April 12, 1932. LE ROY C. DAVIDGE 1,853,553

SPACING STRIP

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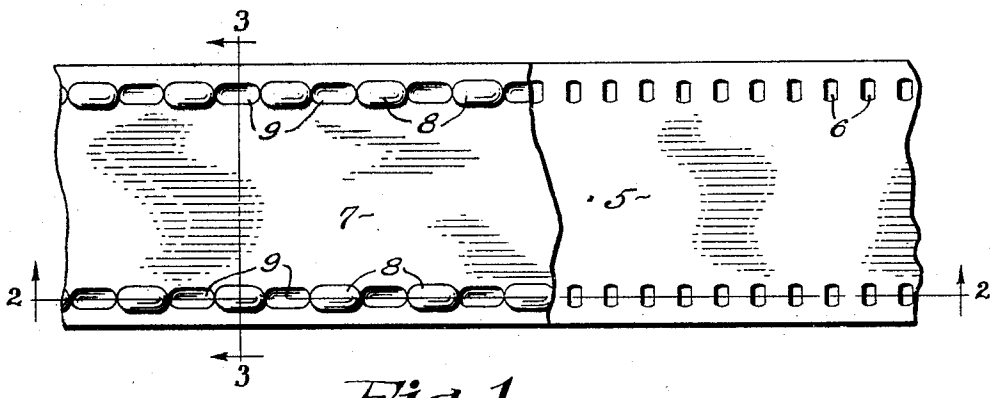

Fig. 1

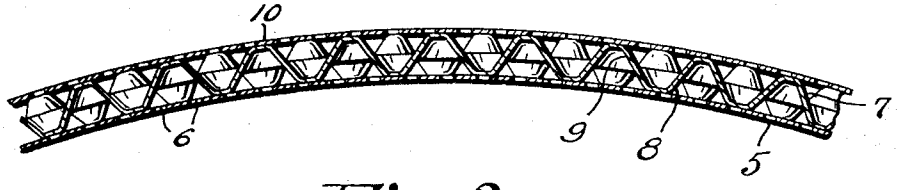

Fig. 2

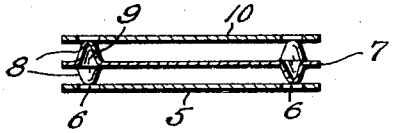

Fig. 3

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SPACING STRIP

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In this specification, and the accompanying drawings, I shall describe and show a preferred form of my invention, and specifically mention certain of its more important objects. I do not limit myself to the forms disclosed, since various changes and adaptations may be made therein without departing from the essence of my invention as hereinafter claimed; and objects and advantages, other than those specifically mentioned, are included within its scope.

My invention relates to means for spacing the layers of coiled or otherwise superposed films and the like, for the purpose of treating them in liquid baths. Among its principal objects are: first, to provide an improved type of spacing strip that has protuberances on each face thereof at each of its edges, and which is otherwise particularly suitable for the purpose mentioned; second, to provide a spacer of the above character wherein the contacts between the protuberances and the surfaces being treated, cannot have any injurious effect; third, to provide such a spacer wherein the spacing means cannot engage the sprocket perforations of a motion picture film, thereby avoiding any possibility of such films and spacer becoming locked together; fourth, to provide a spacer of the above nature wherein the protuberances cannot close the sprocket perforations of a motion picture film used therewith, to more than a slight extent, thereby permitting all of said holes to materially assist in maintaining a free circulation of fluid to all parts of the film; fifth, to provide a spacer of the character described, wherein the protuberances are so shaped and so located as to adapt them to break up the flow paths of liquid that is forced between it and the layers of an associated film; and, sixth, to accomplish the above by means of a very simple, inexpensive, and thoroughly practical device.

My objects are attained in the manner illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of a portion of my improved spacing strip associated with an ordinary type of motion picture film therebeneath, the two being in the relative position they assume when they are coiled together, or when they are otherwise superposed for the purpose of treating the film in a liquid bath;

Figure 2 is a longitudinal section of the above film and spacer taken on the line 2—2 of Fig. 1, and with an additional film on top of the other two in the same relative position, thereby illustrating how two superposed films may be separated by my improved means; and

Figure 3 is a cross-section taken on the line 3—3 of Fig. 1, with said additional photographic film on top of the other two, as in Fig. 2.

Similar reference numerals refer to similar parts throughout the several views.

In a joint application filed January 23, 1929 (Serial No. 334,438), by Arthur E. Reeves and myself, we disclosed, but did not claim per se, a form of spacing strip having certain features in common with the spacer herein disclosed for the first time. Subsequently I became the sole owner of said prior invention, and of all rights to accrue under said application, as per an assignment duly recorded in the Patent Office. I now desire to secure protection upon the spacing strip disclosed in said prior application, as well as upon the subsequent improvements made thereon, as herein set forth and claimed.

My present invention will be found to be particularly applicable to the treatment of coiled photographic films in liquid baths, but may be used in connection with the treatment of superposed uncoiled films. By far the greater part of the films that are handled and treated superposed, comprise motion picture films having spaced sprocket perforations at each edge. Such a film is shown in the drawings at 5, the sprocket perforations being indicated at 6.

My method of spacing such films, includes the use of a spacing strip 7 having a longitudinal series of spaced protuberances 8 upon each face, adjacent each of its edges. The protuberances of each series, on each face of the film, are positioned between corresponding protuberances of the same dimensions on the other face. They may be formed, most

conveniently, by embossing a strip of suitable material. In this way the protuberances of one face will appear as depressions 9, when viewing the other face of the film. The two series of protuberances on each face of the spacer are staggered in transverse relation to each other, in order to enable them to break up transverse flow paths of liquid circulating between the spacer and films 5 and 10 that are spaced thereby.

Each of the two series of protuberances, on each face of the spacer, may be so located that, when the spacer is placed between layers of a motion picture film, the contacts between the protuberances and the film will lie only in the track of sprocket perforations 6. This track is not useful for any photographic purpose other than for affording means for causing mechanical movement of the film, and any differences or variations of treatment by reason of these contacts in said track is of no importance.

The dimensions of protuberances 8, at the points where they contact with the surface of motion picture films being spaced, is made such that they cannot enter perforations 6, or more than partially close them. Thus the longitudinal dimension of the protuberances at the points of contact is made greater than the width (longitudinal dimension) of the perforations; and the transverse width of the protuberances at the points of contact is made less than the length (transverse dimension) of the perforations. Therefore, if any protuberance happens to lie opposite a sprocket perforation, it will bridge the latter longitudinally, and leave an open space for circulation of fluid through the perforations at each side of the protuberance.

I prefer to make the spacing of the protuberances a considerable multiple of the perforation spacing. By the use of this expedient the protuberances cannot come opposite the perforations, except at considerable intervals. The width of spacer 7 is preferably made the same as that of the film being treated.

I have found that my improved form of spacer can be made very conveniently from a plain celluloid strip, by embossing it immediately after it has been passed through hot water, and become softened thereby. Such a strip is very light, strong, cheap, and inert to the chemicals used in photographic processes. The softened strip cools and sets almost immediately after passing through the embossing rolls, and it may be used many times in the treatment of photographic films without deterioration.

Having thus fully described my invention, in a manner that will make its construction and operation clear to those familiar with the art involved, I claim:

1. An article of the character described, comprising; a spacing strip having on a face thereof opposed longitudinal rows of spaced protuberances adjacent its lateral edges, whereby it is adapted to maintain a spaced relation to a superposed strip; the protuberances of said rows being staggered with respect to each other, transversely of the strip, thus adapting them to break up currents flowing transversely between said two strips.

2. An article of the character described, comprising; a spacing strip having opposed longitudinal rows of spaced protuberances adjacent its lateral edges on each of its faces, whereby it is adapted to maintain a spaced relation to a superposed strip at each side; the protuberances of said rows on each face being staggered with respect to each other, transversely of the strip, thus adapting them to break up currents flowing transversely between said faces and said superposed strips.

3. An article as set forth in claim 2, wherein the respective rows of protuberances on opposite faces of the spacing strip are opposed, and the protuberances are staggered; and wherein the protuberances are embossed from the material of the strip.

4. An article as set forth in claim 2, wherein the respective rows of protuberances on opposite faces of the spacing strip are opposed, and the protuberances are staggered; and wherein the protuberances are formed with surfaces of double curvature embossed from the material of the strip.

5. An article as set forth in claim 2, wherein the respective rows of protuberances on opposite faces of the spacing strip are opposed, and the protuberances are staggered; and wherein the protuberances are ellipsoidal with their major axes approximately parallel to the edges of the strip, and are formed by embossing from the material of the strip.

6. A spacing strip having a longitudinal row of spaced protuberances on a face thereof adjacent each of its lateral edges whereby it is adapted to maintain a spaced relation to a superposed film strip having correspondingly positioned rows of sprocket perforations therethrough; said protuberances being so shaped, and being of such dimensions, as to render them incapable of engaging said perforations.

7. A spacing strip having a longitudinal row of spaced protuberances on a face thereof adjacent each of its lateral edges, whereby it is adapted to maintain a spaced relation to a superposed film strip having correspondingly positioned rows of sprocket perforations therethrough; said protuberances having rounded surfaces, and longitudinal and transverse dimensions that differ materially from the corresponding dimensions of the perforations.

8. A spacing strip having a longitudinal row of spaced protuberances on a face thereof adjacent each of its lateral edges, whereby it is adapted to maintain a spaced relation to

a superposed film strip having correspondingly positioned rows of sprocket perforations therethrough; said protuberances having rounded surfaces, and having longitudinal dimensions greater than, and lateral dimensions less than, the corresponding dimensions of said perforations.

9. A construction as set forth in claim 6 wherein the longitudinal spacing of the protuberances is materially different from the longitudinal spacing of said perforations of corresponding rows.

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