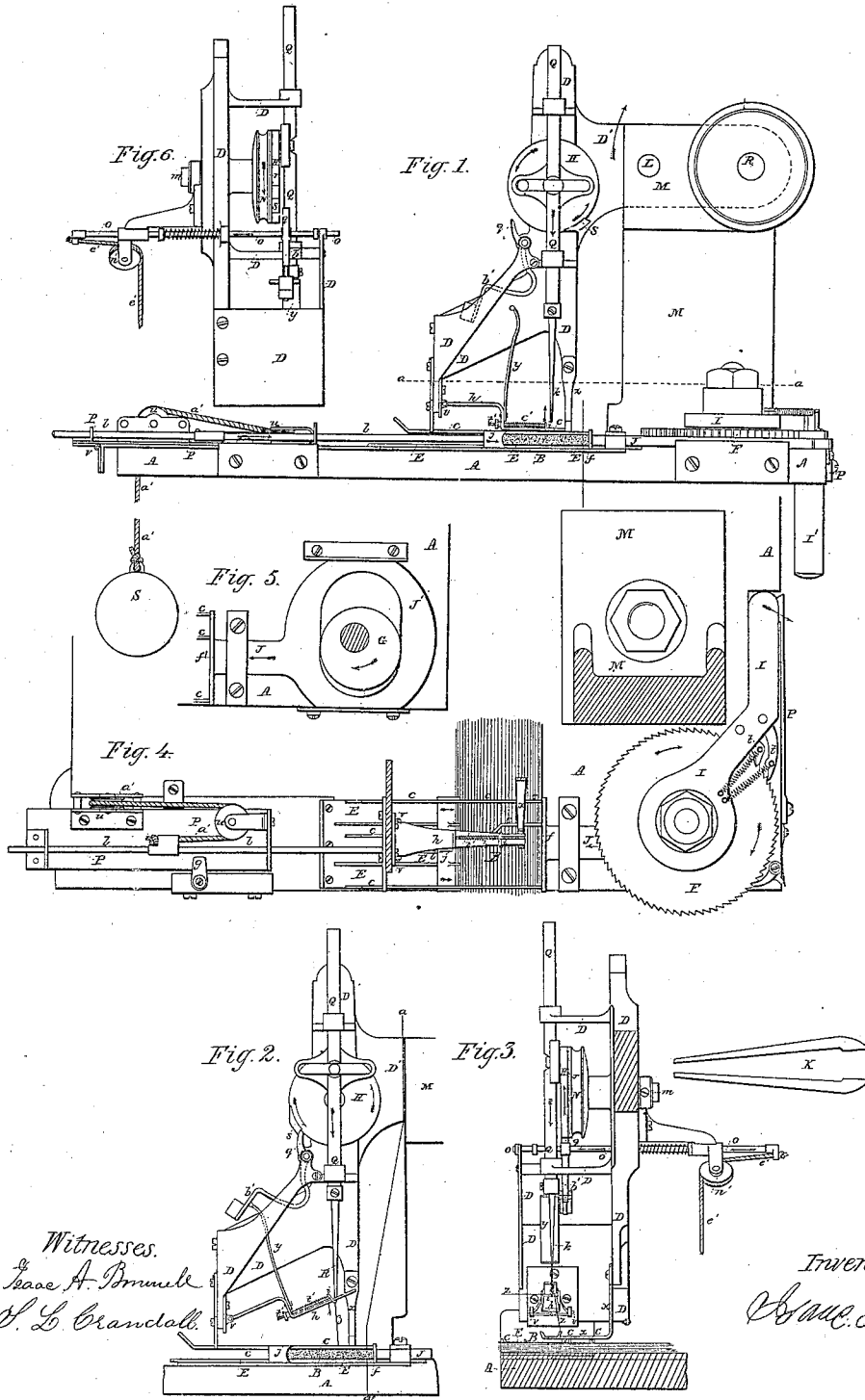


I. LINDSLEY.

METHOD OF FEEDING THE WEFT TO HAIR CLOTH LOOMS.

No. 32,634.

Patented June 25, 1861.



UNITED STATES PATENT OFFICE.

ISAAC LINDSLEY, OF PROVIDENCE, RHODE ISLAND.

LOOM FOR WEAVING HAIRCLOTH.

Specification of Letters Patent No. 32,634, dated June 25, 1861.

To all whom it may concern:

Be it known that I, ISAAC LINDSLEY, of Providence, in the county of Providence and State of Rhode Island, have invented a new and Improved Method of Feeding the Weft to Haircloth-Looms; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a front elevation of the machine which embodies my improved method. Fig. 2, is a like view of the same showing the several parts in different relative positions in accordance with their mode of operation. Fig. 3, is a side elevation and section by the line *a, a*, of Fig. 2. Fig. 4, is a plan and section by the line *a, a*, of Fig. 1. Fig. 5, is a plan of a portion of the machine which is referred to in the course of the description. Fig. 6, is an elevation of the reverse side of Fig. 3.

Similar letters refer to corresponding parts in all the figures.

It has hitherto been found impracticable by any mechanical means to select and separate a single hair or length of weft from a mass or bunch and present the same successively to the hook nippers or other device performing the functions of a shuttle in weaving hair cloths and similar fabrics with the proper degree of certainty and precision to enable the operation to continue uninterruptedly, from the fact that the means employed either failed to select the hair or length of weft at the proper time, or selected more than one length, either casualty resulting in the stoppage of the loom or an imperfection in the fabric.

The object of my invention therefore is to overcome these difficulties, and to insure the positive selection of a single hair or length of weft, and its presentation to the hook nippers or other device used to insert the weft in the web, at the proper time to enable the operation of weaving to continue without interruption, and to effectually guard against the occurrence of such imperfections in the fabric which result from the causes above mentioned.

My invention consists—first in confining the lengths of hair or other weft which by a previous operation have been arranged parallel to each other, in a bunch or compressed body, at one end, and in reciprocating or otherwise changing the position of the said

compressed weft with respect to the device employed to select single lengths therefrom so that a different portion or surface of the compressed weft is presented to said device at each stroke or motion made by it or at each successive beat of the lay, for the purpose of insuring greater certainty in selecting and separating a length of the weft from the compressed mass or bunch. Secondly in the use of a notched bevel pointed lance or the equivalent thereof, which being plunged into the compressed hair or weft at right angles to the parallel lengths, selects therefrom a single length and in connection with a yielding pad or arm carries the length thus selected to the proper position, and holds the weft in the notch of the lance until it is seized and detached therefrom by the hook, nippers or other device used to insert the weft in the warp or web. The notch in the said lance being of such capacity that it will contain but a single hair or length of weft, and the said lance being beveled from the notch to its point so that in penetrating the interstices of the compressed hair or weft, the surrounding lengths are made to depart from their parallel position and some one of the lengths of hair is forced by the resistance thus created to enter the notch of the lance. Thirdly, in causing the said lance or its equivalent to repeat its efforts to select a hair or length of the weft several times during a single beat of the lay by making said repeating action dependent upon the failure in the first and succeeding ineffectual movements to secure a hair or length, by any effective automatic mechanism which in the absence of the hair in the notch of the lance permits its movements to continue, and stops the same when a hair or length of weft has been secured.

To enable others skilled in the art to make and use my invention I will proceed to describe the construction and operation of the same.

In the drawings, *A, A*, is the bed piece upon which the several devices are arranged and operate.

The hair *B*, is confined at one end between the plate *E*, and the rods *c, c, c*, Figs. 1 and 4, both plate and rods being attached to the cross piece *f*, upon the shank *J*. Thus confined, the hair is compressed between the cross head *j*, upon the rod *l*, and the cross piece *f*, by means of the weights *S*, suspended from the cord *a'*, which passes over

the pulleys *u*, *u*, and is attached to the rod *l*, as shown in Fig. 4. Thus arranged the said rod (*l*) is made to slide in the direction indicated by the arrows, thereby exerting a constant lateral pressure against the confined portion of the hair, so that as the successive hairs are withdrawn therefrom, the remaining hair is made to fill their place and is preserved at a uniform density. The compressed portion of the hair is reciprocated laterally by the intermittent rotation of the eccentric *G*, Fig. 5, within the yoke *J'*, formed on the shank *J*, by motion transmitted through the ratchet wheel *F*, to which said eccentric is attached, the ratchets *t*, *t*, and the vibrating arm *I*, which is made to swing in the direction indicated by the arrow by motion communicated thereto from the vibrating lay of the loom which strikes against the projection *I'*, upon said arm (*I*), Fig. 1, in retreating from beating up the weft. The said arm is returned with the succeeding beat of the lay by the force of the spring *p*, Fig. 4.

The single lengths of hair or weft are selected from the compressed ends and presented to the hook, nippers or other device for the purpose by means of the lance *k*, in connection with the yielding pad *i*, upon the arm *h*, Figs. 1, 2, 3. The said lance is formed as shown in the several figures, with a notch near the point which will contain but a single hair, and a bevel from the notch to the point, and is of such a width at the point that upon being plunged into the compressed hair from a position at right angles to the parallel lengths, the surrounding hairs will be sufficiently separated and forced from their natural, parallel position, to cause one of the disturbed hairs to enter the notch in the lance and to remain therein by the resistance of the compressed hair caused by such separation, until in the ascent of the lance the hair meets the yielding pad *i*, which holds it in the notch until disengaged therefrom by the hook nippers or other device for the purpose. The lance *k*, is secured in the bar *Q*, which is reciprocated vertically in suitable bearings formed in the projecting arms of the frame *D*, by being connected with the stud on the face plate *H*, which is revolved in the direction indicated by the arrows by motion communicated thereto by the friction washer *r*, from the grooved pulley *N*, upon the shaft *m*, the latter having a bearing in the boss formed in the frame *D*, as shown in Figs. 3 and 6.

The arm *h*, is formed as shown in the several figures, and is hinged at *v*, to a plate which is attached by screws to the frame. A slot is formed in the loose end of said arm see Figs. 3 and 4, for the passage of the lance *k*, and upon this end of the arm slides the yielding pad *i*, it being subjected to the action of the spiral spring which encircles

the rod *t'*, to which the pad *i*, is attached, and is adjusted to its proper position by the thumb nut on the end of said rod as shown in Figs. 1 and 2. The office of this yielding pad is to hold the hair in the notch when separated from the compressed mass until the end of the hair is seized by the hook nippers or other device, used to insert the hair in the web, as shown in Fig. 2.

Upward from the arm *h*, extends an arm *y*, the upper end of which comes in contact with, and serves to lift the weighted end of the lever *b'*, when the arm *h*, is carried upward as seen in Fig. 2, in the act of separating and carrying the hair *z*, to the proper position to be seized by the nippers *K*, as shown in Figs. 2 and 3.

The lever *b'*, is fixed upon the sliding rod *o*, Figs. 3 and 6, upon which is also fixed a dog *q*, which engages with the stop *s*, projecting from the periphery of the face plate *H*, at the proper time for the purpose of arresting the further descent of the lance *k*, until the end of the hair *z*, held in the notch of the lance *k*, is seized and detached therefrom by the hook nippers or other device used to insert the hair in the web, as shown in Figs. 2 and 3. The dog *q*, is disengaged from the stop *s*, and the face plate allowed to resume its revolutions when the hair has been removed from the lance, by sliding the rod *o*, endwise as shown in Fig. 6, by means of the cord *e'*, which is attached to the end of the rod and passing over the pulley *n'*, receives an impulse by means of any suitable mechanism which being attached to the main shaft or some other moving part of the loom will impart the requisite action at the proper time. The rod *o*, is encircled by a spiral spring which opposes the sliding of the rod and thus serves to return it to the proper position to present the dog (*q*) to the stop at the succeeding revolution of the face plate.

The mechanism above described consisting of the lever *b'*, the dog *q*, and the sliding rod *o*, in connection with the stop *s*, upon the face-plate and actuated by the arm *y*, in the manner described governs the repeating movement or action of the lance *k*, hereinbefore mentioned, whereby the said lance repeats its effort to select a hair one or more times in case of failure at first to do so. In performing this function which is of the utmost importance to the successful operation of the machine, it should be noticed that the lance *k*, simply catches the single hair by being plunged into the compressed mass, that said hair being caught in the notch of the lance is held therein by the pressure against it of the yielding pad *i*, see Figs. 2 and 3, that being thus caught and held a connection of the arm *h*, with the lance *k*, is effected by the presence of the hair *z*, in the said notch, that in con-

sequence of such connection the arm *h*, is lifted with the ascending lance, causing the arm *y*, to lift the weighted end of the lever *b'*, and the dog *g*, to engage with the stop *s*, and in so doing to arrest the descent of the lance and hold the hair *z*, in the proper position to be readily seized by the nippers *K*, as shown in Figs. 2 and 3, as before stated. But should the lance on being plunged into the compressed hair fail to catch one of the number no connection of the arm *h*, takes place, and the said arm, and the lever *b'* remain motionless, the dog *g*, is withheld from contact with the stop *s*, (as shown in Fig. 1,) and the lance is permitted to repeat its reciprocating movement during a single beat of the lay until it succeeds in catching a hair, which is thereupon presented to the nippers, the several parts acting as before explained. It will be seen that the arm *h*, is hinged at a point (*v*) above the plane of the surface of the hair *B*, and that the yielding pad *i*, upon the loose end of said arm rests upon the surface of the hair (*B*) near the point at which the lance *h* enters the said hair, by means of which arrangement, the connection of the arm *h*, with the lance *h*, being effected as before explained, an increased pressure is exerted by the resistance of the spiral spring upon the rod *t'*, to hold the hair in the notch of the lance in ascending to the position shown in Fig. 2, thereby preventing the hair *z*, from being detached from the notch, by any slight force, after the end of said hair is withdrawn from beneath the rod *c*.

It has been specified above that the notch in the lance is of a capacity to contain but a single hair, but it is obvious that if it is necessary a larger notch may be employed and two or more hairs selected at the same time, or a series of two or more notches may be used in connection with the yielding pad *i*, to select more than one length of hair from the bunch and present the same to the hook nippers or other device used to insert the hair in the web.

The hair instead of lying horizontally upon the bed piece *A*, may be suspended vertically, being confined and compressed in like manner, and when thus suspended the equivalent of the lance *h*, and yielding pad *i*, may be embodied with or made to take the place of the hook nippers or like device for the purpose, and thus the weft may be selected from the bunch and inserted in the web, at one operation by one and the same means.

A convenient arrangement of the frame *D*, upon the bed piece *A*, to provide for the ready insertion of fresh bunches of hair from time to time is shown in Fig. 1 of the drawings, which consists of the projecting arm *D'* of the frame (*D*), which is hinged

upon the pivot *R*, to the stand *M*, and secured in the position shown by means of the pin *L*. When a fresh bunch of hair is to be inserted the pin *L*, is withdrawn and the frame swinging upon the pivot *R*, is lifted up out of the way, with the parts which are attached thereto, after which the fresh supply of hair may be inserted beneath the rods *c*, *c*, *c*, by sliding back the cross head *j*, and by turning the button *g*, from the plate *P*, the latter with the rod *l*, cross head *j*, swings upon the hinge *v'*, up out of the way, when the hair is placed beneath the rods *c*, *c*, *c*, after which the plate (*P*), rod *l*, and cross head *j*, are returned to their proper position, and the frame and working parts thereon being also returned, and secured in place, by replacing the pin *L*, the machine is ready for operation, which following, the several parts act in their proper order in the manner hereinbefore specified.

Having thus described my invention I would not be understood as restricting myself to the particular construction and arrangement herein set forth and described, as I claim all modifications in which the same mode of operation is performed by equivalent means.

I claim—

1. Confining and compressing the lengths of weft at one end, and reciprocating or otherwise changing the position of the compressed portion with respect to the device used to select a single length therefrom and present the end thereof to the hook, nippers or other device used to insert the lengths of hair or other material in the web, in the manner and for the purpose substantially as herein specified.

2. The lance *h*, or its equivalent substantially as described, for the purpose specified.

3. The yielding pad *i*, or its equivalent in combination with the lance *h*, or its equivalent, arranged and operating substantially as described, for the purpose specified.

4. The mode of operation substantially as specified, by means of which a single length of the weft or several lengths, are selected and separated from the compressed mass, or portion, of the weft and presented to the hook nippers or other device used to insert the weft in the warp substantially as specified.

5. The mode of operation substantially as specified by means of which in case the lance or equivalent device fails to select a length of the weft, from the compressed mass, its efforts to do so are in consequence repeated several times during a single beat of the lay substantially as specified.

ISAAC LINDSLEY.

Witnesses to signature:

ISAAC A. BROWNELL,
G. L. CRANDALL.