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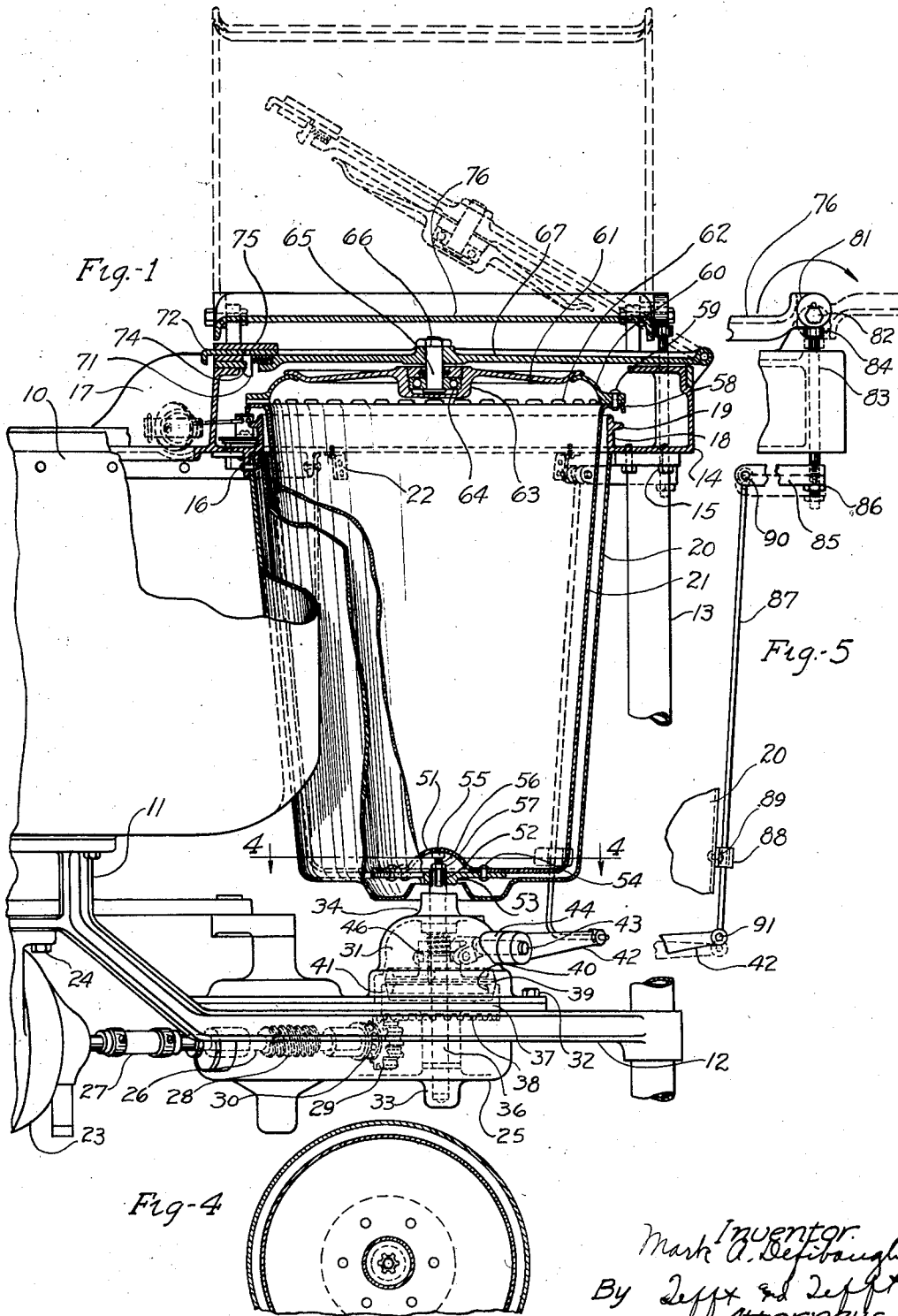
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WASHING MACHINE

Filed Dec. 22, 1926

2 Sheets-Sheet 1



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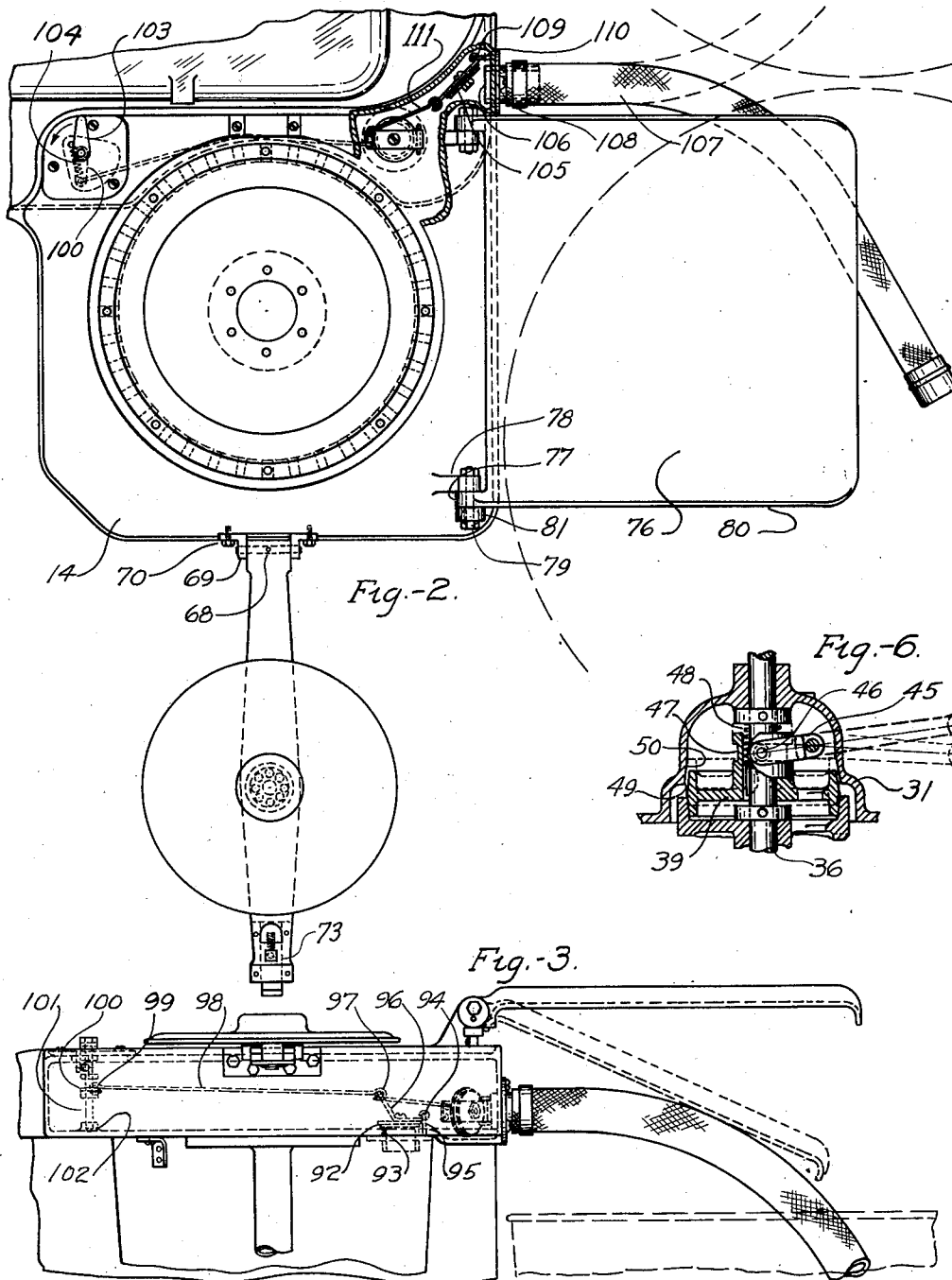
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UNITED STATES PATENT OFFICE

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WASHING MACHINE

Application filed December 22, 1926. Serial No. 156,300.

This invention relates to a device for drying clothes.

The invention includes a revolving clothes containing basket and a housing therefor, including special fashioning of the basket and a relationing of the same to its exterior housing, and also includes driving means for the basket.

The invention includes novel means for supporting and maintaining a revoluble basket in relation to a driven member, and adjusting means in connection therewith for vertical projection and retraction of the basket with respect to its support.

The invention includes, in conjunction with an upwardly tapered, non-foraminated basket, a fluid chamber for receiving fluid discharged from the basket, deflector baffle means in connection with the fluid chamber to prevent overflow therefrom into the basket housing member, and outlets from the liquid receiving chamber optionally to an adjacent and related tub member, and to other exterior points with respect to the fluid receiving chamber, and the washing machine tub.

The invention includes a closure member for an opening in the top of the basket, a relatively stationary locking bar support therefor, including a relationing of closure member and bar, to facilitate turning of the basket and lid with respect to the stationary bar, and to effect centering of the basket in conformity to its driving axis and in a relationship to prevent lateral shift of the upper portion of the basket.

The invention includes a superposed closure member adapted for selective service in covering of the locking bar, the fluid receiving chamber and the closed basket during drying activities, and for removal as a cover, when the drying activities have ceased and the basket is opened, for service as a drip board intervening between the basket and adjacent rinse or bluing tub.

The invention includes means automatically active, upon the raising of the closure member, to break the driving connection to the basket supporting and driving shaft, and coincidentally to apply brake action thereto

to quickly terminate basket rotation and reversely, upon closure of the closure member, to release said brake connection on said basket supporting and driving shaft and to effect driving connection thereto from the driving means.

The invention includes generally relatively contributing combinations of parts to the end of developing certain improved results in connection with centrifugal drying apparatus.

Referring to the drawings—

Fig. 1 is a side elevation of the device, partly in section, and partly in duplicate position showing of certain parts, and including a diagrammatic showing of associated tub and certain gear mechanisms;

Fig. 2 is a plan view of the device showing the basket cover and locking bar and drip board in open or relief association with respect to the top of the basket housing and fluid receiving chamber, with parts broken away angularly with respect to vertical lines through the wall portions of the top covering parts and including dotted line showing to disclose certain outlet valve features and showing of related washing tub, partly in section, and also showing, partially in dotted lines, arrangement of rinse and bluing tub with respect to the washing tub and drying receptacle;

Fig. 3 is a side elevation of the top portion of the centrifugal drier, wherein a top covering member is shown in different opened positions, and including a diagrammatic illustration of a tub for rinse or bluing water;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1, and showing spline and groove relationing of a basket member to the driving shaft and a pin support for the basket;

Fig. 5 is a detail view showing shifting means controlled by the movement of a cover member to effect selective release or driving action of a basket support and driving shaft; and

Fig. 6 is a detail view showing a clutch and brake mechanism co-operatively related to the shifting means shown in Fig. 5.

Referring to the drawings, there is shown in Fig. 1 the special centrifugal extractor, the

same being disclosed in connection with a washing machine, and as a matter of fact, it is combined therewith not only by means of a common driving connection, but also in an operative manner to increase the efficiency of the washing and drying operation and to decrease the time usually consumed in washing operations.

Although the present application is directed more specifically to the centrifugal extractor and connected portions, nevertheless there is also included connecting portions between the centrifugal extractor and washing machine tub which make necessary the showing of the washing machine, which in the present instance is designated 10.

Although the present machine has been generally referred to as 10, it is actually the tub portion of the washing machine which has been so designated. In view of the fact that the mechanism for agitating the water in the tub 10 has no relation to the present application, the same has not been disclosed.

There is a common supporting means for the washing machine and centrifugal extractor, said supporting means comprising the structural formation 11 disposed beneath the washing machine tub 10, the extended framing 12 and the vertical end support 13 disposed adjacent the centrifugal extractor later to be described. As a matter of fact, the vertical support 13 forms one of the legs of the combined washer and centrifugal extractor, and the tub portion upon the side, not shown, carries the two other legs which form the complete supporting structure. As may be clearly seen in the drawings, the framing 12 also forms the support for the driving mechanism for the centrifugal extractor, as well as for the washing machine, although the driving mechanism for the washing machine is not shown in detail in the drawings.

The washing machine tub 10 is related, or rather, connected to the centrifugal extractor 45 or drier portion by means of a fluid chamber 14, said chamber not only surrounding the upper portion of the centrifugal extractor in a manner to catch the discharge therefrom, but also providing a supporting connection 50 between the centrifugal extractor mechanism, the vertical supporting member 13 and the tub 10. This fluid chamber is fashioned, as may be clearly seen in Fig. 1 of the drawings, as an integral cast piece, the same being bolted, as at 15, to the leg portion 13, and upon its opposite side being attached in a plural manner, as shown at 16, to the washing machine tub.

In Fig. 2 of the drawings, this fluid chamber is disclosed in plan, and its connection with the washing machine tub is probably more clearly shown in that view. In other words, it is applicant's desire to connect the centrifugal drier mechanism with the washing machine mechanism in a unitary manner,

and he accomplishes this result by the above described supporting means.

The fluid chamber 14, by means of an extended portion 17, forms also the upper portion of the washing machine tub 10, which greatly adds to the unitary structural assembly of the combined washer and centrifugal drier.

Valve mechanism for controlling the passage of fluid from the fluid chamber 14 into the tub 10 has been provided and will be later described in detail in connection with the operation of the centrifugal drier.

It will be noted that the fluid chamber 14 is not only open at the top, but also is open at the bottom, the inner, upwardly projecting flange 18, however, actually forming the fluid receptacle or chamber 14. This upwardly projecting flange has a horizontally extended baffle member 19, which, as will be described more in detail later, operates to prevent the passage of fluid from the chamber 14 into the casing 20 which surrounds the centrifugal extractor or drier 21.

The casing 20, as is clearly shown in Fig. 1, is formed of a non-perforated sheet of metal and is tapered to conform exactly with the shape of the centrifugal extractor 21, and is fashioned to completely surround same, there being an opening, however, in the lower end thereof to permit the projection therethrough of the driving means for the extractor 21. The tapered casing 20 is securely attached to the fluid chamber and integral connecting member in the manner shown at 22.

As respects the means for rotating the centrifugal extractor 21, the conventional electric motor 23 is suitably connected, as at 24, to the framing 11. Also, the completely enclosed gear casing 25 is shown, which houses the horizontally disposed drive shaft 26, the same being connected to the electric motor by means of the flexible coupling 27. On the horizontal drive shaft 26 is a worm 28 which is adapted to rotate a worm gear, not shown, which in turn, through connected driving mechanism, reciprocates the water agitating means in the washing machine tub. This mechanism, however, has not been disclosed, as it forms no part of the present application.

A gear 29 is securely attached to the operating end of the horizontal drive shaft, said shaft being supported by means of a ball bearing 30 within the gear casing 25. An upwardly projecting portion of the gearing casing 25 is designated 31, the same forming a removable cover for said casing 25, and being attached thereto in the manner shown at 32. The casing 25 and the portion 31 provide bearings 33 and 34 respectively for a vertically disposed short drive shaft 36. Rotatably mounted upon the vertical drive shaft 36 is a crown gear 37 having the teeth 38 thereon meshing with the teeth on the gear 29. Means for clutching the gear 37 to the vertical drive

shaft 36 is provided in a clutch member generally referred to as 39, the same being positively connected to the drive shaft 36 and having the friction surface 40 adapted to engage a similarly shaped clutch or friction surface 41 on the upper portion of the crown gear 37. Means is provided for effecting engagement and release of the clutch member 39 with the crown gear to control the movement of the drive shaft 36. This engagement and release is effected through a lever 42 attached to a shaft 43, which is pivotally mounted, as at 44, in the gear casing cover 31. The shaft 43 projects within the cover 31 and has its engagement end bifurcated in the manner shown at 45, and also has lugs 46 thereon which provide a slidable, although operative, connection with the cut-away portion 47 of the crown gear 37. A coil spring 48 exerts tension on the clutching mechanism.

It will be noted that the clutch, which has been generally referred to as 39, has also the friction surface 49 adapted in the release clutch position to engage a similarly shaped friction surface 50 formed on the interior of the cover portion 31.

The above mechanism provides a means for effecting braking action on the vertical drive shaft 36 when the driving connection with the main drive shaft 26 has been broken by the release of the clutch. Ordinarily, we might say that rotation of the drive shaft 36 would cease upon the release of the clutch, but in the present instance, due to the fact that the centrifugal drier is exceedingly heavy, it is found that due to the inertia, the drive shaft will rotate for such time as makes absolutely necessary the provision of this braking means to stop very quickly the rotation thereof.

The upper end of the vertical drive shaft 36 projects through the opening in the bottom of the centrifugal drier casing 20 and engages a raised portion 51 on the lower end of the centrifugal extractor 21. The upper end of the drive shaft 36 is fashioned as at 52 in such manner as to engage a similarly shaped plate 53, which is securely attached as at 54 to the bottom of the centrifugal extractor 21.

As may be clearly seen, the driving connection between the shaft 36 and centrifugal extractor is effected at the above described point, although said drive shaft has the adjustable screw portion 55 which projects further and engages the raised portion 51 of the centrifugal extractor. This adjustable screw member, generally described as 55, is made up of the screw 56, which is threaded into the upper end of the vertical drive shaft, there being provided a lock nut 57 for permitting adjustment of the screw 56 and positioning thereof in any desired position.

This means for varying the position of contact between the upper end of the drive shaft and the centrifugal extractor has the follow-

ing advantages. It is absolutely essential to successful operation of a centrifugal extractor that there be no lost motion between the driving means and the balanced centrifugal extractor, and unless a quickly adjustable connection is used, as here shown, it would be absolutely necessary in assembling the various mechanisms, that the greatest care be taken in the machining of the various elements, so that there would be an absolutely perfect fit between the centrifugal driving means and the centrifugal extractor. It may be clearly seen that should such care be necessary in assemblies of this kind, great expense would be incurred and the present simple adjustment has been devised to save this expense, as well as to provide an adjustable mechanism at a point which is readily accessible to the operator. In other words, should it be found necessary to vary the position of the screw 56 to prevent any play between the driving mechanism and the centrifugal extractor, it is merely necessary to remove the centrifugal extractor and to adjust the screw and lock nut to the proper position, as can obviously be accomplished in a very few moments.

Referring now to the centrifugal extractor 21, the same is balanced in one instance at the bottom, as clearly described, and in order to insure substantially vibrationless rotation during excessive speed of rotation, which is necessary for efficiency in the driving operation, there must be provided a balancing point or bearing directly above the lower contact or balancing point. In the present instance, the centrifugal extractor 21 is tapered upwardly, as may be clearly seen in Fig. 1 of the drawings, and the upper edges of the continuous sheet are flared outwardly as at 58 to a point above and beyond that part of the fluid chamber designated 18 and 19.

Securely attached, as at 59, at points adjacent the outer edges of the before mentioned flared portion 58, is a metal ring 60, projecting upwardly and inwardly, and as a matter of fact, downwardly, to provide a receiving surface for the top 61 of the centrifugal extractor.

It might be stated at this time that the ring 60 is perforated, as at 62, in a manner substantially continuously throughout to permit passage of the fluid from the container during rotation, the fluid obviously having a tendency to rise due to the tapered formation of the tub.

The extractor top 61 is fashioned as at 63 to receive therein a conventional ball bearing 64, said bearing receiving a shaft 65 securely attached, as at 66, to a locking bar 67. Due to the above construction, it is apparent that the centrifugal extractor is balanced at the bottom and at the top, the driving means therefor being through the

vertical shaft 36 therebelow. The position of the upper bearing or balancing point 64 is determined by the lock bar 67, which is shown clearly in Figs. 1 and 2 of the drawings. This bar 67 is hinged as at 68 in brackets 69, which are securely attached, as at 70, to the fluid chamber 14 surrounding the upper end of the centrifugal extractor, and which, as previously described, has an integral connection with the top of the washing machine. The bar 67 has its actual locking portion formed on the opposite end thereof, the same including a latch 71 which is formed as a part of a member 72 slidable in guideways 73 in the end of the lock bar 67. The latch 71 projects downwardly in a manner to engage an inwardly projecting lug 74 which is formed either as a part of or attached to the upper side of the fluid chamber 14.

It is apparent that the latch 71 is held in a tensioned manner with respect to said lug by means of the spring 75. The slidable bar 72, when manually manipulated, either permits locking of the bar 67 or release thereof, as may be clearly seen in the drawings, it being necessary only to apply manual pressure thereto to release the latch 71. Raising and lowering of the lock bar also raises and lowers the top 61, and when in a locked position, establishes a frictional connection between the top 61 and the ring 60 of the centrifugal extractor. It is also apparent that when the lock bar is lowered, the top portion always assumes the same position, and it is apparent that the bearing or balancing point is also in its proper place, with the result that proper balancing of the centrifugal extractor 21 is always maintained.

In the present instance, the aim has been to insure safe operation of the centrifugal extractor. To this end, a member 76 has been provided to cover the centrifugal extractor top and lock bar when in a locked and operating position. This cover 76 is perhaps most clearly shown in Fig. 2, wherein connecting portions 77 thereof are pivoted to bracket portions 78 on the top of the fluid chamber 14 by means of the bolts 79. The cover portion 76 is therefore adapted either to lie over the lock bar and centrifugal extractor top or to be moved to an outward position, as shown clearly in Figs. 2 and 3, at which time said cover forms a drain board between the centrifugal extractor and a washing machine tub, not shown except in dotted lines, which is ordinarily placed at this point for the reception of the clothes which have just been wrung in the centrifugal extractor. The edges 80 of the cover 76 are either flared downwardly, substantially at right angles, in such manner that in one instance they operate as a contacting means between the cover and the top of the fluid

chamber 14, and in the other instance to confine the flow of fluid when the clothes are removed from the centrifugal extractor and placed in the tub adjacent thereto.

This cover portion 76 also operates as a safety member and to this end one of the members 77 has attached thereto in a fixed manner a cam member 81. This member 81 is circular in form, but is eccentrically mounted as at 82 on one of the bolts 79, with the result that raising and lowering of the cover operates but to give said member a cam like action, causing the bar 83, or rather the head 84 thereof to be depressed or permitted to rise, as the case may be, due to movement of the cover. The rod 83 is connected to the clutch lever 42 by means of a horizontally disposed member 85 securely attached to the lower end of rod 83 as at 86, said member 85 having a substantially vertically disposed rod 87 providing the connecting link between said bar and the clutch lever 42. A member 88, securely attached as at 89 to the centrifugal extractor casing 20, provides a guide means for the rod 87, said rod being pivotally connected to the member 85 as at 90 and to the clutch lever 42 as at 91.

Due to the above connection between the safety cover and drain board 76, it is impossible, in the first instance, to start rotation of the extractor until first locking of the top 60 has been effected by lock bar 67 and thereafter the cover portion moved to a position directly over the said top and lock bar portions. When the cover is placed in this position, the clutch is thrown into engagement with the gear 37, with a resulting rotation of the drive shaft 36, and hence movement of the extractor. It is apparent, also, that it is impossible to raise the top 61 of the centrifugal extractor without first raising the cover 76, with the result that when it is desired to stop the movement of the centrifugal extractor and remove the clothes from which the liquid has been extracted, it is first necessary to raise the cover, whereupon the clutch, due to the above described connecting means, is thrown to a release position with respect to the gear 37 and not only operates to disconnect the driving means for the centrifugal extractor, but due to the automatic engagement of the friction surface 49 on the clutch with the adjacent friction surface 50 on the gearing casing cover, a braking action is also automatically applied to the drive shaft 36, and therefore to the centrifugal extractor.

We might say that due to the weight of the centrifugal extractor, especially when the clothes are contained therein, and to the efficient balancing thereof, there is a tendency, upon the unclutching of the driving connection, for the centrifugal extractor to maintain a considerable speed or rotation for some time. This is very undesirable, and there-

fore applicant has provided a brake that operates automatically, upon release of the clutch, to stop almost immediately this rotation. This mechanism is also a safety measure, and as a matter of fact, when the cover 76 has been raised and moved to a position to operate as a rinse or drain board, the centrifugal extractor has either entirely stopped or at least the speed thereof has been decreased to one below the danger point when the operator finally unlatches the lock bar and raises the cover preparatory to the removal of the clothes from which the water has been extracted.

Perhaps most clearly shown in Fig. 3, is a manually operable valve mechanism to control the flow of fluid which has been extracted from the clothes in the centrifugal extractor 21, or as a matter of fact, the flow of the fluid from the fluid chamber 14, the same having accumulated therein due to the rotation of the drier. It is desirable at times to have the extracted fluid returned to the washing machine tub, and to accomplish this purpose, a valve 92 is disposed over an aperture 93 that opens into the washing machine tub, it having been previously indicated that the fluid chamber 14 was also integrally formed with the washing machine tub and is a part thereof. This valve 92 is pivotally attached, as at 94, to a bracket fixedly attached to the fluid chamber, as shown at 95, the means for raising and lowering said valve being provided in the rod 96 which is pivotally connected, as at 97, to another rod 98, which is in turn attached, as at 99, to a member 100, said member 100 being securely attached to a vertically positioned bar 101, said bar having its lower end disposed in a bearing 102 integrally cast as a part of the fluid chamber. The upper end of the bar 101 projects through the upper surface of the fluid chamber 14 and has securely attached thereto the manually operable lever 103, which may be moved in the direction of the arrow shown in Fig. 2 in a manner to raise or lower the valve 92, thereby controlling the flow of the fluid into the washing machine tub.

The coil spring 104 operates to hold the lever 103 in position. The rod 98 not only operates to raise and lower valve 92, but simultaneously controls the movement of another valve 105 which is disposed over an opening 106 in the side of the fluid chamber. A conventional hose member 107 is securely attached as at 108 to the fluid chamber in a manner to coincide with the aperture therein and to divert the fluid flow either to a wash tub or any type of drain mechanism. The valve 105 is also pivoted as at 109 to a bracket 110 securely attached to the fluid chamber 14, and there is a connecting member 111 which connects the valve 105 with the before mentioned valve 92.

Due to the above construction, with manual

movement of the lever 103 there is a valve opening movement transmitted to either of valves 92 or 105, as the case may be, with the result that one valve is always open when the other is closed, and therefore not only permitting the diversion of the fluid either to the washing machine proper or to some outside drain member, but also preventing any accumulation of fluid in the fluid chamber 14 during rotation of the drier 21.

Referring to the operation of the machine, the centrifugal extractor or drier is so associated with the washing machine as to form a substantially unitary structure therewith. It is apparent that the centrifugal extractor can be rotated only when the lock bar has been latched with the top in frictional engagement with the centrifugal extractor proper and the cover portion lowered thereover. In view of this construction, the centrifugal extractor cannot be rotated when the clothes are placed therein, and as a matter of fact, when the operator does place the clothes in the centrifugal extractor for the purpose of drying same, the lock bar and top are first lowered to latched position and the cover 76 moved to a position thereover.

With the lowering of the cover 76, the driving connection is effected, with a consequent rotation of the centrifugal extractor, whereupon the water in the wet clothes, which have just been taken from the washing machine due to centrifugal action, is thrown outwardly and thereafter, due to the tapered shape of the tub, rises upwardly, passing through the aperture 62 into the fluid chamber and therefrom either back to the washing machine tub or through the hose 107 to any conventional drain mechanism.

Following the drying operation, the operator, in order to remove the clothes, must first raise the cover 76 and upon this raising of the cover, through the connected mechanism with the clutch, first the clutch is disengaged and automatically there is set up a braking action which operates immediately to effect a cessation of rotation of the centrifugal extractor, which has a normal tendency to maintain a high degree of speed for a considerable time. By the time the cover 76 has been thrown to its outward or drain position, the centrifugal extractor has stopped and the operator may safely unlatch the lock bar and raise the cover, thereafter removing the completely dried garments.

The operation of the mechanism for controlling the flow of the fluid from the fluid chamber is thought apparent from the description, but it might be said that mere manual movement of the lever 103 effects opening or closing of either valve desired, and therefore diversion of the fluid to the washing machine tub or some drain member.

What I claim is:

1. In a device of the character de-

scribed, in combination, a centrifugal extractor comprising a tapered, imperforate basket, a casing surrounding said basket, a fluid chamber at the upper end of the casing and surrounding the top of the basket, driving means projecting through said casing and engaging the bottom of said basket, a ring secured to the upper edge of the basket and providing openings therebetween, a top for said basket, a locking bar providing a bearing support for the top, said locking bar having a pivotal connection with the fluid chamber at one end in a manner to permit the raising and lowering of the top, and locking mechanism disposed upon the opposite end adapted to secure the locking bar to the fluid chamber.

2. In a device of the character described, in combination, a centrifugal extractor, driving mechanism for the extractor disposed therebelow and permitting vertical removal of the extractor therefrom, a top for the extractor, an upper bearing support for the extractor disposed medially of the top, and an adjustable connection between the driving mechanism and the bottom of the extractor, said adjustable mechanism adapted to be manually adjusted upon vertical removal of the extractor to effect an efficient connection between the driving mechanism and the bearing supports for the extractor.

3. In a device of the character described, in combination, a centrifugal extractor, driving mechanism for the extractor disposed therebelow, a medially disposed bearing support for balancing and sustaining the extractor at its upper end, and an adjustable connection between the extractor and driving mechanism, permitting manual variance thereof to effect a close frictional connection between the driving mechanism and the extractor.

4. In a device of the character described, in combination, a centrifugal extractor, said extractor including an imperforate basket, a series of discharge openings surrounding the upper edge of said basket, a fluid chamber disposed about the upper edge of said basket, and being adapted to receive the fluid discharged therefrom, said fluid chamber having openings therein, valve members disposed over said openings, and manually operable lever mechanism for controlling the movement of said valves in such manner that one of said valves is always closed while the other is open.

5. In a device of the character described, in combination, a centrifugal extractor, a fluid chamber adapted to receive the discharge from said extractor, said fluid chamber having openings therein, valved members controlling the passage of fluid through said openings and lever mechanism connected to said valves, said lever mechanism operating

in a manner to simultaneously open one valve while the other is closing.

6. In a device of the character described, in combination, a centrifugal extractor, driving mechanism disposed below said extractor a top for the extractor, a pivoted locking bar for said top, said locking bar providing a bearing support for the top at a point intermediate its length, a clutch member included in the driving mechanism for controlling the movement of said driving mechanism, a cover for the extractor, and connecting means between the cover and clutch mechanism adapted to unclutch the driving mechanism for the extractor when the cover member is raised.

7. In a device of the character described, in combination, a centrifugal extractor, driving mechanism disposed below the extractor, a top for the extractor having a bearing support disposed medially thereof, a pivoted locking bar disposed over the extractor and preventing the same from being removed when said bar is in locked position, a clutch including the driving mechanism, a combined extractor cover and drain board, and connecting means between the cover and clutch adapted to control the position of said clutch by the raising and lowering of said cover.

In testimony whereof I have hereunto affixed my signature.

MARK A. DEFIBAUGH.

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