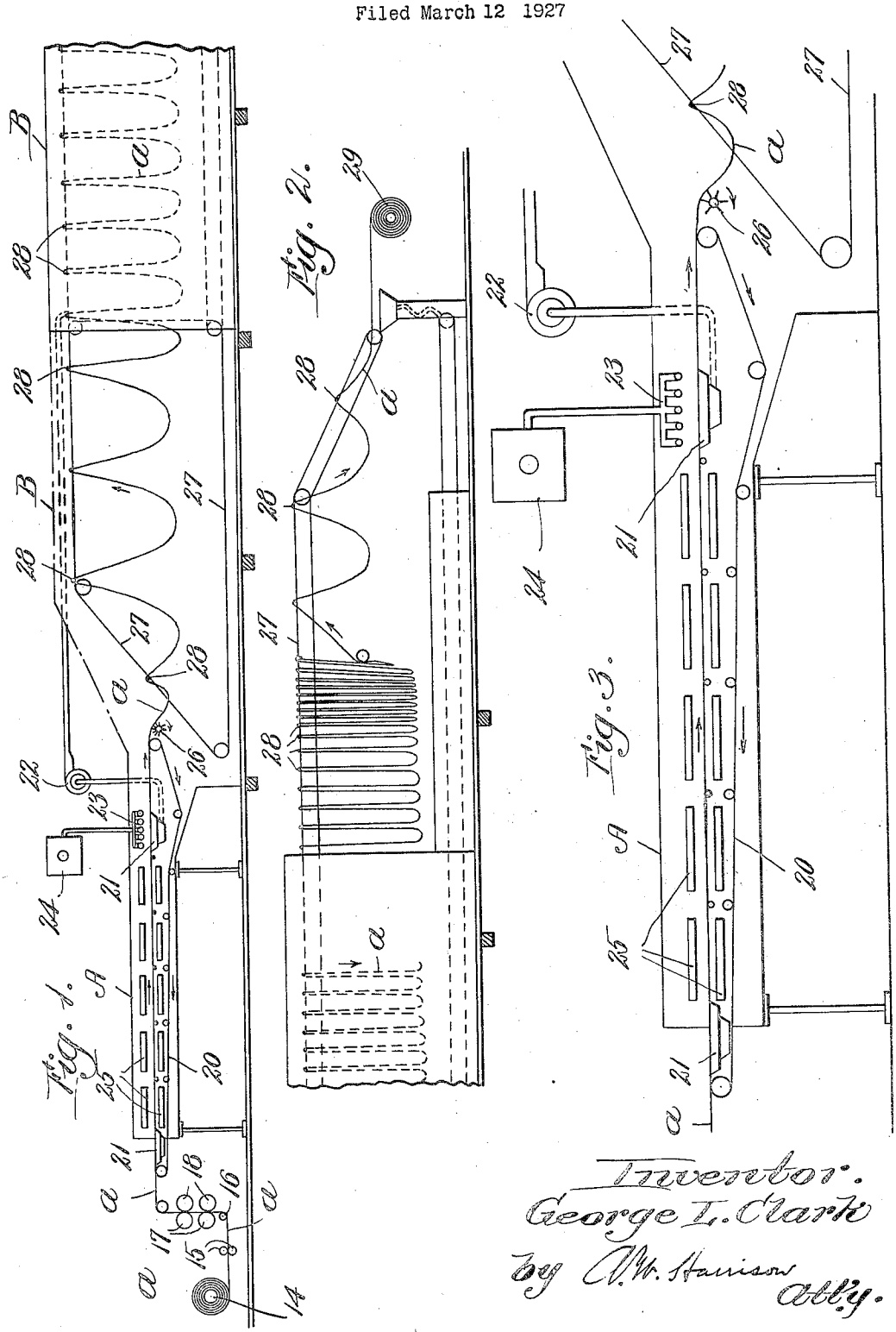
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METHOD OF AND APPARATUS FOR EFFECTING RAPID DRYING OPERATIONS

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METHOD OF AND APPARATUS FOR EFFECTING RAPID DRYING OPERATIONS.

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This invention relates to facilitating the output of printing presses or other machines which apply to paper or other sheet material a surface application of readable or ornamental material which latter is not readily capable of being dried by evaporation.

Printing inks, for instance, are usually composed essentially of linseed oil or other drying oils, mixed with a pigment. The drying of such ink is not a process of evaporation but one of oxidation of the oil. Rapid drying of ink after printing, so that the ink is well set before the printed surface comes in contact with another surface of paper, is of great commercial importance in order to prevent offset of ink from one sheet to another and the sticking together of the printed sheets.

As the invention in one aspect relates to effecting rapid output of printing presses, the following description will emphasize that utility.

Printing presses are sheet fed or roll fed and in the latter case the delivery may be in sheet form or as a web in roll form. In piling up sheets or re-winding rolls off a printing press there is a great tendency to offset the ink and to stick, and this tendency is aggravated in high-finished relatively impenetrable paper such as glassine paper.

In carrying out my invention the paper may be printed on flat bed, cylinder, rotary, offset, or lithographic presses of known and commonly used types, and the paper is then caused to travel for a considerable distance between the point of ink application and the final delivery mechanism, through a chamber filled with air containing ozone.

Of the accompanying drawings:

Figures 1 and 2, taken together, illustrate the entire apparatus somewhat diagrammatically.

Figure 3 is a view similar to a portion of Figure 1 but on a larger scale.

Similar reference characters designate similar parts or features in all of the views.

In the drawings a web of paper *a* is illustrated as supplied from a roll mounted on a shaft or core 14 and passing between pinch rolls 15 and under a guide roll 16 to a printing press, portions of the latter being illustrated at 17 for the plate cylinders and at 18 for the impression cylinders. It is to be understood however, that the parts indicated at 17 and 18 might be, instead of parts of a printing press, parts of a machine which entirely or partially coats a surface of sheet material with a film of material the drying of which will be effected in the manner presently described.

The printed or coated paper presses over a guide roll 19 and onto a perforated apron or belt 20 which is driven so as to cause it to travel in the direction of the arrows, to feed the paper in the direction indicated by said arrows. Below the upper stretch of the apron 20, and near each end thereof, is the entrance portion 21 of a suitable suction apparatus the purpose of which is to draw the paper into contact with the travelling apron so that the latter will feed the paper along. An exhaust fan, for effecting the suction, is indicated at 22.

The apron 20 is enclosed in a chamber A into which, as at 23, ozone is delivered from a suitable ozone generator indicated conventionally at 24. Within the chamber A are heating units 25 which may be of any suitable electric or other type. While the heating units are illustrated as both above and below the web *a* and the upper run of the apron 20, it is to be understood that they may be only above or only below. There is a material advantage in employing heat prior to subjecting the oily material carried by the web to the action of the ozone delivered at 23, because I have found that pre-heating expedites the oxidizing action of the ozone. The oxidizing or drying effect of the ozone while the printed or coated web is passing through the chamber A requires but a few minutes, this being due to the high concentration of ozone in the air within said chamber.

To effect removal of the odor of ozone from the paper, it is preferable to continue travel of the web for a considerable distance through a well-ventilated chamber such as illustrated at B, any suitable means being employed for effecting the ventilation.

Within said chamber I may employ a type of carrier commonly used for conveying a web in the form of loops from a point of treatment to a distant point for reeling or other disposal.

The web, as it leaves the apron 20, passes over revolving blades 26 commonly known as a "knocker" which acts on the under surface of the web to smooth it and prevent it, especially the edges, from buckling.

As loop carriers such as illustrated are well-known, it will be sufficient for present purposes to explain that the web *a* is fed through the chamber A at such speed relatively to the speed of travel of chains 27 which carry what are known as sticks 28, that the web *a* is gathered into loops hanging from the sticks, and said web, in loop form, travels through the chamber B, and is finally coiled on a reel indicated at 29.

Reference has been made to printed or coated paper, and to ink or coating. This is because I do not limit myself to practice of the invention only on paper which has had readable characters applied thereto. For instance, paper rendered waterproof by a complete coating or layer of drying oil may have its coating rapidly dried by the same ozone treatment and by substantially the same apparatus which has been described in connection with the treatment of paper issuing from a printing press. The coating of film of boiled oil may or may not contain a pigment. Furthermore, substantially the same method or apparatus may be advantageously employed for drying webs which have been impregnated with drying oils throughout the entire areas thereof or in spots locally applied.

And I do not limit myself to the described treatment of sheet material in the form of a continuous web. Obviously cut sheets of paper, printed or coated, may be treated in the same way, with a suitable carrier for such sheets, and which carrier will then deliver the sheets in a pile. Such carriers are well-known and need no detailed description.

Having now described my invention, I claim:

1. The method of drying oily substances borne by sheet material, consisting in progressively first heating the material to a comparatively high temperature, and then, before the material cools, subjecting it to the action of a confined mixture of ozone and air.

2. The method of drying oily substances borne by sheet material, consisting in progressively first heating the material to a comparatively high temperature, then, before the material cools, subjecting it to the action of a confined mixture of ozone and air, and then ventilating the material.

3. The method of facilitating the drying of printing ink on a web of paper, consisting in causing the printed web to travel and while so traveling subjecting it first to the action of a confined mixture of ozone and air and then subjecting it to the action of air alone.

4. Apparatus for drying oily substances borne by sheet material, comprising an elongated chamber having means for heating the interior of one portion of it, means for delivering ozone into another portion of said chamber, and means for causing the sheet material to travel through said chamber from the heated portion to the portion where ozone is delivered.

5. Apparatus for drying oily substances borne by sheet material, comprising a pair of connected elongated chambers, means for heating one of said chambers, means for delivering ozone into said heated chamber, means for ventilating the other chamber, and means for causing the sheet material to travel first through the ozone chamber and then through the ventilated chamber.

In testimony whereof I have affixed my signature.

GEORGE L. CLARK.