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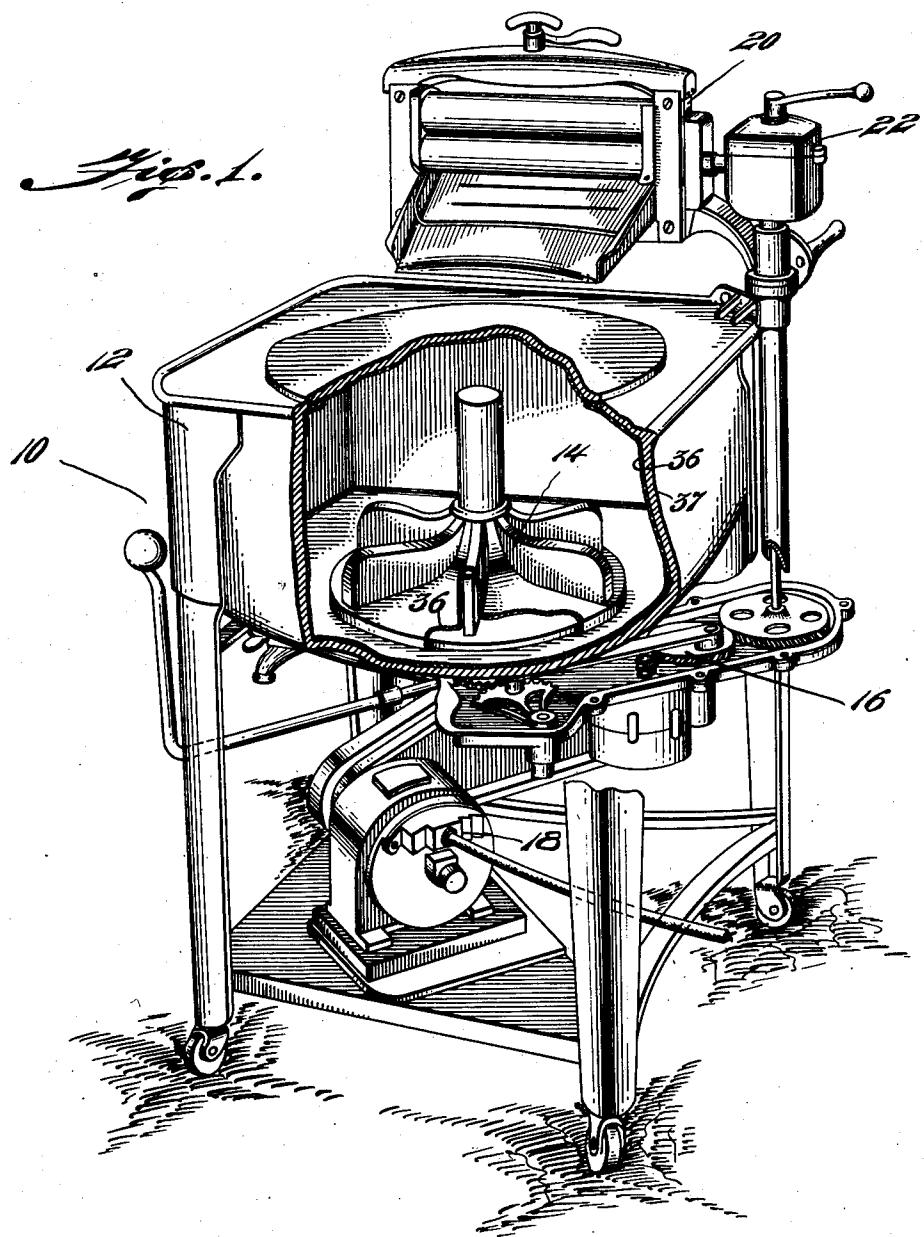
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1,854,745

LAUNDRY MACHINE

Filed July 25, 1928

2 Sheets-Sheet 1



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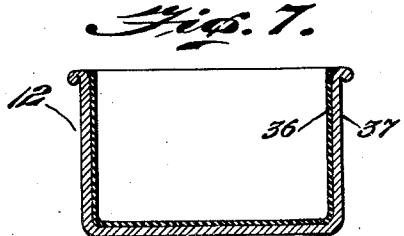
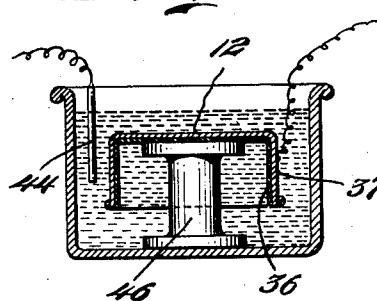
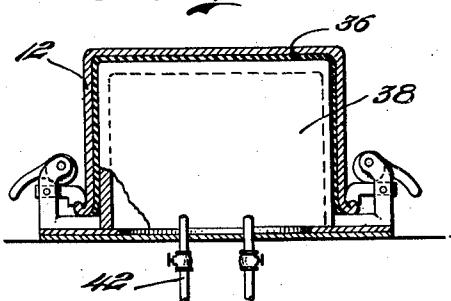
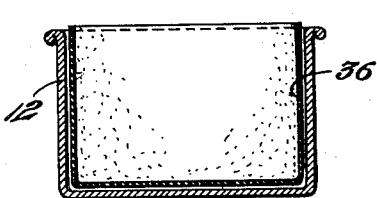
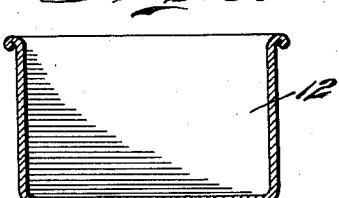
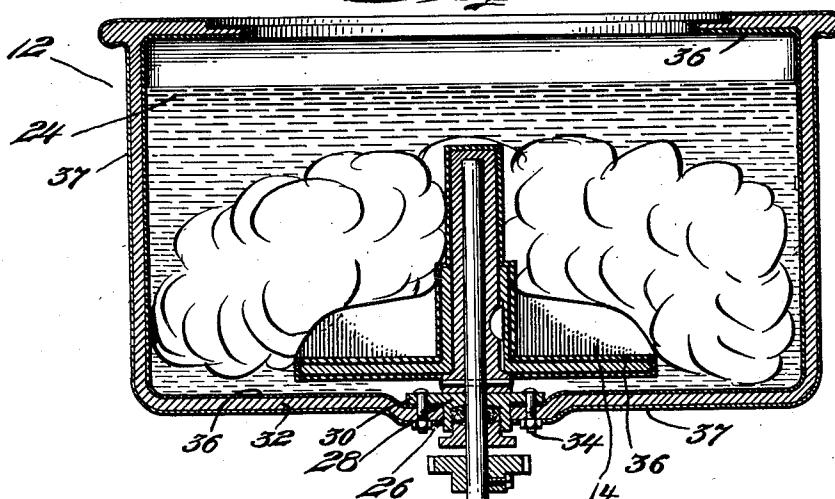
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## LAUNDRY MACHINE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## LAUNDRY MACHINE

Application filed July 25, 1928. Serial No. 295,173.

My invention relates to laundry machines, specifically to various parts thereof and the method of their manufacture.

My invention includes a novel type of tank and its method of manufacture, specifically adapted for use in laundry machines. I preferably provide the entire interior of the washing machine tank and all parts of the washing machine normally underneath the water surface therein in contact with the clothes with an elastic surface preferably formed by a thin layer of rubber attached to the surface thereof and preferably vulcanized thereto. Hitherto washing machine tanks have consisted of copper tanks tinned or otherwise rust proofed on the inside. Attempts have been made to employ a cheaper steel tank covered with a layer of zinc or other rust proof metal. It has been found that this metallic rust proof layer does not stay on a long time during the rough treatment the clothes receive in washing. I therefore preferably employ as the metal of the tank a metal to which a rubber layer may be vulcanized, such as steel, and vulcanize a thin layer of rubber thereto preferably one which is resilient or elastic. It is common knowledge that clothes do not last as long in modern washing machines as they did with the old fashioned hand method of washing. This is apparently due to the great speed which the agitators are run in practice, beating the clothes many times with a hard metallic or other surface. Thus I provide the agitator with a resilient surface and by providing the tank with a resilient surface I believe I am enabled to provide a novel method of washing, which comprises effecting a contacting engagement of the clothes with elastic surfaces only while they are in the cleaning liquid. I also prevent a metallic surface which tends to rust or tear the clothes from touching the clothes during the automatic washing or a wooden surface which tends to splinter or tear the clothes from touching the clothes during the washing operation.

A further advantage of a rubber surface on the interior of the tank and the agitating means is that it lasts a longer time as strong acids do not affect it.

A further advantage which also tends to cause less damage to the clothes and a more thorough agitation thereof is that as the surface of the rubber lining is slippery it will not drag on the clothes.

A further object of my invention is to provide the agitating means for use in washing machines with a similar elastic covering specifically a covering of rubber with the above delineated advantages. While I am aware that others have provided washing machines with rubber on the base thereof, so far as I am aware no one has hitherto covered completely the entire interior of a washing machine tank with a smooth rubber surface on all parts thereof normally in contact with the clothes.

An additional advantage of my invention, particularly where a bearing for attaching the agitator is mounted on the bottom of the tank is to eliminate the necessity of an additional gasket for the bearing.

A further feature of my invention, which is I believe new in tanks broadly is to provide a tank which is entirely rust proof and which has an elastic covering on a portion thereof and a metallic coating on the balance or other desired parts thereof, specifically preferably a rubber elastic lining on the interior thereof and a rust proof layer on the exterior thereof. Thus by employing a steel tank having a smooth rubber covering vulcanized to the interior thereof and an electrodeposited layer of rust proof metal such as cadmium on the exterior thereof, I am enabled to provide a relatively cheap rust proof tank superior to other types of tanks for laundry machines or other purposes now on the market.

A further feature of my invention resides in my method of making such a rust proof tank which so far as I am aware has not hitherto been employed in this specific application of manufacturing tanks with a metallic outer covering, namely that of a covering of rubber vulcanized to a portion thereof such as the interior will act as a resist to prevent electrodeposit of the metal layer thereon. It is thus possible therefore to first cover the desired portion of the tank with a

rubber layer and then to immerse the entire tank in an electro-plating bath without any additional later step of removing the electrodeposit from the desired elastic rubber surface.

These and such other objects of my invention as may hereinafter appear will be best understood from a description of the accompanying drawings which illustrate various 10 embodiments thereof.

In the drawings, Fig. 1 is a perspective view of a modern type of automatic electrically driven washing machine with the tank thereof partially broken away to show the agitating means and rubber lining on the exposed surface of the interior of the tank and said 15 agitating means.

Fig. 2 is a sectional view through the tank with the agitating means shown in section.

20 Figs. 3-7 illustrate various steps in the process of manufacturing my improved metallic outer lined and elastic interior lined tank, Fig. 3 being a diagrammatic sectional view of a plain steel tank, Fig. 4 being a diagrammatic sectional view of said steel tank having a thin rubber layer laid adjacent the interior surface thereof, Fig. 5 being a diagrammatic sectional view of such a tank having the rubber lining vulcanized to the 25 inner surface thereof, Fig. 6 being a diagrammatic sectional view of such a rubber lined tank having a layer of metal electrodeposited on the exposed surface thereof and Fig. 7 being a sectional view of a complete tank.

30 In the drawings, wherein like characters of reference indicate like parts throughout, 35 generally indicates a modern type of electrically driven automatic washing machine having the usual clothes tank 12, and the 40 usual agitator 14 in the interior thereof suitably oscillated in opposite directions by the oscillating gearing 16 driven in any suitable manner by the motor 18. If desired a wringer 20 suitably driven by the additional gearing 22 may be attached to the top thereof.

45 As stated my invention specifically includes such a washing machine containing the tank 12 adapted to receive clothes in a cleaning liquid 24 having suitable agitating means for 50 said clothes contained within, such as the agitator 14, all parts of said tank 12 and agitating means 14 normally in contact with the clothes during the operation of the machine having a smooth resilient covering.

55 As stated hitherto much of the wear and tear of the modern type of automatic washing machines on the clothes has been due to the metallic or wooden surfaces thereof rubbing and striking against the clothes to tear and 60 wear them. As I preferably cover the agitating means and the interior of the tank with an elastic surface I provide a novel method of washing clothes which comprises effecting a contacting engagement of the clothes with the smooth resilient surfaces thereof

while immersed in the cleaning liquid. While any type of elastic surface may be employed on the interior of the tank I preferably vulcanize a thin layer of rubber thereto for this purpose. This in addition provides 70 a slippery surface which results in the clothes not sticking or becoming torn and in a more thorough agitation thereof and it is well known in addition that a rubber surface is acid proof and proof against strong alkalies 75 as are often present in the present day type of laundry soaps, or cleaning substances often employed.

80 A further feature of my invention consists in covering the agitating or other means employed contained within the tank normally in contact with the clothes with a similar elastic surface with the same advantages portrayed above for the interior surface of the tank and I provide the elastic lined agitating means in combination with a tank having an elastic lined interior to more effectively 85 secure said advantages.

86 As shown more particularly in Fig. 2 most washing machine tanks are provided with a hole 26 in the base thereof adapted to receive a bearing 28 for mounting an agitator shaft thereon provided with a circumferential flange 30 overlapping the interior of the tank above said hole and secured to the base 90 32 of the tank around said hole preferably by means of the bolts 34. When my improved elastic covering 36 on the base of the tank is employed, it thus may additionally serve as a washer for said flange thus eliminating the 95 necessity of the usual additional separate washer.

100 As stated hitherto my invention relates in addition to a novel type of metal coated tank 105 preferably one which is rust proof specifically adapted for use in washing machines and its improved method of manufacture. I am thus enabled to provide a tank adapted for various uses having a smooth rubber covering on a portion of the surface thereof and a metallic layer coated on the outer surface thereof specifically the smooth rubber covering 36 vulcanized to the interior thereof and the electrodeposited metallic layer 37 on the exterior thereof. The electrodeposited metallic layer preferably consists of a rust proof metal to make the entire tank rust proof. 110 Figs. 3-7 illustrate my improved method for covering such a tank. In Fig. 3 I have shown the tank 12 which is preferably manufactured of steel to which rubber may be readily vulcanized. I then as shown in Fig. 4 lay a rubber layer 36 around the desired portion of the interior thereof and as shown in Fig. 5 I preferably suitably vulcanize the rubber layer to the interior of the tank 12 in a suitable vulcanizing mould 38 heated by the steam introduced through the pipe 42. I have discovered that such a lining of rubber will serve 115 as a resist to prevent the electrodeposit of 120 125 130

metal on such a rubber surface and I have discovered that it is therefore possible to electrodeposit a metallic layer such as a rust proof cadmium layer 37 on the surface of said tank 5 not covered by said rubber layer in an ordinary electroplating bath. Fig. 6 diagrammatically illustrates such a tank 12 covered with the rubber lining 36 vulcanized to the interior thereof being electroplated with a 10 metallic layer from the anode 44 to the cathode which in this case consists of the metal tank 12 itself preferably suitably mounted during electroplating on the standard 46. The electrodeposited layer 37 of the desired 15 thickness may be suitably coated thereon in the usual manner by varying the strength of the bath, the voltage of the electroplating current and the time of the electrodeposit. Fig. 7 illustrates a tank subjected to the 20 process just described in finished form. It is obvious that such a tank is entirely rust proof having the rubber layer 36 vulcanized to the interior thereof, and the rust proof metallic layer 37 vulcanized to the exterior 25 thereof and it is also obvious that such a tank is adapted for use in laundry machines with the splashing of washing and damage of rust staining the clothes attendant therein.

It is thus obvious that I have provided a 30 novel type of washing machine, a novel type of tank for use therein, a novel type of agitator for use in washing machines preferably in combination with said elastic lined tank, a novel tank adapted for use in any purpose having an elastic lined portion and a metal coated portion and the novel method of 35 its manufacture.

It is understood that my invention is not limited to the specific embodiment shown or 40 methods described and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What I claim is:

45 1. A clothes washing machine comprising a tank adapted to receive a cleaning liquid and agitating means for said clothes contained within, all parts of said tank and agitating means normally in contact with the clothes 50 during the operation of the machine having smooth resilient surfaces.

55 2. A clothes washing machine comprising a tank adapted to receive a cleaning liquid and agitating means for said clothes contained within, all parts of said tank and agitating means normally in contact with the clothes during the operation of the machine having a smooth thin rubber covering vulcanized thereto.

60 3. In a washing machine, a washing tank having a smooth resilient lining on the interior thereof and a hole in the base thereof and a bearing for mounting an agitator shaft having a flange secured to said base around 65 said hole and overlapping said lining where-

by said resilient lining may serve as a washer for said flange.

4. In a washing machine, a washing tank having a smooth thin rubber lining vulcanized to the interior thereof and a hole in the 70 base thereof and a bearing for mounting an agitator shaft therein having a flange secured to said base around said hole and overlapping said lining, whereby said rubber lining may serve as a washer for said flange. 75

In testimony whereof I affix my signature.

GEORGE R. KELTIE.

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