2 Sheets—Sheet 1.

O. LOW.

MACHINE FOR CLEANSING WOOL AND OTHER MATERIAL.

No. 188,385. Patented March 13, 1877.

Fig. 1.

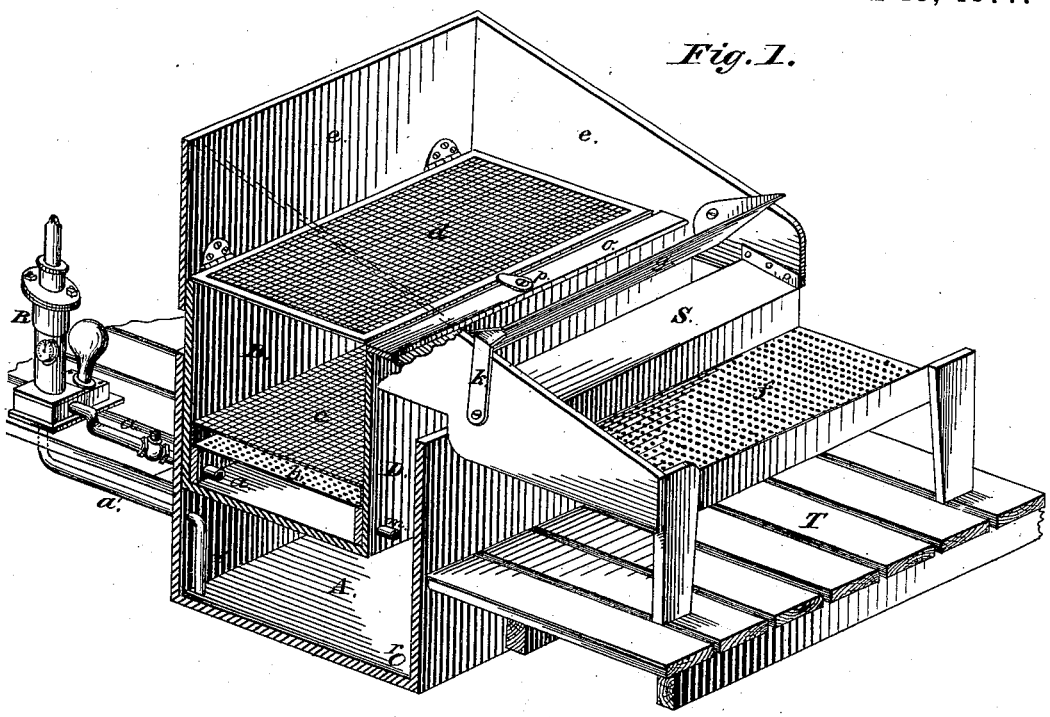
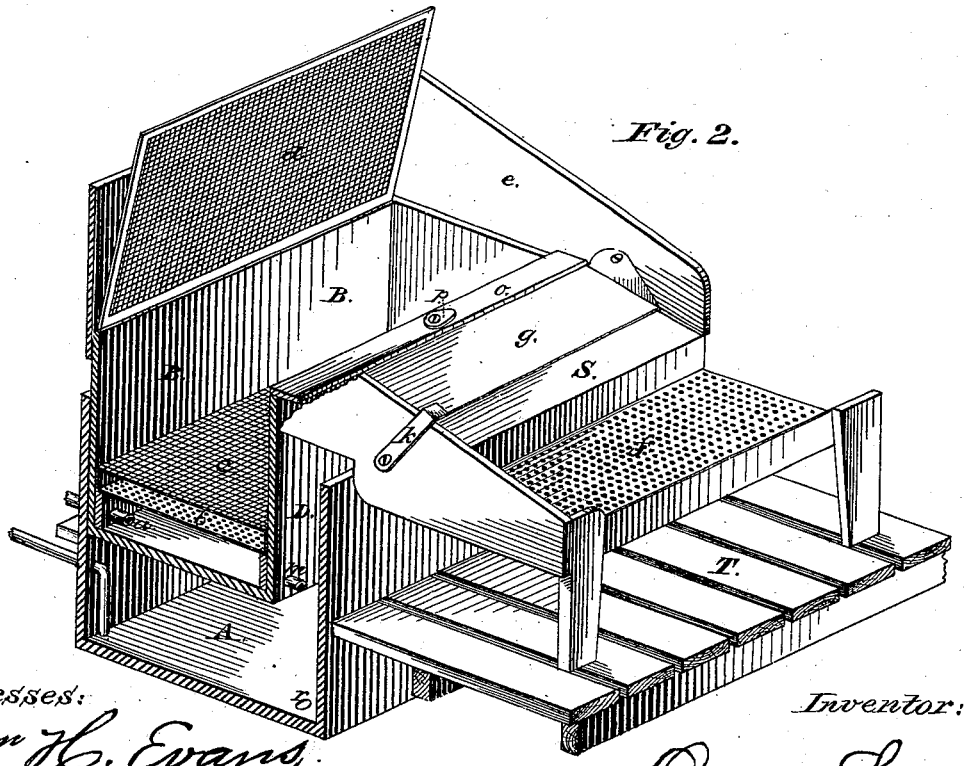


Fig. 2.



Witnesses:

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Geo C Paine.

Inventor:

Oscar Low.

2 Sheets—Sheet 2.

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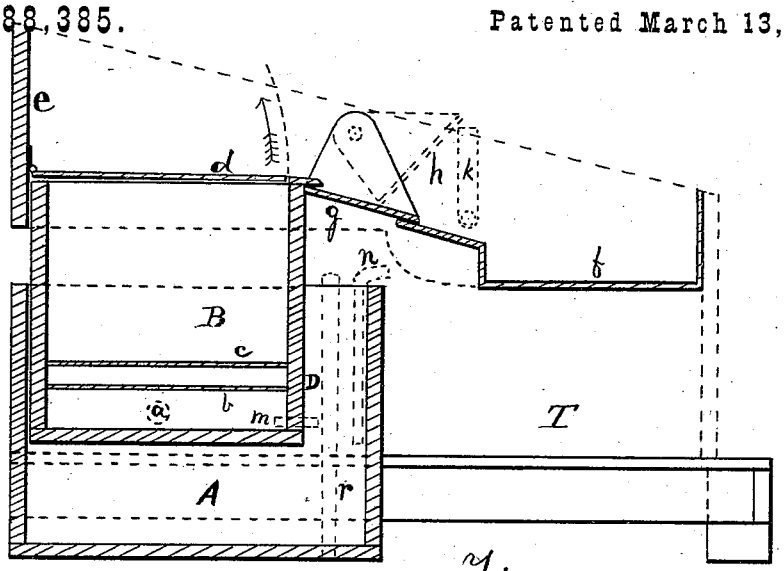

Fig. 3

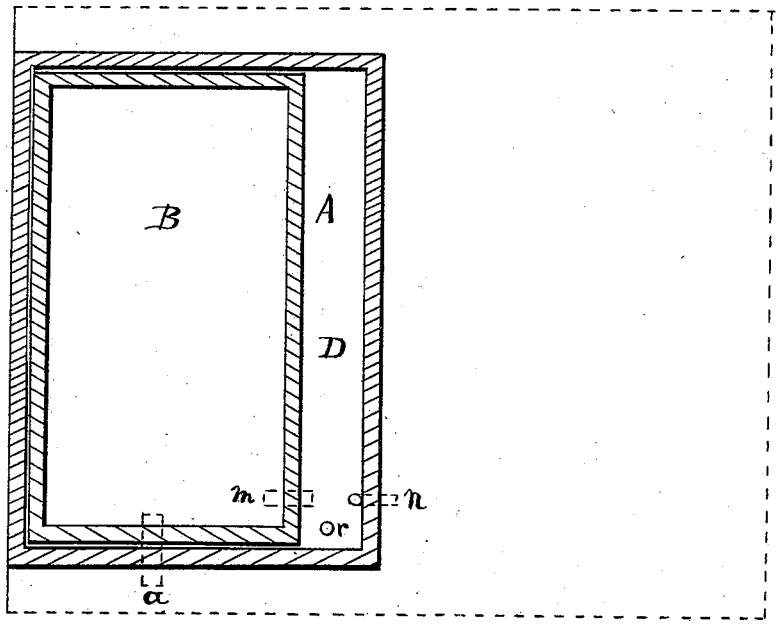

Fig. 4

ATTEST

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OSCAR LOW, OF HYDE PARK, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR CLEANSING WOOL AND OTHER MATERIAL.

Specification forming part of Letters Patent No. **188,385**, dated March 13, 1877; application filed July 31, 1876.

To all whom it may concern:

Be it known that I, OSCAR LOW, of Hyde Park, Norfolk county, Massachusetts, have invented certain new and useful Improvements in Mechanism or Apparatus for Cleansing Wool and other material; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention consists in a new apparatus for cleansing and scouring wool, whereby the difficulties now besetting this operation are entirely obviated.

It is well known that wool, before being cleansed, contains certain impurities which constitute a very large percentage of its weight. Among those most difficult of removal by the ordinary processes may be mentioned vegetable matter, such as burrs, &c., and the grease exuding from the skin, with grit, sand, and many other foreign substances intimately worked into the fleece. For the removal of the first-mentioned class of impurities it has been found necessary to employ chemical solutions which destroy the vegetable or woody fiber of those substances, while in the latter the wool is ordinarily soaked and agitated in an alkaline bath, which combines with the grease to form soap, when it is placed in a tank or "rinse-box" with water, is agitated therein to rinse it, and then passed to the hydro-extractor to remove the water.

By the method first named it has been found necessary to soak the wool in strong chemical solutions for a considerable time, to insure the thorough penetration of the liquor to the burrs and woody substances, and it has been discovered that this protracted exposure to the action of so powerful an agent injures its quality to such an extent that chemically removing burrs and other vegetable matter from wool is considered by manufacturers to be virtually impracticable. On the other hand, in using alkalies difficulty has been experienced in effecting such an intimate penetration of the liquid to all parts of the fiber as is necessary to attack all the particles of grease and render its complete removal possible, and in order to secure a thorough penetration of the alkaline liquor to all parts of the wool it is necessary to agitate it while in the bath, and in so doing it is impossible to avoid "felting" it. This felting of the wool in the process of cleansing is one of the most serious difficulties encountered, and is the one which all manufacturers chiefly desire to avoid. Besides, in rinsing the wool in water to remove the soapy compound thus produced great danger is incurred, as in the alkaline bath, of causing it to felt or "full up," while by the ordinary method of rinsing only a partial cleansing is effected, as the agitation of the wool in the rinsing-tank can only remove a small percentage of impurities, which penetrate every part of, and are ground into, the fleece, besides leaving the wool, as I have already mentioned, in such a felted condition that it is carded with great difficulty.

My invention consists in an apparatus by which wool and other material are thoroughly and quickly cleansed of the impurities mentioned, while the difficulties named are wholly avoided.

I will proceed to describe its several parts and method of operation.

Referring to the drawings forming part of this application, Figure 1 is a perspective view, showing one end of the apparatus broken away to show the interior parts. Fig. 2. is a similar view in perspective, showing the position and arrangement of both exterior and interior parts. Fig. 3 is a section taken longitudinally through Fig. 1; and Fig. 4 is an elevation of some of the parts shown in Figs. 1 and 2, as hereinafter described.

In the drawings, A and B indicate two large tanks of suitable form, one of which, B, is placed partly within the other, A, in such a manner as to leave a space, D, at the front between them, and a still greater space between the bottoms of the upper and lower tanks. The relative arrangements of these parts may, of course, be infinitely varied; but I have found in practice that the one shown is most convenient for actual use. In the lower part of the smaller tank or chamber B a double grating, *b c*, is placed, raised a short distance above the floor of the chamber. This grating or partition is removable as I have shown it, but it may be made a part of the chamber by being rigidly secured therein. It consists of a lower plate formed of sheet metal, and having equidistant perforations throughout its whole extent, as seen at *b*, Figs.

1 and 2. To this perforated plate is secured a diaphragm, formed of fine wires crossing each other, and leaving small interstices between the strands. This wire diaphragm is raised somewhat above the perforated plate *b*, the relative arrangement of the two being shown at *b c*, Figs. 1 and 2. The top of this chamber B is also closed by a wire screen similar to that shown at *c*, said screen being hinged to one side of the top of the chamber, as seen at Fig. 1, in order that it may be thrown open, as shown in Fig. 2.

Upon three sides of the chamber B the walls rise to a considerable height, to form guards *e*. At the front of said chamber I place an adjustable sluiceway, *g*, which consists of a flat sheet of metal or other material, having ears or other suitable projections at its ends, by which it can be pivoted to the walls *e* in such manner that, when turned down, as shown in Fig. 2, an edge will lie just under the projecting edge *o* of the chamber B, while the plate shall slope down until its other edge rests upon the incline S, forming an unbroken inclined way, leading to the receiver. (See Fig. 2.) This adjustable sluiceway *g* may, also, be thrown up into the position shown in Fig. 1, where it is retained by a dog, K, pivoted to the wall *e*. The purposes of this construction will be described below.

Into the bottom of the chamber B, and beneath the perforated and netted diaphragm *b c*, I lead an induction-pipe, *a*, which is connected with a forcing-pump, R, Fig. 1. A draft-pipe, *a'*, is introduced into the lower part of the larger chamber or tank A, and a discharge-pipe with stop-cock, *m*, leads from the interior of chamber B into the outer chamber A.

The operation of my machine is as follows: When acid solutions are to be used upon the wool to destroy the vegetable matter it contains, the wool is placed in the chamber where it is closely packed. The tank below is filled with the chemical solution, and the pump put in motion. By its power the fluid is driven with great force through the mass of the wool, penetrating every part thoroughly. To saturate the burrs with it, it is not necessary to subject the wool to the action of the machine more than a few moments, and thus the result desired is attained in a perfect manner without the least injury to the quality of the wool, and with the least danger of felting.

In employing alkaline liquors the mode of operation is similar. The wool is placed in the smaller or inner chamber, where it may be packed under pressure, as this is, in all cases, desirable, (though not indispensable,) to prevent the agitation of its particles, and the consequent felting. The alkali is placed in the tank A, and the pump is worked as before.

It will be noticed that in Fig. 1 the adjustable sluiceway *g* is shown as turned partly up. As the the liquor flows up through the wool-chamber, and passes out at the perforated top, falling over the edge *o*, it is guided by this adjustable gate or sluiceway *g* back into the tank below, whence it may be used over and over again.

When every particle of grease in the wool has combined with the alkaline solution the pump is stopped, and the liquor remaining in the chamber B is drawn off through the cock *m*. The draft-pipe *a'* is then disconnected from the tank, and pure water is supplied to the pump, which is again started. The strong and rapidly-flowing current, which is forced with great power through the closely-packed mass of wool, rinses it, and carries away the impure or foreign matter contained in the fleece, consisting of the neutralized grease, sand, grit, manure, &c.

It will be noticed that the wool rests upon the wire screen forming part of the diaphragm *b c*. If it it was placed directly upon the lower plate, which is perforated, it is evident that those portions lying between the perforations would not be exposed to the force of the liquid entering the chamber, and would thus be in danger of remaining uncleansed. By placing it upon the wire screen *c*, raised a little above the perforated plate *b*, the jets of water entering through the latter are broken up and mingled together, and thus the liquid enters the wool in every part, forcing through it and carrying away every particle adhering to the fiber.

Beside the manifest advantages of this mode of operation, I am able to effect a considerable economy in transportation, as I am able to remove from the wool from sixty to eighty per cent. of its weight, and this without breaking of the fleece, thus enabling purchasers to buy cleansed fleeces and do their own sorting.

When the wool has been thus cleansed and rinsed, it is necessary to discharge it from the tank B. This is accomplished as follows: The top *d* which closes the chamber being raised, the sluiceway *g* is dropped into the position shown in Fig. 2. The pump being then put in motion, a strong current of water flows up through the chamber and out over the edge O, whence it flows down the incline *g* S until it falls into the receiver *f*. The wool in the chamber is necessarily carried by the force of this current to the top of the tank, whence it is discharged by the stream and carried upon its surface down the inclined plane until it falls into the receiver *f* just mentioned. This receiver, being perforated, allows the water to pass off freely, leaving the wool in a moist condition in the receiver, ready to be taken away to the "hydro-extractor."

I propose to build my apparatus in a mill by sinking the tank A somewhat beneath the flooring T. The tank A may also be provided with a suitable cock or opening, *r*, to discharge its contents.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, in a machine for cleansing wool and other material, of a closed receiving-chamber, having suitable escape-openings, with mechanism for forcing water or

other liquids through said chamber under pressure.

2. In a machine for cleansing wool or other material, the combination, with a cleansing-chamber and a receiver, of suitable mechanism for forcing water into said chamber under pressure, whereby the wool is, by the current or overflow, wholly discharged from said chamber and deposited in the receiver, as and for the purposes set forth.

3. The combination, in a machine for cleansing wool or other material, of the tank A, chamber B, and pumping mechanism R, having draft-pipe *a'* and injection-pipe *a*, as and for the purposes set forth.

4. The combination, with tank A and chamber B, of the adjustable sluiceway *g*, as and for the purposes set forth.

5. The combination, with tank A and sluiceway *g*, of the receiver *f*, as shown and described.

6. The double diaphragm, consisting of the metallic perforated plate *b* and the foraminous wire screen *c*, adapted to be placed in the top or bottom, or both, of the chamber B, as and for the purpose set forth.

7. The combination, with the chamber B, having a perforated cover, *d*, of the double diaphragm *b c*, as and for the purpose set forth.

8. In a wool-cleansing machine, the combination, with a closed chamber having suitable opening for the escape of the liquor, of a foraminous diaphragm placed near the bottom of said chamber, above the injection-pipe, as shown and described.

9. In a wool-cleansing machine, the combination, with tank A and chamber B, of the double diaphragm *b c*, as shown and described.

10. The combination, in a wool-cleansing machine, of a tank, A, chamber B, and adjustable sluiceway *g*, the dog K, incline S, and receiver *f*, as shown and described.

OSCAR LOW.

Witnesses:
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