Dec. 7, 1954 L. HORNBOSTEL 2,696,149

PAPER MACHINE SUCTION PRESS

Filed Jan. 11, 1950

Fig. 1

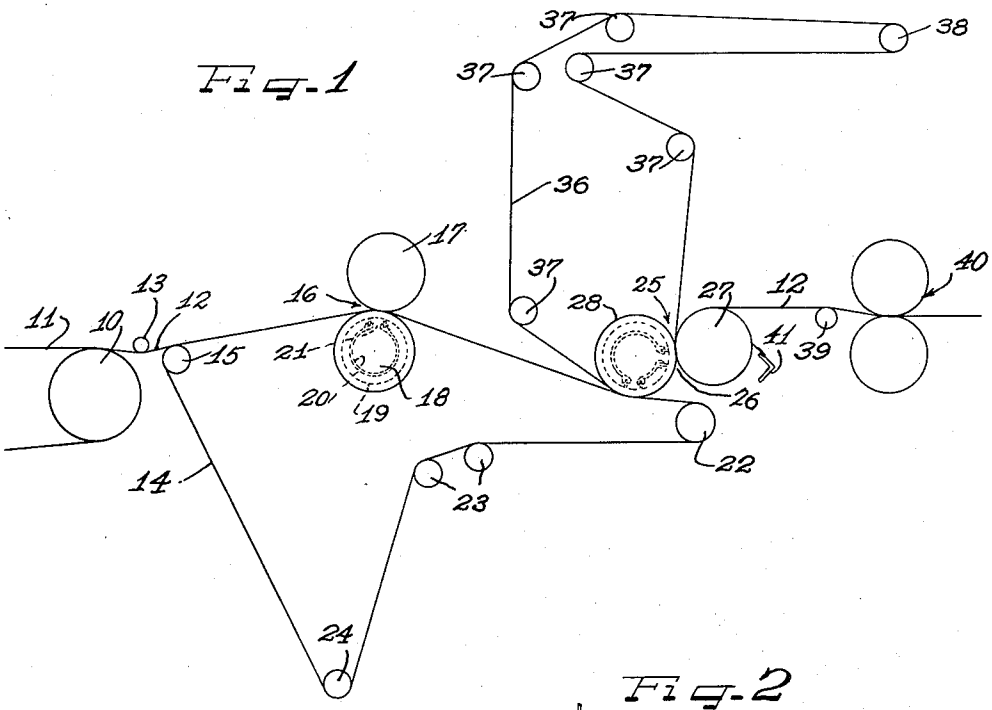
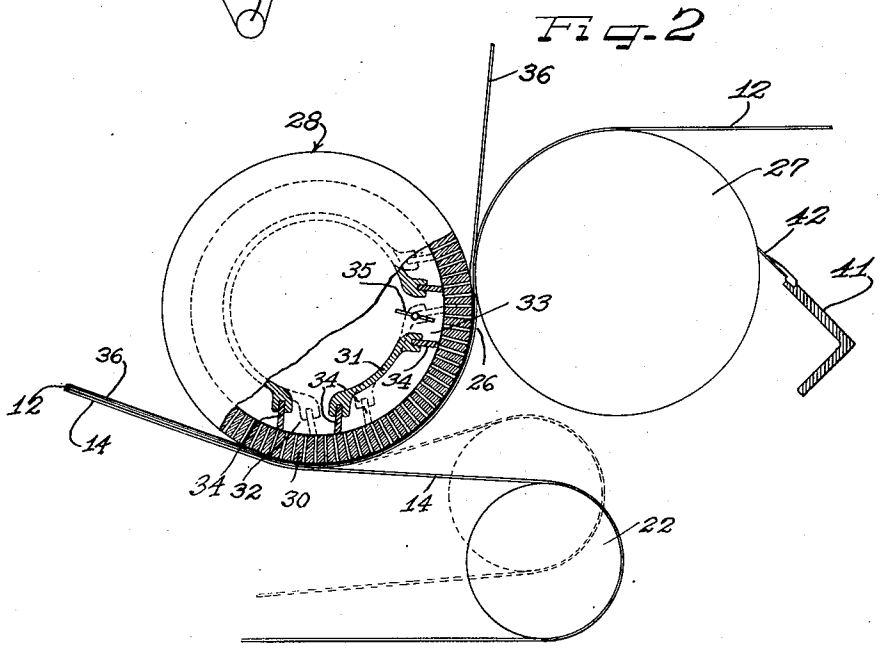



Fig. 2




Inventor
LLOYD HORNBOSTEL

by The Firm of Charlesworth Atty's.

United States Patent Office

2,696,149

Patented Dec. 7, 1954



2,696,149

# PAPER MACHINE SUCTION PRESS

Lloyd Hornbostel, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin

Application January 11, 1950, Serial No. 138,022

2 Claims. (Cl. 92—49)

The present invention relates to a paper machine suction press and more particularly to a reverse suction press for the removal of moisture from the wet paper web, including means for transferring the moist web from a first press felt to a second press felt without subjecting the web to the action of a press nip.

The present invention provides a novel form of reverse suction press for employment with a paper machine and is particularly adapted for employment in the manufacture of light-weight papers. Conventional reverse suction presses, as heretofore employed, are generally unsatisfactory for employment with light-weight webs, because of the necessity of reversing or otherwise drastically changing the direction of travel of the web during its passage through the reverse suction press, in which each side of the web is successively subjected to the action of a suction nip and to the action of a plain press roll. In addition, in conventional reverse presses, the transfer of the web from one press felt to another has been accomplished at a press nip, which is unsatisfactory due to the crushing of the lightweight web at the pressures necessarily present at the nip.

The present invention now provides a reverse suction press construction which obviates these disadvantages. Substantially straight forward travel of the web is provided with no doubling back of the web upon itself for subjection to the reverse suction nip. The only vertical travel of the web through the press of the present invention is utilized to complete the transfer of the web from the final press felt, and the absence of web reversals at high speed eliminates the possibility of the web being thrown from a felt or a guide roll. In addition, the present invention provides a reverse suction press having a vertical nip accommodating free drainage of moisture ahead of the nip and clean transfer by the utilization of gravitational forces acting upon the web beyond the nip to thereby strip the web from the reversed press felt. Further, the employment of a vertical nip permits the provision of a self-dumping doctor for the plain press roll of the reverse press with consequent operational advantages.

It is, therefore, an important object of the present invention to provide an improved paper machine suction press which eliminates the disadvantages of the prior art suction press constructions.

Another important object of the present invention is to provide an improved reverse suction press in which the web is transferred from a first press felt to a second press felt by means of suction developed at the reverse suction press, but without subjecting the web to nip pressure as it is transferred.

It is a further important object of the present invention to provide an improved paper machine suction press, including first and second reverse suction presses and means for conveying a moist web through the presses in a substantially straight forward travel and without drastic changes of web direction tending to throw the web from its carrying means.

Still another important object of the present invention is to provide an improved suction press for a paper making machine, including a reverse press having a vertical nip for receiving the web carried by a press felt lapped about the suction roll of the press, the vertical nip accommodating gravity drainage of moisture ahead of the press nip and also permitting the employment of gravitational forces in effecting the transfer of the web from the press felt.



Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

On the drawings:

Figure 1 is a schematic view of a paper machine section press section of the present invention; and

Figure 2 is a greatly enlarged fragmentary view of a section of the press of Figure 1.

As shown on the drawings:

In Figure 1, reference numeral **10** refers generally to a couch roll of conventional design having lapped thereabout a forming wire **11** of a paper making machine. A paper web **12** is formed on the forming wire **11** and is stripped therefrom and guided under a guide roll **13** onto a first press felt **14**.

The press felt **14** is trained about a guide roll **15** to the nip of a first suction press **16** consisting of an upper plain surfaced press roll **17** and a lower suction press roll **18**. The suction press roll **18** is provided with a rotatable, cylindrical, perforate shell **19** and an interior suction gland **20** having its suction area **21** underlying the nip of the press **16**.

After the web **12** supported on the felt **14** has been passed through the nip of the press **16**, the felt is passed about a shiftable guide roll **22** and then returned about a pair of closely spaced guide rolls **23** and a stretcher roll **24** to the initial guide roll **15**.

The web **12** is removed from the felt **14** intermediate the press **16** and the guide roll **22** and is passed through the suction nip of a second or reverse suction press **25**. The reverse press **25** comprises a pair of cooperating, generally horizontally arranged rolls cooperating to define therebetween a vertically extending self-draining nip **26**.

More particularly, the press **25** is defined by a plain press roll **27** and a suction press roll **28** more particularly illustrated in Figure 2. The suction press roll **28** includes a cylindrical, rotatable, perforate shell **30** and a suction gland **31** mounted therein. The suction gland **31** provides a pair of radially spaced suction areas **32** and **33** defined by spaced sealing strips **34** contacting the inner periphery of the shell. The suction area **33** is provided with a butterfly-type shut-off valve **35** provided with suitable controls and adapted to regulate the degree of suction within the area **33** to entirely shut off the suction in this area. The gland **31** is rotatably shiftable (i. e. mounted pivotally about the roll axis) within the shell **30** to a plurality of adjusted positions, including positions illustrated in solid and in dotted lines in Figure 2.

A second press felt **36** is lapped about a portion of the periphery of the suction press roll **28** to cover both the suction areas **32** and **33** thereof. This felt is trained about suitable guide rolls **37** and a stretcher roll **38** so as to pass about the suction areas of the roll **28** and to pass substantially vertically from the nip **26**. It will be seen that suction exerted by the suction area **32** through the porous press felt **36** will serve to remove the web **12** from the felt **14** to the felt **36**, with the felt **36** conveying the web about that portion of the periphery of the roll **28** lying between the suction areas **32** and **33** and across the suction area **33**.

After the web **12** has passed through the nip **26** it will adhere to the plain press roll **27** and will be trained thereabout over a guide roll **39** to desired further processing apparatus, as for example to a plain press **40**. Any broke or paper stock adhering to the plain press roll **27** will be removed therefrom by a self-dumping or gravity assisted doctor **41**, including a doctor blade **42** contacting the periphery of the roll **27**.

The roll **22** is arcuately movable to lap the felt **14** and the web **12** carried thereby about a varying portion of the periphery of the suction press roll **28**, this movement of the roll **22** being coordinated with the shifting of the suction gland **31** within the roll **28** to insure transfer of the web **12** to the roll **28**. In this manner, it is possible to obtain the efficient transfer of lightweight webs or other webs which are difficult to handle without the necessity of effecting the transfer at a pressure nip which might cause crushing of the web between the two felts.

The advantages residing in the hereinbefore described invention will be appreciated by those skilled in the art and these advantages include, first, the transfer of the web from a first press felt to a second press felt by the use of suction alone and in the absence of a pressure nip which might cause crushing of the web. Also, the adjustability of the guide roll **22** accommodates various types of webs with this adjustability being correlated with adjustment of the suction gland **31** to insure the transfer of the web.

The provision of the vertical nip **26** permits gravity drainage of moisture ahead of the nip so as to insure efficient moisture removal from the web **12**. Further, vertical travel of the web **12** through the nip **26** results in a vertical component which tends to hold the web **12** to the plain press roll **27**. This clean transfer makes possible the employment of an unsupported web draw from the plain press roll **27** to the press **40** without the possibility of tearing or otherwise damaging the web.

The valve **35** within the roll **28** is effective to cut off the suction area **33** during initial starting of the press section, so that suction is not lost as the leading relatively narrow "tail" of the web is threaded through the press. Of course, it is understood that when the gland **31** is moved to its dotted position in Figure 2, the felt **36** may be lapped further about the surface of the roll **28**, so as to completely cover the suction area **33** in its adjusted dotted position, thereby preventing substantial loss of the suction.

The adaptability of the assembly for use with a self-dumping doctor **41** is also an advantage of the present invention inasmuch as it permits the clean removal of broke or fibrous residue from the surface of the plain roll **27** without the broke falling upon a web, felt, roll, or like portion of the press assembly.

The entire construction hereinbefore set forth results in the passage of a moist web through a first suction press and a reverse suction press wtihout the necessity of doubling the web or otherwise drastically changing its position, with the exception of the passage of the web through the vertical nip **26**. In this manner, the web is maintained substantially free of vertical components exerted thereon, and also drastic changes in the direction of web travel are prevented which would tend to throw the web off its guide rolls or felts during travel through the press.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A paper machine suction press comprising a first suction press roll, a first plain roll above said first suction roll and defining therewith a horizontal press nip, a first looped felt trained through said horizontal nip providing a downwardly inclined felt run at the outgoing side of said horizontal nip, a guide roll below the plane of said horizontal nip and within the loop of said first felt supporting the outgoing end of said downwardly inclined felt run, a shiftable mounting for vertical movement of said guide roll, a second suction press roll above said inclined felt run having a perforate rotatable shell and a suction gland disposed within the shell defining a first suction area at the bottom of the shell and a second suction area circumferentially spaced from the first on the uprunning side of the shell, a second felt lapped about said second suction roll and over both said areas, said guide roll adjustably urging said inclined felt run upwardly against the first suction area of said second suction roll to effect web transfer onto said second felt, a second plain roll cooperating with said second suction roll defining a vertical press nip adjacent said second suction area, and valve means on said gland controlling the suction at the second suction area, said suction gland being rotatably shiftable within the shell for movement of the first suction area relative to the downwardly inclined felt run and movement of the second suction area relative to said vertical press nip and the movement of said guide roll being coordinated with the shifting of said suction gland to effect web transfer at said first suction area.



2. A paper machine suction press comprising a first suction press roll, a first plain roll above said first suction roll and defining therewith a horizontal press nip, a first looped felt trained through said horizontal nip providing a downwardly inclined felt run at the outgoing side of said horizontal nip, a guide roll below the plane of said horizontal nip and within the loop of said first felt supporting the outgoing end of said downwardly inclined felt run, a shiftable mounting for vertical movement of said guide roll, a second suction press roll above said inclined felt run having a perforate rotatable shell and a suction gland disposed within the shell defining a first suction area at the bottom of the shell and a second suction area circumferentially spaced from the first on the uprunning side of the shell, a second felt lapped about said second suction roll and over both said areas, said guide roll adjustably urging said inclined felt run upwardly against the first suction area of said second suction roll to effect web transfer onto said second felt, a second plain roll cooperating with said second suction roll defining a vertical press nip adjacent said second suction area, a self dumping doctor on the down running side of said second plain roll, and valve means on said giand controlling the suction at the second suction area, said suction gland being rotatably shiftable within the shell for movement of the first suction area relative to the downwardly inclined felt run and movement of the second suction area relative to said vertical press nip and the movement of said guide roll being coordinated with the shifting of said suction gland to effect web transfer at said first suction area.


**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,959,520 | Blais et al. | May 22, 1934 |
| 2,111,834 | Berry | Mar. 22, 1938 |
| 2,186,171 | Millspaugh | Jan. 9, 1940 |
| 2,204,426 | Millspaugh | June 11, 1940 |
| 2,386,584 | Berry | Oct. 9, 1945 |

FOREIGN PATENTS

| Number | Country | Date |
|---|---|---|
| 463,188 | Great Britain | Mar. 23, 1937 |
| 545,406 | Great Britain | May 22, 1942 |