Jan. 23, 1968 J. PROULX 3,365,359

SUCTION BOX COVERS FOR PAPER MAKING MACHINES

Filed Dec. 10, 1964

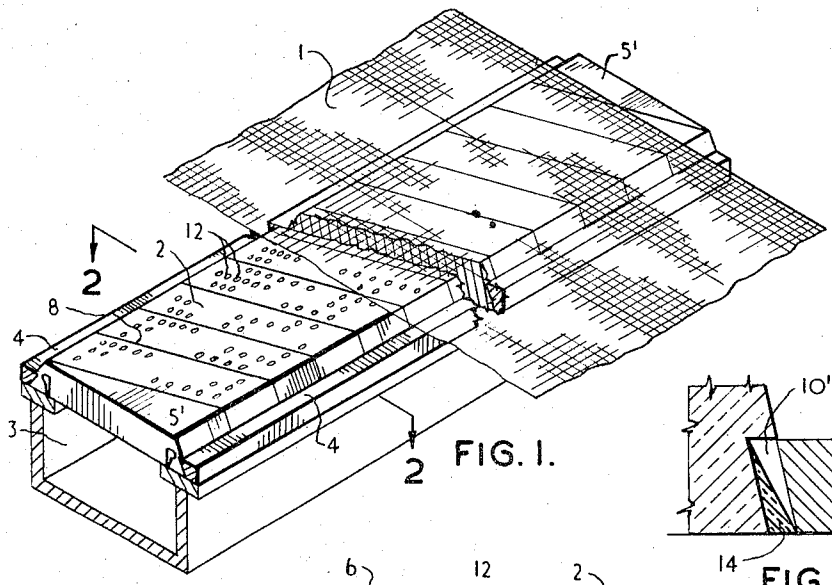


FIG. 1.

FIG. 4.

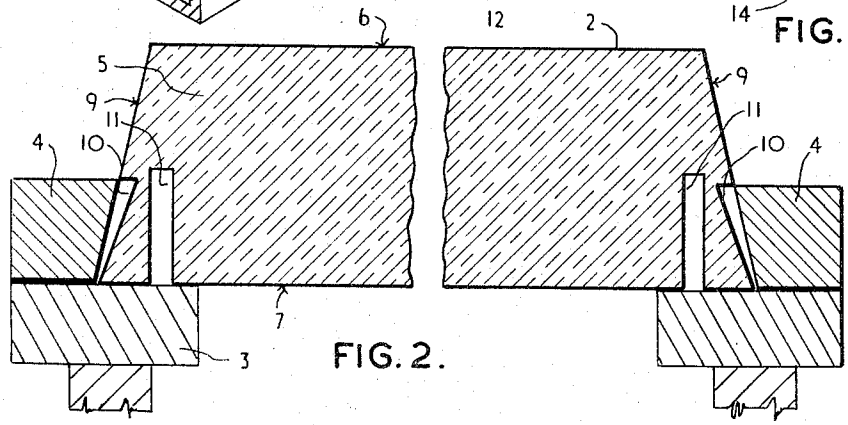


FIG. 2.

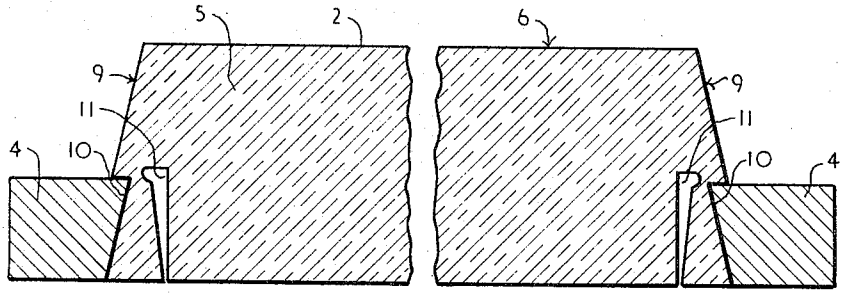


FIG. 3.

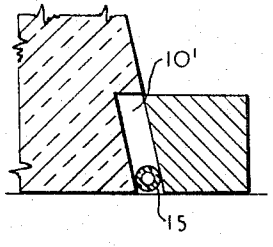


FIG. 5.

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SUCTION BOX COVERS FOR PAPER MAKING MACHINES

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ABSTRACT OF THE DISCLOSURE

A suction box cover having expansion-absorbing means along and/or adjacent to its edge to prevent the bulging or crowning of the upper wire-carrying surface.

My present invention relates to suction box covers for paper making machines.

For more than three decades I have devoted my efforts entirely to designing and manufacturing suction box covers and in recent years have found it possible to produce covers of greatly improved quality and increased durability. Because these new covers now afford outstanding service over such a prolonged period, it is desirable to effect all refinements that conduce to their perfection.

While long life, high quality covers with very low coefficient of friction can be made from various materials, I prefer a sectionalized cover composed of a plurality of relatively small juxtaposed moulded blocks of polyurethane or an equivalent synthetic because of its constant uniformity over the whole wire engaging surface and throughout its entire depth. Because such a material can be substantially impervious to heat, water and paper stock chemicals there can be an almost complete absence of swelling in normal use. However, because of the length of time such a cover is retained in use, and because of the superlative standards of quality I have now set, it is intended that no expansion of the cover, from absorption or the like, however minimal, shall act to cause the cover or any portion of it to bulge, or crown.

The principal object of this invention is to provide a suction box cover that will maintain a level, co-planar top surface at all times.

A further object of the invention is to provide a suction box cover designed to absorb any swelling or expansion that may occur and so preclude bulging or crowning on the upper wire-carrying surface thereof.

A further object of the invention is to provide a suction box cover with expansion absorbing means along at least one edge thereof disposed transversely of the paper machine able to accommodate up to the maximum swelling of the cover that may occur longitudinally of the machine.

A still further object of the invention is to provide a novel expansion absorbing suction box cover characterized by structural simplicity, durability, increased efficiency, and relatively low cost of production whereby the same is rendered commercially desirable.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:

FIGURE 1 is a perspective view of a suction box cover according to this invention, with a portion of a forming wire shown in normal travelling relation thereover;

FIGURE 2 is an enlarged transverse vertical section as taken on line 2—2 thereof;

FIGURE 3 is a similar sectional view of the cover when expanded; and

FIGURES 4 and 5 are sectional-elevational details of modified expansion absorbing ends.

Referring now particularly to the drawings, **1** represents a Fourdrinner wire that runs over the top surface of a cover **2** mounted on a conventional elongated suction box **3** that is arranged to extend transversely of a paper making machine. The cover provided with any suitable pattern of suction openings is shown with inclined sides engageable by side rails **4** inclined on their confronting sides that are secured to the suction box.

Covers may be made of a single elongated slab or plank or composed of a plurality of juxtaposed blocks as taught by my early Patents 1,977,352; 2,346,785; and 2,408,176. In the case of a single elongated plank, it extends longitudinally of the suction box which is positioned transversely of the paper making machine and direction of travel of the Fourdrinier wire. Where a plurality of blocks compose a cover, the row of juxtaposed blocks, like the elongated plank, runs longitudinally of the suction box and transversely of the machine and line of travel of the wire but the individual blocks of the so-called sectionalized cover run across the suction box, i.e., their longitudinal dimension is disposed transversely of the box and in line with the machine or direction of travel of the wire, or alternatively at an angle thereto but reaching across the box.

The cover illustrated is a sectionalized cover comprising a plurality of juxtaposed individual elongated blocks **5** arranged in a row that extends longitudinally of the suction box **3**, each block bridging the box but disposed at an angle to the direct transverse line and the ends of the row are squared off with triangular filler blocks **5'**. Preferably the blocks are small individually moulded polyurethane units, precision machined to size and shape such as disclosed in my copending application Ser. No. 223,988, and a companion application entitled "A Suction Box Cover" being filed herewith.

The blocks **5** shown have horizontal top and bottom surfaces **6** and **7** respectively, vertical side walls **8** and inclined ends **9**. The outwardly inclined ends **9** are normally engaged by the inner inclined faces of the suction box side rails **4** that rise part way up the height thereof. In the precision machining of these blocks, a groove **10** is formed in each inclined end extending from the bottom to a point level with the top of the side rail **4**. The groove is deep at the top but tapers out toward the bottom to engage the side rail at or near the bottom thereof in line with the general slope of the upper ungrooved portion of the block's end.

Parallel with and inwardly of each end of the block a deep slot or channel **11** is cut extending up from the bottom to a point substantially above the upper deep edge of the end groove **10**. The width of the deep slot for its full length and throughout its entire depth is substantially equal to the depth of the triangular groove **10** at the top thereof, as will be clearly seen in FIGURE 2. Because the block **5** may have a maximum expansion of up to 2% of its overall length, and such longitudinal expansion can be absorbed by the outward thrust of the block at both the expansion to be absorbed at each end need be only ±1% of the overall length of the block and so the depth of the groove **10** at the top thereof and the width of the transverse slot **11** will be approximately 1%+ of the block's length. The block seen in FIGURE 3 has expanded longitudinally to its limit with the groove **10** pressed into close engagement with the inner inclined wall of the side rail and the slot **11** compressed until it is closed at its lower end or mouth, the bottom end por-

tions of the block lying outwardly of the slots **11** and the end of the block, or between the slots **11** and the grooves **10**, being displaced inwardly.

This simple provision for taking up expansion of the block at opposite ends avoids any upward bulging that might otherwise occur to destroy the perfect coplanar top of the sectionalized cover that supports the forming wire. Similarly, if the top were composed of a single slab, these slots along opposite sides of the bottom would likewise act to take up expansion and prevent unwanted humping. However, in the case of the sectionalized cover formed of a row of juxtaposed moulded blocks the best results are obtained when the block is provided with both an expansion absorbing means at the ends thereof and a stress resisting spline as disclosed in my copending application mentioned above that serves to direct any swelling that might cause an upward bulge into longitudinal expansion that can thus be cared for. Because of the nature of these moulded blocks the precision drilled suction holes **12** present no clogging problem and allow wide choice of design and pattern.

In the modified forms shown in FIGURES 4 and 5, compressible cushions are employed between the ends of the block and the side rails, the grooves **10'** being approximately of even depth throughout with the base of the groove substantially paralleling the general incline of the upper portion of the block's end. In FIGURE 4 the cushion **14** is of wedge shape in cross section with its wide base arranged at the bottom while in FIGURE 5 the cushion **15** is a tubular member, and either may be of suitable compressible material of the nature of neoprene, synthetic rubber or the like that is able to withstand heat, water and paper stock acids.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that a suction box cover for paper making machines is provided that will fulfil all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of the invention may be constructed within the scope of the appended claims, without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings shall be interpreted as illustrative and not in a limitative or restrictive sense.

What is claimed as new is:

1. A suction box cover for a paper making machine having an expansion slot extending up from its under side adjacent to and parallel with at least one edge.

2. For a paper making machine having an elongated suction box extending transversely thereof, a cover formed of polyurethane with at least one slot extending up from its under side paralleling and inwardly of a longitudinal edge thereof.

3. For a paper making machine having an elongated suction box extending transversely thereof and side rails therefor, a cover formed of polyurethane with at least one slot extending up from its under side paralleling, inwardly of but adjacent to a longitudinal edge thereof, said slot rising to the height of said rails.

4. For a paper making machine having an elongated suction box extending transversely thereof and side rails therefor, a cover formed of polyurethane with grooves along opposite edges thereof facing said rails, and a slot extending up from the under side, parallel with and near each edge.

5. For a paper making machine having an elongated suction box extending tranvsersely thereof and a pair of opposite side rails therefor, a cover comprising a plurality of juxtaposed blocks arranged in a row extending longitudinally of the box with the individual blocks bridging the box, said blocks having inclined ends confronting said opposite rails and a slot in the under side near each end rising to the height of said rails.

6. For a paper making machine having an elongated suction box extending transversely thereof and a pair of opposite side rails therefor, a cover comprising a plurality of juxtaposed blocks arranged in a row extending longitudinally of the box with the individual blocks bridging the box, said blocks having inclined ends confronting but spaced in part from said opposite rails and a slot in the under side near each end rising to the height of said rails; said end spacing and said under side slots allowing for the absorption of expansion of said blocks in a direction transversely of said cover.

7. The suction box cover according to claim **5** wherein said inclined ends have grooves across their lower edges for at least the height of said side confronting rails, whereby on the expansion of said blocks in a direction transversely of said box, the end portions of said blocks above said grooves may push outwardly over the top of said side rails.

8. The suction box cover according to claim **5** wherein said inclined ends have grooves across their lower edges for at least the height of said side confronting rails, and wherein said under side slots parallel the block ends and rise above the level of the top of said side rails, whereby on the expansion of said blocks in a direction transversely of said box, the end portions of the said blocks above said grooves may push outwardly over the top of said rails to the limit of the maximum depth of said grooves and the material of the blocks lying between the under side slots and the adjacent ends of the blocks may be displaced and compressed inwardly to close said grooves.

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