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AMMONIA TANKS FOR USE IN DEVELOPING DIAZO SENSITIZED MATERIAL

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Fig. 1.

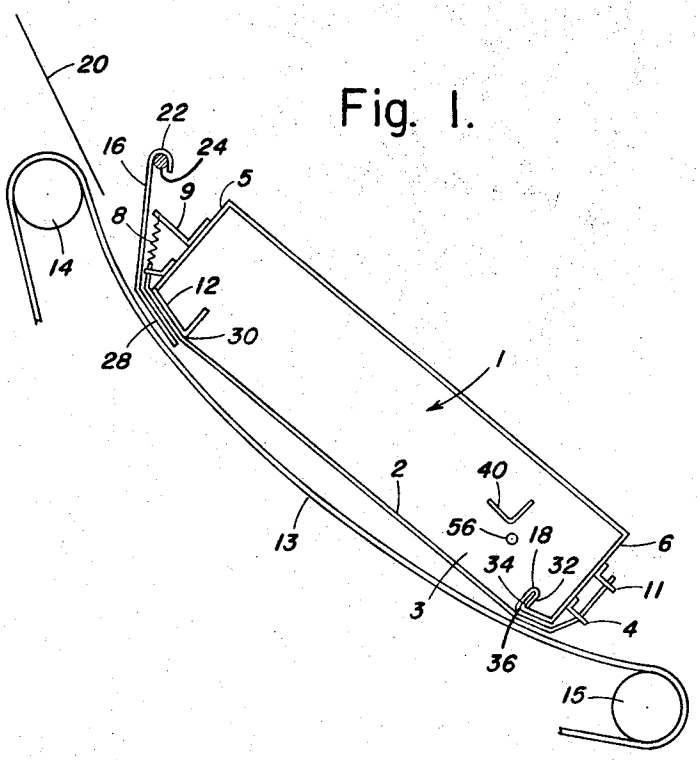
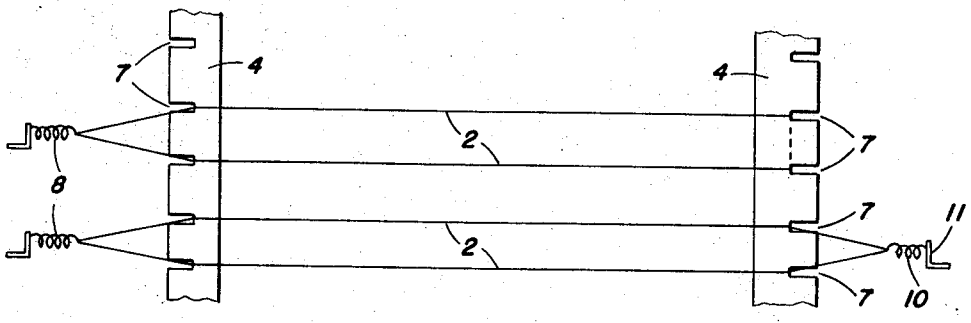


Fig. 2.



INVENTORS
Stanley Lewis Lyons
William Bert Pead

BY

Edward H. Laveman

ATTORNEY

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AMMONIA TANKS FOR USE IN DEVELOPING DIAZO SENSITIZED MATERIAL

Stanley Lewis Lyons, Beckenham, and William Bert Pead, London, England, assignors to GAF Corporation, New York, N.Y., a corporation of Delaware

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U.S. Cl. 95—94 1 Claim

ABSTRACT OF THE DISCLOSURE

An apparatus for developing a sensitized material by passing the material across an aperture of the developing tank which contains a gaseous developing media. The tank has a plurality of tensioned filaments stretched across the aperture to prevent the material from falling into the tank as it passes over the aperture. A slip screen is positioned at the leading edge of the aperture to reduce the friction at the leading edge thereof.

The present invention relates to developing apparatus and more particularly to such apparatus in which sensitized material is contacted by a gaseous medium such as ammonia gas and water vapor mixture.

Certain reproduction processes use a developing media such as an ammonia gas and water vapor mixtures to develop exposed images on sensitized sheets or webs of film, plastics, paper or other gelatin coated materials. In machines of this nature the ammonia gas and water vapor mixture is stored in a tank which has an opening for permitting the developing media to escape and contact the material carried over the tank opening. However, the hereinabove mentioned materials, due to their physical properties, method of transport through an exposure station, heat from the exposure station, etc. tend to curl and thereby enter the opening in the tank. It has been customary hitherto to provide a perforated sheet of metal or a plastics material or a combination of metallic and plastics sheets positioned across the opening in the tank but while this serves the purpose of preventing the material from entering the opening of the tank, it greatly reduces the atmosphere contact area and slows up the development time which is a speed limiting factor in developing machines of this kind. In addition, condensation can take place on the perforated sheet and the resulting moisture is frequently transferred to the material.

Therefore, in accordance with the present invention there is provided an apparatus for developing sensitized sheet material where the material is conveyed across the opening of an ammonia development tank by an impervious conveyor band and the material is prevented from entering the tank by a plurality of tensioned filaments stretched across the opening. In a preferred example, the area of the filaments, which may consist of metal or a plastic material such as nylon, occupy not more than 1% of the area of the opening.

Accordingly, an object of the invention is to provide a developing apparatus in which sensitized material can be contacted by the developing medium uniformly and over the entire area thereof.

Another object of the invention is to provide a developing tank construction which has an increased gas contact area without a corresponding increase in the size of the tank opening.

These and other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which:

FIG. 1 is a diagrammatic cross sectional view showing one form of developing apparatus made in accordance with the present invention.

FIG. 2 is a diagram showing a detail of the arrangement of the wires shown in FIG. 1.

Referring now to the drawings, wherein like characters designate like or corresponding parts throughout the several views, there is shown the tank **1** having a plurality of thin wires **2** of stainless steel. These are positioned across the downwardly facing aperture **3** of the tank **1** such that the ratio of the areas of the wires to the area of the aperture is 0.5%. The wires **2** are arranged parallel to the line in which the material is being conveyed. A divergence of the wires from the parallel is permissible provided it is less than 45°, for example 10° to 15°. Means for mounting the wires consists in providing two L-shaped brackets **4** which are secured to the outside of the front and rear faces **5** and **6**, respectively, of the tank **1** as shown in FIG. 1. These brackets have slots **7** in which the wires are adapted to be positioned as most clearly illustrated in FIG. 2. One of the difficulties experienced in the use of wires is that temperature changes cause dimensional variation of the wires so that the tension of the wires may vary considerably and this may lead to the wires breaking or stretching so as to become too loose to act as effective guides for the paper. At the front face **5** the wires **2** are connected to springs **8** which are secured to an anchor bracket **9**. At the rear face **6** the ends of the wires **2** are fastened directly to a bracket **11**. In FIG. 2 two alternative forms of tensioning means are shown for tensioning the wires. At the top of FIG. 2 two of the wires **2** are joined together to form a loop and the spring **8** is attached to the loop. The second alternative tensioning means shown at the bottom of FIG. 2 is to provide a second coil spring **10** positioned at the other end of a closed loop of wire **2** and secured to the anchor bracket **11**. These arrangements for tensioning the wires **2** result in the wires remaining at a reasonably constant tension over the range of temperature variations likely to be met in the apparatus, and obviates the danger of the wires **2** being overstretched or while ensuring that they act efficiently to prevent the inadvertent entrance of the sensitized material into the tank **1**.

The tank **1** is positioned above a shallow loop in a conveyor belt **13** which is carried on rollers **14** and **15** and lightly tensioned by means (not shown) to seal against the aperture **3** in the tank **1** while permitting material to be carried on the belt over said aperture **3** for development.

In order to reduce friction at the leading marginal surface **12** of the aperture **3** of the metal tank **1**, a slip screen **16** of anti-friction plastics material, for example polytetrafluoroethylene is provided. Another slip screen **18** is shown positioned at the trailing edge of the aperture **3** in tank **1** though this may not be required.

As will be seen from FIG. 1 a substantial proportion of the slip screen **16** is arranged nearly vertically and is external to the tank **1** so as to act as a guide for the incoming material sheet to be developed as well as an anti-friction device for reducing the friction between the material and/or the belt against the leading edge marginal surface **12** of the aperture **3**. A sheet of sensitized material is indicated diagrammatically at **20**. The leading edge **22** of the slip screen **16** is anchored to a convenient member **24** located at a convenient distance external to the tank **1** and said member being mounted on any convenient part of the machine not shown. The trailing edge **28** of the slip screen **16** is permitted to lie free and be approximately coincident with the inner edge **30** of the marginal surface **12** at the aperture **3** of the tank **1**. It will be obvious in this way the stainless steel wires **2** lie between

the slip screen **16** and the tank **1**. The slip screen **18** at the trailing edge of the aperture **3** in the tank **1** has its leading edge **32** anchored within the tank **1** to a bent up flange **34** at the mouth of the aperture **3** and its trailing edge **36** is free.

It should be explained that owing to the heat used and the pressure of the belt **13** the stainless steel wire **2** will tend to form grooves in the slip screens **16** and **18** but this is not a disadvantage as it improves the seal.

Only a portion of the endless conveyor belt **13** is illustrated and any convenient form of driving means may be employed. An evaporating trough **40** and tubular heater **56** are shown disposed inside the tank **1** (FIG. 1) but these are not described herein detail as such arrangements are well known in the art.

A developing tank constructed in the manner heretofore described has proven to provide excellent transport of the sensitized material and good quality and evenness of development. Owing to the free access of the tank atmosphere to the paper, which is provided by this invention, a much shorter tank opening may be utilized for a given speed of transport and quality of development.

It should be understood that the foregoing relates to only a preferred embodiment of the invention, and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purpose of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. An apparatus for developing a sensitized material by conveying said material by a conveyor belt across an aperture of a developing tank containing a gaseous developing media comprising a plurality of tensioned filaments stretched across said aperture whereby said material is prevented from entering said tank and is exposed to said developing media, and a slip screen located at the leading edge of such aperture, with said tensioned filaments lying between said slip screen and said tank, said filaments being stretched in an inclined plane with the tank located above the conveyor belt which also is inclined and located below the aperture of such tank with the leading edge thereof above the trailing edge, so that the unsensitized material is conveyed by the belt downwardly under said filaments.

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NORTON ANSHER, Primary Examiner

F. L. BRAUN, Asisstant Examiner

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