June 27, 1967 R. K. NOLTE 3,327,722

WASHING MACHINE

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FIG. 4

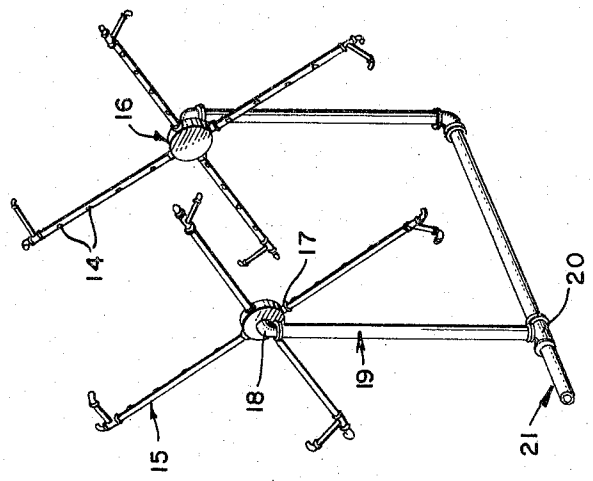
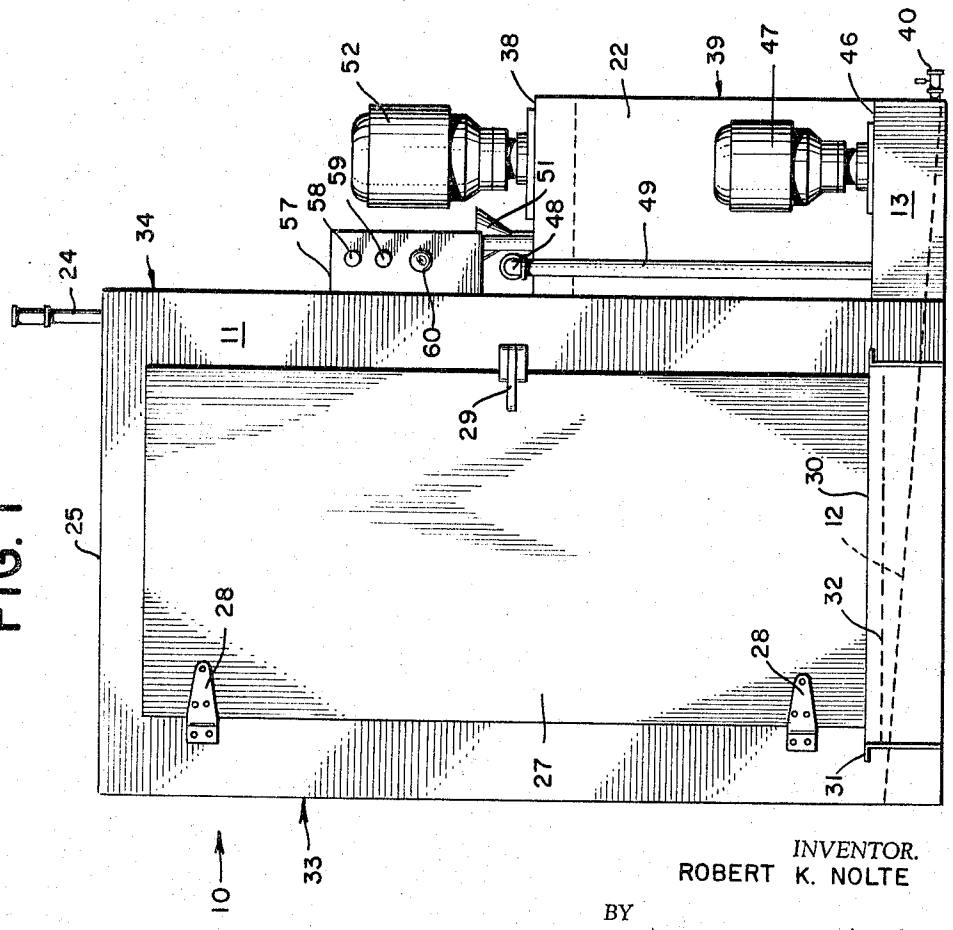


FIG. 1



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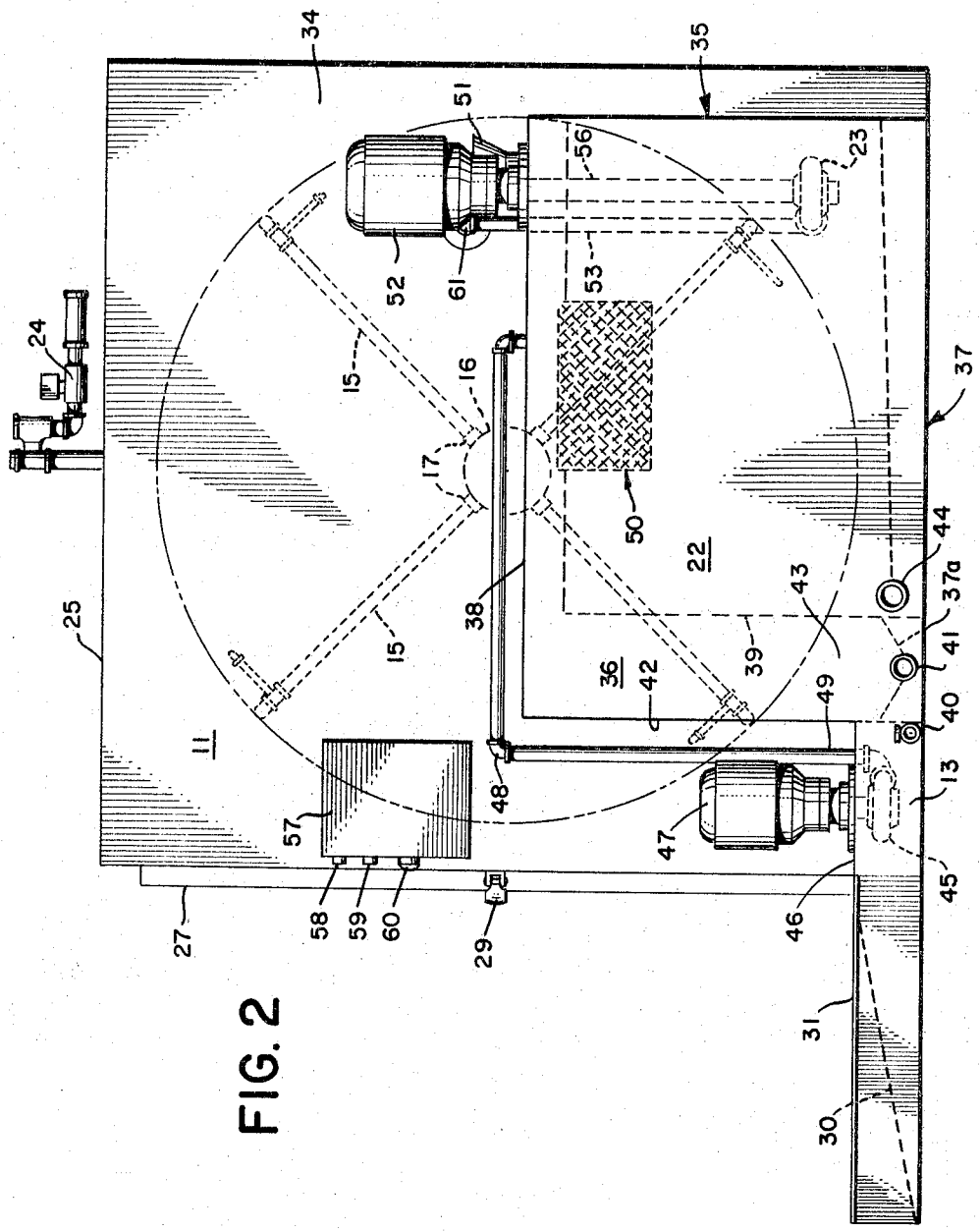


FIG. 2

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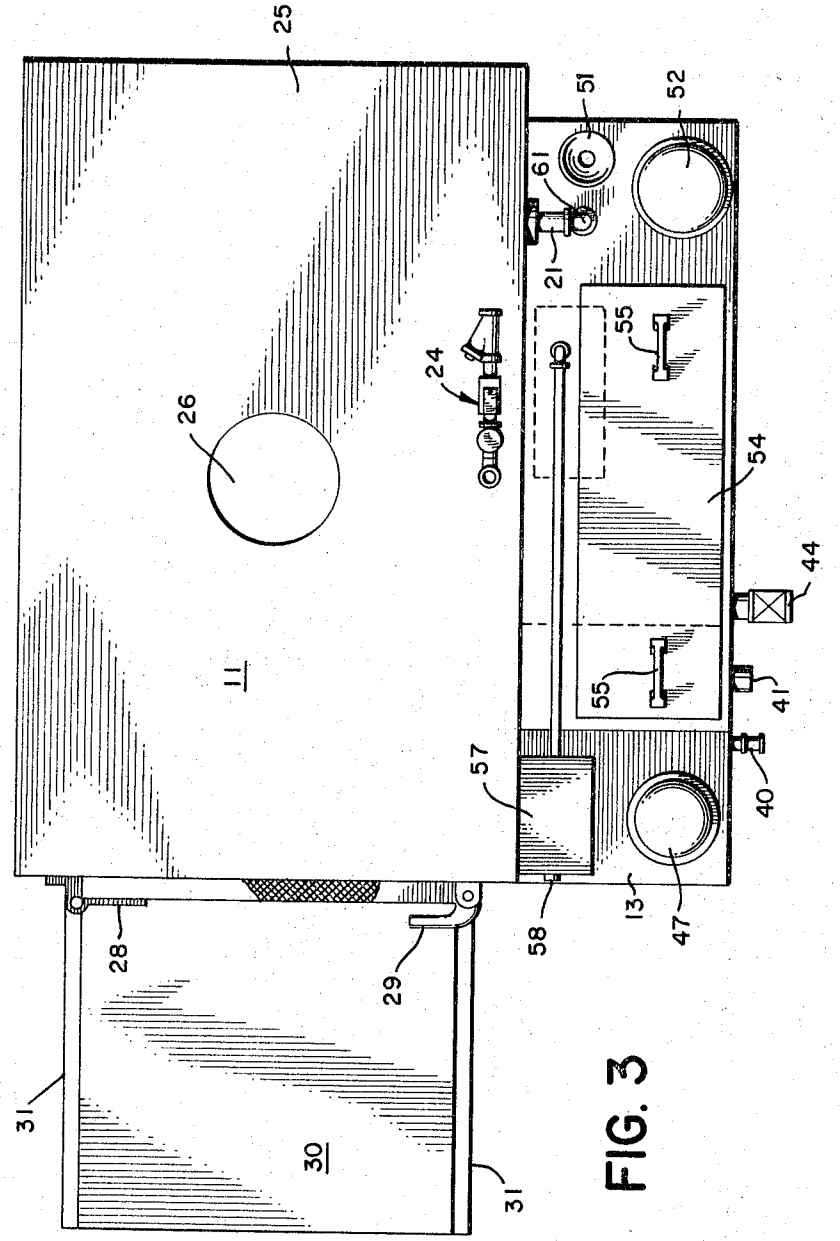


FIG. 3

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WASHING MACHINE

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Filed Sept. 23, 1965, Ser. No. 489,551
4 Claims. (Cl. 134—111)

This invention relates to washing machinery for the cleaning of metallic objects such as those used in industrial applications and the like.

More particularly this invention is concerned with a washing apparatus of the type which permits loading at the floor level so that the equipment may be more readily used in the cleaning of heavy articles such as racks and industrial food cages and the like.

Under earlier types of washing machinery, it was necessary to provide a sump area which was set into the floor and below the washing zone. Under this sump arrangement, it was necessary to install special fixtures into the masonry and to modify the existing supports in the building. Washing machinery so installed was, by necessity, fixed in that particular location as to move it would require a new installation of a sump area with resulting modifications in the building structure.

It is also known in the art to place the sump area at the floor level and to pump the sump liquid into a storage tank which was positioned above the sump area. The disadvantages here, which become readily clear, is that a considerable amount of support structure is required to support the storage tank which is a large and weighty structure when one considers that the storage area holds the total amount of washing fluid.

With the storage area located above the sump area, it is also difficult to provide means for filtering the sump liquid so that the filtering means can be easily removed for cleaning when cleaning is necessary.

It is, therefore, an object of the present invention to provide an improved structure for recycling the cleaning fluid for use in an industrial washing machine.

It is a particular object of this invention to provide a new and improved fluid recycling system for use in an industrial washing machine which employs rotary spray techniques such as those disclosed in United States Letters Patent No. 2,744,532.

The positioning of the storage tank to best operate in conjunction with a rotary spray apparatus also presents problems with relation to the maintaining of the pump elements under a liquid head without the undue increase of the amount of piping required for proper recycling.

It is, therefore, an object of this invention to provide a recycling system which includes an external auxiliary storage station which eliminates the necessity for providing excessive supporting structure for auxiliary station such as those positioned above the sump area, and to properly position the auxiliary tank for compatible operation with a spray solution delivery pump, that is one which delivers a proper liquid head utilizing a minimal and simple piping arrangement. The cleaning solution which is stored in the storage tank is then delivered through the rotary spray structures in the washing chamber in which the articles being cleaned are placed.

The present invention provides a recycling system for a limited area washing installation which is both structurally strong and relatively less expensive than such structures which are now known in the art.

This invention resides in the combination of elements and in their relative placement as defined in the appended claims. The objectives and advantages of the invention will thus be understood by reference to the following description of the specific embodiment thereof with relation to the accompanying drawings in which:

FIG. 1 is a front elevation view of a washing machine incorporating the invention;

FIG. 2 is a side elevational view of the washing machine shown in FIG. 1;

FIG. 3 is a top plan view of the washing machine shown in FIG. 1; and

FIG. 4 is a view in perspective showing the rotary spray apparatus used in the washing machine.

Referring now to the figures in which corresponding numbers represent corresponding elements of the structure, washing machine **10** is basically of the type which is disclosed in U.S. Letters Patent 2,744,532 in that it comprises a washing chamber **11** having a floor **12** transversely inclined and integral with the floor of a communicating side tank **13** which in this embodiment takes the form of a sump area.

As in the construction of the machine of U.S. Letters Patent 2,744,532, the washing of the article within chamber **11** is accomplished by delivering a washing solution, under pressure, through nozzles **14** (FIG. 4) and pipes **15** which are in turn supplied with a washing fluid through a distributor head **16** onto which is threadably mounted four equi-radially spaced hubs **17** into which pipes **15** are screwed. The distributor head is rotatably mounted on elbow **18** which is mounted on pipe **19**. Pipe **19** is supplied with washing solution through coupling **20** and supply line **21**. Supply line **21** is immersed into an auxiliary storage tank **22**. Fluid is driven through a supply line **21** through a high pressure pump **23**.

The fresh water rinse piping (not shown) supplies fresh rinse water to washing chamber **11** through connection **24** which is placed on the top panel **25** of washing chamber **11**. A conventional vent **26** is also provided on top panel **25** and access to the washing chamber is provided by a front door **27** which is suitably hinged at hinges **28** and latched via conventional handle mechanism **29**.

The articles to be washed, which are too heavy to be readily lifted by hand, may be placed into the washing chamber by being rolled on suitable roller carriages off the loading ramp **30** which is inclined at the front of machine **10** between the bottom edge of door **27** and the floor level. Side guards **31** prevent accidental upset of the articles being loaded.

An upper or false floor **32**, shown in phantom in FIG. 1, supported by conventional means within chamber **11**, receives the articles to be washed or the carriages holding the articles, and positions them during the washing operation. The floor **32** extends from the front of door **27** to the rear panel of washing chamber **11** and is spaced laterally from sides **33** and **34** of chamber **11** to accommodate the piping previously described with reference to FIG. 4.

In accordance with this invention the auxiliary storage station or tank **35**, enclosed within casing **36**, is positioned immediately adjacent to side **34** of washing chamber **11** and is supported at floor level **37**. The upper edges of storage tank **35** are spaced below the upper panel **38** of the outer casing **36**, and the forward or front panel **39** of storage tank **35** is rearwardly spaced from the panel **42** of the storage tank to provide a spill area **43** which extends from the top edge of the tank **35** to the bottom panel **37***a* of the casing **36**, which bottom panel may be integral with the bottom panel **37** of the storage tank, both panels being aligned with the bottom-most extension of sump area **13**. Sump area **13** is also located on the floor level and within outer casing **36**. Sump drain **40** leading from sump area **13**, along with overflow connection **41** leading from the spill area and tank drain valve **44** leading from the storage tanks, are all located just above floor level so that they are readily available for connection with proper plumbing connections therewith.

The washing fluid, after being used in washing chamber **11**, flows to the sump area along inclined floor **12**. A low pressure pump **45** is immersed into the sump area and is suspended from the top of surface **46** of the sump area which is contiguous with storage tank casing **42** on which is mounted electric motor **47** which drives the pump **45**. Pump **45** discharges the sump fluid through outlet line **49** which extends through panel **46** to a point above the upper panel of casing **38** where the direction of flow is changed from a vertical to a horizontal flow by a suitable elbow connection **48** so that the traveling fluid empties directly above a strainer basket **50** which is supported by any conventional means to the top of storage tank **35**.

In operation, storage tank **35** is filled with a washing solution through tank water flow connection **51**. High pressure pump **23** which is driven through shaft **56**, which is driven by electric motor **52** loacted on top of surface panel **38**, forces the solution therein under pressure through the spray delivery system, shown in FIG. 4, to the rotary distributor head which operates, in a manner more fully disclosed in U.S. Patent 2,744,532, to both provide a conduit for the solution under pressure and to rotate the rotary spray so as to provide a hard hitting washing action upon the articles being cleaned within chamber **11**. The spent spray falls upon inclined floor **12** and is delivered thereby to sump area **13** where it is pumped via the action of the low pressure sump pump through the recycling pipes into the storage tank **35** where it is filtered by the action of the strainer basket **50**.

It will be appreciated that when the storage tank is drained via tank drain valve **44** the sump pump will also be drained as will the conduit **53**.

Both pumps are controlled at junction box **57**, at which start button **58** and stop button **59** are used to start and stop the washing operation. Warning light **60** is provided on junction box **57** to give a visual indication to the operator that the machine is in operation.

Ready access to the storage tank **35** and strainer basket **50** is provided by access cover **54** which can be lifted by means of handles **55**. It can also be appreciated that the placement of the storage tank adjacent the lower portions of the sidewall **34** of chamber **11** permits for a construction which does not require support or bracing structures for the tank as the tank is supported directly on the floor level. By placing the strainer basket accessible on the top of the storage tank, thereby greater ease in cleaning the strainer is provided since all that is now required is the lifting of access cover **54** and removal of strainer basket **50**.

The positioning of the storage tank in a lowermost position permits for very short conduit connection between piping **53** and the distributor head **16** which can take the form of a direct horizontal connection **21** from connection **61** to the distributor **16** where the rotary spray nozzles **14** are supported by independent means within the chamber (not shown).

With the arrangement of parts described, all drainage ports are conveniently located in one area of the machine and all external piping is placed for ready and facile connections for repair and cleaning.

It is to be understood that the embodiment described is shown only for purposes of illustration and that various changes in detail can be made thereto without departing from the spirit and scope of this invention which are defined in the appended claims.

What I claim is:

1. Washing apparatus comprising; a washing chamber, rotary spray means for spraying washing solution into said chamber, an inclined floor within said chamber, a sump area located externally of said chamber and having a floor aligned with the lowermost portion of said inclined floor of said chamber whereby the spent spray solution is drained from said chamber into said sump area, a solution storage tank mounted externally of said chamber and of said sump area and having a floor aligned with said floor of said sump area, said storage tank being mounted in continuous adjacency with an outer side wall of said chamber and having a height reaching to below a horizontal plane passing through the center of said chamber, low pressure pump means for transferring the spent spray solution to said storage tank from said sump area, means for filtering said spent wash solution disposed within said storage tank, and high pressure pump means for delivering the filtered solution from said storage tank to said rotary spray means.

2. A washing apparatus as recited in claim **1** wherein said rotary spray means is mounted within said washing chamber in a vertical plane about an axis perpendicular to said sidewall of said chamber at the approximate center of the peripheral boundaries of said sidewall.

3. A washing apparatus as recited in claim **1** wherein said low pressure pump means comprises an immersion pump element disposed below the fill line of said sump, and conduit means extending externally of said sump area to an outlet port entering said storage tank at the top portion thereof.

4. A washing apparatus as recited in claim **3** wherein said high pressure pump means comprises an immersion pump disposed within said storage tank, and further comprising conduit means extending upwardly from said pump and upwardly from said storage tank through the sidewall of said chamber intermediate the top and bottom of said sidewall, and mounting means coupling said conduit means to said rotary spray means located within said chamber.

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