

No. 878,279.

PATENTED FEB. 4, 1908.

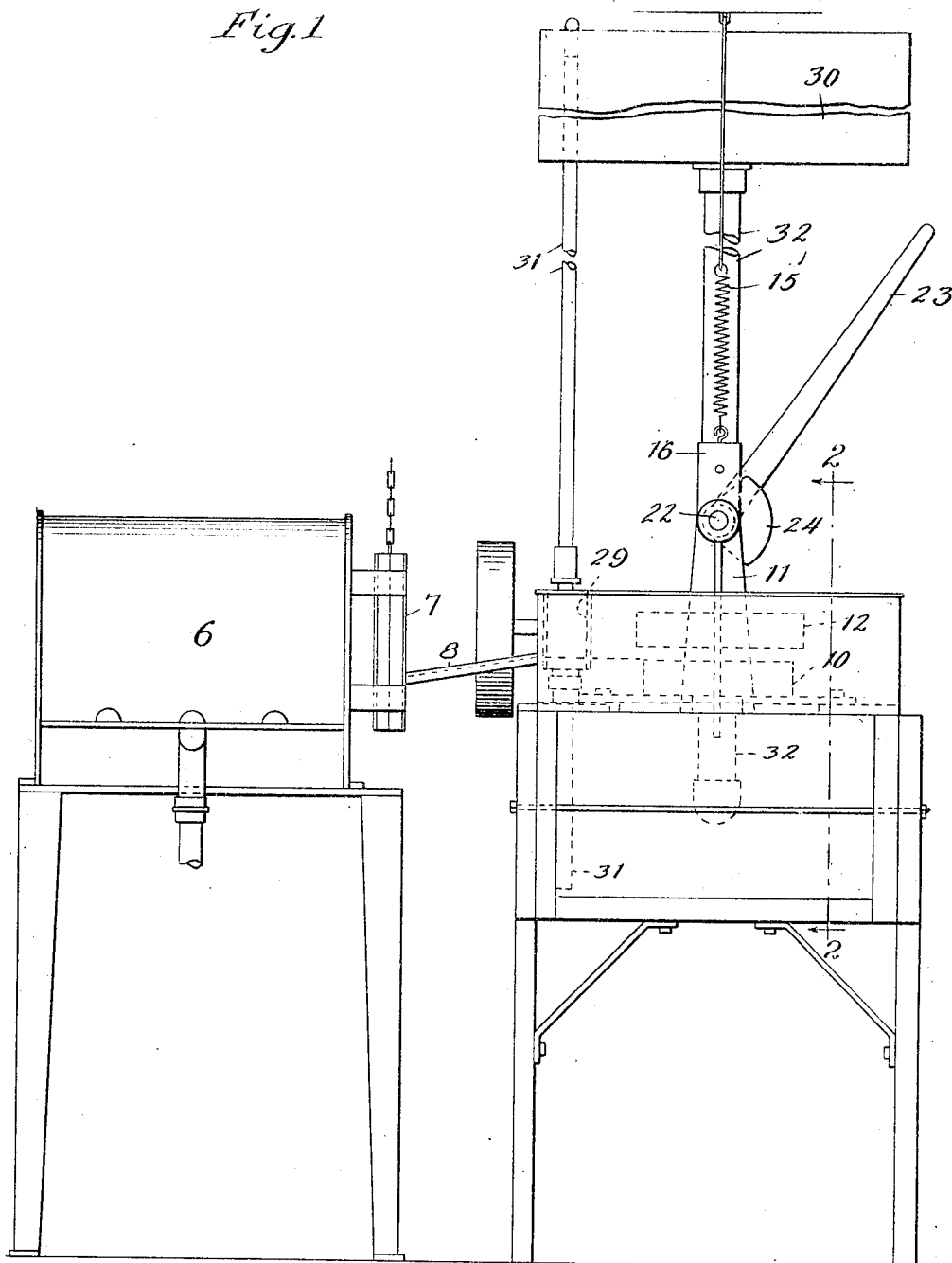
L. E. CURTIS.

APPARATUS FOR HARDENING METAL.

APPLICATION FILED SEPT. 30, 1905.

2 SHEETS—SHEET 1.

Fig. 1



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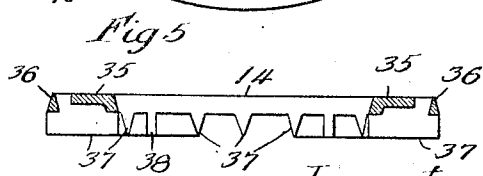
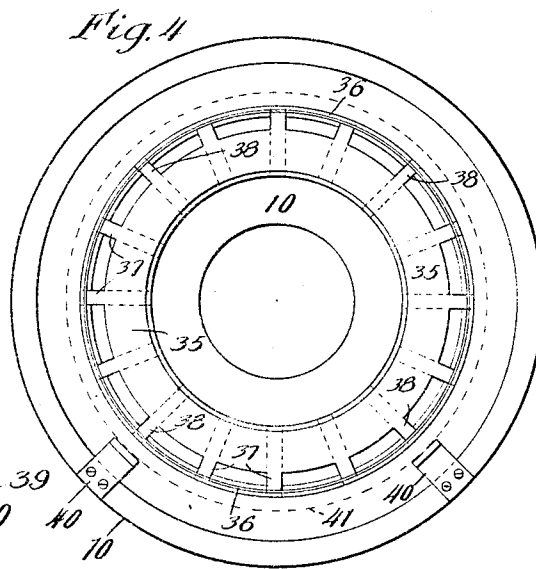
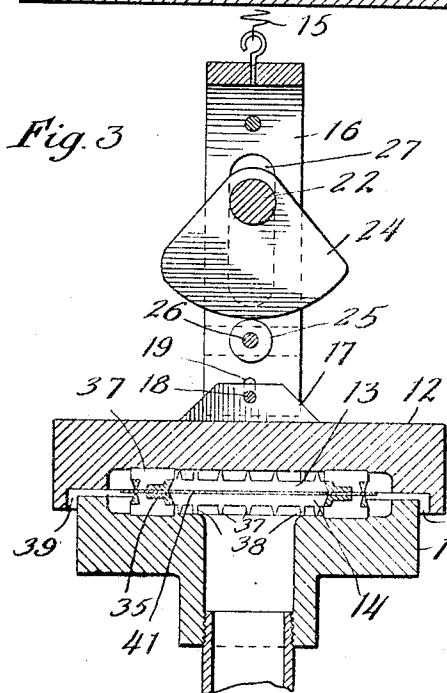
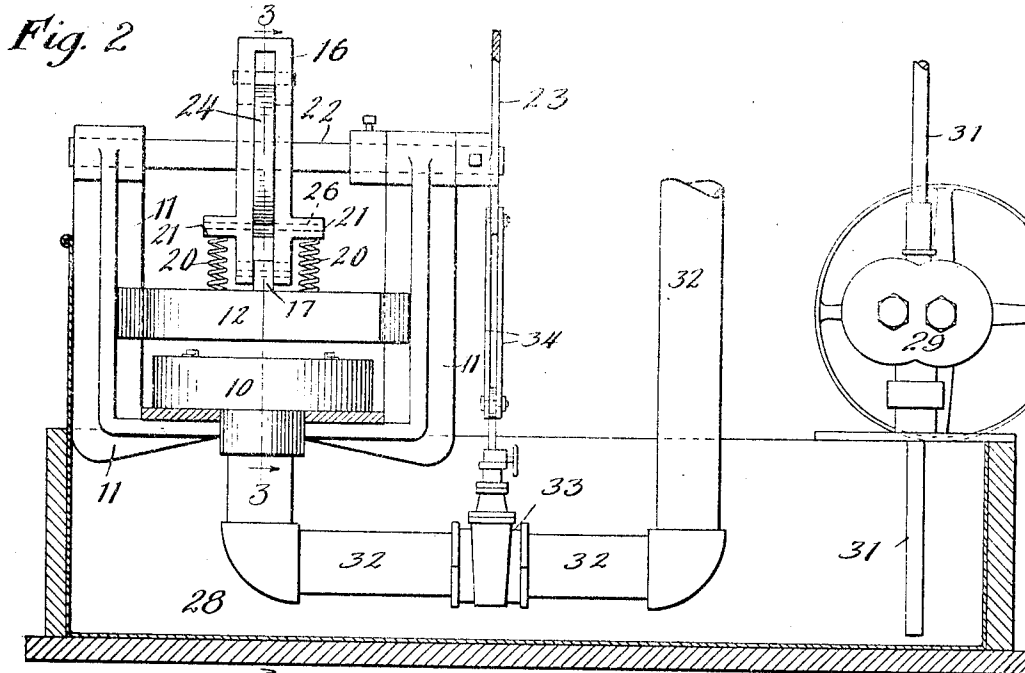
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR HARDENING METAL.

No. 878,279.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed September 30, 1905. Serial No. 280,770.

To all whom it may concern:

Be it known that I, LEWIS E. CURTIS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Apparatus for Hardening Metal, of which the following is a specification.

This invention relates to apparatus for hardening metal, and has been devised with special reference to its use in hardening the disk or ring cutters employed in the machine for slitting sheet metal shown in the patent to me of April 9th, 1901, No. 671,915. Its object has been to improve the previous construction of such apparatus, and its nature is fully set forth below and illustrated in the accompanying drawing, in which latter

Figure 1 is an elevation of the invention. Fig. 2 is a vertical section of the same. Fig. 3 is a section upon the line 3—3 of Fig. 2. Fig. 4 is a plan of the lower clamping member for holding the ring while it is being acted upon by the oil. Fig. 5 is a vertical section of one of the clamping rings.

In said drawing, 6 represents a furnace in which the ring or other article to be hardened is heated, and which may be of any suitable construction. The door 7 through which the heated rings are withdrawn from the furnace, is desirably provided with a counter-balance not shown, and a bridge 8 over which the ring may be moved, extends from the furnace to the oil administering portion of the apparatus. In this portion are clamping devices consisting of a stationary bed 10 supported by the frame 11, and a movable plate 12 located over and of a somewhat larger diameter than the bed so that its edge overhangs the bed as plainly shown. The underside of the plate 12 is recessed so that it may set down over the bed 10, and so it will receive a clamping ring 13, and the top of the bed 10 is also recessed so it will receive the clamping ring 14. The movable plate is confined at its opposite sides and moves vertically between the limbs of frame 11, and it is supported by a spring 15 attached to the ceiling or other overhead support, and an inverted U shaped frame 16 connecting the spring to the top plate, the attachment to the plate being preferably constructed as follows: At 17 is a riser formed on or attached to the plate, and a pin 18 is secured

to the riser, with its ends projecting at either side thereof and entering elongated openings 19 formed in the limbs of frame 16. The feet of frame 16 are normally raised from the plate as seen at Fig. 3, springs 20 being inserted between the arms 21 on the frame and top of the plate, and tending to keep the parts separated.

The depressing of the plate 12 when a cutting ring is to be clamped is accomplished as follows: A shaft 22 is journaled in the top ends of the frame 11 and provided with an operating lever 23. Upon this shaft is a cam 24 located in the opening between the two sides of the frame 16. This cam is adapted to engage a roller 25 journaled upon a cross shaft 26 supported in the sides of the frame 16, and through such contact to depress the frame 16 to the extent necessary to cause the clamping of the cutter ring between the clamping rings secured to the plate 12 and bed 10. In this operation the springs 20 serve to cushion the contact at the beginning so that the full measure of the pressure is not exerted until said springs are compressed and the feet of the frame 16 bear upon the plate 12. The pressure may be maintained, of course, for any length of time desired. The sides of the frame 16 are slotted as at 27 to give room to the shaft 22. The cam 24 is brought to the position of Fig. 3 which is its operating position, by swinging the lever 23 as will be understood.

Below these clamping devices is an oil tank 28 which is provided with a pump 29 adapted to lift the oil from the tank to an overhead tank 30 through the pipe 31 so that the oil used with the apparatus may be fed to the clamping apparatus under considerable pressure. The overhead tank is connected to the clamping devices by a comparatively large pipe 32, the lower end of which is turned upward and enters the bed 10 delivering the oil at the center of the recessed space in the bed. A valve 33 is located in pipe 32 and controls the flow of the oil therefrom, and this valve is operated by the lever 23 through the medium of the connecting link 34 in such manner that the operating of the lever for the purpose of clamping a cutter ring, shall at the instant the clamping is effected and in the same operation open valve 33 and admit a large volume of the oil into the clamping chamber

formed between the bed and the plate 12, sufficient to completely immerse the ring being hardened.

The clamping rings it will be noticed, are adapted to admit the oil freely to almost the entire surface of the ring being treated, being formed of an inner annular supporting surface 35, an outer knife edged supporting surface 36, V shaped feet 37 and other feet 38 having broad supporting surfaces. The feet are arranged radially, as plainly indicated at Fig. 4 and both rings are exactly alike, the upper one being inverted. The oil is given freedom to move from the center outward in every direction by this construction of the clamping rings and it finds its outlet from the clamping chamber through the annular orifice 39 leading from the chamber to the outside of the bed from whence it flows into the tank 28. In the practice of the invention, it will be noted that the oil does not remain stationary in the clamping chamber, but on the contrary it flows out of the same nearly as fast as it enters and is in constant motion through the chamber, keeping all parts of the ring immersed at all times. The pump 29 may be kept in constant action so that the oil in the overhead tank, does not become exhausted and between the hardening operations that tank may be completely filled. The broad surfaced feet of the clamping rings offer a means for their attachment to the plate 12 and to the bed, and the bed is provided with gages or stops 40 against which the rings to be hardened may be positioned. A cutter ring is shown at 41 in Fig. 3 in position to undergo the hardening operation.

It will be noted that the recesses in the proximate faces of the plate 12 and 10 form an inclosed chamber within which the ring or article to be hardened is located and through which the oil may be kept moving by feeding it to the chamber under pressure; also that the rings by which the article operated upon is clamped and supported are

adapted to admit the oil freely through their center openings and also to distribute it outwardly in all directions through the open spaces between the radiating feet, and the outlet being annular and at the outside of the chamber the oil necessarily reaches every part of the cutter, and especially the cutting edge thereof where the hardening is most needed.

1. The combination with the clamping means having an inclosed chamber in which the article to be hardened may be located during the hardening operation, and a lever for operating said means, of a pipe supplying oil under pressure to said chamber, an outlet for the oil, and a valve in said pipe connected to and operated by said lever when it operates the clamping means.

2. The apparatus for hardening cutter rings consisting of the plate 12 and bed 10 having recesses on their proximate faces forming a hardening chamber, an oil inlet pipe, supporting rings in said chamber between which the cutter rings are positioned, an outlet for the oil, means for forcing the plate and bed together, embracing an operating lever, and a valve controlling said inlet pipe and mechanically connected to said lever so as to be operated simultaneously therewith.

3. The apparatus for hardening cutter rings consisting of the plate 12 and bed 10 having recesses on their proximate faces forming a hardening chamber, an oil inlet pipe delivering the oil at the center of the chamber, supporting rings in said chamber between which the cutter rings are positioned, an annular outlet for the oil, means for forcing the plate and bed together, embracing an operating lever, and a valve controlling said inlet pipe and mechanically connected to said lever so as to be operated simultaneously therewith.

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Witnesses:

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