

March 27, 1945.

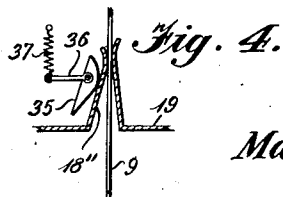
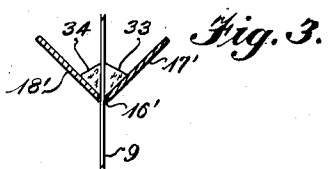
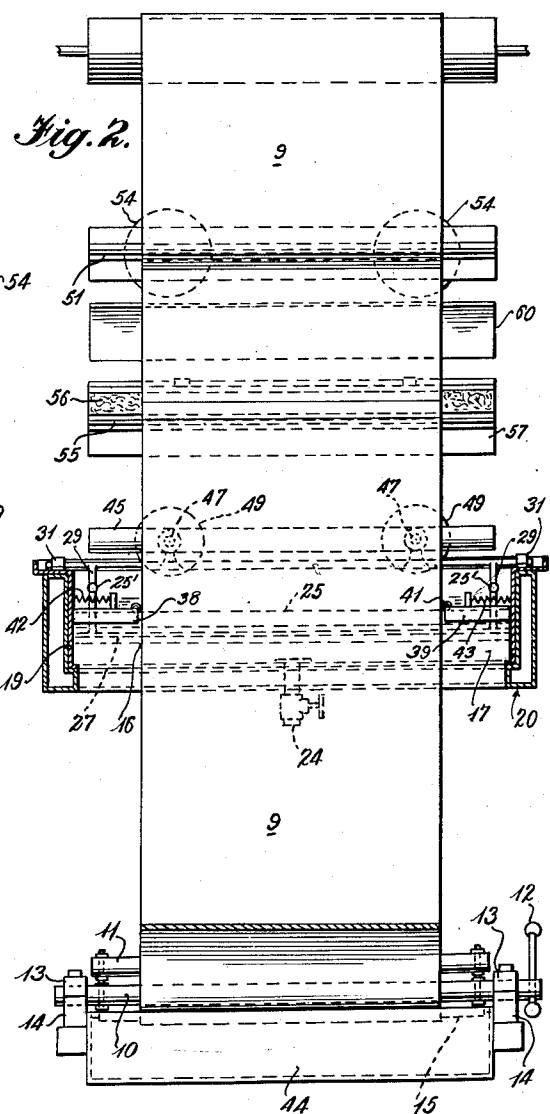
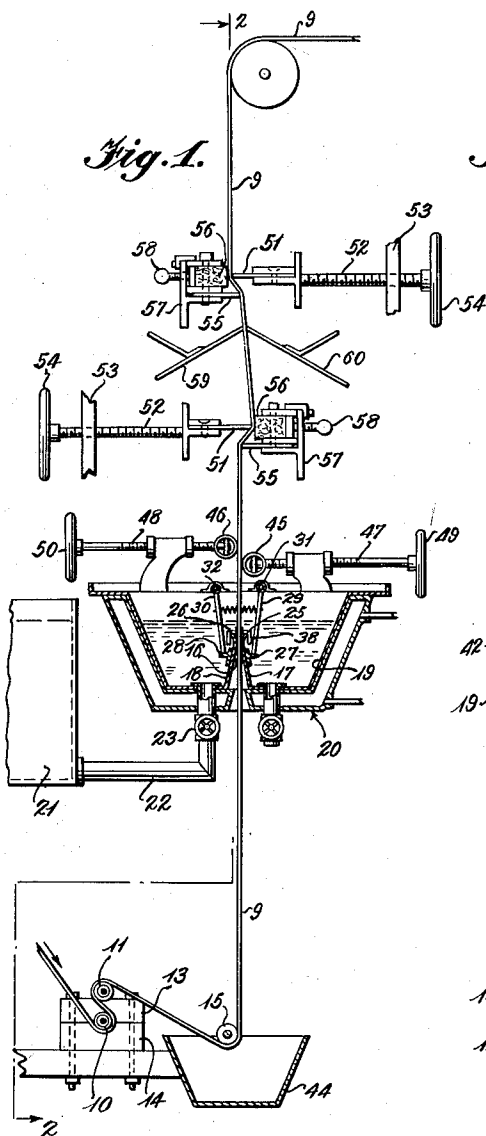
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2,372,248

COATING APPARATUS

Filed Nov. 23, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

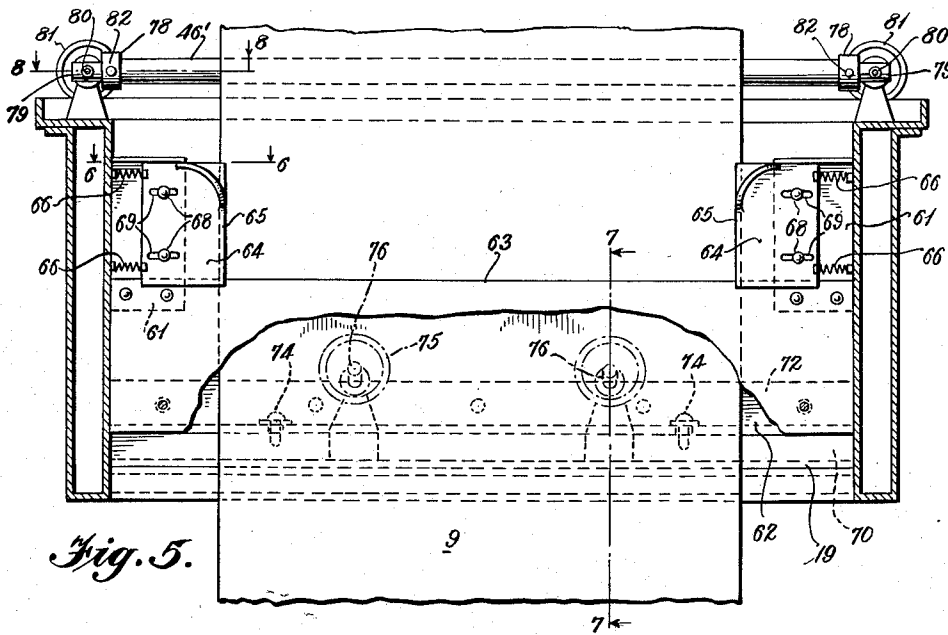


Fig. 5.

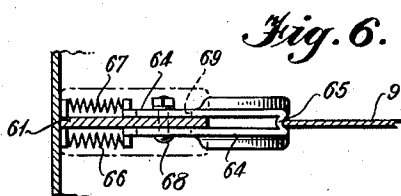


Fig. 6.

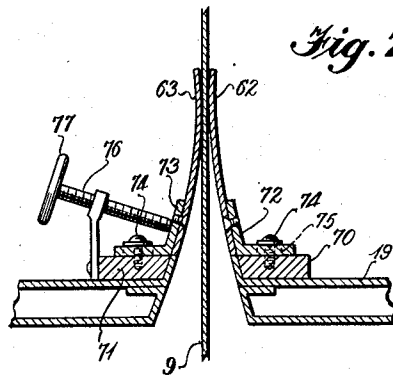


Fig. 7.

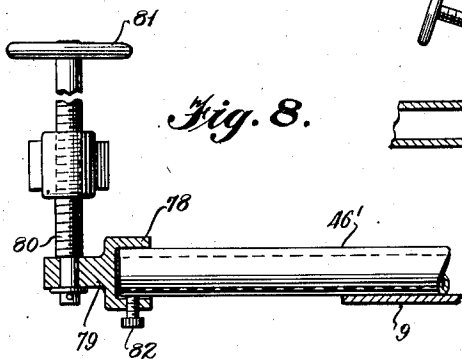


Fig. 8.

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UNITED STATES PATENT OFFICE

2,372,248

COATING APPARATUS

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Application November 23, 1943, Serial No. 511,463

10 Claims. (Cl. 91—32)

The invention relates to coating apparatus and has as an object the provision of means for applying coating material to a running sheet of fabric in such a manner as to produce a uniform effect.

It is a further object to provide an apparatus of the character referred to which will coat sheet fabric of substantial width by passing the fabric upwardly only in a bath of coating material without contact with any object while in the bath, whereby to secure uniform effects on the two sides of the fabric.

Further objects of the invention will appear from the following description when read in connection with the accompanying drawings showing illustrative forms of apparatus embodying the invention, and wherein:

Figure 1 is a central vertical section through a form of apparatus embodying the invention, the frame being omitted;

Figure 2 is a side view of the apparatus of Figure 1, partly in section on line 2—2, Figure 1; and

Figures 3 and 4 are detail vertical sections of alternative forms of slot control means;

Figure 5 is a detail side elevation corresponding to a portion of Figure 2 and partly in section showing an alternative form of the device.

Figure 6 is a detail section on line 6—6 of Figure 5.

Figure 7 is a detail section on line 7—7 of Figure 5.

Figure 8 is a detail section on line 8—8 of Figure 5.

In former apparatus for the purpose of the present invention, where sheets of substantial widths and varying thicknesses were to be coated, the sheet has been introduced into the bath from above the surface and passed under a roller in the bath, then led upwardly out of the bath. The result is a difference of treatment of the material on the two sides thereof. It has been proposed to coat ribbons and filaments by upward movement only, in a bath. The apparatus which may be used for such operation is inoperative for the coating of sheets of substantial widths and thicknesses.

In accordance with the present invention the sheet 9 to be coated is placed under considerable tension, led upwardly through a slot having means to cause the lips thereof to hug the fabric to minimize leakage, is subjected to stripping, scraping and finishing action, uniform on both sides and conducted to a storage roll—not shown.

To place the fabric under tension, the storage

roll—not shown—is power driven in any desired or usual manner. To provide resistance reacting against said pull, a pair of friction cylinders 10, 11 are shown as rigidly connected in spaced relation, being revoluble about the axis of the cylinder 10 by means of lever 12 when the clamp blocks 13, 14 are loosened for the purpose of adjustment of frictional resistance.

The sheet is shown as then passed under an idle roller 15 placed directly below the slot 16.

The slot 16 is provided between lips at the edges of walls 17, 18, extending upwardly from the bottom of a pan 19 seated in and freely removable from a receptacle 20 having hollow walls to provide steam jacketing for the purpose of heating the coating bath.

To provide a supply of coating material, a tank 21 is shown, connected to the pan 19 by means of a conduit 22 under control of a valve 23, the opening of which may be adjusted in accordance with the rate of consumption from pan 19. It is obvious that a float valve could be utilized to control the level of the bath in pan 19. Any desired source of heat may be provided for tank 21. A valve controlled drain pipe 24 is shown for pan 19. It is to be understood that the bottom and end edges of walls 17 and 18 are connected to pan 19 in a liquid-tight manner.

Means are shown to provide a snug fit with the fabric as it passed through the slot. In the preferred form of Figure 1, the lips 25 and 26 are curved outwardly and are pressed against the fabric by means of tension springs 27 acting on angle members 27, 28 through the medium of arms 29, 30 pivoted upon the rim of pan 19, as at 31, 32.

In the alternative construction of Figure 3 the walls 17, 18 converge downwardly to slot 16 and triangular blocks 33, 34 are slidable by gravity against the fabric. If desired a resilient covering as of felt may be provided on the blocks 33, 34 to improve the seal.

In the form of Figure 4, a cam block 35 is shown which may be pivoted at its ends to the end walls of the pan 19 and caused to press against the wall 18 by means of lever arm 36 and tension spring 37.

It is found in practice that the resilience of the lips 25, 26 cause the slot to close sufficiently beyond the selvages of the fabric to prevent any substantial leakage of bath material. However, if desired, U-shaped members 38, 39 may be provided to further minimize leakage, which members may be provided with rollers 40, 41 to contact

the selvages and may be urged toward the fabric as by compression springs 42, 43.

To catch any material leaking through the slot, a pan 44 is shown, but it is found that when the sheet is in motion such leakage is carried upwardly by the sheet and very little escapes.

To strip excess material from the sheet, strippers 45, 46 are shown, in the form of pipes adjustably held in contact with the sheet, or with the surface of the coating, by means of adjusting screws 47, 48, manipulatable by means of hand wheels 49, 50.

To produce a finish upon the coated fabric two pairs of scrapers and wipers are provided. Each pair comprises a scraper blade 51 adjustably pressed against the fabric by screws 52 mounted in frame members 53 and adjustable by hand wheels 54, which scrapers are opposed by scrapers 55 and stroking blocks 56 assembled as units.

These units are mounted in stationary angle irons 57 and are adjustable as by wing bolts 58. The blocks 56 are desirably of resilient material, felt being preferred.

Any material removed by strippers 45, 46 or the lower scrapers 55, 51 will fall into the pan 19. To catch any drip from the upper scrapers pans 59, 60 are shown.

It will be seen that the scrapers 55, 51 are so related as to deflect the sheet 9 from a line of direct travel and therefore, under the tension of the sheet, to place considerable pressure on the same.

The desirable tension on the sheet 9 is sufficient to noticeably stretch the material, when a woven fabric is treated. Due doubtless to slight differences in resistance to stretching as the sheet runs, it is found in practice that the sheet oscillates edgewise to some extent, as it is drawn through the apparatus under tension, which action is beneficial as it provides an even wear upon the various members in contact with the material.

The fabric to be coated is supplied from a zig-zag folded pile of fabric and successive lengths are butt sewn to the trailing end as needed.

As shown in Figures 5 and 6, the machine is equipped to apply different colored coating materials to opposite sides thereof. To this end, shields are provided whereof a central plate 61 projects between the spring members 62, 63 providing the slot through which the material is upwardly drawn, the plate 61 being of a thickness substantially equal to that of the material. Overlapping the upper edge of the members 62, 63, there is shown a slidable member 64 comprising two plates connected at their edges by portion 65 which is formed with a shallow notch to contact the material. The member 64 is shown as lightly pressed against the material by compression springs 66, 67 guided by screws 68 working in slots 69. Thus equipped, material of different color may be placed in the two sides of the trough or pan 19 which will be kept separated by the material in work, the members 62, 63 and 61, 64.

In this figure, there is also shown an alternative form of adjustment for the slot. The members 62, 63 are indicated as made of clock spring steel supported upon blocks 70, 71 by angle members 72, 73. The angle members may be fixed in adjusted position by screws 74 passing through slots 75. When the receptacle is empty, one of the members as 62 may be brought up to the material to slightly deflect the same and fixed in this position, whereupon the remaining member

may be given a fine adjustment by means of screw 76 and hand wheel 77, after which the screw 74 can be utilized to fix the angle 73 in adjusted position. This can be done for each thickness of material before coating material is filled into the receptacle.

In these figures, there is also shown an alternative form of adjustment for pipes 45, 46. As shown, pipe 46' is mounted at its ends in sockets 78 carried by studs 79 mounted upon the end of screws 80 equipped with hand wheels 81. When the pipe as 46' becomes slightly worn in one line upon its periphery, the set screw 82 may be loosened and a new portion of the surface of the pipe may be turned to contact the fabric.

In operation, after the initial threading of the machine, the machine is stopped when a strip is coated and before the following end passes the rolls 10, 11, and the leading end of a strip to follow is attached by a butt seam.

The amount of material applied may be adjusted by modifying one or more of several conditions. The depth of material above the slot and the speed of the fabric will determine how much material penetrates the fabric. The pipes 45, 46 have an effect of rubbing material into the fabric and the scrapers remove a certain amount. The action of each of these instrumentalities will be affected by the tension on the fabric. Therefore by changing the speed of travel, the tension, the depth of the bath and amount of deflection of the sheet at the pipes 45, 46 and at the scrapers 51, 55, the amount of the added material may be very closely determined through a wide range.

Minor changes in the form of the apparatus may be made, within the scope of the appended claims, without departing from the spirit of the invention.

I claim:

1. Apparatus for sheet material comprising, in combination: a bath receptacle; a pair of walls in liquid tight relation to walls of the receptacle and converging upwardly therein; means external to said walls to press the upper margins of said walls against opposite surfaces of sheet material of varying thickness; means to draw sheet material upwardly from below said receptacle between said walls through a bath in the receptacle rising to a level above the upper edges of said walls.

2. The combination of claim 1 with means to place the running sheet under tension.

3. The combination of claim 1 with means to place the running sheet under tension and with means to strip excess material from the sheet as it leaves the bath.

4. Coating apparatus comprising, in combination: a bath receptacle; means providing a slot opening from the bottom of said receptacle and to a point below the surface of a bath in the receptacle; cylindrical stripping means to remove excess material from each side of a sheet drawn from below through said slot and bath, as the material leaves the bath; and scraping means contacting one side of said sheet and pressing the same against resilient absorbent material at the opposite side of the sheet to provide a finish for the sheet.

5. The combination of claim 4 with a second set of scraping means and absorbent material providing a pair of similar devices arranged to successively treat opposite sides of the sheet.

6. Apparatus for coating sheet material comprising, in combination a steam jacketed receptacle, a sheet metal receptacle nesting therewith

and removable therefrom, said latter receptacle comprising a pair of walls in spaced relation at their junction with the bottom wall of the receptacle and sloping upwardly and inwardly to lips adapted to contact each other, means to press said lips resiliently toward contact whereby to provide tight engagement with a sheet drawn upwardly therethrough, said means comprising stiffening members at the outside of each wall and arms pivoted at the upper portion of the inner receptacle, with spring means to urge said arms toward each other.

7. Coating apparatus comprising, in combination: a bath receptacle; a pair of walls in liquid tight relation to the walls of the receptacle and converging upwardly therein; means to press the upper margins of said walls against opposite surfaces of sheet material of varying thickness; means to draw sheet material upwardly from below said receptacle through a bath in the receptacle rising to a level above the upper edges of said walls; and means to prevent bath material in said receptacle on opposite sides of said walls from intermixing.

8. Apparatus for sheet material comprising, in combination: a bath receptacle; a slot in the bottom thereof; a pair of spring steel walls adjustably mounted at opposite margins of said slot and converging upwardly to contact with material drawn upwardly through said slot; means to adjust said walls for firmness of contact with material drawn therebetween, said walls extending into liquid tight engagement at their ends with the end walls of the receptacle; a member extending upwardly from the upper edge of said walls and rigid with the end wall of the recep-

tacle; a member having sliding engagement with said upwardly extending member and formed with a recess at its edge for engagement with said material and means to cause said sliding member to yieldingly engage an edge of said material whereby bath material in the receptacle on the two sides of the material may be prevented from intermixing.

9. Coating apparatus for sheet material comprising, in combination: a bath receptacle provided with a slot through which material to be coated may be drawn upwardly; means to place the running material under tension; means acting to vary the amount of coating added to the material, in coaction with variable speed of travel of the material and depth of the coating bath, comprising, means to adjust the tension of the fabric and a pair of scrapers acting at opposite sides of the sheet to deflect the same from a straight line travel including means to vary said deflection to vary the scraping effect thereof.

10. Apparatus for coating sheet material comprising, in combination: a bath receptacle formed with a slot in its lower portion; a pair of walls formed of resilient metal each in liquid tight engagement with the walls of the receptacle at the respective sides of said slot and at their end margins; said walls extending upwardly to positions of close proximity at a line in the upper portion of the receptacle to be below the surface of a bath therein and to press against a sheet drawn upwardly therethrough; whereby to provide relatively deep pockets on opposite sides of the walls for accommodation of bath material.

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