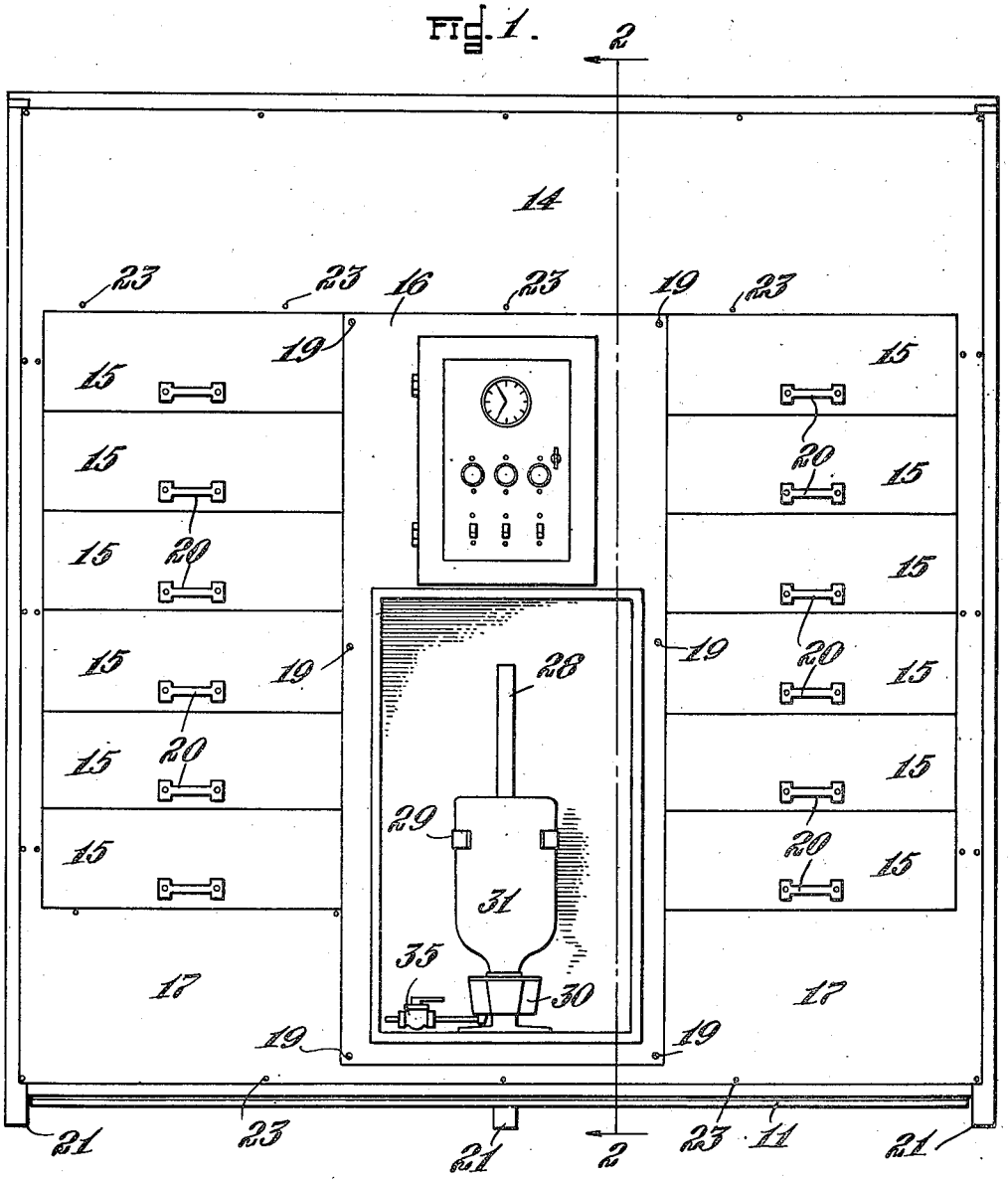
Sept. 2, 1941. C. F. EATON 2,254,870

APPARATUS FOR MULLING LEATHER

Filed Sept. 7, 1939 5 Sheets-Sheet 1

Fig. 1.



Inventor:
Charles F. Eaton
by Pollock, Cushman & Woodbury
Attys.

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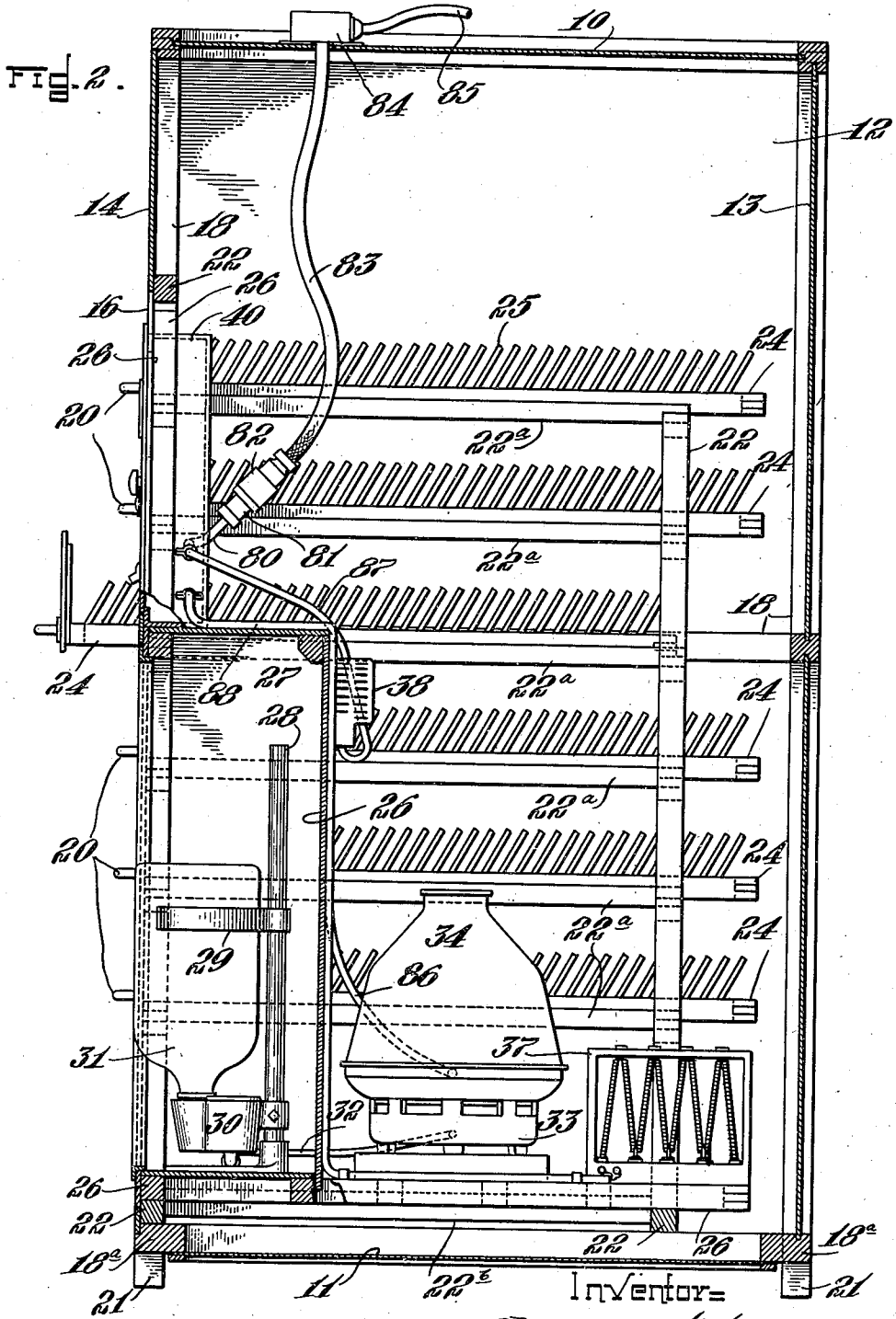
Filed Sept. 7, 1939 5 Sheets-Sheet 2

Fig. 2.



Inventor=

Charles F. Eaton

by Roberts, Cushman & Woodberry.

Att'ys.

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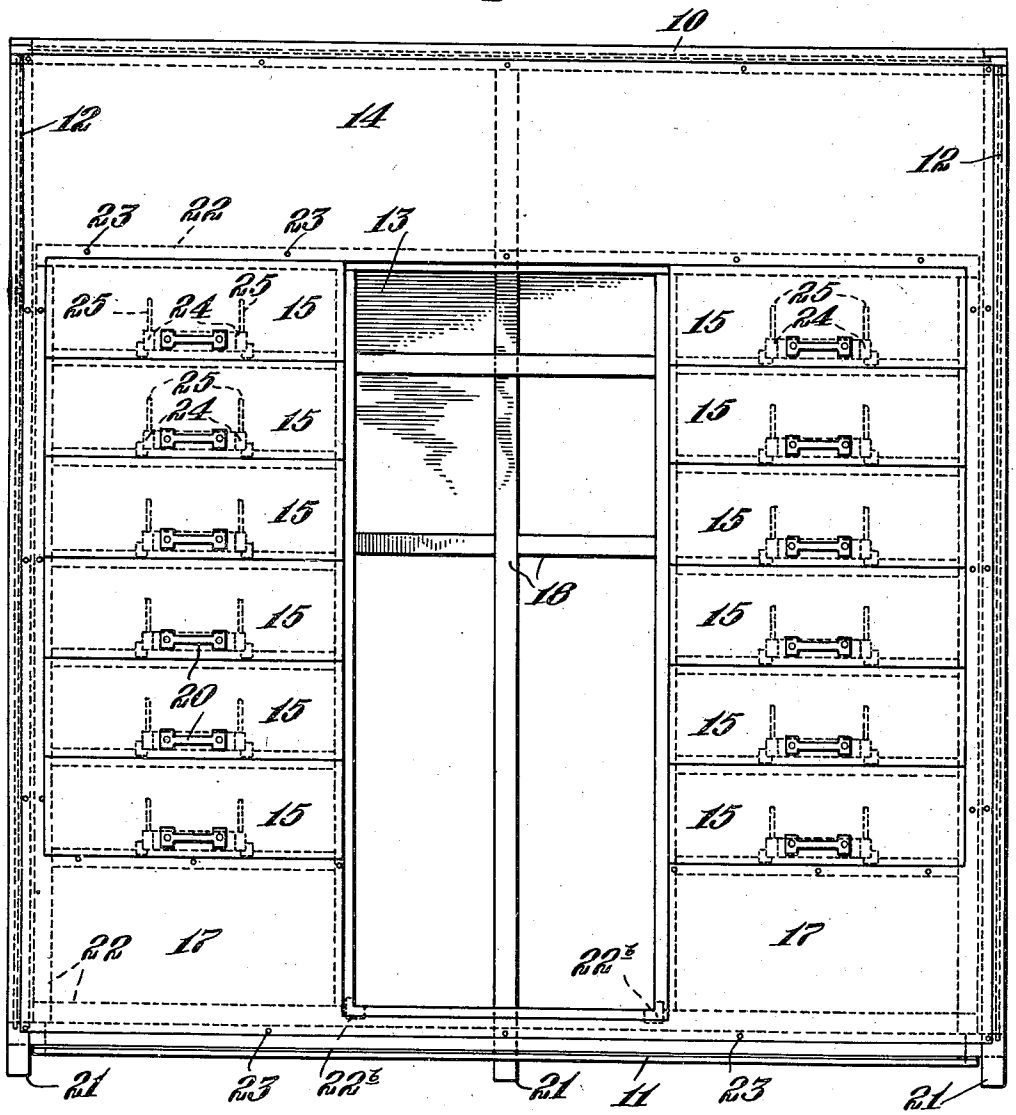
APPARATUS FOR MULLING LEATHER

Filed Sept. 7, 1939 5 Sheets-Sheet 3

Fig. 3.



Inventor=

Charles F. Eaton

by Pollock, Cushman & Woodberry

attys

Sept. 2, 1941. C. F. EATON 2,254,870

APPARATUS FOR MULLING LEATHER

Filed Sept. 7, 1939 5 Sheets-Sheet 4

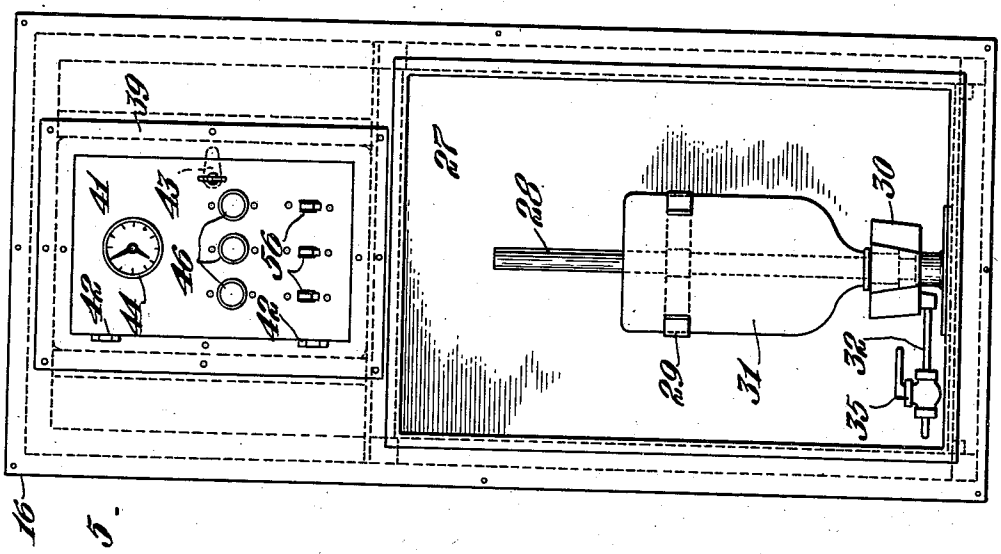


Fig. 3.

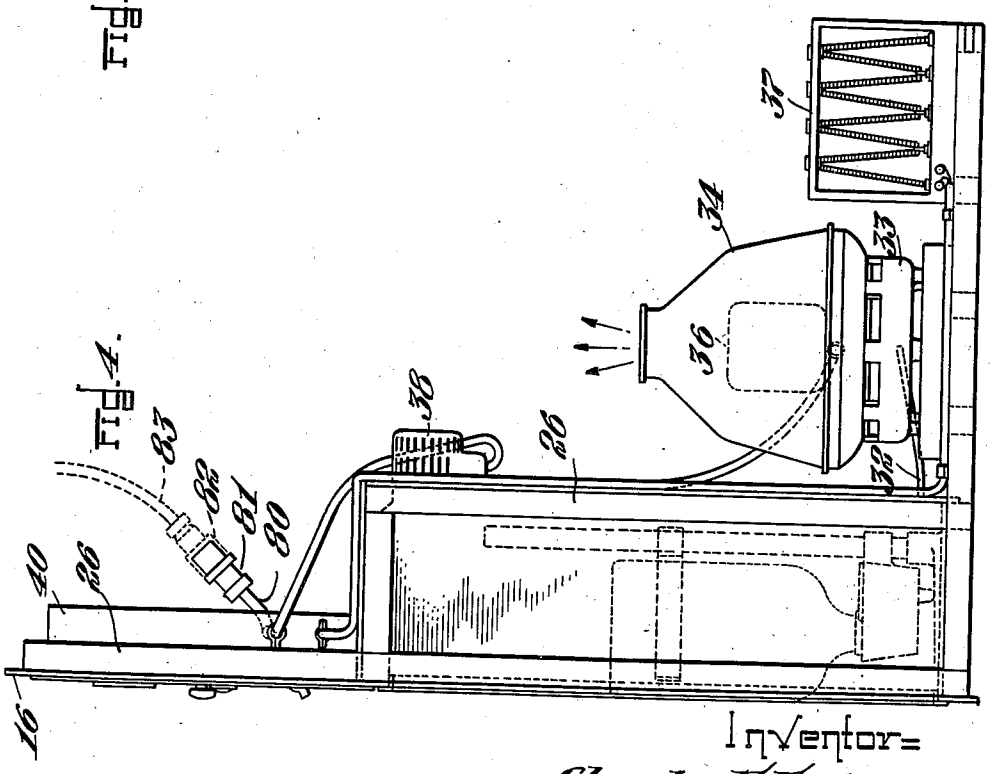


Fig. 4.

Inventor=

Charles F. Eaton

by Roberts, Cushman & Woodberry.

attys.

Sept. 2, 1941. C. F. EATON 2,254,870

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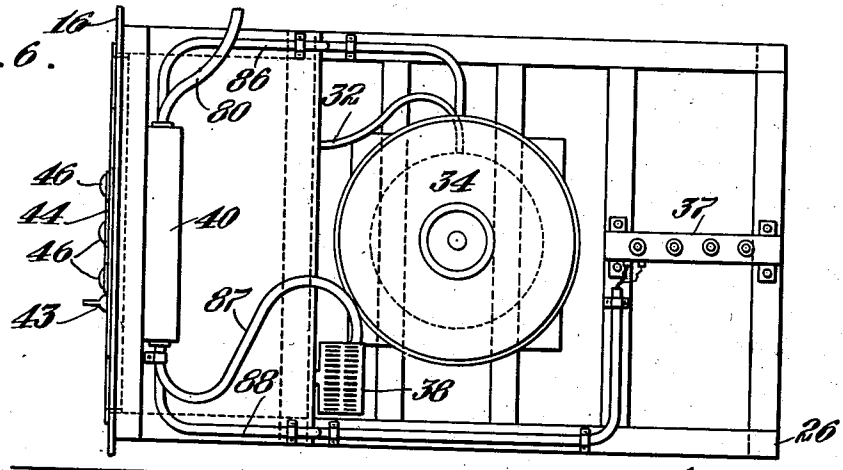
Filed Sept. 7, 1939 5 Sheets-Sheet 5

Fig. 6.



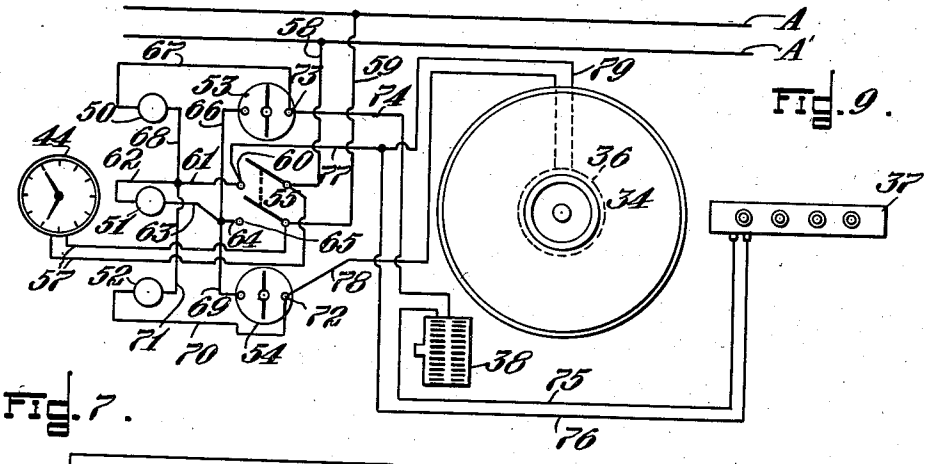


Fig. 9.

Fig. 7.

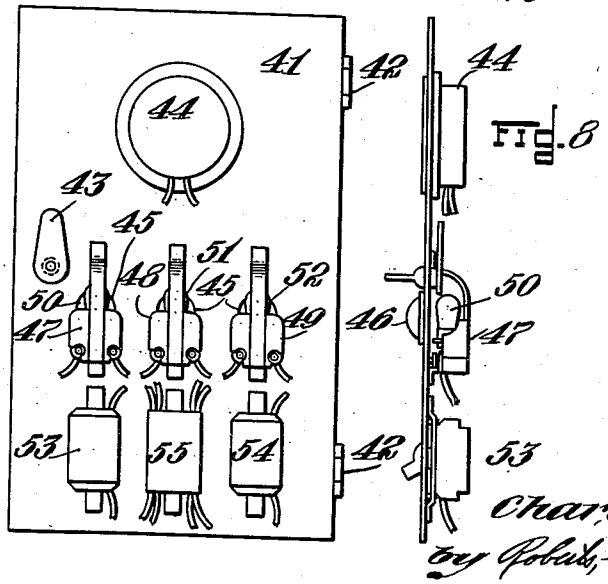


Fig. 8.

Inventor=
Charles F. Eaton
by Pollard, Cushman & Woodbury
Attys.

Patented Sept. 2, 1941

2,254,870

UNITED STATES PATENT OFFICE

2,254,870

APPARATUS FOR MULLING LEATHER

Charles F. Eaton, Methuen, Mass., assignor of one-half to North American Holding Corporation, Syracuse, N. Y., a corporation of New York, and one-half to Parshad Holding Corporation, Syracuse, N. Y., a corporation of New York

Application September 7, 1939, Serial No. 293,666

4 Claims. (Cl. 12—1)

This invention relates to the manufacture of boots and shoes and provides an apparatus for, and method of, tempering or mulling leather parts of boots and shoes in order to condition the same for incorporation in the latter.

In the manufacture of boots and shoes it is customary to temper or mull the soles thereof so that they will be in a desirable condition during several operations, viz., sole laying, rough rounding, channel turning, Goodyear rapid stitching, channel cementing, channel laying, heel seat nailing and sole leveling.

The apparatus and methods heretofore employed in tempering required the use of drying rooms into which the finished shoes were placed for drying after the leveling operation and this drying operation often resulted in injury to the shoes; the drying operation frequently melted the wax on the threads, prevented the proper adherence of a sole to the cemented and filled bottom of a shoe, and also caused staining of the inner sole and quarter linings. The present invention obviates these objectionable features characterizing the apparatus and methods heretofore employed.

The principal objects of this invention are to provide a novel and efficient method of and apparatus for mulling leather.

A further object is to provide such an apparatus in which the working parts are affixed to a unit which is removable from the mulling chamber.

Other objects relate to the construction and mode of operation, and will be apparent from a consideration of the following description and accompanying drawings which exemplify one embodiment of my invention chosen for the purpose of illustration.

In the accompanying drawings:

Fig. 1 is a front elevation of an apparatus for use in mulling or tempering leather soles for boots and shoes preparatory to incorporation in the latter, said apparatus being constructed in accordance with this invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a front elevation of the apparatus but with the middle section, hereinafter described, removed;

Fig. 4 is a side elevation of the middle section of the apparatus;

Fig. 5 is a front elevation of the middle section;

Fig. 6 is a top plan view of the middle section;

Fig. 7 is an elevation of the inner side of the door, hereinafter described, of the middle section;

Fig. 8 is a side elevation of the door shown in Fig. 7; and

Fig. 9 is a diagrammatic view showing the electrical connection of the apparatus.

The embodiment of the invention herein illustrated comprises a main housing structure including a top wall 10, a bottom wall 11, two oppositely disposed side walls 12, 12, a rear wall 13 and a front wall comprising an upper transverse panel 14, two spaced apart vertical rows of panels 15 which fit edge to edge, an intermediate panel 16 (Fig. 1) disposed between the two vertical rows of panels 15 and two lower panels 17 each disposed below one of the vertical rows of panels 15. The walls 10, 11, 12, 13, together with panels 14 and 17, are all permanently and rigidly fastened to a framework 18 (Fig. 2) while the panel 16 is removably fastened to a supplemental framework 22 (Figs. 1, 2 and 3) by means of screws 19. The panels 15 constitute the fronts of removable rack drawers and each is equipped with a handle 20 by means of which the rack drawer may be inserted within or removed from the housing.

The supplemental framework 22 rests upon a sill 18a (Fig. 2) forming part of the main framework 18 of the housing and is fixed in position within the latter by means of screws 23 by which it is fastened to the front wall of the housing.

The framework 18 of the housing is constructed with legs 21 to rest upon a floor or other support.

Each panel 15 has fixed in position against its inner side one end of a rectangular frame 24 (Figs. 2 and 3) whose opposite side bars are equipped with inclined upwardly extending tines 25 between which the leather parts that are to be treated are stacked with their lower edges resting upon said side bars. The opposite side bars of the drawer frames 24 are slidably supported on ways 22a (Fig. 2) forming part of the supplemental frame 22 and, as will be clear, each rack drawer may be completely withdrawn from the apparatus for loading and unloading.

As shown in Figs. 4, 5 and 6 the middle front panel 16 forms a permanent part of an instrument-carrying unit which, after removal of screws 19, (Fig. 1), can be withdrawn in its entirety from the main housing. This unit is constructed with a second supplemental framework 26 (Figs. 4 and 6) to which the panel 16 is rigidly and permanently fastened. The instrument-carrying framework 26 is slidably supported by

and within the lower portion of the supplemental frame 22 between the two tiers of rack drawers, said lower portion being constructed with angular guide bars or ways 22b (Fig. 3) into which the opposite side bars of the base portion of the unit frame 26 are slidably fitted.

As shown in Figs. 2 and 5 the front wall panel 16 is constructed with a niche or recess 27 whose interior is accessible from the exterior of the apparatus, but shut off from communication with the interior of the main housing by walls forming part of the framework 26.

Within the niche 27 is fixed a vertically disposed post 28 equipped with a spring yoke 29 and to which is adjustably fixed a trap 30. This trap is constructed the same as similar traps which are employed in connection with range oil burners, and water is automatically fed barometrically into the same from a container 31 so that the body of water within the trap is maintained at a predetermined height. Before the container 31 is installed, it is loaded with a volume of water sufficient to last a predetermined length of time; the container 31 may be an inverted bottle that is removably held in position by the spring yoke 29 and provided with a normally open valve controlled outlet.

The outlet of trap 30 is connected by a delivery conduit 32 with a vessel 33 (Figs. 2 and 4) forming part of a water atomizing humidifier 34 of ordinary construction. The vessel 33 and trap 30 are disposed so that water flows from the trap to the vessel by gravity and the level of the water is maintained within the vessel at the same height as the level of the water within the trap. Within the delivery conduit 32 is arranged a normally open shut-off needle valve 35 (Fig. 5). The humidifier 34 of which the vessel 33 forms part may be constructed and operate upon the principle disclosed in the patent to Mills No. 1,815,951, granted July 28, 1931. As explained in that patent the humidifier includes a motor that is indicated in Fig. 4 by dotted lines at 36 and this motor drives mechanism by which the water is lifted from vessel 33, atomized, and discharged from the top of the humidifier—as indicated by arrows—in a finely divided state. This water vapor is impelled upwardly by the humidifier into the upper portions of the main housing and thence laterally and downwardly through the two tiers of rack drawers and the soles or other pieces of leather with which said drawers are loaded.

Fixed in position upon the base portion of the panel framework 26, alongside of humidifier 34, is an electric heater 37 whose operation is controlled by a thermostat switch 38 (Figs. 2 and 4), fixed in positions on framework 26. Electric heater 37 and thermostat switch 38 cooperate to maintain the vaporous atmosphere within the main housing approximately at a predetermined temperature.

Fixed in position upon the outer side of intermediate panel 16 is a rectangular metal frame 39 (Fig. 5) bordering a rectangular opening provided in said intermediate panel 16, and to this frame 39 is fastened a switch box 40 (Figs. 4 and 6) that is normally closed at its front by a door 41 (Fig. 5) that is hinged at 42, 42 to the frame 39. This door is normally held in closed position by an adjustable latch 43 (Figs. 5 and 7) so that when desired it can be opened. Fixed within an aperture, adjacent to the top of door 41, is an electric clock 44 (Figs. 5, 7 and 8) and below this clock the door 41 is formed with three circular apertures 45 (Fig. 7) within each of which is fixed a colored lens 46 (Figs. 5, 6 and 8). Mounted upon the inner side of door 41 opposite the apertures 45 are three socket fixtures 47, 48 and 49 (Fig. 7) provided, respectively, with lamps 50, 51 and 52 whose rays are projected through the transparent colored lens disposed opposite the same. Also mounted upon the inner side of door 41, below the socket fixtures, are two snap switches 53 and 54 and a double pole snap switch 55. As shown in Fig. 5 the operating levers of these switches project through apertures 56 formed in door 41 to the exterior of the latter where they are accessible for operation, and as will be clear the operating member of each switch is disposed directly below or opposite one of the lenses 46 whose lamp it controls.

The thermostatic switch 38 is constructed as usual and is of that type containing a thermostatic element operating a mercury switch so that when the mercury switch is tilted in one direction by said element a circuit is closed and when tilted in the opposite direction by said element said circuit is opened. Also, as usual, it is adjustable so that it can be set to open said circuit when the temperature of the compartment or room rises to a predetermined high point and to close said circuit when the temperature of the compartment or room falls below said predetermined point.

In Fig. 9 I have shown the wiring of the apparatus when its electrical instruments are supplied with alternating current. As will be clear from this figure of the drawings, the clock 44 is arranged within a circuit 57 which is at all times supplied with current from line wires A and A'. The two movable contacts of double pole switch 55 are connected by wires 58 and 59 with the line wires A and A', respectively.

The fixed contact 60 of switch 55 is connected by wires 61 and 62 with one of the terminals of lamp 51 whose opposite terminal is connected by wires 63 and 64 with the other fixed contact 65 of switch 55. It will, therefore, be clear that so long as switch 55 is closed the lamp 51 will be illuminated and this illumination will not be affected by operation of lamps 50 and 52 or of snap switches 53 and 54.

The fixed contact 60 of switch 55 is connected by wire 61 and a wire 68 with one terminal of the lamp 50 whose opposite terminal is connected by a wire 67 with the terminal 73 of snap switch 53. The opposite terminal of switch 53 is connected through a wire 66 and the wire 64 with the other fixed contact 65 of switch 55. Thus upon closure of snap switch 53 the lamp 50 is lighted.

The fixed contact 60 of double pole switch 55 is connected through the wire 61 and a wire 71 with one terminal of lamp 52 whose opposite terminal is connected by a wire 70 with the terminal 72 of snap switch 54, the other terminal of snap switch 54 being connected by a wire 69 and the wire 64 with the other fixed contact 65 of switch 55. It will thus be seen that a circuit of lamp 52 will be closed when snap switch 54 is closed.

The terminal 73 of snap switch 53 is connected by a wire 74 with one terminal of the thermostatic switch 38 whose opposite terminal is connected by a wire 75 with one terminal of heater 37. The other terminal of heater 37 is connected by wires 76 and 77 with the fixed contact 60 of switch 55. Therefore, thermostatic switch 38 and heater 37 are in series in a circuit including

wires 77, 76, 75, 74, 66 and 64 which is closed when snap switch 53 is closed.

The terminal 72 of snap switch 54 is connected by a wire 78 with one terminal of the motor 36 of humidifier 34 while the opposite terminal of said motor is connected through a wire 79 and wire 77 with the fixed contact 60 of switch 55. It will thus be clear that when snap switch 54 is closed a circuit through motor 36 is closed which includes wires 64, 69, 78, 79 and 77.

The wires 58 and 59 are incorporated within a cable 80 (Figs. 2, 4 and 6) provided with a terminal plug 81 separably coupled to a terminal socket 82 whose contacts are connected by wires incorporated within a cable 83 leading to a junction box 84 fastened in position upon the top wall 10 of the main housing. Within the junction box 84 the wires of cable 83 are connected with wires incorporated within a cable 85 leading to the line wires A and A', (Fig. 9).

It will thus be seen that after removal of the screws 19 (Fig. 1) the panel 16, together with its framework 26 on which the electric instruments are mounted, can be partly removed to permit uncoupling of the plug 81 and socket 82 after which the panel unit may be completely removed from the apparatus. Also, in replacing the panel the plug 81 and socket 82 are recoupled after which the panel 16 may be fastened in position by the screws 19.

In Fig. 6 of the drawings 86, 87 and 88 represent cables leading from the heater 37, humidifier 34 and thermostatic switch 38 to the interior of switch box 40 where their wires are connected up with the switches and lamps as shown in Fig. 9. These cables are fastened in position to the framework 26 of panel 16.

In preparing the apparatus for operation the soles to be tempered or mulled are first coated upon their flesh sides with cement and then brought together in pairs, cemented sides contacting, each pair including a right and left sole. Then the pairs of soles are stacked between the upstanding tines 25 of the rack drawers after which the latter are slid into position within the housing. The container 31 (Fig. 2) is then installed loaded with a predetermined amount or volume of water calculated to last for a predetermined portion of the mulling period. The double pole switch 55 is then closed which illuminates lamp 51 giving a visual signal that the apparatus is in condition for operation. Then the snap switches 53 and 54 are closed which starts the operations of heater 37, thermostatic switch 38 and humidifier 34.

The operation of humidifier 34 discharges upwardly a stream or current of water vapor as indicated by the arrows in Fig. 4, and this current of vapor, upon reaching the top of the housing, is diverted laterally and passes downwardly through the two tiers of rack drawers and the pairs of soles stacked thereon. Upon reaching the bottom of the housing or cabinet the current of vapor is diverted toward the middle of the apparatus and thence upwardly again. Meanwhile, the heater 37 heats the vaporous contents of the cabinet or housing thereby expanding and rarefying the same so that it sufficiently penetrates the soles at their edges and outermost grain sides and so that their cemented and contacting flesh sides remain dry.

During the operation of the device the thermostatic switch 38 functions to control the heater 37 so as to maintain the temperature of the vaporous contents of the housing at a predetermined point, said heater being thrown out of operation thereby when the temperature reaches said predetermined point and being restored to operation automatically when said temperature falls below said predetermined point.

The treatment to which the soles are thus subjected may be terminated by the exhaustion of water within the container 31 and when this occurs the soles are removed from the apparatus and each is incorporated in a shoe by the operations of sole laying, rough rounding, channel turning, Goodyear stitching, channel cementing, channel laying, heel seat nailing and sole leveling, at the conclusion of which the soles are approximately dry so that the use of a drying room and loss of time in subsequently drying the finished shoes, as heretofore, is obviated.

This result of timing the drying of each sole approximately simultaneously with the completion of the series of operations to which it is subjected in making the shoe, is accomplished by the use of the measured amount of water within container 31, the amount of which is determined by the prevailing outside atmospheric condition.

By cementing the soles together in pairs, as described, the flesh sides thereof are kept dry and while under treatment the moisture enters the same only at the edges and through the grain side.

The work-holding means of the above described apparatus may, of course, be modified to adapt the same to support other leather shoe parts such as welting, upper leather and the like.

A distinct advantage to the above described apparatus resides in the fact that it does not require any water piping within the factory where it is used and the further fact that to place it in operation it is only necessary to connect the wires 58 and 59 (Fig. 9) with the current-supplying line wires and to replenish the water within container 31.

Bottles or containers of different sizes may be provided so that the attendant cannot make the mistake of providing more or less water than is required for the proper treatment of a batch of soles under the prevailing outside atmospheric conditions to which the soles are subjected while being incorporated in the shoe.

Ordinarily the best results are obtained by maintaining eighty percent humidity and eighty degrees of temperature within the housing while treating a batch of soles, welting or upper leather. By selecting the proper size bottle the mulling operation may then be regulated to fit different factory conditions as well as prevailing atmospheric condition, the size of the bottle preferably determining the length of the mulling period although this latter may be gauged by the clock 44. That is, it is sometimes necessary to continue the mulling operation for a period of time after exhaustion of the water from the bottle 31.

The above described apparatus is characterized by low cost of operation; it is easily and inexpensively installed since it is only necessary to plug into the electric circuit of the building where it is used; no water pipes run to or from the muller; the amount of water used in any one run is governed by the size of the bottle; the temperature within the housing is automatically controlled by the room thermostat 38; temperature and humidity can also be manually controlled at will; it avoids moldy soles and water

stains; it can be adjusted or operated so as to put into the soles the amount of moisture required to maintain the same soft and pliable for any definite period of time, for example, from sole laying to sole leveling; it dispenses with drying rooms now used in most factories; it avoids wet soles laid on to the shoe which heretofore has caused inner soles to stretch and linings to be stained and mildewed, and the cost of operation thereof is very low.

While I have shown and described one desirable embodiment of the invention, it is to be understood that this disclosure is for the purpose of illustration and that various changes in shape, proportion and arrangement of parts and the substitution of equivalent elements or steps may be made without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim:

1. Leather mulling apparatus comprising a mulling chamber for receiving leather pieces and a removable unit fitting within said chamber, said removable unit comprising a source of water, a water humidifier connected with said source of water and adapted to discharge water vapor to the interior of said mulling chamber, and a heater communicating with said mulling chamber and adapted to maintain a predetermined temperature therein.

2. Leather mulling apparatus comprising a mulling chamber for receiving leather pieces and a removable unit fitting within said chamber, said removable unit comprising a removable water container accessible from the exterior of said unit, a water humidifier connected with said water container to receive water therefrom and adapted to discharge water vapor to the interior of said mulling chamber, and a heater communicating with said mulling chamber and adapted to maintain a predetermined temperature therein.

3. Leather mulling apparatus comprising a mulling chamber for receiving leather pieces and a removable unit fitting within said chamber, said removable unit comprising a water humidifier adapted to discharge water vapor to the interior of said mulling chamber, a heater communicating with said mulling chamber and adapted to maintain a predetermined temperature therein, means operable from the exterior of said unit for controlling operation of said humidifier and means operable from the exterior of said unit for controlling operation of said heater.

4. Leather mulling apparatus comprising a mulling chamber for receiving leather pieces and a removable unit fitting within said chamber, said unit comprising a source of water, a water humidifier connected to said source of water and adapted to discharge water vapor to the interior of said mulling chamber, means operable from the exterior of said unit for controlling the flow of water from said source of water to said humidifier, means operable from the exterior of said unit for controlling operation of said water humidifier, a heater communicating with said mulling chamber and means operable from the exterior of said unit for controlling operation of said heater.

CHARLES F. EATON.