Feb. 13, 1923. 1,445,150

E. T. MANNING

APPARATUS FOR PEENING PACKING RINGS

Filed May 14, 1919

Fig. 1

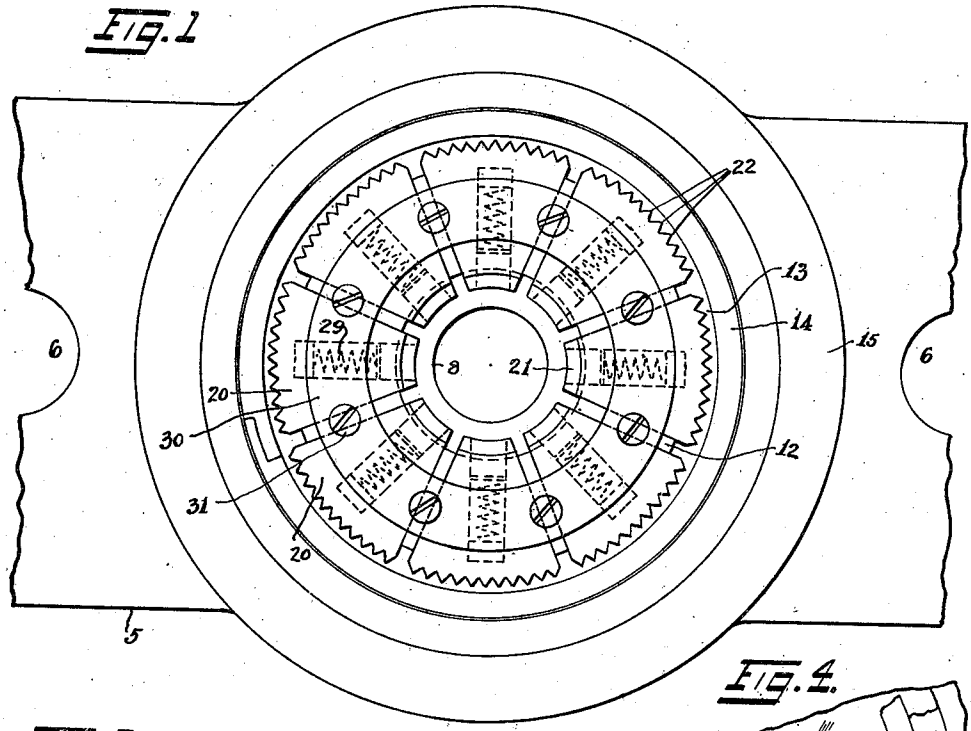


Fig. 3.

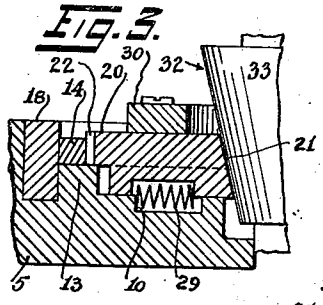


Fig. 4.

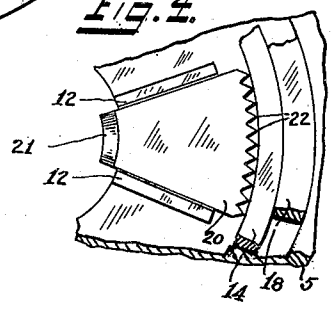
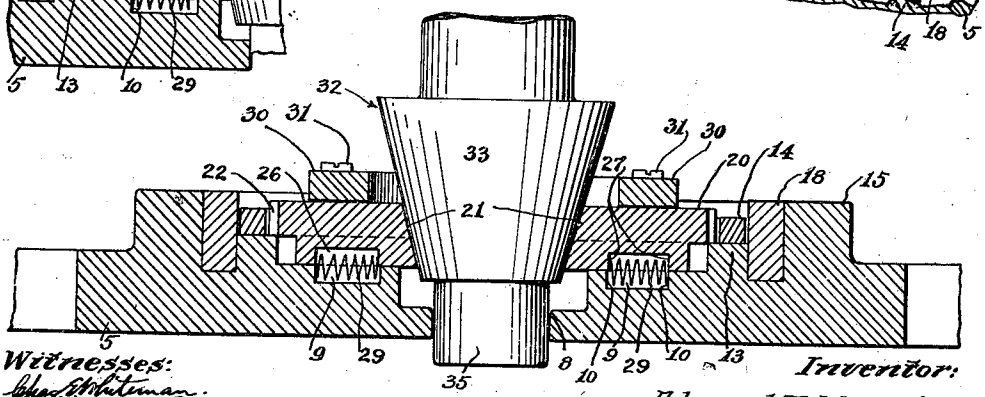


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PEENING PACKING RINGS.

Application filed May 14, 1919. Serial No. 297,118.

To all whom it may concern:

Be it known that I, EDWARD T. MANNING, a citizen of the United States, residing in New London, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Peening Packing Rings, of which the following is a specification.

This invention relates to apparatus for peening piston packing-rings, for rejuvenating old piston rings or imparting to new rings a sufficient tension for yieldably holding them in contact with the cylinder or the piston as the case may be. Heretofore, this tensioning has been accomplished by striking successive peening blows against the face of the piston ring so that the metal will be there compressed and caused to exert an expansive influence upon the piston ring. This peening has been accomplished by imparting successive peening blows to the face of the piston, one at a time, progressively around the piston ring.

In imparting these peening blows one at a time, there is imparted an unequal elasticity to the piston ring which causes the latter to warp so that it is impossible to impart thereto an equal amount of tension throughout its whole circumference. Furthermore the process involving the successive peening blows consumes a great deal of time and is therefore very costly.

The object of the present invention is to overcome the above mentioned defects, and to provide an apparatus and process by means of which the whole circumference of the piston ring may be peened simultaneously and uniformly throughout, thereby performing the process in a minimum of time and providing a uniformly tensioned piston ring which will have no tendency to warp or to lose its elasticity.

These and other objects will appear as the nature of the invention is disclosed; and while herein I have described minute details of the apparatus and process, the invention is not limited to these since various changes in the details and combinations thereof may be made without departing from the scope of the invention as claimed.

In the accompanying drawing, showing by way of example, one of many possible forms of apparatus by which the new process may be performed,—

Figure 1 is a plan of the apparatus;

Fig. 2 is a central vertical sectional view partly in elevation of the apparatus showing the parts thereof in one position;

Fig. 3 is a fragmentary vertical sectional view showing the parts in a different position; and

Fig. 4 is a plan of the parts shown in Fig. 3.

The new apparatus is intended to be used with an ordinary board or drop press, and is adapted to rest upon the bed of such press.

The foundation part of the apparatus comprises a bolster plate 5, adapted to rest upon the bed of the drop press, and provided with the bolt holes 6 by means of which the bolster plate may be secured to the bed. The bolster plate is provided with a central opening 8, countersunk at its upper part, and surrounded by a plurality of radial upwardly opening recesses 9, each provided with end shoulders 10. Between said recesses there are provided a plurality of raised radial guide lugs 12, spaced from and surrounded by a raised annular seat 13 adapted to receive a piston-packing ring 14 thereon. Surrounding the annular seat there is provided a heavy annular bolster flange 15 concentric and spaced from said ring seat and forming with the ring seat an anvil receiving recess adapted to receive an annular anvil 18 of hardened steel.

Disposed between and guided by said lugs 12 respectively are a plurality of radially disposed radially movable approximately sector-shaped peening members 20 provided with concaved inner end faces 21, together forming a downwardly tapering opening. Said peening members are provided with arcuate outer ends having a large number of vertically disposed, closely adjacent peening projections or teeth 22, adapted to contact with the packing ring 14 placed upon the seat 13 and supported against outward movement by the anvil 18.

The peening members 20 are provided with radial recesses 26 having end shoulders 27. The recesses 9 and 26 register with each other and form housings in which are compressed helical springs 29 adapted to hold said peening members in a normal mid-position with the teeth 22 out of contact with the packing ring. The annular re-

taining plate 30, secured to the lugs 12 by means of the screws 31, holds the peening members between the lugs.

The means for driving the peening members outwardly so that the teeth come into peening contact with the piston ring comprises a tapering plunger hammer 32 which itself comprises, or is mounted on, the plunger of the drop press. This plunger hammer is provided with a tapering body portion 33, adapted to engage in said downwardly tapering recess formed by the concaved faces 21. The lower reduced end 35, of the plunger hammer is guided in the central opening 8.

In operation, the plunger 32 is raised to its upper limit, and a new or an old packing ring 14 is placed upon the raised seat 13, substantially in contact with the anvil 18. The plunger is then released and drops with great force, forcing the tapering body portion 33 into the tapering opening, thereby forcing the peening members radially outwardly until the teeth engage and indent the piston ring and exert an intense peening action throughout the whole of its inner circumference, thereby evenly and thoroughly compressing and tensioning the inner face of the ring throughout. The plunger is then again raised and another piston ring put in place ready to be peened and the operation is repeated until all of the rings are peened.

Obviously the invention is not limited to processes or apparatus for peening the inner face of the piston rings, nor is it limited to piston rings.

I claim as my invention:

1. In combination, a bolster; sector shaped peening members guided on said bolster and having their inner ends together adapted to form a central opening; a retaining plate disposed above said members and holding said members in place; an annular anvil surrounding said members, and a tapering plunger adapted to engage in said opening to force said members outwardly.

2. In combination, a bolster plate provided with, a plurality of raised substantially radial elongated guide lugs; an annular anvil surrounding said plurality of lugs; sector shaped peening members guided between said lugs, and provided with concaved inner end faces together adapted to form a downwardly tapering opening, and arcuate outer ends having peening teeth; an annular retaining plate disposed on and secured to the top face of said lugs and guiding and holding said peening members in place between the lugs; and a tapering plunger adapted to engage in said tapering opening to force said members outwardly.

3. In combination, a bolster provided with a plurality of raised substantially radial elongated guide lugs; an anvil surrounding said plurality of lugs; peening members guided between said lugs, their ends together adapted to form an opening, and a plunger adapted to engage in said opening to force said members outwardly.

4. In combination, a bolster; an anvil; peening members; springs interposed between said members and bolster; and means adapted to force said members toward the anvil.

5. In combination, a bolster provided with recesses; an anvil; peening members provided with radial recesses approximately registering with said first named recesses; springs in said recesses; and hammer means for forcing said members toward the anvil.

6. In combination, a bolster provided with a plurality of substantially radial upwardly opening recesses having end shoulders; an annular anvil surrounding said plurality of recesses and spaced from the outer ends thereof; a plurality of radially disposed radially movable approximately sector-shaped peening members disposed within said anvil and provided with concaved inner end faces together adapted to form a downwardly tapering opening, arcuate outer ends having peening teeth thereon, and radial recesses approximately registering with said upwardly opening recesses and provided with end shoulders; helical springs compressed in said recesses and engaging said shoulders; and a tapering plunger hammer adapted to engage in said opening to force said members outwardly.

7. In combination, a bolster; a raised ring-seat thereon; an annular anvil surrounding said seat; peening members within and limited in outward movement by said seat; and means adapted to force said members outwardly.

8. In combination, a bolster having a flange; a hardened annular anvil removably mounted on said bolster within said flange; peening members; and means adapted to force said members toward said anvil.

9. In combination, a bolster provided with a raised ring-seat, and an annular bolster flange surrounding and spaced from said seat, forming therewith an anvil recess; an anvil in said recess; peening members within said seat; and means adapted to engage and force said members outwardly.

10. In combination, a bolster provided with a raised ring-seat, and an annular bolster flange surrounding and spaced from said seat, forming therewith an anvil recess; a hardened annular anvil removably mounted in said anvil-recess; peening members radially movable within said seat and provided with inner end faces together adapted to form an opening, and arcuate outer ends having peening teeth; and a tapering plunger hammer adapted to engage in said opening to force said members outwardly.

11. In combination, a bolster provided with an opening; an anvil on said bolster; peening members; and means adapted to move into and be guided by said opening, and to force said members toward said anvil.

12. In combination, a bolster provided with a central opening counter-sunk at its upper part, an anvil surrounding said opening; peening members guided round said opening and provided with concaved inner end faces together adapted to form a downwardly tapering opening; and a tapering plunger hammer having a reduced end adapted to engage in said central opening, and a tapering body portion adapted to engage in said counter-sunk upper part and in said tapering opening, and to force said peening members outwardly.

13. In combination, a bolster plate provided with a central opening, a plurality of substantially radial recesses around said opening, a plurality of elongated guide lugs between said radial recesses, a raised annular ring seat surrounding said recesses and adapted to receive a packing ring thereon; an annular bolster flange surrounding said seat thereby forming an anvil recess; an annular anvil in said anvil recess; radially movable sector-shaped peening members disposed between said lugs; said peening members being provided with concaved inner end faces together forming a downwardly tapering opening; arcuate outer ends having vertically disposed closely spaced peening teeth; and radial recesses approximately registering with said first named recesses; and helical springs comprised in said recesses: means secured to said lugs and guiding said peening members in place; and a tapering plunger hammer having a tapering body portion adapted to engage in said tapering opening to force the peening members outwardly to cause the peening teeth to have peening engagement with the inner face of the piston ring.

14. In combination, a substantially annular anvil; guides fixed relative to the anvil; and peening members guided between said guides toward the anvil and together providing a substantially annular peening portion.

15. In combination, fixed guides; a one-piece substantially annular anvil; and peening members guided between said guides toward the anvil and together providing a substantially annular peening portion.

16. In combination, fixed guides; a substantially annular anvil having an unbroken inner face; and peening members guided between said guides toward the anvil and having peening teeth providing a substantially annular peening portion opposing said unbroken face.

17. In combination, fixed guides; an anvil of fixed substantially annular contour; and peening members guided between said guides toward the anvil and together providing a substantially annular peening portion.

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Witnesses:
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