The present invention relates to improvements in washing and drying apparatus for dishes and other culinary utensils, and the primary object of the invention is to provide apparatus of this character wherein dishes and the like may be thoroughly washed and dried in a quick and efficient manner.

A further object of the invention resides in the provision of a combined washing and drying machine embodying a novel arrangement wherein the dishes are moved with a rotary reciprocating motion such as to thoroughly cleanse the dishes, and a novel electric drier so arranged as to thoroughly dry the dishes by means of warm air being circulated thereabout.

A further object of the invention resides in the provision of a combined washing and drying machine embodying a drier so associated with the machine as to permit of the drier being used for various other purposes other than that of drying the dishes.

A still further and important object of the invention is to provide a device of this character embodying a cabinet construction for housing the apparatus, and yet being of such construction as to allow for ready access being had to the driving mechanism when such becomes necessary.

A still further and important object of the invention is to provide an electrically operated dish washing and drying means which is of extremely simple and durable construction, and one embodying features wherein the electrical apparatus is thoroughly protected against likelihood of the washing fluids coming in contact therewith.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification and in which drawings:

Figure 1 is a side elevation of the combined washing and drying machine illustrating the cabinet like construction and showing the doors for allowing access being had to the driving mechanism of the washing device.

Figure 2 is a central vertical section through the machine and illustrating the manner in which the drying apparatus is protected against water coming in contact therewith during the washing process.

Figure 3 is an enlarged fragmentary section on line 3–3 of Figure 2.

Figure 4 is a horizontal section on line 4–4 of Figure 2 and looking upwardly against the under side of the lid or cover carrying the drying apparatus.

Figure 5 is a horizontal section taken substantially on the line 4–4 of Figure 2 but looking downwardly.

Figure 6 is a fragmentary section on line 6–6 of Figure 2.

Figure 7 is an enlarged fragmentary section showing the manner in which the rack bar is associated with the lower end of the vertical tray or basket supporting shaft for imparting a rotary reciprocating motion to the shaft.

Figure 8 is a wiring diagram and switch arrangement for the drying apparatus.

Figure 9 is a wiring diagram and switch arrangement for the washing apparatus.

Referring to the drawings in detail, and wherein similar reference characters designate corresponding parts throughout the several views, the letter A designates a cabinet or housing having enclosed therein washing apparatus B, and drying means C operable with or independently of the washing apparatus B.

Referring first to the cabinet or housing A, the same embodies a frame 5 of square shape in plan as clearly illustrated in Figures 4 and 5, and which frame is preferably formed from a suitable gauge of sheet metal to form parallel front and rear walls 6 and 7 respectively, and parallel side walls 8. Arranged horizontally within the walls of the frame 5 at a location slightly above one-half of the height of the frame, is a partition 9 having its edges secured to the walls of the frame as by welding or the like to provide a waterproof joint at the edges of the partition and forming a square tank compartment 10. Supported in the frame beneath the partition 9 is a suitable shelf 11 which forms a support for the washing apparatus.
Provided in one of the side walls 8 below the tank compartment 10 is a pair of hinged doors 12 which when swung open will allow for ready access being had to the driving mechanism for the washing apparatus supported in a concealed position upon the shelf 11. Connected adjacent one edge of the partition 9 to extend therebelow and through the wall 8, is a suitable drain pipe 13 having a threaded end for receiving a cap 14. This drain pipe 13 is preferably of a considerable internal diameter for a purpose to be subsequently explained.

The cabinet or housing 1A also includes a hinged lid or cover 15 which is hingedly connected at one edge to the rear wall 7 and may be provided at its forward edge with a suitable clamp 16 serving to retain the cover in a closed position over the tank compartment 10. The lid or cover 15 comprises a flat square shaped bottom plate 17 for engaging the upper edges of the walls of the frame 5, and a top plate 18 which is sloped upwardly from each edge of the plate toward the center thereof to form a lid compartment 19. Provided at the axial center of the flat bottom plate 17 is a circular shaped opening 20 which is adapted to be closed by a disc shaped baffle plate 21 of slightly greater diameter than that of the opening 20. The baffle plate 21 is detachably connected with the under side of the plate 17 as by spring pressed keepers 22 working in diametrically formed slots 23 provided in the baffle plate, and having hook shaped portions adapted to extend upwardly through the opening 20 for engaging the upper side of the plate 17. By observing Figure 2 it will be seen that when the keepers are moved longitudinally toward one another that the hook shaped terminal portions of the keepers may be withdrawn through the opening 20 and allow the baffle plate to be removed so that communication may be had through the opening 20 between the lid compartment 19 and tank compartment 10. Thus it will be seen that when the cover 15 is in its lowered position that the tank compartment 10 is closed at its upper end to prevent escape of any of the washing liquid, and that when the baffle plate 21 is in position over the opening 20, that the washing fluid is prevented from splashing into the lid compartment 19.

A sector 24 is pivotally connected at its lower end to one of the side walls 8, and a pin 25 carried by the lid 15 is moveable in the notched slot of the sector for allowing the lid to be retained in various angular positions such as shown by the dotted lines in Figure 1. After the lid has been swung upwardly for the desired distance, one of the notches will engage the pin 25 for retaining the lid in an open position.

Referring now to the washing apparatus 28, the same embodies a vertical carrier shaft 29 having a cylindrical shaped lower portion and a square shaped upper portion. The cylindrical shaped lower portion of the shaft extends through a water tight bearing 27 arranged at the axial center of the partition 9, and the lower end of the shaft is supported in a suitable step bearing 29 supported upon the upper side of the shelf 11 directly beneath the water tight bearing 27. A circular shaped basket or tray 29 is removable supported on the carrier shaft 26 within the tank compartment 10, and preferably is formed with a wire netting supported upon suitable spiders 30 forming quadrant shaped pockets. The spiders 30 are each provided with hub portions 31 having square shaped openings for fitting over the squared upper end of the carrier shaft whereby the foraminous basket will be caused to rotate upon rotation of the carrier shaft. The basket may be readily slid upwardly off of the carrier shaft and removed from the tank compartment, and when the basket is placed in the tank compartment, the hub portion of the lowermost spider engages the shoulders of the carrier shaft at the lower end of the squared portion of the carrier shaft for retaining the basket in slight spaced relation above the partition 9.

Referring now to the drive means for imparting a rotary reciprocating motion to the basket 29, the same embodies an electric motor 32 which is supported on the shelf 11 and has mounted on the shaft thereof, a drive pinion 33 for meshing with a spur gear 34 mounted to revolve in a suitable bracket 35 also supported by the shelf 11. The spur gear 34 carries a crank pin 36, and connected at one end to the crank pin 36, is a rack bar 37 having a series of equally spaced apart cylindrical shaped rack pins 38 projecting from one face thereof for engagement with the teeth of a gear 39 fixedly secured to the carrier shaft 26 between the partition 9 and shelf 11. Thus it will be seen that upon operation of the electric motor 32 that a rocking reciprocatory motion will be imparted to the rack bar 37. A guide is provided for retaining the rack pins 38 in engagement with the gear 39, and embodies a pair of rollers 40 supported on a bracket 41 extending between the plates 9 and 11. As will be observed in Figure 7, the rollers 40 engage the upper and lower edges of the rack bar and have flanges which will allow for slight rocking movement of the rack bar without allowing movement of the rack bar away from the gear 39. When the electric motor 32 is operating by closing of the switch 42 as in Figure 9, it will be seen that a rotary reciprocating motion will be imparted to the basket 29 for causing the washing fluid to be circulated between the dishes in different directions for thorough washing thereof.

Referring now to the drying means 43, which may be operated independently of the
washing apparatus B, the same embodies an electric motor 44 supported at the axial center of the cover top plate 18 with its armature shaft extending vertically and into the lid compartment 19 with fan blades 45 mounted on the armature shaft beneath the top plate 18. Suitable intake openings 46 are provided in the top plate 18 about the motor 45 whereby upon operation of the electric motor air may be drawn through the openings. Extending downwardly from the top plate 18 about the fan blades 45, are suitable arms 47 which support at their lower ends a heating element 48 embodying inner and outer rings of insulating material 49 and 50 respectively serving as a support for a spirally wound resistance wire 51 which preferably extends from the outer to the inner ring and forms substantially a cross as shown in Figures 3 and 8. By observing Figure 2 it will be seen that the heating element is supported beneath the fan blade 45 and directly above the opening 20 leading to the tank compartment 10. When it is desired to merely operate the electric motor 44 for causing a circulation of air it is merely necessary to close the switch 53 in Figure 8, and when desiring to operate the heating element 48 it is merely necessary to close the switch 54. Thus it will be seen by observing Figure 8, the electric motor 32 and 44 and the heating element 48 all may be operated at one time if so desired or that either of the devices may be operated independently of the other upon closing of the proper switch.

As an example of the manner in which the combined washing and drying machine may be used for washing and drying dishes in an efficient manner, the cover 15 is first swung upwardly and the tray 29 removed if so desired, and the dishes and other culinary utensils deposited in the tray. The baffle plate 21 is disposed over the opening 20, and after the washing fluid has been placed in the tank compartment 10, the lid 15 is lowered for closing the tank and the operator then closes the switch 42 for starting the motor 32 which in turn operates through the rack bar 37 for imparting a rotary reciprocating motion to the tray 29. By so having the tank compartment square shaped, and the tray circular shaped, such prevents the washing fluid from attaining any appreciable centrifugal action before the rotating tray completes one cycle of movement and then reverses. After a suitable period of time, the switch 42 is opened for stopping operation of the washing apparatus and then the cap 14 removed and the washing fluid allowed to drain from the tank compartment into any suitable receptacle. The cover 15 is then raised sufficient to allow the operator to remove the baffle plate 21 and then the lid is again swung to a closed position over the tank compartment. The switches 53 and 54 are then both closed and it will be seen that the fan blades 45 will direct air across the heated wires of the heating element whereby the air will be heated and directed through the opening 20 into the tank compartment for drying the dishes. By so having the drain pipe 13 of considerable internal diameter, such will allow for the heated air to readily escape during operation of the drying means. During operation of the drying means it will also be observed that the interior of the tank compartment and the tray 29 will also be thoroughly dried.

By supporting the cover 15 in an elevated position as in Figure 1 it will be seen that the drying means C may be operated to dry one's hair by bringing into operation both the electric motor 44 and the heating element 48, and as an electric fan for cooling purposes by merely bringing into operation the electric motor 44.

From the foregoing description it will be apparent that a novel and efficient combined dish washing and drying machine has been provided embodying novel features of construction whereby the dishes may be thoroughly and efficiently washed and then thoroughly dried without handling of the dishes between the washing and drying operations. It will further be apparent that a novel means has been provided for imparting a rotary reciprocating motion to the tray for receiving the dishes, and that the apparatus has been so enclosed in a neat and compact cabinet structure as to prevent likelihood of any injury being done the operator and yet allowing for ready access being had to the mechanism for inspection or repair thereof. Changes in detail may be made to the specific form of invention herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In a dish washing machine having a dish receiving compartment, a hollow lid closing the upper open end of the compartment, and drying means mounted in the lid for directing hot air currents into the compartment.

2. In a dish washing machine, a tank compartment having a relatively large drain opening in its lower side, a hollow lid for closing the upper side of the tank compartment and having an opening in its under side communicating with the tank compartment when the lid is closed over the compartment, a heating element supported in the hollow lid above the opening thereof, and means supported in the lid above the heating element for directing a blast of air thru the heating element and into the tank compartment.

3. In a dish washing machine embodying a frame having a tank compartment provided at its upper end, a lid hinged to the frame for closing the tank compartment including
spaced upper and lower plates forming a compartment in the lid, said lower plate being provided with an opening forming communication between the lid compartment and tank compartment when the lid is in a closed position, a cover plate removably associated with the lower plate of the lid for closing the opening therein, a heating element supported in the lid compartment above the opening in the lower lid plate, and means supported in the lid above the heating element for directing a blast of air thru the heating element and into the tank compartment upon removal of the cover plate.

4. In a dish washing machine including a frame having a tank compartment at its upper end in which the dishes are washed, a lid hinged to the frame for closing the upper end of the tank including spaced upper and lower plates, said lower plate having an opening therein, a removable cover plate for closing said opening, a heating element supported in the lid between the upper and lower plates thereof and above the opening in the lower plate, said upper plate of the lid having openings arranged above the heating element, and a fan supported by the upper lid plate and having fan blades arranged above the heating element.

CARL N. GEROSA.