Nov. 22, 1949 F. M. TIMM ET AL 2,489,166

QUENCHING MACHINE

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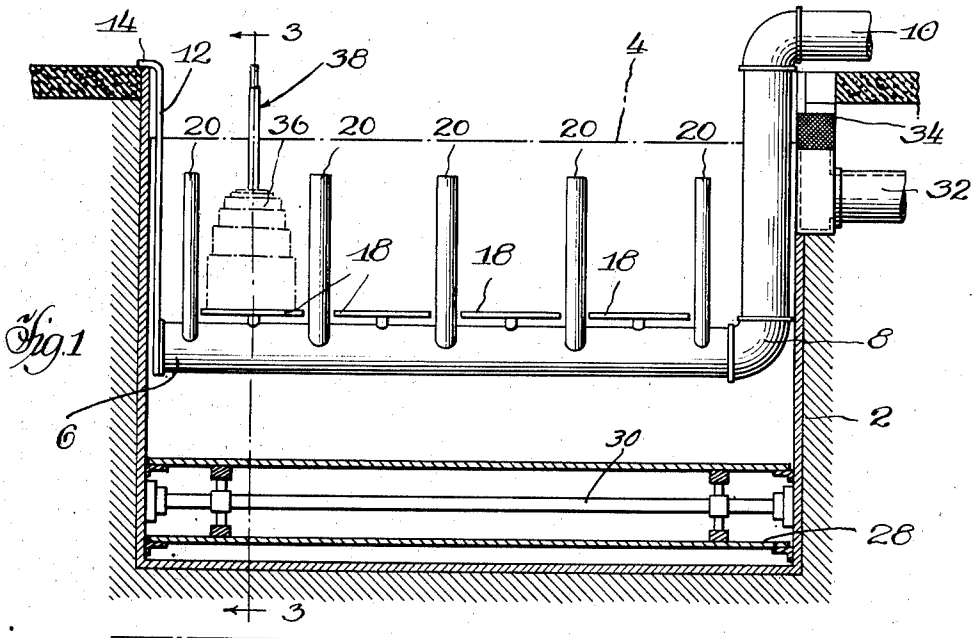


Fig. 1

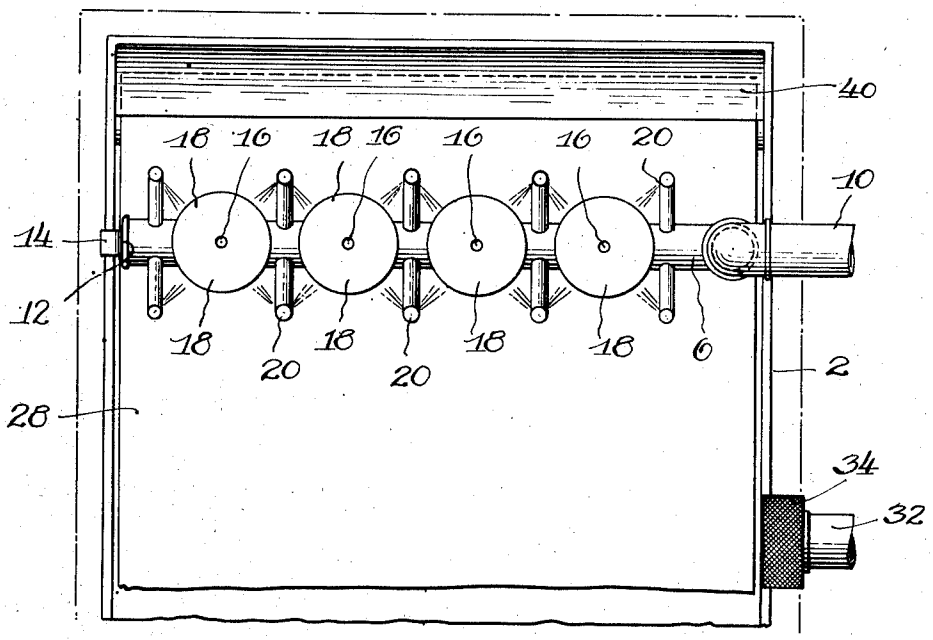


Fig. 2

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Fig. 3

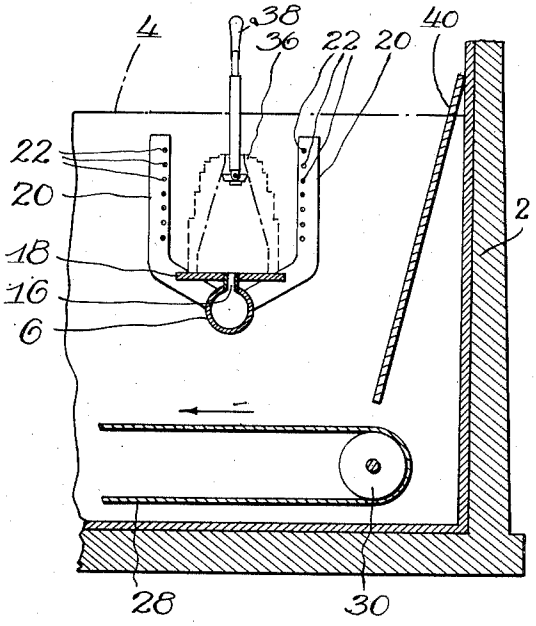


Fig. 4

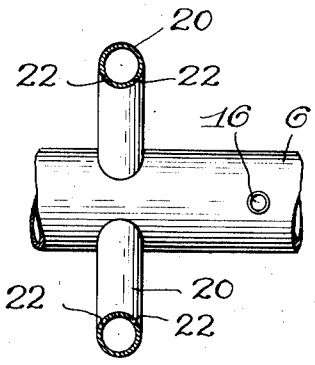
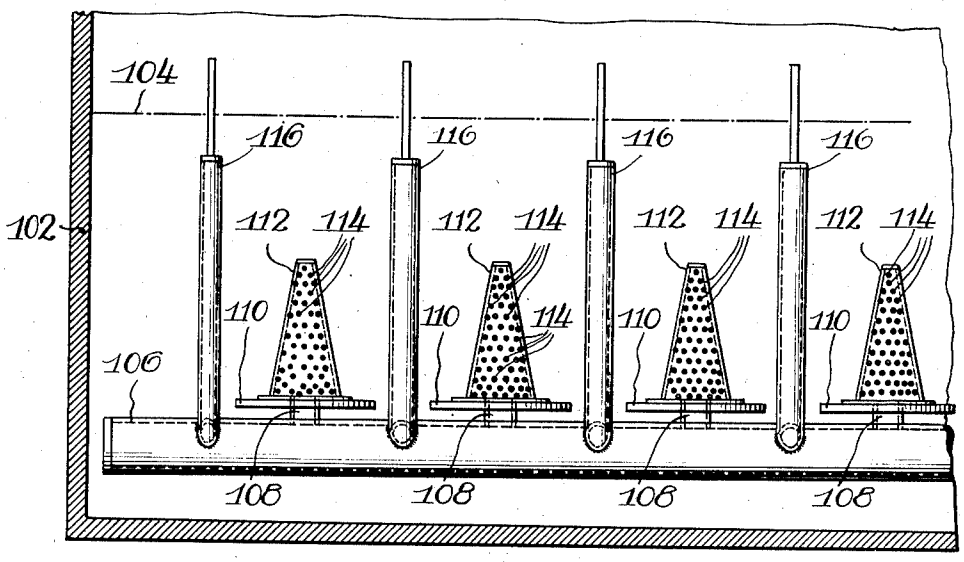


Fig. 5



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QUENCHING MACHINE

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4 Claims. (Cl. 134—170)

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Our invention relates to a device for quenching springs and more particularly to such a device by which a plurality of volute coil spring may be simultaneously quenched.

An object of our invention is to provide means for effecting turbulence of the quenching liquid.

A specific object of our invention is to design quenching apparatus comprising a receptacle filled with any suitable quenching liquid such as oil and a header pipe suspended therein, said pipe being provided with a plurality of ports therein, and spring seats disposed around respective ports, extensions being formed on said pipe at opposite sides thereof and disposed in alternate relationship with the spring seats, each of said extensions being provided with a plurality of ports, and additional liquid being pumped through the header pipe and through said ports to effect turbulence of the liquid within the receptacle.

A further object of our invention is to quench volute coil springs by immersing the same in a quenching liquid and pumping additional liquid therethrough while at the same time pumping additional liquid against the external surfaces of said springs.

In the drawings, Figure 1 is a side elevation of our novel quenching apparatus with portions of the liquid receptacle being shown in section to clarify the view, and Figure 2 is a top plan view of the structure shown in Figure 1.

Figure 3 is a sectional view taken in the vertical plane indicated by the line 3—3 of Figure 1, and Figure 4 is a fragmentary elevational view showing in detail the construction of the header pipe illustrated in Figures 1 to 3 inclusive; and

Figure 5 is a fragmentary view comparable to that of Figure 1 but showing a modification of our novel quenching apparatus.

In each of said figures certain details may be omitted where more clearly seen in other views.

Describing our invention in detail, an oil receptacle or tank 2 is filled with oil or other suitable quenching liquid designated 4. Suspended within the receptacle 2 is a header pipe 6 afforded connection at one end thereof by an elbow 8 to a supply line 10 which is connected to a source of liquid such as a supply pump (not shown). The opposite end of the pipe 6 is closed and is provided with an arm 12 engaged as at 14 with the top of the tank 2 to afford convenient support for the pipe 6. A plurality of ports 16, 16 are formed in the top of the header pipe 6, and a spring seat 18 is mounted around each port. On opposite sides of the header pipe 6 are formed a plurality of upwardly projecting extension tubes 20, 20, said

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tubes communicating with the pipe 6 and being closed at their upper ends, and said tubes being formed with a plurality of ports or openings 22, 22 on the sides thereof adjacent the seats 18, 18. It may be noted that the tubes 20, 20 on each side of the header pipe 6 are alternately arranged with respect to the seats 18, 18, and the portions of the tubes above the level thereof are spaced from each other at a distance greater than the diameter of said seats in order to permit passage of a spring between the tubes in either a vertical or a horizontal direction, as may be clearly seen from a comparison of Figures 1 and 2.

Beneath the header pipe 6 is a conveyor comprising a conveyor belt 28 of conventional form and mounted on a wheel and axle assembly 30, said belt being rotated in a counter-clockwise direction, as indicated by the arrow in Figure 3, by any convenient power means (not shown), said conveyor serving a purpose hereinafter more fully described.

The receptacle or tank 2 is provided with an overflow outlet 32 connected to any convenient means, such as a pump (not shown), for removing overflow liquid from said receptacle, and the outlet 32 is provided with a strainer 34.

In operation of our novel quenching apparatus, a heated volute spring 36 (Figures 1 and 3) is lowered, by means of a pick-up tool generally designated 38 to a position on one of the seats 18, 18 and above the associated port 16 in the header pipe, and thereafter additional quenching liquid is forced or pumped into the header pipe 6 at an adequate rate to cause the liquid to be urged upwardly through the interior of the spring from the port 16 and against the exterior of the spring from the ports 22, 22 in the adjacent extension tubes 20, 20. In this manner a turbulence is created in the quenching liquid which provides adequate quenching of both the inner and outer surfaces of the coils of the spring. The liquid is prevented from overflowing the receptacle 2 by pumping liquid from the overflow pipe 32 at approximately the same rate as liquid is pumped into the header pipe 6. In this connection, it may be noted that a rate of eight hundred gallons per minute has produced very satisfactory results in actual practice.

After a predetermined period of time, the spring may be moved in a horizontal direction from the seat 18 between the adjacent tubes 20, 20 and said spring may then be dropped on the conveyor belt 28, a baffle 40 being being provided to prevent the spring from falling behind the end of the conveyor, and it will be understood by

those skilled in the art that the belt 28 will convey the spring toward the forward end of the tank or receptacle 2 from which it may be conveniently removed. Meanwhile, another spring may be placed on the seat 18 and the above-described cycle may be repeated.

It will be understood that if desired four springs may be quenched at the same time in the arrangement shown, although the header pipe 6 may be constructed to quench any desired number of springs at the same time.

A modification of our novel quenching apparatus is shown in Figure 5 wherein the receptacle 102 may be filled with a quenching liquid 104, and a header pipe 106 may be suspended within said liquid, said pipe being provided with ports 108, 108 and spring seats 110, 110 mounted therearound. On each spring seat is a cone member 112 adapted to project within the associated spring when the same is positioned upon the seat 110, said cone member being provided with a plurality of openings 114, 114 through which additional liquid may be forced by means of the port 108 against the internal surfaces of the associated spring. One each side of the header pipe 106 and arranged alternatingly with the spring seats 110, 110, are a plurality of extension tubes 116, 116 serving the same purposes as the corresponding tubes 20, 20 of the previous modification. It will be understood that the modification of our invention shown in Figure 5 is substantially identical with that disclosed in Figures 1 to 4 inclusive except for the provision of the cone member 112, said cone member serving as a means of creating turbulence in the quenching liquid which is urged through the ports 108, 108 of the header pipe 106.

It will also be understood that although a conveyor mechanism is not shown in Figure 5, such a mechanism may readily be utilized as in the modification shown in Figures 1 to 3.

It is to be understood that we do not wish to be limited by the exact embodiments of the device shown which are merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

We claim:

1. A device for quenching coil springs comprising a receptacle adapted to be filled with liquid, a header pipe suspended therein, said pipe being closed at one end thereof, an outlet in the top of said pipe, a spring seat mounted on said pipe around said outlet, a plurality of extension tubes projecting upwardly from said pipe and spaced about said seat, said tubes communicating with said pipe and being closed at their ends remote therefrom, openings in each extension tube on the side thereof adjacent said seat, said pipe being adapted to convey said liquid under pressure, and means for conveying overflow liquid from said receptacle, the tubes on each side of the pipe being spaced a distance from each other greater than the diameter of said seat, whereby an associated spring mounted on said seat may be moved laterally of said pipe between the tubes at either side thereof and may be dropped toward the bottom of said receptacle.

2. In a device for quenching volute coil springs, a receptacle for containing a fluid quenching medium, a substantially horizontal header pipe suspended therein and comprising a plurality of ports in the top thereof, a spring seat on said header pipe around each port, spaced upstanding extension tubes on each side of said pipe alternately arranged with said seats, ports in said tubes on the sides thereof adjacent said seats, said pipe being adapted to convey said medium under pressure to said receptacle, and means for conveying overflow medium from said receptacle, the space between the tubes on each side of said pipe being greater than the diameter of said seats whereby associated springs mounted on said seats may be removed therefrom laterally of said pipe between the associated tubes and dropped in said receptacle.

3. In a device for quenching hollow members, a receptacle adapted to contain a fluid quenching medium, a conduit in said receptacle adapted to convey said medium and comprising a port, substantially horizontal seat means around said port for supporting a member to be quenched, and extension tubes upstanding from said conduit around said seat means, said tubes comprising ports in their sides adjacent said seat means and being arranged so that a pair of tubes is disposed at each side of said conduit, the distance between the tubes of each pair being greater than the width of said seat means whereby said member may be removed therefrom laterally of said conduit between the associated pair of tubes and may be dropped in said receptacle.

4. In a device for quenching hollow members, a receptacle adapted to contain a fluid quenching medium, a conduit in said receptacle adapted to convey said medium and comprising a port, substantially horizontal seat means around said port for supporting a member to be quenched, and a plurality of extension tubes upstanding from said conduit around said seat means, said tubes comprising ports in their sides adjacent said seat means, the distance between the tubes at each side of the conduit being greater than the width of said seat means whereby said member may be removed therefrom laterally of said conduit between the associated tubes and may be dropped in said receptacle.

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