Oct. 16, 1923. 1,471,032

C. E. JOHNSON

AUTOMATIC PISTON RING LATHE

Filed Jan. 9, 1922 7 Sheets-Sheet 1

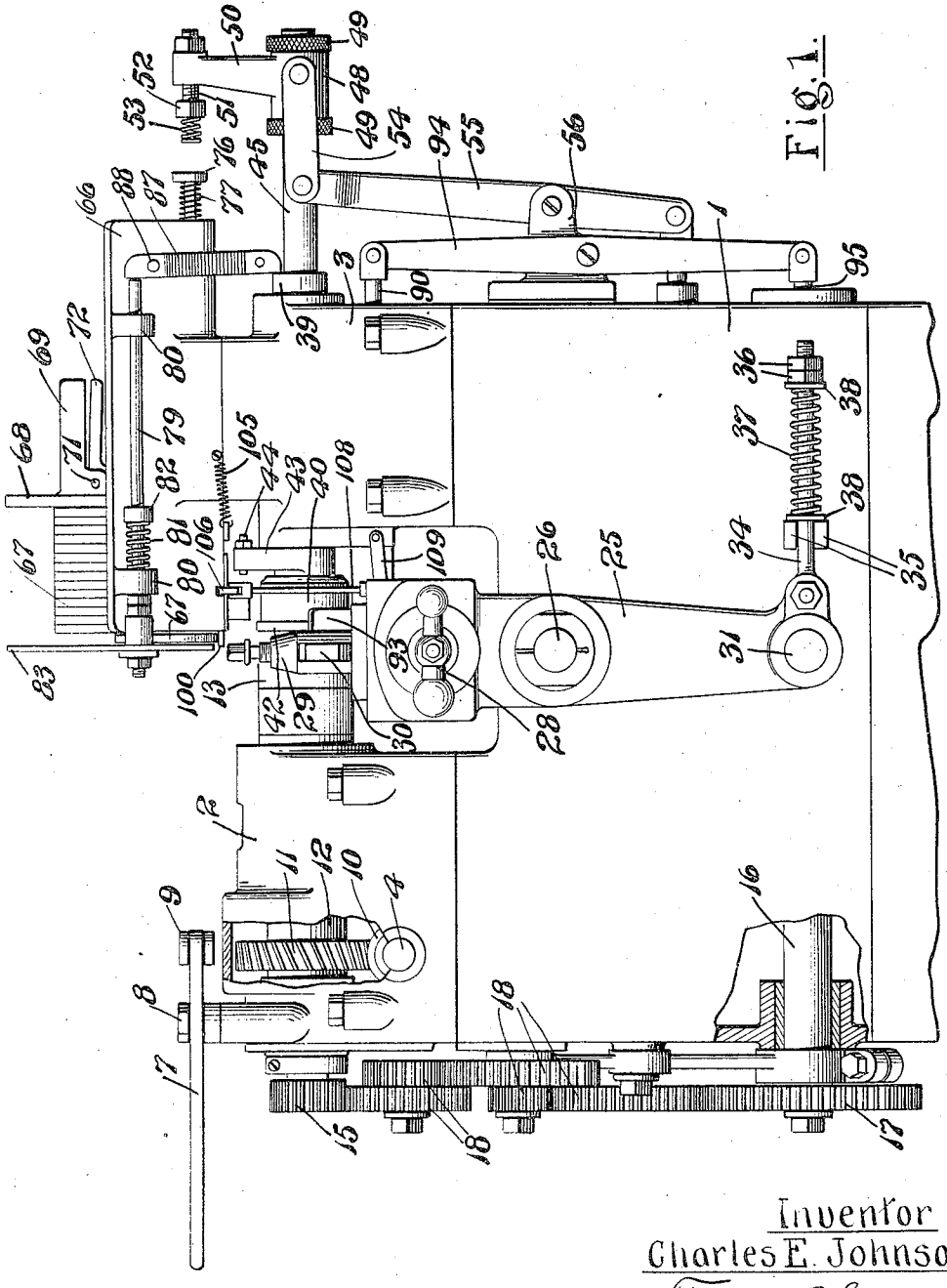


Fig. 1.

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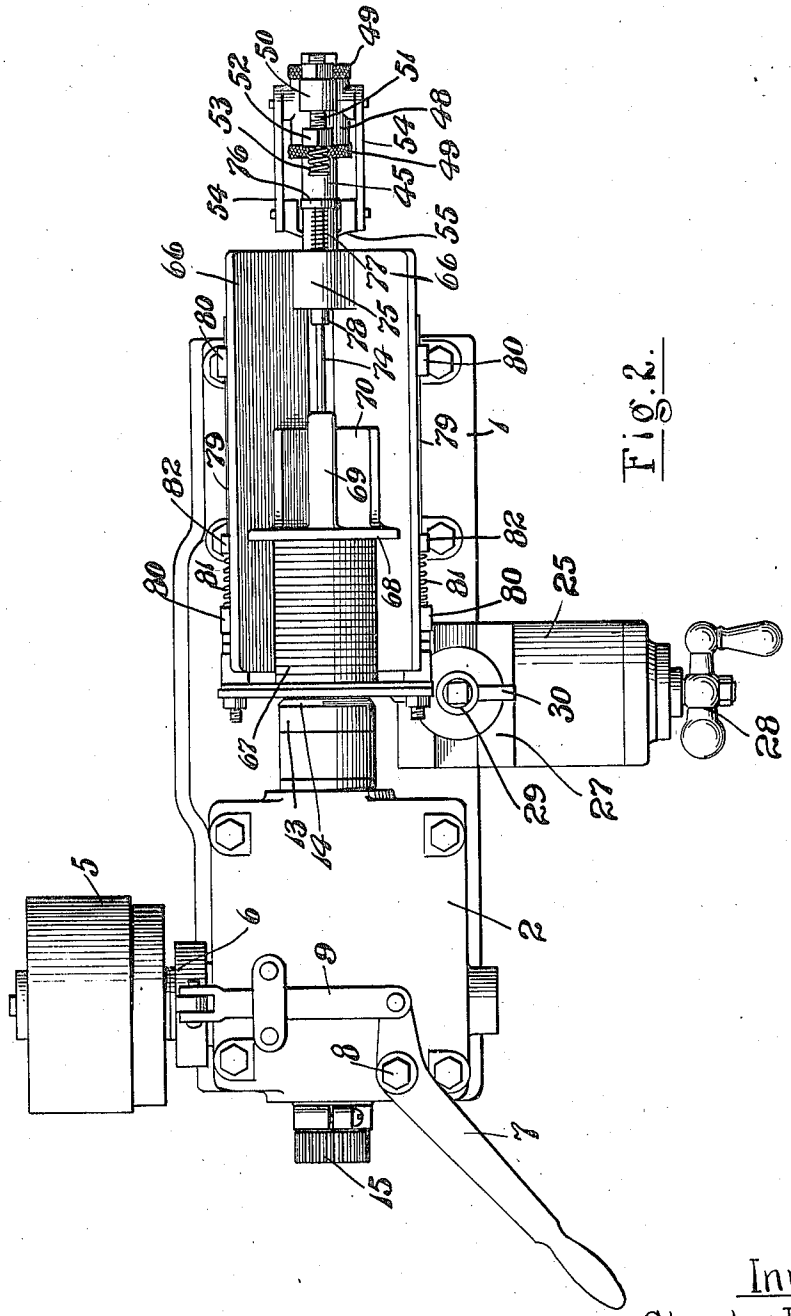


Fig. 2.

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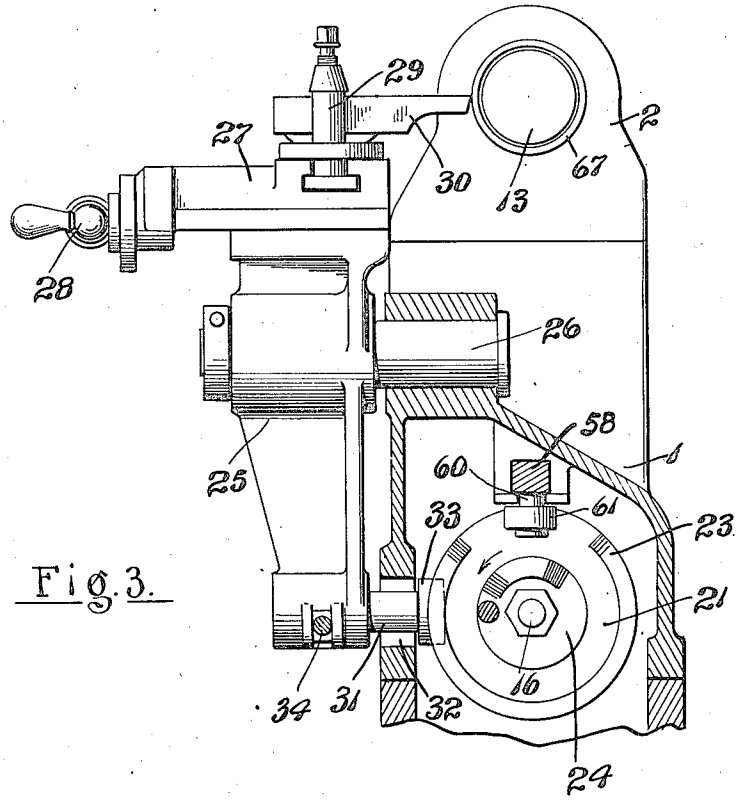


Fig. 3.

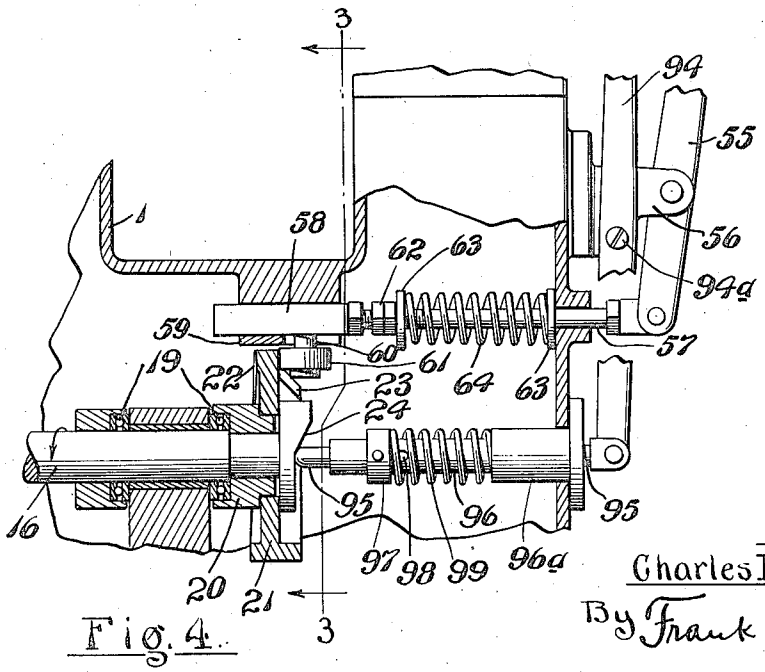


Fig. 4.

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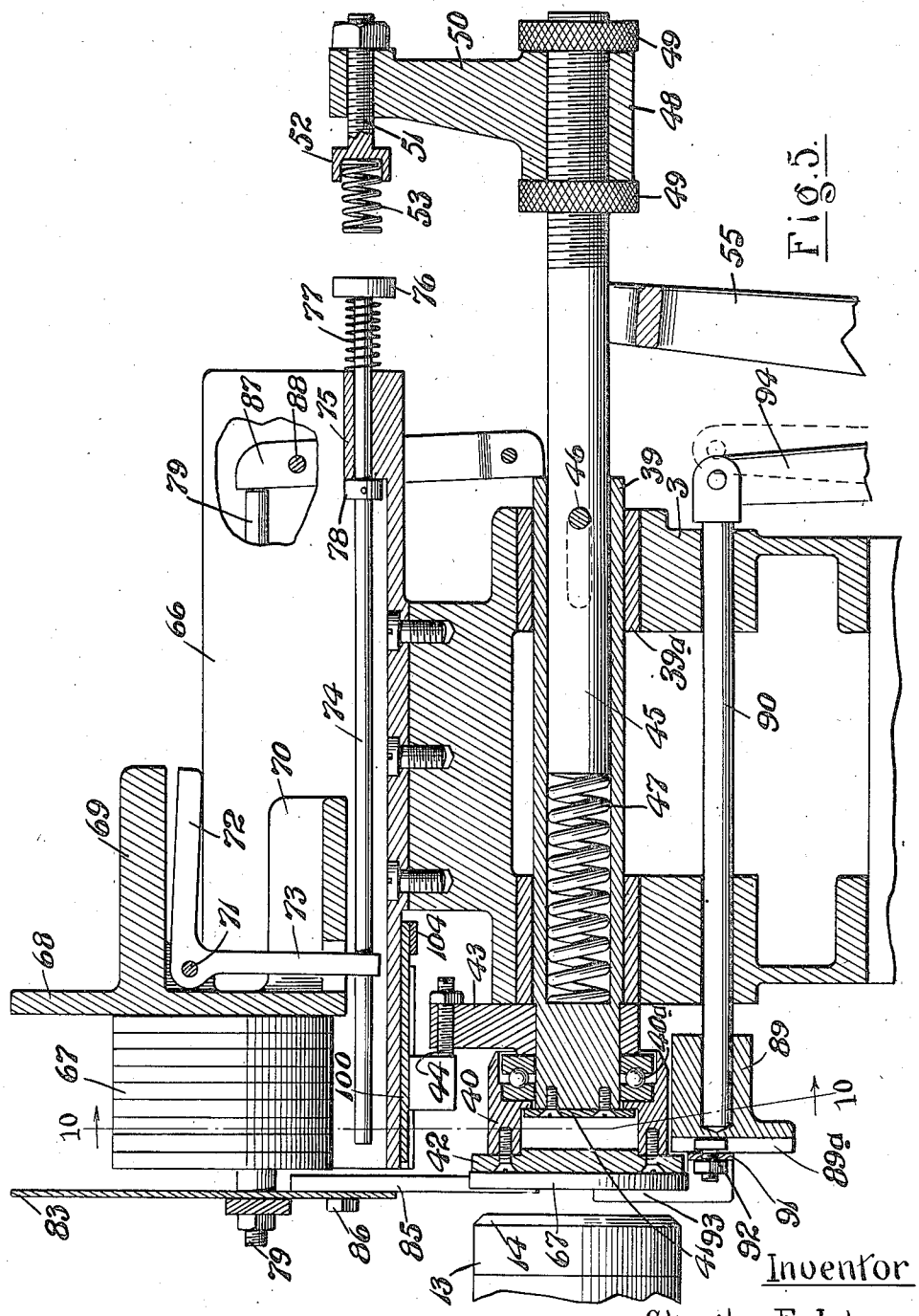


Fig. 5.

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AUTOMATIC PISTON RING LATHE

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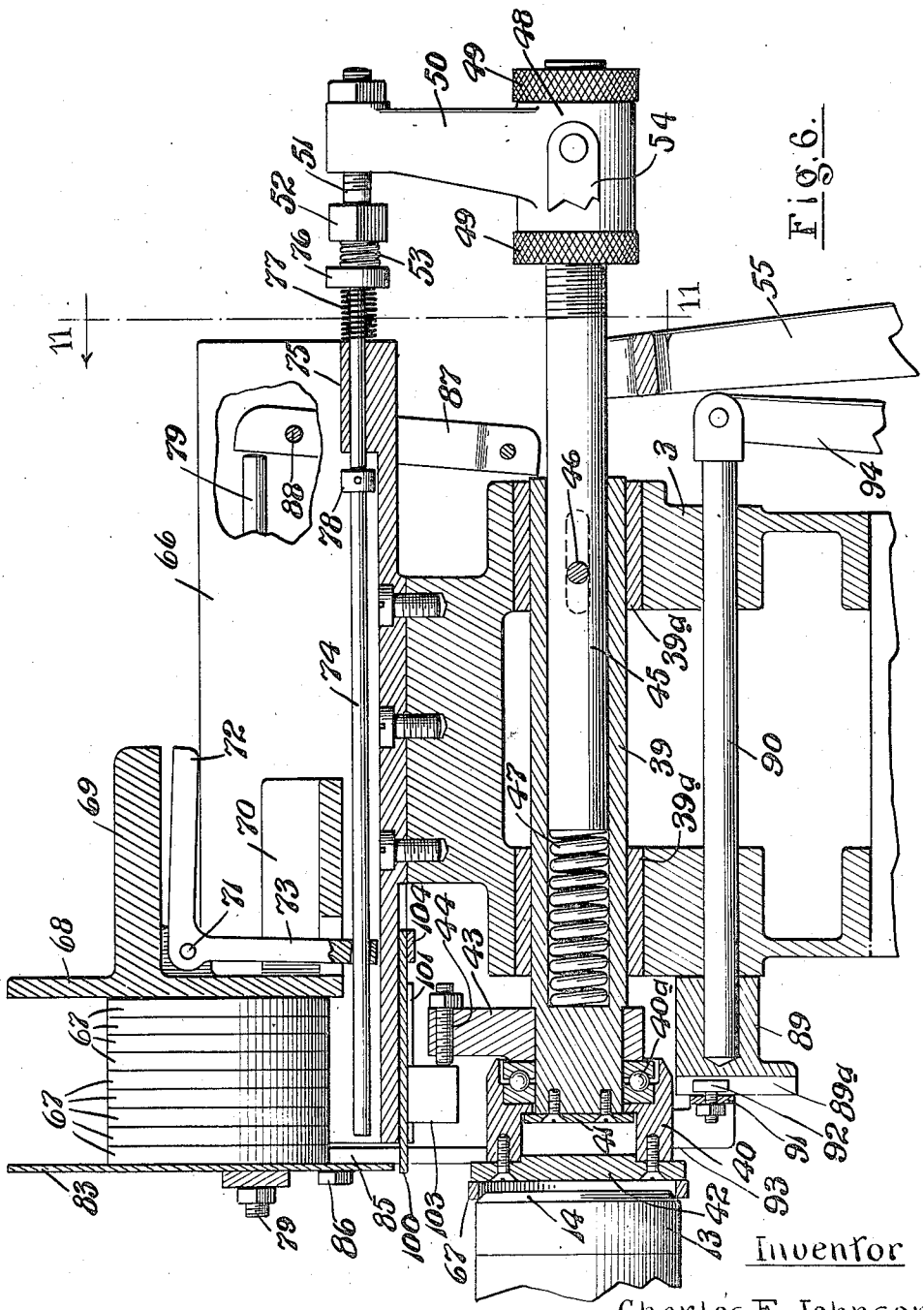


Fig. 6.

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AUTOMATIC PISTON RING LATHE

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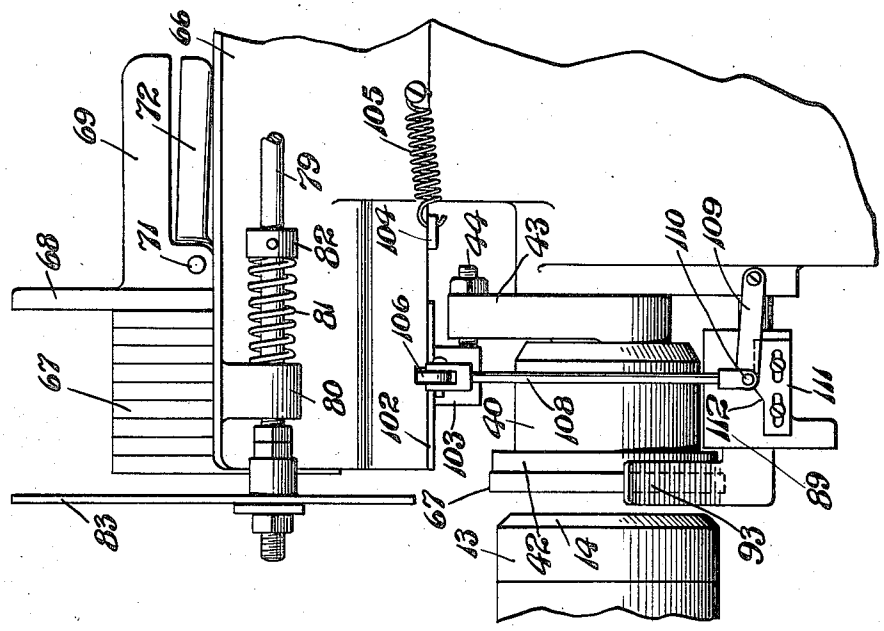


Fig. 8.

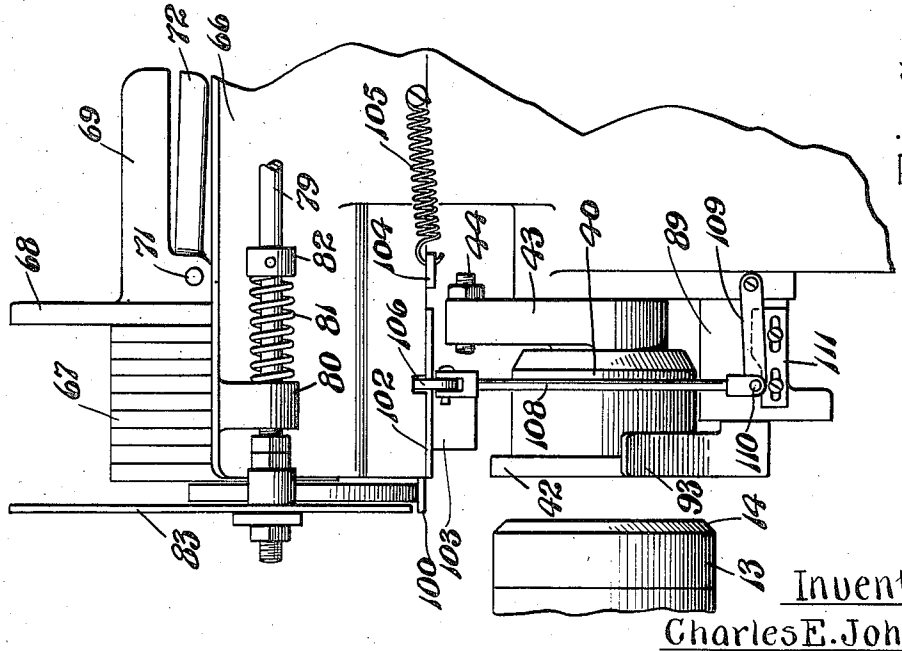


Fig. 7.

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AUTOMATIC PISTON RING LATHE

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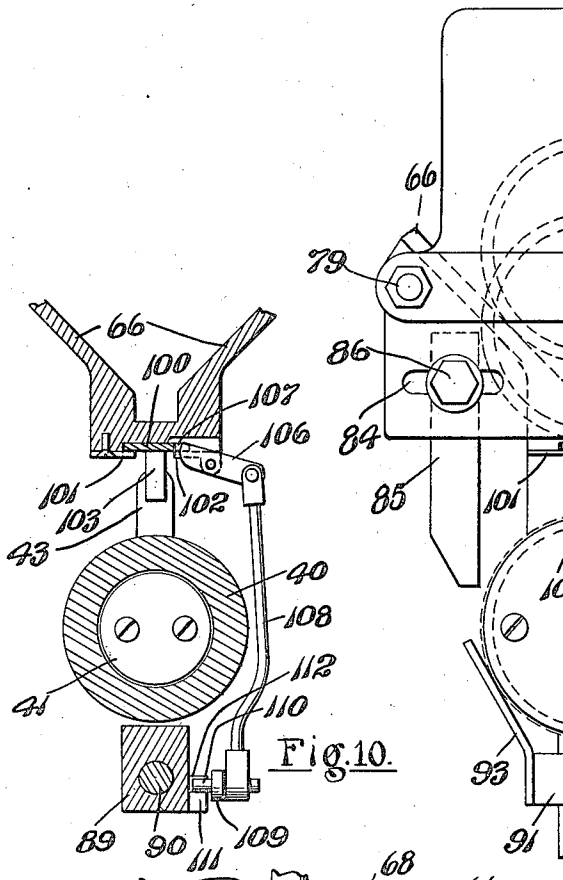


Fig. 10.

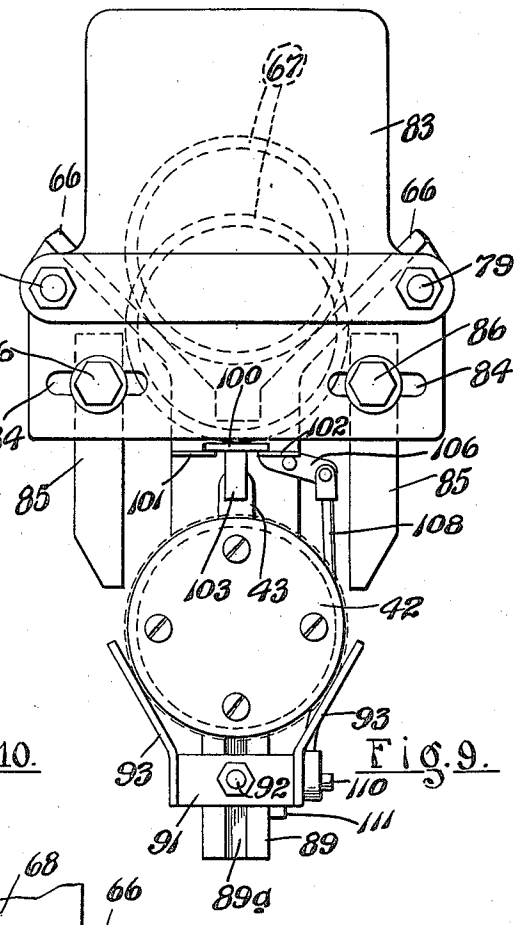


Fig. 9.

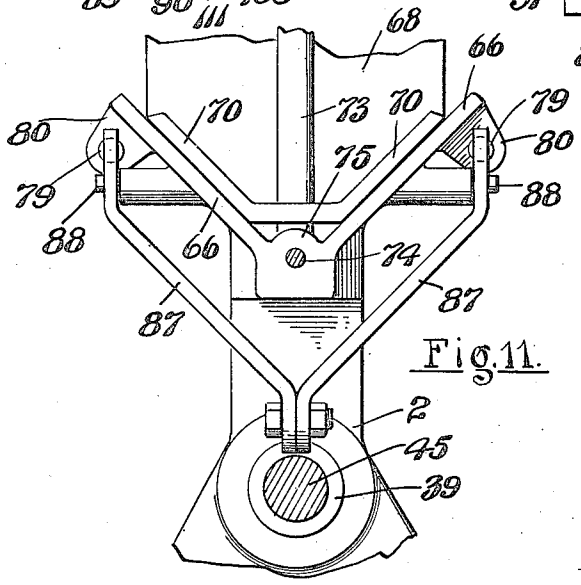


Fig. 11.

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UNITED STATES PATENT OFFICE.

CHARLES E. JOHNSON, OF MUSKEGON, MICHIGAN.

AUTOMATIC PISTON-RING LATHE.

Application filed January 9, 1922. Serial No. 528,076.

To all whom it may concern:

Be it known that I, CHARLES E. JOHNSON, a citizen of the United States of America, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Automatic Piston-Ring Lathes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine, similar to a lathe, for the finishing of piston ring castings of out of round form at their outer curved sides thereof, following the process disclosed in my prior application for patent, Ser. No. 408,506, filed Sept. 7, 1920. It is a primary object and purpose of the present invention to provide a machine in which a quantity of the ring castings may be placed and to which others may be added from time to time, the machine operating to automatically take single ring castings in succession therefrom, distort them to circular form and turn the same at their outer curved sides to remove the scale and a portion of the metal under the same so that all that is required for complete finish of the outer curved surface thereafter is a single grinding operation, the ring casting, after such turning being dropped for the taking of a succeeding ring casting in its place for the same operation thereon. A further object of the invention is to make a machine of this character which is wholly automatic, requiring no working by skilled labor, the labor element entering into the caring for the machine being limited to the placing of the ring castings in the hopper therefor from time to time, other than such attention as is needed to keep the machine in proper running order. A still further object is to provide a machine by means of which large quantity production may be obtained. Many other objects and purposes than those stated together with various novel constructions and arrangements of parts for attaining the same will appear as understanding of the invention is had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a front elevation of the machine, certain parts being broken away and in section to disclose interior structure.

Fig. 2 is a plan of the machine.

Fig. 3 is a vertical section through the machine substantially on the plane of line 3—3, of Fig. 4.

Fig. 4 is a fragmentary vertical longitudinal section at the lower right portion of the machine shown in Fig. 1.

Fig. 5 is an enlarged fragmentary vertical longitudinal section through the upper right hand portion of the machine showing the parts in one position.

Fig. 6 is a like view, the parts being shown in another position.

Fig. 7 is an enlarged fragmentary front elevation of the machine, the portion shown being at the right of the middle of the machine.

Fig. 8 is a like view, the parts shown being in a different position from that shown in Fig. 7.

Fig. 9 is an end elevation of the ring holding hopper and adjacent parts of the machine under the hopper.

Fig. 10 is a fragmentary transverse vertical section, taken substantially on the plane of line 10—10, of Fig. 5, and

Fig. 11 is a like section taken on the plane of line 11—11, of Fig. 6.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction of the machine, a bed support 1 is used on which two heads 2 and 3, spaced apart are mounted, one at one end of the support 1 and the other at the opposite end thereof. A shaft 4 extends transversely through the lower part of the member 2 and is adapted to be driven by a belt around the pulley 5 which may be connected to or disconnected from the shaft by a clutch 6 which is operated by a hand lever 7, pivotally mounted at 8 and operatively connected with the clutch by a link 9, as best shown in Fig. 2.

A gear 10 on the shaft 4 engages with and drives a gear 11 fixed on a shaft 12 disposed lengthwise of the member 2. At its inner end, the shaft 12 is equipped with a cylindrical head 13 which, at its free end has a conical tapered surface 14 formed as shown. At its outer end the shaft has a pinion 15 fixed thereto. A second horizontal shaft 16

is rotatably mounted adjacent the lower portion of the bed support 1, its outer end carrying a gear 17. A plurality of gears and pinions 18 are interposed between the pinion 15 and gear 17 whereby shaft 16 is rotated at slow speed from shaft 12.

The shaft 16 has suitable thrust bearings 19 associated therewith at its inner end within the support 1 and a collar 20 secured near the inner end on which a wheel 21 is secured, formed with oppositely projecting cam flanges 22 and 23. At its extreme inner end the shaft 16 carries a cam 24 of the shape shown in Figs. 3 and 4, the use of which will later appear.

A post 25 is positioned vertically in front of the support 1 and is pivotally mounted between its ends on a stud 26 extending forwardly from the support to turn about a horizontal axis. The upper end of the post carries a slide 27 mounted to move in or out through manual operation of a crank 28. A tool post 29 is adjustably mounted on the slide and in the same a suitable lathe tool 30 may be secured. The cutting end of the tool is designed to act on ring castings pressed against the conical surface 14 of the head 13. A rod 31 is attached to the lower end of the post 25 and extends to the rear through a slot 32 in the front side of the support 1, at its rear end carrying a roller 33 which bears against the cam 22. A rod 34 is pivotally connected to the lower end of post 25 and extends therefrom alongside of the front of the support 1, passing between two lugs 35 projecting out from said support. Its end is threaded to receive nuts 36 and a coiled compression spring 37 is located around the rod and between two washers 38 bearing against lugs 35 and one of the nuts 36, respectively. The spring has the effect to hold roller 33 against cam 22 at all times. It is evident that on rotation of the shaft 16, an oscillation of the post 25 about its pivotal axis takes place, this causing the tool 30 to feed across the ring casting on which it works. This feed is even and uniform, and the return may be uniform also owing to the design of the cam.

A rod 39 is slidably mounted through the head 3 in horizontal alinement with the shaft 12, passing through sleeves 39^a. At its inner end a head 40 is rotatably mounted, roller bearings 40^a being used, and the head is retained on the rod by a retaining plate 41. The outer end of the head is completed by a circular plate 42, the diameter of which is a little larger than the diameter of the head 13. It is to be understood that the head 13 and plate 42 may be removed and replaced by others of greater or less diameter for different sizes of piston ring castings machined. Back of the head 40, an arm 43 is secured to the rod 39, extending vertically therefrom and a screw 44 is threaded therethrough near its upper end for a use which will hereafter appear. The screw may be adjusted to different positions with respect to the arm and locked in any position to which adjusted, as is evident.

The rod 39 is centrally bored from its outer end for a considerable portion of its length for the reception of a smaller rod 45 slidably inserted thereinto and held from rotation by a cross pin 46 passing through rod 45 and through slots in the sides of rod 39 and the sleeves 39^a. A strong coiled spring 47 is located in the opening in rod 39 ahead of rod 45, the ends of the spring bearing against the inner end of the opening and inner end of the rod 45, as shown in Figs. 5 and 6.

The rod 45 extends outwardly beyond the end of the rod 39 and at its end carries a sleeve 48, adjustably held between two nuts 49 threaded on to the rod. An arm 50 is cast with and extends upwardly from the sleeve 48, a screw 51 threading through the upper end of the arm. This screw has a cup 52 at its end in which one end of a coiled spring 53 is secured, the spring extending beyond the cup.

Two links 54 are attached to the sleeve 48 at one end, one at each side of the sleeve and at their opposite ends are attached to the two forks of the forked upper end of a lever 55 vertically positioned at the end of the machine and pivotally mounted between its ends on a bracket 56 attached to the support 1. A rod 57 has pivotal connection to the lower end of lever 55 and passes through the end of the support 1 to the inside and is connected to a bar or block 58 slidably mounted in a suitable guide 59 formed on the support. A pin 60 extends downwardly from the bar 58 on which a roller 61 is mounted, the same engaging against the cam 23. Two nuts 62 are threaded on to the inner end portion of rod 57 and two washers 63 are located on the rod one against one of the nuts and the other against the side of the support. A coiled compression spring 64 is located around rod 57 between the washers, the effect of which is to hold roller 61 against cam 23 at all times. With the rotation of the shaft 16 and attached cam 23, a periodical reciprocation of rod 57 with a consequent like reciprocation of rods 45 and 39 takes place and the sleeve 48 and spring 53 connected therewith moves back and forth at the same time.

A hopper for carrying ring castings is secured to and lies above the head 3, the hopper having two sides 66 located at an angle to each other to make a V-shaped trough in which the ring castings 67 may be vertically positioned in contact with each other. A follower plate 68 is slidably mounted in the hopper and located vertically behind the ring castings, being formed with a horizon-

tally extending integral bar 69 near its upper portion and with integral rearwardly projecting members 70 at its lower end set at an incline to each other to conform to the inner sides of the sides 66 of the hopper. A bell-crank lever is pivotally mounted at 71 adjacent the juncture of the bar 69 with the follower plate and has a substantially horizontal arm 72 located directly under the bar 69 and a downwardly extending arm 73 back of the follower plate, the lower portion of which passes through an opening made through the point where members 70 join together. A rod 74 is positioned lengthwise of and in the lower portion of the V-shaped hopper, its inner end portion passing through a circular opening in the lower end of the arm 73 and its rear end portion passing loosely through a suitable guide 75 cast with the hopper. The rod extends beyond the end of the hopper and is provided with an enlarged head 76 at its end, between which and the end of guide 75 a coiled spring 77 of less strength than spring 53 is placed around the rod, the effect of which is to normally move the rod 74 outwardly until collar 78 thereon strikes against the inner end of the guide 75. Rod 74 and screw 51 are in horizontal alinement.

Two rods 79 are slidably mounted, one at each side of the hopper, in and through lugs 80 cast with the sides of the hopper. A spring 81 is located around each rod 79 between the forward lug 80 and a collar 82 fixed on each rod 79 a short distance from the lugs, having a tendency to draw the rods and the vertical plate 83 carried by and between the rods at their front ends back so as to close the adjacent end of the hopper with said plate. Plate 83 has two horizontal slots 84 cut therein, one at each side of the plate and two vertical depending guide bars 85 are located back of the plate, one at each side and connected adjustably thereto by bolts 86. These bars serve as guides for ring castings when the same drop from the inner end of the hopper to position for machining. The inner end of the hopper and the guide bars are so located that a piston ring casting 67 dropping from the hopper and falling between the bars comes directly in front of the plate 42, as shown in Fig. 5. Two levers 87 are pivotally mounted between their ends, one at each side of the hopper, at 88 and come together for connection together at the end of the rod 39 immediately above rod 45. It is evident that turning movement of the levers 87 so as to press the upper ends thereof against the outer ends of the rods 79, moves said rods and attached plate 83 so as to carry the plate away from the hopper and leave sufficient space between it and the hopper for the passage of a ring casting 67.

Below the head 40, a block 89 is secured on the inner end of a horizontal rod 90 slidably mounted on and passing through the head 3. This block has a vertical T-slot 89a cut in its side. A flat bar 91 is disposed horizontally across the side of the block and adjustably connected thereto by means of a bolt 92, the head of which is in the T-slot. Bar 91 at its ends is turned and bent to make two upwardly and outwardly extending sides 93 of a ring receiving cradle into which the ring castings drop from the hopper, stopping the ring castings between the head 13 and the plate 42.

A lever 94 is located vertically at the end of the support 1 alongside of the lever 55 and likewise pivotally connected between its ends to the bracket 56. At its upper end it has connection to the outer end of rod 90 and at its lower end to the outer end of a rod 95 which passes through a sleeve 96 inserted through the end of the support 1, and bears against the cam 24 (see Fig. 4). A collar 97 is loosely mounted around the inner smaller end of sleeve 96 and pinned to rod 95, the pin passing through slots 98 in the sleeve. A spring 99 around the smaller portion of the sleeve between the collar 97 and the larger portion 96a has the effect of keeping the end of rod 95 against the cam 24 at all times.

A plate 100 is slidably mounted under the inner end portion of the ring hopper, being retained by guide plates 101 and 102, one at each side thereof. From this plate a lug 103 depends so as to come directly in front of the screw 44 on arm 44. An arm 104 is attached to and extends laterally from the rear end of the plate and a spring 105 is attached thereto and to a suitable stationary portion of the machine, normally tending to draw the plate to the position shown in Fig. 5.

A latch lever 106 is pivotally mounted between its ends at one side of the plate (see Fig. 10) and in the projected position of the plate is adapted to enter a notch 107 in the side edge of the plate to hold it against return under the influence of spring 105 until the lever is moved to unlatching position. A rod 108 is pivotally connected to the outer end of lever 106 and depends therefrom, at its lower end having pivotal connection to a link 109 at one end thereof, the other end of which is pivotally connected to the head 3. The pivot pin 110 connecting rod 108 and link 109 is extended a short distance so as to pass above a cam plate or block 111 adjustably secured to the side of member 89 (see Figs. 7 and 8), the upper side of which has an incline which, when it passes under the pin serves to elevate rod 108 and thereby turn latch lever 106 to inoperative position to free the plate 100 for return to normal position.

The operation of the machine constructed

as described is as follows: Pulley 5 being driven and the clutch 6 in connecting relation, shaft 16 is continuously driven at slow speed and shaft 12 with its attached head 13 at relatively high speed. The cam wheel 21 carrying cams 22 and 23 turns continuously as does the cam 24, it being evident that the post 25 is continuously moved back and forth about its pivot 26 and rods 57 and 95 are periodically reciprocated with a consequent turning of levers 55 and 94 about their pivots. As a consequence of the oscillation of lever 55, rod 45 is moved inwardly, and its movement is imparted to rod 39 through the heavy spring 47 so as to bring plate 42 toward the end of head 13 and with a ring casting 67 in front of the plate it is forced against the conical tapered surface 14 and the ring distorted to a perfectly round shape. The ring casting held on the head 13 turns therewith and the tool 30 passes across the same as it is rotating, the outside cut from the ring being taken. Head 40 also rotates in unison with the ring casting and head 14. Spring 47 is strong enough that its pressure is sufficient to hold the ring casting very firmly against the head 13 and distort the out of round casting to the required circular form for machining. On the outward movement of rod 45 it draws rod 39 back after the spring has been released and pin 46 reaches the outer ends of the slots in the sides of said rod 39, this freeing the ring casting which has been machined so that it may drop from the machine and make way for the succeeding one to be machined.

The inward movement of the rod 45 also carries the arm 50 and spring 53 carried thereby toward the head 76 on rod 74 so as to move said rod lengthwise of the hopper. With such movement the arm 73 of the bell-crank lever bites on to the rod making a secure connection so that follower plate 68 moves with the rod and forces the body of rings ahead of it so as to push the foremost ring beyond the end of the hopper, as shown in Fig. 6. Simultaneously the plate 100 is moved beyond the end of the hopper by reason of the engagement of the screw 44 with the lug 103 and is latched automatically against return by latch lever 106, the plate being positioned so that the foremost ring cannot drop until the plate is retracted. On return outward movement of the rod 45 and attached parts, and release of rod 74, said rod 74 is returned to initial position by spring 77, sliding freely through the arm 73 which is held from passing by the vertical so as to again bite on rod 73 by the stop interposed by arm 69 against arm 72 of the bell-crank lever. It is evident that on outward movement of the rod 39, shortly following the similar movement of rod 45, its engagement with the lower ends of levers 87 causes rods 79 and the plate 83 carried thereby at their inner ends to be moved so as to free the foremost ring 67 in the hopper for dropping as soon as plate 100 is retracted.

The oscillation of lever 94 moves rod 90 and its attached member 89 toward the plane of the end of the head 13, carrying the ring receiving cradle comprised of members 93 into position to receive the ring dropped. With this movement, pin 110 rides up the incline 112 and causes the unlatching of the latch lever 106 to free plate 100 for retraction by spring 105. The foremost ring 67 immediately prior to this movement is located as shown in Fig. 7, resting on the plate 100. The cradle moves to its projected position, plate 100 is unlatched and retracted and the ring falls to the cradle in front of plate 42, as shown in Fig. 8, ready to be moved to and forced against the conical portion 14 of the head 13 on the next movement of the rod 39 inwardly. While the turning of the casting is taking place, cam 24 moves so as to free rod 95 and its attached parts so that the cradle is withdrawn and the latch lever freed to permit the dropping of the finished ring casting after machining the same and the latch lever to latch the plate 100 when it is again moved beyond the end of the hopper.

From the foregoing it is evident that an automatic machine is provided in which everything is done by the machine except the placing of the ring castings in the hopper. This may be done by unskilled labor, and several machines taken care of by one attendant. The process is continuous, the rings being periodically dropped from the hopper and machined and replaced by succeeding rings. The machine has the several adjustments for changing it from one size of ring machined to another if such change is desired at any time. For speed in operation in finishing the outer curved surfaces of the ring castings in accordance with my process heretofore mentioned, and large quantity production the machine is exceptionally efficient and practical. The construction is durable and not at all liable to get out of order. The appended claims define the invention and I consider myself entitled to all forms of structure coming within their scope.

I claim:

1. In a machine of the class described, means for holding a piston ring casting comprising two heads mounted to turn about a common axis and separable from each other, means for operating said heads to separate them to receive a piston ring casting between them and then moving them to clamp the casting between the heads whereby the casting is turned with the heads, a movably mounted tool support adapted to carry a

tool to machine the outer curved sides of the ring casting, means for moving said tool support back and forth in a plane paralleling the sides of the ring, means for periodically operating the head separating means, and means for periodically feeding a ring casting to between the heads when the same are separated.

2. In a machine of the class described, a rotatably mounted head against which ring castings are adapted to be pressed, a second rotatably mounted head mounted a short distance from and in alinement with the first head, means for periodically moving said second head toward the first head, holding it for an interval and then releasing it for return, means for holding a quantity of ring castings, means for periodically feeding ring castings from the quantity of castings to and between the heads at the times they are farthest separated, and a cradle to which the ring castings are individually fed, said cradle stopping and positioning the ring castings between the heads.

3. In a machine of the class described, a rotatably mounted head against which ring castings are adapted to be pressed, a second rotatably mounted head mounted a short distance from and in alinement with the first head, a ring holding hopper located above the heads and adapted to carry a plurality of ring castings vertically positioned and in contact with each other, means for periodically moving the ring castings as a whole toward an end of the hopper directly over the space between the heads to thereby push the foremost ring casting in the hopper therefrom to drop it between the heads, means for moving the second head toward the first head after a ring casting has dropped between the heads, means for machining the ring casting at its outer curved sides while held between the heads, and means for retracting the second head after the machining has been completed to free the ring casting for escape and make room for a succeeding ring casting.

4. In combination, a support, a horizontally and rotatably mounted shaft at one end of the support, a head attached to the shaft at the inner end thereof, a rod slidably mounted at the other end of the support in alinement with the shaft, a second head rotatably mounted on an end of the rod adjacent the first head, means driven by the shaft for periodically moving the rod and its attached head inwardly toward the first head, means periodically actuated and operated by the first shaft for periodically feeding a ring casting between the heads whereby it is grasped and held by said heads on movement of the second head toward the first head, and means for machining the ring casting on its outer curved sides while held between the heads.

5. In combination, a support, a rotatably mounted shaft on the support, a head attached to the shaft at one end, means for driving the shaft at relatively high speed, a second shaft, means for driving the same from the first shaft at relatively low speed, a rod slidably mounted on the support in alinement with the first shaft, a second head rotatably mounted on the end of the rod adjacent the first head, cams on the second shaft, means operated periodically by one cam for moving the rod and its attached head toward the first head, means periodically operated by another cam for periodically feeding a ring casting between the heads when they are separated so as to be grasped and rotated on movement of the second head toward the first head, and means for machining the ring casting on its outer curved sides while held between and rotated by said heads.

6. In combination, a support, a rotatably mounted shaft on the support, a head attached to the shaft at one end, means for driving the shaft at relatively high speed, a second shaft, means for driving the same at relatively slow speed, a rod slidably mounted on the support in alinement with the first shaft, a second head rotatably mounted on the end of the rod adjacent the first head, three cams on the second shaft, means operated periodically by one cam for moving the rod and its attached head toward the first head, means operated by another cam for periodically feeding a ring casting between the heads when they are separated, a movably mounted tool holder, and means for operating the same by the third cam to carry the same back and forth across the ring casting held between the heads and rotating therewith.

7. In combination, a support, a rotatably mounted shaft on the support, a head attached at one end of the shaft, means for driving the shaft at relatively high speed, a second shaft, means for driving the same at relatively slow speed, a rod slidably mounted on the support in alinement with the first shaft, a head on the end of the rod adjacent the first head, means for periodically moving the rod and attached head toward the first head once with each revolution of the second shaft, means actuated once with each revolution of the second shaft for feeding in a ring casting between the heads at the time they are separated so as to be grasped and rotated on movement of the second head toward the first head, and means for machining the ring casting on its outer curved sides while held and rotated by said heads.

8. In a machine of the class described, a horizontal rotatably mounted shaft, a head at one end thereof, means to drive the shaft, a second rotatably mounted head normally separated a short distance from the

first head and movable toward the first head, means for periodically moving the second head toward the first head, holding it against return for an interval and then releasing it for return to normal position, spring means tending to move the second head away from the first head, a horizontally located ring container above the heads adapted to contain a quantity of rings side by side and in vertical relation, means for periodically moving the quantity of rings as a whole along the hopper to drop a single ring from the end of the hopper between the heads while they are separated, said ring when the heads are brought together being grasped and rotated with the heads, and means for machining the ring at its outer curved surface while held between and rotated by said heads.

9. A ring holding hopper comprising a V-shaped trough, a follower plate slidably mounted therein, means for periodically moving the follower plate a predetermined distance along the hopper, a plate at one end of the hopper toward which the follower plate moves, rods slidably mounted, one at each side of the hopper and connected to the second plate to carry the same, spring means associated with the rods to draw the second plate toward the end of the hopper, and means periodically acting on the rods to move the same and attached plate against said spring means to carry the second plate away from the end of the hopper.

10. In a machine of the class described, a support, a shaft thereon rotatably mounted, a head on the end of the shaft, a second shaft rotatably mounted on the support, means to drive the first shaft at relatively high speed and the second shaft at relatively low speed, a rod slidably mounted on the support in alinement with the first shaft, said rod being interiorly bored from its outer end inwardly for the greater portion of its length, a second head rotatably mounted on the inner end of the rod, a second rod inserted in the opening in the first rod, a pin passing through the second rod and received at its ends in slots in the sides of the first rod, a strong spring between the inner end of the second rod and the bottom of the opening in the first rod, a lever pivotally mounted between its ends on the support, connections between one end of the lever and the second rod, a cam on the second shaft, a rod connected to the opposite end of the lever, means for moving said rod in one direction on rotation of the cam, and spring means tending to move the rod in the opposite direction, whereby the two heads are held normally separated, but said second head may be moved toward the first head.

11. A construction containing the elements in combination defined in claim 10, combined with a holder for a quantity of ring castings, a second cam on the second shaft, and means actuated by said second cam for forcing a ring casting from the holder with each revolution of the second shaft to pass to between the heads at the time the same are separated.

12. A construction containing the elements in combination defined in claim 10, combined with a V-shaped ring casting holder, a follower plate mounted to move lengthwise of the holder, a rod disposed lengthwise of the holder and extending beyond the same at one end, spring means tending to move said rod outwardly, a lever pivotally mounted on and depending from the follower plate having an opening through which said rod passes, stop means preventing movement of the lever in one direction beyond the vertical, and means to periodically move said rod inwardly a distance to thereby move the follower plate a predetermined distance and eject a ring casting from the inner end of the holder to pass between said heads at the time the same are separated.

13. In a machine of the class described, a support, a shaft rotatably mounted thereon, a head on the shaft, a second rotatably mounted head normally spaced a short distance from the first head, means for periodically moving the second head toward the first head, spring means retracting said second head when free to do so, a holder for a quantity of ring castings, one end of which terminates in a plane substantially the same as that in which the side of the second head adjacent the first head lies when in retracted position, means for periodically pushing a ring casting from said end of the holder to permit its passage between the heads when separated, and releasable means for controlling the time of passage of the ring casting to between the heads to insure its passage thereto after a preceding ring casting has been released by the heads and has escaped therefrom.

14. In a machine of the class described, two rotatably mounted heads having adjacent vertical faces and mounted to turn about a horizontal axis, means to drive one of the heads at a relatively high speed, spring means normally retracting the second head a short distance from the driven head, a horizontally located ring casting holder mounted over the heads and having one end terminating in a plane substantially the same as the plane of the said vertical face of the second head when it is in retracted position, a vertical plate movably mounted at said end of the holder, spring means normally drawing said plate towards the holder, means for periodically pushing a quantity of ring castings along the

holder to force one of them beyond said end of the holder, means operated simultaneously with the retraction of the second head for moving the vertical plate away from said ring casting to permit the same to drop between the heads, and means for forcing the second head toward the driven head after a ring casting has dropped between them to clamp the castings between the heads for rotation thereof and machining the same while rotating.

15. A construction containing the elements in combination defined in claim 14, combined with a movably mounted cradle for receiving the ring casting when it drops to between the heads, spring means normally retracting said cradle, and means for periodically moving the cradle to position for receiving the ring castings and holding the same until clamped between said heads, said means thereafter releasing the cradle for return to initial position.

16. A construction containing the elements in combination defined in claim 14, combined with a plate slidably mounted under the hopper at said end thereof, means moving said plate beyond the end of the hopper on movement of the second head toward the driven head, latching means for holding said plate in extended position after the second head has been retracted, a cradle movably mounted below the second head and adapted to be moved to receive the ring casting dropping to between the heads, spring means normally holding the cradle back of ring receiving position, means for moving the cradle to ring receiving position after the second head has been retracted, and means automatically operated with said movement of the cradle to unlatch said latching means, and a spring connected to the plate for automatically retracting it when unlatched.

17. In a machine of the class described, two rotatably mounted heads having adjacent vertical faces and mounted to turn about a horizontal axis, means to drive one of the heads at relatively high speed, spring means normally retracting the second head a short distance from the first head, a V-shaped ring casting holder mounted above the heads having an end terminating in a plane substantially the same as the plane of the said vertical face of the second head when it is in retracted position, means for moving a quantity of ring castings in the holder along the same toward said end of the holder at periodic intervals to force one of the ring castings beyond the end of the holder at each operation, a plate slidably mounted under the holder, means movable with the second head for moving the plate outwardly beyond the end of the holder when said second head is moved toward the first head, means for moving the second head toward the first head at periodic intervals, means for latching the plate in extended position, spring means attached to the plate to return it to initial position, and means for automatically unlatching the plate shortly after the second head has been retracted.

18. In a machine of the class described, a support, a horizontal shaft rotatably mounted on the support, a head secured at one end of the shaft, means to drive the shaft at relatively high speed, a second shaft, means to drive the same at relatively slow speed, a second rotatably mounted head movably mounted to move toward or away from the first head, means normally tending to carry the second head away from the first head, means operated from the second shaft to periodically move the second head toward the first head, hold it in position for an interval and then release it for return to initial position, once with each revolution of the second shaft, means to feed a ring casting to between the heads prior to the movement of the second head toward the first head with each revolution of the second shaft, a cam on the second shaft, a pivotally mounted tool post, a roller attached to the end of the post and bearing against the cam, spring means attached to the post tending to move it in one direction and hold the roller against the cam, and a tool on the opposite end of the post to finish the outer curved surface of the ring casting while held between the heads, the tool moving across the ring casting on movement of the tool post induced by the cam.

19. In a machine of the class described, a holder for a quantity of out of round continuous ring castings, holding means in which said ring castings are adapted to be clamped and held and distorted to circular form, means for feeding the ring castings individually to said holding means at periodic intervals, and means for machining the ring castings at their outer curved sides while held by the holding means in said distorted form.

20. In a machine of the class described, a rotatably mounted two-part separable holding means for individual piston ring castings, means included in the construction of said holding means for securely clamping an out-of-round piston ring casting and distorting it to circular form when clamped, means for driving the holding means at relatively high speed, means for periodically separating and then bringing the parts of the holding means together, means for feeding a piston ring casting of out-of-round form to the holding means at the time of separation of the parts thereof, and means for machining the outer curved outer sides of the casting while held and rotated by said holding means.

21. In a machine of the class described,

holding means in which ring castings are adapted to be clamped, means for rotating said holding means, means for feeding ring castings individually to said holding means at periodic intervals, means on the holding means engaging with the rings when the same are clamped to distort the said rings from normal shape, and means for machining the ring castings at their outer curved sides while held in said holding means and rotated therewith.

In testimony whereof I affix my signature.

CHARLES E. JOHNSON.