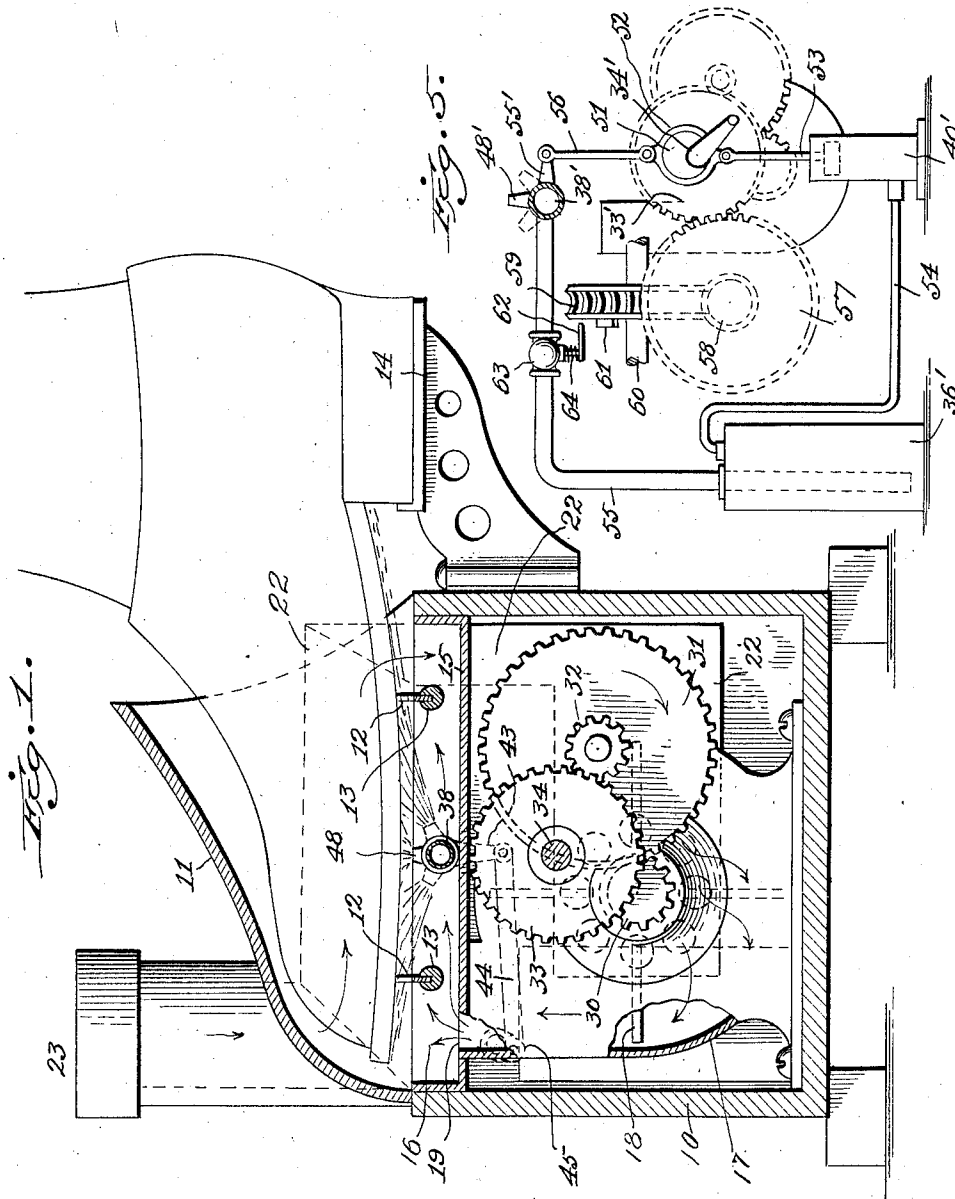


N. M. HOPKINS.
 APPARATUS FOR TREATING FOOTWEAR.
 APPLICATION FILED AUG. 29, 1919.

1,340,544.

Patented May 18, 1920.

3 SHEETS—SHEET 1.



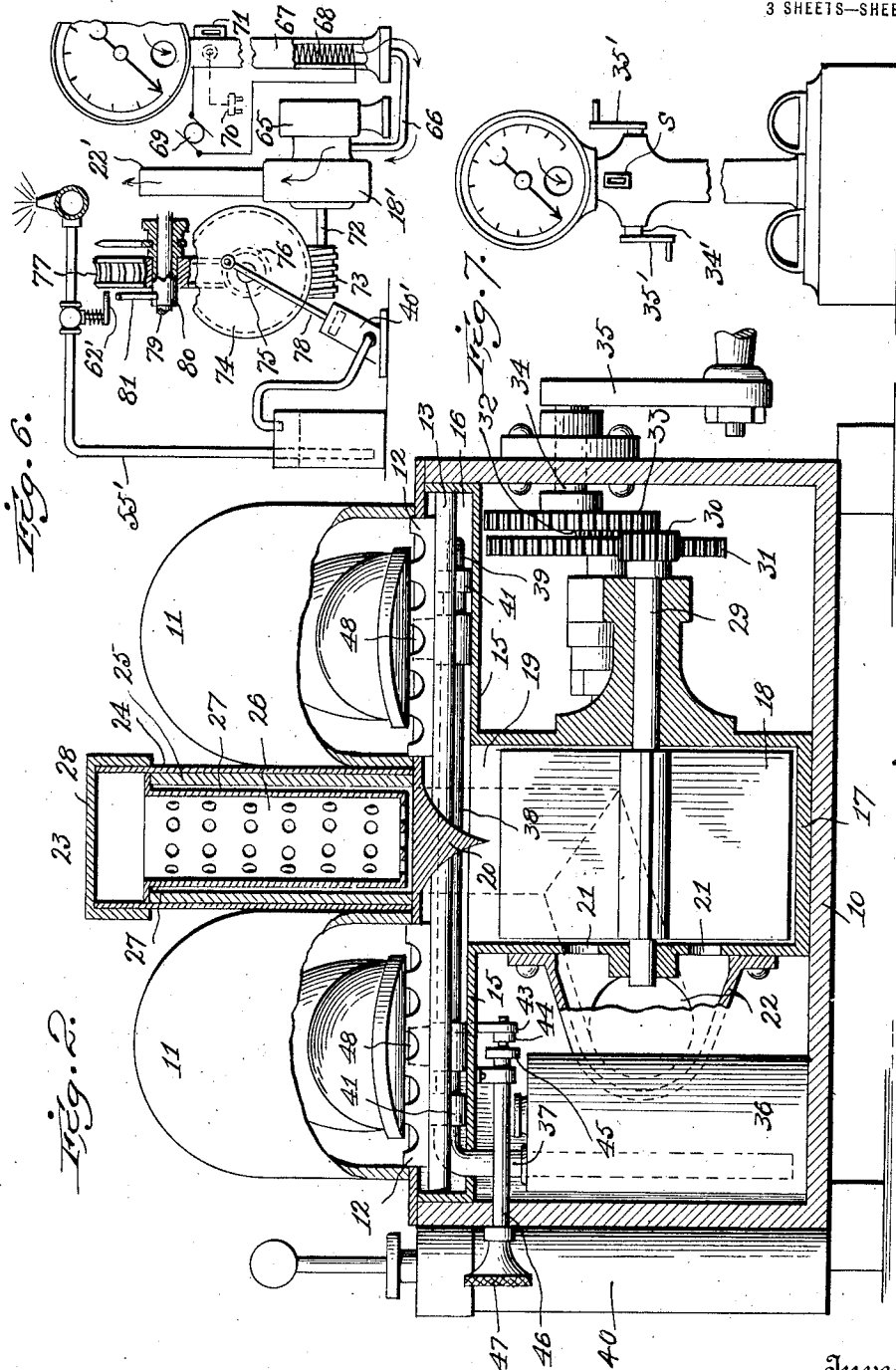
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3 SHEETS—SHEET 3.

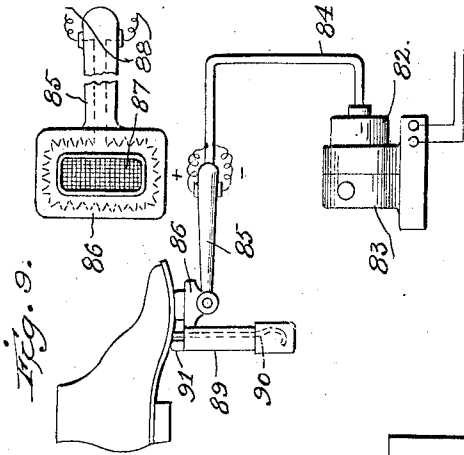


Fig. 8.

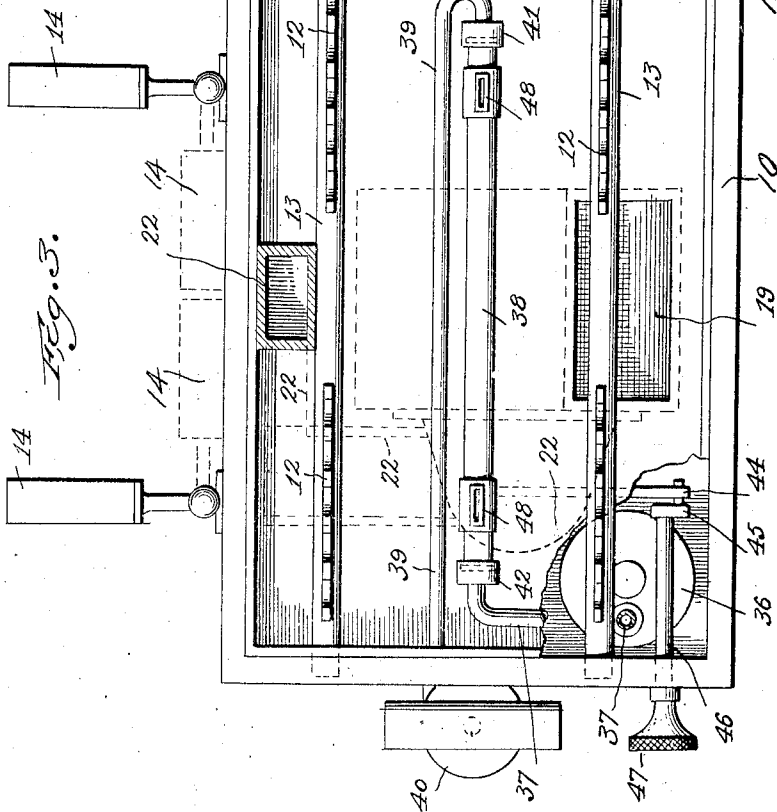
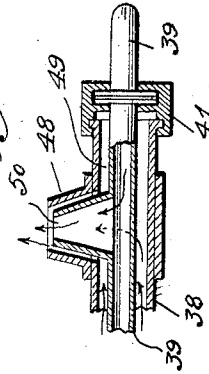


Fig. 4.



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UNITED STATES PATENT OFFICE.

NEVIL MONROE HOPKINS, OF WASHINGTON, DISTRICT OF COLUMBIA.

APPARATUS FOR TREATING FOOTWEAR.

1,340,544.

Specification of Letters Patent.

Patented May 18, 1920.

Application filed August 29, 1919. Serial No. 320,645.

To all whom it may concern:

Be it known that I, NEVIL MONROE HOPKINS, a citizen of the United States of America, and a resident of the city of Washington, District of Columbia, have invented new and useful Improvements in Apparatus for Treating Footwear, which invention is fully set forth in the following specification.

When boots and shoes become wet or damp from use in rainy or slushy weather, it is desirable and important, both to the life of the shoes and the health of the person wearing the same, that the shoes be promptly dried and waterproofed before use thereof is continued. The main object of the present invention is to provide for quickly drying and waterproofing damp or wet shoes while retained on the feet of the wearer thereof, and for accomplishing this with the convenience, facility and expedition of an ordinary boot-blackening operation.

The accompanying drawings illustrate what I now believe to be preferred embodiments of apparatus of the present invention capable of accomplishing the aforesaid and other objects, as will more fully appear from the detailed description.

In said drawings—

Figure 1 is a transverse sectional view of a portable apparatus embodying the invention;

Fig. 2 is a similar view at right angles to that shown in Fig. 1;

Fig. 3 is a horizontal sectional view;

Fig. 4 is a detailed sectional view showing a pair of spraying nipples;

Fig. 5 is a detailed view of a modified form of the driving mechanism;

Fig. 6 is a detailed view showing another modification of the driving mechanism;

Fig. 7 shows an embodiment in a coin-in-the-slot machine;

Figs. 8 and 9 are detailed views showing the device adapted to an electric heater and a suction cup.

Referring more particularly to Figs. 1, 2 and 3, which disclose a portable device adapted to be carried about by itinerant operators, on the top of the casing 10 are secured the hoods 11 shaped to receive the shoes to be treated while on the feet of the wearers. The hoods are sufficiently large to form spaces around the front part of the shoes and over their insteps, through which

air may be propelled for drying purposes. When in position in the hoods, the balls of the feet rest upon the notched plates 12 carried by the bars 13 extending across the upper part of the casing, the notches in the plates permitting a free passage of air beneath the shoe-soles. The heels rest on the supports 14 pivoted to the back of the casing and when not in use these supports can be turned out of the way against the back of the casing as indicated by dotted lines in Fig. 3.

Extending across the upper part of the casing 10 is the horizontal partition 15 forming therein an air-chamber 16 open to the under sides of the hoods 11. With this air-chamber communicates the blower-casing 17 in which is mounted the fan 18. Opposite the outlet 19 of the blower-casing is the deflector 20 to direct the incoming air into both sides of the air-chamber 16 beneath the hoods. Communicating with the inlets 21 in the side of the blower-casing is the conduit 22 leading from the chemical heater 23 mounted on the top of the main casing 10 between the toes of the hoods 11. The conduit leads from the lower end of the chemical heater back over the top of the main casing between the hoods, then down through the partition 15 and then forward to the inlets 21 of the blower-casing, as indicated by dotted lines in Fig. 1.

The chemical heater 23 comprises a cylindrical casing 24 fixed to the top of the main casing 10 and is provided with a lining 25 of heat-insulating material. Removably contained within the cylindrical casing is the foraminous cylindrical holder 26 separated from the lining 25 by an annular space 27 communicating at the lower rear end of the heater with the conduit 22. The holder 26 is adapted to contain a mixture of granulated charcoal and saltpeter, or other suitable fuel. This fuel is preferably prepared in the form of cartridges to facilitate the loading of the holder. As the holder is removable, it can be readily displaced to discharge the ashes of a burnt cartridge and to receive a new one. The upper end of the cylindrical casing 24 is provided with a cap 28 that can be removed to admit air to support the combustion and to supply heated air to the conduit 22 when the fan 18 is in motion. When the cap is replaced, air is excluded from the heater

and the combustion is suspended. The nature of the fuel is such that the combustion smolders when air is excluded, but will flare up on the admission of fresh air so that rekindling will not be required for each operation.

The fan 18 is carried by the shaft 29 journaled in suitable bearings in the blower-casing 17. On an end of this shaft is a pinion 30 meshing with the gear 31 driven by the spur 32 engaging the gear 33 on the shaft 34 rotatable by the crank 35. When the crank-shaft 34 is rotated, through the intervening gear-train, the fan 18 is driven to propel air through the foraminous holder 26 of the heater (the cap 28 being removed), the annular space 27, the conduit 22, the blower-casing 17, and the outlet 19 into the air-chamber 16.

In the operation of the drier, the wearer of the wet shoes thrusts his feet into the hoods 11 and the operator turns the crank-shaft 29 to propel heated air into the chamber 16 as has been described. The heated air first impinging on the wet soles quickly dries them, and then passing upwardly in the hoods dries the uppers. The air is projected with considerable force from the rear openings of hoods 11 around the heel portions of the shoes and dries these also.

Means are provided whereby the soles can be impregnated with a waterproof composition after drying. Mounted in the main casing 10 is the reservoir 36 to contain any suitable waterproofing composition in a liquid form. Leading from the lower part of this reservoir is the supply pipe 37 communicating with one end of the rotatable tube 38 extending horizontally across the air-chamber 16 between the foot-rests 12 and slightly below the same. Entering the other end of the tube 38 is the pipe 39 leading from the air-pump 40 suitably mounted on the casing 10. The pipe 39 extends to the opposite end of the tube 38 and is closed at its inner end. The pipe 39 is in sections which are connected together by the coupling 41 (Fig. 4) so that the section traversing the tube 38 can be turned relative to the other section, which is fixed. The coupling 41 also furnishes a closed bearing for the adjacent end of the tube 38. The other end of the tube 38 has a similar coupling 42 with the end of the fixed pipe 37 leading from the reservoir 36. By means of the couplings 41 and 42, the tube 38 and the inclosed section of the pipe 39 can be turned on their longitudinal axes relative to the fixed pipe 37 and the fixed section of the pipe 39. The tube 38 has a radial arm 43, which is connected by the link 44 with the crank-arm 45 on the inner end of the shaft 46 journaled in the wall of the casing 10. On the outer end of shaft 46 is the knurled finger-piece 47 by means of

which the shaft can be turned and, through the intervening mechanism, a rocking motion imparted to the tube 38.

At each end of the tube 38 is a nipple 48 leading from the annular space 49 between the tube and the inclosed section of the pipe 39. With the nipple 48 registers a second nipple 50 on the inclosed section of the pipe 39 and leading from the interior of the latter. The two nipples are spaced apart to form an annular exit between them from the annular space 49 between the tube and pipe-section. As the inner nipple projects into the outer one, when the tube 38 is rocked the inclosed section of the pipe 39 must rock with it.

Each pair of nested nipples 48, 50 form a spraying ejector. When air is forced outwardly through the two nipples, a suction is created in the annular space between the two and this draws through the tube 38 and the pipe 37 the liquid from the reservoir 36 to spray it into the air-chamber 16. The ejectors are so located as to be directly below the soles of the shoes placed in the hoods, and as the tube 38 is rocked the liquid is sprayed over the entire under surface of the soles. While the liquid is particularly directed toward the sole of each shoe, yet as said liquid is atomized to a considerable extent some of it will rise in the hood and be deposited on the upper part of the shoe to lightly waterproof the same.

After the soles and uppers of the shoes have been thoroughly dried, the operator ceases turning the fan 18 and with one hand operates the air-pump 40 to force the waterproofing composition through the ejectors and with the other hand turns the finger-piece 47 to rock the ejectors so that composition will be sprayed over the entire under surface of the soles. During the drying process, the leather of the soles is heated and its pores are opened through the expulsion of the moisture therein. The slight amount of moisture that remains in the leather is in a vaporized condition and, when cooled by the application of the spray, this moisture is condensed and produces, to some extent, an inward suction in the individual pores. This suction aids the capillary attraction of the pores in the absorption of the waterproofing composition by the leather.

The operation of the machine is simple and can be readily handled by the ordinary boot-black, and it can be carried around by him in place of his ordinary blacking kit during rainy weather. The drying of the soles is quickly accomplished and the waterproofing composition can be applied in a few minutes.

The machine has been previously described as a portable device; it can also be established as a fixture in boot-blackening

places, barber-shops and the like. When so established, several additional features can be added that would be too weighty for a portable kit.

5 Referring to Fig. 5, which shows a modification of the operating mechanism, on the crank-shaft 34', which drives the gear-train that rotates the fan, is the eccentric 51 carrying the strap 52. A link 53 connects the
10 strap on one side with the piston of the pump 40' that forces air through the pipe 54 into the reservoir 36' containing the waterproofing fluid. From the lower part of the reservoir, the pipe 55 leads to the rota-
15 table tube 38' having nipples 48', as in the first instance. This tube 38' is rocked by its connection through the arm 55' and the link 56 with the eccentric strap 52. As the eccentric rotates, the strap is reciprocated to rock the tube 38' and to move the piston
20 of the pump 40'. As the tube and piston connections are on opposite sides of the strap, their operations will be balanced to some extent.

25 Meshing with gear 33' on the crank-shaft 34' is a somewhat larger gear 57 fixed on the worm-shaft 58 driving the worm-gear 59 on the shaft 60 journaled in suitable bearings (not shown). On one side of the
30 worm-gear 59 is a cam 61 to engage, during the rotation of the worm-gear, the lever 62 to open the valve 63 in the supply pipe 55, said valve being normally closed by the spring 64. When the valve is opened, the
35 air-pressure in the upper part of the reservoir 36' forces a charge of waterproofing fluid through the supply pipe 55 into the tube 38' and through the nipples 48' onto the soles of the shoes during the rocking of
40 the tube. The interval during which the valve 63 is held open depends on the length of the cam 61, and there will be one actuation of the valve during one rotation of the worm-gear 59. However, there may be
45 more than one cam to open the valve more frequently should it be deemed necessary.

50 In Fig. 6 another modification is shown in which the chemical heater of the first described embodiment is replaced by an electric heater, in which an electric motor is provided for driving the blower, and in which an adjustable setting device is provided for actuating the valve in the fluid-supply pipe. In this embodiment, the fan
55 of the blower 18' is driven by the electric motor 65, the blower communicating through the conduit 22' with the air-chamber beneath the hoods. Into the blower 18' leads the pipe 66 from the hollow casing 67
60 in which is mounted the heating coil 68 electrically connected with the generator 69. Instead of the direct generator connection, a plug connection 70 may be used for the ordinary lighting system. Also, the circuit
65 through the coil may be controlled by an

ordinary coin-in-the-slot mechanism 71. With the current on in the coil 68, air is drawn through the casing 67, where it is heated, by the blower, and is propelled through the conduit 22' to the air-chamber
70 beneath the hoods for drying purposes, as in the first embodiment. On the shaft 72 of the blower 18' is the worm 73 engaging the gear 74 fixed on the shaft 75 carrying a worm 76 engaging the gear 77. Through
75 the connection 78, the air-pump 40' will be actuated as in the previous instance. On the shaft 79 is the sleeve 80 having a frictional engagement with the gear 77 to turn with the latter on said shaft. On the sleeve
80 80 is a hand to cooperate with a suitably fixed dial (not shown), and on the other end of the sleeve is a cam-arm 81 to engage the arm 62' of the valve in the fluid-supply
85 pipe 55'. By adjusting the sleeve 80 in the gear 77, the cam-arm 81 can be set to engage the arm 62', at any predetermined point in the rotation of the gear 77, to open the valve in the fluid-supply pipe 55'.

In Fig. 7 is shown an embodiment of the
90 invention including a coin-controlled device whereby the customer can operate the machine himself. The operative parts of the machine are driven by the crank-shaft 34' adapted to be turned by the cranks 35' in
95 the hands of the customer. The rotation of the crank-shaft is controlled by the coin dropped into the slot S as is usual in such machines.

100 In Figs. 8 and 9 a further embodiment of the invention is disclosed. In this instance, a suction-fan 82 is driven by an electric motor 83. Leading to the inlet of the fan is the flexible tube 84 connected to the stiff
105 hollow handle 85 carrying the suction-cup 86, which communicates through the hollow handle and flexible tube with the inlet to the fan. Across the mouth of the suction-cup extends the grid 87 connected by wires
110 88 with any suitable source of current, the grid being made of conductive material and suitably insulated from the wall of the cup. With the suction-fan in operation and the grid heated by a suitable current passing
115 therethrough, the suction-cup is moved back and forth across the wet sole to dry the same, the heat from the grid vaporizing the moisture in the leather so that it can be withdrawn by the suction.

120 Attached to the suction-cup is the reservoir 89 carrying the waterproofing fluid, which is fed therefrom by the wick 90. As the suction-cup is moved back and forth across the sole, the projecting end of the wick contacts with the leather and applies
125 the fluid. On the upper end of the reservoir is a guide 91 to bear against the sole to protect the wick.

While the invention has been described as being embodied in apparatus particu- 130

larly adapted to drying foot-wear while on the feet of the wearer, yet it is obvious that the apparatus can also be used to treat the foot-wear while off the feet, and for treating individual boots or shoes.

What is claimed is:—

1. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a support for the foot, means associated with said foot-support for drying foot-wear while on said support, and means associated with said foot-support for waterproofing foot-wear while on said support.

2. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a foot-rest, means for drying the foot-wear while on said foot-rest, means for waterproofing the foot-wear while on said foot-rest, and a common support for the associated foot-rest, drying means and waterproofing means.

3. In an apparatus for treating wet foot-wear while on the feet of the wearer, the combination of a casing having an air-chamber in its upper part, hoods over the air-chamber open to the same to receive the feet of the wearer, means for propelling air through the air-chamber and the hoods for drying the foot-wear, and sprayers receiving a supply of waterproofing liquid located in the air-chamber for applying the liquid to the foot-wear.

4. In an apparatus for treating wet foot-wear while on the feet of the wearer, the combination of a casing having an air-chamber in its upper part, hoods over the air-chamber open to the same to receive the feet of the wearer, means for propelling air through the air-chamber and the hoods for drying the foot-wear, an element in the air-chamber carrying sprayers supplied with a waterproofing liquid, and means for rocking the said element to apply the liquid to the foot-wear.

5. In an apparatus for treating wet foot-wear while on the foot of the wearer, means for drying the foot-wear, means associated with said drying means for waterproofing the foot-wear, and a support common to and carrying both of said associated drying-means and waterproofing means.

6. In an apparatus for treating wet foot-wear while on the foot of the wearer, means for applying heat to dry the foot-wear, means associated with said heat-applying means for waterproofing the foot-wear, and a support common to and carrying both of said associated heat-applying means and waterproofing means.

7. In an apparatus for treating wet foot-wear while on the foot of the wearer, means for directing a current of air for drying the foot-wear, means associated with the air-directing means for waterproofing

the foot-wear, and a support common to and carrying both of said associated air-directing means and waterproofing means.

8. In an apparatus for treating wet foot-wear while on the foot of the wearer, means for applying heat together with means for directing a current of air for drying the foot-wear, means associated with said heat-applying means and said air-directing means for waterproofing the foot-wear, and a support common to and carrying the said associated heat-applying means, the air-directing means and the waterproofing means.

9. In an apparatus for treating wet foot-wear while on the foot of the wearer, means for directing a current of heated air for drying the foot-wear, means associated with said heated-air directing means for waterproofing the foot-wear, and a support common to and carrying both of said heated-air directing means and the waterproofing means.

10. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having a rest for the foot-wear, a blower carried by the casing for projecting a current of air to dry the foot-wear placed on said rest, and an ejector carried by the casing and communicating with a forced supply of waterproofing fluid for spraying the foot-wear placed on said rest.

11. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having a rest for the foot-wear, a blower carried by the casing for projecting a current of air to dry the foot-wear placed on said rest, a heater carried by said casing for heating the air projected by the blower, and an ejector carried by the casing and communicating with a forced supply of waterproofing liquid for spraying the foot-wear placed on said rest.

12. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing, a hood mounted on the casing to receive the foot-wear, a blower carried by the casing for projecting a current of air into the hood to dry the foot-wear contained therein, and an ejector carried by the casing communicating with a forced supply of waterproofing liquid and opening into the hood to spray the foot-wear contained therein.

13. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing, a hood mounted on the casing closed at one end and open at the other to admit the foot-wear, a blower carried by the casing communicating with the closed end of the hood to force a current of air through said hood to dry the foot-wear contained therein, and an ejector carried by the casing communicating with

a forced supply of waterproofing liquid and opening into the hood to spray the foot-wear contained therein.

14. In an apparatus for treating wet foot-wear while on the foot of the wearer the combination of a casing, a hood mounted on the casing to receive the foot-wear, a blower carried by the casing for projecting a current of air into the hood to dry the foot-wear contained therein, a heater carried by the casing for heating the air projected into the hood, and an ejector carried by the casing communicating with a forced supply of waterproofing liquid and opening into the hood to spray the foot-wear contained therein.

15. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing, a hood mounted on the casing closed at one end and open at the other to admit the foot-wear, a rest for the foot-wear mounted within the hood, a blower in the casing communicating with the closed end of the hood to force a current of air through said hood to dry the foot-wear placed on the rest therein, and an ejector mounted in the casing communicating with a forced supply of waterproofing liquid and opening into the hood to spray the foot-wear contained therein.

16. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having an air-chamber in its upper part, a hood on the casing with its under side open to said air-chamber and open at its rear to admit the foot-wear, a blower mounted in the casing and communicating with the air-chamber for propelling a current of air through said air-chamber and the hood to dry the foot-wear contained in said hood, and an ejector mounted in said air-chamber communicating with a forced supply of waterproofing liquid to spray the footwear contained in the hood.

17. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having an air-chamber in its upper part, a hood on the casing with its under side open to said air-chamber and open at its rear to admit the foot-wear, a rest extending across the open under side of the hood to support the foot-wear thrust into the hood, a blower mounted in the casing communicating with the air-chamber for propelling a current of air through said air-chamber and the hood to dry the foot-wear placed on said rest, and an ejector mounted in the air-chamber communicating with a forced supply of waterproofing liquid to spray the foot-wear placed on the rest.

18. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having an air-cham-

ber in its upper part, a hood on the casing with its under side open to said air-chamber and open at its rear to admit the foot-wear, a rest extending across the open under side of the hood to support the foot-wear thrust into the hood, a blower mounted in the casing communicating with the air-chamber for propelling a current of air through said air-chamber and the hood to dry the foot-wear placed on said rest, a tube journaled in the casing and extending across the air-chamber, an ejector carried by said tube, a reservoir containing liquid waterproofing communicating with said tube, a pump on the casing for forcing the waterproofing from the reservoir through the tube to the ejector to be sprayed by the latter onto the foot-wear placed on said rest, and means for rocking the tube to oscillate the ejector to vary the direction of the sprayed liquid waterproofing.

19. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having an air-chamber in its upper part, a hood on the casing with its under side open to said air-chamber and open at its rear to admit the foot-wear, a rest extending across the open under side of the hood to support the foot-wear thrust into the hood, a blower mounted in the casing communicating with the air-chamber for propelling a current of air through said air-chamber and the hood to dry the foot-wear placed on said rest, a tube journaled in the casing and extending across the air-chamber, a nipple on said tube, a reservoir containing liquid waterproofing communicating with said tube, an air-pump communicating with a pipe leading through said tube and having a nipple registering with the nipple on the tube, said air-pump operating to force air through said pipe and the nipple on the latter to produce a suction in the outer nipple to draw the liquid waterproofing through the tube from the reservoir to spray the same on the foot-wear placed on the rest, and means for rocking the tube to oscillate the nipples to vary the direction of the sprayed waterproofing.

20. In an apparatus for treating wet foot-wear while on the foot of the wearer, the combination of a casing having an air-chamber in its upper part, a hood on the casing having its under side open to said air-chamber and having its front closed and open at its rear to admit the foot-wear, a rest extending across the open under side of the hood to support the foot-wear thrust into said hood above the air-chamber, and means carried by the casing for projecting fluid under pressure into the air-chamber to contact with the foot-wear.

In testimony whereof I have signed this specification.

NEVIL MONROE HOPKINS.