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FILM WIPER

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This invention pertains to photographic arts and relates more particularly to a film wiper useful, for example, in wiping off surplus developing fluid or wash water from a length of film during the developing operation, or for cleaning a finished film, either negative or positive, for instance, before printing or exhibiting.

The embodiment of the invention herein chosen for specific illustration is particularly designed as a hand-actuated implement for use in wiping or cleaning a roll film of the kind used in the ordinary hand camera, but the principle of the invention is obviously capable of embodiment in an attachment to a developing or exhibiting apparatus designed for use with moving picture films.

During the usual process of development, the film is immersed successively in developing and fixing solutions and in wash water. Since the same developing and fixing baths may be used for treating many films in succession, these baths often become contaminated with small particles of solid or semi-solid matter, for instance bits of the coating emulsion, shreds of backing paper, dust, etc., and in removing the film from the bath such solid particles may cling to the surface of the film and unless removed before the next subsequent step in the process, may cause defects in the image. Moreover, in shifting the film from one bath to another it is desirable to remove surplus fluid from the film in order to avoid undue contamination of one bath by the fluid of the preceding bath, and, after washing, the surplus water should be removed to prevent the formation of drops on the partially dried film with consequent streaks or spots on the finished film.

The principal object of the present invention is to provide a film-wiping device useful in removing surplus fluid from the film during or at the conclusion of the developing operation.

Most of the wiping is a mechanical action in which the wiper pushes the fluid ahead of it, and it is requisite, in order to obtain a close contact of the wiper with the film, that the film-contacting element of the wiper be soft and resilient. Obviously, it must be of a nature such that it will not scratch or scrape the film, and for best results it should be of an absorbent nature so as by capillary action to pick up and hold small particles of solid matter. However, when the film-contacting element or pad of the wiping device is of absorbent nature, it will become saturated with fluid after being passed over the film a few times and will soon be soiled by absorption

of solid particles. A further object of the invention is to provide a wiping device having a film-contacting pad of absorbent non-abrasive material which may readily be removed and replaced with fresh material as often as may be desired.

Since the materials used in development, as well as those which form the image on the film, are in the nature of chemical salts subject to reactive change when brought into contact with other chemical substances, it is requisite that the wiping pad be so designed that it may be made of a material which is chemically neutral as respects the developing reagent, and a further object of the invention is to provide a wiper device comprising means for holding pad-forming material which is substantially neutral (from the chemical standpoint) but which may be obtained in a self-sustaining form capable of being handled and which will not disintegrate or evolve free lint during use.

Other objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawing wherein

Fig. 1 is a perspective view to small scale, showing the device in a preferred embodiment and its mode of use;

Fig. 2 is a plan view to larger scale of that embodiment of the device illustrated in Fig. 1;

Fig. 3 is a side view of the device shown in Fig. 2;

Fig. 4 is a fragmentary section to larger scale on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view illustrating a length of pad-forming material of a kind which has been found very desirable for use in the device illustrated in Figs. 1, 2 and 3;

Fig. 6 is a fragmentary plan view illustrating a wiping device provided with a pad of different form; and

Fig. 7 is a view similar to Fig. 6 but showing another form of pad.

Referring to the drawing, the letter F designates a photographic roll film such as is used in the ordinary hand camera, the film being shown as provided with a clip or clamp C at each end by means of which the film is supported in substantially vertical position between two hooks H. This may, for example, illustrate the position of the film after it has been washed, and while it is being dried.

The wiping device forming the subject matter of the present invention is indicated generally by the numeral 1. This wiping device, as illustrated

in Figs. 1, 2, 3 and 4 comprises a pair of elongate holders 2 and 3, preferably substantially rigid and conveniently made from bars of wood, hard rubber, synthetic resin or other suitable material which will not be injuriously affected by exposure to developing fluids or the like. At one end, each of these elongate holders 2 and 3 is provided with a transverse slot 4 (Fig. 3). Within these slots are disposed portions of a rigid spacer member 5, here shown as a thin rigid disk of metal or other suitable material. Preferably this disk 5 is rigidly united to one of the holders, for example, the holder 3, by means of two or more screws or rivets 6 (Fig. 2) but is pivotally united to the other holder by means of a pivot member 7, here shown as a bolt (Fig. 4) having a slotted head for the reception of a screw driver and screw threaded at its opposite end for engagement with a conical plug 8 embedded in the substance of the holder 2. This form of pivot member permits wear to be taken up, and by tightening the bolt, the upper and lower parts of the holder 2 may be caused to pinch the spacer member 5 more or less so as not only to take up wear but also to vary the freedom of motion of the holders with respect to each other. The axis of the pivot member 7 is so located that the connected ends of the holders 2 and 3 are normally spaced apart a distance more or less approximating the combined thickness of the wiping pads which are carried by the respective holders so that, in use, the opposed faces of these pads may be disposed in nearly parallel relation. The portions 2^a and 3^a of the holders 2 and 3, adjacent to the spacer 5, constitute handle elements by means of which the device may be grasped in the hand K of the user, as indicated in Fig. 1.

Each of the holders 2 and 3 is provided with a pair of longitudinally spaced openings 10, 11; and 12, 13, respectively, these openings, as illustrated in Figs. 1, 2 and 3, being substantially circular,—passing through the entire thickness of the holder,—and with the axis of each opening substantially perpendicular to the length of the holder.

Extending between the respective pairs of openings are lengths 14 and 15, respectively, of pad-forming material, the ends 14^a and 14^b of the length 14 extending outwardly through the openings 10 and 11, respectively, while the ends 15^a and 15^b of the length 15 of material extend out through the openings 12 and 13, respectively. This pad-forming material is of sufficient natural stiffness and resiliency so that when its ends are projected out through the openings, the resistance of the material to flexure causes it to bite against the edges of the openings and thus retain the pad-forming material in position until it is purposely removed.

For the use for which it is intended, it is requisite, as above suggested, that this pad-forming material be chemically neutral with respect to the developing reagent, so that it will not react with the latter or with the image-forming substances on the film. Such materials as carefully cleaned and washed cotton fiber; the material known as alphacellulose; or chemical filter paper are well suited for the purpose. As illustrated in Fig. 5, a preferred form of this material is a cylindrical strand of carefully cleaned and sterilized cotton fiber, such as is commonly used by dentists for absorbing saliva in the mouth of the patient. Such material is apparently made by winding a very thin film or fleece of refined cotton, such as is delivered by a cotton

carding machine or the like, so as to form a compact cylinder, the outer surface of the cylinder being coated with a neutral size, for example, gellatin size, which is allowed to dry and thus to retain the cylindrical shape of the strand; at the same time effectively anchoring the outer fibers in place so that no loose lint or fiber projects from the surface. This material may be obtained in long lengths, offers substantial resistance to sharp bending, and may be cut to the proper length for insertion in the holes of one of the holders, the elongate bight of material extending from one hole to the other, constituting the film-wiping pad, as above suggested.

Having supplied each of the holders with one of these pads, the device is used as illustrated in Fig. 1. The operator swings the holders apart and disposes them on opposite sides of the film, and then, grasping the handle portions 2^a and 3^a of the holders between his thumb and fingers squeezes them together so as to bring the pads in contact with the opposite sides of the film. The device is then moved bodily downward in the direction of the arrow A (Fig. 1), thus pushing surplus fluid ahead of it toward the lower end of the film. Thus all surplus fluid may be removed and at the same time any small solid particles which do not flow ahead of the wiper may be expected to be absorbed by or to cling to the surface of the wiping pad. After the wiping pads have become soiled or so saturated that they no longer exert any capillary action useful in picking up solid particles, the lengths of pad-forming material may readily be removed from the holders and new and clean lengths inserted in their place. Such change of the pad-forming material is accomplished very easily and without requiring the use of tools, and since this pad-forming material, even in such a pure state as is requisite, may be obtained at a reasonably low cost, the user may be assured of a clean, efficiently operating and substantially lintless wiping device without undue expense.

In Fig. 6 a slight modification is illustrated wherein a portion 2^x only of one of the holders is shown. This holder is provided with the openings 10^x and 11^x, corresponding to the openings 10 and 11 of the holder 2. In this instance, instead of using wiper material in the form of a single unitary strand, like the strand 15, the wiping material is here in the form of an elongate pad P consisting of a series of superposed layers of absorbent material, for example filter paper, the ends of the pad extending outwardly through the holes 10^x and 11^x. In using this device and after the outermost layer has become soiled, it is merely necessary to tear off this outer layer to provide a clean layer for the next operation.

In Fig. 7 a somewhat more elaborate arrangement is illustrated wherein the holder 2^y has the openings 10^y and 11^y corresponding to the openings 10 and 11 of the holder 2, but in this instance is furnished at its inner surface with a resilient pad member 17, for example of sponge rubber permanently united to the holder and forming a part of the latter. Extending over the inner face of this pad is a length 14^y of absorbent material, for example filter paper in the form of an elongate ribbon which, at one end, is wound to form a supply roll R disposed in a housing 18 secured to the outside of the holder 2^y. This filter strip extends inwardly through the opening 10^y, along the surface of the pad 17, and out through the opening 11^y, and its free end is then held in

place by means of a spring clip 19. When the exposed surface of this strip has become soiled it is merely necessary to disengage the clip 19 and draw a fresh length of the strip from the roll R and over the pad 17, and after tearing off the used length, allow the clip 19 to resume its normal position.

Although the devices of Figs. 6 and 7 may be desirable under some conditions, the arrangement of Figs. 1 to 4 inclusive is preferred, in view of its simplicity and the highly resilient character of the pads which result from the use of the cylindrical strand material which, as above noted, possesses a substantial degree of resilient stiffness and which thus, when projected through the openings in the holder, tends to bow outwardly away from the holder at the portion 14 or 15, thereby forming a very resilient yieldable wiping element.

So far as the broader aspects of the invention are concerned, it is evident that the specific form of hinge connection here shown is not essential, and it is contemplated that equivalent means, for instance a spring bow, having its legs attached to the respective holders, or even extended to form the holders, might be substituted for the arrangement illustrated without departing from the spirit of the invention. Furthermore, as respects other features disclosed, it is to be understood that the invention is not necessarily limited to the precise arrangements herein shown, but is to be regarded as broadly inclusive of all equivalent constructions which fall within the terms of the appended claims.

I claim:

1. A film-wiping device comprising a holder having spaced openings therein, an elongate removable wiper pad threaded through said openings to expose a film-wiping surface at the inner side of the holder, and means for holding the wiping surface of the pad in intimate contact with the film while the wiping device and film are moved relatively to each other longitudinally of the film.

2. A film-wiping device comprising an elongate rigid holder having spaced openings therethrough, and a length of wiping material threaded through the respective openings to form an elongate film-contacting bight at the inner side of the holder, said wiping material being in the form of a substantially cylindrical, coherent and substantially lintless strand of organic fiber.

3. A film-wiping device comprising a pair of elongate rigid holders designed to be disposed at opposite sides of the film and to be moved toward each other to grip the film between them, each of said holders having a pair of spaced openings therethrough and a length of wiping material threaded through the holes of each holder to form an elongate film-contacting bight at the inner surface of the respective holder, each length of wiping material being freely removable from its respective holder and replaceable by a new length of such material.

4. A film-wiping device comprising a pair of substantially rigid elongate holders each having a longitudinal slot adjacent to one end, a spacer member having portions thereof disposed in the slots of the respective holders, means connecting the spacer to each holder, the connection being such that the connected ends of the hold-

ers are disposed in spaced relationship, the connection between the spacer and one at least of the holders being a pivotal connection, each holder having a pair of spaced openings therethrough and a length of absorbent, chemically neutral and non-abrasive material disposed at the inner side of each holder to form a film-wiping pad, the ends of such length of material extending outwardly through the openings in its respective holder, each such length of material being removable from its holder to permit its replacement by a fresh length.

5. A film-wiping device comprising a pair of substantially rigid elongate holders, and a connection between said holders near one end thereof said connection being rigidly secured to one holder and pivotally secured to the other, the pivotal axis being so located that the connected ends of the holders are spaced apart, the holders being free to swing toward and from a substantially parallel relation, each holder having a pair of spaced openings therethrough, a length of substantially cylindrical, absorbent, fibrous strand extending from one opening to the other of said holders at the inner side of the holder to form a wiper pad, each of said lengths of strand projecting outwardly through the openings in the respective holder, thereby to retain the pad in position.

6. A film-wiping device comprising a pair of substantially rigid, elongate holders, hinge means uniting said holders at one end, each holder having a pair of spaced openings therethrough, and a length of absorbent, resilient and non-abrasive material threaded through the openings of each holder, the absorbent material forming an elongate film-contacting bight at the inner side of the holder.

7. A film-wiping device comprising a pair of substantially rigid, elongate holders, hinge means uniting said holders at one end, said hinge means comprising parts which hold the hinged ends of the holders in spaced relation, and film-contacting elements of absorbent material extending inwardly through an opening in each holder, thence longitudinally of each holder at the inner side of the latter, and then outwardly through another opening in the holder, each film-contacting element being freely removable from its respective holder, the hinged ends of the holders being designed and arranged to constitute handles whereby the device may be seized in the hand of the user and the free ends of the holders pressed toward each other so as to grip the film between the absorbent film-contacting elements.

8. A film-wiping device comprising a pair of elongate, substantially rigid holders having hinge means uniting them at one end, the hinge means being so designed and arranged as to permit the opposed surfaces of the holders to be disposed in substantially parallel spaced relation, the parts of the holders which are adjacent to the hinge constituting handles by means of which the device may be grasped and squeezed thereby to press the free ends of the holders toward each other, and an elongate removable, absorbent wiper pad at the inner face of each holder between the handle portion of the latter and its free end.

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