

July 24, 1923.

1,463,016

A. HUMBERGER

WASHING MACHINE

Filed June 29, 1921

4 Sheets-Sheet 1

FIG. 2

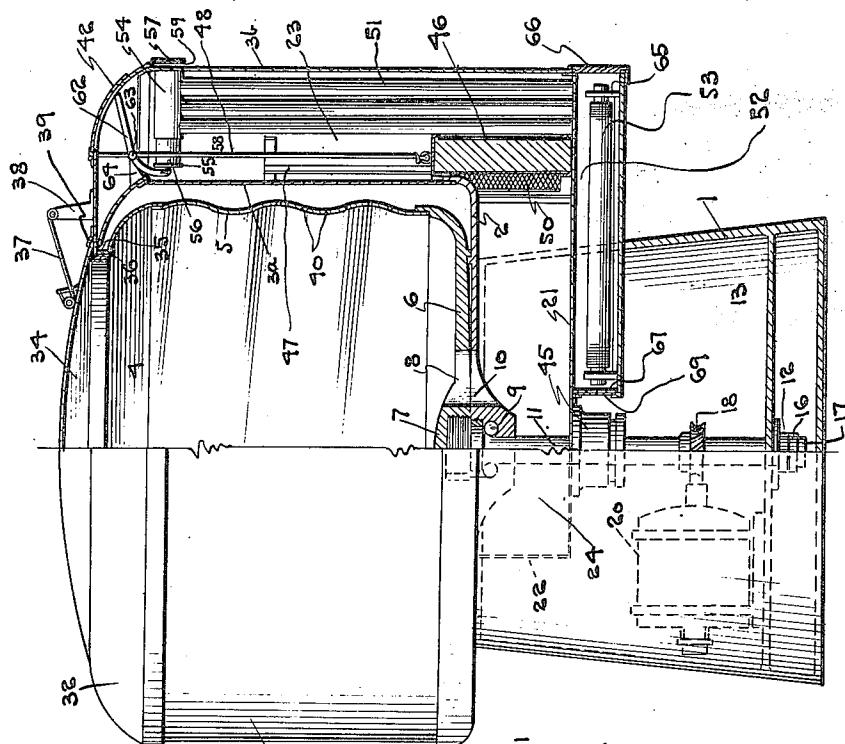
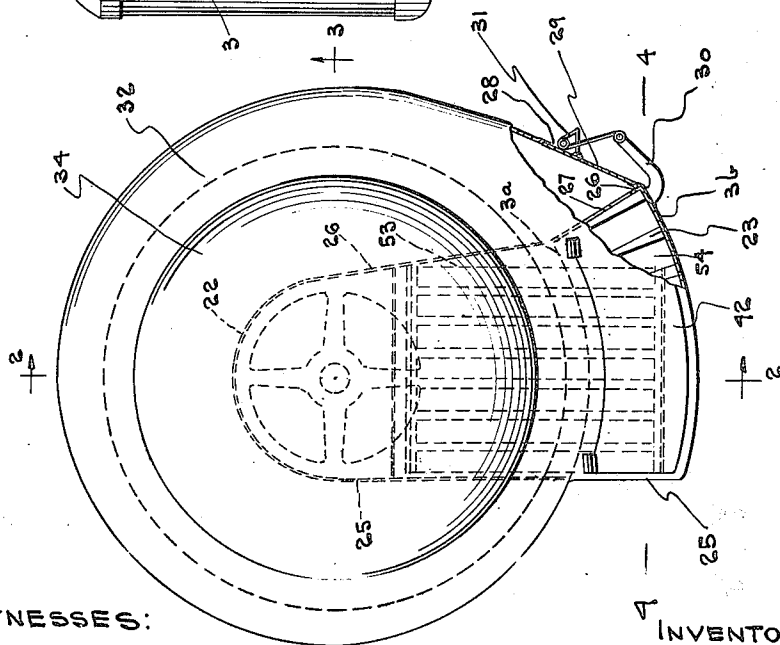


FIG. 1



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Fig. 4

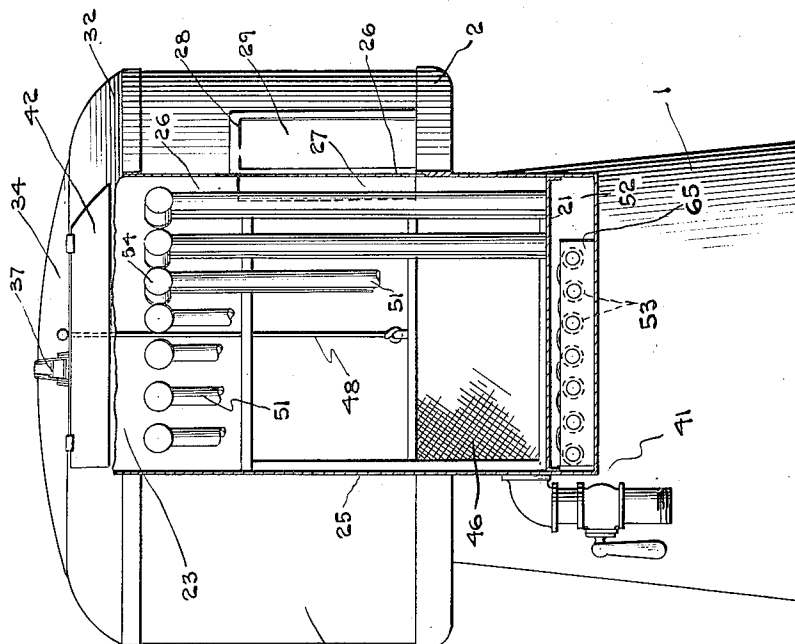
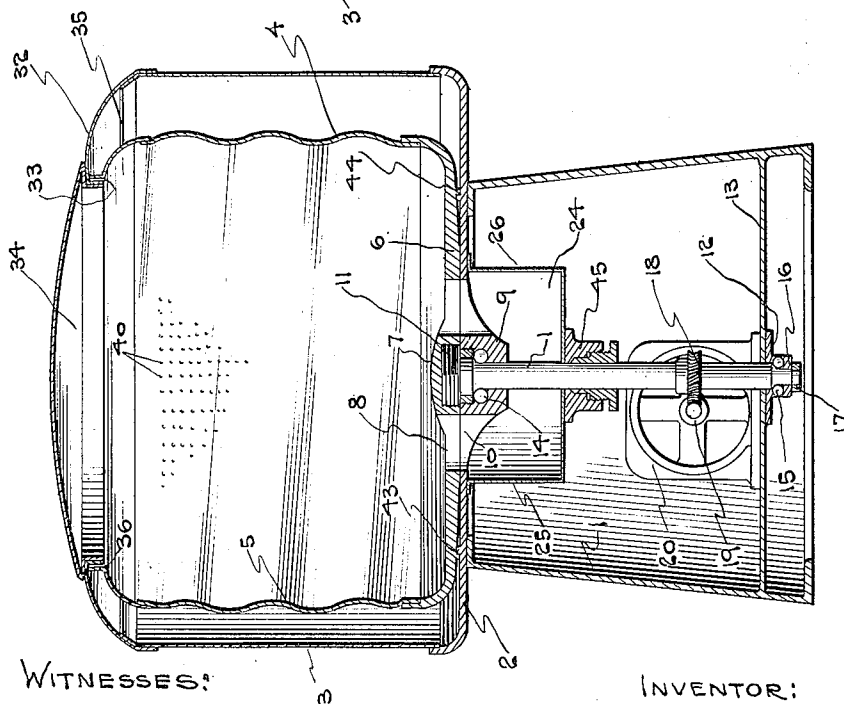


Fig. 3



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Fig. 7

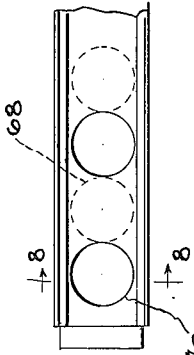


Fig. 6

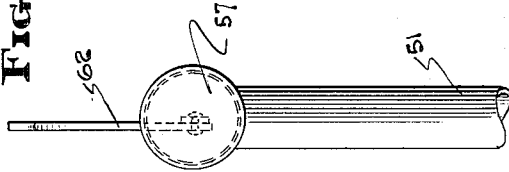


Fig. 8

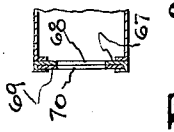


Fig. 10

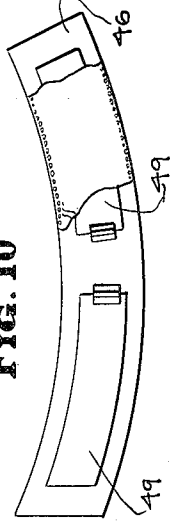


Fig. 9

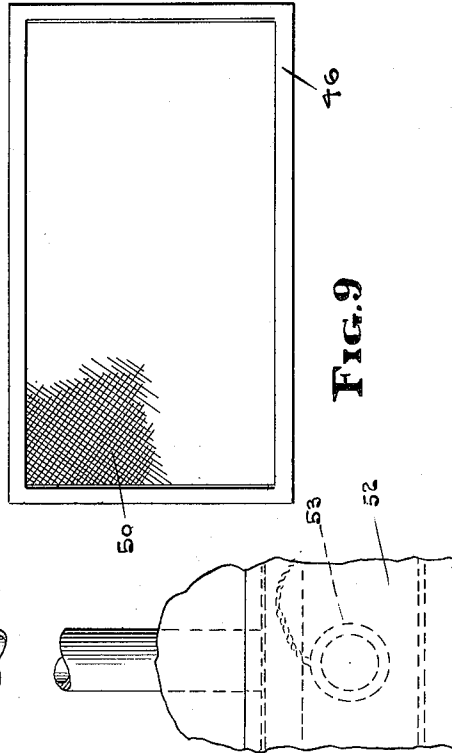
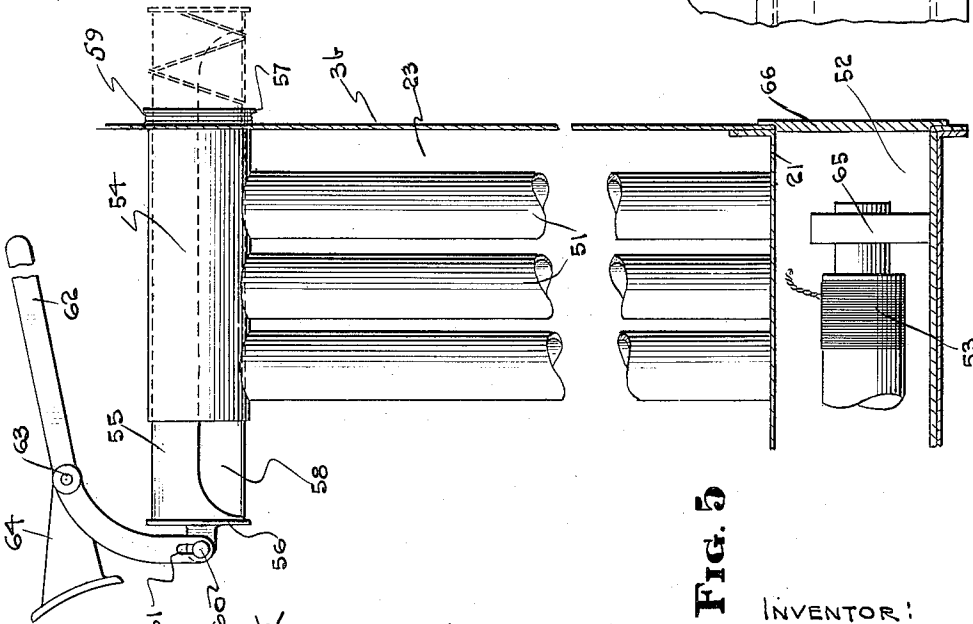


Fig. 5

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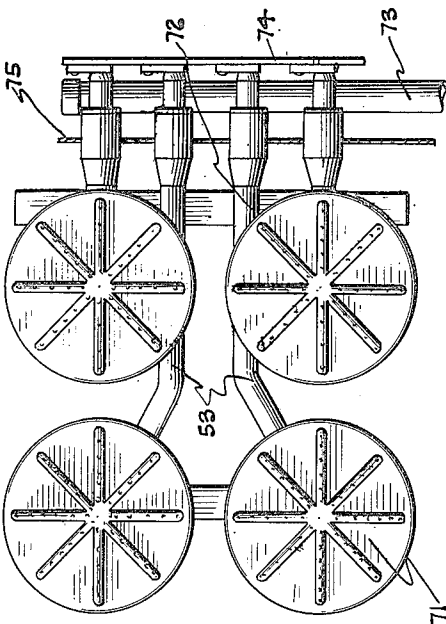


FIG. 13

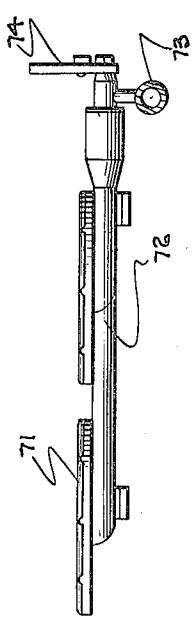


FIG. 14

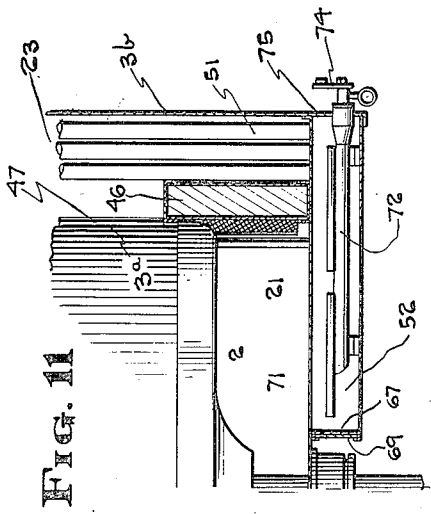
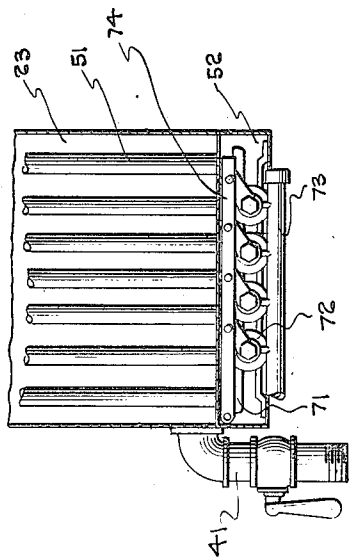


FIG. 11

FIG. 12



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# UNITED STATES PATENT OFFICE.

ALONZO HUMBERGER, OF CHICAGO, ILLINOIS.

WASHING MACHINE.

Application filed June 29, 1921. Serial No. 481,221.

*To all whom it may concern:*

Be it known that I, ALONZO HUMBERGER, a citizen of the United States, and a resident of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Washing Machines, of which the following is a specification.

My invention relates to washing machines and more particularly to those of the centrifugal type, and the invention may be said to cover improvements in the construction, arrangement and operation in the machine disclosed in my Patent No. 1,301,055 of April 15th, 1919.

One of the important objects of my invention is to provide improved arrangement and operation of the heating means for heating the circulating washing and rinsing water, and the circulating air for drying the washed clothes. The important feature in this improvement is an arrangement which permits either electrical heating units or gas heating units to be applied to the machine together with means for controlling the circulation of the heat, and escape of the fumes when gas is used.

Another important object of the invention is to provide improved arrangement of a filtering element which can be readily adjusted to be interposed in or withdrawn from the circulating stream of fluid while the machine is in operation.

The above and other features of my invention are incorporated in a machine disclosed on the accompanying drawings in which

Fig. 1 is a plan view,  
Fig. 2 is a side elevational view one-half of which is in section on plane 2—2, Fig. 1,  
Fig. 3 is a sectional view on plane 3—3, Fig. 1,  
Fig. 4 is a sectional view on plane 4—4, Fig. 1,  
Fig. 5 is an enlarged side elevational view of a flue group,  
Fig. 6 is an end elevational view of a flue group,  
Fig. 7 is an enlarged view of the inlet end of the heating element containing housing,

Fig. 8 is a sectional view on plane 8—8, Fig. 7,

Fig. 9 is a side elevational view of the filtering structure,

Fig. 10 is a top view of the filtering structure,

Fig. 11 is a sectional view similar to Fig. 2 but showing a gas heating element instead of an electrical heating element,

Fig. 12 is a front view of the parts shown in Fig. 11,

Fig. 13 is an enlarged plan view of the gas heating element, and

Fig. 14 is a side view of the gas heating element.

The supporting structure for the machine comprises the base housing 1 preferably in the form of a casting, this base supporting the circular bottom 2 of the spiral outer housing 3 within which is the clothes receiving drum 4. The body of the drum is of sheet or cast metal and cylindrical and has the inwardly extending ribs or corrugations 5 arranged in spiral form and extending from the bottom to the top, substantially in the same manner as disclosed in my patent referred to. The drum body is secured in the circular base 6 preferably in the form of a casting, the enlargement 7 being formed at the center and the openings 8 being provided adjacent the enlargement. Directly below the enlargement is the bearing hub 9 which forms part of the bottom 2 of the spiral housing 3, the bottom having also the openings or passageways 10 for registering with the passageways 8 of the drum. Threadedly secured in the enlargement 7 is the vertical shaft 11 which extends downwardly through the bearing hub 9 and engages in the lower bearing frame 12 secured on the intermediate horizontal wall 13 of the base structure 1. Suitable ball bearing members 14 are provided in the hub 9 for supporting the shaft at its upper end, and in the lower bearing structure 12 are provided the ball bearing members 15 which are held in place by the cup 16 and the nut 17 which threadedly engages the lower end of the shaft. By tightening the nut the ball bearing members are ad-

justed so that the shaft may freely rotate but is prevented from playing longitudinally. Intermediate its ends the shaft has mounted thereon the worm wheel 18 which is engaged by the worm 19 on the shaft of the electric motor 20 which is seated within the base structure 1 on the wall 13.

The body of the outer housing or container 3 is also of sheet or cast metal and extends in Archimedean spiral form. It begins adjacent the cylindrical inner drum 4 and departs gradually therefrom in spiral form with its ends 3<sup>a</sup> and 3<sup>b</sup> partly overlapping and parallel as clearly shown in Fig. 1. The inner wall section 3<sup>a</sup> extends down to the bottom 2, while the outer wall section 3<sup>b</sup> extends downwardly below the bottom a distance to be there met by the horizontal lower wall 21 from whose inner end the vertical wall section 22 extends up to the bottom 2. The walls form the vertical passageway 23 and the horizontal passageway 24 which communicate. At one side the passageways are closed by the wall 25 and at the opposite side the passageways are closed by the wall 26, these side wall sections extending vertically between the wall sections 3<sup>a</sup> and 3<sup>b</sup> and then horizontally between the lower wall section 21 and the bottom structure 2. In the vertical wall section 26 is the passageway 27 which extends from the bottom 2 and part way to the top of the wall, so as to afford communication between the spiral passageway between the members 3 and 4, and the passageway 23. Adjacent this passageway 27, the passageway 28 is provided in the wall of the member 3, and at the juncture of this wall and the wall 26 is hinged the door 29 so as to be adapted to swing to close either the passageway 27 or the passageway 28. Between the door and a bracket 30 is interposed a double acting spring 31 of suitable design which serves to hold the door in either of its positions.

The outer housing 3 has the top 32 provided with the central flanged inlet opening 33 which is normally closed by the cover 34. At its upper end the drum 4 has the flange 35 which surrounds the cover receiving flange 36. When the drum rotates the flanges will assist in balancing the drum. The cover is held in its open or closed position by means of a suitable double acting spring 37 which extends between the cover and the bracket 38, the cover being shown hinged to the housing 3 at 39.

From the description thus far the operation of the machine for washing can be understood. The cover 34 is removed and the clothes to be washed are piled into the drum 4. Washing water is then poured into the drum, and water will flow through the perforations 40 in the drum shell and into the

outer spiral container 3. Water will also flow through the passageways 8 and 10 into the horizontal passageway 24 and will rise in the vertical passageway 23 to the same level as in the drum. The drum is now rotated by means of the motor in a direction to cause its spiral corrugations to exert lifting force on the clothes and the water, the clothes and the water being thrown outwardly by centrifugal force, the clothes then engaging against and tending to rise along the corrugated wall of the drum. The clothes are thus well agitated, turned over and rubbed against themselves and the corrugations, while the water is thrown outwardly through the perforations 40 and travels spirally through the space between the drum and outer shell and then through the passageway 27 into the vertical passageway 23 and from there into the horizontal passageway 24 and back into the drum through the passageways 10 and 8, there being thus a constant circulation of the water through the drum and clothes. After a washing operation the dirty water is drained from the machine through the valve controlled drain pipe 41 connected with the lower passageway 24, as clearly shown in Fig. 4. After draining of the water the drain pipe valve is closed and rinsing water is poured into the drum and the drum is again rotated, the water then circulating through the same path to rinse the clothes. After a rinsing operation the drain pipe valve is again opened and the rinsing water drained off. The door 29 which was closed during the washing and rinsing operation against the passageway 28, is now swung inwardly to close the passageway 27. The drum is now speeded up and most of the moisture will be driven therefrom by centrifugal force through the perforations 40, and the moisture-laden air will escape from the spiral passageway through the outlet 28. During the drying operation the cover 42 provided for the vertical passageway 23 is opened so that the suction effect caused by the revolving of the drum in the spiral shell will cause air to be drawn down the passageway 23 and through the horizontal passageway 24 and into the drum through the passageways 8 and 10. A constant circulation of air is thus maintained through the drum to assist in carrying off the moisture and drying the clothes.

To prevent water from leaking from the spiral passageway to the passageway 24 the bottom 2 is provided with an annular baffle ridge 43 which is surrounded by the annular baffle ridge 44 on the drum base. To prevent leaking where the shaft extends through the lower wall 21 of the passageway 24 a stuffing box 45 is provided, as clearly shown in Fig. 3.

It is very desirable to remove from the washing water, particles of grease, dirt or other matter, and I therefore provide a filtering frame 46 which I slidably mount in the vertical passageway 23 in guideways 47. When at the bottom of its guideways the frame extends across the juncture of the vertical and horizontal passageways 23 and 24 between the wall 21 and the bottom 2, the frame being preferably bent to follow the contour of the bottom. A cord 48 running upwardly to the exterior of the machine is provided so that the filtering frame can be readily raised or lowered. Suitable covers 49 are provided by means of which the filtering frame can be readily filled with filtering material, as for example, coke, the inner and outer walls of the frame being of meshed or other material 50 which will permit water to readily pass therethrough but which will prevent passage of solid particles, the coke or other filtering material within the frame retaining the grease, dirt, etc. The filtering frame is in its lower filtering position during a washing operation of the machine, but during a rinsing operation and the drying operation the frame is preferably raised.

One of the important features of my invention is to provide heating apparatus for the water and drying air in which electrical heating units or gas heating units may be interchangeably applied. In the passageway 23 I provide a plurality of flues 51 which communicate at their lower ends with the chamber 52 provided below the wall 21 for receiving heating units 53. On the drawing I have shown the flues divided into groups of three, the flues of each group connecting at their upper ends with a horizontally extending valve tube 54. In each valve tube is slidably a tubular valve 55 closed at its ends by caps 56 and 57 and having the longitudinally extending outlet slot 58. On each valve, between its outer cap 57 and the wall 3<sup>b</sup> is a compression spring 59 which tends to hold the valve out with its outlet slot closed to the passageway 23 but open to the exterior of the machine.

On the inner cap 56 of each valve is a pin 60 which engages in the slot 61 of a bell crank lever 62. These levers are all pivoted to a shaft 63 which is journaled in brackets 64. The outer ends of the levers project into the path of the door or lid 42 for the passageway 23. When the lid is open the springs 59 are free to draw the valves outwardly, but when the lid is closed it engages with the levers and the valves are shifted inwardly to disconnect the outlet slots 58 from the atmosphere and to connect them with the passageway 23.

In Figs. 1 to 6 the heating units 53 are electrical and are mounted on a frame 65 which can be readily inserted into or with-

drawn from the chamber 52 upon removal of the door or closure plate 66. At its inner end the chamber 52 has the wall 67 provided with inlet openings 68 which are adapted to be opened or closed by the register plate 69 which has the openings 70 adapted for more or less overlap with the openings 68 to control the inflow of air to be heated.

In Figs. 11 to 14 a gas burner structure is provided for supplying the heat. The structure shown comprises a number of burner heads 71 connected with pipes 72 extending from the gas supply pipe 73. The pipes 72 have suitable valves connected with a common controlling lever 74. At their outer ends the pipes carry a closure plate 75 which closes the outer end of the chamber 52 when the heating unit is inserted. When gas is used for heating, the lid 42 is raised to permit the valves to be shifted outwardly so that the gas fumes can escape from the flues into the atmosphere. With this arrangement when the machine is operated for drying the air flows through the passageways 23 and 24 and through the drum.

When electrical heating units are used the lid 42 is closed to cause the valves to be shifted inwardly, the entire heat flowing upwardly through the flues and into the passageway 23. The register 69 is opened wide so that the air for drying purposes may flow through the chamber 52 thence through the flues and out of the valves and through the passageways 23 and 24 to the drum, the moisture laden air then flowing outwardly through the spiral passageway and to the atmosphere through outlet 28.

Summing up the operation, the clothes are piled into the drum and water is filled in as already explained. During washing of the clothes the filter frame 46 is dropped into its filtering position so that the washing water will flow through the filter material. The door 29 is in its outer position to expose the passageway 27 and to close the outlet 28. The flues 51 being in the vertical passageway 23, the washing water must circulate around them and is consequently heated during circulation thereof. When electrical heating units are used the lid 42 is closed to cause the flues to connect at their upper ends with the passageway 23. When gas is used the lid 42 is open to permit the flues to be connected at their upper ends with the atmosphere.

After the washing operation the washing water is drained from the machine and rinsing water is poured in. The filter frame is raised so that the water can freely circulate and thoroughly rinse the clothes. The rinsing water is also heated during circulation thereof. After the rinsing operation the water is drained off and the drum again rotated. If electrical heating units are used

the lid 42 is closed so that the air for drying purposes must enter through the chamber 52, and the heated air will flow upwardly through the flues and then through the passageways 23 and 24 into and through the drum where it extracts moisture from the clothes, the moisture laden air flowing through the spiral passageway and out through the outlet 28, the door 29 having been swung to its inner position to open the outlet 28 and to close the passageway 27. If gas is used for heating, the lid 42 is opened so that products of combustion may flow into the atmosphere, the air for drying purpose then flowing into the passageway 23 at the top thereof, then through the passageway 24 and through the drum, and then through the spiral passageway to the exterior through outlet 28.

My improved machine is of very efficient construction and operation. The change for washing, rinsing or drying can be quickly made and the machine can be readily equipped for either electrical heating or gas heating. I do not desire to be limited to the exact construction and arrangement shown and described as changes and modifications can be readily made which would still come within the scope of the invention.

I claim as follows:

1. The combination with a washing machine having a passageway for the circulation of clothes washing water or clothes drying air, of a heating chamber below said passageway, a heating device within said chamber, flues extending upwardly from said heating chamber and through said passageway, and means at the upper end of said flues for connecting them either with the exterior of the passageway or with the interior thereof.

2. The combination with a washing machine comprising a tub and a passageway connected therewith for the circulation of washing water or of drying air, of a heating chamber below said passageway, a heating device in said chamber, flues extending from said chamber upwardly into said passageway, and valves operable to connect the upper end of said flues either with the exterior of said passageway or with the interior thereof.

3. The combination with a washing machine comprising a tub and a passageway connected therewith for the circulation of washing water or drying air, of a heating chamber below said passageway, a heating device within said chamber, flues extending upwardly from said chamber into said passageway, said flues being divided into groups, a valve housing for each group of flues receiving the upper ends thereof, and valves shiftable in said housing to connect said flues at their upper ends either with

the exterior of said passageway or with the interior thereof.

4. The combination with a washing machine comprising a tub and a passageway connected therewith for the circulation of washing water or drying air, of a heating chamber below said passageway, a heating device within said chamber, flues extending upwardly from said chamber through said passageway and to the upper part thereof, valve housings receiving the upper ends of said flues, a valve slidable in each housing, and means for simultaneously actuating said valves to connect said flues at their upper ends either with the exterior of said passageway or with the interior thereof.

5. The combination with a washing machine comprising a tub and a passageway connected therewith for the circulation of washing water or drying air, of a heating chamber below said passageway, a heating device in said chamber, flues extending upwardly in said chamber and through said passageway, a valve housing receiving in the upper ends of said flues, a valve slidable in said housing, means tending to shift said valve outwardly to connect said flues at their upper ends with the exterior of said passageway, and means for shifting said valve inwardly to connect the flues with the interior of the passageway.

6. The combination with a washing machine comprising a tub and a passageway for the circulation of washing water or drying air, of a heating chamber below said passageway, a heating device within said chamber, flues extending upwardly from said chamber into said passageway, said flues being divided into groups, a valve housing receiving the upper end of each group, a valve shiftable in each housing, means tending to shift said valves outwardly to connect the upper ends of said flues with the exterior of the passageway, and means for shifting said valves inwardly to connect the upper ends of said flues with the interior of said passageway.

7. The combination with a washing machine comprising a tub and a passageway for the circulation of washing water or drying air, of a heating chamber below said passageway, a heating device in said chamber, flues extending upwardly from said chamber through said passageway, said flues being divided into groups, a valve housing for each group receiving in the upper ends thereof, a valve shiftable in each housing, springs tending to shift said valves outwardly to connect the flues at their upper end to the exterior of the passageway, and means for simultaneously shifting said valves inwardly to connect the upper ends of the flues with the interior of the passageway.

8. The combination with a washing ma-

chine comprising a tub and a passageway connected therewith at top and bottom for the circulation of washing water or drying air, of a heating chamber below said passageway, a heat producing device in said chamber, flues extending upwardly from said chamber through said passageway, a valve housing connecting the upper ends of said flues, a valve shiftable in said housing, 5 means tending to shift said valve outwardly to connect the upper ends of said flues to the exterior of said passageway, a lid for said passageway, and mechanism between said valve and lid operable to shift said valve inwardly when the lid is closed to then connect the upper ends of said flues with the interior of said passageway. 15

In witness whereof, I hereunto subscribe my name this 20th day of June A. D., 1921.

ALONZO HUMBERGER.