Feb. 3, 1970 H. REINERS ET AL 3,492,838

APPARATUS FOR STEAMING LOOPED TEXTILE MATERIAL OR CARPETING

Filed Oct. 14, 1966

Fig.1

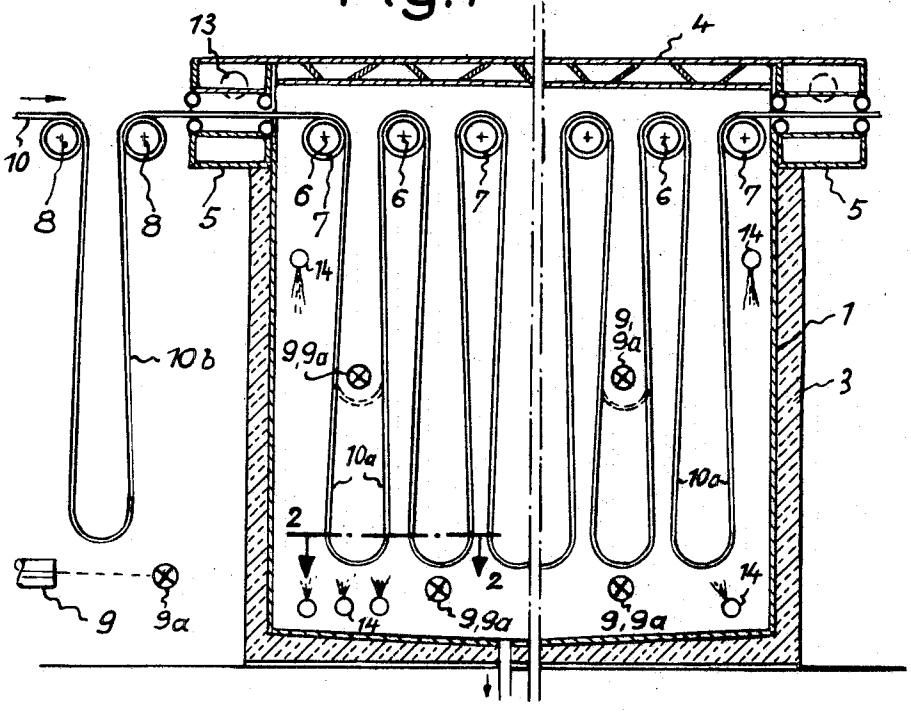
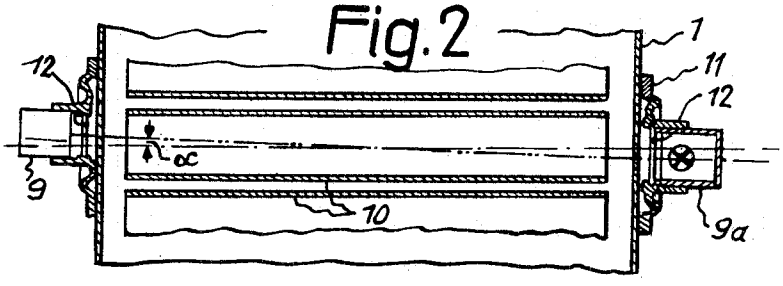


Fig.2



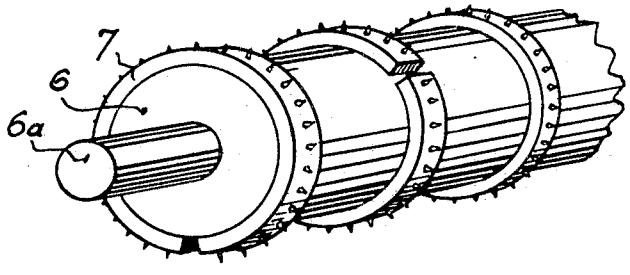


Fig.3

United States Patent Office 3,492,838 Patented Feb. 3, 1970

3,492,838

APPARATUS FOR STEAMING LOOPED TEXTILE MATERIAL OR CARPETING

Herbert Reiners, St. Tonis, and Alfred Korsch, Krefeld, Germany, assignors to Gerber and Co., G.m.b.H., Krefeld, Germany

Filed Oct. 14, 1966, Ser. No. 586,693
Claims priority, application Germany, Oct. 22, 1965, G 45,004
Int. Cl. D06c *1/08;* B65h *25/10*
U.S. Cl. 68—5 2 Claims

ABSTRACT OF THE DISCLOSURE

An improvement in steaming devices which include spaced hanger rolls adapted to be driven at variable speeds with the lengths of carpeting or other material hanging over the tops of the rolls and depending therefrom with sensing means in various points to control the lengths of the loops, that improvement being providing for the electric sensing means comprising a photocell and a coacting light source, and an elastic mounting means for the photocell and light source on opposite sides of the steam chamber.

This invention relates to an apparatus for steaming carpet webs and textile fabrics in continuous lengths.

More particularly, the invention is concerned with the steaming or like treatment of wide carpet webs after printing or dyeing of the same, wherein a conveyer means may be allowed to engage one side only of the web.

In the prior art, it has been customary to form loops in the carpet or fabric web and to suspend the loops from bars which are moved along by a pair of endless chains. This arrangement has not been entirely satisfactory particularly in connection with the larger widths of heavy carpeting mainly because of the necessity for suspension bars which are very heavy, rendering the apparatus impractical and too expensive.

Accordingly, it is the primary object of this invention to overcome the difficulties of the prior art through the provision of an apparatus in which the loops of carpeting are formed over and supported and driven by fixed axis rotating hanger rolls, together with novel means for regulating the speed of such rolls and additional novel means for regulating the size of the carpet loops between desirable limits.

Another objective achieved by the present invention is the elimination of slippage between the driven web and the supporting and driving rolls.

Other objects and advantages of the invention will become apparent during the course of the following detailed description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

FIGURE 1 is a partly diagrammatic longitudinal vertical section through a steaming or treatment apparatus embodying the invention;

FIGURE 2 is an enlarged fragmentary horizontal section taken on line 2—2 of FIGURE 1; and

FIGURE 3 is an enlarged fragmentary perspective view of a hanger roll and associated elements.

As shown in the drawings, the steamer apparatus comprises a steaming chamber **1**, preferably provided with exterior heat insulation **3**. The top of the box-like steaming chamber is covered by a detachable heated cover plate **4**. Steam from any suitable source is introduced through plural nozzles **14** into the chamber **1**, FIGURE 1. As shown, some of the nozzles are near the bottom of the steam chamber directing steam upwardly, while

others are at an upper elevation directing steam downwardly.

In order to prevent excessive escape of steam from the apparatus, the inlet and outlet of the main chamber, near the top thereof, consists of a pair of heated extension chambers **5** connected with the main chamber **1** by a narrow flow gap in each case. Preferably, the chambers **5** have a somewhat higher temperature than the main steam chamber **1**. Any steam from the main chamber which does enter either of the chambers **5** is conducted therefrom by a suitable vent **13** leading to the atmosphere.

Mounted within the main chamber **1** at approximately the elevation of the chambers **5** is a plurality of hanger rolls **6** in the required number, between which the individual dependent loops **10***a* of the carpeting or like material entering the apparatus from the left are formed to achieve the necessary stay period inside of the apparatus. The hanger rolls **6** are at the same elevation and are all of equal diameter and they serve not only to form and support the loops of carpeting but also to feed the same toward the right hand end of the apparatus, FIGURE 1. The several rolls **6** are connected with and driven by a conventional variable speed drive means, not shown, so that their individual speeds may be regulated or groups of the rolls may have their speeds regulated dependent upon needs. Various conventional drives are known for this purpose, for example, a Leonard drive may be employed.

Ahead of the steaming chamber **1**, there is preferably provided a pair of additional driving and hanger rolls **8** for the support and feeding of a buffer or slack loop **10***b* of the moving web **10**.

The full utilization of the apparatus makes it essential that the individual loops **10***a* achieve their maximum desirable length but do not become foreshortened beyond a minimum required length. These limits are illustrated for the loops **10***a* in full lines and broken lines in FIGURE 1. These limits are necessary to prevent the loops from sliding on the hanger rolls **6** because of greatly unbalanced weight between adjacent loops.

In accordance with another feature of the invention, the formation of the loops **10***a* and their respective lengths is monitored by electro-optical sensing means, in particular photoelectric control means. Specifically, in the lower part of the chamber **1** and arranged adjacent to one or more of the loops **10***a* in their vertical planes, a photocell **9** and a coacting light source and lens **9***a* are mounted on the side walls of the apparatus in such a position that the light rays are generally parallel to the lower curved ends of the loops. Toward this end, the elements **9** and **9***a* are housed within elastic flanges **11** suitably secured to the opposite side walls of the steaming chamber **1** and are protected against the hot steam atmosphere by glass plates **12**, FIGURE 2. These protective plates may be electrically heated in a conventional manner to prevent fogging.

Since the photoelectric sensing means would constantly release positive and negative impulses with the unavoidable swinging of the loops **10***a* where the light rays are exactly parallel to the axes of the loops, the apparatus is further refined as shown in FIGURE 2 so that the light rays from the source **9***a* are at a small angle (alpha) with the bottom loop curvature axis in the horizontal plane. This small angle (alpha) is preferably about three degrees, as shown.

The minimum loop length is regulated in the same manner by additional similar photoelectric control means **9** and **9***a* arranged at a higher elevation within the chamber **1** as shown diagrammatically in FIGURE 1. In a like manner, the length of the loop **10***b* is monitored and regulated by another similar control means in such a manner that when its length exceeds desirable limits,

an impulse is released which either slows down or speeds up the material supplied into the steamer. In all cases, when the curved end of a loop, due to lengthening or shortening of the loop in the system, crosses the beam of light from the source **9***a*, the hanger roll **6** will be caused to slow down or speed up to bring the loop or loops within the required tolerance limits.

In order to prevent the carpet web from slipping on the rolls **6**, it is necessary to provide some form of needle surface arrangement on the rolls and because the needle surface wears rapidly with the feeding of the heavy carpet material, a novel arrangement is provided whereby the needles on the individual rolls **6** may be changed or replaced. This construction is shown in FIGURE 3 of the drawings. In this figure, at intervals along the roll **6**, the needles **7***a* are mounted upon removable split rings **7**, which rings may snugly engage the body of the roll **6** and be applied over one end of the roll **6**. The individual rings **7** may be anchored to the roll **6** in any preferred manner as by mounting them in milled notches where they will be held against turning on the rolls. With this arrangement, the rings mounting the needles are readily replaceable when wear occurs.

It is believed that the several features and advantages of the invention will be readily apparent to those skilled in the art.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

We claim:

1. In an apparatus for applying steam or the like to one side of a running length of carpeting or like material including a steam chamber, means for introducing steam into said chamber, a plurality of spaced hanger rolls journaled within the upper portion of the steam chamber and adapted to be driven at variable speeds, said length of carpeting hanging over the tops of said rolls and depending therefrom in plural loops, said loops extending substantial distances below said rolls, and sensing means connected with the steam chamber at plural elevations thereon and operable to sense the lengths of the depending loops within the steam chamber between permissible maximum and minimum lengths, said sensing means initiating changes in the speed of rotation of the hanger rolls so as to maintain the lengths of said loops within the required limits, with the further proviso that the sensing means comprises a photoelectric sensing means mounted upon opposite side walls of the steam chamber for directing light rays across said chamber in the regions of the closed ends of the loops and wherein said light rays are substantially parallel to the bottom curved ends of the loops and at a small angle to the axis of loop curvature in a horizontal plane so as to compensate for swinging of the loops within the chamber; the improvement which comprises:

each photoelectric sensing means comprising a photocell and coacting light source, and elastic mounting means for the photocell and light source on opposite side walls of the steam chamber.

2. The invention as defined in claim **1** which further includes a steam tight electrically heated protective glass on each elastic mounting means in protective relationship to the photocell and light source.

References Cited

UNITED STATES PATENTS

2,785,042	3/1957	Grajeck et al.	68—5 X
3,074,261	1/1963	Wilcox	68—5
3,367,039	2/1968	Jacobsen	68—5 X

FOREIGN PATENTS

700,100	11/1953	Great Britain.

WILLIAM I. PRICE, Primary Examiner

U.S. Cl. X.R.

29—121, 125