July 13, 1965 D. E. ROBINSON 3,194,729

SUCTION BOX TOP

Filed Oct. 23, 1961 2 Sheets-Sheet 1

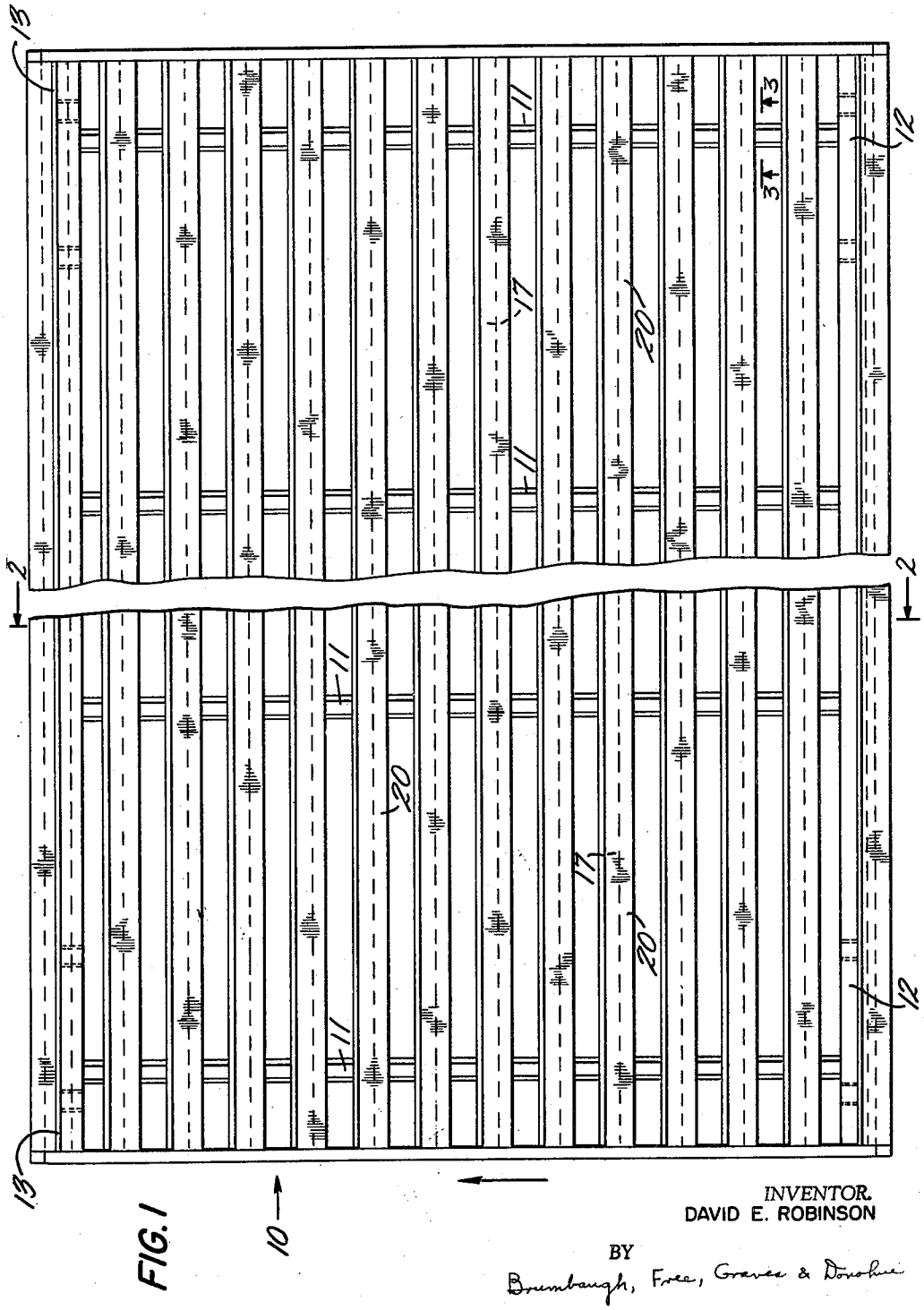


FIG. 1

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SUCTION BOX TOP

Filed Oct. 23, 1961 2 Sheets-Sheet 2

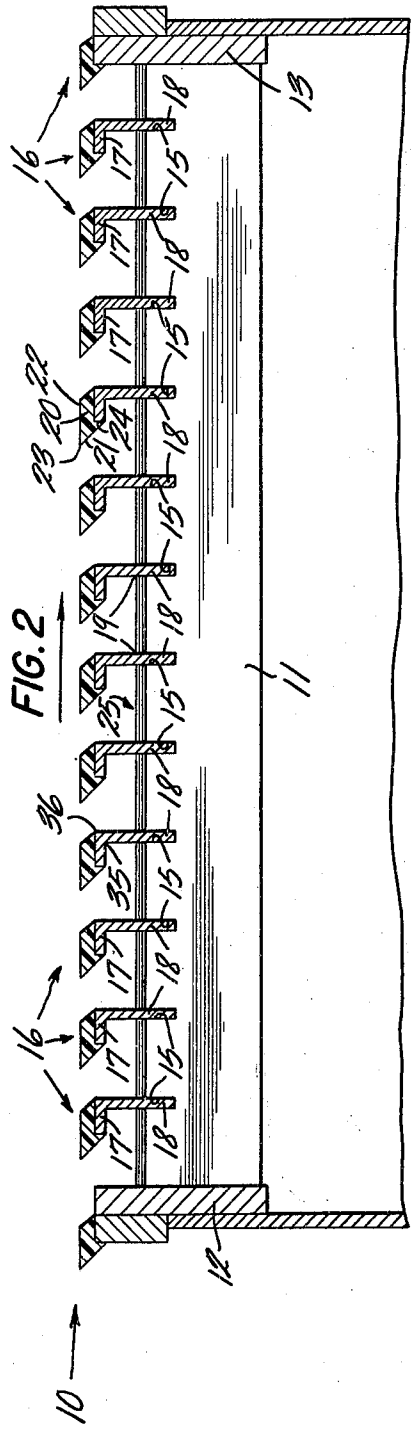


FIG. 2

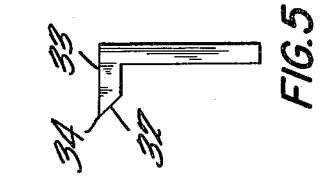


FIG. 5

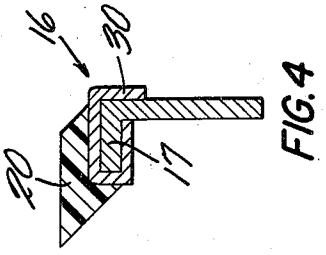


FIG. 4

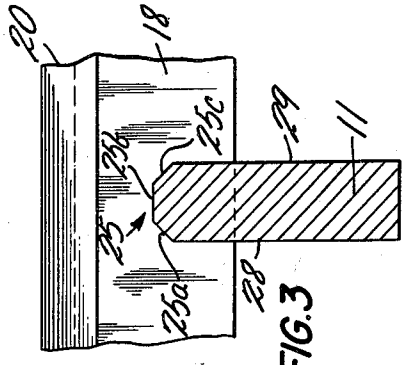


FIG. 3

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3,194,729

SUCTION BOX TOP

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7 Claims. (Cl. 162—374)

This is a continuation-in-part of my application Serial No. 1,261, filed January 8, 1960, for "Paper Former," now abandoned.

This invention relates to suction-box tops for use in the paper-making industry and, more particularly, to a novel and inexpensively-produced suction-box top combining great rigidity, water-draining capacity, and resistance to plugging.

The ever-greater operating speeds of which modern paper-making machinery is capable make it important to devise improved means for draining water from a paper stock during the felting of the stock to form a web of paper. Presently-available water-draining means, such as a row of suction boxes having specially-designed tops, typically either have insufficient water-draining capacity or offer too little support for the apparatus such as a Fourdrinier wire used to transport the stock during the felting process.

A principal object of the present invention is to provide a novel suction-box top adapted to solve the problems outlined above and a novel method of making the new top. Another object of the invention is to provide a suction-box top which is highly resistant to corrosion and inexpensive to manufacture and repair.

These and other objects are accomplished by providing at least one bar, preferably made of stainless steel, extending transversely of the top and having first and second intersecting legs, the first leg lying parallel to the side of the top which supports the paper-web-transporting means such as a Fourdrinier wire and extending forwardly from the second leg and the second leg extending in a direction away from the paper-web-transporting means. Novel means are provided for supporting the second leg on the suction-box top.

An understanding of further aspects of the invention can be obtained from a consideration of the following detailed description of several representative embodiments thereof, taken in conjunction with the accompanying figures in the drawings, of which:

FIG. 1 is a plan view of a suction-box top constructed in accordance with the invention;

FIG. 2 is a sectional view along the line 2—2 of FIG. 1 and looking in the direction of the arrows;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1 and looking in the direction of the arrows;

FIG. 4 is a fragmentary sectional view similar to FIG. 2 but showing also a clip constructed and mounted in accordance with the invention; and

FIG. 5 is an elevational view of a bar constructed in accordance with the invention and adapted to be used without covering material.

It should be borne in mind in connection with the following detailed description that the "top" of a suction box is not necessarily the uppermost part thereof, but rather the part thereof adjacent to the paper-web-transporting means.

FIG. 1 shows a suction-box top **10** adapted to support a paper-web-transporting means such as a Fourdrinier wire (not shown) which moves over the top **10** in the direction indicated by the arrow (see also FIG. 2). A plurality of rigid supporting webs **11** extend longitudinally of the top **10** from the forward end **12** to the rearward end **13** thereof.

As FIG. 2 shows, each supporting web **11** is formed with a plurality of holding means such as slots **15** in the edge thereof which confronts the Fourdrinier wire. Each of a plurality of novel, preferably stainless steel bars **16** constructed in accordance with the invention comprises a first leg **17** which lies substantially parallel to the side of the top **10** which supports the Fourdrinier wire and a second leg **18** which intersects the first leg and can be adjustably coupled with the slots **15** by insertion thereinto.

Each leg **17** extends forwardly from the corresponding leg **18**, and the legs **18** extend in a direction generally away from the Fourdrinier wire. The legs **18** may be rigidly secured in the slots **15** (after proper adjustment therein) by an adhesive such as an epoxy resin **19**.

A cover **20** of a material such as polytetrafluoroethylene (sold by E. I. du Pont de Nemours & Co. under the trade name "Teflon") or polyurethane may be secured to each of the legs **17**. Desirably, the forward surfaces **21** of the covers **20** form with the wire-supporting surfaces **22** an acute dihedron of which the edge **23** lies in the side of the box **10** adapted to support the wire. Such a construction facilitates the drainage of water from a web of paper in the manner disclosed in my copending application referred to above. Further, the forward surfaces **21** may overlap the forward surfaces **24** of the bars **16** as shown in order to minimize the opportunity for the entry between the two of water flowing between successive bars **16**.

The supporting web **11**, having its wire-confronting edge **25** widely spaced apart from the legs **17**, does not materially interfere with water drainage at any part of the paper web. Hence, though the supporting web **11** extend longitudinally of the top **10**, it causes no shadowing of the paper.

FIG. 3 shows the construction of the edge **25** of the supporting web **11** in greater detail. The edge **25** presents a generally convex surface to the mixture of water and fines flowing through the Fourdrinier wire and therefore discourages pile-up of the fines. It may be rounded or it may have a number of plane surfaces such as the three surfaces *25a*, *25b* and *25c* which form obtuse dihedral angles with each other and with the sides **28** and **29** of the supporting web **11**.

A novel clip **30** constructed in accordance with the invention and adapted to be slipped endwise over the bar **16** so that it substantially encompasses the leg **17** is illustrated in FIG. 4. The cover **20** may be attached to the clip **30** so that replacement of the cover **20** can be effected simply by removal of the clip **30** and the substitution therefor of another clip already having a cover bonded in place.

The clip **30**, as well as the bar **16**, is desirably made of stainless steel in order to provide a high degree of resistance to corrosion.

A bar constructed in accordance with the invention may be used without a cover, as shown in FIG. 5. In such case, it is desirable that the forward surface **32** and the wire-supporting surface **33** of the bar form an acute dihedron to facilitate water drainage. The edge **34** of the dihedron lies substantially in the wire-supporting side of the top **10** and extends transversely of the top **10**. A bar without a cover is well suited for use in combination, for example, with a nylon Fourdrinier wire.

In order to fabricate a suction-box top of the character described above, it is necessary merely to form the slots **15** in the supporting web or webs **11** at appropriate intervals and adjustably insert the legs **18** of the bars **16** in the respective slots **15**. Mutual alignment of the legs **17** is effected by any suitable means. Only after perfect alignment is obtained is the epoxy **19** or other adhesive applied. Obviously, neither machining nor welding is necessary. The elimination of the welding requirement

in accordance with the novel method of fabrication of the top is particularly advantageous in that it facilitates the use of stainless steel parts.

Thus, in accordance with the invention, a novel and inexpensive suction-box top combining great rigidity, water-draining capacity, and resistance to plugging is provided. While the top is particularly adapted for use in the wet end of a Fourdrinier machine, it may also find application elsewhere in the paper-making industry.

Many modifications in form and detail of the representative embodiments described above are possible within the spirit and scope of the invention. For example, while the legs 17 and 18 are shown in the figures as lying in mutually perpendicular planes, other relative orientations of the planes in which they lie are possible. Further, the outer surfaces of the legs 17 and 18 need not intersect in lines 35 and 36 but may be rounded somewhat, one into another. Again, while the holding means have been illustrated as slots 15, holes or even projections of various descriptions are likewise adaptable adjustably to secure the legs 18 to the supporting webs 11 and to allow mutual alignment of the legs 17 prior to application of the adhesive. Many other modifications will readily occur to workmen skilled in the art.

Accordingly, the invention is to be construed as including all of the modifications which fall within the scope of the appended claims.

I claim:

1. A suction-box top which has a forward end, a rearward end, and a side adapted to support paper-web-transporting means movable in a direction from said forward end to said rearward end, comprising at least one bar extending transversely of said top and having first and second intersecting legs, said first leg lying substantially parallel to said side and extending forwardly from said second leg and said second leg extending from said first leg in a direction away from said paper-web-transporting means, a clip engageable with said first leg, a portion of said clip lying between said first leg and said paper-web-transporting means, a cover attached to said clip and lying between said clip and said paper-web-transporting means, said cover having a supporting surface and a forward surface forming with said supporting surface an acute dihedron of which the edge lies substantially in said side and extends transversely of said top, and means for supporting said second leg on said top.

2. A suction-box top as defined in claim 1 in which said means for supporting said second leg on said top comprises a supporting web extending longitudinally of said top in spaced-apart relation to said side and having a transversely-extending slot formed therein in confronting relation to said side, said slot being adapted to receive said second leg and said supporting web being formed with a generally convex surface confronting said side.

3. A suction-box top as defined in claim 1 in which said bar is made of stainless steel.

4. A suction-box top as defined in claim 1 in which said means for supporting said second leg comprises an adhesive.

5. A suction-box top as defined in claim 1 in which said means for supporting said second leg comprises an epoxy resin.

6. A suction-box top as defined in claim 2 in which said supporting web is widely spaced apart from said first leg.

7. A suction-box top as defined in claim 1 in which said clip has a forward surface and in which said cover overlaps said forward surface of said clip.

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