(No Model.) 2 Sheets—Sheet 1.

J. B. BOWDEN & H. V. BERNHARDT.

ROLLING MACHINE FOR SHAPING AND SIZING RINGS.

No. 426,707. Patented Apr. 29, 1890.

FIG. 1.

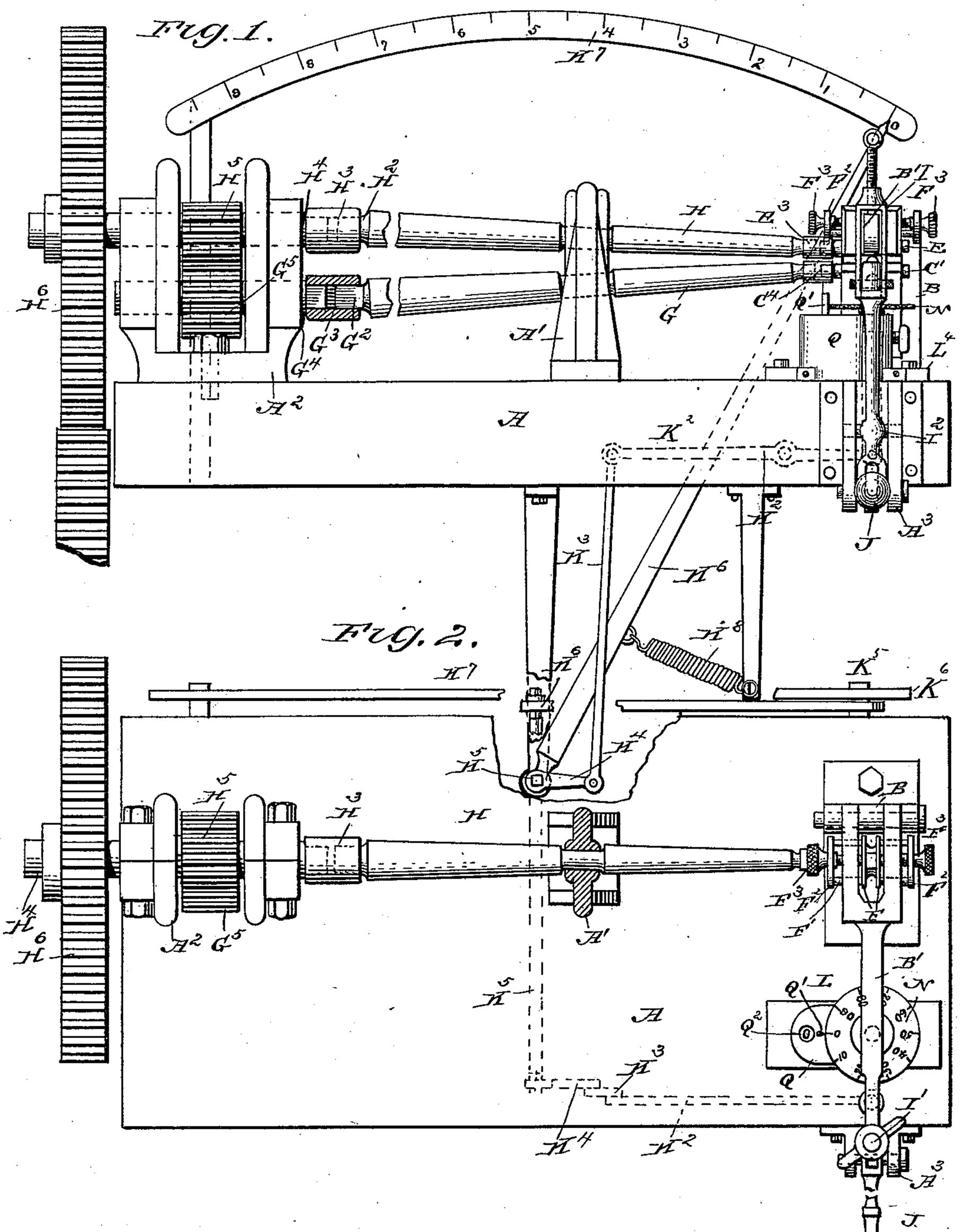

FIG. 2.

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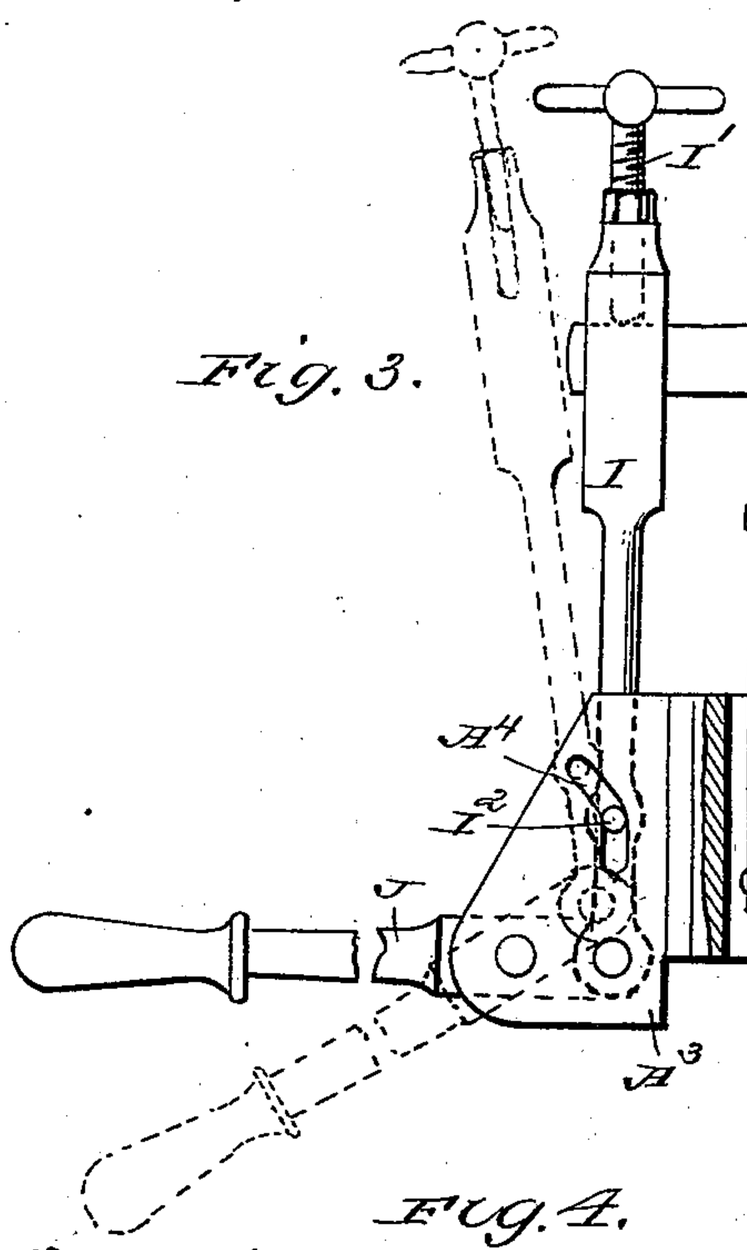


Fig. 3.

Fig. 4.

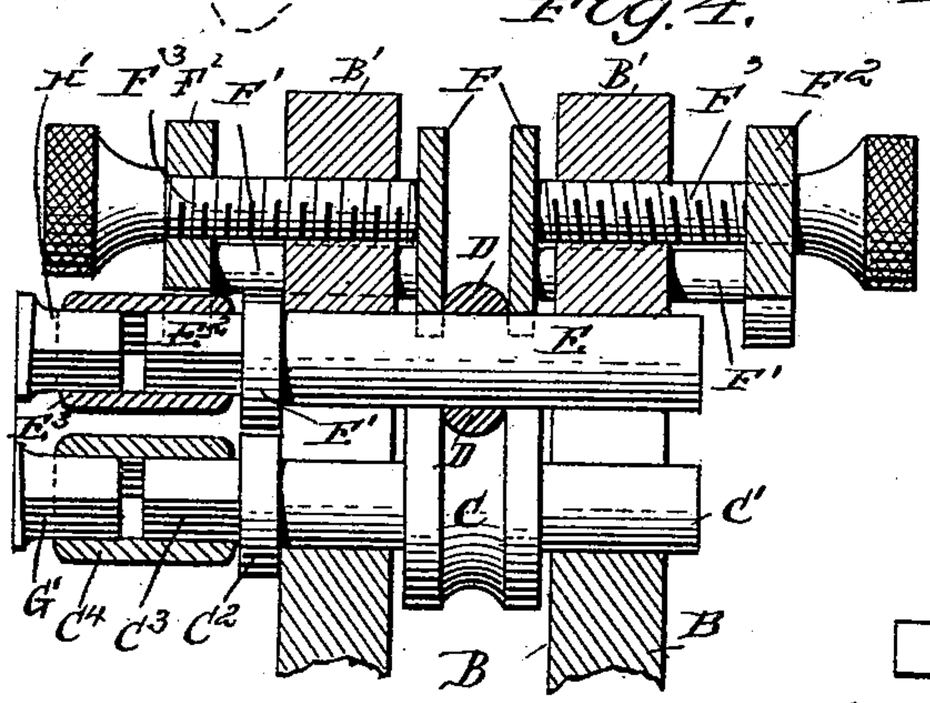


Fig. 5.

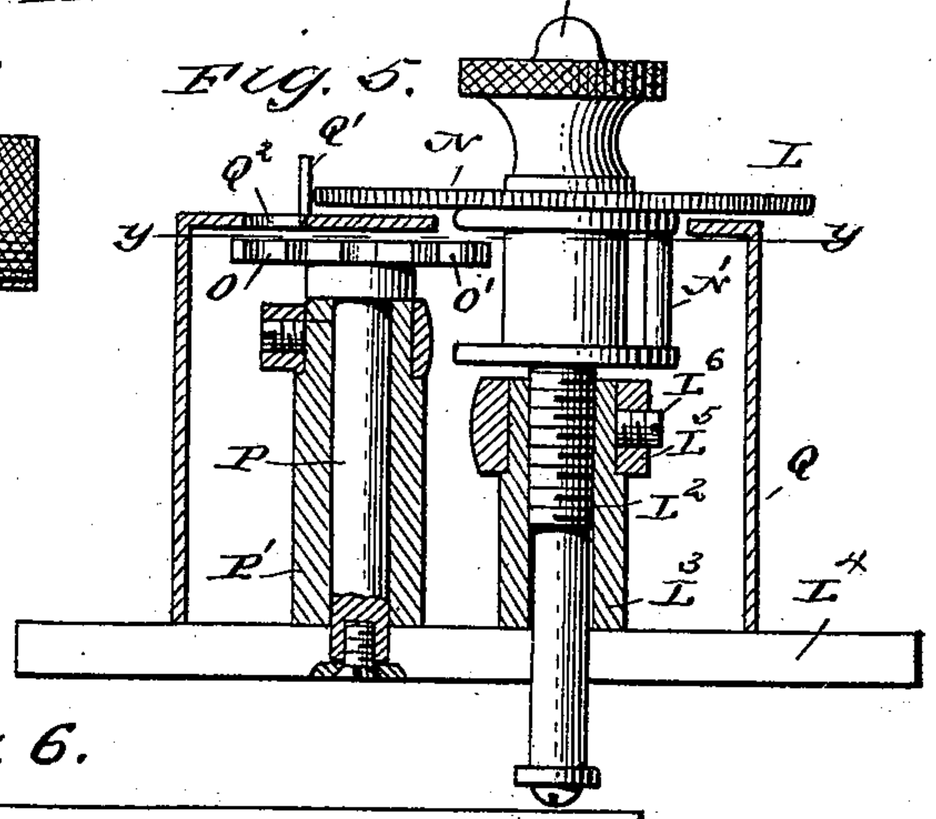
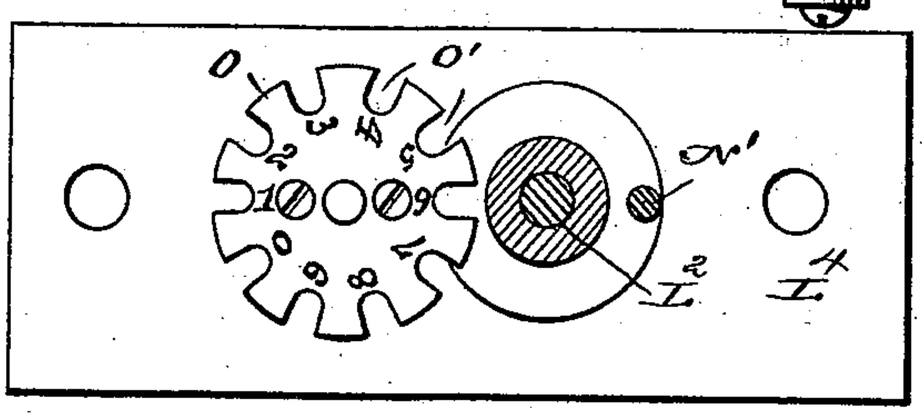


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH B. BOWDEN AND HERMANN V. BERNHARDT, OF BROOKLYN, NEW YORK; SAID BERNHARDT ASSIGNOR TO SAID BOWDEN.

ROLLING-MACHINE FOR SHAPING AND SIZING RINGS.

SPECIFICATION forming part of Letters Patent No. 426,707, dated April 29, 1890.

Application filed February 26, 1890. Serial No. 341,787. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH B. BOWDEN and HERMANN V. BERNHARDT, both of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Rolling-Machine for Shaping and Sizing Rings, of which the following is a full, clear and exact description.

The object of the invention is to provide a new and improved rolling-machine which is simple and durable in construction, very effective in operation, and specially designed for accurately and rapidly shaping finger and other rings to any desired size.

The invention consists of a grooved circular die mounted to turn and adapted to engage the outside of the ring to be rolled and a second circular die traveling at a differential rate of speed to the said grooved die and adapted to engage the inside of the ring.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a plan view of the same with parts broken out and parts in section. Fig. 3 is an enlarged end elevation of the same with parts in section. Fig. 4 is an enlarged sectional side elevation of the dies and adjacent parts on the line *x x* of Fig. 3. Fig. 5 is an enlarged sectional side elevation of the sizing device, and Fig. 6 is a sectional plan view of the same on the line *y y* of Fig. 5.

The improved rolling-machine is preferably mounted on a suitable table A, supporting standards B, in the upper ends of which is journaled a shaft C′, carrying a grooved roller-die C, fitted between the two standards and engaging with its groove the outside of the ring D to be rolled and sized. Through the ring D is passed a circular die E, mounted to turn in the under side of the bifurcated end of a lever B′, fulcrumed on the rear ends of the standards B and serving to hold and press the die E toward the grooved die C to press the body of the ring into the groove of the said die C.

The shafts C′ of the die C, as well as the die E, are loosely journaled in the standards B and the lever B′, respectively, so that they can be readily removed and exchanged according to the shape of the ring to be rolled.

The two dies C and E are located one above the other, and the die E is adapted to travel on the periphery of the grooved roller when the ring is finished.

In order to hold the ring in place on the die E—that is, to prevent the sidewise movement of the ring—two plates F are provided, engaging the sides of the ring on the top of the die E, the said plates being held to slide longitudinally by being mounted on pins F′, fitted to slide transversely in the lever B′. The outer ends of each set of pins F′ are connected with each other by a plate F^2, through which passes a screw F^3, screwing in the lever B′, and abutting at its inner end against the respective plate F, so that when the screw F^3 is turned the respective plate F is moved inward or outward toward or from the side of the ring. (See Fig. 4.) The plates F are made adjustable to accommodate rings of different widths.

One outer end C^3 of the shaft C′, carrying the grooved die C, is made square, and on it fits a correspondingly-shaped collar C^4, also engaged by the square end G′ of a shaft G, having its bearings in a standard A′, erected on the table A and extending in an inclined position to the shaft C′, as is plainly shown in Fig. 1. The die E is provided with a similar square end E^2, engaged by a collar E^3, into which fits the square end H′ of a shaft H, extending above the shaft G and inclined in an opposite direction to the shaft G, as shown in Fig. 1. The other ends of the shafts G and H are also provided with square ends G^2 and H^2, respectively engaged by correspondingly-shaped collars G^3 and H^3, respectively fitted onto the square ends of shafts G^4 and H^4, respectively mounted to turn in suitable bearings in a standard or frame A^2, secured on the top of the table A. The shafts G^4 and H^4 are arranged parallel with each other and carry gear-wheels G^5 and H^5, respectively in

mesh with each other and of different diameters—that is, the gear-wheel G^5 is larger in diameter than the gear-wheel H^5. On the outer end of the shaft H^4 is secured a large gear-wheel H^6, connected with suitable machinery for imparting a rotary motion to the shaft H^4, which latter, by the gear-wheel H^5 meshing into the gear-wheel G^5, rotates the shaft G^4.

The rotary motion of the shafts H^4 and G^4 is transmitted by the shafts H and G to the dies C and E, respectively, so that the latter rotate simultaneously at a differential rate of speed. The differential rate of speed of the two dies C and E is necessary, as the die C, which travels on the outside of the ring, has to travel faster than the die E, which travels on the inside of the ring, in order to roll the ring to a perfect circular shape, which would not be the case if the two dies traveled at the same rate of speed at their peripheries. The shafts H and G are inclined in opposite directions, so as to admit of the use of large and strong gear-wheels G^5 and H^5, to transmit the necessary power to the dies C and E, respectively, for rolling the ring to the proper shape.

The front end of the lever B′ is adapted to pass into a slot formed in a link I, in the top of which screws a screw I′, which passes into the slot onto the top of the lever B′ to set the latter to the proper place. The lower end of the link I is pivotally connected with a hand-lever J, extending horizontally to the front when in its normal position, as is plainly shown in Fig. 3. The lever J is fulcrumed between two lugs A^3, bolted to the front of the table A. (See Figs. 2 and 3.) A pin I^2 projects from the lower part of the link I and passes into a slot A^4, formed in the lugs A^3. Parts of the slots A^4 are straight, and the upper parts are curved outward, as illustrated in Fig. 3, so that when the operator releases the hand-lever J the latter swings downward into the position shown in dotted lines in Fig. 3, the link is moved upward and forward, and the pin I^2 travels in the outwardly-curved parts of the slots A^2. By this movement the link I is disengaged from the lever B′, as it swings outward in the position shown in dotted lines in Fig. 3, to enable the operator to conveniently raise the lever B′, for taking out the rolled ring.

In the rear of the link I is held a nut K, adapted to abut against the under side of the lever B′ and screwing on the upper threaded end of the rod K′, pivotally connected at its lower end with a longitudinally-extending lever K^2, fulcrumed in a recess in the table A. The lever K^2 is pivotally connected by a link K^3 with an arm K^4, secured on a transversely-extending shaft K^5, mounted to turn in suitable bearings held on the under side of the table A. On the rear end of the shaft K^5 is secured a pointer K^6, extending upward on the back of the table A and adapted to indicate on a graduated segment K^7, supported on suitable brackets fastened to the table A. On the pointer K^6 acts a spring K^8 to hold the said pointer at zero on the graduated segment K^7.

When an upward pressure is exerted on the handle J, a downward pull is imparted to the link I, thus swinging the lever B′ downward, which downward movement is recorded on the graduation K^7 by the pointer K^6, actuated by the nut K and intermediate mechanism, previously described. This pointer K^6 and the graduation K^7 are specially intended to show the operator how much pressure he exerts on the lever J, so that he can easily regulate this pressure according to the movement of the pointer K^6 on the graduated segment K^7. When the ring is rolled to the proper size, the pointer K^6 indicates the size on the segment K^7.

The downward movement of the lever B′ is stopped by a stopping device L, located on top of the table A and provided with a head L′, adapted to be engaged by the under side of the lever B′ to interrupt the downward movement of the said lever. The head L′ is formed on the upper end of a screw-rod L^2, screwing in a suitable bearing L^3, fastened on the base L^4 of the device L, which thus is secured to the top of the table A. The bearing L^3 is preferably split and the upper end is inclosed in a ring L^5, carrying a set-screw L^6, which, when screwed up, securely clamps the split bearing L^3 onto the threaded screw L^2 to hold the latter firmly in place and prevent a further movement of the screw L^2 when the head L′ is turned. On the head L′ is secured a disk N, provided on its top with a suitable graduation indicating the inside diameter of the finished ring. On the under side of this disk N is held a pin N′, adapted to engage successively notches O′, formed in a disk O, secured on a shaft P, mounted to turn in a bearing P′, erected on the base L^4. The bearing P′ is similarly arranged to the bearing L^3 and serves to clamp the bearing P′ to the shaft P. The disk O has ten notches, so that ten revolutions of the disk N are necessary to make one complete revolution of the disk O by means of the action of the pin N′.

The several parts of the stopping device L, with the exception of the head L′ and the disk N, are inclosed in a casing Q, on the top of which is arranged a pin Q′ alongside the periphery of the disk N and next to an aperture Q^2, arranged in such a manner as to permit of viewing one of the numerals in the disk O at a time.

When the head L′ is turned, the disk N operates the disk O, and any desired numerals can be made to appear in the aperture Q^2 and on a subdivision of the disk N, which stands opposite the pin Q′, to indicate the size of the ring. When the head L′ is turned, the screw L^2, carrying the said head, is raised or lowered in its bearing L^3 until the desired number is reached for the size of the ring, and then the screw L^2 is clamped in its bearing L^3, and the

shaft P is clamped in its bearing P′, as previously mentioned. The rolling position of the lever B′ and the top of the head L is then set, so that when the lever B′ in its downward movement, as previously described, rests on the top of the head L′ then the ring has the diameter indicated by the graduations on the disks O and N.

The operation is as follows: The ring in its rough state is placed on the die E, and then the latter is put in position on the lever B′, which for this purpose can be disengaged from the link I and raised. When the die E is replaced, its square end E^2 is passed into the collar E^3, as shown in Fig. 4. The stopping device L has previously been set, as above described, to the proper size of the ring when finished, the head L′ then being the proper distance below the lever B′. The operator then adjusts the plates F to the sides of the ring, which latter rests in the groove of the die C. The lever J is then in its lowermost position and when raised causes the link I to engage the free end of the lever B′, and when the lever J is raised further the said lever B′ is pressed downward, and at the same time a rotary motion is imparted to the dies C and E from the shafts G^4 and H^4, as previously described. The operator presses the lever J upward until a further downward movement of the lever B′ is interrupted by the said lever striking the top of the head L′ of the stopping device L. During the process of rolling the ring between the two dies C and E the die E is pressed onto the inside of the ring to hold the latter in the groove of the die C, and both dies rotate at such a speed that the movement is such that no retarding pressure is caused between the two dies and the ring, the outer die C traveling faster than the inner die and in such proportion as to always press equally and radially on the ring. The dies C and E are prevented from slipping sidewise by suitable collars C^2 and E′, adapted to abut against the outer faces of one of the standards B and the lever B′. When the ring is finished, the operator releases the lever J to disengage the link I from the lever B′, and then the latter is swung upward, the die E is removed, and the finished ring D is slipped off of the die and a new rough one is placed on the die, which is again placed in position in the lever B′ and engaged with the collar E^3. The above-described operation is then repeated.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, substantially as shown and described.

2. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, and a lever pressing on the said second circular die to press the ring into the groove of the grooved die, substantially as shown and described.

3. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, a lever pressing on the said second circular die to press the ring into the groove of the grooved die, and a stopping and indicating device for interrupting the downward movement of the said lever and for indicating the size of the ring rolled, substantially as shown and described.

4. In a rolling-machine for shaping and sizing rings, the combination, with a grooved die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, a lever pressing on the said second circular die to press the ring into the groove of the grooved die, and means, substantially as described, for pressing the said lever, and an indicating device actuated by the said lever and serving to indicate the power applied on the said lever, and to finally indicate the size of the ring rolled, substantially as shown and described.

5. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, a lever pressing on the said second circular die to press the ring into the groove of the grooved die, and guiding-plates held adjustably in the said lever and adapted to engage the sides of the ring to be rolled, substantially as shown and described.

6. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, a lever pressing on the said second circular die to press the ring into the groove of the grooved die, guiding-plates held adjustably in the said lever and adapted to engage the sides of the ring to be rolled, and screws screwing in the said lever to adjust the said guide-plates, substantially as shown and described.

7. In a rolling-machine for shaping and sizing rings, the combination, with a grooved circular die mounted to turn and adapted to

engage the outside of the ring, of a second circular die traveling at a lower rate of speed than the said grooved die and adapted to engage the inside of the ring, a lever pressing on the said second circular die to press the ring into the groove of the grooved die, two inclined shafts connected with the said dies, and gear-wheels of different diameters in mesh with each other and connected by their shafts with the said inclined shafts to impart a differential rate of speed to the said dies, substantially as shown and described.

8. In a rolling-machine for shaping and sizing rings, the combination, with a die-lever, of a link adapted to engage the free end of the said lever, a hand-lever pivotally connected with the said link, and pins held on the said link and adapted to engage curved slots, substantially as shown and described.

9. In a rolling-machine for shaping and sizing rings, the combination, with a die-lever, of guide-plates held in the said lever and screws screwing on the said lever to adjust the said guide-plates, substantially as shown and described.

10. In a rolling-machine for shaping and sizing rings, a stopping device comprising a screw-rod having a head and screwing in a fixed bearing, a graduated disk held on the said screw-rod, and a second graduated disk operated from the first-named graduated disk to indicate the full size of the ring, while the first-named disk indicates subdivisions, substantially as shown and described.

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