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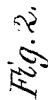
No. 261,756.

Patented July 25, 1882.



Witnesses. H

H. C. Lodge  
Fred. J. Munroe



Inventor:

John Petrie Jr.  
A. Curtis. Atty.

(No Model.)

3 Sheets—Sheet 2.

J. PETRIE, Jr.

WOOL WASHING MACHINE.

No. 261,756.

Patented July 25, 1882.

*Fig. 3.*

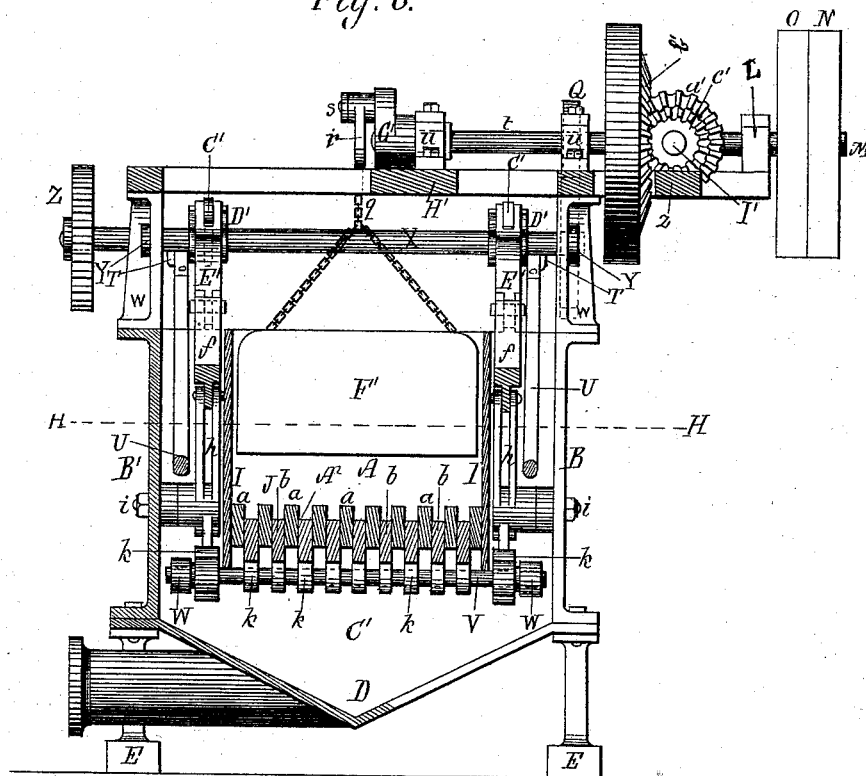
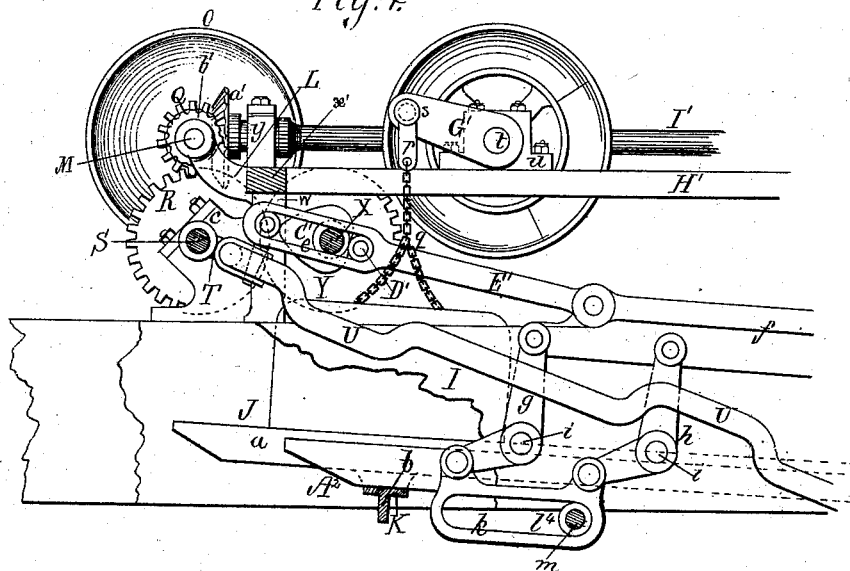


Fig. 4.



*Witnesses.*

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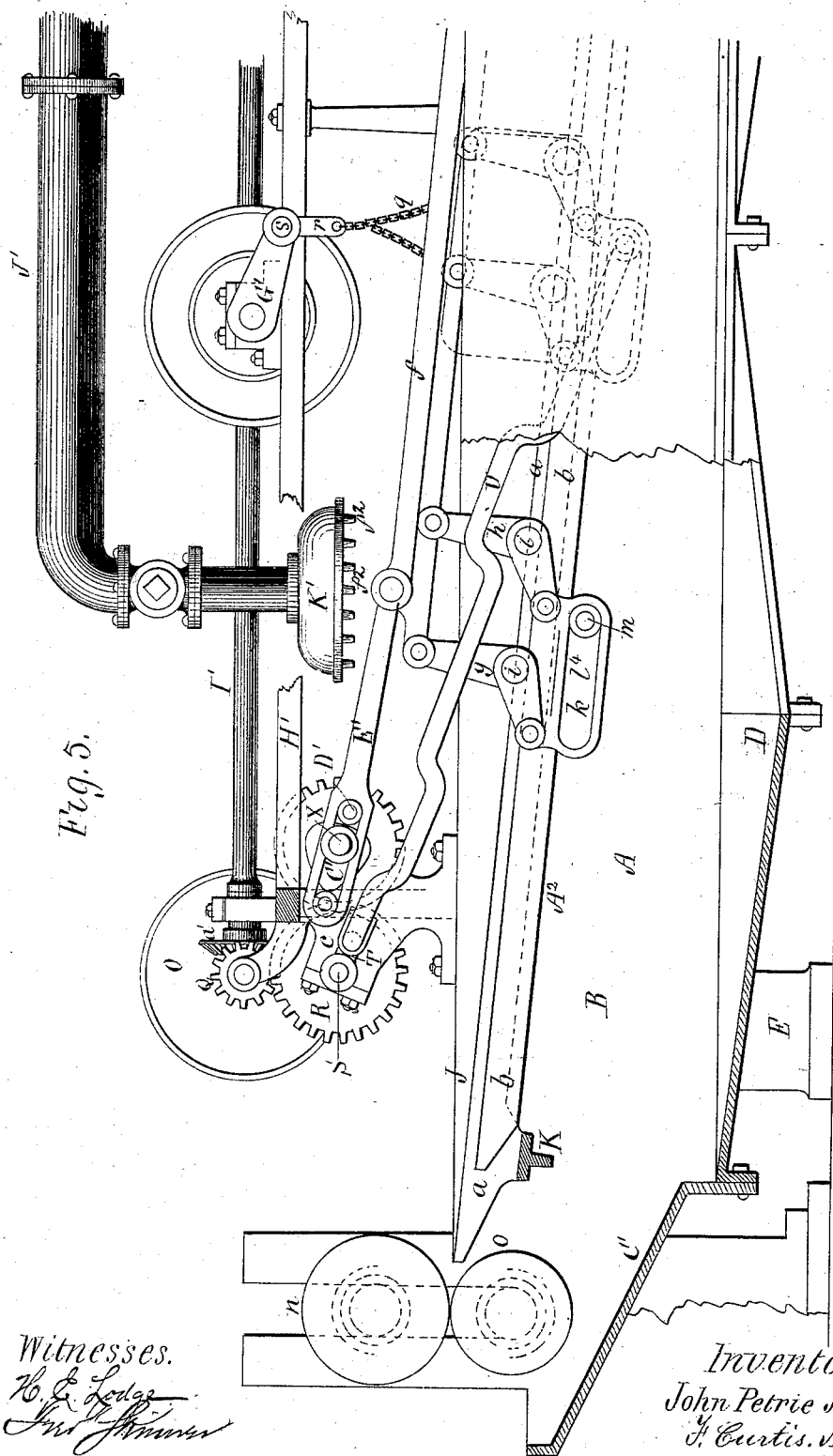
(No Model.)

3 Sheets—Sheet 3.

J. PETRIE, Jr.  
WOOL WASHING MACHINE.

No. 261,756.

Patented July 25, 1882.



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# UNITED STATES PATENT OFFICE.

JOHN PETRIE, JR., OF ROCHDALE, COUNTY OF LANCASTER, ENGLAND.

## WOOL-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 261,756, dated July 25, 1882.

Application filed March 6, 1882. (No model.) Patented in England December 21, 1881, No. 2,720.

*To all whom it may concern:*

Be it known that I, JOHN PETRIE, JR., a citizen of Great Britain, residing at Rochdale, in the county of Lancaster, England, have invented certain new and useful Improvements in Machinery for Washing and Cleansing Wool; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of my present invention is to simplify and accelerate the first step in the process of treating wool and other fibrous material for spinning and other purposes—that is, the washing or cleansing of such material—which is necessarily accomplished before it is subjected to the scouring process.

To accomplish these results my invention consists partly in the combination of a movable feeding-frame with a stationary frame or grid, both being located in the tank for the wool and cleansing-fluid, and devices or mechanism for reciprocating the movable frame longitudinally and vertically and returning to its starting-point, and partly in certain subsidiary devices hereinafter particularly set forth.

The drawings which accompany this specification and illustrate my invention represent, in Figure 1, a sectional elevation, in Fig. 2 a plan, and in Fig. 3 a vertical cross-section, of a machine for washing and cleansing wool or other fibrous material. Fig. 4 in said drawings represents a portion of a longitudinal section. Fig. 5 represents a modification of the invention.

Reference being had to the above-named drawings, especially Figs. 1, 2, and 3 thereof, it will be seen that A represents an upright rectangular vat or tank to hold the cleansing-liquid, and of a capacity adapted to the amount of labor to be performed, the sides of this vat being shown at B B', its ends or heads at C C', and its bottom at D, the latter being supported upon suitable feet, E E, &c., and the vat being supplied with suitable inlet and discharge ports to enable it to be cleansed or emptied, as occasion requires.

At the front end of the vat A, and at the up-

per part thereof, I locate an endless traveling feed-apron, F, upon which the material to be cleansed is placed, and by which apron such material is fed into the vat. Within the vat, and near the feed-apron, I place a rotary fluted or grooved roll or tumbler, G, the office of which is to submerge in the steeping or cleansing liquid contained in the vat the material fed to the trough by the apron F, the level of the cleansing-liquid being indicated by H.

Within the vat, and upon opposite sides thereof, and at some distance from its sides B B', I place upright housings or plates I I, which extend longitudinally throughout the vat parallel with the said sides B B', these housings being to support the horizontal barred grid or false bottom, which supports the material to be cleaned. This grid is shown at J as composed of a series of parallel bars, a a, &c., which are secured at their front ends to the head C of the vat, while at their opposite ends such bars are secured to the top of a horizontal transverse beam, K, secured at its ends to opposite sides of the vat.

The movable grid or carrier frame for advancing the material along the stationary grid is shown at A<sup>2</sup> as composed of a series of parallel bars, b b, disposed between the bars a a of the stationary grid.

In order to lift, advance, lower, and retract the bars b b, and in so doing cause them to seize and advance the wool or other material along the grid J, then drop below such material and return to their starting-point, I proceed as follows: At the rear end of the vat, and above the same, and mounted in suitable curved standards or brackets, L L, erected upon or secured to the sides of such vat, I dispose a horizontal transverse shaft, M, provided with fast and loose pulleys N O, the former of which is bolted to a suitable driving-pulley, by which the shaft M is put in rotation. Upon one end of the shaft M, I secure a pinion, Q, which engages and drives a spur-gear, R, secured to a horizontal shaft, S, arranged beneath or parallel to the shaft M, and mounted in bearings c c, erected upon the sides of the vat below the standards L L, before named. Upon the shaft S, I form two cranks, T T, and to the wrist-pins of these cranks I pivot the ends of twin connecting-rods U U, the opposite or front ends of these rods being in turn pivoted to opposite

ends of a horizontal rod or bar, V, extending laterally across the lower part of the vat beneath the bars *a* of the stationary grid J. Rotations of the crank-shaft S, through the agency of the rods U U, effect reciprocating longitudinal movements of the barred frame, and to effect the vertical motion of such frame I employ a horizontal shaft, X, extending laterally across the top of the vat in front of the shaft S, and about level therewith, and mounted in bearings Y Y, erected upon the sides of the vat; and upon one end of this shaft X, I secure a spur-gear, Z, which engages a twin gear, B<sup>2</sup>, secured to the end of the shaft S opposite that carrying the gear R, before named, the said shaft S, by means of the gears Z and B<sup>2</sup>, putting the shaft in motion. Moreover, I secure to the shaft X two twin heart-cams, C' C', the peripheries of which are embraced by anti-friction rollers D' D', pivoted at opposite ends of longitudinal slots *e e*, formed in the rear ends of two connecting-rods, E' E', disposed above the rods U U, before named, the slots *e e* of the rods E' E' straddling the shaft X, and thereby guiding said rods in their longitudinal movements, such rods having annular shoulders to embrace opposite sides of the cams C' C', in order to prevent lateral play. The connecting-rods E' E' are pivoted at their front ends to long rails or bars *f f*, disposed longitudinally within the vat immediately outside of the housings I I, while these rails or bars *f f* in turn have pivoted to them at intervals the upper ends of a series of bell-crank levers, *g g h h h*, arranged and operating in jaws upon each side of the vat, the angles of the levers *h h h g g g* being pivoted, as shown at *i*, to the side plates or walls, B B', of the vat, while the lower ends or noses of said bell-crank levers are pivoted to opposite ends of slotted ears *k k*, the slots *l l* of these ears straddling anti-friction rollers turning on opposite ends of rods *m m*, extending horizontally across the vat beneath the grid J, and beneath the bars *b b* in manner similar to the rods or bars V, before named.

The rotations of the crank-shaft S effect, through the agency of the rods U U, longitudinal reciprocations of the barred frame A<sup>2</sup> within the barred grid J, while at the same time the shaft S, by means of the gears B<sup>2</sup> and Z, puts the shaft X in rotation, while such shaft X, by means of the cams C' C' and rods E' E', will impart longitudinal reciprocating motions to the bars or rails *f f*, to which the upper ends of the levers *g h* are pivoted, and these reciprocating movements of said bars or rails effect rocking movements of said levers *g h*, the result of which is that the lower arms of these levers alternately raise and depress the barred frame A<sup>2</sup>, the parts being so timed or adjusted that as the barred frame moves forward toward the squeezing-rollers (which are shown at *n* and *o*, respectively, arranged at the rear or outlet end of the vat) it rises and raises above the stationary grid J the mass of fibrous material upon the latter, thereby feeding such mass, step by step, toward said rollers, while as the

barred frame retreats to its starting-point at the front end of the vat to act anew upon the mass of material it lowers beneath the surface of the grid.

The transverse rod or bar V, before mentioned, takes the place of one of the rods or bars *m*, and the slotted ears W, in which it moves, are substantially the same in construction as the other slotted ears, *k*, in which the ends of rods *m* are guided. The rod V is distinguished from the others by a different letter, because it is the one to which the connecting rods U are directly attached, and through which motion is communicated to the movable frame *b*, whereas the other rods, *m*, merely act as supports and guides for said frames. All of said rods are attached firmly to said frame and provided with rollers, which turn in said slotted guides. The slotted ears *k* W do not move with rods or bars *m* V, but merely guide them. Said ears being hung from bell-crank levers *g*, the action of said levers lifts said ears, and with them the bars *m* V and the movable frame. Thus the movable frame receives longitudinal motion from the connecting-rod U and vertical motion from bar *f* and bell-crank levers *g*. The two sets of devices combined give the compound motion desired.

To raise the mass of material, after cleansing, to the level of the squeeze-rolls and deliver it to the latter, I employ a device of any suitable construction, that herein shown consisting of a series of inclined bars, *p p*, &c., arranged parallel across the vat and extending longitudinally of the latter, these bars being armed upon their upper surface with card-clothing or other rough or bristling covering, which shall seize and hold the mass of material as it is fed forward, and prevents its slipping back to the vat. The conjoint action of the grid and barred frame will tend to loosen and cleanse the material more or less effectually; but to aid in this operation I prefer to subject it to the pounding action of a series of plungers, which are shown in the drawings at F' as four in number, arranged centrally over the vat, and each suspended by a rope or chain, *q*, from the lower end of a link, *r*, which link in turn is pivoted at its upper end to the wrist-pin of a crank, G', which is secured to one end of a horizontal shaft, *t*, mounted in bearing *u v*, one of which, *u*, is erected upon the upper edge of the right side, B, of the vat and the other, *v*, upon a horizontal beam, H', erected centrally and longitudinally over the vat upon columns *w w*, secured to its sides by means of cross-beams *x x'*, the latter being at the outlet end of the vat.

To impart the requisite slow rotary motions of the series *t t t t* of shafts, I employ a long horizontal shaft, I', which is mounted in bearings *y y*, &c., a horizontal rail, *z*, erected from the right side, B', of the vat, and at its front end has secured to it a bevel-gear, *a'*, which engages and is driven by a beveled pinion, *b'*, secured to the shaft M, before alluded to, between the pinion Q and pulley O, carried by

such shaft. Furthermore, I secure the shaft I', at intervals, bevel-pinions  $c'$   $c$ , &c., each of which engages and drives a beveled gear,  $d'$ , secured to one end of each crank-shaft  $t$ . As the shaft M rotates during the operation of the machine it puts (by means of the pinion  $b'$  and gear  $a'$ ) the shaft I' in slow rotation, and the rotations of this shaft I' effect, through the instrumentality of the pinion  $c'$ , gears  $d'$ , and cranks G', alternate rises and falls of the plungers F', which in their descent drop upon the mass of material to be cleansed, and by their pounding action tend to facilitate the operation of loosening and detaching any foreign matter contained in such material.

To avoid entangling or felting of the wool or other material by the plungers during such time as the latter may rest upon the material while it is being fed forward by the movable frame, the length of each chain  $q$  is to be such that as the plunger drops upon the chain it shall slacken and permit the plunger to move forward by and with the material.

As it is intended to immerse the plungers to a greater or less extent in the liquid in the tank as they lower upon the material to be cleansed, they are or may be constructed in the form of boxes, upon the tight bottom of which weights may be placed, if necessary, and it may be found in practice advantageous to form a flange or ledge about the edge of the bottom, as shown at  $e'$  in the drawings, in order to provide an air-space or inclosure,  $f'$ , which, upon descent of the plunger or beater into the liquid, inclose and carry into such liquid a certain amount of air, a portion of which, as it becomes compressed, is forced through the wool or other material and aids in removing the impurities contained in the same.

In Fig. 5 of the accompanying drawings I have shown a modification of my machine, said figure being a side elevation of a portion of the machine. In this figure the tank is shown at A, one of its sides at B, one end or head at C', its bottom at D, and its supporting-feet at E E, &c., the barred grid at J, the movable barred frame at A<sup>2</sup>, the squeeze-rolls at  $n$   $o$ , these parts being arranged and operating as described in the original machine. These modifications relate to means for lifting the cleansed material to the level of the squeeze-rolls as a substitute for the inclined bars  $p$ , first described, and consists in raising the rear ends of the barred grid and of the barred frame operating therewith to such level. I effect this by increasing the pitch or slope of the said grid or frame and bringing their outer ends to a level with the squeeze-rolls, as shown in Fig. 5, by this means lifting the material by a gradual inclined plane and delivering it direct to such rolls. Moreover, I employ in this modification a water-conduit, J', arranged centrally and longitudinally above the tank and connected with a suitable water-supply. In connection with this conduit I employ hollow

heads or domes K', which communicate with such conduit and are suspended from the frame or beam H', and are provided upon their under side with tubular teats or nozzles  $f''$  for precipitating water in a shower upon the material below as it is fed along by the barred frame to the squeeze-rolls. The spray or shower of water, in conjunction with the pounding action of the plunger, is an effective ally in cleansing the material. I do not, however, restrict myself to the combination of the plunger and showering-pipes, as the latter may be used independent of the former. Nor do I restrict myself to the precise construction or location of the showering-pipes, as they may be in the form of simple perforated pipes placed in the lower part of the vat below the barred grid, and through which water under heavy pressure may be forced upward; or these perforated pipes may be connected with an air-pump and jets of air forced upward through the mass of material to be cleansed, and thereby aid in opening and loosening such mass.

I sometimes use a circular vat, which may be arranged to rotate. This construction and the mechanism therefor will form part of the subject-matter of another application.

I claim—

1. In machinery for cleansing wool or other fibrous material, the vat or tank provided with barred grid J and movable frame A<sup>2</sup>, the bars  $b$  of said frame being disposed between the bars  $a$  of said grid and arranged parallel therewith, substantially as set forth.

2. The combination, with plungers F', suspended from link  $r$ , pivoted at its upper end to the wrist-pin of crank G, which is secured to a shaft,  $t$ , of the mechanism for operating said shaft, substantially as set forth.

3. In combination with a tank and stationary grid, a wool-feeding frame reciprocated longitudinally and vertically, as described, and the bar  $f$ , bell-crank levers  $g$ , the slotted ears suspended therefrom, the bars or rods  $m$ , the connecting-rod U, and the devices for operating said rod U and bar  $f$ , substantially as set forth.

4. In machinery for cleansing wool or other fibrous material, the combination of the vat or tank for containing the material to be cleansed and the liquid to effect such cleansing, the barred grid J, and transferring-frame A<sup>2</sup>, with an inclined frame at one end of said vat, having its upper surface roughened and adapted to receive and transfer the wool from said frame A<sup>2</sup> to the squeezing-rolls, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN PETRIE, JR.

Witnesses:

JOHN WODESWORTH,  
Solv., Rochdale.

WM. ROSSUSE,  
His Clerk.