Aug. 11, 1942. H. BAECHTOLD 2,292,596

DEVICE FOR ALTERING THE SURFACE OF FABRIC

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Fig. 1

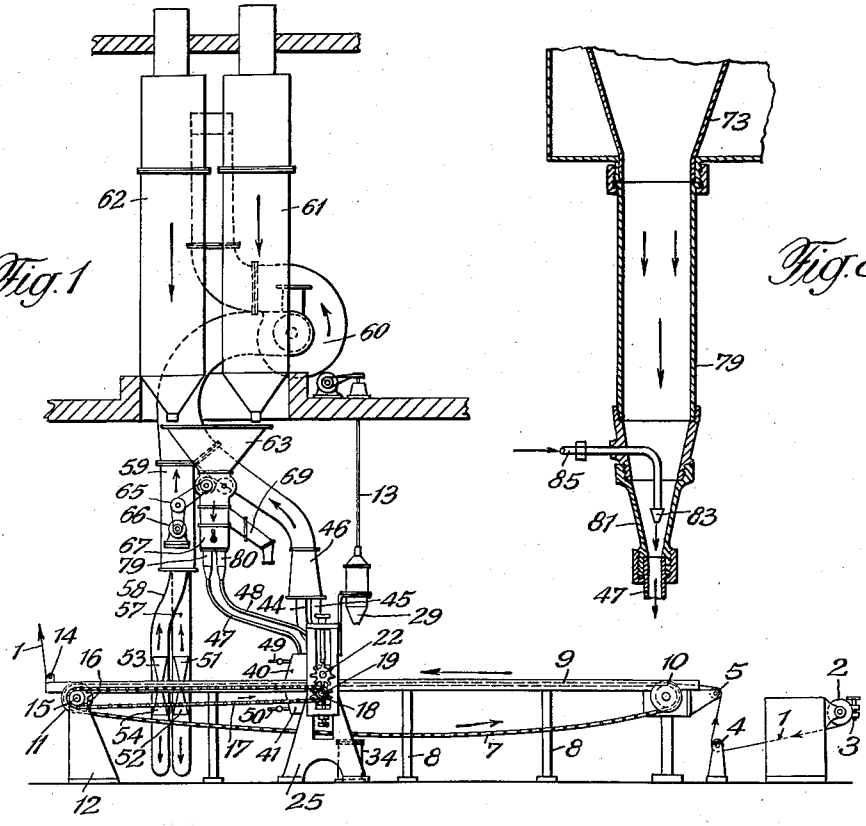


Fig. 8

Fig. 3

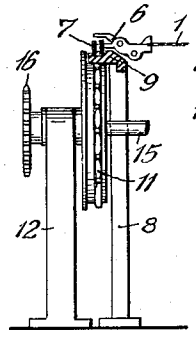
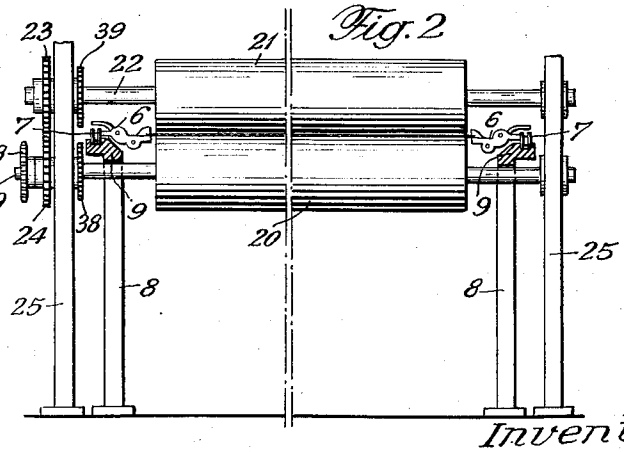


Fig. 2



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DEVICE FOR ALTERING THE SURFACE OF FABRIC

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Fig. 4

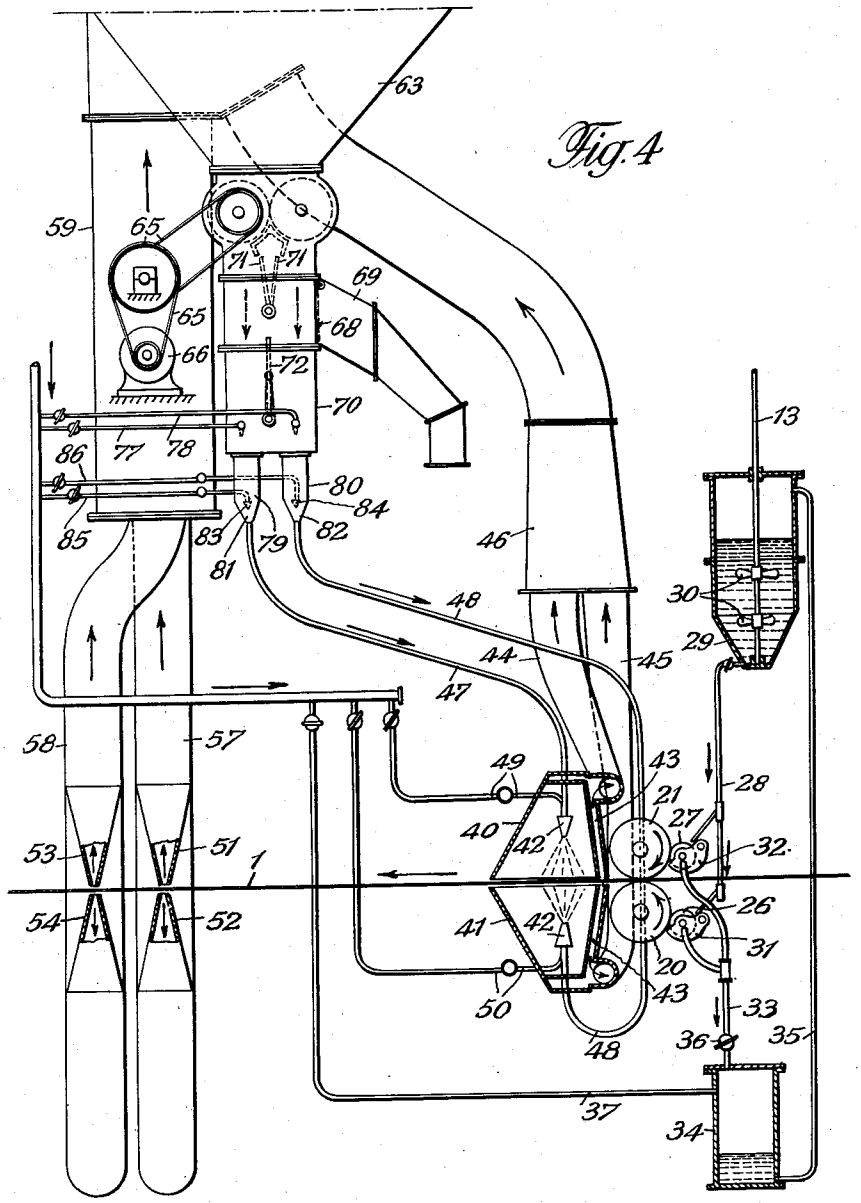
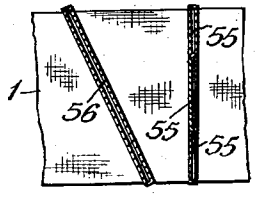


Fig. 5



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DEVICE FOR ALTERING THE SURFACE OF FABRIC

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Fig. 6

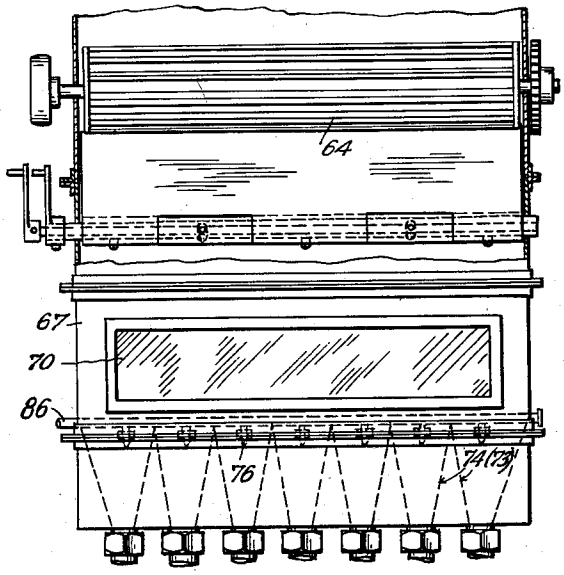


Fig. 7

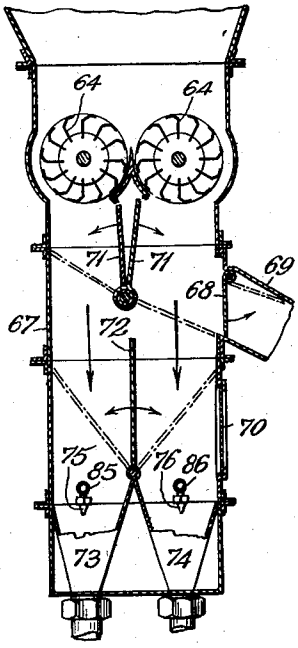
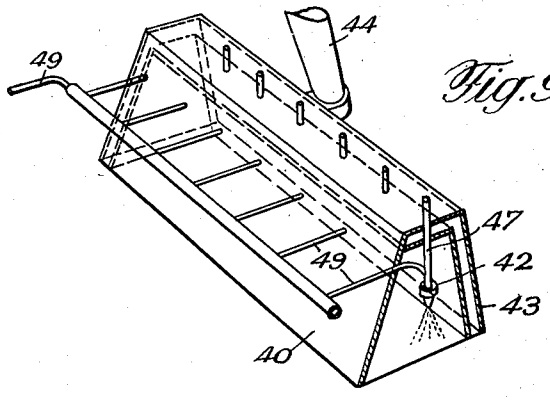


Fig. 9



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UNITED STATES PATENT OFFICE

2,292,596

DEVICE FOR ALTERING THE SURFACE OF FABRIC

Hermann Bacchtold, St. Gall, Switzerland

Application February 13, 1940, Serial No. 318,780
In Switzerland February 6, 1939

5 Claims. (Cl. 91—17)

This invention relates to an apparatus for altering the surface of webs of fabric throughout or at any desired portion, for example, by printing, application of adhesive and spreading dispersive materials thereover, and so forth, by means of press rollers.

With a view to locating the web of fabric in a predetermined position exactly, with respect to the rollers, for the purpose of obtaining, for example, accurate registry in multi-colour printing, in the apparatus according to this invention the web of fabric is firmly held taut in a frame-like travelling conveyor in longitudinal and transverse directions of the web, by means of clamps, and is passed through between the rollers, while the requisite timed relation between the speed of the rollers and that of the fabric web is obtained by coupling the drives of the frame-like travelling conveyor and the rollers. By stretching the fabric web in the longitudinal and transverse directions by means of the clamps the web is fixed longitudinally as well as transversely. By this means, the fabric web can also be printed on both sides or be treated in other manner, by reversing its movement, or otherwise.

Advantageously, the adhesive may be applied to the fabric web in accordance with a pattern by means of the press rollers and then finely divided particles of materials, such as, for example, fibres of vegetable or animal origin, or artificial fibres, or metallic material, glass, sand, hydraulic binders, and so forth, may be applied to one or both sides of the fabric web, where the particles used are to be fixed to the fabric web by means of the adhesive, whereupon the surplus amount of particles of material is automatically removed by suction action, separated out of the stream of air and is then reentered into the working process.

Furthermore, lacquer may be applied to the fabric web by means of the press rollers in accordance with a pattern, by means of the press rollers, in order to obtain imprints of lacquer.

Moreover, the fabric web may be passed between engraved and heated press rollers for the purpose of obtaining patterned matting effects.

The apparatus according to the invention is provided with one or more pairs of cooperative driven press rollers and with a driven frame-like travelling conveyor having clamps and with automatic opening and closing devices for the clamps as well as with positive coupling means interposed between the drive of the press rollers and that of the frame-like travelling conveyor.

In the accompanying drawings a form of an apparatus according to the invention is illustrated, by way of example, in which

Fig. 1 shows a schematic elevation of the assembled apparatus;

Fig. 2 is a cross-sectional view of the stretching device for the fabric web on a larger scale;

Fig. 3 further shows the stretching device in a partial cross section;

Fig. 4 is a view of details of Fig. 1 partly in section on a larger scale;

Fig. 5 shows schematically in plan view modified suction nozzles;

Fig. 6 shows an elevation partly in section of a valve device and an adjoining distributing chamber;

Fig. 7 is a cross-section of Fig. 6;

Fig. 8 shows a longitudinal section of an individual discharge head connected with the distributing chamber, and

Fig. 9 is a perspective partial view of a sparge box.

The web of fabric 1, the surface of which is to be altered in the apparatus, is wound up on a beam 2 provided with a brake block 3 which allows of regulating the tension of the fabric web portion 1 unwinding from the beam 2. From the latter the fabric web 1 runs over rollers 4, 5 onto a frame-like travelling conveyor which is provided with two endless chains 7 which are equipped with clamps 6 and are guided by two guide rails 9 supported by legs 8 and pass over chain wheels 10, 11 arranged at the ends of the rails. At the right hand end of the rails 9 closing devices (not shown) are located which close the clamps 6 to such an extent that the edge of the fabric web 1 is clamped fast. The guide members provided on the rails 9 for the chains 7 diverge in the longitudinal direction from right to left, so that the fabric web, which is stretched longitudinally during the unwinding from the braked beam 2, is stretched by the clamps 6 in the transverse direction also.

At the left hand end of the rails 9 opening devices (not shown) are arranged which open the clamps 6 so as to release the fabric web 1 which then passes over a guide roller 14.

The chain wheel 11 of the frame-like travelling conveyor 6, 7 is mounted on a shaft 15 which takes its bearings in buttresses 12 and carries a chain wheel 16 over which passes a chain 17 which drives the shaft 19 of a press roller 20 via a chain wheel 18. The shaft 22 of the associated press roller 21 is driven from the shaft 19 by a gear ratio drive 23, 24. By this means the two cooperative press rollers 20, 21 are so coupled

with the drive of the frame-like travelling conveyor that the requisite timed relation between the speeds of the rollers and the fabric web 1 is obtained. Both shafts 19 and 22 are mounted at both ends in a buttress 25.

As shown in Fig. 4 each of the press rollers 20, 21 provided with circumferential patterned projections is in bearing engagement with a supply roller 26, 27 respectively with which rollers is associated a pressure fluid supply conduit 28 carrying, for example, an adhesive. The conduit 28 is connected by means of a valve with a supply tank 29 which serves for the reception of the pressure fluid and in which a stirring device 30 for agitating the fluid is arranged and is driven by a shaft 13. Each of the two supply rollers 26, 27 is associated with a receptacle 31, 32 respectively for the excess of fluid. The two receptacles 31, 32 communicate with a container 34 via a conduit 33. The conduit 33 can be closed by a valve 36, and a compressed air conduit 37 leads into the container 34, so that by raising the pressure in the container 34 atfer the valve 36 has been closed liquid can be returned from out of the container 34 through a conduit 35 into the supply tank 29. The two supply rollers 26, 27 are driven by means of correlated gear wheels 38, 39 carried by the shafts 19, 22 respectively (Fig. 2), and in each of the receptacles 31, 32 a wiping device (not shown) for removing the excess of fluid is provided.

After having passed between the two press rollers 20, 21, the fabric web 1 is led between upper and lower sparge boxes 40, 41 in each of which a number of spray heads 42 are arranged so as to face toward the fabric web at regular distances apart across the width of the web. These spray heads serve for spraying the fabric web with finely divided particles of materials, such as fibres of vegetable or animal origin, or artificial fibres, or metallic material, glass, sand, hydraulic binders, and so forth. The sparge boxes 40, 41 are provided on the side facing toward the press rollers 20, 21 with double walls 43 (Fig. 9) the hollow collecting space of which is connected with suction ducts 44, 45 respectively. The two suction ducts 44, 45 lead into a common suction duct 46. By action of sub-atmospheric pressure thus set up within the double walls 43 the particles that may discharge on that side of the boxes are withdrawn by suction action and removed through the ducts 44, 45, 46. Supply conduits 47, 48 and associated compressed air conduits 49, 50 are connected with the individual spray heads in the upper and lower boxes respectively (Figs. 4 and 9).

Behind the sparge boxes 40, 41 above and below the fabric web 1 suction nozzles 51, 53, and 52, 54 respectively are provided which extend in the transverse direction of the fabric web over the full width thereof. Each suction nozzle may be divided in the transverse direction thereof, for example, in three individual nozzles 55, as indicated on the right hand side of Fig. 5. Furthermore, the nozzles may extend obliquely to the longitudinal direction of the fabric web instead of extending perpendicularly thereto, as indicated at 56 on the left hand side of Fig. 5. From the suction nozzles 51, 52 and 53, 54 suction ducts 57, 58 respectively lead into a suction duct 59 with which communicates the suction duct 46 and which leads from this junction into a separator 61, 62 via a fan 60. This separator is provided with two cylinders 61 and 62 the outlets of which are located above a supply funnel 63.

To the lower end of the entrance funnel 63 a double-cylinder valve device 64 is connected which is driven from a driving motor 66 by means of a belt drive 65. Underneath the valve device 64 a box 67 is arranged which forms a distributing chamber from which leads out a discharge spout 69 including a damper 68 for closing the same. In the box 67 are further arranged a glass window 70 and flow control dampers 71, 72 as well as two lower rows of discharge chutes 73 and 74 respectively. In the full line positions of the dampers 68, 71, 72 the finely divided particles of material entering through the valve device 64 pass into all the chutes 73, 74 uniformly.

If the damper 68 is opened and the two dampers 71 are rocked into the chain-dotted positions the particles of material are discharged through the spout 69. Moreover, by rocking the damper 72 into either of the chain-dotted positions to the right or left the particles of material are either passed only into the left hand or right hand chutes 73 or 74.

Into each of the discharge chutes 73 and 74 opens a nozzle 75 or 76 arranged on compressed air branch pipes 77, 78, respectively, and underneath each of the chutes 73, 74 a cylindrical discharge head 79 or 80 respectively is provided in which the particles of material are intermixed by being whirled about and heated at the same time, if desired. The lower ends 81, 82 of these heads which are conically reduced and each of which houses a nozzle 83, 84 respectively, of associated compressed air branch pipes 85, 86, are connected with conduits 47, 48 respectively leading to the spray heads 42.

The apparatus described permits of applying an adhesive on one or both sides of a longitudinally and transversely tautened web of fabric 1 by means of the rollers 20, 21, if desired, conform to a pattern. This done, finely divided particles of materials of any suitable kind may be sprayed on one or both sides of the fabric web 1 by means of the sparge boxes 40, 41, that is, the nozzles 42, by which means the particles are fixed to the fabric web at the portions of the latter provided with adhesive. The surplus amount of particles is then automatically withdrawn by suction action of an air stream produced by means of the suction nozzles 51 to 54 and by passing it into the separator 61, 62 in which the particles are separated out and then returned into the working process again through the funnel 63. The amount of particles consumed must be replenished by feeding fresh particles to the funnel 63.

With the aid of the press rollers 20, 21 patterned portions of lacquer can be produced on the longitudinally and transversely tautened fabric web instead of patterned portions of adhesive, for the purpose of obtaining prints of lacquer. In making patterned prints of lacquer, recessed portions can be obtained which provide a ground for the obtainment of effects similar to printing effects. The lacquer to be applied can be stored in a closed supply tank in the same manner as described in the example given for adhesive, and the surplus amount of lacquer can be automatically returned into the supply tank.

Furthermore, the fabric web tautened in the longitudinal and transverse directions can be passed between heated engraved press rollers for the obtainment of patterned matting effects.

What I claim is:

1. In an apparatus for altering the surface of webs of fabric by attaching dispersive materials thereto, at least one pair of cooperative driven

press rollers acting on a web of fabric, a frame-like driven travelling conveyor for said web, releasable clamping means on said conveyor for holding said web taut across said conveyor in the transverse direction of said web, means for automatically releasing and closing said clamping means, respectively, at the exit and entrance of said conveyor, means for longitudinally stretching said web tautened by said clamping means, and positive coupling means interposed between said drives of said rollers and said conveyor for establishing a requisite timed relation between the speed of said web and the speed of said rollers, for positively coordinating the impressions applied to said web by said roller action with said place of pressure application.

2. In an apparatus for altering the surface of webs of fabric by attaching dispersive materials thereto, at least one pair of cooperative driven press rollers acting on a fabric web, a frame-like travelling conveyor carrying said web tautened transversely and stretched longitudinally on said conveyor being driven in a requisite timed relation to said rollers, a store of dispersive replenishing material, a supply funnel fed from said store with said material, a double-cylinder valve device for dosing said material supplied by said funnel, compressed air nozzles associated with said valve device for conveying said dosed material toward said web, and spray heads confronting said web for applying said dosed material to said web.

3. In an apparatus for altering the surface of webs of fabric by attaching dispersive materials thereto, at least one pair of cooperative driven press rollers acting on a fabric web, a frame-like travelling conveyor carrying said web tautened transversely and stretched longitudinally on said conveyor being driven in a requisite timed relation to said rollers, a store of dispersive replenishing material, a supply funnel fed from said store with said material, a double-cylinder valve device for dosing said material supplied by said funnel, compressed air nozzles associated with said valve device for conveying said dosed material toward said web, spray heads confronting the upper and lower surfaces of said web and spaced apart substantially uniformly across the respective web surface, and flow control means associated with said valve device for directing said dosed material selectively to said lower or upper and lower spray heads for applying said material to said web in a uniform distribution over all the width of said fabric at increasing speed as said material approaches the exit of said spray heads.

4. In an apparatus for altering the surface of webs of fabric by attaching dispersive materials thereto, at least one pair of cooperative driven press rollers acting on a fabric web, a frame-like travelling conveyor carrying said web tautened transversely and stretched longitudinally on said conveyor being driven in a requisite timed relation to said rollers, a store of dispersive replenishing material, a supply funnel fed from said store with said material, a separator for surplus material removed from said web at certain points thereof in front of said rollers, said separator discharging into said supply funnel, suction nozzles arranged at said points of said web above and below the latter, a fan connected with its suction end with said suction nozzles and with its delivery end to the entrance to said separator for feeding said surplus material into said supply funnel in conjunction with said feed of replenishing material to said funnel, a double-cylinder valve device for dosing said material supplied by said funnel, compressed air nozzles associated with said valve device for conveying said dosed material toward said web, and spray heads confronting said web for applying said dosed material to said web.

5. In an apparatus for altering the surface of webs of fabric by attaching dispersive materials thereto, at least one pair of cooperative driven press rollers acting on a fabric web, a frame-like travelling conveyor carrying said web tautened transversely and stretched longitudinally on said conveyor being driven in a requisite timed relation to said rollers, a store of dispersive replenishing material, a supply funnel fed from said store with said material, a separator for surplus material removed from said web in front of said rollers discharging into said funnel, suction nozzles confronting said points of removal of said web, a fan interconnecting said suction nozzles and said separator for feeding said surplus material into said supply funnel in conjunction with said feed of replenishing material thereto, a double-cylinder valve device for dosing said material supplied by said funnel, a distributing chamber, having an inspection glass window, succeeding said valve device for loosening the dosed material, compressed air diffusing means associated with said chamber for whirling about said dosed material, compressed air nozzles associated with said chamber for conveying said loosened dosed material toward said web, and spray heads confronting said web for applying said loosened dosed material to said web.

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