The present invention relates generally to improvements in apparatus for the production of artificial sponges and it relates more particularly to an improved apparatus for the production of artificial sponge by the viscose method.

In the production of regenerated cellulose sponge by the viscose method it is a common practice to fill a large mold with a viscose sponge forming mass comprising viscose, reinforcing fibers such as cut hemp or the like, and a leachable pore forming material such as granular sodium sulphate decahydrate. The viscose is then coagulated, the cellulose therein regenerated and the pore forming material leached out, these steps being usually effected by heating the viscose in the mold by steam, hot salt solution, electrical resistance heating or the like.

The resulting sponge block is then washed, purified, bleached and plasticized, dried to a predetermined moisture content and then cut into sponges of the desired size and shape and packaged. The aforesaid procedure possesses numerous drawbacks and disadvantages. It is highly time and labor consuming and hence results in a relatively expensive end product, and close process control is extremely difficult with a consequence of non-uniform and frequently less than optimum production. Furthermore, by producing the sponge in large blocks, a large part of the block, particularly that adjacent to the outer surfaces thereof which are of the nature of a non-uniform highly unattractive skin, is generally of an unacceptable quality and must either be discarded or merchandised as substandard. Moreover, the properties of the sponge varies throughout the block so that the pieces cut therefrom are not uniform. While many forms of apparatus have been proposed for the continuous production of regenerated cellulose sponges, such equipment possesses many of the drawbacks of the batch systems conventionally employed, represents little improvement thereover and introduces other disadvantages.

It is therefore a principal object of the present invention to provide an improved apparatus for the production of artificial sponge.

Another object of the present invention is to provide an improved apparatus for the production of artificial regenerated cellulose sponge in a continuous manner.

A further object of the present invention is to provide an apparatus of the above nature characterized by its ruggedness, reliability, efficiency and adaptability.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a front fragmentary elevational view of an apparatus embodying the present invention;

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a rear fragmentary view thereof with the hopper being shown by broken line at opposite ends of its stroke and by full line at an intermediate position;

FIGURE 4 is a sectional view taken along line 4—4 in FIGURE 3, the hopper valve being shown by full line in closed position and by broken line in open position;

FIGURE 5 is a transverse sectional view of the upper part of the hopper and the switch control mechanism associated therewith;

FIGURE 6 is a diagrammatic view of the hopper valve and hopper shifting control mechanism; and

FIGURE 7 is a transverse sectional view of a section of sponge produced in accordance with the present invention.

The novel apparatus includes a longitudinally extending first endless band having an upper run advancing from a trailing to a leading end, a longitudinally extending second endless band disposed along the trailing section of said first band and having a lower run disposed above and substantially parallel to said first band upper run and advancing along said lower run at substantially the same speed and in the same direction as said first band upper run, means for depositing a layer of a sponge forming mass on said first band upper run at a point trailing said second band, and a pair of electrodes extending longitudinally along the side borders of said first band upper run and said second band lower run and forwardly of said second band.

In accordance with the preferred form of the present apparatus the first belt is embodied in its outer face with any desired pattern and travels along its advancing run over a support table which is flat and horizontal along its trailing section and is transversely crowned along the remainder thereof. The second belt is supported above the first belt and is vertically adjustable relative thereto and in registry with that part of the upper run of the first belt which traverses flat section of the support table. Extending for a major part of the belt along longitudinal borders thereof are a pair of upright electrodes imperforate from the trailing ends to a point shortly forward of the upper belt and are thereby provided with apertures to permit the drainage of liquid therethrough. The side borders of the second belt extend along the upper edges of the registering sections of the electrodes. A transversely extending open bottomed hopper is located at the trailing end of the first belt and is provided with a forwardly directed transversely extending outlet opening which is adjustable in height to define an extrusion opening through which the viscose forming mass flows. Disposed above the top of the first hopper is a transversely reciprocatable second hopper having a downwardly directed outlet opening registering with the inlet opening to the first hopper. A gate is carried by the second hopper in registry with its outlet opening and means are provided responsive to the level of mass in the first hopper for reciprocating the second hopper and for effecting the opening of the hopper gate. Thus the sponge forming mass is delivered by the second hopper into the first hopper as successive superimposed transversely extending layers.

Referring now to the drawings which illustrate a preferred embodiment of the present apparatus, the reference numeral 10 generally designates the improved apparatus which includes a sponge mass extrusion section 11 and a coagulating and regenerating section 12. The sponge mass coagulating and regenerating section 12 comprises a frame 13 suitably supported on a plurality of upright legs 14 and including a pair of transversely spaced horizontal, longitudinally extending parallel beams 16 reinforced and interconnected by a plurality of transversely extending longitudinally spaced cross bars 17. Supported by the cross bars 17 and extending along the length of the frame 13 is a belt support platform 18 having side edges spaced inwardly of the beams 16 and provided with a rear or trailing section of flat horizontal configuration and terminating in a depending curved lip 19 at its trailing end. The remainder of the belt supporting platform 18 is transversely crowned, the height of the crown varying...
A pair of transversely aligned bearing blocks 19 are mounted at the leading ends of the beams 16 and have a transversely extending shaft 20 rotationally journaled therein and having affixed thereto a first leading drum 21. The trailing ends of the beams 16 are provided with longitudinal slots defining slots which slidably support corresponding bearing members 22, the bearing members 22 being longitudinally adjustable by means of a screw member 23 extending from each of the bearing members 22 through an opening in a stationary block 24 and engaged by a threaded knob 26 which permits the pulling and longitudinally repositioning of the respective screws 23 and the corresponding bearings 22. A transverse shaft 27 is journaled in the bearings 22 and has affixed thereto a first trailing drum 28.

An endless main conveyor belt 29 is supported by and between the drums 21 and 28 and traverses an upper advancing run along the upper surface of the supports platform 18 and returns from the leading drum to the trailing drum along a path below the frame 13, the belt 29 being guided in its return run by a plurality of suitably mounted rollers 30 extending along the side edges of the belt 29. The belt 29 is formed of any suitable material, preferably of a fabric reinforced natural or synthetic rubber type material, the outer face of the belt having any desired pattern embossed or impressed therein, for example, a diamond shaped pattern or the like. The belt 29 is suitably tensioned by means of the hand nuts 36, and as it advances along the platform 18 it conforms with the contour thereof, that is, flat along the trailing section of the platform 18 and crowned along the remainder thereof.

A shaft 32 is suitably rotatably supported and extends longitudinally along the outer face of the rear beam 16. An electric drive motor 33 provided with an adjustable speed reducing unit 34 having an output shaft 36 is affixed to a mounting plate 37 disposed below the leading end of the frame 13 and supported therefrom by suitable depending brackets 38. A sprocket wheel 39 is mounted on the output shaft 36 and is connected by a sprocket chain 40 to a sprocket wheel 41 mounted on the longitudinal shafts 32. The drum supporting shafts 20 and 27 project through corresponding bearings 19 and 22 and have keyed thereto worm gears 41 and 42 respectively, the worm gears 41 and 42 engaging respective worms secured to the shaft 32 whereby the leading and trailing drums 21 and 28 may be driven at the same rate.

Mounted on the frame 13 and extending along the length thereof between the confronting edges of the drums 21 and 28 and disposed shortly outwardly of the side edges of the belt 29 along the upper run thereof are a pair of longitudinally extending horizontal mounting bars 43. Supported by each of the mounting bars 43 by means of connecting bolts 44 is an elongated electrode 46 extending along the corresponding side borders of the belt 29 along its upper run from a point forward of the trailing end of the belt upper run to a point adjacent to the leading end thereof, the electrode 46 engaging the upper surface of the belt 29. Each of the electrodes 46 includes a trailing section 47 of reduced height, the upper edge thereof being spaced above the upper run of the belt 29 a distance approximately equal to the height of the sponge to be produced by the subject equipment. The leading section 49 of the electrode 46 are slightly inwardly offset relative to the trailing section 47 thereof and are joined thereto by connecting sections 50. Formed in the bottom border of the electrode leading sections 49 are a plurality of space apertures 51 to permit the drainage of liquid from the processed sponge mass. The electrodes 46 are connected to a source of alternating current in a manner described in the above-identified Patent No. 3,276,072 which describes the subject electrode system in detail.

A support frame including longitudinally extending beams 51 is mounted above the upper run of the belt 29 in the vicinity of the electrode section 48 by means of opposing pairs of posts 52 carried by the main support frame 13. The upper support frame is preferably vertically adjustable and the beams 51 carry longitudinally spaced pairs of transversely aligned bearing blocks 53 in each of which pair is journaled a horizontal transverse shaft 54. Affixed to each of the shafts 54 is a drum 56 and an upper endless belt 57 formed of a fabric reinforced natural or synthetic rubber or any other suitable material is carried by and between the drums 56.

A worm gear 58 is affixed to each of the shafts 54 outside of the respective bearing block 53 and is engaged by a mating worm fixed to a longitudinally extending shaft 59 supported by suitably mounted bearing brackets 60 above the shaft 54. The shaft 59 is coupled to the shaft 32 by means of a sprocket chain and sprocket wheels 61 connected to the shafts 52 and 59, the drums 21, 28 and 56 and the various coupling drive gears and sprocket wheels and chains being so related that all of the drums have the same linear peripheral speeds.

The belt 57 is tensioned by an idler roller 63 extending transversely across and bearing on the upper face of the belt 57 as it traverses its upper run, the roller 63 being supported by a transverse shaft 49 carried by and between transversely aligned bearing brackets 65. Each of the bearing brackets 65 slidably engages a vertical track 66 supported on the inner faces of the frame beams 13. A vertical adjusting screw 67 is aligned with each of the tracks 66 and is rotatably supported by a bracket 68 which restricts the screw 67 against axial movement, the screws 67 engaging tapped bores in the bearing brackets 65 to permit the vertical adjustment of the bearing brackets 65 by rotating the respective screws 67 to thereby permit the adjustable tensioning of the belt 57.

The outer face of the belt 57 is provided with transverse parallel ribs 69 extending across the full width of the belt 57 and being separated by intervening valleys or grooves. The cross sectional shapes of the ribs 69 and the interwoven grooves may be of any desired configuration, but are preferably of rectangular shape. The width of the grooves are preferably between ⅛ and ⅜ inch, for example, ⅛ inch and the width of the ribs are preferably between ⅛ and ⅜ inch, for example, ⅛ inch and the height of the ribs above the bases of the grooves is preferably between ⅛ and ⅜ inch, for example, ⅛ inch. It should be noted that the lower run of the belt 57 advances in the same direction and at the same speed as the upper run of the belt 29 and is parallel thereto.

The sponge mass layer depositing section 11 is positioned above the trailing section of the belt 29 rearwardly of the belt 29 and includes an open-topped and open-bottomed rectangular hopper 70 having the lower edges of its rear and side walls in engagement with the upper face of the belt 29 along its advancing run directly forwardly of the trailing drum 28 and in registry with the trailing section of the support plate 18. The hopper 70 is suitably supported by and between a pair of end bracket members 71 affixed to the frame beams 16. The front wall of the hopper 70 is provided with a forwardly directed transverse opening extending for a little less than the full width of the hopper 70 and a transversely extending doctor blade 72 is vertically disposed below the hopper front wall and has a tapered sharp bottom edge which, with the upper face of the belt 29 delineates a sponge mass extrusion opening which is substantially the width of the distance between the trailing sections 47 of electrodes 46 and of a height approximately equal to the spacing between the confronting faces of the belts 29 and 57. Thus, as the belt 29 advances along a path in registry with the bottom opening of the hopper 70 to withdraw a sponge forming mass layer from the hopper 70 corresponding to the dimensions of the extrusion or discharge opening. A pair of side guides 55 extends from
the hopper front wall to the trailing edges of the electrode sections 47.

Positioned above the first hopper 70 are a pair of longitudinally spaced transversely extending track defining angle members 73 which are supported by bracket frames 74 from an overhead support 76. A second hopper 77 is supported by the tracks 73 for transverse movement along the tracks by means of a pair of front and rear bracket plates 78 and 79b respectively secured to and directed upwardly from the upcurved portion of the front and rear wall of the hopper 77 and provided with pairs of longitudinally spaced upwardly directed vertical legs 79. A flanged wheel 80 is suitably journaled to each of the legs 79 and rides along corresponding tracks 73 to permit the first transverse movement of the hopper 77. The hopper 77 has a downwardly directed bottom rectangular discharge opening 81 which has a width which is a small fraction of the width of the hopper 70 and has a longitudinal dimension slightly less than the longitudinal dimension of the top opening in the hopper 70. The hopper 77 is provided with a large top feed opening of a width slightly less than that of the first hopper 70 and of a much greater longitudinal dimension, the front edges of the feed and discharge openings of the hopper 77 being connected by a front vertical transverse wall 82 and the side and rear edges of the openings being connected by downwardly inclining inclined walls and a downwardly forwardly inclined rear wall.

In order to impart a reciprocating movement to the hopper 77 along the full width or transverse dimension of the hopper 70 there is provided a suitably mounted horizontal stationary hydraulic cylinder 83 having a piston including a transverse piston rod 84 which has connected to and axially projecting from an end thereof a rack member 86 having teeth formed along its lower edge. A longitudinal shaft 87 is suitably journaled in a bearing block 88 supported by a bracket 89 at a point forwardly of the hopper front wall 82 between the upper and lower ends thereof. Affixed to the leading end of the shaft 87 is a relatively small gear 90 which engages the rack 86 and affixed to the trailing end of the shaft 87 and along the front face of the hopper front wall 82 is a relatively large gear 91. A horizontal transversely extending rack 92 is affixed to the front face of the hopper wall 82 above the gear 91 and engages the gear 91, thereby rotating the gear 91 counterclockwise and reciprocating movement of the piston rod 84 and the rack 86 imparts a relatively large reciprocating movement to the hopper 77 by way of the gears 87, 91 and rack 92, the stroke of the hopper 77 being regulated in a manner which will be hereinafter set forth.

A pair of cooperating gate members 94 register with the discharge opening 81 of the hopper 77 and each includes a cylindrical wall 96 connected by radial end walls 96 to a transversely extending shaft 97, the shaft 97 being coaxial relative to the corresponding cylindrical walls 96 and the cylindrical walls 96 in turn slidably engaging corresponding transverse edges delineating the discharge opening 81. The shafts 97 are parallel and longitudinaally spaced and suitably journaled to transversely spaced bracket plates 99 secured to and depending from the side walls of the hopper 77.

When the gate members 94 are in the closed position as shown by full line in FIGURE 4 of the drawings, the inner edges of the cylindrical walls 96 are in contact and the outer peripheral borders are in engagement with the corresponding transverse edges of the discharge opening 81. When the left and right hand gate members 94, as viewed in FIGURE 4, are rotated clockwise respectively until the lower walls 97 thereof are brought into alignment with the corresponding front and rear walls of the hopper 77, as shown in broken line in FIGURE 4, the gates 94 are in fully open position as is discharge opening 81.

Secured to opposite side walls of the hopper 77 are a pair of mounting brackets 100 to each of which is swingably secured by means of a hinge block 101 a depending pneumatic cylinder 102 which in turn is provided with a depending connecting rod 103 connected to the cylinder piston. The connecting rods 103 are pin connected at their ends to the free ends of respective tine links 104 affixed to corresponding shafts 98, the crank arms 105 and the gates 94 being so related that when the connecting rods 103 are in their extended position the gates 94 are closed and when in their retracted position the gates 94 are open.

A suitably supported medially stationary chute 106 projects into the upper feed opening of the hopper 77 and a second chute 177 is directed toward the upper end of the chute 106.

In order to sense the level of mass in the hopper 70 the rear wall thereof is provided with a window covered by flexible diaphragm 108. A double throw switch 109 is provided with an actuating arm 110 whose end is spring urged into engagement with the diaphragm 108 whereby upon the mass in the hopper 70 reaching a predetermined level above the diaphragm 108, the diaphragm 108 is urged outwardly sufficiently to actuate the switch 109 to its open position. As seen in FIGURE 6 of the drawing, in the switch unactuated position the switch arm 109a is in engagement with a first switch contact 109b and upon actuation of the switch 109 the switch arm 109a is shifted into engagement with an opposite switch contact 109c.

The mechanism for controlling the reciprocating stroke of the hopper 77 and the centering thereof following a hopper filling cycle includes a double throw switch 110 and a normally closed switch 111 supported for transverse adjustment above the hopper 77. Switches 110 and 111 are provided with depending actuating arms 112 and 113 respectively which are disposed in the path of a pair of transversely spaced tripping arms 114 and 116 mounted on a wall of the hopper 77 and projecting above the upper edge thereof. The switches 111 and 112 as well as the tripping arms 114 and 116 are independently transversely adjustable. The switch 110 includes a switchblade 110a and a pair of opposite contact elements 110b and 110c respectively, and the switch 111 includes a switchblade 111a and a normally closed contact 111b.

Opposite sides of the cylinder 83 are oppositely connected by way of solenoid actuated valves 117 and 118 alternatively to a free discharge or to the outlet of a solenoid actuated valve 119 which is connected to a source of fluid under pressure, for example, water under pressure. The valves 117, 118 and 119 are actuated by solenoids 120, 121, and 122 respectively. The solenoid 121 is connected between a line X, which is connected to the side of a source of electric current, and the switch contact 110 c, and the other solenoid 120 is connected between the line X and the switch contact 110 b. The switchblade 110a is connected to a line Y connected to the other side of said source of electric current. The solenoid 123 is connected between the line X and the switch contact 111 b and the switchblade 111a is connected to the switch contact 109 c and the switchblade 109a is connected to the current line Y.

The cylinders 102 have their corresponding sides interconnected and the opposite ends of the cylinders 102 are connected to the opposite outlet ports of a solenoid actuated four-way valve 130 having an inlet port connected to a source of compressed air and an outlet port connected to the atmosphere, the valve outlet ports being alternately connected to opposite inlet parts. The valve 130 is actuated by a solenoid 131 which has one end connected to the current line X and the other end connected to the switch contacts 111 b. It should be noted that switch contacts 110 b and 110 c and the solenoids 120 and 121, valves 117 and 118 and the cylinder 83 are so interconnected that when the switch actuating arm 112 is swung counter-clockwise, as illustrated in FIGURE 5 of the drawings indicating an end of the stroke of the hopper 77, one of the solenoids 120-121 is de-energized and the other energized to thereby reverse the conditions of
the valves 117 and 118 and the movement of the piston rod 84 by the cylinder 83 and hence effect the return stroke of the hopper 77 until the actuating arm 112 is swung counter-clockwise by the tripping arm 116, the reciprocating continuing until a proper level has been reached in the hopper 70 and the hopper 77 is suitably centered as will be hereinafter set forth. During the rec- iprocating of the hopper 77 which proceeds while the switch 119 is open, the solenoid 122 is energized to maintain the valve 119 in open condition and the solenoid 131 is energized to maintain the valve 130 in a condition which effects connection of the lower ends of the cylinders 102 to the source of compressed air and the upper ends thereof to the atmosphere by way of the valve 130 and hence the opening of the gate members 94. During the reciprocation of the hopper 77 the viscosc sponge forming mass flows through the discharge opening 81 and is deposited as horizontal superimposed successive layers into the hopper 70 whereby the constituents of the sponge forming mass have a transverse horizontal orientation imparted thereto. When the sponge forming mass in the hopper 70 reaches a predetermined level the switch 109 is actuated to shift the switchblade 109a into engagement with the switch contact 109c thereby maintaining the solenoids 131 and 122 energized so that reciprocation of the hopper 77 continues and the gate members 94 are retained in their open position. However, when the tripping arm 116 strikes the actuating arm 113 the switch 111 is opened to de-energize the solenoids 131 and 122 whereby to close the valve 119 and stop the move- ment of the hopper 177 and to reverse the condition of the valve 130 and effect the closing of the gate members 94. The rest position of the hopper 77 can be adjusted by correspondingly adjusting the position of the switch 111 and the actuating arm 113.

In the operation of the apparatus described above, the electrodes 46 are connected to the terminals of a source of alternating current which may be the commercially available 60 cycle alternating current, and which may be a commercially available voltage, for example, 220 volts, it being understood however that lower and higher values of voltage may be employed in order to obtain optimum heating and temperature distribution in the coagulating and regenerating sponge mass. A viscosc sponge forming mass of any well-known composition, for example, as described in U.S. Patent No. 3,048,888 and includes viscosc cut fibers, for example, hemp or the like and granular sodium sulphate decaysylate as well as other chemical and other additives. The sponge forming mass is introduced by the chute 107 through the chute 106 into the hopper 77 to maintain the mass in the hopper 77 at a suitable level. The hopper 77 de- 

Delivers horizontal superimposed layers of the viscosc sponge forming mass into the hopper 70 to a desired level in the manner described above. As the belt 29 advances along its upper run below the hopper 70 it withdraws and transports a layer of sponge forming mass the height of which is controlled by the doctor blade 72, and is approximately that of the distance between the advance runs of the belts 29 and 57. As the layer of sponge forming mass advance into registry with the underface of the belt 57 it has horizontal ridges and grooves impressed in the upper face thereof corresponding to the ribs and valleys in the face of the belt 57. The layer of sponge forming mass during its traverse between the electrodes 46 is heated by reason of resistance losses of the current traversing therethrough consequent to the voltage between the electrodes 46. The rib construction of the belt 57 functions to drain the liquid evolving from the viscosc sponge forming mass enclosed between the belts 57 and 29 and the electrode trailing sections 47 thereby greatly contributing to the uniform heating of the mass in the area and consequent uniform end product. The various parameters effecting the heating of the mass as it traverses its path beneath the belt 57 are so adjusted that the temperature of the viscosc sponge forming mass as it enters the area below the belt 57 is below that of the skin forming or coagulating temperature, that is below 28° C. and preferably between 17° C. and 25° C., and the temperature of the sponge forming mass as it emerges from the area below the belt 57 is at least the coagulation temperature, that is above 28° C., preferably at least 35° C. However, the temperature of the viscosc sponge forming mass as it emerges from below the belt 57 should be below the cellulose regeneration temperature of the sponge forming mass and preferably between 50° C. and 60° C. As the sponge forming mass leaves the area of the belt 57 it is along the remainder of the upper run of the belt 29 between electrodes 46 which effect the continual heating of the sponge forming mass and the regeneration of the cell- 

ulose therein. Attendant to the heating of the sponge forming mass the sodium sulphate decaysylate crystals are melted and liquidized and flow through the apertures 81 as described in the above-identified patent application. The continuous web of sponge material is then conveyed as such in a continuous manner through successive treating stations including washing, bleaching, plasticiz-

ing, etc.

The sponge 125 produced by the above method has a cross section illustrated in FIGURE 6 of the drawing, the upper face of which is provided with upstanding ribs 126 separated by intervening valleys 127 complementing the ribs and valleys in the belts 57 and the lower face of the sponge 125 has a pattern 128 impressed therein making that form in the belt 29. It is important to note that the pores 129 in the sponge 125 are greater at the bottom of the sponge and decrease substantially uniformly in size approaching the upper face of the sponge 125 and the density of the top of the sponge is greater than that of the bottom, the density increasing uniformly from the bottom to the top face of the sponge. Furthermore, the absorption properties of the sponge are much greater at the bottom than they are at the top, likewise uniformly increasing from the bottom to the top. In the one-inch thick sponge produced in accordance with the present method the density of the sponge was of the order of 20% higher in the area of the upper face of the sponge than it was along the area of the lower face thereof and the other parameters varied accordingly. This difference in density provided a sponge having different cleaning and scouring properties at opposite faces thereof of which did not require any laminating or the employ- ment of different compositions, and such different cleaning and scouring properties are a considerable advantage. The sponge may be of any desired thickness which is ad- 

vantageously between 3/8 inch and 3 inches. Furthermore, by reason of the method in which the viscosc is deposited in the lower hopper 70 from the upper hopper 77, that is, the horizontal transverse orientation thereof, the sponge product was of substantially uniform strength in all direc-

tions. In the absence of the oscillating hopper 70 and the process practiced thereby in depositing the viscosc sponge forming mass, the ratio of the strength of the sponge in the longitudinal direction as compared to the transverse direction was about 2.5:1 whereas with the present apparatus and process the ratio is about 1:1.

While there has been described and illustrated preferred embodiments of the invention it is apparent that numerous alterations, omissions, and additions may be made without departing from the spirit thereof. For example, in place of the doctor blade 72 the trailing section of the belt 57 advantageously registers with the front opening in the hopper 70 to delineate an extension opening therefrom.

We claim:

1. An apparatus for the continuous production of artificial sponge comprising a longitudinally extending first endless band having an upper run advancing from a trailing to a leading end, a longitudinally extending sec-
ond endless band disposed along the trailing section of said first band and having a lower run of lesser length than disposed above and substantially parallel to said first band upper run and advancing along said lower run at substantially the same speed and in the same direction as said first band upper run, said first band being substantially flat along said upper run coextensive with said second band lower run and being transversely upwardly crowned along at least part of said upper run forward of said second band, means for depositing a layer of a sponge forming mass on said first band upper run at a point trailing said second band, and a pair of electrodes extending longitudinally along the side borders of said first band upper run and said second band lower run and forwardly beyond the leading end of said second band and connected to a source of current.

2. The apparatus of claim 1 wherein said second band has transversely extending ridges and grooves formed in the outer face thereof.

3. The apparatus of claim 1 wherein said depositing means includes a first hopper disposed above said first band upper run rearwardly of said second band and having a transversely extending bottom opening formed therein.

4. The apparatus of claim 3, including a second hopper disposed above said second hopper and having a width less than that of said first hopper, and means for reciprocating said second hopper transversely across said first hopper.

5. The apparatus of 1 wherein the confronting faces of said first and second band and confronting faces of said electrodes along the length of said second band define an open ended tunnel extending along the length of said second band.

6. A sponge producing apparatus comprising a longitudinally extending first endless belt having an upper run advancing longitudinally from a trailing end to a leading end, means located along said upper run for coagulating a viscose sponge forming material carried along said upper run, a first hopper disposed above the trailing section of said upper run and having formed along the bottom thereof a transversely extending forwardly directed opening provided with a doctor defining upper edge and a transversely extending inlet opening formed in the top thereof, a feed conduit directed toward said hopper inlet opening and having a longitudinal dimension substantially equal to that of said hopper inlet opening and a transverse dimension less than that of said hopper inlet opening, and means for reciprocating said feed conduit transversely along the length of said first hopper.

8. A sponge producing apparatus comprising a longitudinally extending first endless belt having an upper run advancing from a trailing end to a leading end means located along said upper run for coagulating a viscose sponge forming material carried along said upper run, a first hopper disposed above the trailing section of said upper run and having formed along the bottom thereof a transversely extending forwardly directed opening provided with a doctor defining upper edge and a transversely extending inlet opening formed in the top thereof, a second hopper having a discharge opening registering with said first hopper inlet opening and having a transverse dimension less than and a longitudinal dimension substantially equal to those of said first hopper inlet opening a gate registering with said discharge opening, and means responsive to those in said first hopper for actuating said gate and reciprocating said second hopper along the length of said first hopper inlet opening whereby to maintain the level in said first hopper within predetermined limits.

9. The apparatus of claim 8 including means for terminating the reciprocation of said second hopper at a predetermined position in the path thereof.

10. The apparatus of claim 8 including means for adjusting the reciprocation stroke of said second hopper.

11. A sponge producing apparatus comprising a longitudinally extending first endless belt having an upper run advancing from a trailing end to a leading end, means located along said upper run for coagulating a viscose sponge forming material carried along said upper run, a first hopper disposed above the trailing section of said upper run and having formed along the bottom thereof a transversely extending forwardly directed opening provided with a doctor defining upper edge and a transversely extending inlet opening formed in the top thereof, a second hopper having a discharge opening registering with said first hopper inlet opening and having a transverse dimension less than and a longitudinal dimension substantially equal to those in said first hopper inlet opening a gate registering with said discharge opening, and means whereby and movable along the length of said first hopper, a gate registering with said second hopper discharge opening and movable between open and closed positions, means including a pressure fluid cylinder for reciprocating said second hopper, solenoid actuated valve means alternatively connecting opposite ends of said cylinder to a pressurized fluid, a tripping element carried by said second hopper and movable therewith, and means including a switch provided with an actuating arm located in the path of said tripping element for controlling the energization of said solenoid actuated valve means.

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