

Jan. 24, 1950

F. SPANIER
TEXTILE WASHER AND DRIER UTILIZING
COMPRESSION WAVES
Original Filed Aug. 6, 1947

2,495,295

FIG. 1

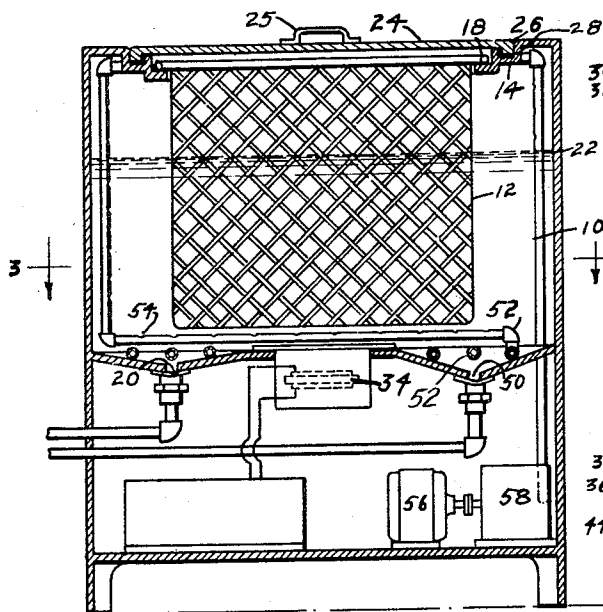


FIG. 2

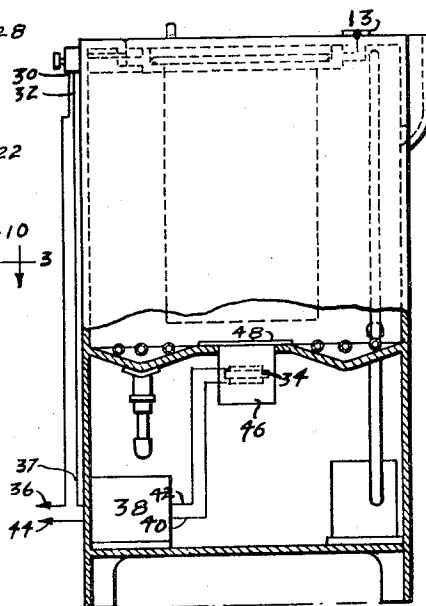
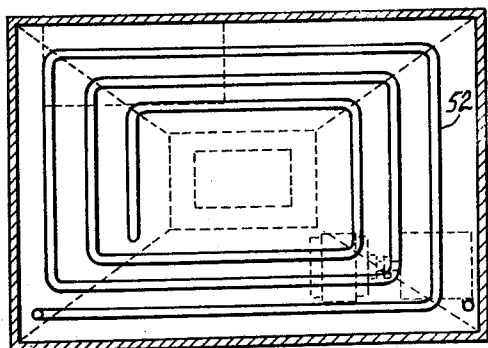


FIG. 3



INVENTOR.

FRITZ SPANIER

BY

Dodson & Dykeman.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,495,295

TEXTILE WASHER AND DRIER UTILIZING
COMPRESSION WAVES

Fritz Spanier, Staten Island, N. Y.

Original application August 6, 1947, Serial No.
766,490. Divided and this application Novem-
ber 15, 1947, Serial No. 786,236

4 Claims. (Cl. 68-20)

1

My invention relates to compression waves which are sometimes referred to as supersonic or ultrasonic waves and more specifically to their use to wash clothes. The principal object of my invention is to construct an apparatus to practice the process set forth in my copending application Serial No. 766,490, filed Aug. 6, 1947, of which this application is a division.

A further object is to provide a clothes washer to wash clothes without the necessity of contacting the clothes with any interior matter such as paddles, cups, etc.

A further object is to construct a clothes washer which will be more efficient than any on the market with which I am familiar.

My means of accomplishing the above objects may be more readily apprehended by having reference to the accompanying drawings in which:

Fig. 1 is a vertical elevation partly in section;

Fig. 2 is a side elevation partly in section;

Fig. 3 is a top sectional elevation on line 3-3 of Fig. 1 looking in the direction of the arrows, showing the piping system.

Similar reference numerals refer to similar parts throughout the specification.

As shown in Figure 1, I provide a closed treatment chamber 10 in which basket 12, preferably rubber covered, is suspended on the ledge 14 holding the lip 16 of the basket 12 so that water entering through inlet pipe 20 will cover the contents of the basket. As soon as the water reaches the predetermined level, as indicated at 22, in the chamber 10, a valve, (not shown) automatically closes pipe 20. The means for this is well known and is not a part of my invention, consequently I shall not describe any one form. I provide a cover 24 with a convenient handle 26 through which the clothes are inserted into the basket 12. The cover 24 is secured in a flange 28 fitted into a groove 28 formed in the container 10 as part of the ledge 14. A check inlet port 13 is provided to admit air and exhaust it as the system is filled and emptied. It will be noted that leads 30 and 32 run to a cover operated switch whereby when the cover 24 is open the circuit is broken and no vibration can occur. At the bottom of the chamber 10 I provide a transducer such as a crystal 34 which may be natural or manufactured.

Preferably the transducer used is of the crystal type.

The crystal 34 is vibrated by means of a high frequency radio tube oscillator system 38 well known in the art. As shown, the crystal 34 is suspended in a chamber 46 in a dielectric bath

2

where electrode lead lines 40 and 42 connect the opposite sides of the crystal 34 to the oscillator system 38 which, in turn, is connected to a suitable source of input current (not shown) by lead line 44 and leads 36 and 37 through a cover operated switch led by leads 30 and 32 respectively.

I provide a sealed chamber 46 in which the crystal 34 is positioned and in this chamber I provide a dielectric such as a light petroleum oil so that the vibrations of the crystal 34 will be fully communicated to the thin resilient diaphragm or plate 48 which is in contact with the chamber 10 and vibrates the fluid therein. An exhaust pipe 50 is provided to drain the system when required. The pump for this is not shown. Heating pipes indicated generally at 52 are perforated as at 54 and provide the drying means for hot air as pumped in by pump 56 through a heating box 58. These pipes are preferably formed in a coil and are located in troughs formed in the bottom of the container and may extend upwardly following the contour of the container. The controls for these pumps and the oscillator are not shown as they are old and well known.

It is well known that in crystal vibrating systems, the effect of the vibrations is in a direct line of the vertical axis of the crystal as it vibrates. Therefore, if desired, more than one crystal may be employed in the same manner as the crystal 34 described and shown in the drawings without departing from my invention. The addition of one or more crystals merely increases the volume of fluid my system will handle. In the case of the addition of one or more crystals, they are merely positioned with their electric axis in parallel and are connected in parallel to the oscillating system.

The operation of the above described apparatus is as follows:

The clothes to be cleaned are now introduced into the treatment chamber 10 by inserting them in the basket 12.

A small amount of a detergent and/or washing soap may be added if the material to be treated or cleaned is very soiled. The cover 24 is closed and the water is turned on. As soon as the desired height is reached the water is turned off and a switch (not shown) is thrown to start the vibration of the crystal 34. As soon as the desired time interval has elapsed the switch is cut off and the pump is engaged, draining off the dirty fluid through the pipe 50. When the chamber 10 is exhausted, outlet pipe 50 is closed off, the inlet pipe 20 is opened, and water

3

is again admitted to the desired height. Again, the inlet valve is closed, the current switch is thrown and vibration again occurs for a specified time. Upon the ceasing of the vibration, the outlet valve opens, the exhaust pump starts and the system is again exhausted.

The clothes are left where they are and the drying pump 56 connected to air pipes 52 is started and hot air is circulated into the treatment chamber 10 for the desired time.

There are several arrangements, well known, and familiar to those skilled in the art whereby all these functions may be automatically timed and controlled. It will be clear that the method is exactly the same for cleaning clothes, dishes, sterilization of instruments and the like, except that the duration of the vibration period will be varied according to the type of material being treated.

I have found that with vibrations of approximately 60,000 cycles per second cotton textiles will be washed in a few minutes, while silk and rayon clothing will naturally require less time.

Having described my invention what I regard as new and desire to secure by Letters Patent is:

1. In a device for washing and drying textiles, a container substantially open at the top adapted to hold fluid, there being a central opening in the bottom of said container surrounded by an annular depression, a diaphragm covering said central opening, a crystal transducer of a responsive frequency of substantially 60,000 cycles per second, said crystal being located directly below said diaphragm in position to vibrate said diaphragm and the fluid in the container by compression waves, a basket to hold said textiles, said basket being positioned directly above said diaphragm, and a pipe to introduce heated and compressed air into said container, said pipe being formed in a substantially flat coil located in said annular depression and outside of the vibrating area of said diaphragm, said pipe having spaced orifices therein.

2. In a device for washing and drying textiles, a container substantially open at the top adapted to hold fluid, there being a central opening in the bottom of said container and a channel formed in said bottom and surrounding said opening, a diaphragm covering said central opening, a crystal transducer of a resonant frequency of less than 100 kc. per second, said crystal being located directly below said diaphragm in position to vibrate said diaphragm and the fluid in the container by compression waves, a basket to hold said textiles, said basket being positioned directly above said diaphragm, and a pipe to introduce heated and compressed air into said container, said pipe being formed in a substantially flat coil located close to and substantially in the channel formed in the bottom of the container and outside of the vibrating area of said diaphragm, said pipe having spaced orifices therein.

4

3. In a device for washing and drying textiles, a container substantially open at the top adapted to hold fluid, there being a channel formed in the bottom of said container and surrounding a central opening in said bottom, a chamber being attached to said container, fluid tight means closing said central opening and separating said container from said chamber, a crystal transducer in said chamber of a resonant frequency less than 100 kc. per second located directly below said fluid tight means and in a position to vibrate the same and the fluid in the container by compression waves, said chamber being substantially filled with a dielectric such as oil, said fluid tight means adapted to transmit compression waves set up by said crystal through said dielectric to said fluid, said crystal being positioned in said chamber in register with the center of said aperture, a pipe to introduce heated and compressed air into said container, said pipe being formed in a substantially flat coil located in said channel below a plane through said fluid tight means and outside of the vibrating area of said fluid tight means.

4. In a device for washing and drying textiles, a rectangular container open at the top adapted to hold fluid, a basket to hold said textiles, the bottom wall of said container having troughs surrounding a central rectangular orifice, pipes to introduce heated and compressed air into said container located in said troughs, a diaphragm covering said orifice, said pipes being arranged to follow the contour of said container, said pipes being substantially below the level of said diaphragm, a crystal transducer whose resonant frequency is between 30 and 100 kc. per second, a transducer chamber, said transducer being suspended in said chamber, said chamber being substantially filled with oil, said chamber attached to said container directly below said diaphragm, said diaphragm adapted to transmit compression waves set up by said crystal through said oil to said fluid.

FRITZ SPANIER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
987,837	Staunton	Mar. 28, 1911
1,836,063	Bloom	Dec. 15, 1931
2,135,685	Wells	Nov. 8, 1938
2,171,449	Kuhn	Aug. 29, 1939
2,203,479	Witwer et al.	June 4, 1940
2,225,407	Bassett	Dec. 17, 1940

FOREIGN PATENTS

Number	Country	Date
540,960	Great Britain	Oct. 20, 1942
691,392	France	July 8, 1930