2 Sheets—Sheet 1.

F. P. PENDLETON & J. K. PROCTOR.

WOOL-WASHING MACHINE.

No. 180,370. Patented July 25, 1876.

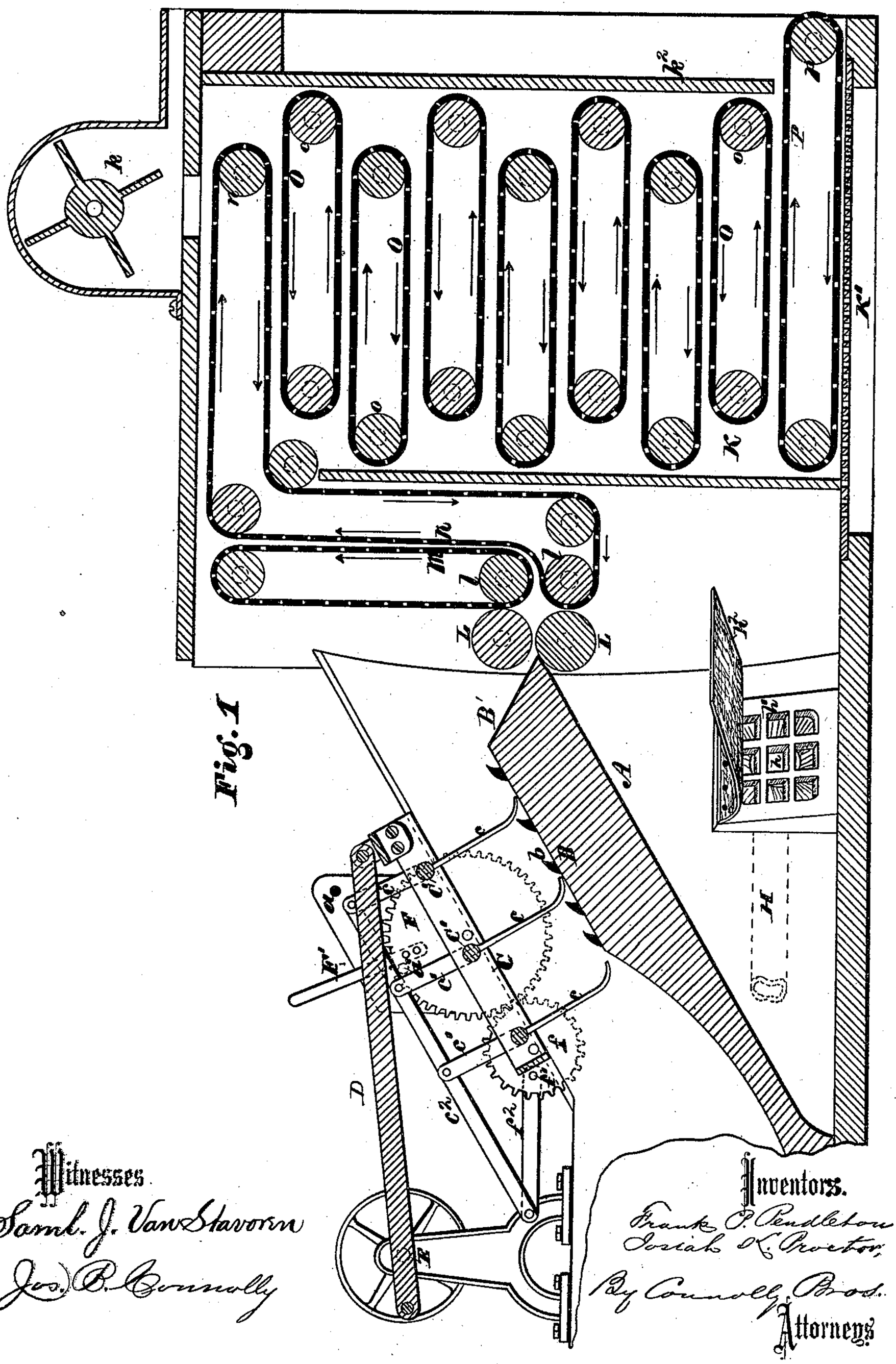

Fig. 1

Witnesses

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2 Sheets—Sheet 2.

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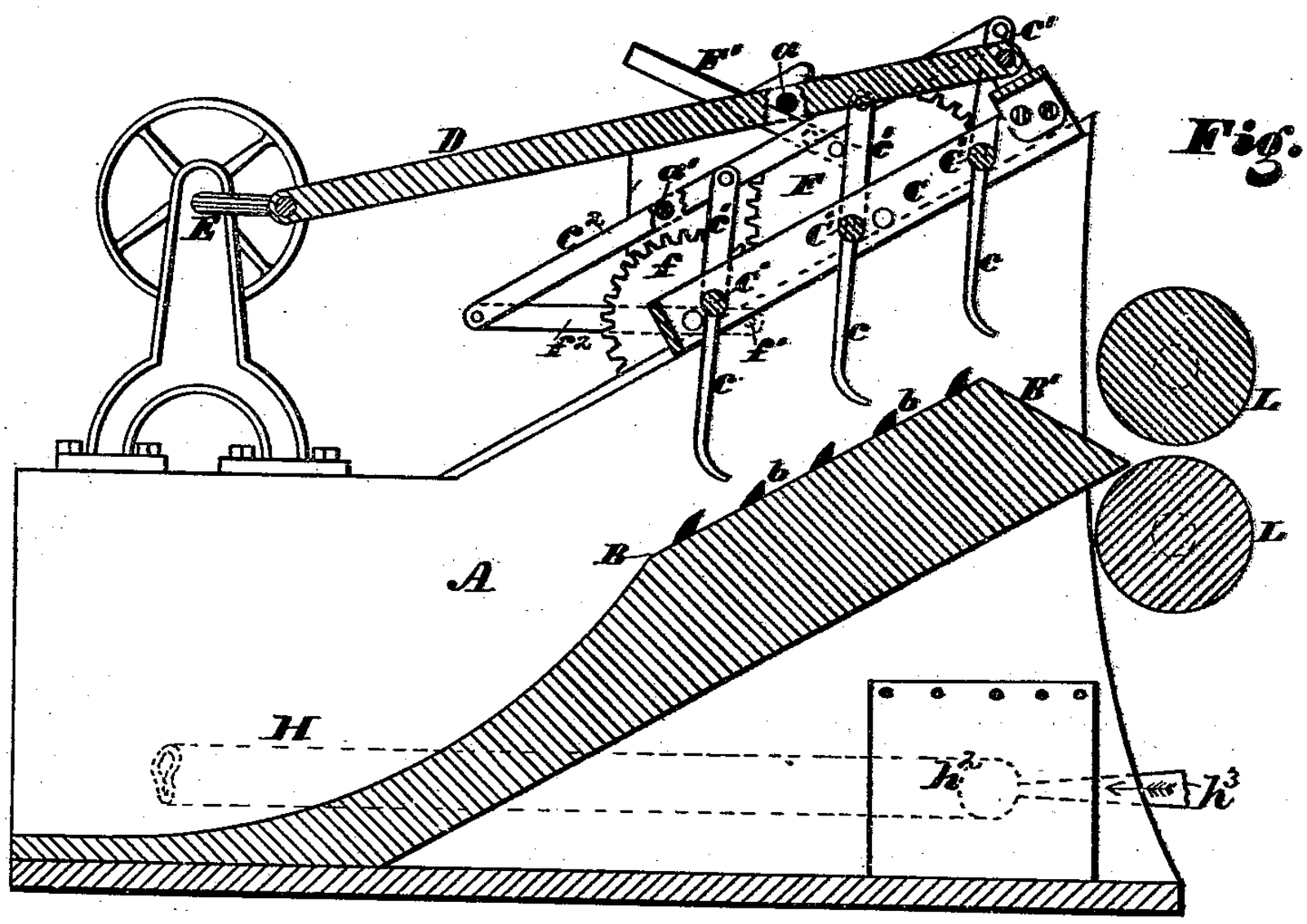

Fig. 2

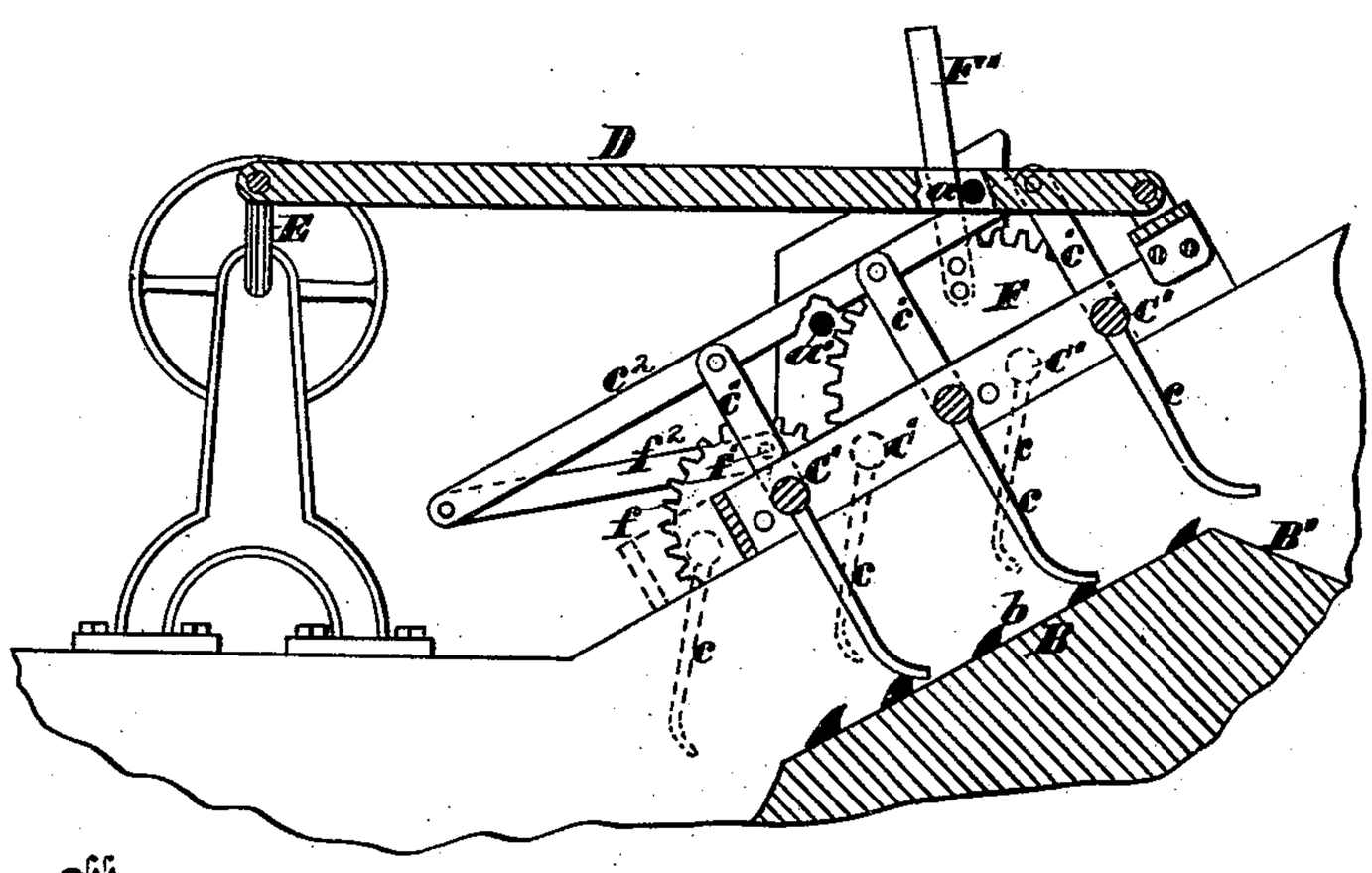

Fig. 3

Witnesses

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UNITED STATES PATENT OFFICE.

FRANK P. PENDLETON AND JOSIAH K. PROCTOR, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WOOL-WASHING MACHINES.

Specification forming part of Letters Patent No. **180,370**, dated July 25, 1876; application filed April 12, 1876.

To all whom it may concern:

Be it known that we, FRANK P. PENDLETON and JOSIAH K. PROCTOR, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Wool Washing and Drying Machine; and we 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a longitudinal vertical section of the combined wool-washer and drier. Fig. 2 is a vertical longitudinal section of the wool-washer, showing the position of teeth when the carrier is descending. Fig. 3 is a vertical longitudinal section of same, showing position of carrier-teeth when carrier is ascending the incline.

The object of our invention is to provide a combined wool washer and drier, in which the stock, after being cleansed, will be lifted up the incline by a carrier of novel construction, operating in a peculiar manner, and in which said stock will be thoroughly dried in a compact chamber or apartment, as hereinafter more fully set forth.

A further object in our invention is to provide an improved combined injector and valve for the pipe, by which the cleansing-liquor is conveyed from one washing-bowl to another.

The carrier of our improved machine is arranged to reciprocate up and down, upon, or above the incline, its depending teeth being attached to shafts to which positive movements are communicated by suitable mechanism, so that on the upward motion of the carrier said teeth will be rigid, and at or about at right angles to the incline, while on the downward movement of said carrier said teeth will be rigid, but turned so as to form on their forward sides an acute angle with the incline; the object of this being to get the teeth of the rear rank back of the stock advanced by the last fork—a result which swinging or pivoted teeth, as shown in Letters Patent No. 163,251, on which this is an improvement, fail wholly to accomplish.

The drier of our improved apparatus consists of a chamber attached to the wool-washing machine, said chamber being supplied with a series of traveling-aprons, by which the stock is carried to and fro and turned over and back while being subjected to a blast or current of heated air.

Our improved combined injector and valve for the pipe, by which the cleansing-liquid is conveyed from one bowl to another, consists of a steam pipe entering a water-pipe, having an opening provided with a grating, and covered by a flexible flap, said grating preventing said flap from collapsing under the outward pressure of the water in the bowl, while, at the same time, it permits the free admission of the liquid coming in the contrary direction, under a pressure of steam, as ordinarily employed for that purpose.

Referring to the accompanying drawing, A designates the bowl or tank, and B the chute or incline, of a wool-washing machine, the same being constructed in the usual or any suitable manner, as, for instance, like the same parts in the Letters Patent aforesaid, No. 163,251. Said chute should have fixed teeth or pins *b b*, as shown in said patent. C represents a reciprocating carrier, moving to and fro on ways on the side of the bowl, and operated by an arm, D, actuated from the fork crank-shaft E. C′ are shafts supported in bearings in the side of the carrier, and provided with rigid teeth *c*, which depend from said shaft at or about at right angles to the incline B. The shafts C′ project through one side of the carrier, and are bent up to form or are provided with winches c^1, said winches being connected by a bar, c^2, so that when a movement is communicated to said shafts they will all move together. F *f* are, respectively, a drive-wheel and pinion, meshing together and sustained in bearings in the side of the carrier C. f^1 is an eccentric pin on the pinion *f*, between which and the bar c^2 is a pitman, f^2, connecting said pinion and bar, so that a rotary motion of the former will have the effect of moving the latter longitudinally. F′ is a lever made fast to the drive-wheel F, and *a a′* are studs or pins projecting inwardly from the wall of the bowl A, and serving as stops for said lever. The parts are relatively adjusted, in the first instance, as shown in

Fig. 1, the crank of the shaft E being back, and the carrier C, consequently, as far down in the bowl as it can go. At the same time the pitman f^2 is on the back dead-center of the pinion f, or directly in the line between the shaft of said pinion and the end of the bar c^2. The revolution of the crank-shaft E now causes the carrier C to ascend the incline B, the teeth of said carrier being, as shown, at or about right angles to the incline, their curved points inclining forwardly. Said teeth are perfectly rigid, and keep in the described position until the carrier has nearly completed its ascent, or until the front rank of teeth have passed beyond the upward extremity of the chute B, and hang over the short incline B′, which descends to the squeeze-rolls. The lever F′ now meets the pin a, and, the carrier continuing to ascend, the wheel F is caused to rotate, moving the pinion f, pitman f^2, and bar c^2 until they assume the position shown in Fig. 2. This brings the teeth c into the position indicated in said figure, causing their points to be lifted considerably above the incline B, so as to clear the stock thereon on their backward movement. The teeth now point backwardly, or incline in such manner as, if continued, to form, with the chute B, an acute angle on their upper side. The movement of the pinion which causes this change in the position of the teeth also changes the dead-center in which the pitman f^2 lies from back to front, so that on the descent of the carrier the teeth will be just as rigid as when the carrier is ascending. The carrier now descends with the teeth in this position until the crank of the shaft E begins to descend on the back side, the rear row of the teeth c having, by this time, got to a line back of the stock, which has been advanced by the fork. The lever F′ now meets the pin a', and, the carrier continuing to descend, the teeth are restored to their original position or inclination, the pitman f^2 returning to the front dead-center of the pinion f, rendering said teeth rigid, as before.

This operation will be observed as entirely different from that of the swinging teeth in the Patent No. 163,251, above referred to. In said patent, as in this and all reciprocating carriers, the teeth are rigid on their upward movement. When the carrier in said patent begins to descend, the teeth incline forwardly, hanging loosely in such position as to form, if continued, an obtuse angle on their upper sides with the chute beneath.

The defect of this method of construction is that the swinging teeth do not get back of the stock advanced by the fork, while, with the herein-described construction the rear rank of the carrier-teeth does come back of said stock, and all the teeth of the carrier are forcibly, and by a positive motion, caused to enter or engage with the stock upon the incline.

A further advantage of this construction is that the change of position of the teeth, accomplished when the carrier has ascended, causes said teeth to draw out of the stock vertically, and clear it wholly when descending toward the bowl.

H shows a pipe for conveying the liquid contents of one bowl to another, said pipe forming a connection with an opening, h, in the side of the tank A. h^1 is a grating in or over said opening, and h^2 is an apron or flap, of sheet rubber or equivalent flexible water-tight material, covering said opening and resting against the grating h^1. When water is being admitted through the pipe H the apron h^2 will rise. When the pressure by which said water is injected ceases, (said pressure being obtained by steam entering through pipe h^3,) the apron drops, the liquid within the tank causing it to close down tightly over said opening h and the grating h^1, preventing it from collapsing.

The wool or stock, after being lifted by the carrier, passes through the squeeze-rolls to the drier, the construction of which we shall now proceed to describe.

K represents a close chamber, at the rear of the wool-washing machine, having a suction-fan, k, above and an opening, k^1, for the admission of hot air below. L L are the squeeze-rolls of the machine, back of which is a pair of slightly-smaller rolls, l l. The stock is received from the squeeze-rolls between the rolls l l, and carried up by aprons m n. The apron N, after ascending nearly to the top of the chamber K, assumes a horizontal position, carrying the stock to the back of said chamber, and dropping it over the roll n upon one of a series of horizontal aprons, O, revolving upon rollers o o. These aprons project over each other alternately at their ends, as shown, so that the stock will be dropped from one to the other, being thus turned over and over again, and caused to traverse the chamber K from top to bottom in horizontal planes, passing out finally upon the apron P, which projects beyond the other aprons O, as shown, its rear roller p being beyond the wall k^2.

The movement of the aprons or carriers M N O is, of course, effected by any suitable motive power applied to the ends of the rolls, and so arranged as to cause the aprons to travel alternately in opposite directions. As the means of effecting such motion is within the province of any skilled mechanic, they do not constitute an essential feature of our present invention, and are therefore properly omitted from the drawing and description.

In order to facilitate the passage of the air through the aprons and stock, the former should have numerous perforations, or be made of open slat-work, through the interstices of which the air may pass.

What we claim as our invention is—

1. In combination with a reciprocating carrier, provided with pivoted teeth, an automatic tripping device, connected with said teeth, and adapted to turn them upon their pivots to bring their points close to the chute when

on the upward stroke, and to swing them backward and draw their points away from the chute on the downward stroke, as described.

2. In a reciprocating carrier, the teeth-shafts C′, bent to form or provided with winches c^1, connected by a bar, c^2, to cause all the teeth to move simultaneously, substantially as and for the purpose set forth.

3. In combination with the teeth *c*, depending from shafts C′, connected by a bar, c^2, mechanism, substantially as described, for changing the positions of said teeth, so that they will move up the chute at one inclination and down at another, as set forth and specified.

4. In combination with the teeth-shafts C′, connected by a bar, c^2, the wheels F *f*, pitman f^2, lever F′, and pins or stops *a a′*, for varying the inclination of the teeth *c*, substantially as shown and described.

5. In combination with a water-pipe H, and steam injector-pipe h^3, the opening *h*, grating h^1, and flexible flap apron h^2, said grating operating to prevent the collapse of said apron, substantially as described.

6. In combination with the squeeze-rolls L L of a wool-washer, the aprons M N, for carrying the stock received from said rolls to the upper part of the drying-chamber K, substantially as set forth.

7. The apron N, passing vertically to the upper part of chamber K, and then horizontally across said chamber, substantially as shown and described.

8. The aprons O, projecting alternately at each end, so as to drop the stock from one to another, and turn over the same, substantially as shown and described.

9. The combination and arrangement of aprons M, N, O, and P, substantially as shown and described.

10. A drying-chamber, K, having a suction-fan and hot-air apparatus, provided with a series of traversing-aprons, by which the stock to be dried will be caused to traverse the chamber, and be turned over and over again while being dried, substantially as shown and described.

11. In combination with a wool-washing machine, a drying-chamber, provided with a fan, air apparatus, and traversing-aprons, so as to provide a continuous and compact mechanism for washing and drying wool without interruption, substantially as shown and described.

In testimony that we claim the foregoing we have hereunto set our hands this 7th day of April, 1876.

FRANK P. PENDLETON.
JOSIAH K. PROCTOR.

Witnesses:
M. DANL. CONNOLLY,
CHAS F. VAN HORN.