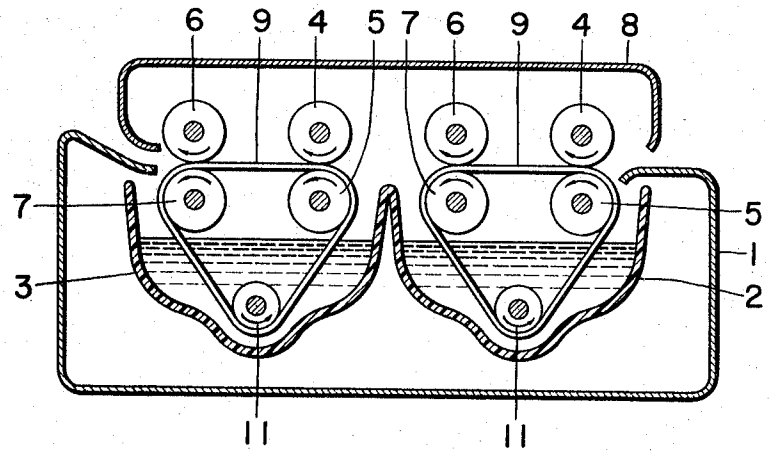
March 14, 1967 SUSUMU FUKUDA 3,308,737

DEVICE FOR APPLYING A TREATING SOLUTION TO SENSITIZED COPYING PAPER

Filed June 9, 1964



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United States Patent Office 3,308,737
Patented Mar. 14, 1967

3,308,737

DEVICE FOR APPLYING A TREATING SOLUTION TO SENSITIZED COPYING PAPER

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Filed June 9, 1964, Ser. No. 373,742
Claims priority, application Japan, June 18, 1963, 38/45,880
2 Claims. (Cl. 95—89)

This invention relates to a device for applying a treating solution to sensitized copying paper. More particularly, it relates to a device for applying a treating solution to sensitized copying paper which comprises a developer tank and a fixer tank arranged in parallel relation in a housing. Two pairs of rollers are arranged above each tank, for applying a treating solution to copying paper and for squeezing the copying paper to remove excessive solution therefrom. The lower rollers of the two pairs of rollers in each tank have an endless belt trained thereover, and each belt is also trained over a guide roller positioned in the bottom of the tank, which bottom has a bilge shape.

In each tank, the copying paper is passed between the upper surface of the belt and the upper rollers of the two pairs of rollers associated with the respective tank. If the copying paper or film is one treated with halogenized silver emulsion for copying purposes, after having been exposed, it is processed successively through the developer bath and the fixer bath. On the other hand, a copying paper or film treated with a positive sensitizer, after being exposed, is processed by passing it only through the developer bath.

The primary object of this invention is to avoid the ageing of treating solution in contact with the paper or film, and render it possible to treat sensitized paper with an ever-fresh solution.

Another object of the invention is to provide means wherein economic use of the liquid in the tanks is made to the last drop.

Description is made of the device with reference to the drawing in which:

The single figure is a longitudinal sectional front view of the device according to the invention.

Referring to the drawing, wherein is illustrated a preferred embodiment of the invention, the device provided by the invention basically comprises two tanks and ten rollers. A developer tank **2** and a fixer tank **3** are arranged in parallel relation in a housing **1**. Two pairs of rollers, **4**, **5** and **6**, **7**, are provided for each tank **2** and **3**, the upper rollers **4** and **6** being rotatably mounted in a cover **8** and the lower rollers **5** and **7** being rotatably mounted in housing **1**. Each of the tanks **2** and **3** has a bilge-shaped bottom, and a fifth roller **11** is rotatably supported along the bilge-shaped bottom of each tank **10**. An endless belt **9** is provided for each tank **2** and **3**, and is trained over the rollers **5**, **7** and **11** of each tank, with the upper surface of belt **9** being engaged by the upper rollers **4** and **6** of each tank. Belt **9** is an endless belt made of flexible material incorrodible by the liquid in the respective tank. It will be noted that endless belt **9** follows an endless path which is in the form of an inverted triangle having its apex in the bilge bottom of the associated tank. The rollers and the belts are actuated in such a direction as to take up or receive copying paper from the right side and send it to the left side. The tanks **2** and **3** are filled with a developer and

fixer, respectively. When the copying paper is inserted between the rollers **4** and **5** with its sentitized surface held downward, the copying paper is drawn in between the roller **4** and the belt **9**, developed with the developer and, after having its surplus liquid left over the paper squeezed out between the next rollers **6** and **7** engaging the belt **9**, is sent to the fixer tank, wherein it is treated with a fixer while it is passing between the upper rollers and the belt **9**. The level of the liquid in the tank drops on account of its consumption but the copying paper is supplied with liquid, while the guide roller **11** is dipped in the liquid, so that a small amount of solution can effectively serve the purpose of treatment.

Summarizing, in the device forming the subject matter of the invention, treatment is effected by a moistened endless belt of absorptive material. The device prevents waste of the treatment solution, because the solution need not be replenished as long as the belt is still in contact with the solution in the bilge. By virtue of the guide rollers **11** provided in the bilge-shaped bottoms of the tanks, the treatment liquid is economically used to the last drop.

What is claimed is:

1. A device for applying a treating solution to sensitized copying paper comprising, in combination, a housing; a tank positioned in said housing and having a bilge-shape bottom, said tank being arranged to contain a treatment liquid; two pairs of rollers, each including an upper and a lower roller, rotatably mounted in said housing above said tank and extending substantially parallel to the longer dimension of the bilge; a fifth roller rotatably mounted to extend longitudinally of the bilge in said bottom; and an endless belt of absorptive material trained between the rollers of the two pairs and under said fifth roller, in the bilge, for immersion in the liquid in the tank, the belt traveling along an inverted triangular path; the copying paper being inserted into the nip of one pair of rollers for passage between the two pairs of rollers in contact with the liquid absorbed in said belt, for continuous treatment of copying paper until the liquid level in the bilge falls below the portion of said belt trained under said fifth roller.

2. A device, as claimed in claim **1**, in which the treatment liquid contained in said tank is a developer liquid; and a second tank, substantially identical to the first mentioned tank, and having operatively associated therewith two pairs of rollers, a fifth roller and an endless belt in the same manner as the first mentioned tank, positioned in said housing in parallel tandem relation with the first mentioned tank; said second tank containing a fixer liquid; whereby copying paper emerging from the nip of the other pair of rollers of said first tank may be inserted into the nip of one pair of rollers of said second tank for passage between the two pairs of rollers operatively associated with the second tank in contact with the fixer liquid absorbed in the belt of the second tank for continuous fixing of copying paper until the liquid level in the bilge of the said second tank falls below the portion of the belt, of the second tank, trained under the fifth roller of the second tank.

References Cited by the Examiner
UNITED STATES PATENTS
1,705,450 3/1929 Mullen ---------- 118—257

NORTON ANSHER, *Primary Examiner.*
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