2 Sheets—Sheet 1.

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

Wool-Washing Machine.

No. 206,192. **Patented July 23, 1878.**

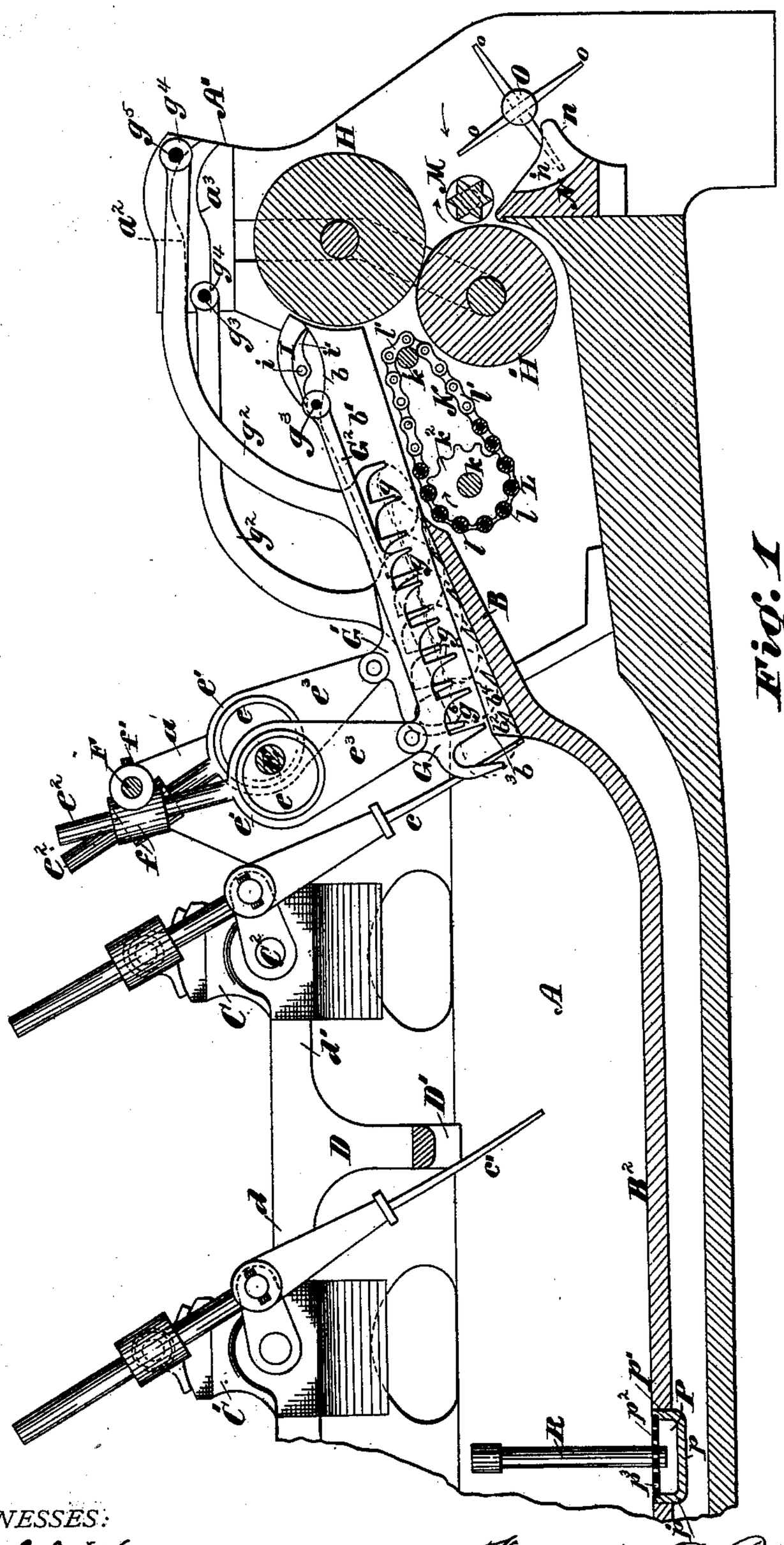


Fig: 1

WITNESSES:

Saml. J. Van Stavoren

J. B. Connolly

INVENTORS

Frank P. Pendleton

Josiah K. Proctor,

By Connolly Bros.

ATTORNEYS

2 Sheets—Sheet 2

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

Wool-Washing Machine.

No. 206,192. **Patented July 23, 1878.**

Fig. 4

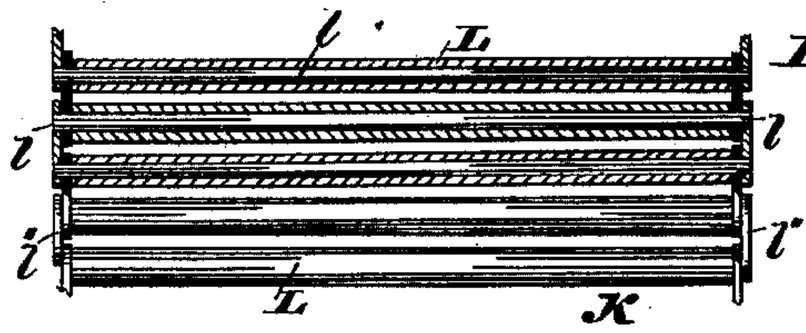


Fig. 5

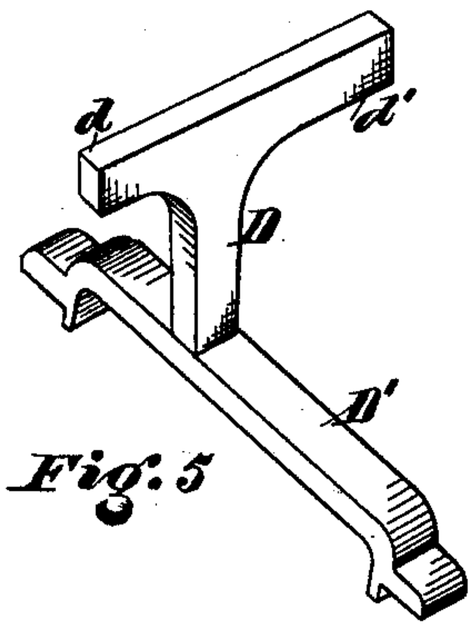


Fig. 2

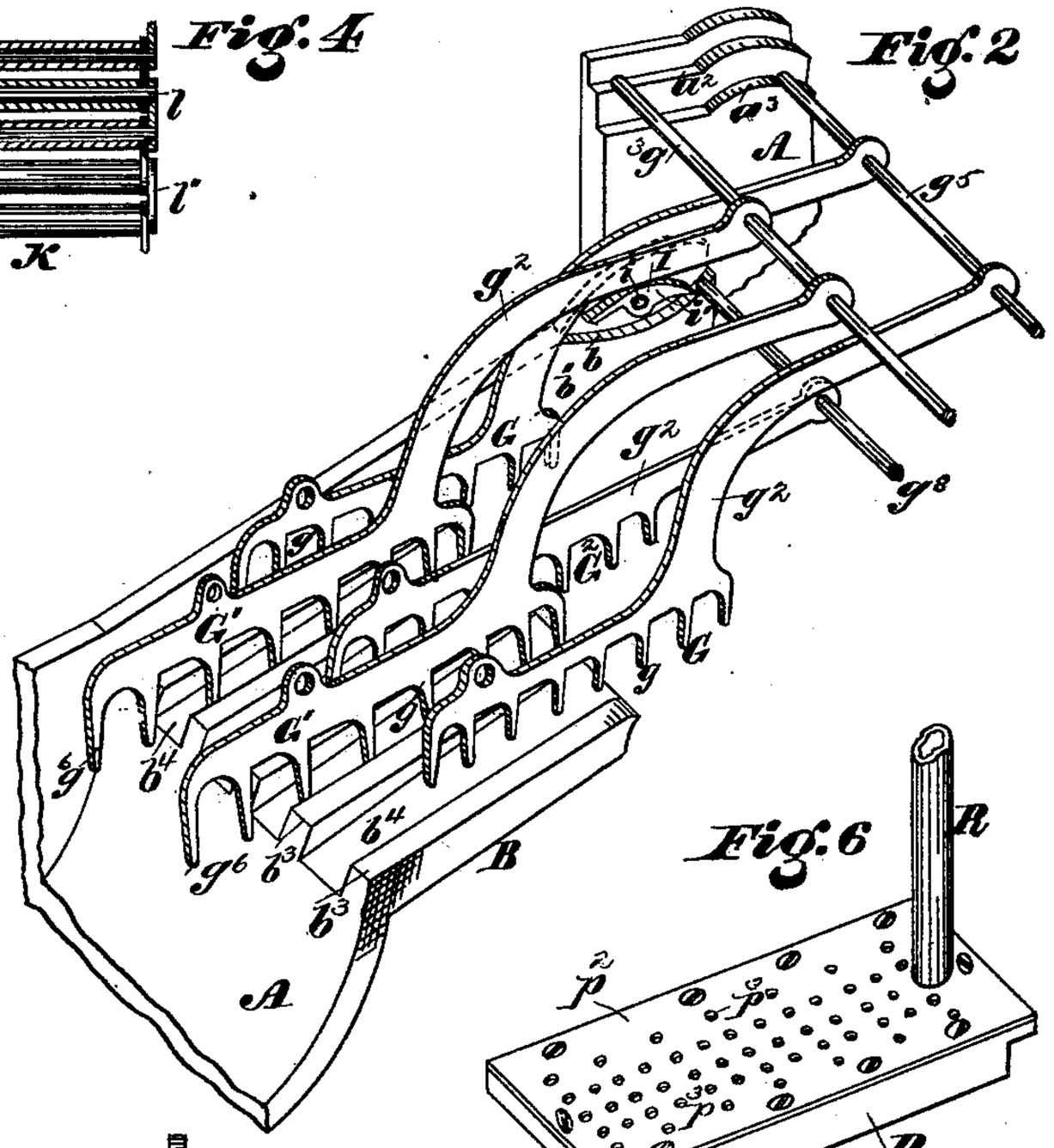


Fig. 3

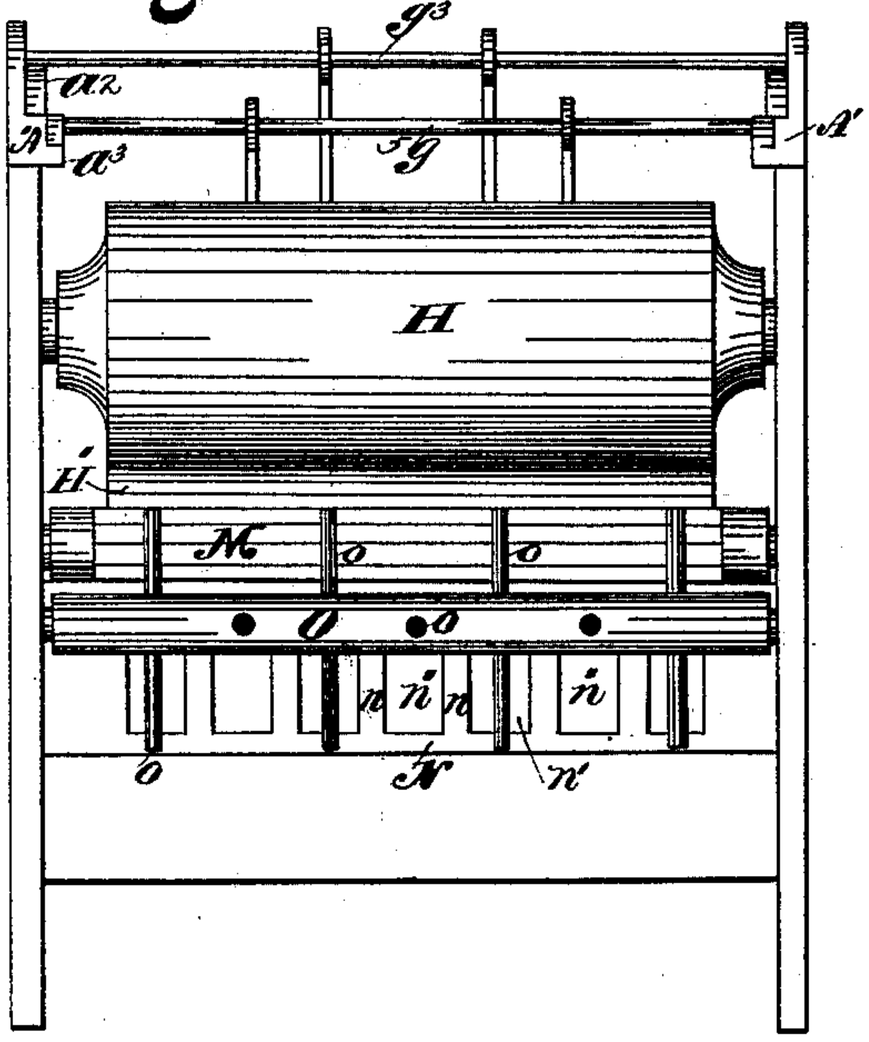
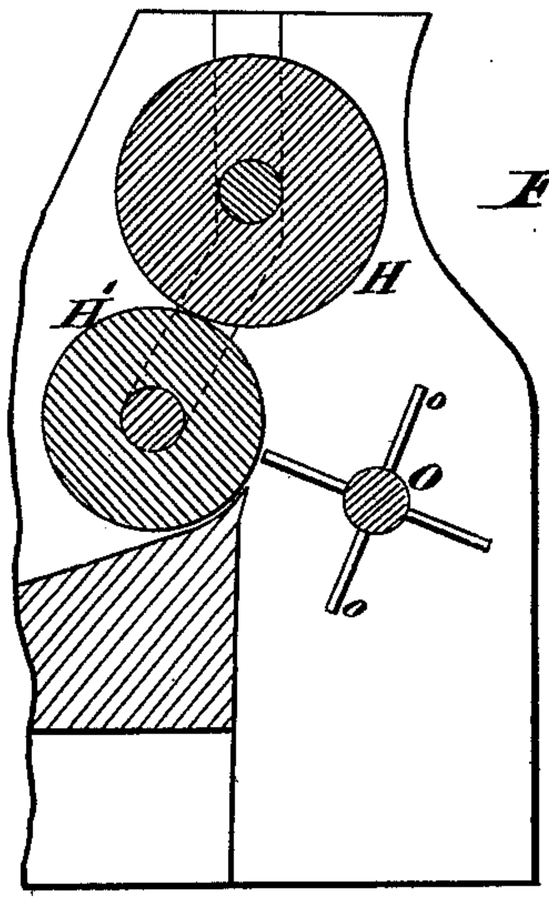


Fig. 6

Fig. 7



WITNESSES:

Saml. J. Van Stavoren

J. B. Connolly

INVENTORS

Frank P. Pendleton

Josiah K. Proctor,

By Connolly Bros., ATTORNEYS

UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN WOOL-WASHING MACHINES.

Specification forming part of Letters Patent No. **206,192**, dated July 23, 1878; application filed September 29, 1877.

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 certain new and useful Improvements in Wool-Washing Machines; 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 our invention. Fig. 2 is a perspective detail of the carrier or lifting device; Fig. 3, a front elevation; Fig. 4, a sectional plan of the endless apron; Fig. 5, a detail perspective of the arched girt and two-branched standard; and Fig. 6 is a detail perspective of the apparatus for heating the scouring-liquid.

The objects of our invention are, first, to provide an improved mechanism for lifting or pushing the stock up out of the bowl and delivering the same to the press-rolls; second, an improved construction of certain portions of the frame-work of the bowl, whereby the latter is made firm and steady; third, the provision of means for heating the scouring-liquid and for rinsing the fiber after it is scoured.

Referring to the accompanying drawings, A designates the bowl or tank, and B the chute or incline, of a washing-machine. C is the standard or support for the bearings of the stirrer-rake *c*. D′ is an arched girt, extending across the top of the bowl from side to side. At either end it grasps the top of the sides of the bowl-frame and is secured firmly thereto, thereby greatly stiffening the frame of the bowl.

The girt D′ is made sufficiently arched to enable the tines of the stirrer-rake to pass under it without striking the same. The arched girt D′ affords also a support for a standard, D, having two branches, *d d′*, one of which is secured to the standard C, as shown, and the other to a similar standard, C^1, which supports the bearings of the next preceding stirrer-rake *c′*. This combination of the girt D′ and standard D with the frame of the bowl A and the standards C C^1 gives great rigidity to all these parts.

From either side of the bowl A arise other standards, a^1, in which are provided bearings for the shafts of the lifting apparatus. E is one of said shafts, operated, if desired, by a crank or other suitable mechanism. On the shaft E are fixed eccentrics *e e*, so arranged that each alternate eccentric shall stand in a diametrically-opposite position from that of its neighbor on either side. These eccentrics work in straps e^1 e^1, provided with projecting levers e^2 and e^3.

F is a stationary shaft, fixed in the top of the standards a^1, and extending from side to side of the machine. On the shaft F are placed right-angled swivel-boxes *f f*, through which pass the levers e^2. To the lower ends of the levers e^3 carrier-bars G G^1 are hinged, each bar having a series of downwardly-projecting teeth, *g g*. The bars G G^1 terminate in arched guide rods or bars g^2 g^2. Through the extremities of the rods g^2 pass guide-rods g^3 and g^5, at the ends of which are slides or friction-wheels g^4. These slides or wheels move over curved ways a^2 a^3, provided in the guide-board A′, which is attached to the frame of the machine directly over the press-rolls H and H′, and at either side of the machine.

The operation of this mechanism is as follows: Motion being communicated to the shaft E, the eccentrics *e e* revolve in the straps e^1, thus causing said straps to oscillate. The levers e^2, being a part of or rigidly attached to the straps e^1, having their upper ends confined by the swivels *f f*, are thus caused to slide to and fro in the swivels *f*, and the latter to rock on the stationary shaft F. The swivels *f f* are prevented from undue end motion by pins *f′* *f′* inserted in holes in said shaft F, between which the swivels *f f* are placed and stand shoulder to shoulder. The result of the oscillating motion of the eccentric-straps, modified by the sliding motion of the levers e^2 in the swivels *f f*, is to produce at the extremities of the levers e^3, and to the bars G G^1 at their junction with said levers, a movement in nearly the form of an ellipse, as shown by the dotted lines in Fig. 1.

Instead of adjoining eccentrics *c c* being

placed opposite to each other, they may be placed in groups of three, each adjoining eccentric having its radius disposed at one-third of a circle from that of its neighbor on either side; but in this case it would be necessary to employ three separate sets of straps e^1, levers e^2 and e^3, swivels f, bars G G^1, rods g^2 g^3, and slides and ways a^2 a^3 in the guide-boards A′, thus complicating the mechanism; hence, in practice, we prefer to employ two sets of eccentrics only, as shown.

The guide-board A′ is provided with two ways, one offset over the other, as shown at a^2 and a^3. It will be observed that each eccentric has its own strap, levers, swivel, carrier-bar, and arched guide-rod, each separate and distinct from those of its neighbor; but that all of the guide-rods g^2 belonging to each set of eccentrics are secured, respectively, to the same guide-rod g^3 or g^5. It is obvious that the two guide rods g^3 g^5 could not pass over the same track or way without coming in conflict with one another; therefore we have provided two ways, the one at a distance above the other sufficient to enable the rods g^3 g^5 to pass one another without striking. Since the rods g^3 g^5 are at different heights, it follows that the rods g^2 must have a slightly-different curvature in the two sets, as shown.

All of the eccentrics of a given set being arranged in the same line, all of the eccentrics of that set will move together, and consequently all of the carrier-bars G or G^1 belonging to that set will move at the same time; but as there are two sets of eccentrics, e e, one set being arranged diametrically opposite to the other set, and two sets of bars, G G^1, said bars will move alternately, one set being always down when the other is up, and one set always going forward while the other is going backward. In one set of bars, G^1, a rear row of teeth, g^6, is provided, located farther back than any of the rows in the other set. When the machine is suitably geared the two shafts, C^2 and E, will move in unison, and each set of bars G G^1 will make one complete movement in the same time that the stirrer-rakes complete one of their movements. Now, the stirrer-rake c having been once set, as shown in Fig. 1, in such manner that the rear tooth of the set of bars G having the least number of teeth shall just pass through the tines of the stirrer-rake c on its extreme forward movement, these parts will always come into the same position on each movement of the stirrer-rake c. When the teeth of the bars G pass between the tines of the stirrer-rake c they grasp the material brought up by the latter and draw it forward upon the incline of the chute B. As the two sets of bars G G^1 move alternately, the set of bars having the greatest number of teeth will be at the lower end of its stroke, when the teeth of the stirrer-rake c are extended back into the bowl, and the additional row of teeth on this set, by reason of their extending back far into the bowl A, gather up the loose fiber that may be floating upon the liquor and draw it upon the incline.

The teeth of the bars G G^1 are made gradually shorter toward the forward end, for the reason that the stock, being somewhat drained as it gets pushed up the incline, does not require so long a tooth as when it is fully saturated at the lower end of the chute. However, the teeth might, if desired, be made all of the same length.

Instead of the curved ways a^2 a^3, pawls I may be employed, said pawls being pivoted at i, having weighted ends i', and being arranged above concave ways b formed on the sides of the bowl A, or on the sides b^1 of the chute B.

On the forward motion of the carrier-bar G^2, (which is an extra bar introduced in the drawing for purposes of illustration,) its slide g^8 will pass below, and on its backward motion pass above, said pawl. The stock lifted by the bars G G^1 and by the bar G^2, if such extra bar be employed, is drawn from the incline B to an apron, K, sustained on shafts k and k^1, supported on either side of the frame sides A. On the shaft k are fixed two wheels, k^2 k^2, having corrugated surfaces, over which pass the endless-chain apron K. This apron consists of a series of hollow tubes, L, all of equal length. Through these tubes pass solid wires or rods l l, to the ends of which, on each end of the tubes L L, are riveted chain-links l'. The wheels k^2 are placed one at each side of the apron, near the outer edge. Revolving motion being communicated to the shaft k and wheels k^2, in the direction of the arrow, the apron K is caused to travel in a continuous movement, and deposit upon the press-roll H the fiber pushed upon it by the action of the carrier-bars G G^1.

The surface of the incline or chute B may be plain, or it may have fixed teeth inserted in its surface, as shown at b^2 b^2; or the surface of the chute may be raised to b^3 and longitudinally grooved, as at b^4.

The teeth of the carrier on their upward stroke pass into the grooves and move through them. When the chute is raised and provided with grooves no fixed teeth will be employed.

By reference to the drawing it will be seen that at one instant of time when the carrier-bars G G^1 are at the extremities of their strokes, both sets of teeth are raised from the chute, one set being on the upward, and the other on the downward, stroke. At this instant the stock might slip backward if not held in place by the hooked teeth b^2 b^2, or some equivalent appliance.

When the teeth of the carrier pass downward into the grooves b^4, the stock is pushed on them by the raised portion of the incline between the grooves, so that by the time one set of teeth is raised up out of the stock the other set is ready to engage with it, and there is no opportunity for slipping.

M is a doffer-cylinder or roll, grooved longitudinally, or provided with longitudinal

strips. This roll, revolving in the direction of the arrow, receives the stock as it passes from between the press-rolls H and H′, and deposits it upon the stationary rack N. This rack is provided with fingers *n n*, between which are spaces *n′ n′*.

O is a shaft having bearings on the frame A, and provided with beater-arms *o o*. The shaft O, in revolving in the direction of the arrow, strikes the stock deposited on the rack N and forces it through the interstices *n′ n′*, thus breaking up, loosening, and depositing it in a pile.

Another way in which this beater may be used with great success is by removing the rack N and revolving the beater at great speed in a direction opposite to that indicated by the arrow. In this case the arms of the beater strike the stock upwardly with great violence as it emerges over the roll H′, thoroughly loosening it, and throwing it to a considerable distance from the machine.

The arms *o o* may be set in any position in regard to the shaft O. In the drawing we have represented them in alternate rows at right angles one with another.

P represents a chest or box fitted in the false bottom B^2 of the bowl A. The bottom *p* and sides p^1 p^1 of this chest are water-tight, while its top p^2, which is on a level with the false bottom B^2, is formed with numerous small openings, p^3 p^3.

R is a steam or water pipe, of capacity greater than the aggregate capacity of the openings p^3 p^3. Said pipe passes through the top p^2, so as to discharge its contents into the chest P, and is located near one of the sides of the bowl A, so as to be out of the way of the stirrer-rake *c′*. The upper end of said pipe is to be connected by any suitable means with a steam-generator or water-pump.

To heat the scouring-liquor, steam or hot water, either or both, may be introduced into the bowl by means of this chest and pipe. Its principal use, however, will be in connection with rinsing, in which connection a strong head of pure water will be introduced through it, such water being permitted to flow off continuously from the bowl as fast as introduced after accomplishing its purposes on the scoured wool.

Where a machine composed, for example, of three bowls and appurtenant parts is used, the third or last bowl may be employed for rinsing, the scouring, by means of alkaline liquid, being effected in the first and second bowls. Where the machine has but one bowl, the scouring may be first accomplished, and the alkaline liquid drawn off, the rinsing being then accomplished by passing the scoured wool through said bowl, water being at the same time introduced through said chest P and pipe R.

The operation of this machine is as follows: The bowl is first filled with scouring-liquid within a few inches of the top. The material to be scoured is fed into the rear end of the machine, and is passed along by the stirrer-rakes until it arrives at the foot of the chute B. Here it is lifted part-way up the chute by the stirrer-rake *c*, and while still retained thereby it is engaged by the carrier-bars G G^1, and by their reciprocating motion conveyed over the incline of the chute and deposited upon the endless apron K. Here it is fed over the apron and deposited upon the squeezing-roll H′, and, passing between the latter and the squeeze-roll H, is pressed nearly dry, and finally removed by the action of the beaters *o o*, as before described.

As the patent to Knowles, Proctor, and Pendleton, No. 187,643, dated February 20, 1877, embraces a single reciprocating carrier, combined with mechanism for raising its rear end on its return stroke, the said patent and the combination above referred to are herein disclaimed.

Having thus described our invention, what we claim as our invention is as follows:

1. The two-branched standard D, in combination with the standards C and C^1 and girt D′, substantially as shown and described.

2. In a wool-washing machine, a lifting mechanism composed of two or more series of independent parallel carrier-bars, combined with mechanism, substantially as described, for alternately reciprocating each series, the rear ends of the bars in each set being lifted upon their return stroke by the reciprocating mechanism, substantially as set forth.

3. The combination of the shaft E, eccentrics *e e*, straps e^1 e^1, with attached levers e^2 and e^3, swivels *f f*, and shaft F with the bars of a carrier or lifting device, substantially as shown and described.

4. The combination, with the bowl A and incline B, of the carrier-bars G G^1, shafts E and F, swivels *f*, eccentrics *e e*, and straps e^1 e^1 with attached levers e^2 and e^3, constructed and operating substantially as shown and described.

5. In a wool-washing machine having a bowl, an incline, squeeze-rolls H H, fork, and carrier, and operating to scour stock by passing the same through said bowl and delivering it to said rolls, a water-conductor arranged below said incline to discharge or eject its fluid contents upwardly and above the false bottom B^2 into the stock during the passage of the latter over it on its way to the squeeze-rolls, as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 7th day of September, 1877.

FRANK P. PENDLETON.
JOSIAH K. PROCTOR.

Witnesses:
M. DANL. CONNOLLY,
JNO. A. BELL.