

Nov. 14, 1939.

F. DEWHURST

2,180,225

LAUNDRY MACHINE

Filed April 9, 1936

6 Sheets-Sheet 1

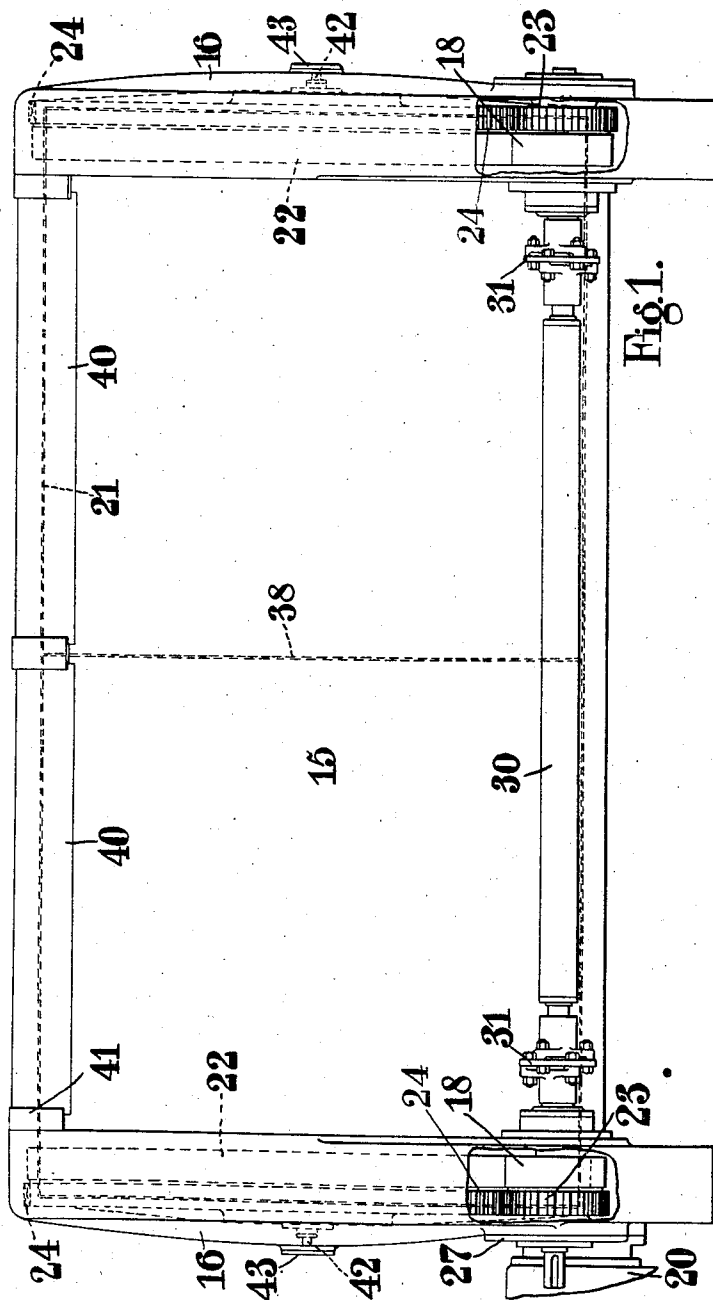


Fig. 1.

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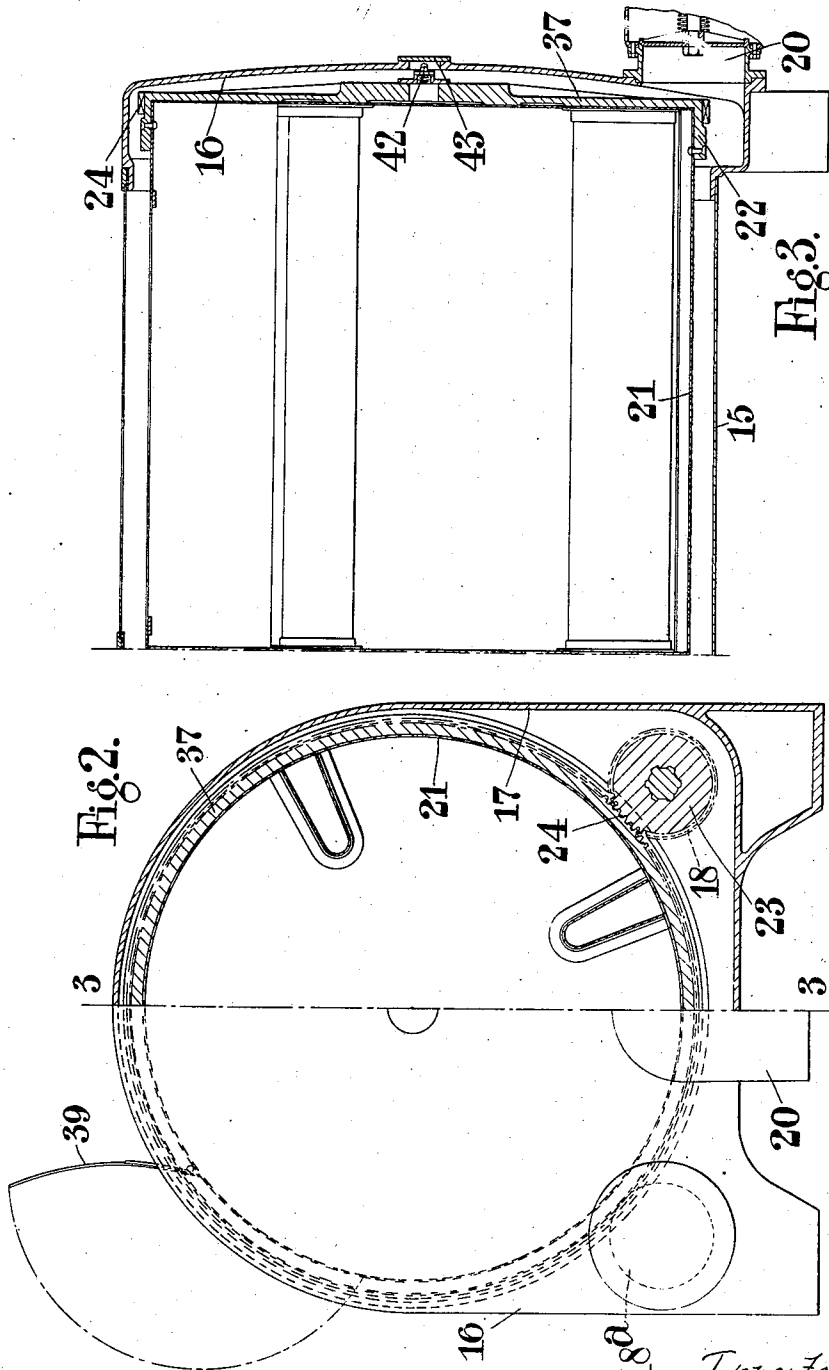
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6 Sheets-Sheet 2



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6 Sheets-Sheet 3

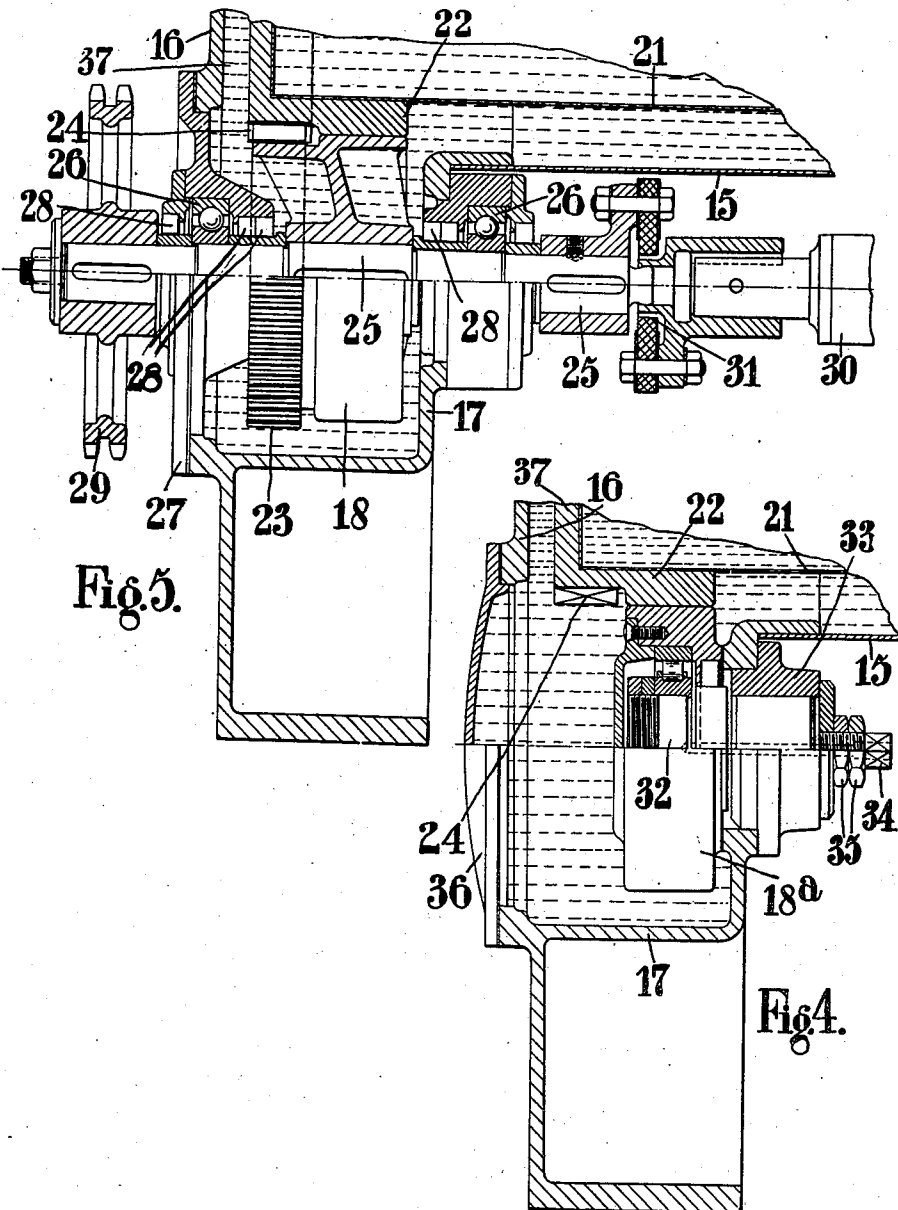


Fig. 5.

Fig. 4.

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6 Sheets-Sheet 4

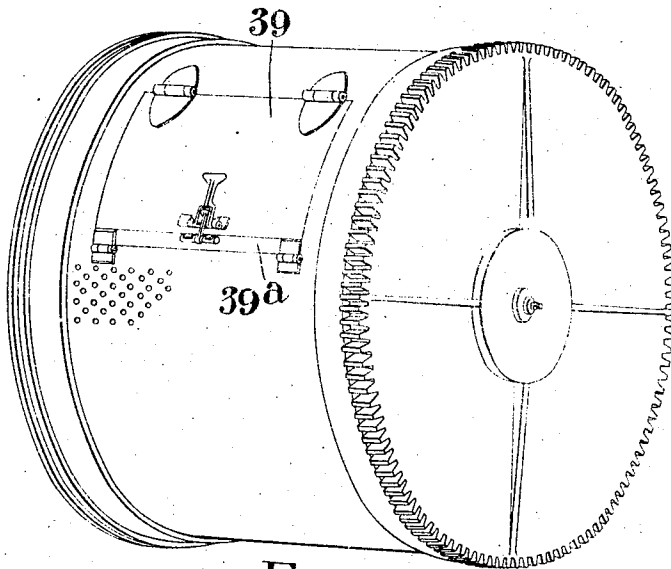
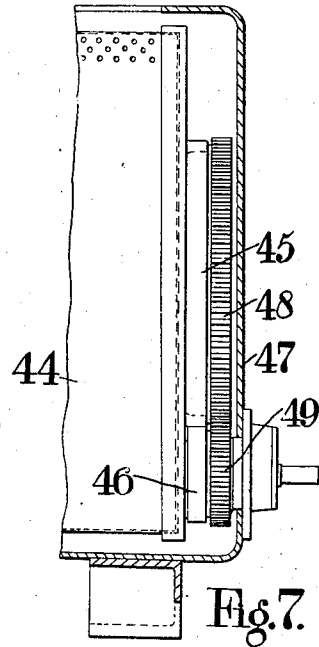
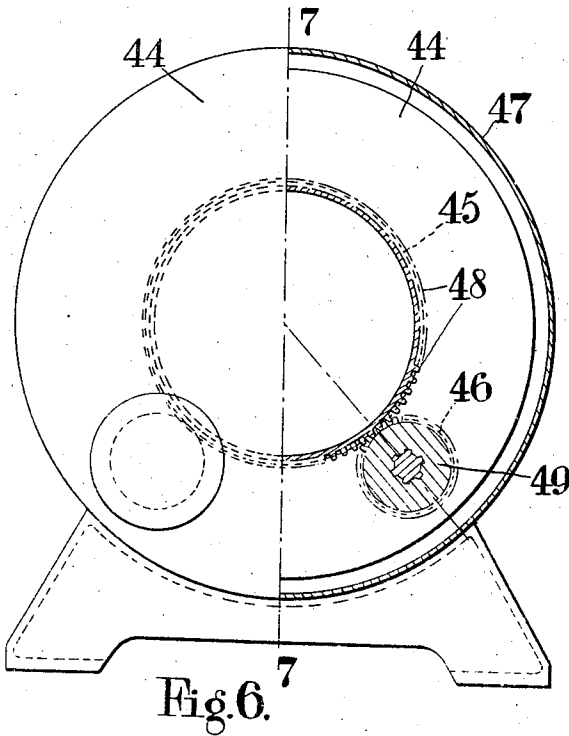


Fig. 13.

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LAUNDRY MACHINE

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6 Sheets-Sheet 5

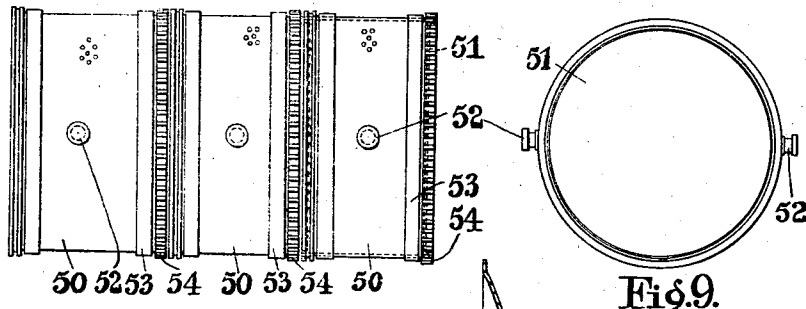


Fig. 8.

Fig. 9.

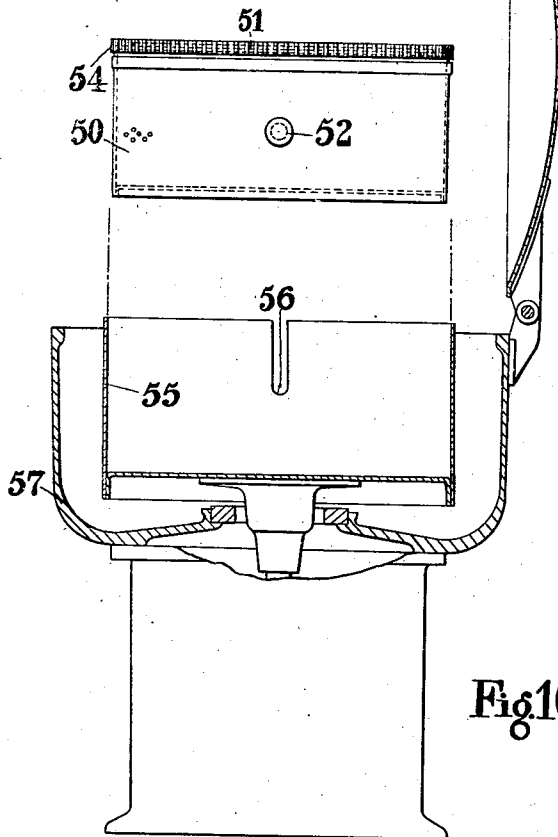


Fig. 10.

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LAUNDRY MACHINE

Filed April 9, 1936

6 Sheets-Sheet 6

Fig. 11.

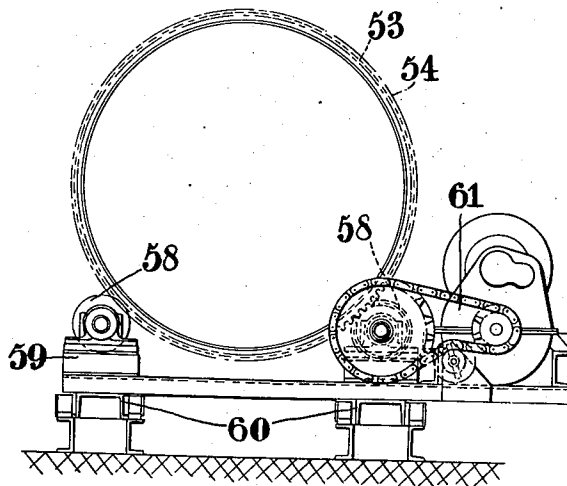
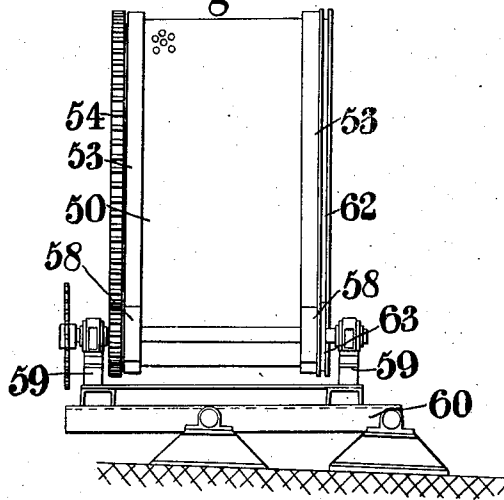


Fig. 12.

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UNITED STATES PATENT OFFICE

2,180,225

LAUNDRY MACHINE

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Application April 9, 1936, Serial No. 73,563
In Great Britain April 15, 1935

2 Claims. (Cl. 68—27)

This invention has reference to laundry machines and relates to improvements in washing machines, hydro-extractor means and shaking machines for disentangling clothes or materials after extraction of moisture therefrom.

An object of the present invention is to provide an improved drum construction and driving means which simplifies manufacture and lowers manufacturing costs and, moreover, provides convenience in working the machine and in handling the clothes or materials.

An aim of the invention is to eliminate the use of trunnions on the washing drum and trunnion driving means and to substitute supports and driving means which lessen the torsion or like strains imposed, thus increasing the life of the machinery and decreasing upkeep costs.

A further aim of the invention is to provide unitary clothes container means adapted to replace the usual perforated or inner washing drum and such as may be subsequently utilised for hydro-extraction purposes and may further, if desired, be employed in the shaking process, with the result that the labour of handling the clothes is reduced to a minimum.

According to the invention the outer stationary washing drum or casing of a washing machine, in its lower part, is provided with an extension (or extensions) in which a plurality of wheels are located and immersed in the washing water and on which the periphery of the perforated or inner washing drum is revolvably supported. The drive may be frictional and communicated through one pair of supporting wheels; these wheels may be circumferentially grooved and adapted to engage a co-operating rib on the drum periphery. Alternatively, a toothed wheel may positively engage a toothed band upon the drum for the purpose of communicating rotation thereto.

The shaft of the driving wheel (or wheels) passes out of the washing machine through a gland and may be driven by any suitable gear from a power source to revolve the inner drum or communicate reversing revolution thereto.

The invention also consists in the provision of a plurality of removable drum-like containers, adapted to be accommodated end to end in the stationary casing, and each of which is adapted to be rotatably supported and driven by wheels within the washing machine casing. Each drum may be provided with a removable compartment forming element (or elements) and is provided with a peripheral door or with a removable end closure means. After use in the washing ma-

chine these drums may be taken out and mounted for the centrifugal extraction of moisture as in hydro-extractor practice. Furthermore, after extraction the drums may be remounted on appropriate supporting means and adapted to act as shakers for disentangling the clothes.

In the accompanying drawings

Figure 1 is a longitudinal outside view, with parts broken away, of the rear of a washing machine according to the invention.

Figure 2 is an end view, partly in section, looking from the left in Figure 1.

Figure 3 is a longitudinal section on the line 3—3 of Figure 2.

Figure 4 is a detail section showing a drum supporting wheel.

Figure 5 is a similar view showing a drum supporting and gear drive wheel.

Figure 6 is an end view partly in section of a modified arrangement of supporting and driving the washing drum.

Figure 7 is a partial section on the line 7—7 of Figure 6.

Figures 8 and 9 are longitudinal and end views of a drum assembly comprising a plurality of drum units.

Figure 10 is an elevation partly in section illustrating the use of a drum unit for extracting purposes.

Figures 11 and 12 are side and end elevations showing a drum unit adapted for shaking purposes.

Figure 13 is a perspective view of a drum unit having a peripheral loading and unloading door.

In carrying the invention into effect according to one convenient mode as described by way of example (see Figures 1 to 3) the outer washing drum or stationary casing of a washing machine comprises a central cylindrical portion and end closure members 16 having supporting feet 16a. Each end closure member at the lower part thereof is provided with lateral extensions 17 (or a common base extension) for the purpose of housing a pair of axially spaced wheels 18 and 18a upon each side of the machine together with shafts or trunnions therefor. Between the extensions at one end of the stationary casing an outlet orifice 20 may be provided for emptying the washing liquid out of the machine. The extensions (or extension) may also include accommodation for various inlets, such as for water, steam, and soap and soda solutions.

The wheels 18 and 18a afford rolling support for the inner perforated drum 21 by engagement with the periphery thereof or with bands 22 se-

cured to the periphery adjacent to the ends of the drum. The wheels may be plain or may be made with a series of circumferential grooves in which case the bands 22 upon the inner washing drum are provided with co-operating circumferential projections. A drive to the inner drum 21 is communicated by the pair of wheels 18 upon one side of the drum, while the pair 18a on the other side are idle supporting wheels or rollers. The drive may be by friction but preferably a positive geared drive is provided.

Referring to Figure 5, each driving wheel 18 is provided with an integral spur pinion 23 which meshes with a gear wheel 24 which is formed on the outer circumference of the band 22. The driving wheels 18 are mounted upon a shaft 25 which is supported in bearings 26 carried respectively by one wall of the extension 17 and a removable cover plate 27. Suitable packing means 28 are provided to prevent egress of washing liquid from the stationary casing 15 and to protect the ball or roller bearings. The outer end of one of the shafts 25 is provided with a chain wheel 29 by which power is applied for rotating or oscillating the washing drum.

The chain wheel may be driven by a separate electric motor or from a reversing or other driving shaft common to a series of washing machines through clutch means operable by a lever adjacent to the machine.

The inner ends of the shafts 25 are coupled together rigidly by an intermediate coupling shaft 30 or as shown by flexible couplings 31.

The idle supporting wheels 18a may be carried by shafts similarly to the driving wheels 18. Preferably however they are arranged as shown in Figure 4. Thus the wheels 18a are carried by stub shafts 32 by the aid of roller bearings. The shafts are mounted in bearing elements 33 secured to the inner walls of the extensions 17. The ends of the shafts located in the bearings 33 are eccentric to the parts of the shafts supporting the wheels and are adjustable in the bearings 33 being provided with squared ends 34 and locking nuts 35. By this adjustment the wheels 18a may be correctly disposed relatively to the drum. Removable covers 36 are provided in the extensions 17 giving access to the wheels 18a for inspection or repair.

The inner perforated drum 21 is provided with end plates 37 which may be perforated or of spider like form and on which the rolling bands 22 and gear teeth 24 are provided. The drum 21 is divided by a partition 38 into two compartments which are provided with loading and unloading doors 39. The free edge of the door may be provided with a hinged locking flap 39a as indicated in Figure 13. The stationary casing is provided with curved sliding doors 40 mounted in the guides 41.

The longitudinal positioning of the washing drum may, as above stated be obtained by co-operating grooves and projections on the wheels 18, 18a and the bands 22 or where these surfaces are plain as shown, the position of the drum axially may be secured by thrust rollers or by studs or bosses 42 arranged coaxially on the drum and adapted to engage if necessary, plates 43 on the end members 16 of the stationary casing.

While it is preferred to impart the drive to the drum 21 at the end (or ends), such could be obtained by a central or intermediate pinion engaging a toothed central or intermediate band on the drum, the outer casing being provided with

the necessary extension or pocket to accommodate the central or intermediate pinion.

Instead of the end member 16 being formed or shaped to provide the lateral extensions, the end members may be of circular shape and extensions or boxes being applied thereto at the appropriate places, apertures being provided in the walls of the end members through which the supporting and driving wheels make contact with the drum.

According to a modified arrangement as shown in Figures 6 and 7, the supporting and driving wheels may be arranged within the perimeter of the washing drum. In this form, the washing drum 44 is provided at its ends with axially extending flanges 45 of less diameter than the drum. These flanges rest upon supporting wheels 46 mounted upon shafts or trunnions supported by the end discs 47 of the stationary casing. Where a positive drive is required one or both flanges 45 is provided with a toothed ring 48 meshing with pinion 49 associated with the appropriate supporting wheels.

It will be appreciated that a reciprocal of the above modification consists in hanging the inner drum upon supporting and driving wheels by the aid of the inner periphery of the annular flanges or toothed rings. In this form the supporting and driving wheels would be located at the upper part of the machine end castings instead of in the lower part of the machine and these wheels would be located within the spaces circumscribed by the flanges.

The ends of the inner drum might be outwardly dished to form a circular boss of larger diameter to provide a circular track and gear either for the lower or upper supporting and driving wheels.

With the forms of the invention above described it will be appreciated that the inner or washing drum is adapted to be permanently mounted within the stationary casing. It may however be removable therefrom, in which case the stationary casing would be divided about a horizontal diametrical plane, the upper half of the casing being hinged to the lower half or otherwise mounted to facilitate opening.

In carrying the invention into effect according to another mode for the purpose of providing a unitary container or basket usable for washing purposes, hydro-extraction and shaking, an outer drum of the character described in the previous paragraph is adapted to receive a series, for example, three independent perforated or reticulated inner drum units or containers 50 (Figure 8) so that together they comprise a multi-section inner washing drum. Each of these drums comprises a short cylinder having a removable end closure or closure plate 51 which may be hinged or fitted into position. Alternatively, the drums may have a fixed end closure in which a door is mounted. Where doors in the side are provided interlocking means may be provided between the drum units for preventing relative rotation to avoid their door working out of register in the case where the drums are driven by friction. Each drum unit is provided with a pair of lifting lugs 52 or other lifting means and each is also provided with peripheral bands 53 towards its ends for engaging supporting and driving wheels corresponding to those above described. In this case in question, there being three drums, there will be six supporting wheels upon each side of the machine and on one side there will be three driving pinions meshing with the toothed rings 54.

According to an alternative mode of giving ef-

fect to the unitary system, the washing machine may be provided with a frame or skeleton drum at the ends of which driving and supporting bands are located. This skeleton is carried on supporting and driving wheels as already described and is adapted to receive a plurality of perforated portable drums or compartments end to end and locking or positioning means are provided for retaining the drums in position during the rotary washing process. This arrangement has the advantage that it avoids the necessity of providing supporting and driving wheels for each of the portable drums. The skeleton frame or holder may alternatively be provided with end ring flanges for resting upon the supporting and driving wheels as already described in connection with the single inner washing drum form (Figures 6 and 7).

Each of the drums may be provided with internal removable division plates or a removable spider adapted to divide the drum into compartments.

For the purpose of utilising the inner or portable drums for centrifugally extracting moisture from the clothes after the washing process has been effected the drums are lifted out of the washing machine and placed on a supporting spider or frame or basket 55 (Figure 10) with their axes vertically disposed and coinciding with the axis of revolution of the spider or frame, a driving connection between a drum 50 and the basket is provided by the engagement of the lifting lugs 52 in slots 56 in the frame or basket 55. The spider or frame, with the drum in position, is enclosed by an outer casing 57 of the type usual in hydro-extractors. It will be appreciated that, by rapidly revolving the drum 50, the clothes which it contains will be subjected to centrifugal action and be deprived of their moisture by its ejection through the perforations in the drum according to the principles employed in hydro-extraction. After treatment the internal partitions (or spider) if such be used are removed and the clothes may be lifted or tipped out. However, the invention affords opportunity for carrying out a still further step in the treatment of the clothes with facility and without requiring unloading the drums. After the partitions (or spider) have been removed a drum unit 50 may be mounted on peripheral driving or supporting rollers 58 (Figures 11 and 12) like those already described but positioned to support the drum

unit, on an inclined axis so that as the drum revolves the clothes are tumbled about and discharged at the lower end due to the rotation and inclination of the drum.

The supporting and driving rollers 58 are carried in bearing 59 mounted on an inclined platform 60. A driving unit 61 is provided for the driving wheels 58.

Where the drum units have circumferentially grooved bands 62 their inclined location will be maintained by the co-operation of such grooves with a projecting rim 63 on a supporting wheel 58 and where plain bands are employed thrust rollers may be provided to engage a flange, an end, or a margin of one of the bands of the drum units.

I claim:

1. A laundry washing machine to be used with a hydro-extractor having a rotary basket, and comprising an outer stationary casing for containing the washing liquid, a closure for said casing providing an opening at the upper part, supporting and driving wheels located within the outer casing, a plurality of inner perforated washing drums located end to end within the outer casing and supported by their peripheries on said wheels, said drums having means adapted for engagement by lifting mechanism to facilitate the removal of the drum from said casing upwardly through said opening, said means forming pivots about which the drum when removed from the casing may be pivoted to a position in which its longitudinal axis is vertical, said means also forming abutments adapted to engage surfaces on the rotary basket of the hydro-extractor to form a driving engagement therewith.

2. A laundry washing machine comprising an outer stationary casing for containing the washing liquid, a closure for said casing providing an opening at the upper part supporting and driving wheels located within the outer casing, a plurality of inner perforated washing drums located end to end within the outer casing and supported by their peripheries on said wheels, each drum having lifting trunnions located on a diameter at right angles to the longitudinal axis of the drum, said trunnions being adapted to engage driving slots in the rotary basket of a hydro-extractor.

FRANK DEWHURST.