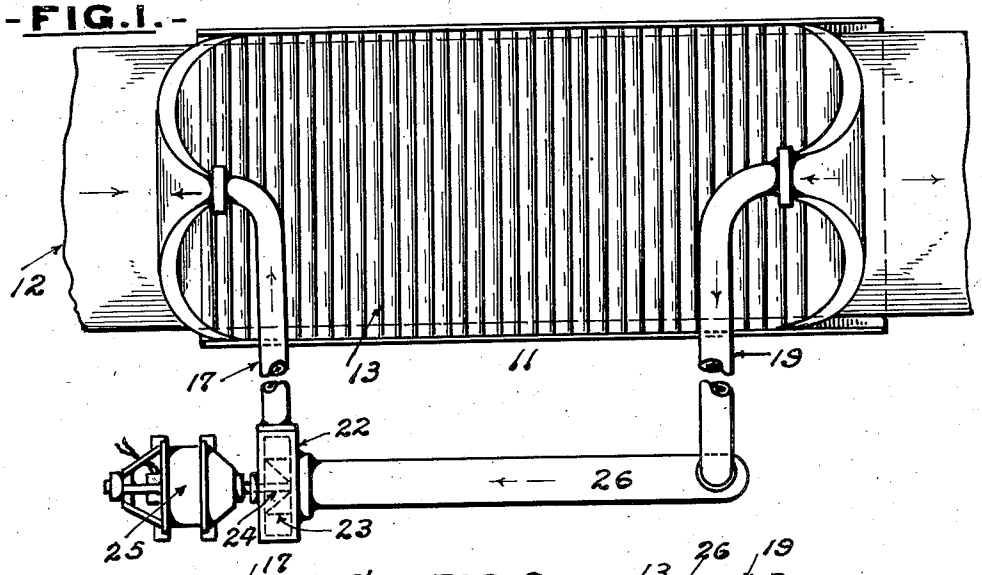
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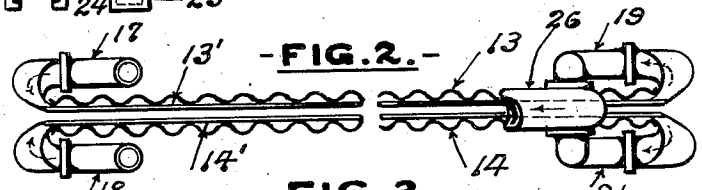
PAPER AND WEB HANDLING MECHANISM FOR PRINTING MACHINES

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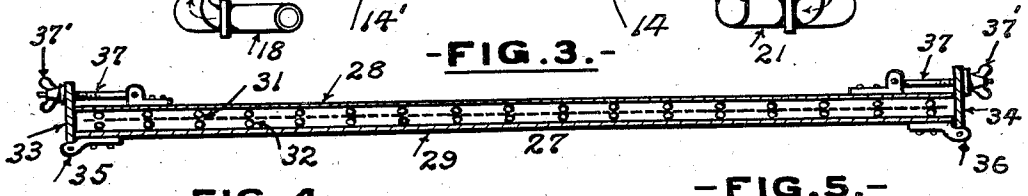
-FIG.1.-



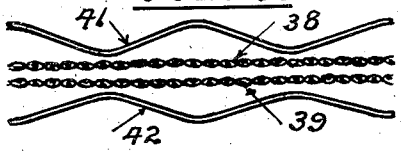
-FIG.2.-



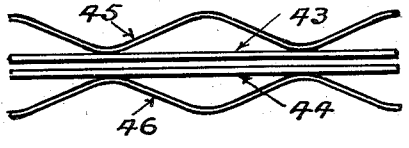
-FIG.3.-



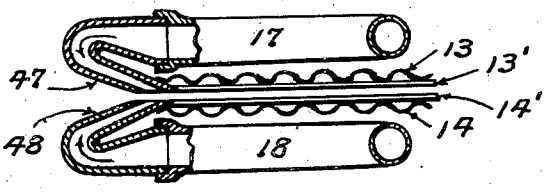
-FIG.4.-



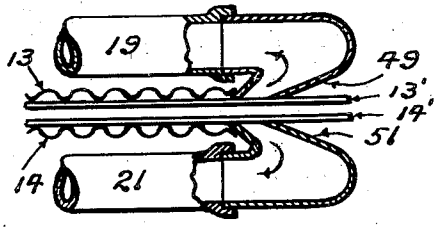
-FIG.5.-



-FIG.6.-



-FIG.7.-



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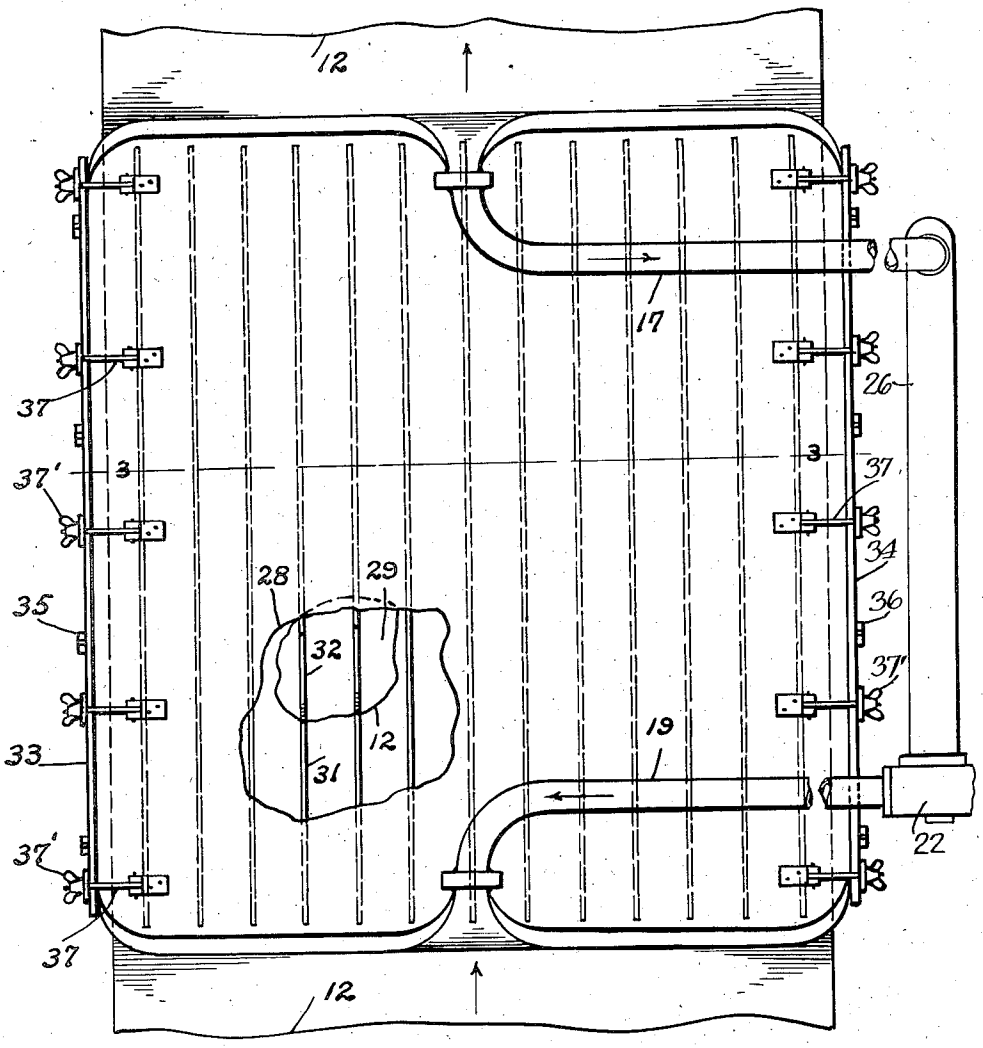
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PAPER AND WEB HANDLING MECHANISM FOR PRINTING MACHINES

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Fig. 3A



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2,037,806

PAPER AND WEB HANDLING MECHANISM FOR PRINTING MACHINES

Harry Little, Rye, N. Y., assignor, by mesne assignments, to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

Application April 8, 1933, Serial No. 665,077

15 Claims. (Cl. 271—2.1)

This invention relates in general to paper and web handling mechanism and more particularly to an improved method for directing and advancing a web or paper by a current of air in connection with paper handling mechanism and especially rotary web printing machines.

The object of the invention is to provide a pneumatic, self-threading device of the kind indicated that will incorporate certain desired improvements over the device described in patent of Schmidt No. 1,161,346, dated November 23, 1915 in the way of a more convenient, economical and efficient pneumatically operated web handling device of the character indicated.

The present invention differs in operation over what hitherto has been attempted in this type of device, by advancing a web or paper through an air conducting, draft shielded casing or channel preferably having novel means for creating air waves therein, whereas, in accordance with Schmidt's invention, the paper was conveyed between rows of pipes open to drafts and other atmospheric disturbances which were apt to interfere with a uniform feeding of the web.

Another object is to provide a device of the kind indicated of a design and construction particularly adapted to shield a feeding web from air currents other than those passing through the device itself.

A further object is to provide an improved device for pneumatically directing and advancing a web through a passageway or chamber shielded against external drafts and provided with special means for increasing the velocity of air through the said chamber and minimizing back pressure of air therein.

A still further object is to provide a novel web conducting passageway or casing particularly designed and adapted to deflect an air current in such manner as to create a series of air waves within a passageway in order to more efficiently float and pull along a web.

It is also an object of the invention to provide a pneumatic paper web handling mechanism of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of an embodiment of the invention showing the exterior of the device through which a web is being advanced, and operative connections to coacting means for creating a current of air under pressure;

Figure 2 is a longitudinal sectional view, with certain parts omitted and others broken away, of the arrangement shown in Figure 1;

Figure 3 is a transverse sectional view of a modified form of the invention taken on the line 3—3 of Figure 3A, the end construction being omitted, showing the disposition of the internal paper or web guides and the auxiliary means employed for regulating the air blast and for sealing or closing the chambers;

Figure 3A is a top plan view of the device shown in Figure 3;

Figure 4 is an enlarged fragmentary detail view showing one form and arrangement of the paper or web guides employed in the form of the invention shown in Figures 1 and 2;

Figure 5 is a view similar to Figure 4, but showing a slightly modified form of web guiding means for use in the air chamber or container;

Figure 6 is an enlarged side elevational view, partly in section, with parts broken away, showing the inlet pipes and nozzles employed therewith which are connected to the left hand end of the web conducting air chamber or passageway as shown in Figure 1; and

Figure 7 is a view similar to Figure 6 showing the type of nozzles preferably employed in connection with the outlet pipes at the right hand side of the web conducting air chamber as illustrated in Figure 1.

Referring to Figures 1 and 2, the numeral 11 designates an elongated passageway of a width sufficient to accommodate a web 12 of the type customarily employed in rotary web printing machines of the form shown in Figures 1 and 2.

The top and bottom walls 13 and 14 respectively of the web conducting passageway or casing 11, which may be termed the web conveyor, are formed with corrugations, the alternate inwardly and outwardly directed folds or bends whereof are arranged face to face in opposed relation, the purpose of which will be set forth hereinafter. Secured to each of the interior walls 13 and 14 of the casing 11 and arranged in opposed relation are two rows of wires or rods 13', 14', one of said rows being superposed over the other and serving as guides between which the web 12, is directed and advanced.

As best shown in Figures 1 and 2, the interior of the casing or passageway 11 has communicating therewith at one end a pair of inlet pipes 17, 18 and at another end a pair of outlet pipes 19, 21, respectively, the inlet pipes 17, 18 communicating with a fluid pressure chamber forming a part of an air blower or fan 22, having a propeller 23 attached to the shaft 24 of a motor 25 whose function is to circulate or force air through the web conducting casing or passageway 11. The outlet pipes 19, 21 which serve as the channels for returning the air after its passage through the casing 11, are connected to a pipe or expansion chamber 26 which communicates directly with the air blower 23, it being observed, as indicated by the arrows in Figure 1, that a current of air is constantly circulating through the casing or passageway 11 in a direction from left to right as viewed in Figure 1, and thence returned to the air blower 22.

In Figure 3, a modified form of the invention is disclosed wherein the air conducting casing or passageway 27 through which the web 12 is conducted, has top and bottom walls or partitions 28, 29 of a non-corrugated or rectilinear type and arranged in spaced relation. To the interior of top wall 28 is secured a series of wires or rods 31 which are arranged in opposed and parallel relation to a corresponding series of wires or rods 32, the said opposed series of wires or rods 31, 32 serving as the guiding means through which the web 12 passes as the latter is impelled through the casing 27. The chamber or space between the walls 28 and 29 is closed at each side by lids or side members 33, 34 which may serve both as draft compensators and as means to inspect and/or adjust that portion of the web within the said chamber. The said lids 33, 34 are hingedly attached to adjacent sides of the bottom wall 29 as at 35, 36. It is to be understood that the instant modified form of the invention may preferably be provided with the nozzles and other operating details of the form shown in Figure 1.

The said lids 33, 34 are adapted to be secured in the operative vertical position shown by screws or members 37 hingedly connected to the top wall 28 and received in openings or slots (not shown) formed in the upper portion each of the lids 33, 34. Wing nuts 37' threaded on the stems of the members 37 and adapted to be engaged with the lids 33, 34 serve to close same against the ends of the top and bottom walls 29, 31 and thus seal the chamber or space therebetween for the air blast which conducts the web 12.

It will also be understood that when the wing nuts 37' are unscrewed the lids may be positioned at an angle relatively to the top and bottom walls 28, 29 or permitted to depend from the casing 27 to regulate the draft, inspect the web 12 or adjust same, should this be needed. If desired, the sides or lids of the casing 11 may be hingedly connected to the detachable top by the screws and wing nuts 37, 37' shown in Figure 3.

In Figure 4, the web guiding elements 38, 39 may be formed of woven wire or screening and the like and separated from adjacent portions of the corrugated top and bottom walls 41, 42.

In Figure 5, the solid web guiding rods or wires 43, 44 which may be of the type shown in Figure 3, are secured to adjacent parts or bends of their respective top and bottom corrugated walls 45, 46.

In Figure 6, the top and bottom pipes 17, 18 which are of smaller diameter than the outlet pipes 19, 21 have connected thereto nozzles 47, 48 preferably of comparatively small and tapering diameter in order to increase the velocity of the air blast in accordance with well-known principles, thereby aiding the directing and advancing of the web 12 through the air chamber or passageway. The outlet pipes 19, 21 as well as the nozzles 49, 51 immediately connected thereto for exhausting the air from the air chamber, are of considerably larger diameter than the inlet pipes and nozzles above-referred to in order to lessen back pressure in the said chamber.

The general function and manner of operation of the device described above, has been in large measure indicated from the foregoing description, it being understood that in all forms of the invention, the forward or leading end of a web 12 introduced into the front end of the web conducting air chamber or passageway will be at once impelled forwardly or drawn through the said casing or passageway 11, by the air blast passing therethrough and created by the air blower fan driven by the motor 25, it being understood that a plurality of the said passageways or casings will extend from the web rolls to the folders, around corners, conveying the web from point to point, and between any mechanism for guiding and operating upon a web or webs as desired. The alternate inwardly and outwardly directed folds of the corrugations above-mentioned, it will be understood, will create corresponding alternate compressions and comparative rarefactions or less compressed areas in the air blast traveling through the passageway 11, or in a word create high or low pressure waves which it has been found facilitates the floating and conveying of the web 12 through the said passageway 11, substantially in the centre thereof.

The web guiding rods or elements prevent contact of the web with the sides of the web conductor or conveyor, should the air blast be stopped during the operation of the printing machine, thereby preventing smearing or blurring of the newly printed web.

Since the casings 11 and 27 can be formed into any shape effective to convey a web to the points desired, it will be seen that with the present means, a web can be air-borne from point to point while shielded against external air drafts or breezes, carried around corners, and stripped from the printing press without the necessity of physically contacting same with the various members of the printing machine. In this manner, the printing machine may be considered to be self-threading, while the printed web can be fed through the press with the assurance that there will be little likelihood of smearing the still moist ink on the freshly printed web which is a frequent occurrence with conventional mechanical web forwarding and guiding means. If it is desired or necessary to inspect or adjust any portion of the web located in one or more casings, the lids or sides 33, 34 of the respective casings of the form shown in Figures 3A and 3 may be swung downwardly by loosening the wing nuts 37', or the top wall 28 may be separated from the bottom wall 29 to permit an unimpeded inspection of the web which latter may be cleaned, adjusted, etc. The opening or swinging downwardly of the said lids 33, 34 to a variable extent, on any of the casings, it is also to be observed, will admit atmospheric air to enter at the sides and will to some extent reduce the velocity of the blast of air passing through the particular casings desired.

If desired, the air or fluid directed through the chamber 11 may be conditioned; i. e., predried, heated or precharged with moisture to the requisite degree for appropriate treatments of the web 12. For example, dehydrated and/or heated air may be employed for removing moisture from a web or for drying the ink thereon after printing; while on the other hand, it is possible, if desired, to moisten the web either to improve printing conditions or to remove static electricity from a traveling web, by passing same through steam or moistened air.

The present invention lends itself admirably to accomplishing these functions. Either the chamber 11 or preferably the expansion chamber 26 may be equipped with air drying, heating or moistening means, or a combination of same which may be selectively brought into play for the desired purpose.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having an elongated passageway, air blast conducting means arranged at one end of the passageway, air blast exhausting means arranged at another end of the passageway, and dampers hinged to opposite sides of said passageway for admitting air to regulate the air pressure therein.

2. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having an elongated passageway, an air regulating damper directly connected to said means for regulating air within the passageway, air blast accelerating means connected at one end of the passageway, air blast exhausting means connected at another end of the passageway, and other means including an expansion chamber for returning air from the last-mentioned end of the passageway to the first-mentioned end thereof.

3. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having an elongated passageway, air blast accelerating means connected at one end of the passageway, air blast exhausting means connected at another end of the passageway, other means for returning air from the last-mentioned end of the passageway to the first-mentioned end thereof, and auxiliary means for regulating air pressure within the passageway, said last mentioned means admitting air through the sides of the passageway.

4. A pneumatic paper directing and advancing mechanism for a printing machine, comprising an elongated passageway having top and bottom members, side walls adjustably connected to the top and bottom members, air blast accelerating means connected to one end of the passageway, air exhausting means connected to the other end of the passageway, and an expansion chamber connecting said air blast accelerating and air exhausting means.

5. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having an elongated passageway formed of top and bottom members, side walls adjustably connected to said top and bottom members, paper guides attached to said top and bottom walls, said paper guides being arranged in opposed relation and adapted to slidably receive paper therebetween, and other means for creating a blast of air in said passageway and for facilitating the prevention of back air pressure in the passageway.

6. In a paper handling machine, means having an elongated passageway adapted to receive a web, nozzles secured to said means adjacent either end of said passageway, and other means connected to the nozzles for forcing a blast of air through said passageway for pulling said web therethrough, said passageway having a detachable top wall.

7. In a paper handling machine, means having a passageway adapted to receive a web, other means arranged adjacent said passageway for forcing a blast of air therethrough, and web guiding members secured within said passageway for preventing direct contact of the web with the inner surface of the passageway, said web guiding members being composed of screens arranged in opposed relation.

8. In a paper handling machine, means having an air conducting passageway adapted for advancing a web therethrough, a plurality of web guiding elements arranged in opposed relation within the passageway, and other means for regulating air pressure within said passageway while a web is positioned in same, said last mentioned means admitting air through the sides alone of the passageway.

9. In a paper handling machine, means having a passageway adapted to receive a web, web guides secured to said means for preventing contact of the web with the means, an inlet nozzle secured to one end of said means adjacent the passageway for passing a blast of air into the passageway, an outlet nozzle secured to another end of said means adjacent the passageway, means hinged to the sides of the first mentioned means for admitting air through the sides of the passageway, and an expansion chamber arranged between the said inlet and outlet nozzles for facilitating the movement of air from the said passageway.

10. In a paper handling machine, means having a passageway adapted to receive a web, inlet means and outlet means connected to said means at either end of said passageway, a blower connected to said inlet means for creating a blast of air through said passageway, and opposed web guiding means arranged within said passageway, said first mentioned means including a detachable lid and coacting hinged side members for opening said passageway for inspection of said web.

11. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having a passageway adapted to receive a web, said passageway including upper and lower walls, longitudinally extending guides secured to the said upper and lower walls in opposed relation for guiding said web and preventing contact of same with the said upper and lower walls, and other means for facilitating the creation of a strong blast of air at a forward end of the passageway and preventing back pressure at a rear end of the passageway, said last mentioned means including an expansion chamber.

12. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising means having a passageway adapted to receive a web, said passageway including upper and lower walls, sides movably connected to the upper and lower walls, web guiding means fastened to said upper and lower walls, said web guiding means preventing contact of the web with the said upper and lower walls, draft creating means at one end of the passageway, and other means for preventing back pressure in the chamber at another end thereof, said last mentioned means including an expansion chamber.

13. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising air blast creating means having an air conducting passageway for directing and advancing a web, air regulating damper means directly connected to said first mentioned means, other means for accelerating a blast of air into said passageway and minimizing back pressure of air therein, and additional means for returning air to the air blast creating means, said last mentioned means including an expansion chamber.

14. A pneumatic paper directing and advancing mechanism for a rotary printing machine, comprising air blast creating means, means having a web conducting passageway connected to the blast creating means, a damper connected to said last mentioned means for regulating air within the passageway, a nozzle connected to one end of the passageway and the air blast creating means for accelerating an air blast into the passageway, a second nozzle connected to another end of the passageway for minimizing back pressure of air in the passageway, and conduit means having an expansion chamber connecting the said second nozzle and the air blast creating means.

15. In a paper handling machine, means having a passageway adapted to receive a web, hinged damper means normally closing said passageway at the sides but adapted to swing relatively thereto to admit air through the said sides, web guides arranged in said passageway in opposed relation for accommodating a web therebetween, a detachable top wall forming a part of said passageway and permitting inspection and/or adjustment of a web located therein, means for forcing a blast of air through the passageway, and other means including an expansion chamber connected to either end of said passageway for facilitating the movement of air from the passageway.

HARRY LITTLE.