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TEMPERING APPARATUS

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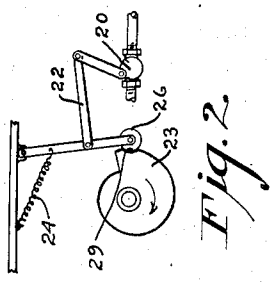

Fig. 2.

Fig. 1.

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TEMPERING APPARATUS

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7 Claims. (Cl. 49—45)

My invention relates to timing mechanisms, and more particularly to a form of mechanism especially suitable for facilitating the carrying out of tempering methods such as proposed in a co-pending Lewis application Serial Number 138,418, filed April 22, 1937, and in Fig. 4 of a co-pending Littleton et al. application, Serial Number 150,172, filed June 24, 1937.

One form of my invention is diagrammatically illustrated in the accompanying drawing as applied to an apparatus such as illustrated in Fig. 4 of the aforesaid Littleton et al. application.

The tempering apparatus illustrated includes a turntable 11 having a suitable group of fingers 12 on which a bottle 13 to be tempered is placed in an inverted position. A fixed apertured tube 15 coincides with the axis of the table and extends to within a short distance of the inner bottom surface of the bottle, the apertures being distributed and their size calculated in accordance with the intensity of the chill to be given to the respective surfaces toward which they are directed. A reservoir 16 has a row of apertures 17 in a wall thereof faced toward the outer surfaces of the bottle. A union 18 in the fluid supply line 14 is provided to enable rotation of reservoir 16 away from tube 15 to enable a bottle such as 13 to be placed on or removed from supports 12.

The tube 15 and reservoir 16 receive their supply of cooling medium from a main fluid supply line 19 through separately controlled valves 20 and 21. Valve 20 is adapted to be actuated by a mechanical link 22 carrying a cam follower 26 under control of a cam 23 and an associated helical spring 24, with the cam follower normally resting in a detent 29 in the cam. Valve 21 is actuated by like apparatus except that the contour of its associated cam 25 varies from that of cam 23 as required to suitably control the application of the chilling medium to the inner surfaces of the bottle.

The cams 23 and 25 are mounted on a tubular shaft 27 carried by suitable pillow blocks 28 and are adapted to be rotated at a predetermined speed by a motor 30 through the medium of a reduction gear assembly 31, a drive shaft 32, and a magnetic clutch 33 whenever the operating magnet 34 of such clutch and motor 30 become energized. Multiple circuits for effecting the energization of magnet 34, motor 30, and a motor 38 employed in rotating table 11 are completed upon energization of a suitable control relay 35. This relay is initially energized by actuation of a start button 36 and is subsequently maintained energized throughout a tempering cycle under control of a lock-in relay 37. The latter relay is in turn controlled by a single segment commutator 40 carried by shaft 27, and is normally energized over a circuit extending from terminal X of a suitable current source (not shown) over conductor 41, through relay 37, the segment of commutator 40 and conductor 45 to terminal Y of the same current source.

It is believed that the invention can best be made clear by describing the sequence of operations occurring during a tempering cycle. With a suitably preheated bottle 13 in place, button 36 is depressed for a few seconds, thereby completing a circuit for relay 35 which extends from terminal X over conductors 41, 42 and 43, then through relay 35, conductor 44, the contacts of push button 36 and conductor 45 to terminal Y. Relay 35, upon becoming energized, at contacts 46 bridges motor 30 and a speed regulating rheostat R in series therewith, directly across conductors 42 and 44, and at its contacts 47 connects motor 38 directly across these conductors. The relay 35 also at contacts 48 completes a similar circuit for clutch magnet 34 through collector rings 49 carried by shaft 32. Operation of motors 30 and 38 is accordingly initiated, the motor 38 effecting rotation of bottle 13 and the rotation of motor 30 effecting rotation of shaft 32. Since clutch magnet 34 is also energized the tubular shaft 27 and the elements carried by it are also driven by motor 30. After a few degrees rotation of commutator 40 the circuit for relay 37 is interrupted. This relay accordingly becomes deenergized and closes its contacts 50, thereby locking up relay 35 independently of the contacts of push button 36. As the cams 23 and 25 rotate, cam followers 26 and 26' move the valve actuating linkages 22 in a manner determined by the contours of the cams so as to actuate valves 20 and 21 as required to produce the desired chilling effect, and then fully close these valves some time prior to the completion of one revolution of the cams. The time consumed in this operation may be modified as required by proper adjustment of the motor speed regulating rheostat R. A few degrees prior to the completion of one revolution of the cams, the segment of commutator 40 again completes the circuit for relay 37 which accordingly again becomes energized and at its contacts 50 opens the circuits for relay 35. Relay 35 therefore becomes deenergized and again opens the circuits for motors 30 and 38 and for clutch magnet 34. With magnet 34 deenergized,

shaft 27 is disconnected from the influence of motor 30 and is readily brought to a stop with the cams 23 and 25 in their initial position as detent 29 in cam 23 is encountered by the roller 26. The reservoir 16 may now be swung clear of bottle 13, such bottle replaced with another and the foregoing tempering cycle repeated.

Although I have illustrated my invention as applied to the control of application of a chilling medium to a piece of ware of simple configuration and therefore requiring the control of but two valves, it will be readily appreciated that my invention contemplates the control of as many valves as the article being chilled may require.

I claim:

1. In a device for tempering glass articles, a tempering fluid supply line containing a valve for controlling the volume and time period of application of a chilling medium to the surfaces of a preheated glass article, a valve actuating linkage and an associated cam for actuating the same, a motor for driving said cam, means for initiating the operation of said motor, and means actuated by said motor for thereafter maintaining it in operation independently of said initiating means until a predetermined cycle of movement of said cam has been completed.

2. The combination with a tempering apparatus wherein an article to be tempered is placed on a support and rotated by an associated motor while a chilling fluid supplied by valved supply lines is directed against surfaces of the article, of a timing mechanism including a driving motor, a relay having contacts included in operating circuits for said motors, an energizing circuit for said relay including manually operable contacts, means under control of the motor of the timing mechanism for closing a holding circuit for said relay for a predetermined period of time following the energization of said motors, and mechanism operated by said driving motor to effect opening and closing of the valves in such supply lines during such period.

3. The combination with a tempering apparatus wherein an article to be tempered is placed on a support and rotated by an associated motor while a chilling fluid supplied by valved supply lines is directed against surfaces of the article, of cams for opening and closing the valves in such supply lines, a motor for rotating said cams, an operating circuit for said motor, means for manually controlling the closure of said circuit, and a relay thereafter controlled by said motor for maintaining the motor circuit closed during a predetermined angular movement of said cams.

4. The combination with a tempering mechanism of the type wherein the ware is rotated while chilling fluid is directed toward its surfaces from valved supply lines, of a shaft carrying mechanism for imparting a predetermined opening and closing movement to the valves, means for simultaneously initiating the operation of said shaft and mechanism and the rotation of a piece of ware to be tempered, and means responsive to the operation of said shaft for insuring the continued operation thereof until a predetermined cycle of movement is completed.

5. The combination with an apparatus including a rotatable support for a preheated article to be tempered and a valved tempering fluid supply line having openings directed toward a surface of such an article when mounted on said support, of a power unit for actuating the valve to control the volume of fluid issuing from said line, a second power unit for actuating said support to distribute tempering fluid issuing from said line over a maximum surface area of such article, manually controlled means for initiating the application of said power units for the purposes set forth, and means for thereafter automatically continuing their operation for a definite time period independently of such manually controlled means.

6. In a tempering apparatus, chilling medium supply lines having apertures adapted to be directed toward surfaces of an article to be tempered, a motor for effecting relative movement between such lines and the article, valves in said supply lines, mechanism for actuating said valves, a second motor, a clutch for temporarily linking said latter motor in driving relation to said mechanism, operating circuits for said motors and clutch, a relay for closing said circuits, manually operable means for completing a circuit for said relay whereby operation of a tempering cycle is initiated, means controlled by one of said motors for maintaining said relay energized throughout a predetermined movement of said mechanism, and means included in said mechanism for definitely stopping it in its initial position after its disconnection from the drive motor by said clutch.

7. In a tempering apparatus a rotatable support for an article to be tempered, tempering fluid supply lines having orifices therein directed toward surfaces of an article on said supoprt, valves included in said supply lines, means for starting the rotation of said support and means set into operation coincident with the starting of rotation of said support to manipulate said valves in a predetermined manner.

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