

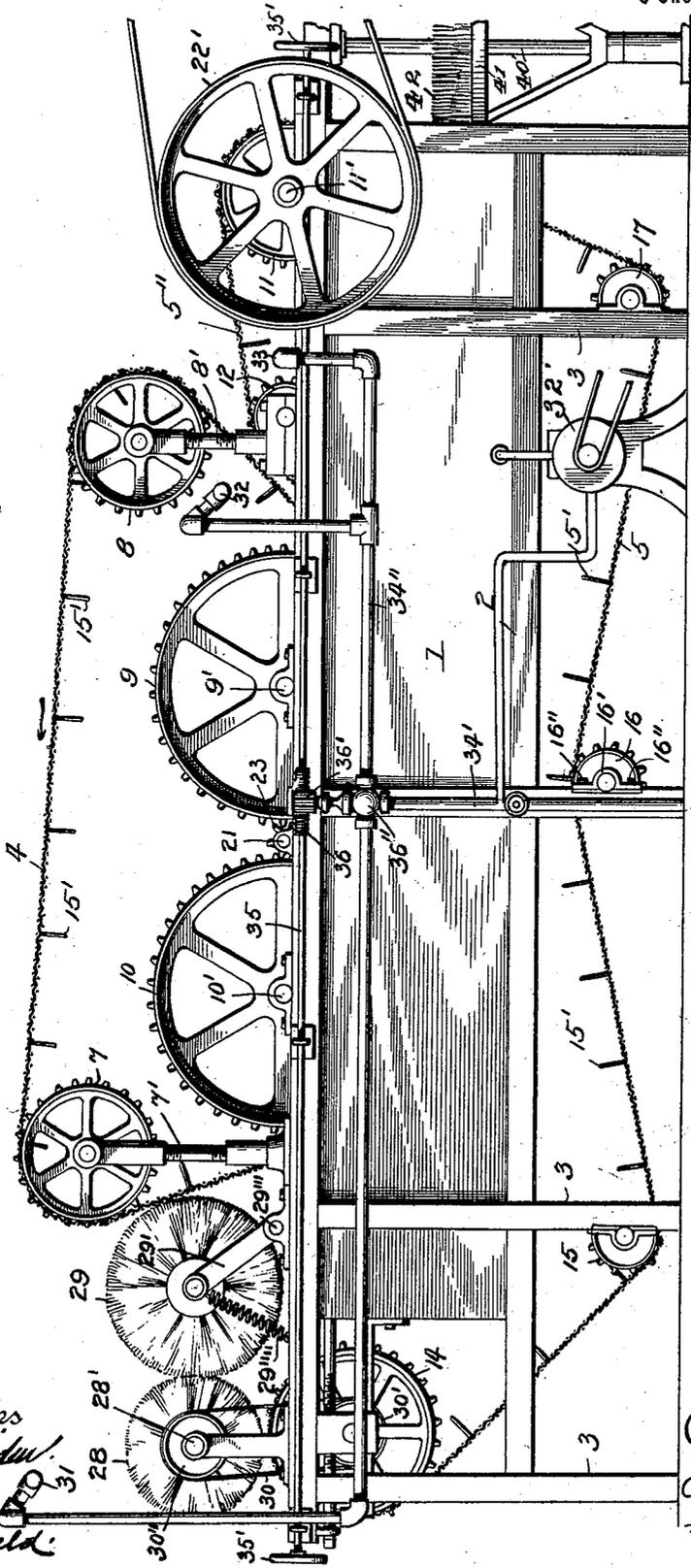
C. B. KNOTT.
DISH WASHING MACHINE.

(Application filed Nov. 13, 1899. Renewed Jan. 22, 1902.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses
[Signature]
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Inventor
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 by
Russell S. Knott
 his Attorneys

No. 695,400.

Patented Mar. 11, 1902.

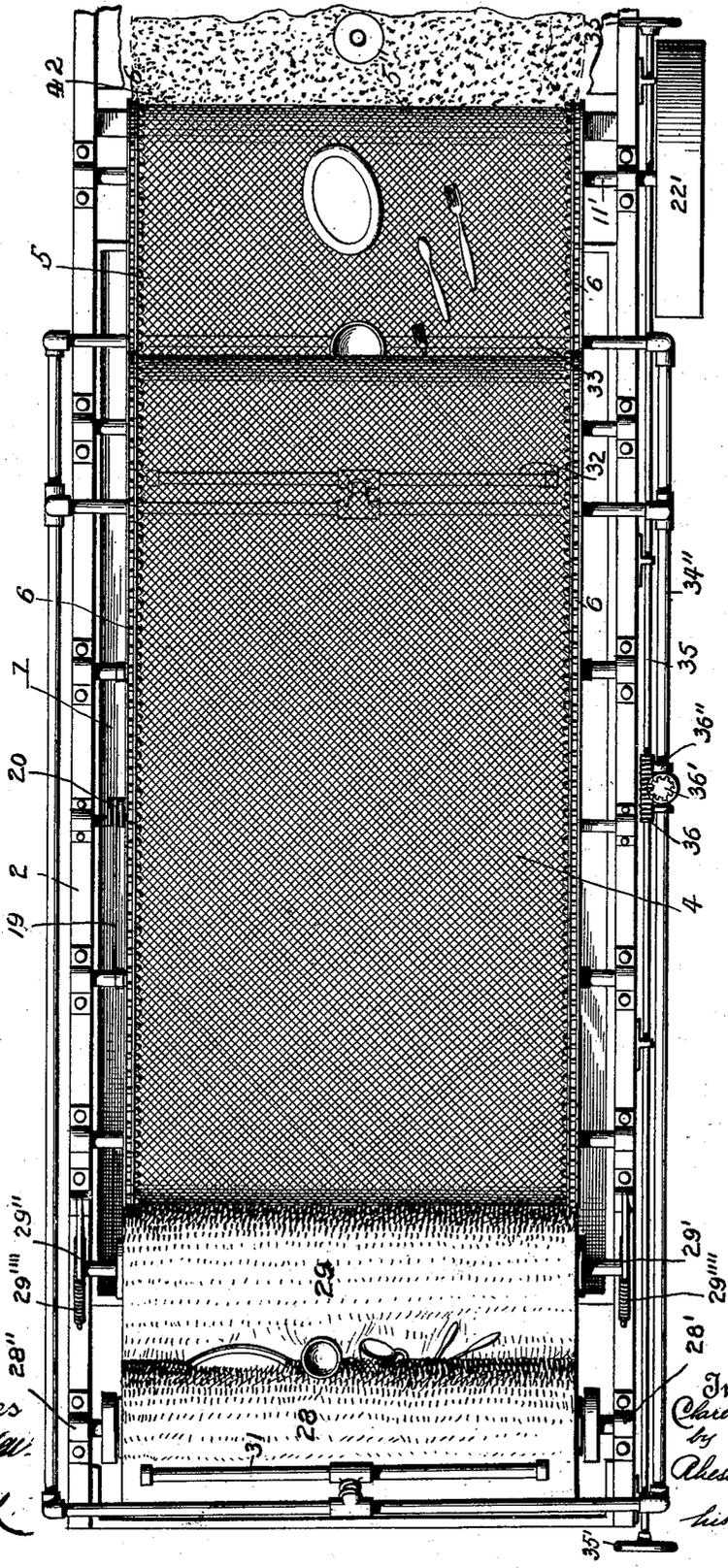
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Fig. 2.



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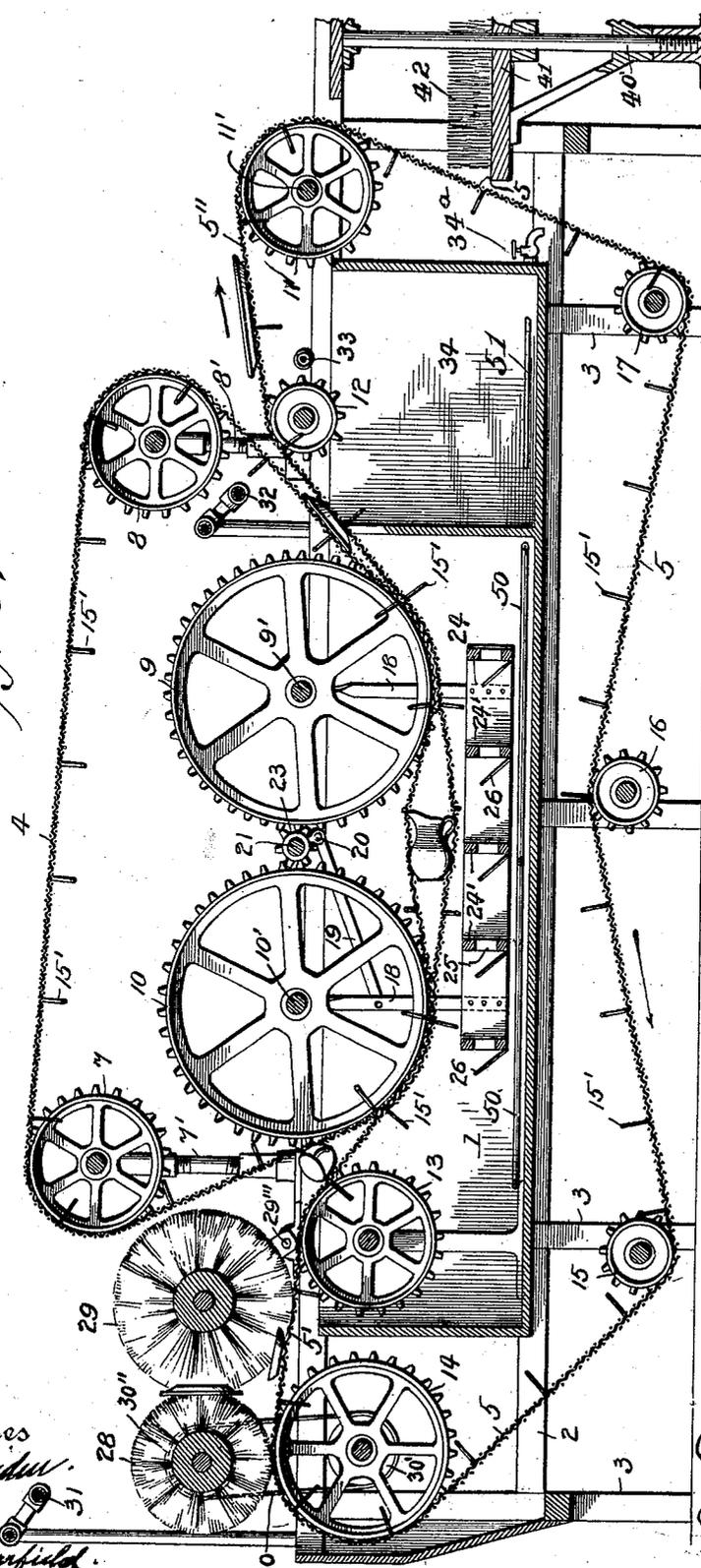
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Fig. 3.



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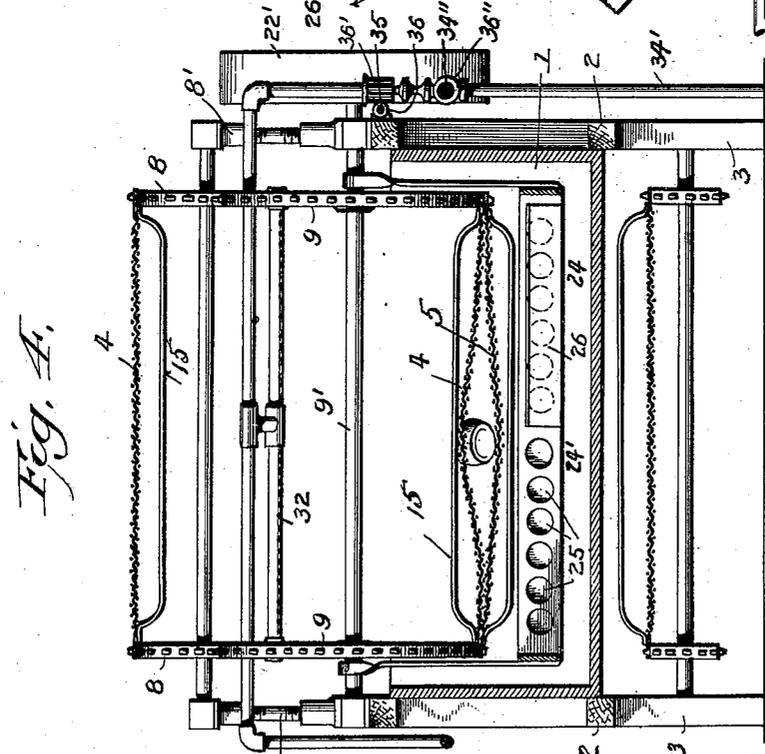
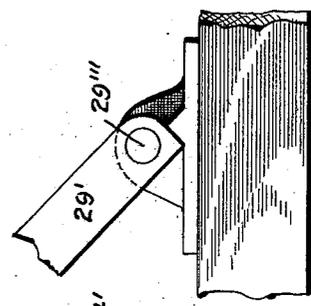
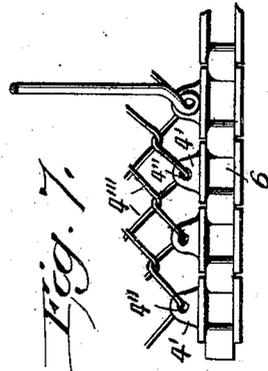
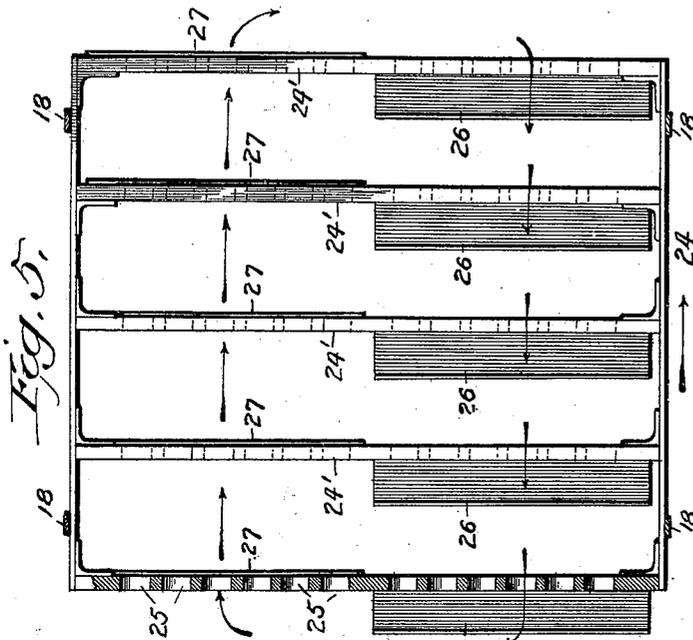
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DISH WASHING MACHINE.

(Application filed Nov. 13, 1899. Renewed Jan. 22, 1902.)

(No Model.)

5 Sheets—Sheet 4.



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(No. Model.)

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Fig. 8.

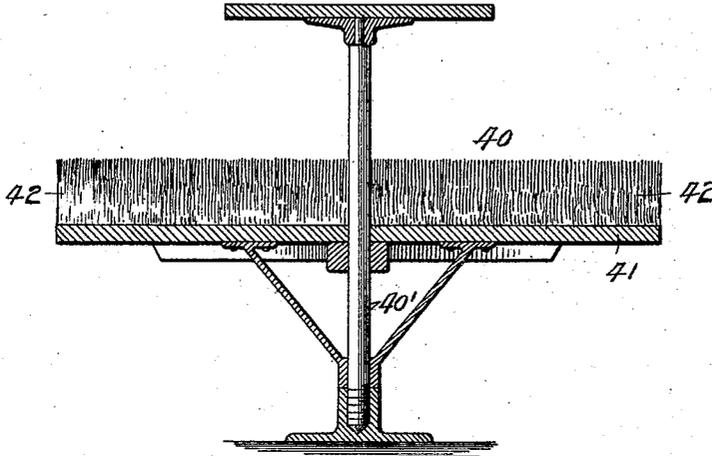
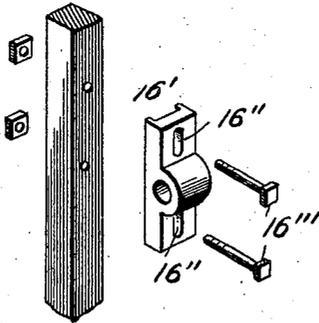


Fig. 9.



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INVENTOR
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UNITED STATES PATENT OFFICE.

CLARENCE B. KNOTT, OF NEW YORK, N. Y.

DISH-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,400, dated March 11, 1902.

Application filed November 13, 1899. Renewed January 22, 1902. Serial No. 90,335. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE B. KNOTT, a citizen of the United States of America, residing in New York city, in the county and State of New York, have invented a new and useful Improvement in Dish-Washing Machines, of which the following is a specification.

My object is to provide a machine which while in continuous motion will indiscriminately receive, grasp, and wash various sizes and kinds of eating utensils—such as knives, forks, spoons, plates, cups, saucers, pitchers, bowls, glasses, &c.—much more rapidly and with comparatively little labor and liability to breakage and chipping them.

A further object of my invention is to make the machine self-cleaning, whereby the water in the washing-tank will not become foul as quickly as in machines of this kind formerly used.

These purposes are accomplished through the medium of a pair of oppositely-disposed aprons or conveyers which continuously move together with dishes between them through a washing compartment or tank, in connection with certain other peculiar features whereby dishes entered at one end of the machine are grasped, held apart from one another, and washed while in transit and then passed out at the other end of the machine, all of which will be more fully described hereinafter and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my complete invention; Fig. 2, a top view thereof; Fig. 3, a longitudinal vertical section of the machine; Fig. 4, an end view of the machine in which some parts of it are removed and others shown in section to better illustrate the mechanism; Fig. 5, a top view of the agitator, a part of which is cut away to better show the apertures through which the suds or washing agent is forced to flow. Fig. 6 is a detail view showing the manner of attaching one of the brush-hangers; Fig. 7, a detail view of a portion of one of the dish-conveyers, and Fig. 8 is a view of a cushioning or catching device upon which any dishes that may escape the operator at the receiving end

will fall. Fig. 9 is a detail view of the adjustable bearing.

The reference-numeral 1 represents a suds-tank or washing-compartment supported in any suitable frame, such as 2, and mounted on legs 3. This tank is adapted to hold the washing fluid, consisting, preferably, of hot water containing soap and soda. The dishes are carried down through the fluid by a pair of endless conveyers 4 and 5, placed one above the other in such a manner that the bottom of the upper conveyer lies upon the top of the lower conveyer, and the two will travel slowly together through the tank with dishes between them. Both conveyers are composed of non-corrodable network, preferably brass, through the open meshes of which the washing fluid will pass to attack the dishes upon all sides. The edges of both conveyers are provided with sprocket-chains 6, by which they are propelled and kept at the proper longitudinal tension. The chains are prevented from being drawn off the sprocket-wheels over which they pass by transverse span-bars 15', which have their opposite ends attached to the links of the chain and are arched to allow for the spreading of the conveyers when the dishes are between them. The chains of the upper conveyer pass over four sprocket-wheels 7, 8, 9, and 10. The upper wheels 7 and 8 are mounted in bearings supported on vertical adjusting-screws 7' and 8', whereby the wheels can be raised or lowered to tighten or loosen the conveyer. The lower sprocket-wheels 9 and 10 are of larger diameter than the upper wheels, so that their lowermost portions will carry the conveyers down into the fluid in the tank 1 and will also lie far enough apart to give the immersed portion of the conveyers a horizontal stretch sufficient to expose the dishes between them to the action of the washing fluid during as long a period as possible. The means of attaching the network portion of the conveyers to the sprocket-chains consist of laterally-projecting ears 4', cast integral with the links and provided with holes 4'', through which the wires 4''' pass. The lower conveyer is made longer than the upper conveyer to form a receiving portion 5'

at the receiving end of the machine and a discharge portion 5" at the discharge end of the machine.

11, 12, 13, 14, 15, 16, and 17 are the sprocket-wheels over which the lower-conveyer chains pass. The sprocket-wheel 16 is mounted in adjustable bearings 16', provided with oblong slots 16", through which the set-screws 16''' pass.

10 The tank is heated by steam-pipes 50, located in the bottom thereof. These pipes are perforated to permit small jets of steam to escape into and heat the washing fluid submerging them. The hot fluid in the tank 15 may be projected against the dishes in various ways; but I prefer to do it with an agitator suspended by hangers 18. The agitator will reciprocate below the lowermost portion of the aprons or conveyers. The hang- 20 ers swing from the shafts 9' and 10', on which the large sprocket-wheels 9 and 10 are fixed. The means for actuating the agitator consist of a pitman 19, connected to a crank 20 on a shaft 21, which shaft is provided with a pin- 25 ion 23, interposed between and meshing with the contiguous sides of the two large sprocket-wheels 9 and 10. The agitator, as better shown in Fig. 5, consists of a rectangular frame 24, open at the top and bottom and containing 30 several vanes 24', each of which has a series of apertures 25, through which the washing solution in the tank flows, as indicated by arrows. Check-valves 26 on one side of the series of vanes cooperate with one half of the 35 series of apertures and a similar set of check-valves 27 on the opposite side of the vanes cooperate with the other half of the series of apertures, so that when the agitator is moved in one direction one set of valves closes, while 40 the other set opens, driving the fluid in a continuous direction and producing a cyclonic whirl, such as denoted by arrows, and projecting the fluid against the slowly-passing dishes while they are held in their isolated po- 45 sitions between the network of the conveyers.

At the front or receiving end of the machine are located two large revoluble feed-brushes 28 and 29, which serve to receive the dishes from the hand of the operator and direct them independently of one another down 50 upon the conveyer below. The brush 29 bears against both conveyers and scrubs them. This scrubbing action of the brushes will prevent the formation on the conveyers of a 55 film which would leave a mark on the dishes, an objection common to the wire brackets used to immerse dishes in tanks. These brushes also serve to give the dishes a preliminary scrubbing before they enter the 60 tank. One of the feed-brushes 28 is journaled in fixed bearings 28' and 28'', and the other, 29, is journaled in the free ends of oscillating arms 29' and 29'', the latter being pivoted at 29''' to move toward and from the stationary 65 brush 28, a coil-spring 29'''' holding it normally against the latter, whereby the brushes

will accommodate themselves to various sizes of dishes. The fixed brush operates upon the top of the lower apron or conveyer and brushes off the adhering particles of food 70 which it brings up from the tank. The stationary brush is revolved by a short belt 30, passing around pulley 30' on the shaft of the sprocket-wheel 14, together with a pulley 30'' on the shaft of the brush 28. The bristles of 75 both brushes mesh, and hence motion is communicated from one to the other. A sprinkler 31 overhangs the brushes and projects hot water on the dishes before they are entered between the brushes and also washes the 80 latter. Sprinklers 32 and 33 are disposed, respectively, above and below the conveyers at the discharge end of the machine and over a tank 34 for the purpose of rinsing the dishes 85 after they have passed through the suds-tank. These rinsing-sprinklers may be connected with a pump 32', which draws the water from the tank 34, into which much of it falls after having rinsed the dishes.

34' and 34'' are the supply-pipes for fur- 90 nishing hot water to the sprinklers. It is also obvious that pipe 34' may be connected with any hot-water supply and the pump dispensed with, in which event the tank 34 could be drained, as occasion might require 95 it, by opening cock 34^a. The action of the sprinklers is controlled by a horizontal rod 35, which extends along the side of the frame of the machine and is provided with oper- 100 ating-knobs 35' at its opposite ends. The rod is provided at the middle with a worm 36, which meshes with a pinion 36' on the stem of a three-way cock 36'' at the junction of the pipes 34' and 34'', whereby an operator station- 105 ed at either end can control the sprinklers by merely turning the knobs.

A cushioning device 40 is disposed under- 110 neath the discharge end of the lower conveyer to receive those dishes which might escape the operator. This device consists of a stand- 40', on which is mounted a revolving hori- zontal table 41, covered with vertical bristles 42. Dishes falling on the table can be quickly 115 moved out of the way of succeeding dishes by revolving the table.

The whole machine is actuated by a pulley 22' on the shaft 11', which carries the sprocket- 115 wheels 11.

The operation of the machine is as follows: Having first supplied the tank with water 120 containing the proper amount of soap and soda and heated the water by the jets of steam and having started the machine, the agitator will soon churn up the solution to the required degree. The sprinklers being 125 now turned on, the dishes should be passed under them to give them a preliminary flushing and thence between the brushes 28 and 29. From the brushes the dishes fall upon the projecting portion of the lower conveyer 130 and are carried forward beneath the upper conveyer, which engages their upper portions

and holds them separately and firmly between the two conveyers. They are then carried slowly down and immersed in the fluid of the tank. This fluid is in a high state of ebullition and dashes against the dishes from all sides. The agitator is timed to make about six or seven reciprocations, and thus project the suds an equal number of times against each dish while it passes through the tank. The network of the reticulated conveyers allows the washing fluid full play upon the dishes and exposes them fully to the action of the fluid. The dishes then pass upward and outward and are then rinsed upon both sides as they pass between the sprinklers 32 and 33. The water coming from the sprinklers 32 and 33 is made very hot by a heater 51, located in the tank 33' below, and may be used over and over again by means of a pump 32' of any suitable design. The conveyer will catch and carry out of the tank the loose particles of food liberated from the dishes. Therefore it will be seen that the washing fluid in the tank is automatically kept clean. In the event of a dish passing through the machine without being thoroughly cleaned it can be placed upon the top fold of the upper conveyer and returned to the starting-point to pass through the machine again.

I believe myself to be the first to provide a dish-washing machine which while in continuous motion is capable of indiscriminately receiving and grasping without preadjustment various sizes and kinds of dishes and eating utensils and of securely holding them immovably apart from one another, so that they cannot clash and become nicked or broken while being carried through the machine.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dish-washing machine, a tank or washing-compartment, in combination with two reticulated coating dish-conveyers which travel together in and out of the compartment, with dishes between them, and means whereby the conveyers automatically adapt themselves to various sizes of dishes, substantially as described.

2. In a dish-washing machine, a tank or washing-chamber in combination with a pair of reticulated conveyers arranged to travel together through the tank with dishes between them, and means for regulating the tension of the conveyers and hence their relation to each other.

3. In a dish-washing machine, a tank or washing-chamber and two reticulated dish-conveyers adapted to travel together through the tank, in combination with agitating and rinsing devices, substantially as described.

4. In a dish-washing machine, two oppositely-disposed dish-conveyers adapted to grasp dishes of various sizes between them and provided with means for regulating their ten-

sion in relation to each other, in combination with a washing-compartment through which the dishes pass, and means for projecting the contents of the tank against the dishes as they pass through the compartment, substantially as described.

5. In a dish-washing machine, a tank or washing-chamber, in combination with two endless reticulated conveyers movable together through the tank, and an agitator, substantially as described.

6. In a dish-washing machine, the combination of a tank for holding the washing fluid, devices for continuously conveying dishes in and out of the tank, devices for dashing the fluid against the dishes while in transit, and devices for continuously removing foreign matter from the fluid, substantially as described.

7. In a dish-washing machine, a suds-tank provided with a pair of conveyers traveling through the fluid in the tank and adapted to hold dishes between them, in combination with rinsing devices, substantially as described.

8. In a dish-washing machine, a suds-tank provided with a pair of adjustable reticulated conveyers traveling through the fluid in the tank and adapted to hold dishes between them, in combination with rinsing devices, substantially as described.

9. In a dish-washing machine, a suds-tank provided with a pair of adjustable reticulated conveyers traveling through the fluid in the tank and adapted to hold dishes between them in combination with rinsing devices and an agitator, substantially as described.

10. In a dish-washing machine, a suds-tank, in combination with an endless conveyer composed of network and provided with bowed spread bars, which are attached to and span from edge to edge of the conveyer, substantially as described.

11. In a dish-washing machine, a suds-tank, in combination with an endless conveyer composed of network and provided with arched spread bars, substantially as described.

12. In a dish-washing machine, a tank, in combination with a pair of endless conveyers, an agitator, brushes and devices for washing the brushes.

13. In a dish-washing machine, a tank, in combination with a pair of endless conveyers, an agitator, automatically-adjustable brushes and devices for washing the brushes.

14. In a dish-washing machine, a water-tank, in combination with endless conveyers submerged in said tank and means for keeping said conveyers clean.

15. In a dish-washing machine, a water-tank, in combination with endless conveyers submerged in said tank and revolving brushes operating on the conveyers.

16. In a dish-washing machine, the combination of a pair of endless conveyers composed of network traveling together through

a tank, sprocket-chains to which the network is attached and sprocket-wheels over which the chains pass, and an agitator.

17. In a dish-washing machine, a washing-
5 chamber and means for agitating the water therein, of means for automatically engaging dishes of various sizes and conveying them

into and out of the chamber, and means for automatically removing foreign matter from the water, substantially as described.

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In presence of—

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