

(No Model.)

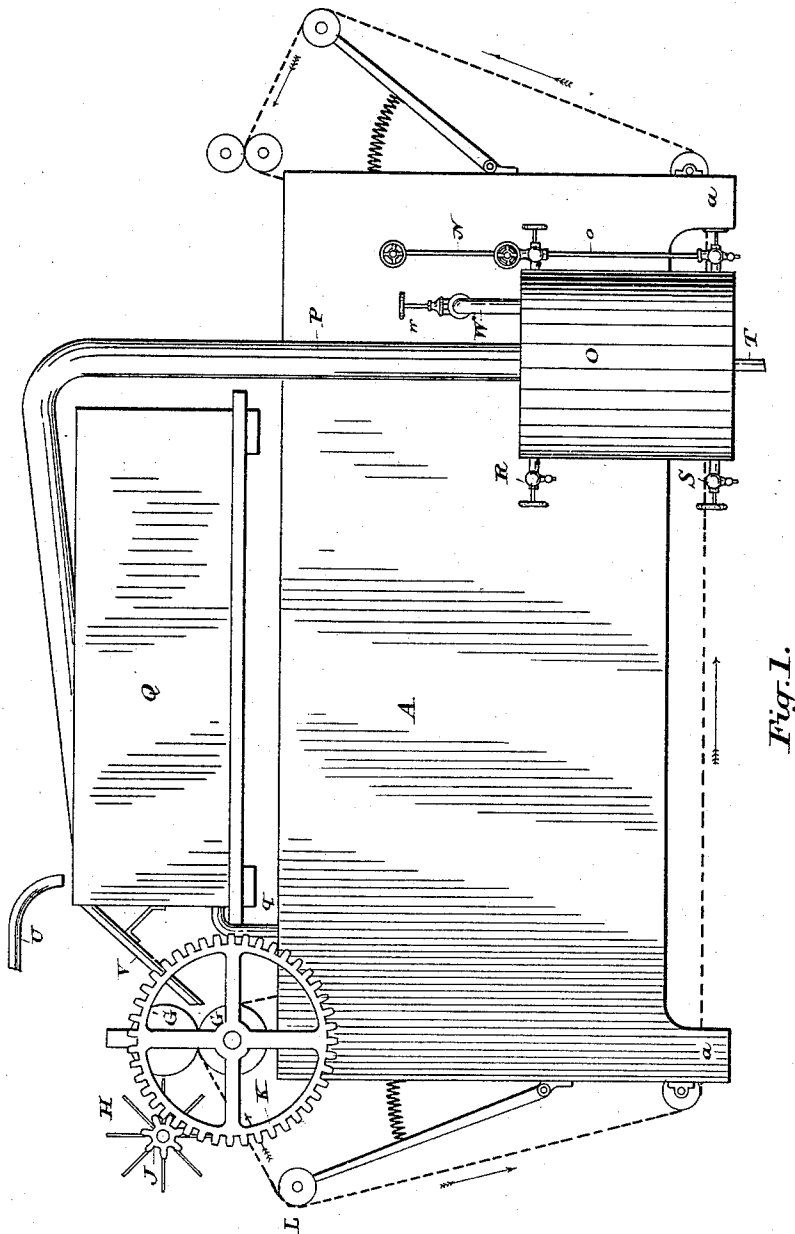
4 Sheets—Sheet 1.

R. PATRICK, Jr., & G. GODFREY.

APPARATUS FOR WASHING PIECE GOODS.

No. 324,723.

Patented Aug. 18, 1885.



*Witnesses.*

George East  
M. Wills

*Inventors.*

Robert Patrick Jr.  
George Godfrey  
by L. Tomlinson H.  
Attys.

(No Model.)

4 Sheets—Sheet 2.

R. PATRICK, Jr., & G. GODFREY.

APPARATUS FOR WASHING PIECE GOODS.

No. 324,723.

Patented Aug. 18, 1885.

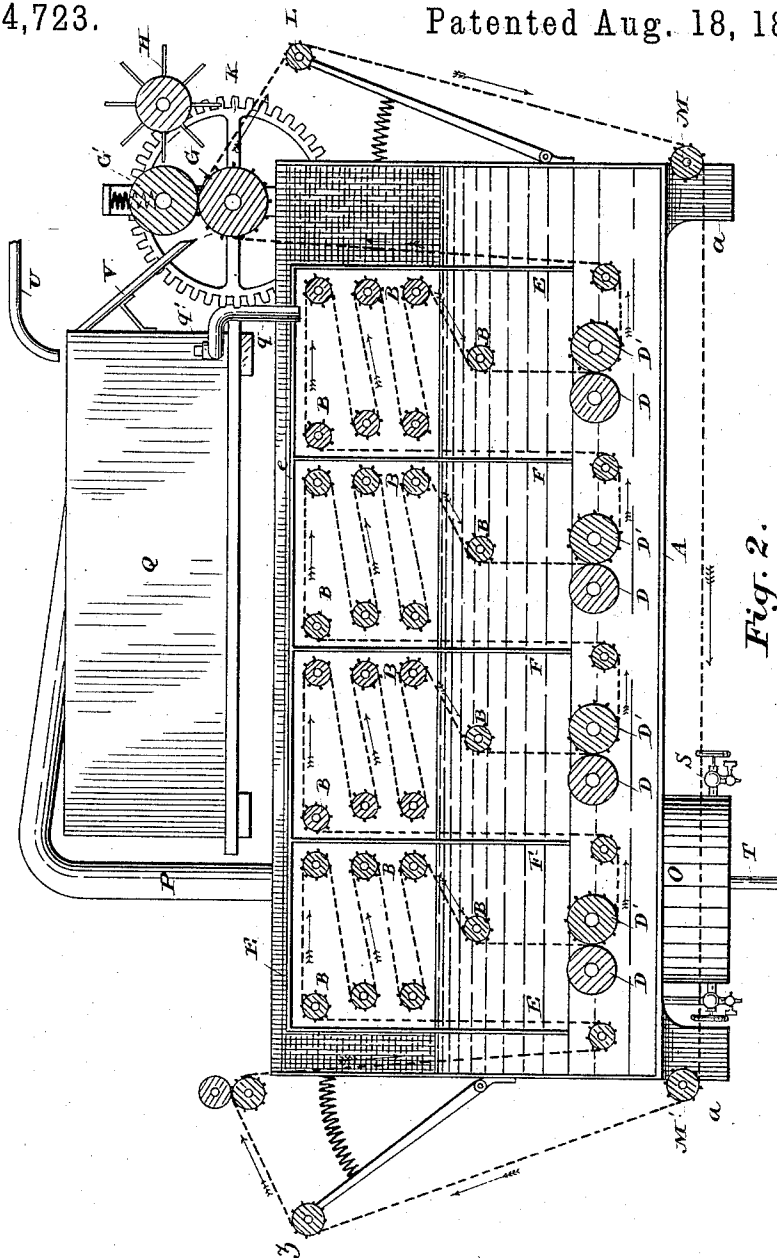


Fig. 2.

Witnesses.

George East  
H. Wills

Inventors.

Robt Patrick Jr.  
George Godfrey  
by L. Tomlinson &  
Attys

(No Model.)

4 Sheets—Sheet 3.

R. PATRICK, Jr., & G. GODFREY.

APPARATUS FOR WASHING PIECE GOODS.

No. 324,723.

Patented Aug. 18, 1885.

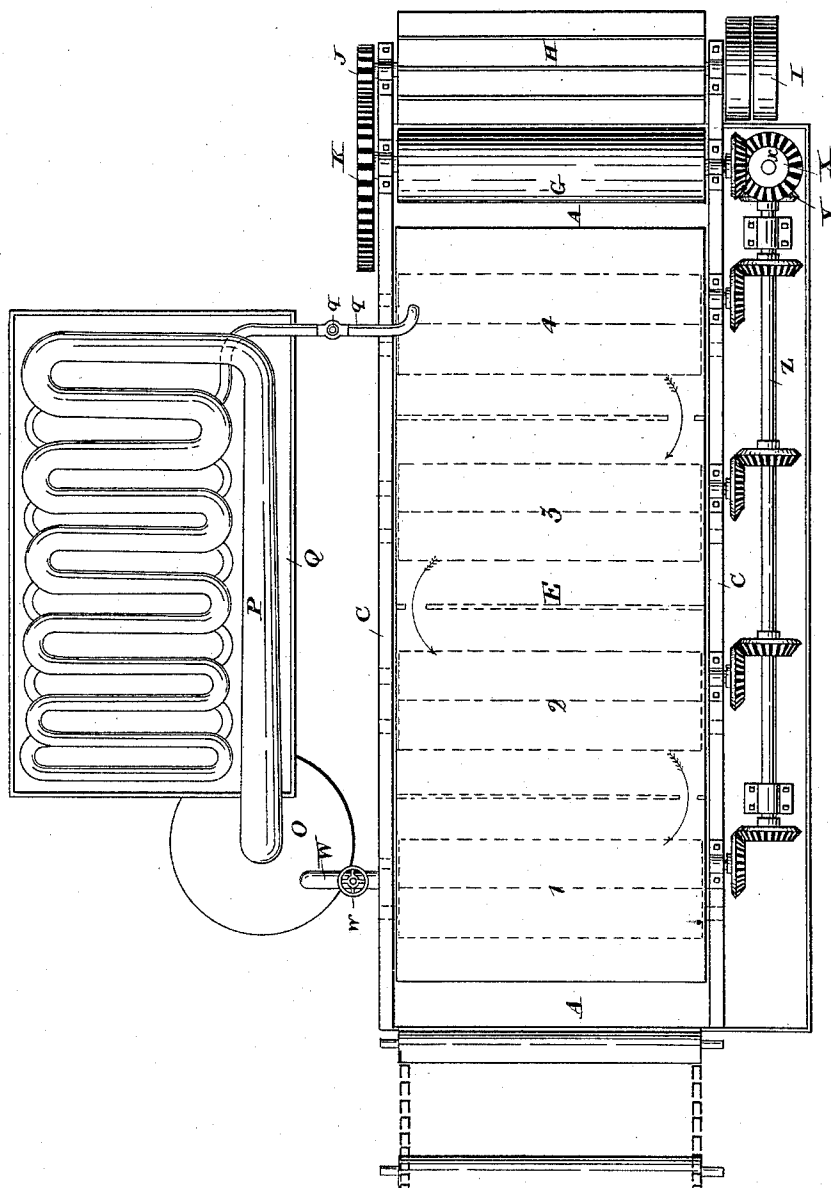


Fig. 3.

Witnesses.

George East  
H. Wills

Inventors.

Robert Patrick Jr.  
George Godfrey  
by L. Jamieson &  
Attys.

(No Model.)

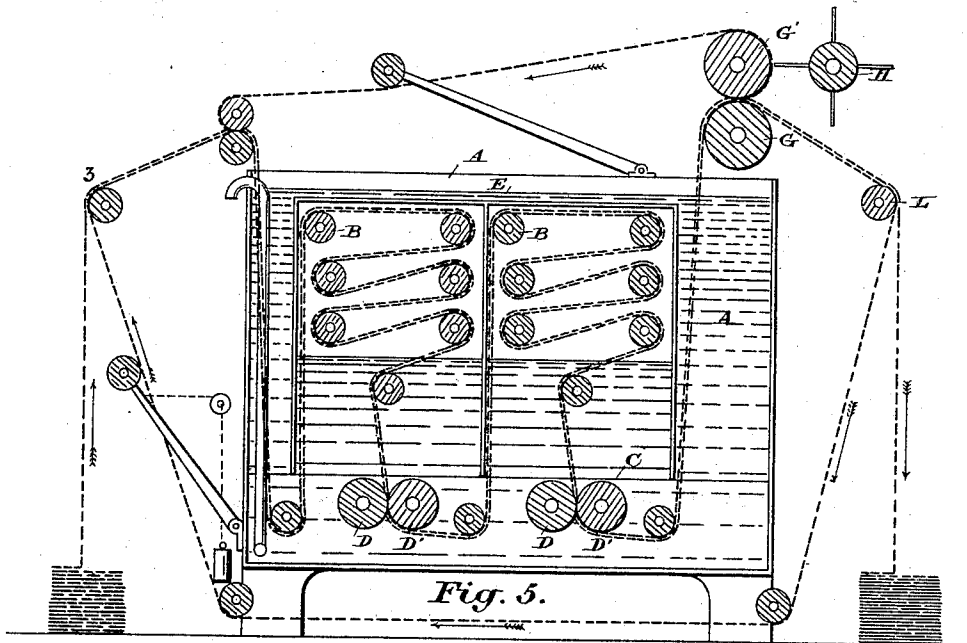
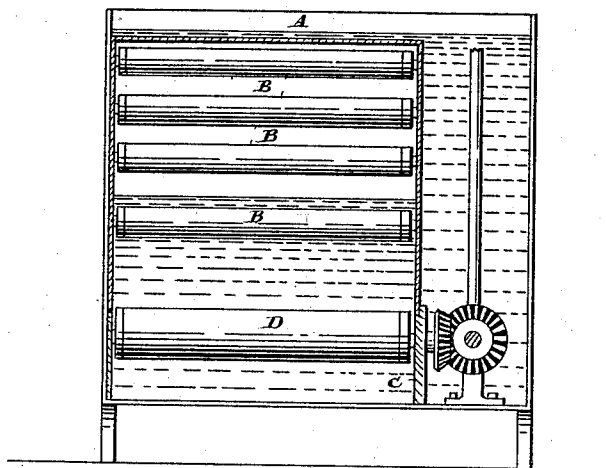
R. PATRICK, Jr., & G. GODFREY.

4 Sheets—Sheet 4.

APPARATUS FOR WASHING PIECE GOODS.

No. 324,723.

Patented Aug. 18, 1885.



Witnesses.

George East  
M. Mills

Inventors.

Robert Patrick Jr.  
George Godfrey  
by L. Tomlinson & Co.  
Attys.

# UNITED STATES PATENT OFFICE.

ROBERT PATRICK, JR., AND GEORGE GODFREY, OF GALT, ONTARIO, CANADA.

## APPARATUS FOR WASHING PIECE-GOODS.

SPECIFICATION forming part of Letters Patent No. 324,723, dated August 18, 1885.

Application filed March 30, 1885. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT PATRICK, Jr., and GEORGE GODFREY, both subjects of the Queen of Great Britain, residing at Galt, in the county of Waterloo, in the province of Ontario, Canada, have invented a new and useful Improvement in Mechanism for Cleaning Textile Fabrics, of which the following is a specification.

The object of our invention is the thorough and continuous cleansing of cloth, yarn, knitted goods, stockings, full-fashioned underwear, &c., from the grease and oil used in their manufacture, also wool, shoddy, or greasy waste of any kind, without the use of soap or alkali, which invariably injures the colors and destroys the fiber to a greater or less extent, depending, of course, on the temperature and strength of the alkali used and the length of time that the fiber is subjected to its action. The solvents we propose to use in our invention are benzine or naphtha and gasoline.

We propose to effect the objects sought by means of the mechanism illustrated in the drawings, in which—

Figure 1 is an elevation of our cloth-cleansing machine. Fig. 2 is a section. Fig. 3 is a plan. Fig. 4 is a cross section of the tanks. Fig. 5 is a sectional view of the machine adapted for the cleansing of small articles.

The drawings illustrate in the following manner the machine used and the method followed with the two solvents, benzine and gasoline.

A is a tank, in which are placed (being suitably fixed in bearings consisting of wooden frames, or in any other most suitable manner) a number of small carrying-rollers, B.

C are bed-plates, suitably fixed, in which are the bearings for four pairs of squeezing-rollers, D D'. One of each pair of the squeezing-rollers and each of the carrying-rollers is fitted with sprocket-wheels attached or hooped over at each end. Over these sprocket-wheels a chain passes, as shown by heavy dotted lines in the several figures. To the spindle of each of the squeezing-rollers provided with a sprocket-wheel is firmly attached bevel-gearing, as shown in Fig. 3.

E is an inverted tank, constructed of sheet-iron or other suitable material, and within this tank are partitions, F, as shown. Each

end of this inverted tank is near each end of the large tank, and the partitions are placed equidistant from these ends. *e* is the air-tight cover of the inner tank, and thus a small portion of the large tank is left open at either end.

Another pair of powerful squeezing-rollers, G G', is placed directly over one of the open ends of the tank A, and two rollers, similar to those within the tank E, are arranged nearly over the other end. In rear of the squeezing-roller G', and running close to its face, is placed a wiper, H, having a fast-and-loose pulley, I, attached to its shaft at one end and a spur-pinion, J, on the other, which meshes into the spur-gear K upon the lower squeezing-roller, G. In the rear of the roller G is placed a small roller, L, of the same description as the rollers B, and immediately underneath the tank A, at each end, are placed similar rollers, M M'.

The tank A, being supported by feet *a* at each corner, and the bearings of the last-mentioned rollers being attached to the feet of the said tank, allow a clear space from the floor to the bottom of the tank for the free passage of the chains and apron.

Arranged vertically upon the outside of the tank is a gage-glass, N, near which is placed a steam-jacketed evaporator, O, as shown in Fig. 1, the evaporator also having a gage-glass, *o*, and being connected to the tank by a pipe, as shown. Another pipe, P, rises from the evaporator O, passing into a condensing-tank, Q, above. In this condensing-tank is a coil of pipe, to the top of which coil the pipe P is connected and forms a part. This coil extends from the top to the bottom of the condenser Q, and, passing through its rear side near the bottom, is led by a pipe, *q*, into the tank E, containing the rollers and solvent.

The steam-jacketed evaporator O is provided with a pipe, R, at the top of the jacket, for the ingress of steam, and another pipe, S, at the bottom, to let off the water of condensation.

Another pipe, T, in the inner compartment of the evaporator is for the purpose of drawing off the contents as may be required.

U is a water-supply pipe leading into the condensing-tank, and V is an overflow-pipe from the same.

Having thus described the mechanical parts of our invention, its operation may be briefly

described as follows: The outer tank, A, is half filled with water, and a plug,  $q'$ , in the pipe  $q$  being removed allows the air to escape sufficiently for the water to rise in the partitioned tank E to the same level as it attains outside. This level will be considerably above the lower part of the partitions, as shown by dotted lines on Fig. 2. On referring to Fig. 3 it will be seen that the partitions (which are here shown by dotted lines) have each apertures at opposite sides from each other. These compartments in the tank E are now filled full with either of the solvents, which is introduced to it by means of the pipe  $q$ , and a small quantity is allowed to run into the evaporator through the pipe W. The solvent being much lighter than water, will not unite with it in any way, but will remain in a body by itself on the top of the water. The top, sides, and ends of the tank E being perfectly airtight, and the lower part of the sides and ends being considerably below the water-line, it will thus be seen that there is no chance for the escape of the solvent, except into the evaporator, which is controlled by a valve,  $w$ , on the pipe connecting the tank and evaporator. Steam being now let into the jacket of the evaporator, and the solvent boiling at a low temperature, it rises in vapor up the pipe P, which leads into the condensing-tank Q, which is kept full of cold water. The vapor passing around and down the coil is condensed, and passes out of the condensing-tank by the pipe  $q$  connected to the lower end of the coil into the fourth compartment of the partitioned tank E. The solvent is thus caused to flow from the fourth compartment through the aperture on the opposite side of the next partition into the third compartment, as indicated by arrow on Fig. 3, and from the third to the second, and so on to the first. From the first compartment it passes by the pipe W into the evaporator. It will be seen that thus there is a steady serpentine circulation of the solvent. Power is now applied by means of the belt on the wiper H, which, by its spur-pinion J meshing into the large spur-wheel K on the lower squeezing-roller, gives motion to it in the proper direction. On the opposite end of the lower squeezing-roller shaft is affixed a bevel-gear, which drives the bevel-wheel X fixed to the upright shaft  $x$ . To this upright shaft is keyed miter-gear working in a corresponding miter-wheel, Y, on the horizontal shaft Z. This horizontal shaft Z has affixed to it four miter-gears, by means of which the squeezing-rollers D' are driven, and which work in the water. It will thus be seen that the endless sprocket-chains, deriving their motion from the sprocket-wheels on the squeezing-rollers, impart their motion to all the rollers within the tank E in the direction indicated by arrow in Fig. 2. We now take a piece of cloth and attach it at each corner, at  $z$ , to said chains before it enters the tank, and let it pass down with the chains into the water and around

the roller at the bottom of the first partition up inside the first compartment. As the cloth rises above the water-line the oil and grease in it are immediately attacked by the solvent and the fatty matter completely dissolved, uniting with the solvent. After it has passed round the series of rollers in the first compartment and again descended into the water, the solvent and dissolved grease, being lighter than water, leaves the material and remains above the water. Should any remain, when it reaches the squeezing-rollers D D' it is expressed along with the dirt, the heaviest portion of the dirt settling to the bottom of the large tank A, and the lightest going up with what remained in the cloth of the solvent. As it passes from the first pair of squeezing-rollers it turns another small roller placed immediately beneath the second partition and passes upward into the second compartment and goes through the same process, then through the third, and so on. As the solvent in the fourth compartment is coming clean from the condenser all the time, it insures the complete cleanness of the fabric, which then passes down to the fourth pair of squeezing-rollers, when they are subjected to more pressure to insure against their carrying away any of the solvent; then, passing round another small roller below the end of the tank E, it rises up through the water and out of the open end of the tank A, then it passes through the powerful squeezing-rollers G G'. It is now delivered at the back of the tank A perfectly clean and half dry. The corners of the cloth may here be unfastened from the chains, and the cloth may be allowed to fold itself on the floor, the endless chains passing down to the small roller M, underneath the tank, through the space between the bottom of the tank and the floor, round the small roller M', and so on.

It will be noticed that the evaporating and condensing process is going on all the time, taking the dirty solvent united to the grease which was in the material into the evaporator, the solvent passing up the pipe P in vapor, and being condensed and returned clean to the fourth compartment, the grease which was united with the solvent being left behind in the evaporator and drawn off by the pipe T in the bottom as often as may be found necessary.

To summarize briefly: The cloth or fabric is going constantly through the machine, leaving all grease and dirt therein and coming out perfectly clean, with the colors bright and improved. The solvent, by means of the evaporator and condenser, is being constantly purified and freed from the grease or oil which it had extracted from the cloth.

Yarn in hanks may be treated in the same manner, the hanks being either tied or chained in the ordinary way familiar to all yarn-scourers.

The method of treating wool, shoddy, waste,

underwear, or knitted goods of any description in the same machine, is as follows: (See Fig. 5:) Two aprons of open texture, resembling fine net, are provided and attached to the chains in the same manner as before shown in the case of cleaning cloth at *z*. These aprons are allowed to pass through the machine until the ends of them have passed through the last pair of squeezing-rollers, G G'. The upper apron is then detached from the chains and carried round the upper squeezing-roller, G', and between it and the wiper, while the lower apron, still fastened to the chains, is carried under the tank and round to its starting-point. It is then unfastened from the chains and its two ends laced together, making it an endless apron, the same having been done for the upper apron, which is carried over the tank and over the upper rollers, as shown. The lower apron, being longer than the upper one, is carried round the small roller 3 immediately in front of the tank. Both upper and lower aprons are provided with weighted rollers running against their surfaces to maintain a proper degree of tension on each apron. The wool, shoddy, waste, or goods to be cleaned is then fed evenly on that portion of the lower apron (at or near the small roller 3) which constitutes a feed-table, and is carried by it up to and between it and the upper apron, passing down into the tank, and going through precisely the same process as the cloth, is delivered at the back in the same manner, the wiper H brushing off any of the goods that may adhere to the apron after passing through the last squeezing-rollers.

Briefly summarized, the material is fed between two aprons and held in its place by the tension on the same, is subjected to the action of the solvent and the squeezing in the water, and is delivered clean at the back, while the solvent is being constantly freed from all impurities by the evaporator and condensing-vat, as before explained.

In Fig. 5 two compartments only are shown but it must be understood we do not confine ourselves to this number, the same number as before being intended and recommended.

In order not to complicate the drawings, we have not shown bearings or supports for any of the rollers; but it is understood that we do not confine ourselves to any particular form of bearing.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an apparatus for cleaning textile fabrics, the combination, with an outer tank, of an inner tank or vessel having partitions dividing it into compartments and provided with carrying-rollers connected together by an endless chain or belt, whereby the articles to be cleansed are carried through the clean-

ing agents in said vessels, substantially as described.

2. In an apparatus for cleaning textile fabrics, the combination, with an outer tank and an inner inverted tank or vessel divided into compartments by partitions and provided with carrying-rollers, of squeezing-rollers located in said outer tank and connected with said carrying-rollers by an endless chain or belt connection, substantially as described.

3. In an apparatus for cleaning textile fabrics, the combination, with an outer tank provided with squeezing-rollers and an inner inverted tank or vessel divided into compartments by partitions, and provided with carrying-rollers and endless chain or belt connection between said carrying and squeezing rollers, of gears located on the journals of the squeezing-rollers meshing with gears upon a power-shaft, whereby motion is imparted to the endless chain or belt, substantially as described.

4. In an apparatus for cleaning textile fabrics, the combination, with an outer tank having squeezing-rollers D D', and an inner partitioned inverted tank or vessel having carrying-rollers B, of the squeezing-rollers G G', located above the outer tank, and an endless chain or belt connection between the squeezing-rollers D D' G G', and carrying-rollers B, substantially as described.

5. In an apparatus for cleaning textile fabrics, the combination, with an outer tank and an inner inverted tank or vessel, and the squeezing and carrying rollers therein, of the squeezing-rollers G G', and wiper H, substantially as described.

6. In an apparatus for cleaning textile fabrics, the combination, with an outer tank having sprocketed rollers D', and an inner inverted tank divided into compartments by partitions F, and having sprocketed carrying-rollers B, of the sprocketed squeezing-roller G, and sprocketed rollers L, M, M', and *z*, and an endless chain engaging with the sprockets on said rollers, and means for actuating the rollers D', substantially as described.

7. In an apparatus for cleaning textile fabrics, the combination, with an outer tank and an inner inverted tank or vessel, and means for carrying the fabric to be cleansed there-through, of a jacketed evaporator and a condenser connected with the inner tank and with each other, whereby a continuous circulation of the solvent in the inner tank is secured, substantially as described.

R. PATRICK, JR.  
GEO. GODFREY.

Witnesses:

R. P. ECHLIN,  
C. I. T. GOULD.