Aug. 26, 1969 D. GOLDMAN 3,463,173

MACHINES FOR WASHING LABORATORY EQUIPMENT SUCH AS FLASKS, BOTTLES, TEST TUBES AND SIMILAR ARTICLES

Filed Oct. 23, 1965 4 Sheets-Sheet 1

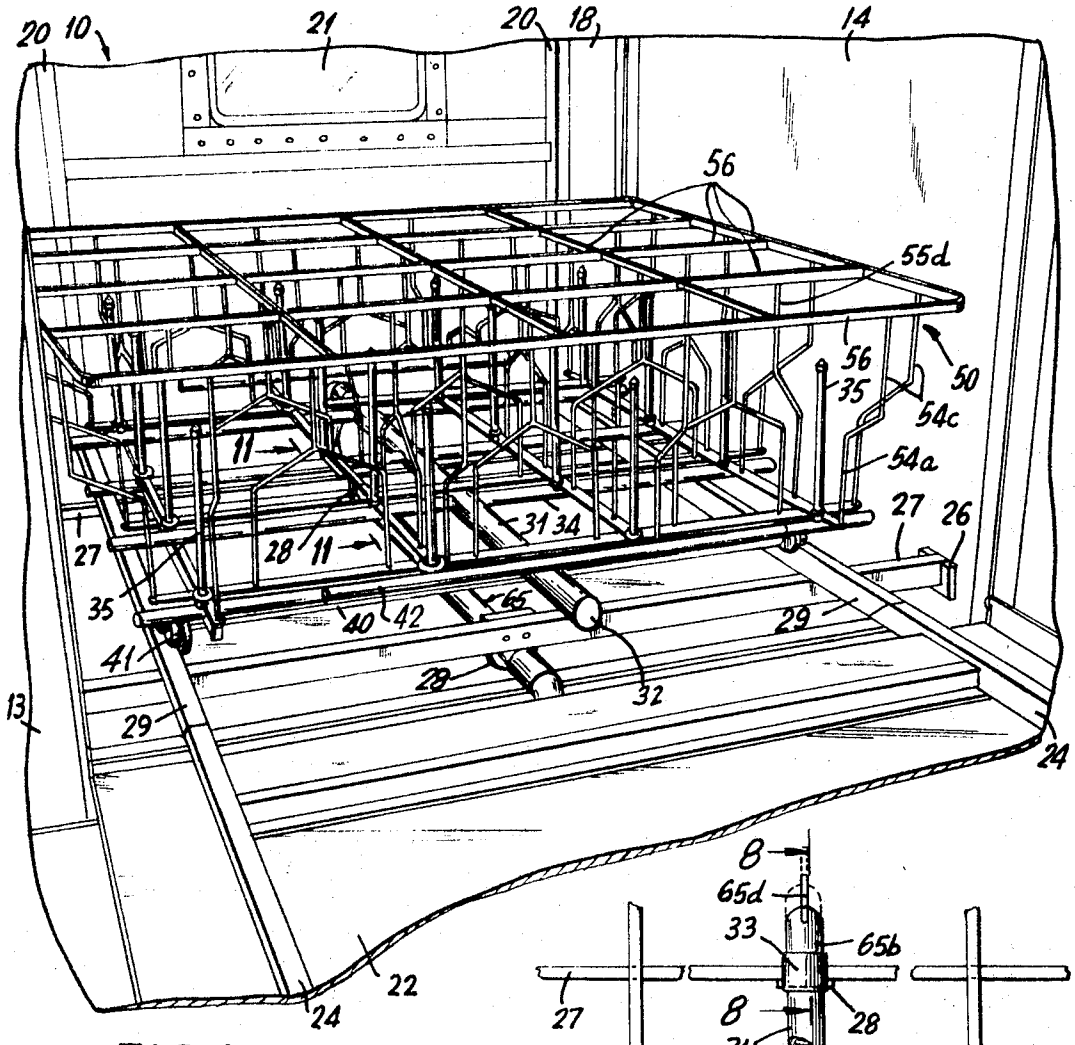


FIG. 1

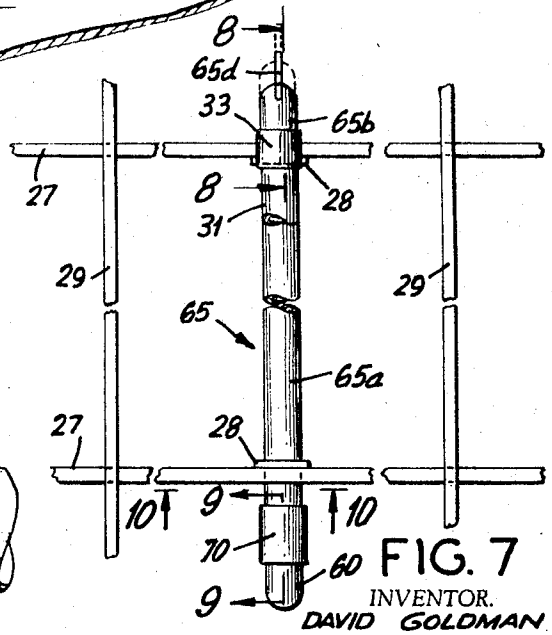


FIG. 7

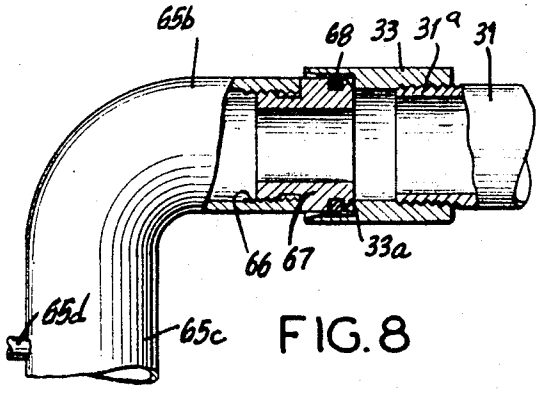


FIG. 8

INVENTOR.
DAVID GOLDMAN

BY

J. B. Feldheim

ATTORNEY.

Aug. 26, 1969 D. GOLDMAN 3,463,173

MACHINES FOR WASHING LABORATORY EQUIPMENT SUCH AS FLASKS, BOTTLES, TEST TUBES AND SIMILAR ARTICLES

Filed Oct. 23, 1965 4 Sheets-Sheet 2

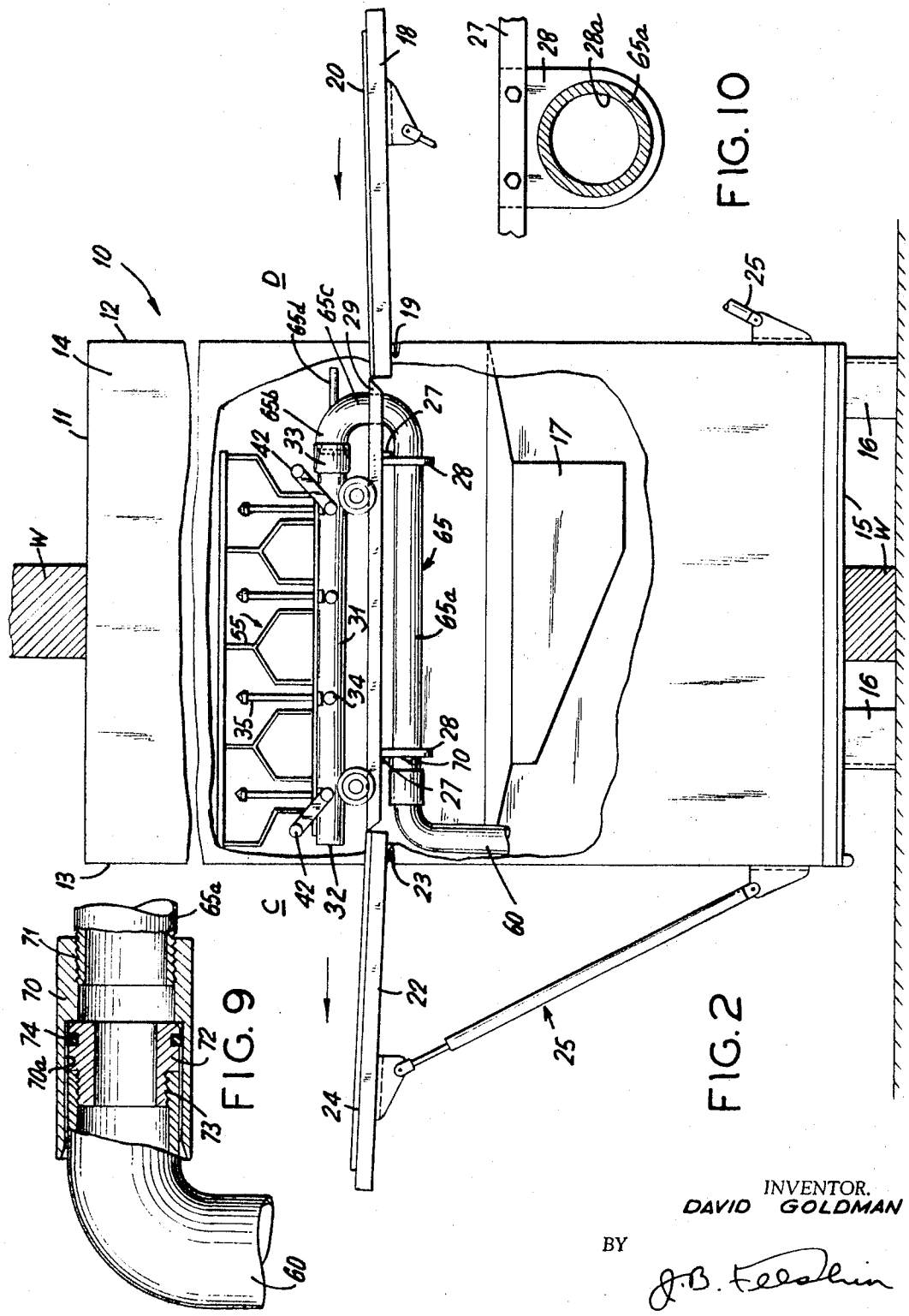


FIG. 10

FIG. 2

FIG. 9

INVENTOR.
DAVID GOLDMAN

BY

J. B. Felsheim

ATTORNEY.

Aug. 26, 1969 D. GOLDMAN 3,463,173

MACHINES FOR WASHING LABORATORY EQUIPMENT SUCH AS FLASKS, BOTTLES, TEST TUBES AND SIMILAR ARTICLES

Filed Oct. 23, 1965 4 Sheets-Sheet 3

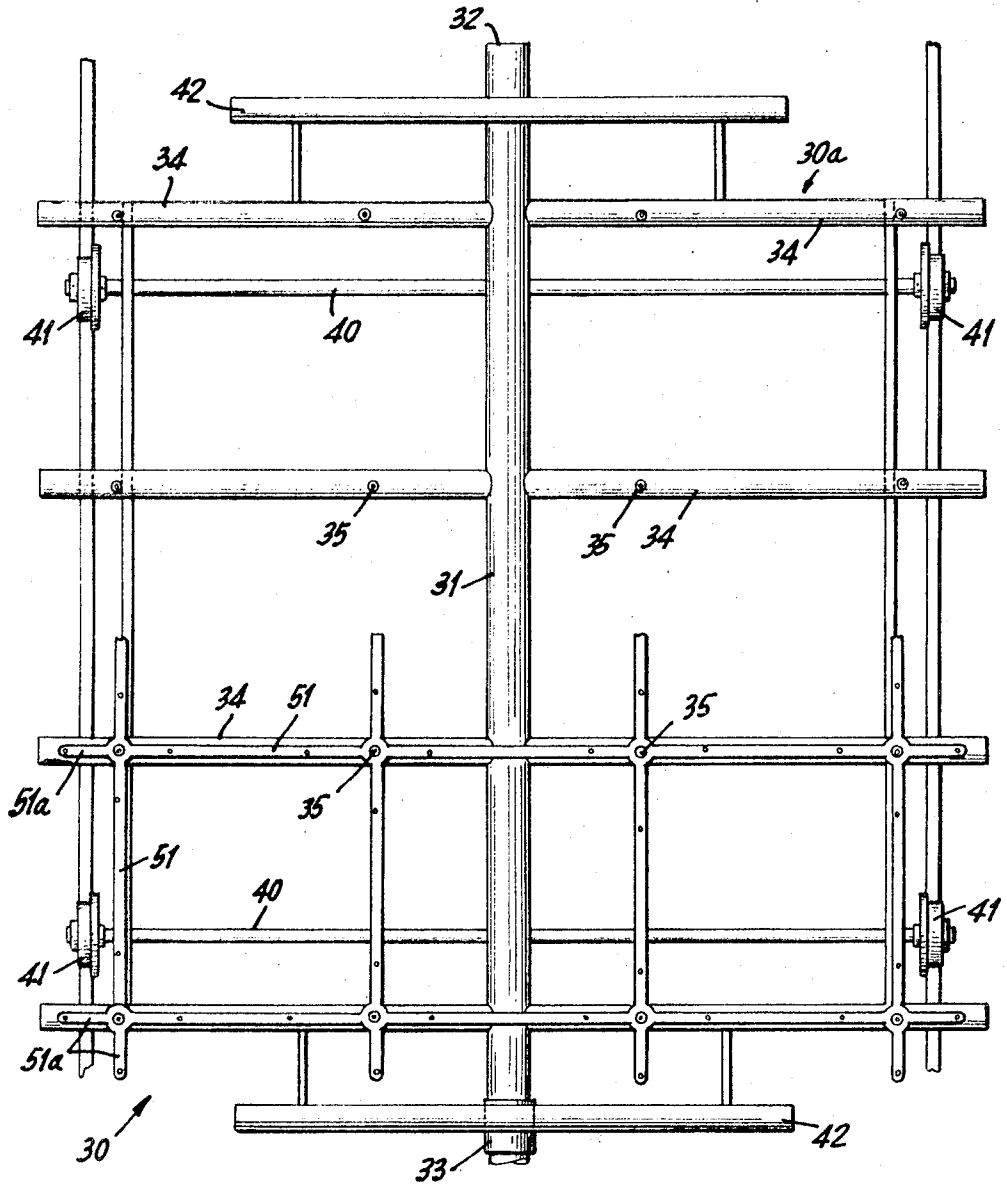


FIG. 3

INVENTOR.
DAVID GOLDMAN

BY

J. B. Feldman

ATTORNEY.

Aug. 26, 1969 D. GOLDMAN 3,463,173

MACHINES FOR WASHING LABORATORY EQUIPMENT SUCH AS FLASKS, BOTTLES, TEST TUBES AND SIMILAR ARTICLES

Filed Oct. 23, 1965 4 Sheets-Sheet 4

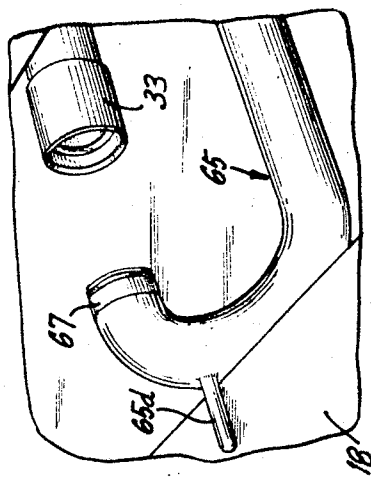


FIG. 6

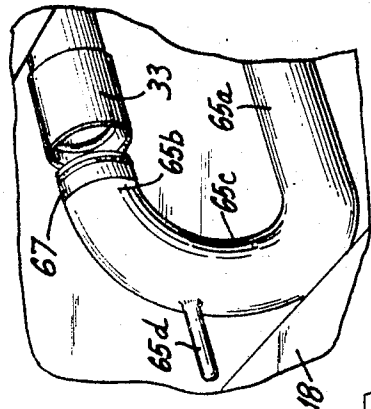


FIG. 5

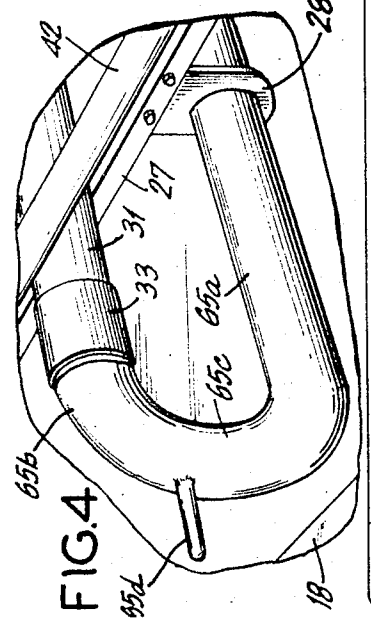


FIG. 4

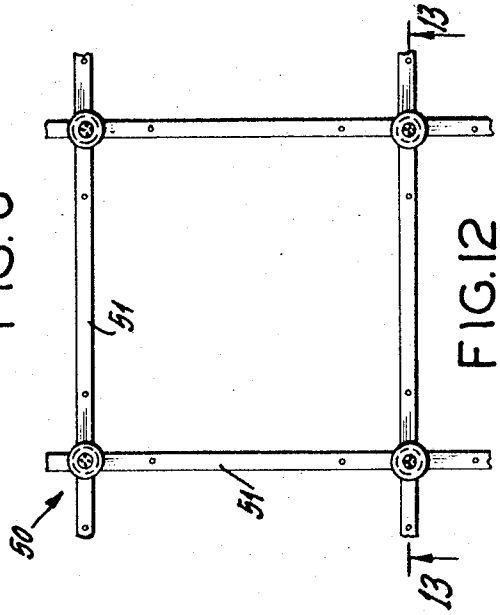


FIG. 12

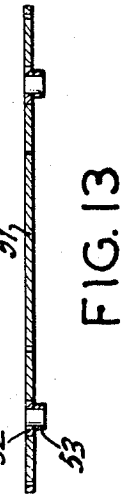


FIG. 13

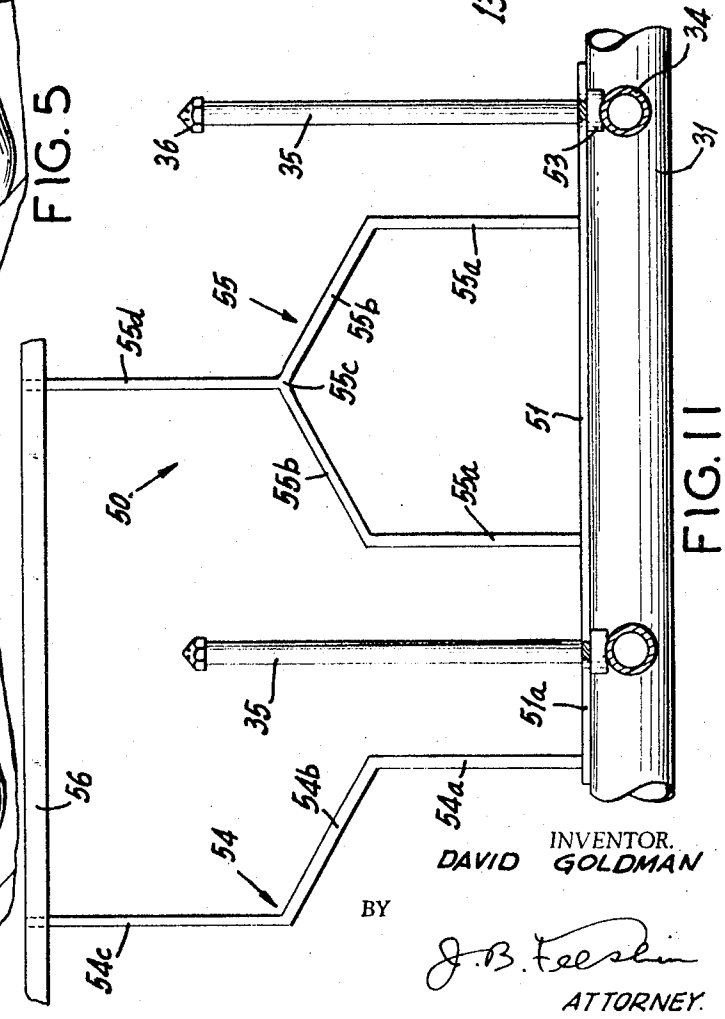


FIG. 11

INVENTOR.
DAVID GOLDMAN

BY

J. B. Feeslin

ATTORNEY.

United States Patent Office

3,463,173

Patented Aug. 26, 1969

3,463,173

MACHINES FOR WASHING LABORATORY EQUIPMENT SUCH AS FLASKS, BOTTLES, TEST TUBES AND SIMILAR ARTICLES

David Goldman, New York, N.Y., assignor to Better Built Machinery Corporation, New York, N.Y., a corporation of Delaware

Filed Oct. 23, 1965, Ser. No. 503,528
Int. Cl. B08b 3/00, 13/00
U.S. Cl. 134—145 10 Claims

ABSTRACT OF THE DISCLOSURE

A laboratory equipment washer comprising a casing placed in a building wall, with an entrance door of the casing on one side of the wall and an opposed exit door on the other side of the wall. A horizontal rail support is disposed in the casing, leading from the entrance door to the exit door so that a header adopted to receive water, may be placed onto the support and into the casing through the entrance door and moved out through the exit door. In the casing there is a water supply which is disengageably engagable with the header to supply water thereto, and includes a pipe which has constant connection to the water supply but is movable into the path of movement of the header for engagement therewith and which must be moved out of the path of the header to permit passage of the header through the casing and out of the exit door.

BRIEF DESCRIPTION OF THE INVENTION

This invention relates to machines for washing laboratory equipment such as flasks, bottles, test tubes; and similar articles.

The invention is directed to improvements in the type of washing machine disclosed in United States Patent 2,786,480, issued Mar. 26, 1957 for Machine for Washing Test Tubes, Bottles, Receptacles, Pipettes, and Like Articles. The patented machine comprises a casing provided with a front opening closed by a door pivoted adjacent its lower end to the front wall of the casing and swingable upwardly to close the casing and downwardly to horizontal position to open the casing, said door being provided with rail means, and said casing being provided with rail means, and a header placeable on the rail means on the door when the door is swung down to horizontal open position and said header being adapted to be pushed into the casing, and the casing being provided with horizontal rail means forming a continuation of the rail means on the door, to support the header as the header is pushed into the casing, said header being provided with a coupling element engageable with a fixed coupling element adjacent the back wall of the casing, the arrangement being such that as the header is pushed into the casing, the coupling elements will interengage to form a sealed coupling so that water may be passed through the coupling into the header for washing test tubes, bottles or other articles placed thereon, the construction being such, furthermore, that the header may be pulled out after the washing operation, to automatically uncouple or disengage the coupling elements after the water supply has been shut off.

While this type of machine operated well, it had certain disadvantages. Since this machine had only one door, a header and tray carrying unwashed flasks, bottles, test tubes or similar articles (hereinafter referred to as ware), was likely to be brought into close proximity to a header and tray loaded with washed and sterilized ware. This situation could possibly recontaminate the clear ware. Similarly, the area where the clean ware was unloaded and/or stored could be contaminated by the proximity of the unwashed ware.

Therefore, it is an object of this invention to provide a machine of the character described, which is adapted to be installed in a wall between a sterile ware room and an unsterile ware room, whereby washed and sterilized ware may be unloaded, moved and stored without being brought into proximity with unsterilized ware, to thereby avoid re-contamination of the clean ware before it is used.

Another object of this invention to provide a machine of the character described provided with a door in each of two opposite walls thereof, each of the doors being provided with rail means, each of the door rail means being cooperable with rail means in the washing machine casing when the door is swung to a horizontal open position, whereby a header loaded with unwashed ware may be moved into the casing through one door, and removed after the washing process through the opposite door to thereby avoid contact with unwashed ware.

Still another object of this invention to provide a machine of the character described provided with a connecting pipe, movably mounted within the casing, means to connect said connecting pipe to a header, and means to also connect said connecting pipe to the inlet of water and the various other fluids used in the washing process and yet permit connecting and disconnecting said connecting pipe from the header, and movement of the header into and out of the machine without interference from said connecting pipe.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

SUMMARY OF THE VARIOUS VIEWS OF THE DRAWINGS

In the accompanying drawings in which is shown an illustrative embodiment of this invention,

FIG. 1 is a perspective view of a machine embodying the invention looking into one door opening into the casing with a carriage in washing position;

FIG. 2 is a side elevation view thereof with both doors open and with portions broken away for clarity;

FIG. 3 is a plan view of a carriage tray used in the present invention, with portions broken away;

FIG. 4, 5 and 6 are sequential views showing the manner of dis-connecting the connecting pipe from the header;

FIG. 7 is a plan view of the connecting pipe with the header removed;

FIGS. 8, 9 and 10 are cross-sectional views taken on lines 8—8, 9—9 and 10—10 of FIG. 7, respectively;

FIG. 11 is a cross-sectional view taken on line 11—11 of FIG. 1;

FIG. 12 is a partial plan view of a portion of a carriage; and

FIG. 13 is a cross-sectional view taken on line 13—13 of FIG. 12.

DETAILED DESCRIPTION OF THE INVENTION

Referring now in detail to the drawing, 10 designates a washing machine embodying the invention. Machine 10 comprises a casing comprising a top wall 11, a front wall 12, a rear wall 13, a pair of side walls 14, 14 and a bottom wall 15. Legs 16 may be provided at the bottom wall.

If desired, machine 10 may be positioned in a suitable opening formed in a wall W so that front wall 12 is in one room D, and rear wall 13 is in an adjoining room C. As will appear more clearly hereinafter, room D may

be used to load the carriages with dirty and unsterilized ware, and room C may be used to remove the clean and sterilized ware therefrom and to store the ware. Of course, wall W could also be a partition instead of wall between two rooms, or the machine could be used in one room, the separation between washed and unwashed ware being obtained nevertheless, since the ware is handled in different areas before and after washing.

Machine **10** includes a fluid and waste collector **17** mounted therein below the washing area, which is part of the usual washing apparatus, the remainder of which is not shown.

Front wall **12** is formed with an opening in which is mounted a front door **18**, hinged to wall **12** as at **19**. The inside surface of door **18** is provided with a pair of spaced rails **20, 20**. If desired, the doors may be provided with a window portion **21** between the rails, as is well-known in the art.

Rear wall **13** is formed with an opening in which is inserted a rear door **22**, hinged to wall **13** as at **23**. The inside surface of door **22** is provided with a pair of spaced rails **24, 24** which are aligned with rails **20**. Details of the door arrangement are disclosed in said Hofer patent.

Support means **25** may be provided for each door tc help support the weight of the header, trays and ware, and to insure that the door makes an angle with the machine which tends to roll the header into the casing, as shown, rather than off the end of the door.

Mounted on side walls **14, 14** by any suitable means, are two pairs of U-shaped brackets **26**. The ends of two supporting bars **27** rest in U-shaped brackets **26**. Each bar **27** has a downwardly extending bracket **28** fixed thereto by any suitable means. The function of brackets **28** will be explained hereinafter. Mounted on cross bars **27**, by any suitable means, are a pair of rails **29**. Rails **29** are aligned with door rails **20** and **24**, and in end-to-end abutting relation with said door rails, when the doors are open, to form a continuous track for the ware carriages. Rails **29** could be supported within the machine by means other than supporting bars **27**, such as by supporting members extending from the walls and floor of the casing. In such case, brackets **28** could also be supported from means extending from the floor of the casing or any other fixed part of the machine.

Means are provided to carry ware into and out of the washing machine. To this end carriages, generally designated by numeral **30**, are provided. Each carriage comprises a header or manifold **30*a***, with a tray **50** mounted thereon if desired. Reference may be had to the aforementioned Hofer patent 2,786,480 which describes headers very much like those used in the present invention.

Each header comprises a central pipe **31**, one end of which is sealed by any suitably means as at **32**, and the other end of which is provided with a female coupling **33**, joined to pipe **31** as by threads **31*a***, see FIG. 8. Extending perpendicularly outwardly to opposite sides of central pipe **31** are a plurality of smaller branch pipes **34**. Pipes **34** and **31** are in one horizontal plane. Communicating with and extending upwardly from pipes **34** are a plurality of still smaller pipes or tubes **35** having tips **36** which may be of the type disclosed in said Hofer patent. Thus, when washing fluids are supplied to pipe **31**, these fluids pass through pipes **31, 34, 35** and out the tips **36** to wash the ware.

The header thus far described, is mounted by any suitable means on an undercarriage structure comprising a pair of axles **40** on the outer ends of which are flanged wheels **41**, which cooperate with the rails **20, 24** and **29** in a well known manner. Handles **42** are also provided to facilitate moving header **30*a***. Headers **30*a*** may be used as thus far described as in the aforesaid Hofer patent. However, if desired, a tray (FIGS. 11 to 13) **50** may be mounted on pipes **31, 34** and **35** so that the resulting carriage may accommodate different types and configurations of ware, and to make racking and washing the ware more efficient. Tray **50** comprises a base framework of intersecting bars **51**, spaced so that their junctures correspond to the spacing of upright tubes **35**. Said junctures are provided with ring members **52** having downwardly extending portions **53**, the lower ends of which rest on pipes **34** and thereby raise the bars **51** to the level of the top of pipe **31** so that tray **50** will lie flat on the headers **30*a***. Ring members **52** fit loosely over pipes **35** so that the tray **50** can be readily removed from the header if it should be desired to use the header without the tray.

The header **30*a*** shown in FIG. 3 has sixteen upright tubes arranged roughly in a square, four on each side. Bars **51** have extensions **51*a*** extending outwardly beyond the imaginary square defined by the sixteen upright tubes **35**.

Extending upwardly from the outer end of each extension **51*a***, is a wire-like member **54** which comprises a first upwardly extending portion **54*a***, a second upwardly and outwardly inclined portion **54*b***, and a third upwardly extending portion **54*c***. Each member **54** is in the vertical plane of extension **51*a***. Between each juncture of the bars **51** is a member **55**. Each member **55** comprises a pair of upwardly extending portions **55*a***, a pair of inclined portions **55*b*** which meet at a juncture **55*c***, and an upwardly extending portion **55*d*** extending from juncture **55*c***. The top of tray **50** is defined by ten bars **56** arranged in two groups of five, the groups crossing each other at right angles. The bars **56** are joined to the top ends of the portions **54*c*** and **55*d***.

Thus, members **54** and **55** and bars **56** define sixteen compartment-like spaces each surrounding an upright pipe **35**. Tray **50**, as shown, in suitable for washing relatively large flasks or the like. Of course other carriages having different manifolds and corresponding trays may be used.

Machine **10** is provided with an inlet pipe **60** which is connected to the pumps of the machine to supply the washing fluids to the manifold of the carriage. Means is provided to connect the outlet end of pipe **60** to the inlet **33** of the manifold of a carriage.

To this end, a connecting pipe **65** is provided. Pipe **65** is shaped like a candy-cane and comprises a long leg portion **65*a***, a short leg portion **65*b***, and a connecting portion **65*c***. Portion **65*c*** is provided with a rod **65*d*** extending outwardly therefrom opposite to legs **65*a*** and **65*b*** for reasons appearing hereinafter. Long leg **65*a*** is slidably and rotatably received in suitable openings **28*a*** formed in brackets **28** for reasons appearing hereinafter.

The end of portion **65*b*** is internally threaded as a **66**. A male plug **67** is threadably received on said threads **66**. Any other suitable means such as welding, may be used as well. The front end of plug **67** is formed with an opening in which is fitted an O ring or sealing gasket **68**. The outside surface of O ring **68** extends slightly outwardly beyond the side wall of the plug **67**. Coupling **33** is formed with an opening **33*a*** of a diameter slightly less than the outside diameter of O ring **68**, but slightly greater than plug **67**. Thus, when plug **67** is thrust into opening **33*a***, the O ring **68** is slightly compresed to thereby form a fluid tight seal but which at the same time permits rapid and easy uncoupling by merely pulling plug **67** and coupling **33** apart.

The end of leg portion **65*a*** is provided with a coupling **70** joined thereto by thread means **71** or any other suitable means. The other end of coupling **70** is formed with an opening **70*a*** which is of a substantial length for a reason appearing hereinafter. The end of pipe **60** is bent so that its axis coincides with the axis of leg portion **65*a***. A plug **72** similar to plug **67** is mounted by threads **73** or any other suitable means, in the end of pipe **60**. Plug **72** is formed with an opening in which is mounted an O ring **74** similar to O ring **68**. The outside diameter of pipe **60** is equal to or less than the diameter of plug **72**. Plug **72** and coupling **70** cooperate in the same manner as do plug **67** and coupling **33**, except that the fluid tight seal between O ring **74** and opening **70*a*** remains intact even

if coupling **70** is pulled away from plug **72** as long as said O ring contacts the wall of the opening. Thus, connecting pipe **65** may be moved away from inlet pipe **60** a distance substantially equal to the length of opening **70***a* without breaking the seal between said pipes. For convenience, this distance will be called the slide distance hereinafter. Similarly, pipe **65** may be rotated with respect to plug **72** and the seal between said pipes remains intact.

OPERATION

Referring to FIG. 2, when front door **18** is open as shown, the distance between the bottom end of the door and portion **65***b* is less than the slide distance. The length of rod **65***d* is greater than the slide distance. Thus, pipe **65** is always in sealed communication with pipe **60** during normal use. When coupling **33** is not on a header, pipe **65** is free to rotate about the axis of leg portion **65***a* mounted in brackets **28**, but rod **65***d* will hit the inside surface of the door, see FIG. 6, to prevent leg portion **65***b* from rotating below the axis of leg portion **65***a* where it might be inconvenient for an operation to reach.

In normal use, carriages carrying unwashed ware will be put into the machine from the right and removed to the left, referring to FIG. 2. As explained above, the ware may move from a dirty room D to a clean room C. At the time the carriage is rolled into the casing, rear door **22** is closed and pipe **65** is in the FIG. 6 position. In the position, short leg portion **65***b* is below the level of manifold **31** and therefore the carriage may be rolled over said leg portion **65***b* without touching said portion.

Then the operator rotates leg portions **65***b* to the FIG. 5 portion, so that plug **67** aligns with coupling **33**. Then the operator pushes coupling **33** and plug **67** into sealing engagement as described above. Door **18** is closed and the ware is washed.

After washing, the rear door **22** is opened, an operator may grasp the rear handle **42** and roll the carriage out of the machine onto rails **24**, breaking the seal between coupling **33** and plug **67** in the process. Plug **72** will bottom in opening **70***a* to rest the tendency of pipe **65** to follow this motion. When the carriage is removed, portion **65***b* will rotate to one side or the other by its own weight, or may be moved back to the FIG. 6 position by hand in preparation for another cycle.

Pipe **65**, supporting bars **27** and rails **29** can be removed as a unit from the casing, if desired, for cleaning or for any other reason, by unthreading coupling **70** from the end of leg portion **65***a* while pipe **65** is held in the FIG. 6 position, since threads **71** are shorter in length than the slide distance. Of course any other suitable means may be provided to accomplish dis-assembly as will be clear to those skilled in the art.

It will thus be seen that there is provided an article, apparatus and method in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention and as various changes might be made in the embodiment above set forth it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A washer comprising a casing, an entrance door on said casing, washing fluid supply means fixed within said casing, means within the casing to support a carriage inserted into the casing through the entrance door above said supply means, said carriage comprising means to receive washing fluid, spray means on said receiving means, and conduit means connecting said fixed supply means to said receiving means, and disposed in the path of movement of said carriage through said entrance door into the casing, and said conduit means having means disconnectable from said receiving means, and means to retain connection to said supply means when disconnected from said receiving means and said means to retain connection with said supply means including means to permit movement of said conduit means when disconnected from said receiving means, out of the path of movement of said carriage through said entrance door onto said support means within said casing, an exit door on said casing and said receiving means when disconnected from said conduit means being movable off said support means and out of the casing through said exit door, said entrance and exit doors each being located in one of a pair of opposed walls of said casing respectively, said supply means being located adjacent said exit door and below said support means, said conduit means comprising a pipe having a long leg portion, means on said support means to rotatably and slidably mount said long leg portion below said support means, one end of said long leg portion being connected to said supply means by said retaining means, said pipe comprising a short leg portion, one end of said short leg portion being connectable to said receiving means by said disconnectable means, said disconnectable means being disposed adjacent said entrance door, said pipe further comprising a connecting portion connecting the other ends of said long and short leg portions whereby said short leg portion and connecting portion of said pipe may be rotated about the axis of said long leg portion and retaining means when said disconnectable means are disconnected from said receiving means, and whereby said pipe may be moved along said axis to connect and disconnect said disconnectable means.

2. A washer comprising a casing having pair of opposed walls, an entrance door on one wall, an exit door on the other wall, said entrance and exit doors being in opposed relation, a horizontal support fixed in said casing, and extending from the lower end of said entrance door to the lower end of said exit door, a carriage movable on said support, washing fluid receiving means on said carriage, means to supply washing fluid to said receiving means, and being disposed in the path of movement of said carriage to prevent movement of said carriage through said casing, and being movable out of the path of said carriage, when disengaged from said receiving means, to permit passage of said carriage through said casing, said supply means including a pipe having a long leg portion, a short leg portion and a bent back portion, means to mount said long leg portion for sliding and rotary movement, one end of said long leg portion having a telescope and rotary fit with said supply means while retaining its connection thereto, one end of said short leg portion being disengageably engageable with said receiving means upon moving said pipe about the axis of said long leg portion to move said short leg portion out of the path of movement of said receiving means through said casing.

3. The combination of claim **2**, said means to retain connection between said conduit means and supply means including a slidable and rotatable fluid tight connection.

4. The combination of claim **2**, and a tray removably mounted on said receiving means.

5. The combination of claim **4**, said tray having ring portions slidably receiving said spray means.

6. The combination of claim **4**, and handle means at each end of said receiving means with said tray between said handle means.

7. The combination of claim **2**, said disconnectable means being connectable and disconnectable by relative movement between said conduit means and receiving means longitudinally of the direction of movement of said carriage.

8. The combination of claim **7**, and said disconnectable means when connected being fluid tight.

9. The combination of claim **2**, and said disconnectable means comprising telescoping coupling means on said conduit means and receiving means with an O ring therebetween.

10. The combination of claim 9, and said retaining means comprising telescoping coupling means on said conduit means and supply means with an O ring therebetween.

References Cited

UNITED STATES PATENTS

3,017,892	1/1962	Mixon	134—165 XR
3,413,987	12/1968	Brown	134—176 XR

FOREIGN PATENTS

527,304	6/1931	Germany.

ROBERT L. BLEUGE, Primary Examiner

U.S. Cl. X.R.

134—152, 165