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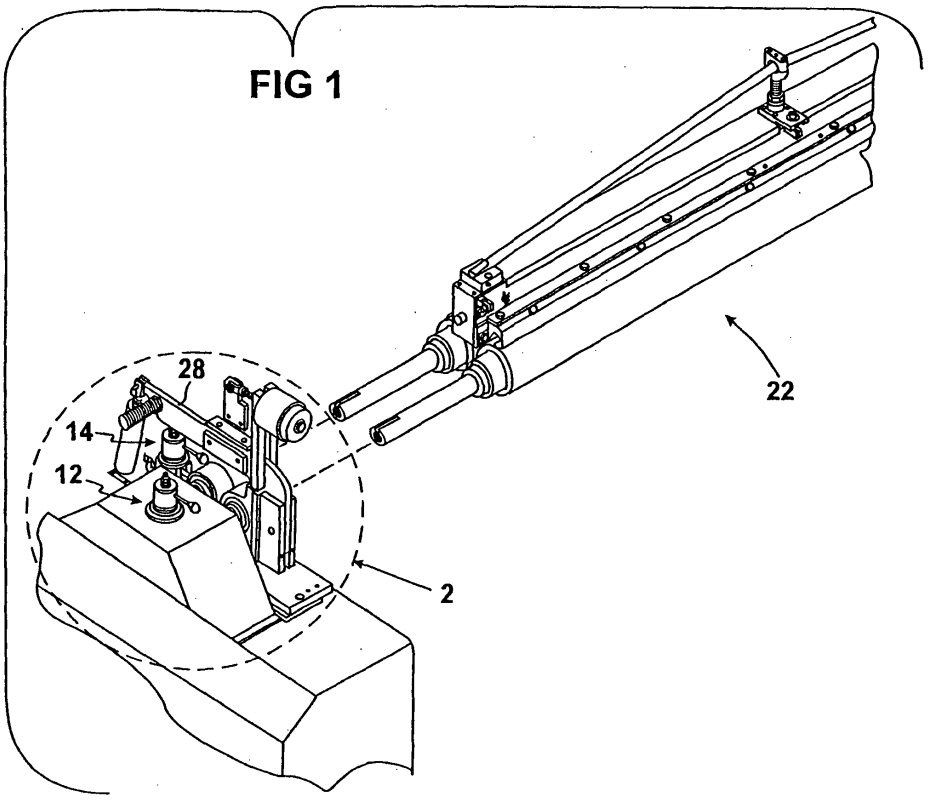
(54) **Apparatus for adjusting a compression zone in a compressive shrinking machine**

(57) Devices for adjusting positions of: a removable slip sheet (16) in a compression zone (18) defined by a pair of rollers (20) of an open width textile compressive shrinking machine (22) to adjust a size of the compression zone (18) for various thickness and types of textiles; a wedge (24) between the pair of rollers (20) for spacing apart the pair of rollers (20) a predetermined dimension; and a shoe (26) in the compression zone (18) for allowing for different thickness and types of textiles.

FIG 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention:

[0001] The present invention relates to an apparatus for controlling a compression zone in a compressively shrinking fabric web, more particularly, the present invention relates to an apparatus for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a upper shoe in the compression zone for allowing for different thickness and types of textiles.

Description of the prior Art:

[0002] The knitting industry uses, for manufacture of garments, various compacted knitted textile fabrics of different constructions, generally accepted as having been shrink-proofed.

[0003] For such compressive shrink-proofing, two-pass types of compactor have been in vogue; as disclosed in each of United States Patents 4,689,862 and 5,655,275; which compactors are typical of machines used for knitted fabric made of natural and./or man-made fibers. Although these compactors produce generally acceptable shrink-proofing results, they are temperamental and require frequent re-adjusting of their compression zones.

[0004] United States Patent 5,016,329 uses two stationary opposing blades to form a compression zone. A fabric being compacted is required to change direction abruptly on entering and exiting the compression zone. Applicant's GULL-WING brand compactor, disclosed in United States Patent 5,012,562, employs a compression zone consisting of an apex (or nadir) of a stationary notched shoe and an opposing impact blade with the fabric being compacted required to make a "V" turn in passing through a compression zone. Common to the prior art compactors presently used for shrink-proofing knitted textile fabrics is a requirement for an abrupt change of direction of fabrics due to an organized obstruction in their respective compression zones. The abrupt change of direction contributes to jamming, for example, at the apex of the GULL-WING brand compactor. A single-pass in-line compression zone taught by Applicant's U.S. Patent Number 6,681,461, whose disclosure is included herein by reference, eliminates the abrupt change of direction to render the compactor taught by Applicant's U.S. Patent Number 6,681 ,461 more operator-friendly, knit-friendly and produces trouble-free superior shrink-proofing on a wide variety of constructions of knitted textile fabrics and other fabrics having characteristics kindred to knitted textile fabrics.

[0005] Compressive shrink-proofing of knitted textile fabrics, formed from interlocked loops of yarns made usually of natural fibers or man-made fibers had its origin in shrink-proofing of woven textile fabric webs. With increased popularity of knitted garments, compressive shrink-proofing of knitted textile fabrics evolved from prior experience obtained by working with flat woven textile fabric webs. Woven textile fabrics webs are rectilinear grids of threads having longitudinal warp threads interwoven by transverse fill threads. Emphasis in compaction for shrink-proofing of woven textile fabric webs naturally focused on a need for longitudinal compression. The woven textile fabrics were, and are, manufactured in such continuous webs which inevitably get stretched lengthwise while being woven, transported, and processed. So it was, and is logical, convenient and effective to shrink compressively the woven fabric webs in a longitudinal direction along their flat continuous webs. However, knitted textile fabrics, like randomly deposited fabrics made of natural or man-made fibers, are neither formed nor structured similarly to woven textile fabrics.

[0006] Knitted textile fabrics, for example, are composed of yarns, usually of natural fibers, formed in interlocking curvilinear loops which are arranged in stitch rows sometimes aligned perpendicularly to and sometimes skewed from perpendicular orientations relative to alignment of their continuous webs.

[0007] The loops generally interlock with each other substantially at right angles (orthogonally) to their respective stitch row. It is sometimes convenient to visualize stitch rows ideally as being straight and aligned transversely relative to a longitudinal path of the fabric, like soldiers marching on parade through their compactor. Yet such an ideal image of stitch rows through a compactor rarely finds its counterpart in the real world. Knitted textile fabrics frequently are not designed with straight transverse stitch rows. Handling and treatment of knitted textile fabrics warp, bend, twist, and otherwise distort their stitch rows. Further, the stitch rows themselves are formed as a progression of repeating series of curvilinear loops of yarn. So as far as compacting of knitted textile fabrics is concerned, terms such as "straight" or "aligned" stitch rows are wishful euphemisms.

[0008] A loop of yarn in a knitted fabric actually exhibits behavior characteristics quite different from those that logically might be expected from an ideal image of stitch rows.

[0009] Applicant examined behavioral characteristics of actual knitted structures as they undergo compaction, so as to deal on their own terms with the loops and stitch rows as they actually exist.

[0010] The knitted textile fabrics, when composed of natural fibers, typically are manufactured in the form of continuous tubes which are then flattened and compacted in a longitudinal direction in analogous fashion to compacting of woven textile fabrics. Alternately, the knitted tubes may be split open, spread, and subjected to longi-

tudinal compacting as open webs. Knitted textile fabrics, with small loops or fine yarns making up the loops, require compaction as open webs. As has been noted herein, technology which evolved from compacting of woven textile fabric webs generally has achieved inconsistent success in treating knitted textile fabrics. Lack of consistent success has been common to compaction of knitted textile fabrics both as tubes and as open webs. Accordingly, some people look upon compressive shrinking of knitted fabrics as an occult art.

[0011] In actual knitted textile fabrics, we frequently can expect unreliable orientation (skewing) of stitch rows formed of interlocked yarn loops. And, alignment of the loops has been recognized by Applicant to occur orthogonally, each individual loop relative to its related skewed stitch row. Applicant's recognition, acceptance, and accommodation of the skewed orientation of the stitch rows and inherent behavior of the loops relative to their respective stitch rows are at the crux of Applicant's successful, consistent and reliable compacting of knitted textile fabrics and other similar fabrics made of natural and/or man-made fibers. It followed that organizing apparatus and a related method for freeing the interlocked loops of yarn to move easily, as they naturally choose, toward each other orthogonally relative to their skewed stitch rows, opened the door to Applicant's success.

[0012] Effective compressive shrink-proofing of knitted textile fabrics of natural fibers depends in part on expansion of heated and/or moistened yarn caused by partial unraveling of their fibers. Steam puffing and lubricating effects on natural yarn loops of knitted textile fabrics are discussed in Applicant's United States Patent 4, 447,938, whose disclosure is included herein by reference. Another reality of compaction is that the fabric reduces in volume by mechanical pushing of the interlocked loops of yarn preferably toward each other. Applicant's U.S. Patent Number 6,681,461 focuses on the mechanical pushing action.

[0013] The loops interlock generally at right angles (orthogonally), each relative to its related stitch row. With the stitch rows unreliably organized, and the yarn loops arranged orthogonally thereto, application of longitudinal compaction through a crimped, bent, kinked, or otherwise obstructed compression zone was effective along a series of longitudinal vectors from a continuum of points along a curvilinear loop of yarn. Simultaneously, a series of companion transverse vectors of any, or all, of the same points could thereby be either wasted or they could contribute to counterproductive stretching. Accordingly, a substantial portion of longitudinal compacting effort on knitted textile fabrics was self-defeating when performed though the crimped, bent, kinked, or otherwise obstructed compression zones of the prior art. By eliminating abrupt direction change, due to obstruction, as the web of knitted fabric passes through the compression zone, Applicant frees the loops, each to move according to its own natural preference, which Applicant recognized to be orthogonally relative to its related stitch row, unaffected by likely skewed orientations of the stitch rows that make up the web of knitted fabric.

[0014] Applicant had in Applicant's U.S. Patent Number 6,681,461 approached compacting of knitted textile fabrics by delivering and removing a confined web of the fabric, usually heated and/or moistened, through a substantially in-line compression zone wherein the loops of yarn of the fabric web, while expanding due to partial unraveling, are allowed to reduce in volume by the loops being pushed together, each according to its own natural preference orthogonally relative to a skewed axis of its respective stitch row. By eliminating crimps, bends, kinks, and other obstructions at the compression zone, Applicant avoided limiting the compacting effort to being only longitudinally directed relative to the fabric web and thus Applicant avoids the counterproductive stretching. Employing this approach, Applicant allowed the expanding loops to move as they choose according to inherent influences of their composition, history, and knitted structure in the easiest and most natural way they can find so as to each reduce its own volume. By this teaching, the direction of movement of the interlocked yarn loops is toward each other orthogonally relative to their respective stitch rows, independent of how bent, warped, twisted, or otherwise skewed those stitch rows may be.

[0015] Because of Applicant's novel, useful, and non-obvious approach, the apparatus taught by Applicant's U.S. Patent Number 6,681,461 is inexpensive to build, easy to operate, and more reliable than apparatuses of the prior art. He achieved operator-friendly, knit-friendly, superior and more reliable compaction of knitted textile fabrics and similar fabrics than has heretofore been achievable. His compactor contributed toward its goal by eliminating counterproductive tensions. He achieved his objective without polishing, crimping, or grabbing of the knitted fabric. Applicant's apparatus and related method for shrinking of knitted textile fabrics made of natural fibers taught by Applicant's U.S. Patent Number 6,681,461 also is applicable to fabrics made from man-made fabrics, non-woven textiles, papers, papers with additives, and the like; because their formations and structural characteristics are generally random and much more similar to those of knitted textile fabrics than they are to those of woven textile fabrics. Further, the invention taught by Applicant's U.S. Patent Number 6,681,461 was easily retrofittable into a wide variety of existing compressive shrink-proofing apparatuses. Single-station double-roller compressive shrinkproofing apparatuses are the most likely candidates for retrofitting.

[0016] Numerous other innovations for fabric shrinking related devices have been provided in the prior art. Even though these innovations may be suitable for the specific individual purposes to which they address, they each differ in structure and/or operation and/or purpose from the present invention since they do not teach devices for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width

textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles.

SUMMARY OF THE INVENTION

[0017] ACCORDINGLY, AN OBJECT of the present invention is to provide devices for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles that avoid the disadvantages of the prior art.

[0018] ANOTHER OBJECT of the present invention is to provide devices for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles that are simple to use.

[0019] BRIEFLY STATED, STILL ANOTHER OBJECT of the present invention is to provide devices for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles.

[0020] The novel features which are considered characteristic of the present invention are set forth in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of the specific embodiments when read and understood in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The figures of the drawing are briefly described as follows:

Figure 1 is an exploded diagrammatic perspective view of an open width textile compressive shrinking machine utilizing the devices of the present invention for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of the open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles;

Figure 2 is an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by **ARROW 2** in **FIGURE 1** of the devices of the present invention for adjusting the positions of: the removable slip sheet in the compression zone defined by the pair of rollers of the open width textile compressive shrinking machine to adjust the size of the compression zone for various thickness and types of textiles; the wedge between the pair of rollers for spacing apart the pair of rollers the predetermined dimension; and the shoe in the compression zone for allowing for different thickness and types of textiles;

Figure 3 is an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by **ARROW 3** in **FIGURE 2** of the device of the present invention for adjusting the position of the removable slip sheet in the compression zone defined by the pair of rollers of the open width textile compressive shrinking machine to adjust the size of the compression zone for various thickness and types of textiles;

Figure 4 is an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by **ARROW 4** in **FIGURE 3** of the removable slip sheet in the compression zone;

Figure 5 is an enlarged diagrammatic cross sectional view of the area generally enclosed by the dotted curve identified by **ARROW 5** in **FIGURE 2** of the device of the present invention for adjusting the position of the wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and

Figure 6 is an enlarged diagrammatic cross sectional view of the area generally enclosed by the dotted curve identified by **ARROW 6** in **FIGURE 2** of the device of the present invention for adjusting the position ofthe shoe in the compression zone for allowing for different thickness and types of textiles.

LIST OF REFERENCE NUMERALS UTILIZED IN THE DRAWINGS

[0022]

10 device for adjusting position of removable slip sheet 16 in compression zone 18 defined by pair of rollers 20 of open width textile compressive shrinking machine 22 to adjust size of compression zone 18 defined by pair of rollers 20 of open width textile compressive shrinking machine 22 for various thickness and types of textiles

12 device for adjusting position of wedge 24 between pair of rollers 20 of open width textile compressive shrinking machine 22 for spacing apart pair of rollers 20 of open

14 width textile compressive shrinking machine 22 predetermined dimension device for adjusting position of shoe 26 in compression zone 18 defined by pair of rollers 20 of open width textile compressive shrinking machine 22 for allowing for different thickness and types of textiles

16 removable slip sheet

18 compression zone defined by pair of rollers 20 of open width textile compressive

20 pair of rollers of open width textile compressive shrinking machine 22

22 open width textile compressive shrinking machine

24 wedge between pair of rollers 20 of open width textile compressive shrinking machine 22

26 shoe of open width textile compressive shrinking machine 22

28 pivotal arm of open width textile compressive shrinking machine 22

30 intermediate arm of open width textile compressive shrinking machine 22

32 inner side of intermediate arm 30 of open width textile compressive shrinking machine 22

34 top of intermediate arm 30 of open width textile compressive shrinking machine 22

36 bottom of intermediate arm 30 of open width textile compressive shrinking machine 22

38 bracket for having removable slip sheet 16 depend therefrom and for being movably mounted to intermediate arm 30 of open width textile compressive shrinking machine 22 so as to allow removable slip sheet 16 to move in compression zone 18 defined by pair of rollers 20 of open width textile compressive shrinking machine 22

40 body of bracket 38 for up and down movement on intermediate arm 30 of open width textile compressive shrinking machine 22

42 adjuster of bracket 38 for mounting to intermediate arm 30 of open width textile compressive shrinking machine 22

44 retainer of bracket 38 for having removable slip sheet 16 depend therefrom

46 upright portion of body 40 of bracket 38 for mounting to inner side 32 of intermediate arm 30 of open width textile compressive shrinking machine 22

48 pair of transverse portions of body 40 of bracket 38

50 threaded through bore through upper transverse portion of pair of transverse portions 48 of body 40 of bracket 38

52 plate of adjuster 42 of bracket 38 for affixing to top 34 of intermediate arm 30 of open width textile compressive shrinking machine 22

54 bolt of adjuster 42 of bracket 38

56 through bore through plate 52 of adjuster 42 of bracket 38

57 housing of retainer 44 of bracket 38 for abutting against inner side 32 of intennediate arm 30 of open width textile compressive shrinking machine 22

58 shaft of retainer 44 of bracket 38 for being as wide as removable slip sheet 16 and for capturing removable slip sheet 16 between itself and wall of downwardly tapering walls 66 defining cutout 64 in housing 57 of retainer 44 of bracket 38

60 bolt of retainer 44 of bracket 38

62 bottom of housing 57 of retainer 44 of bracket 38

64 cutout in housing 57 of retainer 44 of bracket 38 for having removable slip sheet 16 depend therefrom

65 bore in housing 57 of retainer 44 of bracket 38

66 downwardly tapering walls defining cutout 64 in housing 57 of retainer 44 of bracket 38

68 housing

70 shaft

72 inclined plane

74 handle

76 lower end of shaft 70 for having wedge 24 depend therefrom and move therewith

78 inner end of handle 74

80 spring around shaft 70

82 housing

84 shaft

86 inclined plane

88 handle

90 upper end of shaft 84 for having pivot arm 28 of open width textile compressive sluinking machine 22 stop thereupon

92 inner end of handle 88

94 spring of shaft 84

DETAILED DESCRIPTION OF THE INVENTION

[0023] Referring now to the figures, in which like numerals indicate like parts, and particularly to FIGURES 1 and 2, which are, respectively, an exploded diagrammatic perspective view of an open width textile compressive shrinking machine utilizing the devices of the present invention for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles; a wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension; and a shoe in the compression zone for allowing for different thickness and types of textiles, and, an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by ARROW 2 in FIGURE 1 of the devices of the present invention for adjusting the positions of: the removable slip sheet in the compression zone defined by the pair of rollers of the open width textile compressive shrinking machine to adjust the size of the compression zone for various thickness and types of textiles; the wedge between the pair of rollers for spacing apart the pair of rollers the predetermined dimension; and the shoe in the compression zone for allowing for different thickness and types of textiles, the devices of the present invention are shown generally at 10, 12, 14 for adjusting positions of: a removable slip sheet 16 in a compression zone 18 defined by a pair of rollers 20 of an open width textile compressive shrinking machine 22 to adjust size of the compression zone 18 for various thickness and types of textiles, a wedge 24 between the pair of rollers 20 for spacing apart the pair of rollers 20 a predetermined dimension, and a shoe 26 in the compression zone 18 for allowing for different thickness and types of textiles, respectively, wherein the shoe 26 moves with a pivotal arm 28 of the open width textile compressive shrinking machine 22, via an intermediate arm 30 of the open width textile compressive shrinking machine 22, and wherein the intermediate arm 30 has an inner side 32, a top 34, and a bottom 36.

[0024] The specific configuration of the device 10 for adjusting the position of the removable slip sheet 16 in the compression zone 18 defined by the pair of rollers 20 of the open width textile compressive shrinking machine 22 to adjust size of the compression zone 18 for various thickness and types of textiles can best be seen in FIGURES 3 and 4, which are, respectively, an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by ARROW 3 in FIGURE 2 of the device of the present invention for adjusting the position of the removable slip sheet in the compression zone defined by the pair of rollers of the open width textile compressive shrinking machine to adjust the size of the compression zone for various thickness and types of textiles, and, an enlarged diagrammatic side elevational view of the area generally enclosed by the dotted curve identified by ARROW 4 in FIGURE 3 of the removable slip sheet in the compression zone, and as such, will be discussed with reference thereto.

[0025] The device 10 comprises a bracket 38. The bracket 38 is for having the removable slip sheet 16 depend therefrom and for being movably mounted to the intermediate arm 30 so as to allow the removable slip sheet 16 to move in the compression zone 18.

[0026] The bracket 38 comprises a body 40, an adjuster 42, and a retainer 44. The body 40 of the bracket 38 is mounted for up and down movement on the intermediate arm 30. The adjuster 42 of the bracket 38 is for mounting to the intermediate arm 30 and is operatively connected to the body 40 of the bracket 38 so as to allow selectively movement of the body 40 of the bracket 38 up and down on the intermediate arm 30. The retainer 44 is for having the removable slip sheet 16 depend therefrom and is operatively connected to the body 40 of the bracket 38 so as to allow the removable slip sheet 16 to move in the compression zone 18 when the body 40 of the bracket 38 is moved by the adjuster 42 of the bracket 38.

[0027] The body 40 of the bracket 38 is substantially C-shaped, and as a result thereof, has an upright portion 46 and a pair of transverse portions 48. The upright portion 46 of the body of the bracket 38 is for-mounting to the inner side 32 of the intermediate arm 30. An upper transverse portion 48 of the body 40 of the bracket 38 is operatively connected to the adjuster 42 of the bracket 38, while a lower transverse portion 48 of the body 40 of the bracket 38 has the retainer 44 depend therefrom. The

upper transverse portion 48 of the body 40 of the bracket 38 has a threaded through bore 50 that extends axially therethrough,

[0028] The adjuster 42 of the bracket 38 comprises a plate 52 and a bolt 54. The plate 52 of the adjuster 42 is for affixing to the top 34 of the intermediate arm 30 and extends outwardly therefrom to above and over the upper transverse portion 48 of the body 40 of the bracket 38. The plate 52 of the adjuster 42 has a through bore 56 that extends axially therethrough and which is in alignment with the threaded through bore 50 in the upper transverse portion 48 of the body 40 of the bracket 38.

[0029] The bolt 54 of the adjuster 42 depends into the through bore 56 in the plate 52 of the adjuster 42 and threadably into the threaded through bore 50 in the upper transverse portion 48 of the body 40 of the bracket 38 so as to allow the body 40 of the bracket 38 to move up and down on the intermediate arm 30 when the bolt 54 of the adjuster 42 is rotated by virtue of the bolt 54 of the adjuster 42 threading into and out of the threaded through bore 50 in the upper transverse portion 48 of the body 40 of the bracket 38.

[0030] The retainer 44 of the bracket 38 comprises a housing 57, a shaft 58, and a bolt 60. The housing 57 depends from the lower transverse portion 48 of the body 40 of the bracket 38 and moves therewith, is for abutting against the inner side 32 of the intermediate arm 30, and has a bottom 62, a cutout 64, and a bore 65. The cutout 64 in the housing 57 of the retainer 44 is defined by downwardly tapering walls 66 which extend laterally therethrough. The cutout 64 in the housing 57 of the retainer 44 communicates with the bottom 62 of the housing 57 ofthe retainer 44 and is for having the removable slip sheet 16 depend therefrom. The bore 65 in the housing 57 of the retainer 44 extends therethrough, in line with and communicates with the cutout 64 in the housing 57 of the retainer 44.

[0031] The shaft 58 of the retainer 44 extends laterally and freely in the cutout 64 in the housing 57 of the retainer 44, is captured in the cutout 64 in the housing 57 of the retainer 44 by the downwardly tapering walls 66 in the housing 57 of the retainer 44, and is for being as wide as the removable slip sheet 16 and is for capturing the removable slip sheet 16 between itself and a wall of the downwardly tapering walls 66 in the housing 57 of the retainer 44.

[0032] The bolt 60 of the retainer 44 extends threadably in the bore 65 in the housing 57 of the retainer 44, and when tightened, abuts against and forces the shaft 58 of the retainer 44 against the downwardly tapering walls 66 of the cutout 64 in the housing 57 of the retainer 44 thereby trapping the removable slip sheet 16 between the shaft 58 of the retainer 44 and the wall of the downwardly tapering walls 66 in the housing 57 of the retainer 44.

[0033] The specific configuration of the device 12 for adjusting the position of the wedge 24 between the pair of rollers 20 of the open width textile compressive shrinking machine 22 for spacing apart the pair of rollers 20 a predetermined dimension can best be seen in FIGURE 5, which is an enlarged diagrammatic cross sectional view of the area generally enclosed by the dotted curve identified by ARROW 5 in FIGURE 2 of the device of the present invention for adjusting the position of the wedge between the pair of rollers for spacing apart the pair of rollers a predetermined dimension, and as such, will be discussed with reference thereto.

[0034] The device 12 comprises a housing 68, a shaft 70, an inclined plane 72, and a handle 74. The shaft 70 is mounted in the housing 68, moves up and down therewith, and has a lower end 76 for having the wedge 24 depend therefrom and move therewith.

[0035] The inclined plane 72 is contained in the housing 68. The housing 68 moves up and down relative to the inclined plane 72 and is affixed to the shaft 70. The handle 74 extends through the housing 68 and has an inner end 78 that engages the inclined plane 72. The housing 68, with the shaft 70 and the wedge 24 affixed thereto, is caused to move up and down when the handle 74 is rotated by virtue of the inclined plane 70 riding up and down along the inner end 78 of the handle 74.

[0036] The shaft 70 has a spring 80 therearound that is external to the housing 68 and which biases the inclined plane 72 against the handle 74.

[0037] The specific configuration for the device 14 for adjusting the position of the shoe 26 in the compression zone 18 for allowing for different thickness and types of textiles can best be seen in FIGURE 6, which is an enlarged diagrammatic cross sectional view of the area generally enclosed by the dotted curve identified by ARROW 6 in FIGURE 2 of the device of the present invention for adjusting the position of the shoe in the compression zone for allowing for different thickness and types of textiles, and as such, will be discussed with reference thereto.

[0038] The device 14 comprises a housing 82, a shaft 84, an inclined plane 86, and a handle 88. The shaft 84 is mounted in the housing 82, moves up and down therewith, and has an upper end 90 for having the pivot arm 28 stop thereupon.

[0039] The inclined plane 86 is contained in the housing 82. The housing 82 moves up and down relative to the inclined plane 86 and is affixed to the shaft 84. The handle 88 extends through the housing 82 and has an inner end 92 that engages the inclined plane 86. The housing 82, with the shaft 84 affixed thereto, is caused to move up and down when the handle 88 is rotated by virtue of the inclined plane 86 riding up and down along the inner end 92 of the handle 88.

[0040] The shaft 84 has a spring 94 there around that is external to the housing 82 and which biases the inclined plane 86 against the handle 88. It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

[0041] While the invention has been illustrated and de-

scribed as embodied in devices for adjusting positions of: a removable slip sheet in a compression zone defined by a pair of rollers of an open width textile compressive shrinking machine; a wedge between the pair of rollers; and a shoe in the compression zone, however, it is not limited to the details shown, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

[0042] Without further analysis, the foregoing _will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute characteristics of the generic or specific aspects of this invention.

[0043] The invention claimed is:

Claims

1. A device for adjusting a position of a removable slip sheet in a compression zone of an open width textile compressive shrinking machine to adjust a size of the compression zone for various thickness and types of textiles, wherein the compression zone is defined by a pair of rollers of the open width textile compressive shrinking machine, and wherein said device is for moving with a pivotal arm of the open width textile compressive shrinking machine, via an intermediate arm of the open width textile compressive shrinking machine, said device comprising:

a bracket;

wherein said bracket is for having the removable slip sheet depend therefrom and for being movably mounted to the intermediate arm so as to allow the removable slip sheet to move in the compression zone for various thickness and types of textiles.

2. The device as defined in claim 1, wherein said bracket comprises a body; wherein said bracket comprises an adjuster; and
wherein said bracket comprises a retainer.

3. The device as defined in claim 2, wherein said body of said bracket is for mounting for up and down movement on the intermediate arm.

4. The device as defined in claim 2, wherein said adjuster of said bracket is for mounting to the intermediate arm and is operatively connected to said body of said bracket for allowing selectively movement of said body of said bracket up and down on the intermediate arm.

5. The device as defined in claim 2, wherein said retainer is for having the removable slip sheet depend therefrom and is operatively connected to said body of said bracket for allowing the removable slip sheet to move in the compression zone when said body of said bracket is moved by said adjuster of said bracket.

6. The device as defined in claim 2, wherein said body of said bracket is substantially Cshaped.

7. The device as defined in claim 6, wherein said body of said bracket has an upright portion; and
wherein said body of said bracket has a pair of transverse portions.

8. The device as defined in claim 7, wherein the intermediate arm has an inner side;
wherein said upright portion of said body of said bracket is for mounting to the inner side of the intermediate arm and;
wherein an upper transverse portion of said body of said bracket is operatively connected to said adjuster of said bracket; and
wherein a lower transverse portion of said body of said bracket has said retainer depend therefrom.

9. The device as defined in claim 8, wherein said upper transverse portion of said body of said bracket has a threaded through bore; and
wherein said threaded through bore extends axially through said upper transverse portion of said body of said bracket.

10. The device as defined in claim 9, wherein said adjuster of said bracket comprises a plate; and
wherein said adjuster of said bracket comprises a bolt.

11. The device as defined in claim 10, wherein the intermediate arm has a top; wherein said plate of said adjuster is for affixing to the top of the intermediate arm;
wherein said plate of said adjuster is for extending outwardly from the top of the intermediate arm;
wherein said plate of said adjuster extends above said upper transverse portion of said body of said bracket; and
wherein said plate of said adjuster extends over said upper transverse portion of said body of said bracket.

12. The device as defined in claim 10, wherein said plate of said adjuster has a through bore; and
wherein said through bore extends axially through said plate of said adjuster.

13. The device as defined in claim 12, wherein said through bore through said plate of said adjuster is in

alignment with said threaded through bore in said upper transverse portion of said body of said bracket.

14. The device as defined in claim 12, wherein said bolt of said adjuster depends into said through bore in said plate of said adjuster and threadably into said threaded through bore in said upper transverse portion of said body of said bracket for allowing said body of said bracket to move up and down on the intermediate arm when said bolt of said adjuster is rotated by virtue of said bolt of said adjuster threading into and out of said threaded through bore in said upper transverse portion of said body of said bracket.

15. The device as defined in claim 10, wherein said retainer of said bracket comprises a housing;
wherein said retainer of said bracket comprises a shaft; and wherein said retainer of said bracket comprises a bolt.

16. The device as defined in claim 15, wherein said housing of said retainer depends from said lower transverse portion of said body of said bracket;
wherein said housing of said retainer moves with said lower transverse portion of said body of said bracket; and
wherein said housing of said retainer is for abutting against the inner side of the intennediate arm.

17. The device as defined in claim 15, wherein said housing of said retainer has a cutout; wherein said cutout in said housing of said retainer is defined by downwardly tapering walls; and
wherein said downwardly tapering walls extend laterally through said housing of said retainer.

18. The device as defined in claim 17, wherein said housing of said retainer has a bottom; wherein said cutout in said housing of said retainer communicates with said bottom of said housing of said retainer; and
wherein said cutout in said housing of said retainer is for having the removable slip sheet depend therefrom.

19. The device as defined in claim 17, wherein said housing of said retainer has a bore; wherein said bore in said housing of said retainer extends in line with said cutout in said housing of said retainer; and
wherein said bore in said housing of said retainer communicates with said cutout in said housing of said retainer.

20. The device as defined in claim 19, wherein said shaft of said retainer extends laterally in said cutout in said housing of said retainer;
wherein said shaft of said retainer extends freely in said cutout in said housing of said retainer;
wherein said shaft of said retainer is captured in said cutout in said housing of said retainer by said downwardly tapering walls of said cutout in said housing of said retainer;
wherein said shaft of said retainer is for capturing the removable slip sheet between itself and a wall of said downwardly tapering walls of said cutout in said housing of said retainer; and
wherein said shaft of said retainer is for being as wide as the removable slip sheet.

21. The device as defined in claim 20, wherein said bolt of said retainer extends threadably in said bore in said housing of said retainer; and
wherein said bolt of said retainer abuts against and forces said shaft of said retainer against said downwardly tapering walls of said cutout in said housing of said retainer thereby trapping the removable slip sheet between said shaft of said retainer and said wall of said downwardly tapering walls of said cutout in said housing of said retainer when said bolt of said retainer is tightened.

22. A device for adjusting a position of a wedge between a pair of rollers of an open width textile compressive shrinking machine for spacing apart the pair of rollers a predetermined dimension, said device comprising:

a) a housing;
b) a shaft;
c) an inclined plane; and
d) a handle;

wherein said shaft is mounted in said housing;
wherein said shaft moves up and down with said housing;
wherein said shaft is for having the wedge depend therefrom; wherein said shaft is for having the wedge move therewith;
wherein said inclined plane is contained in said housing;
wherein said housing moves up and down relative to said inclined plane;
wherein said housing is affixed to said shaft; wherein said handle engages said inclined plane; and
wherein said housing, with said shaft and the wedge affixed thereto, is caused to move up and down when said handle is rotated by virtue of said inclined plane riding up and down along said handle and thereby allowing the wedge to space apart the pair of rollers the predetermined dimension.

23. The device as defined in claim 22, wherein said shaft has a spring therearound;
wherein said spring is external to said housing; and
wherein said spring biases said inclined plane against said handle

24. The device as defined in claim 22, wherein said shaft

has a lower end;
wherein said lower end of said shaft is for having the wedge depend therefrom; and wherein said lower end of said shaft is for having the wedge move therewith.

25. The device as defined in claim 22, wherein said handle has an inner end; and
wherein said inner end of said handle engages said inclined plane.

26. The device as defined in claim 22, wherein said handle extends through said housing.

27. A device for adjusting a position of a shoe of an open width textile compressive shrinking machine in a compression zone of the open width textile compressive shrinking machine for allowing for different thickness and types of textiles, wherein said device is for forming a stop for a pivotal arm of the open width textile compressive shrinking machine from which the shoe depends, via an intermediate arm of the open width textile compressive shrinking machine, said device comprising:

a) a housing
b) a shaft
c) an inclined plane and
d) a handle;

wherein said shaft is mounted in said housing;
wherein said shaft moves up and down with said housing;
wherein said shaft is for having the pivotal arm stop thereupon;
wherein said inclined plane is contained in said housing;
wherein said housing moves up and down relative to said inclined plane; wherein said housing is affixed to said shaft;
wherein said handle engages said inclined plane; and
wherein said housing, with said shaft affixed thereto, is caused to move up and down when said handle is rotated by virtue of said inclined plane riding up and down along said handle and thereby allowing said shaft to form a stop for the pivotal arm and thereby adjust the position ofthe shoe of the open width textile compressive shrinking machine in the compression zone of the open of the width textile compressive shrinking machine for allowing for different thickness and types of textiles.

28. The device as defined in claim 27, wherein said shaft has a spring therearound; wherein said spring is external to said housing; and
wherein said spring biases said inclined plane against said handle

29. The device as defined in claim 27, wherein said shaft has an upper end; and wherein said upper end of said shaft is for having the pivotal arm stop thereupon.

30. The device as defined in claim 27, wherein said handle has an inner end; and wherein said inner end of said handle engages said inclined plane.

31. The device as defined in claim 27, wherein said handle extends through said housing.

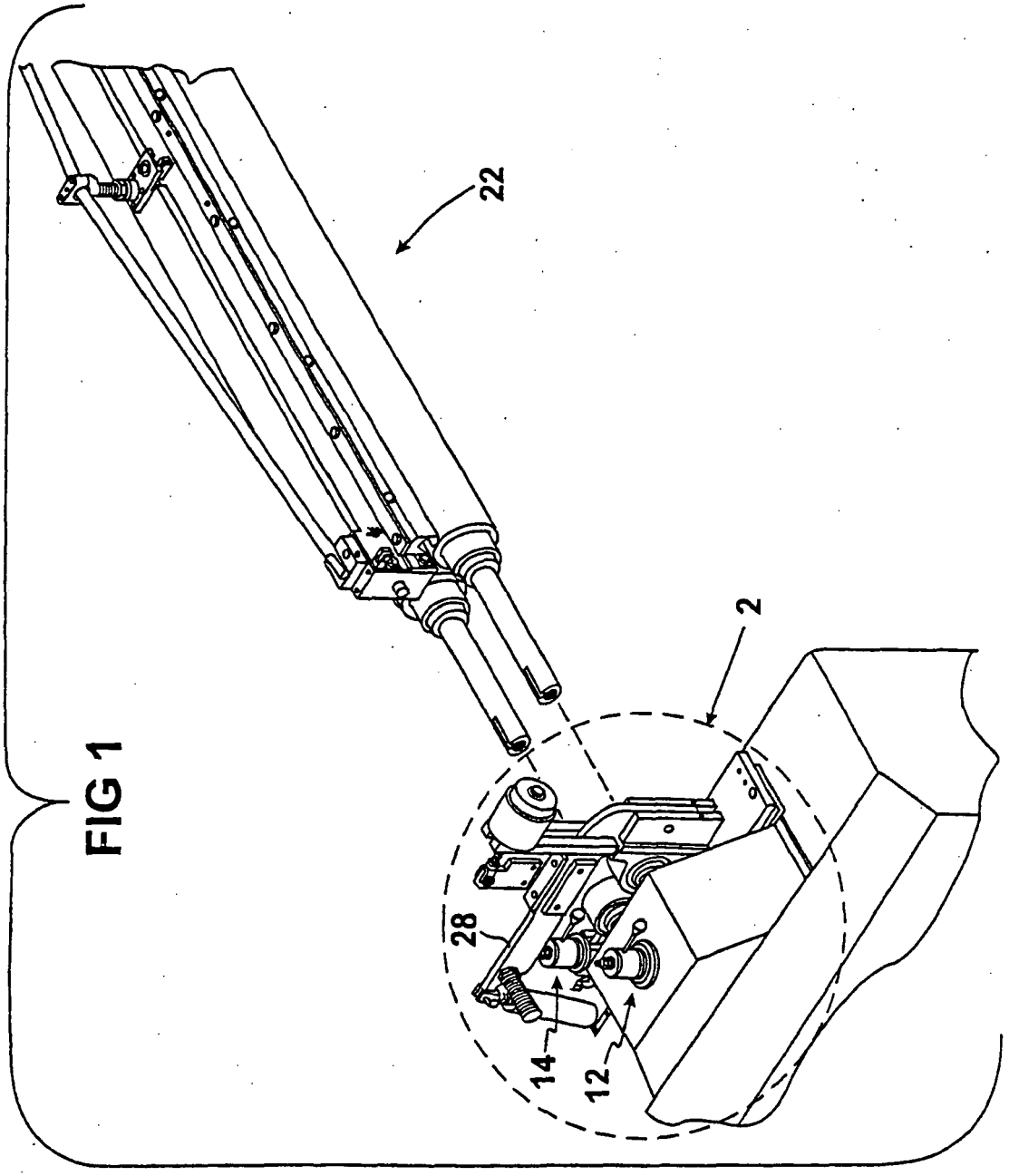

FIG 1

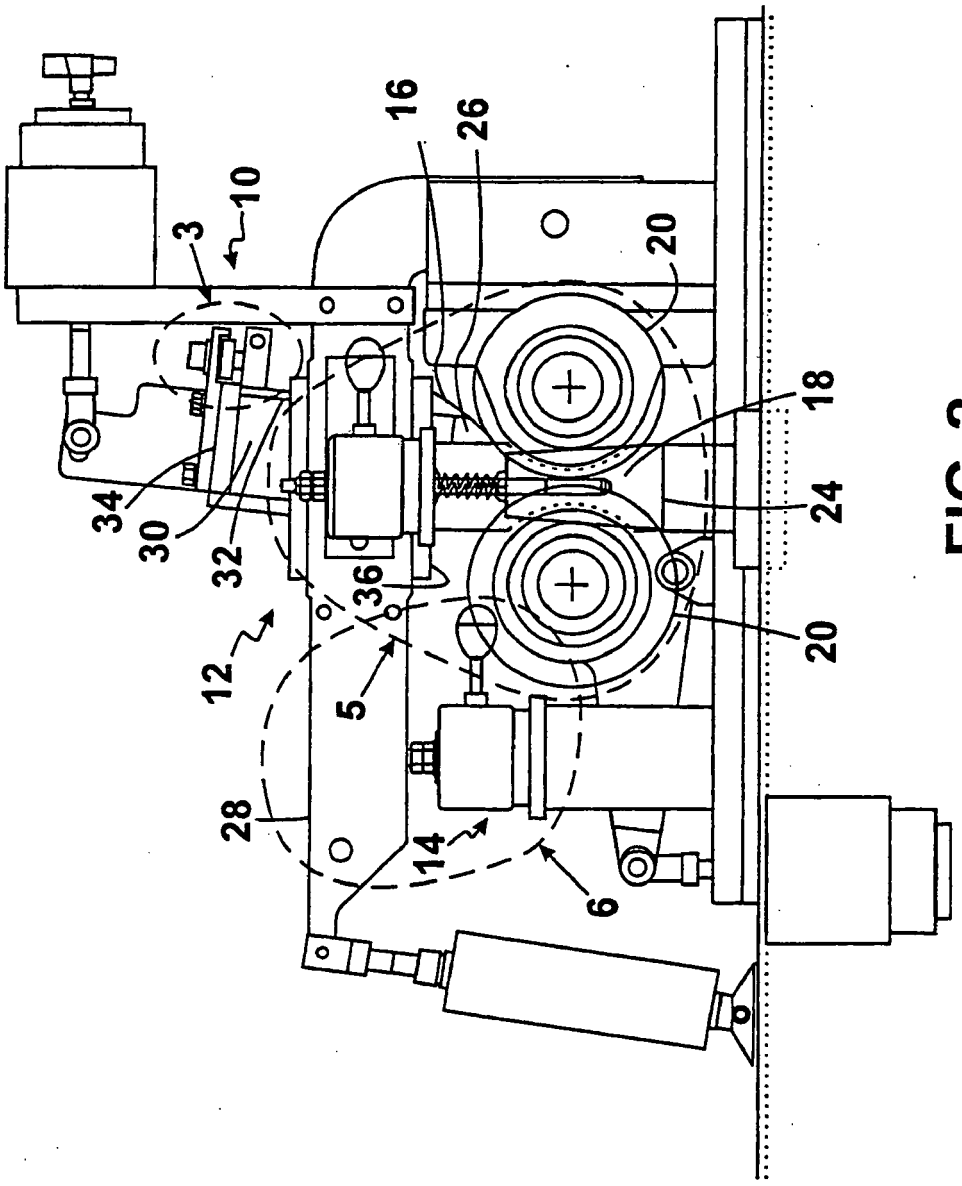

FIG. 2

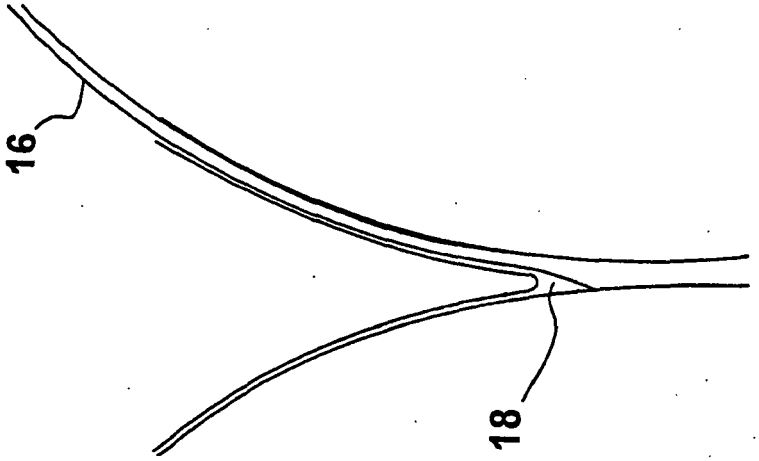
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FIG. 4

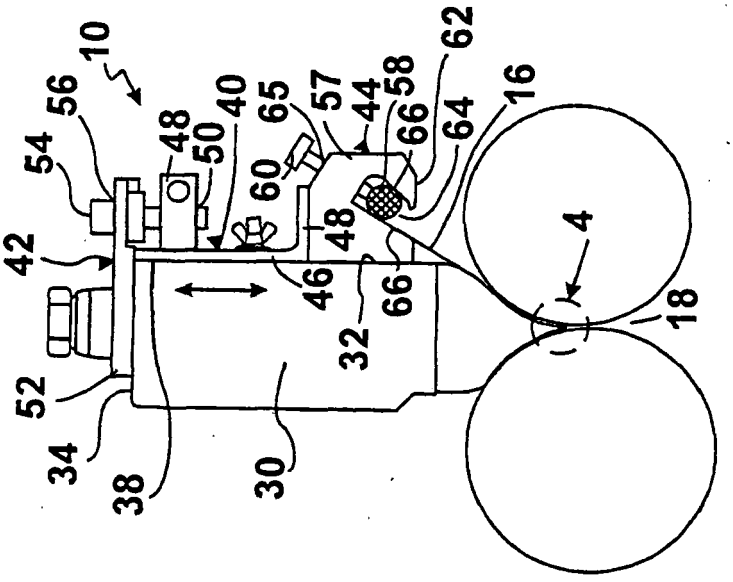
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FIG. 3

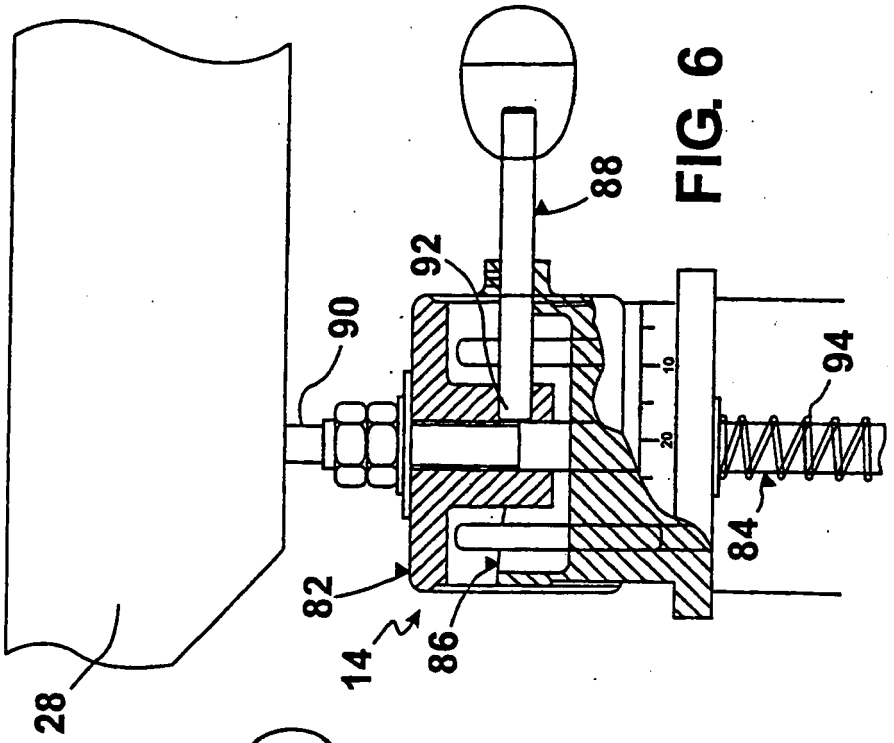

FIG. 6

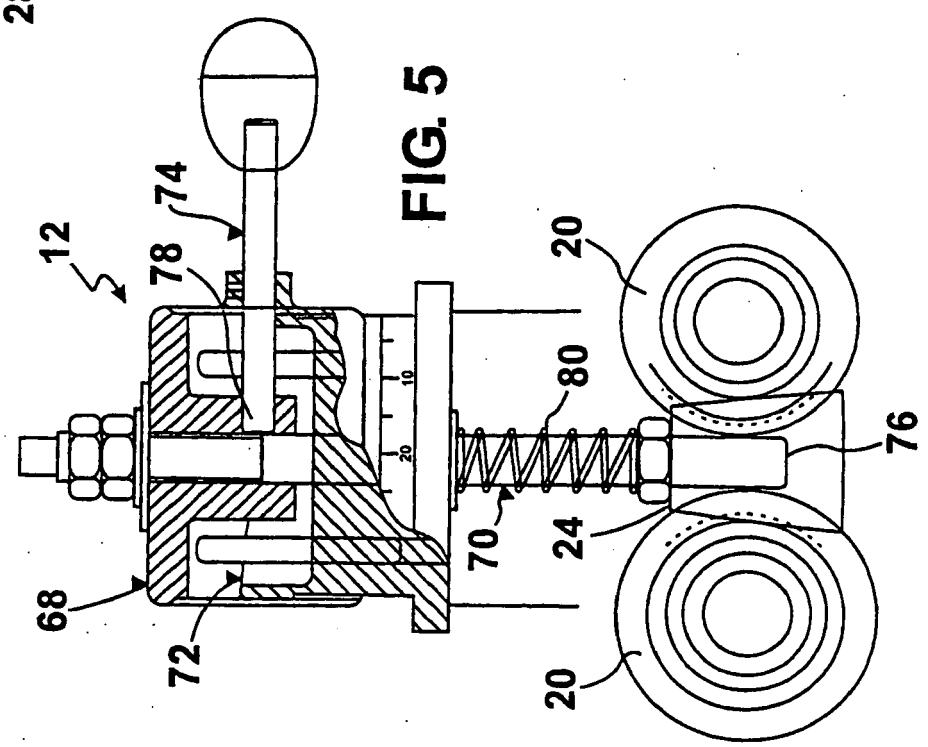

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 00 5347

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/053603 A1 (F. CATALLO; U. SEIDEL) 16 March 2006 (2006-03-16) * claims 1-31 *	1-31	INV. D06C21/00

TECHNICAL FIELDS SEARCHED (IPC)

D06C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 July 2007	Goodall, Colin

CATEGORY OF CITED DOCUMENTS

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30-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006053603 A1	16-03-2006	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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