(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 396 514**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **90830189.8**

(51) Int. Cl.5: **G03D 13/06**

(22) Date of filing: **02.05.90**

(30) Priority: **04.05.89 IT 4791489**
04.09.89 IT 4832889

(43) Date of publication of application:
07.11.90 Bulletin 90/45

(84) Designated Contracting States:
DE ES FR GB

(71) Applicant: **Bernardini, Angelo**
14 Via Ruzzante
I-00145 Roma RM(IT)

(72) Inventor: **Bernardini, Angelo**
14 Via Ruzzante
I-00145 Roma RM(IT)

(54) **Device for the mechanical stripping of the envelopes of endo-oral radiographic film plates.**

(57) A device for the stripping of the envelopes containing endo-oral radiographic film plates has been described, said device being composed of a container with cover and of a stripping mechanism embodied by a rotatable shaft provided with holding means, the container serving to hold the processsing solutions and to receive the extracted film plates, while the cover serves to exclude the penetration of light and the shaft to effect the material undoing of the envelope.

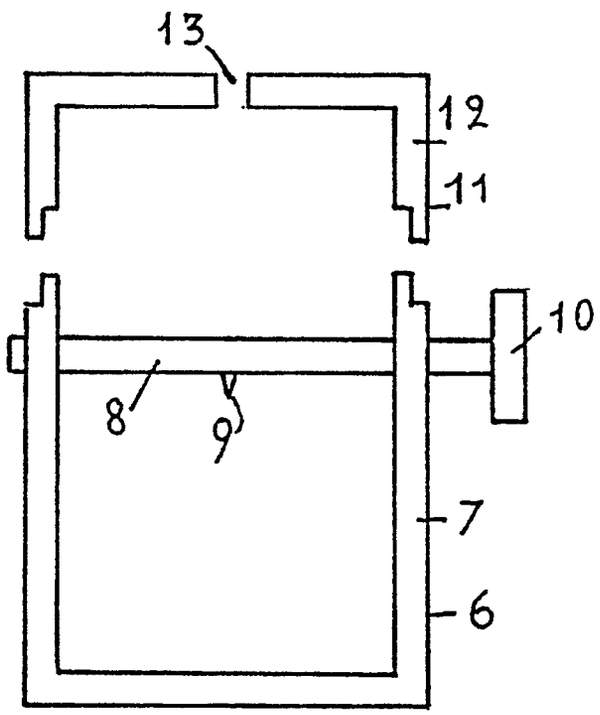

FIG. 2

EP 0 396 514 A2

The present invention refers to a mechanical means for the extraction of radiographic film plates from the envelopes where they were X-rayed in the mouth of dental patients.

We know that in the dental practice the most common means to process said radiographs is presently a darkroom embodied by a light-tight box, where the operator introduces and processes the exposed films : to do this he has to undo manually their envelope inside said box, extract the film plates and process them with photographic reagents, all these operations taking place in the absolute darkness warranted by the construction and material of the box.

The purpose of the present invention is to replace the manual undoing of the aforesaid envelopes with the work of an internal stripping mechanism, the end finality being to release the film plate herein contained into the processing photographic solution without using the darkroom box.

This presents the advantages of not only easing the operator's work, but also of needing a much smaller space. In addition, the operator's hands will no longer come in contact with harmful chemicals such as those of the developing solutions.

Endo-oral radiographic film plates are of standard size and shape, and in the adjoined sheet of drawings the front face of a conventional envelope is portrayed.

The device of this invention comprises basically the combination of the following parts :

- A container with removable cover, the latter or both provided with one or more perforations for the introduction and the extraction of the process solutions : their assembly works contemporarily as a dark room and as a photographic reactor.
- A rotatable shaft : this crosses the container or the cover in a preferably horizontal direction, and its function is that of grasping a loose flap borne by the envelope and dragging it in its own rotation, as will be better explained later.

To do this, the shaft is provided with holding or hooking means, which can consist of different contrivances, such as for instance needle-shaped points protruding from its surface, or longitudinal slits, or adhesive compounds, or calibrated cylindrical spiral springs keyed onto it and bearing in one or in both extremities hook-shaped protrusions, and so on.

For a successful operation, the condition must be satisfied that the envelope, once grasped by the holding means of the shaft, cannot follow the latter's rotation. This can be realized through various means, a simple one being that of having the shaft running so close to the container's or cover's wall that the envelope can pass through the interstice, but not rotate jointly with the shaft. By the term "wall" is here meant not only the inner surface of the container or of the cover, but also the inner face of the cover's roof.

Means to hinder said envelope's rotation other than this can also be employed, such as for instance a solid or filiform or rod-like element running parallel to the shaft at a distance from the same to allow the envelope to go across the interstice, but not large enough to let it rotate with the shaft.

The container-cover combination can be of several geometrical shapes : good results were obtained with parallelepipedal or cylindrical conformations. The material must be impervious to light.

With reference to fig. 1, the numeral 1 represents the outer front face of a standard endo-oral film plate envelope, the numeral 2 indicates a line corresponding to a cross seal bearing a loose flap 3. 4 is the upper part of the envelope's front face, while 5 is the lower part.

Fig. 2 portrays the front view of one of the possible embodiments, in this case a square-based prysmatic one, with the shaft located in the container's body. In this figure the numeral 6 indicates said container's body, 7 its wall, 8 the shaft bearing a pointed hook 9 and driven by the handle or knob 10, 11 indicates the cover, 12 the cover's wall and 13 a perforation in the cover.

Fig. 3 portrays the front view of a similar possible embodiment, different from that of fig. 2 in that of having the stripping mechanism located in the cover instead than in the container.

Figures 4 and 5 are both vertical views of figures 2 and 3, and differ as regards the location of the shaft : this in fig. 4 is located close to the wall, and the space 14 between the shaft and the wall is so limited as to be sufficient to let the envelope to pass through, but not to rotate with the dhaft, while in fig. 5 the shaft is located at a larger distance from the wall : since the interspace between shaft and wall would be large enough for the envelope to follow the rotation of the shaft, in which case it would not be stripped, a filiform element or a rod running parallel and close to the shaft works as a hindrance to the rotation of the envelope.

The above named figures serve to explain how the stripping operation proceeds : when the shaft 8 is set in rotation by the drive 10, which can be operated either manually or through other mechanical means, after grasping the flap 3 of the envelope 1 it drags this flap, and the flap winds on its surface. As the rotation continues, the drag undoes the seal 2 and the section 4 of the envelope winds also on the shaft, following the flap 3 and followed by the back face of the envelope in the winding process : the entire envelope is now wound on the shaft, and the film plate is released and falls to the bottom, into the processing solution.

Claims

1. A device to extract mechanically the endo-oral radiographic film plates from their envelopes, comprising a light-tight combination of a container with a corresponding removable cover, both of appropriate geometrical conformation, with a stripping mechanism provided with means to grasp and drag in a stripping rotation the faces of the aforesaid protecting envelopes and combined with means apt to prevent that the envelopes be dragged in rotation by the shaft, located inside.

2. Device as in claim 1, where the stripping mechanism is located in the container.

3. Device as in claim 1, where the stripping mechanism is located in the cover.

4. Device as in the claims 2 and 3, where the stripping mechanism is embodied by a rotatable shaft provided with holding or hooking means.

5. Device as in claim 4, where the means to hold the envelope consist essentially in a rigid point protruding from the shaft's surface.

6. Device as in claim 4, where the means to hold the envelope consist essentially in a longitudinal slit in the body of the shaft.

7. Device as in claim 4, where the means to hold the envelope consist essentially in adhesive substances.

8. Device as in claim 4, where the means to hold the envelope are represented by a calibrated spring kayed to the shaft and having one or both extremities hook-shaped.

9. Device as in claim 1, where the container and the cover are of a substantially parallelepipedal form.

10. Device as in claim 1, where the container and the cover are of a cylindrical form.

11. Device as in claim 1, where the shaft crosses the inside.

12. Device as in any of the preceding claims, bearing perforations in the body or in the cover or in both.

13. Device as in any of the preceding claims, where the envelope is prevented from rotating with the shaft by an elongated element running parallel and close to the shaft.

14. Device as in any of the claims from 1 to 12, where the rotation of the envelope is prevented by the shortness of the interspace between shaft and wall.

15. Device as in any of the preceding claims, where means to drive the shaft are provided.

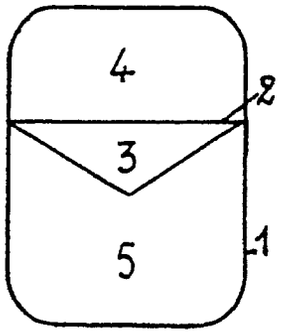

FIG. 1

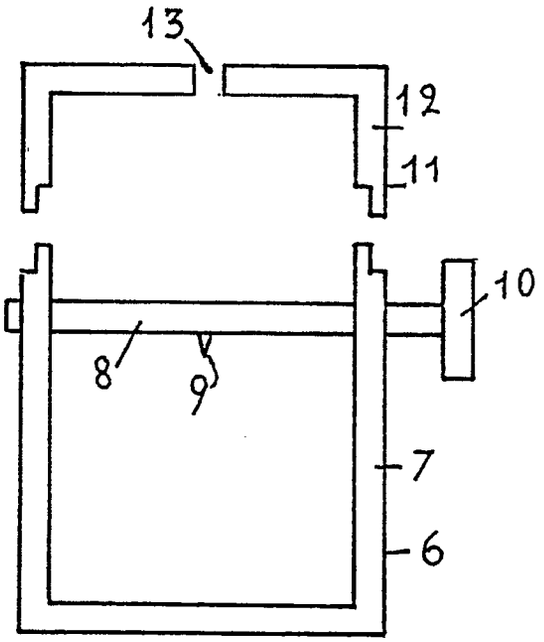

FIG. 2

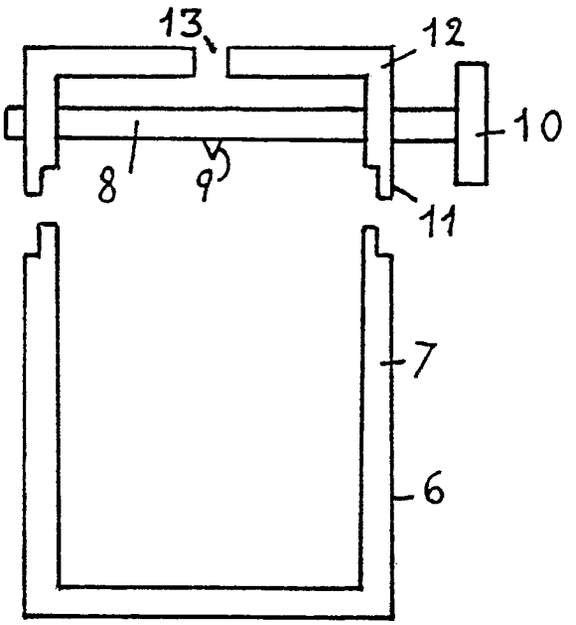

FIG. 3

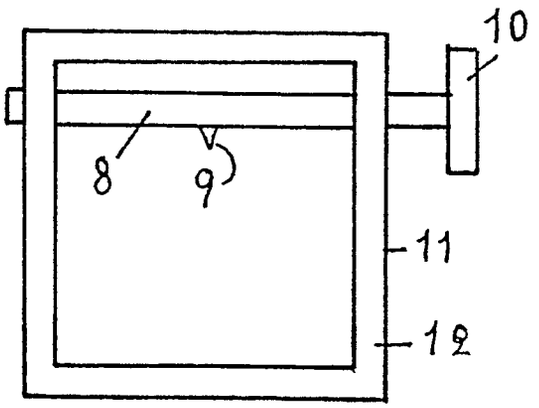

FIG. 4

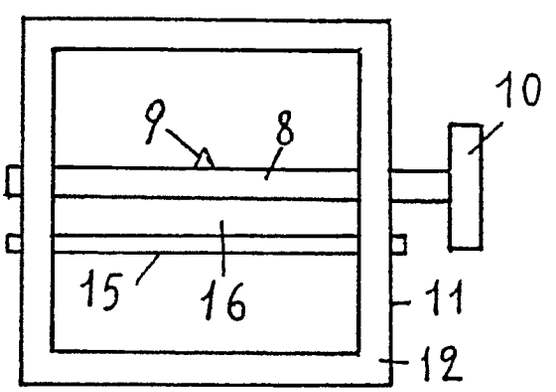

FIG. 5