

No. 663,452.

Patented Dec. 11, 1900.

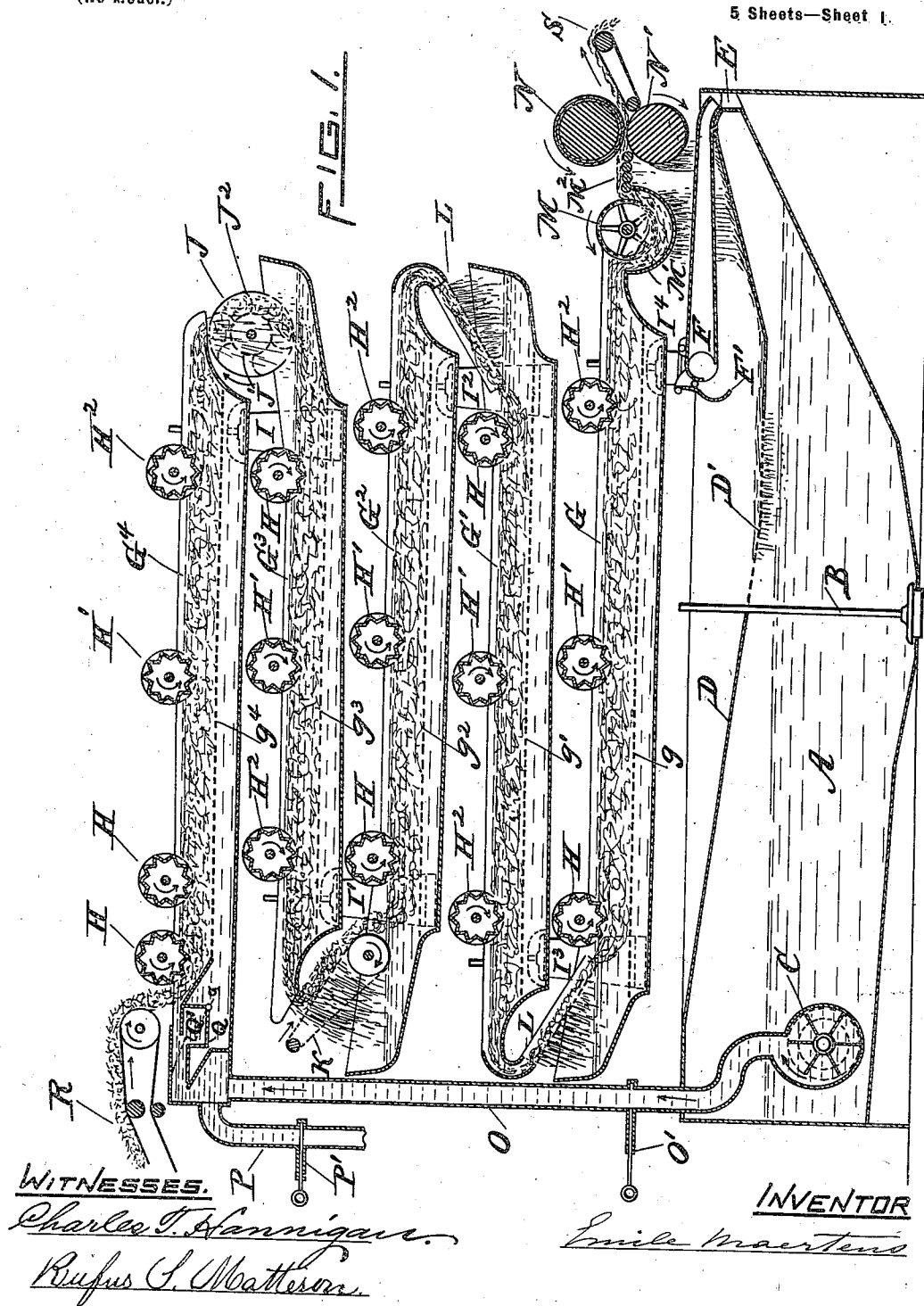
E. MAERTENS.

MACHINE FOR WASHING, RINSING, OR CHEMICALLY TREATING WOOL.

(Application filed Apr. 14, 1900.)

(No Model.)

5 Sheets—Sheet 1.



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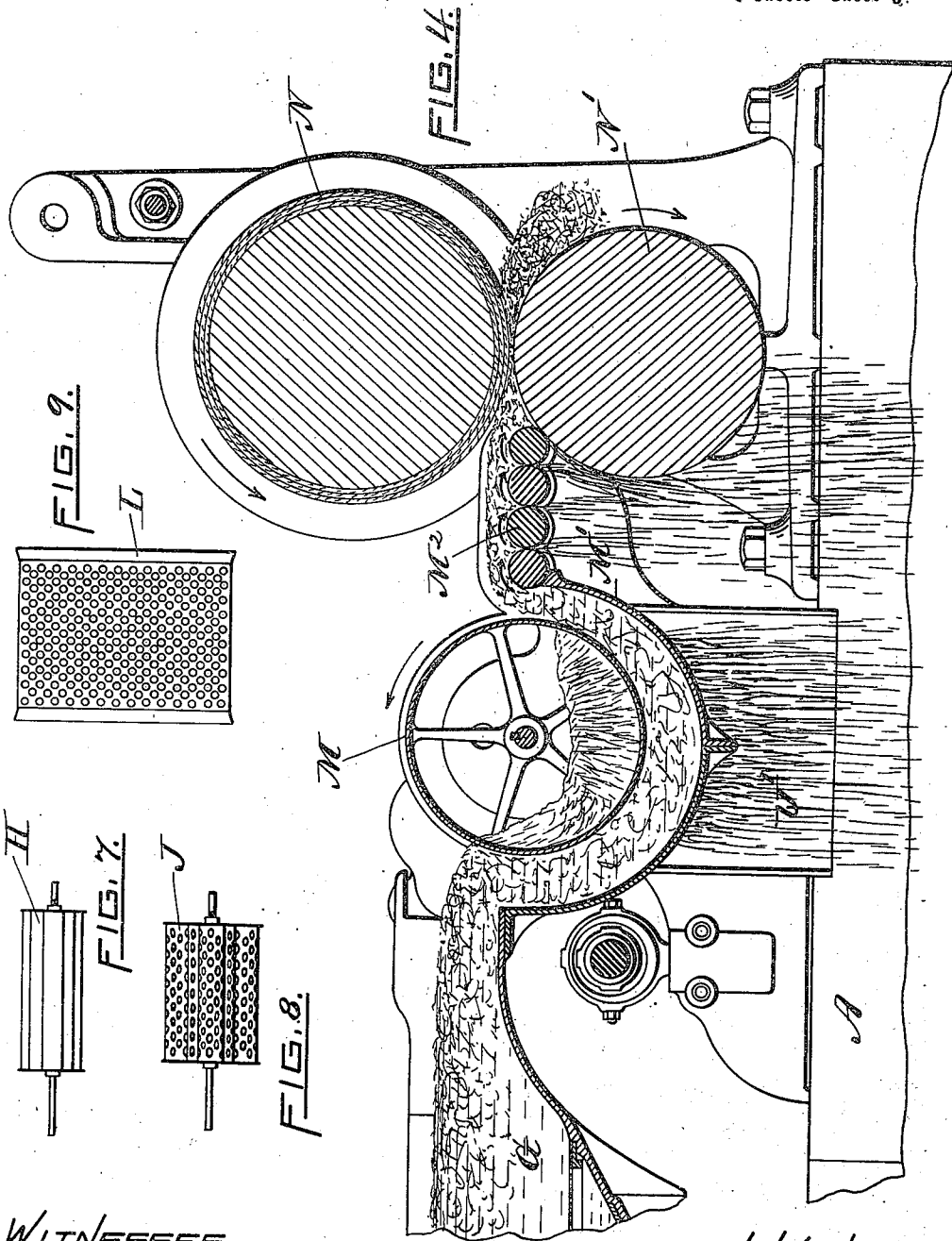
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WITNESSES.

Charles T. Hannigan.
Rufus S. Matthews.

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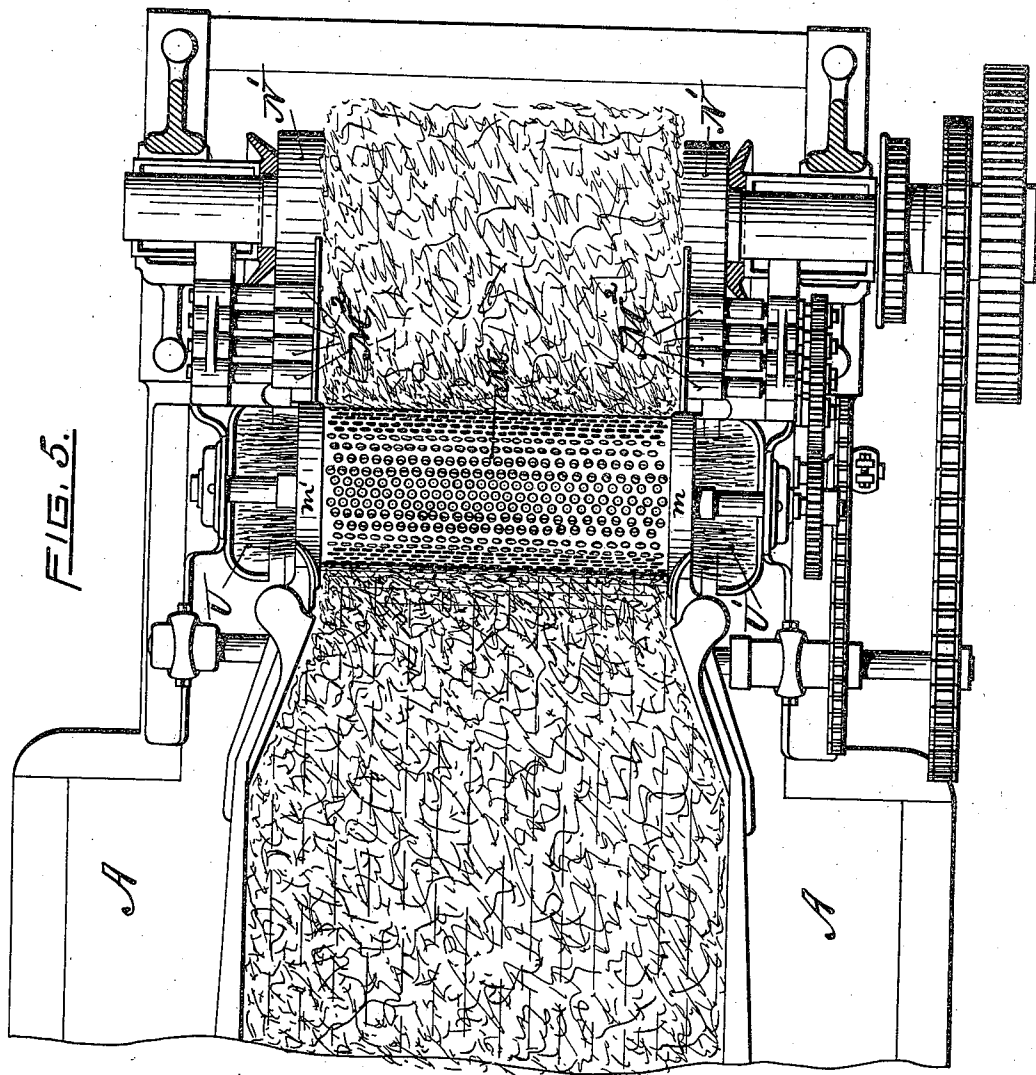
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5 Sheets—Sheet 4.



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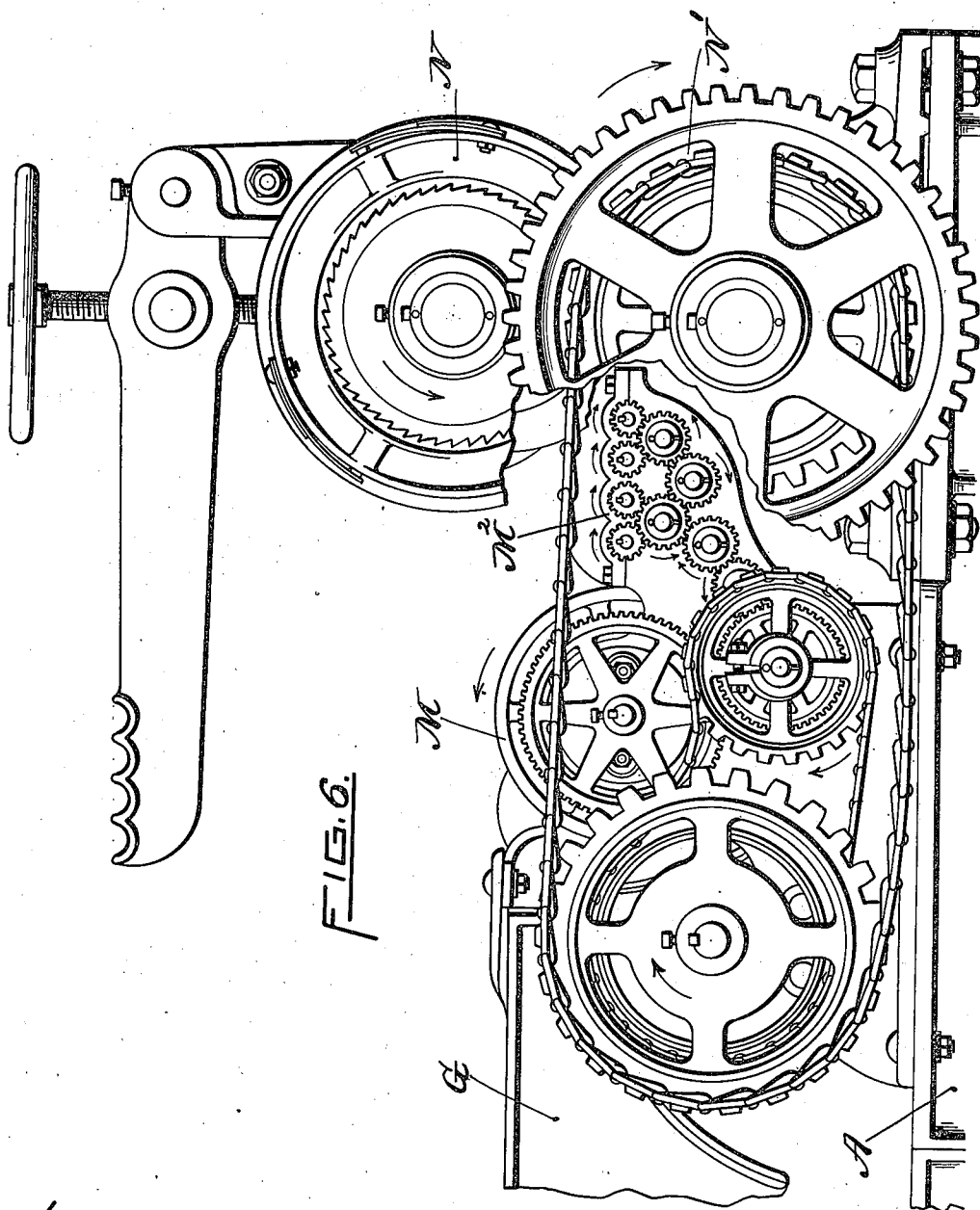
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5 Sheets—Sheet 5.



WITNESSES.

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INVENTOR.

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UNITED STATES PATENT OFFICE.

EMILE MAERTENS, OF PROVIDENCE, RHODE ISLAND.

MACHINE FOR WASHING, RINSING, OR CHEMICALLY TREATING WOOL.

SPECIFICATION forming part of Letters Patent No. 663,452, dated December 11, 1900.

Application filed April 14, 1900. Serial No. 12,853. (No model.)

To all whom it may concern:

Be it known that I, EMILE MAERTENS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Machine for Washing, Rinsing, or Chemically Treating Wool and other Animal Fibers, of which the following is a specification.

My invention relates to improvements in wool-washing machines having superposed chutes or troughs through which the wool is carried by means of a flow of liquid which is supplied to them by a pump or other equivalent device and also to improvements in the means employed for carrying or lifting the wool from said chutes or troughs or from a washbowl into the squeezing or pressing rollers of wool-washing machines, the object being to improve the quality, increase the quantity, and lessen the cost of the work. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a whole machine built according to my invention and representing one element in a battery. Fig. 2 is a vertical section of an ordinary single washbowl fitted up with my improved lifting device and submergers or regulators. Fig. 3 is a plan view of the same. Fig. 4 is an elevation in section, showing my improved lifting or carrying device as applied to machines of the style shown in Fig. 1. Fig. 5 is a plan view of the same. Fig. 6 is a side elevation showing how my improved lifting or carrying device is driven. Fig. 7 represents one of the submergers and regulators H to H². Fig. 8 represents the foraminous bucket-wheel or conveyer J. Fig. 9 represents the foraminous inclined plate or conveyer L.

Similar letters refer to similar parts throughout the several views.

Referring to Fig. 1, A is the bottom tank or reservoir for holding the liquid used in the operation. B is a valve for emptying the contents of said tank into the sewer.

C is a centrifugal pump, which circulates the liquid.

D is a false top or partition with perforations at D', through which the liquid coming from the chutes or troughs or expressed by the squeezing-rollers returns to the tank A

and which prevents any stock which may accidentally be dropped from entering said tank.

E is an overflow from tank A into the sewer.

F is a pipe capable of discharging direct from the bottom of the lower trough or chute into the sewer (when the valve F' is closed) by way of the overflow E.

G, G', G², G³, and G⁴ are superposed chutes or troughs.

H represents revolving submergers, which submerge the stock in the liquid on entering the chutes.

H' and H² are revolving regulators, (of a construction similar to H,) which regulate the soaking time of the stock, its motion forward through the chutes, and its delivery from chute to chute.

I I' I² I³ are valved ducts, through which the bottom of each chute or trough (below the perforated false bottoms g to g⁴) is made to communicate with the bottom of the one next beneath it, and these exist on both sides of the troughs or chutes. I⁴ is a similar valved duct, putting the bottom of chute or trough G in direct communication with the sewer by way of pipe F and overflow E or with the tank A, according to whether the valve F' is closed or open.

J is a revolving wheel having a foraminous core J', forming the bottoms of a series of buckets J², having foraminous sides but full or closed ends, such revolving bucket-wheels being one of the means sometimes employed for conveying the stock from one chute to the one next below it.

K is a foraminous traveling apron, sometimes used for the same purpose as the wheel J.

L represents foraminous inclined planes with full or closed upturned sides, sometimes used for the same purpose as the wheel J and the apron K.

M is a foraminous open-ended hollow revolving cylinder running in a closed-end trough M', which lifts or carries the stock to the carrying-rollers M² for delivery to the squeezing-rollers N and N'.

O is a pipe which delivers the liquid pumped from tank A by pump C into the upper trough G⁴, and valve O' regulates the quantity of liquid admitted to said trough.

P is a pipe conveying water under high

pressure for washing-out purposes, and the valve P' regulates its flow.

Q is a plate pivoted at q and capable of being moved in the position shown by the dotted lines Q' and which when in that position causes the flow of liquid from either pipe O or P to travel underneath the false bottom g^4 of the trough or chute G⁴ instead of above said false bottom.

R is a traveling apron delivering stock to the machine.

S is a traveling apron which conveys the stock from the machine or from one machine to the next one of a series or battery.

T, Fig. 2, is the tank containing the liquid used in the operation, and t' is its foraminous false bottom or partition.

U U' are ducts into which flows the liquid which enters the foraminous hollow revolving roller M and which is discharged through its open ends or sides $m m'$, Fig. 3.

V V' are pipes connecting with the ducts U and U' and with the pumps C for the circulation of the liquid from the inside of the cylinder M to the back of tank T, Fig. 2.

Referring again to Fig. 1, the operation of the machine is as follows: Assuming that the tank A is suitably filled with a scouring liquor at the proper degree of temperature, the pump C is started and the liquor from tank A is forced into the upper chute or trough G⁴, and when it reaches a regulated height in said trough it overflows into the foraminous bucket-wheel J, and through it falls into trough G³. When the liquor has reached the proper height in this chute, it overflows onto the foraminous apron K, and through it falls into trough G². When the liquor has reached the proper height in this chute, it overflows into trough G' by way of the foraminous inclined plate L, and from there in turn and in a similar manner overflows into trough or chute G. From the chute G it overflows into the semicircular trough M' and from there, passing through the foraminous roller M, it drops back into tank A via ducts U and U', Figs. 4 and 5 and perforated false top D'. The machine is now put in motion. The wool fed in by the apron R falls into trough G⁴, where it is met by a current of liquor forced from tank A by the pump C. This current floats the wool against the revolving submergers H, which cause its complete immersion and forward movement at a predetermined rate of speed. The liquor travels faster than the wool in all the chutes and passes underneath it and between it and the false bottom g to g^4 so long as the wool floats between submergers and regulators; but when the wool has got beyond the controlling action of the last regulator in any chute it assumes the same velocity as the liquor in said chute. As the submergers H let go of the wool it is carried forward and up to regulator H', which revolves slower than submergers H. This causes the wool to accumulate in the space between H and H' near the surface of the liquor. As

the regulator H' lets go of the wool it is carried forward and up to regulator H², which revolves slower than regulator H', and this again causes the wool to accumulate near the surface of the liquor in the space between H' and H². As regulator H² lets go of the wool it assumes the velocity of the liquor and falls with it into wheel J; but it is separated from its liquor therein and deposited at a predetermined rate of speed in the trough G³ below, the liquor from succeeding charges of wool and liquor in the upper buckets serving to wash or help empty from the lower buckets the wool with which they were filled by preceding charges. The current generated by the entrance into trough G³ of the liquor passing through the foraminous wheel J floats the wool deposited by said wheel up to the submerger H of said trough or chute, and from there it is passed along from submerger H to regulator H', from the latter to regulator H², and when this regulator lets go of it it is carried by the current onto the traveling foraminous apron K, where it is separated from its liquor and deposited by said apron into trough G². The current generated by the entrance into said trough of the liquor passing through apron K floats the wool up to submerger H of said trough, and it is by it and the current transmitted to regulator H' and from the latter to regulator H², as previously explained. When regulator H² of chute G² lets go of the wool, the current carries it onto the inclined foraminous plate L, down which it floats into chute or trough G', separating itself from its liquor (which passes through the openings or perforations in said plate) on its way into said chute. The wool passes through chute G' as it has through the other chutes and enters trough G in the same manner as it entered trough G'. It is carried through chute G in the same manner as through the other chutes; but when the regulator H² of chute G lets go of it the liquor carries it into the semicircular trough M', in which revolves the hollow foraminous roller M. The liquor finds an exit from said trough M' by way of the openings or perforations in the hollow roller M and the ducts U and U', Figs. 4 and 5, connecting with the ends therefrom; and returns into the tank A through the perforations at D'. In finding its exit the liquor carries the wool over the perforations in M, and the rush of liquor toward the surface of said roller and its pressure thereon while seeking an exit causes the wool to fasten itself to said roller in a continuous, even, and unbroken sheet which is formed continuously and as fast as new unobstructed perforations are brought forth by the rotation of said roller. The wool sticking to roller M passes through the trough M' and is slightly squeezed in its exit therefrom between the surface of said roller and the first of the small carrying-rollers M². It is delivered in an even sheet onto the carrying-rollers M² and by them carried to the nip

of the squeezing-rollers N and N' and by them delivered onto the traveling apron S for transmission to the next bowl of the series or battery of machines. When the space
 5 between the bottom of the chutes G to G⁴ and the false bottoms g to g⁴ becomes filled with sand or dirt freed from the wool or when it is deemed necessary to clean them, the valves I, I', I², I³, and I⁴ are opened and the liquor
 10 contained in the chutes or troughs, along with some of the sand or dirt existing under the false bottoms of said chutes, is allowed to drain back into the tank A; but the great bulk of the dirt which remains under
 15 the false bottoms is removed and discharged directly into the sewer as follows: Valve O' being closed, the plate Q is raised in the position shown by the dotted lines Q'. The valve P', which admits water under high
 20 pressure, is then opened, while the valve F' on pipe F, which is thus made to communicate directly with the sewer by the overflow E of the tank A, is opened also. The water admitted under the false bottom g⁴ washes out
 25 the dirt from under said false bottom, which, together with said water, enters the duct I and through it the space under false bottom g³ of chute G³, washes out the dirt deposited in said space, enters the duct I', and through
 30 it the space under false bottom g² of chute G², washes out the dirt deposited in said space, enters the duct I², and through it the space under false bottom g' of chute G', washes out the dirt deposited in said space, enters the
 35 duct I³, and through it the space under the false bottom g of chute G, washes out the dirt deposited in said space, enters the duct I⁴, and through it the pipe F, by which it empties into the sewer, as previously stated.
 40 The liquor from tank A can of course be used for washing-out purposes; but when this is done the dirt washed out of the chutes is deposited into the tank A, or if it is not allowed to enter said tank, but is sent to the
 45 sewer by way of pipe F, the liquor used for washing-out purposes is wasted, which may not always be desirable.
 When it is deemed advisable to draw off the liquor in tank A, it is discharged by valve
 50 B into the sewer, and the sand and dirt which has deposited in said tank is then washed or flushed out, preferably by water under pressure. The revolving submergers and regulators H H' H², represented in the drawings
 55 as corrugated star-shaped drums with plain round heads, can of course be shaped differently and could be replaced by cylinders with projecting wings, &c. They not only submerge the wool, but regulate its travel through
 60 the chutes, prevent it from being controlled by the current, form across the surface of the liquor in the chutes efficient dams which check its forward motion, cause it to accumulate
 65 and soak, and permit it to be carried forward only. Were it not for the regulators the wool

would shoot forward as fast as the current would carry it. At times it would get lodged on one side or the other of the chute and form a pack which would either become dislodged
 70 in a lump or would block or dam up the chute in such a manner that all current through it would stop and the liquor made to overflow on the sides of the chutes back of the congested portion thereof.
 75

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

1. In wool-washing machines, the rotating, traveling or inclined and stationary foraminous conveyers, J, K or L, adapted to transfer the wool from one chute to the succeeding chute, and to separate said wool from the bulk of the liquor with which it is delivered to said conveyers, in its transfer from chute to chute, substantially as described.
 85

2. In a wool-washing machine, the combination of a series of chutes, means for feeding raw wool thereto, and devices intermediate of the chutes which transfer the wool from one chute to another and simultaneously drain
 90 the wash liquid therefrom.

3. In a wool-washing machine the combination of a series of chutes provided with false bottoms and a device intermediate of the chutes for transferring the wool from one
 95 chute to the succeeding chute said transferring device being provided with a foraminous portion whereby the wool is separated from the bulk of the liquid which it carries, substantially as described.
 100

4. In a wool-washing machine the combination of a suitable vat and the rotating submergers H and regulators H', H², adapted to submerge the wool, to regulate its travel through the chutes, to prevent it from being
 105 controlled by the current of liquor flowing through said chutes, to form across the surface of the liquor, in said chutes, efficient dams to check the forward motion of the wool, to cause it to accumulate and soak between
 110 submergers and regulators in said chutes and to allow it to be carried forward by the flow of the liquor in the chutes at a predetermined rate of speed only, substantially as described.
 115

5. In a wool-washing machine, the combination of a suitable vat for holding the material to be treated, positively-driven submergers and positively-driven regulators therein which compel the wool to be submerged and act as dams to check the advance of the wool,
 120 thus causing it to accumulate and soak, substantially as described.

6. In a wool-washing machine, the combination of a suitable vat, a plurality of positively-driven submergers and positively-driven regulators therein, adapted to be driven at different rates of speed for the purpose set forth.
 125

7. In a wool-washing machine, the combination of a suitable vat, a series of submergers and regulators therein and mechanism for driving the submergers and regulators at suc-
 130

cessively-decreasing speeds, whereby the progress of the wool through the water is checked, substantially as set forth.

8. In wool-washing machines, the combination of a suitable vat, a plurality of regulators therein provided with transversely corrugated, ribbed or winged surfaces, substantially as described.

9. In wool-washing machines the combination of a suitable vat, a foraminous partition therein, means for supplying the vat with wash-water which has been previously used, independent means for supplying the same with flush or pure water and means whereby either current of liquid may be directed above or below the foraminous partition, substantially as described.

10. In wool-washing machines, the combination of a series of chutes, draw-off devices connecting the chutes in succession whereby the dirt or sediment accumulating in the different chutes may be flushed or forced from the chutes in succession, substantially as described.

11. In a wool-washing machine, the combination of a series of chutes, mechanism intermediate of the chutes for removing the bulk of the liquid from the wool in its passage from one chute to the succeeding chute, suitable submergers and regulators in the chutes, a vat into which the wash liquor is adapted to flow, means for returning the wash-water to the first chute whereby it can be again passed through the machine, substantially as described.

12. In a wool-washing machine, the combination of a series of chutes, a tank into which the wash-water from the chutes is adapted to flow, an overflow to said tank adapted for connection with the sewer, a draw-off whereby the wash-water may be passed directly from the chutes into the sewer and a valve for directing the liquid into the tank or into the draw-off, substantially as described.

13. In a wool-washing machine, the combination of a suitable vat, a rotating, hollow, open-ended, foraminous elevating-cylinder M, having a direction of motion opposite to that of the bottom squeezing-roller N' and adapted to rotate in a trough M', to lift the wool from said trough or equivalent thereof, to the nip of the squeezing-rollers N and N' by the pressure of the liquor in said trough upon the wool and cylinder, to equalize the thickness of wool adhering to said cylinder by the carrying action of the liquor passing through the perforations of said cylinder, and to press out of the wool the bulk of the liquor which it contains by squeezing said wool between its own foraminous surface and the first of the carrying-rollers M² before its delivery to the squeezing or nip rollers N and N', substantially as described.

14. In a wool-washing machine, the combination of a suitable vat, the cylinder M revolving in the direction of the flow of the liquid in the vat, the trough M' and means for

carrying away the liquor from the inside of cylinder M, substantially as described.

15. In a wool-washing machine the combination of a suitable vat, the cylinder M revolving in the direction of the flow of the liquid in the vat, the trough M', means for carrying away the liquor from the inside of cylinder M and the carrying-rollers M², substantially as described.

16. In a wool-washing machine, the combination of a suitable vat, a foraminous cylinder with open ends revolving in the direction of the flow of the liquid in the vat adapted to receive the wool therefrom and elevate it out of the vat, substantially as described.

17. In a wool-washing machine, the combination of a suitable vat, a foraminous cylinder with open ends revolving in the direction of the flow of the liquid in the vat adapted to receive the wool therefrom and drain the same, and oftakes connected with the open ends of the cylinder to receive the liquid therefrom, substantially as described.

18. In a wool-washing machine, the combination of a suitable vat, a foraminous elevating-cylinder revolving in the direction of the flow of the liquid in the vat adapted to receive the wool therefrom, said cylinder being provided with open ends, means for drawing off the liquid from the ends of said cylinder and means for returning it to the vat, substantially as described.

19. In a wool-washing machine, the combination of a suitable vat, foraminous elevating means traveling in the direction of the flow of the liquid in the vat adapted to elevate the wool out of the vat, carrying mechanism to receive the wool from the elevating means and adapted to cooperate therewith whereby the wool is freed from the bulk of the liquid which it carries, substantially as described.

20. In a wool-washing machine, the combination of a suitable vat, a foraminous elevating means traveling in the direction of the flow of the liquid in the vat adapted to receive the wool from the vat, carrying-rollers to receive the wool from the elevating means and squeezing-rolls adapted to receive the wool from the carrying-rollers and express the liquid therefrom, substantially as described.

21. In a wool-washing machine, the combination of a suitable vat, submergers therein, suitable elevating mechanism traveling in the direction of the flow of the liquid in the vat, carrying-rollers cooperating therewith, squeezing-rollers, and means whereby the liquid expressed from the wool may be reused.

22. In a wool-washing machine, the combination of a suitable vat, a tank adjacent thereto and adapted to receive the wool therefrom, and foraminous elevating mechanism in said tank traveling in the direction of the flow of the liquid therein, substantially as described.

23. In a wool-washing machine, the combination of a suitable vat, a tank adjacent

thereto, a foraminous open-ended elevating-cylinder in said tank traveling in the direction of the flow of the liquid therein and off-take-pipes adapted to receive the liquid from the ends of said cylinders, substantially as described.

24. In a wool-washing machine, the combination of a suitable vat, an adjacent tank, a foraminous elevating-cylinder therein traveling in the direction of the flow of the liquid in said tank, carrying mechanism cooperating therewith, squeezing-rolls to receive the wool from the carrying mechanism and means for reusing the wash-water, substantially as described.

25. In a wool-washing machine, the combi-

nation of a suitable vat, a foraminous partition therein, suitable submergers and regulators above the partition, elevating mechanism traveling in the direction of the flow of the liquid in the vat adapted to receive the wool from the vat, devices whereby the wash liquor can be reused and means for directing the liquor above or below the foraminous partition, substantially as described.

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

EMILE MAERTENS.

Witnesses:

RUFUS S. MATTESON,
M. I. FAY.