Nov. 26, 1935. T. FUYKERS 2,022,593

APPARATUS AND METHOD FOR DRYING PRINTED WEBS

Filed March 18, 1931 5 Sheets-Sheet 1

Fig. 1.

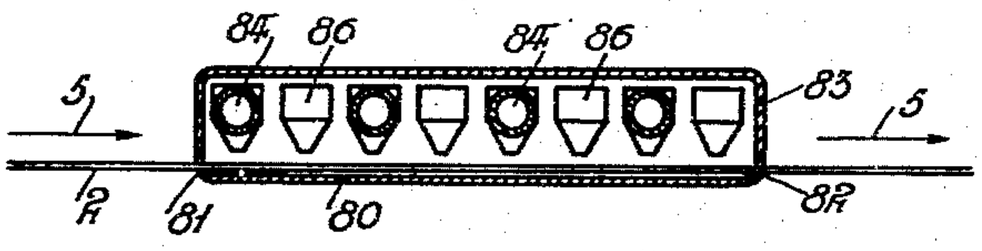


Fig. 2.

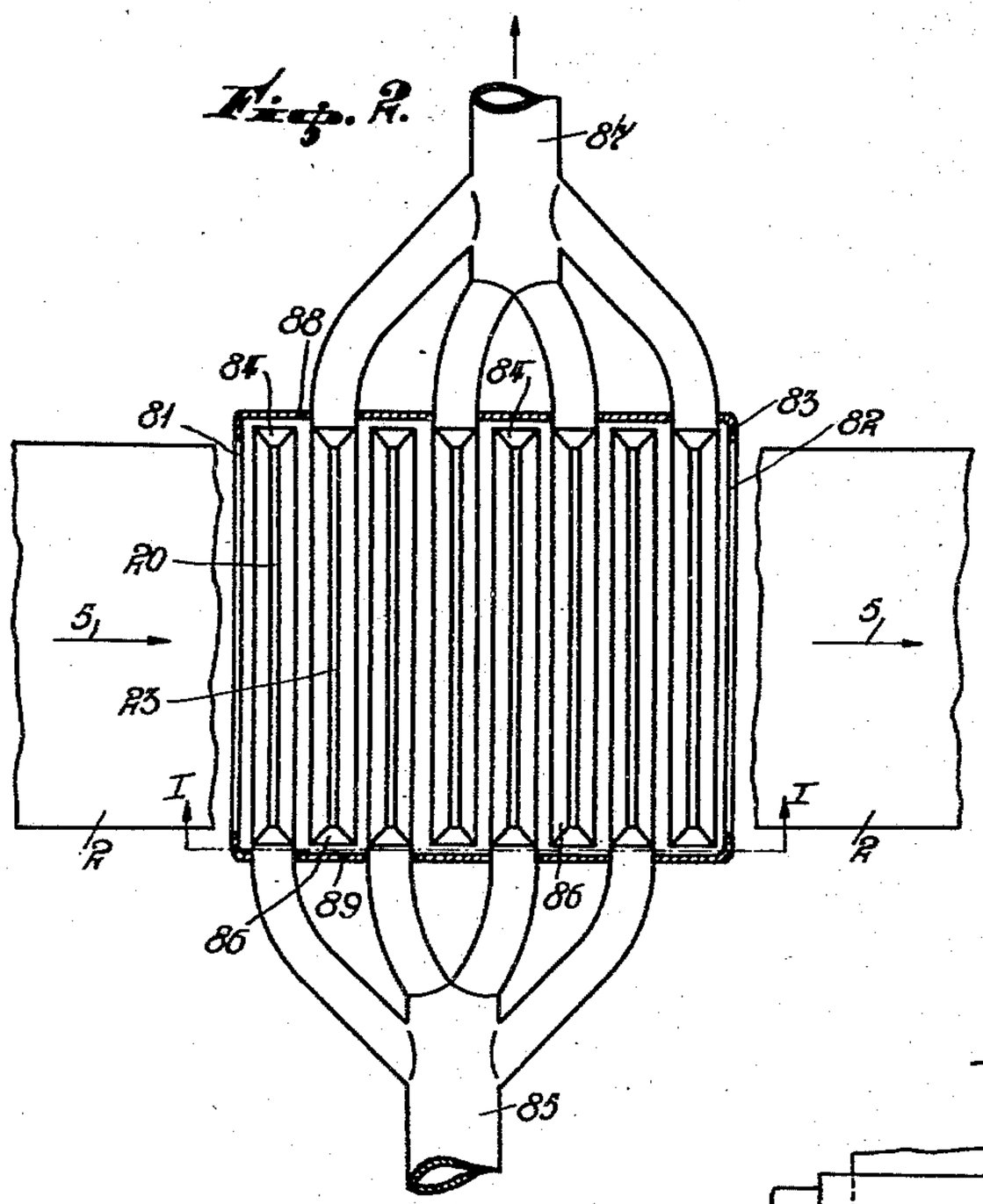


Fig. 3.

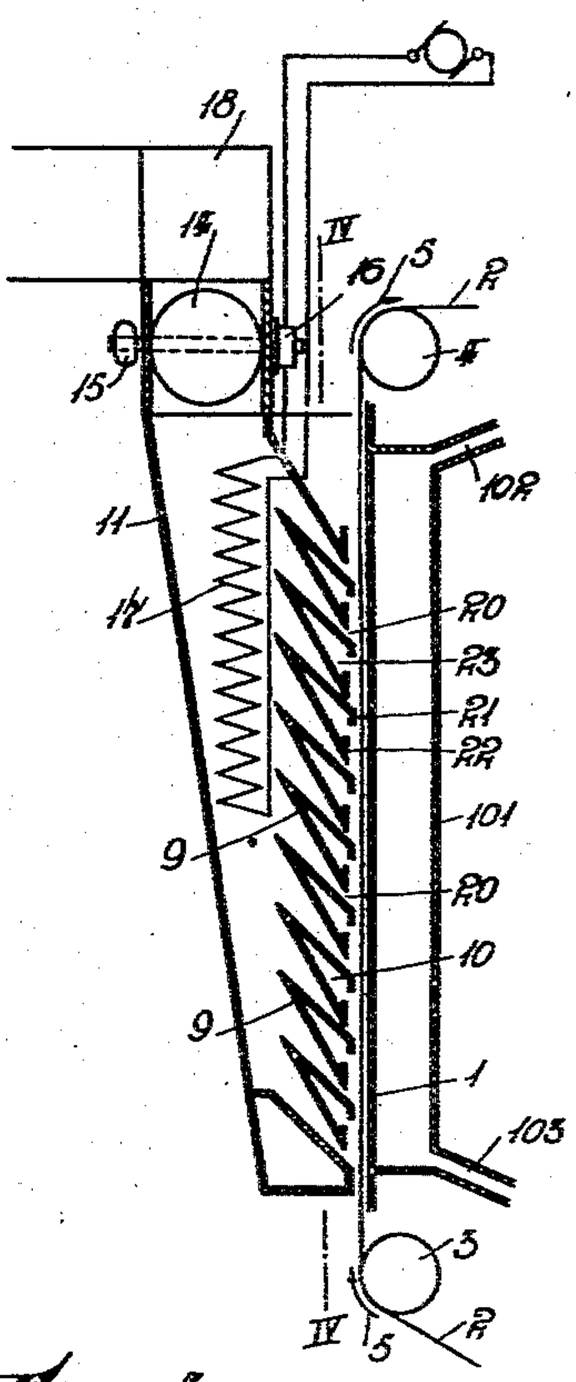


Fig. 5.

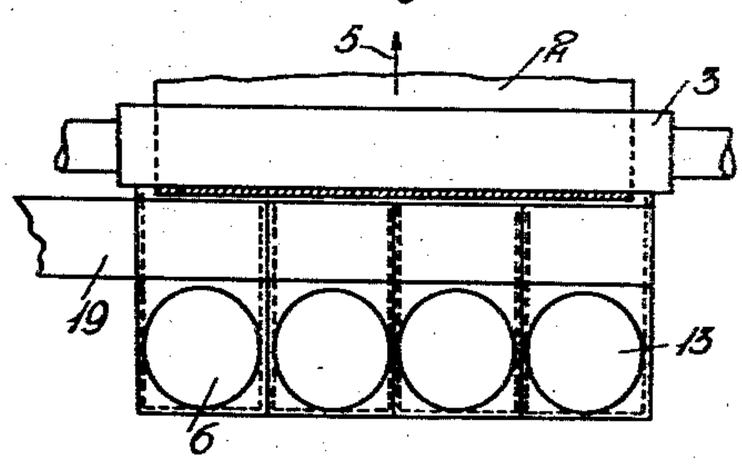
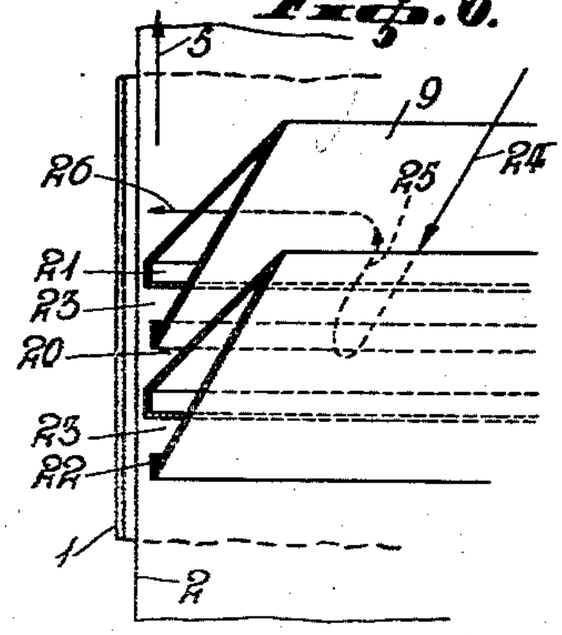


Fig. 6.



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APPARATUS AND METHOD FOR DRYING PRINTED WEBS

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Fig. 4.

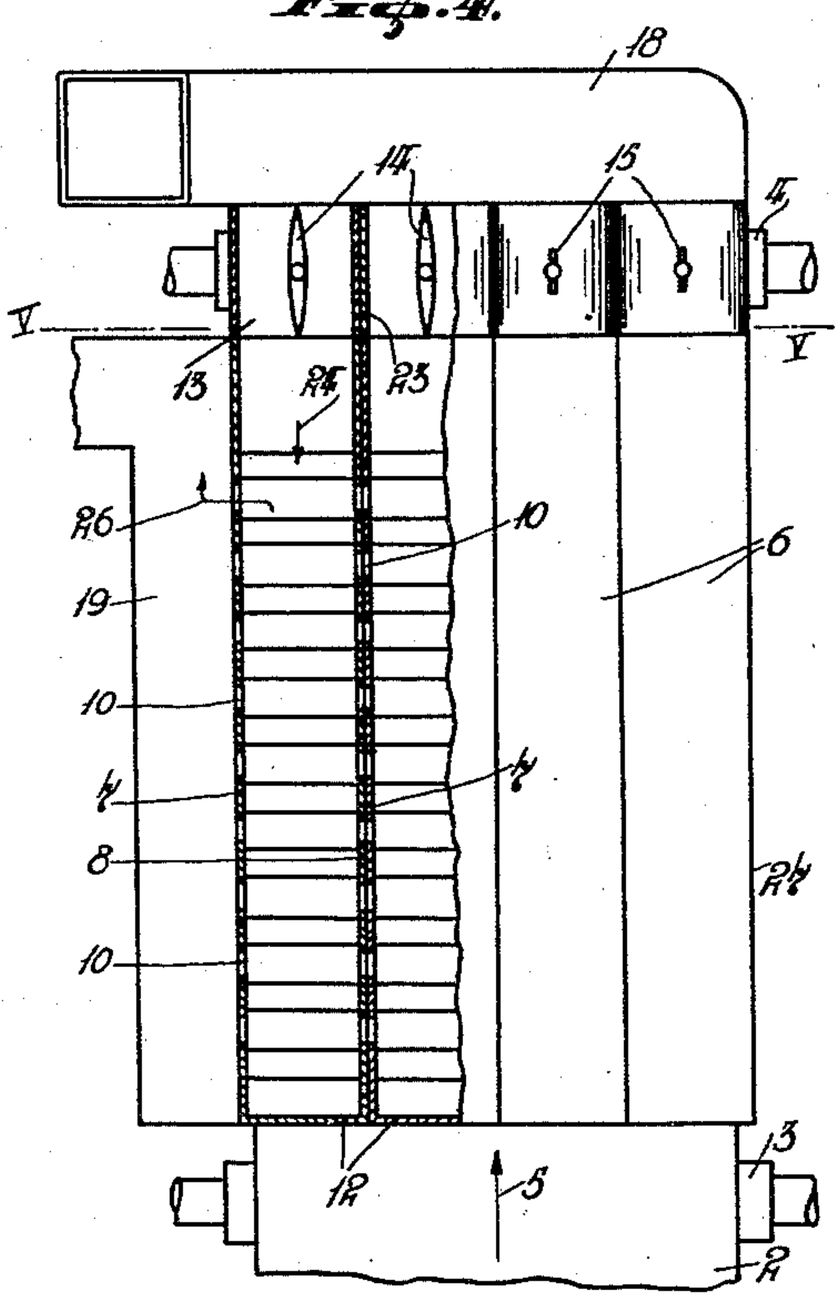


Fig. 8.

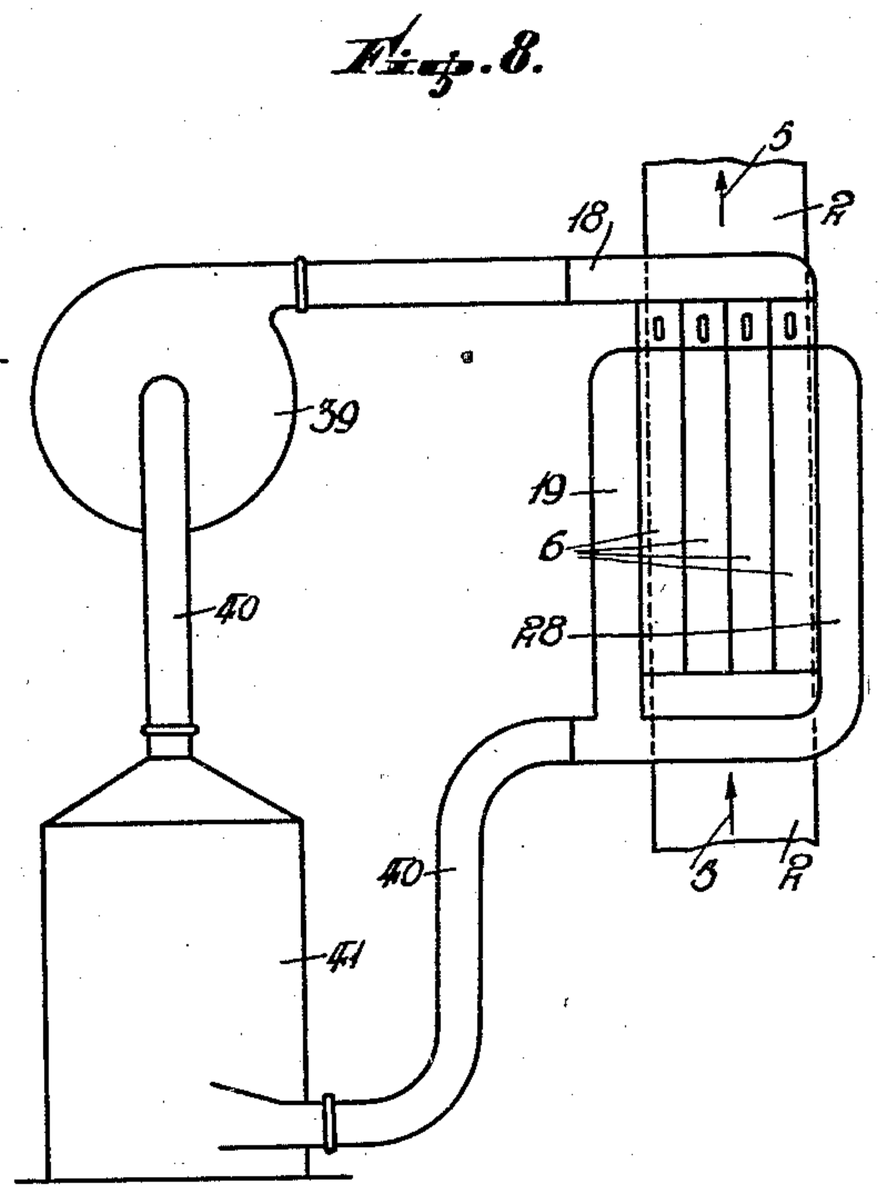
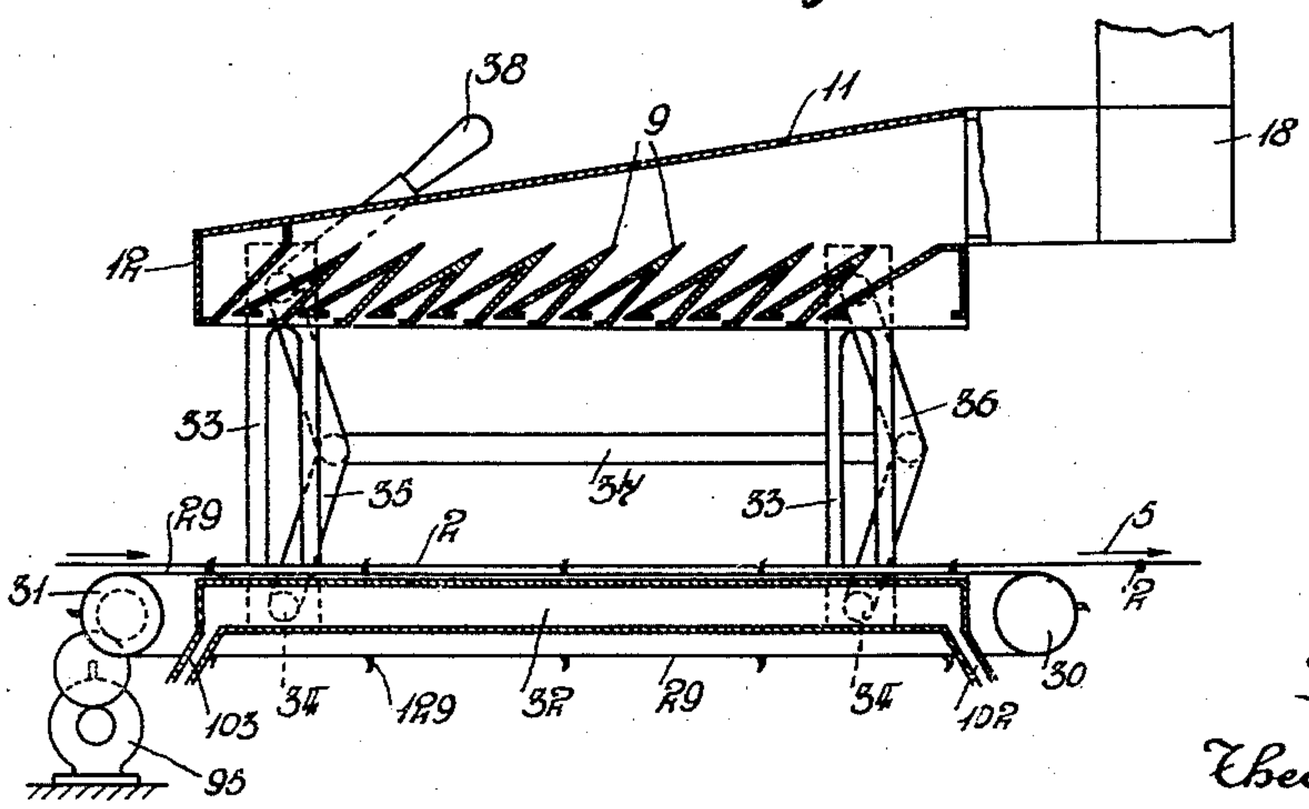


Fig. 6.



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APPARATUS AND METHOD FOR DRYING PRINTED WEBS

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Fig. 9.

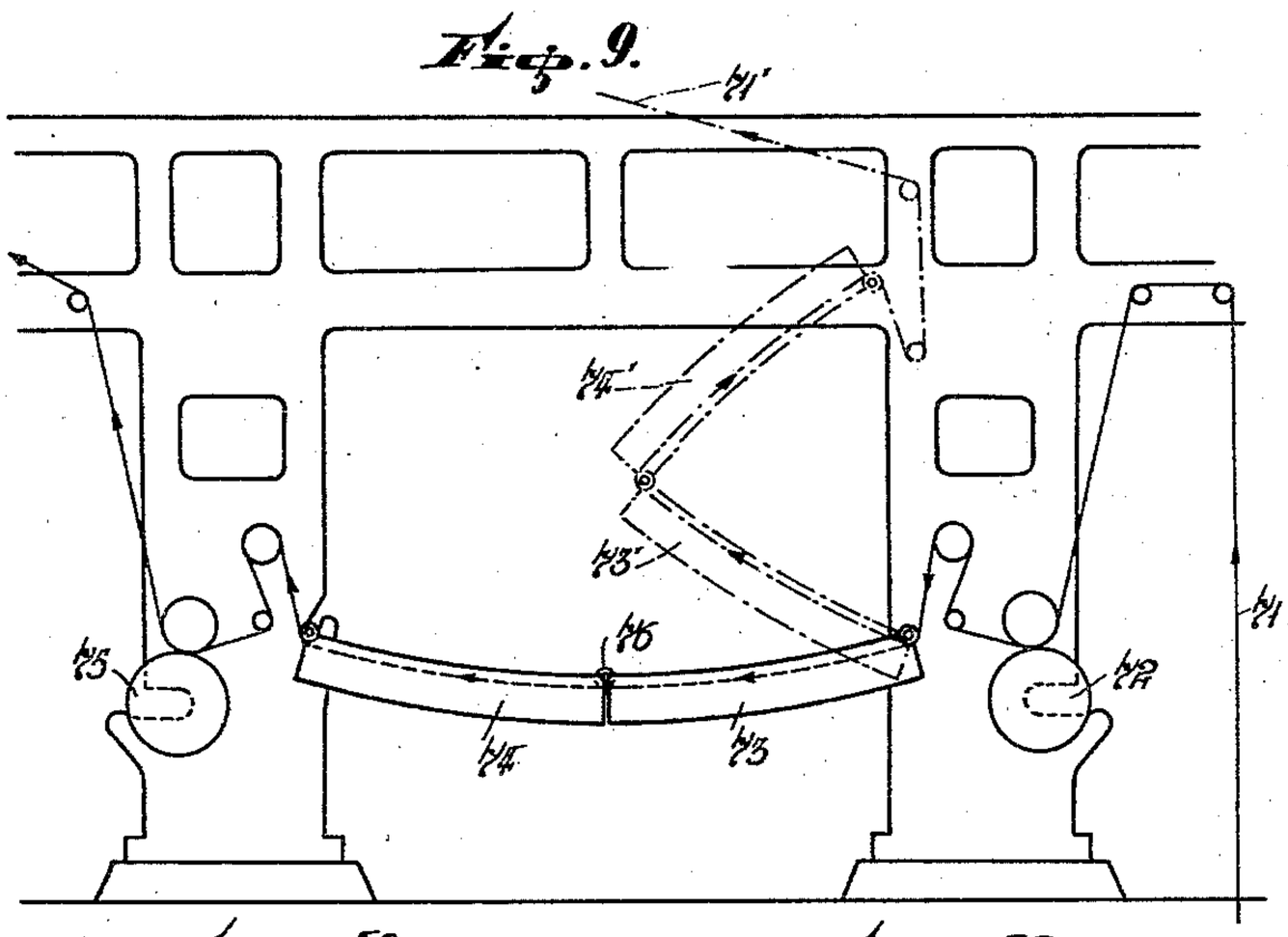


Fig. 10.

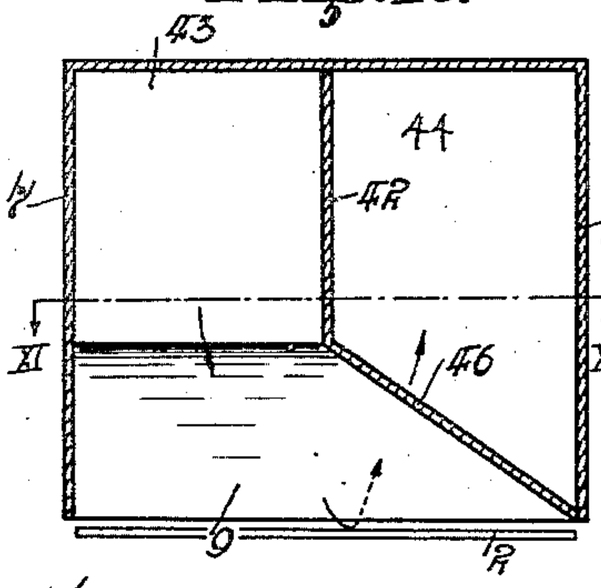


Fig. 12.

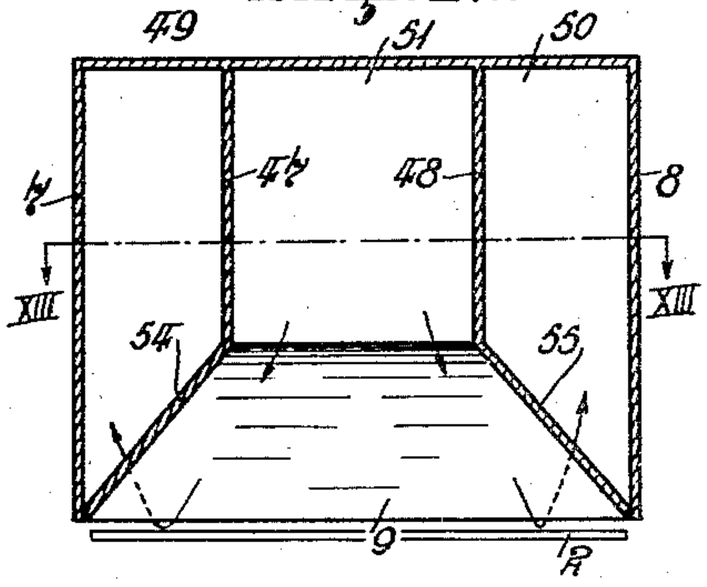


Fig. 11.

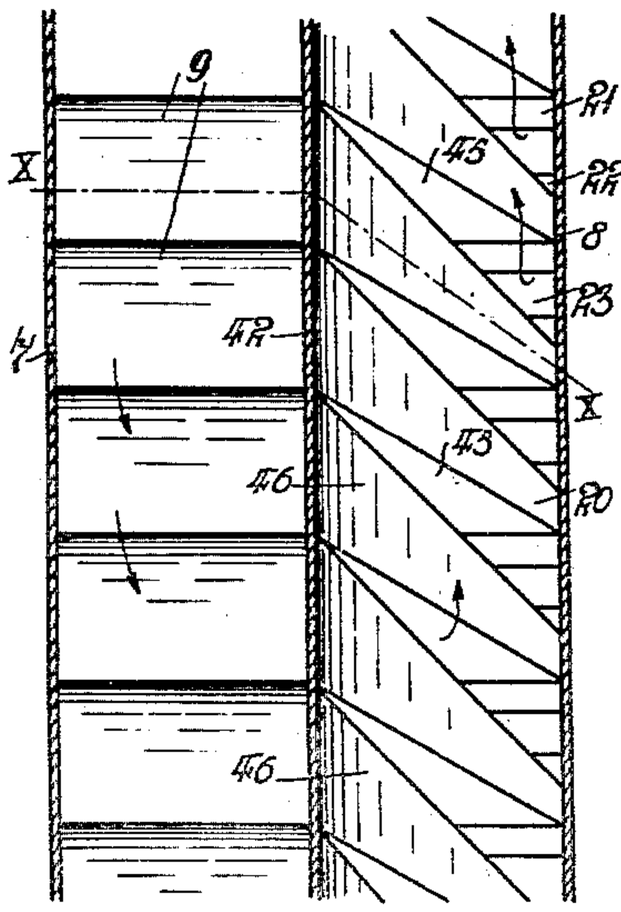
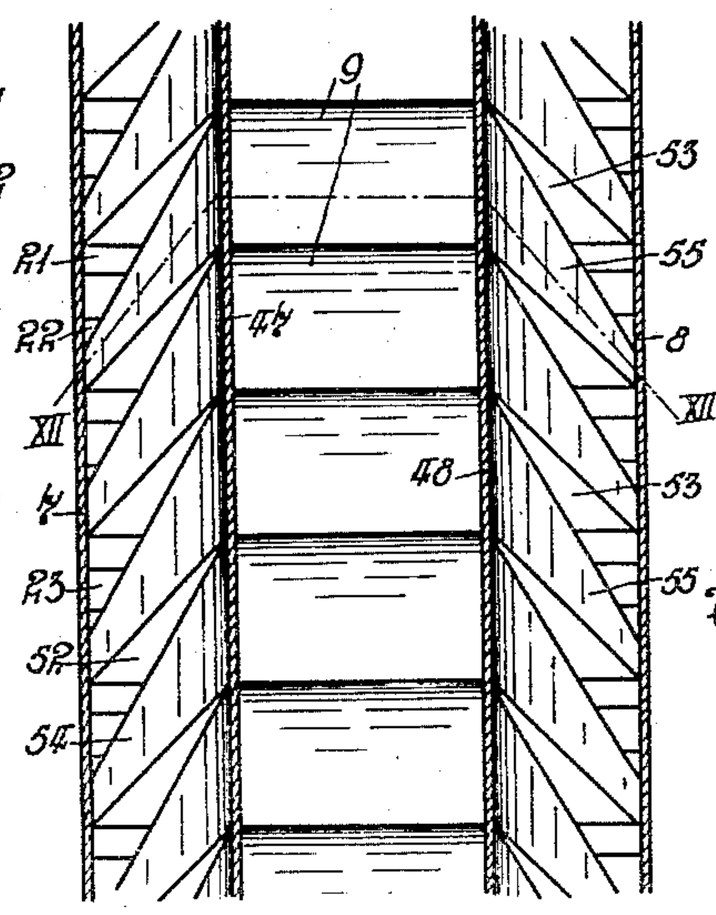


Fig. 13.



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APPARATUS AND METHOD FOR DRYING PRINTED WEBS

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Fig. 14.

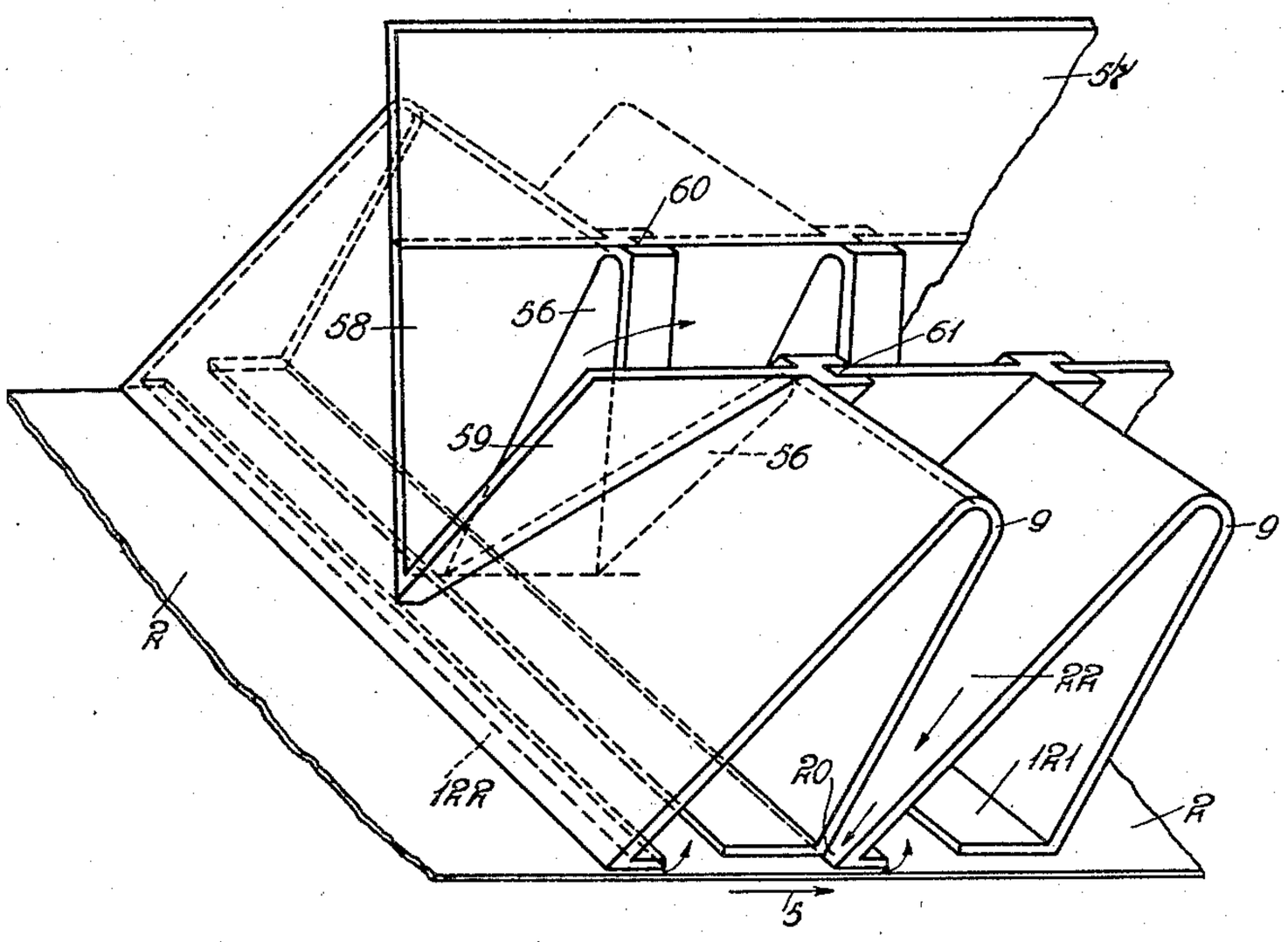
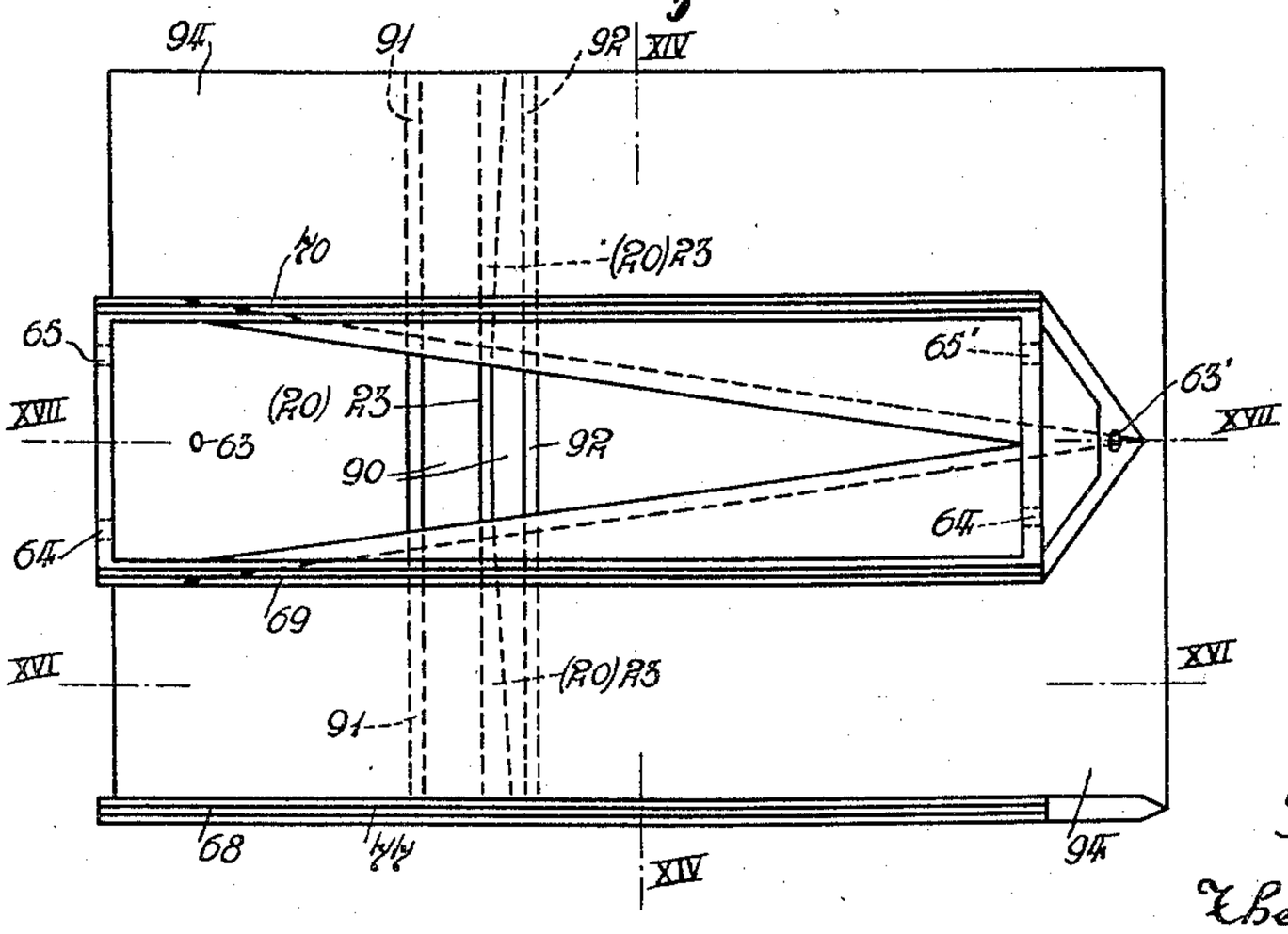


Fig. 15.



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APPARATUS AND METHOD FOR DRYING PRINTED WEBS

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Fig. 16.

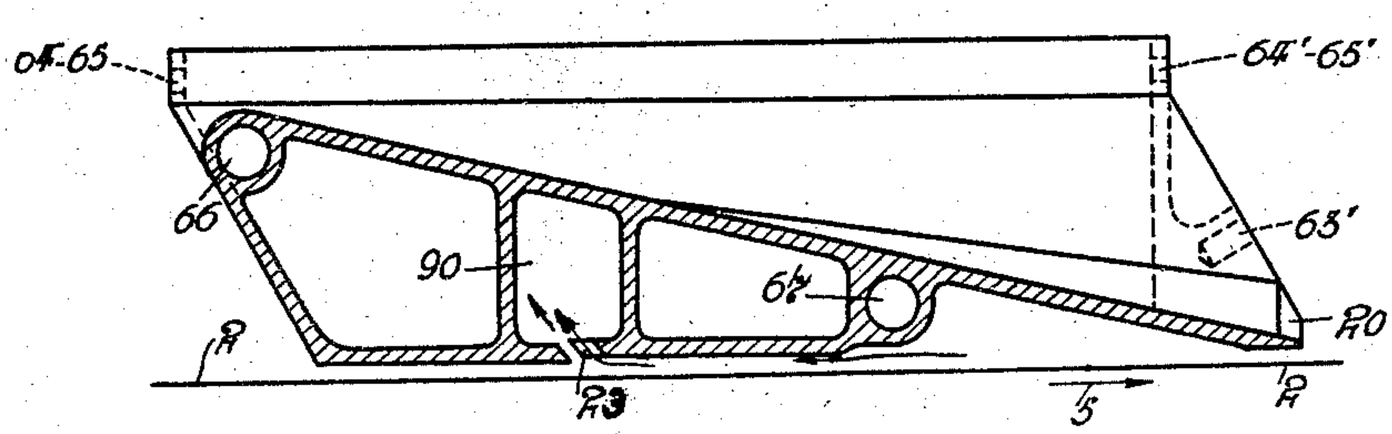


Fig. 17.

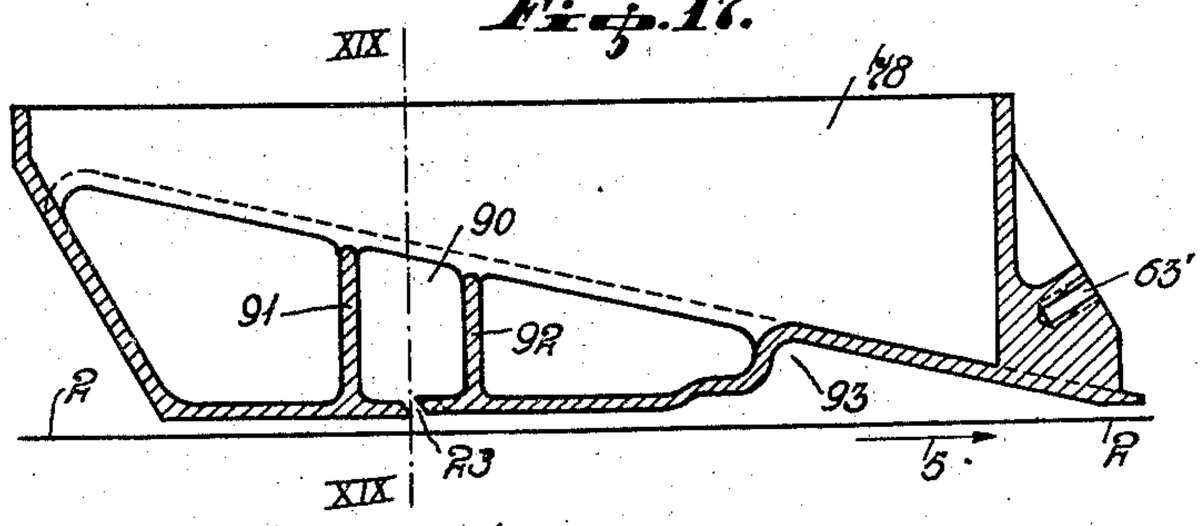


Fig. 18.

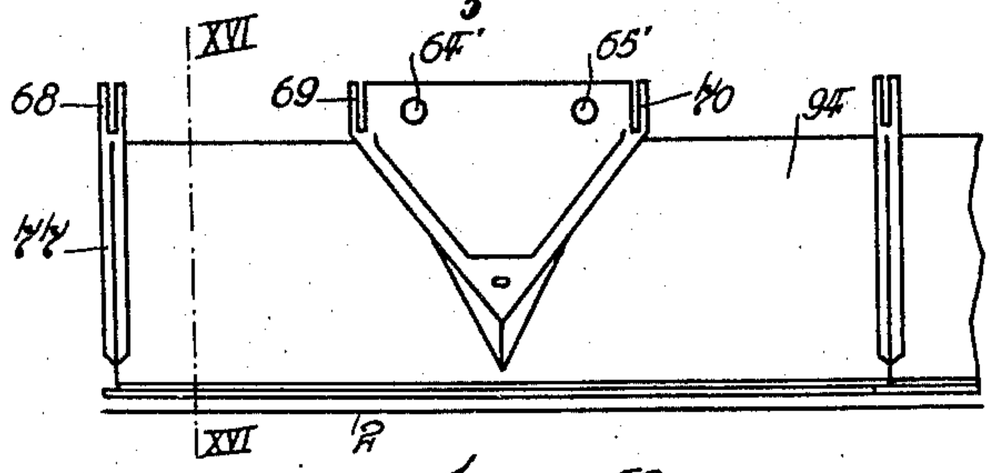
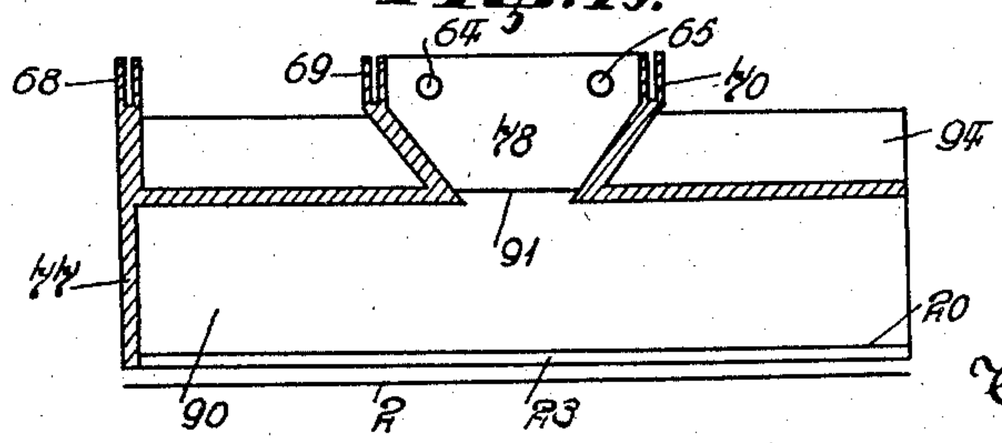


Fig. 19.



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Patented Nov. 26, 1935 2,022,593

UNITED STATES PATENT OFFICE

2,022,593

APPARATUS AND METHOD FOR DRYING PRINTED WEBS

Theodor Fuykers, Dusseldorf, Germany

Application March 18, 1931, Serial No. 523,578
In Germany April 29, 1930

15 Claims. (Cl. 34—48)

For drying webs of all kinds of paper or fabric printed by a heliographic process and especially in the case of continuously printing webs moved by rollers, has been proceeded hitherto by leading this web either round cylindrical heated drums or over heated drying tables and projecting dry air upon the printed side of the running web by means of blowing nozzles distributed above the running web. This drying method requires drying plants of great length, and moreover, the speed of the printed web is limited to very small values.

During the drying process, the printed web will undergo modifications in its physical constitution, due to the intense heating, especially when a web of paper is treated, said heating even bringing about a shrinking effect on the web of paper or fabric, so that afterwards it will be very difficult to adjust the different colours during polychromatic printing. The slow drying process also provokes partial penetration of the printed colour into the paper even going entirely through the web.

Finally, the before-mentioned method has the disadvantage of evaporating the solvents of the colours, so that these vapours will spread into the workshop, which is prejudicial to the health of workmen.

The object of the present invention is an improved method and apparatus, whereby the before-mentioned inconveniences are eliminated.

According to the present invention, dry air is blown, by means of nozzles, upon the running web of paper or fabric, this air being immediately sucked away by corresponding suction nozzles, so that no vapors of the solvents of the colour will be distributed in the atmosphere or will be carried along by the running web.

On applying this method, a rapid renewing of the air loaded with the vapors of the solvents of the colour will be obtained and said air loaded with the solvents will immediately be evacuated from the running web, so that each following part of the web will be submitted to the influence of a stream of fresh, dry air well suited for drying the web and the colours thereon.

The apparatus for executing the described method may comprise a series of blowing nozzles alternating with a series of suction nozzles mounted above the web, and transversely thereto with respect to the moving direction of the printed web, the nozzles extending over the whole breadth of the latter.

The nozzles will be advantageously placed inside a chamber closely embracing the running web, the sucked air being delivered into the free atmosphere. In this manner the used air will not penetrate into the workshop or factory and the health of workmen will be secured.

Due to the method according to the present invention, it is now possible to perform the drying over a very reduced length of the running web with the result that the speed of the running web may be considerably increased.

The heating means required hitherto are now eliminated, thus permitting a considerable economy and simultaneously avoiding the undesirable action of the increase of temperature on the constitution of the paper and the difficulties resulting therefrom, for instance the adjustment of the colours during the polychromatic printing.

The present invention also relates to the construction of a drying apparatus of very small dimensions, and avoiding the production of electric sparks, so securing the plant against fire.

Furthermore, it is now very easy to handle the apparatus and the mounting of the latter is also easy.

The accompanying drawings illustrate, by way of example, a plurality of embodiments of an apparatus for executing the method according to the invention.

Fig. 1 is a longitudinal vertical section on line I—I of Fig. 2 of a first embodiment;

Fig. 2 is a plan view thereof, seen from below and partly in section;

Fig. 3 is a longitudinal vertical section through a second embodiment;

Fig. 4 is a front view of a vertical section according to line IV—IV of Fig. 3;

Fig. 5 is a section on line V—V of Fig. 4;

Fig. 6 is a perspective view of a detail;

Fig. 7 is a diagrammatic view of a third embodiment shown in vertical longitudinal section;

Fig. 8 is a diagrammatic view of a plant for executing the method according to the invention;

Fig. 9 is a diagrammatic view of a second application of an apparatus according to the invention in a rotary printing machine;

Fig. 10 shows an example of a series of blowing and suction nozzles in transverse vertical section, on line X—X of Fig. 11;

Fig. 11 shows a horizontal section on line XI—XI of Fig. 10;

Fig. 12 shows another example of a series of blowing and suction nozzles in vertical cross section, on line XII—XII of Fig. 13;

Fig. 13 shows a horizontal section on line XIII—XIII of Fig. 12;

Fig. 14 shows a third example of a series of combined blowing and suction nozzles, in perspective view;

Fig. 15 shows a plan view of a blowing nozzle of particular construction;

Fig. 16 is a vertical section on line XVI—XVI of Figs. 15 and 18;

Fig. 17 is a vertical section on line XVII—XVII of Fig. 15;

Fig. 18 is an end view of the nozzle shown in Fig. 16; and

Fig. 19 shows a vertical cross section on line XIX—XIX of Fig. 17.

As can be seen from Figs. 1 and 2, a printed web 2 of paper or fabric runs lengthwise in the direction of the arrows 5—5, enters through a small opening 81 near the bottom 80 of a casing, passes over the bottom of said casing with the non-printed side next to said bottom and leaves said casing through an exit 82. A number of blowing nozzles 84 alternate with a series of suction nozzles 86 having slits 20 and 23 next to the printed side of the web. The blowing nozzles are mounted in a lateral or side wall 89 of the casing and are all connected to a common feeding conduit 85 for supplying fresh, dry air to said nozzles. The suction nozzles are mounted in a lateral or side wall 88 of said casing and connected together to an exhaust conduit 87.

As can be seen from the drawings, the upper parts of said nozzles lie near to the ceiling or top wall of the casing. All slits 20 and 23 are arranged athwart the moving direction of the web and are parallel with respect to one another. The side walls 88 and 89 substantially close the spaces between the top and bottom walls.

The fresh dry air is blown under pressure through the slits 20 of the blowing nozzles 84 onto the web of paper. Said dry air will be loaded with the solvents of the printed colours and will immediately be evacuated by the suction action of the suction nozzles 86 behind the blowing nozzles.

Of course, the shape of said nozzles can be modified as will be seen from the following description of the other figures.

The arrangement of the drying apparatus according to Figs. 3 to 6 consists in the combination of a plurality of drying chambers mounted next and parallel to one another with their axes parallel to the direction of movement 5 of the web 2. Said web runs over rollers 3 and 4 mounted before and behind the base plate of said independent compartments 11, the web running over said base plate 1. Each chamber 11 is provided with a series of suction nozzles 9, mounted in the lateral walls 7 and 8 of each compartment and corresponding with openings 10 therein. As shown on the left hand side of Fig. 4, said openings 10 communicate with an exhaust conduit 19, whilst the lateral openings 10 in the walls 7 and 8 of the adjacent compartments also correspond to enable the exhaust of used air from all compartments into one and the same exhaust conduit 19. Each nozzle 9 has a prismatic triangular shape, as can be seen from Figs. 3 and 6 and leaves between two opposite lateral walls a wedge-shaped passage with a small slit 20 near to the printed web 2, said wedge-shaped passage acting as blowing nozzle. The upper part of each chamber 11 has an inlet port 13 with a closing valve 14, which can be controlled by a handle 15 mounted outside of said inlet 13. On the rotary stem of said valve 14, but on the other extremity, is mounted an electric switch 16, said switch controlling the heating coil 17 mounted within the casing 11, in such a manner that a current of air passing over said coil will be heated. Obviously the switch 16 is connected to a source of electricity.

The arrangement is such that, if a valve 14 is in closed position, the electric current will be switched off.

All inlets 13 are in communication with a feeding conduit 18, to which dry air is supplied by any appropriate means, for instance a fan, sucking and compressing ventilator or draught blower.

As can be seen from the drawings, (Figs. 3 and 6) each slit 23 of the suction nozzles 9, is bounded by flanges or feet 21 and 22, the foot 22 lying at a greater distance from the running web 2 than the foot 21, so that the first one, 22, guides the currents of dry air round the edge of the suction nozzles into the latter, said currents sweeping along the printed surface of the web, so that the working will be very efficient.

It is a known fact that printed webs while running over rollers become loaded with static electricity, even to such a degree that often sparks will be produced, this being a danger for the whole plant and have already in many cases caused fire. As in the present case the speed of the running web is higher than in plants hitherto used, this danger of producing static electricity will be much greater and for this reason, in the present case, this danger can be reduced by arranging on the back side of the wall-plate 1 a cooling room 101 with an inlet 102 and an outlet 103, so that a current of cooling water may run through this chamber 101 in counter-direction to the running movement 5 of the printed web. In this manner the taking fire, due to the production of electric sparks, of the web or any dust is avoided.

As can be seen from Fig. 4, a plurality of drying chambers 11 are arranged lengthwise adjacent to each other, so that the whole breadth of the running web will be treated and dried with great efficiency. As the series of blowing nozzles 20 alternate with the series of suction nozzles 9, the length of the apparatus may be very short and the time during which a drying action takes place on the running web is consequently also very short, so that the known disadvantages, for instance the shrinking effect, will be entirely avoided, as the drying action is very rapid. Moreover it is possible to regulate said drying effect stripwise in accordance with the number of parallel drying compartments 11.

Furthermore, it is an advantage that these compartments 11 are interchangeable and that their number may be increased or decreased according to the width of the running web to be treated, so that the output of the plant will be very high.

The path of the current of air has been indicated in Figs. 4 and 6 by the arrows 24, 25, and 26. It will be understood that the lateral wall 27 will have no outlet openings if no exhaust conduit is provided for to that side of the extreme right hand drying compartment 11. But in the case of Fig. 8, where an exhaust conduit 19 is provided on the left hand and an exhaust conduit 28 on the right hand, the lateral partition 27 will of course have outlet openings 10, as has been shown for the lateral walls 7 and 8 in Fig. 4.

In the modified embodiment shown in Fig. 7, the bottom of each compartment is formed by an endless belt 29 running over guiding rollers 30 and 31, driven by a motor 95, preferably at a speed equal to the speed of the running web 2 and in the same direction, so that no rubbing effect will be produced. Between the two strands of the endless belt is mounted a cooling casing 101 with an inlet 102 and an outlet 103, as has already been described with reference to Fig. 3.

The upper part of the apparatus, however, is movable with respect to the base part and is carried by slotted guide bars 33, which grip round

bolts 34 mounted on the frame 32. The upper part can be distanced from the paper web by actuating the two toggle levers 35 and 36, which are pivotally connected to each other by the rod 37 and to the top and bottom parts, and by operating a hand lever 38 fixed to one of the toggle levers 35, so that an easy inspection as well of the printed web as of the apparatus will be possible.

Of course, the connections to the exhaust and feeding conduits 18 and 19, as well as the connections to the electric source will be flexible for allowing the lifting movement of the upper part of the apparatus.

It is also possible to have the upper part of the apparatus mounted rigidly whilst the base plate or lower part will be movable.

The presence of an endless guiding belt enables the drying of separate sheets of printed paper, but for this purpose hooks 129 or like means will be provided for causing the separate sheets to run with the endless belt. The dried printed sheets will be collectcd as soon as they leave the apparatus.

As has already been mentioned with reference to Figs. 3 to 6, the dry air may be supplied by a fan, ventilator or blower.

A complete plant of such an installation is shown in Fig. 8, where a sucking and compressing ventilator 39, of the centrifugal type, supplies dry air into the feeding conduit 18, the latter feeding the chambers 6. As said draught blower 39 also exerts a suction action, the used air loaded with vapours during the drying action on the printed side of the running web 2 will be sucked out of the compartments 6 in action, through the exhaust conduits 19 and 28 and through the exhaust piping 40. Of course, the ventilator 39 can be driven by any appropriate known means not shown in Fig. 8. As it is absolutely necessary to eliminate the vapours from the used air, a purifier 41 is inserted in the exhaust piping 40, so that in said purifier the vapours of the solvents of ink and colours, for instance xylol, of the printed side of the web may be separated and eliminated, whilst the purified dry air will be sucked by the fan 39 out of the purifier 41. In this manner, the whole quantity of air used for drying purposes will flow in a closed circuit.

It may occur during drying that the running printed web does not stay flat and plane, and therefore it will be advantageous to avoid this undulating during drying. For this purpose, it is preferable to give a convex shape to the bottom of the drying chamber, as diagrammatically shown in Fig. 9 in combination with a rotary printing machine. This Fig. 9 shows diagrammatically drying apparatus 73 and 74 linked together by a hinge 76. The web 71 to be printed passes over a first printing roller 72, then runs through the two apparatus 73 and 74 and will be printed a second time with the supplementary colours by the printing roller 75, after the first printed colours having been dried in the apparatus 73 and 74, showing each a convex bottom. The web leaving the printed roller 75 may of course run again, through another set of drying apparatus.

If the web 71 is only to be printed once by the printing roller 72, it is not necessary to have the printed web passed over the second printing roller 75 and it can immediately be led away upwardly as shown in dotted lines. The printed web 71' will nevertheless pass through a set of drying apparatus 73' and 74' linked together and occupying a knee-shaped position, as indicated by dotted lines. This set of apparatus may be the same as the set 73 and 74, but in this case this set of apparatus will be rotatably and movably mounted round its support. The convex shape of the bottoms of said drying compartments permits the running web to adhere very closely to the support, for instance an endless belt.

The blowing and sucking nozzles as diagrammatically illustrated in Figs. 3 and 6 may be constructed in different ways and a first modification of the combined series of alternating blowing and suction nozzles has been shown in Figs. 10 and 11. Between the two lateral longitudinal partitions 7 and 8 has been mounted a separating wall 42, so that over the whole length of the combined nozzle system lead a feeding conduit 43 and an exhaust conduit 44. The first one is open towards its bottom or back and subdivided in a certain number of bifurcated streams led into the different blowing slits 20 and prevented from escaping laterally into the exhaust pipe by lateral oblique walls 46. The different bifurcated streams will flow around the feet 22 and escape through the slits 23, and finally flow into the exhaust conduit 44 through triangular apertures 45 bounded by the edges of the lateral oblique walls 46. This arrangement causes the different blowing currents to sweep narrowly over the printed side of the running web 2 during their passage between said web and the foot 22 as indicated by arrows in Fig. 10.

As can be seen from Figs. 12 and 13, it is also possible to have a central feeding conduit 51 bounded by two lateral longitudinal partitions 47 and 48, whilst the exhaust of the used air will take place through the lateral exhaust conduits 49 and 50 between the partitions 47 and 7 and 48 and 8. Also in this case the lower side of the feeding conduit 51 is entirely open and the bifurcation of the fed stream of fresh dry air is obtained by the walls 9 constituting the blowing nozzles, their lateral side being closed by oblique lateral walls 55, the latter leaving triangular apertures 52 and 53 communicating with the exhaust conduits 49 and 50, in a similar manner as described with reference to Fig. 11.

All the slits 23 and 20 are parallel and if the combined blowing and suction nozzles system is mounted over the running web, all these slits will be oblique or perpendicular to the running direction of said web. If the width of the running web to be treated is greater than the breadth of a series of combined nozzles, then a plurality of such combined nozzle systems will be adjacent and parallel to one another, so as to treat the entire breadth of the running printed web.

All the feeding conduits 43 or 51 will communicate with a feeding piping, and all exhaust conduits 44, 49, and 50 will be connected to an exhaust piping as shown in Fig. 8.

In Fig. 14 another combination of blowing and suction nozzles has been shown perspectively. All the suction nozzles 9 show in cross section a triangular form. Said suction nozzles do not touch one another at their base, but leave a slit 20, so that the outer surfaces form the blowing nozzles. Each lateral wall of a suction nozzle carries a flange 122 or 121, the distance beneath each flange and the running web 2 being different, so that one series of flanges effects a guiding action upon the bifurcated streams of dry air blown against the printed side of the running web and escaping from the printed side after the drying action, through the slits 23.

All suction nozzles are closed at both extremi-

ties, but exhaust openings 56 are provided in the central portion of the nozzles by cutting away a part of the upstanding walls of the nozzles. For avoiding communication of these suction apertures 56 with the blowing nozzles, lateral longitudinal partitions 58 and 59 are provided, forming together an exhaust conduit of triangular cross section, with the top corner downwards. For enabling the combination of any number of suction nozzles, said partitions 58 and 59 are fitting tightly in corresponding grooves 60 and 61, formed in the partition of the adjacent nozzle. On the top edge of the combined partitions 58 and 59 are then mounted longitudinal walls 57, so that the exhaust conduit is built up by the partitions 57, 58, and 59.

Another form of nozzle has been shown in Figs. 15 to 19, such construction also enabling the alinement of series of nozzles to form a combined blowing and suction system with parallel slits 23 and 20. These nozzles are produced as a pressing or cast element provided with a lateral wall 77. The inner chamber 90 of each nozzle communicates with a suction chamber 78, all suction chambers communicating with the exhaust conduit formed by a U-shaped cover the flanges of which engage the grooves 69 and 70. The inner chamber 90 is bounded by two walls 91 and 92 (Fig. 17), whilst the bottom of the compartment 90 has a suction slit 23 being narrower in its central part than at both its extremities (Fig. 15). A succession of nozzles are connected together by screw bolts passing through bores 63, 64 and 65, 63', 64' and 65'. If all the nozzles are connected and combined together, all slits 20 and 23 will be parallel. Grooves 68 provided in the upstanding lateral and walls 77 are intended to be engaged by the flanges of a further outer cover so as to constitute the blowing conduit delivering air at the sides of the suction chambers 78 and through the slits 20 left between adjacent elements.

Transverse connections between the nozzles are secured in 66 and 67 (Fig. 16).

A transverse recess 93 (Fig. 17) is provided at the underside of the nozzle for producing a whirling effect in the drying air flow.

From Figs. 15 to 19 may be seen that streams of dry air are obliquely directed along the inclined walls 94 of the elements, to the printed side of the running web 2, to be immediately sucked up through the slits 23 in a direction opposite to the moving of the web.

The nozzles according to Figs. 15 to 19 may be obtained by pressing or may be cast. Of course, each blowing slit 20 will alternate with a sucking slit 23.

I claim:

1. An apparatus for drying printed webs, comprising a casing having a top wall, a bottom and side walls, an entrance for a printed web near the bottom of said casing, an exit for said printed web at an opposite side near the bottom of said casing, means for continuously moving said printed web with the unprinted side next to the bottom, a toggle lever connection and guide means between the top and side walls and the bottom wall of the casing for adjustably raising and lowering the top and side walls with respect to the bottom wall, a plurality of blowing nozzles with their slits across the printed web, an equal number of suction nozzles with their slits parallel to the slits of the blowing nozzles, the blowing slits alternating with the suction nozzles and forming an intermediate structure supported by the side walls of the casing, means for feeding a stream of dry air through the blowing nozzles, and an exhaust conduit connected to said suction nozzles.

2. In apparatus for drying printed webs of the type described, a suction nozzle in the shape of a hollow prismatic body of triangular cross section, one wall of said body being substantially parallel to the printed web and having a straight longitudinal slit cut in the median portion thereof so as to leave two flanges forming guides for the flowing air, and at least one opening in the side end walls of the prismatic body for the passage of a current of air.

3. In apparatus for drying printed webs of the type described, a suction nozzle in the shape of a hollow prismatic body of triangular cross section, one wall of said body being substantially parallel to the printed web and having a straight longitudinal slit cut in the median portion thereof so as to leave two flanges, the central portion of said slit being narrower than the end portions thereof, and at least one opening in the side end walls of the prismatic body for the passage of a current of air.

4. In apparatus for drying printed webs of the type described, a suction nozzle formed with a V-shaped wall, the edges of the V-shaped wall having inwardly directed flanges lying in different parallel planes and forming a straight suction slit facing the printed web, means for connecting successive nozzles at a short distance apart from and parallel to each other, and at least one conduit communicating with each nozzle for the passage of a current of air.

5. In apparatus for drying printed webs of the type described, a casing, a plurality of suction nozzles arranged with their slits across the printed web, said suction nozzles being formed with a V-shaped wall and being arranged at a short distance apart from and parallel to each other, so that the walls of adjacent nozzles constitute a blowing nozzle the slit of which is parallel to the suction slit and close to the printed web, at least one partition dividing the casing in blowing and suction conduits, the suction nozzles communicating by ports with said suction conduits and the blowing nozzles opening in said blowing conduits.

6. A method for drying paper webs printed with colors consisting in moving the printed web lengthwise through a chamber which narrowly embraces and substantially completely encloses the moving web, blowing a stream of unheated air inside said chamber against the printed surface along a line transverse to the moving web, and evacuating on the same side of the web the air loaded with vapors of the color solvent along a line adjacent to the line where the stream of blown air strikes the web.

7. A method for drying paper webs printed with colors, consisting in moving the printed web lengthwise through a chamber which narrowly embraces and substantially completely encloses the moving web, blowing a plurality of streams of unheated air inside of said chamber against the printed surface of the web, and sucking away the air loaded with the vapors of the color solvent, at a point closely adjacent the point at which the air strikes the web.

8. A method for drying paper webs printed with colors, consisting in moving a web lengthwise through a casing which is substantially closed on all sides and narrowly embraces the

web, producing a stream of unheated air inside the casing in a direction opposite to the direction of movement of the web, controlling the quantity of said stream of air, subdividing said stream of air into a plurality of bifurcated streams directed towards the moving web, blowing each bifurcated stream against the printed side of the web, sucking off the air loaded with vapors of the color solvent from the printed side of the web at a short distance beyond the line of impact of each bifurcated stream on the web, and guiding each bifurcated stream parallel and close to the surface of the printed side of the web towards the line of suction.

9. In an apparatus for drying paper webs printed with colors, an unheated casing having a top wall, a bottom wall, and side walls substantially closing the spaces between the top and bottom walls for narrowly enclosing a printed web, an entrance for a printed web in the front side wall near the bottom of the said casing, an exit for said printed web at an opposite side near the bottom of said casing, means for continuously moving said printed web with the unprinted side next to the bottom, means for blowing fresh dry air against the printed side of the web along a line transverse to the moving web and for evacuating the air loaded with vapors of the color solvent along a line transverse to the moving web.

10. In an apparatus for drying paper webs printed with colors, an unheated casing having a top wall, a bottom wall, and side walls substantially closing the spaces between the top and bottom walls for narrowly enclosing a printed web, an entrance for a printed web in the front side wall near the bottom of the said casing, an exit for said printed web at an opposite side near the bottom of said casing, means for continuously moving said printed web with the unprinted side next to the bottom, means for blowing fresh dry air against the printed side of the web along a line transverse to the moving web and means for sucking away the air loaded with vapors of the color solvent at a point closely adjacent the point at which the air strikes the web.

11. In an apparatus for drying printed webs, comprising a casing having a top wall, a bottom wall, and side walls substantially closing the spaces between the top and bottom walls narrowly enclosing the printed web, an entrance for a printed web in the front side wall near the bottom of said casing, and an exit for said printed web at an opposite side near the bottom of said casing, means for continuously moving said printed web with the unprinted side next to the bottom, and means for feeding a stream of fresh dry air into said casing, a plurality of blowing nozzles, connected to said air feeding means and having outlet slits extending transversely across the printed web, an equal number of suction nozzles having outlet slits parallel to the slits of the blowing nozzles, the blowing nozzles aternating with the suction nozzles and forming an intermediate sturcture substantially parallel to the printed web and supported by the side walls of the casing, means for guiding the stream of air issuing from the blowing nozzles parallel and close to the printed web, and an exhaust conduit connected to said suction nozzles.

12. In an apparatus for drying printed webs of the type described, an unheated casing having a top wall, a bottom and side walls narrowly enclosing a printed web, an entrance for a printed web in the front side wall near the bottom of said casing, and an exit for the said printed web in an opposite side near the bottom of said casing, means for continuously moving the printed web lengthwise with its unprinted side near the bottom of said casing, means for feeding a stream of dry air into said casing, a plurality of suction nozzles having outlet slits extending transversely across the printed web, said suction nozzles being formed with a V-shaped wall and being arranged at a short distance apart from and parallel to each other, so that the walls of adjacent nozzles constitute a blowing nozzle communicating with the casing and having a slit parallel to the suction slit and close to the printed web, said blowing nozzles being connected to said air feeding means, and an exhaust conduit connected to said suction nozzles.

13. In apparatus for drying printed webs of the type described, an unheated casing having a top wall, a bottom and side walls narrowly enclosing a printed web, an entrance for a printed web in the front side wall near the bottom of said casing, an exit for the said printed web in an opposite side near the bottom of said casing, means for continuously moving the printed web lengthwise with its unprinted side near the bottom of said casing, a plurality of suction nozzles having outlet slits extending transversely across the printed web, said suction nozzles being formed with a V-shaped wall and being arranged at a short distance apart from and parallel to each other, so that the walls of adjacent nozzles constitute a blowing nozzle having a slit parallel to the suction slit and close to the printed web, at least one partition dividing the casing into blowing and suction conduits, and means connecting the suction nozzles with said suction conduit and the blowing nozzles with said blowing conduit.

14. A method for drying paper webs printed with colors, consisting in moving the printed web lengthwise through a chamber which is substantially completely closed on all sides and narrowly embraces the moving web, blowing a plurality of streams of unheated fresh dry air inside of said chamber against the printed surface of the web, along a line transverse to the said web, and sucking away the air loaded with the vapors of the color solvent, at a point closely adjacent the point at which the air strikes the web.

15. A method for drying paper webs printed with colors, consisting in moving a web lengthwise through a casing which is substantially completely closed on all sides and narrowly embraces the web, producing a stream of unheated fresh dry air inside the casing in a direction opposite to the direction of movement of the web, controlling the quantity of said stream of air, subdividing said stream of air into a plurality of bifurcated streams directed towards the moving web, blowing each bifurcated stream against the printed side of the web, sucking off the air loaded with vapors of the color solvent from the printed side of the web at a short distance beyond the line of impact of each bifurcated stream on the web, and guiding each bifurcated stream parallel and close to the surface of the printed side of the web towards the line of suction.

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