May 24, 1938. J. DUNGLER 2,118,375.

SELVEDGE GUIDE APPARATUS FOR FABRICS

Filed March 30, 1936 4 Sheets-Sheet 1

Fig. 1

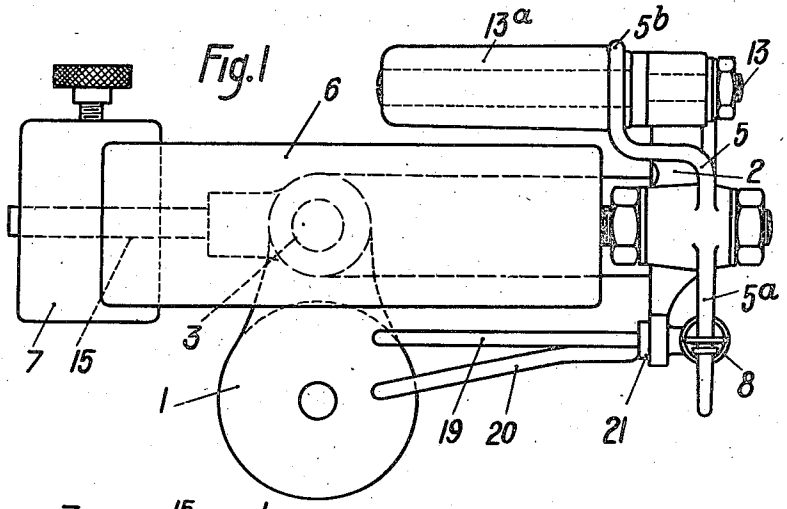


Fig. 2

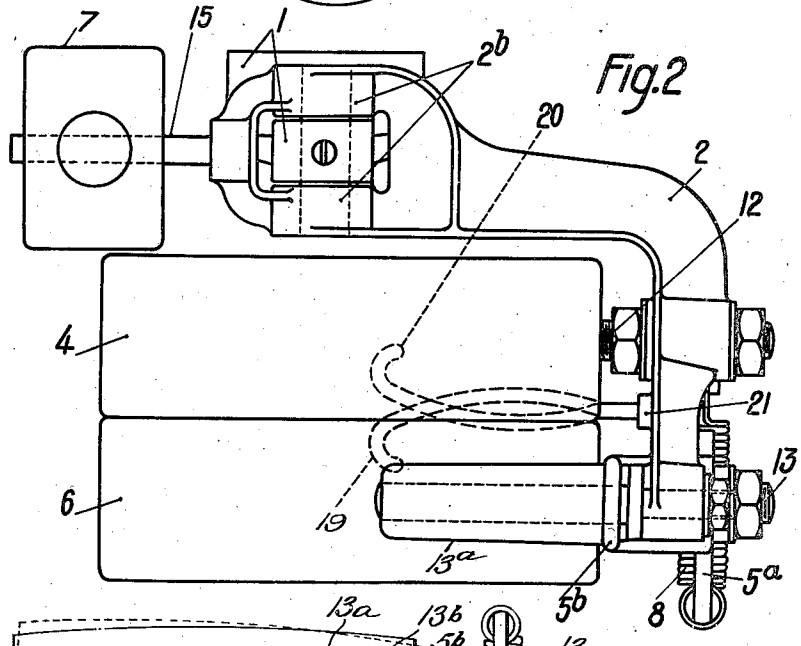
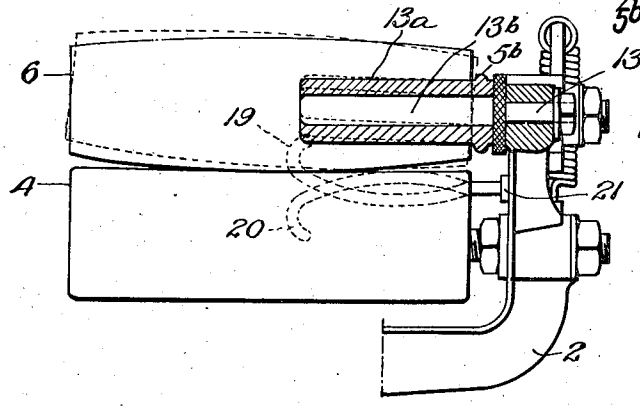


Fig. 10a.



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May 24, 1938. J. DUNGLER 2,118,375

SELVEDGE GUIDE APPARATUS FOR FABRICS

Filed March 30, 1936 4 Sheets-Sheet 2

Fig.3

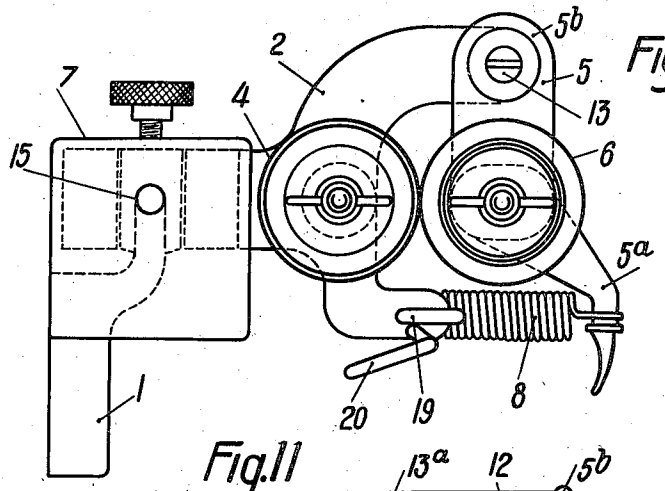


Fig.11

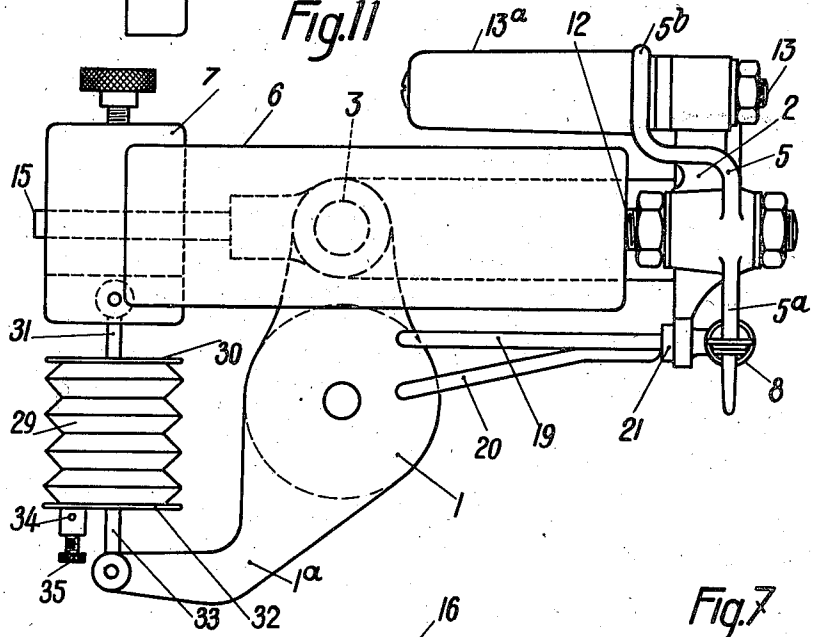


Fig.6

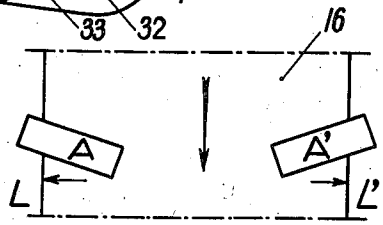


Fig.7

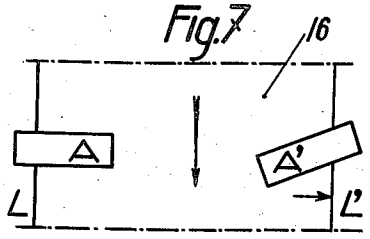
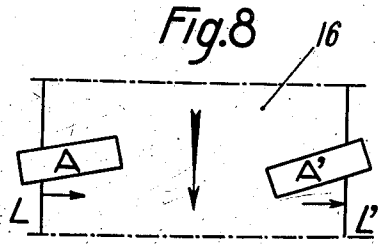


Fig.8



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May 24, 1938. J. DUNGLER 2,118,375

SELVEDGE GUIDE APPARATUS FOR FABRICS

Filed March 30, 1936 4 Sheets-Sheet 3

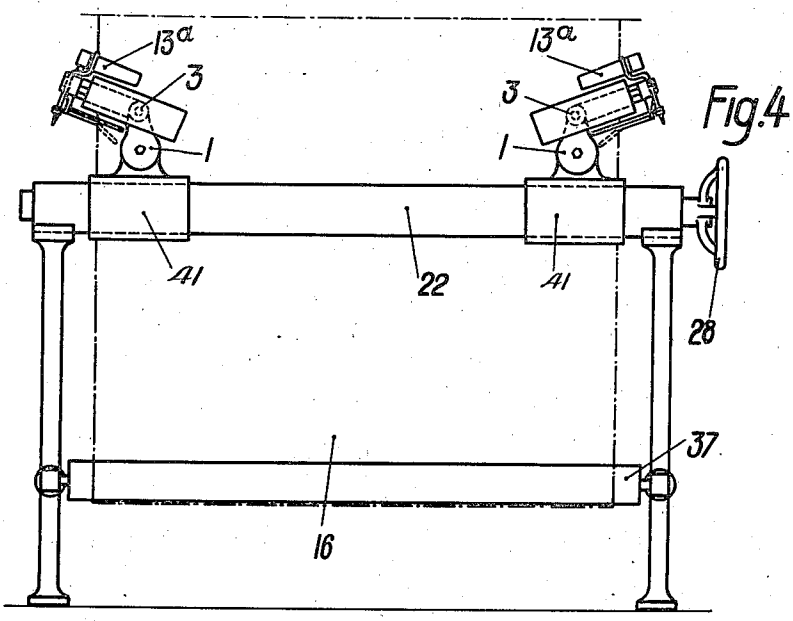


Fig.4

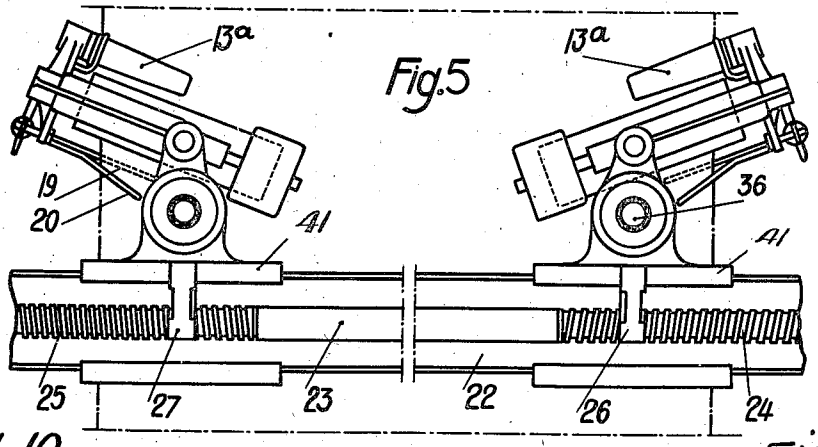


Fig.5

Fig. 10.

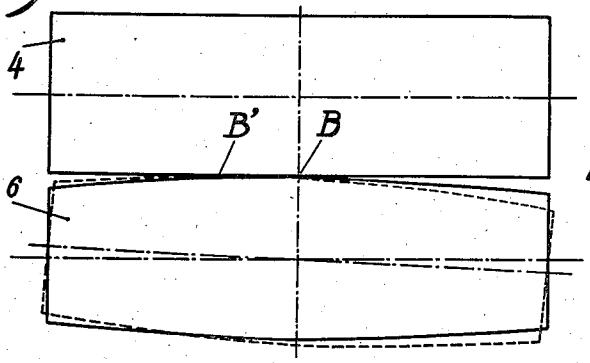
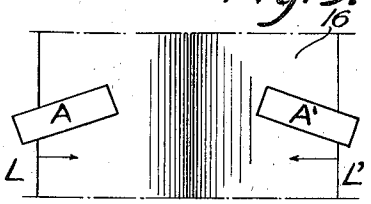


Fig. 9.



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May 24, 1938. J. DUNGLER 2,118,375

SELVEDGE GUIDE APPARATUS FOR FABRICS

Filed March 30, 1936 4 Sheets-Sheet 4

Fig.12

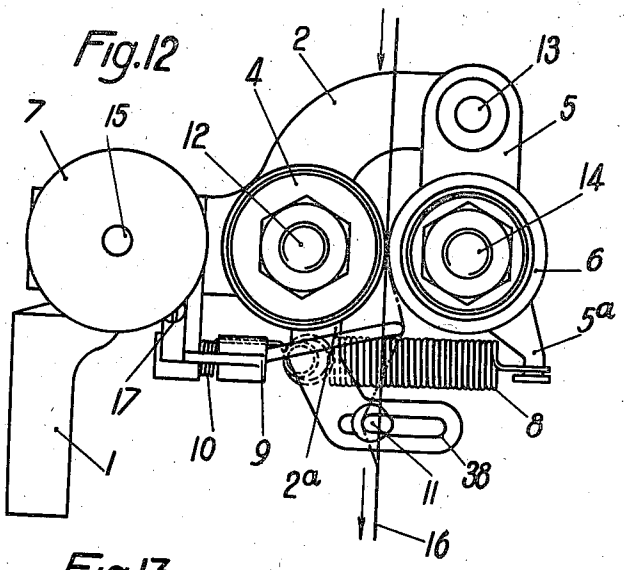
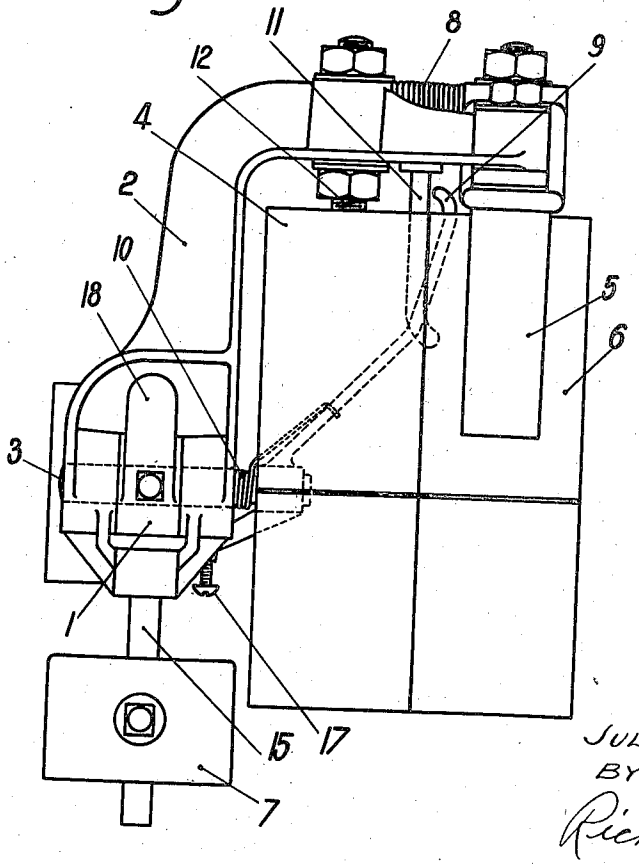


Fig.13



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UNITED STATES PATENT OFFICE

2,118,375

SELVEDGE GUIDE APPARATUS FOR FABRICS

Julien Dungler, Thann, France

Application March 30, 1936, Serial No. 71,639
In France June 14, 1935

6 Claims. (Cl. 26—67)

The invention relates to selvedge guides for textile fabrics in the open width, such guides being used for example in dyeing and finishing machines, tenter frames, drying drums, calenders, singeing machines, machines for folding and rolling fabrics, etc.

It is known to provide two sets or heads of selvedge guides at the feed end of such apparatus, one set controlling one selvedge of the fabric and the other controlling the other selvedge as these pass along through the machine, to keep the fabric in the straight path. Generally, each guide consists of rollers between which the selvedge passes.

According to the present invention a mechanical selvedge guide apparatus is provided in which the roller-carrying frame of each guiding head is pivotally mounted to move around an axis perpendicular to the plane of the fabric and comprises, in combination, a device in which the selvedge of the fabric engages, thus acquiring an undulatory or S form, and a counterweight or other means exerting on the roller-carrying frame an action opposed to the frictional effect of the selvedge on the device in which it is engaged, in order to set up the guiding head in a state of equilibrium varying according to the lateral displacement of the fabric, so that said fabric causes, when a lateral displacement occurs, a tilting of the pivoted frame so as to bring the guiding head in a neutral position, the opposite head thus drawing the fabric again into its proper path, or still in case of a very pronounced deviation of the fabric, to bring said first mentioned guiding head in a position of repulsion.

In a preferred form of embodiment of the invention, the pivoting roller-carrying frame of each guiding head is furnished with a fork disposed preferably below the rollers, in which engages the corresponding selvedge of the fabric, and of which the branches are curved and mounted in such a manner that in projection on a perpendicular plane to that of the fabric their curves are inwardly and in opposite directions and are secant, whilst in projection on a plane parallel to that of the fabric they diverge from their point of attachment on the frame.

Numerous advantages arise from this construction and arrangement:

(*a*) The apparatus has a universal use assuring, always with the maximum of efficiency, the guiding of all fabrics whatever may be their quality, thickness, speed of movement, tension, or whatever the degree of stretching of the selvedges, etc.

(*b*) High efficiency is attained, inasmuch as both selvedge guides can co-operate to straighten the fabric, one by a pull on its selvedge and the other by a pushing action, to restore the fabric to normal path;

(*c*) Simplicity of construction and function renders the guides practically indestructible and fool-proof;

(*d*) Given, that the rollers are always in contact with the fabric selvedge and exercise an uninterrupted pressure thereon, such fabric cannot be creased or wrinkled, as happens sometimes with apparatus which functions on the system of roller separation. In known forms of the latter system it is the contact of the moving fabric which produces the rotation of the rollers, with the result that their movement slackens when they separate as a result of the lateral deviation of the fabric, and when the roller pair again come into operative contact with the latter the roller inertia which has to be overcome is apt to cause creasing on delicate fabrics.

(*e*) The action is not jerky, each movement being on the contrary progressive and this progression corresponding to the speed of movement of fabric deviation.

These advantages, with others not particularized, will be realized from the full description of the invention now to be given, reference being had in the description to the drawings annexed wherein:

Figure 1 is a view in front elevation of an improved guiding head;

Figure 2 is a view in top plan;

Figure 3 in an end view;

Figure 4 is a front elevation of a complete assembly of the apparatus;

Figure 5 is a fragmentary view of the rear view in elevation, to an enlarged scale;

Figures 6, 7 and 8 are schematic showings of the apparatus at various positions in its operation;

Figure 9 illustrates schematically a particular method of utilization of the apparatus;

Figure 10 shows a variation of detail in connection with the rollers;

Figure 10*a* shows a detail of the construction and mounting of the rollers of Figure 10.

Figure 11 is a front elevation similar to that of Figure 1 showing a variation of the arrangement for braking the oscillatory movement.

Figure 12 is an end view similar to that shown on Fig. 3 and illustrates a modification; and

Figure 13 is a view in top plan of the said modification.

Each of the guiding heads comprises a frame 2,

articulated to move around an axis 3 of bearing members 2b of the said frame, and a fixed support 1. To the frame 2 are fixed an axis 12 on which is mounted to rotate freely a roller 4 and an axis 13 of a sleeve 13a around which is freely engaged the upper projection 5b of a movable arm support 5 on which is mounted the axis of a roller 6 constantly pressed against the roller 4 by the influence of a spring 8, which is anchored at one end to a lower projection 5a of the support 5 and at the other end to the frame 2. On the other side of the bearing members 2b the frame 2 carries a lever 15 with counterweight 7 when the head is in use, as shown in the drawings, for the guiding of a fabric 16 which moves vertically; for the guiding of a fabric in the horizontal or in an inclined plane the position of the counterweight should be changed as necessary, or it would be replaced by a spring attached to the frame 2 and at a fixed point in the machine.

The arrangement on which the selvedge of the fabric comes (that is to say, which obliges the said selvedge to take a form more or less undulatory or S-shaped and to exercise thereon friction to a required degree) is constituted by a fork of which the branches 19, 20 are curved and mounted in such a manner that in vertical projection they diverge from their common point of attachment 21 on the frame 2 (Figures 1 and 3) whilst in horizontal projection (Figure 2) their curves are secant and inwardly in opposite directions.

It is this fork 19, 20 which regulates the inclination of the rollers during the movement of the fabric 16. Obviously, such fork may have more than two branches; it may have three, or more.

Normally, the rollers 4, 6, of each head A A' are maintained at the limit or their lower position by the counterweight, 7, that is to say their angle to the horizontal is at the maximum.

After having engaged the fabric 16 in the two heads, the distance between the latter is regulated. It is evident that in proportion as the heads A A' approach each other, the extent to which the fabric engages between the rollers 4, 6 increases. After passing the vertical plane of the axis of articulation, 3, the selvedge engages in the fork 19, 20. At this point in the operation the rollers depart from their lower limit position to draw progressively towards the horizontal position, this latter movement taking place in proportion as the engagement of the fabric in the fork increases.

In normal working conditions, the distance between the heads A A' is regulated to a point where these heads occupy a position sufficiently near the horizontal without however quite reaching it (Figure 6).

Assuming that the fabric, moving downwardly in the vertical plane, moves towards the left of the drawing: The engagement of the selvedge L with the branches 19, 20 of the fork increases and, as these two branches approach each other progressively in the vertical plane whilst being secant in the horizontal plane, the effect of the embarrage (that is to say the accentuation of the undulatory or S form taken by the selvedge L and the increase of the frictional effect exercised by such selvedge on the branches of the fork) is augmented in a very high degree for a minimum displacement of the selvedge L. This effect changes the equilibrium of the apparatus and the head A approaches the horizontal position. Its stretching effect on the fabric thus lessens progressively to zero when the rollers of the head A have attained the horizontal position.

This lateral displacement of the fabric will have equally the effect of withdrawing the selvedge L' to a certain degree from the fork of the head A'. As a result, on this side also there is a disturbance of the equilibrium but having an opposite reaction; the downward inclination of the head A' increases (Figure 7). There is thus a double effect; on the one hand a tendency towards the neutralization of one of the two heads, for example the head A, and on the other hand a progressive increase of the tractive effort of the other head A' upon the fabric.

If the lateral deviation of the fabric continues to increase the head A will reach and if necessary will pass the horizontal position and will exercise in the latter event a repulsive effect on the fabric 16. This effect, in addition to the tractive effort of the head A' which tends to move towards its lower position acts on the fabric with the highest efficiency (Figure 8).

From the explanation given it will be clear that in each head there is set up a frictional effect of the fabric 16 on the branches 19, 20 of the fork, and by the opposing effort of the counterweight 7 a state of equilibrium is set up which varies according to the lateral deviations or displacements of the said fabric.

This form of fork possesses the advantage of setting a strict limit to the lateral displacement of the fabric. In fact, due to the superposing of the two bars of the fork, the friction of the fabric increases in such proportions that the apparatus sets itself in a position of repulsion (when this effect of repulsion is attained it is evident that the lateral displacement of the fabric is stopped short) before the fabric has attained the point of junction of the two branches, all risk of nipping such fabric, which would impart sudden and brusque reactions to the apparatus, being avoided.

To permit of the pressure of roller 6 on roller 4 under the action of the spring 8 being exercised not on a generating line of contact but at a point, and to permit of the regulation of position of this point according to the speed of movement of the fabric, one at least of the rollers, 6 for example, is provided with a peripheral surface which is slightly convex (in Figure 10 this convexity is exaggerated for clearness), and there is further provided a regulation of the position of the axis of the roller 6 in relation to that of roller 4. The method of adjustment is best shown in Fig. 10a, where it will be noted that the element 13 is positioned eccentrically in respect to the element 13b, so that rotation of the elements 13 and 13b will change the relative positions of the rollers 4 and 6. For example, the axis 13 of the sleeve 13a is eccentric so that by rotation by a fraction of a turn of the said sleeve, displacement of the axis of the roller 6 is effected, this latter taking the position shown in dotted lines in Figure 10, the point of pressure passing thus from B to B'. For slow speed of movement of the fabric 16, the parallelism of the axes may be maintained, so that the point of contact B is in the plane of the axis of articulation 3, and thus the oscillation of the apparatus may take place with the highest degree of smoothness. The further the rollers converge towards their free extremities, the further is the maximum point of pressure B' removed from the plane of the axis 3 and the more is the exercised braking effect accentuated. The regulation of the apparatus can thus be effected with great precision.

The guiding heads may be mounted on any kind of appropriate supports.

In the examples shown in Figures 4 and 5, each of the heads is fixed by its support 1, and by means of a bolt 36, on a carrier or runner 41, slidably mounted in a runway or guide rail 22. Inside the rail 22 is arranged a bar 23 with opposite hand screw threads 24, 25, on which are engaged tapped lugs 26, 27, the distance of separation of the latter being regulated by means of a handwheel 28 keyed on the end of the bar 23. After traversing the two guiding heads, the fabric passes around a roller 37 and is then introduced into the machine for treatment.

The apparatus can equally well be mounted with a connection between the two guiding heads of a set of levers and rods. With this arrangement, the pivoting of one of the heads around its axis causes the pivoting of the other head in the opposite direction.

In certain uses of the machine it is essential to obtain a very precise guiding effect, that is to say, that the selvedges must be introduced into the machine with a very strict parallelism, regardless of the width of the fabric. To attain this, instead of placing the two heads A A' at regulatable points of separation their space is diminished, so that each of them reaches and even passes the horizontal position (Fig. 9). At this moment the selvedges L, L' will permanently attain the extreme limit point of their penetration between the forks 19, 20 and the selvedges will remain quite parallel. If the fabric 16 should widen, its excess of width would be pushed towards the axis of the machine without destroying the parallelism of the selvedges.

There can be added to the apparatus a braking movement supplementary to the oscillatory movement, this braking arrangement functioning pneumatically, hydraulically or in any other manner.

In the example shown in Figure 11 this braking arrangement consists of a bellows 29, of rubber or other suitable material, one of the end plates 30 of which is connected by a rod 31 of the counterweight 7 whilst the other end plate 32 is attached by a rod 33 to a lateral projection 1a of the fixed support 1. At each oscillation of the pivoting roller-carrying system and as a result of the counterweight 7, the membrane which constitutes the bellows 29 is compressed and then extended. At the moment of compression the air contained in the bellows is forced out through an opening 34 which is in communication with an orifice the section of which is regulatable by means of a cone (needle) screw 35. On extension of the membrane, air is drawn into the interior through the said orifice. As will be understood, the bellows could be replaced by a cylinder in which a piston might slide, or by any other arrangement producing a braking effect.

In the modification according to Figs. 12 and 13, the rollers 4 and 6 are each preferably composed of two or more cylindrical sections placed end to end, each of these sections being independently rotatable so that, the occasion arising, they can have different speeds imparted to them. In practice two of these sections, as shown in the drawings, give very good results without the necessity of increasing the number, and in that case the plane in which are situated the abutting ends of the sections should preferably be placed in the plane of the axis of pivoting at 3, as seen in the drawings Figure 2.

Upon the frame 2, the pivoting movement of which is limited by stops, solid with the support 1, one of these stops being seen at 18, there are fixed a pivoting rod, or feeler 9, having a return spring 10 or a counterweight, and a fixed rod 11 adjustably mounted in a slot 38. In normal position the feeler 9 occupies the highest position; the engaging portion of the feeler and the rod 11 are not in the same plane but have a crossed position. The selvedge of the fabric which selvedge before being put astride upon the rods 9 and 11 forms a straight line takes the form of an S after having been engaged, as seen in broken lines in Figure 12. It will be evident that by the tractive effort exerted by the fabric 16 on the feeler 9, the latter will be drawn to its lower position nearer to the bar 11. In this position there is still a space between the two members 9 and 11, due to the fact that the extent of movement of the feeler 9 is limited by the stop screw 17, but the S formed by the selvedge will be more pronounced.

To summarize the operation of the device of the present application, the fabric is designed to move vertically downwardly between the rollers 4 and 6 and the prongs 19 and 20 of the fork, as is best illustrated in Figures 6 to 9 by the large central vertical arrow.

When the fabric is not in position in the rollers, the weight 7 will incline the rollers sharply downwardly in the position shown in Figures 4 and 5.

When the fabric is in position and is moving, however, there will be a substantial friction created by passage of the fabric between the prongs of the fork 19 and 20, which friction will tend to counterbalance the action of the weight 7 with the result that the device will assume some position of equilibrium.

In Figure 6, it will be noted that the devices A and A' are still turned or inclined slightly downwardly in the direction of movement of the fabric with the result that there will be a slight tractive force, as indicated by the short transverse arrows.

Usually only one adjustment need be made of the position of the rollers A and A' at the beginning of operation and thereafter the action of the weight and the friction created between the forks 19 and 20 will automatically adjust the position of the selvedges L and L' so that the desired position of the selvedges will be maintained and desirably the normal operation position is that indicated in Figure 6 where the rollers A and A' are slightly inclined in the direction of motion, as indicated by the large vertical arrow.

However, the rollers A and A' might be positioned further away or closer together than is shown in Figure 6, the latter condition being shown in Figure 9.

When the rollers A and A' have been set in the position of Figure 6, and the fabric is displaced laterally toward the left causing further penetration of the selvedge L between the forks 19 and 20, the friction will increase on the device A and the rollers A will advance to a higher position, as shown in Figure 7, against the action of the weight 7.

As this occurs, the tractive effect upon the selvedge L will decrease until it becomes zero.

At the same time, however, the fabric will pull its selvedge L' out of the forks of the head piece A' and as a result, the rollers or head piece A' will incline further downwardly in the direction of movement, increasing the pulling effect upon the selvedge L'. This is best shown in Figure 7.

Thus it is apparent that the position of the

fabric will automatically be adjusted or controlled to return to the normal set position, as illustrated in Figure 6.

In Figure 8, as shown, the position in which the lateral deviation of the selvedge L is indicated, is even greater than in Figure 7 in which the rollers or head A will be inclined toward the direction of movement with the result that there will be an actual repulsion exerted upon the selvedge edge, as indicated by the short arrow at the left of Figure 8.

In Figure 9, where the rollers or heads A and A' are set more closely together causing the fabrics to penetrate further between the forks 19 and 20, a repulsion force will be exerted on both selvedges L and L' toward the center of the fabric.

I claim:

1. A guide mechanism for a travelling web comprising a pair of guide heads having a frame pivoted to swing freely on an axis transverse to the direction of travel of said web, adjustably disposed adjacent opposite selvedge edges and normally inclined towards the direction of travel, a pair of rollers in each of said frames disposed against each other for engagement with the respective edges of the web, fabric engaging means carried by said frame and spaced from said rollers for imparting a progressively increasing undulating course to the web as it is displaced laterally towards the respective guide head and whereby the frictional effect is increased at said guide head and decreased at the other end, said means being so arranged that the friction is substantially equal at both edges of the web and at a minimum when the web travels in the normal course, adjustment means for controlling the position of said frame and said rollers so that they may be positioned transverse to the direction of movement of the fabric when the selvedges are to be maintained in their normal predetermined position and inclined toward the direction of movement of the fabric when the selvedges are moved inwardly from said predetermined position and away from the direction of movement of the fabric when the selvedges are moved outwardly from said predetermined position, balancing means for normally maintaining said frame in a state of equilibrium and mounted on said guide head so as to counteract the effect of said increased friction, whereby a lateral displacement of the web towards one guide head and the consequent increase in friction will cause the respective frame to swing gradually and smoothly with the travel and whereby the consequent decreased friction at the other guide head will cause the respective frame to swing gradually and smoothly in the opposite direction until frictional engagement with the fabric is automatically reestablished pulling the fabric back to its normal course.

2. A guide mechanism according to claim 1, in which said fabric engaging means comprise a fork-shaped element, the branches of said fork-shaped element being curved and arranged in such a manner that in projection on a plane perpendicular to that of the travelling web they curve toward one another and in projection on a plane parallel to that of the travelling web they diverge from each other from their common point of attachment.

3. A guide mechanism according to claim 1, in which at least one of the two rollers has a slightly convex peripheral surface, and means for displacing the axis of said roller relative to the other during the course of the travel of the web whereby the point of maximum pressure of the rollers upon the fabric may be varied according to the speed of the travelling web.

4. A guide mechanism according to claim 1 which includes means for braking the swinging motion of said frames, said means being interposed between said frame and the stationary portion of said guide head.

5. A guide mechanism according to claim 1, which includes means for braking the swinging motion of said frames, said means comprising a resilient bellows interposed betwen the balancing means and the stationary portion of the guide head and means carried by said bellows for controlling its expansion and compression.

6. A guide mechanism according to claim 1, in which said frame is provided with a fixed rod and a movably mounted rod.

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