

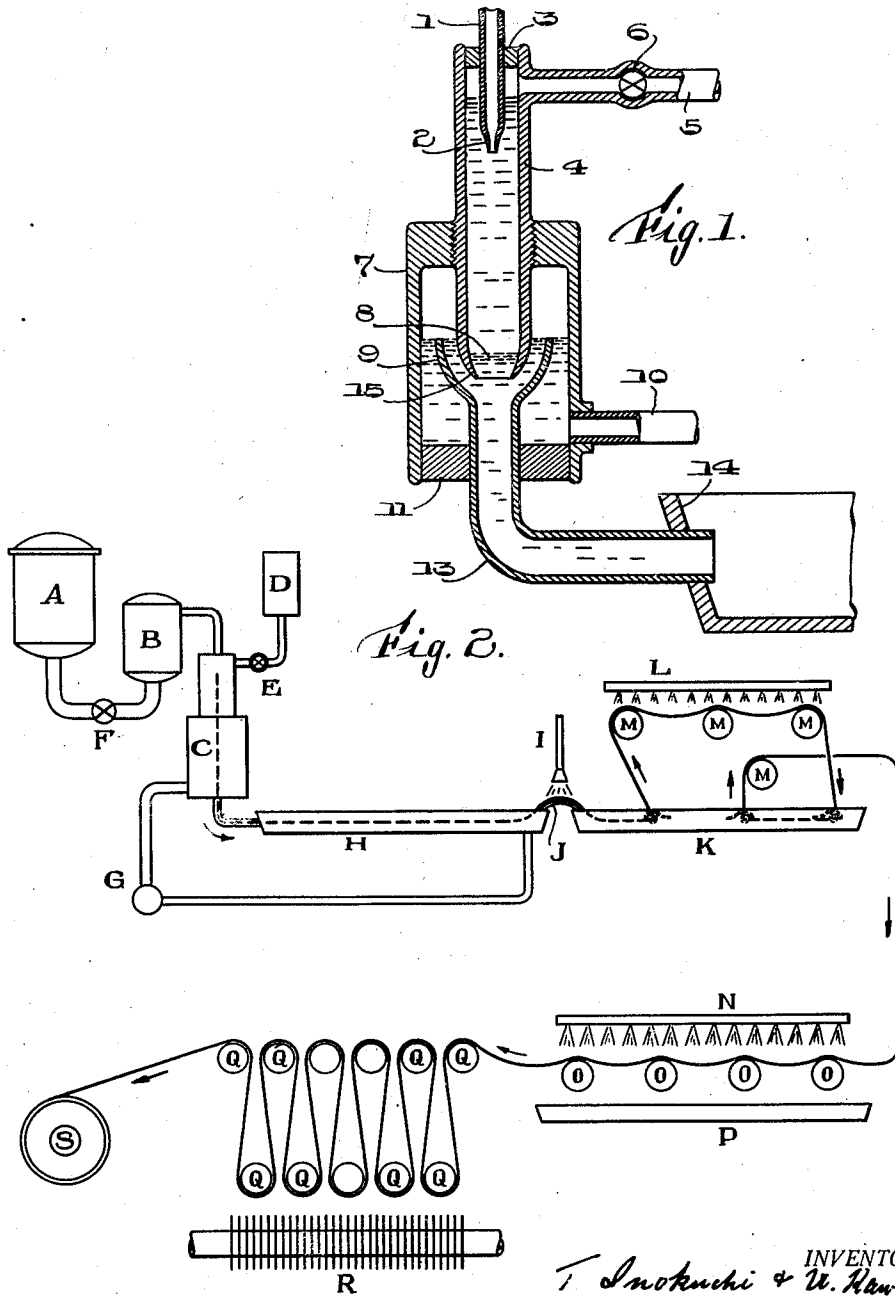
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PROCESS AND APPARATUS FOR SPINNING RUBBER THREAD FROM RUBBER LATEX

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PROCESS AND APPARATUS FOR SPINNING
RUBBER THREAD FROM RUBBER LATEX

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1 Claim. (Cl. 18—54)

The present invention relates to a process and apparatus for manufacturing rubber thread from rubber latex by utilizing two kinds of coagulating baths having different specific gravities such as alcohol and calcium chloride solution, which consists in inserting the first coagulating tube to be filled with alcohol deep into the outer tube provided at the center therein with an overflow pipe adapted for always maintaining calcium chloride solution at a certain level and also keeping it from disturbance, the head of said coagulating tube being buried in the overflow pipe; and attaching a spinning nozzle, which has a mouth gradually enlarged towards the end, to the upper portion of said first coagulating tube, while the second coagulating bath filled with calcium chloride solution is connected with the outer tube by a conduit, so that the calcium chloride solution in the outer tube returns to the second coagulating bath through the regulating overflow pipe and in this way is circulated continuously. The object thereof is to manufacture rubber thread of excellent quality from rubber latex, preventing the loss of alcohol due to volatilization and removing the fear of the mouth of the spinning nozzle being blocked by the coagulation of rubber latex.

According to the present invention, two liquid layers are formed of the first coagulating liquor consisting largely of alcohol and the second coagulating liquor consisting of concentrated calcium chloride by utilizing their difference in the specific gravity. Then, ammoniacal rubber latex is jetted into coagulating liquor consisting of such two liquid layers, so that in the first coagulating liquor the rubber latex flows down automatically into the second liquor owing to their difference in the specific gravity and then is admitted into the second coagulating bath, thus coagulating the flowing down rubber latex in two steps with the first and second coagulating liquors and giving it a thread shape.

Referring to the accompanying drawing,

Figure 1 is a section of the spinning apparatus according to this invention and

Figure 2, a schematic view showing diagrammatically the whole apparatus for manufacturing rubber thread from rubber latex by utilizing this apparatus.

To the upper end of this apparatus is secured tightly a nozzle 1 which has a conical mouth 2 enlarged gradually towards the jetting end. The apparatus is also provided with the first coagulating liquor or alcohol feed pipe 5, and the first coagulating tube 4 is inserted deep into

the center of the outer tube 7 from above. Said outer tube 7 is connected with the second coagulating bath 14 filled with the second coagulating liquor, namely, concentrated solution of calcium chloride by means of an overflow pipe 13 having an overflow brim 9 for maintaining said liquor at a certain level and also keeping it from disturbance. The lower portion of the outer tube is closed tightly and the narrow lower end 15 of the first coagulating tube 4 is buried in the expanded part of the overflow edge 9. The outer tube is provided with an inlet pipe 10 which is situated at a position lower than the overflow brim 9 and is connected with the second coagulating bath 14 through a pump.

The second coagulating liquor consisting of concentrated solution of calcium chloride filled in the second coagulating bath 14 enters the outer tube 7 through the inlet pipe 10, and maintained at a certain level by the overflow brim 9, flows again into the bath 14 through the outlet pipe 13, thus making a circulating movement. The first coagulating tube 4 is filled with the first coagulating liquor 18 consisting chiefly of alcohol which forms a boundary with the second liquor near the lower narrow end 15 of the tube. As the boundary 8 is included in the overflow pipe, it is kept in a certain still condition, being neither moved nor shaken. The first coagulating liquor is replenished by a cock 6.

To explain the spinning of rubber thread with this apparatus, the first coagulating action is done by jetting ammoniacal rubber latex into the first coagulating liquor from the nozzle 1 and allowing the same to flow down automatically through it by the difference in the specific gravity. Next, the second coagulating action is obtained by allowing the above liquor to enter the second coagulating liquor from the boundary 8 of the two liquors and then to flow into the bath 14 together with it. Thus, completing the coagulation by the second coagulating bath, the rubber thread is produced. The jet 2 is kept from being blocked with the coagulating rubber latex by being enlarged gradually towards the end.

The first coagulating tube 4 has a narrow mouth 5 at its lower end to prevent the swirling to be caused by the liquid current and the inlet pipe 10 is disposed at a position lower than the overflow brim 9 so that the second coagulating liquor introduced from the inlet pipe may stay at the bottom of the outer tube 7 for a little while. Then, the liquor flows out into the outlet pipe 13 from said overflow brim 9. Thus, by

smoothening its flow, the uniform rubber thread is spun. The latex in a tank A is maintained at a certain level by a level regulator B and enters the spinning apparatus C of this invention. The consumed first coagulating liquor is supplied from a tank D by regulating the quantity with a cock E, and while circulating the second coagulating liquor in a tank H, the above-mentioned spinning operation is effected. The thus-produced rubber thread receives the water jetted from a spraying pipe I during its passage through a semi-circular glass bridge J and then is conducted into a washing tank K, where it is mounted upon a number of rollers M and during its travel is washed with the water from a shower bath L and re-enters the tank K. Next, it is delivered to the rollers O provided at the upper portion of a washer P and washed perfectly with the fresh water sprayed from a pipe N above the washer. Then, it is made to take a zigzag course by a number of rollers Q and while passing through them is dried with a steam heater R and reeled round a drum S in a certain length.

Finally, it is vulcanized completely with a vulcanizer. According to the present invention, the first coagulating liquor being sealed up, there is no loss to be caused by the volatilization of alcohol with the result that the consumption of the liquor is slight. Thus, it is possible to manu-

facture long rubber thread at a small cost by simple operation.

Further, in this invention, rubber thread is firstly jetted into alcohol having light specific gravity and receives the first coagulating action. The thus-produced rubber thread in a semi-fluid condition sinks slowly into the alcohol layer by its own weight and while being caused to travel by a current of calcium chloride solution, is coagulated completely. Therefore, the spinning operation is carried out very smoothly and consequently there is no apprehension of the spun thread being broken or becoming non-uniform. Especially, as the nozzle for jetting rubber latex is dipped in alcohol, there is no disadvantage of the jetting mouth being blocked by coagulated rubber.

We claim:

Process of spinning rubber thread from rubber latex, comprising using two kinds of coagulating liquors, namely alcohol and calcium chloride solution; forming two liquid layers by floating alcohol on calcium chloride solution, allowing only the lower layer calcium chloride solution to flow continuously in a certain direction; and firstly coagulating rubber latex by jetting it into alcohol; and then while being caused to travel by a current of the flowing calcium chloride solution, coagulating it completely.

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