

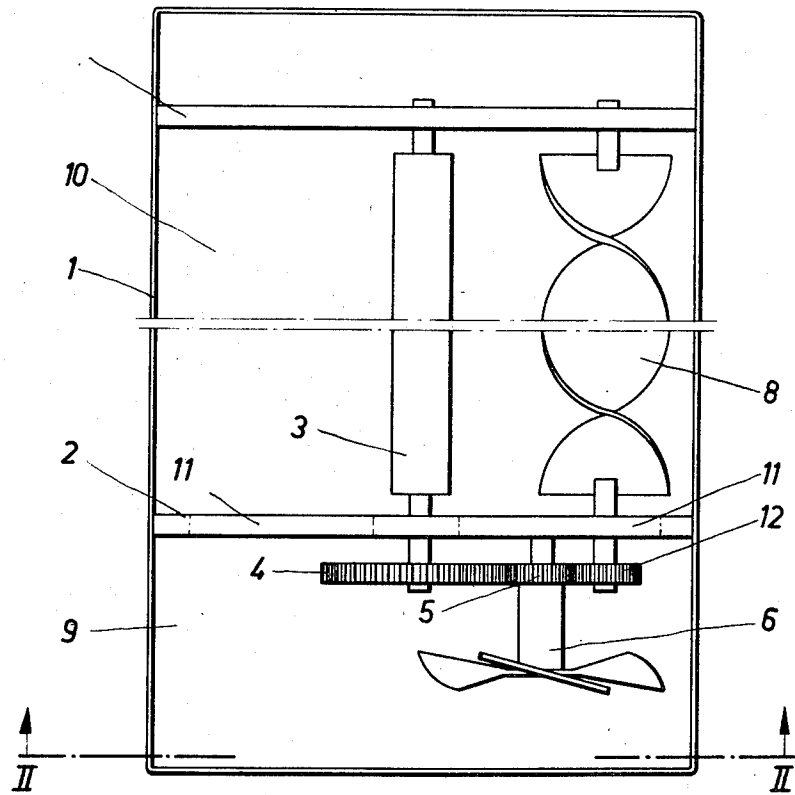
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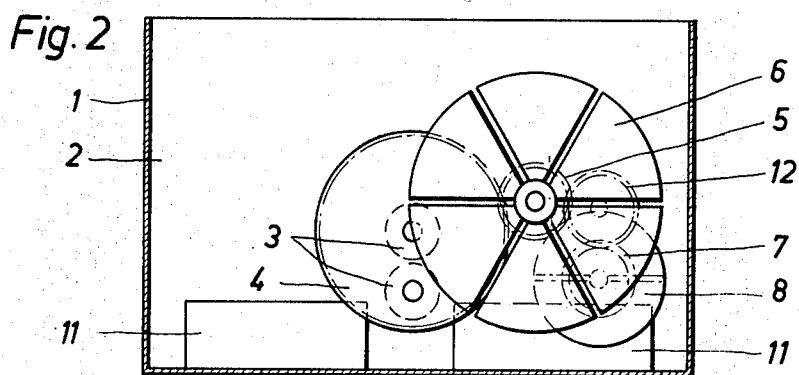
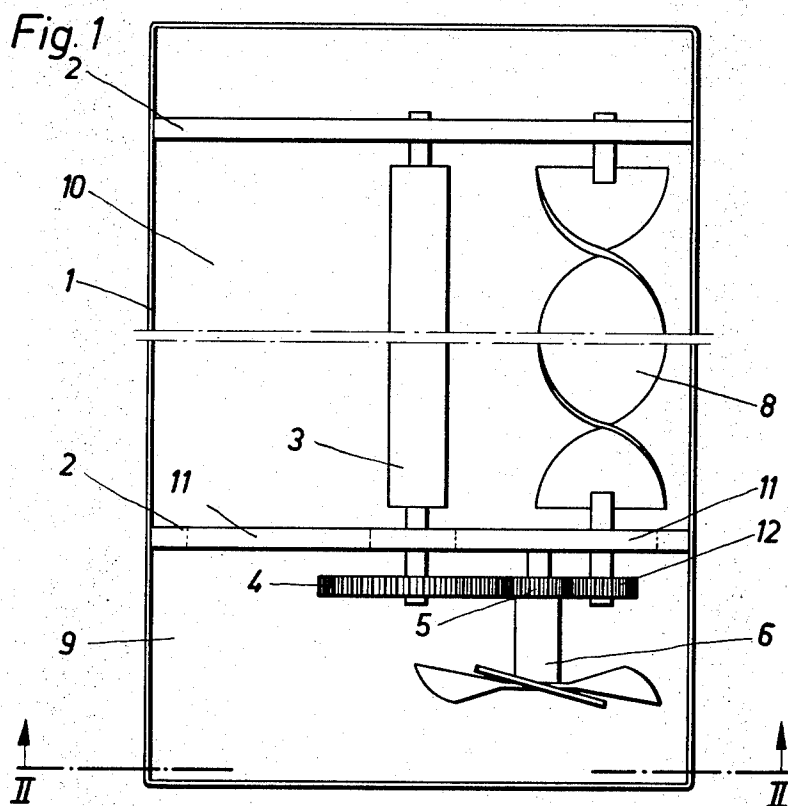
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[54] **APPARATUS FOR PROCESSING LIGHT-SENSITIVE SHEET MATERIAL BY MEANS OF A PROCESSING SOLUTION**
5 Claims, 2 Drawing Figs.
[52] U.S. Cl..... 95/89,
118/427, 134/122, 134/193, 95/96
[51] Int. Cl..... G03d 3/00

ABSTRACT: A processing tank for light sensitive sheet material is divided into adjacent mixing and processing chambers by an intermediate apertured partition. A relatively high speed agitator is located in the mixing chamber while there is a relatively low speed circulating device in the processing chamber. The apertures of the partition are such that the uniformly mixed solution in the mixing chamber is circulated without violent flow to the processing chamber where it is moved by the circulating device over the sheet material to be processed.





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APPARATUS FOR PROCESSING LIGHT-SENSITIVE SHEET MATERIAL BY MEANS OF A PROCESSING SOLUTION

The invention relates to apparatus for processing light-sensitive sheet material by means of a processing solution, with a circulating device for the solution and a feed means for the sheet material, both arranged in a tank.

In previously known apparatus of this type, the circulating device aimed to maintain the processing solution at a uniform concentration throughout the tank while the feed means convey the sheet material through the solution, which may be for example a developer. There was however the danger on the one hand that the sensitive sheet material might be damaged or too intensively washed if speeds of circulation are too high, i.e. if violent motion is imparted to the solution, and, on the other hand, of causing variations in concentration, if the speed of circulation is too low, preventing the sheet material from being uniformly processed.

It is an aim of the invention to provide apparatus for processing light-sensitive sheet material by means of processing solutions, in which apparatus it is possible to achieve uniform processing, without subjecting the sheet material to heavy mechanical stresses or too intensive washing.

In accordance with the present invention, apparatus for processing light-sensitive sheet material comprises a tank for processing solution subdivided by a perforated partition into a processing chamber and a mixing chamber, feeding means for the sheet material located within the processing chamber, a solution circulating device mounted in the processing chamber, a solution agitating device mounted in the mixing chamber, and means for driving the circulating device and the agitating device so that the circulating device circulates the solution relatively slowly in the processing chamber while the agitating device sets up a relatively high speed flow, the perforated partition permitting passage of mixed solution to the processing chamber which prevents violent liquid movement being transmitted to the processing chamber.

The agitating device mixes the processing solution uniformly in the mixing chamber, and the circulating device moves the said solution slowly but uniformly in the processing chamber in which the sheet material is processed. In this way, the sheet material is processed by a slow flow of a uniformly mixed liquid, the liquid in violent motion in the mixing chamber being separated from the calm liquid in the processing chamber by the perforated partition which however permits the passage of the mixed solution to the processing chamber, and excessively violent movements of liquid in the processing chamber is prevented. Furthermore, freshly added processing solutions are first of all mixed in this mixing chamber, and then distributed throughout the whole tank.

Preferably the feed means drives both the circulating device and the agitating device through gearing.

The invention will be more readily understood by way of example from the following description of a processing tank in accordance therewith, reference being made to the accompanying drawing, in which:

FIG. 1 is a plan view of the tank, the middle part of which has been omitted for convenience, and

FIG. 2 is a section on the line II-II of FIG. 1.

A tank 1 is divided into a mixing chamber 9 and a processing chamber 10, by a perforated or apertured partition 2 which extends to the floor of the tank and is parallel to the end walls of the tank.

A pair of feed rollers 3, which feed the sheet material, not illustrated, through the processing solution in the processing chamber 10, are mounted in the latter in the partition 2 and in a parallel transverse wall 2a. A gear wheel 4 is fast on one end of the shaft of one feed roller 3, which is driven by a motor, not illustrated, and that gear wheel 4 meshes with a gear wheel 5 which is fast on the shaft of a vane-agitator 6. The vane-agitator 6 is mounted by way of its shaft in the neighbouring partition 2, and extends therefrom into the mixing chamber 9. The size of the apertures 11 in the partition 2 is so chosen that the high speed at which the liquid in the mixing chamber 9 is mixed cannot have any substantial effect on the liquid in the processing chamber 10.

The gear wheel 5 of the vane-agitator 6 meshes via an intermediate gear wheel 12 with a gear wheel 7 of a worm-agitator 8, which is mounted in the partition 2 and wall 2a and extends throughout the processing chamber 10 parallel to the pair of feed rollers 3 and at a distance therefrom. The transmission ratio of the gear wheels 4, 5, 7 and 12 is so chosen that the vane-agitator 6 is driven more rapidly than the worm-agitator 8.

In operation, when the motor is energized, the vane-agitator 6 causes relatively violent agitation of the processing solution and thus uniform mixing of the solution. The solution is circulated throughout the tank 1 although the size of the apertures 11 prevents the high speed of movement of the liquid obtaining in the mixing chamber 9 from being transmitted to the processing chamber 10. In the processing chamber 10 the solution of uniform concentration is circulated gently over the sheets of light-sensitive material by the action of the worm-agitator 8 to process that material uniformly over its surface.

I claim:

1. Apparatus for processing light-sensitive sheet material comprising a tank for processing solution subdivided by a perforated partition into a processing chamber and a mixing chamber, feeding means for the sheet material located within the processing chamber, a solution circulating device mounted in the processing chamber, a solution agitating device mounted in the mixing chamber, and means for driving the circulating device and the agitating device so that the circulating device circulates the solution relatively slowly in the processing chamber while the agitating device sets up a relatively high speed flow, the perforated partition permitting passage of mixed solution to the processing chamber which prevents violent liquid movement being transmitted to the processing chamber.

2. Processing apparatus according to claim 1 in which the feed means comprise a pair of feed rollers and the circulating device is mounted parallel to, but spaced from, the rollers.

3. Processing apparatus according to claim 1 or claim 2 in which the driving means include gearing by which the circulating device and the agitating device are driven from the feed means.

4. Processing apparatus according to claim 1 in which the circulating device is a worm-agitator.

5. Processing apparatus according to claim 1 in which the agitating device is a vane-agitator.