Feb. 28, 1956 B. OFFEN 2,736,106

SUPPORT MEMBERS FOR WET, PRINTED WEBS

Filed Feb. 4, 1953

3 Sheets-Sheet 1

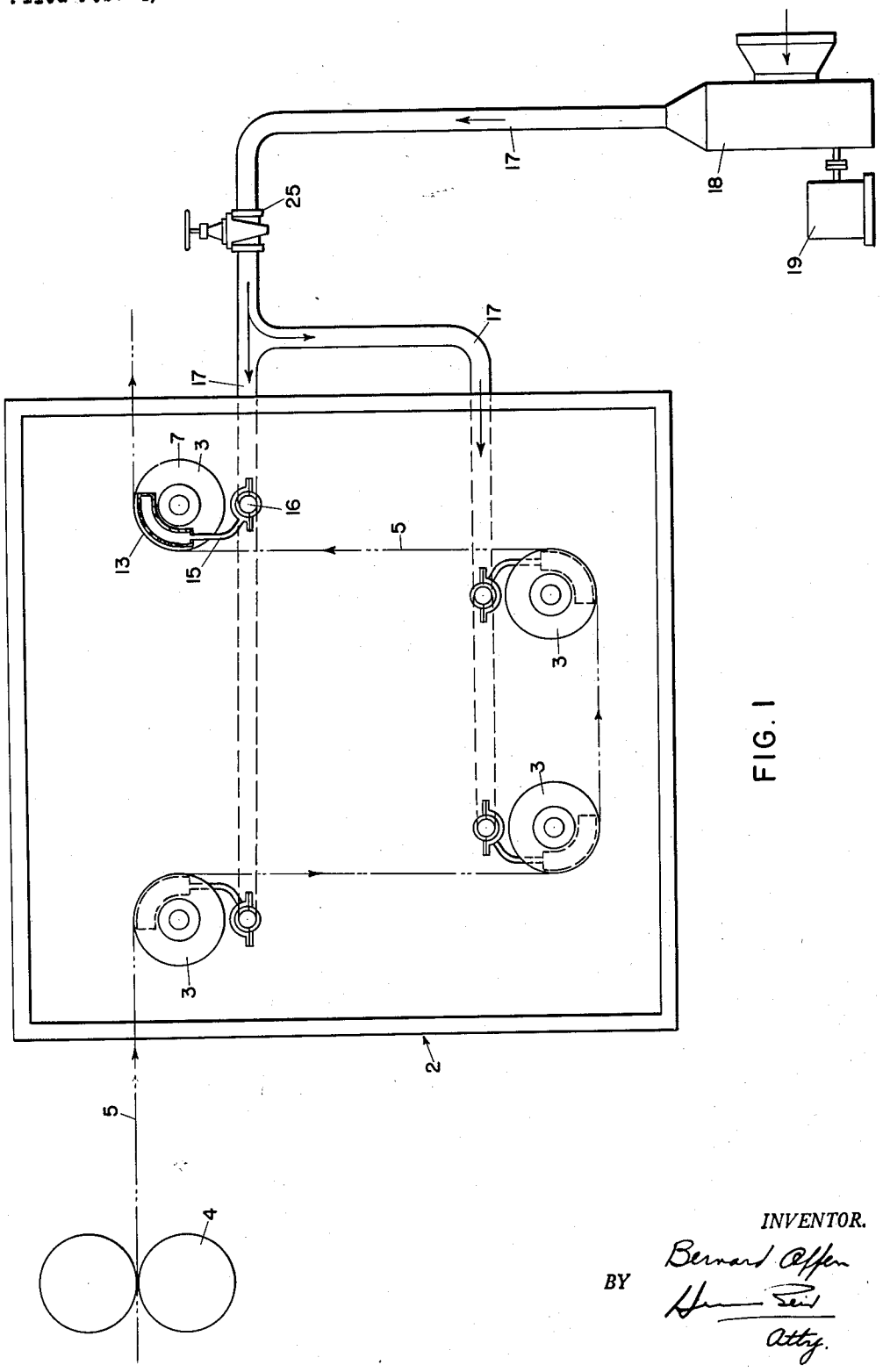

FIG. 1

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FIG. 2

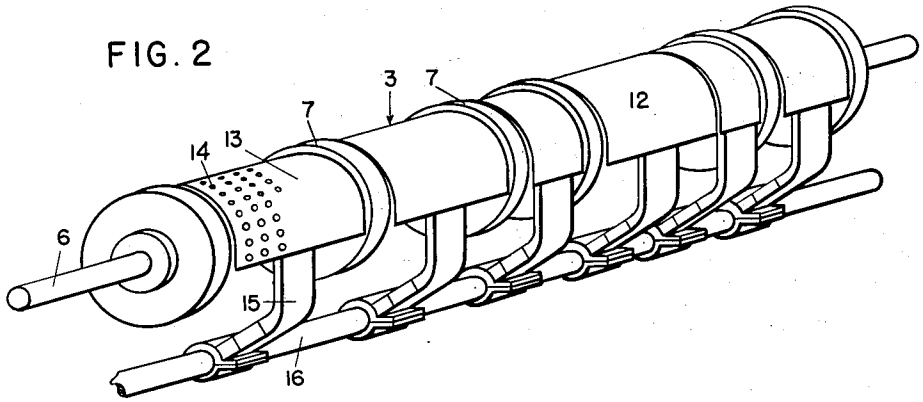

FIG. 5

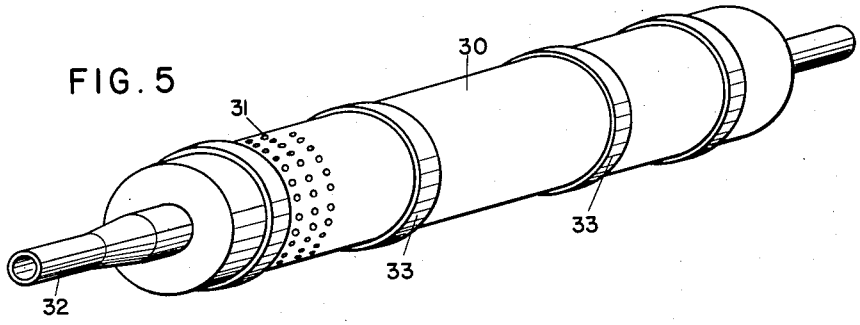

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FIG. 4

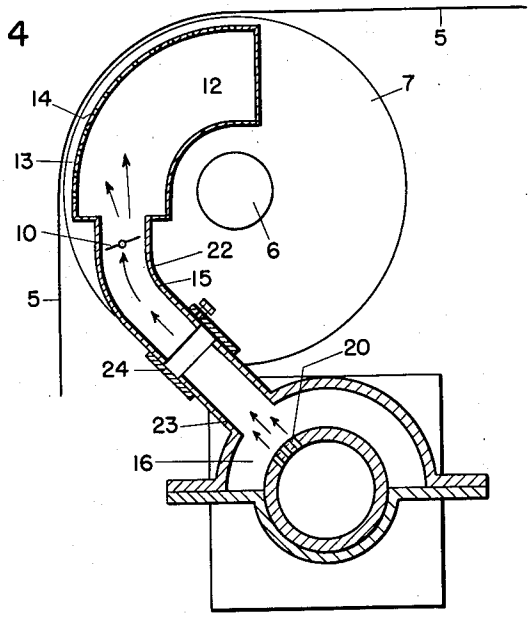
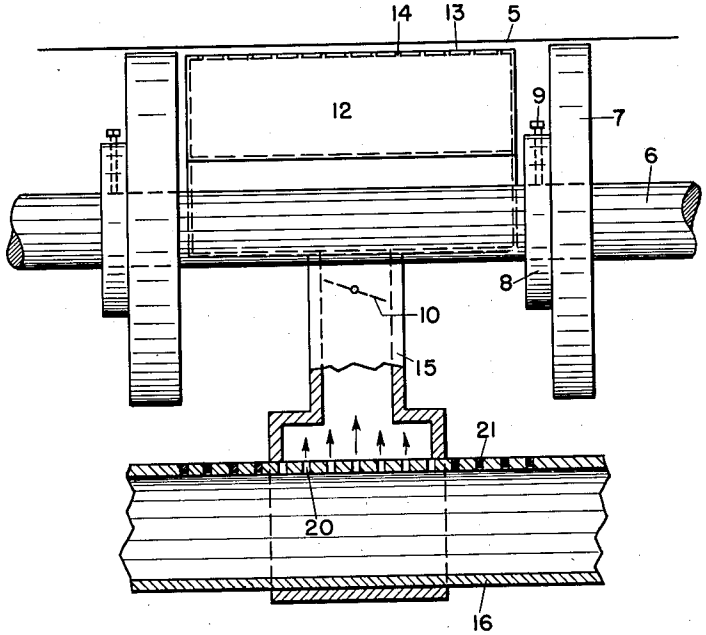


FIG. 3



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SUPPORT MEMBERS FOR WET, PRINTED WEBS

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8 Claims. (Cl. 34—156)

This invention relates to support members for wet, printed webs and, more particularly, to support members including air cushions disposed between adjacent spaced rollers to support and to prevent sagging of a wet, printed web passing over the rollers.

A difficult problem exists in supporting wet, printed webs during their passage through dryers, particularly when the web is printed on both sides. If a longer drying time is desired, means need be provided to support the wet web; such means must be such as to permit passing the web over rollers without smearing the wet ink on both sides of the web or paper sheet. I have provided spaced pulleys or rollers for this purpose, as more fully disclosed and claimed in my copending application Serial No. 205,485, filed January 11, 1951, now Patent No. 2,631,384. While such means are generally adequate for the purpose, I have found that when it is necessary to place adjacent rollers a substantially distance apart, the printed web has a tendency to sag between the rollers, frequently resulting in contact with the rotating shaft supporting the rollers so that smearing and blotting of the wet surfaces results.

The chief object of the present invention is to provide a support member for wet, printed webs which supports the web in such manner that smearing or blotting of the printed surfaces during their passage thereover is obviated.

An object of the present invention is to provide a support member including rotatable pulleys or rollers spaced at desired distances and air cushions between adjacent rollers to prevent sagging and to provide additional support for the web during its passage over the rollers.

A further object is to provide a support member for wet, printed webs including a plurality of spaced, rotatable pulleys or rollers serving to contact spaced portions of the web to support the same and in which stationary air boxes are provided between adjacent rollers, discharge of air from the boxes adjacent the web preventing sagging of the web during its passage over the rollers. Other objects of the invention will be readily perceived from the following description.

This invention relates to a support member for wet, printed webs comprising, in combination, a shaft, rotatable rollers mounted on the shaft and spaced from each other to support a web passing thereover, and means between adjacent rollers to provide an air cushion to support a web passing over the rollers.

This invention further relates to a method of supporting a wet, printed web including the steps of passing the web over spaced, rotatable supporting rollers, and forming air cushions between adjacent rollers to support the web passing over the rollers.

The attached drawings show a preferred embodiment of the invention, in which

Figure 1 is a diagrammatic view of a dryer for wet, printed webs embodying the support members of the present invention;

Figure 2 is an isometric view of a support member;

Figure 3 is a view in elevation of the support member;

Figure 4 is a sectional view taken on the line IV—IV of Figure 3; and

Figure 5 is an isometric view of a modified form of support member.

Referring to the attached drawings, there is shown diagrammatically a dryer arrangement 2 for webs printed on both sides including the support members 3 of the present invention. The printing unit 4 applies wet ink on both sides of the web 5, the web passing into the dryer and over members 3 to dry the applied ink.

Each support member 3 (refer to Figures 2 and 3) includes a shaft 6 having a plurality of adjustable pulleys or rollers 7 mounted thereon. The bushing 8 of roller 7 includes a set screw 9 which attaches the roller to the shaft and permits adjustment of the roller to any desired position longitudinally of the shaft in accordance with the requirements of the web, printed matter on the web. Rollers 7 serve to support the web during its passage through the dryer. The shaft 6 may be journalled in the dryer walls or supported in desired position by any suitable means so long as the rollers 7 are permitted to be freely rotatable by passage of the web thereover.

Stationary air boxes 12 extend longitudinally of the shaft and between adjacent rollers 7. These boxes 12 are in the form of sectors of a circle; in other words, each box 12 has a wall 13 in the form of an arc adjacent the web passing over the support member. Wall 13 is provided with a plurality of openings 14 therein through which air may be discharged adjacent a web passing over rollers 7. The wall 13 extends in a plane within the plane of the circumference of the rollers to provide an air cushion to support the web between adjacent rollers and to prevent sagging thereof.

Each air box 12 is supported by means of a duct 15 attached to a header 16 extending in a direction substantially parallel to the direction in which shaft 6 extends. Restricting valves 10 may be disposed at each of the boxes 12 so that each box may be employed with different air pressures if desired. The headers 16 may be supported in desired position in any suitable manner. Headers 16 are in communication with a duct 17 through which air is supplied by a blower 18 driven by a motor 19. A valve 25 may be placed in duct 17 to regulate pressure of air supplied to the header. Each header 16 is provided with openings 20 spaced longitudinally thereof. Openings 20 may be closed by removable plugs 21, the openings and plugs providing ready means of adjustment of boxes 12 longitudinally of the shaft 6. Thus when it is desired to position a box 12 at any desired position longitudinally of the shaft, plugs 21 may be removed from the openings 20 at that portion of the header and duct 15 attached at that portion to permit supply of air to the box 12.

In order to render box 12 movable toward and from a web passing over the rollers 7, duct 15 may include a branch line 22 extending from the box 12, a branch line 23 extending from the header, and an adjusting sleeve 24 connecting the lines 22, 23.

When a web is passed into the dryer, it is passed over and supported by the rollers 7. To prevent sagging and to provide additional support for the web during its passage over rollers 7, air is discharged from boxes 12 into the space between adjacent rollers and between the box and the web passing over the rollers thus forming air cushions which support the web and prevent smearing thereof which might occur if the web came in contact with wall 13 of box 12 or the shaft 6.

In Figure 5, I have shown a modification of the invention. In this case, the support member comprises a tube 30 having a plurality of openings 31 therein distributed over its surface in any desired pattern. Tube 30 is connected by line 32 to a suitable source of air. Bands 33 are spaced on tube 30 to support the web. The bands 33

extend above the surface of the tube and, preferably, are adjustable longitudinally of the tube. Discharge of air through openings 31 form air cushions between the printed web and the tube which support the web and prevent sagging thereof between the bands 33. This structure is not as desirable as the preferred embodiment of the invention for in this case, a substantial quantity of the air is wasted since the air is discharged about the circumference of the rotating tube.

It will be appreciated, if desired, pulleys or rollers as shown in the preferred embodiment may be employed in place of the bands 33.

Pressure of air discharged to form the air cushions may vary as desired, the pressure variation depending upon the space between the rollers, the weight of the paper, paper tension, etc. Such pressure need be sufficient to support the web to prevent substantial sagging but must not be so great as to cause smearing of the wet ink when discharged from the openings toward a printed surface of the web.

The present invention provides a simple, economical support member for wet, printed webs even though the web be printed on both sides. The invention permits primary support of the printed web by spaced pulleys or rollers contacting unprinted portions of the web and provides air cushions to assure that printed portions are not damaged or smeared by passage through the dryer.

While I have described preferred embodiments of the invention, it will be understood the invention is not limited thereto since it may be otherwise embodied within the scope of the following claims.

I claim:

1. In a support member for wet, printed webs, the combination of a shaft, rotatable rollers mounted on the shaft and spaced from each other to support a web passing thereover, and at least one stationary, sector-shaped support member adapted to receive air from a source of supply, said support member having air discharge openings and being disposed between adjacent rollers to provide an air cushion to support a web passing over the rollers.

2. A support member according to claim 1 in which the sector-shaped member is disposed in a plane within the plane of the circumference of the rollers.

3. A support member according to claim 2 in which the rollers are adjustable longitudinally of the shaft, the support member being adjustable longitudinally of the shaft.

4. A support member according to claim 3 in which the support member is adjustable toward and from a web passing over the rollers.

5. In a support member for wet, printed webs, the combination of a shaft, rotatable rollers mounted on the shaft and spaced from each other to support a web passing thereover, said rollers being adjustable longitudinally of the shaft, at least one stationary support member disposed between adjacent rollers to provide an air cushion to support a web passing over the rollers, a header, a duct connecting the header and the support member, said member having an arc-like wall adjacent the web passing over the rollers, said wall having a plurality of openings therein, and means for supplying air to the header.

6. A support member according to claim 5 in which said header has a plurality of openings longitudinally thereof, and removable plugs in said openings to permit adjustment of said member longitudinally of the shaft.

7. A support member according to claim 6 in which said duct comprises a branch line extending from the header, a second branch line extending from the member, and an adjusting sleeve connecting the branch lines to permit movement of the member toward and from the web.

8. In a support member for wet, printed webs, the combination of a shaft, rotatable rollers mounted on the shaft and spaced from each other to support a web passing thereover, said rollers being adjustable longitudinally of the shaft, at least one stationary support member disposed between adjacent rollers to provide an air cushion to support a web passing over the rollers, a header having a plurality of openings longitudinally thereof, removable plugs in most of said openings, a duct connecting the header and the support member and serving to support said member in desired position, said member having an arc-shaped wall adjacent the web passing over the rollers, said wall having a plurality of openings therein, said duct including a branch line extending from the header, a second branch line extending from the member, and an adjusting sleeve connecting the branch lines to permit movement of the member toward and from the web, and means for supplying air to the header.

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