Jan. 6, 1931. A. F. BREITENSTEIN 1,787,932

FLOATING TOOL HOLDER

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Fig. 1.

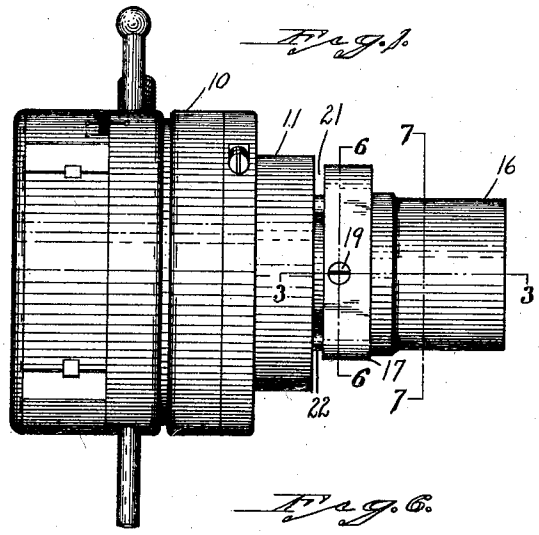


Fig. 2.

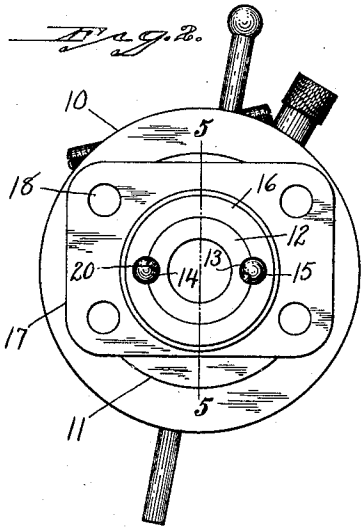


Fig. 6.

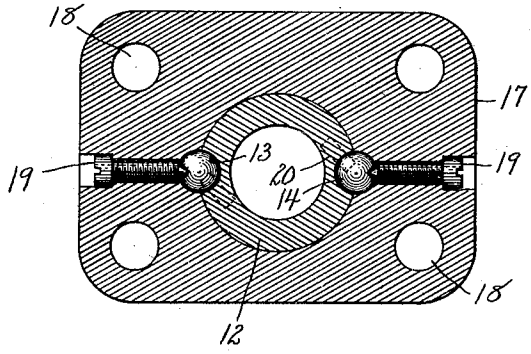


Fig. 7.

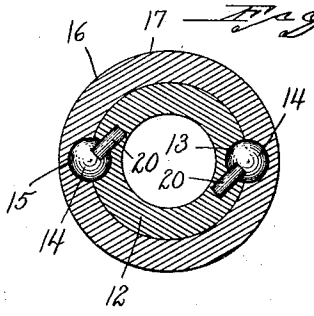
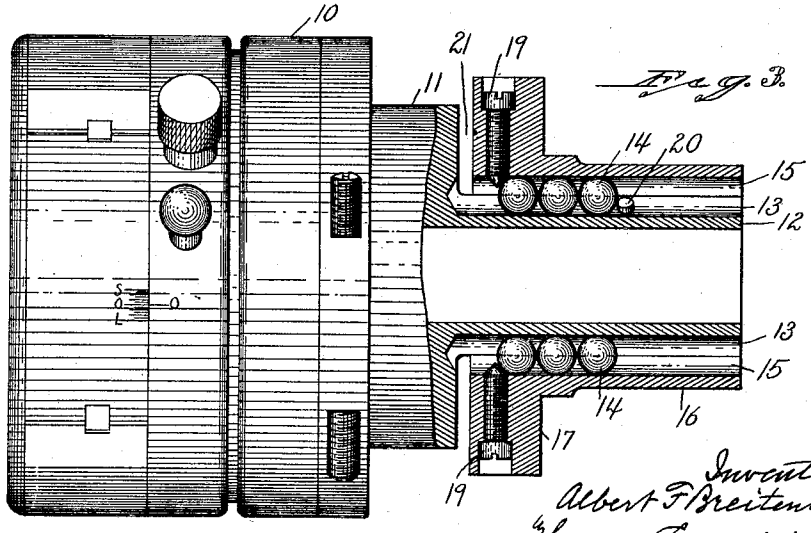


Fig. 3.



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Fig. 4.

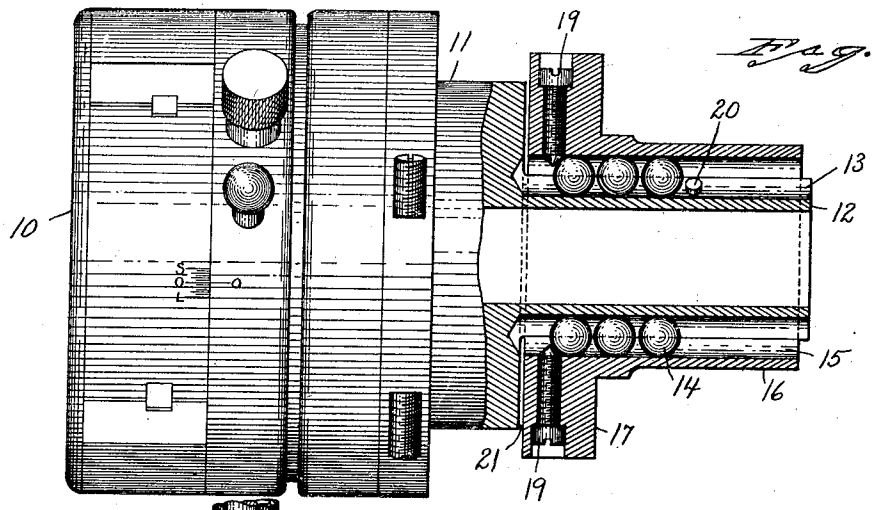


Fig. 5.

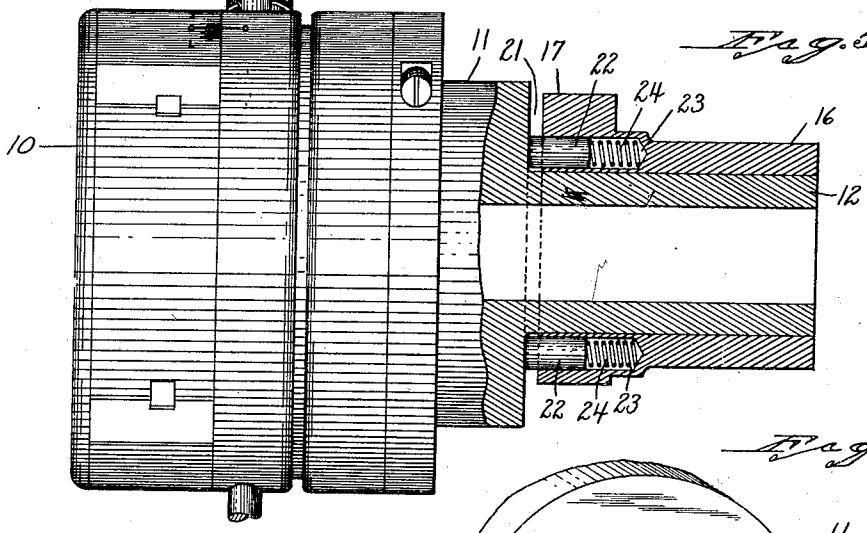


Fig. 9.

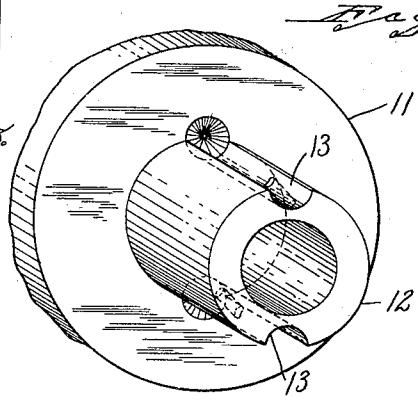
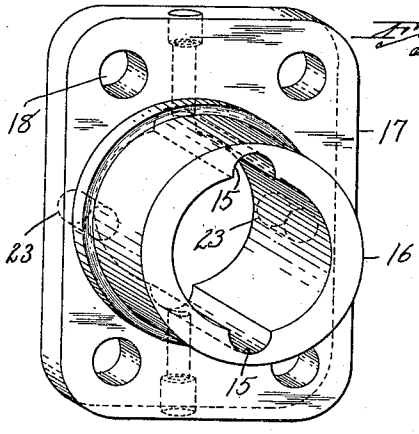


Fig. 8.



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Patented Jan. 6, 1931 1,787,932

UNITED STATES PATENT OFFICE

ALBERT F. BREITENSTEIN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE GEOMETRIC TOOL COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION

FLOATING-TOOL HOLDER

Application filed January 6, 1930. Serial No. 418,968.

My invention relates to an improved holder for "floating tools," such as die-heads, taps, reamers, and similar tools, when designed for use in turret-lathes and kindred machines in which they are yieldingly mounted to compensate for the rigidity and mass of such machines and for the varying human factors in manually feeding the same, so that there will be some compensation between the tool and the article being operated upon, whereby accidents are avoided and the perfect cutting of delicate threads, for instance, insured. Tools so yieldingly mounted are described in the trade and by their users as "floating tools."

My improved floating-tool holder is constructed with particular reference to extreme simplicity and sensitiveness, so as to enable die-heads, taps, reamers, and the like, to be used for delicate work in conjunction with very heavy turret-lathes, or corresponding machines.

With these ends in view, my invention consists in a floating-tool holder characterized by its provision with an anti-friction ball-bearing arranged to couple the tool-holder and the tool so as to prevent their relative rotation and to reduce the friction of their relative axial or "floating" movement to the mimimum.

My invention further consists in a floating-tool holder characterized as above and having certain details of construction and combinations of parts as will be hereinafter described and particularly recited in the claim.

For the purpose of illustration, I have shown my improved floating-tool holder as applied to a die-head of the familiar pull-off type, but I wish to have it distinctly understood that my improved holder is available for use with other types of die-heads, with taps of different types, with reamers, as well as with any tools which it is important shall have a yielding or so-called "floating" connection between them and the lathes or machines in which they may be installed.

In the accompanying drawings:

Fig. 1 is a view in side elevation of my improved floating-tool holder shown as carrying a pull-off die-head of approved construction;

Fig. 2 is a view in rear-end elevation thereof;

Fig. 3 is an enlarged-scale view generally corresponding to Fig. 1 but showing the floating-tool holder in central horizontal section on the line 3—3 of Fig. 1, and the back-member of the die-head also partly in section;

Fig. 4 is a corresponding view shown with the die-head in its rearward position;

Fig. 5 is a view corresponding to Fig. 3 but taken at a right angle thereto on the line 5—5 of Fig. 2;

Fig. 6 is an enlarged-scale view in transverse section on the line 6—6 of Fig 1;

Fig. 7 is a corresponding view on the line 7—7 of Fig. 1;

Fig. 8 is a detached perspective view of the body-member of the floating-tool holder; and

Fig. 9 is a broken perspective view of the back-member of the die-head.

The pull-off die-head herein shown being of known construction, it will be sufficient to apply the numeral 10 to it for its general designation. Such die-head may be of any known construction throughout save as to its back-member 11, which is provided with an axial tubular shank 12 furnished in its outer periphery with oppositely-located longitudinal grooves 13, semicircular in transverse section, which respectively receive a series of hardened-steel anti-friction ball-bearings 14 which project outwardly for half their bulk into corresponding semicircular grooves 15 located opposite each other in the inner periphery of a sleeve 16 forming an integral part of the main or body-member 17 of my improved floating-tool holder, which member 17, as shown, is oblong in shape and provided in its corners with holes 18 for the reception of bolts (not shown) by which the holder is rigidly secured to the face of the turret of a lathe or other machine which is not shown. However, the particular adaptation of the holder to be rigidly secured to a turret or other machine is no part of my invention and may be varied as circumstances may require. The said balls 14 are held against displacement in one direction by radi-

al stop-screws 19 (Fig. 6) mounted in the holder-body 17, and in the opposite direction by stop-pins 20 mounted in the shank 12, as shown in Fig. 3 and elsewhere. As thus applied, the two groups of balls 14 couple the holder-body 17 which, as described, is secured to the face-plate of the turret with the die-head 10 and prevent their relative rotation and at the same time form an anti-friction connection between the two units, i. e., the machine and the tool carried by it, whereby the friction of their relative axial movement is reduced to the minimum. For this axial movement, allowance is made by a gap 21 between the back-member 11 of the die-head 10 and the adjacent face of the body 17 of the tool-holder, this gap being shown at its maximum in Fig. 3, and at its minimum in Fig. 4. This gap is normally maintained by means of buffer-pins 22 located in sockets 23 in the holder-body 17 and by helical springs 24 in the bottoms of such sockets. The pins 22 impinge against the face of the back-member 11 and under the influence of their springs 24 exert a constant effort to maintain the gap 21 at its maximum. It will be understood that as the work is fed into the die-heads, the springs 24 will be somewhat compressed and the gap kept partly closed, dependent upon the pressures developed in the cutting operation. The gap, under these conditions, will constantly fluctuate in width within very narrow limits. When the tool is not actually at work, the gap will, of course, be kept at the maximum by the springs 24.

I claim:

In a floating-tool holder, the combination with a mounting-member having a cylindrical bore formed with a longitudinal ball-receiving groove; of a tool-carrying member having a cylindrical shank reciprocating in the said bore and formed in its periphery with a longitudinal ball-receiving groove, complementing the ball-receiving groove in the said bore; a series of balls installed in the said grooves for coupling the said mounting-member and the said tool-carrying member together against relative rotation; an abutment screw carried by the said mounting-member and projecting into the ball-receiving groove in the bore thereof, in position to engage one end of the said series of balls, and retirable to permit the separation of the said members; and a second abutment carried by the said cylindrical shank and projecting into the longitudinal groove therein in position to engage the opposite end of the said series of balls.

In testimony whereof, I have signed this specification.

ALBERT F. BREITENSTEIN.