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EUROPEAN PATENT APPLICATION

21 Application number: **81103064.2**

51 Int. Cl.³: **B 05 C 3/12, D 21 H 5/00,**
B 05 C 3/18

22 Date of filing: **23.04.81**

43 Date of publication of application: **03.11.82**
Bulletin 82/44

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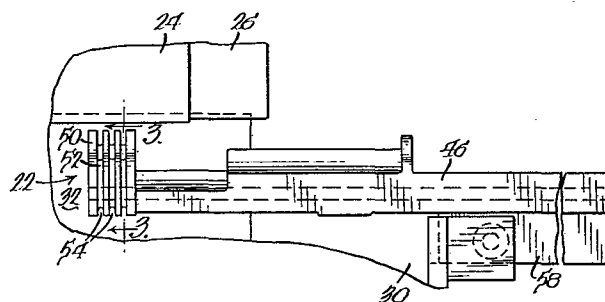
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84 Designated Contracting States: **AT BE CH DE FR GB IT**
LI LU NL SE

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54 **Edge dam assembly for paper coating apparatus.**

57 An edge dam assembly 22 for an applicator for applying a coating liquid to a web 24 of moving paper carried on a backing roll 26, the applicator being of the type having a chamber 32 for receiving coating liquid and an opening therein for directing the liquid onto the web 24, is characterized by a seal element sealed with the front and rear walls of the chamber 32 in an end space therebetween and extending toward and closely adjacent to but spaced from the web 24. The face of the seal element adjacent the web has a plurality of grooves 54 extending generally parallel to the direction of movement of the web 24, so that coating material which attempts to seep past the seal element enters the grooves 54 and leakage of coating material past the seal element is significantly minimized.



EP 0 063 618 A1



Background of the Invention

5 The present invention relates to an improved edge dam for use with applicators of the trailing blade type for applying a coating liquid to a web of moving paper.

10 Conventional applicators of the trailing blade type apply coating material to a paper web that is usually supported and carried by a backing roll. Such applicators may include a chamber having an opening extending across and parallel to the web, together with a doctor blade located on a trailing side of the opening for leveling the coating and a front wall extending from a leading side of the opening toward the web. Coating li-
15 quid is supplied to the chamber, and thence through the chamber opening and between the front wall and doctor blade to the web. To seal the end spaces between the front wall and doctor blade to prevent escape of coating material laterally of the web, edge dams are provided thereat.

20 For applicators of the foregoing types, the edge dams may comprise a flexible element at each end space. Ideally, the edge dams absolutely prevent passage of any coating liquid therepast. However, in practice coating liquid often leaks past
25 the edge dams, with the result that the backing roll or paper web edges become contaminated with coating liquid.

Objects of the Invention

30 A primary object of the invention is to provide improved edge dam assemblies for paper coating applicators, which significantly decrease leakage of coating liquid therepast.

Summary of the Invention

35 In accordance with the present invention, an improved edge dam assembly for use with an applicator for applying a coating liquid to a web of moving paper carried on a backing roll,

wherein the applicator is of a type having a body portion defining a chamber therein with an elongate opening thereto positionable generally adjacent to and transversely of the web, the chamber receiving coating liquid and directing the same
5 through the opening and onto the web, said edge dam assembly comprising seal means mountable in the opening for sealing with the body portion on opposite sides of the chamber opening and for extending toward and closely adjacent to but spaced from the paper web or backing roll, said seal means having a
10 plurality of spaced grooves formed therein whereat the same is adjacent to the paper web or backing roll, the interiors of said grooves being substantially at atmospheric pressure and said grooves extending generally along the direction of movement of the paper web thereat and receiving therein coating
15 liquid seeping past said seal means.

The foregoing and other objects, advantages and features of the invention will become apparent upon a consideration of the following detailed description, when taken in conjunction with
20 the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a side elevation view of one embodiment of edge dam
25 assembly in accordance with the invention, illustrating the same on an applicator for applying a coating liquid to a web of paper carried on a backing roll;

Fig. 2 is a longitudinal view of the edge dam assembly of
30 Fig. 1, showing its orientation with respect to the web of paper and backing roll;

Fig. 3 is a cross-sectional side elevation view of the edge
dam assembly, taken substantially along the lines 3-3 of Fig.2;

35 Fig. 4 is a perspective view of the one embodiment of edge dam assembly;

Fig. 5 is a longitudinal view of an edge dam assembly structured in accordance with another embodiment of the invention, illustrating its orientation with respect to a web of paper;

5 Fig. 6 is a side elevation view, partly in cross section, taken substantially along the lines 6-6 of Fig. 5;

Fig. 7 is a side elevation view, partly in cross section, taken substantially along the lines 7-7 of Fig. 5; and

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Fig. 8 is a perspective assembly view of the edge dam assembly shown in Figs. 5-7.

Detailed Description

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In Fig. 1 there is indicated at 20 an applicator of a type with which an edge dam assembly, indicated at 22 and configured in accordance with one embodiment of the invention, is particularly adapted for use. The applicator applies a pigment bearing
20 liquid coating to a moving web of paper 24 carried on a resilient backing roll 26 in a direction indicated by an arrow 28, and includes a main support or housing 30 having a coating liquid chamber 32 between a front or leading wall 34 and a rear or trailing wall 36 of the support. The walls extend generally
25 transversely of and parallel to the backing roll, and taper toward an open upper end of the chamber. Coating liquid is introduced into the chamber for flowing through the opening and against the web of paper and the lower sides of the chamber are closed by side walls (not shown) extending between the
30 front and rear walls.

During operation, the coating applicator is positioned closely adjacent the backing roll 26 with the opening in the upper end of the chamber 32 facing the surface of the paper web 24. A
35 flexible doctor blade 38 in a slot 40 in the main support 30 forms a portion of the chamber rear wall, and is clamped in place against the edge dam assembly 22 and urged against the

web by a pair of transversely extending air tubes 42 and 44. The doctor blade levels the coating applied to the web and forms a seal at the trailing end of the applicator to prevent escape therepast of excessive amounts of coating liquid. The
5 pressure of the blade on the roll is regulated by the pressure of the air within the tube 42, the tube for this purpose resulting in an even pressure of the blade across the entire width of the paper web.

10 To seal the spaces at the side ends of the doctor blade 38 and front wall 34 of the applicator main support 30, an edge dam assembly is positioned at each side end. As shown in Figs. 2, 3 and 4, the edge dam assembly 22 is preferably of
15 a plastics material such as nylon or polypropylene and includes a mounting and support member 46 through which extends a steel rod 48 for rigidity or stiffening of the assembly. A plurality of quasi-triangular seal elements 50 are at one end of the support member and spacer portions 52, of a smaller size than the
20 seal elements, separate the elements to define peripheral grooves 54 between adjacent elements.

The generally triangular shape of the seal elements 50 enables the edge dam assembly 22 to be mounted in the space between the doctor blade 38, the front wall 34 and the backing roll 26
25 toward the side of and at the opening from the chamber 32. For the purpose, and as shown in Fig. 1, the mounting member 46 has a flange 58 received within a slot 60 in the main support 30 and releasably secured therein by a knob 62 having a threaded portion passing through an opening in the main support
30 into clamped engagement with the flange. With the edge dam assembly mounted as shown, the upper ends of the seal elements 50, separated by the grooves 54, extend toward and closely adjacent to but spaced from the paper web 24 toward a side edge thereof, and form a seal therewith to control passage of
35 coating liquid therepast.

As is seen in Fig. 2, when the edge dam assembly 22 is mounted

on the main support 30 the seal elements 50 and the peripheral grooves 54 lie in planes extending generally perpendicular to the axis of rotation of the backing roll 26, or parallel to the direction of movement of the paper web 24. This provides enhanced sealing capability with the paper web and, as compared with conventional edge dam assemblies in which the seal element defines a continuous sealing surface without any grooves adjacent the web, substantially minimizes leakage of coating material from the chamber 32. This may be appreciated if it is considered that each seal element 50 forms a separate seal with the paper web, and any coating liquid which seeps past a seal element moves into a groove 54, the interior of which is at substantially atmospheric pressure, before it encounters the following seal element. The grooves thus receive and contain coating liquid which seeps past the seal elements, the flow of which must be controlled. Then, as the backing roll rotates, coating liquid in the grooves is drawn by the paper web toward the doctor blade 38 for application onto the web, which minimizes the amount of coating liquid available for leakage past the following seal elements and ultimately beyond the edge dam assembly. The flow of coating liquid within the grooves is orthogonal to the direction of flow of liquid which must be controlled, so that the grooves reduce the quantity of leakage of coating liquid past the edge dam assembly to a considerably greater extent than could otherwise be accomplished with a nongrooved sealing surface.

As is apparent, the configuration and size of the edge dam assembly is important relative to the position of the doctor blade 38. That is, the seal elements 50 must be of a size to substantially fill the area defined between the doctor blade, the front wall 34 and the backing roll 26 when the doctor blade is in its doctoring position. If the seal elements are too small, coating material will leak therepast, and if too large, the doctor blade will be held from its doctoring position against the paper web.

To obtain a secure seal between the doctor blade 38 and the front wall 34, and yet to ensure that the doctor blade will not be held from its doctoring position against the paper web, as shown in Figs. 5-8 a composite edge dam assembly, indicated generally at 100, is provided. In this embodiment, the edge dam assembly includes a plurality of separate seal elements 102, adjacent ones of which are separated by spacers 104. The seal elements and spacers are interleaved and supported at an end of a mounting member 106 by a rod 108 extending through aligned passages in the elements, spacers and mounting member. One end of the rod is fastened to the outermost seal element, and an opposite end is threaded and provided with a knurl nut 110, which may be tightened to draw the elements, spacers and mounting member together.

Each seal element 102 has a pair of sealing surfaces 112 and a peripheral groove 114 between the surfaces, and each spacer 104 has an open ended notch 116 extending from an upper end thereof to a medial point therein. The height of each seal element is such that its upper sealing surfaces 112 extend toward and adjacent to but slightly spaced from the paper web when the edge dam assembly 100 is mounted on the applicator main support 30, but the width of each is less than the spacing between the front wall 34 and the doctor blade 38 when the blade is doctoring the web. Thus, the seal elements do not restrict blade movement against the paper web. Each spacer 104, on the other hand, has a height equal to or less than that of the seal elements and a width greater than the distance between the front wall and doctor blade when the blade is not doctoring the paper. However, because of the notches 116, upon loading of the blade by the air tube 42, the sides of the spacers flex inwardly to enable the blade to move to its doctoring position, and at the same time form secure seals with the blade and the front wall.

Figs. 5 and 6 show the positioning of the edge dam assembly 100

with respect to the paper web 24 when the assembly is mounted on the applicator main support 30. As is apparent, because of the grooves 114 in the seal elements 102, the edge dam assembly operates in the same manner as does the edge dam assembly 22 to minimize leakage of coating liquid therepast. Also, although the assembly is illustrated as comprising three seal elements and two spacers, more or less seal elements and spacers could be used, it being understood that since the seal elements close the notches through the spacers, formation of an efficient seal requires use of at least two seal elements.

While embodiments of the invention have been described in detail, various modifications and other embodiments thereof may be devised by one skilled in the art without departing from the spirit and scope of the invention, as defined in the appended claims.

What Is Claimed Is:

1. An improved edge dam assembly for use with an applicator
for applying a coating liquid to a web of moving paper
5 carried on a backing roll, wherein the applicator is of a
type having a body portion defining a chamber therein with
an elongate opening thereto positionable generally adjacent
to and transversely of the web, the chamber receiving
coating liquid and directing the same through the opening
10 and onto the web, said edge dam assembly comprising seal
means mountable in the opening for sealing with the body
portion on opposite sides of the chamber opening and for
extending toward and closely adjacent to but spaced from
the paper web or backing roll, said seal means having a
15 plurality of spaced grooves formed therein whereat the same
is adjacent to the paper web or backing roll, the interiors
of said grooves being substantially at atmospheric pressure
and said grooves extending generally along the direction of
movement of the paper web thereat and receiving therein
20 coating liquid seeping past said seal means.
2. An improved edge dam assembly as in claim 1, wherein said
seal means has sealing surfaces on opposite sides of and
between adjacent ones of said grooves, said sealing sur-
25 faces extending toward and closely adjacent to but spaced
from the paper web or backing roll.
3. An improved edge dam assembly as in claim 1, wherein said
grooves extend circumferentially around said seal means in
30 a plane extending generally perpendicular to the axis of
rotation of the backing roll.
4. An improved edge dam assembly as in claim 1, wherein said
seal means comprises a plurality of generally planar first
35 and second elements interleaved side by side to alternate
said first and second elements, at least one of the plurali-
ty of said first and second elements have surfaces for seal-

ing with the body portion on opposite sides of the chamber opening and said plurality of first and second elements extend toward and closely adjacent to but spaced from the paper web or backing roll, said elements forming said plurality of spaced grooves.

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5. An improved edge dam assembly as in claim 4, wherein said first and second elements lie in planes extending generally perpendicular to the axis of rotation of the backing roll, said first elements have surfaces extending toward and closely adjacent to but spaced from the paper web or backing roll and said second elements have surfaces for sealing with the body portion on opposite sides of the chamber opening.

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6. An improved edge dam assembly as in claim 4 or 5, wherein each of said first elements has a peripheral groove along its surface toward the paper web or backing roll, said groove extending generally along the direction of movement of the paper web thereat and said first element having sealing surfaces, on opposite sides of said groove, extending toward and closely adjacent to but spaced from the paper web or backing roll.

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7. An improved edge dam assembly as in claim 6, wherein said second elements have surfaces for sealing with the body portions on opposite sides of the chamber opening.

25

8. An improved edge dam assembly as in claim 7, wherein each of said second elements has an open ended notch extending from an edge thereof to a medial point therein in a direction generally along the body portions, and a width between the body portions which is greater than the spacing between the body portions, said notch permitting compression of said second elements so that the same fit between and seal with the body portions.

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9. An edge dam assembly as in claim 1 or 4, comprising a pair of said assemblies, each for being mounted at an opposite end of the applicator chamber opening.

AMENDED CLAIMS

-10-

1 What is claimed is:

1. An improved edge dam assembly for use with an applicator for applying a coating liquid to a web of moving paper carried on a movable support, wherein the applicator is of a type having a body portion defining a chamber therein with an elongate opening thereto positionable generally below, adjacent to and transversely of the web, the chamber receiving coating liquid and directing the same generally upwardly through the opening and onto the web, said edge dam assembly comprising seal means at each end of the opening mountable in the opening generally below the web for sealing along side surfaces thereof with the body portion on opposite sides of the opening and for extending at upper surfaces thereof toward and closely adjacent to but spaced from the web for sealing therewith, each said seal means having a plurality of spaced grooves formed therein along said side and upper surfaces thereof, the interiors of said grooves being substantially at atmospheric pressure and said grooves in said upper surface extending generally along the direction of movement of the web thereat, whereby coating liquid seeping past said seal means enters and gravitates through said grooves.

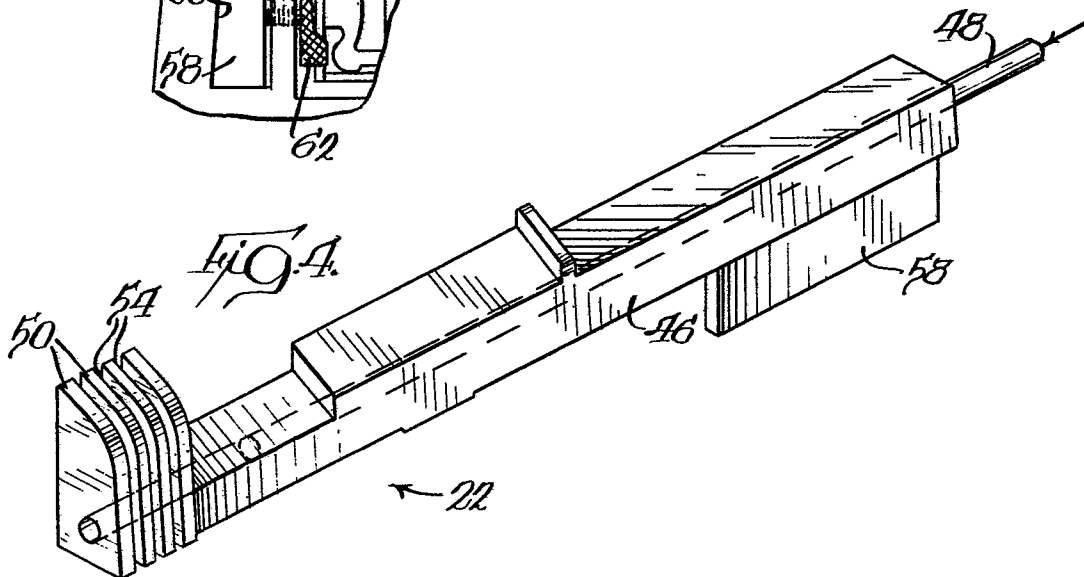
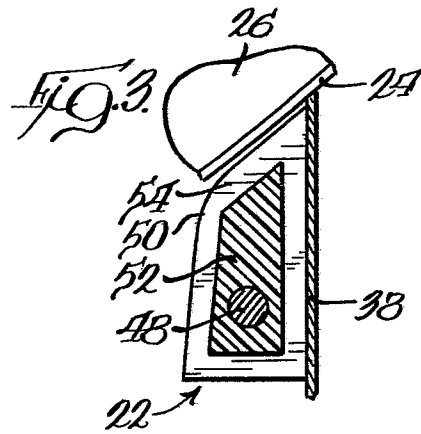
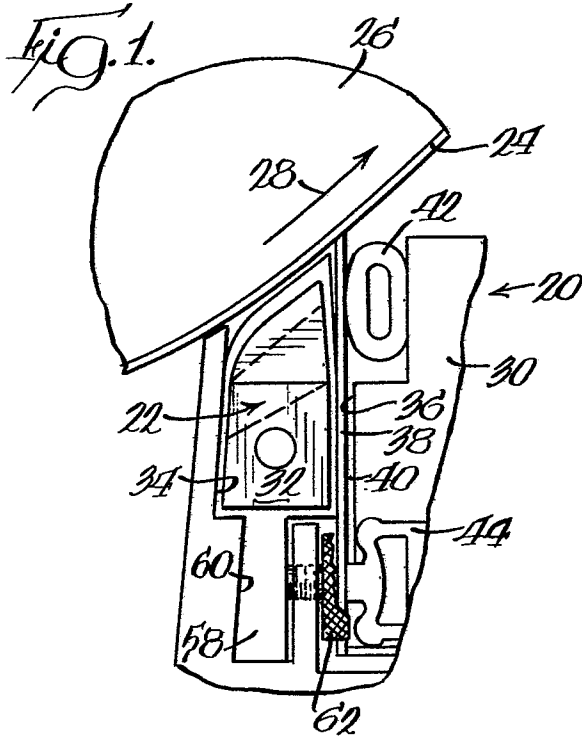
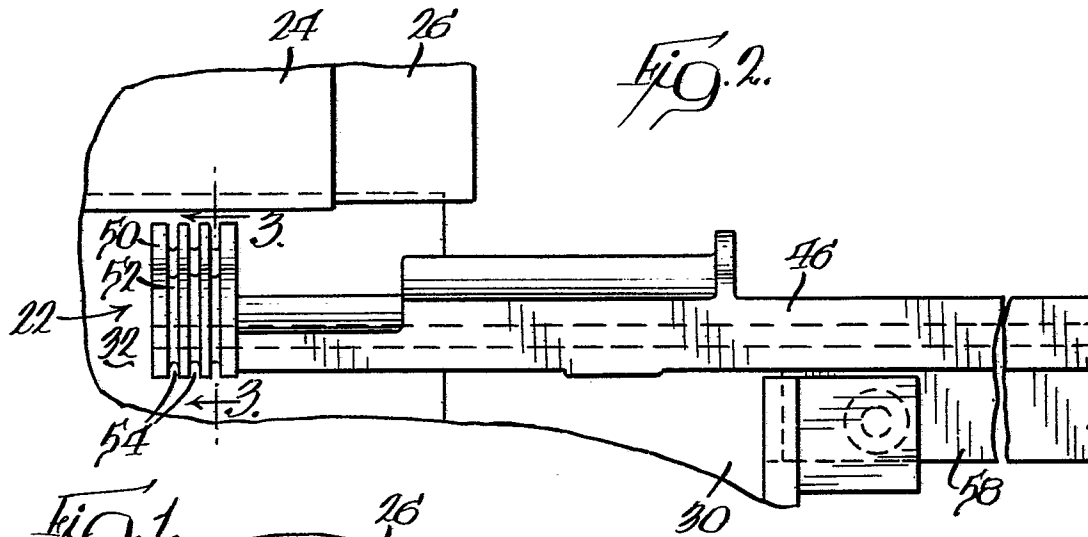
2. An improved edge dam assembly as in claim 1, wherein said side and upper surfaces of each said seal means define sealing surfaces on opposite sides of said grooves, said sealing surfaces of said top surface extending toward and closely adjacent to but spaced from the paper web or backing roll.

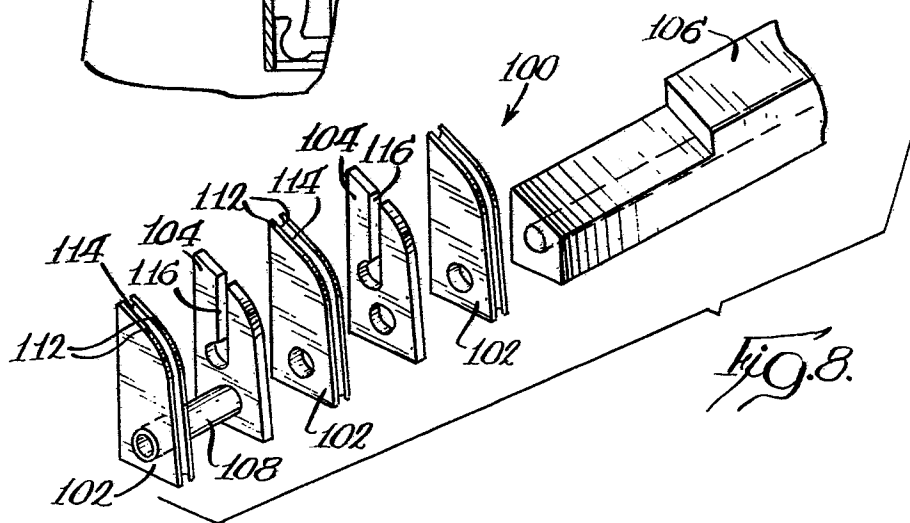
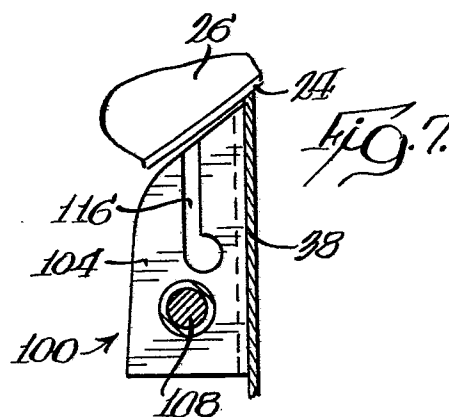
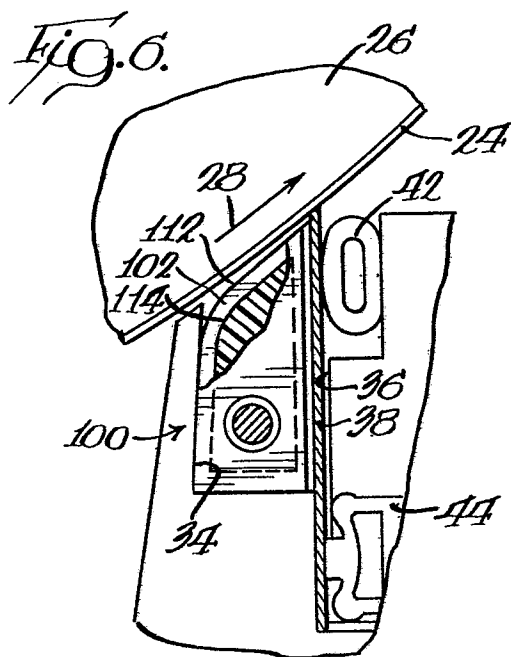
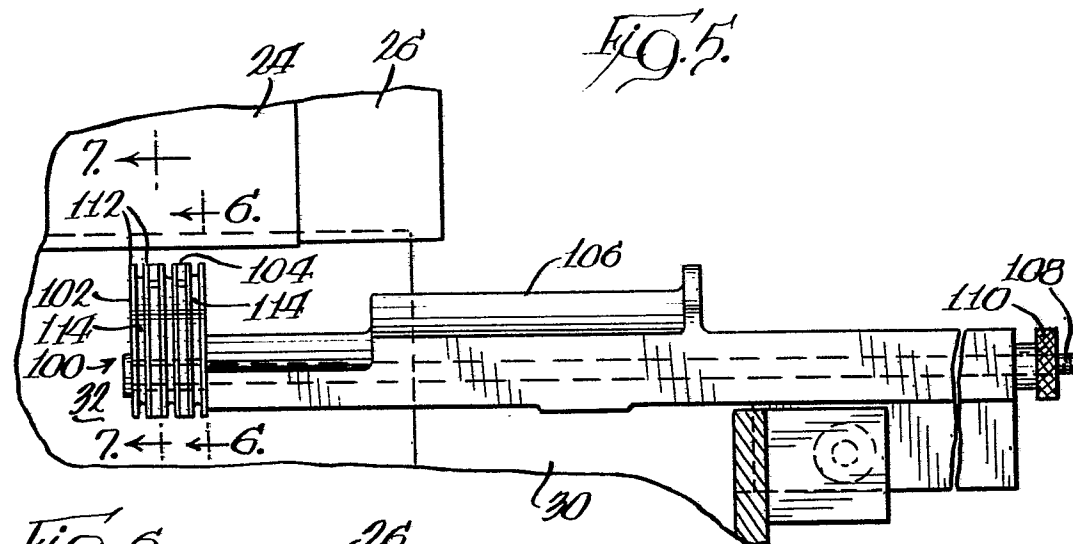
**AMENDED
CLAIMS**

-11-

- 1 3. An improved edge dam assembly as in claim 1,
 wherein said grooves lie in generally parallel planes.
4. An improved edge dam assembly as in claim 1, wherein
5 each said seal means comprises a plurality of
 generally planar first and second elements inter-
 leaved side by side to alternate said first and
 second elements, said first and second pluralities
10 of elements being dimensioned to form said plurality
 of spaced grooves.
5. An improved edge dam assembly as in claim 4, wherein
 said first and second elements lie in planes ex-
 tending generally parallel to the direction of move-
15 ment of the web.
6. An improved edge dam assembly as in claim 4 or 5,
 wherein each of said first elements has a peripheral
 groove in and along its upper and side surfaces and
20 sealing surfaces, on said upper surface on opposite
 sides of said groove, extending toward and closely
 adjacent to but spaced from the paper web.
7. An improved edge dam assembly as in claim 6, wherein
25 said second elements have surfaces for sealing with
 the body portions on opposite sides of the chamber
 opening.
8. An improved edge dam assembly as in claim 7, wherein
30 each of said second elements has an open ended notch
 extending from an edge thereof to a medial point
 therein in a direction generally along the body
 portions, and a width between the body portions which
 is greater than the spacing between the body portions,
35 said notch permitting compression of said second
 elements so that the same fit between and seal with
 the body portions.

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European Patent
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EUROPEAN SEARCH REPORT

Application number

EP 81 10 3064

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	US - A - 4 034 707 (E.S. HANSEN)		B 05 C 3/12 D 21 H 5/00 B 05 C 3/18
A	US - A - 4 250 211 (W.A. DAMRAU)		
A	GB - A - 1 166 862 (BRITAINS)		
A	US - A - 3 078 825 (J.P. MUNTUN) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 05 C 3/12 3/00 9/00 9/02 11/04 5/02 D 21 H 5/00 B 05 C 3/18
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family. corresponding document
<div style="display: flex; justify-content: space-between;"> <div> The present search report has been drawn up for all claims </div> <div> Place of search The Hague </div> <div> Date of completion of the search 23-12-1981 </div> <div> Examiner FRIDEN </div> </div>			