C. E. JOHNSON.

MACHINE FOR ASSEMBLING PISTON RINGS AND PISTONS.

APPLICATION FILED MAR. 20, 1916.

1,204,028.

Patented Nov. 7, 1916.

2 SHEETS—SHEET 1.

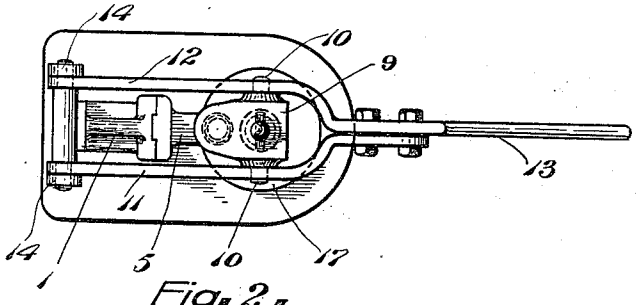


Fig. 2.

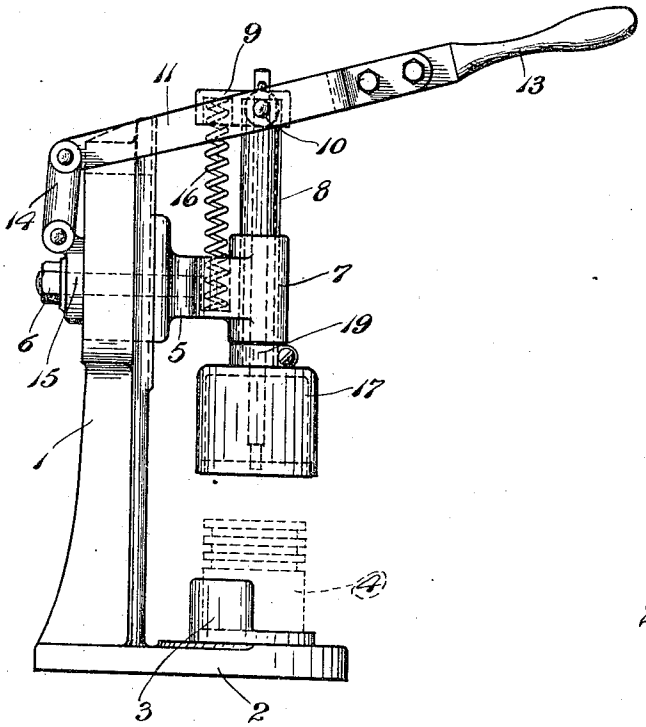


Fig. 1.

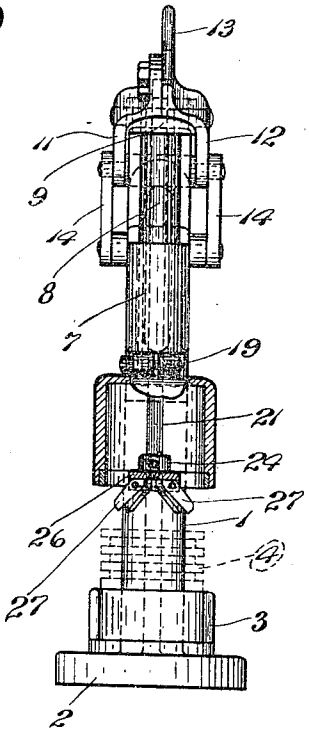


Fig. 3.

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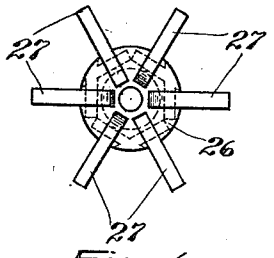


Fig. 6.

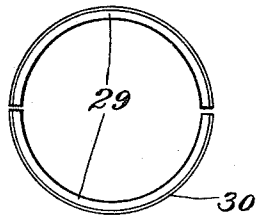


Fig. 7.

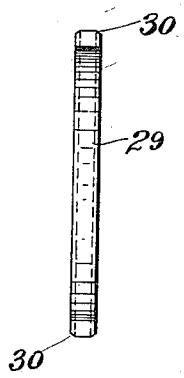


Fig. 8.

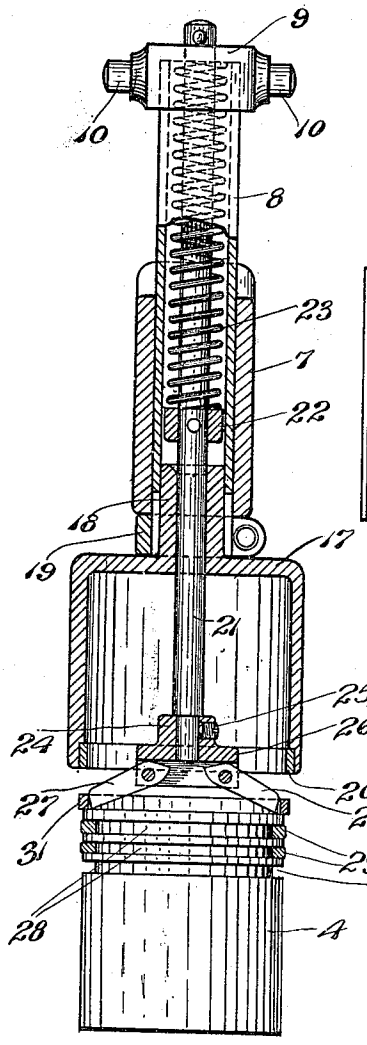


Fig. 4.

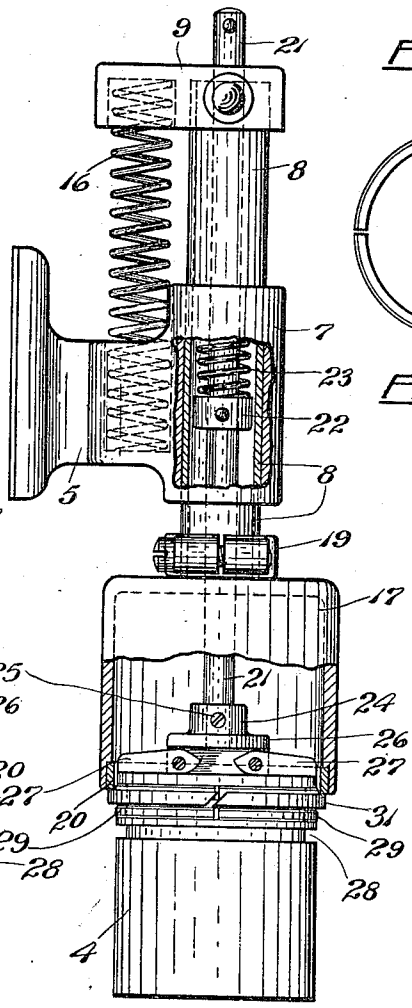


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR ASSEMBLING PISTON-RINGS AND PISTONS.

1,204,028. Specification of Letters Patent. Patented Nov. 7, 1916.

Application filed March 20, 1916. Serial No. 85,349.

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 Machines for Assembling Piston-Rings and Pistons; 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 mechanism to be used in assembling piston rings and pistons.

It is the object and purpose of my invention primarily to provide a machine with which piston rings may be assembled with pistons at a very rapid rate permitting one man to accomplish as much as has heretofore been possible for several. To this end I have produced the construction shown in the accompanying drawings which discloses many novel and useful features of construction and operation as will be apparent upon understanding thereof as the description progresses.

In the drawings; Figure 1 is a side elevation of a complete machine for assembling piston rings and pistons. Fig. 2 is a plan view. Fig. 3 is an end view, parts being shown in section. Fig. 4 is a vertical section through the reciprocating parts of the machine showing the spreading device as it is about to engage with a piston ring. Fig. 5 is a side elevation of said reciprocating parts of the machine, parts being broken away and shown in section and illustrating the ring as it is being carried to position to a groove on the piston. Fig. 6 is an under plan view of the spreader. Fig. 7 is a plan view of the filling blocks used in the upper grooves of a piston; and Fig. 8 is an elevation of one of said blocks looking toward the ends thereof.

Like reference characters refer to like parts throughout the several views of the drawings.

In the construction of my invention as shown an upright supporting standard 1 is provided carried by a base 2, this base also serving as a support for a piston holder 3, the piston being indicated at 4. The piston holder is detachably connected to the base and for different sized pistons different sized holders may be used.

At a distance above the base a bracket 5 is adjustably mounted on the standard 1 and is held in any desired position by tightening the nut 6. At its forward end directly above the piston holder the bracket carries a sleeve 7 in which is slidably mounted a vertical tube 8, the upper end of which has a cap 9 secured thereto from opposite sides of which project pins 10 seating in openings in the spaced apart arms 11 and 12, one of which is extended and fashioned into an operating handle 13. Arms 11 and 12 are pivotally connected to substantially vertical links 14 which at their lower ends are pivotally connected to a block 15 held between the nut 6 and the rear side of the standard 1. A coil spring 16 normally raises the handle 13 and attached parts to uppermost position.

The tube 8 at its lower end carries a plunger 17 formed as an inverted cup and having a lug 18 extending centrally from its upper side into the lower end of the tube 8, said lower end being split as indicated in Fig. 4, to receive the plug. A clamping ring 19 passes around the tube and serves to rigidly connect the tube and plunger 17 together. By loosening the clamping ring other plungers 17 for different sized pistons may be substituted for the one shown. The plunger is of circular outline in cross section and at its lower end and on its inner face carries a ring 20 of hardened material which is thus formed, as it engages with the piston rings and is subject to considerable wear such that if of softer material it might become battered or have parts broken away.

Extending centrally through the tube 8, plug 18 and plunger 17 is a rod 21 having a collar 22 fixed to it within the tube 8 and immediately above the plug 18. A coil spring 23 is interposed between the cap 9 and the plug 22, the effect of which is to force the rod 21 and attached parts to a lower position with collar 22 seating against the plug 18. At the lower end of the rod 21 a member 24 is detachably connected by means of a set screw 25, this member having a head 26 provided with a plurality of radial grooves in which are pivotally mounted a plurality of spreader fingers 27 which in the uppermost position of the moving parts drop by gravity toward each other as far as permitted by the formation of the fingers as shown in Fig. 3. For different

sizes of rings different spreaders may be used as is apparent.

Normally the parts of the machine under the influence of coil spring 16 occupy an upper position, the plunger 17 being a distance above a piston 4 located directly beneath it. In the piston a plurality of piston ring grooves 28 are formed, usually three in number though a greater or less number of course may be present. It is necessary for the operation of the machine that all of the grooves except the lowermost one which is to receive the piston ring shall be filled with filler blocks similar to those indicated at 29, each being formed as a semicircle having an outside diameter slightly in excess of the diameter of the piston and formed with beveled edges 30 so that when a ring is forced down over the piston it will slide easily by the filler blocks. The ring 3 is laid upon the upper end of the piston and the handle 13 moved downwardly. The first operation as the handle moves downwardly is to engage the lower ends of the fingers against the upper end of the piston whereupon they spread laterally striking against the inner sides of the ring 31 and expanding it so that it may pass over the piston. Simultaneously with this movement the plunger 17 moves downwardly, its ring 20 engaging with the piston ring 31 to move it over the piston to the groove which is open to receive it. The movement of the rod 21 in a downward direction is stopped when head 26 engages with the upper end of the piston, the downward movement of plunger 17 and the tube 18 thereafter causing a compression of the spring 23 which may be easily accomplished as it is of limited strength. The piston ring passes over the piston and over the filler block 29 until it reaches the lower groove 28 whereupon it snaps into this groove. Handle 13 is then released, the parts taking their uppermost position, the filler blocks 29 in the groove 28 next above that one filled are removed and the operation repeated. If there are more than two grooves in the piston the operation is repeated until all of the grooves have received piston rings.

With a machine of this character the assembly of piston rings and pistons may be very rapidly accomplished. The machine is of comparatively simple character and is very simple in its operation. Many changes in detail of structure may be resorted to without departing from the principles of the invention and accordingly I do not wish to be limited to the specific construction shown but consider myself entitled to all modifications of structure falling within the scope of the appended claims defining the invention.

I claim:—

1. In combination, means to hold a piston, means to expand a piston ring laid on the upper end of the piston, separate means to move the ring over the piston after it is expanded, and means to operate said expanding means and moving means, substantially as described.

2. In combination, a support, a piston holder on the support, a ring expander and a plunger movably mounted above the piston holder, and means for operating said ring expander and plunger to a lower position to expand a piston ring on and carry it over a piston held by the piston holder.

3. In combination, a support, a bracket on the support carrying a guide, a vertical tube slidably mounted for vertical movements in the guide, means for reciprocating the tube in the guide, an inverted cup-like plunger connected to the lower end of the tube, a rod movably mounted in the tube and a piston ring spreader secured at the lower end of the rod.

4. In combination, a support, a bracket adjustable on the support to different positions, a guide on the bracket, a tube positioned vertically and slidable in the guide, means for reciprocating the tube in the guide, an inverted cup-like plunger detachably connected to the lower end of the tube, a rod movably mounted within the tube and extending into the plunger, and a piston ring spreader detachably secured at the lower end of the rod.

5. In combination, an upright support, a bracket adjustable on the support to different positions, a guide on the free end of the bracket, a tube loosely mounted in the guide, a handle pivotally connected to an end of the tube, link connections between one end of the handle and the bracket, an inverted cup-like plunger attached to the opposite end of the tube, a spring between the handle and bracket normally elevating the handle and tube, a rod loosely mounted lengthwise of and extending through the tube, a spring operating the rod toward the plunger end of the tube, a head having a plurality of radial slots secured to the end of the rod which extends into the plunger, a plurality of fingers pivotally mounted on the head and positioned in the slots, and a piston holding member positioned directly below the plunger and fingers.

6. In combination, an upright support, a bracket adjustable on the support to different positions, a guide on the bracket, a tube loosely mounted on the bracket, means carried by the bracket and adjustable therewith to reciprocate the tube, an inverted cup-like plunger detachably connected to the lower end of the tube, a rod extending lengthwise through the tube, a collar on the rod within the tube, a spring around the rod and located between the collar and the upper end of the tube, a head detachably connect-

ed to the lower end of the rod and a plurality of fingers pivotally mounted on the underside of the head.

7. In combination, an upright support, a bracket having a guide adjustable on the support to different positions, a member slidably mounted in the guide, means carried by the bracket and adjustable therewith for reciprocating the member, a plunger secured to the lower end of the member, and a spreader device movably carried by said member.

In testimony whereof I affix my signature.

CHARLES E. JOHNSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."