Sept. 9, 1941. M. H. SIDEBOTHAM 2,255,397

MACHINE FOR LAMINATING PAPER

Filed Oct. 5, 1938 2 Sheets-Sheet 1

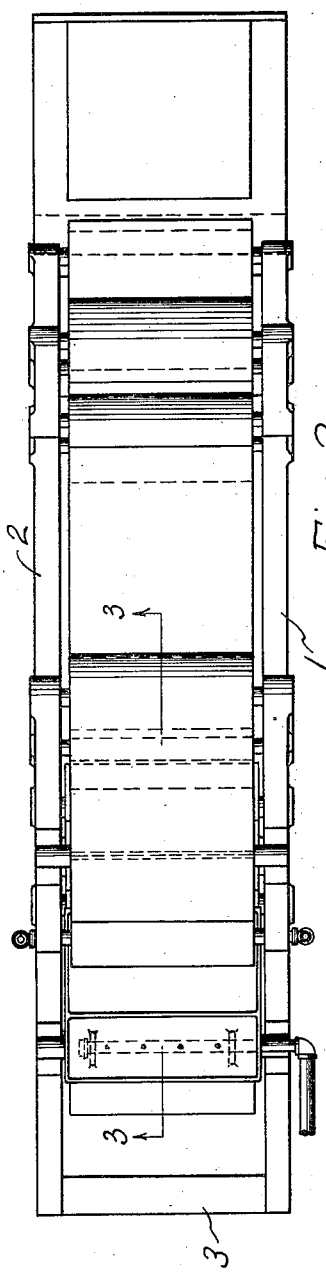


Fig. 2

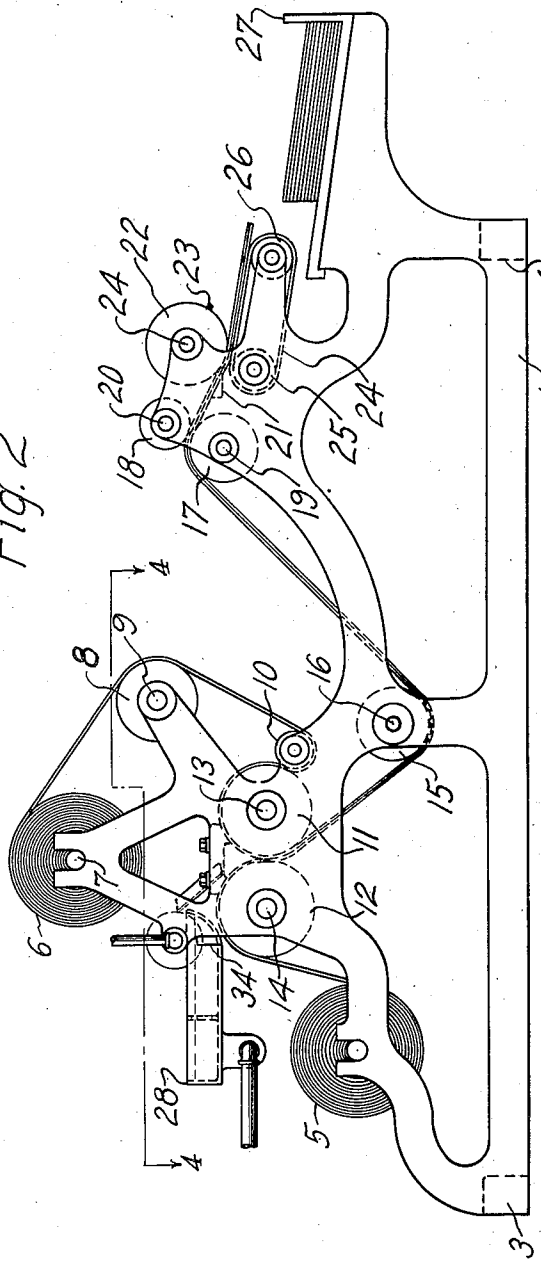


Fig. 1

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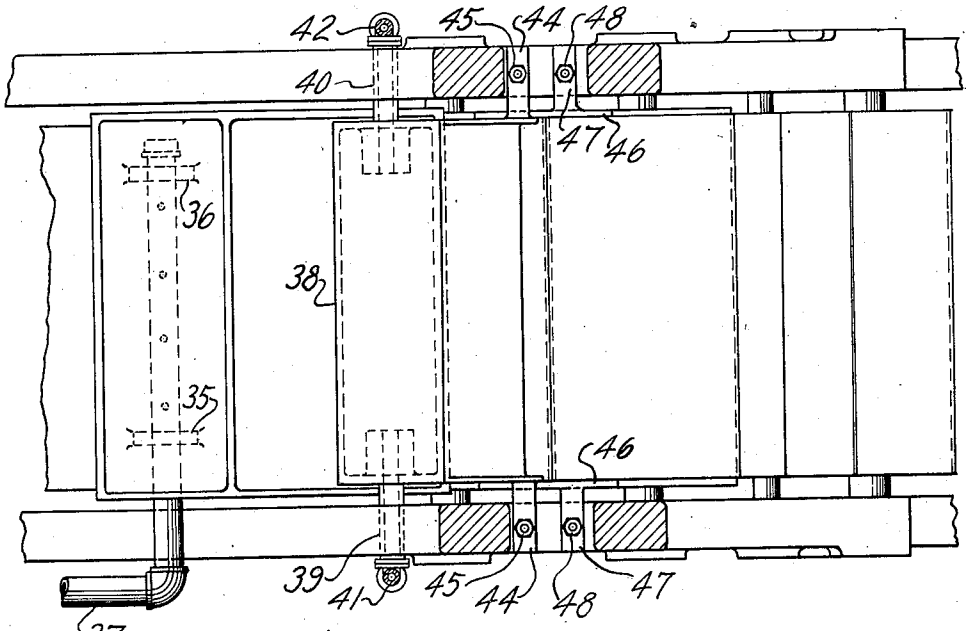


Fig. 4

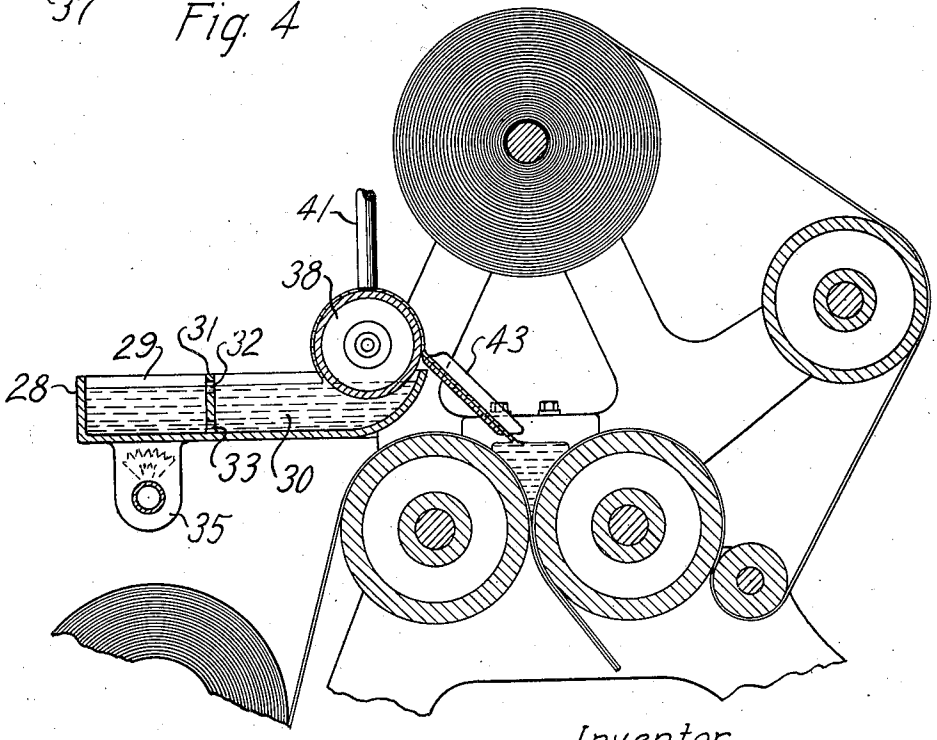


Fig. 3

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UNITED STATES PATENT OFFICE

2,255,397

MACHINE FOR LAMINATING PAPER

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Application October 5, 1938, Serial No. 233,431

5 Claims. (Cl. 154—37)

This invention relates to the production of laminated sheet material which is moisture-proof, water-proof and grease-proof. Such material is very desirable for use in the packaging of foods such as bakery products, dairy products, and for use wherever a package is required to have the quality of resisting the action of moisture and grease, whether inside or outside of the package.

One object of this invention is to provide a machine by which a thin sheet of paper may be bound to a sheet of paper board by means of a layer of wax.

Another object of my invention is to provide a machine which will automatically supply wax of a predetermined consistency between the layers of paper to be laminated.

Another object of my invention is to provide a machine to effect rapid production of laminated paper by a sequence of operations, comprising means to cause two webs of paper to travel and means for applying a binding material between the two traveling webs, means for pressing the united web, and means for cutting the laminated web into sections for use.

Other more specific objects and advantages of the invention will be apparent to persons skilled in the art as the same becomes better understood by reference to the following description, taken in connection with the accompanying drawings, in which I have shown one practical embodiment of my invention, and wherein:

Figure 1 is a side elevation of the machine.

Figure 2 is a plan view of the machine.

Figure 3 is an enlarged section at 3—3 of Figure 2.

Figure 4 is an enlarged section at 4—4 of Figure 1.

It will be readily understood, without need of illustration, that any suitable motor may be employed for operating the machine, and that suitable gearing is employed in practice to cause the various rolls and shafts to rotate at uniform peripheral speed to effect travel of the webs of paper through the machine and to operate the various devices which act upon the paper to produce laminated sheets in the manner described.

Referring to Figures 1 and 2, the different parts of members of the machine are mounted on suitable side frames 1 and 2 connected by cross bars 3 and 4 which constitute the framework of the machine. Paper roll 6 is secured to shaft 7 which is rotatably mounted on side frames 1 and 2. The guide roll 8 is mounted on shaft 9 which is journaled in side frames 1 and 2. Lead roll 10 is journaled in side frames 1 and 2. Operating rolls 11 and 12 are secured to shafts 13 and 14 which are journaled in side frames 1 and 2. A guide roll 15 secured to shaft 16 mounted on side frames 1 and 2 is provided beneath the operating rolls. Pressing rolls 17 and 18 mounted on shafts 19 and 20 journaled in side frames 1 and 2 serve to press the laminated web. The cutting bed plate 21 is supported by side frames 1 and 2. The cutting roll 22, having secured thereto a cutting knife 23, is mounted on shaft 24 journaled in side frames 1 and 2. Delivery belt 24 is supported by rolls 25 and 26 journaled in side frames 1 and 2. A delivery board 24 is provided to receive the cut laminated sheets.

Referring to Figures 1 and 3 wherein is shown the wax preparing unit composed of a wax heating tank 28 having two compartments 29 and 30 formed by partition 31 which is provided with two openings 32 and 33. The said tank 28 being secured to side frames 1 and 2 by means of lugs 34 (Fig. 1). The tank 28 is also provided with two pipe support members 35 and 36 (Figs. 3 and 4) which support heater pipe 37. The wax feeding cylinder 38 is supported by tubular shafts 39 and 40. Water cooling pipes 41 and 42 are connected to the ends of shafts 39 and 40. A wax scraping plate 43 having lugs 44 is secured to side frames 1 and 2 by means of bolts 45. A pair of wax guides 46 having lugs 47 is secured to side frames 1 and 2 by means of bolts 48.

While the machine herein described and claimed includes the combined instrumentalities herein mentioned, I wish it to be understood that I consider the herein described means not only combinatively novel, but insofar as I am aware, certain of the devices going to make up such means are new in less combinations than the whole and some capable of individual use, as will more clearly appear hereinafter.

It will aid toward an understanding of the operation of the machine and of the method of laminating the paper, to explain the action of the machine which effects the production of laminated sheets from two or more rolls of paper. Referring to Figures 3 and 4 wherein is shown a wax preparing unit. The wax herein used is at usual atmospheric temperatures, solid and rather firm, but upon the application of heat the wax melts and becomes liquid. The pipe 37 is provided to apply heat to the bottom of tank 28 for the purpose of melting the wax. The wax being placed in compartment 29 for melting. The openings 32 and 33 in partition 31 are provided to allow the liquid wax to circulate from compart-

ment 29 through compartment 30. The wax feeding cylinder 38 is so positioned that a portion of the outer diameter will always be submerged in the liquid wax in compartment 30 of the tank 28. This cylinder is provided with means for cooling the outer surface of the cylinder so that the outer surface thereof will be at a temperature lower than that of the liquid wax in the tank. The cooled cylinder 38 in rotating through the liquid wax will have formed on the outer surface thereof a coating of pliable semi-congealed wax. This semi-congealed wax is scraped from the surface of the cylinder by means of scraper 43. The wax thus prepared is deposited between the layers of paper to be laminated. The paper to be laminated is supplied from rolls 5 and 6. From roll 6 the paper passes over rolls 8 and 10 and thence to operating roll 11 where the paper receives a coating of wax as it passes over said operating roll 11. The paper from roll 5 passes directly to operating roll 12 where it receives on one surface thereof a coating of wax, and also becomes united with the paper web supplied from roll 6. The united web then passes under roll 15 to pressing rolls 17 and 18 where the laminated web is securely pressed. The web then passes to the cutting unit which severs the web into predetermined lengths and supplies the cut sheets to the delivery board 27 ready to be picked up for use.

The methods heretofore employed for securing a thin paper material to paper board, resulted in a discolored unsightly product, due to the hot wax penetrating the thin paper material.

Applicant has obtained new and improved results by first melting the wax to liquid condition, and then cooling the wax until it is of a semi-plastic consistency.

Having now described my invention, what I claim is:

1. In a paper laminating machine, comprising a wax heating unit, a wax feeding cylinder positioned to rotate in liquid wax, means to cool the wax picked up by the wax feeding cylinder, and a stationary scraping plate positioned to scrape the cooled wax from the rotating wax feeding cylinder and depositing the wax between two webs of paper.

2. In a machine for laminating paper, comprising means to heat wax to a liquid condition, a wax feeding cylinder positioned to rotate in the liquid wax, means to cool the wax deposited on the cylinder to a semi-plastic condition, a scraping plate adjacent to the cylinder for scraping the semi-plastic wax from the cylinder and depositing the wax between two sheets of paper, and rolls for pressing the sheets of paper together.

3. In a machine for laminating paper, comprising a wax heating tank, a wax feeding cylinder positioned to rotate in liquid wax, means to chill the wax picked up by the cylinder, means to remove the chilled wax from the cylinder, and thereafter deposit the wax between two layers of paper.

4. In a machine for laminating paper, comprising a wax heating tank, a wax feeding cylinder positioned to rotate in liquid wax, means for supplying cold water to the inside of the cylinder for the purpose of lowering the temperature of the wax on the outside surface of the cylinder, and means for scraping off the conditioned wax from the outside surface of the cylinder and depositing said wax between two webs of paper.

5. In a machine for laminating paper, comprising a frame, having paper carrying rolls journalled therein, a wax heating tank, a wax feeding cylinder revolving in liquid wax, means for cooling the wax applied to the cylinder, and a scraper plate for removing the wax from the cylinder and for depositing the wax between two sheets of paper.

MELVIN H. SIDEBOTHAM.