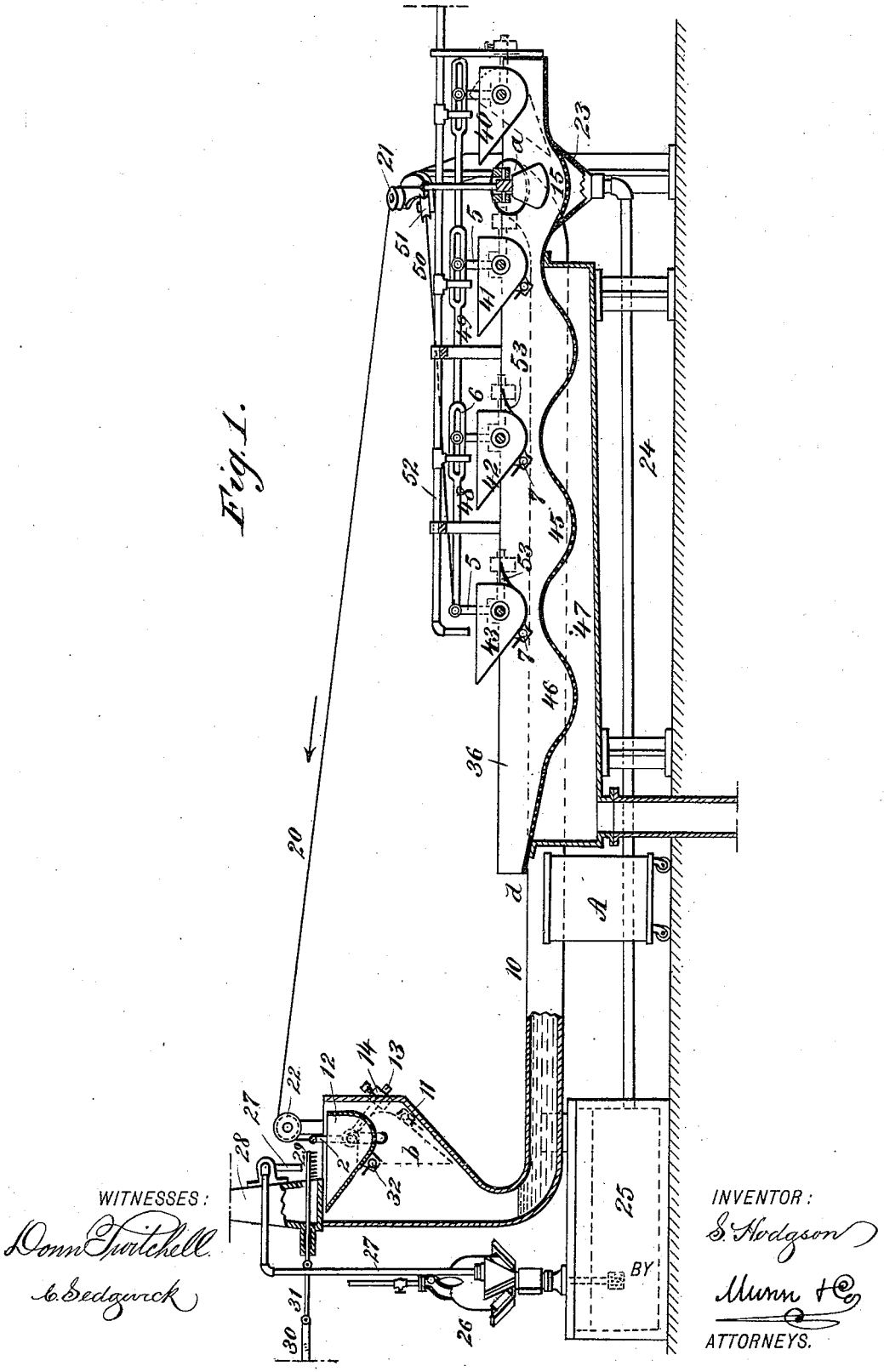
(No Model.) 2 Sheets—Sheet. 1.

S. HODGSON.

PROCESS OF SCOURING AND DYEING.

No. 419,331. Patented Jan. 14, 1890.

Fig. 1.



WITNESSES:

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C. Sedgwick

INVENTOR:

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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

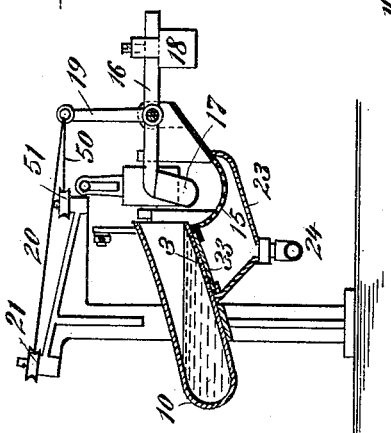

Fig. 2.

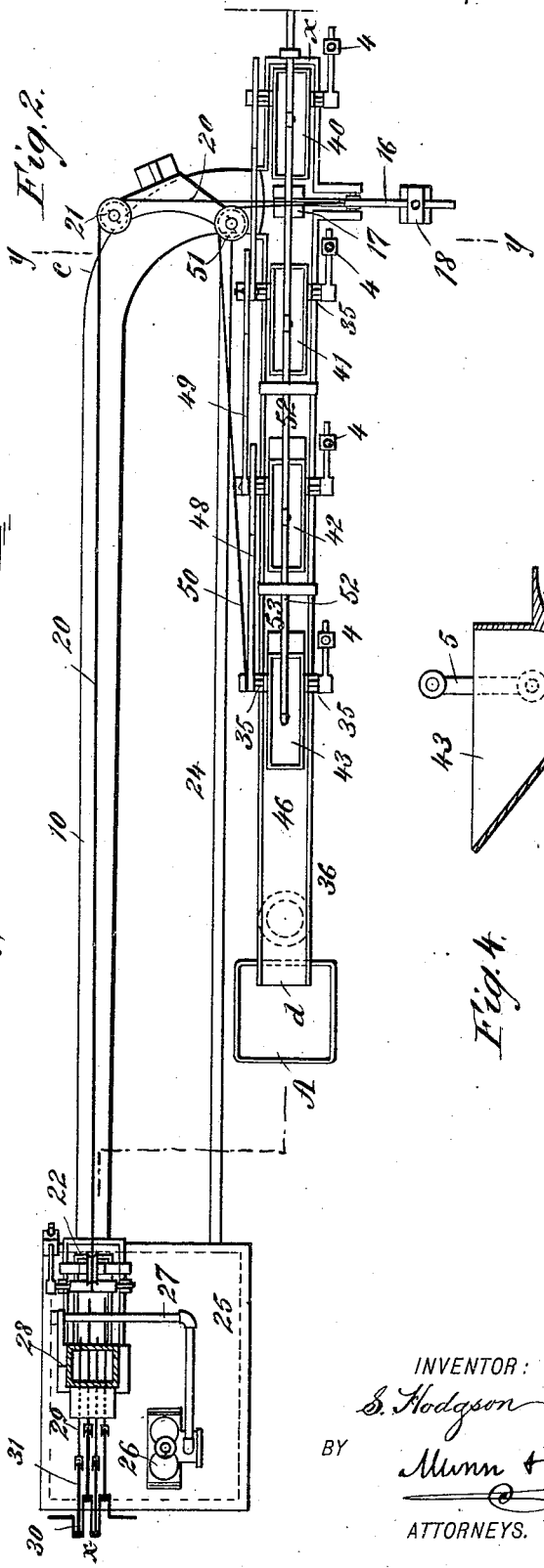

Fig. 5.

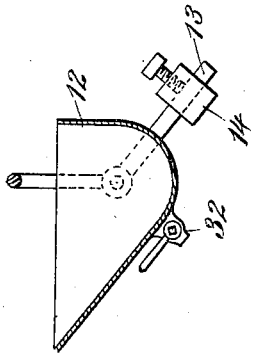

Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL HODGSON, OF MEDWAY, MASSACHUSETTS.

PROCESS OF SCOURING AND DYEING.

SPECIFICATION forming part of Letters Patent No. 419,331, dated January 14, 1890.

Application filed September 2, 1889. Serial No. 322,656. (No model.) Patented in England November 27, 1888, No. 17,271; in France November 30, 1888, No. 194,452; in Germany December 7, 1888, No. 48,032; in Belgium March 2, 1889, No. 85,234, and in Cape of Good Hope March 29, 1889, No. 58.

To all whom it may concern:

Be it known that I, SAMUEL HODGSON, of Medway, in the county of Norfolk and State of Massachusetts, have invented a new and Improved Method of Dyeing, Scouring, or Washing, (for which I have obtained patents in Great Britain, No. 17,271, dated November 27, 1888; in France, No. 194,452, dated November 30, 1888; in Germany, No. 48,032, dated December 7, 1888; in Belgium, No. 85,234, dated March 2, 1889, and in Cape of Good Hope, No. 58, dated March 29, 1889,) of which the following is a full, clear, and exact description.

This invention relates to a method of scouring, washing, or dyeing any fibrous material—such as wool—the main objects of the invention being to provide for a uniform submersion of the staple and to provide for a submersion of any desired length of time.

To the ends named the invention consists, essentially, in submerging the staple and in subjecting said staple and its surrounding liquid to forward impulses.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which I have represented an apparatus arranged to carry my improved method of dyeing, scouring, or washing into operation, similar figures and letters of reference being employed to indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the machine, the view being taken on line *x x* of Fig. 2. Fig. 2 is a plan view of the machine, the staple-receiving hopper being shown in section. Fig. 3 is a sectional view on line *y y* of Fig. 2. Fig. 4 is a longitudinal sectional view of one of the tilting flushing-tanks, and Fig. 5 is a sectional view of the main tilting flushing-tank.

In constructing the particular machine illustrated in the drawings above referred to I provide a tube 10, at one end of which there is arranged a hopper 11, while the other end of the tube is raised, so that the lower edge of the discharge-opening *a* will be above the level of the top of the main body of the tube. Within the hopper 11, I mount a tilting flushing-tank 12, the trunnions of said tank riding in boxes that are held to slide in vertical slots *b*, formed in the side walls of the hopper 11; or the trunnions could ride directly in the slots *b*. To one of the trunnions of the flushing-tank 12, I rigidly connect a lever 13, that is provided with a counterbalancing-weight 14, the weight being held to the lever by a set-screw or in any other desired manner, so that it may be adjusted toward or from the tank-trunnion, in order to regulate the amount of liquid delivered at each tilting of the tank, as will be readily understood.

Beneath and just beyond the delivery end of the tube 10, I arrange a perforated receiving tray or pan 15, and in the construction illustrated in the drawings it will be seen that the tube 10 is bent at about right angles at a point *c*, the object of this construction being to economize space. At one side of the tray 15, I mount a lever 16, the inner end of said lever carrying a presser-foot 17, while the outer end of the lever supports a counterbalancing-weight 18. The lever 16 is provided with an upwardly-extending arm 19, to which there is connected a cord 20, said cord passing over sheaves 21 and 22 to the bail 2 of the tank 12; or the cord could be connected to the tank in any other desired manner. The weight 18 acts to normally hold the tank 12 in the position in which it is shown in full lines in Fig. 1.

Beneath the tray 15 there is a gathering-trap 23, which discharges into a return-pipe 24, said pipe 24 leading to a tank 25, and in connection with this tank I arrange a steam-pulsometer 26, which acts to force a stream of liquid up through a supply-pipe 27, the arrangement being such that all liquid passing out of the delivery end of the tube 10 will be returned to the tank 25, to be pumped thence through the tube 27 to the tilting flushing-tank 12, a proper liquid-heating apparatus being arranged in connection with the tank 25.

Above the hopper 11, I arrange a hopper 28, adapted to receive the staple in connection with which my cleansing-machine is designed to operate, and in connection with the hopper 28, I arrange one or more rakes 29, that

are operated in any desired manner—as, for instance, by a crank-shaft 30, to which the rakes are connected by pitmen 31.

We will suppose that the apparatus above described is to be used for the cleansing of wool. In which case the wool to be operated upon is placed in the hopper 28, the liquid in the tank is heated, and the pulsometer is set in operation so as to deliver a stream from the pipe 27. Then as the rakes 29 are reciprocated they will carry a portion of the material out of the hopper 28, and the wool so carried out of the hopper 28 will be freed from the rakes and carried into the flushing-tank 12 by the stream flowing from the nozzle 27. As the flushing-tank 12 fills, the weight 14 will be overbalanced, and the tank, tilting to the position indicated by dotted lines, will deliver its contents to the hopper 11 and thence to the tube 10, the tank gradually lowering as it fills, and as the tank so lowers the cord 20 will be drawn in the direction of its arrow and the presser 17 will be forced downward gradually against the staple in the trap 15. Immediately after the tank 12 has discharged, the weights 14 and 18 will act to return it to the position shown in Fig. 1. In order that a continuous current may be maintained within the tube 10, I provide the tank 12 with a discharge-tube 32, the flow from said tube being regulated by a stop-cock. As each successive charge from the tank 12 is delivered to the tube 10 the preceding charges will be forced forward within the tube toward its delivery end, and, in order that there may be no danger of the jamming of the staple within the tube, I greatly prefer that the tube should be made so as to gradually increase in diameter from the hopper 11 to its delivery end, this gradual increase being shown in the drawings. As before stated, a continuous current or flow of liquid is maintained within the tube 10, the liquid so delivered to the tube passing therefrom through a series of apertures 3, formed in the under side of the upturned delivery end of the tube; or a portion of the liquid may pass directly out of the end of the tube, the amount of liquid passing through the perforations 3 being controlled by a slide 33. After the staple has passed through the tube 10 it is rinsed in water, and this rinsing may be brought about in any desired manner, but I greatly prefer that the rinsing should be done by means of a series of flushing-tanks—such as those shown at 40, 41, 42, and 43—said tanks being mounted upon trunnions which rest in bearings 35 upon the side walls of a washing-tray 36, the bottom of said tray being sinuous, whereby there are formed basins 44, 45, and 46, and beneath these basins there is arranged a drip-tank 47.

The flushing-tanks 40, 41, 42, and 43 are provided with counterbalancing-weights 4 and with upwardly-extending lever-arms 5, and to the lever-arm 5 of the tank 43 there is pivotally connected a rearwardly-extending rod 48, which is slotted at 6 to receive a pin that is carried by the lever-arm of the tank 42, and the lever-arm of the tank 42 is in turn pivotally connected to a slotted rod 49, which rod is connected to the lever-arm of the tank 41, and this method of connection is continued throughout the series of tanks. In the drawings I have shown four flushing-tanks, but I desire it to be understood that any number of tanks could be employed.

The tanks 41, 42, and 43 when they tilt deliver their contents to the basins 44, 45, and 46; but the tank 40 delivers its contents to the tray 15, and is timed to tilt so that it will deliver its contents just as the presser 17 is rising—that is, just after the tank 12 has discharged its contents. The discharge of the tanks 43, 42, and 41 is timed so that the tank 43 in discharging will draw upon its rod 48 and insure the discharge of the tank 42 immediately after its own discharge, the discharge of the tank 42 bringing about the discharge of the tank 41, and the tank 41 of the tank 40, so that, as each tank discharges, its contents will wash the staple subjected to its flow into the next basin in advance.

The tanks 40 to 43 are fed from a supply-pipe 52, each tank being provided with a feeding-nozzle, the capacity of the nozzle exceeding that of the tank-discharge nozzles 7. The discharge-nozzles 7 are provided, in order that the staple in the basins 44, 45, and 46 may be continually agitated, the flow from said nozzles being governed by stop-cocks, if desired. In order that the staple, when subjected to the action of the streams flowing from the nozzles 7, may tend to keep up a rotary motion, I provide each of the advance-tanks with deflecting-plates 53. Passing from the last of the basins of the tray 36, the staple is forced over the end *d* of the tray and into any proper receptacle, as A.

To insure a final forcible squeeze from the presser 17, I connect a cord 50 to the lever 19 and to the lever 5 of the tank 43, so that as the lever 5 tilt forward it will act to forcibly throw the presser 17 downward. In the construction shown in the drawings the cord 50 passes about a sheave 51.

From the construction above described it will be seen that by increasing the flow of liquid from the supply-pipe 27, I increase the frequency of the tilting of the tank 12, or by cutting down the supply of liquid I decrease such tilting. It will also be seen that by shifting the weight 14, I may regulate the amount of liquid delivered at each tilting of the tank, whereby I am enabled to regulate with the greatest nicety the length of time that the staple remains in the liquid delivered to the tube 10. The desired regulation may also be brought about through the medium of the stop-cock arranged in connection with the discharge-tube 32.

I have described this invention as one particularly adapted to the cleansing and washing of wool; but I desire it to be distinctly understood that the method could be used in

the cleansing and washing of any other material, and that it could be used in the dyeing, washing, or treatment in any way of materials in processes where it is desirable to submerge the material. I further desire it to be understood that in this specification I have used the term "staple" in the sense of "unfinished material," or "material needing treatment."

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein-described method of dyeing, scouring, or washing, which consists in submerging the staple and in subjecting the said staple and its surrounding liquid to forward impulses, substantially as described.

2. The herein-described method of dyeing, scouring, or washing, which consists in submerging the staple and in subjecting the said staple and its surrounding liquid to intermittent forward impulses, substantially as described.

3. The herein-described method of dyeing, scouring, or washing, which consists in submerging the staple, and in then subjecting the staple and its surrounding liquid to the intermittent action of a liquid-supply, as described.

4. The herein-described method of dyeing, scouring, or washing, which consists in intermittently feeding the staple to the operating-liquid, and in subjecting said liquid and the staple to intermittent forward impulses, substantially as described.

5. The herein-described method of scouring, which consists in submerging the staple, in then subjecting the staple and its surrounding liquid to the intermittent action of a liquid-supply, and in finally washing the staple, substantially as described.

6. The herein-described method of scouring, which consists in submerging the staple, in subjecting said staple and its surrounding liquid to forward impulses, and in finally washing the staple, substantially as described.

SAMUEL HODGSON.

Witnesses:
WILLIAM C. SMITH,
CHARLES H. ASHWORTH.