Jan. 31, 1950 C. T. BLUME 2,495,885

FEEDING DEVICE

Filed April 12, 1946 2 Sheets-Sheet 1

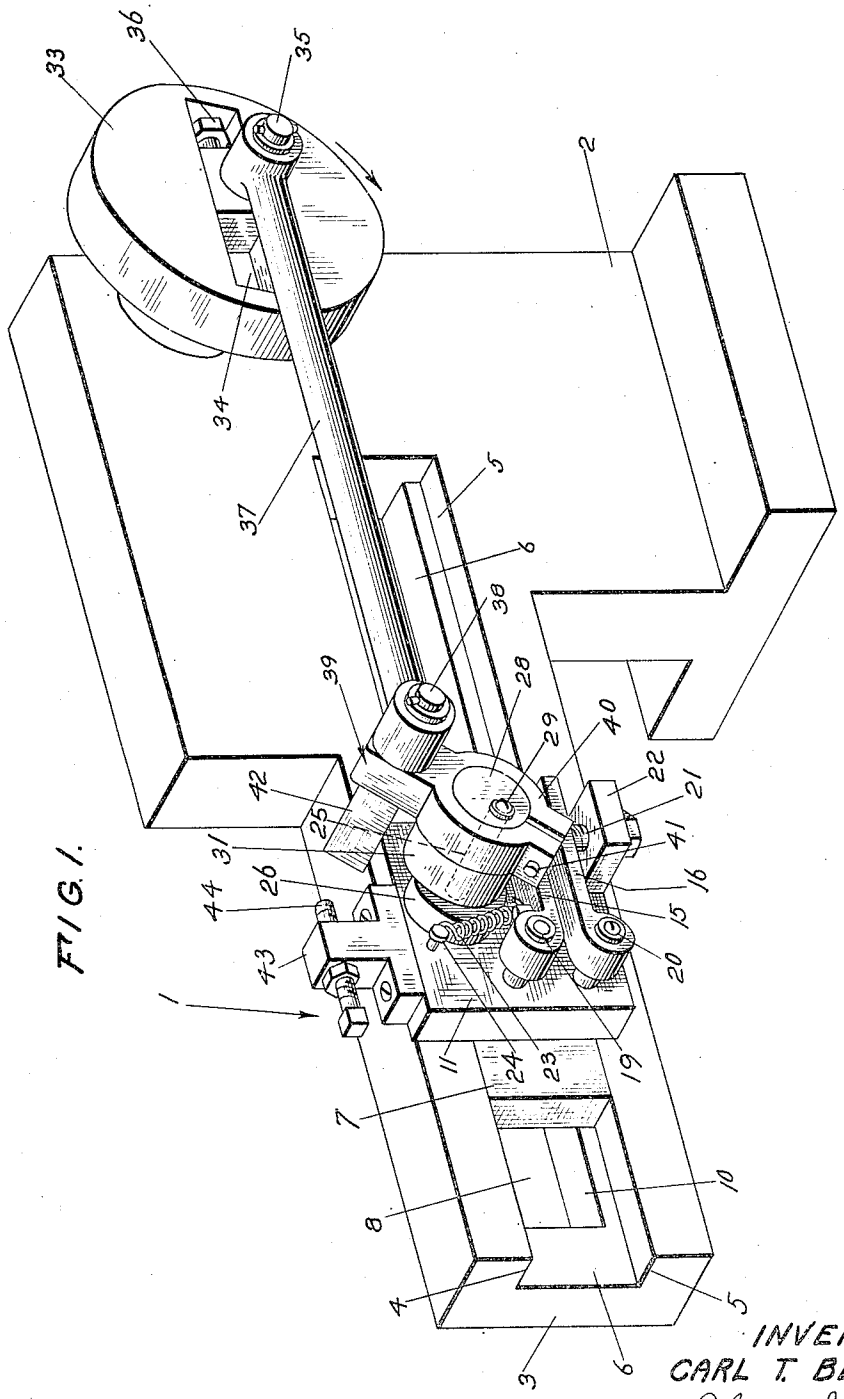



FIG. 1.

INVENTOR
CARL T. BLUME
BY Elmer J. Gorn
ATTY.

Jan. 31, 1950 C. T. BLUME 2,495,885

FEEDING DEVICE

Filed April 12, 1946 2 Sheets-Sheet 2

FIG. 2.

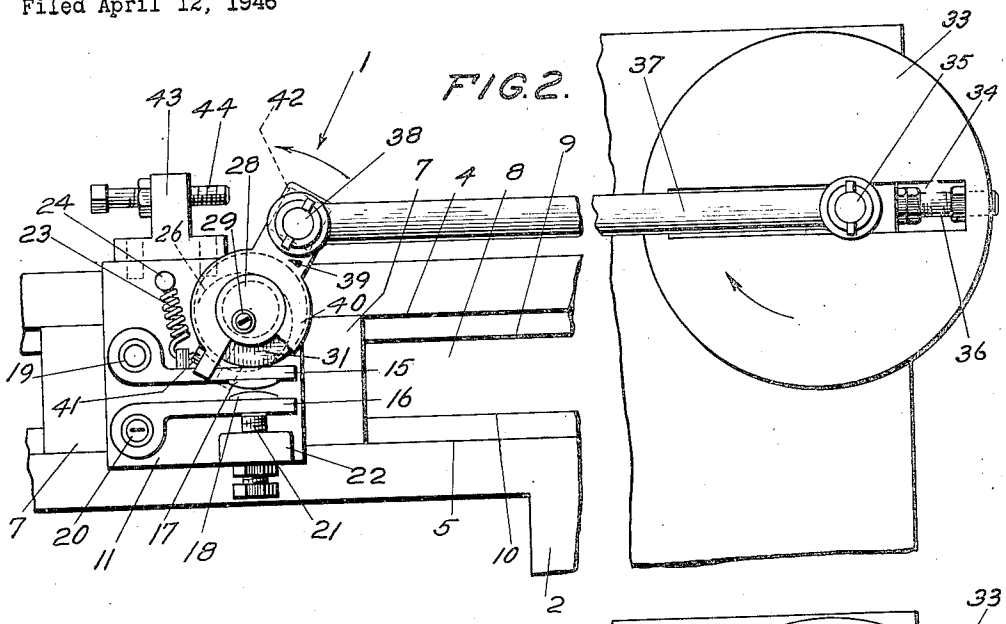



FIG. 3.

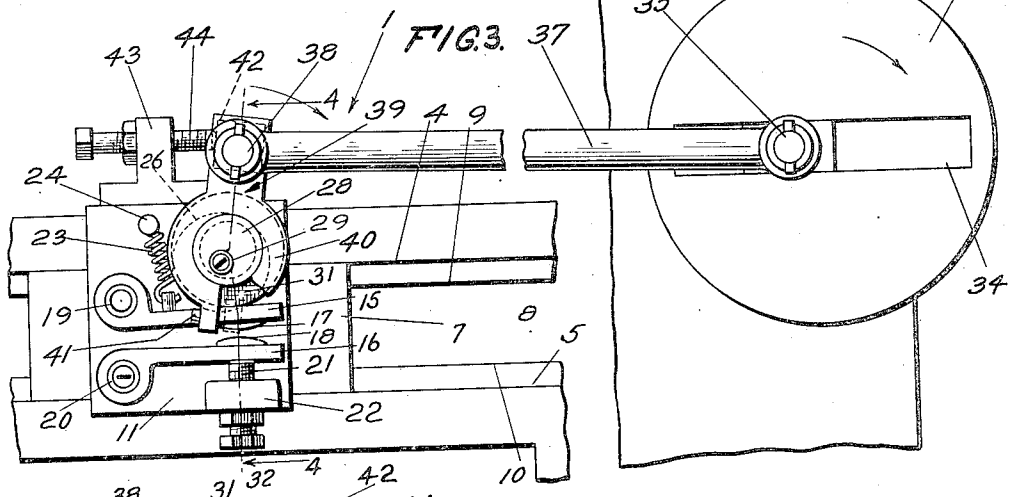
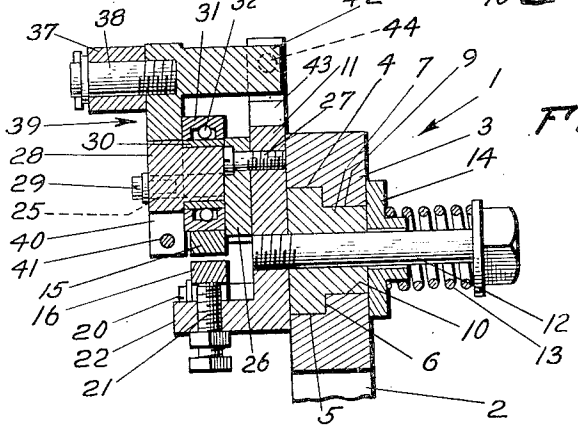



FIG. 4.




INVENTOR
CARL T. BLUME
BY Elmer J. Gow
ATTY.

Patented Jan. 31, 1950 2,495,885

# UNITED STATES PATENT OFFICE

2,495,885

## FEEDING DEVICE

Carl T. Blume, West Newton, Mass., assignor to Raytheon Manufacturing Company, Newton, Mass., a corporation of Delaware

Application April 12, 1946, Serial No. 661,657

6 Claims. (Cl. 140—130)

1

This invention relates to a feeding device, and more particularly to an apparatus for automatically feeding predetermined lengths of thin metallic ribbon or wire to a shearing, punching, or forming tool.

An object of the invention is to devise a feeding apparatus which will feed uniform lengths of stock to a machine tool.

Another object is to provide a feed device which will not injure the stock fed.

A further object is to devise a feeding device which is readily adjustable for different thicknesses of stock and for different lengths to be fed, as well as for different tensions of the spool from which the stock is to be fed.

The foregoing and other objects of the present invention will be best understood from the following description of an exemplification thereof, reference being had to the accompanying drawings, wherein:

Fig. 1 is a perspective view of the device;

Fig. 2 is an elevation of the device, showing it in one position of movement;

Fig. 3 is an elevation of the device, showing it in another position of movement; and

Fig. 4 is a cross-section taken on line 4—4 of Fig. 3 and looking in the direction of the arrows.

Referring to the drawings, the device 1 includes a cast base portion 2 which is adapted to be rigidly mounted on a table or other support. Integral with base portion 2 is an elongated guiding portion 3 of channel shape in cross-section, which provides upper and lower horizontal guide faces 4 and 5, respectively, and vertical guide face 6. Mounted for sliding movement in this fixed guideway is a plate 7 of rectangular cross-section and of such dimensions as to slidably fit in the channel of guiding portion 3. Guiding portion 3 is provided also with a rectangular elongated slot 8, of smaller height than the distance between faces 4 and 5, but centered with respect thereto, said slot extending entirely through the portion 3 from the vertical face 6 to the rear face of portion 3 and defining upper and lower horizontal guide faces 9 and 10, respectively. Plate 7 has a rearwardly-extending portion which fits slidably in this slot 8, said portion being of smaller area than the front portion of plate 7 which fits in the channel of guiding portion 3. Mounting member 11, which carries the active portions of the feeding device, is secured to plate 7 by means of a bolt 12 which passes through plate 7 and is threaded into member 11. Member 11 is a relatively thin member

2

having a larger surface area than plate 7, and it is held tightly against the outer surface of plate 7 and the front outer face of guiding portion 3 by means of a spring 13 which is under compression, one end of said spring bearing against a washer 14 which engages the rear face of portion 3 and the other end of said spring bearing against the head of bolt 12. It may therefore be seen that member 11 is supported for sliding movement in a horizontal direction by means of plate 7 which slides in stationary guiding portion 3.

Upper and lower jaws 15 and 16, respectively, having clamping surfaces 17 and 18, respectively, which are adapted to be brought into engagement, are mounted on member 11. Jaws 15 and 16 are relatively elongated and the surfaces 17 and 18 thereof are each adjacent one end of the corresponding jaws. Upper jaw 15, at its end which is remote from its clamping surface 17, is mounted for free rotation on a pin 19 which is firmly attached to member 11. Lower jaw 16, at its end which is remote from its clamping surface 18, is mounted for rotation about a pin 20 which is fixed to member 11, said pin 20 being provided with a clamping member whereby jaw 16 may be firmly clamped in any desired angular position with respect to said pin 20. The rear edges of jaws 15 and 16 are maintained spaced from the front surface of mounting member 11 by any suitable means, such as by means of collars on pins 19 and 20. The clamping end of lower jaw 16 is rendered vertically adjustable with respect to member 11 by means of bolt 21 which is threadedly mounted in an outwardly-projecting member 22 integral with member 11, the upper end of said bolt bearing against the lower surface of the clamping end of lower jaw 16. Any suitable means of maintaining bolt 21 in its desired adjusted position may be provided. Spring 23, which is placed under tension in response to the movement of clamping end of upper jaw 15 downwardly about pin 19, is attached at one end to pin 24, which is fixed to member 11, and is attached at its other end to the upper jaw 15.

A pin 25 is mounted at the center of a circular collar 26, said collar being firmly or rigidly attached to mounting member 11 by means of screws 27. A shaft 28 has an eccentrically-located aperture therethrough, by means of which said shaft may be mounted on said pin 25 for rotation with respect thereto, said shaft being maintained in position on said pin 25 by means

of a screw 29, threaded into the end of said pin, and bearing against the outer face of said shaft. Shaft 28 has an outer portion of a certain diameter, and an inner portion of a lesser diameter. The inner raceway 30 of a ball-bearing structure is rigidly mounted on the inner portion of shaft 28. This ball-bearing structure includes an inner raceway 30, an outer raceway 31, and a plurality of balls 32 therebetween. The outer surface of outer raceway 31 of this ball-bearing structure is so positioned as to be at all times in rolling contact with the upper face of upper jaw 15. Due to the fact that shaft 28 is eccentrically mounted on pin 29, when said shaft 28 is rotated, the ball-bearing structure will be moved downwardly or upwardly to rotate upper jaw 15 into and out of engagement with lower jaw 16, about its pivot pin 19.

In order to produce partial rotation of shaft 28 in two opposite directions, to thereby force jaw 15 into and out of engagement with jaw 16, a connecting rod structure is provided. A disk 33, driven at a uniform rate during operation of the device, has a diametrically-extending slot 34 therein. Slidably mounted in slot 34 is a structure carrying a pivot pin 35, said pivot pin being adjustable to various positions with respect to the center of disk 33, and said pin 35 being fixed in various positions by fastening means 36. Pivotally mounted on pin 35 is a connecting rod 37, of any suitable length. The opposite end of connecting rod 37 from disk 33 is pivotally connected, by means of a pin 38, to a fastening member 39, which is in turn fastened to shaft 28. Fastening member 39 includes a split ring portion 40, which is adapted to be slipped over shaft 28, and to be fastened thereto by means of fastening means 41, and a rearwardly-projecting stop or abutment member 42. It will be seen that, when fastening member 39 is securely fastened to shaft 28, and when pin 35 is displaced with respect to the center of disk 33, rotation of disk 33 will produce a rotation of shaft 28 through a certain angle, and successively in opposite directions, thereby forcing jaw 15 downwardly into engagement with jaw 16, and then allowing the jaw 15 to be pulled upwardly away from engagement with jaw 16 by the action of spring 23. Due to the fact that fastening member 39 includes a split-ring portion 40 which fastens around shaft 28, the relative angular positions of shaft 28 and fastening member 39 may be adjusted or varied. An adjustable stop member 44 is disposed in the path of movement of abutment 42. This stop member 44 is threadedly mounted in a bracket 43 which is rigidly attached to mounting member 11.

A description of operation of the device to feed wire from a spool not shown but to the left of the device will now be given. Disk 33 is rotated in the clockwise direction, and Fig. 3 shows the relative positions of the elements when pin 35 is in its left dead-center position with respect to disk 33, while Fig. 2 shows the relative positions of the elements when pin 35 is in its right dead-center position with respect to disk 33. Starting from the position of Fig. 3, and with disk 33 revolving in the clockwise direction, rod 37 will first be moved to the right, rotating shaft 28 about pin 25 in the clockwise direction. Due to the eccentric mounting of shaft 28 on pin 25, as shaft 28 is rotated in a clockwise direction, the outer raceway 31 will, due to its contact with the upper surface of upper jaw 15, force said jaw 15 downwardly toward jaw 16. Jaw 15 will continue to be forced downwardly in response to the rotation of shaft 28 in the clockwise direction, until clamping portions 17 and 18 of jaws 15 and 16 come into engagement, or are separated only by the thickness of the stock being fed. When the jaws come into engagement, the rotation of shaft 28 in the clockwise direction is stopped. However, due to the fact that pin 35 has not yet reached its right-hand dead-center position with respect to disk 33, and that rod 37 is therefore continuing to move to the right, the entire mounting member 11, with the elements mounted thereon, will now be moved bodily to the right in response to the movement of rod 37. This is permitted because mounting member 11, as stated above, is supported for sliding movement in the guide ways of guiding portion 3. Due to the fact that the mounting member 11 is moved bodily in a horizontal direction, jaws 15 and 16 are also moved horizontally, thereby feeding the stock in a horizontal direction to the machine to which the stock is to be fed. By adjusting the position of pin 35 in slot 34 with respect to the center of disk 33, the amount of movement of mounting member 11 in the horizontal direction may be adjusted and may be made to have any desired value. The pressure with which jaws 15 and 16 are forced into engagement may be regulated by varying the angular position of fastening member 39 with respect to shaft 28.



Mounting member 11 will continue to be moved bodily to the right until pin 35 has come to the right-hand dead-center position with respect to disk 33, which is the position of the elements as shown in Fig. 2. Continued rotation of disk 33 from the right-hand dead-center position shown in Fig. 2 will cause rod 37 to be moved to the left. Movement of rod 37 to the left will cause a counter-clockwise rotation of shaft 28. As shaft 28 is rotated counter-clockwise, the downward pressure which was applied against the top surface of top jaw 15 will be released, due to the eccentric position of pin 25 with respect to shaft 28 and the resultant upward movement of outer raceway 31 of the ball-bearing structure. Outer raceway 31 of the ball-bearing structure will be moved upwardly, allowing upper jaw 15 to be drawn upwardly out of engagement with lower jaw 16, by the tension of spring 23. As fastening member 39 and shaft 28 continue to move in the counter-clockwise direction about pin 25, abutment 42 will come in contact with stop 44, preventing further rotation of shaft 28. However, rod 37 is still moving toward the left, due to the fact that pin 35 has not yet reached its left dead-center position with respect to disk 33. Due to the engagement of abutment 42 with stop 44 (said abutment being integral with fastening member 39), continued movement of rod 37 toward the left will cause the mounting member 11 and all of the elements carried thereby to be moved to the left. Member 11 is allowed to move bodily to the left in a horizontal plane, due to the fact that it is supported for slidable movement in guiding portion 3. Movement of mounting member 11 toward the left will also, of course, cause the jaws 15 and 16 to be moved to the left.

When the pin 35 has, as shown in Fig. 3, reached its left-hand dead-center position with respect to disk 33, the jaws 15 and 16 will be widely separated, and the mounting member 11 will be displaced to the left from its position as shown in Fig. 2. Movement of jaws 15 and 16 to the left, as shown in Fig. 3, allows a fresh "bite" to be obtained on the stock being fed, so that

when the jaws 15 and 16 are again forced together, as explained above, a new length of stock may be effectively fed toward the right by movement of mounting member 11 and jaws 15 and 16 to the right.

Continuous rotation of disk 33 will therefore first cause the jaws 15 and 16 to be forced into engagement, after which the jaws, together with the stock gripped thereby, will be moved toward the right, to feed the stock to another machine, after which the jaws 15 and 16 will be released, and thereafter said jaws will be moved toward the left to get a fesh "bite" on the stock to be fed.

Due to the fact that a ball-bearing is used to force the jaws 15 and 16 together, the outer raceway of said ball-bearing rolls into and out of engagement with the upper surface of upper jaw 15, thereby producing a gentle biting effect on the stock, and not producing appreciable injury of the stock. By the use of this invention, uniform lengths of stock may be fed from a stock supply to a separate machine. The gap between jaws 15 and 16 may be varied in order to accommodate different thicknesses of material, by the adjustment of bolt 21 to move lower jaw 16 vertically.

In the device of this invention, a number of adjustments are provided, in order to vary the length of the stroke, to vary the pressure with which the jaws 15 and 16 are brought together, and to center the travel of mounting member 11 when pin 35 is positioned directly above or below the center of disk 33. As stated above, the relative displacement of pin 35 with respect to the center of disk 33 may be varied by moving the element which carries pin 35 radially in slot 34 of disk 33, after which said element may be fastened in the desired position by fastening means 36. Also, as stated above, the relative angular position of fastening member 39 and of shaft 28 may be varied.

The length of adjustable stop 44 with respect to the travel of abutment 42 may be varied, in order to center the travel of member 11, with respect to the vertical position of pin 35 above or below the center of disk 33. In the device of this invention, a maximum stroke of one inch may be obtained, with a minimum stroke of as small as one-tenth of an inch, for example. The term stroke, as used herein, refers to the amount of horizontal movement of mounting member 11, or, in other words, the amount of stock fed toward the right on each "bite" of jaws 15 and 16, and each movement of mounting member 11.

Of course, it is to be understood that this invention is not limited to the particular details as described above, as many equivalents will suggest themselves to those skilled in the art. It is accordingly desired that the appended claims be given a broad interpretation commensurate with the scope of this invention within the art.

What is claimed is:

1. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being stationary with respect to said member and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fastened around the outwardly-projecting portion of said shaft, and means for producing rotation of said latter member.

2. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being capable of vertical adjustment with respect to said member but being stationary with respect to said member during operation of the device and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fastened around the outwardly-projecting portion of said shaft, and means for producing rotation of said latter member.

3. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being capable of vertical adjustment with respect to said member but being stationary with respect to said member during operation of the device and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fastened around the outwardly-projecting portion of said shaft, and means for producing partial rotation of said latter member successively in opposite directions.

4. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being capable of vertical adjustment with respect to said member but being stationary with respect to said member during operation of the device and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fas-

tened around the outwardly-projecting portion of said shaft and a rearwardly-extending abutment portion, means for producing partial rotation of said latter member successively in opposite directions, and a stop member secured to said first-mentioned member and disposed in the path of movement of said abutment portion.

5. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being capable of vertical adjustment with respect to said member but being stationary with respect to said member during operation of the device and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, means for biasing said jaws to the disengaged position, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fastened around the outwardly-projecting portion of said shaft and a rearwardly-extending abutment portion, means for producing partial rotation of said latter member successively in opposite directions, and a stop member secured to said first-mentioned member and disposed in the path of movement of said abutment portion.

6. A device of the character described, including, in combination, a mounting member, means supporting said member for sliding movement, a pair of jaws mounted on said member, one of said jaws being mounted for pivotal adjustment



with respect to said member but being stationary with respect to said member during operation of the device and the other of said jaws being pivotally movable relative to said member into and out of engagement with said one jaw, spring means attached to said other jaw for biasing said other jaw out of engagement with said one jaw, a pin attached to said member, a ball-bearing structure having inner and outer raceways, a shaft fixed to said inner raceway and having a cylindrical portion projecting outwardly therefrom, said shaft having an eccentrically-located aperture therethrough for mounting said shaft on said pin for rotation with respect thereto, said outer raceway being engageable with said other jaw to move said other jaw into engagement with said one jaw, a member having a split-ring portion fastened around the outwardly-projecting portion of said shaft and a rearwardly-extending abutment portion, means for producing partial rotation of said latter member successively in opposite directions, and a stop member secured to said first-mentioned member and disposed in the path of movement of said abutment portion.

CARL T. BLUME.


REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,007,236 | Poirier | Oct. 31, 1911 |
| 1,305,342 | DeSmith | June 3, 1919 |
| 1,495,508 | Campbell | May 27, 1924 |
| 1,959,853 | Borton | May 22, 1934 |
| 1,986,356 | Palucki | Jan. 1, 1935 |
| 2,049,914 | Lewis | Aug. 4, 1936 |
| 2,250,530 | Havecost | July 29, 1941 |
| 2,315,108 | Chism | Mar. 30, 1943 |