Sept. 4, 1956 W. R. BRIDGEWATER 2,761,365

APPARATUS FOR DEVELOPING PHOTOGRAPHIC SENSITISED MATERIAL

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Fig. 1.

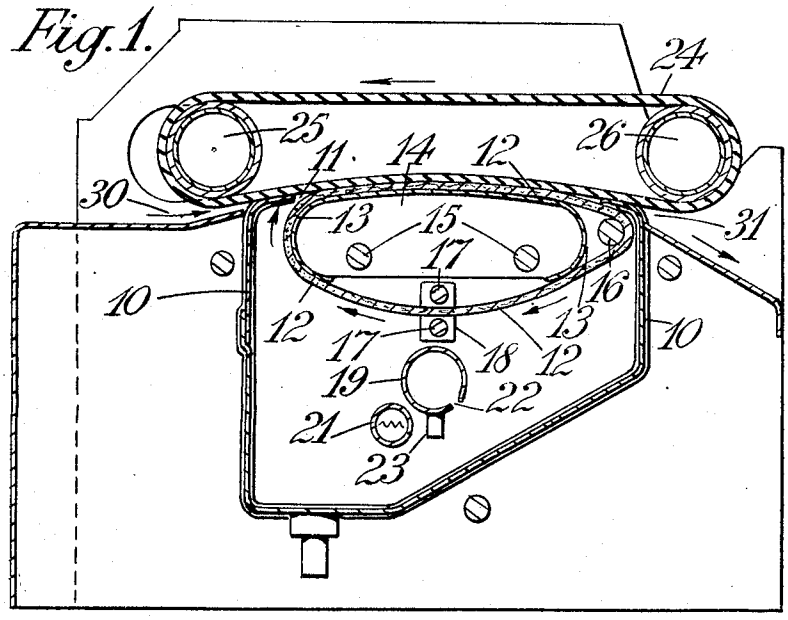
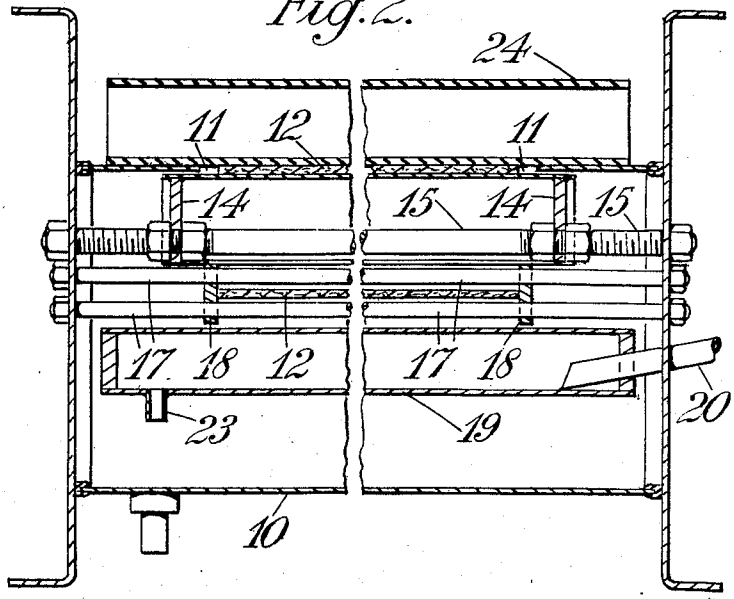


Fig. 2.



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APPARATUS FOR DEVELOPING PHOTOGRAPHIC SENSITISED MATERIAL

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3 Claims. (Cl. 95—94)

This invention relates to the development of photographic sensitised material, in particular diazotype prints, by a method in which the material, after exposure to light, is subjected to the action of moist alkaline vapours contained within a chamber (hereinafter referred to as the development chamber) and generated therein from an aqueous solution of ammonia or other alkaline developing solution.

The invention is concerned with improvements in developing apparatus for carrying out the above method and of the type (hereinafter referred to as the type described) in which the development chamber is formed with a top opening across which is traversed an endless band of gas-permeable material adapted to absorb the moist alkaline vapour generated within the chamber and in which development is effected by transporting the sensitized material in company with the band, with the exposed sensitized surface of the material in contact with the band, transportation of the material being brought about by means of a second endless band (hereinafter referred to as the transport band) surmounting the gas-permeable band and forming between the two hands a nip through which the exposed sensitised material may be passed.

In developing apparatus of the type described it has already been proposed (see British specification No. 598,921) to arrange the endless gas-permeable band above the development chamber so as to provide a lower horizontal lap traversing the top opening in the development chamber and an upper horizontal lap surmounted by a transport band of absorbent material which will absorb liquid condensed from the moist alkaline developing vapour.

In apparatus of the type described, as hitherto proposed, certain difficulties arise. For example, it is difficult to ensure a satisfactory gas-tight seal at the top opening in the development chamber and again when two porous bands are employed there may be a considerable loss of developing vapour when the apparatus is held in operational condition but not actually developing prints. One object of the present invention is to avoid these difficulties.

This invention provides developing apparatus of the type described in which the endless gas-permeable band is located within the development chamber so as to present an upper lap under-traversing the top opening in the chamber.

According to a feature of the invention the transport band may be of a material, e. g. rubber, which is non-permeable to the developing vapour.

Other features of the invention relate in particular to the provision, within the development chamber, of a tracking device for the endless gas-permeable band.

An example embodying the invention will now be described with reference to the accompanying drawings, which are to some extent diagrammatic, and in which:

Figure 1 is a general cross-section of the apparatus, and Figure 2 is a section (broken)at right angles to Figure 1. In this figure the rollers on which the transport band is mounted have been omitted.

Like reference numerals indicate like parts in both figures.

In this example the development chamber in the form of a tank **10** is formed with a rectangular top opening **11** across which is under-traversed (in the direction of the arrows in Figure 1) the upper lap of an endless gas-permeable band **12** located wholly within the chamber. The band **12** is guided across the opening **11** by a dished sheet metal guide **13** secured to elliptical plates **14** mounted on rods **15** which extend between opposite sides of the tank. The band **12** is guided in addition by a roller **16**, and the lower lap of the band is passed between rods **17** on which are mounted plates **18** which bear on the edges of the band and serve to centralise it in the width of the chamber. The accepting edges of the plates **18** may be chamfered to allow easy entry of the band. Within the chamber **10** a tube **19** is arranged to receive a supply of the developing solution from an inlet pipe **20**. An electrical heating element **21** is positioned adjacent to the tube **19**, and the latter has a vapour outlet **22** and a drain **23**. A transport band **24**, of non-gas-permeable material, such as rubber, is mounted on rollers **25, 26** (of which the former is adjustable to vary the tension on the band) so that its lower lap bridges the top opening **11** in the development chamber and there overlies the upper lap of the band **12**. One of the rollers **25, 26** is arranged to be driven in any convenient manner.

In operation, the electrical heating element **21** is connected to a source of energy and a supply of aqueous ammonia admitted to the evaporating tube **19**. Evaporation takes place and the chamber **10** is filled with a mixture of ammonia gas and water vapour constituting a developing medium. The non-permeable transport band **24** is then set in motion, the lower run of which propels by frictional contact, the porous band **12**. The capillaries of the porous band **12** become charged with developing medium. Diazo-type material which has been exposed beneath a tracing is passed into the nip formed at **30** between the band **24** and the upper wall of the chamber **10**. The diazo-type material is carried forward by the transport band **24** until its lower i. e. sensitised surface comes in contact with the porous band **12**. It is then traversed over the top opening **11** in the development chamber between the two endless bands, developing medium contained in the capillaries of the band **12** then effecting development of the diazo-type material and the developed print being delivered at **31** on the other side of the apparatus. On continued rotation of the bands **24, 12** the under lap of the band **12** becomes exposed to the reservoir of developing medium within the development chamber and further impregnation takes place in order to replenish the band **12** with developing medium. Owing to the provision of a non-gas-permeable transport band adapted to form a top seal for the opening **11** in the development chamber there is little or no wastage of developing medium; thus economy is achieved and the need for means for removing fumes from the vicinity of the apparatus is reduced to a minimum.

We claim:

1. Developing apparatus for exposed photographic sensitized material, comprising an enclosed developing chamber having a top opening, a sealing surface surrounding said top opening, means for generating within the enclosed chamber a moist alkaline developing vapor, an endless band of gas permeable material located entirely within the enclosed development chamber out of contact with liquid developing material presenting a continuous surface undertraversing the top opening in the chamber and forming with the sealing surfaces a substantially continuous surface and an endless gas impervious

transport band above the top opening sealingly contacting the sealing surfaces surrounding said top opening and in frictional driving engagement with the gas permeable band forming therewith a nip through which the exposed sensitized material may be passed.

2. Developing apparatus for exposed photographic sensitized material, comprising an enclosed developing chamber having a top opening, a sealing surface surrounding said top opening, means for generating within the enclosed chamber a moist alkaline developing vapor, an endless freely rotatable band of gas permeable material located entirely within the enclosed development chamber out of contact with liquid developing material presenting a continuous surface undertraversing the top opening in the chamber and forming with the sealing surfaces a substantially continuous surface, means in the chamber maintaining the band of gas permeable material aligned in said top opening, an endless gas impervious transport band above the top opening sealingly contacting the sealing surfaces surrounding said top opening and in frictional driving engagement with the gas permeable band forming therewith a nip through which the exposed sensitized material may be passed and drive means driving the endless gas impervious band to carry the exposed sensitized material across the top opening in contact with the gas permeable material.

3. An apparatus as claimed in claim 2 wherein the means for maintaining the band of gas permeable material in alignment comprises an ellipsoidal supporting surface lying within the top opening, a roller spaced from said supporting surface beneath an edge of said opening and a pair of spaced parallel bars beneath said supporting surface carrying spaced-apart guide plates thereon, said gas permeable material passing over the ellipsoidal surface and roller and through between the spaced parallel bars and guide plates.

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