April 9, 1963 R. E. CARREL 3,084,740

COVERS FOR SUCTION BOXES

Filed Nov. 4, 1959 4 Sheets-Sheet 1

FIG. 1

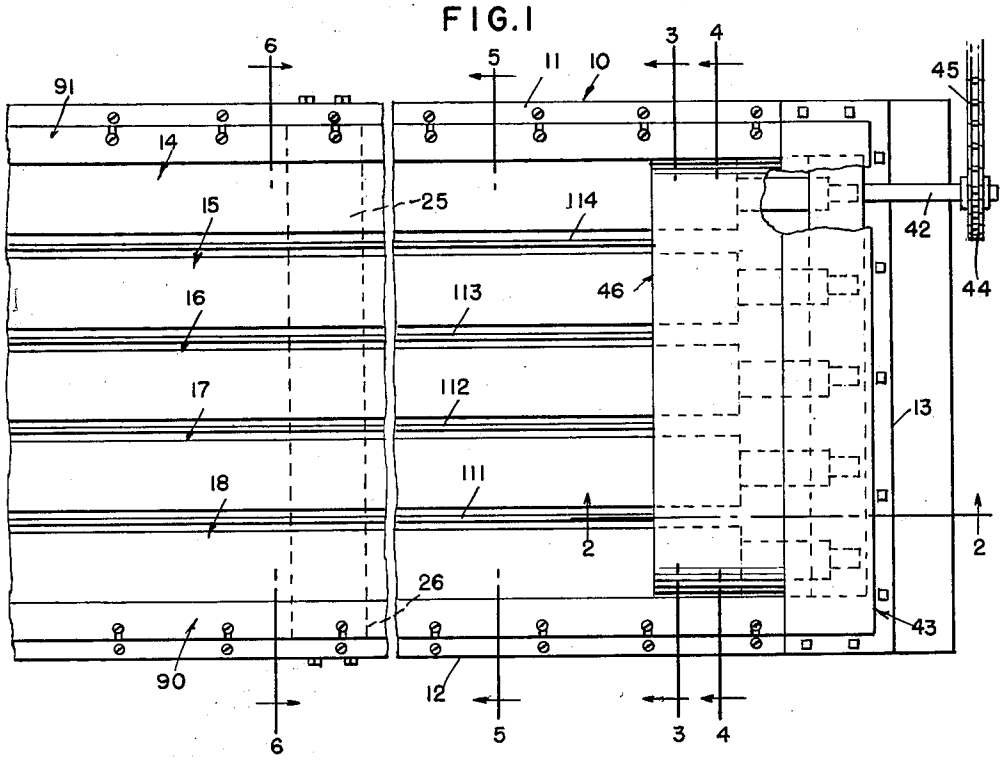


FIG. 2

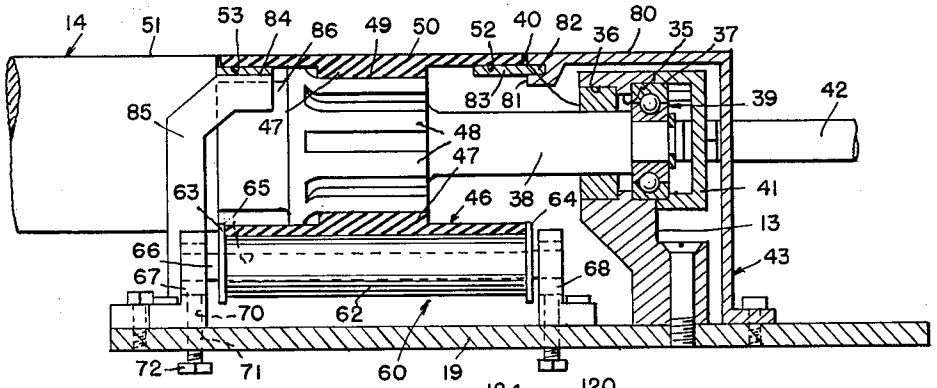
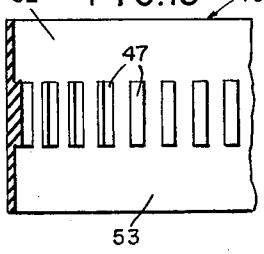


FIG. 13



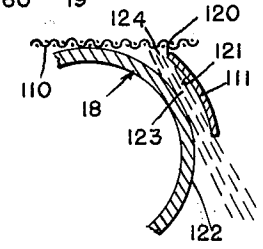


FIG. 12

SIPHON ACTION

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COVERS FOR SUCTION BOXES

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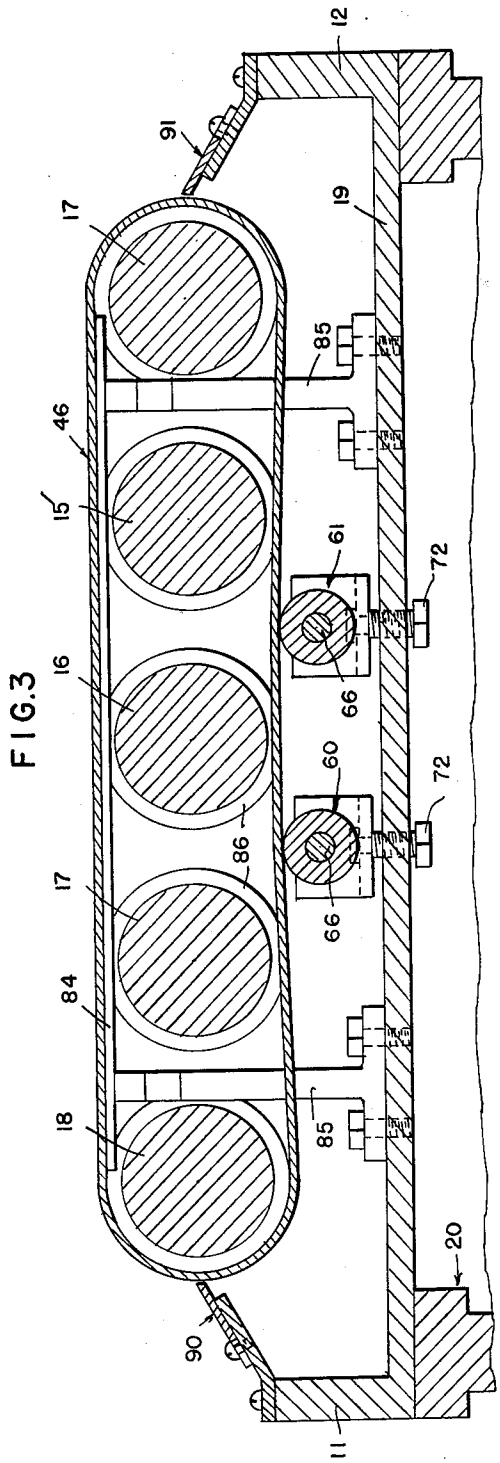


FIG.3

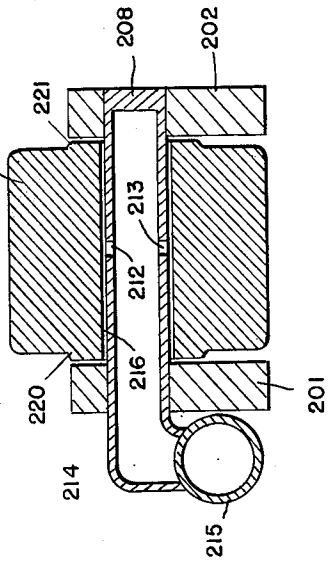


FIG.7

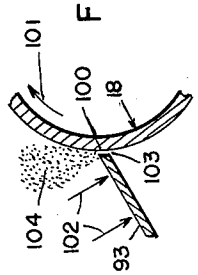


FIG.10

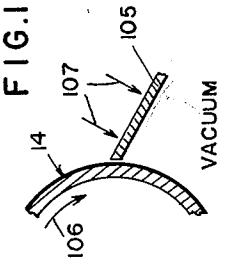


FIG.11

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COVERS FOR SUCTION BOXES

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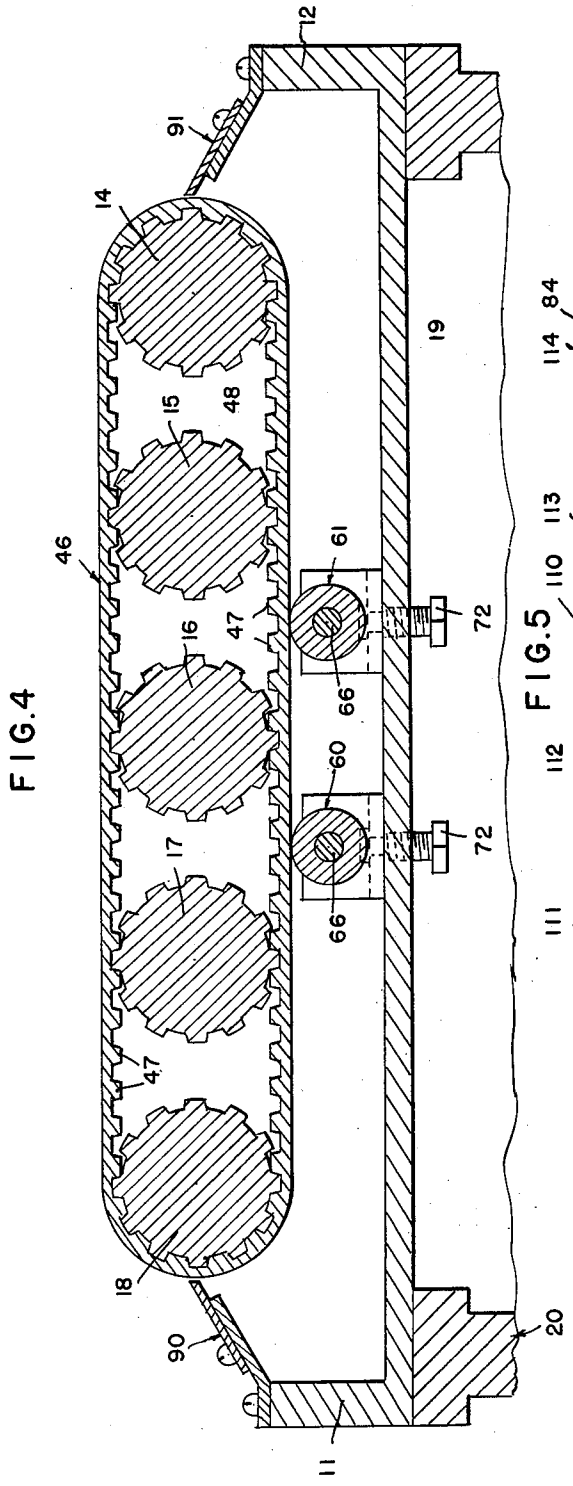


FIG. 4

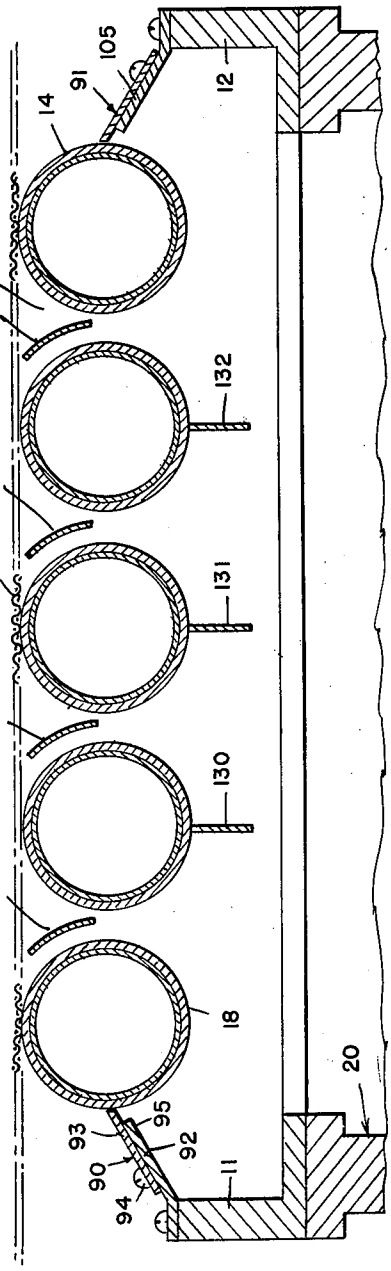


FIG. 5

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COVERS FOR SUCTION BOXES

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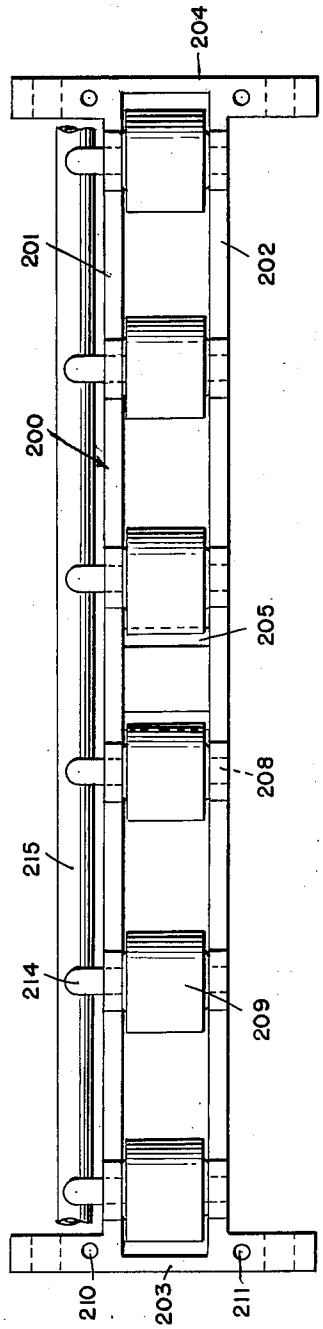


FIG.8

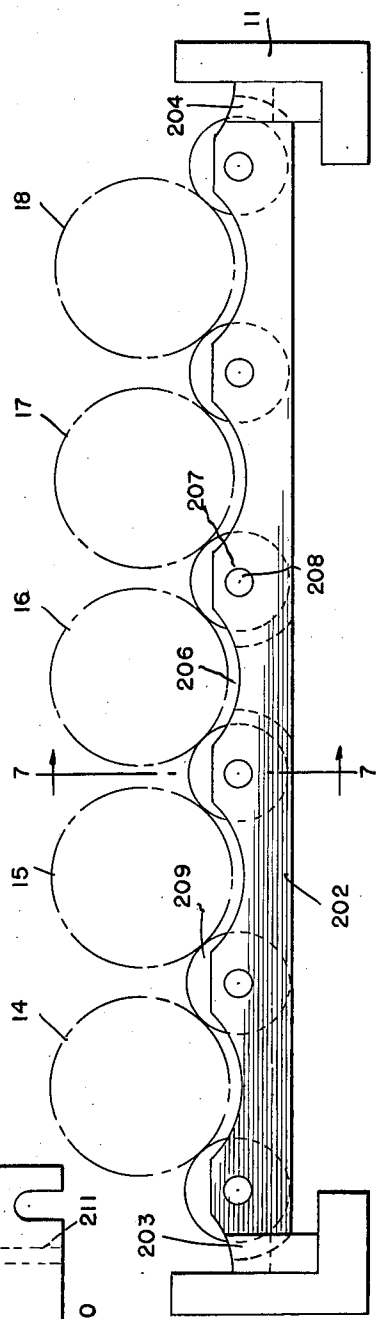


FIG.6

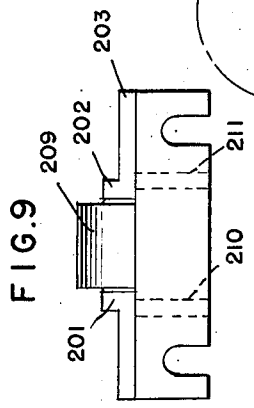


FIG.9

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3,084,740

COVERS FOR SUCTION BOXES

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Filed Nov. 4, 1959, Ser. No. 850,878
13 Claims. (Cl. 162—373)

This invention relates to improvements in suction boxes and pertains, more particularly, to improvements in such devices as, for example, disclosed in my application Serial No. 647,117, now U.S. Patent No. 2,990,015, filed March 19, 1957.

As is set forth in the aforementioned patent, rapid wear of the wire screens used on Fourdrinier machines has long been a problem in the paper making art. The present invention contemplates means for eliminating one source of this wear as much as is practicable and, more particularly, by providing an improved type of suction box cover which incorporates a novel sealing arrangement particularly for the opposite side edges of the wire screen used in the Fourdrinier machine.

A screen is made in the form of an endless horizontal belt running over a driver drum, usually a suction roll, and idler drum to support and keep it tight. The top or tight fit is further supported by free-running table rolls and by several flat boxes, which are boxes rectangular in section in which is maintained a partial vacuum. Paper pulp mixed with a large percentage of water is fed onto the belt or wire at one end and whereas some of this water drains through the wire as it passes along over the paper rolls, a large amount is drawn out by suction as the wire passes over the flat suction boxes. This screening and felting action forms the sheet of paper, which is further processed in subsequent operations. The tops of the flat boxes which are in contact with the wires are made usually of hard wood and are sometimes impregnated with a lubricant in the presence of water. The heavy suction pressure, however, between the rapidly moving wire and the top of the boxes produces a considerable drag, which results in friction and wear. All this is well known in the art.

Many attempts have been made to produce flat boxes equipped with rollers under the wires to overcome these difficulties. These devices have been only partially successful on slow moving paper machines.

My patent is directed to a novel construction of suction box and in particular the cover therefor which is practical and suitable for use in conjunction with high speed paper making machines.

However, the side sealing means of my patent are relatively complex in character, although their operation is perfectly satisfactory. The present invention contemplates the provision of novel side sealing means for the wire which will minimize drag but will, at the same time, be of simplified construction and will also serve as a means for driving the several rollers associated with the suction box cover from the main roller thereof which is driven by a separate source of power.

The present invention also contemplates certain improvements in the end sealing means for the suction box and, more particularly, of means cooperative with the two rollers at the opposite ends of the box and which improved sealing means minimizes wear on the rollers while yet effecting a good sealing therealong.

A further object of this invention is to provide improvements in the internal construction of the suction box whereby an improved draining action is achieved thereby, the deflectors being in the form of arcuate plates closely associated with the surfaces of the individual rollers in the suction box and disposed closely adjacent to the underside of the screen or wire so as to effect a siphoning action, enhanced by the direction of rotation of the rollers.

Still another object of this invention is to provide an improved side sealing means for suction boxes of the character set forth which incorporates an endless belt which itself forms a driving means for the several rollers associated with the suction box, with there being stationary sealing strips engaged with opposite side edges of such driving belt so that the moving wire or screen is not directly engaged by stationary sealing means such as would tend to prematurely wear the screen out particularly in high speed machines.

Still another object of this invention is to provide improvements in suction box assemblies and, more particularly, in the sealing means therefor wherein the end rollers of the box are provided with angled sealing strips of a resilient nature and which are related to the rollers in such a manner as to provide a maximum of efficiency in sealing.

A further object of this invention is to provide an improved driving means for suction boxes which operates both as a driving means and as a part of a seal assembly for the suction box and with there being means associated with the drive for rendering the same effective for driving all of the rollers in the assembly.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is, therefore, illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents, are therefore intended to be embraced by those claims.

In the drawings:

FIG. 1 is a plan view showing a portion of a suction box constructed in accordance with this invention and showing various details of construction thereof;

FIG. 2 is an enlarged vertical section taken substantially along the plane of section line 2—2 in FIG. 1, and showing details of the side seals and drive assembly for the rollers;

FIG. 3 is an enlarged transverse section taken along the plane of section line 3—3 in FIG. 1, showing details of the end seals and also the idler rollers for assuring an effective drive to all of the rollers;

FIG. 4 is an enlarged vertical section taken along the plane of section line 4—4 in FIG. 1 and showing further details of the drive assembly;

FIG. 5 is an enlarged sectional view taken along the plane of section line 5—5 in FIG. 1 and showing details of the end seals as well as details of the deflector assemblies;

FIG. 6 is an enlarged sectional view taken along the plane of section line 6—6 in FIG. 1, illustrating the trunnion supporting members for the rollers;

FIG. 7 is a vertical section taken substantially along the plane of section line 7—7 in FIG. 6;

FIG. 8 is a plan view of one of the trunnion support assemblies;

FIG. 9 is an end elevational view of the assembly shown in FIG. 8;

FIG. 10 is a diagrammatic illustration showing the end sealing means in a portion of one end roller illustrating the functioning of the seal at that end of the suction box;

FIG. 11 is a view similar to FIG. 10 but showing the seal at the opposite end of the suction box;

FIG. 12 is a diagrammatic illustration showing the wire or screen and a portion of one roller as well as one of the deflector plates illustrating the siphoning action which improves the water removing properties of the suction box; and

FIG. 13 is a sectional view showing a portion of the

combined driving and sealing belt used at each side of the suction box.

Referring at this time more particularly to FIG. 1, the improved suction box cover is indicated generally by the reference character 10. The suction box, in general configuration and construction, follows more or less conventional design in that it is generally rectangular in shape having opposite end members 11 and 12 and side members, such as that indicated by the reference character 13, interconnecting the end members. Journalled intermediate the end members 11 and 12 are a plurality of rollers such as those indicated by the reference characters 14, 15, 16, 17 and 18. The end and side frame members form a generally open retcangular framework within which the rollers are disposed and the suction box is provided with a bottom wall 19, see particularly FIG. 4, so that the over-all construtcion is generally in the form of an open topped rectangular box. The entire cover assembly is supported on a suitable supporting framework such as that indicated by the reference character 20 in FIG. 4.

As can be seen most clearly in FIG. 6, the rollers are preferably constructed so that their major extent is of hollow, tubular configuration as indicated by the reference character 22 and having a coating of resilient material as indicated by the reference character 23, preferably rubber. To support these rollers intermediate their opposite ends, there are provided a series of trunnion assemblies such as are best illustrated in FIGS. 6–9 inclusive. Referring at this time more particularly to FIG. 8, one of such trunnion assemblies is indicated generally therein by the reference character 200 and will be seen to consist of a frame having opposite side members 201 and 202 interconnected by transverse end members 203 and 204. These side frame members 201 and 202 are also rigidly interconnected in their central portions as by web member 205.

As can be seen best in FIG. 6, the upper edges of the side frame members 201 and 202 are provided with a plurality of arcuate cut-away portions 206 to provide clearance for the rollers 14, 15, 16, 17 and 18 and intermediate these cutaway portions, the side members 201 and 202 are provided with openings 207 within which are snugly fitted the trunnion journal members or tubes 208. Mounted between the side frame members 201 and 202 on such journals 208 are the trunnion members 209 proper.

The trunnions 209 are, of course, of such diameter as to engage and support between adjacent rollers and the entire framework and assembly 200 are mounted upon the end members 11 and 12 of the suction box cover, there being suitable openings 210 and 211 in the transverse end members 203 and 204 receiving suitable fasteners extending into the end members 11 and 12 for rigidly securing the assemblies in place.

Referring particularly to FIG. 7, it will be seen that the journals 208 are in the form of hollow shafts having one end blocked and being provided intermediate their ends with radially directed openings 212 and 213 and projecting in the ends 214 thereof opposite the blocked end beyond the corresponding side member 201 and being connected to headers 215 which are connected to a source of water under pressure. The trunnions 209 are provided with axial bores 216 rotatably receiving the shafts 208 and providing adequate clearance therebetween to permit the water discharge through the openings 212 and 213 to form a lubricating film between the inner surfaces of the trunnions and the surfaces of the shafts 208. Preferably, the trunnions 209 have projecting bosses 220 and 221 on their opposite end faces which are disposed in close adjacency to the inner surfaces of the side members 201 and 202 and to minimize friction between the side members and the trunnions as the trunnions are rotated in response to the rotational supporting action are the rollers 14, 15, 16, 17 and 18.

Preferably, the trunnions themselves are formed of

nylon or similar synthetic materials to minimize friction and wear on the outer surfaces of the rollers 14, 15, 16, 17 and 18.

The trunnions cooperate with the rollers so as to positively support the intermediate portions thereof and maintain them straight so as to prevent them from bellying downward which would insufficiently support the screen.

Referring at this time more particularly to FIG. 2, it will be seen that the side frame members 13 are provided with a plurality of openings 35 therethrough having enlarged recesses 36 and 37 on the opposite sides thereof and through which openings shaft extensions 38 of the rollers project. Seated in the recess 37 is a ball bearing assembly 39 which rotatably supports each respective shaft extension and in the opposite recess 36 there is provided a sealing member 40 of angular configuration which is snugly engaged with the outer surface of the shaft extension 38. A retaining cap 41 is provided to retain each ball bearing assembly 39 in place, as will be readily appreciated.

The roller 14 is provided with a further shaft extension 42 which projects outwardly beyond the cover assembly indicated generally by the reference character 43, see particularly FIGS. 1 and 2. Any suitable driving means, such as a sprocket 44 and chain 45 is used to impart rotary motion to this roller 14. This drive means is responsible for rotation of all of the rollers 14–18 inclusive, although it directly drives only the roller 14. The drive is transmitted from the roller 14 to the other rollers by means of a belt indicated generally by the reference character 46. This belt, as can be seen most clearly in FIG. 4 is provided with teeth 47 on its inner side which mesh, in turn, with teeth on the rollers, such as those indicated by the reference character 48 on the roller 14. Thus, by virtue of the fact that the roller 14 is rotatably driven by the external drive means, the belt will be operated and will impart drive to the remaining rollers.

As can be seen best in FIG. 2, the teeth 48 on the rollers are formed on a reduced end portion 49 thereof which is immediately adjacent to the shaft extension 38 of each roller. This reduced portion 49 is of such diameter that the upper surface 50 of the belt is substantially flush with the outer surface 51 of the rollers.

FIG. 13 illustrates better the construction of the belt and in this figure, it will be seen that the teeth 47 on the belt are confined to a longitudinally extending central area thereof, leaving relatively smooth surfaces 52 and 53 on opposite sides of the belt on the inner surface thereof, the purpose of which will be presently apparent.

In the particular embodiment shown, see particularly FIG. 4, five rollers are used. In order to assure a positive drive to each and every one of the rollers, idler roller assemblies 60 and 61 are utilized on either side of the middle roller 16. The purpose of these idler rollers is to force the belt upwardly to wrap around a greater circumferential area of the rollers 15, 16 and 17 and more positively assure a proper driving relationship thereto. Since the belt passes over a large circumferential portion of each of the end rollers 14 and 18, obviously no idler rollers are necessary for these rollers and only the two illustrated are needed with a five roller system shown.

These idler or take-up rollers 60 and 61 are provided with main body portions 62 having flanges 63 and 64 at their opposite ends. Each take-up roller is provided with a longitudinally extending axial bore 65 which rotatably receives therein an axle 66, the opposite ends of which are received in brackets 67 and 68. Any suitable means may be provided for affixing the brackets rigidly to the bottom wall 19. The upstanding leg of each of the brackets 67 and 68, which legs receive the opposite ends of the shaft 66, are vertically slotted to permit vertical positioning of the take-up rollers.

A vertical bore 70 in each bracket intersects the vertical slot therein and a spring is received within this bore.

A corresponding threaded bore 71 is provided in the bottom wall 19 in alignment with this last mentioned bore 70 in each bracket and an adjusting bolt 72 is threadedly engaged therein to vary the tension on the spring within the bore 70 to adjust the upward pressure of the take-up rolls on the underside of the belt 46. In this manner, each take-up roller can be so adjusted as to assure sufficient engagement of the belt 46 with the several rollers 16, 17 and 15 as to assure a proper rotational drive thereto.

As can be seen most clearly in FIG. 2, the previously mentioned cover 43 encloses the opposite ends of the several rollers 14–18 and this cover includes a top wall portion 80 substantially in alignment with the upper flight of the belt 46 and is provided on its inner edge 81 with a groove 82 within which is affixed the edge of a longitudinally extending strip 83 preferably formed of Teflon or other suitable material, and which strip engages the undersurface of the corresponding side of the belt. Similarly, on the inner side of each belt there is provided a further sealing strip 84 which is rigidly affixed upon a series of mounting brackets 85 which extend upwardly between adjacent rollers and serve as a support for this strip.

To accommodate for the sealing strip 84, each roller is necked down as indicated by the reference character 86 to permit passage of the strip thereover.

Thus, the sealing strips 83 and 84 cooperate with the surfaces 52 and 53 of the belt to effect a seal therewith to prevent undue leakage of air into the suction box. The Fourdrinier wire, on the other hand, overlaps on its opposite side edges over onto the upper surface 50 of the belt so that the seal is not effected between the moving wire and a stationary member, but rather through the wire to the belts 46 and by virtue of the strips 83 and 84 the belt itself effects the seal. Therefore, there is no undue friction on the wire which would cause its premature breakage or destruction.

On the end frame members 11 and 12, there are provided sealing means 90 and 91 which are similar in many respects to equivalent means illustrated and described in my above mentioned copending application. However, as can be best seen in FIG. 5, these sealing means in the instant case are directed toward engagement with the end rollers 14 and 18 along points lying substantially on the horizontal diameters of these rollers. It has been found that this achieves a superior sealing action as compared with any other location of the sealing means with respect to the end rollers.

Each of the sealing means 90 and 91 includes an angle bracket 92 affixed to its corresponding frame member 11 or 12 and upon which are secured or anchored elongate strips 93 of sealing material, such as Teflon or the like, such securement being achieved by virtue of the fasteners 94. The location and angulation of the legs 95 of the brackets 92 are such as to direct the strips 93 toward engagement with the rollers 14 and 18 in the previously mentioned relationship, that is, extending along substantially the horizontal diameters of these rollers.

The effect achieved by this relationship is shown most clearly in FIGS. 10 and 11. In FIG. 10, the sealing strip 93 is diagrammatically illustrated as being directed toward engagement with the roller 18 along the line on the roller as indicated by the reference character 100 which is substantially at the horizontal diameter of this roller. The direction of rotation of the roller 18 is as indicated by the arrow 101 and as indicated in this figure, vacuum exists below the strip 93 and the arrows 102 are utilized to indicate atmospheric pressure. This tends to deflect the strip 93 toward engagement with the roller 18 but by virtue of the fact that its direction of rotation is such as is indicated and the fact that there is a film of water on this roller, the film of water will constantly resist actual engagement between the tip end 103 of the sealing strip 93 and the outer surface of the roller, but to such end that in actual practice, the seal is so effective that only a very fine mist 104 issues from between the strip 93 and the roller 18, the net effect being the loss of a very minute quantity of water from the system at this point and the seal is thus extremely effective.

In FIG. 11, the seal at the opposite end of the suction box is illustrated diagrammatically. In this case, the sealing strip 105 is related to the roller 14 similarly to the relationship existing in FIG. 10, but in this case, the direction of rotation of the roller 14 is as indicated by the arrow 106. Here again, there exists a vacuum below the strip 105 and atmospheric pressure above the strip as indicated by the arrows 107 and, again, there is a film of water on the outer surface of the roller 14 which tends to obviate direct contact between the roller and the strip 105, but due to the direction of rotation of the roller 14, no mist emanates from the seal joint and very little actual air leakage takes place at this point.

A further feature of the invention is illustrated best in FIG. 5 and consists of means for enhancing the draining action of the suction box on the paper stock resting upon the Fourdrinier wire. The wire is indicated in FIG. 5 by the reference character 110 and as it passes between the rollers 14 and 18, of course the negative pressure maintained within the confines of the suction box withdraws water from the paper stock, not shown, supported upon the wire. To enhance this action, a series of arcuate deflector strips 111, 112, 113 and 114 are provided, these deflector strips extending substantially the entire lengths of the rollers 14–18 but terminating in the region of the belts 46.

The action of these deflector strips is best illustrated in FIG. 12. In this figure, it will be seen that the upper edge 120 of each deflector strip terminates in closely spaced relationship to the undersurface of the wire 110 and with the concave surface 121 of the strip parallel to and closely spaced with respect to the outer surface 122 of the corresponding roller 18. In this fashion, a passageway or channel 123 is provided for between the deflector strip 111 and the corresponding roller 18 and with the mouth of this passageway as indicated by the reference character 124 being in the region immediately adjacent the underside of the wire 110. Therefore, a column of water fills this channel 123 due to the normal sucking action of the suction box and due to the fact that this channel is rather restricted, a siphoning action is continuously effected which enhances the water withdrawing effect of the suction box.

Operating in conjunction with the deflectors 111–114, are divider strips 130, 131 and 132 which tend to isolate one deflector strip from the other and prevent the normal direction of rotation of the rollers from drawing water back around beyond the lowermost sides thereof and upwardly toward the discharge ends of the channels 123 which would otherwise tend to decrease the effectiveness of this siphoning action. In other words, the blades 130, 131 and 132 act as doctor blades to prevent interference with the siphoning action achieved by the deflector strips 111–114.

I claim:

1. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on said screen, said suction box including a plurality of transversely extending rollers rotatably supported in side-by-side spaced relationship, a belt trained around and enclosing all of the rollers at each side of the series of rollers, said screen being of a width to overlap and rest upon, at its opposite sides, said belts, means sealing the opposite end rollers below said screen, means sealing the suction box between stationary portions of the box and said belts whereby the screen is engaged only by portions of the suction box which are travelling at a speed substantially the same as the speed of said screen, means drivingly connecting all of the rollers, the last mentioned

means comprising a series of teeth formed on the inner surface of said belts and there being similarly formed teeth on said rollers with which the belt teeth engage.

2. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on said screen, said suction box including a plurality of transversely extending rollers rotatably supported in side-by-side spaced relationship, a belt trained around and enclosing all of the rollers at each side of the series of rollers, said screen being of a width to overlap and rest upon, at its opposite sides, said belts, means sealing the opposite end rollers below said screen, means sealing the suction box between stationary portions of the box and said belts whereby the screen is engaged only by portions of the suction box which are travelling at a speed substantially the same as the speed of said screen, means drivingly connecting all of the rollers, the last mentioned means comprising a series of teeth formed on the inner surface of said belts and there being similarly formed teeth on said rollers with which the belt teeth engage, said teeth on the belt being confined to a relatively narrow central and longitudinally extending region thereof leaving smooth belt surface portions on opposite sides of such teeth and upon the inner side of said belts, and the stated sealing means engaging said belts being engaged with said smooth side surfaces thereof.

3. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on said screen, said suction box including a generally rectangular frame having a plurality of horizontally aligned rollers journalled thereon and extending between the opposite sides thereof, means for drivingly connecting said rollers whereby they are rotated at approximately the speed of the screen passing thereover, means for sealing said suction box assembly, and a plurality of arcuate deflector plates disposed intermediate adjacent pairs of said rollers, each of said deflector plates having its concave surface disposed in closely spaced parallel relationship to a corresponding roller and being parallel to the outer surface thereof and with the upper edge of each such deflector plate being closely spaced from the under surface of said screen, whereby a channel is formed between each deflector plate and its corresponding roller to effect a siphoning action from the mouth of said channel immediately below said screen.

4. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on said screen, said suction box including a generally rectangular frame having a plurality of horizontally aligned rollers journalled thereon and extending between the opposite sides thereof, means for drivingly connecting said rollers whereby they are rotated at approximately the speed of the screen passing thereover, means for sealing said suction box assembly, and a plurality of arcuate deflector plates disposed intermediate adjacent pairs of said rollers, each of said deflector plates having its concave surface disposed in closely spaced parallel relationship to a corresponding roller and being parallel to the outer surface thereof and with the upper edge of each such deflector plate being closely spaced from the undersurface of said screen, whereby a channel is formed between each deflector plate and its corresponding roller to effect a siphoning action from the mouth of said channel immediately below said screen, and a plurality of vertical blades disposed within said framework with the upper edges thereof closely spaced below the lowermost portions of all of the intermediate rollers to isolate the siphoning action of said deflector plate.

5. In a suction box for sealingly supporting a travelling conveyor screen against suction, a generally rectangular framework including side frame members and end frame members, a plurality of rollers journalled in said framework and extending parallel to each other in substantially horizontally aligned relationship and disposed in parallel relation between said end frame members, the rollers having teeth adjacent the ends thereof, a combined sealing and driving means for effecting rotation of the rollers in unison and for sealing the opposite side edges of the travelling conveyor screen while moving substantially in unison therewith, said combined sealing and driving means including an endless belt for each end of said rollers and for moving in unison with the conveyor screen, the belts having teeth on the inner surfaces and extending across the central portions thereof and meshing with and being complemental to the teeth on the rollers, stationary sealing strips engaging the undersurfaces adjacent to the side edges of the top flights of said belts and being carried by said side frame members.

6. In a suction box for sealingly supporting a travelling conveyor screen against suction, a generally rectangular framework including side frame members and end frame members, a plurality of rollers journalled in said framework and extending parallel to each other in substantially horizontally aligned relationship and disposed in parallel relation between said end frame members, the rollers having teeth adjacent the ends thereof, a combined sealing and driving means for effecting rotation of the rollers in unison and for sealing the opposite side edges of the travelling conveyor screen while moving substantially in unison therewith, said combined sealing and driving means including an endless belt trained over said rollers at each end thereof, the belts having teeth on the inner surfaces and extending across the central portions thereof and meshing with and being complemental to the teeth on the rollers, a cover assembly mounted on each side frame member and enclosing the opposite ends of said rollers and carrying sealing strips engaging the undersurfaces adjacent the outer side edges of said belts.

7. The assembly as defined in and by claim 6 wherein a second sealing strip is associated with each belt, being mounted on the framework substantially coextensive with the upper flight of the belt and engaging the undersurface adjacent the inner side of each belt.

8. In a suction box for sealingly supporting a travelling conveyor screen against suction, a generally rectangular framework including side frame members and end frame members, a plurality of rollers journalled in said framework and extending parallel to each other in substantially horizontally aligned relationship and disposed in parallel relation between said end frame members, the rollers having teeth adjacent the ends thereof, a combined sealing and driving means for effecting rotation of the rollers in unison and for sealing the opposite side edges of the travelling conveyor screen while moving substantially in unison therewith, said combined sealing and driving means including an endless belt trained over said rollers at each end thereof, the belts having teeth on the inner surfaces and extending across the central portions thereof and meshing with and being complemental to the teeth on the rollers, a cover assembly mounted on each side frame member and enclosing the opposite ends of the rollers, the cover having a laterally extending portion with an inwardly extending end portion, the end portion having an inwardly opening groove therein, a longitudinally extending strip of sealing and bearing material mounted within the groove, the sealing and bearing material engaging the plain undersurface of each belt adjacent one edge thereof to seal and support each belt and maintain each belt in substantially flat condition during its travel over the rollers.

9. The structure as set forth in claim 8, wherein brackets are mounted within the suction box adjacent a reduced portion of the rollers inwardly of the teeth, a strip of sealing and bearing material supported by the brackets, the strip engaging an inwardly extending portion of each belt on the undersurface adjacent one edge thereof and maintain each belt in substantially flat condition during its travel over the rollers.

10. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on said screen, said suction box including transversely extending end frame members below said screen and a plurality of transversely extending rollers rotatably supported between such end frame members in spaced parallel relationship to each other and to such end frame members so as to support the screen as it passes over the suction box, a belt trained over the ends of the rollers at each side of the series of rollers and enclosing the rollers at each end thereof, the screen being of a width to overlap and rest upon the belts at its opposite sides, means sealing the suction box between stationary portions of the box and the belts, means sealing the opposite end rollers below said screen comprising a strip of material substantially coextensive in length with its corresponding next adjacent roller and being directed with relation thereto such that one side edge of such strip is disposed closely adjacent to its corresponding roller along a line substantially coincidental with the horizontal diameter of the roller means drivingly connecting all of the rollers, the last named means comprising a series of teeth formed on the inner surface of said belts and there being similarly formed teeth on the rollers with which the belt teeth engage.

11. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on the screen, the suction box including a generally rectangular frame having a plurality of transversely extending rollers supported within the frame in spaced parallel relationship, sealing means mounted within the frame and cooperating with the end rollers of the frame comprising a strip of material substantially coextensive with the adjacent roller and being directed with relation to the roller such that one side edge of the strip is disposed closely to the roller along a line thereon substantially coincidental with the horizontal diameter of the roller, means for drivingly connecting said rollers whereby they are rotated at approximately the speed of movement of the screen thereover, means sealing the driving means with relation to the suction box, and a plurality of arcuate deflector plates disposed intermediate adjacent pairs of the rollers, each of the deflector plates having its concave surface disposed in closely spaced parallel relationship to a corresponding roller and being parallel to the outer surface thereof and with the upper edge of each deflector plate being closely spaced from the under surface of the screen whereby a channel is formed between each deflector plate and its corresponding roller to effect a siphoning action from the mouth of said channel immediately below said screen.

12. The structure as recited in claim 11, wherein a plurality of vertical blades are disposed within the frame with the upper edges thereof closely spaced below the lowermost portions of all of the intermediate rollers to isolate the siphoning action of the deflector plate and to aid in removal of the moisture on the intermediate rollers.

13. In a paper-making machine including a travelling screen adapted to receive a paper pulp web thereon, a suction box assembly for extracting moisture from the paper pulp on the screen, the suction box including a generally rectangular frame having end frame and side frame members, a plurality of rollers extending across the suction box with the ends thereof being rotatably supported on the side frame members the rollers being in parallel relationship to each other and supporting the screen during travel over the suction box assembly, each end portion of each roller being reduced in diameter and having teeth formed in the reduced portions, an endless belt trained over the reduced ends of each roller, each belt having teeth on the inner surface thereof meshing with the teeth on the reduced portion of the rollers and drivingly connecting the rollers together, the teeth on the belt being confined to a relatively narrow central and longitudinally extending portion leaving smooth belt surface portions on opposite sides of the teeth, the belt and the intermediate portion of the rollers being in substantial alignment, adjustable support means within the suction box and engaging the lower run of each belt to force the teeth of the lower run into engagement with the teeth on the rollers, a longitudinal strip of sealing material mounted on each of the end frame members substantially coextensive in length with each end roller adjacent to the end frame members, one edge of each sealing strip being disposed along a line substantially coincidental with the horizontal diameter of each end roller and closely adjacent to the roller and belt to effect a seal along each end frame of the suction box, a cover assembly mounted on each side frame member and enclosing the opposite ends of the rollers, the cover having a laterally extending portion with an inwardly extending end portion, the end portion having an inwardly opening groove therein, a longitudinally extending strip of sealing and bearing material mounted within the groove, the sealing and bearing material engaging one of the smooth surface portions of the belt to seal and support one edge of the belt, brackets mounted within the suction box adjacent to the reduced portion of the rollers inwardly of the teeth, a strip of sealing and bearing material supported by the brackets, the strip engaging the other of the smooth surface portion of the belt to seal and support the other edge of the belt, both sealing and bearing surfaces cooperating with the edge portions of the belt to maintain and support each belt in substantial flat condition during their travel over the ends of the rollers to thereby support the longitudinal edges of the screen, the sealing material mounted on the end frame members and the sealing and bearing material engaging the smooth surface portions of each belt cooperating to effectively seal the suction box, a plurality of arcuate deflector plates disposed intermediate adjacent pairs of the rollers, each of the deflector plates having its concave surface disposed in closely spaced parallel relationship to a corresponding roller and being parallel to the outer surface thereof, the upper edge of each deflector plate being closely spaced from the under surface of the screen, whereby a channel is formed between each deflector plate and its corresponding roller to effect a siphoning action from the mouth of the channel immediately below the screen, and a plurality of vertical blades disposed within the frame of the suction box with the upper edges thereof closely spaced below the lowermost portions of all of the intermediate rollers to isolate the siphoning action of the deflector plate.

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