May 18, 1926. 1,584,782

H. S. LEE

RING MOLDING APPARATUS

Filed June 20, 1925 2 Sheets-Sheet 1

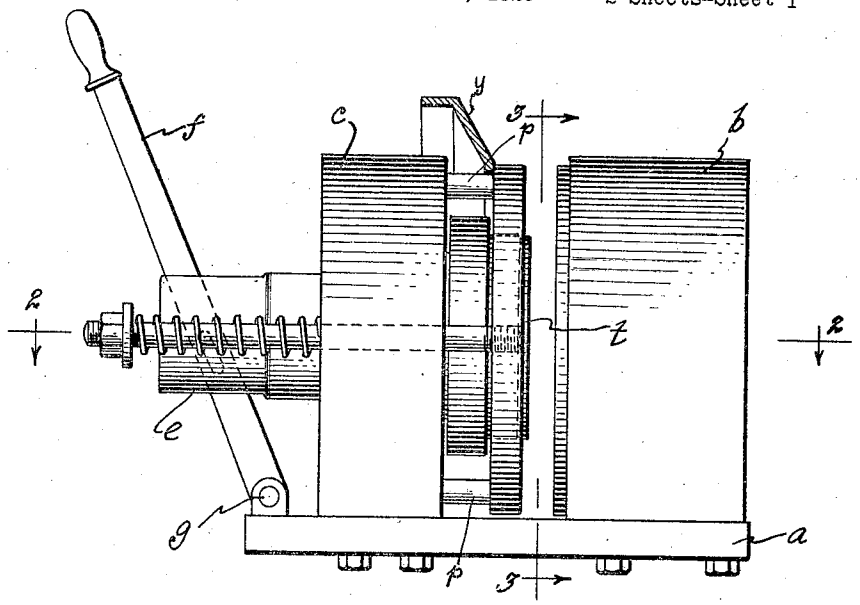


Fig. 1

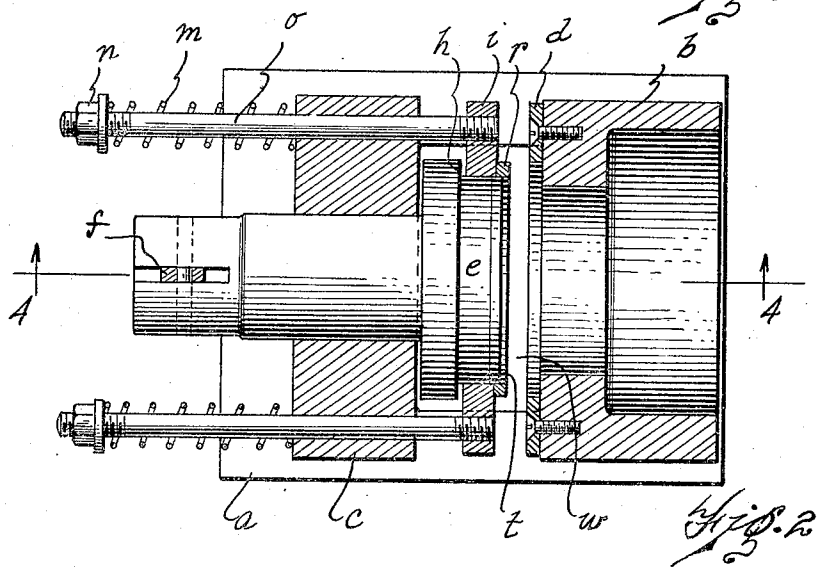


Fig. 2

INVENTOR.
HARRY S. LEE
BY
Stuart C. Barnes
ATTORNEY.

May 18, 1926. 1,584,782

H. S. LEE

RING MOLDING APPARATUS

Filed June 20, 1925 2 Sheets-Sheet 2

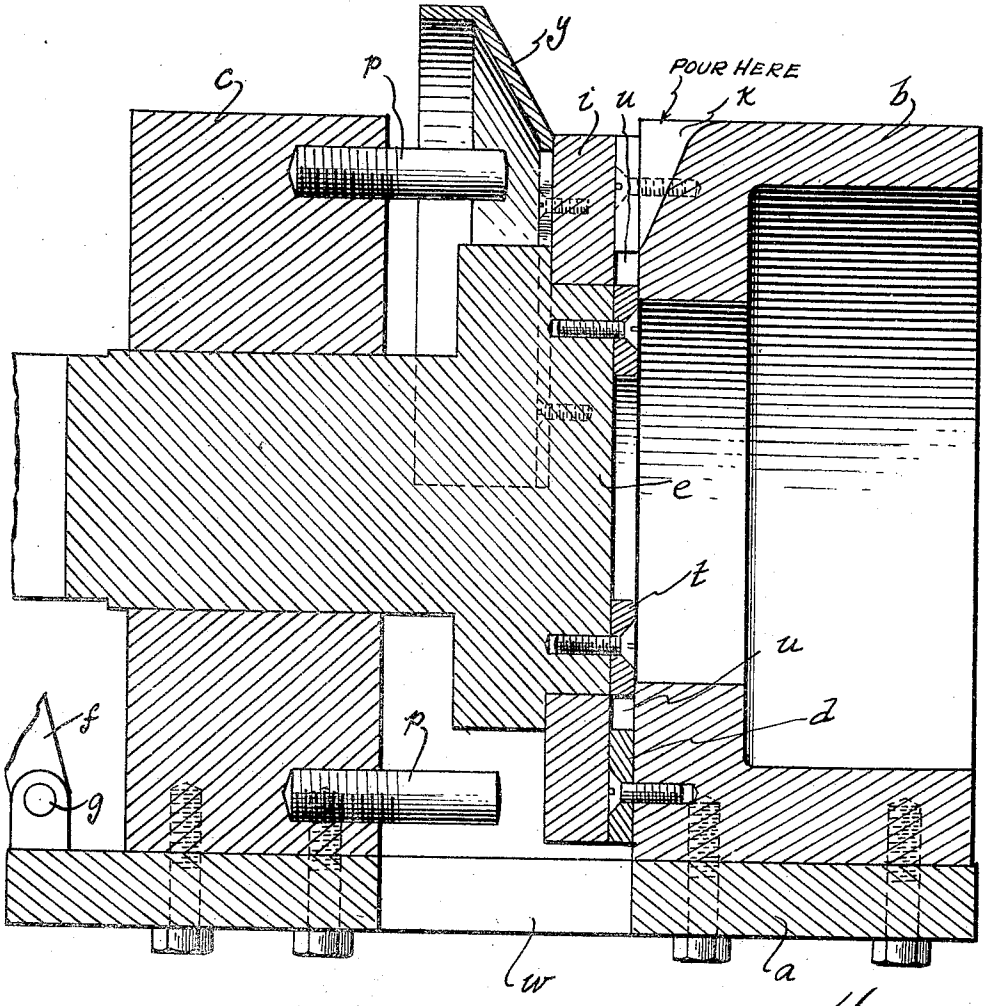


Fig. 4

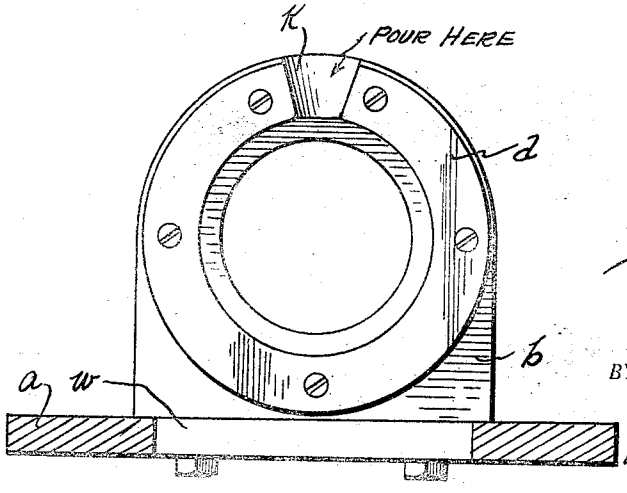


Fig. 3

INVENTOR.
HARRY S. LEE
BY
Stuart C. Barnes
ATTORNEY.

Patented May 18, 1926. 1,584,782

UNITED STATES PATENT OFFICE.

HARRY S. LEE, OF PLYMOUTH, MICHIGAN.

RING-MOLDING APPARATUS.

Application filed June 20, 1925. Serial No. 38,426.

This invention relates to a permanent mold for casting and stripping individual piston rings from one of the mold sections.

Piston rings have ordinarily been made in the past by casting a relatively long cylinder in sand molds and then cutting the same into suitable lengths to form the piston rings. This has made satisfactory piston rings out of low phosphorous iron, but the casting and cutting operations cannot be carried out with the economy that it is possible with my permanent mold apparatus. Furthermore, the product of my molds is, I believe, superior in having greater strength, is free from the average defects of sand castings and has greater density and closeness of grain which is very desirable in an article such as a piston ring.

A second method that has been quite generally practised in the manufacture of piston rings is to cast individual rings in sand molds. However, this method requires a high phosphorous iron in order to produce a ring of the desired character and in order to produce a ring free from chill or hard spots. It will also be evident that this method of casting is relatively slow and the rings are liable to have the several defects that ordinarily attend sand casting operations.

It is the object of the present invention to afford a method and apparatus for rapidly casting individual piston rings in permanent molds. It affords the advantages of greater strength of the casting, freedom from the average defects of sand molding, greater density and closeness of grain which characterizes permanent mold castings. It enables the production under similar conditions to be increased from two to three hundred percent over the previous practice in the manufacture of piston rings.

The apparatus is so designed that by relative movement between some of its parts the ring is quickly stripped from the mold section to which it adheres, when the mold sections are opened.

Referring to the drawings:

Fig. 1 is a side elevation of the apparatus.

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1.

Fig. 4 is a vertical longitudinal section taken on the line 4—4 of Fig. 1.

a designates the bed of the machine. To this is bolted the stationary mold section. This comprises a casting B, to which is secured a removable ring *d*.

The other mold section comprises a movable plunger head *e*. A separate ring *i* is ordinarily held together by the coiled springs *m* on the ends of the rods *o*, the spring pressing against the washers and the nuts *n* on the ends of these rods. This yieldingly holds the rings *i* against the shoulder *h* of the plunger head. The end of the plunger might form the mold wall on the inside of the piston ring, but I prefer to utilize a separate ring for this purpose which can be removed from the end of the plunger head. It will, therefore, be apparent that the ring *t* and the ring *i* which are carried on the plunger head *e* form the second mold section. This second mold section is the movable section and may be opened or closed by means of the lever *f* which is pivoted to the bed *a* at *g*.

However, one of the features of the construction of this second mold section is that the ring *i* has relative movement with respect to the ring *t* after the parts are opened up. This is effected by the ring *i* striking the threaded studs *p*. This stops the ring *i* while the remainder of the mold section continues to draw away. Obviously, this arrangement serves to strip the piston ring from the ring *t*. This operation is shown in Fig. 2.

The pouring is done through the opening *k* in the casting *b* and the ring *d*. Preferably a shield *y* is provided on the ring *i* so as to avoid spilling of the metal onto surfaces which have relative sliding movement.

It will be understood that the faces of the mold sections which come into contact with the metal may be suitably prepared or surfaced in the several ways already well known in the art. I, therefore, will not designate the way the faces should be impregnated or coated. This is not an essential part of my invention, and any of these suitable surfaces may be used with my molding apparatus.

It will also be understood that these rings may be annealed or self-annealed as they are discharged from the apparatus in any of the several ways already proposed in the art, if this seems desirable.

My apparatus and method can, of course, be used to produce other rings than piston rings.

What I claim is:

1. An apparatus for casting rings, comprising two permanent mold sections arranged to have relative movement toward and away from each other, and when closed together, forming an annular chamber to receive the molten metal, one of the mold sections comprising two parts forming the side and inner mold walls and arranged to have relative movement for stripping the solidified ring when it adheres to one of said parts.

2. An apparatus for casting rings, comprising two permanent mold sections which are arranged to have relative movement with respect to each other, and when closed together, form an annular chamber to receive the molten metal, the movable mold section comprising two parts which are yieldingly held together by springs and which are arranged to have relative movement, the moving of said movable mold section causing said parts to move together and then to arrest the movement of one part to permit the other still moving part to strip the solidified ring from off the arrested part.

3. An apparatus for casting rings, comprising two relatively movable mold sections which are arranged, when closed together, to form an annular chamber to receive the molten metal, the movable mold section having two parts which have relatively slidable movement, and provided with springs to normally keep the parts together, and stop devices for arresting one of the parts in the opening movement of the mold section to cause the other part to strip the solidified ring off the arrested part of the movable mold section.

4. An apparatus for casting rings, comprising a pair of permanent mold sections, one of which comprises a movable shouldered plunger head having a movable ring on the periphery of the plunger head, springs for normally keeping such ring against the shoulder of the plunger head, and stop devices for engaging such ring to cause relative movement with respect to the plunger head when the plunger head is thrown back in the opening action of the mold sections, whereby the work is stripped from the mold section to which it adheres.

In testimony whereof I have affixed my signature.

HARRY S. LEE