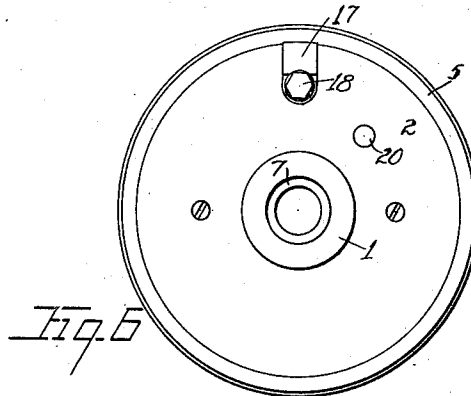
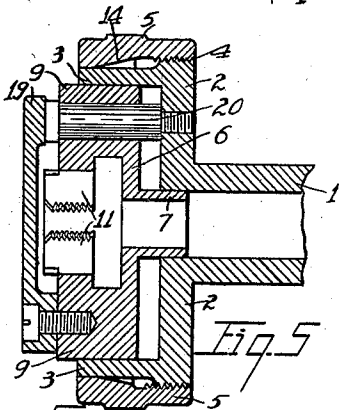
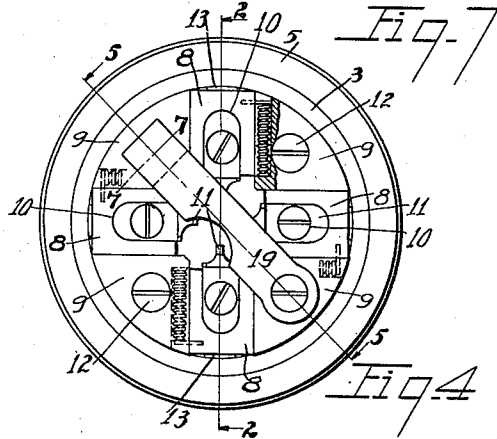
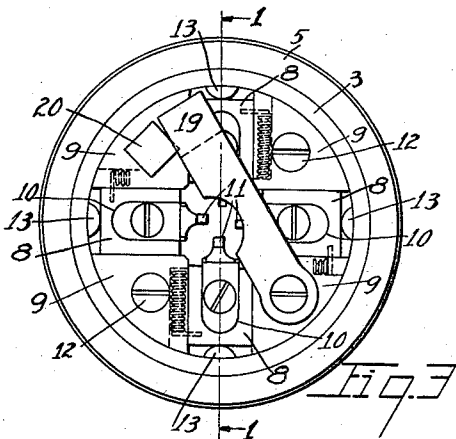
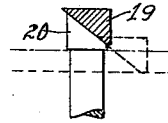
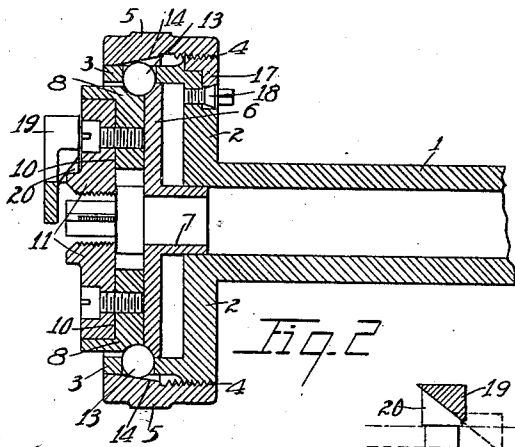
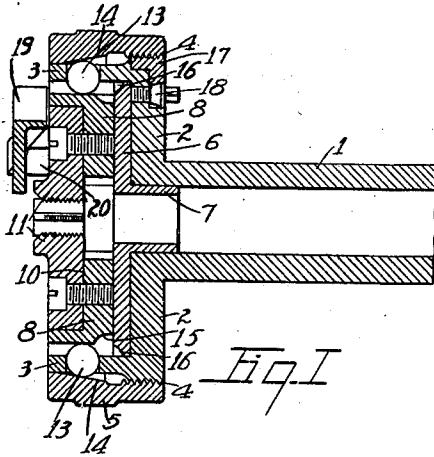


F. S. SHIELDS.
 RELEASING DIE HOLDER.
 APPLICATION FILED MAY 16, 1910.

996,890.

Patented July 4, 1911.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK S. SHIELDS, OF CLEVELAND, OHIO.

RELEASING DIE-HOLDER.

996,890.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed May 16, 1910. Serial No. 561,623.

To all whom it may concern:

Be it known that I, FRANK S. SHIELDS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Releasing Die-Holders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to die holders, the same having for its general object the improvement and increased efficiency of such devices.

More specifically stated, the object of the invention is the production of a holder of the character specified that shall be under control of the stock upon which the thread is to be formed, the jaws carrying the cutting dies automatically closing so as to bring the dies to cutting position and automatically opening after the threads are cut, thereby releasing the stock without reversing or stopping the driving mechanism.

In the drawings forming a part of this application, Figure 1 is a sectional view taken centrally through the holder on the line 1—1 of Fig. 3, the same showing the die cutters in their closed positions; Fig. 2 is a view similar to Fig. 1 and taken on the line 2—2 of Fig. 4, said view showing the die cutters in their open positions; Fig. 3 is a front view of the die holder with the parts in the position shown in Fig. 1; Fig. 4 is a view similar to Fig. 3 and showing the parts in the position of Fig. 2; Fig. 5 is a sectional view through the die holder, said view being taken on the line 5—5 of Fig. 4; Fig. 6 is a rear elevation of the die holder, and Fig. 7 is a view showing a detail.

Referring to the drawings and describing the invention by the use of the reference characters appearing thereon, 1 represents the shank of the die holder, the same being shown as of tubular form. At its outer or front end, the shank 1 is provided with a head 2, said head, in turn, being provided with an outwardly extending flange 3. The outer rim of the head 2 is screw threaded, as shown at 4, to receive a retaining ring or band 5, which band is threaded on its interior to engage the threads 4, and is preferably knurled on its exterior in order that it may be more easily turned.

In front of the head 2 is a disk 6, the same fitting within the flange 3 of the head and having its rear face formed to fit the front

face of the head 2. As will be hereinafter more particularly described, the disk 6 has a movement toward and from the head; and, to assist in guiding the disk in such movement, the latter is provided at its center with a tubular projection 7, the same projecting into the bore of the shank 1.

Mounted to the slide upon the outer or front face of the disk 6 are jaws 8, there being four of such jaws in the present instance, although any desired number of the same may be employed. For guiding these jaws radially, the disk 6 is provided with triangularly-shaped portions 9, the same projecting substantially into the plane of the forward edge of the flange 3 of the head when the disk 6 is in its inner position, as shown in Fig. 1. The jaws 8 are guided between the adjacent faces of these angular portions, suitable cooperating surfaces being provided on the said jaws and triangular portions to permit the jaws to move radially and yet hold them against the face of the disk 6. Each of the jaws 8 is provided with a recess 10 in its outer face to receive one of the die cutters 11.

Two or more of the triangular portions 9 are provided with perforations for receiving shoulder-screws 12, the same extending through the said portions and the disk 6 and screwing into the head 2 of the holder, said screws positioning the disk 6 within the head so as to force the disk and cutters to turn with the head and yet permit them to have an independent back and forth motion with respect thereto, as is indicated by the two positions shown in Figs. 1 and 2.

At points opposite the jaws 8, the annular flange 3 is provided with openings for balls 13, there being preferably one of these balls for each jaw. The balls fit loosely into said openings so that they may turn freely therein but cannot escape therefrom. The adjusting ring or band 5 is formed with an inclined inner surface at 14 which cooperates with the balls 13. The outer edges of the jaws 8 are rounded at 15 on a radius substantially equal to that of the balls, and the outer and forward edge of the disk 6 is also provided with rounded recesses 16, there being one of these recesses for each of the balls.

With the parts in the position shown in Fig. 2, the balls 13 rest in the recesses 15 and 16, the disk 6 and the cutting dies are in their forward positions and the jaws 8

are opened, the same having been moved to their open positions by suitable springs, as shown. When the disk 6 and the parts carried thereby are forced backwardly against the head 2, the balls 13 roll out of the recesses 15 and 16 onto the outer ends of the jaws, thereby forcing the latter inwardly, as shown in Fig. 1. By screwing the ring or band 5 a greater or lesser distance on the head 2, the distance of the balls from the center of the disk is varied, such variation resulting in varying the distance between the opposing die cutters when in their inward positions, and in thus adjusting the cutters to the precise diameter of the stock. After the ring or band 5 has been screwed into its desired position, it may be locked by a slidable and threaded member 17 that is set into the outer edge of the head 2 with its inner part resting upon a conical head 18 of a screw, said screw being tapped into the said head, as shown in Figs. 2 and 6. When the screw is fed inwardly, the member 17 is forced outwardly into locked engagement with the adjusting ring or band.

For the purpose of automatically forcing the disk 6 with the jaws and cutting dies toward the head 2, I pivot to one of the triangular portions 9 a member 19, the same being beveled on the under side of its free end, as shown in Fig. 7, said end resting upon the outer beveled end of a screw 20 when the disk 6 is in its outer position. This screw extends rearwardly through one of the triangular portions 9, and is tapped into the head 2, so that the outer beveled end of the screw is stationary. When the disk 6 is in its outer position, as shown in Fig. 4, the member 19 extends across the holder in front of the die cutters, so that the stock cannot enter the space between the dies without first removing the member 19. The relative movement of the stock and the holder toward each other first brings the stock and the member 19 into contact and then forces the latter and the disk 6 backwardly, such movement resulting, through the engagement of the beveled surfaces of the member and screw 20, in lifting the member and turning it out of the way of the stock, which may then enter between the dies. After the threads are cut upon the stock, a separating movement between the holder and the stock results, through the continued engagement of the die cutters and the stock, in drawing the disk 6 away from the head 2 and in thus automatically separating the die cutters and in releasing the stock. It is immaterial, so far as my invention is concerned, whether it is the stock or the holder that is moved in the above described operation.

From the above description it will be understood that, starting with the parts in the position shown in Figs. 2, 4 and 7, a relative approaching movement between the

holder and the stock results in the engagement of the stock with the member 19, in the forcing of the disk 6 toward the head 2, in the closing of the die cutters to their operating positions and in the automatic swinging of the member 19 so as to permit the stock to enter between the die cutters. The threads being then formed on the stock, a relative receding movement between the stock and the holder results, through the continued engagement of the newly formed threads with the die cutters, in drawing the disk 6 away from the head, thereby permitting the balls 13 to enter the recesses 15 and 16 and the jaws and their die cutters to separate so that the stock is completely released from the holder. This entire operation may be performed any number of times without stopping the rotative movement of the stock or the holder and without reversing the movement of the same, which reversal would be necessary if the die cutters were not separated. From this it will be understood that my invention may be used in machines in which the stock rotates and the holder is held against rotation, or in machines in which the rotative movement is given to the holder and the stock is held against rotation.

Various changes in the details shown and described may be made without departing from the spirit of my invention, and I desire it to be understood that the following claims are not intended to be limited to such details any further than is rendered necessary by the specific terms therein employed.

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

1. In a die holder, the combination with angularly spaced die cutters, of a member upon which said cutters are mounted so that they may approach and recede from each other, and means carried by said holder and adapted to be engaged by the stock to be operated upon for causing said cutters to approach each other as the stock and holder are brought into coöperative relation, said cutters being arranged to recede from each other as the stock and holder are separated.
2. In a die holder, the combination with angularly spaced die cutters, of a member upon which said cutters are mounted so that they may slide toward and from each other, and means carried by said holder and adapted to be engaged by the stock upon which the cutters are to operate for automatically sliding the cutters into their operative positions.

3. In a die holder, the combination with opposed die cutters, of a member upon which said cutters are mounted so that they may slide toward and from each other, and means adapted to be engaged by the stock upon which the cutters are to operate as

said stock is presented to the cutters for sliding the cutters into their operative positions.

4. In a die holder, the combination with angularly spaced die cutters, of means upon which said cutters are mounted so that they slide toward and from each other, a member positioned between the die cutters and the stock upon which the cutters are to operate when the cutters are in their outer and inoperative positions, and connections between said member and the die cutters for moving the latter into their inner and operating positions by the engagement of the stock with the said member as the stock is presented to the cutters.

5. In a die holder, the combination with opposed die cutters, of means upon which said cutters are mounted so that they may slide toward and from each other, a member positioned between the die cutters and the stock upon which the cutters are to operate when the cutters are in their outer and inoperative positions, and connections between said member and the die cutters for moving the latter into their inner and operating positions by the engagement of the stock with the said member as the stock is presented to the cutters, and means engaging said member and moving it out of the path of the stock so that the latter may enter between the die cutters.

6. In a die holder, the combination with a head member, of a second member carried by the head member and adapted to slide toward and from the latter, die cutters carried by said second member and adapted to move radially toward and from one another thereon, means under control of the stock upon which the cutters are to operate for sliding the second member toward the head member, and means coöperating with the second member during its movement for sliding the cutters into their operative positions.

7. In a die holder, the combination with a head member, of a second member carried by the head member and adapted to move toward and from the latter, guide pins projecting from the head member through the second member, die cutters carried by said second member and adapted to move radially toward and from one another thereon as the second member is moved on the guide pins, and means carried by said member and adapted to be engaged by the stock upon which the cutters are to operate for sliding the said second member on said pins.

8. In a die holder, the combination with a head member, of a circular disk in front of said member, said disk being adapted to move toward and from the member, a plurality of jaws slidably mounted upon said disk, the jaws and disk being recessed at

their outer parts, balls projecting into the said recesses of the jaws and disk when the latter is separated from the head member, a retaining band secured to the head member and contacting with the said balls, means adapted to be engaged by the stock to be operated upon for forcing the disk toward the head member, such movement carrying the recesses in the jaws away from the balls and forcing the jaws inwardly, and cutting dies carried upon said jaws.

9. In a die holder, the combination with a head member, of an annular flange projecting forwardly from said member, said flange being provided with a plurality of openings therethrough, of a circular disk within said flange, said disk being adapted to move toward and from the head member, a plurality of jaws slidably mounted upon said disk, the jaws and disk being recessed at points opposite the openings in the annular flange, balls within said openings and projecting into the said recesses of the jaws and disk when the latter is separated from the head member, a retaining band secured to the head member and contacting with the said balls outside the annular flange, means adapted to be engaged by the stock to be operated upon for forcing the disk toward the head member, such movement carrying the recesses in the jaws away from the balls and forcing the jaws inwardly, and cutting dies carried upon said jaws.

10. In a die holder, the combination with a tubular shank, of a head member on said shank, a disk parallel to the outer face of the head member, a tubular extension on the rear side of said disk at its center, said extension projecting into the tubular shank so as to be guided thereby as the disk is moved toward and from the head member, jaws slidably mounted on the circular disk said jaws and disk being recessed at their outer edges, balls resting in the recesses of the jaws and disk when the latter is separated from the head member, the recesses in the jaws permitting the latter to slide outwardly on the disk, a retaining band secured to the head member and holding the balls from outward movement, die cutters carried by the said jaws and means under control of the stock to be operated upon for forcing the disk toward the head member as the stock and the die holder are brought into co-operating position, for the purpose specified.

11. In a die holder, the combination with a tubular shank, of a head member on said shank, a forwardly projecting annular flange on said head member, said flange being provided with a plurality of openings therethrough, a circular disk parallel to the outer face of the head member, and lying within the annular flange, a tubular extension on the rear side of said disk at its center, said extension projecting into the tubular shank

so as to be guided thereby as the disk is moved toward and from the head member, a jaw slidably mounted on the circular disk at points opposite each of the openings in the annular flange, said jaws and disk being recessed at their outer edges, balls within the said openings in the flange and resting in the recesses of the jaws and disk when the latter is separated from the head member, the recesses in the jaws permitting the latter to slide outwardly on the disk, a retaining band secured to the head member and holding the balls from outward movement, die cutters carried by the said jaws and means under control of the stock to be operated upon for forcing the disk toward the head member as the stock and the die holder are brought into cooperating position, for the purpose specified.

12. In a die holder, the combination with a head member, of an annular flange projecting forwardly from the front face of said member, said flange having a series of openings therethrough, a circular disk fitting within the annular flange and adapted to move toward and from the head member, means for guiding said disk in its to and fro movement, a jaw on the front face of the circular disk opposite each of the openings in the annular flange, said jaws and disk being provided with circular recesses in their outer edges, a ball within each of the openings in the annular flange, said balls extending into the recesses in the jaws and disk when the latter is separated from the head member, a retaining band secured to the head member and holding the balls against outward movement, said band being provided with an inclined inner surface for varying the position of the balls in the annular flange, die cutters secured to the said jaws, and means under control of the stock to be operated upon for forcing the disk and the jaws toward the head member as the stock and the holder are brought into operative relation, whereby the balls leave the recesses in the disk and jaws and force the latter and the die cutters inwardly.

13. In a die holder the combination with a head member, of an annular flange projecting forwardly from the front face of said member, said flange having a series of openings therethrough, a circular disk fitting within the annular flange and adapted to move toward and from the head member, means for guiding said disk in its to and fro movement, a jaw on the front face of the circular disk opposite each of the openings in the annular flange, said balls extending into the recesses in the jaws and disk when the latter is separated from the head member, a retaining band secured to the head member and holding the balls against outward movement, said band being provided with an inclined inner surface for

varying the position of the balls in the annular flange, die cutters secured to the said jaws, means under control of the stock to be operated upon for forcing the disk and the jaws toward the head member as the stock and the holder are brought into operative relation, whereby the balls leave the recesses in the disk and jaws and force the latter and the die cutters inwardly, and means for locking the retaining band in position.

14. In a die holder, the combination with a head member, of means for holding said member, an annular flange projecting forwardly from the front face of the head member, said flange being provided with a plurality of openings therein, a circular disk parallel to the front face of the member, said disk lying within the annular flange, means connecting said disk to the head member but permitting it to move toward and from the latter, a jaw mounted on the outer face of the disk opposite each of the openings in the annular flange, said jaws being adapted to slide radially upon said disk, the jaws and disk being provided with recesses opposite the openings in the annular flange, a ball in each of said openings, said balls projecting into the recesses in the jaws and disk when the latter is separated from the head member, a retaining band screwing upon the head member and projecting over the annular flange so as to hold the balls against outward movement, a die cutter carried by each jaw, a member pivoted on the disk and extending across the holder in front of the die cutters when the disk is separated from the head member, said pivoted member being provided with a beveled under surface at its free end, a stationary member projecting forwardly from the head member and having a beveled outer end with which the beveled surface on the pivoted member engages when the disk is in its outer position, said pivoted member being adapted to engage with the stock to be operated upon as the latter and the holder are brought into cooperative relation, whereby the disk is forced rearwardly toward the head member, the balls force the jaws and die cutters toward one another and the pivoted member is moved out of the path of the stock, as and for the purpose specified.

15. In a die holder, the combination with a tubular shank, of a head member formed on one end of said shank, an annular flange projecting from the front face of the head member, said flange being provided with a series of openings therein, a circular disk within the annular flange and adapted for movement toward and from the head member, a tubular extension on the rear of said disk at its center, said extension projecting into the tubular shank, a series of jaws mounted to slide radially on the front face

of the disk, there being one of these jaws opposite each opening in the annular flange, and each jaw and the disk being provided with a recess opposite each of said openings, 5 a ball within each of said openings, said balls projecting into the recesses in the jaws and disk when the latter is separated from the head member, a retaining band secured to the head member and projecting over the 10 annular flange, said band being provided with an inclined inner surface cooperating with the balls and positioning the latter with respect to the center of the disk, means carried by the head member for locking the 15 retaining band in its adjusted position, a die cutter secured to each jaw, a pivoted member secured to the circular disk, said member being provided with an inclined under surface adjacent its free end, a sta- 20 tionary member projecting forwardly from the head member and through the disk, said stationary member having an inclined outer end upon which the beveled surface of the pivoted member rests, the construction being such that as the stock to be operated 25 upon and the die holder are brought into cooperative relation, the stock engages the pivoted member, forces the disk toward the head member, closes the jaws and die cutters and swings the pivoted member away from 30 in front of the cutters, as and for the purpose specified.

16. In a die holder, the combination with a tubular shank, of a head member formed 35 on one end of said shank, an annular flange projecting from the front face of the head member, said flange being provided with a series of openings therein, a circular disk within the annular flange and adapted for 40 movement toward and from the head member, a tubular extension on the rear of said disk at its center, said extension projecting into the tubular shank, a series of jaws mounted to slide radially on the front face 45 of the disk, there being one of these jaws opposite each opening in the annular flange, and each jaw and the disk being provided

with a recess opposite each of said openings, a ball within each of said openings, 50 said balls projecting into the recesses in the jaws and disk when the latter is separated from the head member, a retaining band screwed to the head member and projecting over the annular flange, said band being provided with an inclined inner sur- 55 face cooperating with the balls and positioning the latter with respect to the center of the disk, a plug carried by the head member for locking the retaining band in its adjusted position, a conical screw for forcing the plug against the retaining band, a 60 die cutter secured to each jaw, a pivoted member secured to the circular disk, said member being provided with an inclined under surface adjacent its free end, a pin 65 projecting forwardly from the die and through the disk, said pin having an inclined outer end upon which the beveled surface of the pivoted member rests, the construction being such that, as the stock to 70 be operated upon and the die holder are brought into cooperative relation, the stock engages the pivoted member, forces the disk toward the head member, closes the jaws and die cutters and swings the pivoted member 75 away from in front of the cutters, as and for the purpose specified.

17. In a die holder, in combination, a head having radial recesses, die cutters slidably 80 mounted in said recesses, means for moving said cutters toward their common center upon the approach of the stock to be operated upon, said cutters being arranged to recede from their common center as said stock and holder are separated, and means for 85 simultaneously adjusting the distance of said cutters from their common center when in their inward or operative position.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses. 90

FRANK S. SHIELDS.

Witnesses:

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M. E. TAIF.