No. 898,111. PATENTED SEPT. 8, 1908.

A. HUBER & E. A. HOUCHIN.

SOAP CHILLER AND DRIER.

APPLICATION FILED MAY 24, 1906.

5 SHEETS—SHEET 1.

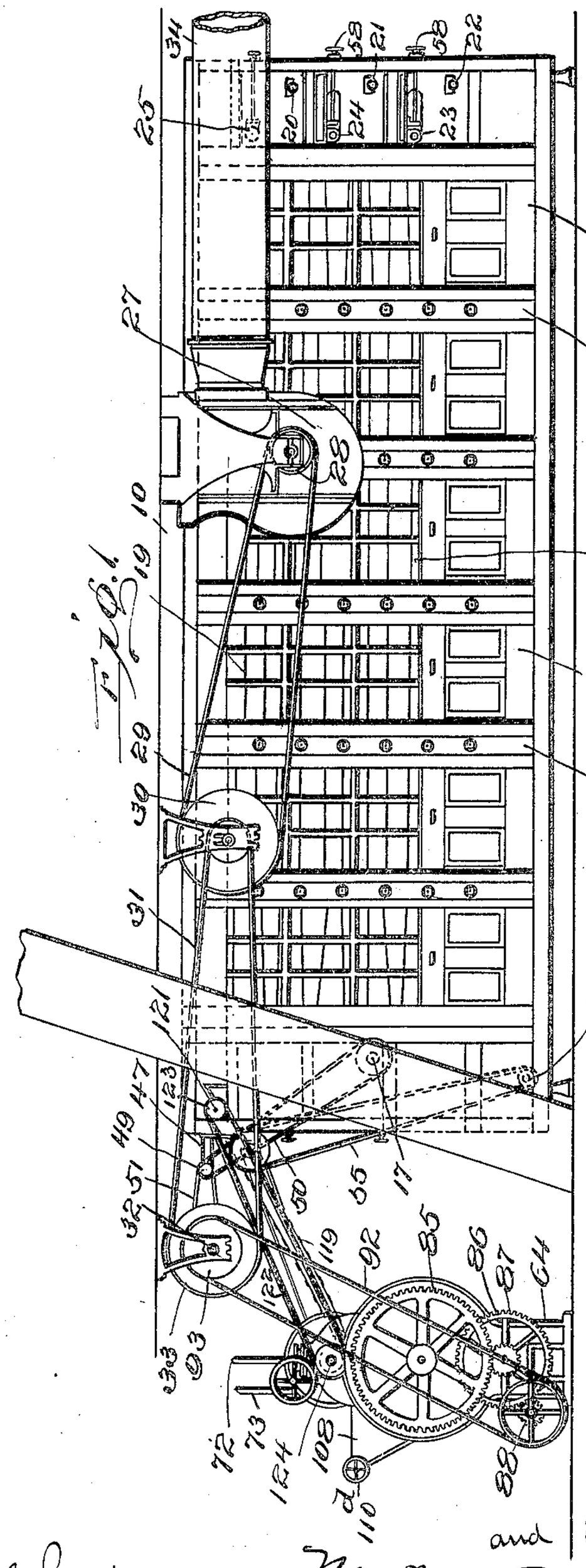

Fig. 1.

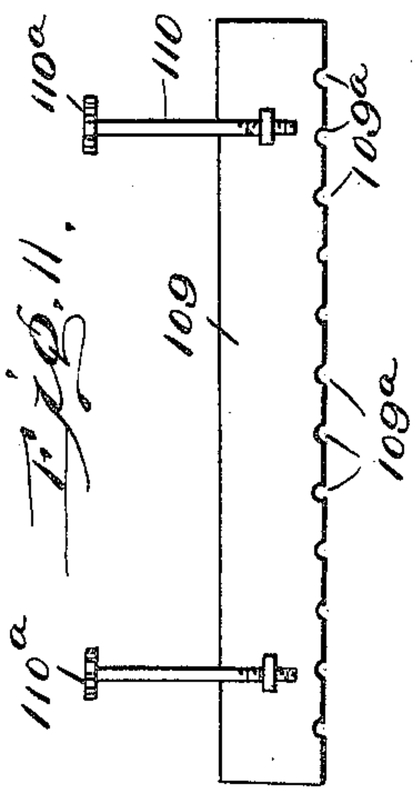

Fig. 11.

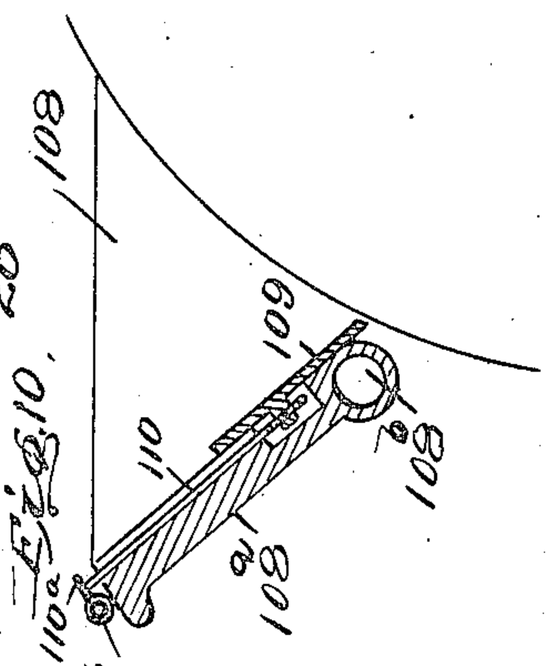

Fig. 10.

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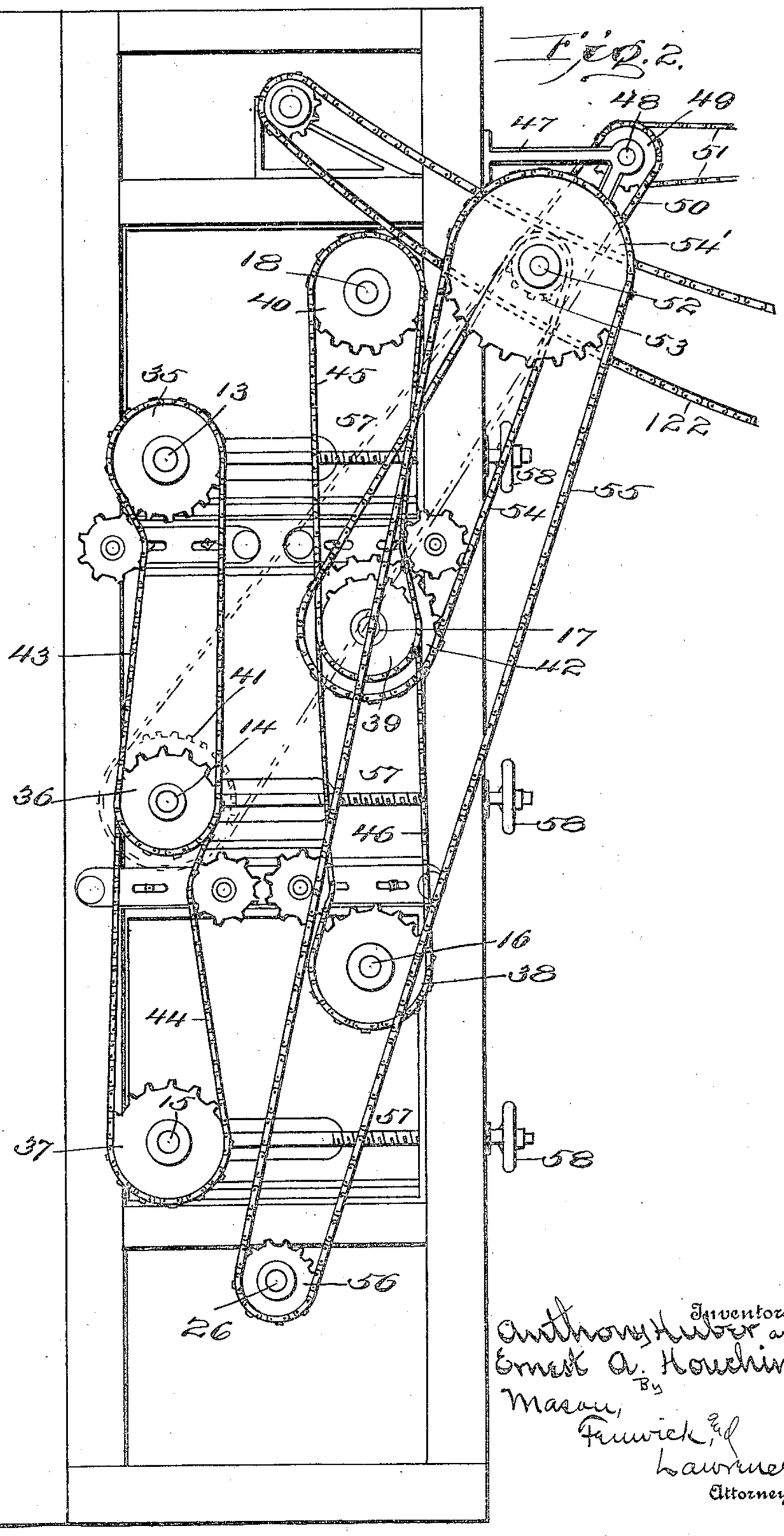
5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

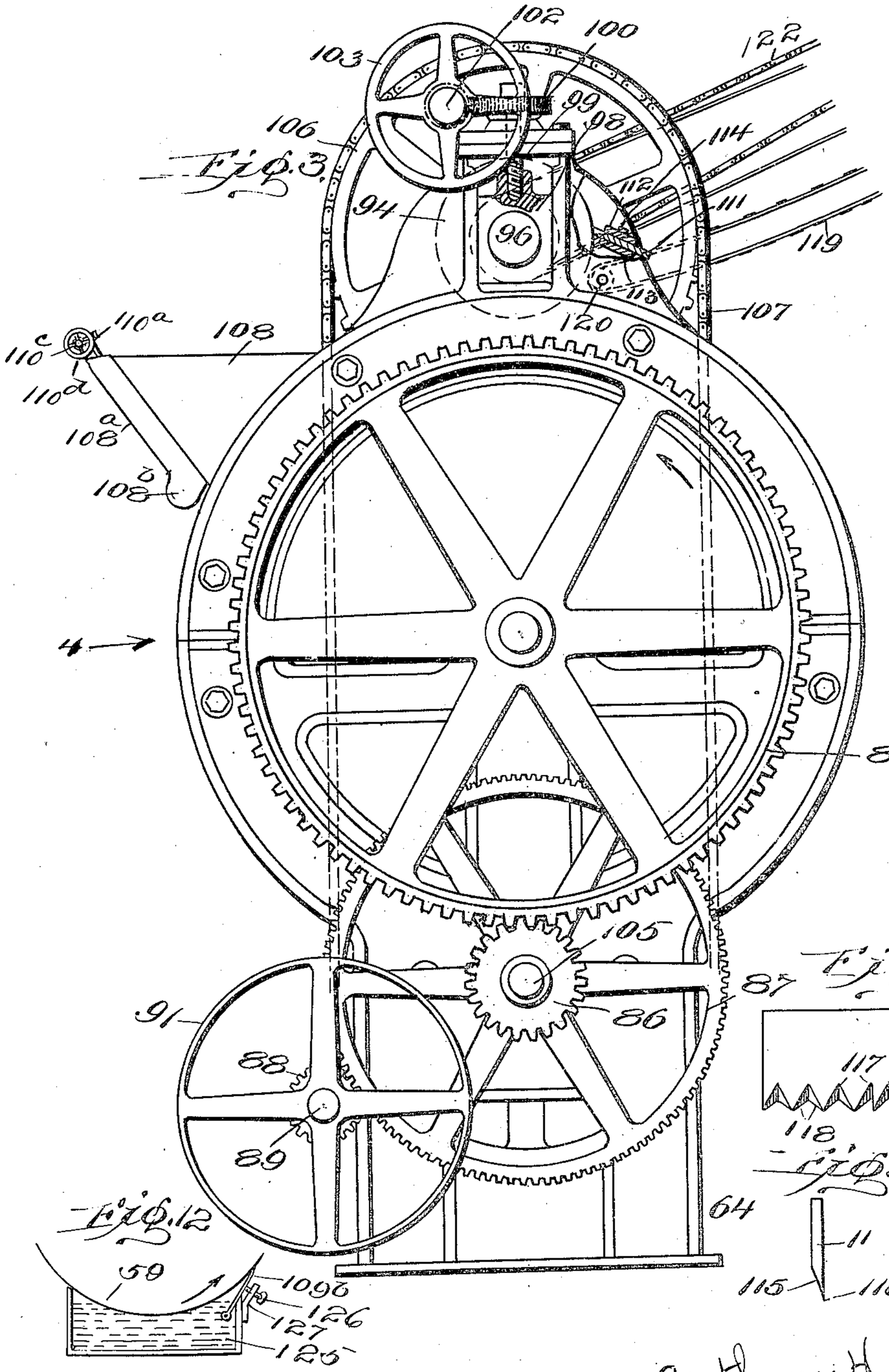

Fig. 3.

Fig. 8.

Fig. 9.

Fig. 12.

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5 SHEETS—SHEET 4.

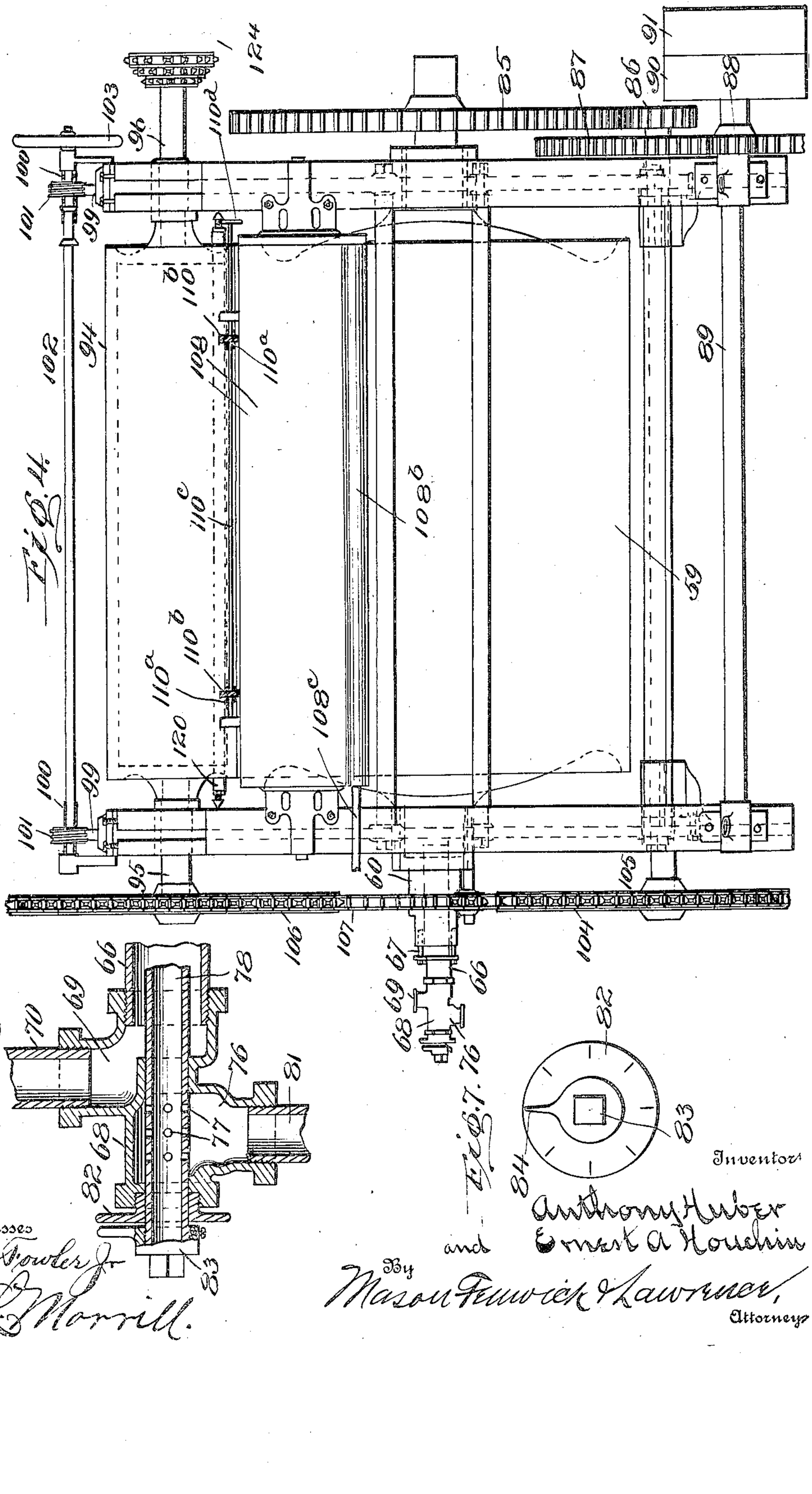

Fig. 4.

Fig. 6.

Fig. 7.

Witnesses

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5 SHEETS—SHEET 5.

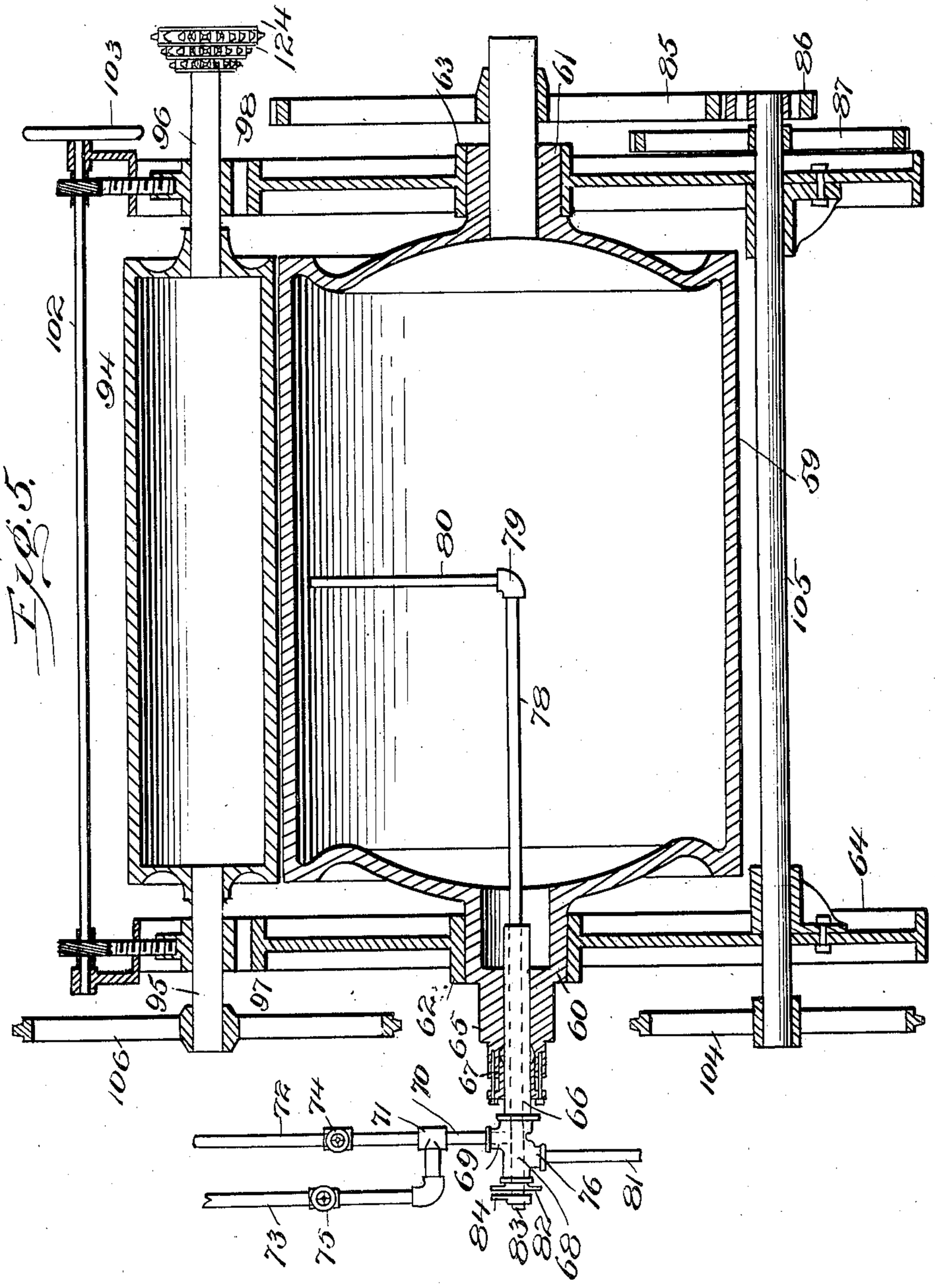

Fig. 5.

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UNITED STATES PATENT OFFICE.

ANTHONY HUBER AND ERNEST A. HOUCHIN, OF BROOKLYN, NEW YORK.

SOAP CHILLER AND DRIER.

No. 898,111. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed May 24, 1906. Serial No. 318,598.

To all whom it may concern:

Be it known that we, ANTHONY HUBER and ERNEST A. HOUCHIN, citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Soap Chillers and Driers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to soap driers and especially to that class of machines adapted to take soap in a liquid or semi-liquid form and reduce it to sheets or chips in dry form.

The object of the invention is to provide a soap-drying machine of improved form embodying a chilling roller arranged to produce a soap film of very thin dimensions and to take the film from the cylinder in such form as to add strength to the film.

A further object of the invention is to provide in a soap-drier means for conveying the soap film from the chilling cylinder to the drier proper arranged to fracture the soap film into irregular pieces.

A further object of the invention is to provide in a soap drier a chilling cylinder having improved means for chilling with a chilling liquid and for regulating the height of the liquid within the cylinder.

A further object of the invention is to provide in a soap drier a chilling cylinder having means for supplying a liquid thereto and with means to regulate the height of the liquid within the cylinder and the temperature thereof.

With this and other objects in view, the invention consists of certain other novel constructions, combinations and arrangements of parts, as will be hereinafter more fully described and claimed.

In the drawings:—Figure 1 is a view of the machine in side elevation and assembled in operative position. Fig. 2 is a view in side elevation of one end of the drier proper seen from the side opposite that shown in Fig. 1. Fig. 3 is a view in end elevation of the soap chilling cylinder and associated parts, some portions of which are broken away. Fig. 4 is a view of the soap chilling cylinder in side elevation, seen along the arrow 4 of Fig. 3. Fig. 5 is a vertical, longitudinal sectional view of the said chilling cylinder showing the means for admitting and discharging a chilling liquid from the cylinder, and means for regulating the temperature and height of the liquid within the cylinder. Fig. 6 is a detail sectional view of the connection for the inlet and outlet pipes associated with the cylinder. Fig. 7 is a view in end elevation of the dial and associate pointer for indicating the position of the discharge pipe within the cylinder. Fig. 8 is a view in side elevation of the stripper knife. Fig. 9 is a view of the stripper knife in end elevation. Fig. 10 is a detail, sectional view showing the hopper and means for maintaining the contents in heated condition. Fig. 11 is a detail side elevation of a slide plate or scraper for regulating the thickness of the soap film. Fig. 12 is a sectional view showing a modified arrangement for coating the cylinder with the liquid soap.

Like characters of reference indicate corresponding parts throughout the several views.

The soap drying machine forming the subject matter of this application comprises the drier shown as a whole at 10 and comprising vertical upright or frame pieces 11 spaced apart to accommodate sliding doors 12, by which access is gained to the interior of the drier.

Transversely across one end of the drier are journaled a plurality of shafts 13, 14, 15, 16, 17 and 18 carrying rollers or sprockets for accommodating and operating conveyer belts shown at 19. At the opposite end of the drier are journaled rollers for carrying the opposite end of the conveyer belt, the said rollers being journaled upon shafts 20, 21, 22, 23, 24 and 25 in such position relative to each other that the discharge end of each apron stops short of the end of the drier and disposed above the end of the apron or belt next below the end of which extends beyond and to receive material discharged therefrom. The belts or conveyer aprons 19 are arranged to travel alternately in opposite directions so that the material discharged first upon one end of the upper apron or belt is conveyed to adjacent the opposite end of the drier and discharged upon the end of the apron next beneath, after which it is conveyed backwardly to the end of the machine from which it started and in like manner dumped upon the end of the apron next beneath, the said aprons being arranged in sequence, so that the material is finally discharged from the last apron at the end of the machine from which it started and into a

trough in which operates a worm or screw conveyer upon the shaft 26.

The interior of the drier is heated in the usual manner by means of air supplied thereto in heated condition and exhausted therefrom by means of an exhaust fan rotating within the housing 27 and operated by a pulley 28 receiving motion by means of a belt 29 from a pulley 30. The pulley 30 receives motion by means of a belt 31 from a line shaft 32 and pulley 33. The heated air from the interior of the drier after being exhausted by the fan in the housing 27 is forced outwardly through the discharge pipe 34 to the atmosphere or to any convenient flue.

For operating the several conveyer aprons or belts mounted upon the shafts, as mentioned, the said shafts 13 to 16 inclusive are respectively provided with sprockets 35, 36, 37, 38, 39 and 40, and the central or middle shafts 14 and 17 respectively are provided with sprockets 41 and 42. Over the sprockets 35, 36 and 37 are mounted the sprocket chains 43 and 44, whereby the said sprockets are synchronously rotated and over the sprockets 38 to 40 inclusive pass the sprocket chains 45 and 46, whereby the sprockets are likewise synchronously rotated.

Upon a convenient portion of the frame, as upon bracket 47, is journaled a shaft 48 provided with a sprocket 49 over which passes a sprocket chain 50, the other end of which passes over the sprocket 41 upon the shaft 14. The shaft 48 and sprocket 49 receive motion in any approved manner, as by means of the chain 51 passing over a sprocket on the line shaft 32. Similarly journaled upon the frame is the shaft 52 upon which is carried a sprocket 53 over which passes the sprocket chain 54, the other end of which engages and operates the sprocket 42 upon the shaft 17. The shaft 52 also carries the sprocket 54′ over which passes the sprocket chain 55, the other end of which passes about the sprocket 56 rigidly mounted upon the conveyer shaft 26.

The apron carrying rollers or sprockets which accommodate the ends of the aprons stopping short of the ends of the drier are provided with means for exerting tension upon the said aprons which may consist of screws 57 and hand wheels 58.

For operation in association with the drier above described, a chilling cylinder 59 is employed, provided with hubs 60 and 61 journaled as at 62 and 63 upon the frame 64. The chilling cylinder 59 is formed hollow and the hub 60 is formed in the shape of a sleeve, as at 65, through which extends a discharge pipe 66 and provided with a stuffing box 67 by means of which the escape of fluid from the cylinder is prevented, except through the said discharge pipe. Externally of the hub the discharge pipe 66 is provided with a coupling 68 having one passage, as 69, in communication with the inlet pipe 66 and arranged to receive a feed pipe 70. The feed pipe 70 is provided with a T-joint 71 whereby communication is formed with a water supply pipe 72 and a steam supply pipe 73 provided respectively with cocks 74 and 75 for controlling the flow of liquid therethrough. The coupling 68 is also provided with a passage 76 communicating by means of openings 77 with the discharge pipe 78, which said pipe extends axially within the cylinder to approximately the middle thereof and is provided with an L-joint 79 and the branch pipe 80 extending approximately at right angles to the pipe 78 and adjacent to the inner periphery of the cylinder. The passage 76 is also arranged to receive the overflow pipe 81, by which communication is had with a sewer or any convenient means for discharging the used liquid from the cylinder.

The end of the discharge pipe 78 extends outwardly through the outer end of the coupling 68 and is embraced by a dial 82 rigidly carried upon the end of the coupling. The end of the pipe is also provided with a cap 83 provided upon one side with a pointer 84 extending in approximate parallelism with the pipe 80 and by means of which the angular position of the pipe 80 within the cylinder 59 is determined. The cylinder 59 is rotated in any approved manner, as by means of a gear 85 meshing with a pinion 86, which in turn is rotated by a gear 87 from a pinion 88. The pinion 88 is mounted upon a shaft 89 provided with the usual fast and loose pulleys 90 and 91 and receiving motion by means of a belt 92 from a pulley 93 upon the line shaft 32.

At any convenient point about the cylinder 59, as vertically thereabove, is provided a roller 94 provided with trunnions 95 and 96 journaled respectively in bearing blocks 97 and 98. The bearing blocks 97 and 98 are vertically slidable in the frame 64 and the vertical position of said blocks is determined and adjusted by means of screws 99 extending vertically above the frame and provided upon their upper ends with worm gears 100 engaging worms 101 rigidly mounted upon the shaft 102 extending longitudinally of the machine and preferably provided at one end with a hand wheel 103 by which the shaft 102 is rotated, adjusting the screws 99 and bearing blocks 97—98 in the well-known manner.

The roller 94 is operated almost in contact with the cylinder 59, the interval between the said roller and cylinder being adjusted as above described, and the roller is rotated at a peripheral speed many times greater than the peripheral speed of the cylinder 59 by means of a sprocket 104 carried upon the shaft 105 upon which the pinion 86 and gear 87 are mounted, which said sprocket is in alinement with a sprocket 106 upon the trun-

nion 95 and with a sprocket chain 107 passing over the said sprockets 104 and 106. It will be noted that the shaft 105 must rotate at a speed very much greater than the speed of the cylinder 59 and that the sprockets 104 and 106 being substantially equal in diameter the roller 94 will rotate in substantial synchronism with the said shaft 105.

The soap film may be applied to the chilling cylinder 59 in any of the usual, well-known and approved manners, but preferably by means of a hopper 108 disposed adjacent one upper side of the chilling cylinder, and provided with a slidable side plate 109 which may be regulated relative to the surface of the cylinder in any approved manner, as by means of the screws 110, whereby the thickness of the soap film discharged from the hopper upon the surface of the cylinder may be regulated with great nicety. The lower and outer side of the hopper 108 is composed of the plate 108^a which may be cast integral with the passage 108^b formed along the lower edge thereof and into which the pipe 108^c is inserted. By the means just described heated liquid as water can be supplied to the chamber or passage 108^b to keep the soap within the hopper and adjacent the film applying plate 109 constantly liquid to insure its proper application to the cylinder.

The plate 109 is provided along its lower edge which contacts with the chilling cylinder with a plurality of spaced notches or indentations 109^a by the use of which the external surface of the applied soap film is provided with upstanding ridges. The said ridges being thicker than the adjacent film of soap, do not become chilled to as great an extent as the surrounding soap, and when the soap film is brought into contact with the crushing roller 94, the ridges are crushed upon the surface of the soap film, whereby the said surface is rendered more adhesive and the said film is by the roller 94 taken off from the chilling roller as described.

The screws 110 are operated in any approved manner, as by means of pinions 110^a rigidly carried upon the extremities of the said screws and engaging worms 110^b carried upon the shaft 110^c journaled upon the upper edge of the hopper side 108^a and manipulated by means of a hand wheel 110^d, or otherwise.

The film of soap is carried by the chilling cylinder 59 during the major part of a revolution and by reason of the chilling liquid contained in the said cylinder the film of soap upon its surface is cooled and chilled. The film of soap carried upon the periphery of the cylinder is brought into engagement with the rotating cylinder 94, and by reason of the more rapid rotary movement of the roller the film of soap is greatly reduced in thickness and is transferred from the chilling cylinder to the surface of the roller. The reduced film is carried by the roller through the major portion of a revolution and is engaged by a stripper or knife 111 in operative engagement with the periphery of the said roller and disposed preferably at an angle of approximately forty-five degrees to a tangent to the roller. The stripper or knife 111 may be mounted in any approved manner, as by means of being slidably inserted between guides 112 and 113 and retained in operative position by means of a set screw 114. The stripper 111 may be of any approved form, but preferably is provided along one edge with a bevel, as at 115, formed upon an arc coinciding with the curvature of the roller 94 and the said bevel portion in contact therewith, as shown in Fig. 3. Along the reduced edge of the stripper 111 formed by means of the bevel 115 is provided a plurality of spaced points 116 formed in any approved manner and by filling or milling the edge as at 117 to produce reversely inclined chisel edges 118 conforming to the curvature 115 and in contact with the periphery of the roller 94.

The soap film removed by means of the stripper 111 shown in Figs. 8 and 9 is formed in corrugated sheets and from the said stripper drop upon the conveyer apron 119 and is thereby conveyed to and discharged into the upper portion of the adjacent end of the drier shown at 10. The conveyer belt 119 is carried or moved at a rate of speed in excess of the surface speed of the roller 94, whereby the soap sheets as they are dropped upon the said apron are subjected to a pulling strain and are thereby broken and fractured into irregular corrugated shape.

The apron 119 is mounted at one end upon the roller 120 journaled in any approved manner upon the frame of the chilling roll, and at its opposite end upon the roller carried upon the shaft 121. The shaft 121 is operated in any approved manner, as by a belt or sprocket chain 122 passing over the pulley or sprocket 123, upon the shaft 121, and a pulley or sprocket 124 upon the trunnion 96 of the crushing roll.

The pulleys or sprockets 123 and 124 are preferably stepped as shown particularly in Fig. 4, whereby the belt or sprocket chain 122 may be shifted from pulleys or sprockets of one dimension to pulleys or sprockets of other dimensions, without change of length.

As shown in Fig. 12 the cylinder 59 may be rotated in a trough or vat 125 containing liquid or heated soap and whereby the liquid soap is carried by the rotation of the cylinder into contact with the scraper, shown as 109^b, similar to the knife shown in Fig. 11, as 109, and provided with a straight edge or with the indentations 109^a. The knife or scraper 109^b may be adjusted relative to the surface of the cylinder in any approved manner as by means of the screw 126 engaging the bracket 127. The position of

the knife 109b is such that the soap film upon the surface of the cylinder will be reduced to the desired thickness by the adjustment of the knife or scraper, and will be carried upon the surface of the cylinder to operate and to be operated upon, as herein described.

The stripper described herein and shown in detail in Figs. 8 and 9 forms no part of the present invention, being the subject-matter of a co-pending application. The conveyer aprons 19 disposed within the drier likewise form the subject matter of a co-pending application and the specific structure of the said aprons forms no part of the present invention.

In operation, soap in a liquid or viscous condition is poured or otherwise discharged into the hopper 108 and the chilling cylinder 59 and its associate and intergeared parts are put into operation as above described. The rotation of the cylinder 59 in the direction indicated by the arrow will engage a film of soap from the hopper 108 which is permitted to escape therefrom by means of the adjusting movement of the side plate 109, and the said film is by the said cylinder carried about and into engagement with the roller 94, whereby it is crushed and reduced in thickness, as above described. The temperature of the chilling cylinder is regulated and maintained by means of any approved liquid, as water, discharged into said cylinder through the pipes 70 and 66, and the height of the water within the cylinder is regulated by means of rotating the pipe 78 and its branch pipe 80 to dispose the extremity of the branch pipe 80 at any height within the cylinder, said position being determined as above-described, by means of a pointer 84 in relation to the dial 82. The introduction of cold water to the cylinder 59 will reduce the temperature of the said cylinder to too great an extent whereupon steam from any convenient and approved source may be admitted through the pipe 73 and controlled by the valve 75. The soap film after passing about the cylinder 59 and being crushed and reduced by the roller 94 as described, is stripped from the said roller by means of the knife 111 in corrugated sheets or strips and is discharged thereby, as described, upon the conveyer apron 119 by which it is discharged upon the end of the upper apron 19 within the drier, and by the said apron 19 carried backward and forward from the end of entry to the opposite end and finally discharged into and conveyed away by means of the screw conveyer upon the shaft 26.

What we claim is:

1. In a machine of the class described, a chilling cylinder, a feed hopper associated with the cylinder, a crushing roller located in juxtaposition to the cylinder, a stripper arranged in contact with the roller, an apron arranged to receive material from the stripper and move at a speed greater than the speed of the roller, and a drier arranged to receive material from the end of the conveyer apron.

2. In a machine of the class described, a hollow chilling cylinder, means within the cylinder for discharging liquid therefrom, and means external of the cylinder for varying the height of the liquid within the cylinder.

3. In a machine of the class described, a hollow chilling cylinder, means to admit a chilling liquid within the cylinder, a pipe extending into the cylinder in axial relation thereto, a branch pipe connected with said axial pipe and extending adjacent to the inner periphery of the cylinder, and means to rotate the axial pipe to adjust the height of the branch pipe.

4. In a machine of the class described, a hollow cylinder, means to admit a chilling liquid to the cylinder, a pipe extending from without the cylinder through the axis thereof, and means carried by the axial pipe at its external end for rotating the said pipe and for determining the position of the branch pipe within the cylinder.

5. In a machine of the class described, a hollow cylinder provided with a hollow hub, an inlet pipe extending axially through the said hollow hub, a coupling upon the outer end of the said inlet pipe for connection with the feed pipe, a pipe extending through the coupling and through the inlet pipe into the cylinder, a branch pipe extending from the inner extremity of the axial pipe and into juxtaposition with the inner periphery of the cylinder, and with its external end extending through the coupling, a dial carried upon the coupling, and means carried by the external end of the pipe for operation in conjunction with the dial to determine the position of the branch pipe within the cylinder.

6. In a machine of the class described, a chilling cylinder provided with means for admitting a chilling liquid thereto, means for regulating the temperature and volume of the contained chilling liquid, a roller rotatably mounted in juxtaposition to the chilling cylinder and rotating with a greater surface speed than the cylinder, a stripper arranged in contact with the roller, an apron disposed to receive material from the stripper, and means for rotating the apron at a greater speed than the surface speed of the roller.

7. In a machine of the class described, a frame, a chilling cylinder journaled upon the frame, means for admitting a chilling liquid to the cylinder, means for regulating the temperature and volume of the liquid contents of the cylinder, a crushing roller mounted in juxtaposition to the chilling roller, means for rotating the crushing roller at a greater surface speed than the surface

speed of the chilling cylinder, a stripper mounted in contact with and to remove material from the crushing roller, an apron disposed beneath the stripper and to receive material discharged therefrom, means to rotate the apron at a speed greater than the surface speed of the roller, and a soap drier positioned to receive material discharged from the opposite end of the apron.

8. In a machine of the class described, a rotating chilling cylinder, a scraper mounted adjacent the periphery of the cylinder and arranged to permit the passage of a film between the edge of the said scraper and the cylinder, the said adjacent edge being provided with spaced notches and, means for supplying liquid or semi-liquid material to the periphery of the cylinder in position to be reduced in thickness by contact with the edge of the said scraper.

9. In a device of the class described, a chilling cylinder, a hopper arranged adjacent the chilling cylinder, means carried by the hopper for depositing a film of material upon the chilling cylinder, means for regulating the thickness of the film deposited, and means for controlling the temperature of the material within the hopper.

10. In a machine of the class described, a chilling cylinder, a hopper disposed adjacent the chilling cylinder, and spaced therefrom at its lower side, a plate within the hopper and movable to vary the interval between its edge and the chilling cylinder, and a chamber formed in the lower edge of the hopper arranged to receive and accommodate a temperature controlling fluid.

11. In a device of the class described, a rotating chilling cylinder, means to remove material from the surface of the cylinder, and an apron disposed to receive material removed from the cylinder and traveling at a rate greater than the rate of movement of the periphery of the cylinder.

12. In a device of the class described, a chilling cylinder mounted to rotate, a scraper positioned to remove material from the surface of the cylinder, and an apron positioned to receive material removed by the gripper and traveling at a rate greater than the rate of travel of the periphery of the cylinder.

13. In a device of the class described, a chilling cylinder, a scraper engaging the periphery of the cylinder and proportioned to remove the material therefrom in ribbons, and an apron positioned to receive the ribbons and traveling at a rate of speed greater than the rate of travel of the periphery of the cylinder.

14. In a device of the class described, a rotating chilling cylinder, means to supply a film of material to the surface of the cylinder, and to produce thickened portions at intervals.

15. In a device of the class described, a chilling cylinder, means to apply a film of material to the surface of the cylinder, and means to produce thickened ribs of material circumferentially of the cylinder, and spaced apart longitudinally thereof.

16. In a device of the class described, a chilling cylinder, a film applying plate spaced from the cylinder and provided with means for producing thickened portions at intervals upon the film.

17. In a device of the class described, a chilling cylinder, and a film applying plate having its edge spaced from the cylinder and with indentations formed in the edge of the plate.

18. In a device of the class described, a chilling cylinder, means to admit a liquid to the cylinder, a discharge pipe extending within the cylinder and provided with a leg disposed at an angle to the main pipe, and means to rotate the main pipe and leg.

19. In a device of the class described, a hollow chilling cylinder, means to admit a liquid to the cylinder, a pipe extending within the cylinder substantially along its axis, a leg carried by the pipe approximately at right angles thereto and extending adjacent to the inner surface of the cylinder, and means to vary the angular position of the leg relative to the axis of the cylinder.

20. In a device of the class described, a chilling cylinder, a hopper adjacent the chilling cylinder, a film applying plate carried by the hopper and with its edge spaced from the cylinder, a plurality of screws adapted to move the film applying plate laterally, and means to actuate the screws simultaneously.

21. In a machine of the class described, a traveling film forming surface, means to remove a film from the surface, and transporting means moving at a rate of speed greater than the movement of the film forming surface.

In testimony whereof we affix our signatures in presence of two witnesses.

ANTHONY HUBER.
ERNEST A. HOUCHIN.

Witnesses:
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