US 20220169468A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0169468 A1**

COUSINS et al. (43) **Pub. Date: Jun. 2, 2022**

(54) **STRETCH WRAP FILM CARRIAGE**

(71) Applicants: **Neil G. COUSINS**, Tottenham (CA); **Srbislav Z. DAVIDOVIC**, Oakville (CA)

(72) Inventors: **Neil G. COUSINS**, Tottenham (CA); **Srbislav Z. DAVIDOVIC**, Oakville (CA)

(21) Appl. No.: **17/106,622**

(22) Filed: **Nov. 30, 2020**

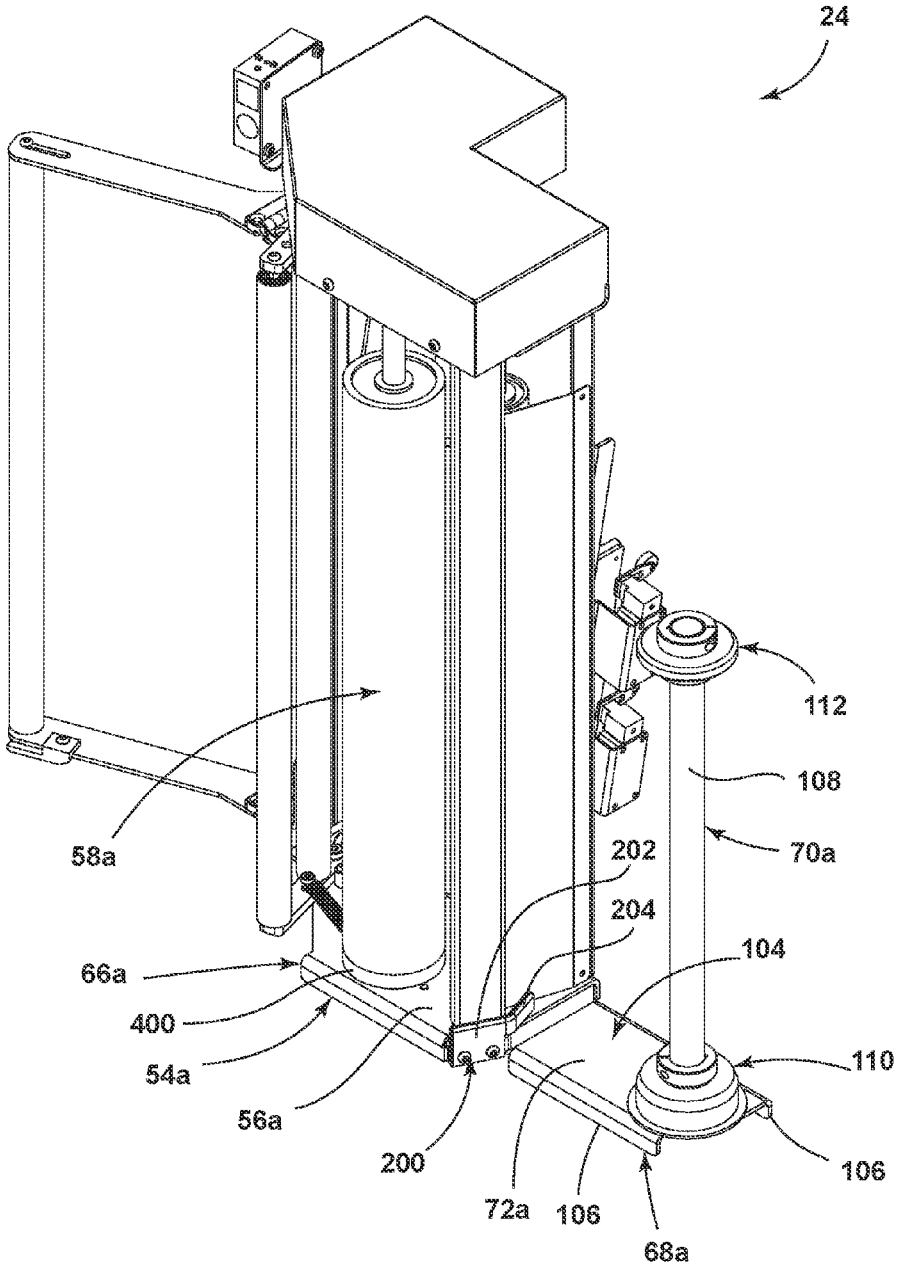
Publication Classification

(51) **Int. Cl.**
B65H 23/182 (2006.01)
B65B 11/02 (2006.01)

(52) **U.S. Cl.**
CPC ***B65H 23/1825*** (2013.01); *B65B 2011/002* (2013.01); ***B65B 11/025*** (2013.01)

(57) **ABSTRACT**

A carriage for a stretch wrap assembly including a base, a top housing, and a pre-stretch assembly. A bottom portion of the film is formed into a roped or creased portion between an area wherein the film leaves a roll of stretch wrap and the pre-stretch assembly.



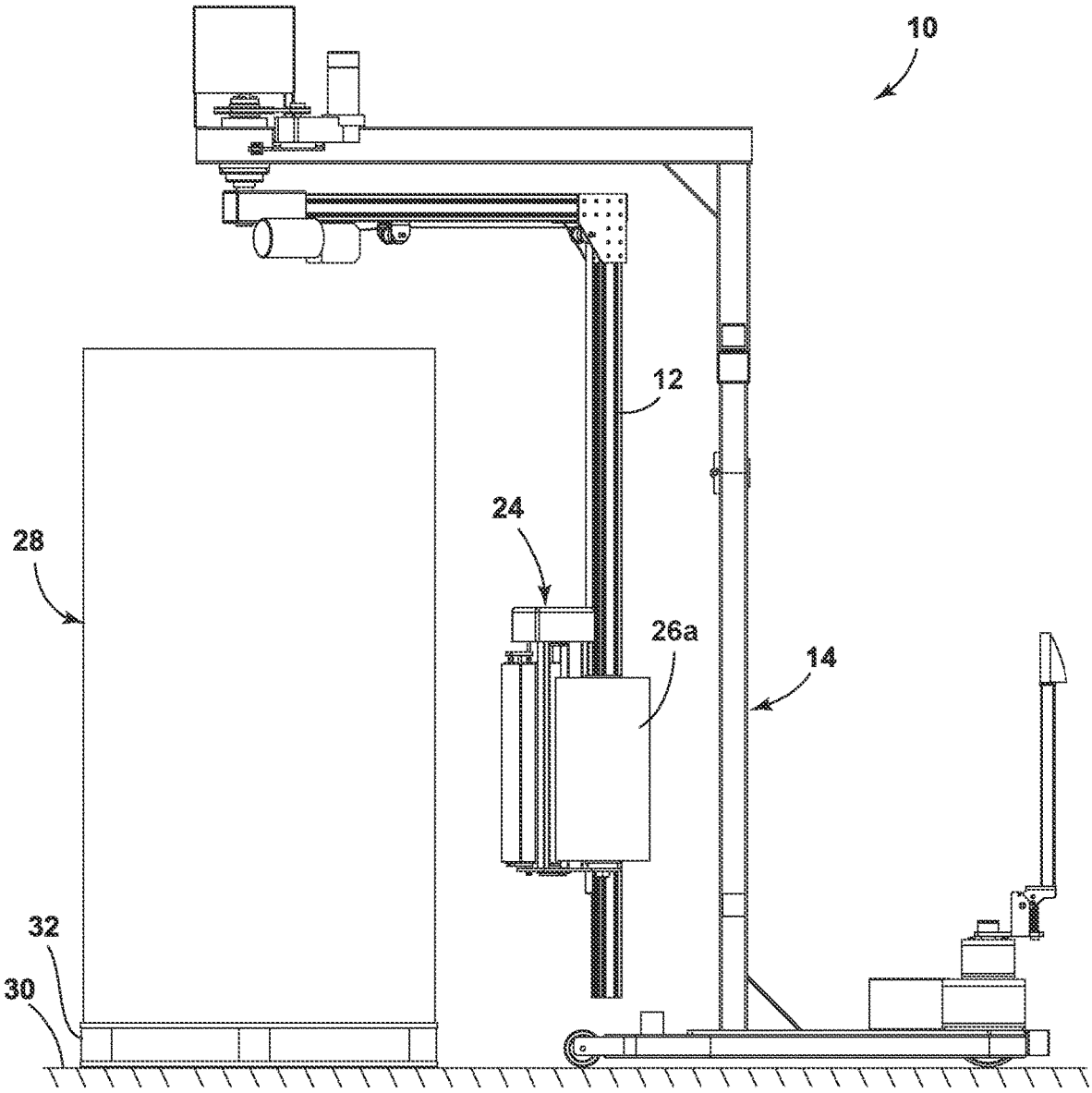


FIG. 1

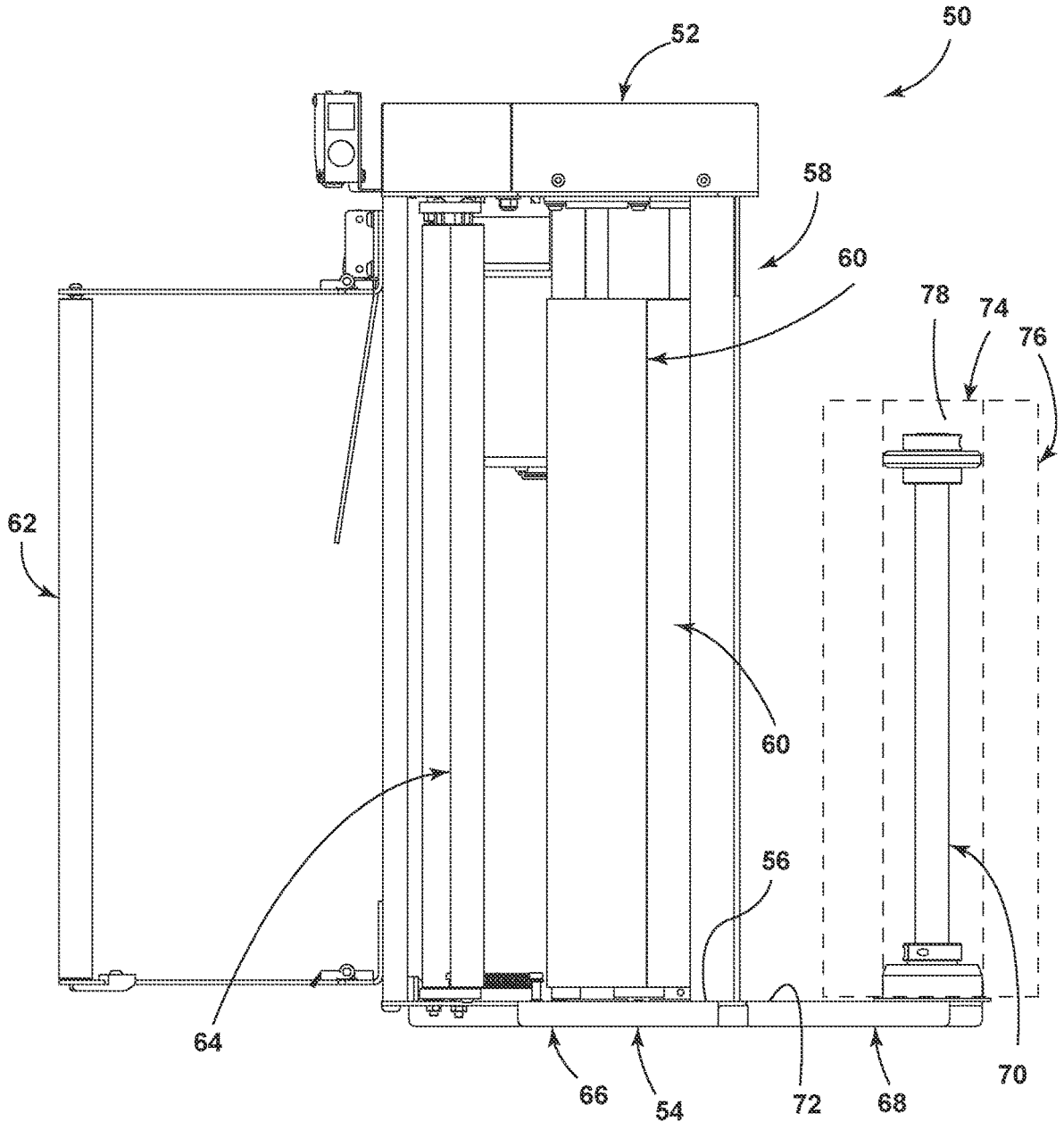


FIG. 2 (PRIOR ART)

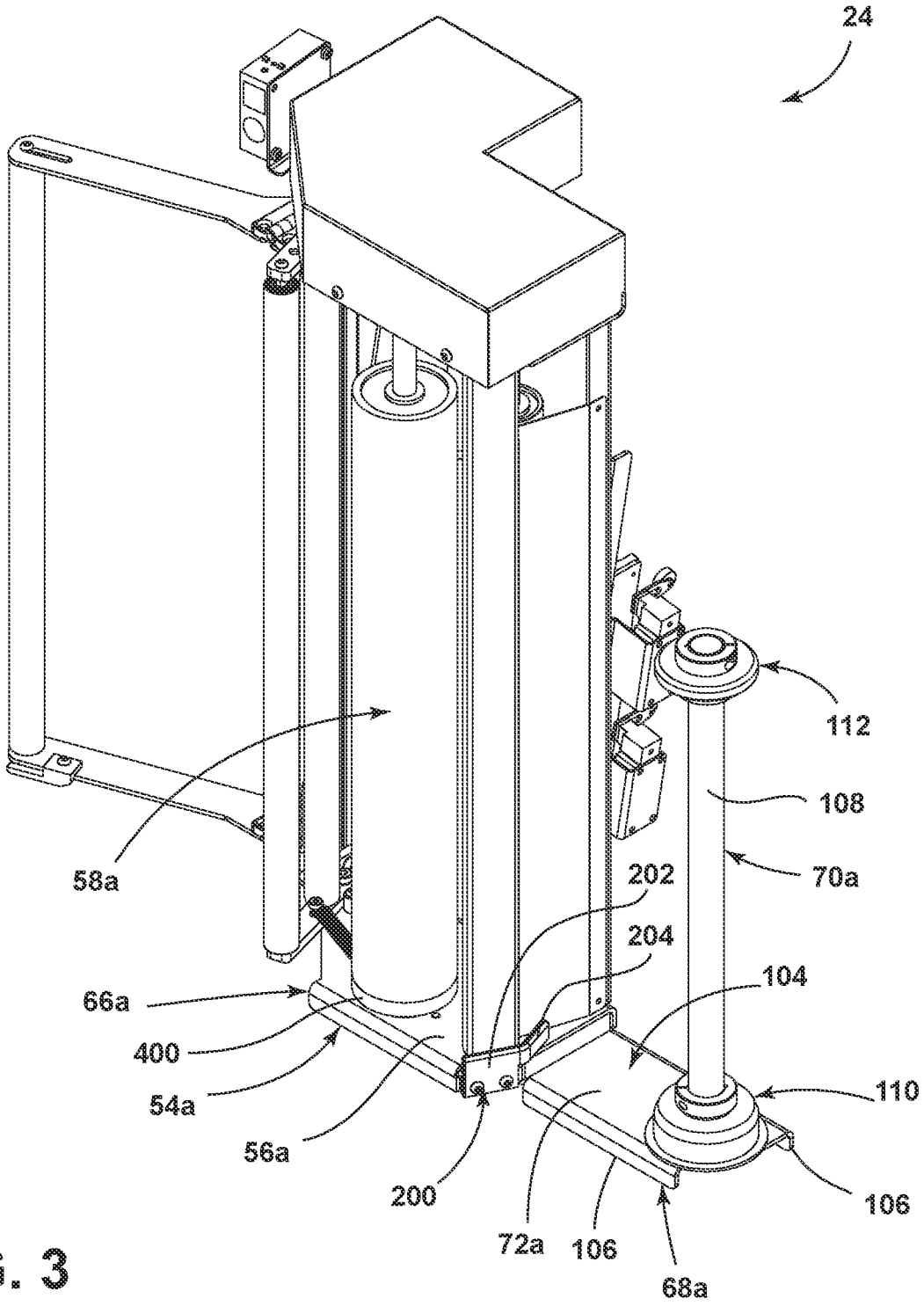

24
112
108
70a
58a
202
204
104
66a
400
54a
56a
110
200
72a
106
106
68a

FIG. 3

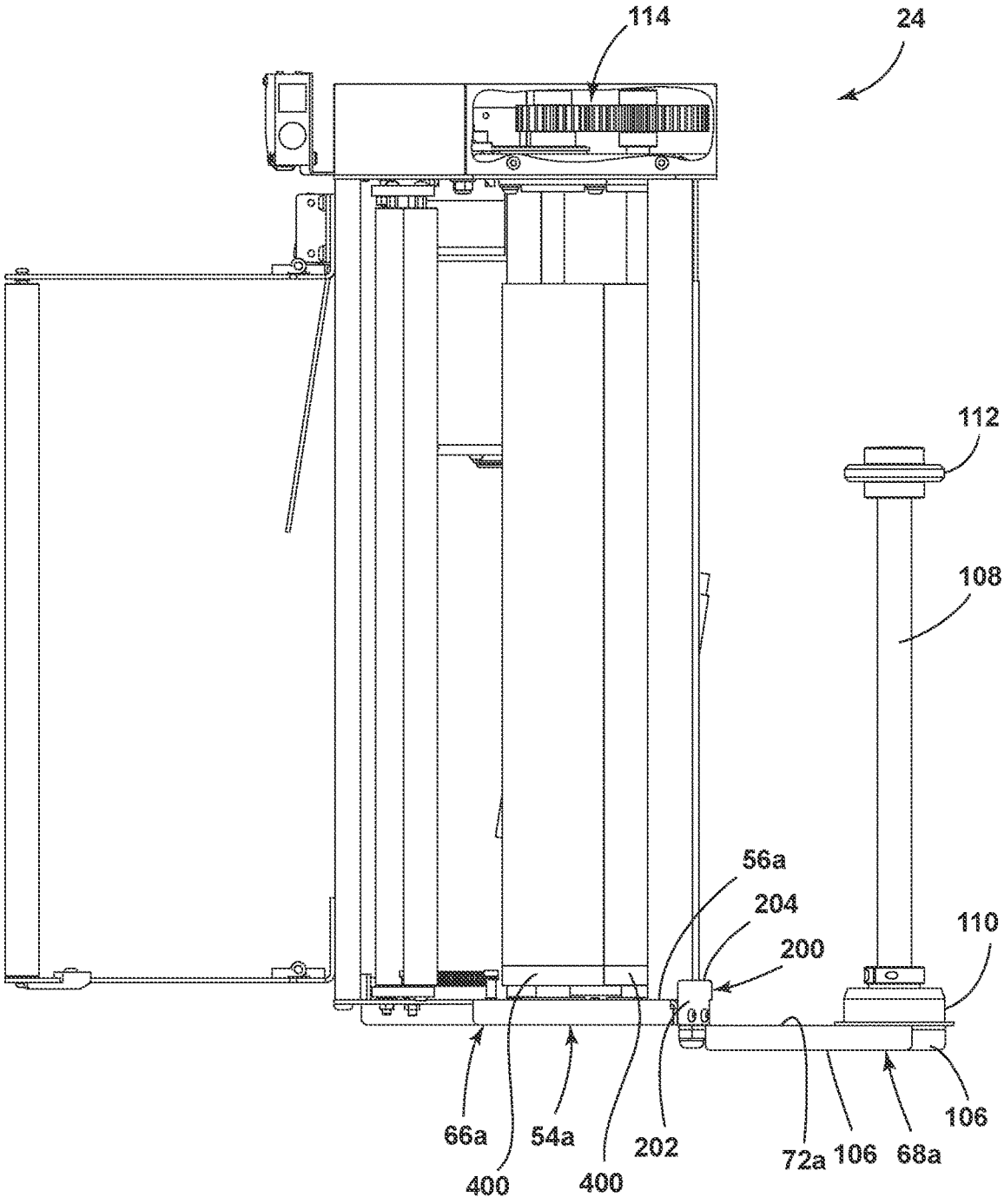

114
24
112
108
56a
204
200
110
66a
54a
202
106
400
400
72a
106
68a
106

FIG. 4

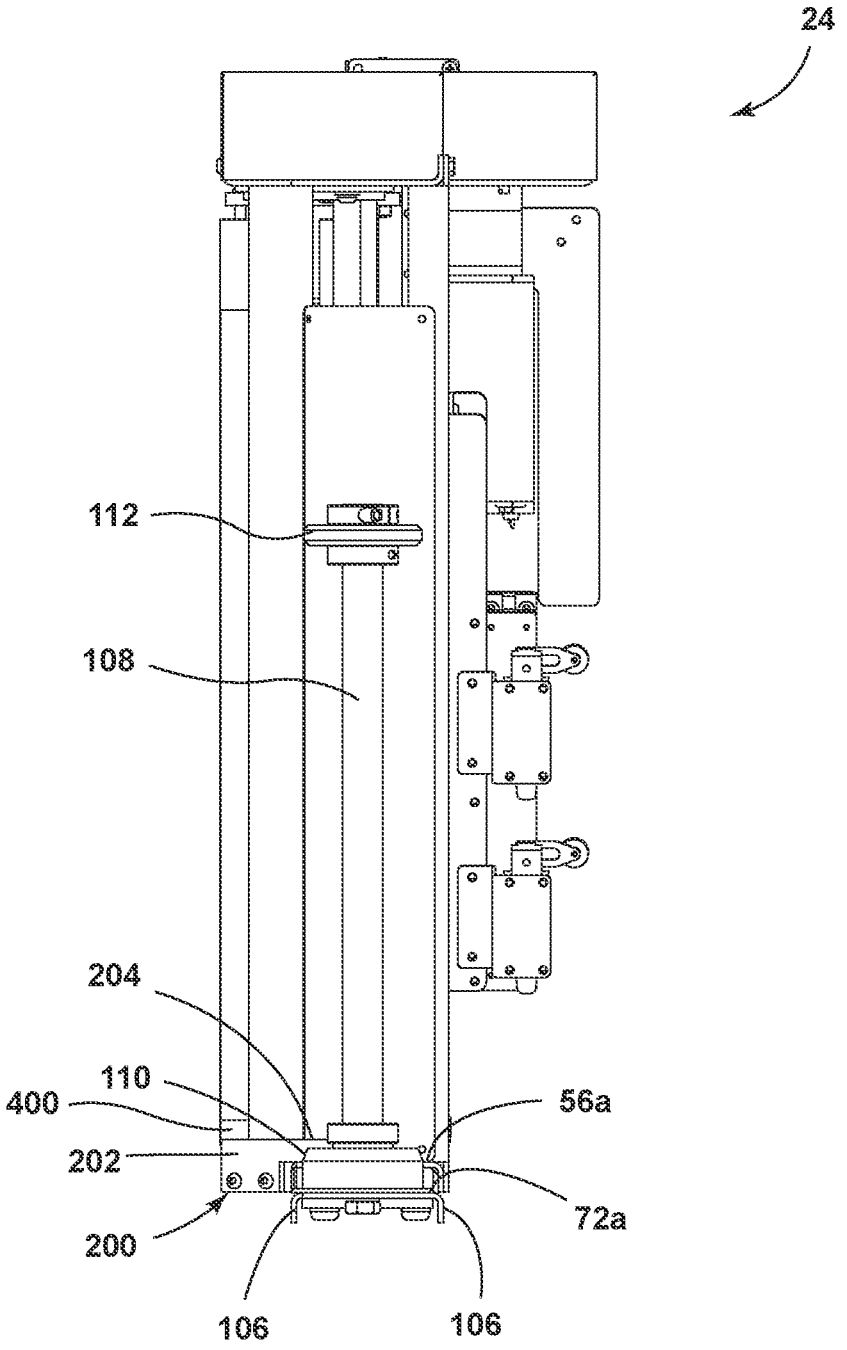


FIG. 5

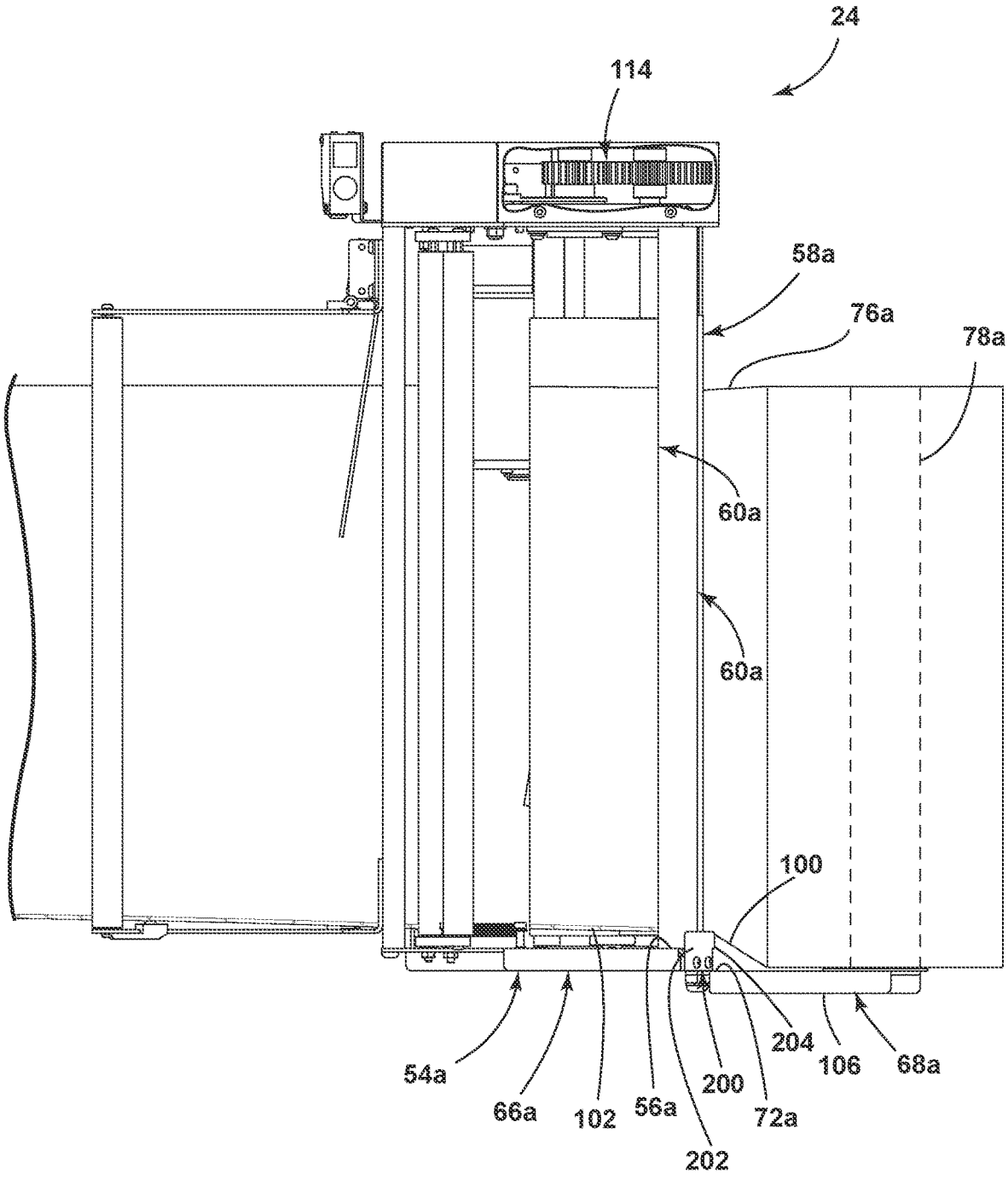

24
114
58a
76a
78a
60a
60a
100
54a
66a
102
56a
202
200
72a
204
106
68a

FIG. 6

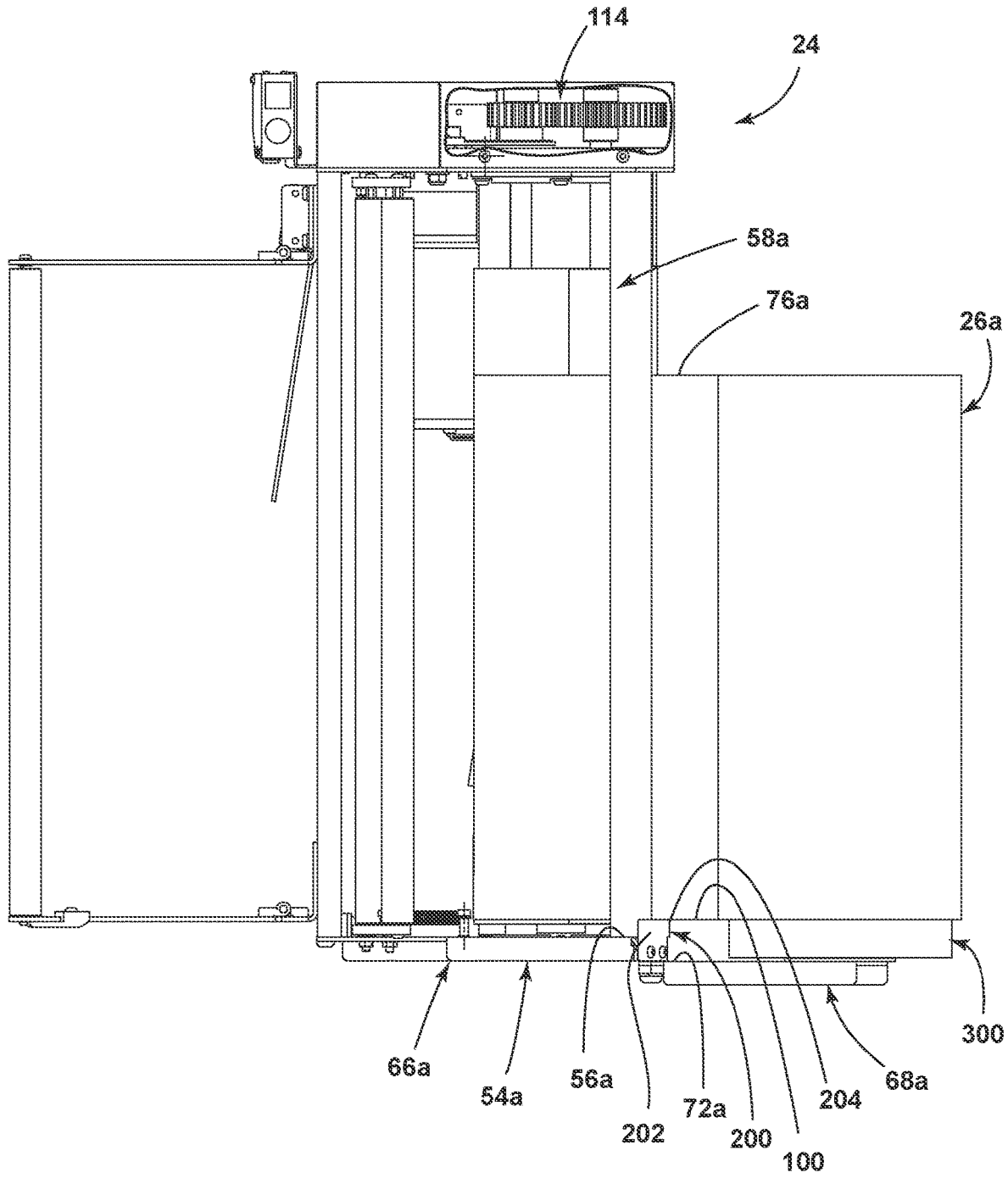


FIG. 7

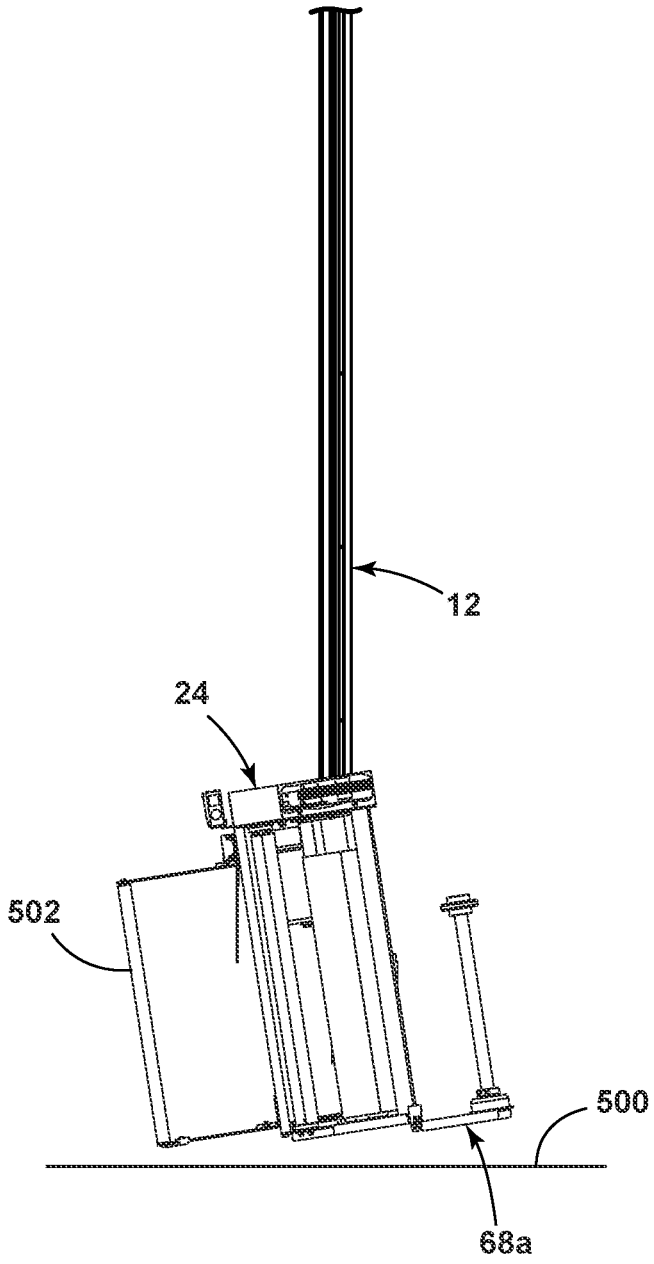


FIG. 8

STRETCH WRAP FILM CARRIAGE

FIELD OF THE INVENTION

[0001] The present invention concerns stretch wrapping machines, and more particularly relates to a carriage for a stretch wrapping machine.

BACKGROUND OF THE INVENTION

[0002] During the past several decades, considerable developments have been made in the field of wrapping a load with a stretched web of film. Most notably, the film web dispenser used in stretch wrapping operations has developed to the extent that it contains a series of rollers which defines a path through which the web passes so that it can be prestretched prior to being dispensed on the load. However, those in the field are continuously looking for means for forming a better wrap about a product.

SUMMARY OF THE INVENTION

[0003] An aspect of the present invention is to provide a carriage for a stretch wrap assembly comprising a base, a top housing, a pre-stretch assembly located between the base and the top housing, with the pre-stretch assembly including a plurality of pre-stretch rollers, and a gear system located for rotating the pre-stretch rollers at a desired relative speed for stretching stretch wrap passing through the pre-stretch assembly. The base has a top surface and the plurality of pre-stretch rollers extending substantially perpendicularly from the top surface such that axes of rotation of the plurality of pre-stretch rollers are substantially perpendicular to the top surface. The base further includes a source of stretch wrap extension platform extending laterally from a main portion of the base, with the source of stretch wrap extension platform not being located under the top housing. The source of stretch wrap extension platform has an upper surface and a mandrel extending substantially perpendicularly from the upper surface. The mandrel is configured to receive a roll of stretch wrap thereon such that an axis of rotation of the roll of stretch wrap is substantially perpendicular to the upper surface of the source of stretch wrap extension platform. The upper surface of the source of stretch wrap extension platform is located below the top surface of the base such that a bottom of the roll of stretch wrap can be located below a bottom of the plurality of pre-stretch.

[0004] Another aspect of the present invention is to provide a carriage for a stretch wrap assembly comprising a base, a top housing, a pre-stretch assembly located between the base and the top housing, with the pre-stretch assembly including a plurality of pre-stretch rollers, and a gear system located for rotating the pre-stretch rollers at a desired relative speed for stretching stretch wrap passing through the pre-stretch assembly. The base has a top surface and the plurality of pre-stretch extending substantially perpendicularly from the top surface such that axes of rotation of the plurality of pre-stretch rollers are substantially perpendicular to the top surface. The base further includes a source of stretch wrap extension platform extending laterally from a main portion of the base. The source of stretch wrap extension platform has a mandrel extending substantially perpendicularly from an upper surface thereof, with the mandrel configured to receive a roll of stretch wrap thereon such that an axis of rotation of the roll of stretch wrap is substantially perpendicular to the upper surface of the source of stretch wrap extension platform. The carriage further includes a roping bar located between the mandrel and the pre-stretch assembly, the roping bar being configured to such that a bottom of the film extending between the roll of stretch wrap and the pre-stretch assembly forces the bottom upward to form the film into a bottom roping portion before the film enters the pre-stretch assembly.

[0005] Yet another aspect of the present invention is to provide a method of roping at least a portion of stretch wrap film, the method comprising providing a carriage having a base, a top housing, and a pre-stretch assembly located between the base and the top housing; placing a roll of stretch wrap on the base; pulling film from the roll of stretch wrap through the carriage; pre-stretching the film passing through the carriage with the pre-stretch assembly; and roping at least a bottom portion of the film from the roll of stretch wrap at a location between the roll of stretch wrap and the pre-stretch assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** is a side view of a wrap machine of the present invention.

[0007] FIG. **2** is a side view of a prior art carriage of a prior art wrap machine.

[0008] FIG. **3** is a perspective view of a carriage of the present invention.

[0009] FIG. **4** is a front view of the carriage of the present invention.

[0010] FIG. **5** is a side view of the carriage of the present invention.

[0011] FIG. **6** is a front view of the carriage of the present invention forming a roped or creased area on film.

[0012] FIG. **7** is a front view of the carriage of the present invention with a support block to prevent forming the roped or creased area on the film.

[0013] FIG. **8** is a front view of the carriage of the present invention on a support column.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] For purposes of description herein, the terms "upper," "lower," "right," "left," "rear," "front," "vertical," "horizontal," and derivatives thereof shall relate to the invention as orientated in FIG. **1**. However, it is to be understood that the invention may assume various alternative orientations, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification are simply exemplary embodiments of the inventive concepts. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting.

[0015] The reference number **10** (FIG. **1**) generally designates a wrap machine of the present invention. The wrap machine **10** includes a base **14** having a rotatable arm **12** connected thereto. The wrap machine **10** further includes a carriage **24** vertically movable on the rotatable arm **12** for wrapping a product **28** on a pallet **32** located on the ground **30**. The carriage **24** carries a roll of stretch wrap film **26***a* for wrapping the product **28** and could also be used for wrapping an upper end of the pallet **32**. The present invention is

drawn to the carriage **24**, which can be used on any wrap machine **10**, including a portable wrap machine as shown. An example of a portable wrap machine is disclosed in U.S. patent application Ser. No. 16/569,170 entitled PORTABLE WRAPPING MACHINE, the entire contents of which are incorporated herein by reference. In the portable wrap machine, the base **14** is movable and carriage **24** is moved about the product on the rotatable arm **12**. It is contemplated that the carriage **24** as disclosed herein can also be used in a wrap machine that does not have a movable base such that the product is moved to adjacent the base and the rotatable arm and carriage is rotated about the product to wrap the product. Such stationary wrap machines are well known to those skilled in the art. Furthermore, it is contemplated that the carriage **24** as disclosed herein can be used with a wrap machine that includes a stationary column that has a carriage movable vertically thereon wherein the product is turned on a turntable to wrap the product. Such wrap machines with turntables are well known to those skilled in the art. An example of a stationary wrap machine with a turntable is disclosed in U.S. Pat. No. 8,166,732 entitled STRETCH WRAP MACHINE WITH TOP CORNER FILM TRANSFER, the entire contents of which are incorporated herein by reference.

[0016] FIG. **2** illustrates a prior art carriage **50**. The prior art carriage **50** includes a top support **52** and a base **54** having a main portion **66** with an upper surface **56**. The prior art carriage **50** includes a pre-stretch assembly **58** including a plurality of rollers extending between the base **54** and the top support **52**, including pre-stretch rollers **60**, a diverter roller **62**, a dancer roller **64**, nip rollers (not shown) for holding film against the pre-stretch rollers **60** and idle rollers (not shown). Such pre-stretch assembly **58**, pre-stretch rollers **60**, the diverter roller **62**, the dancer roller **64**, the nip rollers and the idle rollers and their function are well known to those skilled in the art. The base **54** includes the main portion **66** supporting the pre-stretch assembly **58** and a source of stretch wrap extension platform **68** extending laterally from the main portion **66** of the base **54**. The source of stretch wrap extension platform **68** includes a stretch wrap mandrel **70** extending upward vertically from an upper surface **72** of the source of stretch wrap extension platform **68** of the base **54**. In the prior art carriage **50**, the upper surface **56** of the main portion **66** and the upper surface **72** of the source of stretch wrap extension platform **68** are level and contiguous.

[0017] A roll of stretch wrap film **26** (shown in phantom in FIG. **2**) comprising film **76** wrapped about a center tube **78** is inserted over the stretch wrap mandrel **70** with the mandrel **70** closely fitting within the tube **78** of the roll of stretch wrap film **26**. The roll of stretch wrap film **26** comes to rest on the upper surface **72** of the source of stretch wrap extension platform **68** of the base **54**. During use, the film **76** of the roll of stretch wrap film **26** unrolls from the center tube **78** and is threaded through the pre-stretch assembly **58** to stretch the film **76** before the film **76** is wrapped about the product **28**. The pre-stretch assembly **58** also includes a gear system (not shown in FIG. **2**) that connects to the pre-stretch rollers **60** and an endless link connected to the gear system that rotates the pre-stretch rollers **60** at different speeds and/or the pre-stretch rollers **60** have different diameters to stretch the film in a manner well known to those skilled in the art. An example of a prior art carriage is disclosed in U.S. Pat. No. 7,908,830 entitled CARRIAGE FOR A STRETCH WRAPPING MACHINE, the entire contents of which are incorporated herein by reference.

[0018] In the prior art carriage **50**, the upper surface **56** of the main portion **66** and the upper surface **72** of the source of stretch wrap extension platform **68** are level and contiguous such that the base **54** supports both the stretch wrap mandrel **70**, the pre-stretch rollers **60** and the remaining rollers on a level plane. The center tube **78** along with the film **76** thereon of the roll of stretch wrap film **26** also rest on the upper surface **72** of the source of stretch wrap extension platform **68** of the base **54**. Therefore, the film **76** from the roll of stretch wrap film **26** that enters the pre-stretch assembly **58** of the prior art carriage **50** is substantially parallel to the axes of rotation of the rollers of the pre-stretch assembly **58** and is flat without any creases.

[0019] In the illustrated example, the carriage **24** of the present invention (FIGS. **3-7**) is substantially identical to the prior art carriage **50**. In FIGS. **3-7**, identical parts from the prior art carriage **50** included in the carriage **24** of the present invention are represented by the same, corresponding reference number, except for the suffix "a" in the numerals of the FIGS. **3-7**. The carriage **24** of the present invention allows for roping of a bottom portion **100** of the film **76***a* from the roll of stretch wrap film **26***a* that enters the pre-stretch assembly **58***a*, thereby creating a roped or creased area **102** at the bottom portion **100** of the film **76***a* (see FIG. **6**).

[0020] The illustrated carriage **24** of the present invention can provide for the roped or creased area **102** at the bottom portion **100** of the film **76***a* in several manners. For example, the upper surface **72***a* of the source of stretch wrap extension platform **68***a* can be located below the upper surface **56***a* of the main portion **66***a* of the base **54***a* having the pre-stretch assembly **58***a*. Alternatively, the carriage **24** can include a film bottom roping bar **200** that engages the bottom portion **100** of the film **76***a* from the roll of stretch wrap film **26***a* before the film **76***a* enters the pre-stretch assembly **58***a*. Moreover, it is contemplated that the carriage **24** could include both the upper surface **72***a* of the source of stretch wrap extension platform **68***a* being lower than the upper surface **56***a* of the main portion **66***a* of the base **54***a* and the film bottom roping bar **200**.

[0021] The illustrated source of stretch wrap extension platform **68***a* of the base **54***a* includes a stretch wrap mandrel **70***a* for holding the roll of stretch wrap film **26***a* (see FIG. **6**). In one embodiment, the source of stretch wrap extension platform **68***a* can be any platform wherein the bottom of the film **76***a* leaving the roll of stretch wrap film **26***a* is located below the upper surface **56***a* of the main portion **66***a* of the base **54***a*. As shown in FIGS. **3-7**, the source of stretch wrap extension platform **68***a* includes a plate **104** having the upper surface **72***a*. The plate **104** can be connected or formed from the base **54***a* of the carriage **24***a* and is configured such that the upper surface **72***a* is located below the upper surface **56***a* of the main portion **66***a* of the base **54***a*. The plate **104** can include strengthening flanges **106** extending downwardly from the edges of the plate **104** for strength.

[0022] In the illustrated example, the stretch wrap mandrel **70***a* extends upward and perpendicularly from the plate **104** and is configured to hold the roll of stretch wrap film **26***a* thereon. The stretch wrap mandrel **70***a* includes a fixed post **108**, a bottom wheel **110** and a top wheel **112**. The bottom wheel **110** and the top wheel **112** are rotatable upon the fixed post **108**. The bottom wheel **110** and the top wheel **112** have

approximately the same diameter and are configured to closely receive the center tube **78***a* of the roll of stretch wrap film **26***a* to allow the roll of stretch wrap film **26***a* to easily rotate.

[0023] The source of stretch wrap extension platform **68***a* of the base **54***a* having the upper surface **72***a* being lower than the upper surface **56***a* of the main portion **66***a* of the base **54***a* allows the bottom portion **100** of the film **76***a* to form the roped or creased area **102** as shown in FIG. **6**. As shown in FIG. **6**, when the roll of stretch wrap film **26***a* is fully inserted onto the stretch wrap mandrel **70***a*, the bottom portion **100** of the film **76***a* on the center tube **78** is directly adjacent or abutting the upper surface **72***a* of the source of stretch wrap extension platform **68***a* of the base **54***a*. As the film **76***a* is pulled from the center tube **78** to move through the pre-stretch assembly **58***a* to stretch the film **76***a* as outlined above employing the pre-stretch rollers **60***a* and a gear system **114**, the bottom portion **100** of the film **76***a* is moved upward to move over the upper surface **56***a* of the main portion **66***a* of the base **54***a*, thereby forming the roped or creased area **102**.

[0024] It is contemplated that the bottom portion **100** of the film **76***a* could abut any surface between the upper surface **72***a* of the source of stretch wrap extension platform **68***a* of the base **54***a* and the upper surface **56***a* of the main portion **66***a* of the base **54***a*. For example, such surface could be merely a ledge between the two upper surfaces **56***a*, **72***a*. The surface could also be on the film bottom roping bar **200**. The film bottom roping bar **200** (see FIG. **3**) includes a primary plate portion **202** connected to the base **54***a* and an arm **204** that extends directly in the path between the roll of stretch wrap film **26***a* and the pre-stretch assembly **58***a* such that the bottom portion **100** of the film **76***a* is forced to form the roped or creased area **102**. It is contemplated that the arm **204** can be stationary (as shown) or can be pivotally connected to the primary plate portion **202** (and can have, for example, a circular cross-sectional shape (i.e., a roller)).

[0025] It is contemplated that the film bottom roping bar **200** could be the sole mechanism for forming the roped or creased area **102**. For example, if the upper surface **72***a* of the source of stretch wrap extension platform **68***a* of the base **54***a* and the upper surface **56***a* of the main portion **66***a* of the base **54***a* were level, the arm **204** of the film bottom roping bar **200** could force the bottom portion **100** of the film **76***a* upward to form the roped or creased area **102**. It is further contemplated that the film bottom roping bar **200** could be made to be easily removable (e.g., through a wing nut connection) or could be made to be vertically adjustable to control the amount of the bottom portion **100** of the film **76***a* that is made into the roped or creased area **102**. Alternatively, it is contemplated that the source of stretch wrap extension platform **68***a* of the base **54***a* could be configured to be vertically adjustably connected to the main portion **66** of the base **54***a* to control the amount of the bottom portion **100** of the film **76***a* that is made into the roped or creased area **102**.

[0026] FIG. **7** illustrates a system for not forming the roped or creased area **102** when the film bottom roping bar **200** and/or the unlevel surfaces **56***a*, **72***a* are employed. As shown in FIG. **7**, a support disc **300** can be placed over the mandrel **70***a* before the roll of stretch wrap film **26***a* is over the mandrel **70***a*. The support disc **300** supports the center tube **78***a* and the rest of the roll of stretch wrap film **26***a* above the upper surface **72***a* of the source of stretch wrap extension platform **68***a* of the base **54***a*. Therefore, the bottom portion **100** of the film **76** does not form the roped or creased area **102** before entering the pre-stretch assembly **58***a*. The support disc **300** can be a closed ring inserted over the mandrel **70***a*, donut shaped to be allowed to be slid laterally onto the mandrel **70***a* (or selectively removed or added, for example, after the wrapping of the product has begun). It is further contemplated that the support disc **300** could be recessed into the source of stretch wrap extension platform **68***a* and either manually or automatically raised and lowered.

[0027] When using the carriage **24** as disclosed herein, there can be further modifications. For example, as illustrated in FIG. **3**-**5**, the pre-stretch rollers **60***a* can include a cylindrical lower area **400** that is harder than the remaining portion of the pre-stretch rollers **60***a* and having the same diameter to ensure that the rope portion **102** of the film **76***a* does not permanently indent the grip face of the pre-stretch rollers **60***a*. For example, the lower area **400** can be made of metal (e.g., aluminum). Furthermore, a shown in FIG. **8**, the carriage **24** can be tilted relative to the rotatable arm **12** and a ground surface **500** such that a dancer roller **502** (the last roller before the film **76***a* leaves the carriage **24**) is closer to the ground **500** than the source of stretch wrap extension platform **68**. With such tilt, the rope portion **102** can be wrapped about a product very close to the ground **500** and, if used, about a pallet holding the goods to be wrapped. The tilt also allows the source of stretch wrap extension platform **68** to be lower than the main portion **66***a* of the base **54***a* as outlined above.

[0028] The above description is considered that of the one embodiment only. Modification of the invention will occur to those skilled in the art and to those who make or use the invention. Therefore, it is understood that the embodiment shown in the drawings and described above is merely for illustrative purposes and not intended to limit the scope of the invention.

1. A carriage for a stretch wrap assembly comprising:

a base;

a top housing;

a pre-stretch assembly located between the base and the top housing, the pre-stretch assembly including a plurality of pre-stretch rollers; and

a gear system located for rotating the pre-stretch rollers at a desired relative speed for stretching stretch wrap film passing through the pre-stretch assembly;

the base having a top surface and the plurality of pre-stretch rollers extending substantially perpendicularly from the top surface such that axes of rotation of the plurality of pre-stretch rollers are substantially perpendicular to the top surface;

the base further including a source of stretch wrap extension platform extending laterally from a main portion of the base, the source of stretch wrap extension platform not being located under the top housing;

the source of stretch wrap extension platform having an upper surface and a mandrel extending substantially perpendicularly from the upper surface, the mandrel configured to receive a roll of stretch wrap film thereon such that an axis of rotation of the roll of stretch wrap film is substantially perpendicular to the upper surface of the source of stretch wrap extension platform;

wherein the upper surface of the source of stretch wrap extension platform is located below the top surface of

the base such that a bottom of the roll of stretch wrap film can be located below a bottom of the plurality of pre-stretch rollers.

2. The carriage according to claim **1**, further including:

a roping bar located between the mandrel and the pre-stretch assembly, the roping bar being configured to such that the bottom of the film extending between the roll of stretch wrap film and the pre-stretch assembly forces the bottom upward to form the film into a bottom roping portion before the film enters the pre-stretch assembly.

3. The carriage according to claim **1**, wherein:

the pre-stretch rollers include a cylindrical lower area that is harder than the remaining portion of the pre-stretch rollers and having the same diameter.

4. The carriage according to claim **3**, wherein:

the cylindrical lower area includes a cylindrical aluminum surface.

5. A carriage for a stretch wrap assembly comprising:

a base;

a top housing;

a pre-stretch assembly located between the base and the top housing, the pre-stretch assembly including a plurality of pre-stretch rollers;

a gear system located for rotating the pre-stretch rollers at a desired relative speed for stretching stretch wrap film passing through the pre-stretch assembly;

the base having a top surface and the plurality of pre-stretch rollers extending substantially perpendicularly from the top surface such that axes of rotation of the plurality of pre-stretch rollers are substantially perpendicular to the top surface;

the base further including a source of stretch wrap extension platform extending laterally from a main portion of the base;

the source of stretch wrap extension platform having a mandrel extending substantially perpendicularly from an upper surface thereof, the mandrel configured to receive a roll of stretch wrap film thereon such that an axis of rotation of the roll of stretch wrap film is substantially perpendicular to the upper surface of the source of stretch wrap extension platform; and

a roping bar located between the mandrel and the pre-stretch assembly, the roping bar being configured to such that a bottom of the film extending between the roll of stretch wrap film and the pre-stretch assembly forces the bottom upward to form the film into a bottom roping portion before the film enters the pre-stretch assembly.

6. The carriage according to claim **5**, wherein:

the pre-stretch rollers include a cylindrical lower area that is harder than the remaining portion of the pre-stretch rollers and having the same diameter.

7. The carriage according to claim **6**, wherein:

the cylindrical lower area includes a cylindrical aluminum surface.

8. A method of roping at least a portion of stretch wrap film, the method comprising:

providing a carriage having a base, a top housing, and a pre-stretch assembly located between the base and the top housing;

placing a roll of stretch wrap film on the base;

pulling film from the roll of stretch wrap film through the carriage;

pre-stretching the film passing through the carriage with the pre-stretch assembly; and

roping at least a bottom of the film from the roll of stretch wrap film at a location between the roll of stretch film wrap and the pre-stretch assembly.

9. The method according to claim **8**, further including:

locating a roping bar between a mandrel and the pre-stretch assembly, the roping bar forcing the bottom upward to form the film into a bottom roping portion before the film enters the pre-stretch assembly.

10. The method according to claim **8**, wherein:

the pre-stretch assembly includes pre-stretch rollers having a cylindrical lower area that is harder than the remaining portion of the pre-stretch rollers and having the same diameter.

11. The method according to claim **10**, wherein:

the cylindrical lower area includes a cylindrical aluminum surface.

* * * * *