

**RAPID PHOTOGRAPHIC PRINTING, DEVELOPING, AND DRYING APPARATUS.**

Some time ago we described in these columns an automatic printing apparatus in which glass negatives were mostly employed, involving a mechanism for raising the negative at stated times from the sensitive paper.

Our engravings show a new form of apparatus, invented by Mr. Arthur Schwarz, a German inventor, arranged principally for rapidly printing from continuous ribbon negatives upon sensitized bromide paper, and the method by which it is done is somewhat ingenious.

Referring to the small upper diagram engraving, a cross section of the exposing cylinder, the course of the paper is shown by the heavy black line. The cylinder consists of a circular frame supporting on its circumference a perfectly transparent film; secured around this film is the flexible film ribbon negative. The sensitive bromide paper is next passed around the cylinder in a non-actinic light, then the hinged portions of the inclosing box, shown extended by the dotted lines, are brought together, which also brings the endless contacting band into contact with the surface of the paper, pressing it tightly against the flexible negative. Ranged radially around the axle of the exposing cylinder are electric incandescent lamps, lighted at stated periods by suitable switches. As the cylinder rotates, these lights give the proper exposure from the center outward through the negatives to the paper, the negative rotating in a continuous circle, while the paper enters on one side and passes out the other side duly exposed, as indicated by the arrows.

The large engraving illustrates the entire apparatus. Upon the right is observed the roll of sensitized paper, passing into the bottom of the exposing box, out again upward over the top of the developing trough, passing horizontally through that, thence downward into the fixing trough, and lastly through hardening and washing troughs upward into a drying chamber, finally being wound up on a spindle below, completely finished.

A cross rocking rod on the trough below the top one enables the operator to raise the paper out of the solution occasionally to readily examine the pictures. The apparatus is operated by an electric motor observed near the exposing box, motion being extended to the other parts by suitable shafting and gearing capable of easy regulation and adjustment.

One of the particular advantages of the machine is that the action of the chemicals is at all times observable

while passing through the horizontal troughs, a point unattainable in the vertical dipping troughs; there is also economy in the quantity of solutions used. It will be seen that the duplication of prints can be made in enormous quantities with almost printing-press certainty and rapidity at a minimum of expense and labor.

**Quick Method of Preparing Lantern Slides.**

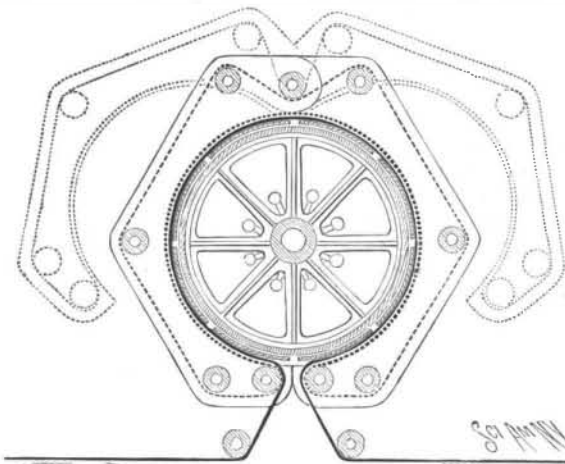
Recently we have had occasion to make between one and two hundred lantern slides, and some account of the modus operandi may be of service to those who are about to make slides for use during the coming winter. Although it was desired to obtain the highest possible quality, the work had to be done against time, and a rapid, simple, and yet certain method of development was a necessity.

The essentials of a good developer for lantern slides are, it seems to us, as follows: (1) Regular action, well under control, yet at the same time fairly rapid, to avoid waste of time, and admitting of local modification with the aid of a brush or otherwise. (2) The production of an image of good color, admitting of variations within moderate limits. (3) A comparatively transparent deposit in the shadows, free from what is commonly called "clogging up." (4) The absence of any tendency to produce fog, stains, or frilling. (5) Freedom from any necessity for the subsequent use of a clearing bath.

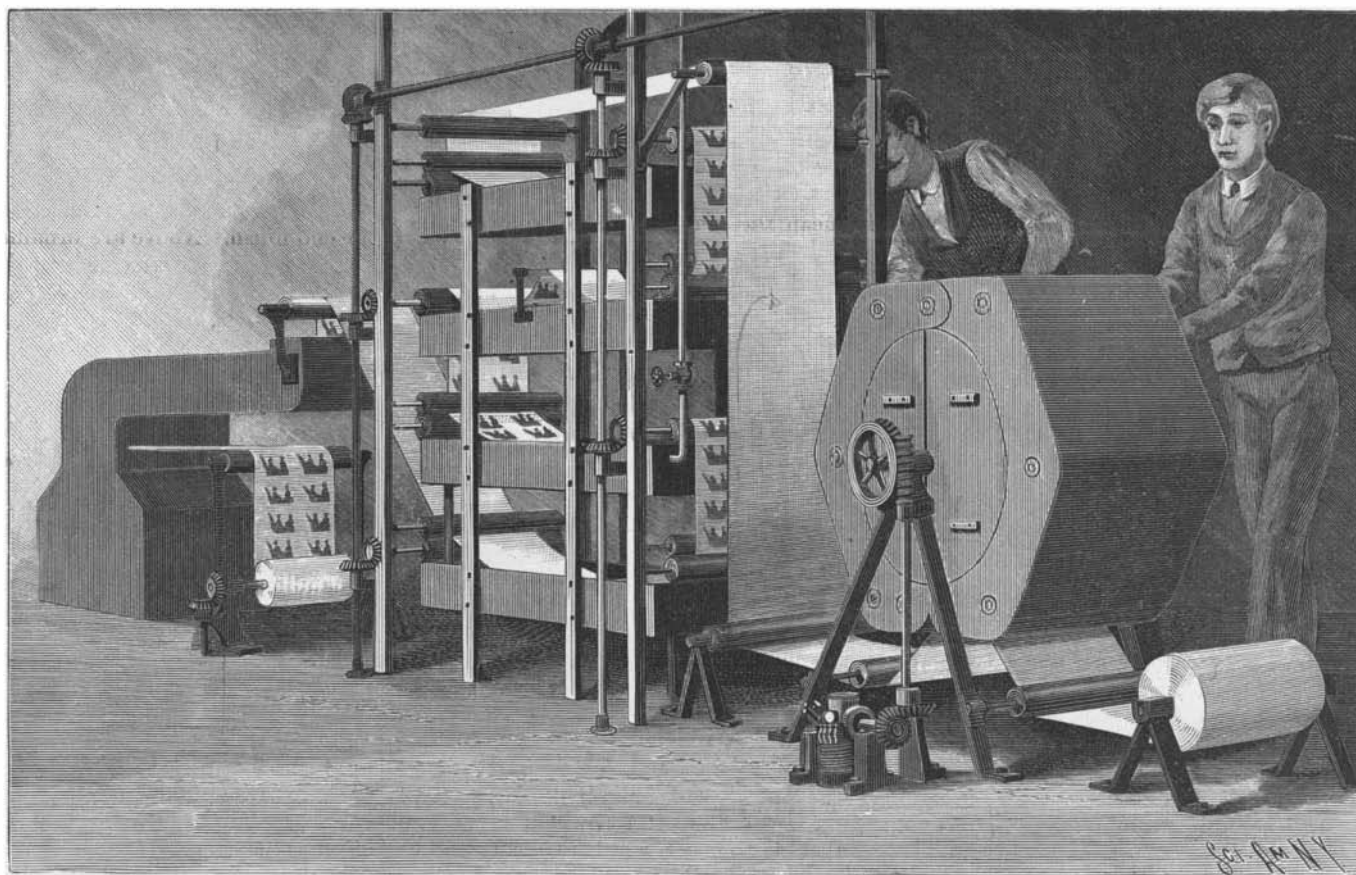
(6) General applicability to the various brands of lantern plates now on the market.

Some of the newer developers only imperfectly satisfy condition (1), at any rate as regards ease of control. As regards the color of the image, the chief difficulty, as every slide maker knows, is to obtain blacks that have a warm brownish tinge, rather than the bluish, or, what is worse, the olive tinge so commonly met with. It is still more difficult, except by very slow development, to obtain yet warmer colors without losing transparency and vigor.

The clogging up, or loss of transparency, in the shadows, is due to several causes, but we believe that sufficient attention has not been given, in this connection, to the effect of the organic oxidation product which, under certain conditions, and with certain developers, is precipitated on the reduced silver. The popularity of ferrous oxalate as a developer for lantern slides and other diapositives may be attributed, in part at least, to its freedom from any tendency of this kind.



THE EXPOSING BOX.



IMPROVED PHOTOGRAPHIC BROMIDE PRINTING, DEVELOPING, AND DRYING APPARATUS.

Conversely, the objections often felt against the use of any modification of the pyro developer for diapositive work. Hydroquinone, used alone, is not free from objection on the same grounds.

On the other hand, in spite of its undoubted merits, ferrous oxalate fails to satisfy some of the conditions that we have laid down; the great difficulty of getting a warm colored image, the necessity for the use of something other than plain water for the first washings after development, and the special difficulties that attend its use with "hard" waters, to say nothing of the ease with which bad stains are produced by very minute traces of hypò, are points that tell heavily against it when a large quantity of work has to be got through rapidly.

No developer of which we have any experience so nearly satisfies all the specified requirements as ortol, used with sodium carbonate as the alkali. Moreover, it has the additional advantage that the same quantity of solution can be used over and over again—a fact which adds greatly to both convenience and speed, as well as economy.

All the slides to which we referred at the outset, numbering very nearly two hundred, were developed with ortol, and, although one particular brand of lantern plate was used for the majority, no fewer than six of the brands on the market have been used at one

time or another with the ortol developer, and in all cases with satisfactory results. It follows that its range of applicability is wide.

As a basis in mixing the developer, we use the modification of Dr. Hauff's formula that we have described before, but will now repeat for the sake of completeness:

**ORTOL SOLUTION.**

Ortol.....	15	parts or 120 grains.
Potassium metabisulphite.....	7½	" " 60 "
Water to make up to.....	1,000	" " 20 ounces.

**SODA SOLUTION.**

Soda crystals.....	10	parts or 2 ounces.
Sodium sulphite.....	10	" " 2 "
Potassium bromide.....	0.23	" " 20 grains.
Water to make up to.....	100	" " 20 ounces.

Generally, we mix ortol solution one part, soda solution one part, water two parts, and this gives images that are decidedly warm in color. By using only one part of water, the action is more rapid, and the color of the image distinctly colder, while at the same time the exposure of the plate must be somewhat less in order to get the best results. A mixture of equal parts of ortol and soda solutions, without any added water, may also be used, but the action is then liable to be too rapid, especially in warm weather. Temperature, in fact, has an important influence on the action of the ortol, and if the developing solution is very cold, the rate of development will be much slower.

In warm weather the proportions, ortol solution one part, soda solution one part, water two parts, may be adopted as the normal proportions, while in winter the added water should be reduced to one part.

When making a large number of slides, it is very convenient to use the papier maché dishes, with divisions that hold four plates. A good plan is to have three dishes of this sort in use, so that while four plates are being developed in one dish, another four can be fixing in a second dish, while a third four are having their first washing after fixing in a third dish. The risk of injury to the plates is lessened by developing,

fixing, and washing in the same dish, and no evil effects result from this practice if the washing after fixing is allowed to go on for several minutes before the plates are transferred to the rack of the washing tank for their final washing.

The possibility that some of the plates may be over or under exposed makes it advisable to have ready (a) a dish containing some bromide solution, say two per cent, into which a plate can at once be put if the image appears too rapidly; (b) a measure containing some ortol and soda solution without any added water; and (c) a vessel (such as a measure, or a short, wide mouth-

ed bottle) containing some soda solution only.

Over-exposed plates are removed from the dish as soon as over-exposure is recognized, and placed for a short time in the bromide solution, after which they may be returned to the developing solution, or to some separate developer to which an extra quantity of bromide has been added. Sometimes it may be found necessary to place the plate alternately in the bromide solution and the developing solution.

On the other hand, if the plate shows signs of under-exposure, it may be lifted out of the dish, and flooded with some of the strong developer, which, after a time, is allowed to run into the dish containing the developer, the plate being also returned to the dish until the image acquires sufficient opacity. If this should not suffice, the plate may be flooded in a similar way with some soda solution previously diluted with more or less water, and then returned to the developer.

Local development with the aid of a brush is sometimes necessary, and either the strong developer or the soda solution alone may be used for this purpose.

How many times the developer can be used over and over again we are not prepared to say, but, if strengthened from time to time by addition of small quantities of strong developer, it may be used for three or four dozen plates without producing stains. No clearing solution is necessary.—C. H. B., in Photography.