Oct. 17, 1950 H. D. BROTMAN 2,526,002

CLOTHES-WASHING MACHINE

Filed July 5, 1944 3 Sheets-Sheet 1

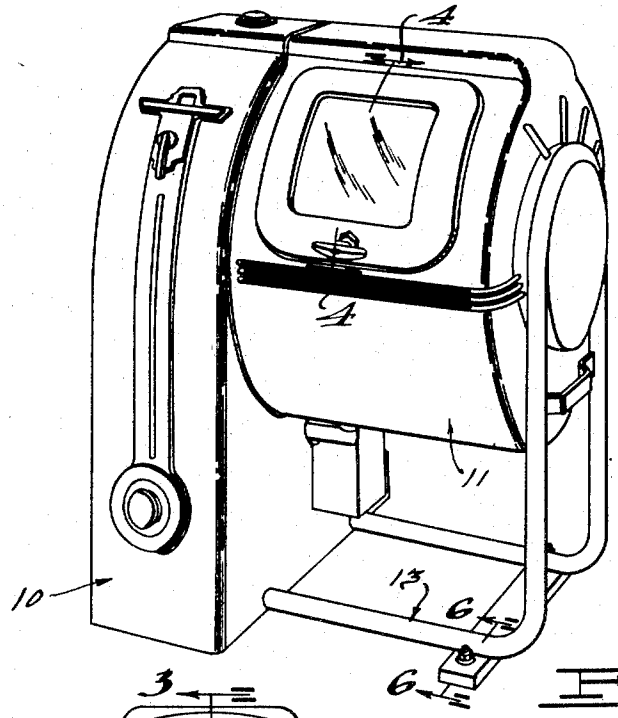


Fig. 1.

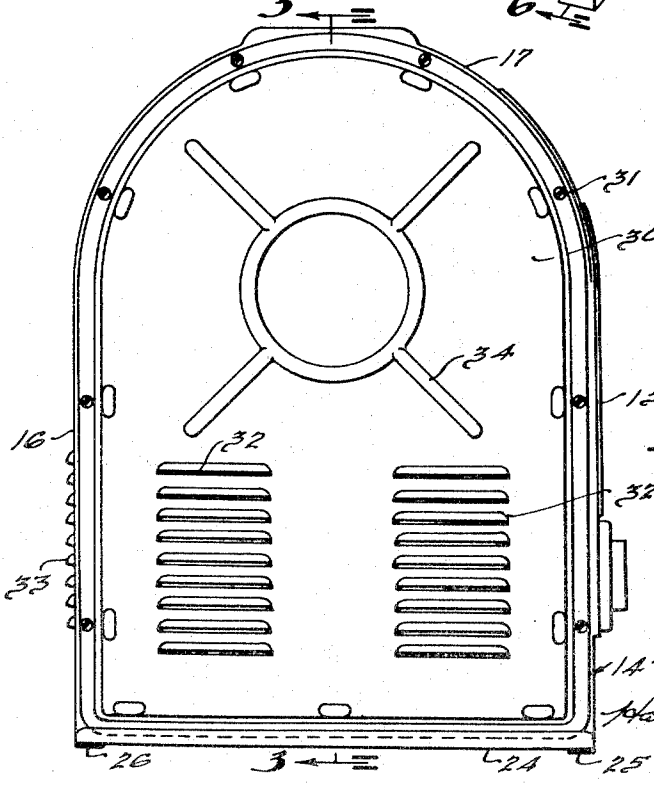


Fig. 2.

INVENTOR.
Hyman D. Brotman.
BY
Howson, Dickey & Pierce.
ATTORNEYS

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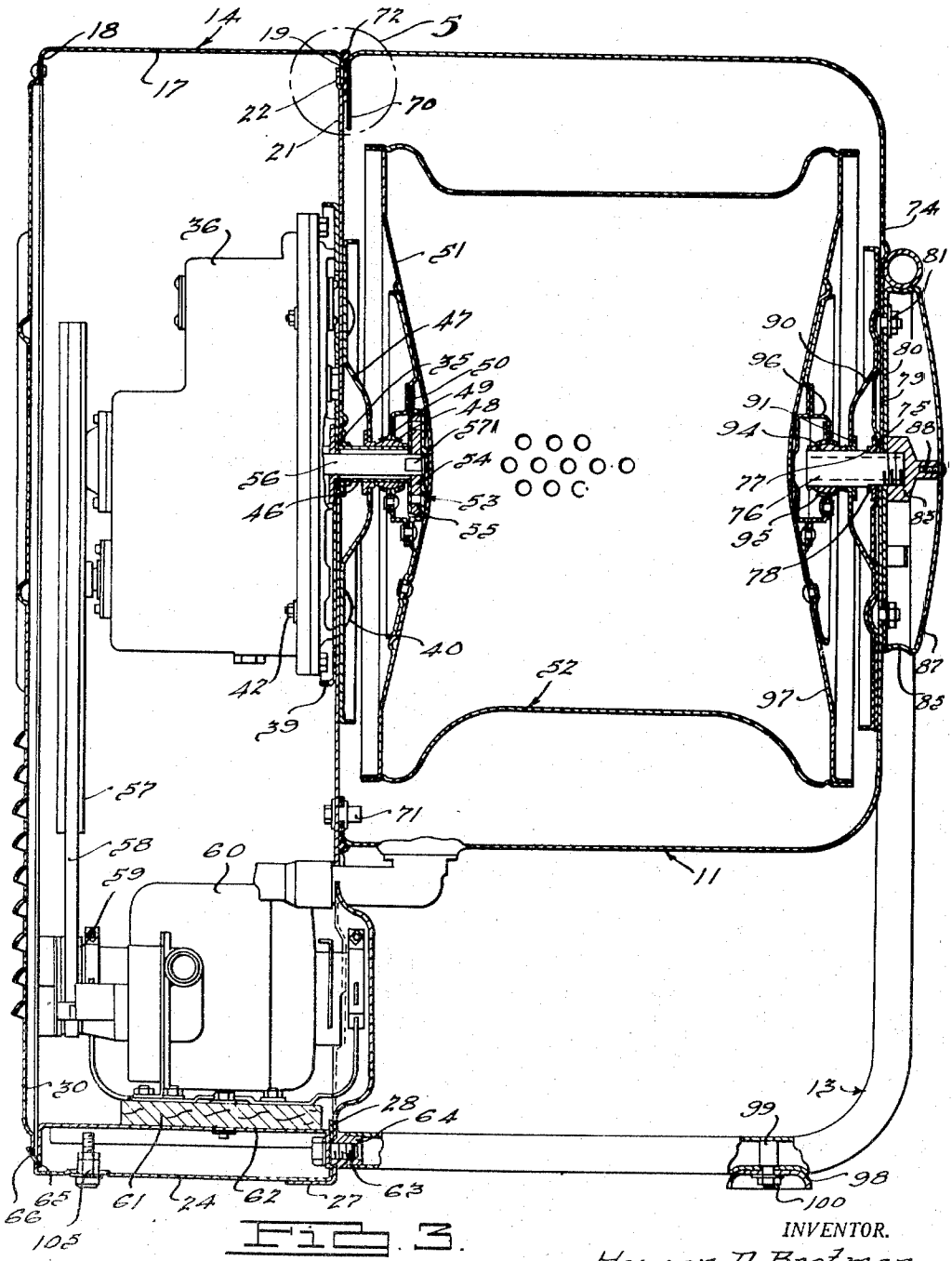


Fig. 3.

INVENTOR.
Hyman D. Brotman.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

Oct. 17, 1950 H. D. BROTMAN 2,526,002

CLOTHES-WASHING MACHINE

Filed July 5, 1944 3 Sheets-Sheet 3

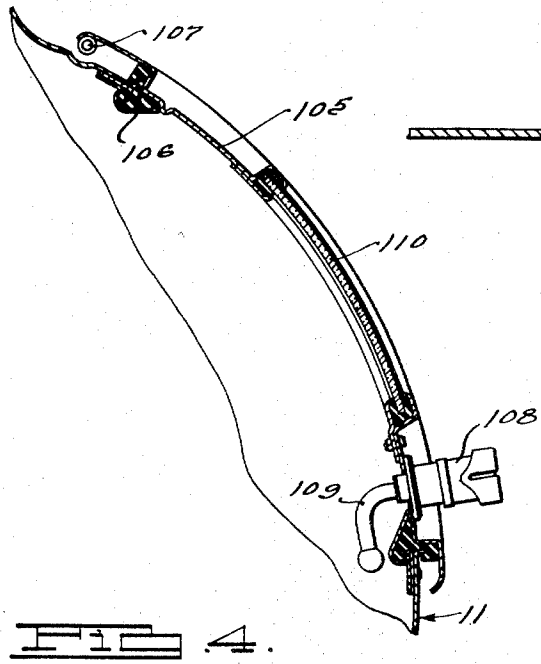


Fig. 4.

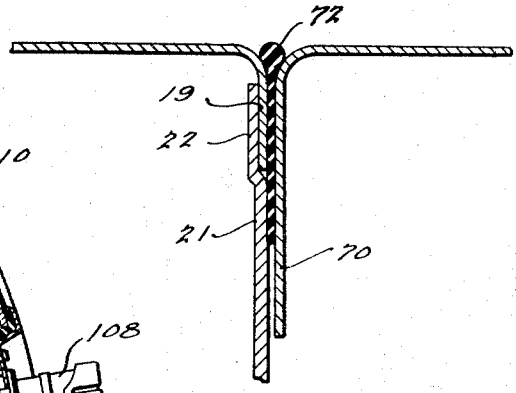


Fig. 5.

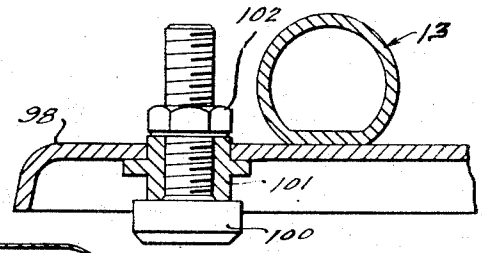


Fig. 6.

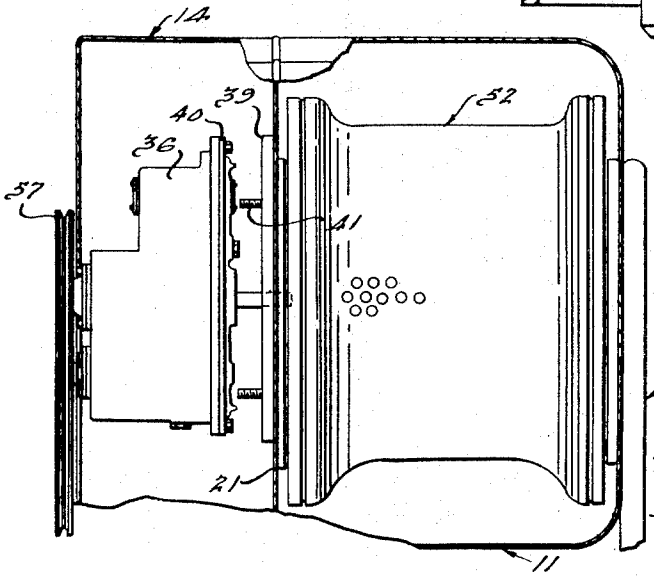


Fig. 7.

13

INVENTOR.
Hyman D. Brotman.
BY
Barness, Dickey & Pierce
ATTORNEYS.

Patented Oct. 17, 1950 2,526,002

UNITED STATES PATENT OFFICE

2,526,002

CLOTHES-WASHING MACHINE

Hyman D. Brotman, Detroit, Mich., assignor, by mesne assignments, to Horton Manufacturing Company, Fort Wayne, Ind., a corporation of Indiana

Application July 5, 1944, Serial No. 543,538

4 Claims. (Cl. 68—140)

1

The invention relates to washing machines and it has particular relation to a washing machine of the automatic type.

In the type of machine with which the invention is particularly concerned, a cylinder is employed which turns on a horizontal axis. This cylinder is adapted to receive the clothes to be washed and the machine is of such character that the clothes are automatically washed, rinsed and centrifugally dried without being removed from the cylinder. Therefore, a mechanism is operatively connected to the cylinder for effecting such movements of the latter and control of the water so as to obtain these results.

One object of the invention is to provide an improved construction of automatic washing machine having a horizontal cylinder wherein the cylinder is journalled in bearings of improved character so that the cylinder is free from any binding action that might otherwise result from misalignment of its axis relative to the drive shaft of the driving mechanism.

Another object of the invention is to provide an improved construction for supporting the bearings so that during operation of the washer, the cylinder does not vibrate or move excepting for the rotary movement imparted to it.

Another object of the invention is to provide an improved means for mounting the operating mechanism and connecting it to the cylinder so that the mechanism may be easily and quickly disengaged as a unit for the purpose of facilitating assembly, repair and replacement.

Another object of the invention is to provide an improved form of cabinet and supporting structure for housing and supporting the mechanism and cylinder which is strong and durable in character and which may be manufactured and assembled efficiently and economically.

Other objects of the invention will become apparent from the following description, from the drawings to which it relates and from the claims hereinafter set forth.

For a better understanding of the invention reference may be had to the accompanying drawings wherein:

Figure 1 is a side elevational view illustrating a washing machine constructed according to one form of the invention;

Figure 2 is an end view of the machine as seen from the left end of Figure 1;

Figure 3 is a cross-sectional view on a larger scale taken substantially along the line 3—3 of Figure 2;

2

Figure 4 is a cross-sectional view on a larger scale taken substantially along the line 4—4 of Figure 1;

Figure 5 is a detail view on a larger scale illustrating a junction of parts shown on a smaller scale in the circle in Figure 3;

Figure 6 is a cross-sectional view on a larger scale taken substantially along the line 6—6 of Figure 1; and

Figure 7 illustrates the manner in which the driving mechanism is assembled with the machine.

Referring to Figures 1, 2, and 3, the invention illustrated comprises a cabinet portion 10 which generally is employed for supporting purposes and for housing the operating mechanism, and a generally cylindrically shaped receptacle 11 in which the washing cylinder is placed. A tubular bar 13 is anchored in the lower part of the cabinet portion 10 and is also secured to the outer end of the receptacle 11 for supporting the latter and details of this arrangement will be set forth presently.

The cabinet portion 10 comprises a band 14 having vertically arranged side portions 15 and 16 and a substantially semi-cylindrical upper portion 17. At its opposite edges, the band, as best shown by Figure 3, has respectively inwardly turned flanges 18 and 19 and these serve to increase the rigidity of the band and also to provide attachment portions. The flange 19 overlaps the edge of a vertical wall 21 and is welded thereto to have the band 14 extend laterally from one side of the wall. It will be noted that the edge of the wall is slightly offset as indicated at 22 so that the flange lays substantially flush with the remainder of the wall. The wall 21, if desired, may have pressed out beads or ribs to increase its rigidity.

The lower edges of the band 10, as best shown by Figure 2, are bent inwardly and under a bottom wall 24 as indicated at 25 and 26 and the lapping portions are spot welded. Similarly, as best shown by Figure 3, the lower edge of the wall 21 is bent inwardly under the bottom wall 24, as indicated at 27, and the lapping parts are welded. This bottom wall also has an upwardly turned edge flange 28 which may be welded to the lower part of the wall 21 and it similarly may have end flanges projecting upwardly and welded to the lower ends of the vertical parts 15 and 16 of the band 14. A rear cover 30 closes that side of the band 14 opposite the wall 21 and the edges of the cover may be secured to the flange 18 by means of screws 31.

This cover may have suitable louvres 32 and the side portion 16 of the band 14, which is at the rear side of the machine, may have similar louvres 33 so that ventilation is provided. Similarly to the wall 21, the cover may be reinforced by beads such as indicated at 34 to increase its rigidity. The compartment thus provided is extremely rigid and strong and in particular it should be noted that the band 14 greatly increases the rigidity and load bearing characteristics of the wall 21.

At its upper edge, the wall 21 is substantially semi-circular and substantially at the center of curvature the wall has an opening 35 to accommodate a driving shaft which will presently be mentioned. At the left side of the wall 21, as seen in Figure 7, a driving unit 36 is provided, and this unit, as best shown by Figure 7, is releasably secured to the wall and to a flanged plate 39 by bolts 40. Nuts 42 on the outer ends of the bolts serve to anchor the unit on the wall, and it will be seen that by removing the nuts the unit may be removed.

A tubular sleeve 46 extends through the opening 35 in plate 21 and is supported at the right side of the plate by a disc 47 also secured to the plate 21 by the bolts 40. Preferably the sleeve is welded in position. Beyond the disc the sleeve has, on its outer surface, a spherical bearing element 48 and this element is engaged by a spherical socket member 49 which is fastened at its outer margin to a concave disc element 50 in turn rigidly fastened to an end wall 51 of a cylindrical cage 52 employed in washing the clothes. The disc element has a free-wheeling device 53 secured thereto which includes a driving element 54 and driving rollers 55 operable to drive the cylinder when the element 54 turns in one direction and operable to permit the cylinder to turn freely in the opposite direction. A shaft 56 projecting from the driving unit 36 and through the sleeve 46 has a square driving end 57 projecting into a similarly shaped opening in the driving element 54 so that the latter is driven.

From the foregoing, it should be apparent that the cylinder 52 positively is driven in one direction and is free to rotate in the other direction and that the driving unit 36 may be removed easily by removing the nuts 42 and then pulling the mechanism away from the wall 21. Whether or not the unit is in place, the disc 50 on the cylinder 52 in conjunction with the socket member 49 seals the end of the sleeve 46 and thus water in the receptacle 11 can not escape.

The unit 36 has a pulley 57 driven by a belt 58 in turn driven by a pulley 59 on the shaft of a motor 60. This motor is supported on a base 61 fastened to two supporting plates 62 of inverted U-shape respectively located adjacent opposite ends of the base. One leg of each element is fastened to the vertical and bottom walls 21 and 24 and to an end of the tubular bar or rod 13 by means of a bolt 63 threaded into a bushing 64 disposed in and welded to the end of the bar. Hence, in viewing Figure 1, it should be understood that the legs of the tubular rod are fastened to the lower part of wall 21 and to wall 24 and respectively to U-shape plates 62. These U-shape plates also have their outer legs welded as indicated at 65 to an edge flange 66 on the base 24.

The receptacle 11 is generally of cylindrical form and its upper portion substantially corresponds in curvature to the upper part 17 of band 14. At the wall 21, the receptacle 11 has an inwardly turned flange 70 which is secured to the wall 21 by means of fastening devices 71 spaced suitably around the edge of the receptacle, and a rubber gasket 72 is provided for sealing purposes between the flange and wall.

The outer end of the receptacle 11 has a radially disposed wall 74 and this wall at its center has an opening 75 through which a tubular element 76 extends. The latter element is enlarged inwardly of the wall 74 thereby providing an annular shoulder 77 and between the wall 74 and this shoulder a collar 78 is provided. At the opposite side of the wall 74 disc elements 79 and 80 are provided and these are secured together by means of circumferentially spaced bolts 81. The wall 74 and disc elements 79 and 80 are secured tightly against the collar 78 and the latter against the shoulder 77 by means of a threaded cap 83 threaded on the outer end of the tubular element 76. From this it follows that the tubular element 76 is rigidly but releasably secured to the wall 74.

The outer disc 80 has an edge flange 85 of arcuate shape so as to fit the tubular rod or bar 13 and this bar extends upwardly and around about half of the flange 85 and along the contact between the rod and flange, the parts are welded. A cover 87 is fastened over the disc 80 by means of a screw 88 so as to enhance the appearance of the construction.

Inwardly of the wall 74, a reinforcing disc 90 is provided which may be welded adjacent its outer edge to the wall. This disc at its inner edge has an opening for receiving the element 76 and preferably an annular collar 91 is provided in the opening to obtain a longer bearing support. Inwardly of the disc 90, a bearing sleeve 94 is provided on element 76 and the outer surface of this bearing element is spherical and contacts a spherical socket 95 secured to a disc element 96 which in turn is fastened to the outer end wall of the cylinder indicated at 97. In connection with this spherical bearing, it should be appreciated that the cylinder 52 can turn with the spherical bearings 48 and 94 and at the same time a self-aligning effect is obtained since the cylinder can move universally at either end about the spherical bearing.

Between the horizontal leg portions of the bar 13, a channel-shaped bar or shoe 98 is provided and this is secured to the two legs of the bar by means of bolt type fasteners 99 having nuts 100 on their lower ends. As best shown by Figures 1 and 6, the shoe 98 has a pair of adjustable stud type supports 100 each of which extends through a bushing 101 and through an opening in the upper wall of the shoe. A lock nut 102 on the upper end of the stud serves to lock it in position. The bushing 101 is welded in place and if the nut 102 is loosened and the stud turned, the vertical position of the stud may be thus varied and the machine thus raised and lowered on the floor. Similar adjusting studs 105, as shown by Figure 3, are provided on opposite ends of the bottom wall 24. From this it follows that the four adjustable points of support are provided to obtain a level support for the machine.

From the foregoing, it should be evident that the cylinder 52 has a self-aligning bearing at each end and that each end is firmly supported by strongly reinforced structural elements so as thereby to avoid vibration. It is evident also that while these results are obtained the entire assembly may be assembled and taken apart

easily, and in particular that the receptacle 11, cage 52 and unit 36 may be easily installed and removed. While assembly and disassembly are thus facilitated, a strong and rigid structure is obtained and this is important in order to withstand centrifugal and other forces involved during operation of the machine. The structure generally is disclosed and claimed in my co-pending application, Serial No. 628,839, filed November 15, 1945.

The receptacle 11 has in its front wall, as best shown by Figure 4, a clothes inserting opening and a door 105, and around the door opening, a rubber sealing element 106 is provided which is shaped to fit the door. At its upper edge the door is hinged as indicated at 107 and at its lower edge a suitable handle 108 and locking element 109 are provided. In a large portion of the door, a glass panel 110 is provided so that operation of the cylinder inside may be observed. While it isn't shown, the cylinder 52 also has a door which may be brought into coinciding relation to the door 105 so that the clothes may be inserted and withdrawn. The walls of the cylinder may be perforated as indicated to allow desired flow of water through the cylinder.

Although only one form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made without departing from the scope of the appended claims.

What is claimed is:

1. A washing machine cabinet structure comprising a vertically arranged wall having a substantially semi-circular upper edge, a band of sheet metal disposed at one side of and transversely to said wall along the vertically arranged side edges and upper edge of the latter and having a vertical flange overlapping and fastened to the opposite side of the wall, a bottom member extending between the lower ends of the band and fastened thereto and to the lower edge of said wall, a transmission mechanism secured to the wall on the side encompassed by said band, and a clothes washing receptacle fastened to the wall at its opposite side, and washing mechanism housed in said receptacle and driven by said transmission mechanism.

2. A washing machine cabinet structure comprising a vertically arranged wall having a substantially semi-circular upper edge, a band of sheet metal disposed at one side of and transversely to said wall along the vertically arranged side edges and upper edge of the latter and having a vertical flange overlapping and fastened to the opposite side of the wall, a bottom member extending between the lower ends of the band and fastened thereto and to the lower edge of said wall, a transmission mechanism secured to the wall on the side encompassed by said band, a substantially cylindrical clothes receptacle having washing mechanism mounted therein and driven by said transmission mechanism, said receptacle having one end fastened to the wall at its opposite side substantially flush with the semi-circular edge of the wall, and a removable closure plate secured to the edge of said band which is spaced from said wall for enclosing said transmission.

3. A washing machine and cabinet structure comprising a vertically arranged wall, a clothes receiving cylinder at one side of the wall and having its axis transverse thereto, a receptacle around the cylinder in housing relation thereto, bearings at both ends of the receptacle for the cylinder, a drive unit on the other side of the wall and drivingly and releasably connected through an opening in the latter to the cylinder, a support for the outer end of the receptacle and anchored to the wall, releasable means connecting the drive unit to the wall and being accessible for release at said other side of the wall, releasable means connecting the receptacle to the wall and being accessible for release also at said other side of the wall, and releasable means connecting the support to the wall and being accessible for release also at said other side of the wall, whereby the receptacle, drive unit, and support may all be removed by releasing the connecting means at the one side of the wall.

4. A washing machine and cabinet structure comprising a vertically arranged wall, a clothes receiving cylinder at one side of the wall and having its axis transverse thereto, a receptacle around the cylinder in housing relation thereto, a bearing at said one side for supporting the adjacent end of the cylinder and disengageable therefrom by relative endwise sliding movement, a drive unit on the other side of the wall and drivingly and releasably connected through an opening in the latter to the cylinder, a support for the outer end of the receptacle and anchored to the wall, a bearing carried by said support for supporting the adjacent end of the cylinder and disengageable therefrom by relative endwise sliding movement, releasable means connecting the drive unit to the wall and being accessible for release at said other side of the wall, releasable means connecting the support to the wall and being accessible for release also at said other side of the wall, whereby the receptacle, drive unit, and support may all be disassembled from each other by releasing the connecting means at the one side of the wall and the cylinder may be removed by endwise sliding movement.

HYMAN D. BROTMAN.

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