March 4, 1947. B. OFFEN 2,417,011

APPARATUS FOR DRYING WEBS

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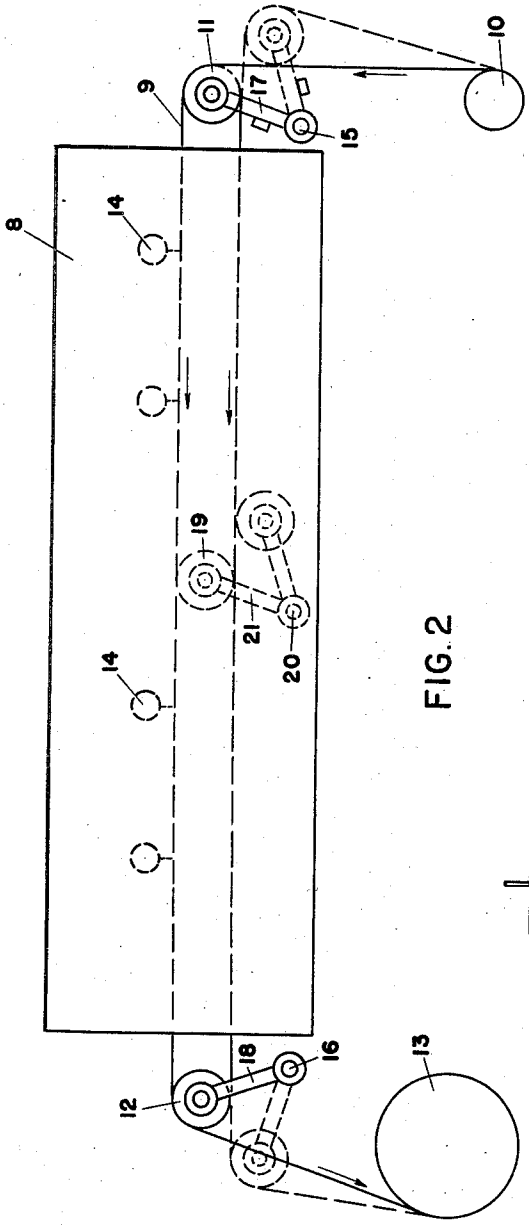

FIG. 1

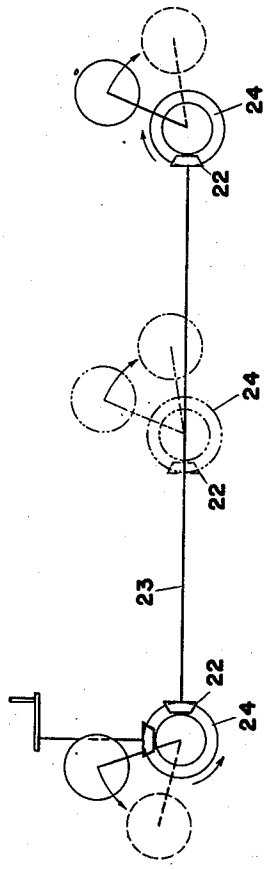

FIG. 2

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FIG. 3

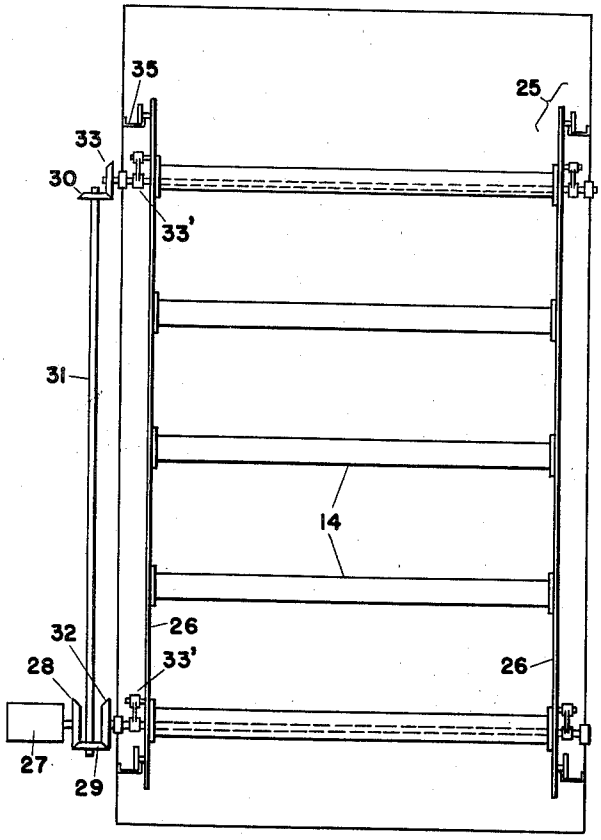
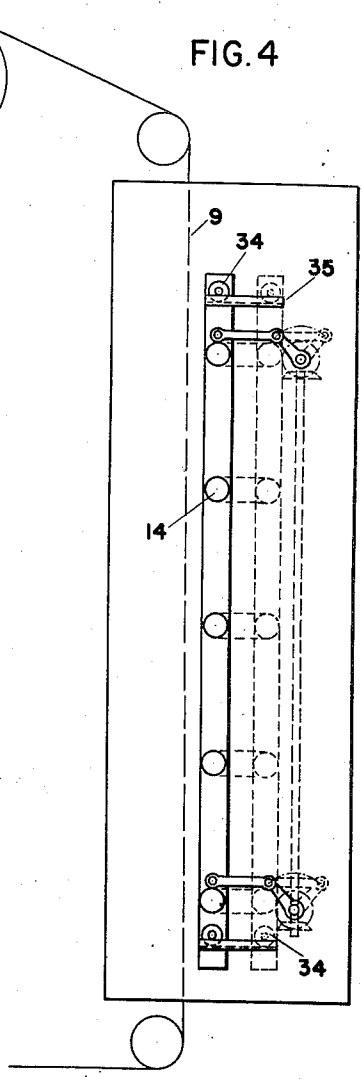


FIG. 4



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Patented Mar. 4, 1947 2,417,011

UNITED STATES PATENT OFFICE

2,417,011

APPARATUS FOR DRYING WEBS

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Application January 8, 1944, Serial No. 517,587

2 Claims. (Cl. 263—8)

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This invention relates to web drying apparatus, and more particularly to methods of and means for insuring maximum effectiveness in letterpress drying with a minimum of spoilage and hazard.

The general object of the invention is to provide simple and substantially foolproof means for positioning a freshly printed web passing over and in contact with flames from a series of gas burners. The use of ribbon type burners for effective drying of webs delivered from letterpresses to a drying hood has previously been disclosed by applicant as, for example, in his Patent No. 2,297,314, issued September 29, 1942. While applicant's arrangement, as disclosed in said patent, shows one arrangement of burner apparatus, the instant invention applies to any letterpress drying or similar apparatus in which gas burners or the like are used. By reference to the patent, it will be observed that in such systems fresh air from any desired source and return air are supplied to the hood through which a web is passed at a desired rate of speed over flames which may or may not be shielded. While the use of such hoods, methods of air circulation, and arrangement for traversing the web form no part of this invention, such organization of apparatus in varying forms is provided by applicant and the invention herein disclosed is adapted for use therewith.

In order to expedite drying of webs fed to a drying hood from a letterpress or the like, the web is routed through the hood directly in contact with the flames from a series of gas burners. Recirculated air, actively contacting the web in its course through the hood, is also at high temperatures. The result is that fire hazard is ever present and operations are subject to burning of the web upon a reduction in speed of the web or when the web comes to a halt as when the press stops. Such hazard is increased due to the fact that the paper, in its course through the hood, runs close to the burners in order that most effective drying be obtained. Thus, even though the flames from the burners may be extinguished upon stopping of the press, the radiant heat from the burners may nevertheless cause burning of the web because of its proximity to them.

The problem of eliminating the fire hazard is of long standing and various expedients are found in the art for accomplishing this objective. One attempted solution is to provide for circulating cold air within the hood, whenever the travel of the web is interrupted in order to reduce the temperature and concomitantly reduce the effect of the radiant heat on the web. Another attempted solution is to provide a water jacket about the burners to enable circulation of cold liquid for removing the heat therefrom whenever the web stops. Another device is the use of a mechanical rotator on the burner so that its hot side will be turned away from the web. These attempted solutions have been costly not only in the expense of apparatus but in the loss of very considerable heat with resultant impairment of efficiency when operations are resumed and have been otherwise disadvantageous.

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Applicant's solution overcomes prior difficulties and inadequacies by permitting a web to be run at high speed directly in contact with a series of flames from burners, and by controlling the distance between the burners and web as the rate of speed of the web varies between maximum and zero.

A feature of the invention resides in controlling the position of a web with respect to a series of gas burners, and maintaining the same overall length between fixed points on the web regardless of the change in position of the web with respect to the burners.

These and other features will be more apparent from the following description of typical forms of the invention to be read in connection with the accompanying illustrative drawings in which:

Fig. 1 shows a diagrammatic arrangement for positioning a web at different distances from a group of burners located within a hood through which the web is passed;

Fig. 2 is an elevation of operating mechanism, diagrammatically illustrated, for varying the position of the web;

Fig. 3 is a front elevation of an arrangement for moving a series of burners toward and away from the line of travel of a web passing through a hood; and

Fig. 4 is a side elevation of the arrangement of Fig. 3.

Considering the drawings, similar designations referring to similar parts, numeral 8 designates an enclosure such as a drying hood through which web 9 is routed to be dried. The web, as from a letterpress, passes over a supporting roller 10, then over positioning roller 11, through hood 8, over positioning roller 12, to supporting roller 13, for disposition as desired. A series of burners 14 shown diagrammatically is positioned within the hood. As disclosed in applicant's Letters Patent 2,297,314, a source of gas supply is provided and the burners are suitably

arranged to throw a flame of desired character against the side to be dried of a web passing through the hood. Rollers 12 and 13 are cold water rollers as is well known in the art.

Roller bracket operating rods 15 and 16 have mounted thereon roller brackets 17 and 18 respectively, and the roller brackets, as is obvious, serve to position a web supported by rollers 11 and 12 toward or away from burners 14, depending upon the movement of operating rods 15 and 16. While rods, brackets, and rollers at each end of the hood are ordinarily sufficient, an intermediate positioning roller 19 with its associated operating rod 20 and roller bracket 21 may be employed for intermediate web support.

Gears 22 mounted on shaft 23 engage drive gears 24 for actuating operating rods 15, 16 and 20 which, in turn, govern the movement of brackets 17, 18 and 21 to shift web positioning rollers 11, 12 and 19. The movement of gears 24 can be controlled manually as by a crank, or automatically as desired by the provision of make and break electrical contact devices. For purposes of illustration, a hand crank is shown although it will be apparent to those skilled in the art that electrical control of the movement of the shaft 23 responsive to starting and stopping of the press, and hence responsive to starting and stopping of the web can readily be provided.

Under operating conditions, with burners 14 producing flame and the web travelling through the hood at high speed, rollers 11 and 12 will be in the solid line position. As a result, the web will pass close to the burners and obtain the benefit of the full drying action of the flame. When it is desired to shut down, or to stop for any reason, a movement of crank 24 will cause rollers 11 and 12 to assume the dotted line position. Consequently, the web will be removed a greater distance from burners 14 and this will be sufficient to save the web from danger of burning. If an intermediate roller, such as 19, is used it, too, will move in unison with rollers 11 and 12 so that the web in an intermediate position may be supported close to the burners or at a predetermined distance therefrom. It is apparent, of course, that any intermediate position may be assumed depending upon the degree to which the driving gears are actuated either manually or under automatic control as desired.

In Figs. 3 and 4, applicant disclosed an alternative arrangement in which the burners may be shifted in position while the path of travel or position of the web remains constant. Frame support 25 for mounting burners 14 is located within the hood. Longitudinal arms 26 support the opposite ends of burners 14 and as the arms are moved toward and away from the path of travel of the web, the burners are positioned in close proximity to or at a desired distance from a web passing through the hood. A controller 27 which may be an electrically actuated device operative responsive to the movement of the web, or operative responsive to the operation of the press from which the web is fed, or an equivalent hand operated crank, controls gear 28 which in turn drives gear 29 as well as gear 30

by means of shaft 31. Driven gears 32 and 33 operate linkage arrangements 33 for moving up and down the longitudinal arms 26. By means of guide rollers 34 connected to arms 26 and confined to channels 35, a controlled up and down movement in a defined path is secured.

As a result, just as in the case of the arrangement of Fig. 1, the web will be close to the burners during operating conditions when the web passes through the hood at high speed. On the contrary, when the web is stopped or slowed down down for any reason, the burners will be at a distance from the web depending upon the degree to which shaft 31 is actuated. The burners in solid line position are close to the web while in dotted line position are removed from the web as shown in Fig. 4.

It will be evident that numerous details of design and construction may be varied to achieve applicant's result, and the diagrammatic representations are, therefore, intended to be illustrative and not limiting, since various alternatives will suggest themselves to those skilled in the art.

I claim:

1. In a combination of apparatus for drying a printed web, a drying hood, a plurality of ribbon burners and means for positioning said burners within the hood for directing flames therefrom toward the path of travel of a web passing through the hood, a roller at one end of the hood, another roller at the other end of the hood, a web supported by said rollers, and means for shifting said rollers in a coordinated movement so that the web will be positioned at a desired distance from the burners.

2. In a combination of apparatus according to claim 1, means for retaining the web substantially taut in its travel through the hood whereby the distance between any two fixed points on the web will be maintained constant regardless of variations in the distance between the burners and web.

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