G. M. WHITIN.

RING POLISHING MACHINE.

APPLICATION FILED APR. 18, 1914.

1,156,958.

Patented Oct. 19, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

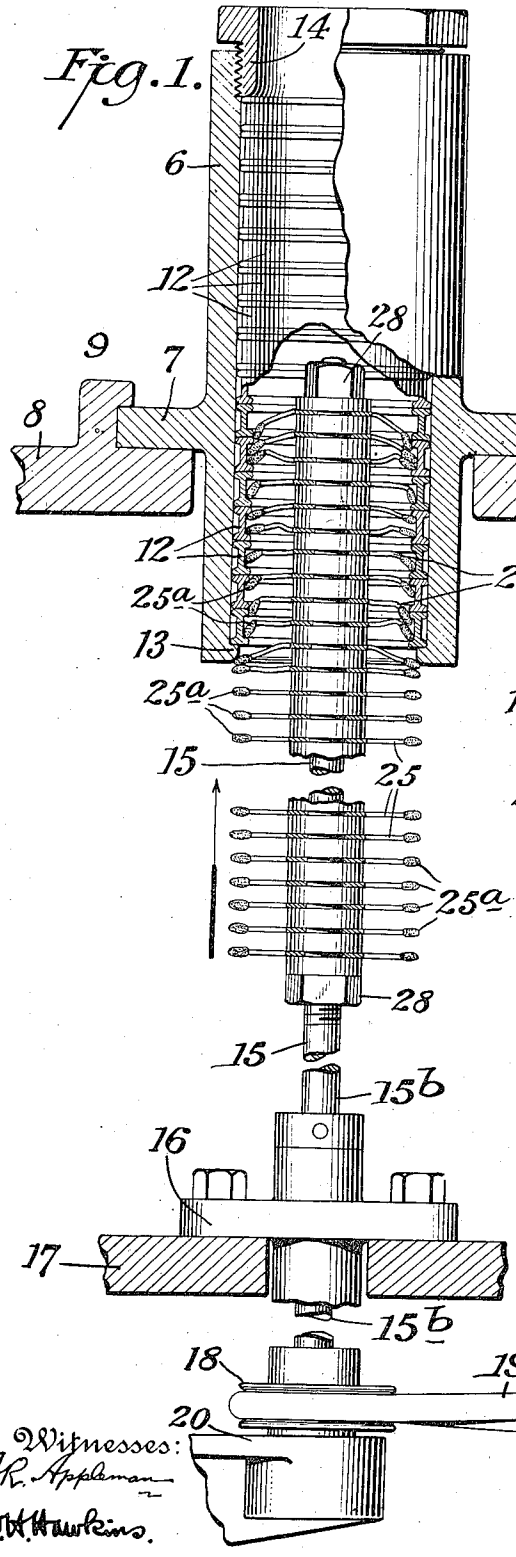


Fig. 2.

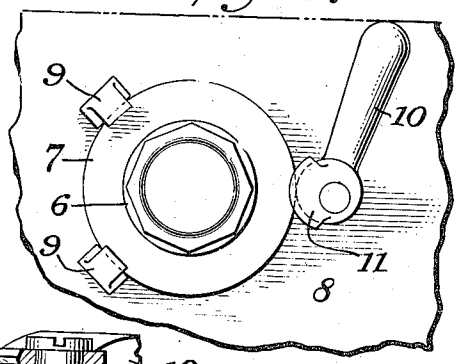


Fig. 3.

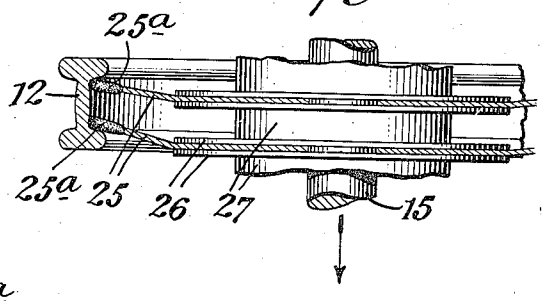


Fig. 4.

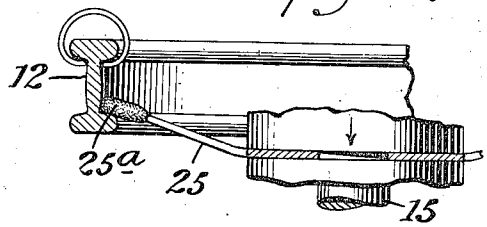
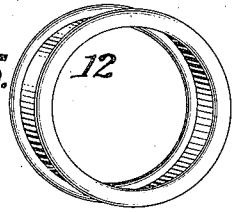


Fig. 5.



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2 SHEETS—SHEET 2.

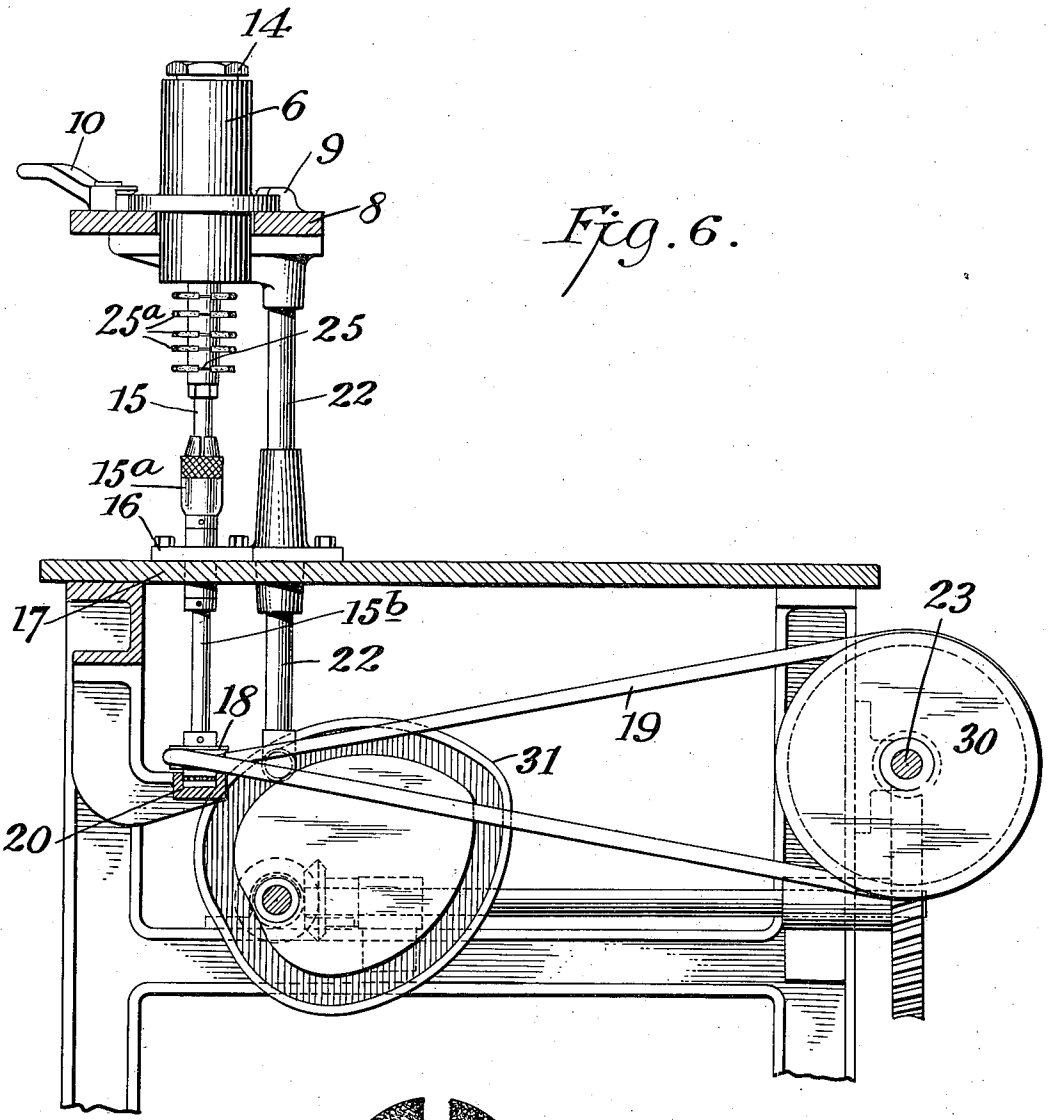


Fig. 6.

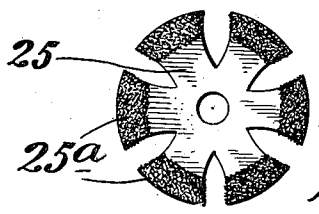


Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE M. WHITIN, OF WHITINSVILLE, MASSACHUSETTS, ASSIGNOR TO THE WHITIN MACHINE WORKS, OF WHITINSVILLE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

RING-POLISHING MACHINE.

1,156,958. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed April 18, 1914. Serial No. 832,729.

To all whom it may concern:

Be it known that I, GEORGE M. WHITIN, a citizen of the United States, residing in Whitinsville, Massachusetts, have invented the following described Improvements in Ring-Polishing Machines.

The invention is directed to apparatus for polishing the interior surfaces of steel spinning rings used on ring spinning frames.

The object is to provide an automatic machine with which the interior surfaces of a plurality of rings may be polished simultaneously, thoroughly and uniformly, and by means of which the cost of the operation is also materially reduced.

Spinning rings are formed with interiorly and exteriorly projecting flanges for retaining the travelers which move thereon at a very high rate of speed. It is, therefore, essential that the surfaces of these rings, particularly the under sides of the flanges and the surfaces adjacent thereto, be highly polished and be polished with a high degree of uniformity in order that the traveler may move uniformly and with the least friction. The polishing of the interior surfaces of these spinning rings, and particularly the interior corner between flange and web, has heretofore consumed a substantial amount of time and labor because of the high temper of such rings. By the present invention, the time is not only greatly reduced but the corners are smoothed and polished better than can be done by hand according to the usual practice.

The invention involves the employment of a holder of tubular form open at its ends and arranged to receive a plurality of the rings in axial alinement. A suitable retainer holds the rings against movement in the holder. In combination with this holder, a rotary polishing member is employed, arranged in axial alinement with the holder, and adapted to be moved relatively within the holder and the rings therein to carry a series of polishing elements into engagement with the interior surfaces of the rings. The polishing member is specially made so as to present a plurality of separated polishing elements each of which is yieldable in the direction of the axis of rotation. By reason of this construction, as the polishing member moves within the rings, or the rings over the member, the polishing elements may yield such an amount as is required in order that they may pass over the flanges on the rings; but the normal positions of the polishing elements and the positions which they tend to assume under the influence of centrifugal force, is transverse to the axis of the polishing member except as affected by their relative axial motion, which gives the result, as I have found, that the interior corner between flange and web receives a specially high polish. The ends of the traveler slide on the surface forming this corner.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which—

Figure 1 is a sectional elevation of the polishing apparatus, broken away in part, Fig. 2 is a top view of the holder and its support, Fig. 3 is a detail view of a portion of the polishing member, Fig. 4 is a view similar to Fig. 3, showing a slightly different construction of the polishing member, Fig. 5 is a perspective view of one of the rings, Fig. 6 a representation of the traverse mechanism and Fig. 7 a plan of the polishing element of Fig. 4.

Referring to these drawings, the construction of a spinning ring is clearly shown by the perspective view in Fig. 5 and the section of Fig. 4. The traveler extends over the edge of the ring and its ends or points engage and slide on the under surface or corners of whichever flange is in use.

Referring to Fig. 1, 6 indicates a holder for a stack of spinning rings, which is of tubular form and open at its ends. Intermediate of its ends it is provided with an exterior flange 7 by which it can be mounted upon a suitable support 8. The latter has a circular opening therethrough for the purpose, and is provided with two hook-lugs 9 upon its upper surface. When the holder 6 is mounted in position, the flange 7 bears on the support 8 and extends under the lugs 9. The holder may then be locked in position by means of a handle 10 provided upon the support 8 and having a cam lip 11 adapted to engage the flange 7, and lock it in place in a centralized position. The stack of rings is clamped in the holder against a flange 13 at its lower end, and by means of an annular retainer 14 at the other end, in the form of a ring nut as shown. The rings 12 are

dropped into the holder so that the lowest one rests upon the flange 13 and the retainer 14 is screwed into the upper end of the holder until it bears firmly upon the uppermost ring. The polishing member comprises a plurality of polishing elements arranged transverse to the axis of rotation and spaced apart so as to be independently yieldable in the direction of that axis. These elements are made of tough flexible fabric or thin leather, and suitable polishing material is applied to their extreme outer edges by dipping them first in melted glue and then in powdered emery or other abrasive, about as shown in the drawings. The addition of the abrasive in this manner weights the edges or tip of the independently yielding elements.

In the form of Fig. 3 the polishing elements 25 are backed, except near their edges, by thin metallic disks or washers 26 on each side thereof, and between each pair of adjacent elements is a spacer 27, all of which are clamped on the shaft 15 of the polishing member. The spacers 27 serve to separate the polishing elements so that they will be free for independent lateral deflection and the portions of the polishing elements projecting beyond the disks 26 possess a degree of flexibility which permits them to be entered within the rings and to act on the interior thereof by the centrifugal effect when highly rotated. They are of slightly larger diameter than the interior of the rings.

The element of Fig. 4 differs from that of Fig. 3, in that the backing plates or disks 26 are omitted and the flexible polishing elements are directly clamped between the spacers 27. Fig. 7 shows the polishing element of this form, and as shown also in Fig. 1, indicating that it may be radially notched to form fingers 25^a each tipped with the polishing agent. The polishing elements and the spacers 27, with or without the backing plates 26 are secured to the shaft 15 by means of the nuts 28, and together form a polishing member somewhat longer than the stack of spinning rings so that the whole of the latter will be acted upon throughout a suitable relative traverse of the parts. The shaft 15 is removably secured in a chuck 15^a on the shaft 15^b, which is journaled in bearings 16 and 20 on the main frame of the machine as shown by Fig. 6. This latter shaft carries a small pulley 18 driven by a belt 19 from a very much larger drum or pulley 30, the ratio of diameters being suited to impart a high velocity to the shaft and polishing member. The support 8 is reciprocated by means of a cam 31 which engages the foot of the traverse rod 22 and is itself driven by the same axle, 23, as drives the drum. The construction will be obvious in the figure, it being apparent that relatively considered the traverse motion is continuous so that the polishing elements are kept advancing constantly into the corners of the rings. It will be evident that it is immaterial whether the holder or the shaft is the traversing member, but it is preferred that the shaft be rotated in a fixed position as shown and that the holder be traversed over it. By reason of the high speed of rotation of the polishing member, the elements thereon tend to assume positions transverse to the axis of rotation and thereby press against the interiors of the rings as indicated in a general way by Fig. 1, and by reason of the traverse motion and their separation from each other, assume various angles of inclination to the axis of rotation such as in practice results in apparently a maximum degree of polish in the interior corners of the rings where, as above stated, the polishing is most needed.

The apparatus may be readily and conveniently operated and because many rings are subjected to the treatment at one time the work is performed with obvious despatch and thoroughness and more economically than has been possible with methods heretofore pursued. It will be understood that while I have herein illustrated only a single machine, the apparatus may be multiple if desired, in which case the supports 8 and 17 will of course each be appropriately extended to accommodate a row of holders and a row of rotary polishing members respectively. Such duplication and similar modifications are intended to be included in the scope of the following claims.

I claim:

1. Ring polishing apparatus comprising the combination of a support, a holder thereon adapted to receive a stack of spinning rings, retaining means for holding the rings against movement within the holder, a polishing member adapted to rotate within the holder and comprising a plurality of flexible polishing elements adapted to bear on the interior of said stack of rings by their centrifugal action, and means for relatively traversing said member and rings, substantially as set forth.

2. Ring polishing apparatus comprising the combination of a support, a tubular holder open at one end and adapted to receive a stack of interiorly-flanged rings in axial alinement, means for detachably mounting the holder upon the support, retaining means on the holder for holding the rings therein against movement, a rotatable polishing member in axial alinement with the holder, a plurality of polishing elements clamped on said member which are yieldable in the direction of the axis of the member, means for rotating said member within the stack, and means for relatively traversing said stack and member in the direction of their common axis, substantially as set forth.

3. The combination of a holder for a stack of interiorly-flanged rings and a rotary polishing member for polishing the interior surfaces of the rings comprising a shaft, a plurality of flexible polishing elements mounted upon the shaft, spacing means between adjacent elements separating them in the direction of the shaft and polishing material applied only to the peripheral edges of said elements whereby such material acts on the rings by the force of centrifugal action.

4. The combination of a tubular holder open at its ends, an inwardly projecting flange at one end of the holder, an annular retainer adapted to be inserted in the opposite end of the holder to retain rings therein against movement, a polishing member rotating within the holder, means for rotating said member, and means for moving the polishing member and holder relatively in the direction of their axis to carry the member within the holder, substantially as set forth.

5. Ring polishing apparatus comprising, in combination with a suitable holder for the rings, a shaft, a plurality of annular spacers disposed along the shaft, a plurality of polishing elements of flexible material on the shaft interposed between the spacers with their outer portions projecting laterally unsupported a substantial distance beyond the spacers and polishing material upon the free edges of said projecting and unsupported portions of said elements, substantially as set forth.

In testimony whereof, I have signed this specification in the presence of two witnesses.

GEORGE M. WHITIN.

Witnesses:
OSCAR L. OWEN,
SYDNEY R. MASON.