Nov. 28, 1933. C. H. VOGT 1,937,258

SCREEN OR TRAY WASHING MACHINE

Filed June 17, 1929 3 Sheets-Sheet 1

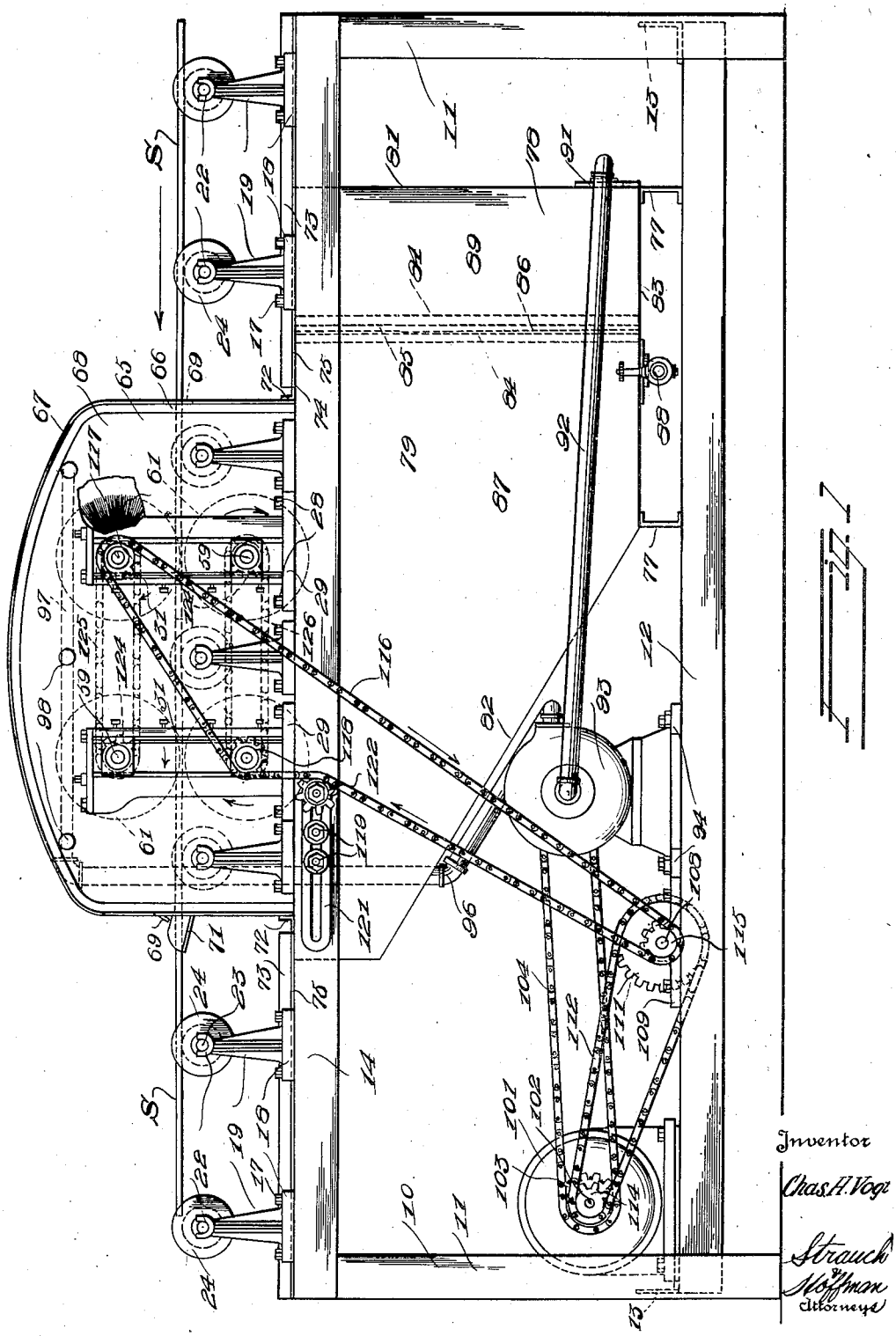


Fig. 1.

Inventor
Chas. H. Vogt
Strauch & Hoffman
Attorneys

Nov. 28, 1933. C. H. VOGT 1,937,258

SCREEN OR TRAY WASHING MACHINE

Filed June 17, 1929 3 Sheets-Sheet 2

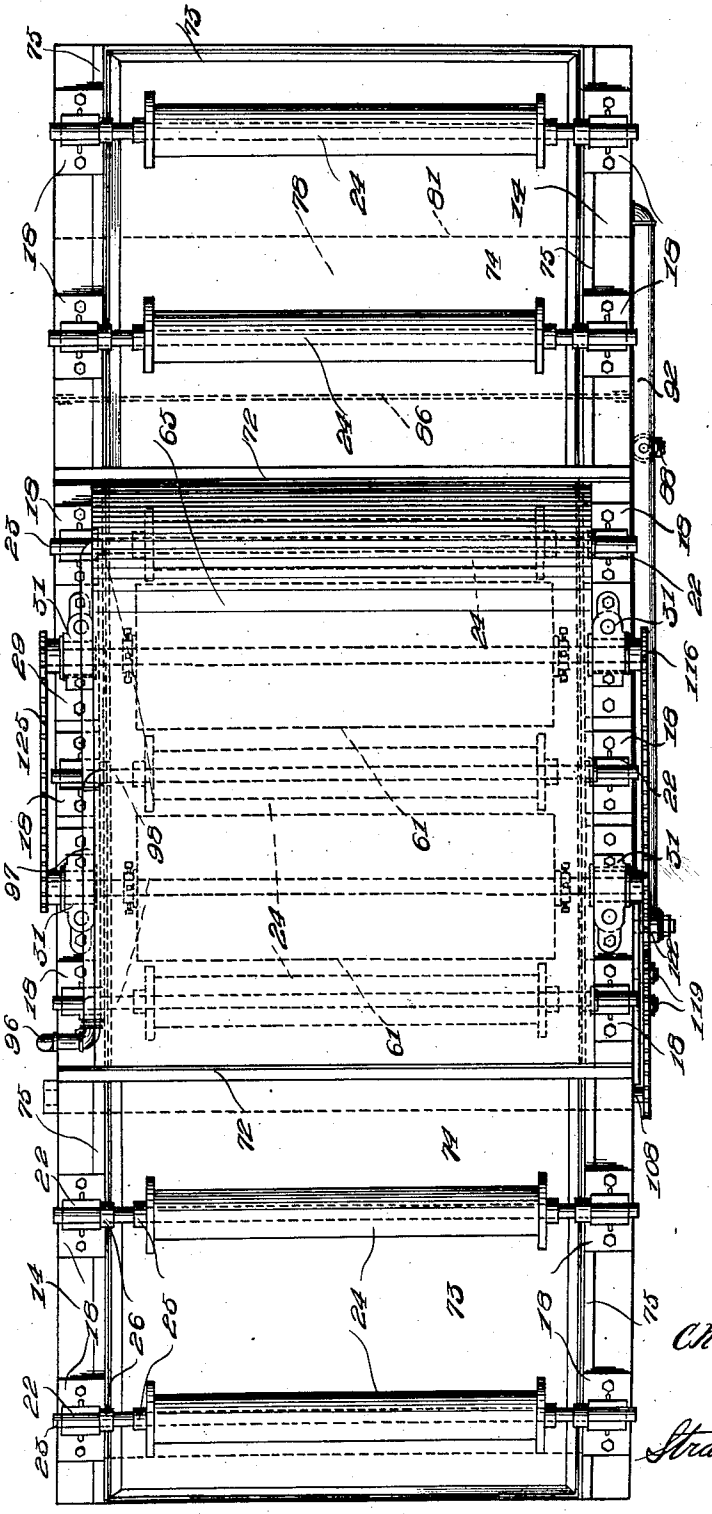


Fig. 2

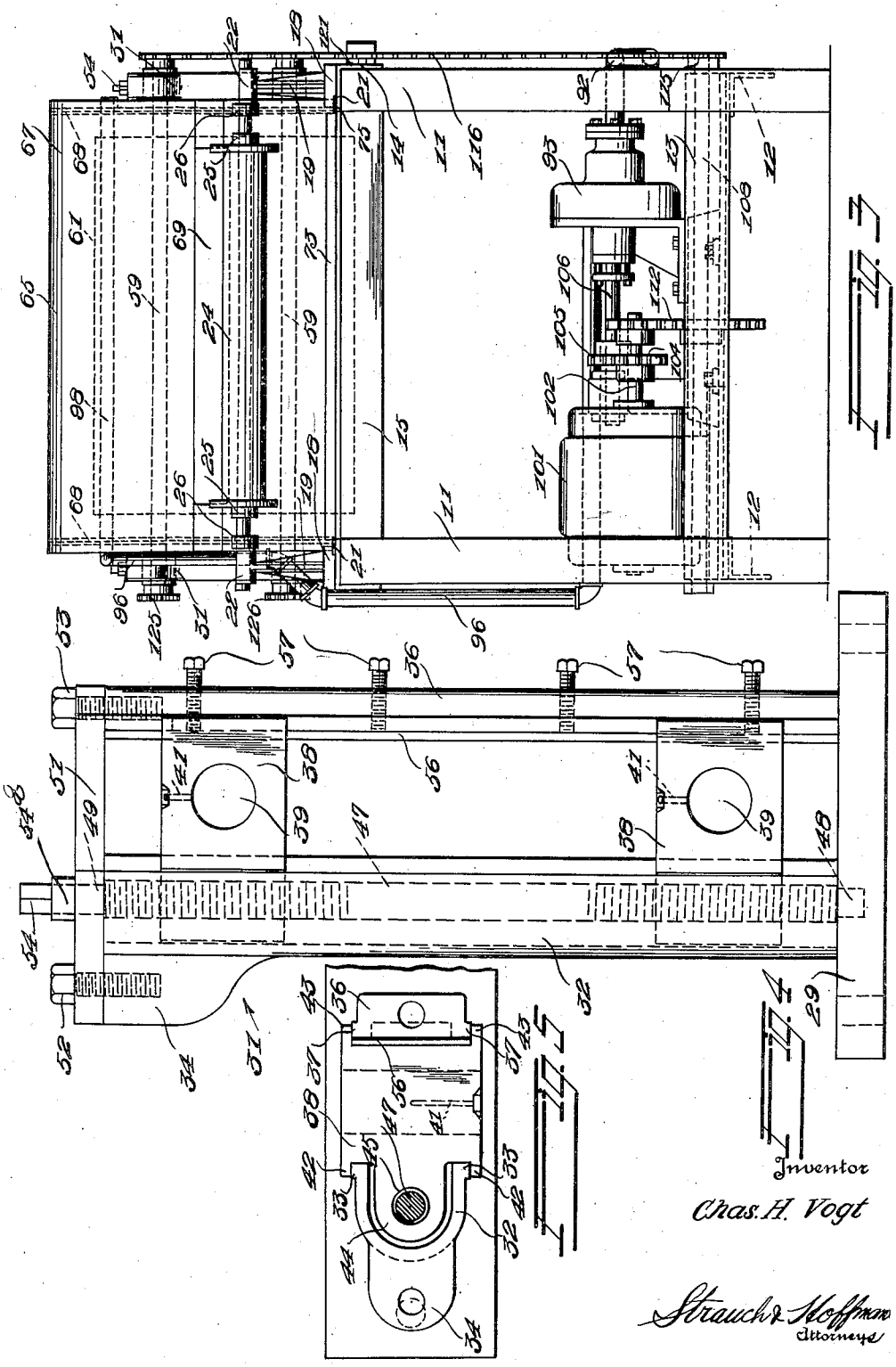
Inventor
Chas. H. Vogt

Strauch & Hoffman
Attorneys

Nov. 28, 1933. C. H. VOGT 1,937,258

SCREEN OR TRAY WASHING MACHINE

Filed June 17, 1929 3 Sheets-Sheet 3



Inventor

Chas. H. Vogt

Strauch & Hoffman

Attorneys

Patented Nov. 28, 1933

1,937,258

UNITED STATES PATENT OFFICE

1,937,258

SCREEN OR TRAY WASHING MACHINE

Charles H. Vogt, Philadelphia, Pa.

Application June 17, 1929. Serial No. 371,579

5 Claims. (Cl. 15—77)

The present invention relates to a washing machine.

More specifically, the invention relates to a machine for washing or cleansing articles to which dirt or grease closely adheres, such as articles of an open mesh or foraminous construction.

The machine of the present invention is particularly adapted to the cleansing of sausage supporting screens of the character disclosed in the co-pending application of Charles H. Vogt, Serial Number 255,942, filed February 21, 1928 though it is capable of use for cleaning any foraminous, or any tray-like bodies in rapid succession.

Difficulty has heretofore been encountered in thoroughly cleansing trays or screens made of foraminous material, wire fabric of any other screen-like material, due to the fact that it is difficult to reach the surfaces that bound the interstices in such material. Especial difficulties arise when the screen is made of wires of substantial thickness and of cylindrical contour because of the fact that the surfaces to be cleaned are rounded and accordingly variously disposed one with respect to the other. This makes it hard to reach and thoroughly scrub the entire exposed surface of such a screen, and if it is attempted to perform this task by hand the work is time consuming and laborious and not uniform in results because of the extreme difficulty in reaching all of the interstices of the screen in such an operation. This invention aims to provide a machine for thoroughly, effectively and rapidly scrubbing every portion of a tray of foraminous or screen-like formation, and to carry out this operation in succession in a number of screens without interruption.

It is further aimed by this invention to provide a sceen washing machine in which the screens are cleaned by brushes that are relatively rapidly rotated so that they tangentially engage opposite sides of the screen and that are rotated where they contact with the screen in opposite linear directions so that the brushes engage all sides or surfaces of the wires that go to make up the screen. This result is secured by virtue of the opposite rotation of the brushes, which preferably are of a width coextensive with the width of the screen upon which they operate, since the brush that rotates in one direction is peculiarly adapted to cover all surfaces of the wire facing toward the direction from which the brushes move in passing over the wires, while the other oppositely rotating brush is peculiarly adapted to cover every portion of the wire that faces toward the direction from which the bristles of said brush are moving. In this way when a screen is passed between oppositely rotating brushes of the character just referred to, every portion of the wires will be thoroughly scrubbed by the bristles of the brush, thus obtaining results that cannot be secured by any hand method, which will not assure that every portion of the wires of the screen will be reached by the brush. It will be readily understood that when screens are used in the manufacture of food products as described in the application above referred to, it becomes a matter of extreme importance to thoroughly and expeditiously cleanse the screens upon which the food products are supported in the course of their manufacture.

A primary object of the present invention is accordingly to provide a washing machine operative to effectively cleanse screens and other articles by a thorough scrubbing that may be accompanied by a flushing action.

A further object of the invention is to provide a washing machine comprising article supporting and conveying means, rotatable means for facilitating movement of the articles being washed through said machine, rotatable means for subjecting said articles to a thorough scrubbing action on both sides thereof, and means for constantly subjecting said articles to cleansing liquid sprays during said scrubbing action.

A still further object of the invention is to provide a washing machine adapted to effectively cleanse sausage supporting screens and other articles with a minimum expenditure of time and expense, which machine is comparatively simple in construction and which can be manufactured at a low cost.

With the above objects in view as well as others that will become obvious in the course of the following disclosure, reference will be had to the accompanying drawings forming part of same and, in which:

Figure 1 is a side elevational view of a washing machine constituting a preferred physical embodiment of my invention.

Figure 2 is a top plan view of the washing machine.

Figure 3 is an end elevation of the machine as seen from the left of Figure 1.

Figure 4 is a side elevational view of one of a plurality of brush supporting and adjusting means embodied in the invention.

Figure 5 is a top plan view of the construction

illustrated in Figure 4 with the top cover plate removed.

Referring to the drawings by reference characters in which like characters designate like parts, 10 designates a supporting frame for the mechanism hereinafter described.

Frame 10 is preferably constructed of angle iron members whereby a relatively light frame of substantial strength is provided and the frame preferably comprises four vertical angle members 11 arranged in rectangular formation. Members 11 adjacent the lower ends thereof have secured thereto the opposite ends of longitudinally disposed angle members 12 and members 11 at opposite ends of frame 10 are interconnected by transversely extending angle members 13, the opposite ends of which rest upon and are secured to the opposite ends of members 12.

Members 11 at opposite sides of frame 10 at the upper ends thereof have secured thereto the opposite ends of longitudinally disposed angle members 14 with the angularly disposed portions thereof in horizontal and vertical disposition and enclosing the upper ends of members 11, as is clearly indicated in Figures 1 and 3. Transversely extending angle members 15 interconnect the outer ends of members 11 at opposite ends of frame 10.

It will accordingly be seen that a relatively light frame of substantial strength is provided for supporting the mechanism about to be described. If desired such frame may be constructed in any other suitable manner.

Detachably secured to the horizontal portions of longitudinally disposed angle members 14, as by stud bolts 17, are the bases 18 of roller supports 19 which as more clearly indicated in Figure 2 are arranged on the opposite members 14 in transversely alined pairs.

The bases 18 of the two end pairs of supports 19 on frame 10 are undercut as indicated at 21 in Figure 3 providing guides for a purpose later referred to. The upper ends of supports 19 are provided with open shaft supports 22 in which are mounted the opposite ends of roller carrying shafts 23. Rollers 24 are rotatably mounted on shafts 23 by means of suitable bearings preferably, of the well known ball or roller type. Rollers 24 are mounted against endwise movement by collars 25 fixed to shafts 23; the shafts 23 being maintained against endwise movement by collars 26 fixed to shafts 23 by any suitable means.

Detachably connected to the horizontal portions of angle members 14 in longitudinal alinement with bases 18 of supports 19, as by stud bolts 28, are the rectangular bases 29 of brush supporting and adjusting members 31, there being two transversely alined pairs of such members as clearly indicated in Figure 2, disposed on opposite sides of central roller supports 19 between said support and the supports adjacent thereto.

Each of the members 31 (Figures 4 and 5) comprises a vertically disposed member 32 of substantially U-shape in transverse section provided with outwardly directed edge flanges 33, merging into an upper thickened section 34. Each member 31 further comprises a vertically disposed channel member 36 in spaced relation to member 32 and provided with outwardly directed flanges 37 opposing flanges 33 as clearly indicated in Figure 5.

Adjustably disposed between members 32 and 36 is a pair of vertically spaced brush journal blocks 38 each provided with a brush shaft receiving bore 39 with which communicates a lubricating duct 41 extending through the block for lubricating the brush shafts. Each block 38 is provided with flanges 42 and 43 on opposite sides thereof in guiding engagement with flanges 33 and 37 respectively and each block 38 is further provided intermediate flanges 42 with an arcuate ended projection 44 for slidable reception within the channel in member 32.

Projection 44 is provided with a threaded aperture 45, the apertures 45 in the vertically spaced blocks 38 being in vertical alinement. Meshing with the threads in apertures 45 of the blocks 38 are oppositely pitched threads of an adjusting screw 47 swivelly mounted at the lower end thereof in base plate 29, as indicated at 48, and swivelly mounted at the outer end thereof as indicated at 49 in a cover plate 51 detachably secured to the outer ends of members 32 and 36 by bolts 52 and 53 respectively. The upper end of screw 47 is provided with an angular extension 54 for engagement of a suitable tool for imparting rotation to screw 47 for moving blocks 38 toward or away from each other.

Secured to screw 47 by means of a set screw is a collar 54a which is adapted to support screw 47 from cover plate 51, so that bearing bores 39 are properly aligned with the screws.

Disposed between blocks 38 and member 36 and confined between flanges 43 of blocks 38 is a wedge plate 56 normally maintained in firm engagement with the adjacent sides of blocks 38 by set bolts 57 adjustable in threaded apertures in member 36 with the ends thereof in engagement with plate 56.

Rotatably journalled in bores 39 of each pair of transversely alined blocks 38 are the opposite ends of shaft 59 of a rotary brush 61 comprising a long wooden or metallic hub provided with basseen fibres constituting the brush proper.

It will thus be seen that two longitudinally spaced pairs of vertically disposed rotary brushes are provided, the brushes of each pair being adjustably mounted upon loosening bolts 57 and turning screw 47 and it will be observed from Figure 1 that brushes 61 of each vertical pair thereof substantially touch each other in a line tangent to rollers 24 for the passage of articles being cleaned between the brushes and conveyed on rollers 24 in a manner more fully explained hereinafter.

Detachably supported on frame 10 is a hood 65, which is preferably constructed of upwardly arched opposite side reinforcing bars 66, an outer cover 67 and opposite sides 68. The hood 65, as clearly indicated in Figures 1, 2 and 3, encloses the brushes 61 and the three adjacent rollers 24. Said hood 65 is provided in the opposite ends thereof with slots 69 for the passage of articles to be cleaned through the hood 65. Hood 65 adjacent the exit slot 69 is also provided with a lip 71 for a purpose later described.

Extending transversely of frame 10 and secured to members 14 thereof are angle bars 72, which, as indicated in Figures 1 and 2, have the vertical flanges thereof in engagement with the opposite ends of hood 65 adjacent the base thereof. The horizontal flanges of bars 72 provide stops for trays 73 one of which is removably positioned on frame 10 adjacent each end thereof, each of the trays being of shallow box formation and having the bottom 74 thereof laterally extended at each side to provide guide flanges 75 slidably disposed in guides 21 of the bases 18 of roller supports 19, thus providing for removal or re-

placement of the trays. It will be noted upon inspection of Figure 2 that trays 73 are open at the inner ends thereof adjacent hood 65 for a purpose later described.

Supported on members 12 of frame 10, in transverse disposition thereto, and suitably secured thereto are channel beams 77 on which is supported a tank 78 of a width substantially equal to that of frame 10 and of a length at the top thereof substantially exceeding the length of hood 65, the tank comprising parallel sides 79, a vertical end wall 81 and a substantially long inclined end wall 82 providing a substantially short base or bottom 83. Secured to opposite sides 79 of tank 78 adjacent end wall 81 in laterally alined position are vertically disposed angle bars 84 providing guide slots 85 in which are positioned the opposite edges of a screen 86 defining a relatively large compartment 87 beneath hood 65 which is provided with a cleaning valve 88 in bottom 83, and a substantially small compartment 89 provided in the end thereof adjacent bottom 83 with a connection 91 to which one end of a water pipe 92 is connected. The water pipe 92 extends along a side of tank 78 with the opposite end thereof in connection with a water pump 93 of any suitable construction, which, as indicated in Figures 1 and 3, is secured to transverse bars 94 in turn secured to frame members 12. In communication with pump 93 is one end of a second water pipe 96 which extends upwardly from pump 93 along the side of tank 78 opposite to pipe 92 and which at the upper end thereof comprises a longitudinally disposed pipe section 97 located within hood 65 in communication with which are a plurality of laterally disposed pipes 98 each provided with a multiplicity of openings forming nozzles.

Supported on members 12 of frame 10 is a high power electric motor 101, which provides motive power for the brushes 61 and pump 93 in the following manner. Secured to motor shaft 102 is a sprocket wheel 103 with which meshes a sprocket chain 104, which is in meshing engagement with a sprocket wheel 105 secured to pump shaft 106, the sprocket wheels 103 and 105 being of substantially equal diameter whereby pump 93 is driven at the same speed as that of motor 101. It is however desirable that brushes 61 be rotated at a less speed than that of motor 101 and consequently a reduction drive between motor 101 and brushes 61 is provided which comprises a counter shaft 108 rotatably journaled in a bearing 109 secured to members 12. To counter shaft 108, intermediate members 12, is secured a substantially large sprocket wheel 111 in engagement with a sprocket chain 112 which sprocket chain is in engagement with a substantially smaller sprocket wheel 114 secured to motor shaft 102 outwardly of sprocket wheel 103, whereby countershaft 108 will be rotated at a substantially reduced speed to that of motor shaft 102. Secured to countershaft 108 outwardly of frame 110 is a substantially small sprocket wheel 115 which is engaged by a sprocket chain 116 which passes around a sprocket wheel 117 secured to the shaft of the upper brush 61 of one vertically alined pair thereof, and a sprocket wheel 118 secured to the shaft of the lower brush 61 of the other vertically alined pair thereof. Longitudinally adjustably connected to one of the members 14 of frame 10, by bolts 119, is an idler sprocket wheel support 121, on which is rotatably supported an idler sprocket wheel 122 in engagement with sprocket chain 116, whereby chain 116 is maintained in an effective taut condition by adjustment of support 121.

Secured to the ends of shafts 59 of brushes 61 opposite to the ends carrying sprocket wheels 117 and 118 are sprocket wheels 124 those carried by the upper shafts 59 being operatively engaged with a sprocket chain 125 and those carried by the lower shafts 59 being operatively engaged into a sprocket chain 126.

In operation of the machine described, the screens to be cleaned are delivered to the machine from the right hand end thereof, as seen in Figure 1, in which two screens are shown supported on rollers 24 and designated by the character S.

In carrying out the cleaning and washing operations, motor 101 is set into operation by closing a suitable switch which through its rotating shaft 102 imparts rotation to the sprocket wheels 103 and 114, which, in turn, impart movement to the sprocket chains 104 and 112 which chains through their respective driving engagement with sprocket wheels 105 and 111 impart rotation to pump shaft 106 and the counter shaft 108. The rotating counter shaft 108, rotating at a substantially reduced speed to that of motor shaft 102, imparts movement to sprocket chain 116 through the sprocket wheel 115. Sprocket chain 116 which travels in a direction indicated by the arrows in Figure 1 imparts rotation to the upper brush 61 of the right vertically disposed pair of brushes, as seen in Figure 1, through sprocket wheel 117 secured to the shaft 59.

Said chain further imparts rotation to the lower brush 61 of the left vertically disposed pair thereof through the sprocket wheel 118, chain 116 being maintained substantially taut by the adjustable idler sprocket 122, so that effective driving engagement with sprocket wheels 117 and 118 of the respective brushes 61 is assured.

It will be seen, upon inspection of Figure 1, that sprocket chain 116 is driven by motor 101 in such direction that the driven brushes 61 are rotated clockwise as viewed in Figure 1 and the other brushes 61 are driven in a like direction through sprocket chains 125 and 126 by the motor driven brushes 61.

The screens are, preferably, fed to the machine in a reversed position which has proven best for thorough cleaning of the screens.

As the screens usually contain more adherent extraneous material on the top than on the bottom, the top of the screen is brought so it contacts with the brush that rotates in the direction opposite to that in which the screens are moved through the brushes, such opposite rotation of the brushes being very effective to clean surfaces that are brought toward the brushes so that they tend to prevent moving the screens between the brushes. The screens are successively placed on rollers 24 by an attendant from the right hand end of the machine as seen in Figure 1 in a reversed position, or with the bottoms thereof upward, and are pushed forward through opening 69 in hood 65 and between the adjacent peripheries of the upper and lower rotating brushes 61.

The upper brushes 61 whose lower portions move to the left as seen in Figure 1 assist in moving the screens S through the machine by meshing of the fibres or bristles of the brushes with the open screen structure and the lower brush 61 whose screen engaging portions move in the opposite direction, or to the right as seen in Figure 1 thoroughly brush the sausage supporting surfaces of the screens. The upper brushes,

while assisting in moving the screens forward, also aid in cleaning the screens. It is necessary that the screens be pushed by the attendant, until they are at least half way through the machine, and then preferably, they are held for a short period of time in order to submit all parts of the screens to a thorough cleaning by having the brushes contacting with the top and bottom of the screens move relatively to the screen. This results in a thorough scrubbing of the screens on both sides and around all of the wires that enter into its construction.

Simultaneous with the movement of the screens between the rotating brushes 61 a constant spray of water flows onto the upper brushes 61 and screens S from nozzle pipes 98, to which pipes the water is pumped under pressure by pump 93 from compartment 89 of tank 78 through pipes 92 and 96.

The water from spray pipes 98 assist in loosening the dirt or any extraneous material on screens S and washes the loosened material from the screens into compartment 87 of tank 78. Screen 86 separating compartments 87 and 89 in tank 78 confines the solid materials washed from the screens to compartment 87 from which compartment the material can be drained from time to time through cleaning valve 88.

The water in compartment 89 is thus substantially freed of sediment by screen 86 and said water or other cleansing liquid may be repeatedly returned by pump 93 through pipes 92 and 96 to the spray pipes 98. Thus it will be seen that by the provision of screen 86 in tank 78 a given supply of cleansing liquid may be used repeatedly for some time for effectively washing the screens, and that no suspended solids are conveyed to the pump at any time to clog or restrict its action.

As the screens S pass between brushes 61, they emerge from hood 65 through the exit opening 69 adjacent to which the inclined lip 71 catches all water that has a tendency to fall out of exit opening 69 in hood 65 and returns the water to tank 78. The screens at the opposite or exit end of the machine are removed by a second attendant.

In order to facilitate the cleaning of the screens they are preferably soaked in hot water in a tank truck, prior to being placed in the washing machine, to loosen the dirt or grease on their surfaces.

Tepid water is used in tank 78 as hot water would soften the basseen brushes and thus reduce their cleaning efficiency. For most effective operation, the bristles of the brushes should be relatively stiff, and, if desired, may be made of wire for certain kinds of work. If wire brushes are used, hot water as cleansing liquid may be employed, provided of course, that the nature of the work to be accomplished permits the use of such water or liquid without interfering with the cleansing process.

By the provision of hood 65 the cleansing liquid is confined in proximity to brushes 61, preventing splashing. Said liquid is thus conserved for repeated use in the manner above described. Trays 73 catch the drip from screens S fed to and from rollers 24. By virtue of the sliding arrangement of the trays, they can be readily withdrawn for cleaning or replacement. By the elimination of the inner ends of the trays 73, the trays may be pulled outward a short distance from bars 72, and the accumulated material thereon brushed over the inner free ends of the trays into compartment 87 of tank 78.

By the provision of the brush supporting and adjusting members 31 comprising the adjustable brush shaft journal blocks 38, the brushes 61 can readily be adjusted for effecting proper vertical spacing thereof for most effective cleansing action on screens of various sizes passing between the vertically disposed brushes.

From the foregoing it will be seen that a washing machine is provided well adapted for the cleansing of various articles and especially adapted to the effective and expeditious cleaning of sausage supporting screens of the character disclosed in said co-pending application. It will further be seen that the machine, while admirably adapted for effective cleaning is comparatively simple in construction thus enabling it to be manufactured and maintained at substantial low cost.

While I have disclosed a single specific embodiment of the invention, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range or equivalancy of the claims are therefore intended to be embraced therein.

What I claim and desire to secure by U. S. Letters Patent is:

1. A screen washing machine comprising a frame; laterally disposed longitudinally spaced pairs of supports detachably supported on said frame adjacent the opposite sides thereof; rollers rotatably supported by said supports; two longitudinally spaced pairs of laterally disposed brush supporting members detachably supported on said frame adjacent the opposite sides thereof in substantially longitudinal alinement with said supports; a hood detachably supported on said frame and enclosing said brush supporting members; a pair of rotatable brushes supported in vertical disposition by each pair of said members; a plurality of spray pipes extending through said hood; said hood provided with openings in the ends thereof for the passage of screens on said rollers and between said brushes; a water tank supported by said frame beneath said hood; means for pumping water from said tank into said spray pipes; and means for driving said last means and imparting rotation to said brushes.

2. The combination defined in claim 1 in which said supports adjacent the opposite ends of said frame are provided with guides; and a sediment collecting tray supported by said frame adjacent each end thereof; said trays provided with flanges slidably disposed in said guides.

3. A screen washing machine comprising a frame; a plurality of longitudinally spaced screen supporting and guiding rollers supported on said frame; two pairs of vertically disposed rotatable brushes supported on said frame intermediate the ends thereof, said vertically disposed brushes having the adjacent peripheries thereof substantially in alinement with the outer peripheries of said rollers; a water storage and sediment collecting tank supported by said frame beneath said brushes; a hood supported by said frame and enclosing said brushes; a plurality of spray pipes supported by said hood adjacent the upper ones of said brushes; a pump supported by said frame; pipe connections between said pump and said

tank and spray pipes; a motor supported by said frame; and drive connections between said motor and said brushes and said pump.

4. The combination defined in claim 3 in which said drive connections comprise a pair of sprocket wheels secured to the shaft of said motor, a sprocket wheel secured to the shaft of said pump, a sprocket chain in driving engagement with one of said first sprocket wheels and said last sprocket wheel for driving said pump, a counter shaft rotatably supported on said frame, a substantially large sprocket wheel secured to said counter shaft, a sprocket chain in driving engagement with the other of said first sprocket wheels and said last sprocket wheel, a substantially smaller sprocket wheel secured to said counter shaft, a sprocket wheel secured to adjacent ends of the shafts of an upper and lower brush of each of the two vertically disposed pairs thereof, a sprocket chain operatively engaged with said smaller sprocket wheel on said counter shaft and said last sprocket wheels, and adjustable idler sprocket wheel engaged with said last sprocket chain, sprocket wheels secured to the opposite ends of the shafts of said brushes, and a sprocket chain operatively engaged with the sprocket wheels of the upper and lower brushes respectively.

5. The combination defined in claim 3 in which each pair of said brushes are supported by a pair of laterally disposed members detachably connected to said frame, each of said members comprising a pair of longitudinally spaced vertically disposed guides, a pair of vertically spaced brush shaft journal blocks slidably supported by said guides, each of said blocks provided with a threaded bore, the threads of the bore in one block being of opposite pitch to those in the other block, a divided threaded screw swivelly mounted in one of said guides with the threads thereof operatively engaged with the threads in said bores, said screw provided with an angular head for facilitating rotation thereof for adjusting said blocks toward or away from each other, a wedge plate disposed adjacent the other of said guides, and set bolts supported by said last guide for binding said wedge plate into engagement with said blocks for maintaining same in adjusted position.

CHARLES H. VOGT.