with the interior of the work, the said jaws and actuating member being of such improved relative formation that the projecting portions of the jaws will be firmly and rigidly supported, and the work held thereby will be effectually prevented from springing or displacement.

The invention consists also in an actuating member in the form of a plunger movable axially and engaging the jaws to expand them, the said plunger being formed with longitudinally extending grooves in which the jaws extend.

Also the invention consists in forming the plunger and jaw with cooperating sloping surfaces adapted, when the plunger is moved axially, to expand and force the jaws outwardly in a uniform manner and bind the same against the work.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevation of my improved chuck with a ring-like work piece held thereby, a portion of the latter being broken away to expose other parts to view.

Fig. 2 is a front face view of the same with the work piece omitted.

Fig. 3 is a longitudinal sectional elevation through the chuck on an enlarged scale.

Fig. 4 is a front perspective view of the actuating plunger showing the grooves therein in which the jaws engage.

Fig. 5 is a front perspective view of one of the jaws.

Fig. 6 is a longitudinal section on the line 6—6 of Fig. 1 showing means for holding the operating plunger with the jaws in gripping position.

Fig. 7 is an elevation of a detail of said holding means.

Referring to the drawings:

1 indicates a body or head of circular disk-like form and suitably formed so that it may be mounted in the machine and rotated about its central axis. The body is provided with a central circular opening 2 extending axially therethrough and at its front it is provided with a plurality of (in the present instance 3) radially extending undercut or dovetail guiding slots 4 which extend through the front face of the body and which communicate at their under ends with the central opening therein. 5 indicates work-holding jaws, one guided in each guiding slot. Each jaw consists of the radially extending stem or body portion 5^a corresponding in cross section to the cross sectional form of the guiding slot and mounted therein, and a lateral active portion or jaw proper 5^b on the inner end of the stem, which several jaws proper are convex on their outer sides so as to engage and fit the concave surface of the interior of the work piece A. The jaws thus mounted are movable to and from the axial centre of rotation of the chuck, the lateral portions or jaws proper extending in an axial direction beyond the front face of the body so that the ring or cylinder, as the case may be, to be

operated on may be passed over the jaws and held firmly in position when the jaws are expanded or moved outwardly radially.

In order that the jaws may be thus expanded and uniformly forced outward against the interior of the work, and in order that the jaws will be powerfully supported against spring, I provide an actuating member 6 in the present instance in the form of a plunger of circular form and cross section to snugly fit the circular opening in the chuck body. This plunger is formed with three grooves 7, one for each jaw, extending longitudinally thereof, the bottoms of which grooves slope or incline rearwardly and outwardly, and which grooves receive the inner edges of the jaws proper, the inner sides of which are beveled or inclined to correspond to the bottoms of the grooves. As a result of this construction, when the plunger is thrust forwardly, the sloping surfaces of the grooves cooperating with those on the jaws, will cause the jaws to be forced outwardly radially and expanded in a uniform manner, and the outer surfaces caused to bind tightly against the interior of the work; whereby the work will be held firmly in position in a plane parallel with the plane of the face of the chuck body and will be truly centered with reference to the axis of rotation of the latter.

The plunger extending thus between the jaws will effectually support the same against strains or forces exerted transversely of the axis so that the work will be prevented from spring or displacement in the operation of the forming, shaping or grinding mechanisms thereon. Due to the extension of the inner edges of the jaws proper in the grooves in the plunger, and due to the fit of the latter in the circular opening in the chuck body, this opening is completely closed by the jaws and plunger so that the entrance of grindings, chips or dust or other foreign matter to the interior working parts of the chuck will be effectually prevented.

The plunger may be operated to expand the jaws in any suitable manner either by an air piston connected with a rod 6^a attached to the plunger, or by a hand operated screw or otherwise, these operating means not being illustrated as they form no part of the present invention.

For the purpose of forcing the jaws inwardly to release the work when the plunger is retracted, I provide the radial stem of each jaw with a pin 7^a extending rearwardly from near the outer end of the stem into a radial recess 8 formed in the chuck body and forming a rearward continuation of the guiding slot at its outer end. A spiral spring 9 is seated in the recess with its inner end bearing against the pin and its outer end bearing against a plug 10 screwed in the outer end of the recess. These springs tend to urge the jaws forwardly and when the plunger is retracted they will act to force the jaws inwardly and release the work.

The same result may be accomplished but in a positive manner by forming the sloping surfaces on the jaws and plungers with interlocking T-shape slots and ribs as shown by dotted lines in Fig. 2, the result being that when the plunger is retracted, it will positively draw the jaws inwardly and thus release the work.

Due to the support of the projecting jaws proper by the plunger extending between the same, the jaws may have considerable overhang without danger of spring or displacement. This will permit of the location of the work and its support by the jaws, at a considerable distance beyond the face of the body so that the work may be presented with its three sides exposed to be operated on. In setting the work in position on the jaws a slotted distance washer or plate B is first slipped over the jaws and seated against the same and then the work set in place around the jaws and against the distance washer, and after the jaws are expanded within the work and its position fixed, the distance piece may be removed.

In order to hold the operating plunger so as to maintain the jaws in their gripping position, in cases where the plunger is operated by fluid pressure and in the event of the failure of the pressure to maintain the plunger in its forward position, I propose to adopt the construction shown more particularly in Figs. 1 and 6 where it will be seen that a stem 11 is screwed into a threaded opening 12 in the forward end of the plunger and is provided with an annular shoulder 13 which bears against a slotted washer 14 surrounding the stem and engaging the outer ends of the jaws 5^b. By screwing this stem into the threaded opening with the shoulder thereon engaging the washer and the washer engaging the jaws, the plunger will be locked or held in its forward position and the jaws will be maintained in their gripping position on the work without liability of the retraction of the plunger and the release of the jaws.

In the foregoing description and accompanying drawings I have set forth my invention in the form which I prefer to adopt and which in practice has been found to answer to a satisfactory degree the ends to be attained. It will be manifest however that various changes may be made in the details without departing from the spirit of my invention and it will be understood that the invention is not limited to any particular form or construction of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. In an expanding chuck for holding and supporting work pieces, the combination of a body provided with an axial opening therethrough, work holding jaws mounted for radial movement on said body and provided with active axial portions disposed at intervals around said opening and formed on their outer sides with work gripping surfaces adapted to bear on the interior of the work and fixedly hold the same, said jaws having on their inner sides engaging surfaces sloping rearwardly and outwardly, and an actuating plunger snugly fitting the said axial opening in the body and adapted to be advanced and retracted therein, said plunger being provided with longitudinal grooves in which the inner sloping surfaces of the axial portions of the jaws fit, the bottoms of said grooves sloping outwardly and rearwardly and bearing against the correspondingly sloping surfaces of the jaws, and the side walls of the grooves bearing against the sides of the axial portions of the jaws and acting in conjunction therewith to exclude dust from the interior of the chuck, the form and relation of the parts being such that when the plunger is advanced between the jaws, the latter will be expanded into firm engagement with the interior of the work and the plunger will give direct support to the overhanging active portions of the jaws.

2. In a chuck, the combination of a body, work holding jaws mounted therein and movable to grip the work, a movable operating plunger adapted to engage the jaws to operate the same, and releasable means for holding the plunger engaged with the jaws to maintain the latter in gripping position, said means adapted to engage the plunger and act on the jaws.

3. In a chuck, the combination of a body, work holding jaws mounted therein and movable outwardly to grip the work, an operating plunger movable forwardly between the jaws to expand the same, and releasable means for holding the plunger forward with the jaws in gripping position, said means comprising a stem screwed into the end of the plunger, and a washer engaged by the stem and bearing against the ends of the jaws.

In testimony whereof, I have affixed my signature.

FRED E. BRIGHT.