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CLOTH LAYING MACHINE HAVING INTERMITTENT POSITIVE FEEDING MEANS

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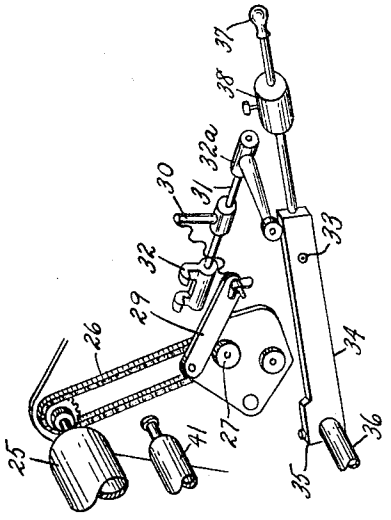


Fig. 2

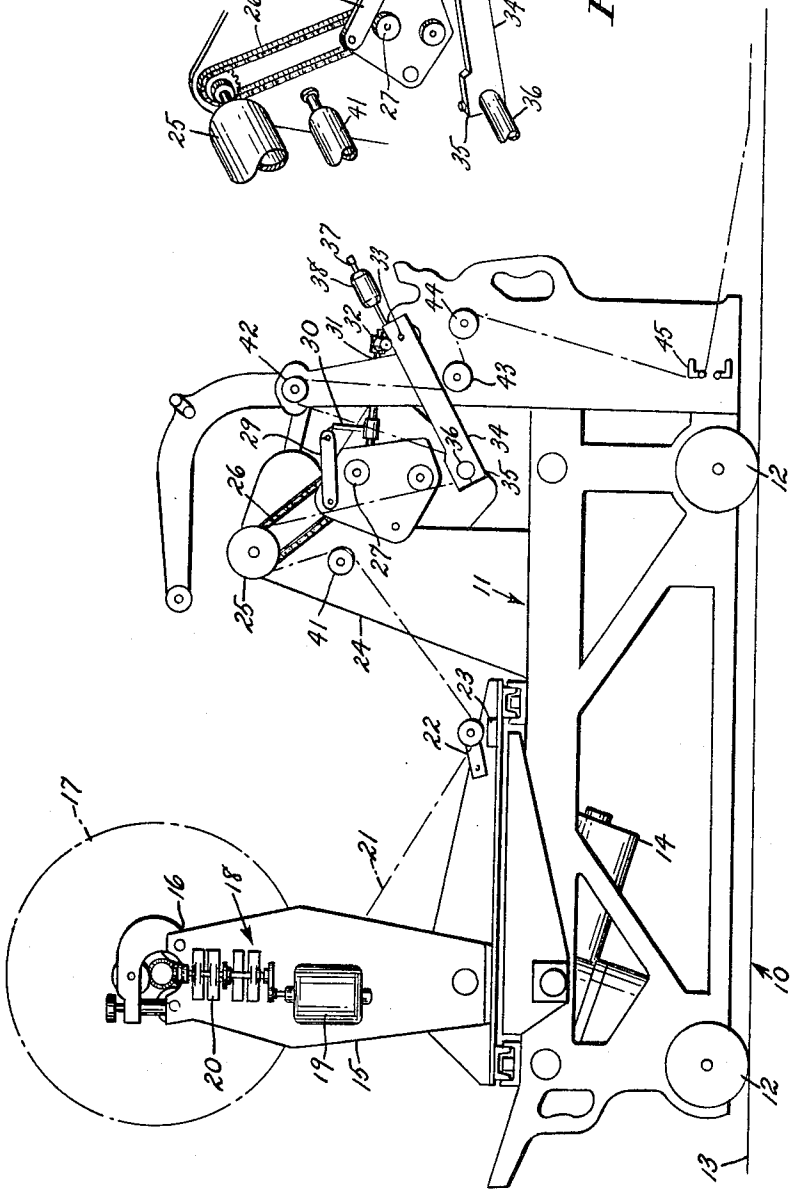


Fig. 1

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3,284,017

CLOTH LAYING MACHINE HAVING INTERMITTENT POSITIVE FEEDING MEANS

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1 Claim. (Cl. 242—75.43)

This invention relates generally to the field of cloth laying machines of a type adapted to dispense a web of cloth upon the surface of a cloth laying table with the reciprocation of a carriage thereover. Devices of this general type are known in the art, and the invention lies in specific constructional details which lend themselves to the handling of heavy cloth bolts.

In devices of this type, considerable inertial forces are involved in the starting and stopping of rotation of the cloth supply roll as well as the positive feed roll or rollers, owing to the heavy mass of the same and consequent high rotational inertia.

In the co-pending application of Gerard J. Wendelken, Serial No. 329,587, filed December 10, 1963, now Patent No. 3,227,390, said application having been assigned to the same assignee as the instant application, there is disclosed a cloth roll accelerating means employing an electric motor which serves selectively as a means of accelerating a cloth roll from rest upon a demand for cloth supply, or as a dynamic braking means to slow the roll upon the occurrence of excess length in the cloth web. A device of this type contemplates a rotational speed of the cloth supply roll greater than actual cloth requirements, and during operation the motor is continuously accelerating or decelerating the cloth roll in accordance with requirements.

While the embodiment disclosed in said application has proved to be very useful, very large cloth laying machines have an additional problem in that the positively driven feed roll which responds by rotation in a single direction in response to movement of the carriage in either of two directions over the cloth laying table cannot be brought immediately to rest upon the halting of the carriage at the end of a given stroke. Since it possesses considerable inertial rotation, it is known in the art to provide an overrunning clutch between the drive mechanism and the roller, so that as the carriage is brought abruptly to a stop, the drive roller merely "freewheels" to a stop. This motion allows additional cloth web slack in the area between the feed roller and the table, which must be taken up when the cloth laying carriage moves again in an opposite direction. In very large machines, owing to the above-mentioned inertial rotation, this slack has often been excessive, and makes difficult the subsequent feeding of the slack in a uniform and even manner.

It is therefore among the principal objects of the present invention to eliminate the formation of excessive slack in the cloth web in the area following the positive drive roller, whereby subsequent feeding of the cloth web to the table is performed in a smooth, continuous and wrinkle-free manner.

Another object of the invention lies in the provision of an improved positive clutch interconnecting the driven feed roller and the drive means for said roller, whereby movement of the carriage over the cloth laying table may take place in the absence of driven rotation of the feed roller.

Another object of the invention lies in the provision of improved means for braking the freewheeling feed roller by exerting a drag on that segment of the web leading from the supply roll to the feed roller, thereby eliminating excessive freewheeling of the feed roller and the occurrence of excessive slack in the web emanating therefrom.

A feature of the disclosed embodiment lies in the fact that the inventive construction forming a part thereof may be incorporated into existing cloth laying machine designs with relatively little modification.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claim.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a schematic side elevational view of an embodiment of the invention.

FIGURE 2 is a fragmentary perspective view as might be seen from the right-hand portion of FIGURE 1.

In accordance with the invention, the disclosed embodiment, generally indicated by reference character **10**, includes a carriage element **11** having wheeled means **12** supporting the same for reciprocation over the upper surface **13** of a cloth laying table of well-known type, the details of which form no part of the present disclosure. In the preferred form, the carriage, being relatively heavy, is equipped with motor means **14** driving the wheeled means **12**, the motor being controlled by suitable switching means (not shown) for reversal of direction at the end of a cloth laying pass or stroke.

Supported by the carriage element **11** are a pair of supports, one of which is indicated by reference character **15**, having means at the upper end **16** thereof for retaining a cloth supply roll **17**. One of the supports **15** mounts cloth roll accelerating means **18** of the type disclosed in the above-mentioned Patent 3,227,390. As more fully described in said application, the means **18** includes a motor **19**, and gear reduction means **20**.

Emanating from the cloth roll **17** is a continuous web **21** which passes about a first pivotally mounted nip roller **22**, movement of which opens and closes a switch **23**. From a consideration of FIGURE 1, it will be apparent that upon the occurrence of excessive slack in the web **21**, the roller **22** will descend to contact the switch **23**, opening the circuit to the motor **19**.

Disposed rightwardly from the nip roller **22**, as seen in FIGURE 1, is a second pair of support members, one of which is indicated by reference character **24**, which mount a positively driven feed roller **25** driven by a sprocket chain **26** in response to reciprocating movement. The details of the drive are well-known, and form no part of the present disclosure, reference being made to U.S. Patent No. 3,094,319 granted to Walter Deichmann, and assigned to the same assignee as the instant application, as showing a typical arrangement suitable for use in the instant embodiment. Motion is transmitted through a clutch **27** of overrunning type, the clutch being positively engaged and disengaged by an operating lever **29**. The lever **29** connects to a link **30** to a spring **30***a* on a rotatably mounted actuating shaft **31**, positioned so as to keep the clutch **27** normally engaged by contact of a member **32** with the lever **29**.

Describing orbital movement about an axis **33** are a pair of nip roller arms, one of which is indicated by reference character **34**, the lower ends **35** of which support a second nip roller **36**. A short shaft **37** supports a counterweight **38** to permit the nip roller **36** to oscillate depending upon the degree of slack existing in the web in that area.

Riding on one of the arms **34** is a cam follower **32***a* on the actuating shaft **31**, so that when the nip roller is in its lowermost position, the clutch **27** is disengaged.

After passing about the first nip roller **22**, the web passes about an idler roller **41**, and thence to the feed roller **25**. It then drops downwardly about the second nip roller **36**, and subsequently about idler rollers **42**, **43** and **44**, following which it drops to the box blades **45** prior to being deposited upon the cloth laying table.

During operation, as the carriage moves over the surface of the cloth laying table, upon the occurrence of insufficient slack in the web after the feed roller **25**, the nip roller **36** will raise, causing the clutch **27** to be engaged. The feed roller **25** now positively drives the web as long as the clutch remains engaged. The motor **19** will rotate the cloth roll **17**, as determined by the position of the switch **23**, in a continuous manner.

As the cloth feed exceeds that required by movement of the carriage over the table, the occurrence of excessive slack at the nip roller **36** will disengage the clutch **27**, allowing the feed roller **25** to freewheel. Owing to the inertial of the roller, where the carriage has been operating at relatively high speed, considerable slack could occur beneath the nip roller **36**. However, as soon as the feed roller is disconnected from the clutch, the inertial force causing it to continue to rotate is insufficient to overcome the drag of the web caused by the periodically braked cloth roll **17**. As the decelerating action and subsequent accelerating action takes place much more rapidly and often than the interruption of the engagement of the clutch **27**, the period of time during which the cloth feed roller is permitted to freewheel is materially shortened, and at no time is excessive web allowed to accumulate beneath the nip roller **36**. Thus, upon the recurrence of demand for cloth with resumed reciprocation of the carriage element over the table, the slack beneath the nip roller **36** is quickly taken up, and both the nip rollers again perform the required control function.

I wish it to be understood that I do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

In a reciprocating cloth laying carriage having a principal axis of reciprocation for use with a cloth laying table, the improvement comprising:

(a) means for supporting a cloth supply roll for rotation about an axis perpendicular to said axis of reciprocation;

(b) electric motor means for accelerating and decelerating said roll using dynamic braking upon the interruption of current flowing thereto;

(c) a first nip roller lying in the path of a web of material emanating from a cloth supply roll disposed upon said supporting means;

(d) switch means conducting current to said motor means upon the absence of sufficient slack in said web of material in the area of said first nip roller;

(e) a driven feed roller engaging said web, and means for rotating said feed roller in a single direction in response to reciprocation of said carriage in either of two directions;

(f) overrunning clutch means interconnecting said feed roller and said driving means;

(g) and a second nip roller engaging said web of material, and serving to engage said clutch in the absence of sufficient slack in the area of said second nip roller;

(h) whereby upon the occurrence of excess feeding by said feed roller, the corresponding occurrence of slack in the area of said second nip roller will serve to disengage said clutch, following which the interruption of positive feeding by said feed roller will cause the occurrence of slack in said web in the area of said first nip roller and the interruption of current to said motor means, said motor means then acting as a dynamic brake upon said cloth supply roll, resulting tension in said cloth web between said supply roll and said feed roller serving to retard said feed roller.

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