No. 735,359. PATENTED AUG. 4, 1903.

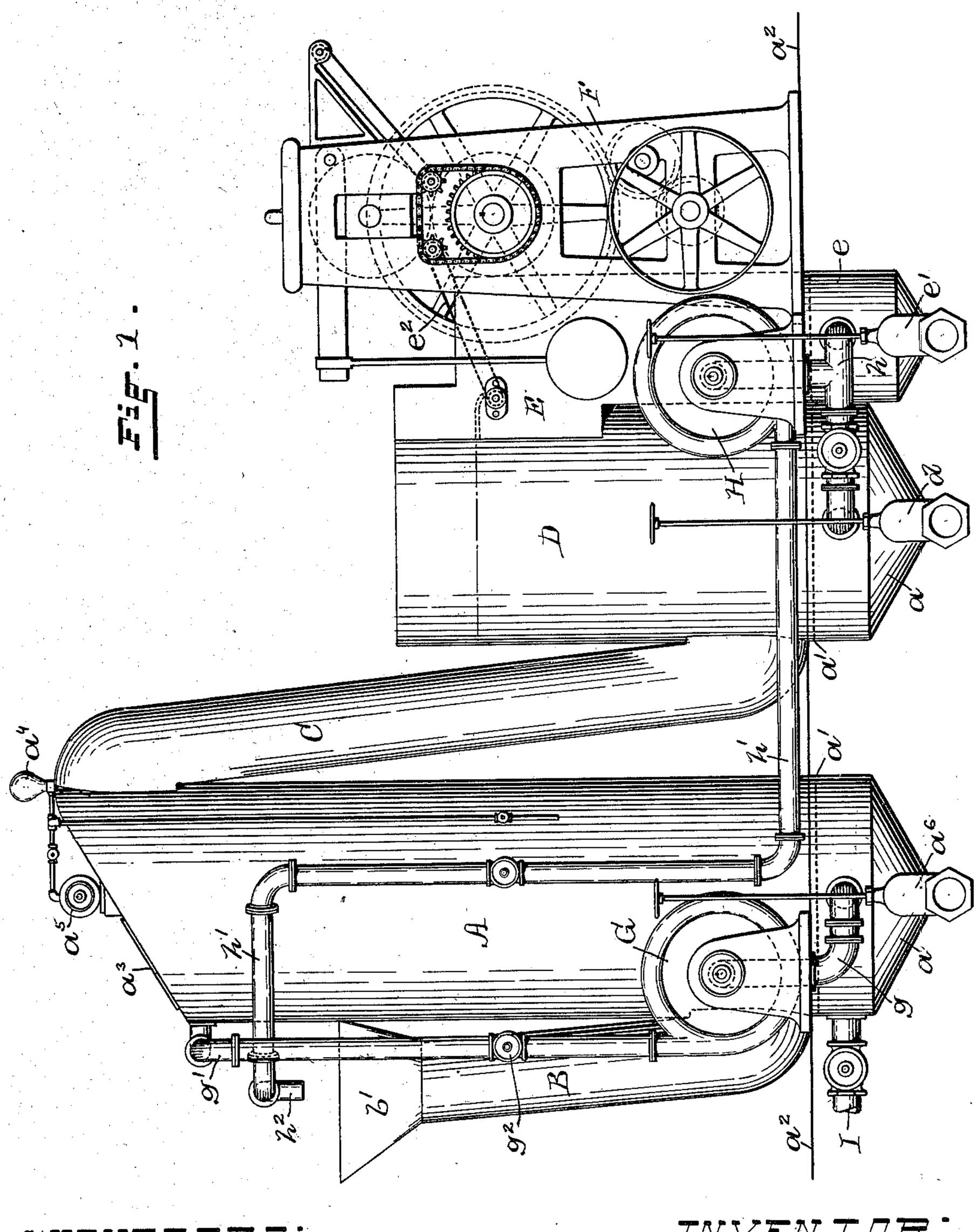
H. S. FRANK.

WOOL WASHING MACHINE.

APPLICATION FILED JULY 28, 1899. RENEWED FEB. 24, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Chas. H. Luther Jr.

B. M. Simms.

INVENTOR:

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by Joseph A. Miller & Co.

Attys.

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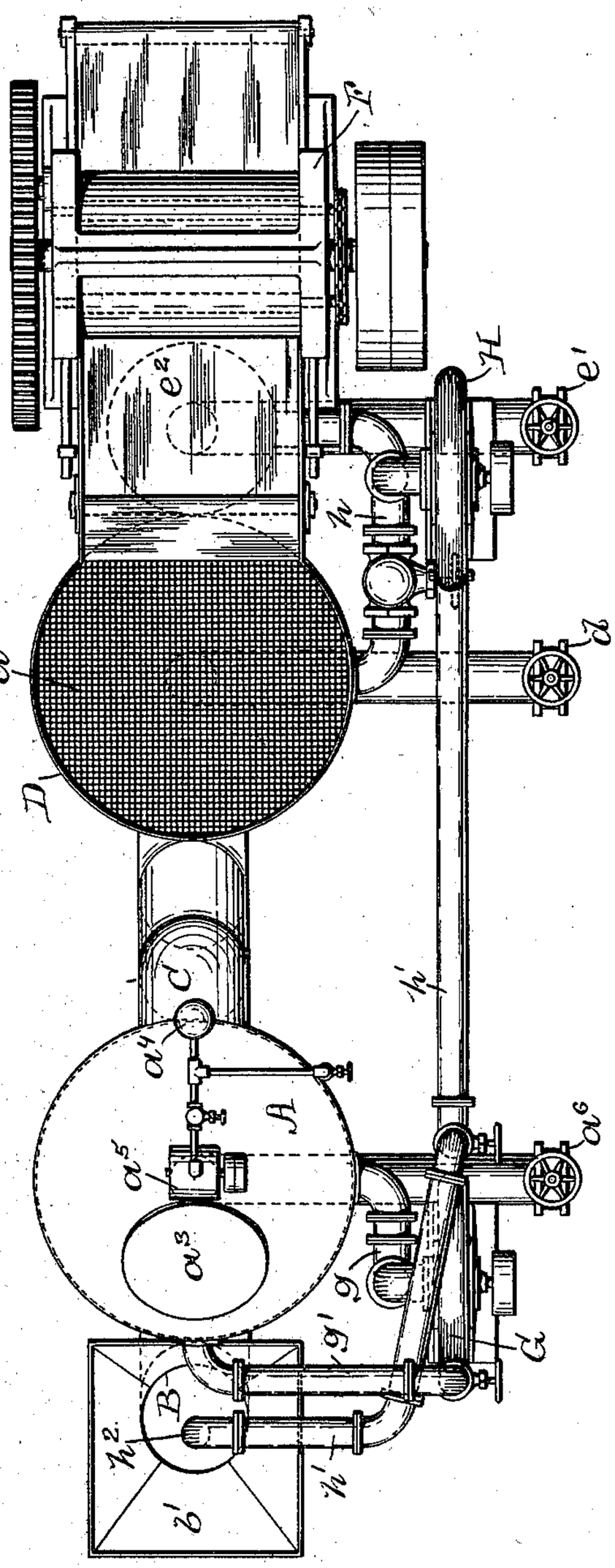

Fig. 2.

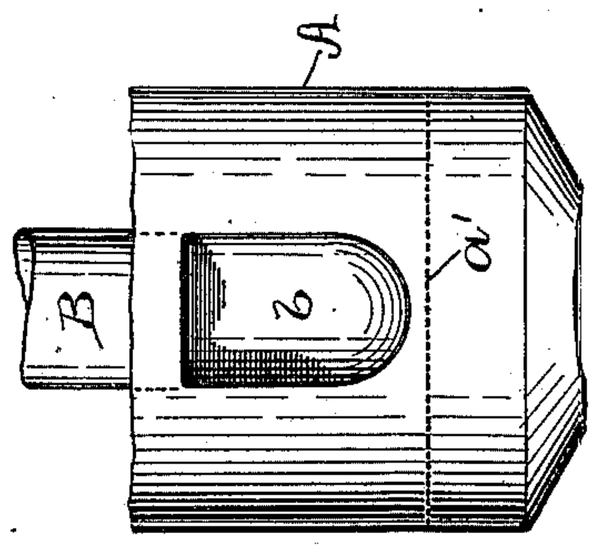

Fig. 3.

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No. 735,359. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

HARRY SAUL FRANK, OF PROVIDENCE, RHODE ISLAND.

WOOL-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 735,359, dated August 4, 1903.

Application filed July 28, 1899. Renewed February 24, 1903. Serial No. 144,828. (No model.)

To all whom it may concern:

Be it known that I, HARRY SAUL FRANK, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Wool-Washing Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in machines for washing wool; and it consists in the peculiar and novel arrangement and combination whereby the wool is subjected to the washing process in vertical tanks and the washing liquor is circulated through the floating wool, as will be more fully set forth hereinafter.

In machines for washing wool as heretofore constructed the wool was carried through the washing liquor by means of racks or similar devices to subject the wool to the action of the liquid. The movement of the racks or forks compacts the wool in its passage through the liquid, and repeated washings usually in a number of tanks is required.

The object of this invention is to wash the wool by forcing the liquid through the open floating wool in its passage through one or more vertical tanks.

Figure 1 is a side view of my improved wool-washing machine. Fig. 2 is a top view of the same. Fig. 3 is a view showing the opening connecting the conveying-trunks with the tanks.

Similar marks of reference indicate corresponding parts in all the figures.

In the drawings, A indicates a vertical tank, referred to hereinafter as the "main" tank, and *a* the bottom of the tank. The broken line *a'* indicates a strainer placed into the tank A near the bottom. The tank A is usually placed on a frame or floor the upper surface of which is indicated by the line a^2 a^2, the said frame or floor forming the support of the various parts of the machine. The duct B is connected with the lower part of the tank A preferably by a large opening *b*, as shown in Fig. 3, and is provided at the upper end with the expanded hopper *b'*.

On the upper part of the tank A a manhole a^3, provided with a suitable cover, gives access to the interior of the tank, and in the preferred form at the highest part of the tank A is placed a suitable air-chamber a^4, connected, by a pipe provided with a suitable valve, with the air-pump a^5.

When it is convenient to extend the duct B to a point above the trunk-pipe C, connected with the upper part of the tank A, the air-chamber and air-pump may be omitted.

The trunk-pipe C connects the upper part of the tank A with the lower part of the tank D. When the air-pump a^5 is used to exhaust the air from the upper part of the tank A, the tank D may be lower than the tank A, as is shown in Fig. 1; but when no air-pump is used the tank D must be as high or may be somewhat higher than the tank A.

I prefer to use the air-pump and construct the machine in the manner as shown in the drawings, but do not wish to confine myself to the construction or the relative proportions as shown in the drawings.

The tank D is also provided with a strainer and a bottom *a*, sloping toward the center and connecting with a discharge-pipe provided with the gate *d*, the tank A being provided with the gate a^6.

The delivery-tank D has the rectangular chamber E projecting from one side, on the lower end of which the tank *e*, provided with a strainer, a conical bottom, and the gate *e*, is secured. An endless apron e^2 of the usual construction has one end supported in the chamber E, the other end of the apron e^2 extending between the two rollers of a roller-press F, from which the squeezed-out wool is discharged. The press F may be of any one of the types of presses used to extract the liquor from the wool, or any form of hydro-extractor may be used in connection with the wool-washing machine.

The pump G, preferably a centrifugal pump, is connected with the lower part of the tank A below the strainer by the pipe *g* and with the upper part of the same tank by the pipe *g'*, a valve or gate g^2 being placed into the pipe *g'* at some convenient point.

The pump H, preferably a centrifugal pump, is connected with the lower parts of the tanks D and *e* below the strainers by the pipe connections *h*, the discharge-opening of the pump being connected, by the pipes *h'*,

with the nozzle h^2 over the hopper b'. Valves or gates may be placed into the pipes h and h' in convenient positions. I indicates the liquor or water supply main provided with a valve or gate for regulating the supply.

To enable those versed in the art to use my invention, I will now describe the operation of my improved wool-washing machine more fully.

The machine is constructed as shown in the drawings and has its pumps and apron connected with some prime motor in any suitable manner, so that in the operation of the machine they will be continuously operated at the required speed. The pump G, which is preferably made to throw a considerable quantity of liquid, draws the liquid from the lower part of the tank A and delivers the same into the upper part of the same tank. The air-pump a^5, maintaining a partial vacuum in the tank, allows the tank A to be practically filled with the liquor, although the water-level in the duct B and the delivery-tank D is lower than the water in the tank A. The pump H draws the liquor from the lower part of the tanks D and e and discharges the liquor into the hopper b'. By this arrangement a constant rapid circulation of the liquor is maintained in the tanks. The prepared wool is placed into the hopper b' and passes down the duct B into the lower part of the tank A above the strainer, where the wool opens out in the rapidly-circulating liquor and floats slowly upward, being constantly agitated by the currents, to free the wool from its impurities, which are precipitated and collected in the lower part of the tank to be discharged from time to time. From the upper part of the tank A the wool and the liquor pass into the trunk-pipe C and down the same into the lower part of the tank D, where the wool rises and is drawn onto the endless apron e^2, to be carried to the pressing-rolls, by which the liquor is pressed out of the wool, and then the wool is discharged. In passing the wool from the tank A to the tank D downward through the trunk-pipe C the tendency of the wool to rise is counteracted by the down-rushing liquor, and an effective scrubbing action is maintained, thoroughly cleaning the wool before it enters the tank D, where the impurities are precipitated in the bottom of the tank and can be removed from time to time by opening the gate d. The action on the wool of the currents of the liquid does not affect the fiber and leaves the wool in its natural condition.

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

1. In a wool-washing machine, the combination with a tank, a wool-supplying duct connected with the lower part of the tank, and a trunk-pipe connecting the upper part of the tank with a delivery-tank, of means for circulating the liquor in the tank, as described.

2. In a wool-washing machine, the combination with a tank, a wool-supplying duct connected with the lower part of the tank, a delivery-tank, a trunk-pipe connecting the upper part of the tank with the lower part of the delivery-tank, and strainers in the bottom of both tanks, of a pump connected with the lower part of the delivery-tank and with a nozzle discharging into the supply-duct, and a pump connected with the lower and the upper part of the main tank; whereby the liquor is constantly circulated and passed through the wool, as described.

3. In a wool-washing machine, in combination, a vertical tank, a wool-feeding duct connected with the lower part of the tank, an air-chamber on the upper part of the tank, an air-pump, and a delivery-tank; whereby a water-level may be maintained in the tank above the inlet of the wool-feeding duct, as described.

4. In a wool-washing machine, in combination, a main tank, a wool-supplying duct connected with the lower part of the main tank, a delivery-tank, a trunk-pipe connecting the upper part of the main tank with the lower part of the delivery-tank, an air-pump connected with the uppermost part of the main tank and a pump connected with the lower and upper parts of the main tank, as described.

5. In a wool-washing machine, the combination of the following instrumentalities: a vertical main tank, a wool-supplying duct connected with the main tank, a delivery-tank, a chamber connected with the delivery-tank, a trunk-pipe connecting the upper part of the main with the lower part of the delivery-tank, an air-exhausting device connected with the upper part of the main tank, means for delivering the washed wool, and means, such as a pump or pumps, for circulating the water through the wool, as described.

In witness whereof I have hereunto set my hand.

HARRY SAUL FRANK.

Witnesses:
B. M. SIMMS,
J. A. MILLER, Jr.