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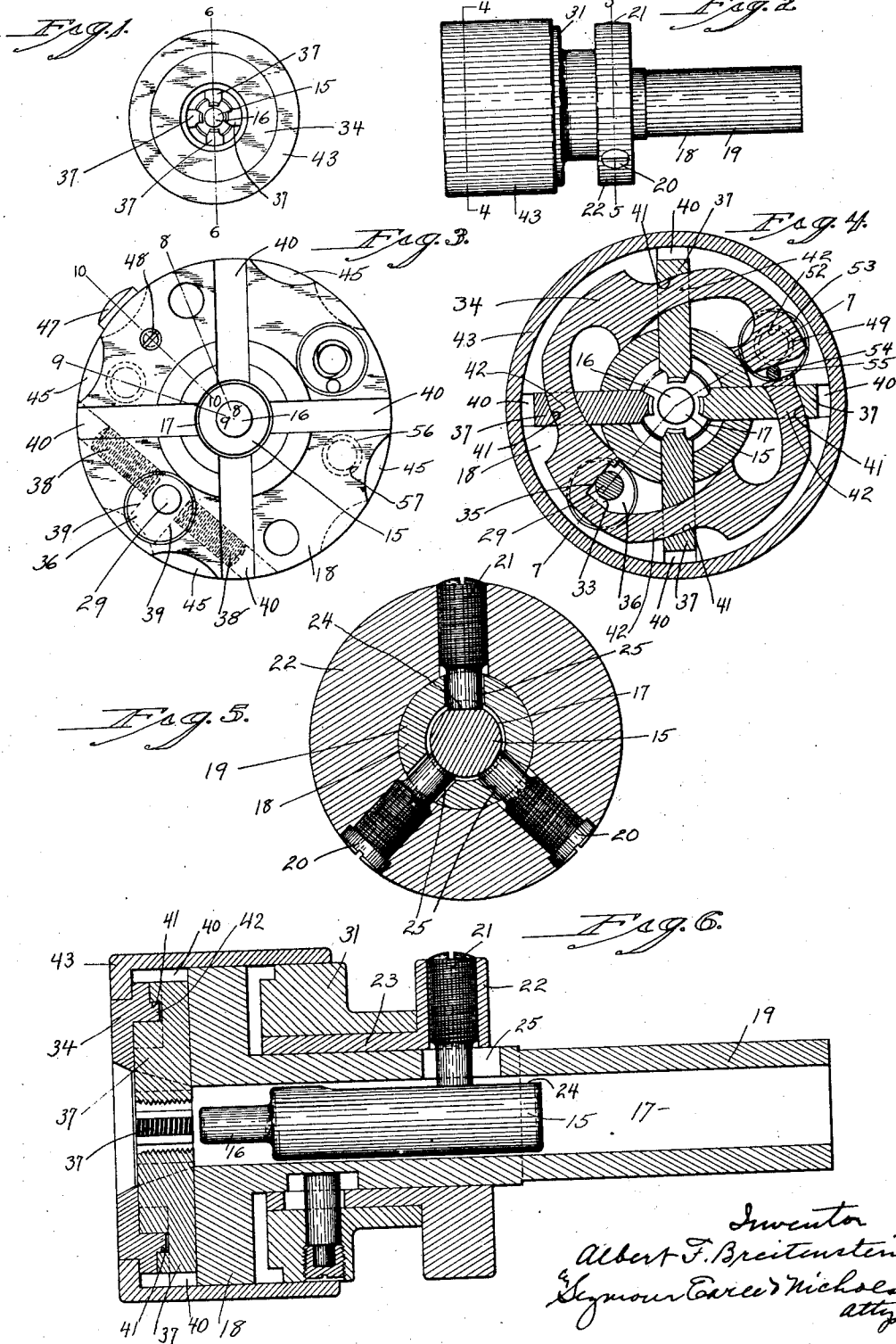
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A. F. BREITENSTEIN

SELF OPENING DIE HEAD

Filed Feb. 9, 1927

2 Sheets-Sheet 1



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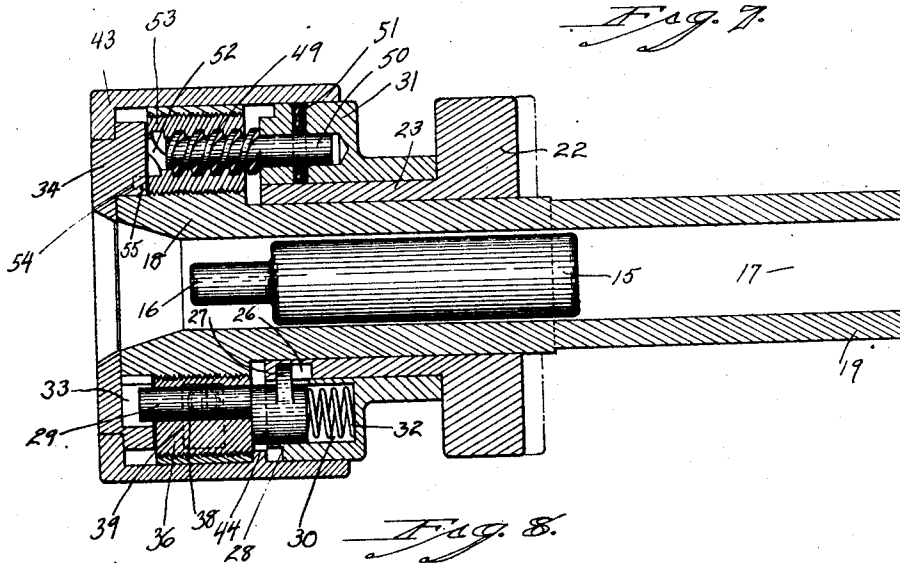
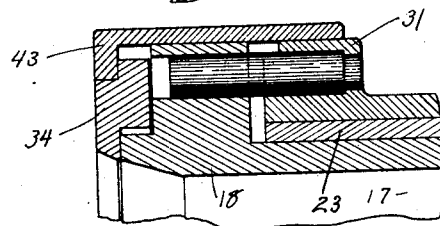
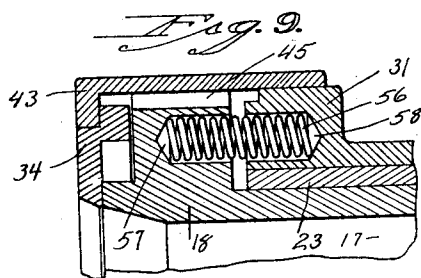
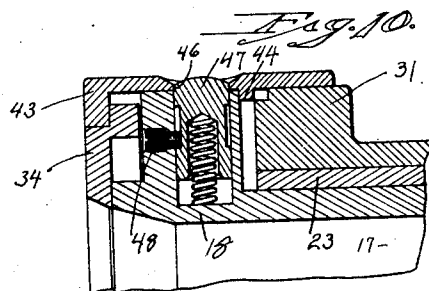
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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

SELF-OPENING DIE HEAD.

Application filed February 9, 1927. Serial No. 166,978.

My invention relates to an improvement in self-opening die-heads, the object being to produce a simple, compact, efficient and durable fixture constructed with particular reference to being tripped from the inside or the outside, according to the nature and exigency of its use.

With these ends in view, my invention consists in a self-opening die-head having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claim.

In the accompanying drawings:

Fig. 1 is a view in front elevation of a self-opening die-head embodying my invention;

Fig. 2 is a view thereof in side elevation;

Fig. 3 is a view in front elevation with the chaser-operating cam, the retaining-cap therefor, and the chasers removed;

Fig. 4 is a view in transverse section on the line 4—4 of Fig. 2;

Fig. 5 is a corresponding view on the line 5—5 of Fig. 2;

Fig. 6 is a view in central longitudinal section on the line 6—6 of Fig. 1;

Fig. 7 is a corresponding view on the line 7—7 of Fig. 4;

Fig. 8 is a broken detail view in longitudinal section on the line 8—8 of Fig. 3;

Fig. 9 is a corresponding view on the line 9—9 of Fig. 3; and

Fig. 10 is a corresponding view on the line 10—10 of Fig. 3.

In carrying out my invention, as herein shown, I employ a cylindrical, plunger-like tripping-gauge 15, reduced at its outer end to form a nose 16 and axially arranged within the bore 17 extending through the die-body 18 and the hollow mounting-shank 19 thereof. This gauge is supported within the said bore, free of the walls thereof, by means of two centering-screws 20 and a clamping-screw 21, all radially mounted in a heavy, annular abutment-flange 22 formed integral with the rear end of a tripping-sleeve 23 mounted directly upon the shank 19 of the body 18 and having axial movement thereupon. The said gauge 15 is formed with a flattened face 24 for engagement by the clamping-screw 21, which seats the gauge upon the inner ends of the centering-screws 20, as shown in Fig. 5, whereby the gauge 15 is rigidly connected with the tripping-sleeve 23, with capacity for axial

adjustment with respect thereto. Clearance-slots 25 in the shank 19 receive the inner ends of the screws 20 and the screw 21 and permit the same to move back and forth for the movement of the tripping-sleeve 23 and tripping-gauge 15, relative to the die-body 18.

At its forward end, the sleeve 23 is formed with a peripheral groove 26 (Fig. 7) receiving a lug 27 laterally offsetting from the body 28 of the locking-bolt 29, the axis of which is offset from the axis of its said body 28, which has sliding bearing in a socket 30 formed in a ring 31 slidably mounted upon the tripping-sleeve 23 and interposed between the abutment-flange 22 thereof and the rear face of the die-body 18. A helical spring 32 located in the socket 30 exerts a constant effort to enter the end of the bolt 29 into a locking-recess 33 formed in the rear face of a circular, plate-like, chaser-operating cam 34, the said locking-recess providing an abutment-face 35 which is normally held in engagement with the bolt, as will be hereinafter described.

The said bolt 29 passes through, and has bearing in, a threaded bushing 36 located in the die-body 18 and rotated therein in one direction or the other for adjusting the depth to which the radially-movable chasers 37 cut, by means of adjusting-screws 38 (Fig. 3) respectively engaging with flat faces 39 produced by milling the opposite sides of the said bushing 36, as shown in Fig. 3. Inasmuch as the axis of the bolt is eccentric to the axis of the bushing, the turning of the bushing in one direction or the other will vary the position of the bolt 29 with respect to the abutment-face 35 in the chaser-operating cam 34.

The four radially-movable chasers 37 located in as many radial slots 40 in the die-body 18 are formed near their outer ends with inclined transverse passages 41 receiving correspondingly-inclined, cam-like ribs 42 formed upon and projecting from the inner face of the chaser-operating cam 34, as shown in Fig. 4. This cam, which is applied directly to the flat, outer face of the die-body 18, is secured in place by a retaining-cap 43 sleeved over the said die-body and the ring 31 aforesaid and held against axial movement thereupon by four inwardly-projecting, segmental locking-lugs 44 which, in their locking positions, engage, as shown

in Fig. 10, with the rear face of the die-body, which is formed in its periphery with four spaced clearance-grooves 45, which clear the lugs as the cap is sleeved over the body into its retaining position, after which it is rotated a short distance to engage the said lugs with the rear face of the die-body. The cap is now prevented from rotation by means of the outward movement into a circular hole 46 formed in it of a spring-plunger 47 (Fig. 10) mounted for radial movement in the die-body 18 and limited in such movement by a stop-screw 48.

The oscillation of the cam 34 for the positive inward and outward movement of the chasers 37, is effected by means of a worm 49 having a rearwardly-extending stem 50 by means of which it is secured by means of a pin 51 in the ring 31 aforesaid, which carries both the bolt 29 and the said worm 49. The worm-thread takes into a worm-groove 52 formed in an externally-threaded bushing 53 turning freely in a threaded bore in the die-body 18 and provided at its forward end with an eccentric operating-pin 54 entering and co-operating with the opposite walls of a slot 55 in the inner face of the cam 34, as shown in Figs. 4 and 7.

Normally, the abutment-face 35 already mentioned of the cam 34 is held against the adjacent face of the bolt 29 by the action of two main operating-springs 56, one of which is shown in Fig. 9, these springs extending at their ends into sockets 57 and 58 respectively formed in the adjacent faces of the die-head 18 and ring 31 and exerting a constant effort to force the said head and ring apart. This effort of the springs, acting through the worm 49, tends to turn the bushing 53 which, in turn, through the eccentric pin 54, bodily turns the cam 34 so as to hold its said abutment-face 35 against the bolt 29. This constantly-exerted effort of the operating-springs 56 to turn the cam 34 and thus open the die-head, is thus normally resisted by the said bolt 29 and abutment-face 35. Therefore, when the bolt 29 is withdrawn from the locking-recess 33 in the rear face of the cam, the operating-springs 56, by separating the die-head 18 and ring 31, bring the worm 49 into play for rotating the bushing 53, which, in turn, rotates the chaser-operating cam 34 as required for opening the die.

It may be now explained that as the work being threaded passes through the chasers 37, it ultimately engages with the nose 16 of the tripping-gauge 15 and stops the forward

movement thereof with respect to the movement of the die-body and the parts associated directly therewith. The forward movement of the tripping-sleeve 23 is thus arrested and with it the locking-bolt 29, whereby, in the continued forward movement of the die-body, the chaser-operating cam 34 is disengaged from the forward end of the bolt 29, which is immediately followed by the rotation of the cam 34 by the springs 56 for opening the die. The reverse action takes place, when the die is closed, in the usual manner, through the medium of an ordinary yoke, which, however constructed and arranged, acts to move the ring 31 forward with reference to the die-body against the tension of the operating-springs 56 in the usual manner, the said yoke being received in the annular groove formed between the rear face of the ring 31 and the forward face of the annular abutment-flange 22. During this closing action, the worm 49 will act to reversely rotate the bushing 53 and hence reversely turn the cam 34, so as to permit the locking-bolt 29 to again snap into the locking-recess 33 and, therefore, into position to be re-engaged by the abutment-face 35 of the cam, which is thus held in its closed position with the chasers in their closed or cutting positions.

I claim:

In a self-opening rotary die-head, the combination with a die-body formed with a tubular shank, radially-movable chasers installed in the said body, a chaser-operating cam for positively moving the said chasers in opposite directions, an operating-ring connected with the said cam for oscillating the same, a tripping-sleeve having sliding bearing directly upon the said shank, extending forward within the chaser-cam operating-ring so as to provide a bearing therefor, and provided at its rear end with an annular abutment-flange, an internal tripping-gauge located axially within the said shank, radially-disposed screws mounted in the said abutment-flange for centering the tripping-gauge within the said shank and coupling the same to the said sleeve, and clearance openings formed in the shank for the outward passage of the said screws, the said operating-ring and abutment-flange together forming an annular groove for the reception of an external re-setting member.

In testimony whereof, I have signed this specification.

ALBERT F. BREITENSTEIN.