No. 709,512. Patented Sept. 23, 1902.

C. F. ROPER.

MECHANISM FOR TRUING SPINNING RINGS.

(Application filed Jan. 9, 1902.)

(No Model.) 3 Sheets—Sheet 1.

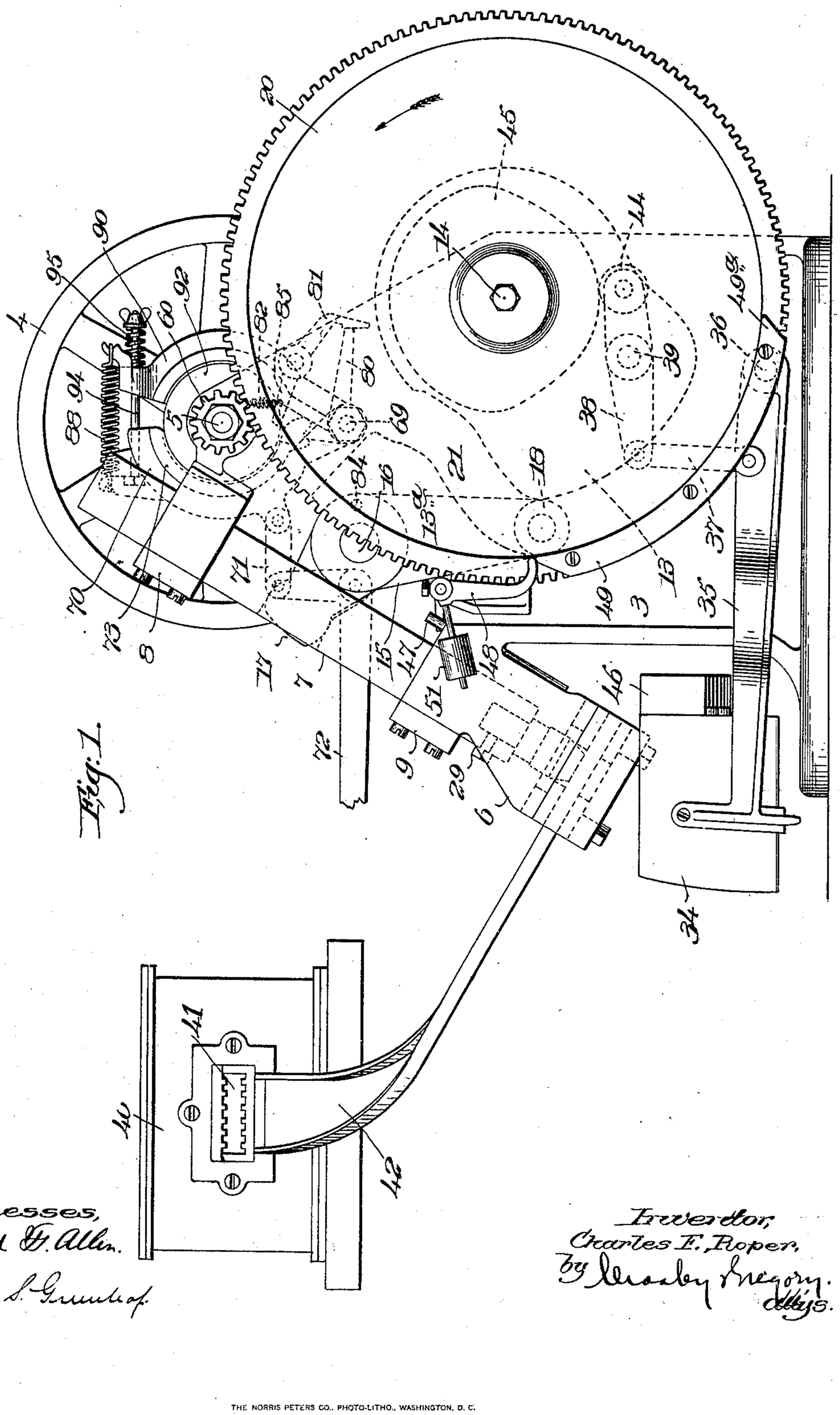

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

Fig: 2.

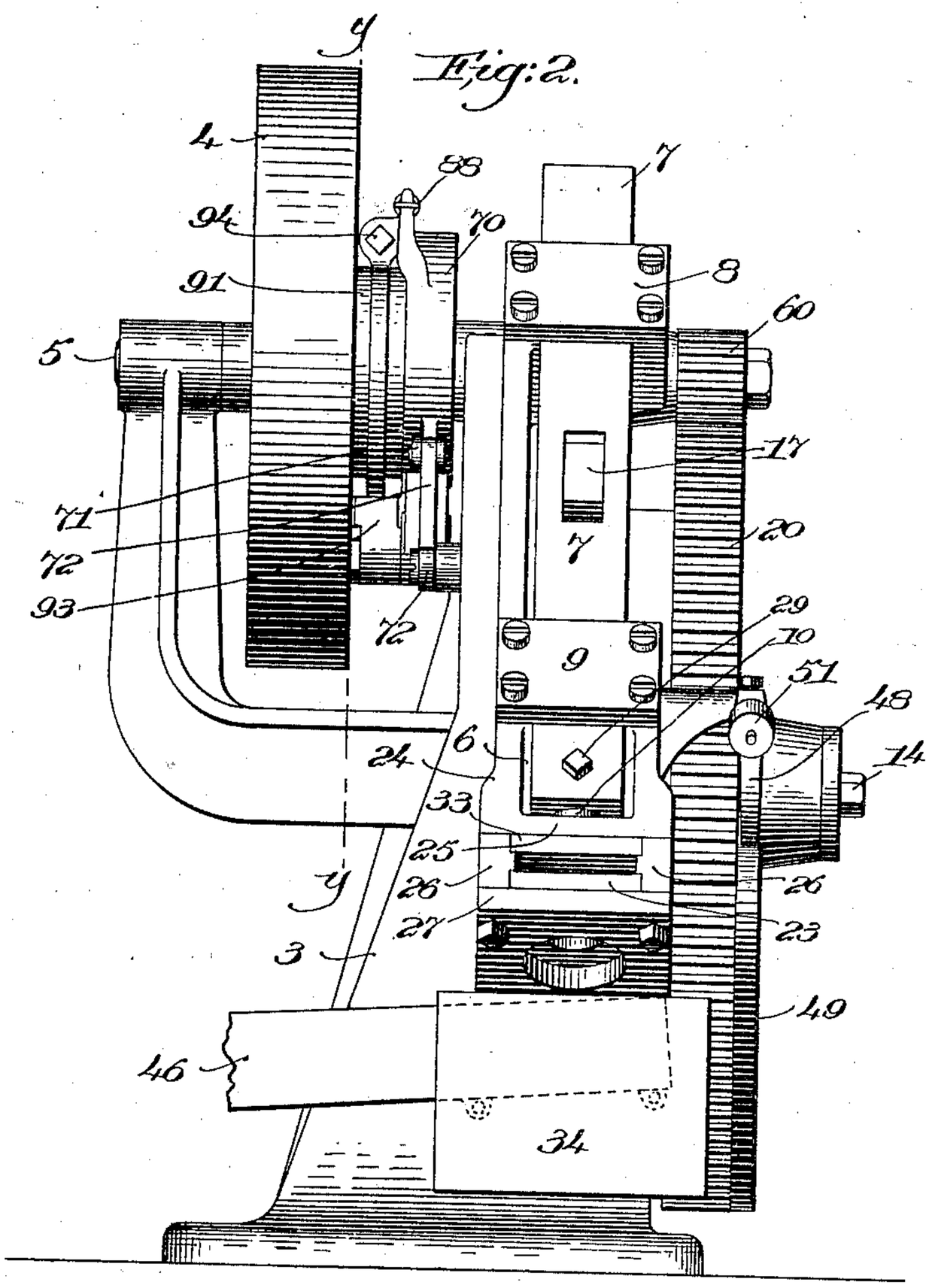

Fig: 3.

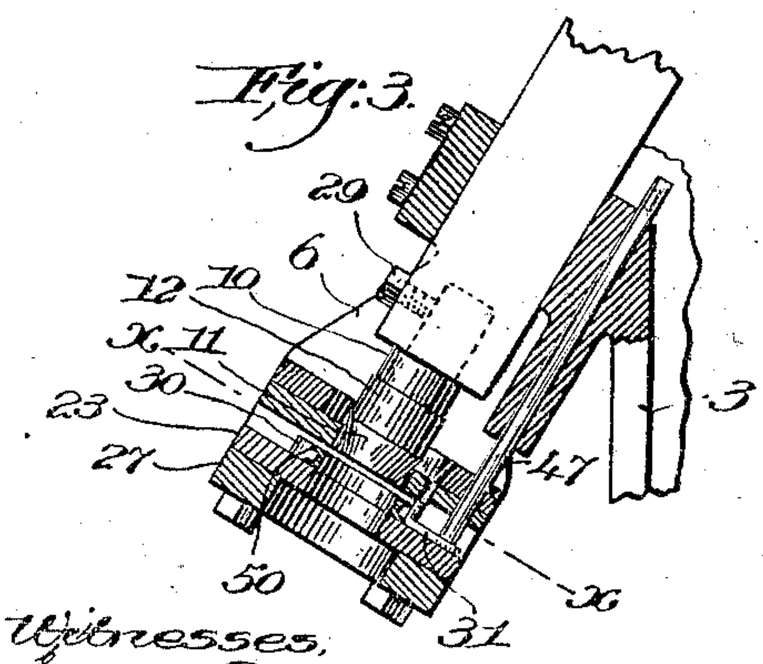

Fig: 4.

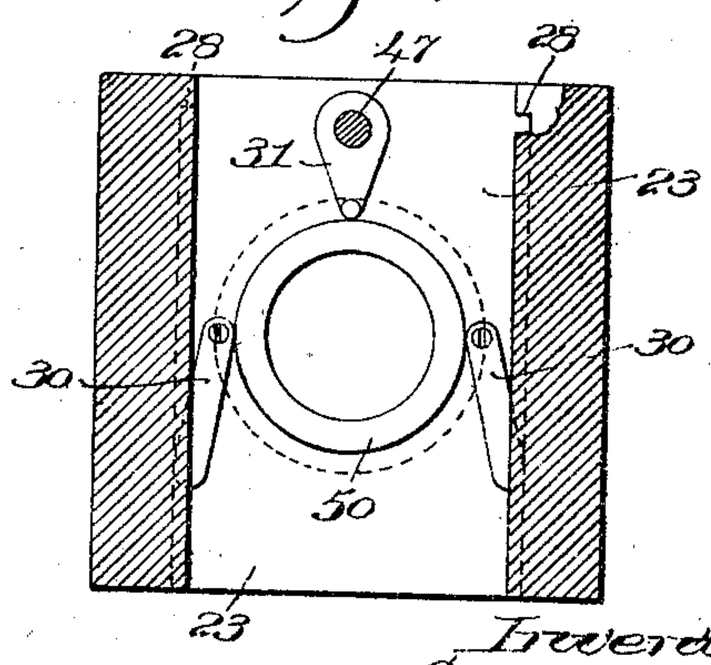

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Fig: 5.

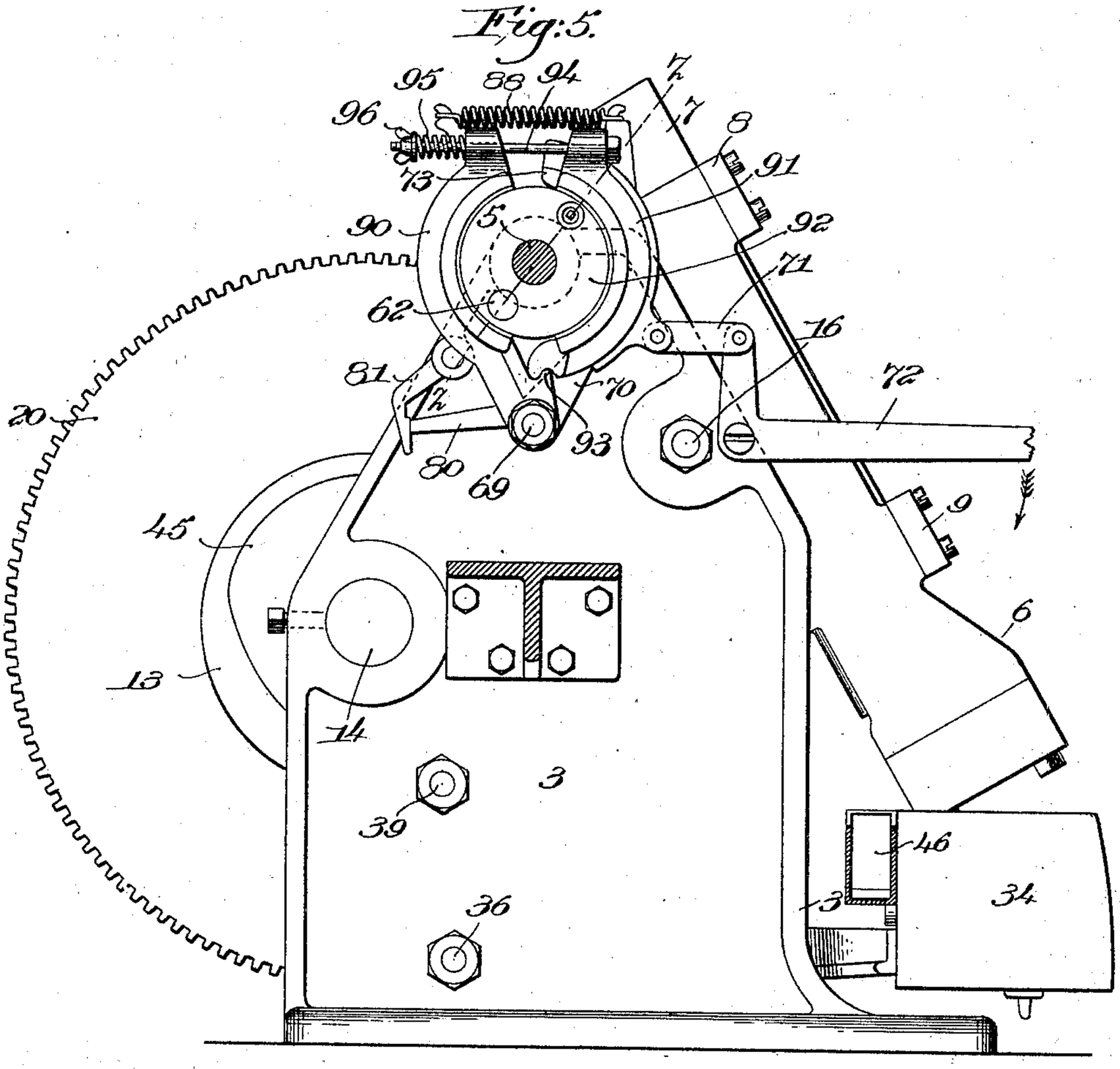


Fig: 6.

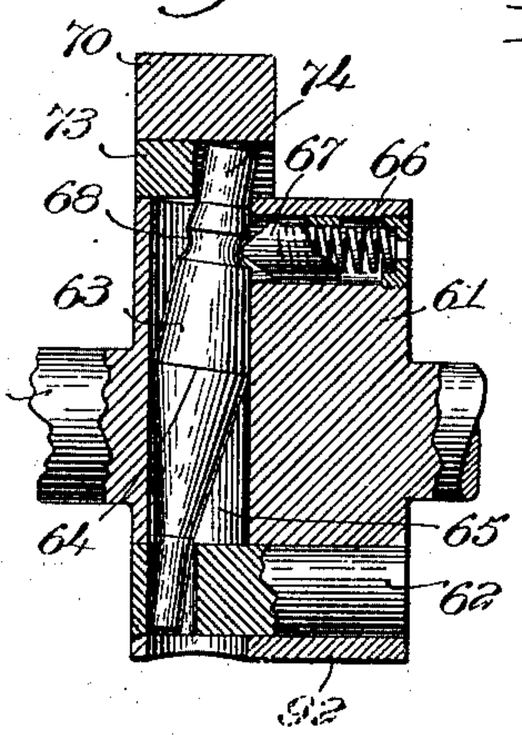
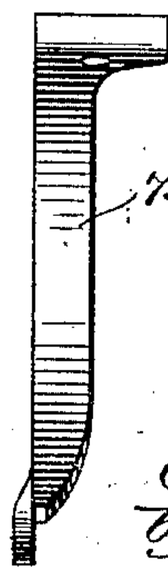


Fig: 7.



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UNITED STATES PATENT OFFICE.

CHARLES F. ROPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

MECHANISM FOR TRUING SPINNING-RINGS.

SPECIFICATION forming part of Letters Patent No. 709,512, dated September 23, 1902.

Application filed January 9, 1902. Serial No. 88,976. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Mechanism for Truing Spinning-Rings, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

In the manufacture of spinning-rings it frequently happens that after being tempered or hardened in the first instance the spinning-ring is not perfectly true, this distortion of the spinning-ring being due to the unequal structural strains to which it is subjected in the process of hardening, and often causing sufficient irregularity or eccentricity in the ring to seriously affect the operation of the ring when used in a spinning-machine.

In United States Patent No. 606,675, dated July 5, 1898, is described a hand device by which spinning-rings may be trued up. In this patent the ring, which has previously been hardened in any usual manner and which has been distorted slightly in such hardening process, is heated to such a temperature as will admit of its stretching without rupture, and thereafter an arbor having a tapering end and a cylindrical portion of the diameter desired for the interior of the ring is forced into the said ring, the ring during this operation being sustained upon a suitable seat, which is so constructed as to sustain the ring beneath its web. The result of this operation is that the ring is stretched slightly and is given by means of the arbor a correct and true internal diameter. While the ring is thus stretched over the arbor it is cooled in some suitable way, thus giving to the ring a second hardening, and as this rehardening of the ring is accomplished while the ring is stretched over the arbor no distortion of the ring occurs during this process. In the patent above referred to these various steps were performed entirely by hand—that is, the arbor was forced into the ring by hand. The ring and arbor were then immersed in some water by hand, and subsequently the ring was manually stripped from the arbor.

It is the object of my invention to provide an organized machine which performs these various operations automatically and without the necessity of manual operation.

My invention comprises a device including a support to sustain the ring to be treated, an arbor to be forced into the ring, automatic mechanism to give said parts a relative movement toward and from each other, and means operating automatically to cool the ring while thus stretched upon the arbor.

My invention also includes a device for stripping the cooled or rehardened ring from the arbor as the arbor is separated from the support.

With my machine, therefore, it is merely necessary to feed the heated rings one by one into a suitable chute, which conducts them to the support, and the other steps of the rehardening process are carried on entirely automatically.

The support which I preferably employ for the rings comprises a plate having an aperture therethrough of a size to receive the arbor, which is mounted in a suitable guideway above the support and which is reciprocated by suitable mechanism hereinafter described.

Suitable mechanism is employed to correctly position the heated ring upon the support as the ring is delivered to the support from the chute.

After a ring has been received by the support, the arbor-reciprocating mechanism is thrown into operation and the arbor is forced into the ring, as will be readily understood, to stretch the same slightly. Thereafter a pan or tank containing water, which pan is normally supported beneath the support for the ring, is raised by suitable mechanism, so as to immerse the ring in the water therein, whereby the ring is cooled, and thus rehardened. The pan-operating mechanism then lowers the pan, and at the same time the arbor-reciprocating mechanism withdraws the arbor. The ring is lifted with the arbor, as will be obvious, and, as the arbor is retracted, the ring is brought against a stripper-plate, which serves to strip the ring from the arbor. After the ring is released from the

arbor it passes into a suitable chute, which conveys it into a receptacle or to any other suitable place.

Referring to the drawings, Figure 1 is a side view of a machine embodying my invention. Fig. 2 is an end view of Fig. 1. Fig. 3 is a sectional view of the support and stripper-plate. Fig. 4 is a section on the line $x\,x$, Fig. 3. Fig. 5 is a section on the line $y\,y$, Fig. 2; and Figs. 6 and 7 are details of the clutch mechanism which I prefer to employ, Fig. 6 being a section on line $z\,z$, Fig. 5.

The operative parts of the organized machine are mounted upon any suitably-shaped framework (designated generally by 3) and are driven from a suitable driving-pulley 4, mounted upon a shaft 5.

In the form of my invention herein illustrated the frame 3 has as a portion thereof an arm 6, which is shown as slightly inclined and which carries the support or seat upon which the ring is fixedly sustained, the said arm also having means to receive and guide the lower end of the arbor-carrier.

The arbor-carrier is designated by 7 and is illustrated as a bar sliding through a suitable guide 8 at its upper end and through a similar guide 9 at its lower end, the said carrier having secured in its lower end in any suitable or usual way the arbor 10, which is adapted to be inserted into the ring and has the cylindrical portion 12 of the diameter desired for the interior of the ring. Preferably the arbor will be constructed with the conical end portion 11, as in my patent above referred to, in order to facilitate its insertion into the ring.

The arbor-carrier and arbor are shown as being reciprocated by means of suitable cam devices 13 13^a. (Shown in dotted lines in Fig. 1.) The said cam devices are shown as carried by a disk 20, mounted on a suitable shaft 14, supported in the frame. An actuating-lever 15, oscillating on a stud or pivot 16 on the frame, has one arm 17 thereof extending through a suitable aperture in the arbor-carrier 7, and the other arm of said lever carries a roll 18, which engages the cam devices 13 13^a. It will be observed from Fig. 1 that these cam devices are so positioned as to leave a cam-groove 21 therebetween, and as the disk 20 rotates in the direction of the arrow, Fig. 1, the actuating-lever 15 is first rocked by the cam 13^a in a direction to force the arbor-carrier 7 downwardly, this action continuing until the roll 18 leaves a groove 21, and as the disk 20 continues to rotate the cam 13, owing to its peculiar shape, will raise the carrier 7, as will be obvious. The cam devices 13 13^a and the actuating-lever 15 therefore constitute the arbor-reciprocating mechanism.

The support or seat which fixedly sustains the ring while the arbor is being forced therein into is designated by 23, and it is shown as detachably sustained in the lower end of the arm portion 6 of the frame. This arm portion of the frame is conveniently made so as to comprise two side pieces 24, connected by a cross-web 25. To the under side of the cross-web 25 are secured two pieces 26, to the bottom of which the apertured plate 27 is connected in any suitable way. The pieces 26 are illustrated as grooved slightly, as shown in Figs. 2 and 4, and the lower groove is adapted to receive the supporting-plate 23, which forms the seat for the ring, as above described.

The plate 23 is provided with an aperture which is of a size to receive the cylindrical portion 12 of the arbor with a sliding fit, and said plate is supported in its proper position in the groove by means of shoulders 28 on either side thereof, which engage corresponding shoulders at the end of the groove. (See Fig. 4.) The object of slidingly supporting the plate in the groove, as shown, is so that any particular plate 23 may be removed and another plate with a larger or smaller aperture therein be inserted in its stead. The arbor is also detachably sustained in the arbor-carrier by means of the set-screw 29, and my machine therefore can be used for rehardening spinning-rings of different sizes by simply changing the plate 23 and the arbor. The spinning-ring 50 being treated is centered upon the plate or seat 23 by means of the guides 30, which are slightly inclined, as illustrated, to form a flared mouth to receive the ring as it is delivered from the chute, hereinafter described. A suitable back-stop 31 engages the back side of the ring, and the said back-stop and guides 30 serve to properly position the ring to receive the arbor during its reciprocation.

I have illustrated in Fig. 1 any suitable furnace 40, in which the rings are heated to the correct temperature. This furnace is situated in any convenient position, and the mouth 41 thereof is preferably connected by means of a suitable chute 42 with the mechanism above described, the chute being so positioned as to deliver the rings between the inclined guides 30. It is simply necessary, therefore, to withdraw a heated ring from the furnace and place it in the chute, when the chute will deliver it to the seat 23, and the centering device will center it properly to receive the arbor 10. After the arbor has been forced into the ring, as above described, the arbor, with the ring thereon, is immersed in a pan 34, containing water. To accomplish this, I have illustrated the pan as being supported on a suitable arm 35, pivotally mounted at one end upon the frame, as at 36. The arm 35 is connected by means of a suitable link 37 with a lever 38, (see dotted lines, Fig. 1,) mounted upon a stud 39 on the frame, the free end of said lever carrying a roll 44, which engages a cam 45 on the shaft 14. From Fig. 1 it will be observed that the cam 45 is so shaped that after the arbor has been forced into the ring by means of the cam 13^a the said cam 45 will rock the arm 38, and thereby raise the pan 34. The connections between the cam and the pan

are such that the vertical movement of the pan is sufficient to cause the ring and arbor to be immersed in the water in the pan, whereby the ring is chilled or cooled. As the rise of the cam 45 passes off from the roll 44 and the pan descends the cam 13 engages the roll 18 and operates to withdraw the arbor-carrier 7 and arbor 10. As the arbor begins its upward movement it carries the ring with it, and to strip the ring from the arbor I have provided the stripper-plate 33, which rests in the upper grooves in the side pieces 26 and backs against the cross-rib 25. The stripper-plate 33 is provided with an aperture of a size approximately equal to the diameter of the cylindrical portion 12 of the arbor, and as the arbor is retracted the ring 50 is brought against the under side of the stripper-plate and is by the continued upward movement of the arbor stripped therefrom. The stripper-plate 33 is preferably supported in its receiving-groove in the same way that the supporting-plate 23 is, whereby stripper-plates having different-sized apertures may be employed, according to the size of the ring operated upon. As the ring is stripped from the arbor the back-stop 31 is automatically removed to allow the ring to pass by gravity through the space between the stripper-plate and the supporting-plate and drop into any suitable and desired place, the inclined position of the plate allowing the ring to thus be discharged by gravity. The provisions which I have made for thus automatically removing the stop 31 at the proper time consist in providing the said stop with a stem 47, passing through the stripper-plate and cross-web 25 and through a guiding-aperture in a portion of the arm 6. The upper end of a stem 47 has a slot therein which receives one arm of a weighted elbow-lever 48, the other arm of said lever being constructed to engage a suitable cam 49, carried by the disk 20. Referring to Fig. 1, it will be seen that just as the cam 13 is retracting the arbor the end 49ª of the cam 49 engages the elbow-lever 48, thereby rocking said lever in a direction to raise the back-stop 31. The back-stop is held in the last position so long as the arm 48 is in engagement with the concentric portion of the cam 49, and during this time the ring has been stripped from the arbor and has been carried by gravity into the chute 46. When the disk reaches the position shown in Fig. 1, the arm 48 passes off from the cam 49, and the back-stop resumes its initial position under the influence of the weight 51, and the relation between the cams 13 13ª and the arm 15 is such that at this instant the arbor is just about to descend. When the parts are in this position, the device is in readiness to receive a ring from the furnace 40, as will be obvious.

In the preferred embodiment of my invention the action of the machine is intermittent—that is, assuming that parts are in the position shown in Fig. 1 and that a ring has just been placed upon the seat, the various operations above outlined will be performed, to-wit: The arbor will be forced into the ring, the pan will be raised to immerse the ring and cool the same, and the arbor will then be retracted and the ring stripped therefrom, and at the same time the back-stop will be removed to allow the ring to pass off from the seat during one complete rotation of the disk 20, and as the said disk comes into the position shown in Fig. 1 its rotation is automatically stopped. Another ring may then be withdrawn from the furnace and delivered to the apparatus and the device again set in operation to perform another cycle of operations, after which it will again be automatically stopped.

The disk 20 is provided on its periphery with gear-teeth which mesh with a pinion 60 on the shaft 5, and the shaft is clutched to the continuously-rotating driving-pulley 4 by means of a clutch mechanism so constructed as to automatically unclutch the pulley 4 from the shaft when the parts have reached the position shown in Fig. 1. One convenient form for accomplishing this object is illustrated in the drawings and will now be described. The shaft 5 has thereon one clutch member 61, which coöperates with the driving-pulley 4, forming the coöperating clutch member. The fixed clutch member 61 supports a suitable clutch-pin 62, which when projected to the right, Fig. 6, is adapted to engage a coöperating pin or suitable recess in the loose clutch member or driving-pulley 4. The clutch-pin 62 is extended or withdrawn by means of an actuating-lever 63, carried by the clutch member 61. The actuating-lever 63 is illustrated as a pin having an enlarged central portion 64, which is of a size to fit the side walls of the transverse aperture 65, said enlarged portion 64 forming, in effect, a fulcrum about which the lever 63 turns. The pin 63 tapers toward its ends, and one end engages a suitable eye in the end of the clutch-pin 62. The other end of the pin 63 is acted upon by means of a suitable spring 66, said spring normally tending to turn the actuating-lever 63 about its fulcrum in a direction to extend the clutch-pin 62. The spring is shown as seated in a recess in the end of a wedge-shaped piece 67, which piece engages a suitable groove 68 in the pin 63, as shown plainly in Fig. 6. Pivoted to the frame 3 at 69 is an arm 70, which is curved to fit the clutch member 61, the said arm being connected by means of a suitable link 71 to a clutch-operating lever 72, suitably pivoted to the frame. The curved arm 71 has fast thereto a cam 73 of the shape shown in Fig. 7, the cam being so situated as to engage the extended end 74 of the actuating-lever as the clutch member 61 rotates. The parts are shown in the drawings in the position they assume when the clutch member 4 is disconnected from the shaft, and the operative parts of the machine are consequently at rest. To bring the clutch mem-

bers into engagement, the clutch-operating lever 72 is moved in the direction of the arrow, Fig. 5. This operation will withdraw the arm 70, turning the same about the pivot, the movement of the arm being sufficient to withdraw the cam 73 from the end of the pin 74. The spring 66 then acts to turn the lever 63 about its fulcrum, thereby extending or advancing the clutch-pin 62 into position to be engaged by the coöperating clutch member 4. The clutch members are now in engagement, and the continuously-rotating driving-pulley 4 will, through the clutch, set the disk 20 and the various parts of the mechanism into operation.

Since the complete cycle of operations is not performed until the disk 20 has made one complete rotation, it is necessary to maintain the clutch members in engagement during the time of the complete rotation of the said disk. Accordingly I have provided the arm 70 with a tailpiece 80, which when the arm 70 is withdrawn to release the actuating-lever 63, as above described, engages and is sustained by a suitable pivoted latch 81, the latch 81 serving to hold the arm 70 and cam 73 in their inoperative position. The latch 81 may be pivoted to the frame in any suitable way and is preferably maintained in normal position by means of a suitable spring 82. The disk 20 has thereon a clutch-releasing pin 84, (shown in dotted lines in Fig. 1,) the said pin being so situated that as the disk rotates it wipes over and engages the arm 85, forming part of the latch 81. This operation turns the latch 81 about its pivot, and thereby releases the tail portion 80 of the arm 70, when the arm 70 is brought into the full-line position, Fig. 5, by means of a suitable spring 88, which is secured at one end to the upper end of said arm and at the other to a suitable abutment. When the arm 70 is brought to the full-line position, the cam 73 is thrown into a position to be engaged by the end 74 of the lever 63, and as the shaft 5 continues its rotation the said end 74 of the lever rides over the cam 73 and is thereby swung into the position shown in Fig. 6, thus retracting or withdrawing the clutch-pin 62 and disengaging the clutch members. As soon as the clutch is disengaged the shaft 5 is brought to rest immediately by means of the two brake-shoes 90 and 91, which engage the surface 92 on the clutch member 61. One of the brake-shoes 90 is shown as pivoted at 69, and the other brake-shoe 91 is fulcrumed about a projection 93 on the first-named brake-shoe 90. The upper end of the brake-shoes 90 91 are yieldingly held together by means of a bolt 94, passed therethrough, the said bolt sustaining a coiled spring 95 between the adjusting-nut 96 and the brake-shoe 90. The tension of the brake may therefore be adjusted by means of the said adjusting-nut.

It will be seen from the above description that I have provided an automatic clutch-operating mechanism which when rendered active remains active or operative while one cycle of operations is being completed, but which is automatically rendered inactive as soon as the said cycle of operations has been completed, whereby the machine is automatically stopped.

Believing that I am the first to employ an organized machine for automatically performing the various operations incident to the rehardening of spinning-rings, which machine contains a support to hold the ring in fixed position, and automatic means to insert an arbor into the ring and then cool the ring while stretched upon the arbor, I desire to claim the same broadly, and while it has been necessary in order to fully explain the invention to describe specifically one embodiment of my invention, yet I do not consider my invention limited to the precise mechanism shown, as it is evident that the particular form of arbor-reciprocating mechanism and the mechanism for immersing the ring in the water and the means for stripping the ring from the arbor, &c., may be varied without departing from the spirit of my invention.

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

1. In an organized machine for truing spinning-rings, the following instrumentalities viz: an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the ring, means to support the ring while the arbor is being inserted therein, arbor-reciprocating mechanism, and mechanism operating automatically to cool the ring after it has been stretched upon the arbor.

2. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into the ring, and having a cylindrical portion of the diameter desired for the interior of the ring, means to support the ring while the arbor is being inserted therein, arbor-reciprocating mechanism and means independent from the arbor-reciprocating mechanism to immerse the ring in a cooling-bath after it has been stretched upon the arbor.

3. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support for the ring operating to hold the latter in fixed position while the arbor is being inserted therein, arbor-reciprocating mechanism, and means to cool the ring while stretched upon the arbor and during the time that it is sustained by the support.

4. In a machine for truing spinning-rings, an arbor adapted to be inserted into a spinning-ring and having a cylindrical portion of the diameter desired for the interior of the ring, a seat to support the spinning-ring, arbor-reciprocating mechanism, and means separate from the latter to immerse said ring in a cooling-bath when stretched upon the arbor.

5. In an apparatus for truing spinning-

rings, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain a ring in fixed position, arbor-reciprocating mechanism, the movement of the arbor toward the support operating to force the arbor into the ring, means to cool the ring when stretched upon the arbor, and means to strip the ring from the arbor during the backward movement of the latter.

6. In an apparatus for truing spinning-rings, a support to sustain a spinning-ring, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, arbor-reciprocating mechanism, the movement of the arbor toward the support operating to force the arbor into the ring, means to cool the ring when stretched upon the arbor, and means independent from the support to strip the ring from the arbor during the backward movement of the latter.

7. In an apparatus for truing spinning-rings, a suitable frame, arbor-reciprocating mechanism carried thereby, an arbor detachably connected to said arbor-reciprocating mechanism, a support for the ring detachably carried by the frame, the movement of the arbor toward the support operating to force the arbor into the ring, and means separate from the arbor-reciprocating mechanism to immerse the ring in a cooling-bath while it is stretched upon the arbor.

8. In a machine for truing spinning-rings, a suitable frame, arbor-reciprocating mechanism, an arbor detachably connected therewith, a support for the ring removably carried by the frame, the movement of the arbor toward the support operating to force the arbor into the ring, means to cool the ring when stretched upon the arbor, and means to strip the ring from the arbor as the latter recedes from the support.

9. In a mechanism for truing spinning-rings, a reciprocating arbor adapted to be inserted into a spinning-ring, and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring, means to center the ring on the support in position to receive the arbor, said means being independent from the support and arbor-reciprocating mechanism.

10. In a mechanism for truing spinning-rings, a reciprocating arbor adapted to be inserted into a spinning-ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring in fixed position, devices to center the ring on the support in position to receive the arbor, arbor-reciprocating mechanism, the arbor in its movement toward the support being forced into the ring, and means to cool the ring while stretched upon the arbor.

11. In a machine for truing spinning-rings, a reciprocating arbor adapted to be inserted into a ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring in a fixed position, devices to center the ring on the support in position to receive the arbor, arbor-reciprocating mechanism, the arbor in its movement on the support being forced into the ring, means to cool the ring while stretched upon the arbor, and means to strip the ring from the arbor as the latter recedes from the support.

12. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring while the arbor is being inserted therein, arbor-reciprocating mechanism, means to cool the ring when stretched upon the arbor, and means independent from the support to strip the ring from the arbor during the retrograde movement of the latter.

13. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into a ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring while the arbor is being inserted therein, means independent from the support to center the ring thereon in position to receive the arbor, arbor-reciprocating mechanism, and means independent from the support to strip the ring from the arbor during the retrograde movement of the latter.

14. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into the ring, and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring while the arbor is being inserted therein, means independent from the support to center the ring, and means to cool the ring when stretched upon the arbor.

15. In a mechanism for truing spinning-rings, a reciprocating arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, a support to sustain the ring, means to center the ring on the support in position to receive the arbor, said means including a removable stop, arbor-reciprocating mechanism, the arbor in its movement toward the support being forced into the ring, means to strip the ring from the arbor during the receding movement of the latter, and means acting simultaneously to withdraw the stop from the path of the ring whereby the finished ring passes off from the support.

16. In a mechanism for truing spinning-rings, an arbor adapted to be inserted into the ring and moving in an inclined path, said arbor having a cylindrical portion of the diameter desired for the interior of the ring, an inclined support to sustain the ring in the path of movement of the arbor, arbor-reciprocating mechanism, the arbor during its reciprocation being forced into the ring, and means to strip the ring from the arbor during the backward movement of the latter, the in-

clined position of the parts allowing the finished ring to be discharged from the support by gravity.

17. In a mechanism for truing spinning-rings, an arbor adapted to be inserted into the ring and moving in an inclined path, such arbor having a cylindrical portion of the diameter desired for the interior of the ring, an inclined support to sustain said ring in the path of movement of the arbor, means to properly position said rings on the support to receive the arbor, said means including a removable stop, arbor-reciprocating mechanism, the arbor during its movement toward the support being forced into the ring, means to strip the ring from the arbor when the latter recedes from the support, and means to simultaneously remove the back-stop from the path of the ring, the inclined position of the parts allowing the finished ring to be discharged from the support by gravity.

18. In an apparatus for truing spinning-rings, an arbor adapted to be inserted into the ring and moving in an inclined path, said arbor having a cylindrical portion of the diameter desired for the interior of the ring, an inclined support to sustain said ring in the path of movement of the arbor, centering devices to properly position the ring on the support to receive the arbor, arbor-reciprocating mechanism, the arbor during its movement toward the ring being forced into the latter, a pan containing a cooling-bath and situated beneath the support, means to raise said pan to immerse the ring in the cooling-bath, and means to strip the ring from the arbor as the arbor recedes from the support.

19. In a mechanism for truing spinning-rings, an arbor adapted to be inserted into the ring and moving in an inclined path, such arbor having a cylindrical portion of the diameter desired for the interior of the ring, an inclined support to sustain said ring in the path of movement of the arbor, means to properly position said ring on the support to receive the arbor, said means including a removable stop, arbor-reciprocating mechanism, the arbor during its movement toward the support being forced into the ring, a pan containing a cooling-bath and situated beneath the support, means to raise said pan to immerse the ring in the cooling-bath, means to strip the ring from the arbor as the arbor recedes from the support, and means to simultaneously remove the stop from the path of the ring, the inclined position of the parts allowing the finished ring to be discharged from the support by gravity.

20. In a machine for truing spinning-rings, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, means to force said arbor into a ring, means to hold the ring in fixed position while the arbor is being inserted therein, means to cool the ring when stretched upon the arbor, and means to strip the ring from the arbor, combined with means acting automatically to stop the operation of the machine when the above-named cycle of operations has been completed.

21. In a machine for truing spinning-rings, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, devices to force the arbor into the ring, means to hold the ring in a fixed position while the arbor is being inserted therein, devices to cool the ring when stretched on the arbor, and devices to strip the ring from the arbor after the ring has been cooled, a driving-shaft operatively connected with each of said devices, a clutch mechanism by means of which said driving-shaft is rotated, and means to automatically render said clutch inactive after a complete cycle of operations has been performed.

22. In a mechanism for rehardening spinning-rings, a support to receive the ring to be treated, an arbor, arbor-reciprocating mechanism including a rotating cam device, the arbor in its movement toward the support being forced into the ring, a pan beneath the support, said pan adapted to receive a cooling-bath, cam devices rotating in unison with the first-named cam device, and operating to elevate the pan to immerse the ring therein while said ring is stretched over the arbor, means to rotate said cam devices, and means acting automatically to stop the rotation thereof when said cam devices have made one complete revolution.

23. In a mechanism for rehardening spinning-rings, a stationary support, a reciprocating arbor-carrier, an arbor secured thereto, an operating-lever engaging said carrier, a cam mechanism coöperating with said lever, and through the lever causing the arbor to be reciprocated, the arbor in its movement toward the support being forced into the ring, an oscillating arm carrying a pan at one end adapted to contain a cooling-bath, and a cam controlling the movement of said arm, the construction being such that after the arbor has been forced into the ring, the pan is raised to immerse the ring in the cooling-bath.

24. In a mechanism for rehardening spinning-rings, a stationary support, a reciprocating arbor-carrier, an arbor secured thereto, an operating-lever engaging said carrier, a cam mechanism coöperating with said lever, and through the lever causing the arbor to be reciprocated, the arbor in its movement toward the support being forced into the ring, an oscillating arm carrying a pan at one end adapted to contain a cooling-bath, a cam controlling the movement of said arm, and a stripper-plate situated above the support and having an aperture through which the arbor passes in its reciprocation, the construction of these devices being such that after the arbor has been forced into the ring, the pan is raised to immerse the ring in the cooling-bath, and as the arbor recedes from the support, the ring is brought against the stripper-plate and stripped from the arbor.

25. In a mechanism for rehardening spinning-rings, a frame, a stationary support detachably secured therein, an arbor-carrier, an arbor detachably secured to said carrier, an actuating-lever engaging said carrier, a pan beneath the support, and adapted to contain a cooling-bath, an oscillating arm to which said pan is connected, and cam mechanism for actuating said lever and arm respectively, whereby the arbor and pan are moved toward and from the support, the construction being such that the arbor is forced into the ring as it moves toward the support, and the ring is immersed in the cooling-bath while stretched over the arbor.

26. In an apparatus for truing spinning-rings, a support adapted to sustain a ring, an arbor, an arbor-reciprocating lever, a pan to contain a cooling-bath, an oscillating lever or arm supporting said pan, rotating cam devices for actuating said lever and arm respectively, and means acting automatically to stop the rotation of the cam devices when they have made a complete rotation.

27. In apparatus for truing spinning-rings, an inclined support, a chute to deliver a ring to said support, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, means to reciprocate said arbor, said arbor in its movement toward the support being forced into the ring, a pan to contain a cooling-bath, said pan being situated beneath the support, means to raise the pan and immerse the ring in the bath while the said ring is stretched over the arbor, means to strip the ring from the arbor as the latter recedes from the support, and a chute to receive the ring as it is discharged from the inclined support by gravity.

28. In an apparatus for truing spinning-rings, a support to sustain a ring, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, automatic means to move one of said parts toward the other whereby the arbor is forced into the ring, devices separate from said automatic means to immerse the ring in a cooling-bath while stretched upon the arbor.

29. In an apparatus for truing spinning-rings, a support to sustain a spinning-ring, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, automatic means to move one of said parts toward and from the other, the arbor being forced into the ring during the relative movement of the parts toward each other, means operating automatically to cool the ring when stretched upon the arbor, and means independent from the support to strip the ring from the arbor as the arbor and support are separated from each other.

30. In an apparatus for truing spinning-rings, a frame, an inclined supporting-plate therein, having an aperture, an arbor adapted to be inserted into the ring and having a cylindrical portion of the diameter desired for the interior of the ring, means to give said arbor and supporting-plate a relative movement toward and from each other, the arbor being forced into the ring as the arbor and plate are brought toward each other relatively, means to cool the ring when stretched over the arbor, a stripper-plate above the support and having an aperture to receive the arbor as the arbor and support are moved toward each other, the said stripper-plate operating to strip the ring from the arbor, as the latter and the support are moved away from each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. ROPER.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.