Nov. 6, 1923. 1,472,912

C. JOBST

DIE HEAD

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FIG-1-

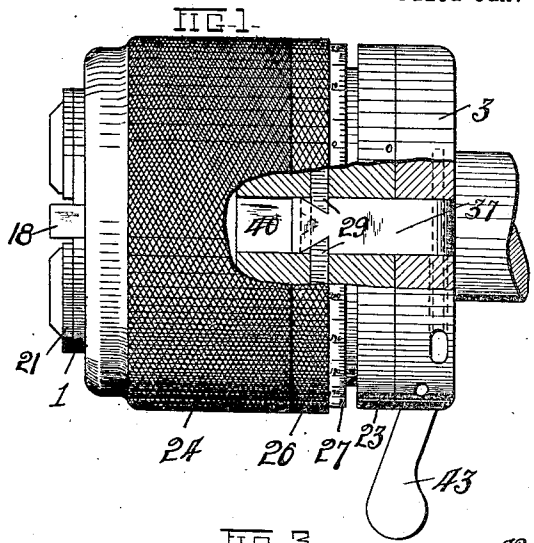


FIG-2-

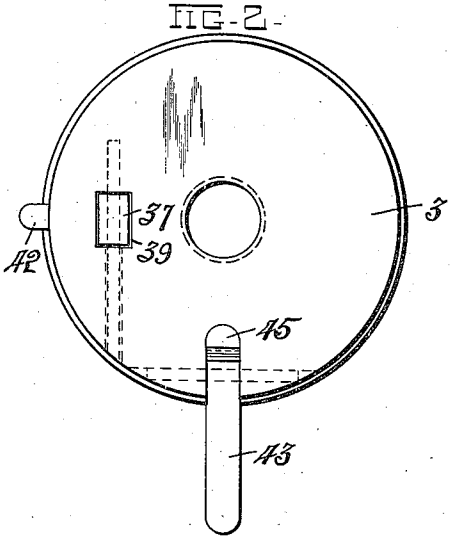


FIG-3-

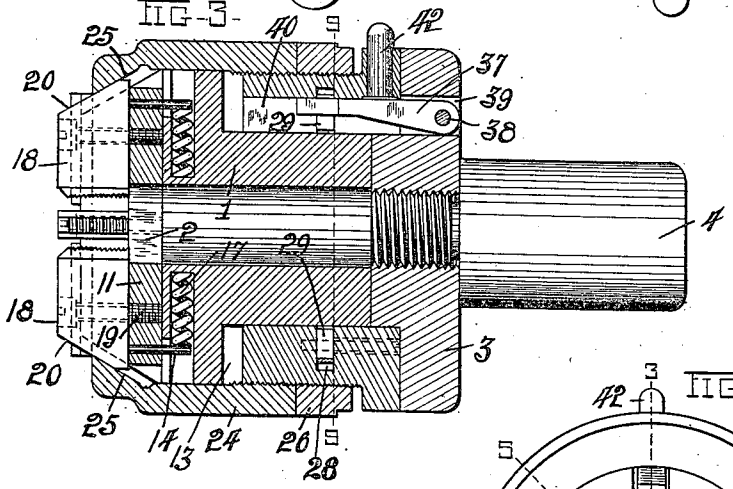


FIG-4-

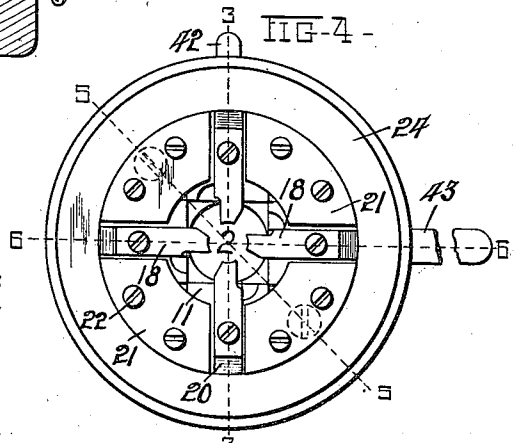
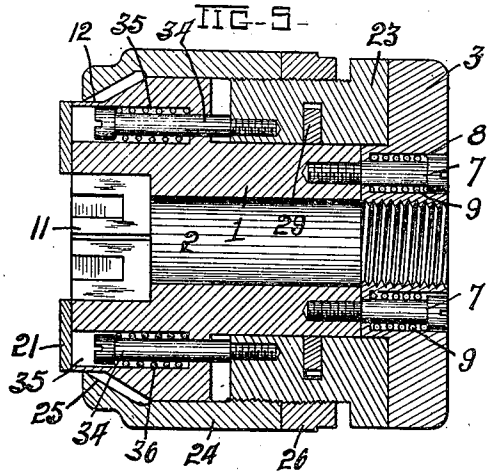


FIG-5-



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FIG-6-

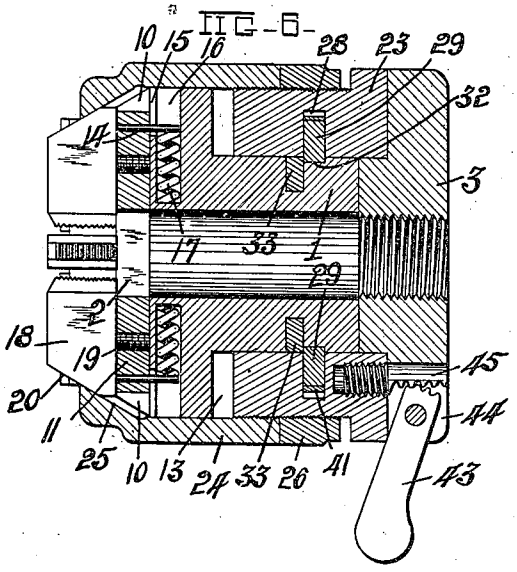


FIG-7-

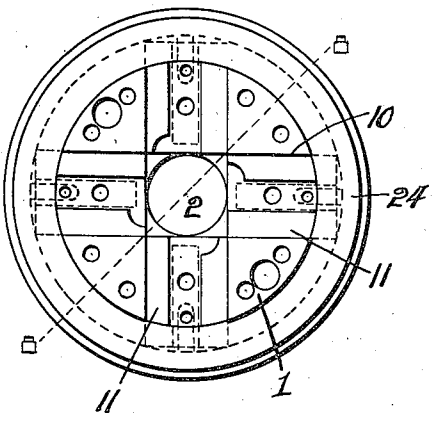


FIG-8-

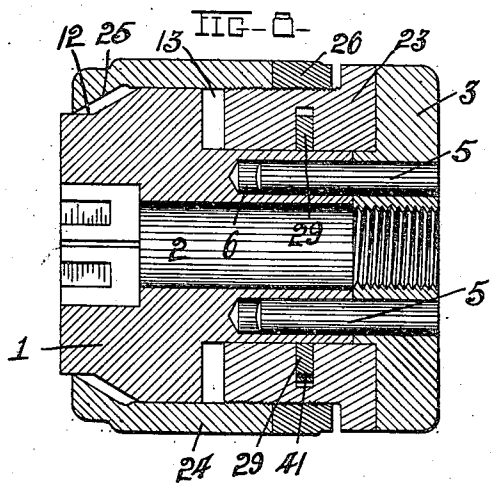
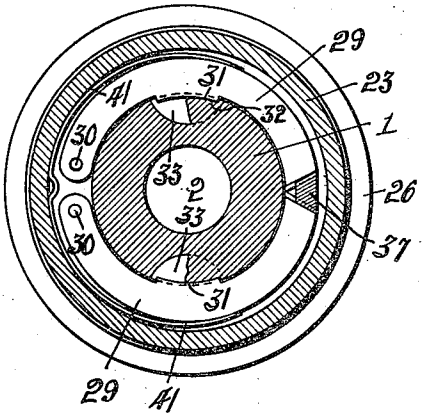


FIG-9-



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Patented Nov. 6, 1923. 1,472,912

UNITED STATES PATENT OFFICE.

CONRAD JOBST, OF TOLEDO, OHIO, ASSIGNOR TO ROBERT L. ELLERY, OF TOLEDO, OHIO.

DIE HEAD.

Application filed January 29, 1921. Serial No. 440,837.

To all whom it may concern:

Be it known that I, CONRAD JOBST, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have made an Invention Appertaining to Die Heads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to die heads, and particularly to those of the thread cutting type used in connection with automatic machines.

An object of my invention is the provision of a new and simple die head of the class described, which is easily and quickly adjustable to trip and permit an opening movement of the chasers when a thread of predetermined length has been cut.

Another object of the invention is the provision of a die head of the class described, which is capable of use either as a rotary head with the work stationary, or as a stationary head with the work rotatable, thereby adapting it for use on different types of machines.

Further objects and advantages of the invention will be apparent from the following detailed description thereof.

While the invention in its broader aspect is capable of embodiment in numerous forms a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a die head embodying the invention, with a part broken away. Fig. 2 is an inner end view thereof with the shank removed. Fig 3 is a section on the line 3—3 in Fig. 4, with parts in full. Fig. 4 is an outer end view of the head. Fig. 5 is a section on the line 5—5 in Fig. 4, with parts in full and with the shank removed. Fig. 6 is a section on the line 6—6 in Fig. 4, with parts in full. Fig. 7 is an outer end view of the head with the chasers and outer end plates removed. Fig. 8 is a section on the line 8—8 in Fig. 7, with parts in full, and Fig. 9 is a cross-section on the line 9—9 in Fig. 3.

Referring to the drawings, 1 designates a die holder having a work receiving opening 2 axially therethrough and being carried at its inner end by a plate 3 for limited yielding movements axially thereof. A shank 4 is attached to the outer side of the plate 3 centrally thereof to adapt the plate to be fastened to the tool post or other suitable carrying part of a machine. The plate 3 has two pins 5 projecting loosely into sockets 6 in the inner end of the holder 1 to guide the relative movements of the plate and holder. Screws 7 project from the inner end of the holder into sockets 8 in the plate 3 and coiled compression springs 9 encircle the screws between the heads thereof and the bases of the sockets to normally retain the holder and plate in abutment and to permit a limited outward relative movement thereof.

The holder 1 has its outer end provided with four radial recesses 10, equidistantly spaced therearound for receiving floating chaser carrying slides 11 for radial reciprocatory movements therein. The outer end portion of the holder 1 is reduced in size, as shown at 12, and the inner end portion thereof, as well as a portion of the inner end of the plate 3, in the present instance, are reduced in size to form an annular recess 13 therearound.

Each chaser slide 11 has a pin or stud 14 projecting from its bottom through a registering radially disposed slot 15 in the top wall of a radial socket 16 provided in the holder below each recess 10 thereof, and a coiled compression spring 17 is disposed in the base of each recess 16 and bears outward against the associated stud 14 to normally retain the chaser slide at the outer end of its movement relative to the holder. Each chaser slide is of U form, and a chaser 18 is mounted therein in radial relation to the holder and with its cutting end disposed within the central opening 2 thereof. Each chaser is fixedly secured to its carrying slide 11 by a screw 19. The outer end of each chaser is tapered longitudinally of the head, as shown at 20, for the purpose hereinafter described. A segmental plate 21 is secured

to the outer end of the holder 1 between each pair of chasers 18 by screws 22 with the ends of the plates in lapping relation to the adjacent slides 11 to slidingly retain the slides in the holder recess 10.

A collar 23 is mounted in the holder recess 13, being of a length shorter than said recess to enable it to have reciprocatory movements therein of predetermined length. A sleeve 24 is threaded at its inner end to the collar 23 for adjustment longitudinally thereof and extends therefrom to the outer end portion of the holder 1 and has its outer end opening restricted in size to fit the outer reduced end portion 12 of the holder and forms an internal annular tapered surface 25 for coaction with the tapered ends 20 of the chasers 18, whereby an outward movement of the chasers with the holder 1 relative to the sleeve 24 will impart inward adjusting movements to the chasers, as is apparent. The sleeve 24 is locked in adjusted relation to the collar 23 by a locking nut or ring 26, which is threaded on the collar therewith. This locking ring is shown, in the present instance, as having a micrometer scale or graduations 27 thereon for registering with a mark or marks on the collar 23 to assist in obtaining a desired adjustment of the sleeve and chasers to suit the diameter of the thread to be cut.

The collar 23 is provided interiorly thereof with an annular recess 28 in which a pair of segmental locking arms 29 are mounted for locking movements transversely of the collar axis and at opposite sides thereof. These arms have adjacent ends pivoted to the collar at 30, while the opposite ends thereof terminate in adjacent position at the opposite side of the collar axis to the pivots 30 and are tapered or fashioned at their ends to cooperate to form an outwardly tapering recess therebetween. Each arm 29 is provided at its inner side intermediate its ends with a spur or inward projection 31 adapted to project into a registering recess 32 and to engage with a wall of such recess to lock the collar at the limit of its movement toward the plate 3. The walls of the recesses 32 with which the arms 29 coact are formed by hardened insert plates 33.

Screws 34 (Fig. 5) project from the outer end of the collar 23 into recesses 35 provided longitudinally in the outer end portion of the holder 1, and coiled compression springs 36 encircle the screws within these recesses between the bases thereof and the heads of the screws to cause the screws to act to normally retain the collar 23 at the limit of its outward movement relative to the holder. It is thus evident that upon a release of the locking arms 29 from within the holding recesses 32 in the holder the collar and tapered chaser coacting sleeve 24 will be moved outward to chaser releasing position by the action of the springs 36 on the screws 34.

A trip lever 37 for the locking arms 29 extends longitudinally of the die head, being pivoted at one end at 38 in a recess or opening 39 of the plate 3 and extending therefrom into an internal longitudinal recess 40 in the collar 23 (Fig. 3). The recess 40 registers with the tapered space between the free ends of the locking-arms 29, and the lever 37 has its free end projecting between the free ends of said arms and tapered or of wedge shape both longitudinally and transversely of the lever so that either an inward radial movement of the lever end or a rearward longitudinal movement thereof relative to the holder 1 and collar 23 will cause an outward swinging of the locking-arms 29 to withdraw their spurs 31 from the locking recesses 32 in the holder. The locking arms 29 are normally held in locking engagement with the holder 1 by a bowed spring 41 which is mounted in a collar recess 28 at the outer sides of the locking arms 29 and has its ends bearing inward against the arms, as shown in Fig. 9. A trip pin 42 (Fig. 3) projects outward from the recess 40 through an opening in the collar 23 and has its inner end in engagement with the trip lever 37 whereby an inward pressure on the trip pin 42 will swing the lever inward and effect a tripping of the locking arms 29. It is evident that a tripping of the lever may be manually accomplished at any time by an inward pressure on the trip pin 42 or by the trip pin at a predetermined point in a longitudinal movement of the die head striking a member disposed in its path of movement.

When the collar 23 and sleeve 24 carried thereby have been moved to chaser releasing position they are returned to locking position with respect to the holder 1 by the movement of a hand-lever 43, which is fulcrumed in a recess 44 in the plate 3 and has its inner end provided with a segmental series of teeth in mesh with a rack bar 45. This bar projects from the inner end of the collar 23 longitudinally thereof and into the recess 44.

The operation of my die head is as follows:—A die-head having been secured in the tool holder or carrying part of a machine in connection with which it is to be used, it is moved forward to work engaging position, and if the machine is either of the type in which the work is rotated and the die-head held stationary against rotation, or vice versa, the threading of the work by the thread cutting action of the chasers will cause the holder 1 and parts carried thereby, namely the chasers, the collar 23, sleeve 24, and locking arms 29, in locking engagement with the holder, to be moved forward rela-

tive to the plate 3, such relative movement being permitted by the engagement of the screw 7 by the springs 9. When the holder is moved forward a predetermined distance relative to the plate 3 the tapered coaction of the trip lever 37 with the ends of the locking arms 29 will have moved such arms outward a sufficient extent to disengage their spurs 31 from locking engagement with the insert plates 33 of the holder. Upon such release of the locking arms the collar 23 and sleeve 24, under the action of the screws 34 and springs 36 and also the outward pressure of the chasers against the taper 25, will be moved quickly outward relative to the holder 1 and chasers 18, thereby releasing the engagement of the sleeve taper 25 with the chaser ends and permitting an outward opening movement of the chasers, which outward movement is influenced by the action of the springs 17. Or, if desired the pin 42 may be either manually or automatically operated at a desired point in a movement of the die holder to effect a release of the locking means irrespective of a relative longitudinal movement of the plate 3 and holder 1.

It is evident with my die head that the holder 1, chasers 18 and chaser holding sleeve 24 are held as a unit in rigid relation during a thread cutting operation and that it is practically impossible to throw the chasers out of central alignment with the head by the cutting action. It is also evident that the die head may be easily and quickly adjusted for different sizes of work by merely turning the sleeve 24 with respect to the collar 23 and then turning the nut 26 into locking engagement therewith.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

1. In a die head, a holder, chasers carried by the holder for true radial movements at right angles to its axis and normally movable outward, means carried by the holder for acting on the chasers to resist an outward movement thereof from operative position and normally movable relative to the holder axially thereof to permit such movement, means carrying the first means in operative chaser holding position, and means associated with and movable relative to the holder and when at a predetermined point in such movement acting to release such means.

2. In a die head, a carrying member, a chaser holder carried by the member for limited yielding outward axial movement relative thereto, chasers carried by the holder for true radial movements at right angles to its axis and normally movable from operative position, means carried by the holder and operable to hold the chasers in operative position and movable lengthwise of the holder to release the chasers, means releasably locking the holder and first means together to hold the chasers in operative position, and means operable to release the locking means to permit a movement of the chasers from operative position.

3. In a die head, a carrying member, a chaser holder carried by the member for limited yielding outward movements relative thereto, chasers carried by the holder for true radial sliding movements and normally movable from operative position, means carried by the holder and operable to releasably hold the chasers in operative position, said means being adjustable to change the operative position of the chasers, means releasably locking the holder and first means together to hold the chasers in operative position, and means operable to release the locking means to permit a movement of the chasers from operative position.

4. In a die head, a carrying member, a chaser holder carried by the member for limited yielding axial movements relative thereto, chasers carried for true radial sliding movements relative thereto, means carried by the holder for limited movements axially thereof and when in one position of its movement coacting with the chasers to retain them in operative position, means locking the holder and first means in operative chaser holding position, and means automatically operable to release the locking means when a predetermined length of thread has been cut.

5. In a die head, a carrying member, a chaser holder carried by the member for limited yielding axial movements relative thereto, chasers carried for radial movements by the holder, means carried by the holder for limited movements axially thereof and when in one position of its movement coacting with the chasers to retain them in operative position, means locking the holder and first means in operative chaser holding position, and means automatically operable by a predetermined relative outward movement of the carrying member and chaser holder to release the locking means when a predetermined length of thread has been cut, the threading of the chasers onto a work piece effecting a separation of the member and holder.

6. In a die head, a carrying member, a chaser holder carried by the member, a plurality of chasers carried for true radial sliding movements by the holder, a collar mounted for limited longitudinal movements on the holder, a sleeve adjustably car-

ried by the collar and having tapered coaction with the chasers to adjustably retain them in operative position when the collar is in one position of its movement relative to the holder, means normally urging a movement of the collar from such operative chaser holding position, releasable locking means for retaining the collar in operative chaser holding relation to the holder, and means operable to release the locking means to permit a chaser releasing movement of the collar and sleeve when a predetermined length of thread has been cut.

7. In a die head, a carrying member, a chaser holder carried by the member for limited axial movements relative thereto, means normally retaining the member and holder at the limit of their inward relative movements, a set of chasers carried for true radial movements by the holder, means carried by the holder for limited relative movements longitudinally thereof and having a tapered chaser coacting part for holding the chasers in operative relation when the means is in one position of its relative movement, means normally urging a movement of the chaser coacting means from operative chaser holding position, means for locking the chaser coacting means in operative chaser holding relation to the holder, and means automatically operable to release the locking means when the chaser holder has moved outward a predetermined distance relative to the carrying member.

8. In a die head, a carrying member, a chaser holder carried by the member for limited axial movements relative thereto, means normally retaining the member and holder at the limit of their inward relative movements, a set of chasers carried for true radial movements by the holder, means carried by the holder for limited relative movements longitudinally thereof and having a tapered chaser coacting part for holding the chasers in operative relation when the means is in one position of its relative movement, means normally urging a movement of the chaser coacting means from operative chaser holding position, means for locking the chaser coacting means in operative chaser holding relation to the holder, means automatically operable to release the locking means when the chaser holder has moved outward a predetermined distance relative to the carrying member, and means for returning the first means to operative chaser holding position.

9. In a die-head, a chaser holder, a set of chasers carried for radial movements by the holder, means mounted on the holder for movements axially thereof, said means having tapered surfaces which coact with the outer ends of the chasers to hold them in operative position when the means is in one position of its movement and permit outward releasing movements of the chasers when the means is moved from such position, means normally urging a chaser releasing movement of the first means relative to the holder, means for locking the first means to the holder in operative chaser holding position, and means operable to release the locking means to permit a normal chaser releasing movement of the first means relative to the holder.

10. In a die-head, a carrying member, a chaser holder carried by the member for limited axial movements relative thereto, a set of chasers carried for radial movements by the holder, means carried by and embracing the holder and movable axially thereof, said means having tapered portions for coaction with the outer ends of the chasers to prevent an outward movement of the latter from operative position when the means is in one position of its movement relative to the holder, means urging a chaser releasing movement to the first means, locking means for engaging the holder and first means at opposite sides of their axes to hold the first means in operative chaser holding position, and means automatically operable to release and permit a chaser releasing movement of the first means relative to the holder when the holder has been moved outward a predetermined distance relative to its carrying member.

11. In a die-head, a carrying member, a chaser holder carried by the member for limited axial movements relative thereto, a set of chasers carried for radial movements by the holder, means carried by and movable axially of the holder and having a conical portion coacting with the outer ends of the chasers to hold the chasers in operative position when the means is in one position of its movement, means urging a chaser releasing movement of the first means relative to the holder, a plurality of pivoted locking members carried by one of said holder and first means and adapted to coact with the other at spaced points around its axis to lock the first means in operative chaser holding position, and means for acting on the locking members to release and permit a chaser releasing movement of the first means relative to the holder when the holder has moved outward a predetermined extent relative to the carrying member.

12. In a die-head, a carrying member, a chaser holder carried by the member for limiting axial movements relative thereto, means normally retaining the member and holder at the limit of their inward relative movements, a set of chasers carried for radial movements by the holder and normally movable outward, a sleeve mounted on the holder for movements axially thereof and having a restricted conical surface for coaction with the outer ends of the chasers to

retain them in operative position when the sleeve is in one position of its movement, means normally urging a chaser releasing movement of said sleeve, a pair of arcuate arms pivotally carried by one of said holder and sleeve and extending in opposite directions from their pivots around the axis of the holder and coacting with the other of said sleeve and holder to lock the sleeve in operative chaser holding position, and means operable to move the locking arms to release the locking connection between the sleeve and holder when the holder has moved outward a predetermined extent relative to the carrying member.

In testimony whereof I have hereunto signed my name to this specification.

CONRAD JOBST.