A processor for photographic prints comprises a pair of slotlike tanks (13, 14) for holding processing chemicals for immersion of the prints. The tanks have V-shaped tops and lie on opposite sides of a common heating core in the form of a water-filled compartment (15) containing a heater and thermostat unit (18). In order to prevent the prints from sticking to the tank walls the walls are provided with a textured finish. Each print is held by a clip comprising a clip body (24) having a pair of jaws (29, 30) one of which carries biting means (31). The resilience of the body biasses the jaws together so that biting means (31) closes against a rigid support surface (32) carried by the other jaw. The jaws are moved apart by a wedge (37) carried by a plunger (25). A doctor blade (16) located above the central compartment (15) removes chemical from the print as it is removed from the tank.
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PHOTOGRAPHIC PROCESSOR AND CLIP

The development of exposed photographic prints involves immersing them in various chemicals for specified periods of time, the chemicals being heated above ambient temperature.

These chemicals are prone to oxidise rapidly on exposure to air (often within one hour) and it has previously been proposed to use them in narrow heated tanks to keep the exposed area to a minimum. This can increase the useful life of the chemicals to several months. It also reduces the volume of chemical which has to be heated, so cutting down warm-up time. There is also a further advantage in that the escape of toxic vapours is reduced.

There is, however, a major drawback with the use of a narrow tank, namely that the print has to be held in a special frame in order to stop the print from sticking to the tank sides. When the frame is removed from the tank it tends to carry a considerable amount of chemical with it so that in order to prevent contamination of the next chemical in the process the print and frame must first be dipped in a stop bath or rinse.

The present invention arises from the notion that if the print frame could be eliminated, the processing time could be
significantly reduced, the stop bath could be done away with, and the tanks could be made even narrower.

Now, the present invention provides apparatus for processing photographic prints, comprising a tank for holding processing chemicals for immersion of prints, in which the interior surface of the tank that might otherwise adhere to the prints is provided with a textured finish whereby such adhesion is prevented.

It has been found that by using such a finish the previous problem of adhesion can be completely eliminated and the volume of the tank can be further reduced by at least half.

Whilst it is envisaged that many different forms of textured finish could be used (bumps, ridges, grooves, pits etc.) the finish preferably incorporates surface indentations. There are preferably between 1 and 100 such indentations per square cm.

The invention also provides apparatus for processing photographic prints comprising a pair of slot-like tanks for holding processing chemicals for immersion of prints, the tanks being disposed on opposite sides of a common heating core with which they are in thermal conducting relationship.

The slot-like nature of the tanks and their disposition relative to the core enables them to rapidly attain the required working temperature.

The tanks are preferably provided with stop members at opposite ends of the slots and projecting from the side of the tank remote from the heating core.

The invention further provides a clip (which may form part of the apparatus or a separate item of commerce) comprising a pair of jaws one of which carries biting means, the jaws being biased
together so that the biting means closes against a rigid support surface carried by the other jaw, and means for moving the jaws apart.

The biting means may be a blade, or preferably teeth, two teeth being preferred.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a print processor in accordance with the invention,

Figure 2 is a transverse section through the processor,

Figure 3 is an enlarged detail of the processor,

Figure 4 is an end view of a print clip for use with the processor,

Figure 5 is a side view of the clip, and

Figures 6 a to f are various schematic representations of the processor and clip illustrating how they may be used.

Referring to Fig.s 1 and 2, the processor comprises a rectangular base 1 provided with rubber feet 2. Upstanding from and integral with the base are two trapezoidal end walls 3, 4, of substantially identical shape. Four further walls 5 - 8 are cemented into grooves 9 - 12 in the base 1 and end walls 3, 4, to form two slot-like processing tanks 13, 14, each of about 1 litre capacity, separated by a central heating compartment 15. The upper edge portions 5a - 8a of the tank walls are turned outwardly to provide the tanks with V-shaped tops. The top edges of the outer tank walls 5, 8, are inset from the converging edges 3a, 3b and 4a, 4b of the
walls 3 and 4, the reason for which will be revealed below.

The central compartment 15 is closed by a top member 16 containing a hole 17. An electrical heater and adjustable thermostat unit 18 is inserted into the lower part of compartment 15 through one of the end walls 4. The processing tanks 13, 14, have drainage taps 19, 20, also inserted through the lower part of end wall 4.

The inner faces of the tank walls 5-8 have textured surfaces (fig. 3) formed by two sets of parallel ridges 21, 22, which intersect to create tetrahedral indentations 23. The ridges are about 3-7 mm apart giving about 9 indentations per square cm.

The clip shown in figs. 4 and 5 is formed of an integral plastics or stainless steel body 24 and a plunger 25. The body includes a flat square top part 26, opposed edges of which lead into underturned sloping shoulders 27, 28, which in turn lead into a pair of opposed downwardly directed jaws 29, 30. One of the jaws 30 carries a pair of spike-like teeth 31 directed towards a flat, rigid support surface 32 provided by a downward extension of the opposed jaw 29. The inherent resilience of the clip body biases the jaws together so that the teeth 31 close against the surface 32. The jaw 29 also carries a stop member 33 positioned above the teeth 31.

The plunger 25 comprises a stem 34 which carries a cap 35 and extends through the top of the body 24. A retaining collar 36 is secured to the stem beneath the top of the body 24 and the stem terminates in a wedge-shaped member 37 directed between the jaws 29, 30.

In use, water pre-heated to 35 to 40°C is introduced into the central compartment 15 through hole 17. The tank 13 is filled to the bottom of the V-shaped top with developer, also at 35 to 40°C, and tank 14 is similarly filled with a fix solution. The heater and thermostat unit 18 is then connected to a suitable
power source and the temperature of the chemicals is checked at 15 minute intervals until they stabilise at the required temperature. In practice the central compartment 15 operates some 5°C higher than the outer tanks. There is a continuous lateral heat flow from the central compartment, through the tanks to atmosphere so that the chemicals quickly attain the required temperature both on initial filling and on topping-up, and once that temperature is achieved there is minimal temperature fluctuation within the tanks.

The clip is attached to an exposed print by grasping the clip in one hand with the fingers below one of the shoulders 27, 28, and the thumb below the other. Light pressure is then applied to the button 35 using the root of the forefinger so that the wedge-shaped member 37 is urged between the jaws 29, 30 forcing them apart. The print is then slid between the jaws with its back against surface 32 until it reaches stop 33 whereupon the pressure on button 35 is released allowing the jaws to close. The teeth 31 bite into the print but since it is rigidly supported by surface 32 there is minimal damage to the print and practically no masking of the print during the development process.

The apparatus is designed for ease of use in low ambient light levels or total darkness. Holding the print by the clip, the back of the print is presented to the top edge of wall 5 (Fig. 6a). The end walls 3, 4, act as stops to enable the correct lateral position of the print to be determined. The print is then drawn upwards and backwards until it is felt to drop into the V-shaped top of the tank 13 (Fig. 6b). The print is then moved to an upright position and lowered into the tank until the clip rests in the V-shaped top (Fig. 6c). The print can be agitated in the developer using the clip. After an appropriate time the print is slowly withdrawn towards the second tank 14 (Fig. 6d). The member 16 acts as a doctor blade to wipe developer from the rear of the print whilst the front of the print drains.
by surface tension. Little if any developer is held by the clip. When the print is felt to locate in the second tank 14 (Fig. 5a) it is lowered into the fix in an upright position. The print is again agitated as necessary and then removed after the appropriate time.

It has been observed that with a textured surface as described above, not only is the print prevented from adhering to the interior of the tank but the surface actually appears to repel the print. The mechanism by which this occurs is not fully understood.

The apparatus is suitable for processing colour or monochrome prints and up to 30 prints per hour can be processed. The chemicals can be left in the tanks for several months without oxidising.

The clip may have other uses apart from the processing of photographic prints.

* * * * * * * * * *
CLAIMS

1. Apparatus for processing photographic prints, comprising a tank for holding processing chemicals for immersion of prints, in which the interior surface of the tank that might otherwise adhere to the prints is provided with a textured finish whereby such adhesion is prevented.

2. Apparatus according to Claim 1, in which the textured finish incorporates surface indentations (23).

3. Apparatus according to Claim 2, in which there are between 1 and 100 surface indentations per square cm.

4. Apparatus according to Claim 1, comprising a pair of slot-like tanks (13, 14) for holding processing chemicals for immersion of prints, the tanks being disposed on opposite sides of a common heating core (15) with which they are in thermal conducting relationship.

5. Apparatus according to Claim 4, in which the tanks (13, 14) are provided with stop members (3, 4) at opposite ends of the slots and projecting from the side of the tank remote from the heating core (15).

6. Apparatus according to Claim 4, including a member (16) capable of acting as a doctor blade and located above the heating core (15).

7. Apparatus according to Claim 4, in which the heating core comprises a compartment (15) for containing water and including a heater and thermostat (18).

8. Apparatus according to Claim 4, in which the tanks (13, 14) both have V-shaped tops.
9. Apparatus according to Claim 1, including a clip comprising a pair of jaws (29, 30) one of which carries biting means (31), the jaws being biassed together so that the biting means closes against a rigid support surface (32) carried by the other jaw, and means (25) for moving the jaws apart.

10. Apparatus according to Claim 9, in which the biting means (31) consists of two teeth.

11. Apparatus according to Claim 9, in which the jaw that carries the rigid support surface (32) is provided with a stop member (33) that defines a registered stop position for an article to be gripped by the biting means.

12. Apparatus according to Claim 9, in which the jaws (29, 30) are provided by a single member (24), the inherent resilience of which biasses them together.

13. Apparatus according to Claim 9, in which the means for moving the jaws apart comprises a wedge-shaped member (37) directed between the jaws (29, 30).

14. A clip comprising a pair of jaws (29, 30) one of which carries biting means (31), the jaws being biassed together so that the biting means closes against a rigid support surface (32) carried by the other jaw, and means (25) for moving the jaws apart.
# INTERNATIONAL SEARCH REPORT

**PCT/GB 84/00121**

## I. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both National Classification and IPC

**IPC**: G 03 D 13/04

## II. FIELDS SEARCHED

### Minimum Documentation Searched

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Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched

## III. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>DE, A, 2920821 (KUNSTSTOFFTECHNIK FRIES GmbH) 4 December 1980, see pages 10-13; figures 1-4</td>
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<td>US, A, 4063324 (R.G. JUNGE) 20 December 1977; see column 5, lines 61-68 and column 7, lines 43-47</td>
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<td>US, A, 3362315 (W.W. BUECHNER) 9 January 1968, see column 5, lines 35-44</td>
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* Special categories of cited documents:
  - **Y** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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**IV. CERTIFICATION**

**Date of the Actual Completion of the International Search**

13 July 1984

**Date of Mailing of this International Search Report**

07. 09. 84

**International Searching Authority**

EUROPEAN PATENT OFFICE

**Signature of Authorized Officer**

G.L.M. Kuytenbers

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V. OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE

This international search report has not been established in respect of certain claims under Article 17(3)(a) for the following reasons:

1. Claim numbers ________ because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim numbers ________, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

VI. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This International Searching Authority found multiple inventions in this International application as follows:

- claims 1-8 : Processing apparatus
- claims 9-14 : Film clip

1. As all required additional search fees were timely paid by the applicant, this International search report covers all searchable claims of the International application.

2. As only some of the required additional search fees were timely paid by the applicant, this International search report covers only those claims of the International application for which fees were paid, specifically claims:

3. No required additional search fees were timely paid by the applicant. Consequently, this International search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers: 1-8.

4. As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest
☐ The additional search fees were accompanied by applicant’s protest.
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This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 03/08/84.

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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82.