

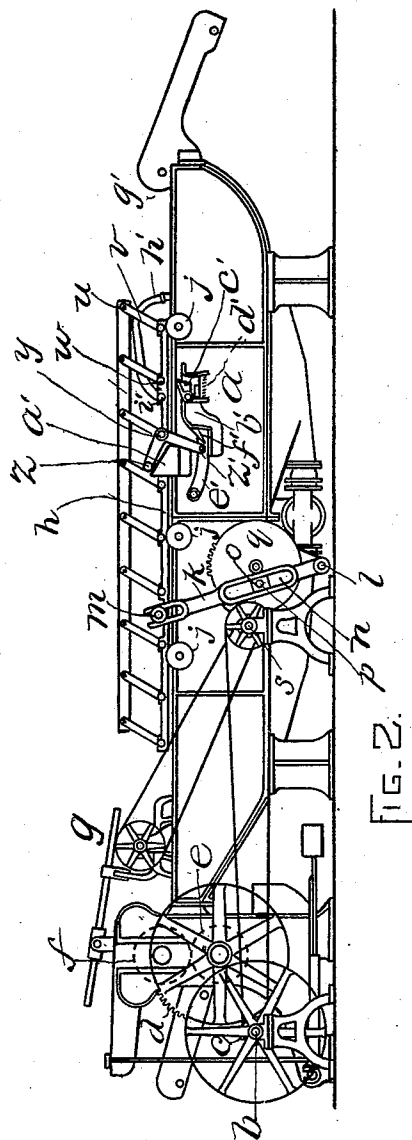
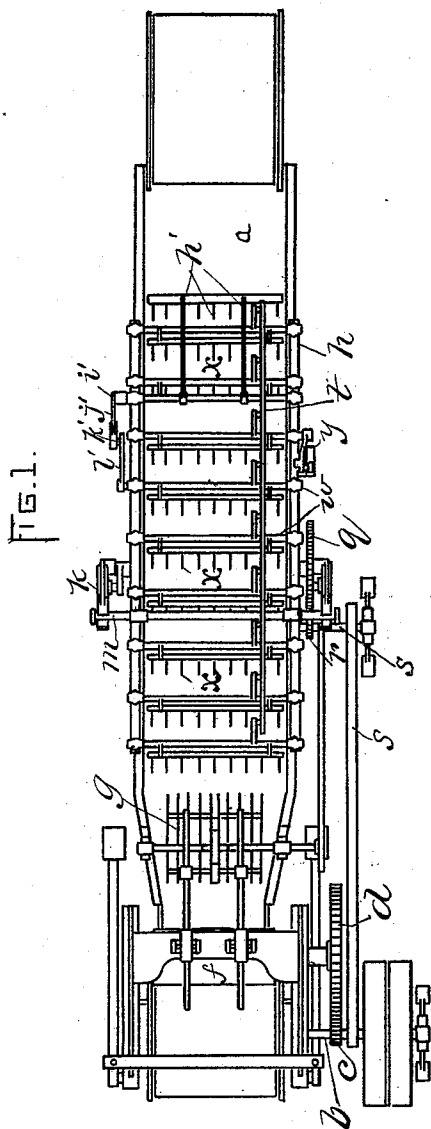
(No Model.)

5 Sheets—Sheet 1.

H. W. CHURCH.
WOOL WASHING MACHINE.

No. 536,171.

Patented Mar. 19, 1895.



WITNESSES:

Arthur H. Abell.

H. A. Hall.

INVENTOR

H. W. Church

BY

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ATTORNEY

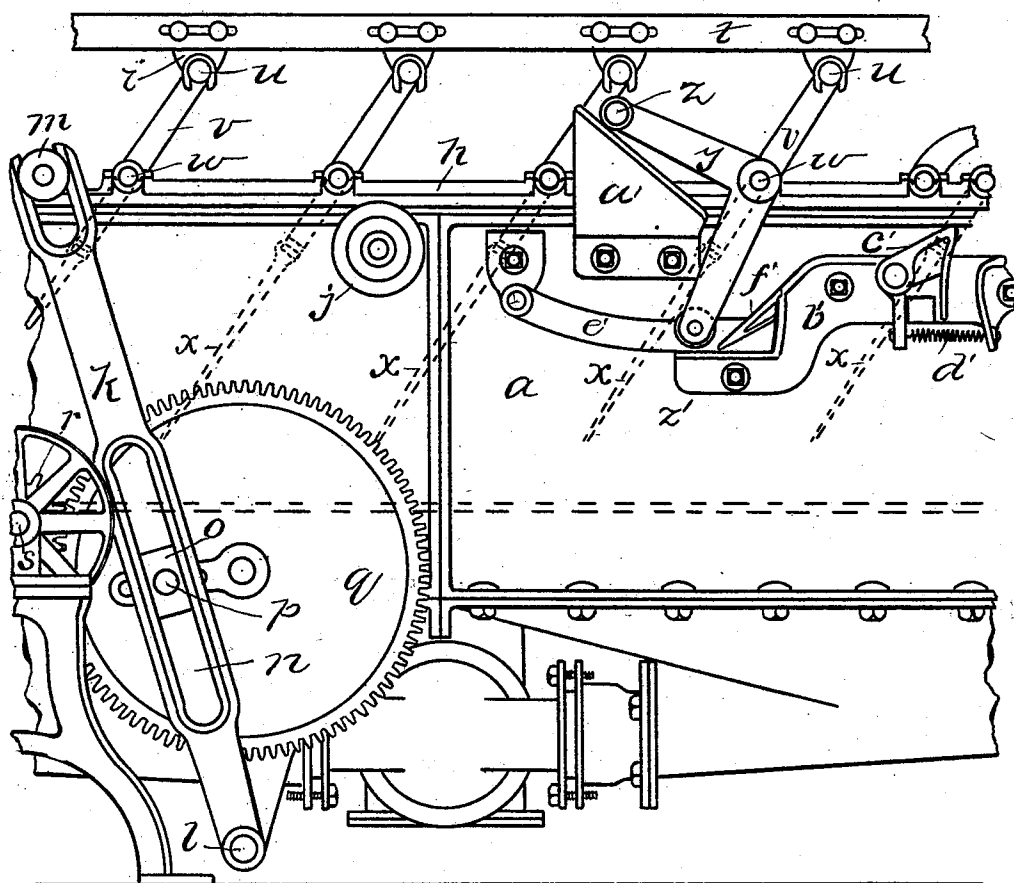
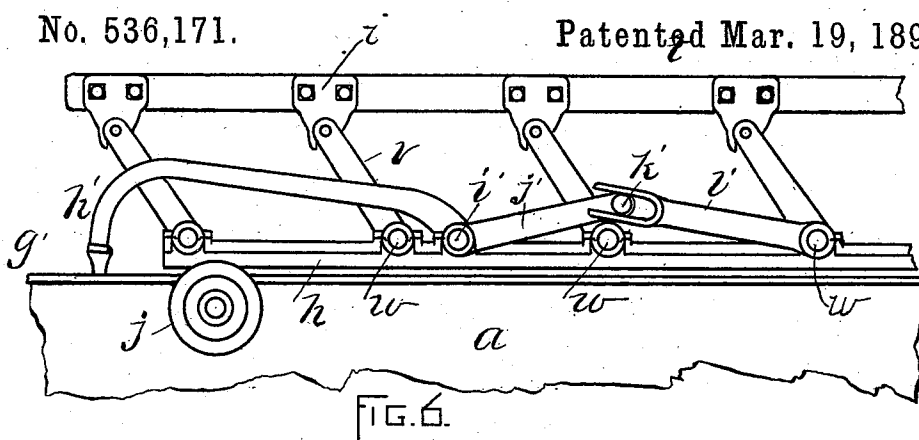
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FIG. 3.

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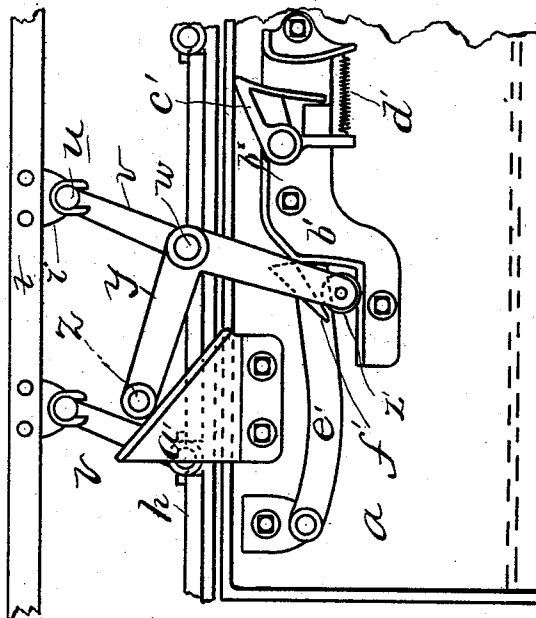
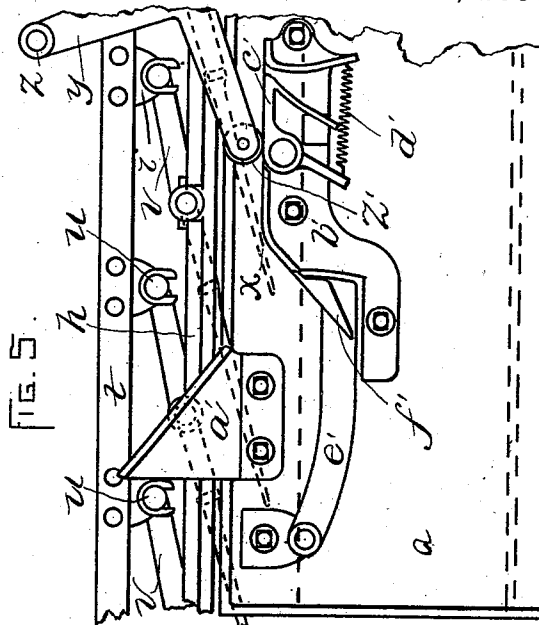
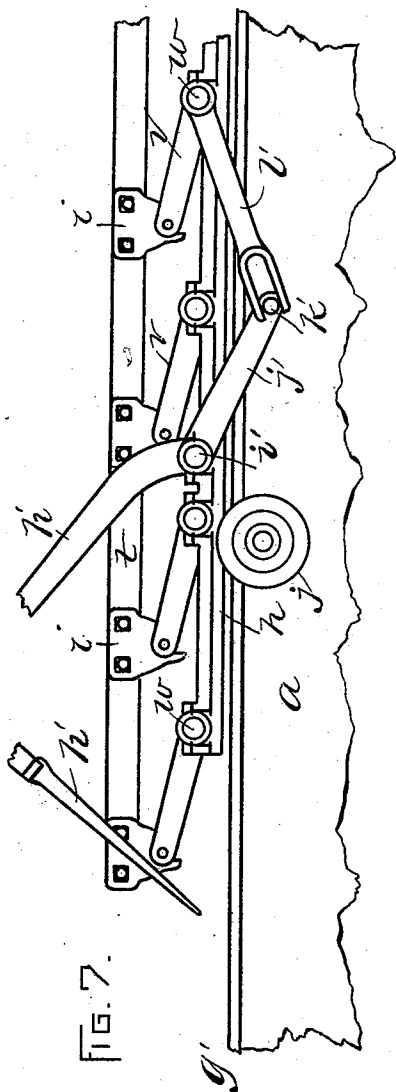
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FIG. 4.

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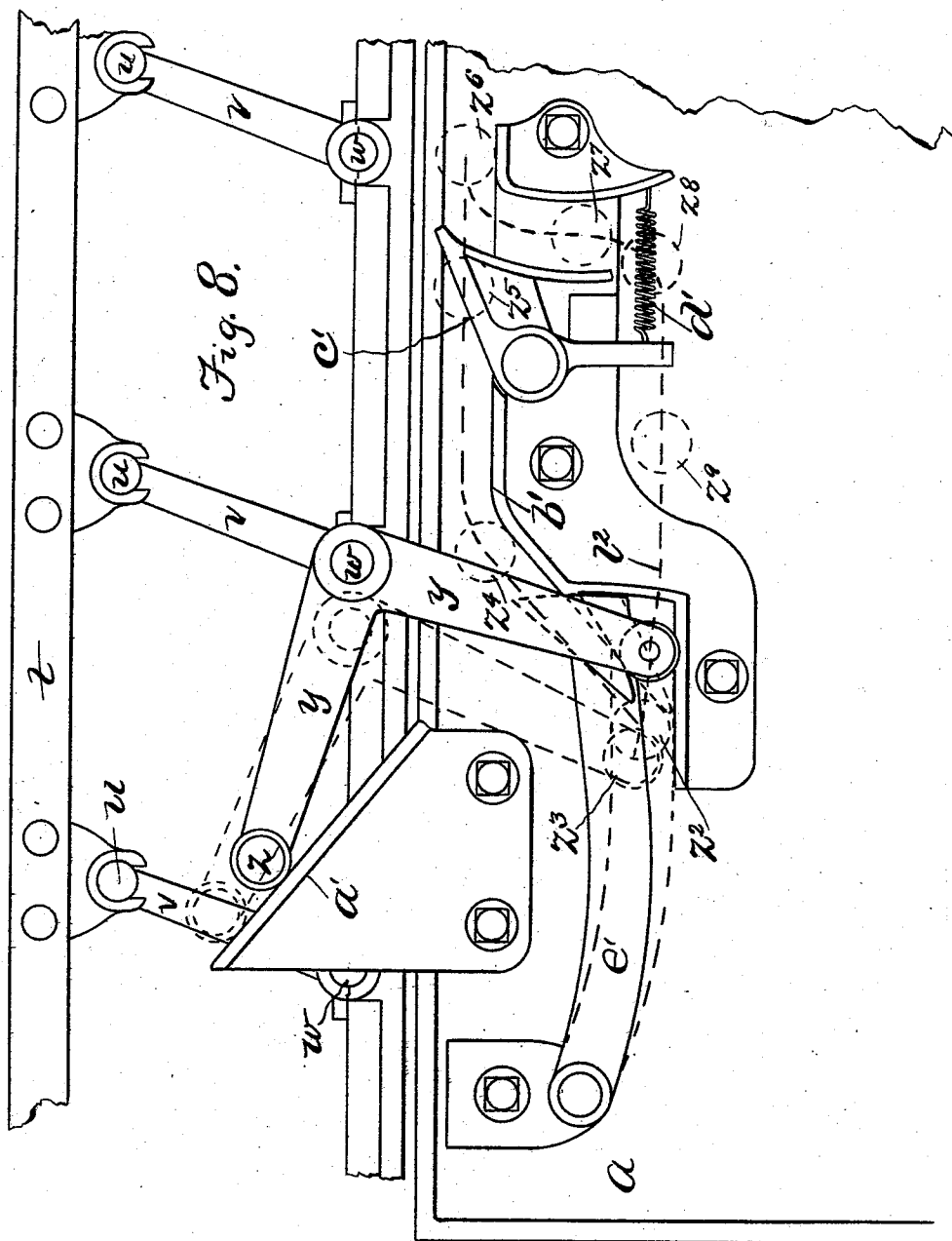
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WITNESSES:

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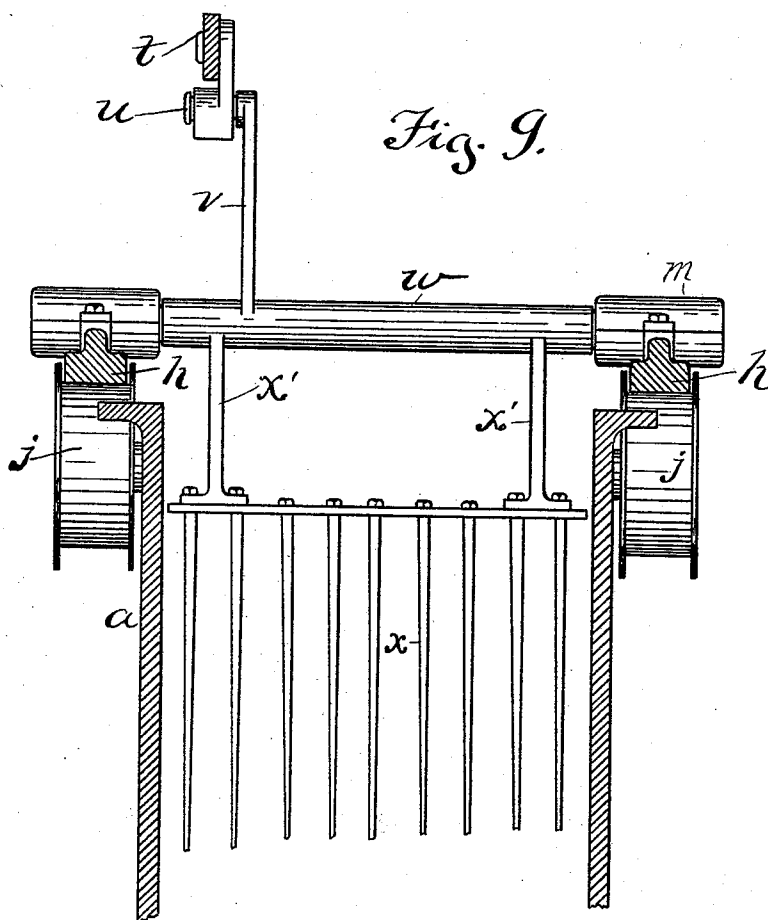
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H. W. CHURCH.
WOOL WASHING MACHINE.

No. 536,171.

Patented Mar. 19, 1895.



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UNITED STATES PATENT OFFICE.

HENRY W. CHURCH, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE
KITSON MACHINE COMPANY, OF SAME PLACE.

WOOL-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,171, dated March 19, 1895.

Application filed September 25, 1893. Serial No. 436,464. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. CHURCH, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Wool-Washing Machines, of which the following is a specification.

This invention has relation to machines for washing wool and other textile fibers, in which rakes operate upon the material submerged in the washing liquid contained in a bowl or trough.

It is the object of the invention to so improve the means which actuate the rakes that they may act upon the stock with washing effects, and without a tendency to roll or snarl the material, so that the latter may be cleansed without being felted or bunched.

It is also the object of the invention to provide improved means for ducking or immersing and advancing the material in the washing liquid as the said material is received from the feed rolls.

It is also the object of the invention while providing the foregoing improvements, and others incidental thereto, to so construct the rake and its operating means as that the minimum degree of simplicity may be reached, so that there may be no liability of the machine or any of its parts getting out of order, and that it may be run with ease, and so that if repair should be necessary it can readily be made.

To these ends the invention consists of the novel construction and arrangement of parts and groups of parts in a wool-washing machine, all as I will now proceed to describe in detail, and finally point out with particularity in the claims hereto appended.

Reference is to be had to the annexed drawings and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features as the case may be, wherever they occur.

Of the drawings—Figure 1 is a top plan view of a wool-washing machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3. is a side view of a section or part of the machine as represented in Fig. 2, drawn to an enlarged scale. Figs. 4 and 5 are diagrams showing the parts portrayed in the different positions that they will be in in

the successive steps of the operation of the machine. Fig. 6 is a side elevation of a part of the machine near the feeding-in end, showing the ducking or submerging rake and means for operating it. Fig. 7 is a diagram of the parts represented in Fig. 6, but showing the same in a different position. Fig. 8 is a diagram somewhat similar to Fig. 4 but drawn to an enlarged scale and showing also the course of travel or movement of some of the parts as will hereinafter appear. Fig. 9 is a cross sectional view showing the parts of the bowl, the carriage and its supports and the rack and its supports, the parts being also drawn to an enlarged scale.

In the drawings—*a* designates the bowl which may be of any desired form and length, suitably supported.

b is the driving shaft from which motion is received to actuate the movable parts of the machine.

c is a pinion on the driving shaft which meshes with a gear wheel *d* on whose shaft is affixed one of the squeeze-rolls *e*, the other squeeze-roll *f* being operated therefrom.

g designates a group of devices for delivering the material to the squeeze-rolls.

All of the parts, so far described, may be of the form and arrangement shown, or any other suited to the purpose, they not having been wrought upon in the working out of the present improvements.

A carriage consisting of the side-rails *h* and transverse rake bars *w* is arranged to be reciprocated above the bowl *a*, the side-rails being adapted to rest and run upon the wheels *j* suitably journaled and having flanges on their outer edges as shown.

k designates an arm secured at its lower end upon a rock shaft *l* and bifurcated at its upper end so as to engage a stud or antifriction roll *m* on the end of a shaft connected with the carriage. The arm *k* is slotted in its body part, as at *n*, in which slot there is a sliding box *o* on a wrist pin *p* extending out from the face of a gear wheel *q*, meshing with and driven by a pinion *r* on a shaft *s*, which is operated by means of a belt and pulleys from the driving shaft *b*, as shown, or in any other suitable way. With this construction and arrangement of parts it will be seen that

as the gear wheel q is rotated, the arm k will be oscillated, and the carriage reciprocated.

There is an arm k on each end of the rock-shaft l , and operating upon each side of the carriage, so as to reciprocate the latter without torsional strain.

Connected with the upper side of the carriage is the rake-frame, consisting of the longitudinal girt or bar t , provided at intervals with ear-pieces v having in their lower parts boxes or bearings to receive the trunnions or pins u formed on the upper ends of the links v which links are rigidly connected at their lower ends to the ends of the rods or bars w with which the rake-teeth x are connected by arms x' . See Fig. 9. It will now be seen that the girt or bar t may be moved longitudinally to a limited extent independently of the carriage, and that by such movement the rake-teeth may be made to assume a vertical position when the links v stand vertically, or an inclined position, as shown in Fig. 3, or a substantially horizontal position, as shown in Fig. 5. This control of the rake-teeth in the movement of the carriage constitutes an important feature of my invention, since thereby I am enabled to act upon the stock without rolling the same or without any other action that would have a tendency to effect felting.

The motion of the rake-teeth in the operation of the invention is first to press rather lightly upon the stock to effect its immersion in the washing liquid, then assume a substantially vertical position and move straight forward in the bowl, then to assume a slightly inclined position and a very limited backward movement by which the stock is lifted somewhat and freed from the teeth of the rake, then to rise out of the stock and assume a horizontal or nearly horizontal position, passing back above the liquid, to repeat the operation described. Various means may be employed to accomplish this function. The form of means herein shown has been found efficient for the purpose.

y designates a bell-crank lever rigidly secured at its angle point to one of the rods or bars w . The ends of the bell-crank lever y are provided with bowls or rollers $z z'$.

a' designates an incline or cam secured to the side of the bowl a in such position that when the carriage moves forward to its utmost limit the roller z will ride up thereon.

b' is a track piece secured to the side of the bowl a in such position that as the carriage moves back the roller z' will ride up and out thereon.

At the rearward end of the track-piece b' there is a switch-block c' pivoted upon the track piece, and having its free end held in normally raised position, as seen in Figs. 3 and 4, by means of a spring d' acting thereon. The said switch block may be depressed so that its face may be level with the face of the track piece by the roller z' riding thereon, as shown in Fig. 5, the spring d' acting to re-

turn it to normal position after the roller z' has passed.

e' designates an arm pivoted at its forward end on a stationary part of the machine, and provided at its rearward end with an inclined piece f' , which when the arm e' is down in normal position, as shown in Figs. 3 and 5 has its upper face coincident with the upper face of the track-piece b' .

The operation of the machine as thus far explained may be described as follows: The rotation of the wheel q having effected the full forward movement of the carriage through the medium of the arm k and connections, the roller z will have ridden up on the incline a' , as shown in Fig. 3 rocking the rake rods w slightly backward, carrying the girt t backward, and tipping the rake-teeth to slightly inclined position and slightly lifting the stock, as shown in Fig. 3. Upon the further movement of the carriage the rake teeth will be moved bodily back to a very slight degree, until the roller z' strikes the incline f' when said roller will ride up said incline and the incline of the track-piece b' on to the horizontal part of the same (see Fig. 5) rocking the rods w backward, carrying the rake out of the material and lifting the said teeth above the liquid, as shown in Fig. 5, in which position they will be carried back by the carriage until after the roller z' passes on the switch-block c' as shown in said Fig. 5 and beyond the same as is illustrated by the dotted circle z^b in Fig. 8, when the carriage will have reached the extreme limit of its backward movement. Upon the return movement of the carriage the roller z' will come into contact with the lower or rearward face of the switch piece c' (which will have been returned to normal position by the spring d' after the roller z , passed it, see dotted circle z^c) and said roller will be guided downward below the switch piece, as shown by the dotted circles z^b and z^c operating the bell-crank lever so as to rock the rods w forward, throw forward the girts t , and bring the rake-teeth to substantially vertical position. In lowering the rake-teeth they will first act upon the stock to depress it in the washing liquid, when they will enter the stock and move bodily forward in vertical position, the roller z' passing under the incline f' of the arm e' raising the free end of the said arm (see Figs. 4 and 8) until after it shall have passed the said incline f' when the arm will fall back by gravity to normal position. See Fig. 3 and dotted lines in Fig. 8. At this point the parts will have arrived at their first mentioned position which will be that shown in Fig. 3, and the operation will be repeated.

In Fig. 8 I have shown by dotted line z^d the course of travel of the axis of the roller z' in one complete movement of the carriage, that is, a complete to and fro movement by which the rake and other parts will be operated in

the manner described. By the dotted circles lettered and numbered z^2 to z^9 , the successive position of the roller z' is indicated so that the course of travel of the said roller and the manner in which the bell-crank or elbow-lever y is clearly indicated. The stock as it is fed into the bowl at the feed end g' must be advanced slightly so that the rakes can take it, and this is accomplished by means of the ducking and advancing rake h' , the rear ends of the shafts of which are secured to the ends of an independent rock rod i' journaled in the carriage, from which rod i' there extends an arm j' having on its free end a laterally extending stud k' which enters a bifurcation formed in the free end of an arm l' , the other end of which is secured to one of the rock-rods w . See Figs. 6 and 7. With this construction and arrangement of parts, as the carriage and rake frame move rearwardly the rods w will be rocked backwardly, depressing the free ends of the arms $j' l'$, and raising the rake h' as shown in Fig. 7. When the carriage and rake frame move forward, the reverse operation will take place and the rake h' will be depressed, as shown in Fig. 6. As the rake h' moves to the extent of the movement of the carriage, it will engage the material and advance it just sufficiently for the rearward teeth of the rake frame to catch it. At the same time with the work of advancing the stock by the rake h' , the said device will operate to immerse the wool in the washing liquid. Its operation on the stock is that of simply pressing it down and moving it slightly forward with a washing effect, and without any tendency to roll, or snarl the wool so as to result in felting to any degree.

It is to be noted that the improvements constituting the invention are exceedingly sim-

ple, not easily disorganized or broken; and if perchance they should become disorganized or broken they can readily be put into order and repaired.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, it is declared that what is claimed is—

1. A wool-washing machine embracing in its construction a bowl, a carriage constructed to be reciprocated on said bowl, rock rods journaled in said frame with which the rake-teeth are connected, means connecting the said rock rods whereby the same may be moved in unison, a lever connected with the end of one of said rods, and inclines or cams on the side of the bowl with which the lever is adapted to come into contact to rock the rod with which it is connected as the carriage is reciprocated, as set forth.

2. As a means for advancing and immersing the stock in a wool-washing machine, a reciprocatory carriage, a rake connected with an independent rock-rod journaled in the carriage, rock rods with which the regular washing rake-teeth are connected, and jointed levers $j' l'$, between one of the latter rock rods and the first mentioned rock rod for operating the latter and the rake, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 31st day of August, A. D. 1893.

HENRY W. CHURCH.

Witnesses:

ARTHUR W. CROSSLEY,
C. F. BROWN.