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AIR CUSHIONED DECKLE

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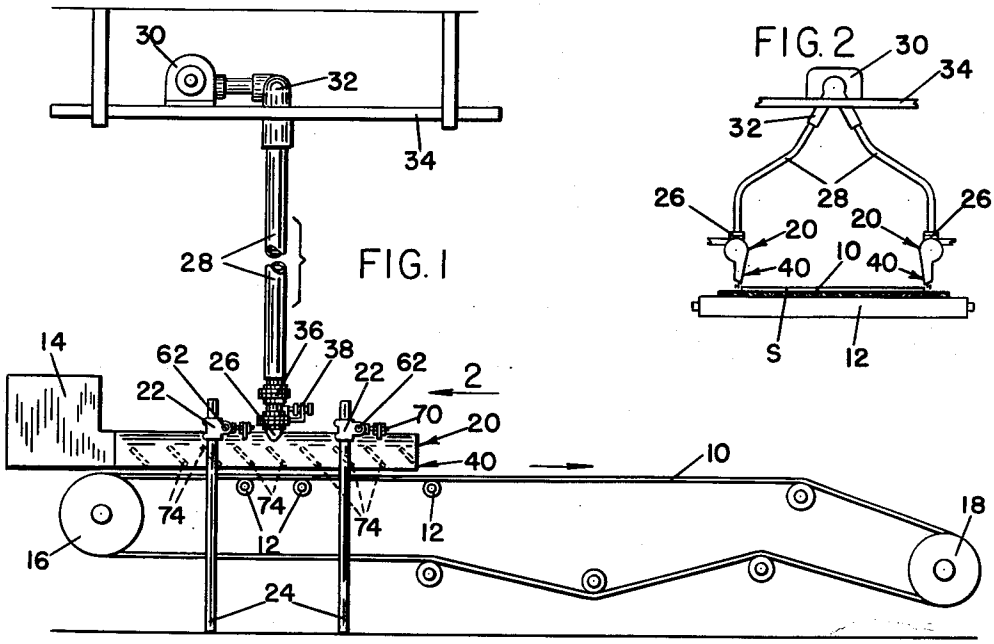


FIG. 1

FIG. 2

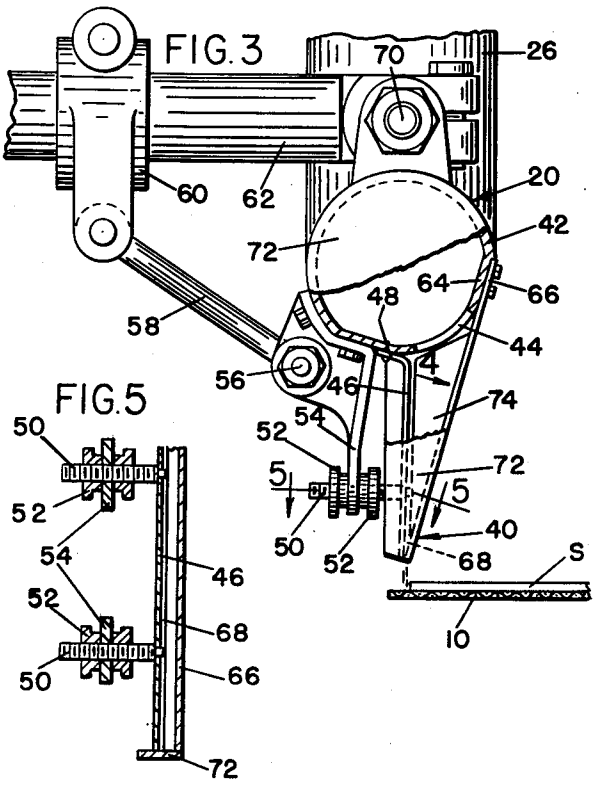


FIG. 3

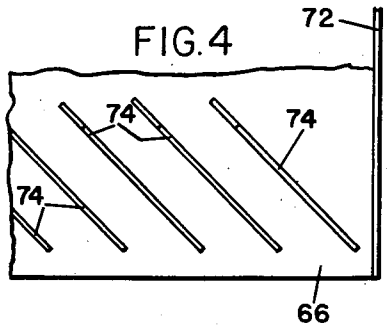


FIG. 4

FIG. 5

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AIR CUSHIONED DECKLE

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This invention provides a new and improved deckle device utilizing a jet of air employing baffles and obviating the usual bow wave in the paper stock created by the drag on the sheet caused by prior art conventional deckle edge rulers and which does not touch or create any wear or drag on the Fourdrinier wire because of the fact that it is actually a blast of air in sheet form, the baffles causing the jet to progress downstream relative to the direction of travel of the Fourdrinier wire, providing an improved square edge instead of the usual rough and sloping edge occasioned by the use of prior art deckle edge rulers.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which:

FIG. 1 is a view in side elevation illustrating the invention;

FIG. 2 is a schematic view in elevation, looking in the direction of arrow 2 in FIG. 1;

FIG. 3 is an enlarged view in end elevation of one of the new air cushion deckles, parts being in section;

FIG. 4 is a fragmentary section of the deckle, looking in the direction of arrow 4 in FIG. 3 and illustrating the baffle construction; and

FIG. 5 is a sectional view on line 5—5 of FIG. 3 illustrating the air flow adjustments.

Referring now to FIG. 1 there is here generally shown a Fourdrinier wire 10 which is mounted to pass rapidly over a series of table rolls 12, mold boards, suction boxes and the like in the direction of the arrow. The head box is shown generally at 14, the breast roll at 16 and the couch roll at 18. The paper stock in fluid form issues through the slice opening from the head box as is well known and as the Fourdrinier wire carries it along, the stock being fluid, tends to flow laterally outwardly to the edges of the Fourdrinier wire in a sort of sloping turbulent form, even with the use of conventional deckle edge rulers. This of course causes waste due to faulty edges in the finished paper which have to be trimmed.

In the present case, a means is provided to prevent this outward flow and turbulence of the paper stock by the provision of continuous elongated jets of air which impinge on the Fourdrinier wire 10 in position to match the width of the opening of the head box slice, see FIG. 2. These jets are provided by the devices comprising the invention in the present case, and these in turn comprise in general air chambers or the like generally indicated at 20, there being one mounted at each side of the machine. These air chambers 20 can be made in any length desired or in multiples of relatively short types and are preferably mounted by means of brackets 22 vertically adjustable on uprights 24 which may be mounted as desired, i.e., on the floor or more usually on the table roll rails.

Each chamber 20 is provided with an inlet connection 26 to which is connected a hose 28 in turn deriving air under pressure from a blower or compressor 30 having a divided connection at 32 and supported in any way desired as by an overhead scaffold 34 as shown in FIG. 1. A quick release connection 36 may be provided as a part of the fixture 26 and the same may be provided with an air volume control damper 38, see FIG. 1.

Each of the chambers is made in general in cylindrical form and each has a narrow depending nozzle 40 which

is elongated and extends the length of each section of chamber 20, so that a continuous jet in the form of a sheet or veil impinges upon the Fourdrinier wire 10 and prevents the outward flow of the paper stock S, see FIGS. 2 and 3, thus providing the paper with a uniform edge and preventing any kind of drag, bow wave, etc., and the consequent wastage.

Chamber 20 and its nozzle 40 form essentially two communicating chambers of which chamber 20 has a much greater volume so that a relatively high velocity jet issues from the nozzle and this jet is uniform from end-to-end.

Referring now to FIGS. 3 and 4, the air cushion deckle chamber is shown in detail wherein as an example of the construction, a kind of cylindrical member 42 is provided, this having a series of apertures 44 lying along a certain portion thereof. A plate 46 is provided with a bent portion 48. The bent portion 48 is adapted to be secured against a side on the bottom part of the cylindrical member 42 and it is provided with a series of screw studs 50, secured to plate 46, which by means of nuts 52 connect plate 46 to angle brackets 54 fixed to member 42.

Each bracket 54 has a depending member which receives a stud, the nuts being mounted on the studs. The bracket itself is connected at 56 to a link 58 in turn connected to a slidable bracket 60 which may be moved along its supporting rod 62. Supporting rods 62 are mounted for vertical adjustment on brackets 22 on uprights 24, FIG. 1.

There is another plate which is referred to as the top lip plate, plate 46 being the bottom lip plate. The top lip plate is secured along a portion of member 42 indicated at 64, the top lip plate being indicated at 66. It will be seen that by adjusting the nuts 52, plate 46 can be moved by being flexed in-and-out with reference to rigid plate 66, thus varying the aperture indicated at 68 whence issues the stream of air which acts as the deckle for the stock on the Fourdrinier wire as explained above.

The chamber 20 may be conveniently mounted on some kind of end pivots 70 so that when the bracket 60 is moved in-and-out (see FIG. 3), the entire chamber including the nozzle 40 formed by the plates 46, 66 can be adjusted at an angle other than normal to the Fourdrinier wire. The air pressure of the jet is controlled by the width of the opening. The plates 46 and 66 are of course provided with end closure plates as at 72.

Mounted upon the rigid lip plate 66 there are a series of triangular baffles or vanes shown in FIGS. 3 and 4 at 74. These baffles are angularly located with respect to the Fourdrinier wire, see for instance FIG. 1. These baffles insure that the stream of air shall progress downstream as respects the direction of travel of the Fourdrinier wire, although of course at an acute angle with respect thereto, and this in turn also decreases any tendency to form a bow wave or interference of any kind with the sheet. These baffles or vanes also aid in balancing the air jet so that uniformity of the jet from end-to-end of the nozzle is maintained.

It will be seen that the nozzles do not touch the Fourdrinier wire which is impinged upon only by the curtain or sheet of air which is quite thin and which definitely prevents the stock from passing it. Thus the air acts as a dam and forms a uniform edge for the stock as it travels in its very liquid condition from the head box opening. All of the objections to mechanical deckles are obviated. There is no bow wave formed nor is there any drag or interference with the stock or the Fourdrinier wire as in the case of mechanical dams or deckle edge rulers. Furthermore, it is found that the stock is uniform and does not taper off in sloping edges, causing waste material as in the prior art using mechanical dams or deckles. The sheet or curtain of air under pressure may be adjusted angularly transversely of the Fourdrinier wire and vertically so that all kinds of adjustments are possible, depend-

ing upon the quality of the stock and speeds of Fourdrinier wire, etc. which may be encountered. The air cushion deckles of the present invention as described may extend as far as necessary dependent on the condition of the stock.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claim, but what I claim is:

In a paper making machine including a Fourdrinier wire and a head box having a slice arranged so that the stock issues from the slice onto the wire, a gas pressure chamber having a nozzle, said nozzle being elongated in the direction of travel of the Fourdrinier wire, a source of gas for the chamber and nozzle causing impingement of the gas upon the Fourdrinier wire in a thin jet acting as a dam to maintain the stock on the Fourdrinier wire along a certain defined predetermined path, and the nozzle being out of contact with the wire but closely spaced therefrom whereby the gas impinges directly upon the wire along a predetermined line, that improvement which comprises baffles in the nozzle directing the jet to impinge upon the Fourdrinier wire at an angle so that the line of force of the jet converges with respect to the direction of travel of the Fourdrinier wire.

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