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DEVICES FOR DEVELOPING PHOTOGRAPHIC COATED CARRIERS

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FIG. 1

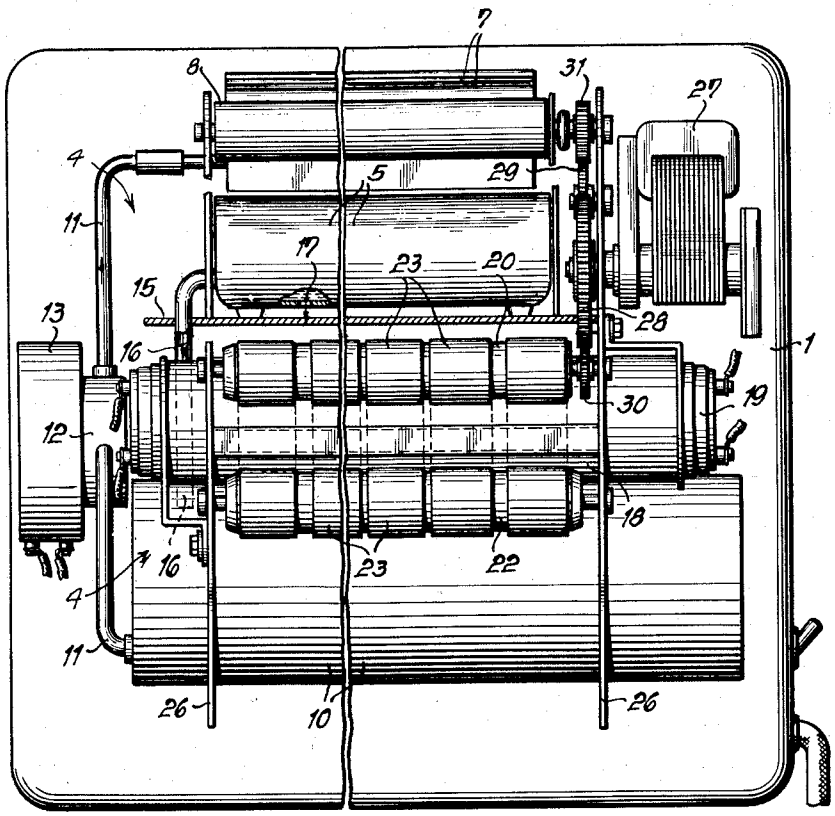
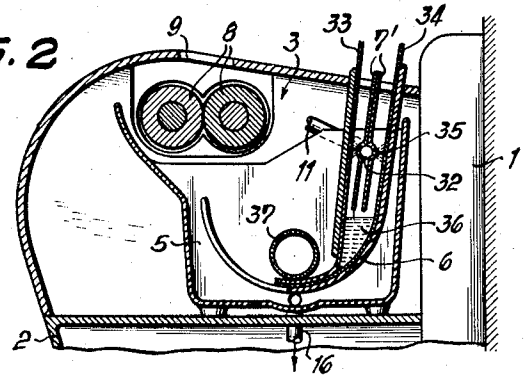


FIG. 2



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DEVICES FOR DEVELOPING PHOTOGRAPHIC COATED CARRIERS

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8 Claims. (Cl. 95—89)

The invention relates to a device for developing exposed photographic coated carriers and for the simultaneous transfer of a picture on to an unexposed coated carrier. As is known, the developing and picture transfer is effected by moistening the two coated carriers with a liquid developer and subsequently pressing together the two coated carriers lying coat to coat. Such devices consist of a container in which the moistening of the coated carriers is effected, and a curved guide track in the container having slots for introducing the two coated carriers separately at one end and a pair of squeezing rollers above the other end, into the nip of which rollers the coated carriers are fed from the ascending section of the guide track.

In the known devices of this type, the liquid developer in the container forms a bath through which the coated carriers are fed for the purpose of moistening them. As the liquid developer becomes prematurely useless due to oxidation when exposed to the action of air, it must always be poured back into a closed bottle after the device has been in use, so as to prevent it from deteriorating.

The necessity of maintaining a permanent bath in the container while the device is in use can be avoided according to the invention by providing a spraying device which is connected to the inflow conduit for the developer and from which the liquid developer is sprayed between the coated carriers. The liquid developer forms a moistening bath in the downwardly tapering gap between the coated carriers, from which gap the liquid runs off laterally into the container.

To save space when setting up the apparatus, the container for the developing device is, according to the invention, arranged at the top of a vertical base plate and slots for introducing the coated carriers are formed in the upper wall of the housing of the apparatus. Below this developing device the known exposing device is mounted on the base plate and its slots for introducing and leading off the coated carriers to be exposed are formed in the front wall of the apparatus housing. An apparatus of this kind possesses the advantage that it can be attached to a wall and is relatively flat, so that it occupies but little space.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, in which

Fig. 1 shows the photocopying apparatus according to the invention in front elevation after the removal of the housing of the apparatus, and

Fig. 2 is a vertical section taken at right angles through the upper part of the photocopying apparatus in which a developing device provided with a spraying device is arranged.

The photocopying apparatus consists of a base plate 1, which can be hung vertically on the wall. However, feet may also be provided on the lower edge of the plate to enable the apparatus to be stood supported on a table flat against the wall. Inside the housing 2 a developing device 3 is arranged underneath the top wall and below this an exposing device 4.

Before introducing the coated carriers into the developing device 3, it is necessary to expose one of the coated carriers together with the original in order to produce a negative picture. This exposure is effected in the exposing device 4 the construction of which is known and therefore only briefly described.

The exposing device 4 consists of a copying cylinder 18 in which a tubular source of light 19 is arranged. Endless feed bands 23 run over three rollers 20, 21 and 22 and the copying cylinder 18. One of these rollers is driven. An inlet slot 24 and an outlet slot 25 are provided in the front wall of the housing 2. An original and the coated carrier to be exposed are introduced through the slot 24, gripped by the conveyor bands 23 and guided round the source of light 19 between the conveyor bands and the copying cylinder 18. The original and coated carrier leave the apparatus through the outlet slot 25. The exposed coated carrier and an unexposed coated carrier are then introduced into the developing device 3 through two separate slots between the guide plates 7.

As can be seen from Fig. 1, both the squeezing rollers 8 and also the guide rollers 20, 21 and 22 are mounted in vertical walls 26. The drive is effected by an electric motor 27 which drives a large gear wheel 28 meshing with a transmission gear wheel 29 and also with a gear wheel 30 keyed on the axle of the roller 20. A gear wheel 31 keyed on the axle of one of the squeezing rollers 8 meshes with the transmission gear wheel 29. As a result of this arrangement the motor 27 simultaneously drives the conveyor bands 23 through the intermediary of the roller 20 and also the pair of squeezing rollers 8.

The developing device 3 is best seen in Fig. 2. A motor 12 drives a pump 12 connected to storage tank 10 which contains a liquid developer. The liquid developer is pumped by the pump 12 through the inflow conduit 11, to a conduit 32 which is arranged in a guide plate 7' two slots formed by guide plates 7, 7' and serving for introducing the coated carriers 33 and 34. Distributed over the length of this conduit 32 are nozzles 35 through which the liquid developer, pumped under pressure into the conduit 32, is discharged and sprayed on the inner sides of the coated carriers 33 and 34. The liquid developer then collects in the gap 36 between the two coated carriers 33 and 34, which gap tapers in downward direction. The liquid developer flows laterally out of this gap 36 at the edges of the coated carriers 33, 34 and drips into the container 5 which is connected with the storage tank 10 by the return flow conduit 16.

At the lowest point of the guide track 6 a pressure roller 37 is arranged which presses the coated carriers 33, 39 together and against the guide track 6. This prevents the liquid developer collecting in the gap from forcing the two coated carriers apart and hindering them from coming into contact with each other as they are being guided along the ascending portion of the guide track 6 to the squeezing rollers 8. The pressure roller 37 may rest loosely on the guide track 6 but it may also be mounted at its ends and, if necessary, driven.

The liquid developer therefore flows back into the storage tank 10 without appreciably moistening the outer sides of the coated carriers. Consequently it does not remain exposed to oxidation for any length of time in the container 5.

The curved guide track 6 is provided with apertures so that the liquid developer cannot collect on this guide track but must run off into the container 5 and through outlet 16 into tank 10.

I claim:

1. In a device of the type described, in combination, container means; a pair of guide members for guiding

two coated carriers spaced from each other in downward direction into said container means; guide means below said guide members for guiding said coated carriers into contact with each other so that the inner surfaces of the coated carriers form a downwardly tapering gap between each other; and spraying means located between said guide members above said guide means and adapted to be located in the tapering gap between the coated carriers for spraying a liquid onto the inner surfaces of the coated carriers so that the liquid accumulates in the gap before laterally flowing into said container whereby the inner surfaces of said carriers are wet when in contact with each other during passage through said guide means.

2. In a device of the type described, in combination, container means; a pair of guide members for guiding two coated carriers spaced from each other in downward direction into said container means; guide means below said guide members for guiding said coated carriers into contact with each other so that the inner surfaces of the coated carriers form a downwardly tapering gap between each other; spraying means located between said guide members above said guide means and adapted to be located in the tapering gap between the coated carriers for spraying a liquid onto the inner surfaces of the coated carriers so that the liquid accumulates in the gap before laterally flowing into said container whereby the inner surfaces of said carriers are wet when in contact with each other during passage through said guide means; conduit means connecting said container means with said spraying means; and pump means located in said conduit means for pumping liquid accumulating in said container means to said spraying means.

3. In a device of the type described, in combination, container means; a pair of guide members for guiding two coated carriers spaced from each other in downward direction into said container means; guide means below said guide members for guiding said coated carriers into contact with each other so that the inner surfaces of the coated carriers form a downwardly tapering gap between each other; a pair of squeezing rollers for receiving and squeezing the coated carriers after passage through said guide means; and spraying means located between said guide members above said guide means and adapted to be located in the tapering gap between the coated carriers for spraying a liquid onto the inner surfaces of the coated carriers so that the liquid accumulates in the gap before laterally flowing into said container whereby the inner surfaces of said carriers are wet when in contact with each other during passage through said guide means.

4. In a device of the type described, in combination, container means; a pair of guide members for guiding two coated carriers spaced from each other in downward direction into said container means; guide means below said guide member for guiding said coated carriers into contact with each other so that the inner surfaces of the coated carriers form a downwardly tapering gap between each other; a pair of squeezing rollers for receiving and squeezing the coated carriers after passage through said guide means; spraying means located between said guide members above said guide means and adapted to be located in the tapering gap between the coated carriers for spraying a liquid onto the inner surfaces of the coated carriers so that the liquid accumulates in the gap before laterally flowing into said container whereby the inner surfaces of said carriers are wet when in contact with each other during passage through said guide means; conduit means connecting said container means with said spraying means; and pump means located in said conduit means for pumping liquid accumulating in said container means to said spraying means.

5. Device for transfer of a picture from a photographic coated carrier to an unexposed coated carrier, comprising, in combination, a container means; a curved guide track in said container means having two spaced slots for the separate insertion of the coated carriers at one end; a pair of squeezing rollers above the other end of said guide track, the coated carriers being guided into the nip of said squeezing rollers by the ascending section of said guide track; a spraying device arranged between said two slots for spraying the liquid developer between the coated carriers whereby the liquid developer forms a wetting bath in the downwardly tapering gap between the two coated carriers so that the liquid developer runs off laterally into said container means; return conduit means connecting said container means with said spraying device; and pump means in said return conduit means.

6. Device for transfer of a picture from a photographic coated carrier to an unexposed coated carrier, comprising, in combination, a container; a curved guide track in said container having two spaced slots for the separate insertion of the coated carriers at one end; a pair of squeezing rollers above the other end of said guide track, the coated carriers being guided into the nip of said squeezing rollers by the ascending section of said guide track; a spraying device arranged between said two slots for spraying the liquid developer between the coated carriers whereby the liquid developer forms a wetting bath in the downwardly tapering gap between the two coated carriers so that the liquid developer runs off laterally into said container; a closed storage tank for the liquid developer located underneath said container; a conduit connecting said storage tank with said container; a return conduit connecting said storage tank with said spraying device; and pump means in said return conduit.

7. Device according to claim 6, wherein the spraying device consists of a horizontal conduit provided with nozzles distributed throughout its length and arranged in a guide surface separating the two slots for introducing the coated carriers.

8. Device according to claim 6, wherein a pressure roller is arranged above approximately the lowest point of the guide track and presses the coated carriers together and against the guide track.

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