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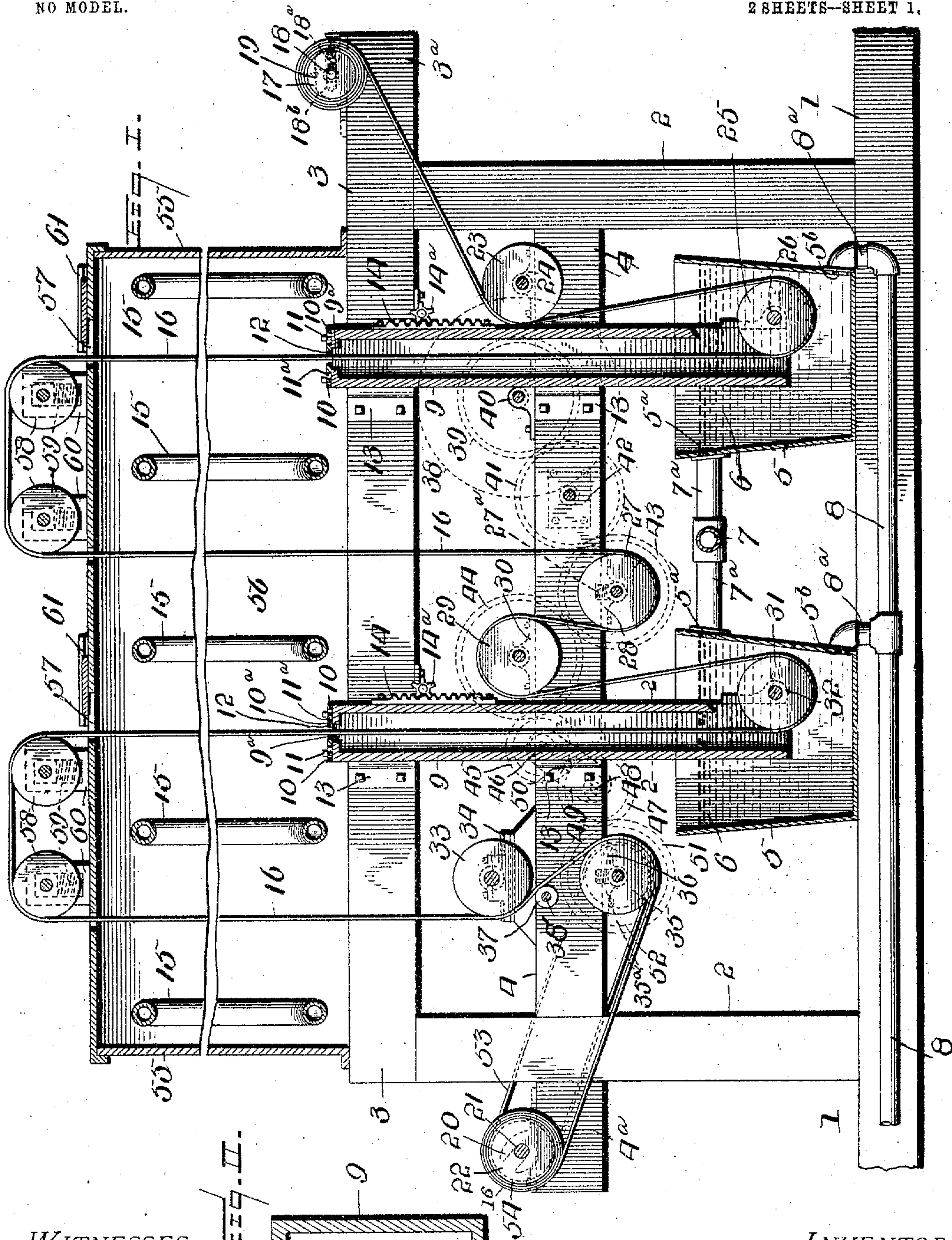
PATENTED NOV. 22, 1904.

C. B. WISNER.
COATING MACHINE.

APPLICATION FILED NOV. 14, 1902.

NO MODEL.

28 SHEETS—SHEET 1.



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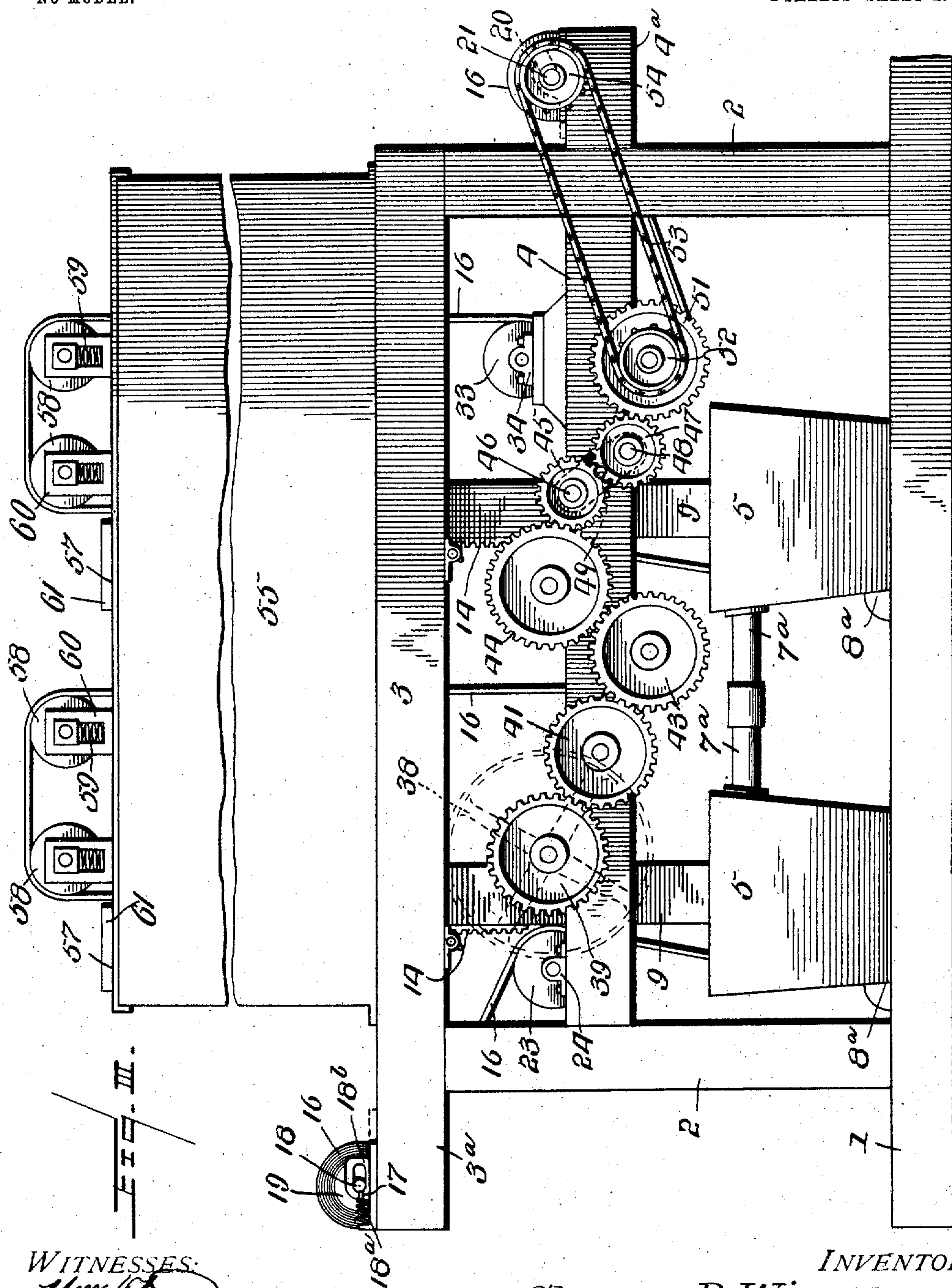
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CLARENCE B. WISNER, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

COATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 775,694, dated November 22, 1904.

Application filed November 14, 1902. Serial No. 131,408. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE B. WISNER, a citizen of the United States of America, and a resident of the borough of Brooklyn, in the city of New York and State of New York, have invented certain new and useful Improvements in Coating-Machines, of which the following is a specification.

My invention is an improvement on those coating-machines which are adapted to apply a varnish or other suitable liquid coating or film to a continuous web of material passing therethrough, is especially intended for the purpose of treating a continuous web of paper, and is adapted to the drying of the liquid coating between the applying of successive coats.

One object of my invention is to provide means for keeping the liquid coating in circulation within the vats, so as to maintain the fluidity of the liquid coating.

Another object of my invention is to provide means for keeping the web of material taut while being unwound on entering the machine and rewound on leaving the machine.

Another object of my invention is to provide means for keeping that part of the web of material immersed in the liquid coating and being operated upon within the vat at a certain level beneath the surface of the liquid coating.

Another object of my invention is to provide means for keeping the surface of the liquid coating above the immersed part of the web in a still and untroubled condition, so that a smooth and even liquid coating is applied to the web of material passing therethrough.

Another object of my invention is to provide means for rapidly drying and airing the coated material as it passes from one vat to another vat.

Another object of my invention is to provide means for taking up the slack at the edges of the web of material so as to run the web evenly through the machine, and thus prevent the web being torn by the overstretching thereof at either edge.

My improved coating-machine comprises bearing-boxes for the rolls of material, located at the ends of the machine, a roll-shaft from which the web of material to be treated is unwound, a reel onto which the treated web is rewound, a vat for the liquid coating in which the web is immersed and through which it is passed, a depending guard-sheath suspended over and extending into the vat through which the web is drawn upwardly, steam pipes or coils located above the vat on opposite sides of the guard-sheath between which the web is passed for drying the liquid coating, and a casing providing an oven within which the steam pipes or coils are inclosed and through which the web is passed to the exterior of the casing for airing and returned again for another liquid coating.

My invention consists in the novel features of construction hereinafter described and claimed.

In order that my invention may be fully understood I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a central longitudinal section of my improved coating-machine, parts of the web, steam-coils, and casing being broken away. Fig. II is a transverse section of one of the guard-sheaths. Fig. III is a side elevation of the machine, showing the operating-gearing.

My coating-machine is provided with a suitable framing consisting of a base-frame 1, uprights 2, a top frame 3, having a front extension 3^a, and an intermediate frame 4, having a rear extension 4^a and located between the base-frame and the top frame to provide a support for the operating-gearing. At suitable distances apart on the base-frame I secure vats 5 for the liquid coating, each having an upper induction-opening 5^a and a lower education-opening 5^b, through which the liquid coating 6 is supplied to and withdrawn from the vats, respectively and continuously, to maintain circulation of the liquid coating and the fluidity thereof at a certain level.

7 is a liquid-supply pipe connected with the upper induction-opening 5^a of the vats by means of lateral branch pipes 7^a.

8 is the discharge-pipe of the vats, connected by branch pipes 8^a with the lower induction-opening 5^b of the vats.

Suspended from the top frame and having their lower ends extending into the vats beneath the surface of the liquid are adjustable depending guard-sheaths 9. These guard-sheaths have the function of keeping the surface of the liquid within their lower ends still and untroubled, and thus insure a smooth and even coating of liquid to the material, which is immersed in the liquid coating and is passed upwardly through the guard-sheaths. The upper ends of the guard-sheaths are each provided with adjustable sliding covers 10, which may be secured by pin 11 and slot 11^a connection, so that the opening 9^a in the guard-sheaths and the aperture 12 between the sliding covers 10 may be adjusted in width as desired. It will thus be seen that the adjacent edges 10^a of the sliding covers may be adjusted with relation to the position of the web of material passing between them. As a means for adjusting the height of the guard-sheaths I provide guide-brackets 13, secured to the framing on one side of the guard-sheaths, and racks 14 and pinions 14^a on the opposite side thereof, so that by rotating the pinions in the proper direction the guard-sheaths can be raised or lowered with relation to the height of the liquid coating within the vats. Located above the framing on opposite sides of the upper ends of the guard-sheaths are flat steam-drying pipes or coils 15, provided for the purpose of drying the coated web of material as soon as it issues from the guard-sheaths and before it passes to the next vat for another coating of liquid.

I will now describe the means which I employ for conducting the web of material 16 through the machine so as to be coated with varnish or other liquid, which, as before stated, is constantly supplied to the vats from suitable sources and led back again so as to maintain the circulation, and thus maintain the fluidity of the coating liquid. Upon the front extension of the top frame I mount adjustable bearing-boxes 17, having slotted bearings 18^b, in which are journaled the spindles of a shaft 18, receiving the core 19 of the roll of material 16 to be treated. These spindles are yieldingly held by springs 18^a within the slotted bearings. Upon the rear extension of the intermediate frame I also mount adjustable bearing-boxes 20, in which is journaled the shaft 21 of the reel 22, on which the web of material 16, which has been treated, is rewound. 23 is an upper guide-roller mounted in bearing-blocks 24, mounted on the intermediate frame directly over the first vat. 25 is a lower guide-roller mounted in a bracket 26, secured to one side of the lower end of the first guard-sheath, so as to be adjustable there-

with within the first vat. 27 is a lower tension-roller mounted at its ends on springs 27^a in hangers 28, secured to the under side of the intermediate frame between the guard-sheaths. 29 is an upper tension-roller mounted in bearing-blocks 30, secured on the intermediate frame. 31 is a second lower guide-roller mounted in a bracket 32, secured to one side of the lower end of the second guard-sheath so as to be adjustable therewith within the second vat. 33 is an upper tension-roller mounted in bearing-blocks 34, secured on the intermediate frame, and 35 is a lower tension-roller mounted at its ends on springs 35^a in hangers 36, secured to the under side of the intermediate frame. 37 is a small idle tension-roller for taking up the slack of the web, located between these tension-rollers, mounted on the shaft 38', secured to the intermediate frame. In operation the web of the material 16 extends from the roll over the upper guide-roller 23, thence into the first vat, beneath the first lower guide-roller 25, within the vat, thence upwardly through the first guard-sheath and between the first and second drying-coils, over the second drying-coil, thence downwardly between the second and third drying-coils, thence under the lower tension-roller 27, between the latter and the upper tension-roller 29, over the latter, thence downwardly beneath the second lower guide-roller 31, within the second vat, thence upwardly through the second guard-sheath, between the third and fourth drying-coils, over the fourth drying-coil, downwardly between the fourth and fifth drying-coils, under the upper tension-roller 33, thence over the small idle tension-roller 37, and under the lower tension-roller 35 to the reel 22, where it is rewound.

For advancing the web of material I employ a driving-pulley 38, carrying a gear-wheel 39 and mounted in a bearing-block 40. This gear-wheel meshes with an intermediate gear-wheel 41, journaled on a bracket 42, and in turn meshes with a gear-wheel 43, located on the end of the lower tension-roller 27. This gear-wheel 43 meshes with a gear-wheel 44, located on the end of the upper tension-roller 29. 45 and 47 are connecting gear-wheels having shafts 46 48, respectively, and journaled in link 49, mounted on a stud 50, secured to the intermediate frame. 51 is a gear-wheel located on the end of the lower tension-roller 35, the upper connecting gear-wheel 45 being meshed by the gear-wheel 44, and the lower connecting gear-wheel 47 meshing with the gear-wheel 51. Also located on the lower tension-roller 35 is a sprocket-wheel 52, transmitting motion by means of a sprocket-chain 53 to a sprocket-wheel 54, located on the reel 22.

The steam-pipes 15 and the upper part of the web 16 are inclosed in a casing 55, which provides an oven or heating-chamber 56. This casing extends from the top frame 3 of

the framing upward for about thirty-five feet and incloses all the steam coils or pipes and the web except those parts of the web which are passed to the exterior of the casing through top openings 57 over supporting-rollers 58, mounted at their ends on springs 59 in bearings 60. On the exterior of the casing the surfaces of the web are exposed to the air for awhile, so that the air will take off the tackiness of the varnish. The rollers 27, 35, and 58 being spring-supported at each end, any slight difference in the length of the edges of the web will not cause any difference in the smooth running of the web over the rollers, for extra tension of the web on one side will cause the springs on that side to give and the web to nevertheless run smoothly over the roller. The top openings 57 where the web runs through are closed by adjustable slides or boards 61, so that the casing may be closed more or less at these parts, according to the heat used and the climatic conditions, and thus an even speed of drying of the varnish can be obtained independently of the weather.

There may be more or less turns of the web. Two have been shown. It will be apparent that instead of the web going up and down and then up and down again a greater number of turns can be made. As the draft is from the front end of the web, the web is kept taut throughout. It is therefore desirable to have the idle rollers spring-supported in the manner described, so that the web will run freely over them notwithstanding the difference in length of its edges.

The drying of the liquid coating between the application of the successive coats enables the application of a thick, durable, and smooth coat.

The shape of the guard-sheaths in cross-section is shown in Fig. II of the drawings.

The spring-supports for the shafts even the strain on the web of the material and prevent breakage of the web, as well as insuring its even travel through the machine.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A coating-machine comprising vats for containing the liquid coating, means for continuously introducing the liquid to the vats and withdrawing it therefrom for maintaining the circulation of the liquid coating within the vats, guide-rollers submerged in the liquid coating, means for yieldingly supporting the web of material and passing it through the vats beneath the rollers, and web-supporting rollers having spring-bearings and located remote from and above the vats, over which the web of material is passed and from which it is suspended for drying the liquid coating between the application of successive coats.

2. A coating-machine comprising a vat for containing the liquid coating, a guard-sheath

through which the web of material is passed and having its lower end immersed in the liquid coating so as to produce a still surface within the guard-sheath, and a rack and pinion whereby the guard-sheath is adjusted as to height.

3. A coating-machine comprising a vat for containing the liquid coating, a guard-sheath through which the web of material is passed, and covers adjustable on the guard-sheath for regulating the width of the aperture at the outlet thereof.

4. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, upper and lower guide-rollers, a depending guard-sheath, the flat drying-coils, the upper and lower tension-rolls, and means for driving the tension-rollers and reel-shaft.

5. A coating-machine comprising front and rear bearing-boxes, a roll-shaft spring-supported in the front bearing-boxes, a reel-shaft journaled in the rear bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, tension-rollers, and means for driving the tension-rollers and reel-shaft.

6. A coating-machine comprising front and rear bearing-boxes, a roll-shaft supported in the front bearing-boxes, a reel-shaft journaled in the rear bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, spring-supported tension-rollers and means for driving the tension-rollers and reel-shaft.

7. A coating-machine comprising front and rear bearing-boxes, a roll-shaft spring-supported in the front bearing-boxes, a reel-shaft journaled in the rear bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, spring-supported tension-rollers, and means for driving the tension-rollers and reel-shaft.

8. A coating-machine comprising adjustable front and rear bearing-boxes, a roll-shaft supported in the front bearing-boxes, a reel-shaft journaled in the rear bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, tension-rollers, and means for driving the tension-rollers and reel-shaft.

9. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, tension-rollers, a casing providing an oven, web-supporting rollers exterior of the casing, and means for driving the tension-rollers and reel-shaft.

10. A coating-machine comprising front and rear bearing-boxes, a roll-shaft yieldingly mounted in the front bearing-boxes, a reel-shaft mounted in the rear bearing-boxes, a vat, a guide-roller within the vat, guide-rollers for directing the web of material to and

from the guide-roller within the vat, a web-supporting roller having spring-bearings and located remote from and above the vat over which the web of material is passed and from
5 which it is suspended for drying the liquid coating, tension-rollers located between the web-supporting roller and the reel-shaft and means for driving the tension-rollers and reel-shaft.

10 11. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, guide-rollers for directing the web of material into and out of the vat, tension-rollers, a casing providing an
15 oven, web-supporting rollers exterior of the casing, spring-bearings on which the web-supporting rollers are mounted, and means for driving the tension-rollers and reel-shaft.

20 12. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, upper and lower guide-rollers, a casing providing an oven, steam-pipes located within the casing, upper and lower tension-rollers, exterior supporting-
25 rollers, and means for driving the tension-rollers and reel-shaft.

13. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, guide-rollers for direct-

ing the web of material into and out of the 30 vat, tension-rollers, a casing providing an oven and having top openings, slides controlling the top openings, web-supporting rollers exterior of the casing, and means for driving the tension-rollers and reel-shaft. 35

14. A coating-machine comprising bearing-boxes, roll and reel shafts journaled in the bearing-boxes, a vat, upper and lower guide-rollers, a casing having a top opening and providing an oven, adjustable slides for the 40 top openings, steam-pipes located within the casing, upper and lower tension rollers, exterior supporting-rollers, and means for driving the tension-rollers and reel-shaft.

15. A coating-machine comprising bearing- 45 boxes, roll and reel shafts journaled in the bearing-boxes, a vat, guide-rollers, a casing having a top opening and providing an oven, steam-pipes located within the casing, web-supporting spring-rollers exterior of the cas- 50 ing, spring-supported tension-rollers, and means for driving the tension-rollers and reel-shaft.

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Witnesses:

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