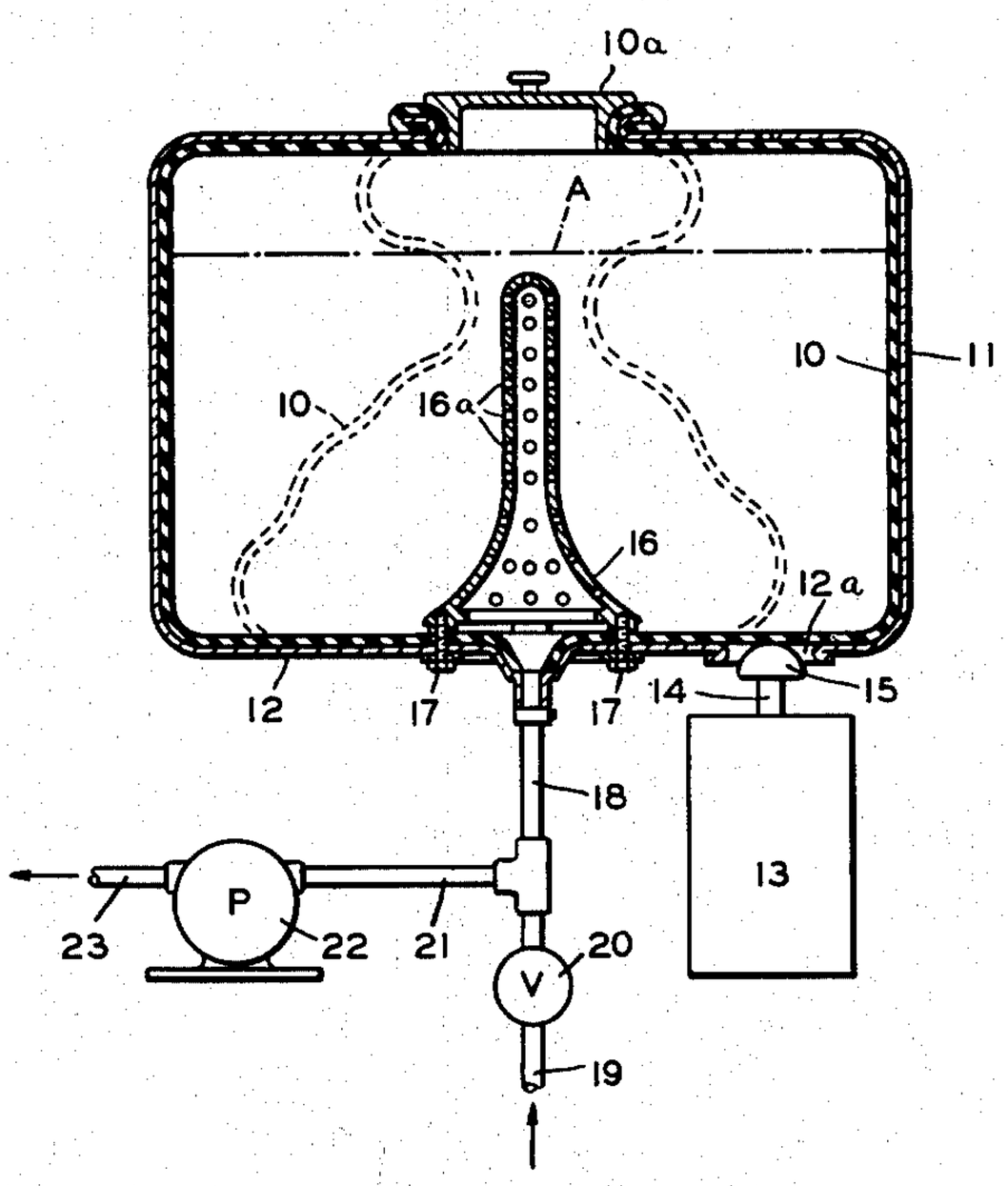
Feb. 24, 1953

H. J. RAND

2,629,244

SHOCK WAVE WASHER WITH VACUUM OPERATED SQUEEZER EXTRACTOR

Filed March 3, 1948



INVENTOR
HENRY J. RAND

BY Hyde, Meyer, Baldwin & Doran

ATTORNEYS

Patented Feb. 24, 1953

2,629,244

UNITED STATES PATENT OFFICE

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SHOCK WAVE WASHER WITH VACUUM OPERATED SQUEEZER EXTRACTOR

Henry J. Rand, Bratenahl, Ohio, assignor to H. J. Rand Washing Machine Corp., Bratenahl, Ohio, a corporation of Delaware

Application March 3, 1948, Serial No. 12,762

2 Claims. (Cl. 68—21)

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This invention relates to improvements in a washing machine wherein the washing action takes place inside of a flexible liquid- and air-tight bag by means of high frequency shock waves followed by a vacuum drying operation.

An object of the present invention is to place clothes and a liquid detergent within a flexible liquid- and air-tight bag, and the washing of the clothes within the bag by means outside the bag adapted to provide high frequency shock waves in the liquid within the bag to cause a washing operation there. Following this, the machine is so arranged to withdraw the liquid and air from the interior of the bag causing the same to collapse against the laundry to squeeze the detergent out of the same. Other objects and advantages of the present invention will be apparent from the accompanying drawing and description and the essential features will be set forth in the appended claims.

In the drawing, the figure is a central sectional view through a washing machine equipped with my invention.

I have chosen to illustrate my invention as applied to a machine wherein a flexible liquid- and air-tight bag 10 is supported inside of rigid side walls 11 and a bottom wall 12. The bag is open at the top for the insertion of laundry and detergent such as soaps and the like and a cover 10*a* is provided for closing this top opening. When the bag is filled with liquid to a predetermined level such as the dot-dash line A indicated in the drawing, and with the clothes and suitable detergent within the bag, a washing action is provided by means positioned entirely outside the bag 10. In the present instance I have indicated diagrammatically at 13 a device adapted to produce vibrations of a very high frequency in the rod 14 which has a button head 15 engaging the bag 10 through a suitable opening 12*a* in the bottom of the bag support 12. The device 13 is of a known character and is adapted to produce vibrations of the button head 15 of the order of three to fifty thousand cycles per second. There is very little appreciable movement of the button head 15 but instead the frequency of its oscillation is transmitted through the bag 10 to the liquid within the bag. This produces shock waves of the same frequency in the liquid and it has been found that waves of this frequency will produce a washing action upon the clothes. This washing action is maintained for the desired length of time after which the drying operation follows.

To attain the advantages of my improved drying operation in connection with a wash accomplished within the bag, I have provided upstanding perforated post 16 extending up from the central portion of the bag and secured to the bottom wall 12 by means of studs or bolts 17. The post is provided with perforations 16*a* communicating with the interior of the bag. Below the central portion of the post a conduit 18 is connected by line 19 and valve 20 with a source of liquid supply such as a faucet or the like which is used for filling the bag to the level A indicated. The conduit 18 also communicates through conduit 21 with pump 22 which is driven by means not shown to withdraw the liquid and air from the interior of the bag when desired and to discharge the same through the discharge conduit 23. It will be noted that the connection of conduit 18 and the connection of the post 16 with the bag and tube structure is provided in a liquid-tight manner as clearly shown in the drawing.

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At the close of a washing operation, the pump 22 is started and liquid and air are withdrawn from the interior of the bag, passing through the perforations 16*a* of the post 16 and then downwardly through the conduit 18. This causes the bag 10 to collapse inwardly to a position similar to that indicated in the broken line of Fig. 1 so that the detergent is removed from the clothes by the combination of the pressure of the bag plus the effect of the vacuum atmosphere within the bag. I thus accomplish a complete washing and considerable drying of the clothes all without removing them from the bag 10 and without any wear and tear on the clothes.

I claim:

1. A washing machine comprising a flexible walled bag adapted to hold laundry and liquid detergent and having an opening at the top and having an air-tight cover for closing said opening, said bag having a bottom wall and side walls, rigid wall means supporting said bag walls on the outside, there being an opening through said rigid wall means, a vibrator extending through said opening and engaging the exterior surface of a wall of said bag, said vibrator adapted to vibrate said engaged wall at high frequency without appreciable movement of said engaged wall, a hollow member located centrally of the bottom wall of said bag and having the hollow of said member communicating outside of said bag, and means for withdrawing liquid and air through the hollow of said member creating a substantial vacuum within said bag to cause said bag to collapse inwardly against said laundry and to squeeze out the detergent.

2. In a washing machine, the combination of a

flexible walled bag, adapted to contain laundry and liquid detergent, said bag having substantial side and bottom walls and an opening at the top thereof, an air-tight cover for closing said opening, a hollow up-standing member located centrally of said bag, said walls being of sufficient size to substantially surround said member, a tub having rigid walls for supporting said bag walls upon the outside thereof, said tub being provided with at least one aperture therethrough, a vibrator extending through said tub wall, said vibrator being positioned to abut a wall of said bag upon the exterior surface thereof and being adapted to vibrate said bag wall at a high frequency to obtain a washing action, and means for withdrawing liquid and air through the said hollow member to cause said bag to collapse inwardly against said laundry and to squeeze out the detergent.

HENRY J. RAND.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,531,924	Graham	Mar. 31, 1925
2,178,385	Alward	Oct. 31, 1939
2,407,660	Graham	Sept. 17, 1946
2,468,550	Fruth	Apr. 26, 1949
2,472,682	Rand	June 7, 1949
2,495,295	Spanier	Jan. 24, 1950

FOREIGN PATENTS

Number	Country	Date
691,392	France	July 8, 1930
506,538	Germany	Sept. 5, 1930
341,740	Great Britain	Jan. 22, 1931
796,891	France	Feb. 3, 1936
548,960	Great Britain	Oct. 20, 1942
587,214	Great Britain	Apr. 17, 1947