Oct. 16, 1956 J. DUNGLER 2,766,503

OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

Filed Sept. 20, 1951 6 Sheets-Sheet 1

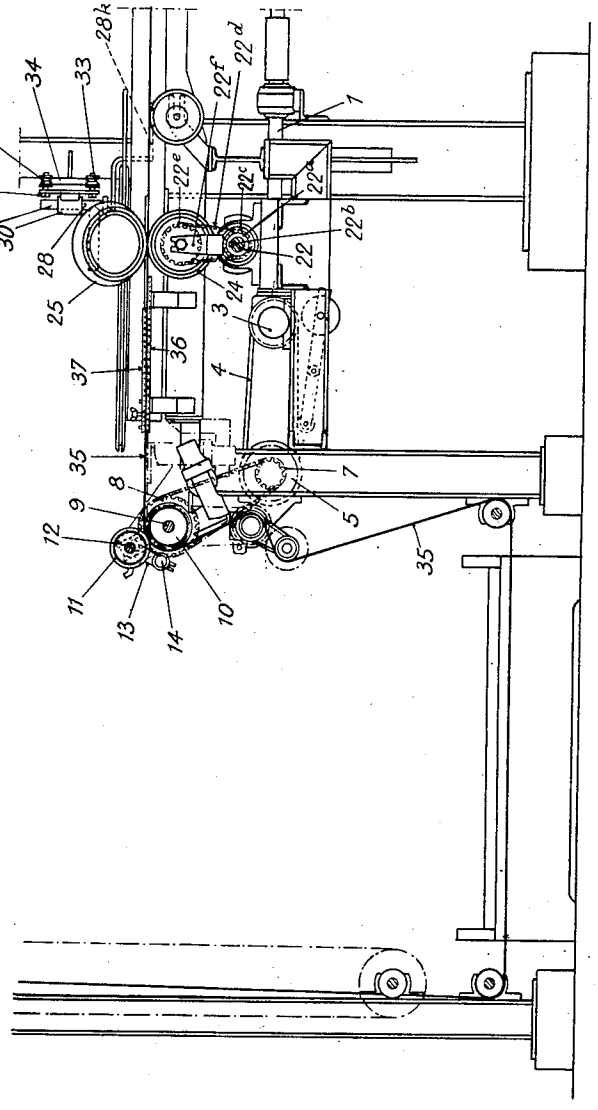


FIG. 1

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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

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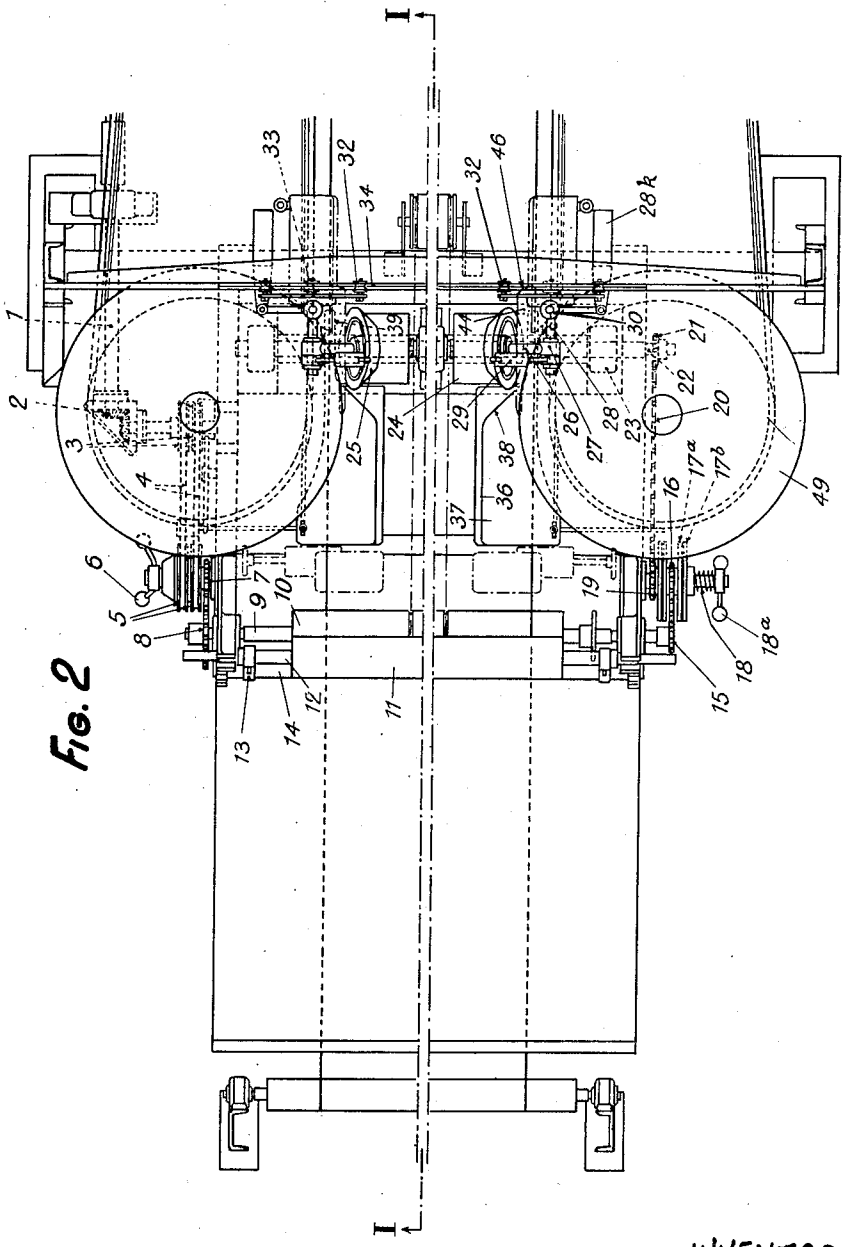


FIG. 2

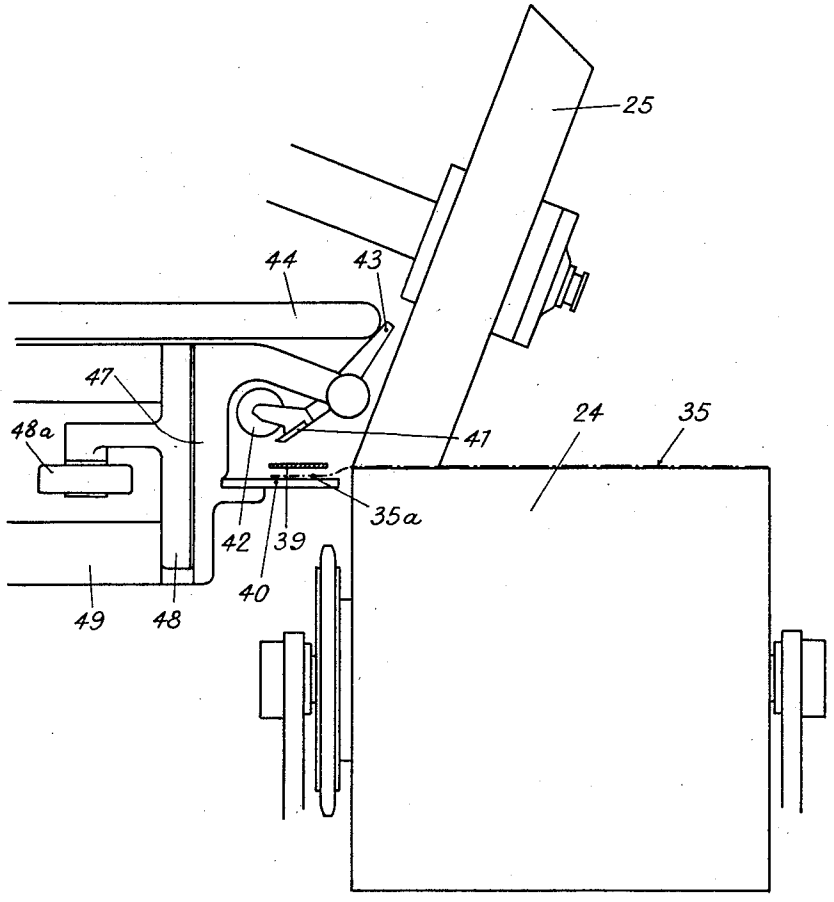
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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

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FIG. 3



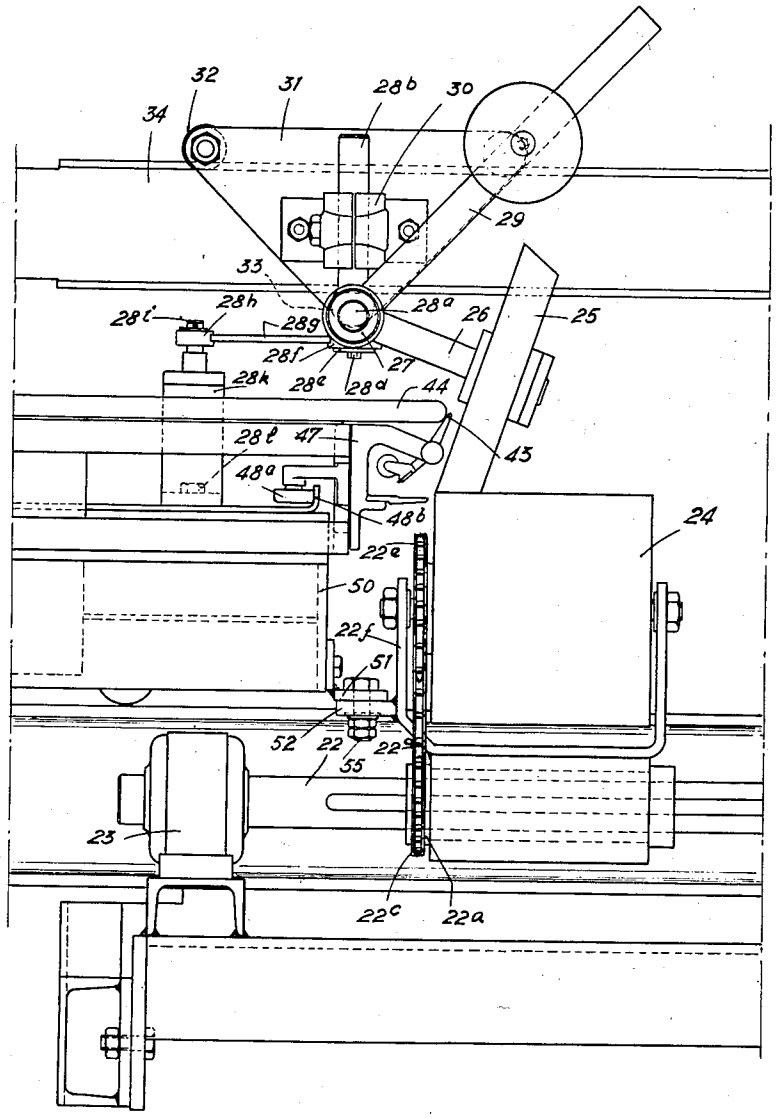
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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

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Fig. 4



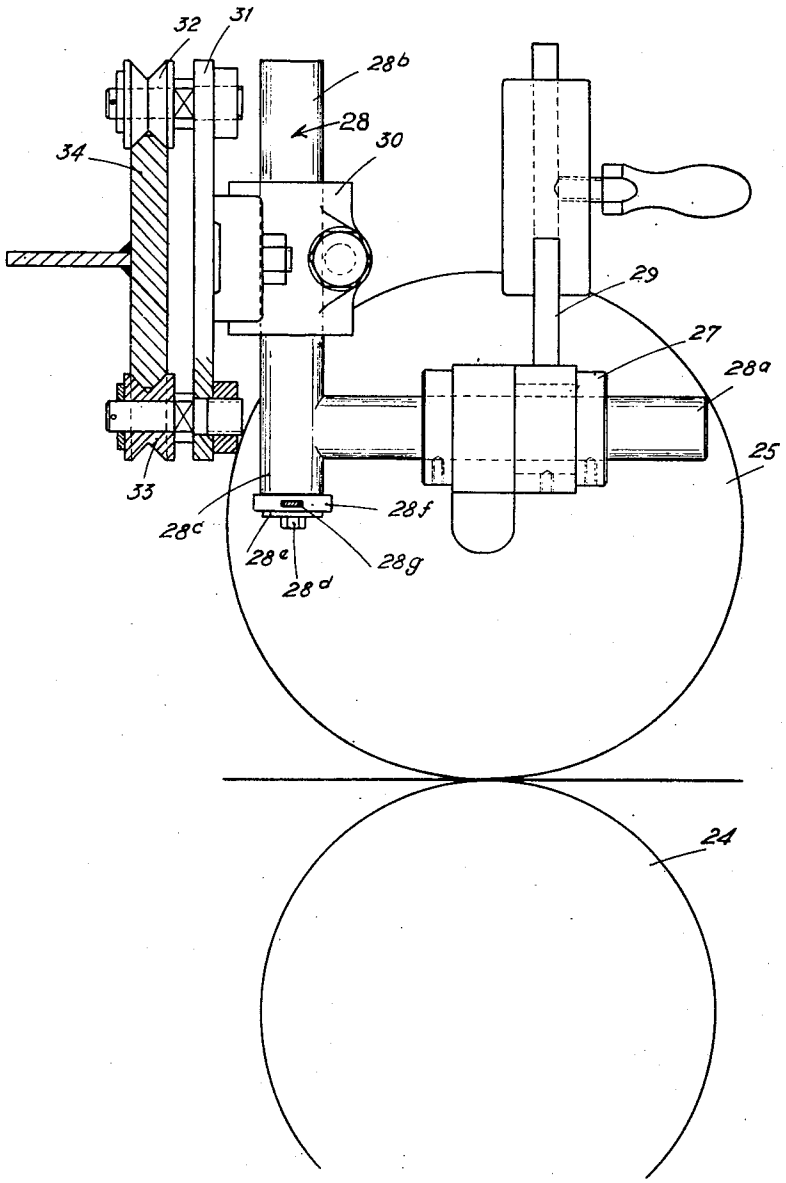
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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

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Fig. 5



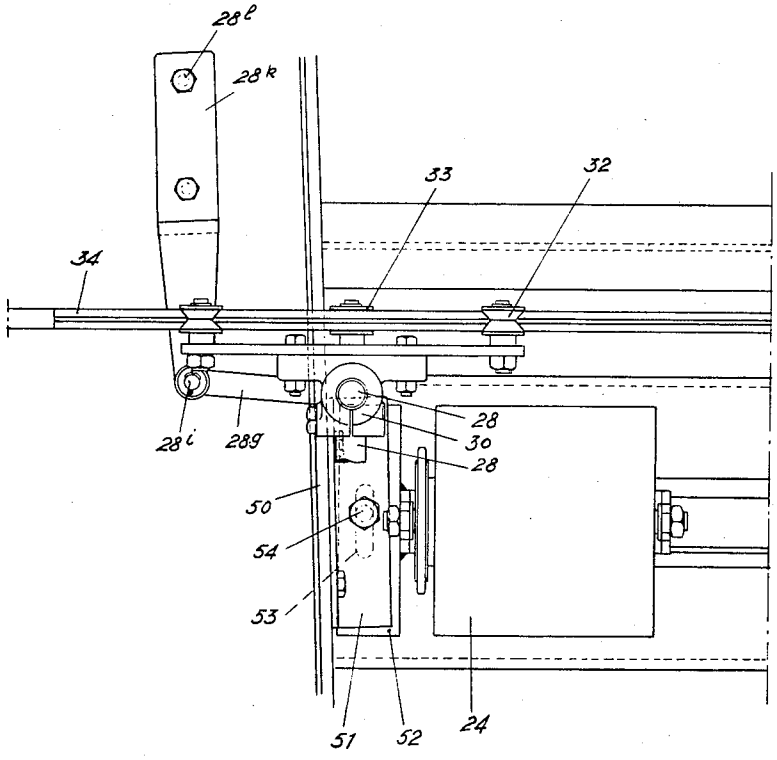
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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

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Fig. 6



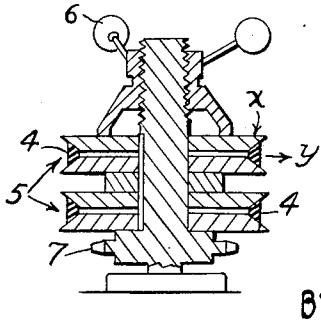


Fig. 7

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OVERFEED DEVICE FOR CLIP-TENTERING MACHINES

Julien Dungler, Basel, Switzerland

Application September 20, 1951, Serial No. 247,515

Claims priority, application France September 25, 1950

19 Claims. (Cl. 26—57)

The present invention deals with improvements in tentering machines.

This invention relates more particularly to a device intended to effect overfeed of the material with respect to the clips of tentering machines, so as to introduce the fabric or similar lengthy material into the clips with a certain advance or overfeed which enables the fabric to form cross or transverse pleats on its being gripped in the clips, with a view to permit shrinkage imparted to the fabric through its treatment in the tentering machine.

One of the objects of the invention is to provide means enabling the fabric to be brought or fed to the clips with overfeed, but without allowing it to form cross pleats at the edges of the fabric before they are gripped by the clips. Generally it was rather difficult if not impossible to hold or support the fabric directly at the edge thereof during its introduction into the clip.

The device according to the invention, which realizes the above object to be attained, includes, in combination: inlet or intake means arranged at the entry of the tenter and devised in such a way as to introduce the fabric into the tenter with a linear speed which is in fixed (predetermined) relation to the speed of the tenter clips and higher than the latter; overfeed means arranged at the beginning of the forward course of the clips and intended to present the fabric to the open clips, while stretching the fabric over the distance between the intake means and the overfeed means; driving means arranged in such a way as to drive the overfeed means at a higher speed than that of the intake means so as to ensure tension of the fabric between the intake means and the overfeed means; connecting means devised so as to regulate the lateral position of the overfeed means in relation to the position of the guide rail means; and means for guiding and straightening arranged in front of the overfeed means and intended to keep the fabric or like material flat before and during its introduction.

According to another characteristic of the invention, the construction and arrangement of the driving means are carried out as to drive the overfeed means through a device limiting the torque.

According to another characteristic of the invention, the overfeed means include lower and upper pressing rollers movable in axial direction, and connecting means intended to displace said rollers in accordance with the displacement of the inlet parts of the guide rails of the tenter.

According to a further characteristic of the invention, the overfeed means is placed short of the selvedge, so that the selvedge passes beyond the overfeed means in sufficient quantity which preferably corresponds approximately to the depth of penetration inside the clips.

According to yet another characteristic of the invention, the lower pressing roller of the overfeed means is cylindrical, while the upper roller has the shape of a truncated cone. The axis of the upper roller is inclined in such a way that the generatrices of the two rollers become

parallel and contiguous to one another at the location of contact between these rollers.

According to still another characteristic of the invention, the upper generatrix of the lower pressing roller is positioned at a level higher than that of the tables or base plates of the clips.

According to still another characteristic of the invention, the connecting means controlling the position of the movable pressing rollers of the overfeed means are devised in such a manner as to convert the pivoting regulating movement of the inlet parts of the guide rails of the tenter into a rectilinear transverse movement of said pressing rollers.

According to another characteristic of the invention, the driving means include a friction drive.

According to still a further characteristic of the invention, the means for guiding and straightening comprise two guiding plates arranged at opposite faces of the fabric, in front of or before the overfeed means, the lower plate being disposed at a level higher than that of the base plates of the clips.

According to another characteristic of the invention, the upper guiding plate has a projecting part or tongue which enters the opened clip between the fabric and the movable faller of the clip.

Other characteristics and advantages of the invention will appear as the description proceeds, which now follows, reference being had to the attached drawings, in which:

Fig. 1 is a diagrammatical view of a machine embodying the invention shown in elevation and parts in section taken along line I—I of Fig. 2.

Fig. 2 is a top plan view of the machine of Fig. 1.

Fig. 3 shows, on an enlarged scale, and schematically the introduction of the fabric into the clips.

Fig. 4 is a detailed view showing the coupling of the overfeed rollers to the guide-rails.

Fig. 5 is a detailed view displaced about an angle of 90° in relation to Fig. 4, showing the mounting of the upper overfeed roller.

Fig. 6 is a plan view of Fig. 4, the upper roller being omitted.

Fig. 7 is a sectional view of a detail seen in Fig. 1.

In the drawings, 1 is the main drive shaft of the overfeed device which in turn is driven in any manner, for instance, as shown, from the main driving shaft of the machine. This shaft 1 drives, through bevel gears 2, two pulleys 3, controlling, through trapezoidal belts 4, a speed regulating device for altering the speed, including two grooved parts forming pulleys 5, whose relationship may be changed to increase or decrease frictional contact therebetween, within certain limits, by operating a handle 6 in the direction of arrow *x*, so that, for example, parts or halves of pulleys 5 may be shifted closer together and V-belts 4 are moved further away from the pulley axis (see arrow *y*).

A sprocket wheel 7, rotatably arranged with grooved pulleys 5, is in driving relation with sprocket wheel 8, which, in turn, is fixed to the shaft 9 which supports lower intake roller 10. There cooperates with this roller 10 a displaceable pressing roller 11 mounted on a shaft 12 which is journalled in arms 13 and which is capable of pivoting round a shaft 14, thus allowing the roller 11 to be applied against the roller 10 in such a way as to grip therebetween the fabric to be brought in. It is to be noted that the ratio of transmission of the ensemble consisting of the parts 2 to 8 is variable, in such a way that the peripheral speed of the roller 10 may be rendered equal to, or, in a determined ratio, higher than the linear speed of the clips of the tenter, to realise either a running operation without advance or overfeed of the fabric in relation to the clips, or the over-feeding operation.

The shaft **9** of the roller **10** bears, on the side opposite to the sprocket wheel **8**, another sprocket wheel **15** in driving relation with a sprocket wheel **16**, rotatable together with disc means **17***a* against which are applied disc means **17***b* by the action of a spring **18** the tension of which can be regulated by the handle **18***a*. Disc means **17***a*, **17***b* are rotatable together with a sprocket wheel **19**, driving, through the chain **20**, the sprocket wheel **21**. The ensemble consisting of the parts **16** to **19** constitutes a friction drive effectuating only the transmission of a force which is limited by the friction between the discs **17***a* and **17***b*.

The sprocket wheel **21** is fixed on a shaft **22** (Fig. 1), journalled in bearings **23**, and on which there is slidably disposed a coupling **22***a* which is rotatable together with this shaft by means of a key **22***b* (Fig. 1). The coupling **22***a* is integral with a sprocket wheel **22***c*, driving, through a chain **22***d*, a sprocket wheel **22***e* integral with the lower roller **24** of the overfeed device, journalled in supports **22***f* integral with the shifting of the coupling **22***a*. This roller **24** cooperates with an upper roller **25**. In the embodiment shown in Fig. 1, the lower roller **24** is cylindrical, while the upper roller **25** has the shape of a truncated cone. For this reason the shaft **26** of the roller **25** is inclined in such a manner that the generatrices of the rollers **24** and **25** are parallel to one another at the location of contact (Fig. 3). However it is to be noted that the upper roller **25** may also assume cylindrical shape.

The shaft **26** is integral with a coupling **27** capable of pivoting round the horizontal branch or arm **28***a* of a supporting stem **28** provided with three arms, **28***a*, **28***b*, **28***c* (Fig. 5). The coupling **27** has also a counter-weight arm **29** intended for the application of the roller **25** against the roller **24**.

The vertical branch **28***b* of the supporting stem passes through a coupling **30** which connects with a carrier **31** adapted to be displaced along a bar **34**, by means of upper and lower rollers **32** and **33** (Figs. 1, 4 and 5).

The movable mounting of the rollers **24** and **25** of the overfeed device is necessary so that this ensemble can follow the correcting movements of the rails guiding the clips brought into action by the variations of the lateral position of the fabric, in order to present the edges of the fabric to the clips always under identical conditions.

For this purpose, the supporting stem has an arm **28***c* extending downwards, on which is jointed, by means of a screw **28***d* and a washer **28***e* an eyelet **28***f* supporting a rod **28***g* which terminates in an eyelet **28***h*. Eyelet **28***h* is capable of pivoting about a pivot **28***i* fixed on a member **28***k* to form the shape of a **Z** therewith and which is fixed by bolts **28***l* on the guide-rail **50** of the clips.

As is known, the guide-rail **50** carries out a correcting movement consisting of a pivoting movement round one of its ends; the movement of the rollers **24** and **25** should then be carried out in such a manner that their axes remain parallel to those of the intake rollers **10** and **11**, in order to avoid any undesirable lateral deviation of the fabric.

This result is obtained, as the upper roller **25**, due to the mounting which has just been described, includes the connection with two articulations **28***d*—**28***f* and **28***i*—**28***h*.

The connection coupling the lower roller **24** to the guide-rail **50** is effectuated by a flat iron bar **51** fixed to the guide-rail **50** and cooperating with another flat iron bar **52** connected with the stirrup **22***f* in which is journalled the roller **24**. The flat iron bar **52** has a slot **53** (Fig. 6) in which engages a bolt **54** fixed on the flat iron **51** by means of nut **55** and thus ensuring an articulated connection between the flat irons **51** and **52** (Fig. 4) as a result of this connection, between the guide-rail **50** and the support of the roller **24**, the shifting of the roller **24** according to a translating movement corresponding to a sliding of the coupling **22***a* on the shaft **22**, may be accomplished due to a pivoting movement of the guide-rail **50**.

Fig. 6 shows the inclined position of the guide-rail **50** in relation to the axis of the roller **24**. Further, it will be seen that the flat irons **51** and **52** are applied against one another over a sufficiently great length, which prevents the rocking of the stirrup **22***f* round the shaft **22**.

It is to be noted that the rollers **24** and **25** should be fitted with individual connections with the same guide-rail, seeing that the fabric passing between these two rollers prevents the realisation of a transverse driving device of a simple construction common to both rollers.

Again it is to be remarked that the ratio of the transmission inserted between the shafts **9** and **22** and including the parts **15** to **21** is such that the peripheral speed of the rollers **24** is higher than that of the intake roller **10**, if there is no sliding between the friction discs **17***a* and **17***b*.

Further it is to be noted that the upper generatrix of the roller **24** is disposed at a level higher than that of the tables of the clips to be fed.

Between the intake rollers **10**, **11** and the overfeeding, rollers **24** and **25** is arranged a guiding and straightening device which consists, in the embodiment shown, of a lower plate **36** and an upper plate **37**, situated at a short distance from one another and between which passes the fabric **35** (Fig. 1).

The lower plate **36** ends close to the overfeeding rollers **24**, **25**. The upper plate **37** has a sloping edge **38** of which the width is reduced in such a way as to leave nothing but a narrow projecting part or tongue **39** intended to enter the opened clips between the portion of the fabric positioned as shown at **35***a* (see Fig. 3), placed on the table **40** of a clip, and its faller **41**.

The clips have, in the usual manner, a stationary base plate or table **40** cooperating with a rocking faller **41**, in order to grip the selvedge of the fabric. The table **40** is furnished with transverse openings, preferably slots or notches, intended to receive the cross folds of the fabric engaged in them by rollers **42** mounted on the faller **41** and the number of which corresponds to that of the slots in the table (see U. S. Pat. No. 2,489,275).

The opening and closing of the clip are controlled by an upper tail piece or finger **43** integral with the faller **41** and cooperating with a guiding member **44** having a sharp angular recess **46** (Fig. 2) located at a place corresponding to the conclusion of the introduction of the fabric into the clip.

The body **47** of the clip is fitted with a tooth element **48** fixed at the back and intended to be seized by the corresponding cavities provided on the circumference of the usual driving pulleys **49** which are located at the ends of the transporting arrangement of the tenter. This tooth element **48** supports a roller **48***a* rolling on a track or rail **48***b* guiding the clip along the tentering machine.

The device works as follows:

The fabric **35** enters the machine and passes through intake rollers **10** and **11**. As already explained, the ratio of the transmission with respect to parts **3** to **8** and the movement from the driving shaft **1** to the shaft **9** on which the intake roller **10** is fastened, is such that the linear speed of the fabric at the intake is higher than that of the clips moved by the pulley drive **49**.

The fabric, coming from the intake rollers **10** and **11**, is drawn by the overfeed rollers **24** and **25**. As explained, the ratio of the transmission formed by the members **15** to **21** is such that the overfeed rollers have a tendency to revolve more quickly than the intake rollers. Consequently, the overfeed rollers **24** and **25** exercise a traction on the fabric coming from the intake rollers **10** and **11**. The strength of this traction is limited, however, by the friction discs **17***a*–**17***b* to an amount compatible with the resistance of the fabric, by the regulation of the spring **18**. As the rollers **24** and **25**, on the one hand, and the rollers **10** and **11**, on the other

hand, are positively moved by the fabric, they revolve, in fact, at the same peripheral speed, the tendency of the shaft **22** to revolve in advance having merely the result of stretching the fabric between the rollers **24** and **25**, on the one hand, and rollers **10** and **11**, on the other hand, with a force limited by the friction discs **17***a*–**17***b*, which then slide upon one another.

It is important to present the selvedges of the fabric to the clips without cross pleats, which is ensured on the one hand by the traction exercised on the fabric between the intake rollers and the overfeed rollers in the way that has just been explained, and on the other hand by the passage of the fabric between the plates **36** and **37** of the guiding and straightening device.

The fabric is guided by the lower guiding plate **36** up to immediate proximity with the clips commencing their running movement after having passed round the driving pulley **49**. In the clip, the fabric takes its position, as shown in Fig. 3 at **35***a*, on the table **40** of the clip, as the generatrix of contact between the rollers **24** and **25**, as well as the upper surface of the lower guiding plate **36**, are at a higher level than that of the clip table.

The tongue **39** prolonging the upper guiding plate **37**, prevents the fabric from hooking on to the faller of the clip.

During the introduction of the fabric into the clip, the latter is kept open by the fact that the upper tail piece or finger **43** of the faller slides along the longitudinal edge of the member **44**. Seeing that the fabric is conducted, by the overfeed rollers **24** and **25**, at a linear speed higher than that of the clip and that, on the other hand, the advancing movement of the fabric is stopped, in front of the clip, while being fed, by the gripping of the fabric in the preceding clip which is already closed, the clip receives a length of fabric greater than the length of its table. When this overfeeding has been ensured over the total length of the clip table, the finger **43** cooperates with recess **46**, entailing a sharp recoil of the finger **43**, in such a way as to allow of a rocking of the clip faller, bringing the rollers **42** in contact with the fabric, said rollers then distributing the excess fabric between the slots of the table **40** provided for this purpose according to U. S. Patent No. place in the usual manner when the fabric is withdrawn 2,489,275. The complete closing of the clip then takes from under the rollers **42** owing to the spread out apart portions of the guiding rails of the clips which are then brought to the working position corresponding to the width of the fabric.

It is to be understood that the embodiment above described and shown on the drawings is only given by way of a simple, non-limitative example, and there may be altered in any suitable manner, the shape, nature, arrangement and mounting of these parts, without, for this reason, exceeding the scope of the invention.

Thus the friction transmission means arranged between the intake rollers and the overfeed rollers can be replaced by a device for the correction of speed, enabling the edges of the fabric to be kept stretched and the excess speed necessary for overfeeding action to be corrected, in order to avoid excess tension from producing a harmful effect on the fabric.

The overfeed means can also consist of two rollers, or endless bands, superimposed, provided with symmetrical ribs in the shape of gear teeth, the depth of penetration of the teeth of the upper roller or band between the teeth of the lower roller or band being capable of exact regulation. As the result of this device the fabric assumes an undulating or wavy shape when passing through said means and this fact causes it to be kept stretched over the distance between the intake means and the overfeed means.

Further, the guiding and straightening device can also consist of a lower guiding plate cooperating with a rotating cylinder fitted with blades of rubber or brushes and animated by a movement of rotation in the same direction as the movement of the fabric but at a linear speed higher than that of the fabric. The rotating cylinder will thus produce traction on the free edges of the fabric while avoiding all risk of pleating or even of the rolling up of the selvedges.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. An overfeed device for tentering machines having displaceable guide rail means, tenter clips and tables for the latter comprising intake means for moving fabric toward said tenter clips with a linear speed proportional to the speed of the tenter clips and higher than the latter; overfeed means spaced from said intake means and arranged at the beginning of the forward course of said tenter clips when they are opened to present the fabric thereto while stretching said fabric over the distance between said intake means and said overfeed means; driving means for said overfeed means and constructed to drive the latter at a higher speed than that of said intake means, to thereby ensure tension of the fabric between said intake means and said overfeed means; connecting means for regulating the lateral position of said overfeed means in relation to the position of said guide rail means; and means for guiding and straightening said fabric and arranged adjacent said overfeed means and for regulating the flatness of the fabric before and during its introduction into the tentering machine.

2. A device according to claim 1, wherein said driving means include torque limiting means for said overfeed means whereby the tension of the fabric is controlled.

3. A device according to claim 1, wherein said overfeed means are placed short of the selvedge of the fabric, so that the selvedge extends beyond said overfeed means for a distance which corresponds approximately to the depth of penetration of the selvedge inside said tenter clips.

4. A device according to claim 1, wherein said overfeed means includes lower and upper pressing rollers movable in axial direction, and guide means for displacing said rollers in accordance with this displacement of said guide rail means.

5. A device according to claim 4, wherein the lower pressing roller of the overfeed means is cylindrical, while the upper roller has the shape of a truncated cone, the axis of the upper roller being so inclined that the generatrices of the two rollers become parallel and contiguous to one another at the location of contact between these rollers.

6. A device according to claim 5, wherein the upper generatrix of the lower pressing roller is positioned at a level higher than that of the tables of the clips.

7. A device according to claim 4, wherein said guide means control the position of the movable pressing rollers of said overfeed means in accordance with the displacement of said guide rail means, said guide means including means for transforming the pivoting regulating movement of said guide rail means into a rectilinear transverse movement of said pressing rollers.

8. A device according to claim 1, wherein said driving means includes a friction drive.

9. A device according to claim 1, wherein said means for guiding and straightening the fabric comprise upper and lower guiding plates arranged on opposite surfaces of the fabric, respectively, said overfeed means being located intermediate said guiding plate, said lower plate being disposed at a level higher than that of said tables of said tenter clips.

10. A device according to claim 9, wherein each of said clips has a movable faller and wherein said upper plate has a projecting part adapted to enter within an opened tenter clip between said fabric and said movable faller of said opened tenter clip.

11. A fabric feeding apparatus for a tentering ma-

chine having a frame, guide rails, clips with table plates; comprising fabric intake means adapted to grip the fabric entering the apparatus, overfeed means adapted to grip the fabric moved through the apparatus, means extending on opposite sides of said overfeed means for guiding the fabric and for straightening the surface of the latter, means operatively connected to said overfeed means for adjusting the feed of said overfeed means relative to the feed of said intake means to thereby stretch the fabric between said intake means and said overfeed means, and means moving said tenter clips at a slower velocity than the velocity of the fabric moved through the apparatus to thereby permit each of said clips to receive a length of prestretched fabric greater than the length of the corresponding table plates of said tenter clips while permitting shrinkage of the fabric on said frame.

12. A fabric feeding apparatus according to claim 11, wherein said adjusting means include limiting means for the torque exerted upon said overfeed means to thereby prevent excessive stretching of the fabric.

13. A fabric feeding apparatus according to claim 11, comprising guiding means for moving said overfeed means in accordance with movement of said guide rails whereby the axis of said overfeed means remains parallel to the axis of said intake means, to thereby prevent lateral deviation of the fabric passing through said machine.

14. A fabric feeding apparatus according to claim 13, said guiding means including means connected to said guide rails for transforming pivotal movement of the latter into rectilinear transverse movement of said overfeed means.

15. A fabric feeding apparatus according to claim 11, said overfeed means including roller means located adjacent the selvedge of the fabric and extending partly over the surfaces of the fabric, whereby the selvedge of the latter is adapted to extend within said clips.

16. A fabric feeding apparatus according to claim 15, wherein said roller means include cylindrical means and conical means having an end thereof truncated, said cylindrical means and said conical means abutting each other, the axis of said conical means being inclined so that the generatrices of said cylindrical means and of said conical means are parallel and contiguous to one another at the point of contact of said cylindrical means and of said conical means.

17. A fabric feeding apparatus according to claim 15, wherein the generatrix of said cylindrical means extends on a plane higher than the plane of said table plates.

18. A fabric feeding apparatus according to claim 11, wherein said driving means includes friction responsive speed regulating means.

19. A fabric feeding apparatus according to claim 11, said means for guiding the fabric and straightening the surfaces of the latter comprising a pair of opposed plates, said overfeed means being located substantially intermediate the ends of said plates, said plates being located on planes extending above the plane of said table plates.

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