Z. E. NOAH.

RAW STOCK DYEING MACHINE.

APPLICATION FILED DEC. 28, 1911.

1,052,371.

Patented Feb. 4, 1913.

2 SHEETS—SHEET 1.

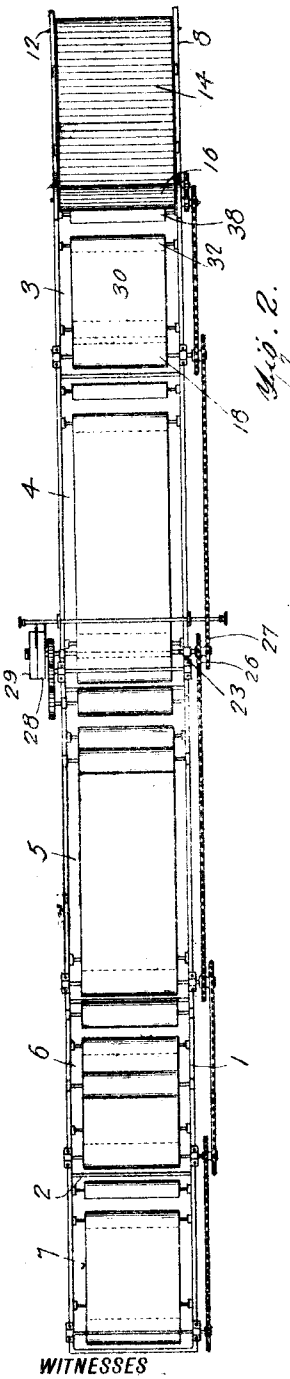

Fig. 2.

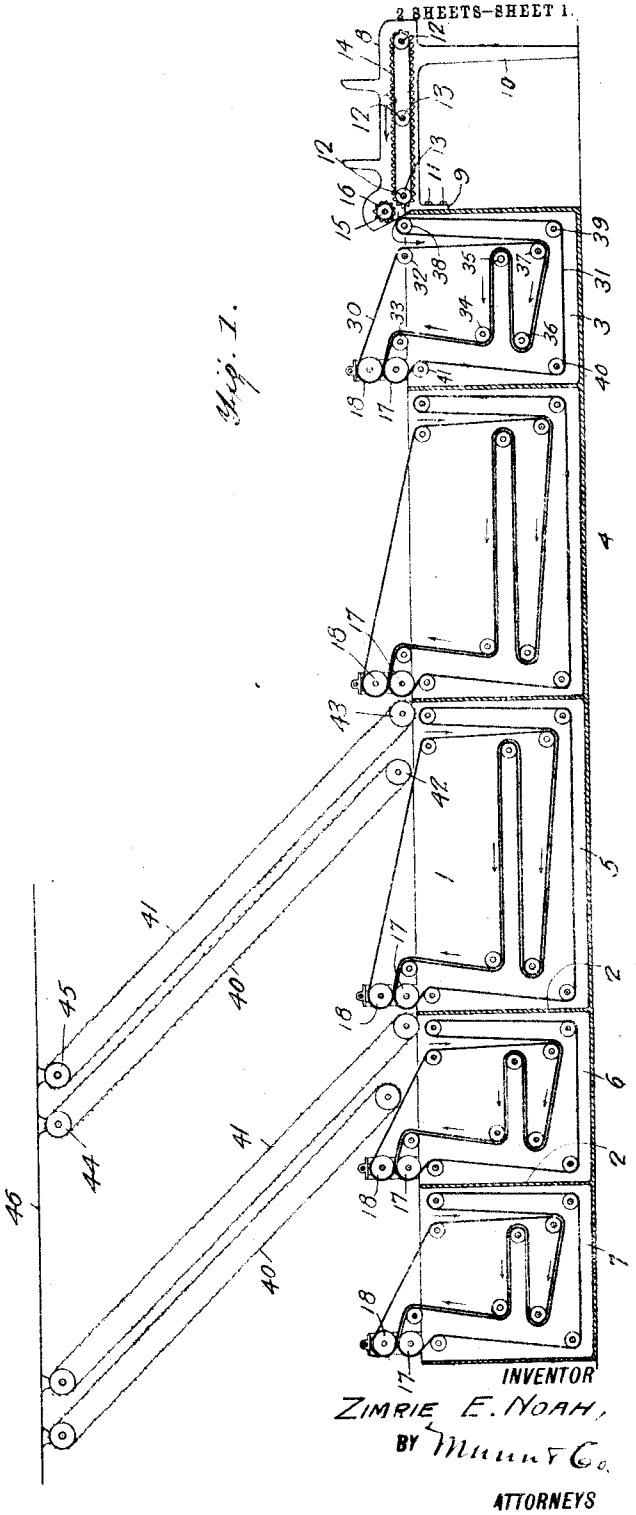

Fig. 1.

WITNESSES

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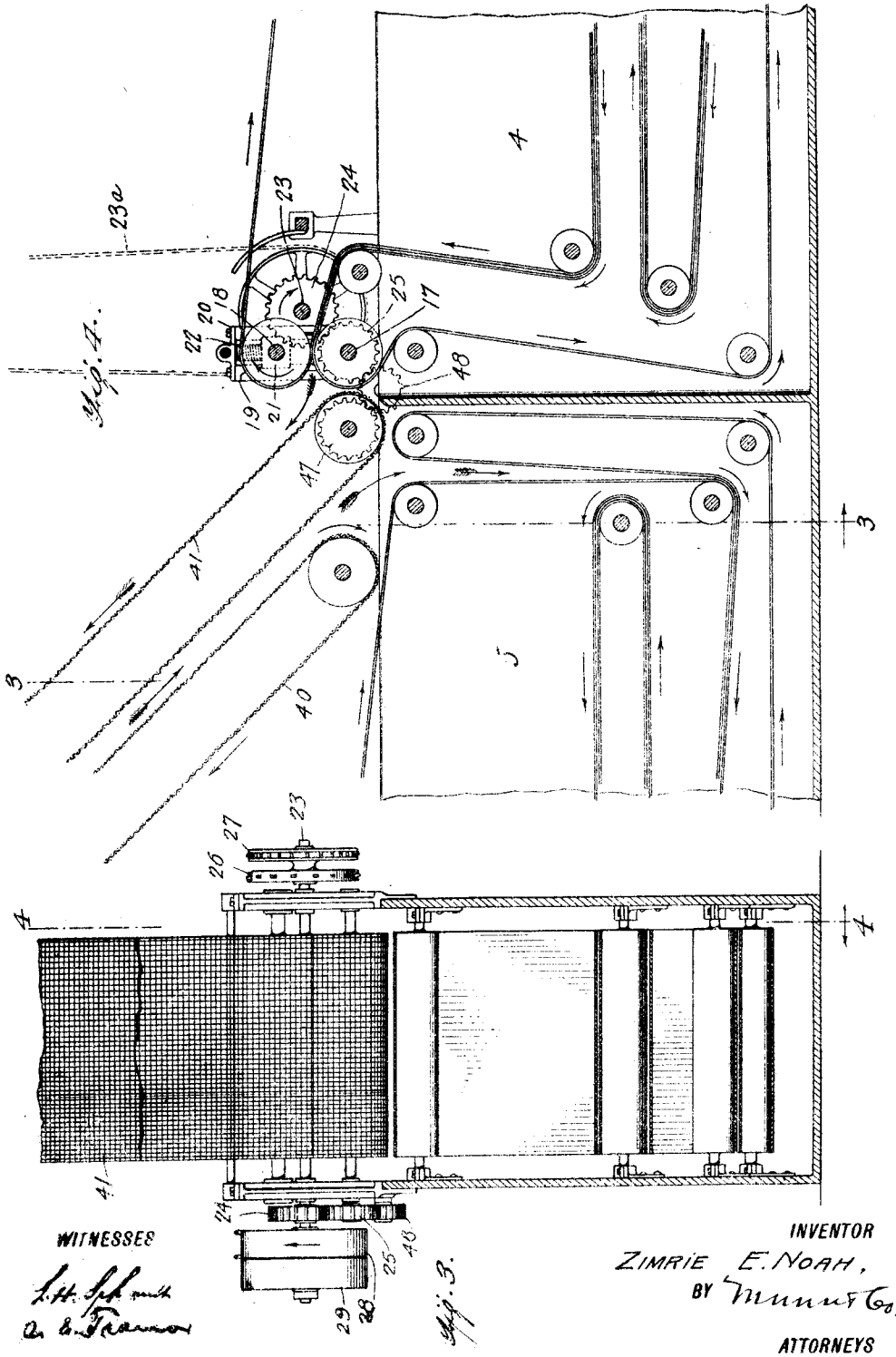

Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

ZIMRIE ELIHU NOAH, OF GREENSBORO, NORTH CAROLINA.

RAW-STOCK-DYEING MACHINE.

1,052,371. Specification of Letters Patent. Patented Feb. 4, 1913.

Application filed December 28, 1911. Serial No. 668,274.

To all whom it may concern:

Be it known that I, ZIMRIE E. NOAH, a citizen of the United States, and a resident of Greensboro, county of Guilford, and State of North Carolina, have invented certain Improvements in Raw-Stock-Dyeing Machines, of which the following is a specification.

My invention is an improvement in stock dyeing machines, and has for its object the provision of a machine which will take the stock and subject it to a plurality of operations, compressing it after each operation.

In the drawings: Figure 1 is a longitudinal vertical section of the improvement; Fig. 2 is a plan view; Fig. 3 is an enlarged section on the line 3—3 of Fig. 4, and Fig. 4 is a similar section on the line 4—4 of Fig. 3.

In the present embodiment of the invention, a casing 1 is provided, having an open top, and divided by partitions 2, into a plurality of compartments 3, 4, 5, 6, and 7 respectively. It will be evident that the compartments might be replaced by separate casings or tanks, if advisable. A pair of bracket plates are secured to the casing at one end, each bracket comprising a side member 8 having at one end a depending lug 9 and at the other a leg 10. The depending lug is secured to the casing by bolts 11, and the side members 8 are connected by shafts 12, upon each of which is mounted a roller 13. An endless apron 14 is supported on the rollers. The shafts 12 are in the same plane, and at the inner end of the apron, a shaft 15 is journaled between the side members above the plane of shafts 12, and a fluted roller 16 is secured to the shaft. The endless apron 14 is composed of transversely arranged connected slats or bars, as shown, and roller 16 coöperates with the inner end of the apron.

A wringing or squeezing device is arranged at the rear side of each compartment, being supported on the side walls of the casing. Each of the said devices comprises a pair of superposed rollers 17 and 18 arranged transversely of the compartment, and journaled in oppositely arranged pairs of standards 19. The members of each pair of standards are connected in spaced relation by top plates 20, and the upper roller 18 is journaled in bearing blocks 21, which are slidable between the members of the pairs of standards, and are pressed toward the lower roller by springs 22. A counter shaft 23 is journaled in front of and between each pair of rollers 17 and 18, and a gear wheel 24 on the shaft meshes with a gear wheel 25 on the shaft of the roller 17. A toothed wheel 26 is also secured to shaft 23, outside of the casing, and a sprocket wheel 27 is secured to the shaft, outside of the toothed wheel. A pair of pulleys, consisting of a fast pulley 28, and a loose pulley 29 is secured to one of the shafts 23 for operating the rollers, and the said pulleys may be engaged by a belt 23^a from a suitable power plant.

Each compartment is provided with means for carrying the stock, as for instance cotton through the material in the said compartment, and as the arrangement in all of the compartments is the same, but one will be described. The said means comprises a pair of endless belts or aprons 30 and 31. The members of each pair have their adjacent runs in contact. The belt 30 is supported on a roller 32 and the upper roller 18, and on rollers 33—34—35—36 and 37, while belt 31 is also supported on rollers 33 to 37, and on other rollers 38—39—40 and 41, and on the lower roller 17. That is the adjacent contacting runs of the belts are supported on rollers 17 and 18 and 33 to 37, and the said rollers 33 to 37 are so arranged that the material carried between the belts is carried backward and forward in the tank to thoroughly expose it to the action of the material in the compartment.

The rollers 32 and 38 are arranged near to the delivery side of the rollers 17 and 18 in all of the compartments after the first, and in the first compartment the said rollers are in position to receive the cotton from the roller 16 and belt or apron 14. The rollers 32 and 38 are spaced apart horizontally so that the cotton may pass easily between the belts. The rollers 37 and 39 are arranged almost directly below rollers 32 and 38, and the adjacent runs of the belts gradually approach, until they pass around roller 37 in contact.

The first compartment 3 of the carriage is for containing a suitable material in which to boil the cotton, as for instance water and

a suitable detergent. Compartments 4 and 5 are for dye, compartment 6 is for containing a suitable cleaning solution, and compartment 7 is for soap for giving the cotton a soap bath.

Above compartments 5 and 6 are arranged endless aprons 40 and 41 of wire gauze, they being supported with their inner runs adjacent and in inclined position, by means of rollers 42 and 43, arranged above and adjacent to rollers 32 and 38, and a pair of rollers 44 and 45 on the ceiling 46 of the room in which the vat or casing is supported. The roller 43 is provided with a gear wheel 47, which is connected to gear wheel 25, by an idler gear 48, to drive the belts 40—41.

In operation, the cotton is fed to the space or throat 49 between belts 30 and 31 at rollers 32 and 38, by the belt or conveyer 14, and is carried through the boiling material in compartment 3. After being thoroughly exposed to the action of the material in compartment 3, the cotton is compressed or squeezed by rollers 17 and 18, to free it from the material of compartment 3, and is delivered to compartment 4. The process is repeated in every compartment until the cotton is finally delivered at the end of the casing, remote from belt 14. As the cotton leaves the conveying device in the compartment or vat 4 it is fed from the rollers 17—18 on to the upper face of the upper run of the gauze belt 41, and by this belt is carried up to the ceiling 46 and over the roller 45 and is delivered on to the upper run of the gauze belt 40. The said belt passes the cotton downwardly and delivers it to the conveying device of vat 5. From vat 5 the rollers 17—18 deliver the cotton to the upper run of the gauze belt 41 above the compartment 6, and the apron 41 delivers the cotton to the apron 40 in the same manner as described for vat 4, and the said apron 40 delivers the cotton to the conveying means of vat 6. The cotton is thus exposed to the air after leaving vat 4, and before entering vat 5, and is similarly exposed between vats 5 and 6. The said exposure is for the purpose of oxidizing the cotton after being dyed in vat 4, and after being dyed in vat 5. This oxidizing is essential to the proper dyeing of the cotton.

The device is especially intended for indigo, raw stock, and the oxidizing process changes the color of the cotton from yellow as it comes out of the vat to a bluish shade before it enters the second vat. This change in color can only be obtained by exposing the cotton to the air after the dyeing process. While, as before stated, the device is especially intended for indigo, the cotton may also be colored with other dyes than indigo, and in either case, the raw stock may be treated from the bale or from the lap.

I claim:

1. A raw stock dyeing machine, comprising a plurality of compartments or vats arranged in succession, means at the rear end of each vat for compressing or squeezing the stock, and for delivering the stock to the succeeding vat, said means comprising superposed rollers, and a yielding mounting for the upper roller, means in each compartment or vat for receiving the stock from the preceding compartment and carrying it backward and forward in the vat and for finally delivering the stock to the compressing means, and means arranged between sundry of the adjacent vats for receiving stock from the compressing device of the preceding vat and exposing it to the air and delivering it to the conveying device of the succeeding vat, said means comprising a plurality of endless gauze belts, pulleys for supporting the belts with their runs in inclined position, and with the upper run of one belt in position to receive the stock from the compressing device of the preceding vat, and with the upper run of the other belt in position to receive the stock from the upper run of the first-named belt and for delivering the stock to the conveying device of the succeeding vat.

2. A raw stock dyeing machine, comprising a plurality of compartments or vats arranged in succession, means at the rear end of each vat for compressing or squeezing the stock, and for delivering the stock to the succeeding vat, said means comprising superposed rollers, and a yielding mounting for the upper roller, means in each compartment or vat for receiving the stock from the preceding compartment and carrying it backward and forward in the vat and for finally delivering the stock to the compressing means, and means arranged between sundry of the adjacent compartments for receiving stock from the compressing device of the preceding vat and exposing it to the air and delivering it to the conveying device of the succeeding vat.

3. In a raw stock dyeing machine, a plurality of vats for containing dye, means in each vat for passing the stock through the dye in the vat, means at the rear end of each vat for freeing the cotton from the excess dye and means between sundry of the vats for receiving the stock from the preceding vat and carrying it through the air away from the vat and returning it and delivering it to the succeeding vat.

4. In a raw stock dyeing machine, a plurality of vats for containing dye, means in each of the vats for passing the stock through the dye in the vat, and means between sundry of the vats for exposing the stock to the air, said means comprising a plurality of inclined endless belts, one of the said belts receiving the stock from the pre-

ceding vat and delivering it to the other belt, said other belt delivering the stock to the succeeding vat.

5. In a raw stock dyeing machine, a plurality of vats for containing dye, means in each vat for passing the stock through the dye in the vat, and means between sundry of the vats for receiving the stock from the preceding vat and for carrying the stock away from the vat and through the air to oxidize the dye, and for returning the stock and delivering it to the succeeding vat, the said means moving with the stock.

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Witnesses:
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