United States Patent [19]

Grenier

[11] **3,713,610**

[45] **Jan. 30, 1973**

[54] MOUNTING MEANS FOR FOIL-TYPE AND SIMILAR ELEMENTS

[75] Inventor: **John E. Grenier,** Cherry Valley, Mass.

[73] Assignee: **Lodding Engineering Company,** Auburn, Mass.

[22] Filed: **May 15, 1970**

[21] Appl. No.: **48,666**

Related U.S. Application Data

[62] Division of Ser. No. 722,960, April 22, 1968.

[52] **U.S. Cl.** **248/1,** 162/374, 254/104

[51] **Int. Cl.**.....**F16m 13/00**

[58] **Field of Search**.....248/285, 286, 287, 295, 298, 248/235, 245, 246, 412; 254/42, 104; 162/374

[56] **References Cited**

UNITED STATES PATENTS

2,852,222	9/1958	Bozar	248/295
3,165,440	1/1965	Jordansson	162/374 X
3,458,052	7/1969	Kann	248/245 X
2,223,680	12/1940	Fischer et al.	248/298 X

FOREIGN PATENTS OR APPLICATIONS

943,214	12/1963	Great Britain	248/245
280,021	7/1913	Germany	248/245

Primary Examiner—William H. Schultz

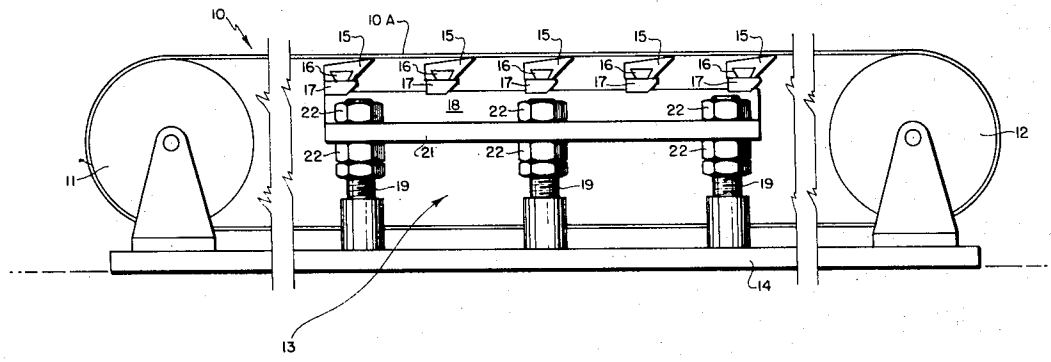
Attorney—Alfred H. Rosen

[57] **ABSTRACT**

The disclosure describes a support for a stationary drainage element for a paper machine extending across the Fourdrinier wire. The support comprises a flaring tenon for a dovetail slide incorporating means to adjust the distance between the flaring walls. The drainage element has a mortise slot for cooperating with the slide. The flare of the slide is adjusted by means of an actuator mounted at one end of the support.

This abstract is intended neither to define the invention of the application, which is to be measured by the claims, nor in any way to be limiting as to the scope of the invention.

9 Claims, 9 Drawing Figures



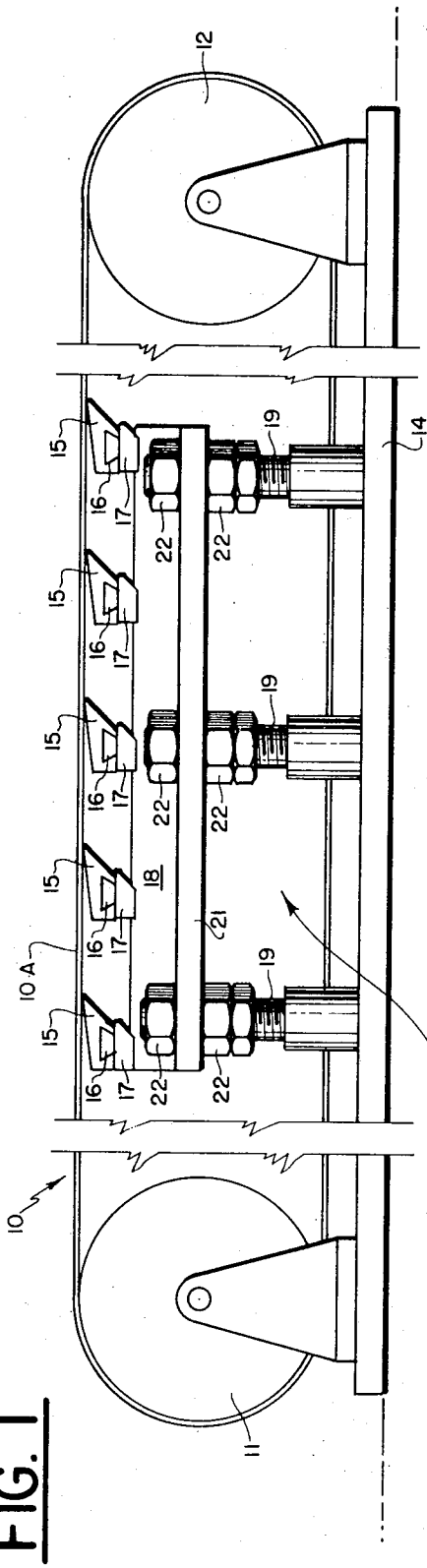


FIG. 1

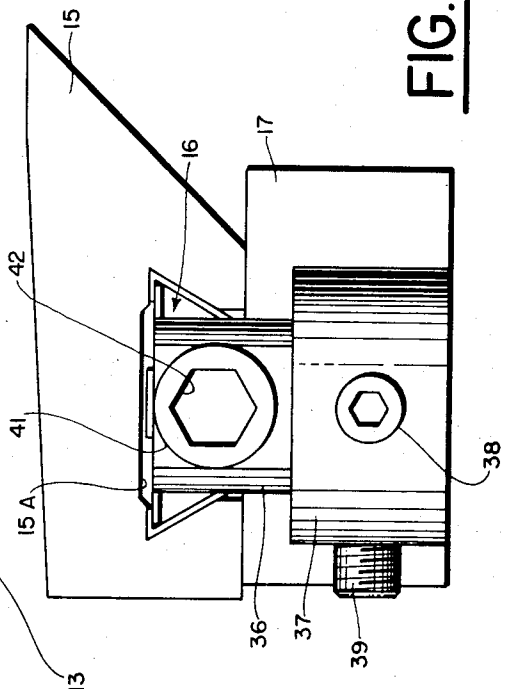
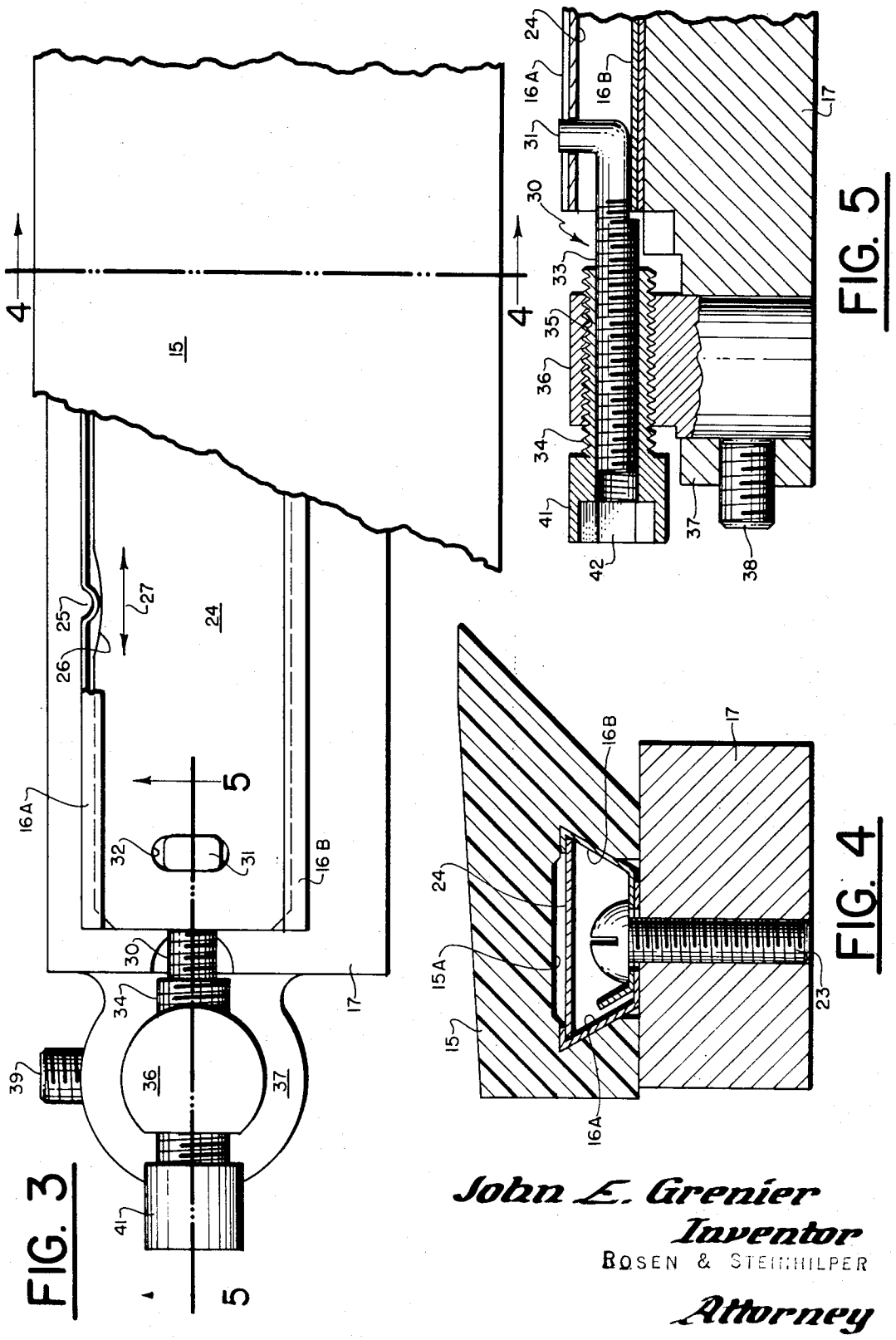


FIG. 2

John E. Grenier
Inventor

ROSEN & SICHNILPER
Attorney



John E. Grenier
Inventor
ROSEN & STEINHILPER
Attorney

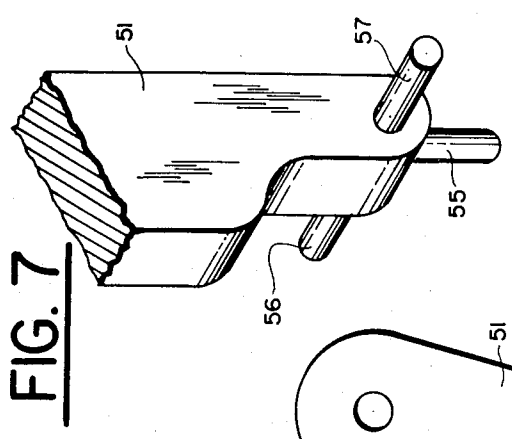


FIG. 7

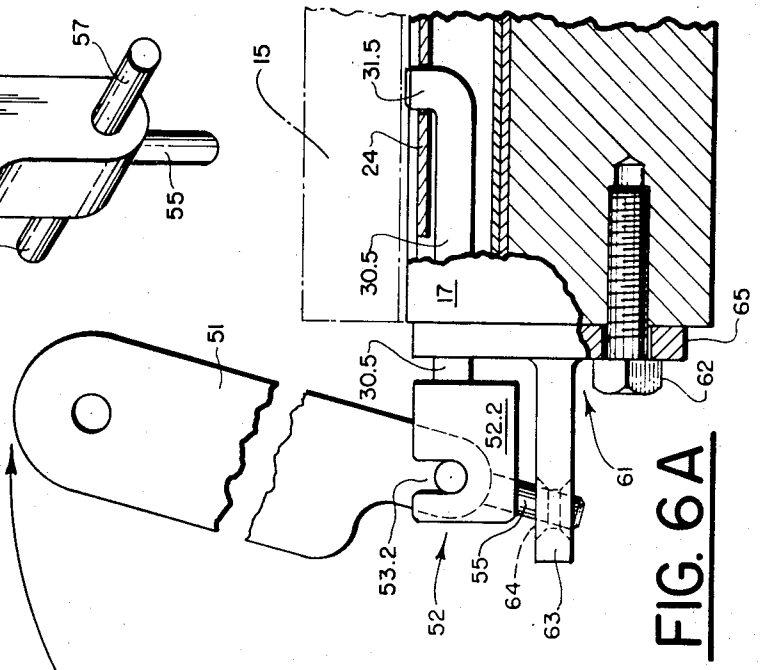


FIG. 6A

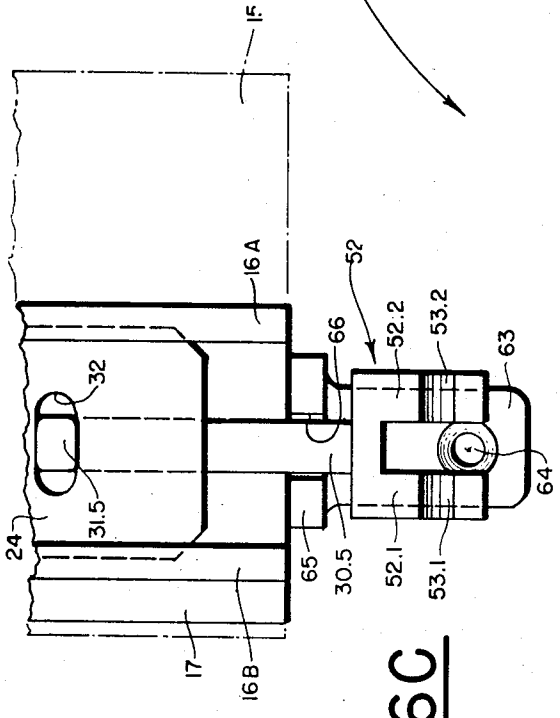


FIG. 6C

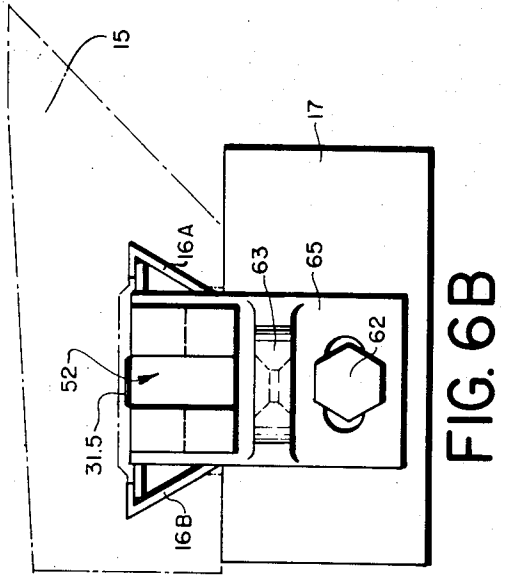


FIG. 6B

John E. Grenier
Inventor

ROSEN & STEINHILPER
Attorney

MOUNTING MEANS FOR FOIL-TYPE AND SIMILAR ELEMENTS

This is a division of application, Ser. No. 722,960 filed on Apr. 22, 1968.

BACKGROUND OF THE INVENTION

Foil-type drainage apparatus for paper-making machines involves one or more drainage elements disposed in fixed relationship to the Fourdrinier wire and extending across the machine transversely to the direction of wire travel. Depending on the width of the paper being made, the drainage elements can be as long as 30 feet, or more. Examples of two different types of such drainage elements are found, respectively, in U.S. Pat. Nos. 2,928,465 and 3,323,982. The element are subject to wear, and for this and other reasons it is desirable that they be exchangeable and hence removably mounted on supports. U.S. Pat. No. 3,165,440 proposes a solution incorporating a dovetail slide on the support and a mating mortise slot in the element for removal and installation of the element by sliding it lengthwise, across the direction of wire travel. The utility of this solution for exchanging elements while the machine is running is obvious, but the problem of maintaining a tight fit on the slide, without binding the element to it so tightly that it cannot be moved, limits the length of the foil element that can be mounted in this manner. Other solutions employing an adjustable gib, which can be tightened by one or more bolts to lock a long element in place on a dovetail tenon, can indeed hold a long (e.g.: 30 feet) element in place on its support, but obviously such solutions will not allow the element to be changed while the machine is operating. The problems of maintenance and replacement of these elements has been recognized in U.S. Pat. No. 3,337,394, which proposes a structure for mounting each element on a supporting rail in a slidably removable manner. This structure, however, relies on springs to take up slack between the tenon and the mortise slot, and does not positively lock the element in place on its support, or hold it rigidly against the forces presented to it by a Fourdrinier wire moving at high speed. There is need for a mounting structure for strip-shaped elements like drainage foils for Fourdrinier paper machines which will enable long elements to be mounted and removed while the machine is running, which will positively lock the element in place on its mounting, and which will readily release it for removal when desired.

SUMMARY OF THE INVENTION

The principal object of the invention is to provide in apparatus for paper-making machines having replaceable strip-shaped elements, such as foils, sealing ribs, wear strips and the like, a support for such elements on which the element can be locked in position, and when desired released and readily removed while the machine is in operation. Another object is to provide locking and releasing means which do not interfere with the removal or location of an element on its support. Another object is to provide a support incorporating locking and releasing means in a structure which is not complex or expensive to construct, which is durable and will retain its ability positively to lock and release without fatiguing over a long period of time, and which will not adversely affect the production of paper.

The invention contemplates, in general, the provision of a support or mounting means incorporating a dovetail slide having a flaring tenon and locking means within the tenon to alter the distance between at least a part of its flaring walls, and cooperating therewith a strip-shaped element having a mortise slot shaped to slide on the tenon, the slot being so dimensioned that when the locking means is in the locking position the tenon expands in the slot to bind the element firmly in place, and when the locking means is in the releasing position the tenon contracts so that the element slides loosely on it.

DESCRIPTION OF AN EXEMPLARY EMBODIMENT

The following description of an exemplary embodiment of the invention refers to the accompanying drawings, in which:

FIG. **1** is a side elevation showing the relationship between drainage apparatus incorporating the invention and the Fourdrinier wire of a paper-making machine;

FIG. **2** is an enlarged end view, in greater detail, of one of the drainage elements shown in FIG. **1**;

FIG. **3** is a plan view, partly broken away, of FIG. **2**, showing the locking and releasing mechanism;

FIG. **4** is a section on line **4—4** of FIG. **3**;

FIG. **5** is a section on line **5—5** of FIG. **3**;

FIG. **6** (A–C) shows an alternative operating mechanism for the locking and releasing mechanism; and

FIG. **7** is an isometric view of the operator used in the operating mechanism of FIG. **6**.

FIG. **1** schematically illustrates a paper-making machine of well-known form employing a Fourdrinier forming wire **10** which travels around rolls **11** and **12**. A drainage apparatus generally designated **13** is located beneath the upper run **10A** of the forming wire. The drainage apparatus is supported on the side rails of the machine, one of which is partially shown at **14**, and incorporates a plurality (in this example five) of drainage foils **15**, each of which is mounted on a dovetail slide **16**, which in turn is supported on a mounting rail **17**. The rails **17** are supported on one or more frames **18** (one of which is shown at an end of the drainage apparatus), and the entire apparatus is supported on the side rails **14** by means of threaded studs **19** mounted at one end thereon, and end flanges **21** (one only being shown) held in place on the studs by nuts **22**. It will be appreciated that the details of mounting drainage apparatus on a paper-making machine are not material to the invention, which is concerned only with securing a foil element **15** on its mounting rail **17** in a manner which firmly locks the element in place, and which allows the element to be unlocked and removed by sliding it lengthwise along the dovetail slide **16** while the machine is running and the forming wire **10A** is moving across the drainage apparatus. Reference is now made to FIGS. **2-5** which show these parts **15**, **16** and **17** in greater detail, together with other parts and components associated in combination with them.

The dovetail slide **16** is made of two elongated strips **16A** and **16B** of flexible material, such as stainless steel, which are fastened to the rail **17**, as by bolts **23**, of which one is shown in FIG. **4**. Each strip has a base, a

side wall bent from the base at an obtuse angle, and a flange at the far edge of the side wall, bent at an acute angle to the side wall so that it is approximately parallel to the base. The bases are apertured for passage of the bolts **23** and are bolted to the rail **17**, and the side walls flare outwardly from the base to the flanges. The flanges confront each other, and are spaced apart. A locking slide **24** is supported between the strips **16A** and **16B**, in the acute-angled corners formed between the side walls and the flanges of the respective strips. The locking slide is a sheet of flat stock, which may also be stainless steel. A plurality of indented dimples **25**, one of which is shown in FIG. **3**, are formed in the acute-angled corner of at least one of the strips **16A**, and the locking slide **24** has a plurality of inwardly curving cam edges **26** (one shown in FIG. **3**) along the edge confronting that corner, located to register with the dimples when the slide is in a first position for releasing the foil element **15**. When the locking slide **24** is moved lengthwise within the dovetail slide **16**, in either direction as represented by the double-headed arrow **27**, the cam edges push against the dimples and thereby increase the distance between the strips **16A** and **16B** in the vicinity of the flanges, or the wider portion of the dovetail slide. There is thus provided a flaring tenon for a dovetail slide having within it means for altering the distance between at least a portion of its side walls.

The drainage element **15** has a mortise slot **15A** which mates with the dovetail slide **16**. This slot is so dimensioned, relative to the slide, that when the locking slide is in the unlocked position (shown in FIG. **3**), the drainage element slides loosely on the tenon, and when the locking slide is in the locked position (not shown), the drainage element is tightly bound on the tenon, and hence on the rail **17**. A convenient mechanism for moving the locking slide between these two positions includes a key **30** having a finger **31** engaging an aperture **32** at one end of the locking slide **24**. The key has a threaded shaft **33** which runs in a threaded sleeve **34**, which in turn is mounted in a threaded bore **35** in a post **36** supported by bolts **38, 39** in a collar **37** mounted to an end of the rail **17**. The sleeve **34** has an enlarged end **41** with a keyhole **42** in it, for cooperation with a wrench to turn the sleeve and thereby move the key **30** in one of the directions of the double-headed arrow **27**. It will be seen that the entire operating mechanism described above is organized so that it can be made small enough to fit within the mortise slot **15A** of the foil element **15**, so that the element may slide on or off the dovetail slide **16** passing without interference over the operating mechanism for the locking slide **24**. This mechanism can be located at either end of the rail **17**, depending on which side of the paper-making machine has room to allow the removal or installation of the element **15**.

In FIG. **6** (A–C) the operating mechanism for the locking slide **24** employs a separate operator **51**, to pull or push on a key **30.5** having a finger **31.5** in the aperture **32**. The key has a bifurcated fitting **52** affixed to its end outside the tenon, the two arms of **52.1** and **52.2** of which have slots **53.1** and **53.2** collinearly disposed in one side of the fitting. A pivot-platform member **61** is affixed to the end of the rail **17** at which the key is located, as by a bolt **62**. This member has a pivot socket **64** in its pivot platform **63**, to receive a pivot pin **55** located at one end of the operator **51**. The pivot platform **63** is affixed to an upright member **65** which is bolted to the rail **17**, and which has a slot **66** in its top end, through which the shaft of the key **30.5** passes. The operator has a pair of fingers **56, 57** extending one from each side perpendicular to the pivot pin **55**, which respectively engage in the slots **53.1** and **53.2** of the arms **52.1** and **52.2** when the pivot pin is located in the pivot socket **64** and the operator **51** is positioned between the arms **52.1** and **52.2** of the bifurcated key fitting **52**. The pivot socket **64** is large enough to allow the pivot pin to pass through it, and is countersunk at both sides of the pivot platform **63**, to allow the pivot pin to be wobbled in the socket. The fingers **56** and **57** are cylindrical in cross section and can rotate in the slots **53.1** and **53.2**. Thus, one can engage the operator **51** in the pivot socket **64** and the slots **53.1** and **53.2** and, using the pivot pin **55** as a fulcrum, one can force the locking slide in either direction, lengthwise, within the dovetail slide **16** (i.e.: in either direction of the double-headed arrow **27**), to lock or unlock the drainage element **15**.

While the invention has been illustrated in connection with drainage foils, it is obviously not limited to that use. Thus, it is contemplated to use the invention in suction boxes, forming boards, felt conditioners, sealing ribs, and wear strips generally to cite but a few examples. Nor is the invention to be limited to the operating mechanism or other details illustrated or described in the exemplary embodiment. It will be obvious to those skilled in the art that changes and modifications can be made, and it is therefore intended to define the invention only in the appended claims.

I claim:

1. A flaring tenon for a dovetail slide having side walls which extend in a first direction and diverge transversely to said first direction from a narrow part to a wide part of said tenon, said side walls being made of sheet-form wall members in a position providing a first distance between them at said wide part, a base member and means mounting said wall members on said base member at said narrow part, adjusting cam means movable in said first direction within said wide part of said tenon and cooperating means on said tenon for engaging said cam means and thereby altering the distance between said members in the vicinity of said wide part when said cam means is moved in said first direction.

2. A flaring tenon for a dovetail slide having side walls which extend in a first direction and diverge transversely to said first direction from a narrow part to a wide part of said tenon, adjusting cam means slidable in said first direction within said tenon between said side walls and cooperating means on said tenon for engaging said cam means and thereby altering the distance between at least a portion of said side walls, actuating means located at one end of said tenon for sliding said adjusting cam means in said first direction within said tenon, the cross-section of said actuating means in a plane parallel to a transverse section of said tenon being smaller than said transverse section, so that a body having a mortise slot cooperating with said tenon can pass over said actuating means while sliding on said tenon.

3. A flaring tenon for a dovetail slide having side walls which extend in a first direction and diverge transversely to said first direction from a narrow part to a wide part of said tenon, said side walls being made of sheet-form wall members providing a first distance between them at said wide part, said wall members each having a flange extending toward the other, an elongated flat adjusting member disposed between said wall members with one of its long edges located in each of the corners formed by said wall members and said flanges for altering the distance between said side walls in the vicinity of said wide part, at least one of said long edges being a cam edge, and cooperating means on said tenon located to cooperate with said cam edge to spread said wall members apart when said flat member is moved in said first direction between said wall members.

4. A tenon according to claim 1 in which said adjusting means is a flat cam that is slidable in said first direction within said tenon between said side walls.

5. A tenon according to claim 4 including actuating means located at an end of said tenon for sliding said adjusting means within said tenon.

6. A tenon according to claim 1 in which said wall members are each made from a separate shallow V-shaped piece of flexible material having first and second flat portions, the first flat portions of each member being fixed to said base member, and the second flat portions extending from said base member flaring outwardly therefrom to form said tenon.

7. A tenon according to claim 2 in which said actuating means comprises a first element fixed relative to said tenon and a second element fixed relative to said adjusting means, and operator means to move said second element relative to said first element.

8. A tenon according to claim 7 in which said operator means is an elongated member fitted at one end for pivotal engagement with said first element and at a point intermediate its ends for pivotal engagement with said second element.

9. A tenon according to claim 3 in which at least one of said wall members is fitted with indentations in the region of said corner for cooperating with said cam edge.

* * * * *