Dec. 1, 1959 W. B. HOWE 2,915,006

PRINTING

Filed July 3, 1956 3 Sheets-Sheet 1

Fig. 1

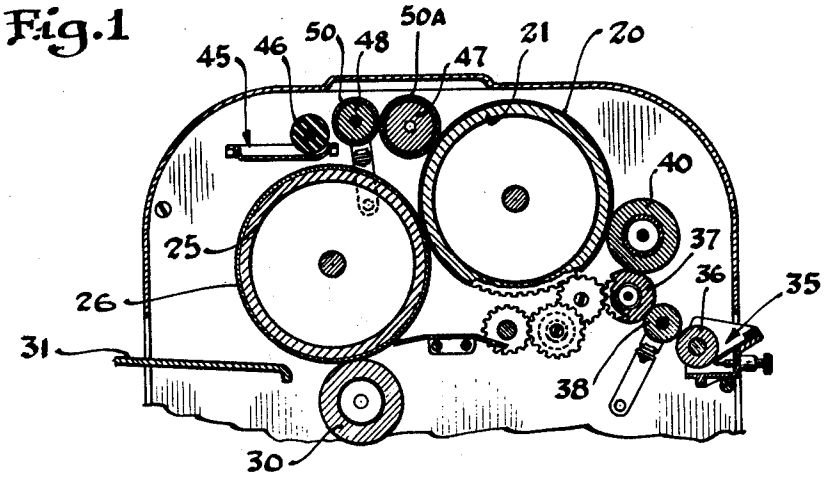
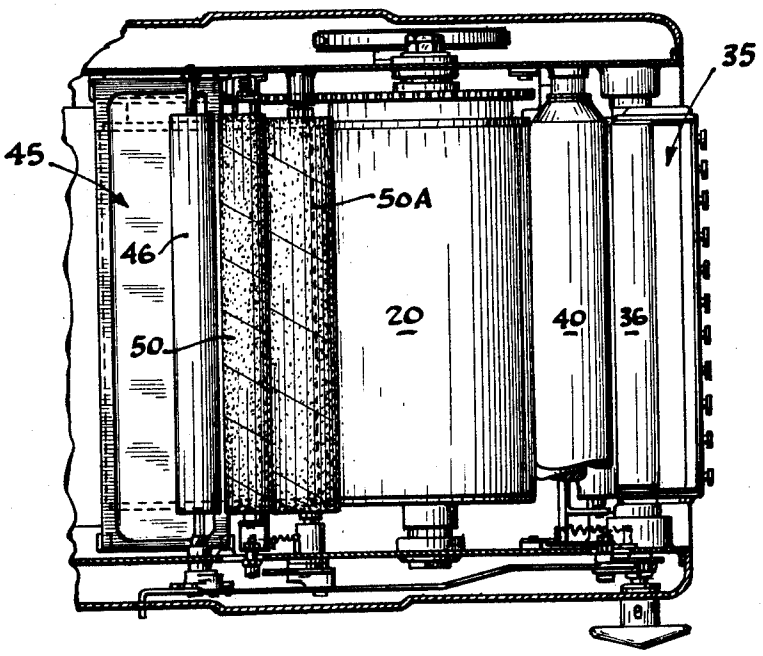


Fig. 2



Inventor

Warren B. Howe

By Wallace and Cannon

Attorneys

Dec. 1, 1959 W. B. HOWE 2,915,006

PRINTING

Filed July 3, 1956 3 Sheets-Sheet 2

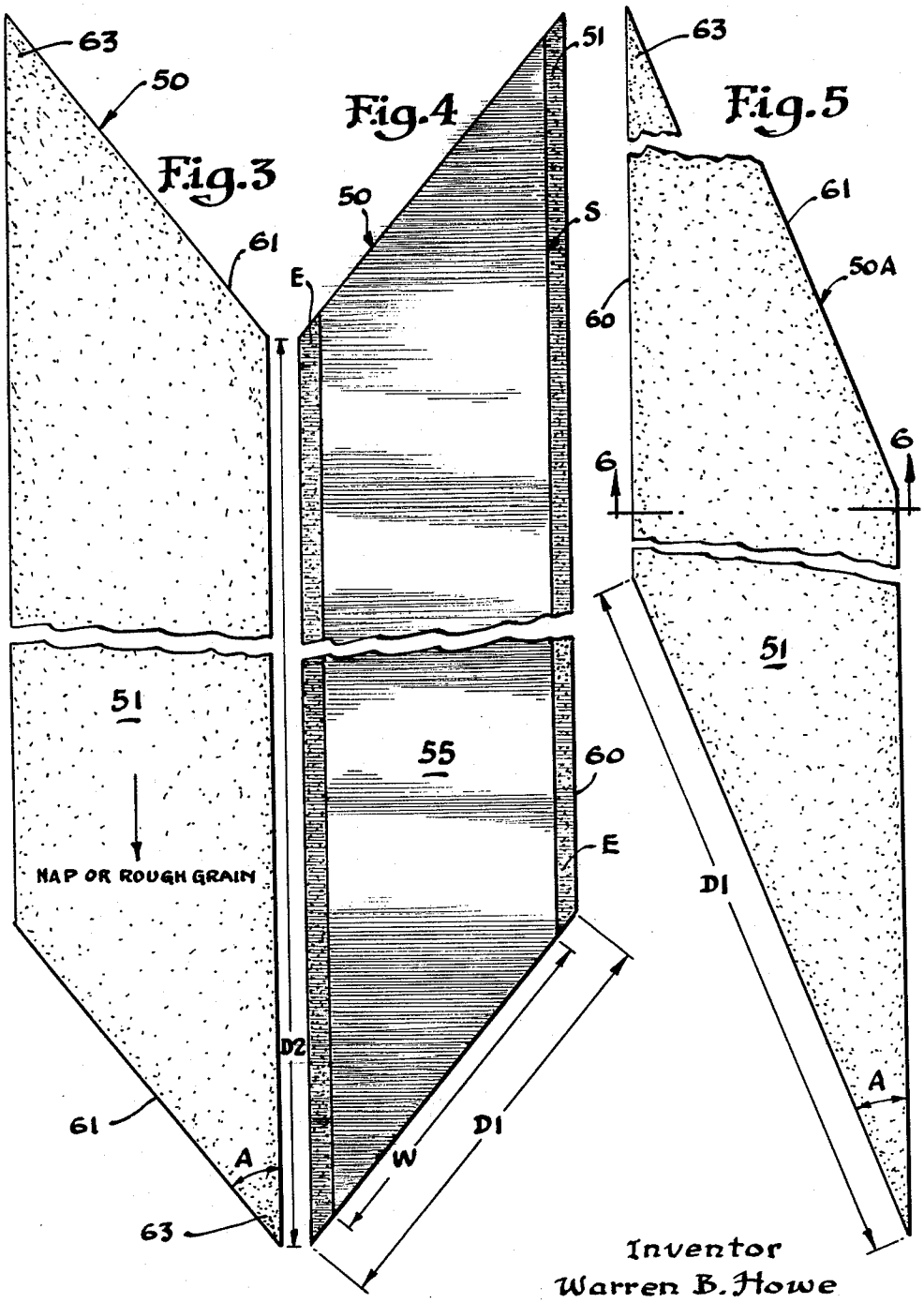


Fig.3

Fig.4

Fig.5

Inventor
Warren B. Howe

By Wallace and Cannon
Attorneys

Dec. 1, 1959 W. B. HOWE 2,915,006

PRINTING

Filed July 3, 1956 3 Sheets-Sheet 3

Fig. 6

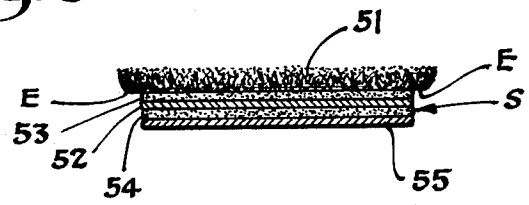


Fig. 7

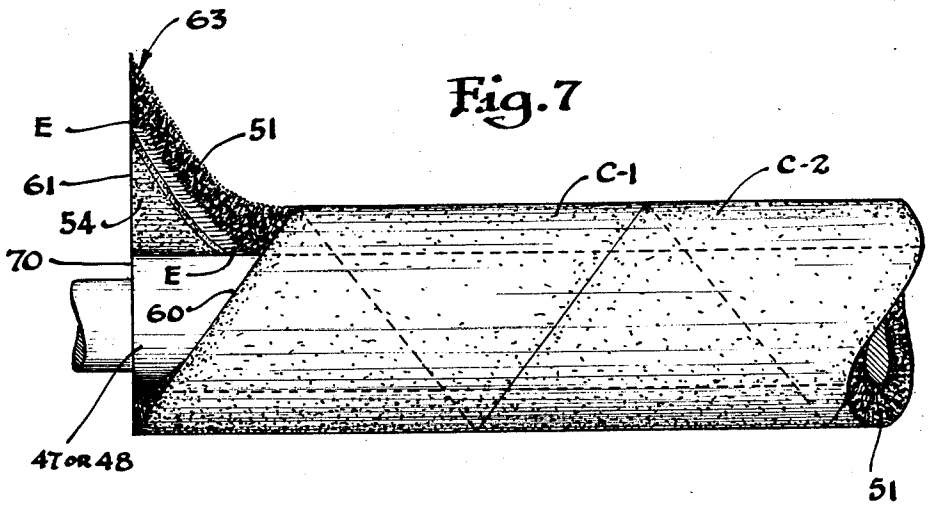
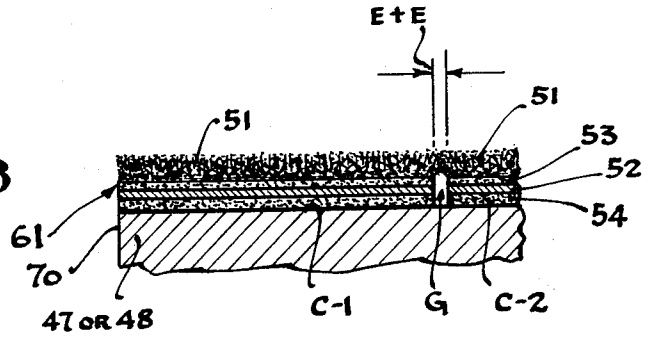


Fig. 8



Inventor
Warren B. Howe

By Wallace and Cannon
Attorneys

United States Patent Office 2,915,006
Patented Dec. 1, 1959

2,915,006

PRINTING

Warren B. Howe, Maple Heights, Ohio, assignor to Addressograph-Multigraph Corporation, Wilmington, Del., and Cleveland, Ohio, a corporation of Delaware

Application July 3, 1956, Serial No. 595,634

3 Claims. (Cl. 101—148)

This invention relates to lithographic printing, and in particular to the moistening roller of a lithographic printing machine.

In the lithographic printing process, the printing plate used is of a highly specialized oleophilic-hydrophilic nature in that the printing surface thereof is one that is capable of holding a master image of an oleophilic nature, while being capable of maintaining an aqueous or hydrophilic condition in the background areas surrounding the image. If, after the desired master image has been developed on the plate, the so-called moistening or repellent solution which is fundamentally aqueous in character is then applied to the plate the moistening solution will be restricted to the afore-mentioned background areas due to the incompatibility between water and oil, and then if a roller bearing lithographic ink is rolled across the plate the ink will adhere to the image only and will be rejected by the water in the background areas of the plate. In most instances, the lithographic printing plate is arranged on a cylinder and is contacted by diametrically composed moistening and inking rollers. The cylinder which carries the printing plate in turn engages a so-called blanket cylinder, and as the printing cylinder rotates ink applied to the master image is transferred in image form from the lithographic printing plate on to the blanket of the blanket cylinder, and the sheet to be printed in turn is fed between the blanket cylinder and an opposed pressure or platen roller so that the image on the blanket cylinder is offset on to the sheet to be printed.

The delicacy of operation entailed in lithographic printing is of a considerable order, and precautions are necessary in order to assure the mutually exclusive roles played by the moistening solution and the ink. One of the more important considerations centers about the moistening rollers in the moisture train of the printing machine which relay the moistening solution to the printing plate. Thus, the ductor roller and the form roller in this train must be of such nature as to absorb and transfer relatively large quantities of moistening solution to the printing plate, thereby bathing the background or hydrophilic areas of the printing plate profusely with the moistening solution which keeps the background areas of the plate free of lithographic ink. In other words, assuming in the first instance the development of a sharply defined master image, the role of the moistening solution is to maintain this definition. Obviously, if the form roller or ductor roller which cooperate to transfer moistening solution to the printing plate become fouled with ink or ink receptive foreign matter there is a tendency for the ink or the ink receptive foreign matter to be transferred to the background areas of the plate which contribute to pickup of lithographic ink in the background areas of the plate.

Numerous materials have been tested and tried for fulfilling the moisture absorptivity characteristic of such moistening rollers, and a replaceable molleton cloth cover appears to afford the most advantageous characteristics in

this regard. But what has heretofore been entailed is to provide the cloth cover, whatever its specific nature, of rectangular dimension having a length corresponding to the axial dimension of the moistening roller and a width corresponding to the circumferential dimension of the moistening roller. The cover is wrapped around the roller and the longitudinal edges are stitched together. Covers of this kind have proven to be highly advantageous for imparting absorptivity to the moistening roller of a lithographic printing machine, but it has been observed that where the edges are stitched as aforesaid the resulting crevice or ridge tends in some instances to rub the plate, provide a haven for ink receptive foreign matter, and also to collect ink from the printing plate with the consequent disadvantages mentioned above. While this may not be overly serious or critical under most conditions, the lithographic printing process is based in the first instance upon high fidelity, and the primary object of the present invention is to eliminate the need for stitching or otherwise physically joining edges of an absorbent cover on a moistening roller of a lithographic printing machine. A further object of the present invention is to materially simplify the covering of a moistening roller of a lithographic printing machine and to so cover the roller that no ribs or crevices are produced.

Specifically, the object of the present invention is to adhesively secure and spirally wind an absorbent cover on a moistening roller of a lithographic printing machine and to do this in such a way as to produce no apparent rib or crevice where adjacent convolutes of the cover abut.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what are now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a sectional view through a typical lithographic printing machine of the kind contemplated by the present invention;

Fig. 2 is a top plan view of the machine shown in Fig. 1;

Fig. 3 is a top plan view of a cover of the present invention, this being broken away in part;

Fig. 4 is a bottom plan view of the cover shown in Fig. 3;

Fig. 5 is a top plan view of a cover of larger dimension, this being broken away in part.

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 5;

Fig. 7 is a schematic view showing the way in which a cover in accordance with the present invention is spirally wound on a moistening roller; and

Fig. 8 is a detail sectional view showing how adjacent edges of the cover mat together evenly without forming a crevice or ribs.

In Figs. 1 and 2, there is shown the essential structural details of a typical lithographic printing machine simplified in some respects. A printing plate **20** is carried in the usual fashion on a printing cylinder **21**, and the printing plate **20** is adapted to be provided with an ink-receptive, planographic master image. Associated with the cylinder **21** is a transfer or so-called blanket cylinder **25** provided with a relatively soft, image-receptive blanket **26** on to which lithographic ink in image form is transferred from the printing plate **20** during

operation of the machine. Rotatably journalled on a shaft below the transfer cylinder 25 is a platen or pressure roller 30, and the sheet to be printed is fed forwardly along a sheet feed table 31 in to the bight of the blanket cylinder 25 and the platen roller 30. Thus, the ink image that was transferred to the blanket 26 from the printing plate 20 in turn is offset onto the sheet that is fed between the blanket cylinder and the platen roller.

The printing plate has developed thereon a master image which is to be repeatedly inked with lithographic ink relayed from an ink reservoir or fountain 35. Disposed in the fountain 35 is a fountain roller 36, and ink is passed from the fountain roller 36 to a transfer roller 37 by means of an oscillating ductor roll 38. Ink on the transfer roller 37 is then transferred to the ink form roller 40 which in turn engages the printing plate.

The moistening solution that is to be applied to the background areas of the printing plate is contained in a moistening fountain 45 provided with a fountain roller 46. Moistening or repellent solution is transferred from the fountain roller 46 to the form roller 47 by an oscillating ductor roller 48, and the form roller 47 engages the printing plate.

Under and in accordance with the present invention, the form roller 47 and the ductor roller 48 in the moistening train described above are provided with an absorbent cover wound spirally on the corresponding roller, and this, as will be described below, eliminates the formation of ribs or crevices on the covers of these moistening rollers.

In Figs. 3 and 4 are shown the two sides of the cover 50 that is to be wound on the ductor roller 47, Fig. 3, showing the absorbent face of the cover, and Fig. 4 showing the back or rear face of the cover. In Fig. 5, there is shown the face of the related cover 50A that is to be used on the larger form roller 47. The absorbent material for both covers 50 and 50A in the present instance is a strip or sheet of molleton cloth 51, and this is backed with an attaching strip in the form of double faced adhesive strip S, Fig. 6, which includes an intermediate sheet 52 provided with a film or coating 53 of adhesive on one side and a like adhesive surface 54 on the opposite or rear side. The adhesive surface 53, it will be observed, enables the attaching strip S to be adhered directly to the back of the molleton cloth 51. The adhesive surface 54 is to be adhered to the moistening roller. Superimposed on the outer side of the adhesive layer 54 is a protective masking sheet 55 that protects the adhesive layer 54 until the cover 50 or 50A is to be attached to the corresponding moistening roller.

Each molleton strip is an inclined parallelogram having parallel side edges 60, inclined or beveled parallel end edges 61, and pointed ends 63. The inclined end edge of each molleton strip 51 has a dimension D1 which corresponds in length to the circumference of the moistening roller that is to be covered. The length D2 of the side edge of each molleton strip will vary depending in part upon the length of the roller to be covered. For a moistening roller 47 or 48 of given axial length L and a given included angle A, Figs. 3 and 5, between adjacent sides 60 and 61 of the molleton strip, the dimension D2 will be $L/\sin A$.

As shown particularly in Fig. 4, the adhesive strip S is also an inclined parallelogram and extends from one beveled end edge 61 to the other of the molleton strip so that the long or side edge dimension of the adhesive strip is also D2. The adhesive strip, however, is of less area than the molleton strip. Thus, the dimension W of each end edge of the adhesive strip S is less than the corresponding dimension D1 of the beveled or inclined end edge of the molleton strip, thereby affording free marginal side edge portions E of molleton material outwardly beyond the longitudinal edges of the adhesive strip S.

In winding either the form roller 47 or the ductor roller 48, the masking strip 55 at the back of the related cover 50 or 50A is first peeled off to expose at least partially the adhesive layer 54 beginning at a pointed end 63 of the cover. The cover thus having the adhesive layer 54 at least partially exposed is juxtaposed relative to the moistening roller to be covered so that the beveled end edge of the cover having adhesive 54 exposed is aligned accurately with the end face as 70 of the roller as shown in Fig. 7. Then, while holding and pressing the pointed end portion 63 of the cover tightly on the roller, the loose or dangling portion of the cover is tensioned and wound spirally, that is, helically, in abutting convolutes along the length of the roller while progressively exposing more and more of the adhesive layer 54 until the opposite beveled end edge 61 of the cover is tightly adhered in alignment with the opposite end face of the roller.

The pitch of the spirally wound cover is determined by the angle A, Fig. 3. For a ductor roller as 48 having a circumference of 3⅜", I prefer that the angle A for the cover 50 be approximately 40°. For the larger form roller as 47 having a circumference of 6¼", I prefer that the angle A for the cover 50A be about 20°.

In each instance, the free marginal portion E of molleton cloth strip is approximately ⅛". While winding the cover tightly on the moistening roller, the marginal or free portions E of the molleton material of adjacent cover convolutes C–1 and C–2, Figs. 7 and 8, are caused to mesh or mat together as shown at $E+E$ in Fig. 8. Such matting together of the free or overhanging molleton side edge portions produces neither a rib nor a crevice, and a gap G, Fig. 8, exists between adjacent attaching strip convolutes.

Molleton cloth has a definite nap when brushed or rubbed in one direction as shown in Fig. 3, and it is important when mounting in the moisture train of the machine a roller having an absorbent outer face of molleton wound thereon in accordance with the present invention to assure that the direction of rotation of the roller is opposite to the direction of the nap or so-called rough grain.

It will be seen from the foregoing, that under the present invention a moistening roller in the moistening train of a lithographic printing machine can be conveniently and easily provided with an absorbent cover merely by winding the cover on the roller. Thus, no stitching or other physical joining of edges of the cover is entailed, and the attaching strip which is used to hold the cover on the roller is so dimensioned relative to the absorbent strip of the cover as to cause free edges of the absorbent material to mat together at adjacent convolutes while the cover is being wound spirally on the roller. Accordingly, ridges or crevices are eliminated from the absorbent cover, thereby greatly enhancing the ability of the absorbent material to avoid ink pickup or collection of foreign matter interfering with the essential function of the moistening roller which is to relay uncontaminated moistening or repellent solution to the printing plate carried by the printing cylinder.

Hence, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a lithographic printing machine having a printing cylinder engageable with a blanket cylinder and a pressure roller engageable with the blanket cylinder, a train of rollers for transferring liquid to the printing cylinder and including a form roller engageable with the printing cylinder, said form roller having an absorbent cover wound helically thereon in successive con-

volutes for substantially the entire length of the form roller, said cover comprising an absorbent strip affording the outer absorbent surface of the cover, and an attaching strip secured to the back of the absorbent strip, said attaching strip being of less width than the absorbent strip so as to have side edges running parallel to the sde edges of the absorbent strip but spaced inwardly of the side edges of the absorbent strip to afford marginal side portions for the absorbent strip free of and unsecured to the attaching strip substantially for the full length of the absorbent strip, and said marginal side portions of the absorbent strip being matted closely together in edge-eliminating relation where the adjacent convolutes abut one another in helical relation along the length of said form roller.

2. An arrangement according to claim 1 wherein the attaching strip is a double-faced adhesive strip having one adhesive face adhered to the back of the absorbent strip and another adhesive face adhered to the surface of the form roller.

3. In a lithographic printing machine having a printing cylinder engageable with a blanket cylinder and a pressure roller engageable with the blanket cylinder, means for transferring liquid to the printing cylinder and including at least one liquid transfer roller comprising a cylindrical body having an absorbent cover wound helically thereon in successive convolutes for substantially the entire length of the cylindrical body, said cover comprising an absorbent strip having a nap with a definite direction and affording the outer absorbent surface of the cover, means for rotating said liquid transfer roller in the machine opposite to the direction of the nap, and an attaching strip secured to the back of the absorbent strip, said attaching strip including an intermediate sheet having a first adhesive film on one face and a second adhesive film on the other face, said first adhesive film being adhered to the back of the absorbent strip and said second adhesive film being adhered to the outer surface of said cylindrical body, and the marginal side portions of the absorbent strip abutting one another substantially in helical edge-eliminating relation along the length of said cylindrical body to afford a substantially continuous, uninterrupted and uniform absorbent surface on said liquid transfer roller.

References Cited in the file of this patent

UNITED STATES PATENTS

578,958	Webster	Mar. 16, 1897
2,633,440	Scholl	Mar. 31, 1953
2,647,300	Thomas	Aug. 4, 1953
2,760,895	Holgerson	Aug. 28, 1956
2,763,587	Masland	Sept. 18, 1956