

UNITED STATES PATENT OFFICE.

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PHOTOPRINT-DRIER.

1,189,383.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK W. POTTER, a citizen of the United States of America, and resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Photoprint-Driers, of which the following is a full, clear, and exact description.

My present invention relates to drying and more particularly to a method of and apparatus for drying photographic prints and it has for its object to increase the rapidity with which the prints may be handled and dried; to provide for the effective drying of a large number of prints with a relatively small and compact apparatus and to generally promote the ease and efficiency with which the operator may treat his product. To these and other ends the invention resides in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the embodiment of the invention illustrated herein, I provide a chamber for the reception of heated air, flues forwardly located relatively to the said chamber and adapted to have connection therewith, (and in which flues the "print rolls" so called,—that is the wet prints rolled up with sheets of blotting paper and corrugated paper, usually on a tubular core,—are inserted) and a fan or blower for forcing the air through the print rolls for effecting the drying of the prints.

The invention, relating to the general type of print drier above referred to, has for its objects to increase the efficiency of the apparatus whereby the prints will be unusually quickly dried; to provide dampers or closures for the respective flues which in the absence of a print roll in a given flue automatically closes that flue, but which closure is automatically opened by the roll when inserted in the flue, so that the roll will be subjected to the drying action of the heated air then permitted to be forced there-through;—the withdrawal of the dried print roll resulting in the closure of the flue which

such roll had occupied whereby the utmost possible conservation of the heated air, and of the gas or other fuel for the heating, is acquired; and to generally construct, combine and arrange the parts of the apparatus to the ends of simplicity, practicability and cheapness.

The invention is described in conjunction with the accompanying drawings and is set forth in the claims.

In the drawings:—Figure 1 is a central vertical section taken from front to rear through the improved photo print drier constructed in accordance with and illustrating one embodiment of my invention. Fig. 2 is a cross sectional view taken on line 2—2, Fig. 1, looking rearwardly. Fig. 3 is a cross sectional view taken on line 3—3, Fig. 1, looking forwardly. Fig. 4 is a transverse sectional view through one of the print holding tubes or flues and its core with a print roll in position therein and shown in end elevation.

In carrying out my invention in its preferred form, I pursue the following method: The wet print is placed between a sheet of absorbent material such as blotting paper on one side and a sheet of spacing material such as corrugated paper on the other, and the whole wound into a roll, preferably with the convolutions of the corrugated paper outermost. It is maintained in this rolled condition by insertion in a tubular flue or holder F as shown in Fig. 4 of the drawings in which a plurality of prints to be dried are indicated at 1, the blotting paper at 2 and the corrugated paper or cardboard at 3. 4 indicates a tubular core piece about which the winding is preferably done to hold the ends tight at the center. I then drive dry heated air through the holding flue and roll, the air being admitted at one end and discharged at the other. This air permeates the whole roll and takes up the moisture from all three elements but more particularly from the blotting paper as the latter draws it from the prints until the prints are perfectly dry. The corrugated paper serves to make the roll longitudinally porous so that all the convolutions are exposed to the drying air,

the ribs thereon serving as spacing members constituting small auxiliary flues, as shown, throughout the roll, which flues give free passage to the air and multiply the exposed damp surfaces that are to be affected. When the prints are thoroughly dried, the roll is removed and the prints separated from the other sheets which are then in condition to receive other wet prints to be similarly treated. I have also disclosed a suitable form of apparatus for treating the prints by this method.

In the drawings, A represents a chambered casing provided with a cylindrical rear extension *a*, forwardly open to the chamber in the casing A, and having a rear closing wall *b*.

B represents a tubular branch of the said cylindrical extension *a*, the same being somewhat convergent upwardly, opening into the space within the casing extension *a*, and being open at its lower end receives the heat from a gas burner C located thereunder, but in such a manner or disposition as not to obstruct the free entrance of air into and through the vertical passage constituted by said tubular branch of the chambered casing.

D represents an electric motor mounted at the rear of the cylindrical casing extension *a*, the shaft *d* of which forwardly and centrally extending carries the fan blades *f f* at about the junction of the forward end of the cylindrical extension *a* and the main chambered casing A.

g represents the front wall of the chambered casing A and forward at a suitable distance beyond this front wall and parallel therewith is another vertical wall *h*.

F F represent flues or tubular passages of comparatively large diameter supported by and between the aforementioned rear and front vertical plates *g* and *h*, said flues being permanently open at their forward ends, but they are provided with closures at their rear ends, which when open permit the passage of heated air through the flues to which they are appurtenant, but which when closed act as dampers for absolutely preventing any passage of the heated air for waste through the flues. These closures are made in the form of circular plates *i*, connected by hinges *j* at their upper edges to the aforementioned front wall *g* of the chambered casing A, so that they will automatically gravitatively close; and for the greater assurance of their positive closing, they are provided with weight members *k* at or near their lower portions.

Each hinged closure plate *i* is provided at its forward face with a right angularly bent strip of flat metal *m*, here represented as of substantially a bail shape, the same having a considerable extension forwardly beyond the face of the plate, into the flue.

The wet photo prints to be dried are interleaved with sheets of blotting paper, and corrugated paper board, and wound upon a hollow core, such, for instance, as a mailing tube, the forward end of which is preferably closed or stoppered; the core prints and the sheets with which they are interleaved are wound to constitute a "print roll" of a diameter to fit and fill the flues, and the length of each roll is approximately, or slightly greater than, the length of the flues.

The motor and gas heater being set in operation preparatory to using the drier, upon the insertion of a print roll into a given flue the forward end of such roll will first strike against the angular extension *m* of the closure plate *i*, whereupon the continued rearward movement of the print roll will be effective to swing the plate *i* to its fully opened horizontal position as represented by the dotted lines in the upper part of Fig. 1, whereupon the previously horizontal upper portion of the bail shaped member *m* now in a vertical or dependent position, acts as a stop for limiting the too far insertion of the roll into the flue.

In practice it is desired that the print rolls shall have their forward end slightly protruding outwardly beyond the front of the drier so that they may be, after the drying, readily grasped, manually, for their withdrawal.

As manifest, so soon as a print roll is inserted in a flue, the closure for that flue is by such insertion, automatically opened whereupon the heated air entering through the tubular passage B and carried into the chambered casing A is by the blower forced through the center of the print roll and also through the convolution of the latter as facilitated by the corrugation of the paper board comprised in the make-up of the roll, with the result that the prints became thoroughly and uniformly dried in an unusually short time. For further expediting the drying action by a conservation of the heated air supplied into the chambered casing A, the surrounding walls of such casing A are forwardly continued as represented by A² in Figs. 1 and 2, so that thereby and in conjunction with the vertical wall *g* and *h*, all of the flues are incased in an inclosed chamber A³ into which an access of heated air is insured by the apertures *o o* provided through the wall forming plate *g* at the front of the casing A. This in a sense provides an oven chamber which is traversed by the flue and hence an external drying effect is acquired additional to the internal drying effect hereinabove explained.

This apparatus aside from the motor driven fan or blower and the annular gas burner may be almost entirely composed of

sheet metal of slight gage, such, for instance, as galvanized iron at such low cost as to permit of presentation of the complete apparatus in the trade at an extremely moderate price.

The apparatus is to be mounted on standards or legs, portions of which are represented by *t t* in the various views.

The gas burner is so located at the lower open mouth of the tubular passage B that the air entering in the comparatively slight, yet sufficient, space between the burner and such mouth, is amply heated, and all of the so heated air is compelled to enter the chambered casing A by way of the cylindrical extension *a* of such casing to be forwardly forced by the blades of the blower having their location at the mouth of said extension.

I claim:—

1. In an apparatus for drying photographic prints, the combination with a tubular holder adapted to receive the print in a rolled condition, of a blower arranged to force air longitudinally through said holder.

2. In an apparatus for drying photographic prints, the combination with a tubular holder adapted to receive the print in a rolled condition, of a blower, a hood leading from the blower to one end of the holder, an air inlet in rear of the blower and means for heating the air traversing the inlet.

3. In an apparatus for drying photographic prints, the combination with a horizontally disposed tubular holder adapted to receive the print in a rolled condition, of a rotary blower rotating on a horizontal axis, a hood leading from the blower to one end of the holder, a casing surrounding the blower, a vertical air shaft connected to the casing to form an inlet in rear of the blower, and means for heating the air in the shaft.

4. In an apparatus for drying photographic prints, the combination with an oven and a plurality of tubular holders extending therethrough and adapted to receive the prints in a rolled condition at their outer ends, of a casing inclosing the oven and holders at their inner ends and a blower within the casing for forcing air through the holders.

5. In an apparatus for drying photographic prints, the combination with an oven and a plurality of tubular holders extending therethrough and adapted to receive the prints in a rolled condition at their outer ends, of a casing inclosing the oven and holders at their inner ends, a blower within the casing for forcing air through the holders and means for delivering heated air to the blower.

6. In an apparatus for drying photographic prints, the combination with a plurality of tubular holders, adapted to receive the prints in a rolled condition through

their outer ends, of a casing inclosing the inner ends of the holders, a blower within the casing for forcing heated air through the holders and closures for such of the holders as are not in use.

7. An apparatus for drying photo prints comprising a chambered casing and means for supplying heated air thereto, a plurality of flues forwardly open and having their rear end openings connecting with said chambered casing, and provided at their rear ends with closures, movably mounted to open from their normally closed positions rearwardly and adapted to be automatically opened by the entrance into the flues of photo print drier rolls, and a blower operable to force the heated air in said casing forwardly through such of the flues as have the rear end closures thereof opened by the engagement therewith of print drier rolls.

8. An apparatus for drying photo prints comprising a chambered casing and an air supply passage open at its lower portion and leading upwardly to communication with, and for conveying air into, such casing, a heater adjacent the lower air entrance end of said passage, a plurality of flues forwardly open and having their rear end openings connecting with said chambered casing, and provided at their rear ends with closures, movably mounted to open from their normally closed positions rearwardly, and adapted to be automatically opened by the entrance into the flues of photo print drier rolls, and a blower having its location in the said chambered casing and operable to force the heated air therein forwardly through such of the flues as have the rear end closures thereof opened by the presence therein of print drier rolls.

9. An apparatus for drying photo prints comprising a chambered casing and an air supply passage leading thereinto, means for heating the air supplied through said passage, a plurality of flues forwardly open and having their rear end openings connecting with said chambered casing, and provided at their rear ends with hinged closure plates adapted to swing rearwardly to open, and having within said flues, forwardly extended angular members, to be engaged for opening the closure plates by photo print drier rolls and to act as limiting stops for the rolls and a blower for forcing the heated air in such casing forwardly through such of the flues as by the presence of a drier roll therein, their closure plates are open.

10. An apparatus for drying photo prints comprising a plurality of flues having permanently open forward and movable closures for closing their rear ends, a chambered casing at the rear of the flues and with which their closure provided ends are connected, means for supplying heated air to said casing, casing walls forming the cham-

ber for entirely inclosing all of the flues with
openings leading from the first named cham-
bered casing thereinto, and a blower for
forcing air from the chambered casing
5 through such of the flues as may be open
and also into the inclosed chamber surround-
ing the flues.

Signed by me at Springfield, Mass., in
presence of two subscribing witnesses.

FRANK W. POTTER.

Witnesses:

G. R. DRISCOLL,
W. S. BELLOWS.