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MACHINE FOR DEVELOPING DIAZOTYPE PRINTS

Filed May 29, 1951

2 Sheets-Sheet 1

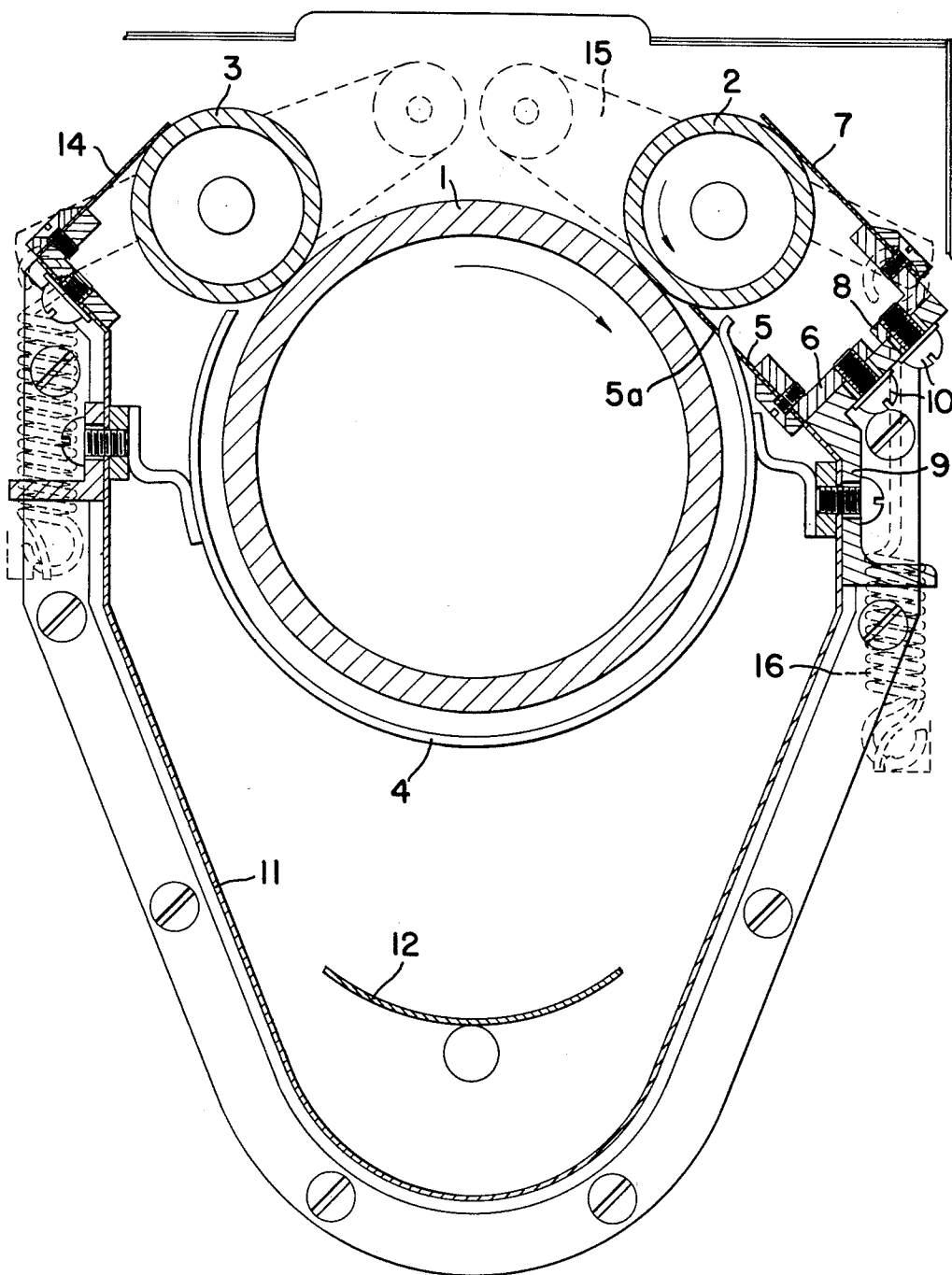


Fig. 1

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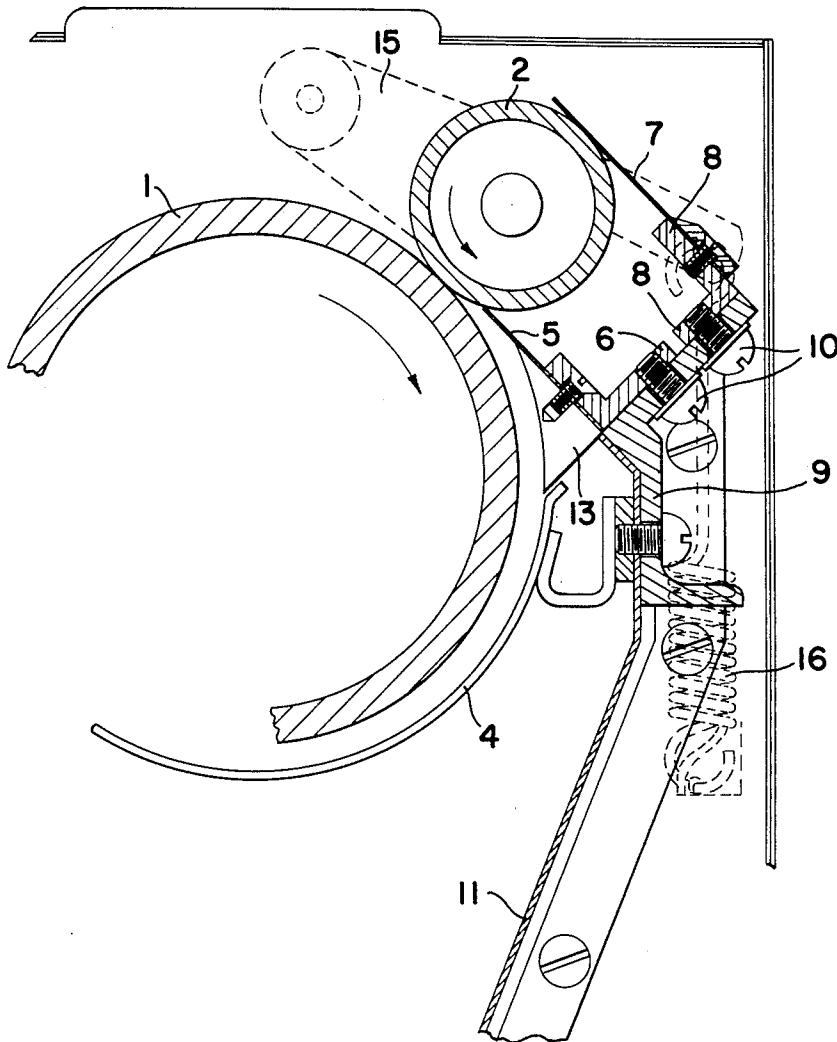


Fig. 2

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MACHINE FOR DEVELOPING DIAZOTYPE PRINTS

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Claims priority, application Germany June 24, 1950

4 Claims. (Cl. 95—94)

This invention pertains to an apparatus for developing diazo-type prints by means of gaseous or vaporous developers, e. g. ammonia, in which the prints to be developed are conveyed through the gas chamber within a channel formed by the outer surface of a main cylinder and a guide grating spaced around this cylinder. In such an apparatus means are required to bring the prints into the tightly sealed gas chamber. The positive introduction of the prints into the developing channel offers a problem that is hard to solve. In this connection the fact must be taken into consideration that such machines operate at a temperature of 80 to 100° C. and that the daily heating and cooling off of the machines causes the guide grating or some of its bars to warp. Since the prints may easily catch at some place owing to their thinness and lack of stiffness, it is necessary to apply special means in order to insure their positive introduction into the developing channel.

In connection with such apparatus as made heretofore, at the place of entrance of the prints an elastic steel band has been provided which serves to press the print against the main cylinder so that it is carried thereby to the developing channel. The steel band extends past the main cylinder to the front end of the guide grating and thus simultaneously assures the introduction of the prints into the developing channel. The use of such steel bands at the print entrance requires, however, sufficient friction between the prints and the main cylinder in order to insure that they will be conveyed into the apparatus against the friction offered by the steel band. For this reason the cylinders of the machines now in use are furnished with a large number of rubber rings which must be accurately ground to assure a perfect fit.

In the course of the years this known construction has shown great drawbacks which cause considerable expense. The drawbacks arise chiefly from the fact that the rubber rings undergo certain changes. They may either be worn away or the surface may become hard and smooth and subsequently no longer assure the positive conveyance of the prints. The conveyance of the prints by means of their adhesion to the main cylinder furthermore involves the very great disadvantage that in this case the surface condition of both sides of the prints is of importance. The conveyance of sheets of highly calendered paper having smooth surfaces is quite uncertain and such prints frequently become stuck in these machines. Consequently the steel bands at the print entrance require frequent cleaning and readjusting, an operation that can be performed only by a specialist when the machine is heated. Another source of uncertainty is the quality of the rubber rings, which frequently cannot be determined in advance. In many cases cylinders had to be removed for replacement of the rubber rings after only a few months' service. The rubber rings, which are indispensable in the constructions heretofore customary, have proven their inability to stand in the long run the exposure to temperatures ranging from 80 to 100° C. Apart from these drawbacks in their opera-

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tion, the manufacture of such cylinders equipped with rubber rings is very costly. Only thick-walled cylinders can be used with engraved grooves, into which the rubber rings are vulcanized.

The principal objects of this invention are a machine for developing diazo-type prints by means of gaseous or vaporous developers, which does not require the use of rubber on the main cylinder and has none of the drawbacks mentioned above.

These objects and the method of their attainment will be more fully understood from the following description taken in connection with the accompanying drawing in which

Fig. 1 is a view in diagrammatic sectional elevation showing the improved development apparatus.

Fig. 2 is a view in diagrammatic sectional elevation showing a second embodiment of the improved means for conveying the prints into the developing channel.

Referring to Figs. 1 and 2, an introduction cylinder 2 is held in contact with the main cylinder 1 by resilient means as shown. The introduction cylinder is supported in bearings which are carried by levers 15 which are under pressure from spiral springs 16. The introduction cylinder 2 is driven by the main cylinder. Since the prints are conveyed by both rotating cylinders, there is no opposing friction and the outer surface of the main cylinder may be absolutely smooth. The rubber rings of the prior art may be entirely dispensed with. The surface condition of the paper used in making the prints does not matter.

An edge of the flexible sheet member 5, which is preferably made from thin spring sheet steel is held in contact with the outer surface of the introduction cylinder 2 by its own elasticity so that it follows the movements of the introduction cylinder 2 (against the resilient means) and maintains continuous contact with the introduction cylinder 2. The pressure exerted by the flexible sheet member 5 in sliding on the introduction cylinder may be subject to regulation.

The flexible sheet member 5 is placed near the main cylinder and serves to scrape off the prints that are being introduced. This member effectively prevents the prints, which frequently show a tendency to coil up, from following the introduction cylinder around and guides them into the developing channel.

A second flexible sheet member 7 which is held in contact with the free surface of the introduction cylinder compensates the pressure exerted by the scraper flexible sheet member 5 on the introduction cylinder 2.

The apparatus covered by this invention may be built in two different embodiments. In the case of the first embodiment which is shown by Fig. 1, the ends of the wire guide grating 4 for the prints pass through holes or openings 5a in the scraper flexible sheet member 5. This arrangement assures the passing of the prints into the developing channel after they have been deflected from the introduction cylinder by the flexible sheet member 5. In this embodiment the second flexible sheet member 7 serves to seal the gas chamber. In the second embodiment, shown in Fig. 2, the flexible sheet member 5 is joined directly to a member 13 which is provided with a curved surface substantially parallel to the surface of the main cylinder 1 which assures the passage of the prints to the wire guide grating 4.

An exit cylinder 3 may also be provided as shown in Fig. 1. The exit cylinder 3 may be held against the main cylinder 1 by resilient means similar to that described for the entrance cylinder 2 and the exit cylinder 3 is also driven by the main cylinder 1. A third flexible sheet member 14 may contact the exit cylinder 3 to seal the gas chamber on the exit side. The diazo-type prints are conveyed through the machine in the direction indicated by

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the arrow. The guide grating is placed around the main cylinder leaving a clearance of a few millimeters. The flexible sheet members 5 and 7, which slide elastically on the introduction cylinder, are fastened on the angle bars 6 and 8 respectively; after loosening the screws 10, which are placed in slots, the laminae can be moved towards or away from the introduction cylinder, thus making an accurate adjustment of the frictional pressure at the cylinder surface possible. The two angle bars 6 and 8 are supported by the bracket 9, which contains the slots for the screws. The outer wall of the gas chamber is formed preferably by sheet metal 11. A heated container 12 for ammonia water is provided in the gas chamber. The ammonia vapor fills the space between the outer surface of the cylinder 1 and the sheet 11 and passes through the wire guide grating 4 to the developing channel.

When a diazo-type print is inserted, the cylinder 2 rises slightly and both the scraper 5 and the outer flexible sheet member 7 elastically follow this movement. The print is then forced to detach itself from the introduction cylinder and now enters the developing channel. The passage of the prints to the guide grating wires is assured by the fact that the ends of the guide grating protrude through holes or openings 5a in the lamina 5. These openings must be large enough to allow for slight distortion of the individual guide grating wires due to heat.

The embodiment illustrated in Fig. 2 differs from the embodiment shown in Fig. 1 only insofar as the print moving in the direction indicated by the arrow, after having been scraped off the introduction cylinder by the flexible sheet member 5, reaches a curved member 13, which assures its passage in the direction indicated to the wire guide grating 4. The ends of the wire guide grating rest loosely on the sectional bracket and consequently can freely expand and move when heated.

Having thus described the invention what is claimed is:

1. An apparatus for developing diazotype prints by means of a vaporous developer comprising a support, a main cylinder having a hard smooth cylindrical outer surface rotatable with respect to said support, grating type means spaced from the cylindrical outer surface of said main cylinder forming an annular developing channel, an introduction cylinder, bearing means for said introduction cylinder carried by said support, resilient means acting between said bearing means for said introduction cylinder and said support pressing said introduction cylinder against said main cylinder, said contacting main and introduction cylinders sealing said developing channel, means for rotating said main cylinder and said introduction cylinder together so that prints are conveyed by both rotating cylinders into the developing channel, a scraper of flexible sheet material having a free edge in elastic contact with the outer surface of said introduction cylinder adjacent said main cylinder for scraping prints off said introduction cylinder and guiding them in said developing channel, means adjustably secured directly to said support carrying said scraper being adjustable from outside said apparatus independent of said grating type means to adjust the pressure between said scraper and introduction cylinder, a second flexible sheet member in elastic contact with the outer surface on the opposite side of said introduction cylinder sealing the vaporous developer in the apparatus, means adjustably secured directly to said support carrying said second flexible sheet member being adjustable from outside said machine independent of said means carrying said scraper to adjust the pressure between said second flexible sheet member and said introduction cylinder to at least partially counteract the pressure applied to said introduction cylinder by said scraper.

2. An apparatus for developing diazotype prints by means of a vaporous developer comprising a support, a main cylinder having a hard smooth cylindrical outer surface rotatable with respect to said support, a grating

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spaced from the cylindrical outer surface of said main cylinder forming an annular developing channel, an introduction cylinder, bearing means for said introduction cylinder carried by said support, resilient means acting between said bearing means for said introduction cylinder and said support pressing said introduction cylinder against said main cylinder, said contacting main and introduction cylinders sealing said developing channel, means for rotating said main cylinder and said introduction cylinder together so that the prints are conveyed by both rotating cylinders into the developing channel, a scraper of flexible sheet material having a free edge in elastic contact with the outer surface of said introduction cylinder adjacent said main cylinder for scraping prints off said introduction cylinder and guiding them in said developing channel, means adjustably secured directly to said support carrying said scraper being adjustable from outside said apparatus to adjust the pressure between said scraper and said introduction cylinder, the ends of said grating passing through openings in said scraper so that said scraper moves independently of said grating type means, a second flexible sheet member in elastic contact with the outer surface of the opposite side of said introduction cylinder sealing the vaporous developer in the apparatus, means adjustably secured directly to said support carrying said second flexible sheet member being adjustable from outside said machine independent of said means carrying said scraper to adjust the pressure between second flexible sheet member and said introduction cylinder to at least partially counteract the pressure applied to said introduction cylinder by said scraper.

3. An apparatus for developing diazotype prints by means of a vaporous developer comprising a support, a main cylinder having a hard smooth cylindrical outer surface rotatable with respect to said support, grating type means spaced from the cylindrical outer surface of said main cylinder forming an annular developing channel, an introduction cylinder, bearing means for said introduction cylinder carried by said support, resilient means acting between said bearing means for said introduction cylinder and said support pressing said introduction cylinder against said main cylinder, said contacting main and introduction cylinders sealing said developing channel, means for rotating said main cylinder and said introduction cylinder together so that the prints are conveyed by both rotating cylinders into the developing channel, a scraper of flexible sheet material having a free edge in elastic contact with the outer surface of said introduction cylinder for scraping prints off said introduction cylinder, guiding them in said developing channel, means adjustably secured directly to said support carrying said scraper being adjustable from outside said apparatus independent of said grating type means to adjust the pressure between said scraper and said introduction cylinder, a member having a curved surface carried with said scraper extending from said scraper to said grating type means to complete said annular development channel and a second flexible sheet member in elastic contact with the outer surface on the opposite side of said introduction cylinder, means adjustably secured directly to said support carrying said second flexible sheet member being adjustable from outside said machine independent of said means carrying said scraper to adjust the pressure between said second flexible sheet member and said introduction cylinder to at least partially counteract the pressure applied to said introduction cylinder by said scraper.

4. An apparatus for developing diazotype prints by means of a vaporous developer comprising a support, a main cylinder having a hard smooth cylindrical outer surface rotatable with respect to said support, grating type means spaced from the cylindrical outer surface of said main cylinder forming an annular developing channel, an introduction cylinder, bearing means for said introduction cylinder carried by said support, resilient means acting

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between said bearing means for said introduction cylinder and said support pressing said introduction cylinder against said main cylinder, said contacting main and introduction cylinders sealing said developing channel, means for rotating said main cylinder and said introduction cylinder together so that the prints are conveyed by both rotating cylinders into the developing channel, a scraper of flexible sheet material having a free edge in elastic contact with the outer surface of said introduction cylinder for scraping prints off said introduction cylinder and guiding them in said developing channel, means adjustably secured directly to said support carrying said scraper being adjustable from outside said apparatus independent of said grating type means to adjust the pressure between said scraper and said introduction cylinder, a second flexible sheet member in elastic contact with the outer surface on the opposite side of said introduction cylinder sealing the vaporous developer in the apparatus, means adjustably secured directly to said support carrying said second flexible sheet member being adjustable from outside said machine independent of said means carrying said scraper to adjust the pressure between said second flexible sheet member and said introduction cylinder to at least partially counteract the pressure applied to said introduction cylinder by said

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scraper, an exit cylinder, bearing means for said exit cylinder carried by said support, resilient means acting between said bearing means for said exit cylinder and said support holding said exit cylinder in contact with said main cylinder and a third flexible sheet member in elastic contact with the outer surface of said exit cylinder sealing the vaporous developer in the apparatus, means adjustably secured directly to said support carrying said third flexible sheet member being adjustable from outside said machine to adjust the pressure between said third flexible sheet member and said exit cylinder, said developing channel extending between said introduction cylinder and said exit cylinder.

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