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[54] **GUIDE MEMBER FOR SHEETS OF
PHOTOGRAPHIC PRINT PAPER**
5 Claims, 5 Drawing Figs.

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226/196, 95/89 R, 134/122
[51] Int. Cl. **G03d 3/12**
[50] Field of Search 95/89, 89
A, 94; 226/196; 118/423, 428; 134/64, 122, 133

ABSTRACT: A guide member which guides a sheet of photographic print paper to a position between two juxtapositioned rotating rollers which move the sheet of paper through a liquid. The guide member has a part provided with spaced-apart portions which permit circulation of the liquid. The spaced-apart portions have converging surfaces so that they do not restrain the movement of the sheet of paper.

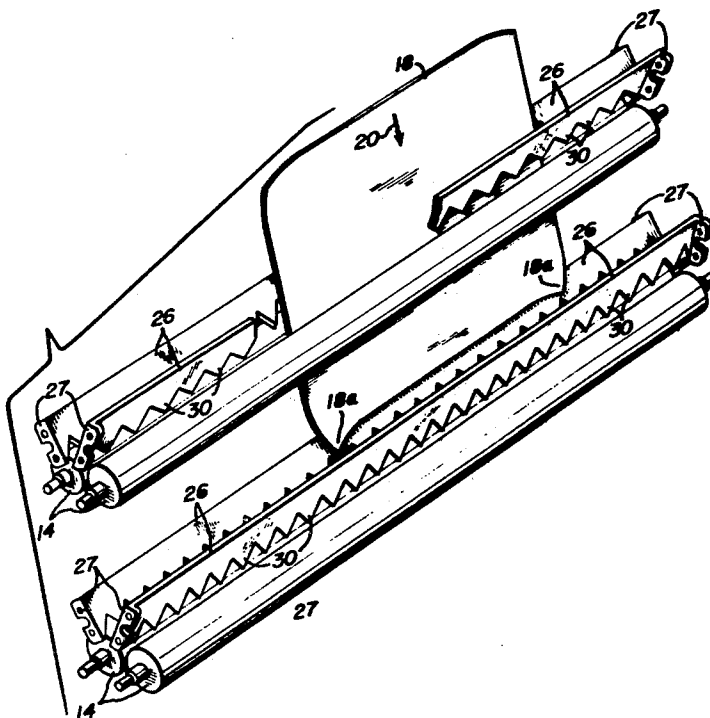


FIG-1

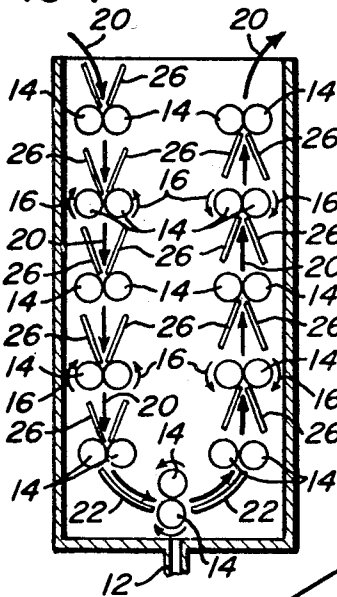


FIG-2

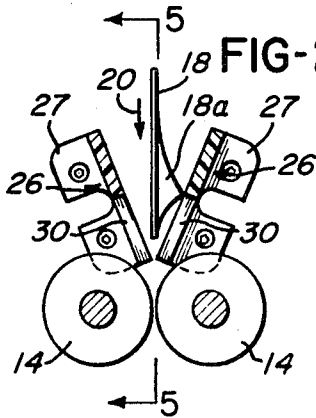


FIG-3

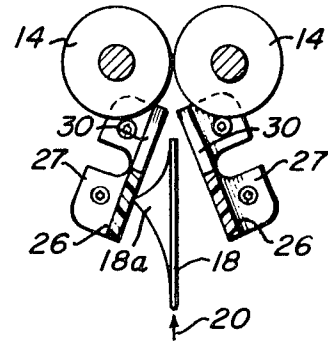


FIG-4

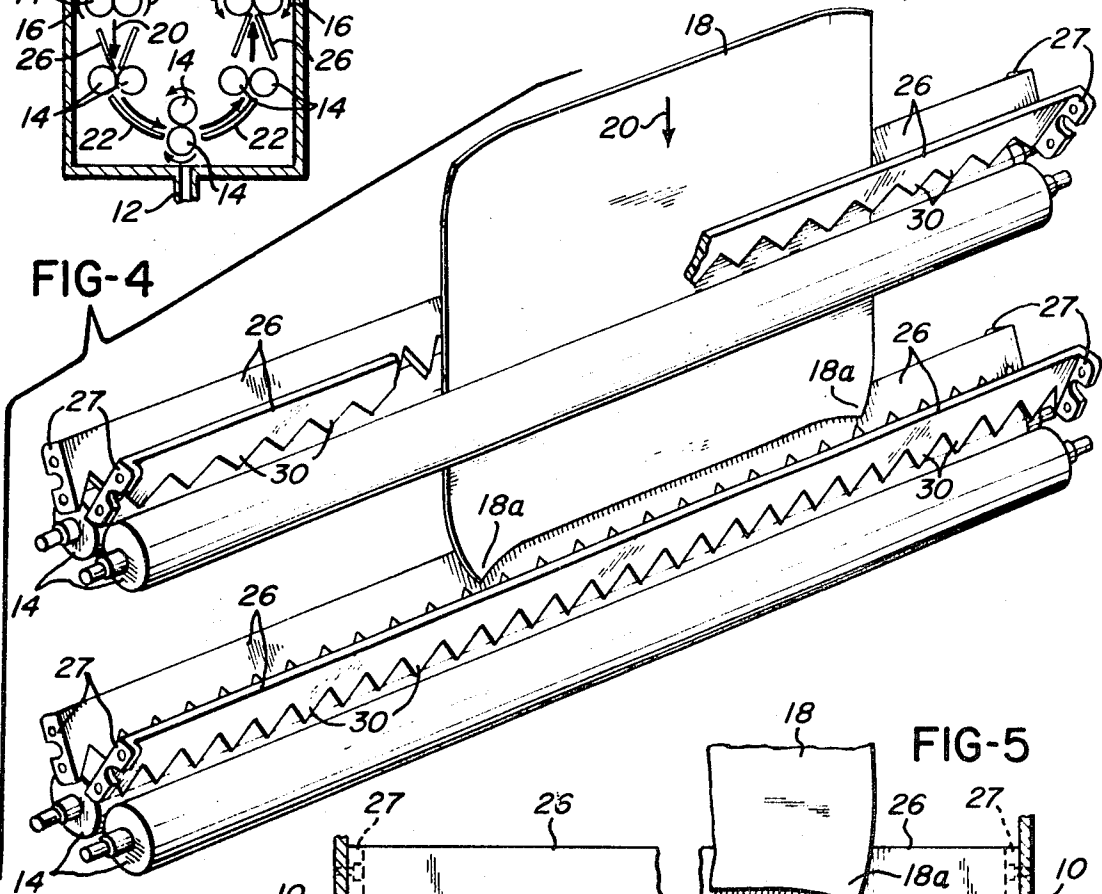
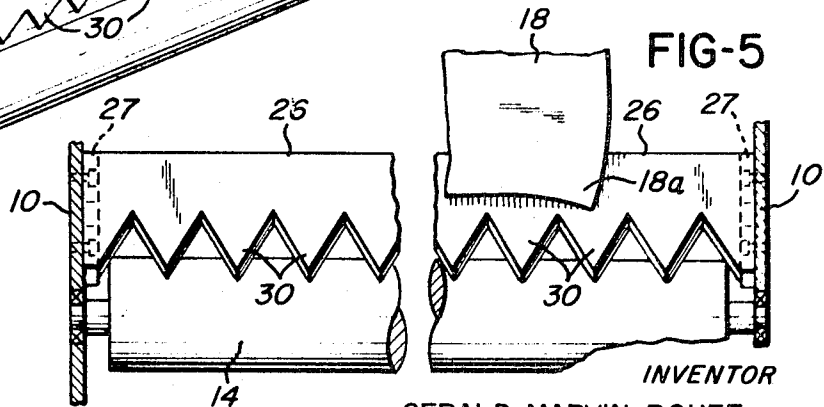


FIG-5



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GUIDE MEMBER FOR SHEETS OF PHOTOGRAPHIC PRINT PAPER

BACKGROUND OF THE INVENTION

Large-scale production apparatus for processing photographic prints usually includes means for moving a sheet of print paper through one or more containers of liquid chemicals. Ordinarily, a series of pairs of juxtapositioned rotating rollers are used to move the sheet of paper through the liquid, as the sheet moves between each pair of the rotating rollers and from one pair to the next pair.

In order that the liquid chemicals may function properly, the liquid is caused to circulate within the container thereof.

Guide means are employed to guide each sheet of print paper from one pair of the juxtapositioned rollers to the succeeding pair of juxtapositioned rollers. In conventional apparatus, in order to permit circulation of the liquid chemical, openings or spaced-apart parallel portions have been provided in the guide means. However, a problem has existed due to the fact that the sheets of photographic print paper which move through the apparatus tend to curl at the corners and edges. The curled corners of the sheets tend to engage the guide means at the edges of openings or tend to engage the guide means between the spaced-apart portions thereof. Such engagement of the sheets with the edges of the openings or with the parts between the spaced-apart portions of the guide means has resulted in stopping or slowing of the travel of the sheet. Such restraining action upon the sheet, even for a very short period of time is objectionable due to the fact that the sheet is thus caused to remain in the liquid chemical a longer period of time. Therefore, the processing time upon the sheet of print paper is increased and a decrease in the quality of the processing occurs.

Thus, it is an object of this invention to provide a guide member for sheets of photographic print paper which guide member permits circulation of the liquid chemical without presenting an abutment portion which may be engaged by a sheet to stop the sheet or decrease the rate of travel thereof.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic type of the side sectional view showing photographic processing apparatus of which a guide member of this invention is a part.

FIG. 2 is an enlarged sectional view of a portion of the apparatus of FIG. 1.

FIG. 3 is an enlarged sectional view of another portion of the apparatus of FIG. 1.

FIG. 4 is a perspective view, drawn on substantially the same scale as FIGS. 2 and 3, showing a portion of the apparatus of FIG. 1.

FIG. 5 is an enlarged sectional view with parts broken away, taken substantially on line 5—5 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the processing of photographic prints a container such as a container 10 shown in FIG. 1 may be employed. The container 10 contains a liquid chemical used in the photographic processing. A conduit 12 is connected to the container 10 for flow of liquid into and from the container 10. The liquid chemical, in order to function properly, is caused to circulate within the container 10. Means, not shown, are employed to cause such circulation of the liquid chemical within the container 10.

Within the container 10 and rotatably carried thereby are a plurality of pairs of juxtapositioned elongate rollers or roller members 14 which are rotated by any suitable means, not shown, in a manner illustrated by arrows 16 in FIG. 1. The pairs of rollers 14 are adapted to move a sheet of photographic print paper, such as a sheet 18, shown in FIGS. 2, 3, 4, and 5, through the container 10 in a manner illustrated by arrows 20 in FIGS. 1, 2, 3, and 4. The sheets of photographic print paper 18 thus move downwardly at the left-hand portion of the container 10, are directed by curved plates 22 to the right-hand

portion of the container 10, and are moved upwardly by the rollers 14 at the right-hand portion of the container 10, as illustrated by the arrows 20.

A pair of guide members 26 is disposed adjacent each pair of juxtapositioned rollers 14 at the receiving portion thereof to direct sheets 18 of photographic print paper to the pair of rollers 14. Each guide member 26 is shown as having a bracket 27 at each end thereof which is attached to the container 10. Preferably, the guide members 26 in each pair thereof are inclined one toward the other.

Each sheet 18 of photographic print paper has a slight degree of rigidity and as the sheet 18 enters the container 10 the sheet 18 characteristically has curled or curved corners 18a. Therefore, as each sheet 18 moves between a pair of the guide members 26, a curved corner 18a of the sheet engages one or both of the guide members 26.

A conventional guide member not shown, which is a part of photographic processing apparatus, is provided with a plurality of openings therethrough or spaced-apart portions which permit the necessary flow of liquid chemical therethrough as the liquid chemical circulates within the container 10. Without such openings or without such spaced-apart portions, the liquid chemical would not circulate sufficiently. However, such openings or spaced-apart portions provide surfaces which are abuttingly engageable by one or more of the curved corners 18a of a sheet 18 of photographic print paper as the sheet 18 moves between a pair of the guide members during travel of the sheets 18. When a curved or curled corner 18a of a sheet 18 engages the edges of the openings or engages a portion between spaced-apart portions of a conventional guide member, the rate of travel of the sheet 18 is, at least, momentarily decreased or stopped. Such decrease in the rate of travel of a sheet 18 of print paper causes the sheet 18 to be located within the liquid chemical of the container 10 a longer period of time than the desired period of time. Thus, the print obtained on the sheet 18 of print paper is of a lesser quality than desired.

A guide member 26 of this invention does not have openings therethrough or conventional spaced-apart parallel portions for flow or movement of liquid chemical. However, a guide member 26 of this invention is provided with a plurality or series of teeth 30 along the edge thereof which leads to a pair of juxtapositioned rollers 14 between which a sheet 18 is directed by the guide member 26. The spacing between the teeth 30 permits flow or circulation of the liquid chemical. Each of the teeth 30 of the guide member 26 has edges which converge toward its adjacent juxtapositioned rollers 14. Thus, the teeth 30 do not provide a surface which can be abuttingly engaged by a sheet 18 to prevent movement thereof or to decrease movement thereof. When a sheet 18 slidably engages a guide member 26, a curled corner 18a of the sheet 18 slidably moves against the guide member 26. As the curled corner 18a of the sheet 18 comes into engagement with one of the teeth 30, the curled corner 18a may slidably engage an edge of the tooth 30. However, due to the fact that the edge of the tooth 30 gradually converges toward the opposite edge of the tooth 30, the edge of the tooth 30 does not provide an abutment surface to prevent or decrease movement of the sheet 18. Thus, the guide member 26 has spaces between teeth 30 for flow of the liquid chemical. However, such space or openings do not provide abutment surfaces which can be engaged by a sheet 18 to stop or decrease movement thereof.

Thus, a guide member 26 of this invention effectively guides a sheet 18 of photographic print paper to a position between a pair of juxtapositioned rollers. The guide member 26 does not prevent flow or circulation of liquid, and the guide member does not prevent proper movement of the sheet 18.

Each pair of guide members 26 at the left-hand side of the container 10 is above its adjacent pair of juxtapositioned rollers 14 to direct a sheet 18 therebetween as the sheet 18 moves from the guide members 26 to the pair of juxtapositioned rollers 14. Each pair of the guide members 26 at the right-hand portion of the container 10 is immediately below its

adjacent pair of juxtapositioned rollers 14 to direct a sheet 18 to the pair of juxtapositioned rollers 14 as the sheet moves from the guide members 26 to the rollers 14.

Thus, in photographic processing apparatus which includes a guide member 26 of this invention, a sheet 18 of photographic print paper is effectively moved through a container of liquid chemical as the liquid chemical circulates within the container.

The invention having thus been described the following is claimed.

1. In photographic processing apparatus having a circulating liquid therewithin, a pair of rotatable elongate parallel juxtapositioned rollers for moving a flexible sheet therebetween as the sheet moves in a given direction of travel, the sheet having at least one curled corner,

a pair of guide members positioned adjacent the rollers, each of the guide members having a generally flat surface directed toward the rollers so that a flexible sheet is movable between the guide members to a position between the rollers,

each guide member including a plurality of longitudinally arranged teeth, each of the teeth having converging surfaces extending generally toward the rollers so that a curled corner of the sheet which engages the guide member is not restrained thereby, and so that the curled corner is moved between the rollers without folding of the corner, said teeth defining therebetween passages to permit circulation of liquid within the apparatus.

2. In apparatus for movement of sheets of photographic print paper through a circulating liquid, a pair of elongate cylindrical juxtapositioned roller members rotatable about substantially parallel axes, the roller members being adapted to rotate together to cause travel of sheets of print paper which move in seriatim relationship between the roller members,

the improvement comprising a pair of elongate guide mem-

bers positioned in adjacent converging relationship one to the other, the guide members being adjacent the roller members and substantially parallel thereto,

each guide member being provided with a longitudinal portion having a plurality of converging protuberances extending generally toward the roller members,

the space between adjacent protuberances serving as passages for movement of liquid which engages the sheets and the guide members and the roller members.

3. The apparatus of claim 2 in which the paper guide means includes an elongate member having a longitudinal axis which is substantially parallel to the axes of rotation of the roller members, the elongate member having a longitudinal portion adjacent the roller members, said longitudinal portion having a plurality of teeth extending generally toward the roller members, each of the teeth having opposed edge surfaces which converge in a direction generally toward the roller members, the edge surfaces being generally normal to the longitudinal axis of the elongate member.

4. The apparatus of claim 3 in which each of the edge surfaces is substantially planar.

5. A guide member adapted to be mounted within a liquid container for directing a flexible sheet between a pair of adjacent feed rolls, said guide member comprising an elongate body having a longitudinally extending continuous edge portion defining a generally flat surface, a plurality of longitudinally spaced teeth projecting in only one direction from said edge portion and defining therebetween a plurality of passages to permit circulation of liquid within the container, each of the teeth being substantially "V"-shaped, and means for mounting said guide member within the container with said teeth projecting generally toward the feed rolls to prevent a curled corner of the sheet from being restrained by said elongate body as the sheet is urged to move toward the feed rolls.

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