

Aug. 20, 1957

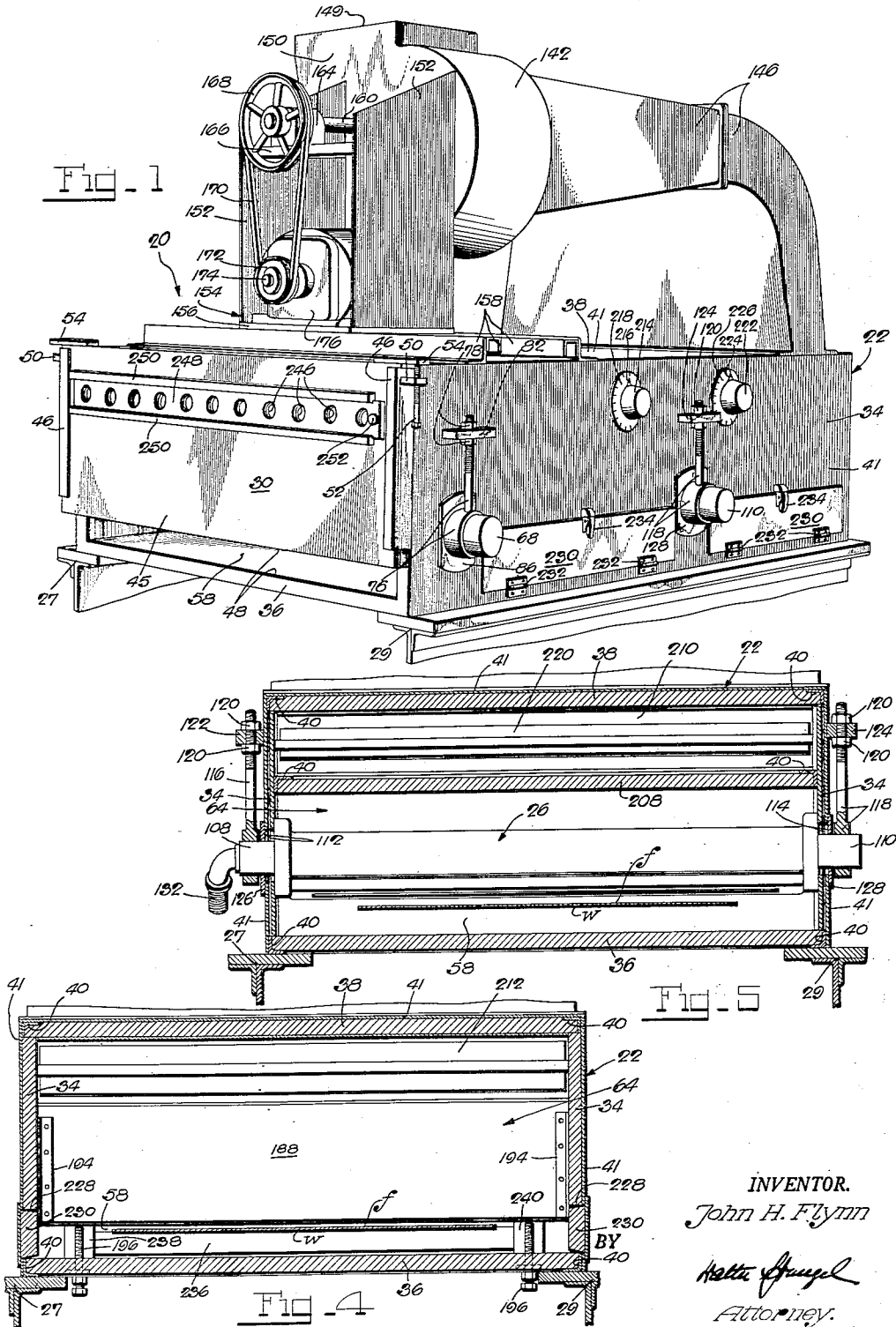
J. H. FLYNN

2,803,446

PRINT-DRYING APPARATUS

Filed April 28, 1955

2 Sheets-Sheet 1



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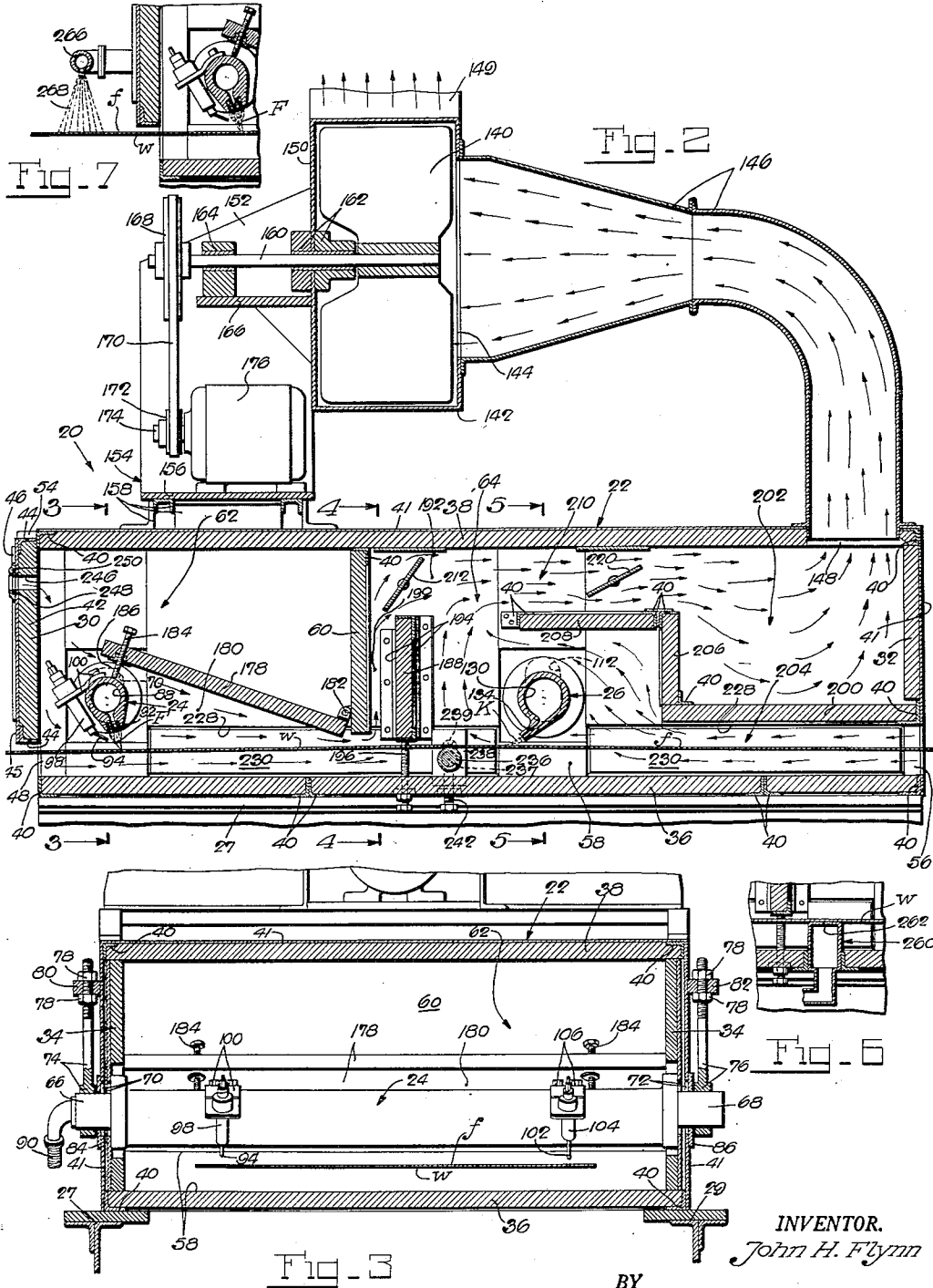
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2 Sheets-Sheet 2



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PRINT-DRYING APPARATUS

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Application April 28, 1955, Serial No. 504,452

17 Claims. (Cl. 263—3)

This invention relates to printed-ink drying in general, and to print-drying apparatus in particular.

My copending application Serial No. 388,541, filed October 27, 1953, discloses a method which permits thorough drying of printed ink on a continuous web while the latter passes through a restricted drying zone at the same high speed at which it travels through a modern printing press and at which a readily perceptible air layer clings to and travels with the web. Thus, a perceptible air layer will cling to a web traveling at even moderate speed, say in the neighborhood of 400 feet per minute, and this air layer will not only increase in height and density, but also cling ever more tenaciously to the web, as the web speed increases and approaches present-day maximum web speeds in the neighborhood of 2000 feet per minute achieved in recently developed printing presses. In accordance with my aforementioned method, a printed web is, on its emergence from a printing press and while traveling at the same high speed as through the latter, directed past a sheet of flame of such high velocity and heat intensity that the same will drive through the clinging air layer on the web and actually contact the printed face thereof and drive the volatiles from the printed ink and into the immediately reforming air layer on the web in which a part of the volatiles will burn off and the remainder become entrapped. Shortly after the subjection of the traveling web to the flame, the air layer clinging to the printed face thereof is with the remaining entrapped volatiles therein separated or lifted from the web by any suitable means, such as a driving air jet or knife directed against the printed web face generally counter to the web travel.

It is an object of the present invention to provide apparatus in which printed ink on a traveling web may be dried efficiently and reliably in accordance with my aforementioned method.

It is another object of the present invention to form the aforementioned drying apparatus in a compact unit of relatively simple construction which lends itself to installation in cooperative relation with existing printing presses as readily as with new press installations.

It is a further object of the present invention to provide the aforementioned drying apparatus with a longitudinal web passage of which a length next to the press end of the apparatus and a succeeding intermediate length thereof are in open communication with flame and exhaust chambers, respectively, that are separated from each other by a partition and in which are provided a gas burner of the high velocity and heat-intensity flame type and an air manifold, respectively, for subjecting the printed face of the traveling web to a flame and air knife in accordance with my aforementioned drying method.

Another object of the present invention is to provide an exhaust fan whose intake side is in communication with an outlet of the exhaust chamber in the aforementioned drying apparatus, thereby not only to expedite the exhaust of the hot gases and combustion products passing from the flame chamber into the exhaust chamber and the air layer on the web after it is lifted therefrom by the air knife,

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but also induce in the remaining length of the web passage, which is a duct closed on all sides, a flow of atmospheric air counter to the travel of the web in order to relieve the latter of any latent heat and also enhance the setting of the printed ink.

A further object of the present invention is to provide the aforementioned gas burner in the flame chamber of the drying apparatus near the press end of the latter, and arrange this chamber so that it slants in its approach to the adjacent exhaust chamber gradually closer to the traveling web until it merges into the former, thereby to avoid any pockets in the flame chamber in which hot gases and combustion products could become trapped, and instead guide them to the exhaust chamber.

It is another object of the present invention to provide the aforementioned flame chamber of the drying apparatus with an air intake or intakes, thereby not only assuring an adequate supply of combustion air for the burner under any and all operating conditions of the apparatus, but also constantly scavenging the flame chamber and driving the hot gases and combustion products therefrom into the exhaust chamber for their constant and most expeditious removal from the apparatus.

A further object of the present invention is to provide in the aforementioned exhaust chamber of the drying apparatus a baffle which is interposed between the air manifold therein and the partition between both chambers and extends from close proximity to the traveling web part way toward the outlet in the exhaust chamber, in order to compel the hot gases and combustion products from the flame chamber on the one hand and the lifted air layer from the web and cooling air on the other hand to flow in separate paths in the exhaust chamber at least within the region thereof in which they would meet head-on if the baffle were not provided, thereby avoiding the throttling effect of clashing countercurrents in the exhaust chamber, and instead achieving a most expeditious and smooth exhaust action in this chamber and, hence, optimum efficiency of the air knife in operation and also maximum effectiveness on the traveling web and printed ink thereon of the counter-flowing atmospheric air in the aforementioned duct part of the web passage.

Another object of the present invention is to provide in the web passage through the drying apparatus a support over which the traveling web is guided just before it is hit by the high-velocity air knife, thereby to prevent fluttering or even tearing of the web on its course through the apparatus.

It is a further object of the present invention to provide in the exhaust chamber of the drying apparatus a damper with which to regulate the draft of the hot gases and combustion products from the flame chamber, thereby to permit operation of the apparatus at maximum efficiency over a wide range of web speeds and other different operating conditions.

It is another object of the present invention to make provisions in the drying apparatus for ready adjustability of the aforementioned gas burner and air manifold toward and away from a web therein, thereby further to adapt the apparatus for drying print at maximum efficiency under different operating conditions.

Another object of the present invention is to close the end of the aforementioned flame chamber in the drying apparatus at the press end of the latter by a gate which is adjustable toward and away from a web in the apparatus and is provided with the aforementioned air intakes to this chamber, and to provide also a sliding shutter for these air intakes, thereby to permit regulation of the draft conditions in this flame chamber for optimum drying performance of the apparatus under any operating conditions.

A further object of the present invention is to achieve in the drying apparatus the aforementioned slanting approach of the flame chamber to the exhaust chamber by means of a pivoted baffle in the former which is adjustable into different inclined dispositions relative to a web in the apparatus, thereby permitting even further regulation of the draft conditions in the flame chamber for optimum drying performance of the apparatus under any operating conditions.

It is another object of the present invention to make provisions in the drying apparatus for adjusting the aforementioned baffle in the exhaust chamber toward and away from a web in the apparatus, thereby to permit this baffle to perform its aforementioned function with maximum efficiency under varying operating conditions of the apparatus.

It is a further object of the present invention to make provisions in the drying apparatus for adjusting the aforementioned web support, which is preferably a roller, transversely of the web path through the passage in the apparatus, thereby to permit initial feed through the apparatus of a new web conveniently in slack condition, and subsequent adjustment of this roller for tensioning the web sufficiently for the next drying run of the apparatus.

Other objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a perspective view of print-drying apparatus embodying the present invention;

Fig. 2 is a longitudinal section through the print-drying apparatus;

Figs. 3, 4 and 5 are fragmentary cross-sections through the print-drying apparatus as taken on the lines 3—3, 4—4 and 5—5, respectively, of Fig. 2; and

Figs. 6 and 7 are fragmentary sections through print-drying apparatus embodying the present invention in different modified manners, respectively.

Referring to the drawings, and more particularly to Figs. 1 and 2 thereof, the reference numeral 20 designates print-drying apparatus which comprises a housing 22 in which are provided a high-capacity burner 24 and an air manifold 26. A continuous printed web *w* is adapted to travel through the housing 22 in a guided path at a speed at which a perceptible air layer will cling thereto and the flame *F* from the burner which contacts the web, will neither burn nor scorch the adjacent printed face *f* thereof. The burner flame *F* is of the high velocity and heat intensity type explained more fully in my aforementioned copending application Serial No. 388,541, and the same is adapted to cut through the clinging air layer on the traveling web *w* and momentarily contact the printed face *f* thereof to drive the volatiles from the printed ink primarily into the quickly re-forming air layer, therein to burn off in part and become entrapped in part.

The manifold 26 is adapted to discharge a powerful air jet or knife *K* which forms with the traveling web *w* an acute angle pointing toward the burner 24. The air knife *K* is adapted to drive against the traveling web with sufficient force to lift therefrom the clinging air layer and entrapped residue of the volatiles from the printed ink.

The present print-drying apparatus 20 is associated with a printing press (not shown) which applies the print to the face *f* of the web *w*, and the latter is adapted to travel in a predetermined path through the drying apparatus under sufficient tension to remain taut. To this end, there are provided suitable rollers on opposite ends of the instant drying apparatus over which the web is guided through the apparatus, and also feeding rolls beyond the apparatus which, through suitable controls, are driven so as to draw the printed web through the apparatus at substantially the same speed at which it is fed through the printing press. The aforementioned guide

and feed rolls, not forming any part of the present invention, are not shown, but their exemplary arrangement may be as shown and described in another copending application of mine, Serial No. 504,453, filed April 28, 1955.

The housing 22, which may be mounted on suitable supports 27 and 29, comprises, in the present instance, front and rear walls 30 and 32, respectively, opposite sidewalls 34, a bottom wall 36 and a top wall 38, all of which may be formed by sheets of any suitable heat-insulating material, and all except the front wall 30 may suitably be secured to a rigid skeleton frame made up of structural steel members 40. For the sake of appearance and added structural strength, the described walls of the housing 22 are on the outside preferably lined with steel plates 41. The front wall 30, which may also be formed by a sheet 42 of any suitable heat insulating material secured in a structural steel frame 44 and externally lined with a steel plate 45, is in this instance a gate which is vertically adjustable in opposite guide channels 46 at the front end of the housing 22 in order to vary the height of a web inlet 48 to the housing. To this end, the guide channels 46 are provided with lugs 50 threadedly receiving adjustment screws 52 on which rest stop plates 54 carried by the gate 30 at the top thereof (Fig. 1). The gate 30 is thus vertically adjustable in its guide channels 46 on simple manipulation of the adjustment screws 52.

The rear wall 32 of the housing 22 is throughout the width of the latter apertured at 56 (Fig. 2) to define, together with the inlet 48 at the front of the housing, a longitudinal web passage 58 through the latter. Provided in the housing 22 is a transverse partition 60 which extends substantially to the web or bottom passage 58 and divides the housing into front and rear chambers 62 and 64, respectively, which are open to the web passage 58, except as pointed out hereinafter (Fig. 2).

The burner 24 is located in the front chamber 62 and is vertically adjustable therein toward and away from the adjacent printed face *f* of a guided web *w* in the passage 58 (Fig. 2 and 3). The burner is to this end provided with opposite end shanks 66 and 68 which extend with clearance through slots 70 and 72, respectively, in the opposite sidewalls 34 of the housing to the outside thereof, and are received in hangers 74 and 76, respectively, which are adjustably suspended by nuts 78 from lugs 80 and 82 on the opposite sidewalls 34 (Fig. 3). The slots 70 and 72 in the sidewalls 34 of the housing 22 are oblong heightwise of the housing (Fig. 2) to permit the explained vertical adjustment of the burner 24, but are of a width substantially equal to the diameters of the shanks 66 and 68 of the burner to prevent movement of the latter longitudinally of the housing. Suitable shields 84 and 86 may be carried by the burner shanks 66 and 68 in order to cover the oblong slots 70 and 72 in the sidewalls 34 of the housing 22. If desired, the burner 24 may also be angularly adjusted by merely turning the same with its shanks 66 and 68 in the hangers 74 and 76, respectively, in which case the hangers are preferably provided with set screws (not shown) in order to clamp the respective burner shanks in any angularly adjusted position to the hangers.

The shank 66 on the burner 24 is hollow and provides communication between the gas distribution chamber 88 in the latter (Fig. 2) and a flexible hose connection 90 (Fig. 3) which through additional conduits (not shown) may be in communication with a combustible gas-air mixture. The burner 24 is provided with suitable outlet ports 92 for the gas-air mixture to sustain the flame *F* of the explained high velocity and heat intensity. The burner 24 may also be provided with an ignition electrode 94 (Figs. 2 and 3) which on energization produces sparks that will ignite the gas-air mixture escaping at the burner ports 92 at the start of a print-drying operation of the apparatus. To this end, the ignition electrode may be carried by a holder 98 which may be mounted at 100 on

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the burner 24, the electrode being connected with the proper current source through suitable wiring (not shown). The burner 24 may also be provided with a flame rod or electrode 102 (Fig. 3) which forms part of a flame electrode circuit that is shown and described in my aforementioned copending application Serial No. 504,453. The flame electrode 102 may be carried by a holder 104 which is suitably mounted at 106 on the burner 24 (Fig. 3).

The air manifold 26 is located in the rear chamber 64 and is vertically adjustable therein toward and away from the adjacent printed face *f* of a guided web *w* in the passage 58 (Figs. 2 and 5). The manifold 26 is to this end provided with opposite end shanks 108 and 110 which extend with clearance through slots 112 and 114, respectively, in the opposite sidewalls 34 of the housing to the outside thereof, and are received in hangers 116 and 118, respectively, which are adjustably suspended by nuts 120 from lugs 122 and 124 on the opposite sidewalls 34 (Fig. 5). The slots 112 and 114 in the sidewalls 34 of the housing 22 are oblong heightwise of the housing (Fig. 2) to permit the explained vertical adjustment of the air manifold 26, but are of a width substantially equal to the diameters of the shanks 108 and 110 of the manifold to prevent movement of the latter longitudinally of the housing. Suitable shields 126 and 128 may be carried by the manifold shanks 108 and 110 in order to cover the oblong slots 112 and 114 in the sidewalls 34 of the housing 22. If desired, the air manifold 26 may also be angularly adjusted by merely turning the same with its shanks 108 and 110 in the hangers 116 and 118, respectively. In that case, set screws (not shown) in the hangers may be used to lock the manifold in any angularly adjusted position thereto.

The shank 108 on the manifold 26 is hollow and provides communication between the air-distribution chamber 130 in the latter (Fig. 2) and a flexible hose connection 132 (Fig. 5) which through additional conduits (not shown) may be in communication with a source of compressed air. The manifold 26 is provided with a suitable outlet port or ports 134 (Fig. 2) for the discharge therethrough of compressed air in the form of the described air knife K.

For safe and efficient performance of the instant print-drying apparatus, the housing 22 is adapted to be constantly purged of all products of combustion and hot gases as well as the air from the knife K and the air layer and entrapped volatiles lifted thereby from the traveling web. To this end, there is provided an exhaust fan 140 (Fig. 2) in a fan housing 142 having an intake side 144 which through a duct 146 is in communication with an outlet 148 in the top wall 38 of the housing 22. The fan housing 142, which has a suitable discharge end 149, is at its front wall 150 suitably mounted on spaced upright walls 152 of a bracket 154 (Figs. 1 and 2) having a base plate 156 mounted on a suitable framework 158 on the top wall 38 of the housing 22. The fan shaft 160, which is journaled in suitable bearing brackets 162 and 164 on the front wall 150 of the housing and on a platform 166 thereon, respectively, carries a pulley 168 which through a belt 170 is drivably connected with a pulley 172 on the shaft 174 of a motor 176 on the base plate 156 of the bracket 154.

In order to expedite the exhaust of the combustion products of the burner flame *F* and hot gases from the front chamber 62 into the rear chamber 64 and thence through the outlet 148 and conduit 146 to the exhaust fan 140, there is provided in the front chamber 62 a transverse baffle 178 which extends from above the burner 24 in downwardly inclined fashion to the lower end of the partition 60 to define in the front chamber 62 a trapless duct 180 which leads the combustion products and hot gases in the most direct and least obstructed path into the rear chamber 64 and thence to the exhaust

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fan 140. The baffle 178 is, in the present instance, pivotally mounted at 182 on the lower end of the partition 60 (Fig. 2) so as to be adjustable in its inclination to the traveling web *w* for different desired draft conditions in the duct 180. The baffle 178 is thus adjustable in its inclination on manipulating set screws 184 (Figs. 2 and 3) which may be threadedly received in the baffle 178 and bear against the burner 24. Of course, the pivotal mounting of the baffle 178 and its rest on the burner 24 through intermediation of the set screws 184 also permits the baffle to follow the burner on vertical adjustment of the latter without varying the gap 186 between them.

To avoid a head-on clash in the bottom region of the rear chamber 64 between the products of combustion and hot gases flowing from the duct 180 into the rear chamber and the generally counterflowing air knife K and air layer lifted thereby from the traveling web *w*, and thus forestall a major impediment of the exhaust action of the fan 140 in the rear chamber, there is provided in the latter in spaced relation with the partition 60 a baffle 188 (Fig. 2) which defines in the rear chamber a duct 190 that forms to all practical intents and purposes a continuation of the duct 180 in the front chamber 62 to a top region 192 of the rear chamber 64. The baffle 188 is vertically adjustable toward and away from the traveling web *w* in suitable ways 194 on the opposite sidewalls 34 of the housing 22 (see also Fig. 4). To this end, the baffle 188 rests on adjustment screws 196 which are threadedly received in the bottom wall 36 of the housing 22 and may be manipulated with a wrench from therebelow.

In order further to regulate the draft in the rear chamber 64, and especially induce a flow of atmospheric air counter to the travel of the web *w* over a rear length of the web passage 58 in order to relieve the web of any latent heat and expedite the setting of the printed ink thereon, there is further provided in the rear chamber a horizontal baffle 200 (Fig. 2) which divides a rear length of the rear chamber from a corresponding rear length of the web passage 58 to define an exhaust chamber 202 and a duct 204 in which atmospheric air flows counter to the web travel, as aforementioned. The baffle 200 is at its inner end continued at 206 and 208 in the offset fashion shown in Fig. 2 so as to extend over the manifold 26 and define in the rear chamber 64 a constricted inlet 210 to the exhaust chamber 202. The draft in the inlet 210 is, by virtue of its constricted cross-sectional area, quite considerable and compels the combustion products and hot gases from the duct 190 and the air from the air knife K and air layer lifted thereby from the traveling web to flow with the least interference from each other through this inlet and into the exhaust chamber 202 from where they are drawn off through the outlet 148 and conduit 146 by the fan 140 and out through the discharge end 149 of the fan housing 142.

In order to regulate the draft in the duct 190, there is provided in the rear chamber 64 a damper 212 (Fig. 2) which may be turned from the outside of the housing 22 by a knob 214 (Fig. 1) that may have a pointer 216 to indicate on a fixed dial 218 the angular position of the damper. The draft in the inlet 210 to the exhaust chamber 202 may be regulated by a damper 220 (Fig. 2) which may be turned from the outside of the housing 22 by a knob 222 (Fig. 1) that may have a pointer 224 to indicate on a fixed dial 226 the angular position of this damper.

In order to gain ready access to the interior of the apparatus for any reason whatever, the opposite sidewalls 34 of the housing 22 are provided with apertures 228 (Figs. 2 and 4) which are normally closed by doors 230 that are hinged at 232 to the respective sidewalls 34 and normally held closed by latches 234 (Fig. 1).

The traveling web *w* is intermediate the length of the web passage 58 through the apparatus, and preferably in fairly close proximity to the air manifold 26, passed over a further guide roll 236 which will prevent tearing or even fluttering of the web as it is hit by the powerful

air knife K. The guide roll 236 is preferably vertically adjustable with its journal bearings 237 in vertical slots 239 in bearing blocks 238 and 240 on the bottom wall 36 of the housing 22 by means of adjustment screws 242 which may be manipulated with a wrench from beneath the housing (Figs. 2 and 4). The intermediate guide roll 236 may be retracted when leading a new printed web in slack condition through the apparatus for a succeeding print-drying operation, and may thereupon be advanced toward the guided web and therebeyond in order to apply proper tension to the latter for its succeeding run through the apparatus.

In order further to regulate the draft in the duct 180 in the front chamber 62 and also supply such additional combustion air as is required by the burner flame F for its desired flame characteristic, the front gate 30 is provided with a plurality of air inlets 246 (Figs. 1 and 2) which may be opened or closed to any desired extent by a shutter 248 that is slidable in gibs 250 on the gate and may be manipulated by a knob 252.

The instant print-drying apparatus is a compact unit of relatively simple construction which lends itself to installation in cooperative relation with existing printing presses as readily as with new press installations. The provision of the baffle 178 in the front chamber 62 so that the former slants from above the burner 24 in its approach to the rear chamber 64 gradually closer to the guided web *w* in the passage 58 until it meets with the lower end of the partition 60, is most advantageous in that the duct 180 defined thereby in the front chamber leaves no pockets in which hot gases and combustion products could become entrapped, and instead leads them in the most direct and unimpeded path into the rear chamber for their expeditious exhaust from there. The provision of the air inlets 246 in the front gate 30 of the apparatus is further advantageous in that they not only assure a regulatable supply of combustion air for the burner flame under any and all operating conditions of the apparatus, but also enhance the action of the exhaust fan 140 in scavenging the front chamber 62, and especially the duct 180, and drawing the hot gases and combustion products therefrom into the rear chamber 64 for their most expeditious removal from the latter. The provision of the baffle 188 in the rear chamber 64 is highly advantageous in that it compels the hot gases and combustion products from the duct 180 in the front chamber 62 on the one hand and the air from the knife K and air layer lifted thereby from the traveling web on the other hand to flow in separate paths in the rear chamber at least within the region thereof in which they would meet head-on if this baffle were not provided, thereby avoiding the throttling effect of clashing countercurrents in the rear chamber and, instead, achieving a most expeditious and smooth exhaust action in this chamber and, hence, optimum efficiency of the air knife in operation and also maximum effectiveness on the traveling web and printed ink thereon of the counter-flowing atmospheric air in the rear duct 204. The provision of the intermediate guide roll 236 and its adjustability to and from the guided web *w* is advantageous in that it not only prevents tearing or even fluttering of the latter under the impact of the powerful air knife, but also permits ready tensioning of the web so that the same will, for its run through the apparatus, remain taut for optimum print-drying results. The provision of the damper 212 for regulating the draft in the duct 190 is advantageous in that it permits operation of the apparatus at maximum efficiency over a wide range of web speeds and other different operating conditions. The adaptation of the instant apparatus to efficient print-drying performance over a wide range of web speeds and other different operating conditions is further enhanced by the provision of the damper 220 for regulating the draft in the inlet 210 to the exhaust chamber 202. The ready vertical, and, if desired, also angular, adjustability of the burner 24 and air knife 26 further adapt the

instant apparatus for drying print at maximum efficiency under vastly different operating conditions. The vertical adjustability of the front gate 30 is in this same connection advantageous in that it enhances even further the adaptability of the apparatus to print-drying at maximum efficiency under vastly different operating conditions. Further advantageous are the pivoted mounting and adjustability of the slanting baffle 178 in the front chamber 62 and the vertical adjustability of the baffle 188 in the rear chamber 64, since these even further enhance the adaptability of the instant apparatus to print-drying at maximum efficiency under widely varying operating conditions.

While the hereinbefore described print-drying apparatus 15 discloses the intermediate web guide roll 236 for preventing tearing or even fluttering of the traveling web *w* under the impact of the powerful air knife K, Fig. 6 discloses a vacuum manifold 260 which takes the place of this intermediate guide roll 236 and serves the same purpose as the latter. To this end, the vacuum manifold 260 20 is connected with any suitable source of sub-atmospheric pressure (not shown), and is provided with a port or ports 262 at which to apply suction to the traveling web *w* to hold it against fluttering and thereby also prevent its 25 possible tearing by the impact thereon of the powerful air knife.

Fig. 7 shows a further modification according to which a spray nozzle 266 applies water in a more or less fine spray or mist 268 to the printed face *f* of the traveling 30 web *w* prior to its subjection to the burner flame F. This is particularly applicable to the drying of the well-known moisture-set inks, the moisture thus applied to the printed web face in the form of the mist or spray 268 being by the burner flame F changed into steam which will 35 subsequently dry the printed ink.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

45 1. Print-drying apparatus, comprising a housing having a longitudinal passage for lengthwise travel of a continuous printed web in a guided path therethrough, and a transverse partition intermediate its length having an inner end next to said passage and defining in said housing adjacent chambers on one side of and open to said 50 passage; a burner in one of said chambers with its flame extending toward and widthwise of said web path; a manifold in the other chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web path and forming therewith an acute angle pointing toward said one chamber; an exhaust fan having an input side in communication with said other chamber; and a 60 baffle in said one chamber extending throughout the width of the latter substantially from said burner inclined toward said passage and leading to said inner end of said partition.

2. Print-drying apparatus as set forth in claim 1, in which said one chamber is provided with an air intake and a damper to open and close the latter to any extent.

3. Print-drying apparatus as set forth in claim 1, in which said burner is mounted for adjustment toward and away from said passage, and said baffle is pivoted at one end to the inner end of said partition and is adjustable in its inclination to said passage.

4. Print-drying apparatus as set forth in claim 1, in which said burner is mounted for adjustment toward and away from said passage, and said baffle is pivoted at one end to the inner end of said partition and carries at its 75 other end a set screw bearing against said burner so that

said other baffle end is adjustable toward and away from said passage with said burner and also independently of the latter.

5. Print-drying apparatus, comprising a housing open at one end and having a longitudinal passage for lengthwise travel of a continuous printed web in a guided path therethrough, and a transverse partition intermediate its length having an inner end next to said passage and defining in said housing adjacent chambers on one side of and open to said passage of which one chamber is also open at said open housing end; a burner in said one chamber with its flame extending toward and widthwise of said web path; a manifold in the other chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web path and forming therewith an acute angle pointing toward said one chamber; an exhaust fan having an input side in communication with said other chamber; a baffle in said one chamber extending throughout the width of the latter substantially from said burner inclined toward said passage and leading to said inner end of said partition; a gate at said open housing end closing said one chamber thereat, said gate having an air intake to said one chamber and being adjustable toward and away from said web path to regulate the gap between them; and a damper to open and close said air intake to any extent.

6. Print-drying apparatus as set forth in claim 5, in which said burner is mounted for adjustment toward and away from said passage.

7. Print-drying apparatus as set forth in claim 5, in which said baffle is pivoted at one end to the inner end of said partition and is adjustable in its inclination to said passage.

8. Print-drying apparatus as set forth in claim 5, in which said burner is mounted for adjustment toward and away from said passage, and said baffle is pivoted at one end to the inner end of said partition and carries at its other end a set screw bearing against said burner so that said other baffle end is adjustable toward and away from said passage with said burner and also independently of the latter.

9. Print-drying apparatus, comprising a housing having a longitudinal passage for lengthwise travel of a continuous printed web in a guided path therethrough, and a transverse partition intermediate its length defining in said housing adjacent first and second chambers on one side of and open to an end length and continuing intermediate length, respectively, of said passage of which the remaining end length thereof is closed on all sides to form a first duct, said second chamber having an outlet remote from said passage; an exhaust fan having an input side in communication with said chamber outlet; a burner in said first chamber with its flame extending toward and widthwise of said web path; a manifold in said second chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web path and forming therewith an acute angle pointing toward said first chamber; and a transverse baffle extending in said second chamber throughout the width of the latter from adjacent said web path part way to said chamber outlet in interposition between said manifold and partition to form in said second chamber second and third ducts in communication with said first chamber and said first duct, respectively.

10. Print-drying apparatus as set forth in claim 9, further comprising a damper in said second duct for opening and closing the latter to any extent.

11. Print-drying apparatus as set forth in claim 9, further comprising means for adjusting said baffle toward and away from said web path.

12. Print-drying apparatus, comprising a housing having front and rear walls with apertures to provide a longitudinal passage for lengthwise travel of a continuous

printed web in a guided path through the housing, and being provided intermediate said front and rear walls with a transverse partition to define in said housing front and rear chambers, respectively, on one side of and open to said passage; a baffle extending longitudinally in said housing from said rear wall thereof over an end length of said rear chamber to partition the same from said passage with the remaining length of said rear chamber being left open to said passage; a burner in said front chamber with its flame extending toward and widthwise of said web path; a manifold in said rear chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web path within said remaining chamber length and forming with said web path an acute angle pointing toward said front chamber; and an exhaust fan having an intake side in communication with said rear chamber within said end length thereof.

13. Print-drying apparatus as set forth in claim 12, further comprising a damper in said end length of said rear chamber for opening and closing it to said remaining length thereof to any extent.

14. Print-drying apparatus as set forth in claim 12, in which an innermost end length of said baffle in said housing is offset from the remaining length thereof away from said passage to constrict a corresponding part of said end length of said rear chamber, and a damper is provided in said constricted chamber part.

15. Print-drying apparatus, comprising a housing having a longitudinal through passage for guided lengthwise travel of a continuous printed web therethrough, and partition means in said housing defining therein longitudinally successive chambers on one side of and laterally open to said passage of which one chamber has an outlet; a burner in the other chamber with its flame extending toward and widthwise of the adjacent printed face of a guided web in said passage; a manifold in said one chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web face and forming therewith an acute angle pointing toward said other chamber; means for adjusting said manifold toward and away from said web-face; and a rotary roller in said passage near said manifold over which to pass the other face of a guided web to prevent fluttering of the latter on subjection to an air stream from said manifold, and means for adjusting said roller toward and away from a guided web in said passage to also regulate the tension in the former.

16. Print-drying apparatus, comprising a housing having a longitudinal passage for guided lengthwise travel of a continuous printed web therethrough, and longitudinally successive chambers on one side of and open to said passage of which one chamber has an outlet; a burner in the other chamber with its flame extending toward and widthwise of the adjacent printed face of a guided web in said passage; a manifold in said one chamber having an air inlet and an outlet arranged for the discharge of compressed air in a stream extending toward and widthwise of said web face and forming therewith an acute angle pointing toward said other chamber; and a suction box in said passage near said manifold over which to pass the other face of a guided web to prevent fluttering of the latter on subjection to an air stream from said manifold, said suction box having means for its connection with a sub-atmospheric pressure source.

17. Print-drying apparatus, comprising a longitudinal housing having a topwall and a bottomwall, opposite sidewalls and opposite endwalls and two internal upright transverse partitions extending between said sidewalls and spaced from each other and from said endwalls longitudinally of said housing, said endwalls and partitions being at their lower ends also spaced substantially equally from said bottom wall to define in said housing a longitudinal bottom passage for lengthwise travel of a continuous printed web in a guided path therethrough, one

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of said endwalls and the partition nearest thereto defining in said housing a first chamber open to said passage, said partitions defining in said housing a second chamber open to said passage, and the other partition and other endwall defining in said housing a third chamber, said other partition being spaced from said topwall to provide thereat communication between said second and third chambers, and a baffle extending between said sidewalls substantially parallel to said bottomwall from the lower end of said other partition to the lower end of said other endwall to close said third chamber to said passage and form with said bottomwall a duct closed on all sides and extending from said other partition to the outside of the housing at said other endwall thereof, said third chamber having an outlet; a burner in said first chamber with its flame extending toward and widthwise of said web path; a manifold in said second chamber having an air inlet and an outlet arranged for the discharge of compressed air in a

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stream extending toward and widthwise of said web path and forming therewith an acute angle pointing toward said first chamber; and an exhaust fan having an input side in communication with said chamber outlet.

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