Jan. 7, 1930. R. F. ALLIN 1,743,012

PORTABLE TUBE DEVELOPER

Filed Sept. 24, 1927

Fig. 1.

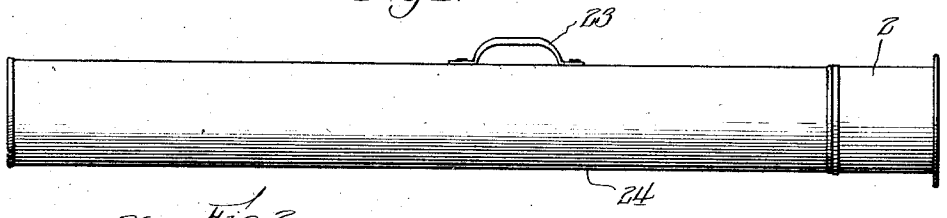


Fig. 2.

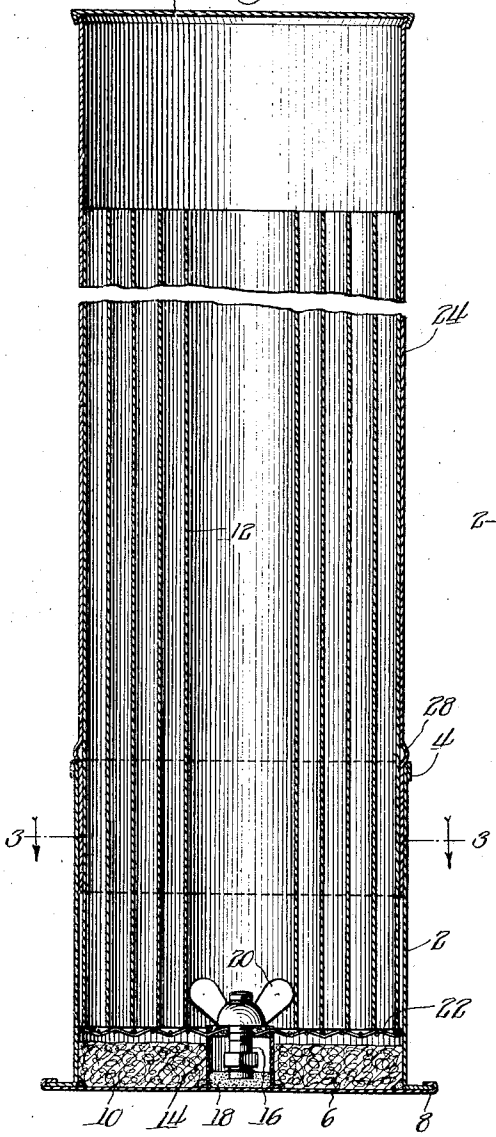
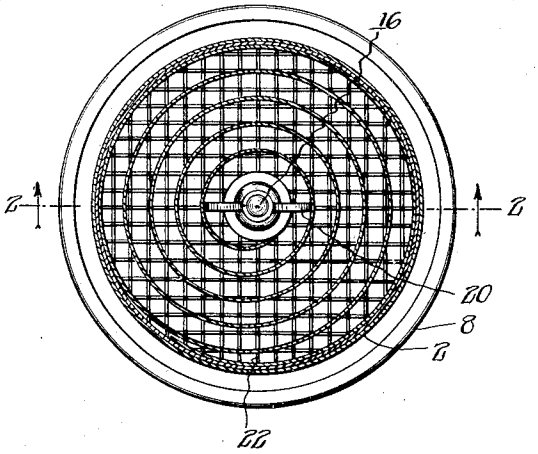


Fig. 3.



Inventor:
Richard Fred Allin,
By Cheever & Cox
Attys.

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UNITED STATES PATENT OFFICE

RICHARD FRED ALLIN, OF NEW YORK, N. Y., ASSIGNOR TO EUGENE DIETZGEN COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

PORTABLE TUBE DEVELOPER

Application filed September 24, 1927. Serial No. 221,690.

My invention relates to apparatus for developing light sensitive material such as papers, films, textile fabric and the like, and particularly for developing light copying paper, an illustration of which is disclosed in the patent to Kogel and Neuenhaus granted February 26, 1923, No. 1,444,469, in which particular patent the development is effected by gas of alkaline reaction, such, for instance, as ammonia.

The object of my present invention is to provide a simple, cheap, yet effective device for developing light sensitive material of this general type by means of the fumes arising from the gas generating material within the device, and in such a manner that the escape of the obnoxious fumes to the surrounding atmosphere is prevented.

Still another object of my invention resides in providing a simple portable type of developing device which may be conveniently carried about as for use in offices and other situations where the use of a large developing apparatus is not necessary.

Yet another object of my invention resides in providing a developing device of the above character which is tubular in form and is provided with means for holding the gaseous or fume-generating material, and is further provided with a tower for containing or holding the paper to be developed in a manner such that when the tower is in position the paper will be held suspended over the fume-generating material so that the fumes may rise through the light sensitized paper and will be uniformly and quickly developed.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings, wherein

Fig. 1 is a perspective view of a simple form of my portable developing apparatus;

Fig. 2 is a sectional view on line 2—2 of Fig. 3 showing the manner in which the device is used when developing the light sensitized paper; and

Fig. 3 is a section on line 3—3 of Fig. 2.

In general the preferred embodiment of my invention comprises a two-part tubular developing apparatus having a basal tube forming a stand or support and provided with means for holding a quantity of developing liquid such as ammonia for generating the gas, and further provided with a bracket disposed above the source of ammonia on which the lower end of the paper to be developed may rest during the developing operation. The other portion of the device comprises a relatively long tube or tower adapted to make contact with the basal tube so as to form a substantially gas-tight fit with the basal tube. The relatively long tube or tower receives a roll or sheet of paper so that when the tower is detachably connected to the basal tube the paper will rest upon the bracket and will be wholly enclosed so that the gaseous fumes arising from the ammonia in the bottom of the basal tube will pass upwardly through the sensitized paper and will quickly and uniformly develop it. As thus constructed none of these gaseous fumes can escape to the atmosphere.

Referring now to the drawings in detail, a simple form of my developing apparatus comprises a basal tube 2 of sheet metal and provided with a preferably double flange 4 at its outer end to cover the raw edge and provide a mouthal portion for the lower tube. The bottom of the lower tube 2 is formed of a circular piece of sheet material 6, seamed as at 8, to the tubular member 2. This bottom portion 6 is of larger diameter to provide a supporting or basal portion of greater area whereby the developing tube may be stood upon its end and will remain in upstanding position for the developing operation.

I provide this basal tube with a means containing a quantity of developing liquid

which is adapted to generate the developing gases or fumes. To this end I provide as one of such means a piece of sponge or felt 10 of substantially ring-like sheet to fit in the bottom of this tube. This felt or sponge is capable of absorbing and holding a sufficient quantity of liquid ammonia to develop fumes for a considerable period. In addition I provide the basal tube with a bracket for holding the lower end of the sensitized paper to be developed. In the present instance this bracket is formed as a circular piece of wire mesh screen or foraminated plate through which the gaseous fumes may readily pass, while at the same time the lower end of the light sensitized paper 12 is supported immediately above the sponge or felt 10. A simple, yet effective, means for arranging this resides in soldering preferably a sheet metal cylinder 14 to the bottom of the disc 6 and soldering a threaded bolt 16 by means of solder 18 concentrically within the cylinder 14. The upper end of this bolt receives the inner nut 20 and clampingly holds the wire mesh disc 22 in position, the bolt 16 passing through the central aperture in the disc 22. Thus the disc 22 is held from inadvertent removal therein, yet can be removed for cleaning and other purposes. The central cylinder 14 forms with the outer wall of the basal tube 2 a concentric well in which the sponge saturated with liquid ammonia is retained.

The other member of my developing apparatus comprises a relatively long tubular member or tower 24 closed at its upper end 26 and open at its opposite end. Near the mouth of the tube 24 the walls are provided with an annular bead 28 for the purpose of aiding the frictional fit and providing a stopping shoulder when the cylinder 24 is inserted within the mouth of the basal tube 2. It will be apparent that the diameter of the cylinder 24 is somewhat less than the basal tube 2 to permit of this substantially air-tight frictional fit. The cylinder 24 is of sufficient length to receive the usual width of sensitized paper, preferably in rolled form, and in addition the tubular member 24 is provided with a handle 23 so that the device may be carried about in most convenient manner.

In the operation of my approved device when it is desired to develop a sheet of light sensitized paper or other material, the paper is inserted in the detached long tube 24 and then the long tube is frictionally fit to the basal tube 2, whereupon the paper will rest upon the foraminated support 22 immediately over the source of gaseous fumes. In this manner the paper is kept out of contact with the liquid ammonia, yet at the same time is supported in suspended open position immediately over the fumes so that the latter in rising into and through the relatively long upstanding or vertical tower 24 will uniformly and quickly develop the paper. Due to the fact that the junction of the tube 24 and the basal tube 2 is an air-tight friction fit, and the further fact that both tubes have their ends closed when assembled, no gases or fumes can escape. It will be further noted that due to the arrangement of the mesh 22 and the means for locking it in position, the absorbent material 10 is positively held in its well so that when the tube is carried along by means of the handle 28 the absorbent material 10 can not become dislodged and fall into the tube 24.

It must be clear that in the foregoing structure I have provided an extremely simple, economical, yet very effective device for developing light sensitive material of the type indicated, and that this device being of light durable characteristic and particularly due to the fact that it is portable, is peculiarly adaptable for service in localities and places where a larger and more cumbersome apparatus could not be used, and that it is particularly effective and adaptable for use and installation in office buildings where room is of prime importance and where a light, small and simple developing apparatus is highly desirable.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A developing apparatus for light sensitized material, comprising a tubular compartment, a detachable base making a substantial air-tight joint with said compartment, means carried by said base for generating gaseous developing fumes, and means arranged in the base directly over the fume-generating means for supporting a sheet of light sensitized material, said supporting means being constructed and arranged to permit the free passage of the developing gases upwardly therethrough.

2. In a developing apparatus of the character indicated, the combination of a tubular tower having a communicating base making substantially air tight connection with the tower means carried by said base for generating developing gases and a foraminated disc positioned immediately over the gas-generating means in the base for supporting a sheet of light sensitized material in the tower.

3. A portable developing apparatus comprising a tubular chamber having a detachable base at one end, said base carrying means for generating developing gases, detachable means for retaining said gas generating means in place and means for supporting a sheet of light sensitized material immediately above said gas-generating means.

4. A portable developing apparatus comprising an elongated tubular tower having a handle whereby it may be carried about

and a basal portion carried by the tower, said basal portion containing means for generating developing gases, and means on said base for supporting a sheet of light sensitive material in the tower directly over said gas-generating means.

5. In a device of the class described the combination of a base having a reinforced mouth portion, absorbent material confined in said base between its outer wall and said smaller cylinder, said absorbent material being adapted to be saturated with a quantity of liquid adapted to generate developing gases, a threaded bolt mounted on said base within said smaller cylinder, a foraminated disc inserted on said bolt and overlying the saturated material and a fastening nut on the end of said bolt for clamping the disc in position, and a relatively long tubular tower of slightly smaller diameter at its inner end than the diameter of the mouth of the basal tube and arranged to make a friction-tight fit with said basal tube whereby said relatively long tube is supported in upstanding position on the basal tube.

6. A developing device comprising a tubular chamber having an opening at one end, a separable base carrying means for generating developing gases and communicating with the chamber, being frictionally telescoped thereto at the open end, and means for supporting a sheet of light sensitized material in the chamber immediately above said gas-generating means.

7. A developing apparatus comprising a relatively long tubular chamber, said chamber communicating with a basal portion upon which it is frictionally supported in upright position, said basal portion having means for generating developing gases and foraminated means for supporting a sheet of light sensitive material in said chamber directly over said gas-generating means.

8. A developing apparatus for light sensitive material comprising a cup-shaped base, means arranged in said base for generating developing gases, means for securing sad gas-generating means within said base, a detachable tubular tower extending upwardly of the base, co-operating means formed and arranged in the tower and base for supporting the tower in position.

9. A developing apparatus comprising a tubular air tight compartment having an open mouth and arranged to receive light sensitive material, a detachable base for said compartment comprising a container communicating with the compartment, means arranged in said base for generating a developing gas and a detachable foraminated member arranged in the base to secure the gas-generating means in position.

10. A developing apparatus comprising a tubular air tight compartment having an open mouth and arranged to receive light sensitive material, a detachable base for said compartment comprising a container communicating with the compartment, and a foraminated member mounted to the base and extending across the mouth of the compartment when assembled to the base for preventing light sensitive material from falling into the base.

11. In a device of the class described, the combination of a cup-shaped base having a re-enforced mouth portion, a relatively elongated tubular tower having an open lower end arranged for frictional air-tight engagement in the mouth of said base, absorbent material confined in said base below the lower end of said tower, said absorbent material being adapted to be saturated with a quantity of liquid adapted to generate gases for developing light sensitive material, foraminated means arranged within said base for securing the absorbent material in position, and means for detachably securing the foraminated means in place.

12. A developing apparatus comprising means arranged to form a developing compartment having an opening for the introduction of light sensitive material into the compartment, means providing a removable closure for sealing said opening and means mounted in said removable sealing means for emitting gases into the chamber after the opening is sealed.

13. In a developing apparatus means forming a gas tight developing chamber having an opening for the insertion of light sensitive material into the chamber, means for sealing the opening of the chamber and means formed and arranged in said sealing means for evolving chemically active gases whereby the same may be liberated in the developing chamber when the sealing means is arranged across the opening.

14. A developing apparatus comprising means arranged to form a developing compartment having an opening for the introduction of light sensitive material into the compartment, a cover frictionally engaging the walls of the compartment adjacent said opening whereby to seal the same and means cooperating with the cover for emitting gases into the chamber after the opening is sealed.

15. A developing apparatus comprising means arranged to form a developing compartment having an opening for the introduction of light sensitive material into the compartment, a removable cover for sealing said opening and means carried by the cover for emitting gases into the chamber when the cover is arranged in sealing position in the opening.

16. A developing apparatus comprising means arranged to form a developing compartment having an opening for the introduction of light sensitive material into the compartment, a removable cover for sealing

said opening and means for emitting gases into the chamber, said means being controlled by the sealing cooperation of the cover and compartment.

17. A developing apparatus for light sensitive material, comprising a compartment having an opening for the insertion of light sensitive material into the compartment and means for creating chemically active gases and projecting them into the compartment through the opening thereof, while the material is in position therein.

In witness whereof, I have hereunto subscribed my name.

RICHARD FRED ALLIN.