Sept. 25, 1923. 1,469,128

J. J. WELDON

COMBINED COATING AND WINDING MACHINE

Filed May 11, 1921 3 Sheets-Sheet 1

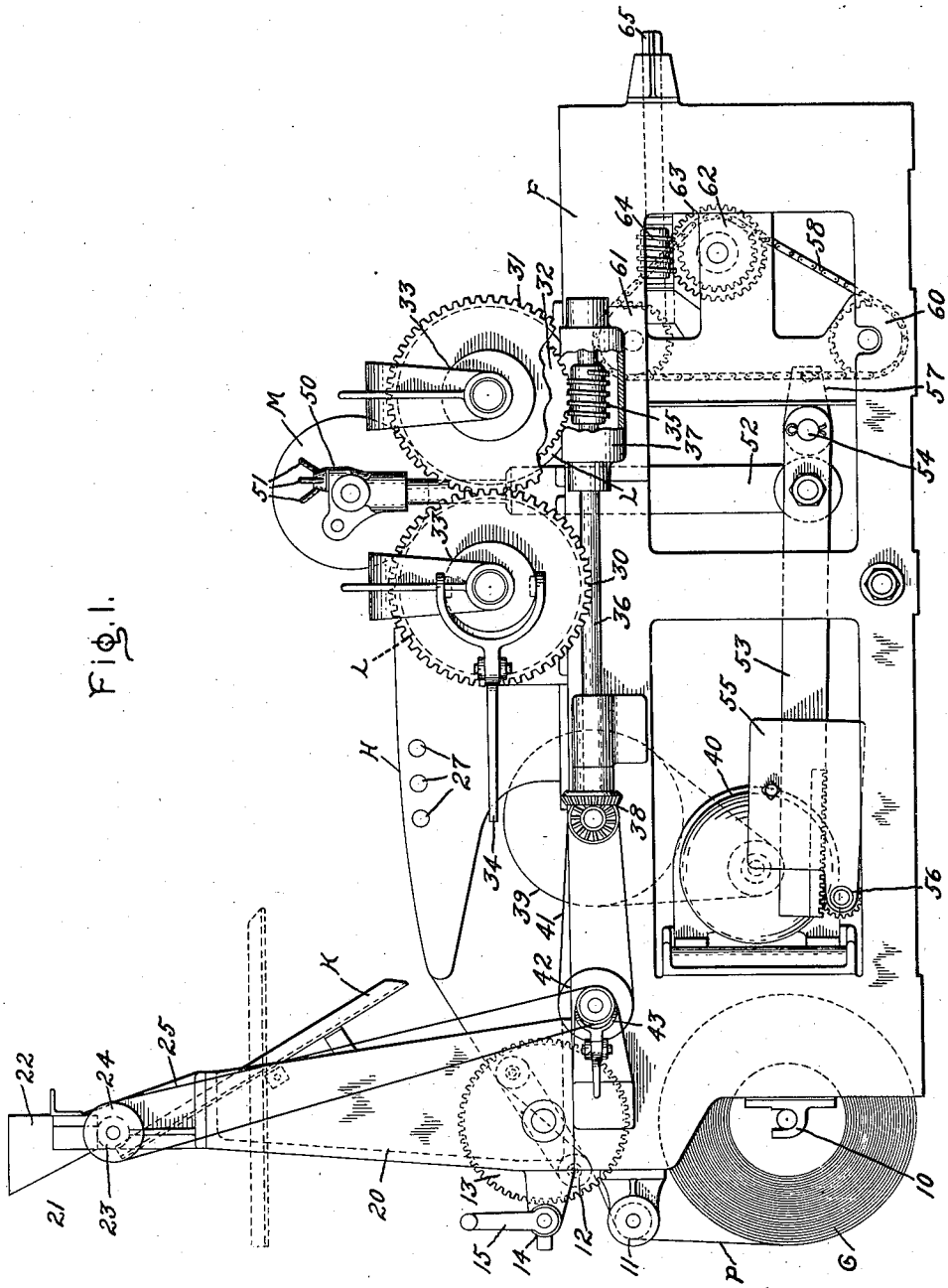


Fig. 1.

Inventor:
John J. Weldon,
by Albert G. Davis
His Attorney.

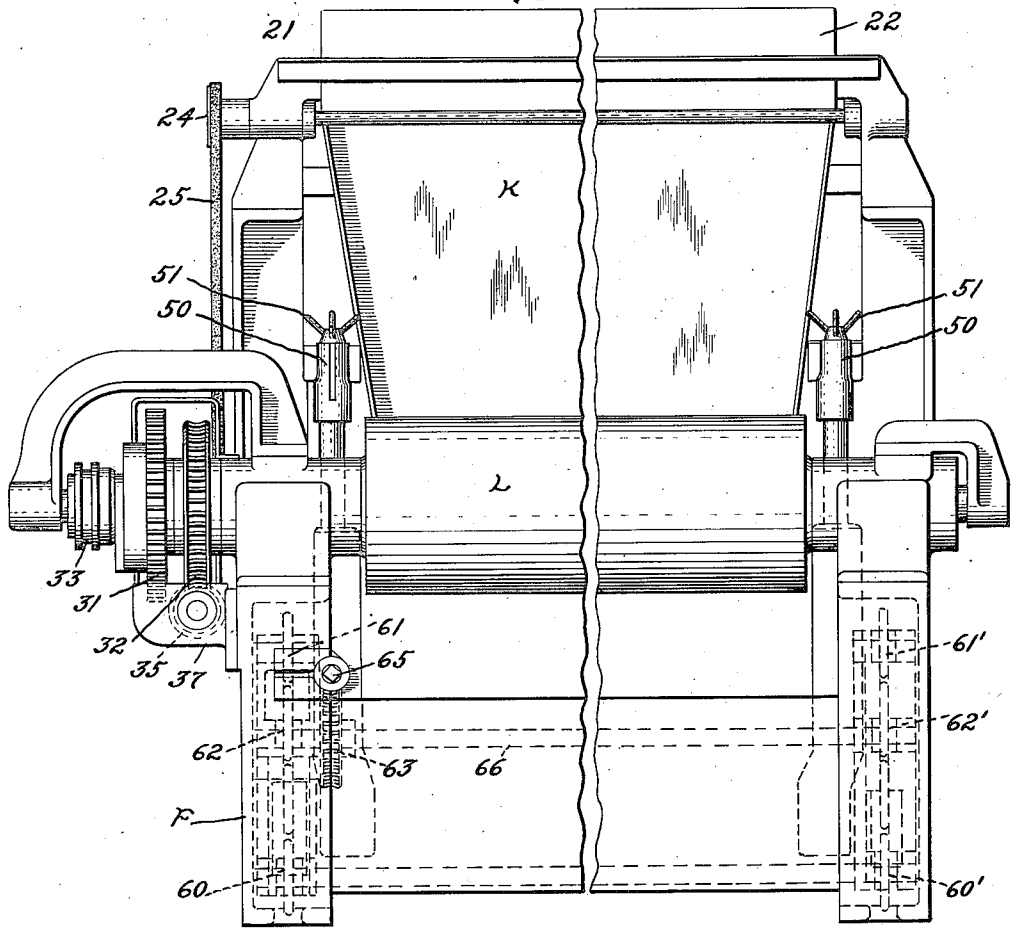
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COMBINED COATING AND WINDING MACHINE

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Fig. 2.



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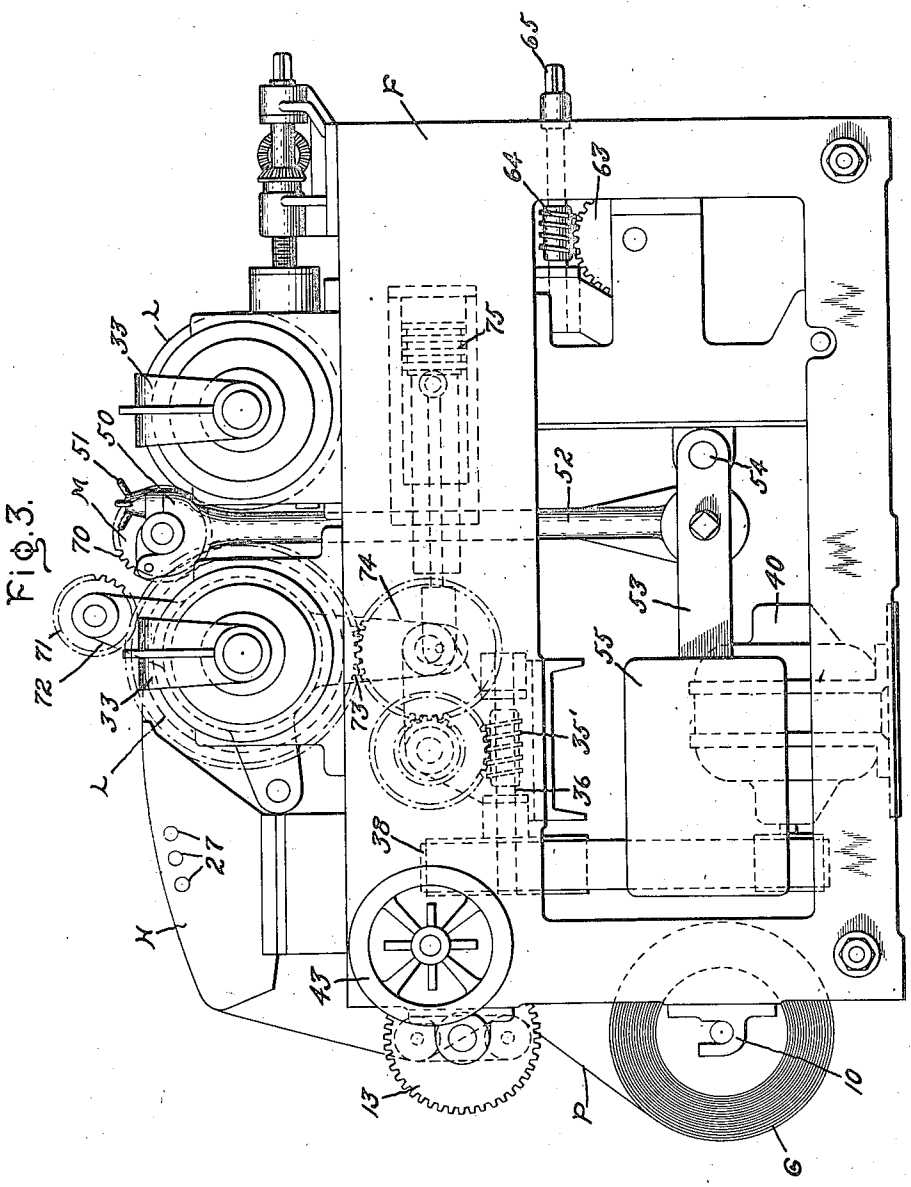
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COMBINED COATING AND WINDING MACHINE

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Fig. 3.



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Patented Sept. 25, 1923. 1,469,128

UNITED STATES PATENT OFFICE.

JOHN J. WELDON, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

COMBINED COATING AND WINDING MACHINE.

Application filed May 11, 1921. Serial No. 468,663.

To all whom it may concern:

Be it known that I, JOHN J. WELDON, a citizen of the United States, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Combined Coating and Winding Machines, of which the following is a specification.

My invention relates to machines for both coating sheet material with an organic binder and winding it into desired forms.

More particularly my invention relates to machines for coating fibrous sheet material, such as paper, with shellac and the like, and which simultaneously wind the same into cylinders, cores, etc.

In the prior art it has been generally customary, when applying the binder, shellac for instance, to any surface, first to get the binder into solution with the aid of a suitable solvent and then to apply the solution. For shellac, alcohol is the solvent generally employed; its use, however, is objectionable in manufacturing cylinders, cores, etc., for electrical apparatus since it reduces the dielectric strength of the product unless it is very thoroughly dried out of the product. The use of any solvent though is an item of considerable expense, since substantially none of the solvent is ever recovered having once been evaporated. In order to avoid this practice, it has been proposed to coat the fabric with binder applied in a solid state, the binder being made to flow and spread itself evenly over the surface of the fabric solely by the application of heat and pressure without the aid of a solvent. By reason, however, of the attention demanded during this operation, the coating of the fabric or sheet material was substantially all that one operator could reasonably attend to at one time.

My invention, however, provides an improved arrangement of parts by which one operator can easily attend to both the operations of coating and winding. In accomplishing this end, I combine the coating and winding rolls to perform their respective operations simultaneously and arrange the controlling devices for the coating, winding and feeding mechanism in such proximity that the whole may be attended by the one operator in his normal operating position.

For a more complete understanding of the nature and objects of my invention, reference should be had to the following detailed description when taken in conjunction with the accompanying drawings in which:

Fig. 1 shows in side elevation a combined coating and winding machine for sheet material constructed to embody my invention, Fig. 2 shows an end elevation of the same machine, and Fig. 3 shows a machine embodying a modified arrangement for propelling the winding mandrel.

Referring now to the drawings, F denotes generally the frame of the machine for coating and winding sheet material, here assumed to be paper, which is fed from the roll of stock G to the hot plate H. An organic binder, here assumed to be dry shellac in a semi-pulverized state, at this point is fed from the chute K onto the paper as it passes over the hot plate. The chute supplies a substantially uniform amount of shellac over the whole surface of the paper as it passes onto the hot plate H whereby there results an approximately even coating of shellac on the surface of the paper.

From the hot plate, with fused shellac on its surface, the paper passes over a heated roll L; and thence it passes to the winding roll or mandrel M on which it is wound into desired forms, as cylinders, cores, and the like.

The frame F is constructed to support the rolls L and M in operative relation together with all the accessory parts operating to produce the wound forms. Brackets 10 support the stock roll G on one end of the frame in such relation that the sheet of paper P passes readily over roll 11 to the tensioning bars 12 secured symmetrically at equal distances from the center of wheel 13. The wheel shown is of the gear type and meshes with a pinion at 14 rotated by crank 15 for changing the tension on the paper as desired. This tensioning device is mounted on frame F and is partly shown in dotted lines to indicate that it is inside the vertical upright supporting members 20, at each side of the frame, which are employed to support chute K and its feeding mechanism 21.

The shellac feeding mechanism, as shown, consists of a hopper 22, in the base of which rotates a preferably grooved feed cylinder 23 substantially as shown in the Reissued Patent to Briggs, No. 14,833, for metering

the shellac fed onto the chute K. The feed cylinder 23 is shown as driven by a pulley and belt 24 and 25, though any convenient form of drive may be used. From the feed cylinder, the shellac falls on to the chute K which is shown in full lines in its operative position, but it may be moved to the position indicated in dotted lines when out of use.

In its operative position, the chute K deposits the shellac on the paper just as it passes onto the hot plate H, such hot plate being designed with sufficient length that the shellac on the surface of the paper has ample time to be fused to the desired consistency as the paper moves over its surface. This hot plate is heated, as here indicated, by a plurality of heating units 27 which are preferably of the electric type, though gas, steam and the like may be employed as the heating agent, the rolls L and mandrel M when desired being similarly heated.

As the paper passes from the hot plate H to the mandrel M, it traverses a portion of the surfaces of the rolls L, which are driven by the intermeshing gears 30 and 31 secured on the rolls. On the spindle of one of these gears 31 is disengageably secured the worm gear 32, the coupling of these gears being accomplished by a clutch device 33 actuated by lever 34. The worm gear 32 is driven by worm 35 on shaft 36, which worm is housed in the housing 37. The shaft 36 in turn is driven by the gearing 38 and pulley 39 which is driven by the motor 40. The motor 40 is mounted at some convenient point on the frame F, here shown inside underneath, the motor providing the driving power for the whole machine. The belt 25 for driving the feeding mechanism is also driven from the gearing 38 by belt and pulley 41 and 42 which are mechanically connected and disconnected from the belt 25 by the clutch mechanism 43.

The mandrel M is mounted in the journal bearings 50 which are shown as provided with thumb nuts 51 so as to be readily opened to remove the mandrel at will. From these bearings extend downwardly the plunger rods 52 which are pivotally secured to levers 53 disposed interiorly near the base at each side of the frame F (only one lever is shown on the drawing in the interests of clearness). The lever appearing in the drawing is pivoted at 54 and has a slidable weight 55 thereon for adjusting the pressure which the lever is designed to apply to the surface of the form being wound on the mandrel. To render the adjustment of weight 55 easy, it is shown as provided with a rack and pinion device at 56. The short arm of the lever 53 extends from the fulcrum 54 to the right, as indicated at 57 in broken lines. The arm 57 is secured to a link in the endless sprocket chain 58 which passes around the three sprocket wheels 60, 61 and 62. The wheels 60 and 61 are idlers, but the wheel 62 is secured on a shaft rigidly with the worm wheel 63 which meshes with the worm 64 whose shaft projects to the exterior of frame F and has a squared end 65 adapted to receive a suitable wrench for applying power manually to move the lever 53. The shaft 66 (see Fig. 2), on which wheels 62 and 63 are secured, extends across the end of the machine to a similar set of sprocket wheels 60′, 62′, etc., for supporting the sprocket chain actuating the mandrel raising and lowering the lever (not shown) which is on the other side of the machine.

In the form of my invention illustrated in Figs. 1 and 2, the rolls L are positively driven while the mandrel M is frictionally driven thereby; it may, however, in some instances be preferable to drive the mandrel positively and have the rolls L frictionally driven. An arangement for accomplishing this is shown in Fig. 3.

In this figure, like reference characters refer to parts similar to those in Figs. 1 and 2. Here the mandrel shaft has rigidly secured thereon a gear 70 adapted to mesh with the pinion 71 carried by pivoted frame 72 which swings about the axis of gear 73 at its center. The gear 73 turns loosely on an end of the shaft from a roll L, and is driven by worm 35′ (similar to worm 35) on shaft 36. From the pivoted frame 72 extends a lever arm 74 actuated by the piston or plunger of a power cylinder 75; such cylinder being supplied by a suitable fluid under pressure, such as compressed air, in the well known manner whenever it is desired to move the frame 72. The movement of the frame 72 causes pinion 71 to engage and disengage with gear 70, the pinion being disengaged when it is desired to remove the mandrel but being normally in driving engagement with the gear 70 when the winding machine is in progress. It will be perceived that this is a flexible arrangement and permits any readjustment of the mandrel with respect to the rolls which may be desired during the winding operation as the cylinder on the mandrel builds up.

The combined coating and winding machine of my invention operates substantially as follows:

The paper is first drawn from roll G, then passed over the tension device, and subsequently onto the hot plate H. The attendant, having previously started motor 40, would now start the feeding mechanism by throwing in the clutch at 43; whereupon shellac is deposited on the surface of the paper P as it is drawn further over the hot plate, where it is fused. The paper in this condition is now pushed over onto the adjacent roll L and then against the surface

of the mandrel M which has been previously prepared to prevent the coated paper from sticking to its surface. The clutch 33 may then be thrown in and the process of continuous winding commenced. A pool of fused shellac is maintained at the juncture of the two converging surfaces between the mandrel and the roll L so that they are simultaneously coated as the paper is wound into its desired form. It is seen from the arrangement of parts disclosed that both the operations of winding and coating are simultaneously controllable by a single operating attendant.

Having now described an embodiment of my invention, which is at present the best means known to me for carrying the same into effect, I would have it understood that this is merely illustrative and that I do not mean to be limited thereby to the precise details shown, nor restricted in the choice of recognized equivalents except as defined in my claims hereunto annexed.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. A combined coating and winding machine for sheet material, comprising means for feeding an excess amount of organic binder in dry form onto a surface of said sheet material, means for heating and fusing said binder into an excess pool of fused binder in contact with both surfaces of said material, whereby both surfaces are coated, and means for winding said material into desired forms.

2. A combined coating and winding machine for sheet material, comprising means for winding sheet material into a desired form, a roll arranged to press said sheet material against the form as it reaches the form, means for feeding an execess amount of organic binder in dry form onto the surface of said sheet material opposite the roll, and means for heating and fusing said binder to form an excess supply thereof in contact with both surfaces of the sheet material.

In witness whereof, I have hereunto set my hand this 9 day of May, 1921.

JOHN J. WELDON.