March 20, 1934. M. B. COVERT 1,951,397

MANUFACTURE OF PISTON RINGS

Filed July 29, 1932

Fig. 1.

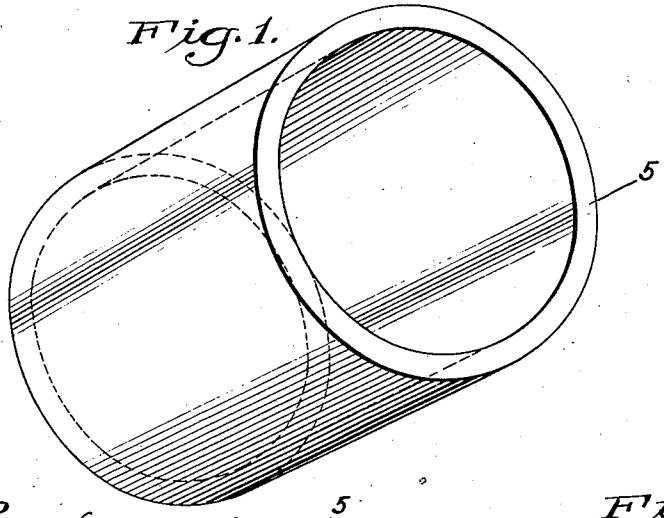


Fig. 2.

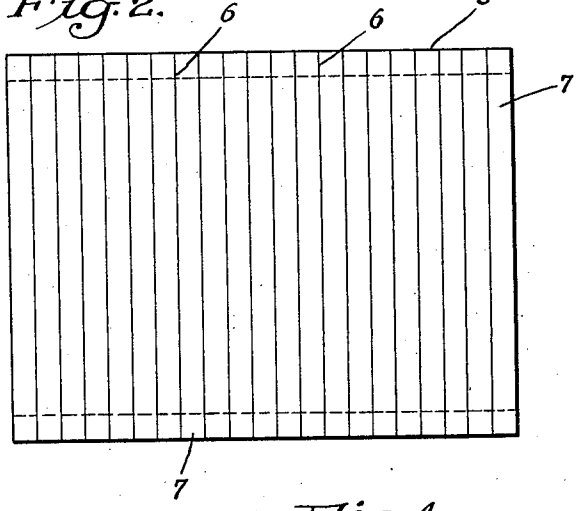


Fig. 3.

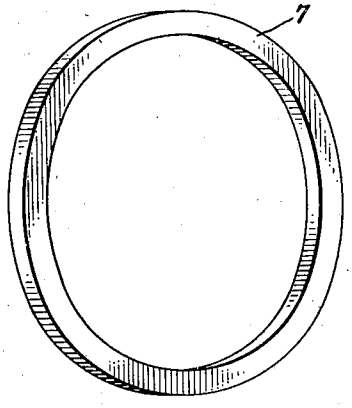
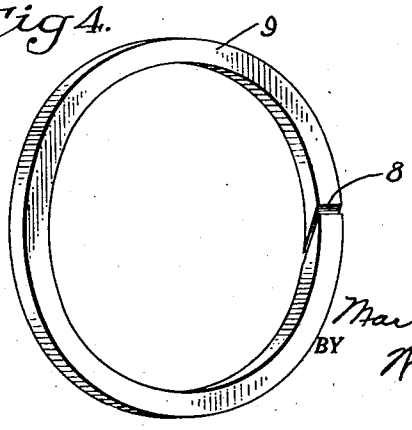


Fig 4.



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MANUFACTURE OF PISTON RINGS

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2 Claims. (Cl. 29—156.62)

This invention relates to the manufacture of piston rings and the like.

Piston rings are customarily made from individual castings but it is sometimes difficult to obtain good castings, particularly where the cross-sectional area is small, because the metal does not uniformly flow through a mold for a ring casting of small cross-section.

It is not difficult to cast a sleeve having a thin wall and hence, particularly where piston rings of small cross-section are required, it is advantageous to cast a sleeve of the required size and to then cut the rings from this sleeve. However, such a cast sleeve is not uniform throughout its length, the end parts usually being harder than the intermediate part, and because of foundry strains, hard spots and the like other non-uniformity is found in the sleeve. Hence, piston rings cut from such sleeves are not uniform, some being much harder than others. Furthermore, where foundry strains, hard spots and the like are present, the rings tend to warp or otherwise distort in use. Moreover, hard spots in piston rings cause excessive wear at some parts of the cylinder wall which is manifestly objectionable.

The principal object of my invention is to manufacture piston rings of uniform hardness and free of foundry strains, hard spots and the like.

Ancillary objects of my invention are to manufacture piston rings by employing a cast sleeve and cutting the rings therefrom; to heat-treat the sleeve to insure uniform hardness throughout the extent thereof and to remove hard spots and foundry strains, and the like; and to rapidly and economically manufacture piston rings which will perform satisfactorily in service.

In the selected embodiment of my invention described herein, reference is made to the accompanying drawing wherein

Fig. 1 is a perspective view of a cast sleeve from which piston rings may be cut;

Fig. 2 is a side elevation showing the manner in which the rings are cut from the sleeve;

Fig. 3 is a perspective view of a ring blank cut from the sleeve; and

Fig. 4 is a perspective view of a completed piston ring.

In practicing my invention, a sleeve 5 is cast either in an ordinary sand mold or in a molding machine or in any other approved way. Preferably the sleeve 5 is made of cast iron although other materials may be used without departing from the purview of my invention. I have found that such sleeves are not of uniform hardness for the end parts are usually harder than the intermediate parts and the sleeves are not free of foundry strains, hard spots and the like. Hence, if blanks for piston rings are cut from the sleeve 5, these blanks will not be of uniform hardness and free of foundry strains, hard spots and the like.

Hence, after obtaining a sleeve 5, I subject it to a heat treatment to insure uniform hardness throughout and to remove foundry strains, hard spots and the like. When the sleeve 5 is made of cast iron, it is subjected to a temperature of approximately 1100° Fahrenheit, which is above the temperature to which rings made from the sleeve will be subjected during use, to remove hard spots and foundry strains and to produce uniform hardness throughout. The sleeve 5 may be heat-treated in its rough state, as it comes from the mold, or it may be rough-machined both inside and out to remove scale and the like and either of these methods is within the purview of my invention.

After the sleeve 5 has been heat-treated, it is clamped in a suitable machine tool such as a lathe and is cut along the lines 6 to divide it into ring blanks 7, one of such blanks being illustrated in Fig. 3. The finishing operations are then performed on the blanks 7 which operations may consist in machining or grinding to size, slotting to provide oil grooves, slitting the blank as at 8 to provide the completed ring 9, filing the ends of the ring at the slit 8, or any other desired operations.

The preferred form of my invention resides in casting the sleeve 5, rough-machining it both inside and out, subjecting the sleeve to a temperature of approximately 1100° Fahrenheit for about thirty minutes, cutting off the ring blanks and performing the finishing operations on these blanks.

Should the sleeve 5 be a poor casting, or if for any other reason it is desirable, the ring blanks 7 or the finished rings 9 may be subjected to a suitable heat-treatment as, for example, subjecting these ring blanks, or rings to a temperature of approximately 1100° Fahrenheit to remove hard spots and foundry strains and to insure uniform hardness throughout but ordinarily such second heat treatment will not be necessary.

Furthermore, the ring blanks 7 may be cut from the sleeve 5 prior to heat-treatment of this sleeve and then the ring blanks or the finished rings may be subjected to a heat-treatment as above described but I prefer to make the rings by heat-treating the sleeve prior to the time the ring blanks are cut therefrom.

I have described my invention with particular reference to piston rings but this is not to be taken as a limitation of the invention for it is adaptable in making other articles. Furthermore, I do not wish to be limited to the precise details set forth but desire to avail myself of such changes and modifications as fall within the purview of the following claims.

I claim:

1. The method of making piston rings or the like which consists in casting an iron sleeve having a relatively thin wall, subjecting the sleeve to a temperature of approximately 1100° Fahrenheit for a sufficient period of time to remove hard spots, foundry strains and the like and to produce uniform hardness throughout the sleeve so that uniform ring blanks may be cut from the sleeve, cutting ring blanks from the sleeve, and performing finishing operations thereon to provide the rings or the like.

2. The method of making piston rings or the like which consists in casting an iron sleeve having a relatively thin wall, rough-machining both the inner and outer surfaces of the sleeve, subjecting the sleeve to a temperature of approximately 1100° Fahrenheit for a sufficient period of time to remove hard spots, foundry strains and the like and to produce uniform hardness throughout the sleeve so that uniform ring blanks may be cut from the sleeve, cutting ring blanks from the sleeve, and performing finishing operations thereon to provide the rings or the like.

MARTIN B. COVERT.