

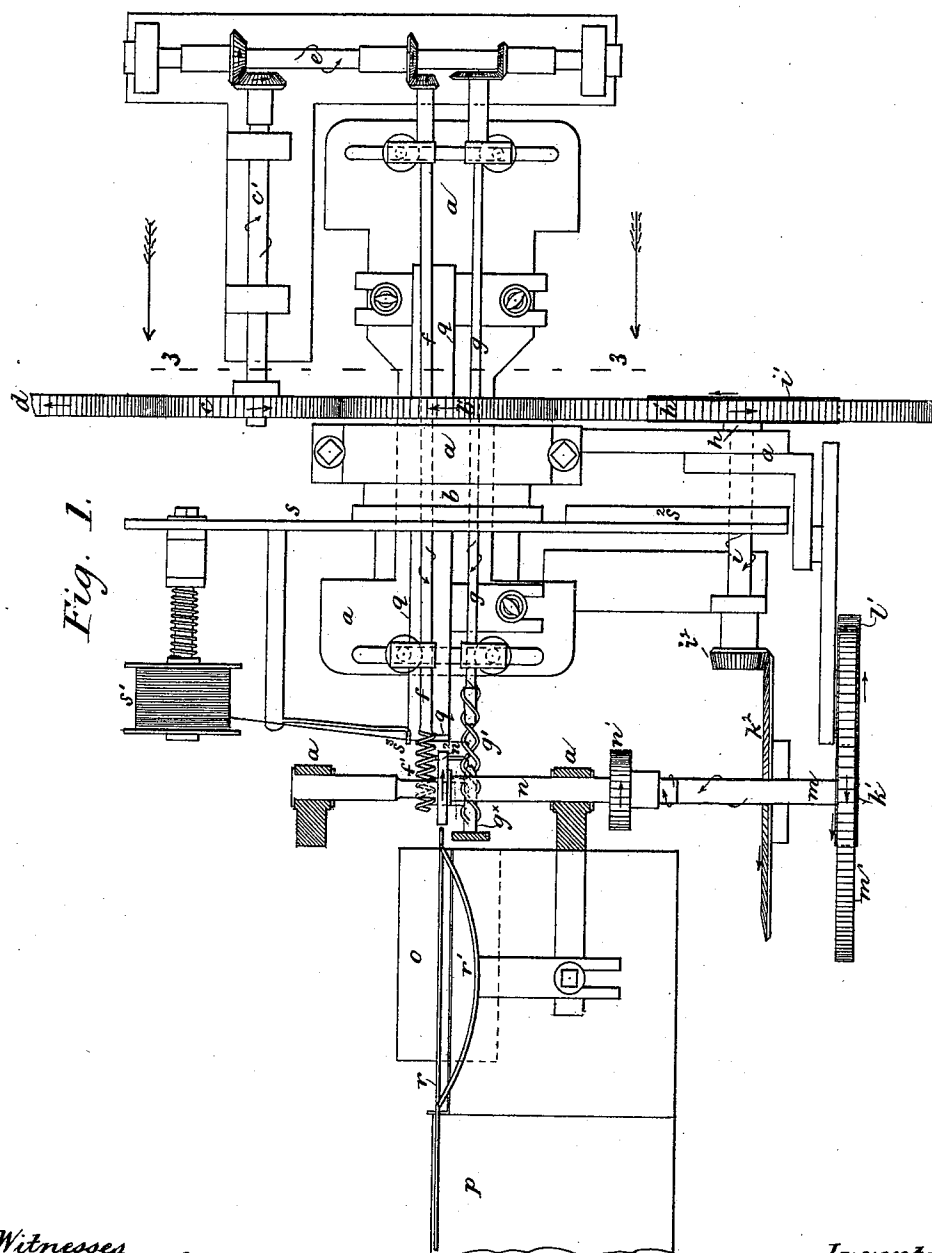
(No Model.)

6 Sheets—Sheet 1.

C. G. HILL.
RUCHING MACHINE.

No. 464,648.

Patented Dec. 8, 1891.



Witnesses
Baltus D. Long
Allan W. Lane Albert

Inventor.
C. G. Hill
By attys -
Fielding, Hopkins & Hyatt.

(No Model.)

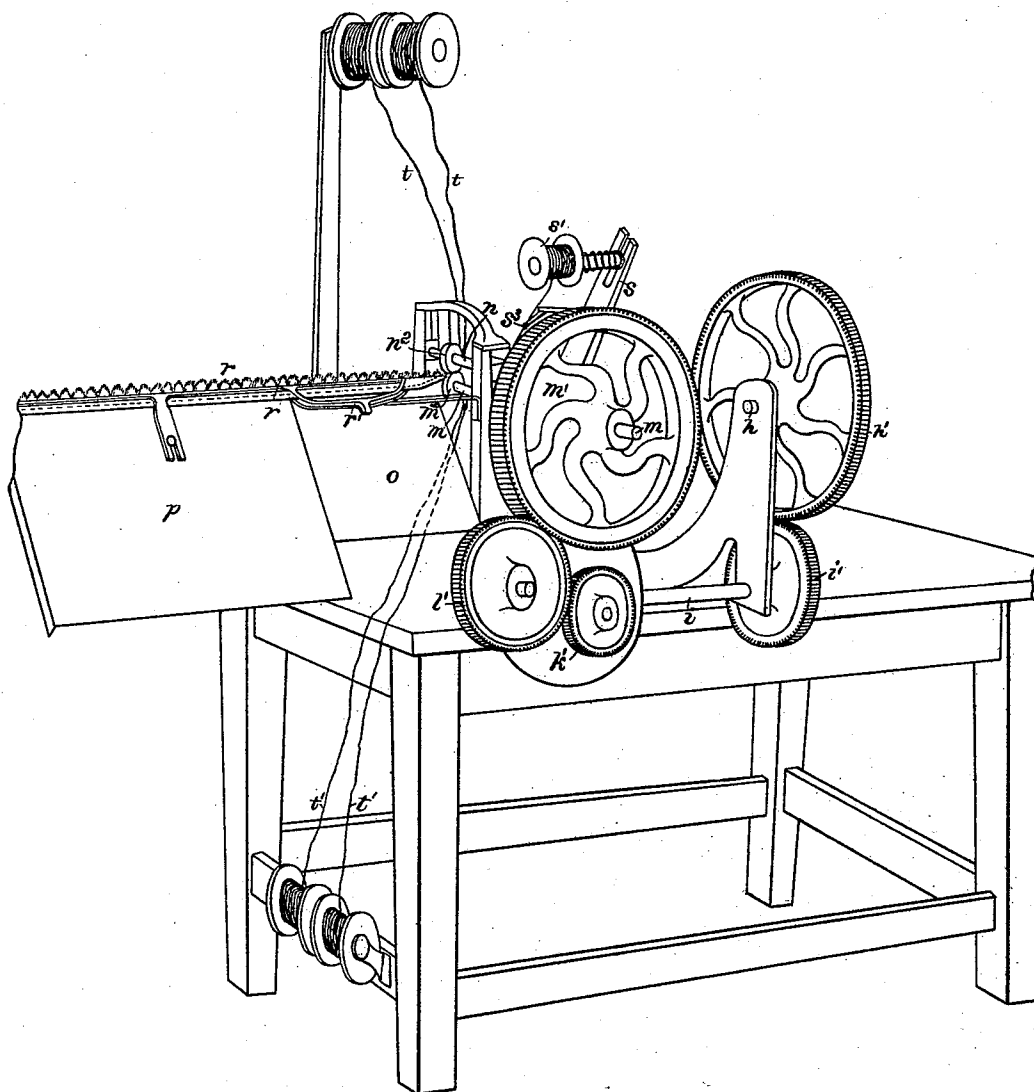
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Fig. 1^x



WITNESSES

E. C. Newman,
C. M. Newman,

INVENTOR

Charles Grey Hill.

By *his Attorneys*

William H. Hays & Co.

(No Model.)

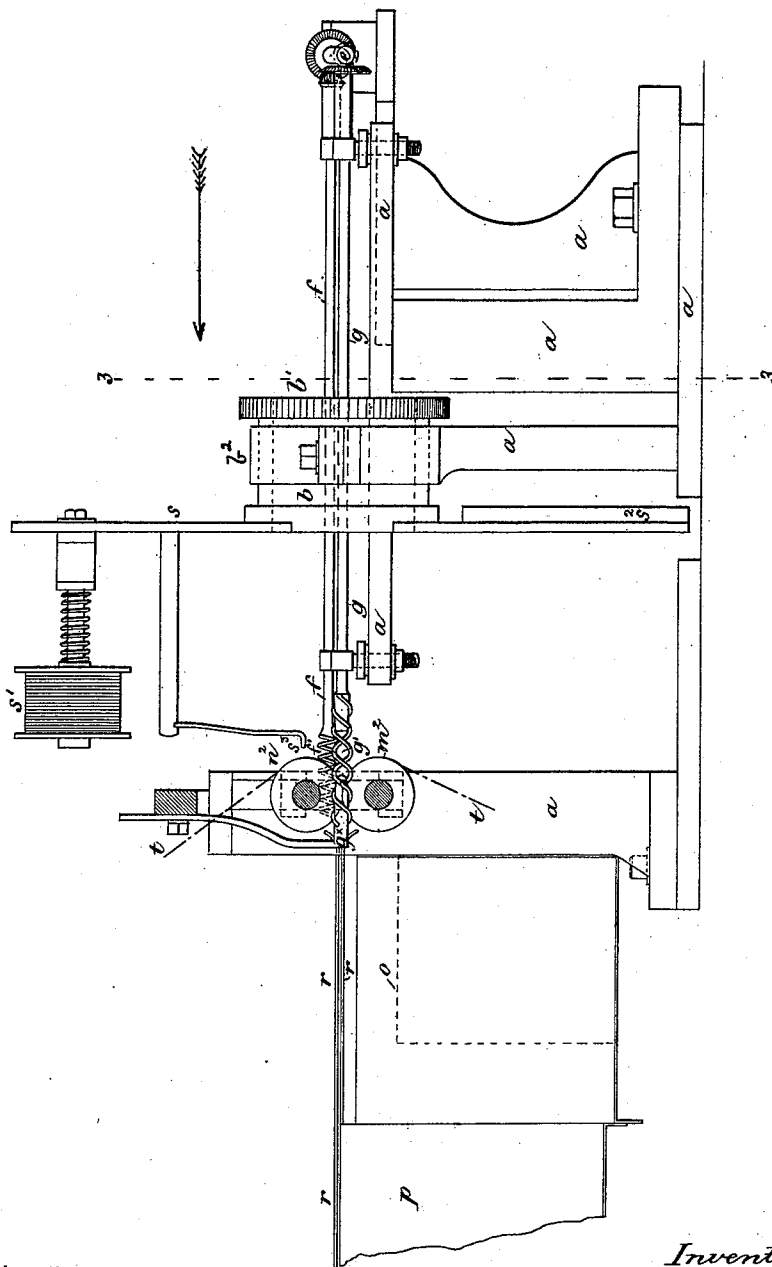
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Fig. 2.



Witnesses.
Baltus & Long
Am. L. Abert.

Inventor.

C. C. Hill

By Attyys -
J. V. Hall
J. V. Hall, Attorney at Law.

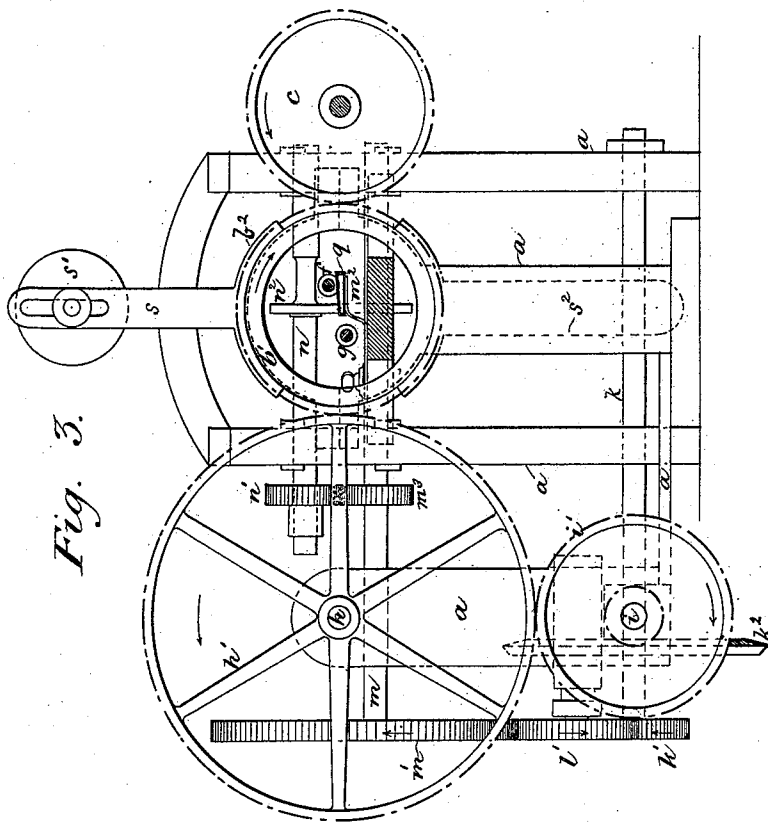
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6 Sheets—Sheet 6.

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Witnesses:
Baltus DeLong
Ann Labent

Inventor
C. G. Hill
By Atty-
Jedediah Hephner Peyton.

UNITED STATES PATENT OFFICE.

CHARLES GREY HILL, OF ARNOT HILL, ENGLAND.

RUCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,648, dated December 8, 1891.

Application filed September 20, 1886. Serial No. 214,042. (No model.) Patented in England December 1, 1885, No. 14,776, and in France April 7, 1886, No. 175,326.

To all whom it may concern:

Be it known that I, CHARLES GREY HILL, a subject of the Queen of Great Britain, residing at Arnot Hill, in the county of Nottingham, England, have invented certain new and useful Improvements in Machines for Making Ruching or Frilling, (for which I have received Letters Patent in Great Britain, No. 14,776, dated December 1, 1885, and in France No. 175,326, dated April 7, 1886,) of which the following is a specification.

My invention relates to machines of the class in which frilling or ruching fed there-through is wrapped with thread, cord, or like material, while longitudinal threads are simultaneously caused to adhere to its surface by means of pressure. Its object is to produce an approved form of ruching by means of simple and effective mechanism, which end I attain by certain novel constructions, combinations, and organizations of instrumentalities hereinafter specified.

The accompanying drawings show so much of my improved machine as is necessary to illustrate the subject-matter claimed. Unless otherwise indicated, the parts are of usual approved construction. The entrance or feed end of the machine I term the "back," the opposite or delivery end the "front." That side on the right of a person facing the front of the machine I term the "right," the opposite the "left." Darts indicate the direction of movement of some of the parts.

Figure 1 is a plan; Fig. 1^x, a perspective view from the right-hand front corner of the machine, looking from the delivery toward the feed end. Fig. 1^{xx} is a corresponding view taken from the opposite corner, looking from the entrance to the delivery end, some of the parts at the latter end being omitted in this figure; Fig. 1^a, Sheet 6, a transverse section of the steam-moistener; Fig. 1^b, a corresponding section through the gas-heater plate; Fig. 2, an elevation of the right side of the machine, partly in section; and Fig. 3, a vertical cross-section on the line 3 3, looking forward or toward the delivery end of the machine. Fig. 4, Sheet 6, shows the form of the frilling or ruching as it passes into the machine. Figs. 5 show, respectively, front and back views of the completed frilling.

The mechanism is shown as mounted in a main frame *a*. A short tube *b* of comparatively large diameter turns in bearings *b*² in the frame and carries a toothed wheel *b*¹, 55 gearing with another wheel *c* on an axis *c*¹, in turn gearing with a wheel *d*, receiving movement in any convenient manner and driving all parts of the machine. A bevel-pinion on the front end of the longitudinal axis *c*¹ drives 60 a corresponding pinion on a cross-shaft *e* on the front or feed end of the machine, which in turn, by corresponding pinions, drives two parallel longitudinal axes *f* *g*, passing through the tube *b* to the front or delivery end of 65 the machine. These axes carry, respectively, corkscrew-like spirals *f*¹ *g*¹, the former a comparatively closely-coiled single spiral, the latter a double spiral of twice the length of pitch of the former one; but the speed of rotation 70 of the double spiral *g*¹ is only half that of the single spiral *f*¹. The organization is such that both these spirals revolve in opposite directions or toward each other on their upper surfaces, as shown by the arrows in Fig. 1. 75 A support *g*^x enters the interior of the front portion of the double spiral *g*¹.

The spirals, their axes, and driving-gear are made adjustable relatively to each other and to the pressure-roll by well-known means 80 shown in the drawings and which require no particular description.

The gear-wheel *b*¹ drives a corresponding one *h*¹ on a stud-axis *h*. This wheel *h*¹ gears with a corresponding pinion *i*¹ immediately 85 below it on a longitudinal axis *i*, a bevel-gear *i*², on the front end of which drives a corresponding gear *k*² on a cross-shaft *k*. A spur-wheel *k*¹ on this shaft drives a corresponding wheel *l*¹, which in turn drives a wheel *m*¹ on 90 a cross-shaft *m* above it, on which the lower pressing-roll *m*² is mounted. The upper pressing-roll *n*² is mounted on a parallel axis *n*, carrying a pinion *n*¹, gearing with a corresponding pinion *m*³ on the axis *m*. Both these 95 pressing-rolls lie in the same vertical plane between the spirals and close together.

A vessel *o* provided with a roof-shaped longitudinally-slitted top (see Fig. 1^a) is arranged in front of but slightly below the 100 pressing-rolls. Steam issuing through this slit acts on the fabric as it passes from the

rolls, after which it passes over a guide-plate p , heated by means of gas. Guide-wires r , resting on adjustable supports r' , overlie the vessel o and plate p .

- 5 A guide g (shown in the form of a flattened tube, Figs. 1 and 3) extends through the tube b to a point near the pressing-rolls. As shown in Fig. 3, this guide lies in the horizontal plane of the junction of the pressing-rolls with
10 one edge in line therewith. The single spiral f' , it will be observed, lies above this tube, while the double one g' lies at about the same level and on the opposite side of this guide. A transverse arm or frame s , fixed upon and
15 revolving with the tube b , carries a counter-balance s^2 at one end and a bobbin s' at the other. The cotton or thread from this bobbin passes to the work through a guide-eye s^3 , carried by an arm on the frame s . Spools
20 mounted on the frame supply threads t to be laid longitudinally on the frilling, as herein-after explained.

- Frillings and ruchings are largely made by setting a plaited or goffered fabric into a
25 straight band. Fig. 4 shows such a fabric as it is passed into the machine. It consists of two strips of gauze, muslin, or other suitable fabric, separately plaited and set into a band, one of these strips—in this instance the under one—being shown as somewhat narrower
30 than the other. Figs. 5 show front and back views of the ruching as it leaves the machine, with the frill displaced or drawn in at regular intervals by a cotton or thread wound around it. The cotton, it will be seen, has
35 drawn the top or loose edge of the frill downward or inward toward the band, at the same time carrying the frill forward and opening out the plaits. The lower part of Figs. 5
40 shows the upper or longer side of the frill, while the upper part shows the opposite or under side, representing both the wider and the narrower plaiting.

- The work, then, which this machine has to
45 do is to convert the frilling shown in Fig. 4 into the form shown in Figs. 5, which is done in the following manner: The straight frill, Fig. 4, is passed through the guide-tube g , with its face or narrower plait downward,
50 and is inserted between the pressing-rolls m^2 n^2 , which nip the flat band, and thus draw the frilling continuously through the tube g , which terminates just in front of the rollers and between the spirals f' g' , as above described. As the frilling passes from the tube to
55 the pressing-rollers the cotton or thread from the spool s' , passing through the guide-eye s^3 , is wound around both the frilling and the spirals f' g' by the rotation of the tube b . The thread is thus distended by the spirals,
60 and, as it is laid around the frilling, encroaches upon its edge and causes it to assume the form shown in Figs. 5. The direction of rotation of the spiral f' , it will be seen, is such
65 as to cause the cotton gradually to feed forward over its point toward the pressing-rolls. The double spiral g' , although twice the

length of pitch, revolves at only half the speed of the single spiral f' , and consequently retards the forward movement of
70 the winding cotton on the band-edge of the fabric, the consequence of which organization and operation is that the winding cottons or threads cross the ruching directly from side to side, instead of diagonally, each
75 turn or revolution of the double spiral carrying forward upon it a complete convolution of the winding cotton or thread. In order to fix this winding thread to the band of the frilling, the pressing-rollers m^2 n^2 are
80 heated by suitable well-known means, such as a gas-flame playing on their axes. The winding cotton, being slightly moist, sticks firmly to the starched or dressed band of the frilling when pressed upon it by the hot rollers. 85
The attachment of this winding thread to the band is rendered more secure by means of a series of longitudinal threads or cottons t t' , passing around the pressing-rollers on both sides of the band and fixed thereon in the
90 way described. These threads cross the winding thread, as shown in Figs. 5. After passing between the pressing-rolls the band of the frilling is drawn by hand between the two parallel guide-wires r r' , standing one over the
95 other, and carried by spring-arms r' , which tend to press them lightly together, so that the band of the fabric is gently held and guided. During its passage between these guides the band is moistened by steam issuing from the longitudinal slit in the top of
100 the vessel o , which steam or vapor is admitted thereto in small quantities from any suitable generator, thus very slightly moistening the fabric. The moistened fabric is then
105 drawn over the heater-plate p , which dries it, and the work is then set in well-known ways, so that the frill will retain its form, even without the aid of the threads, any or all of which may be removed from the finished fabric, if
110 desired, without detriment. The above-described organization is such, it will be observed, that the frilling passes through the revolving tube b on which the winding-thread carrier is mounted from a point near the entrance to a point near the delivery end of
115 the machine. The guide-tube through which the frilling passes terminates a short distance in front of the pressure-rolls. The single spiral f' overlies the frilling side of the guide, extending across the space above mentioned beyond the axis of the narrow crimping or pressing rollers, which act on the band close to the
120 frilling, or, in other words, in line with the opposite edge of the guide. The double spiral g' , it will be seen, extends across the same space, somewhat below and on one side of this latter side of the guide. It also extends beyond the axis of the pressing-rollers, its delivery end being supported by a stationary
125 stud g^x , over the point of which the winding thread is drawn by the action of the spirals and pressing-rollers. The winding thread, it will also be observed, is wound around the

spirals and filling just in advance of the delivery end of the tubular guide during the passage of the frilling across the space between the end of the guide and the pressing-rollers, so as to act directly upon the edge of the frilling to crimp or indent it. As the double spiral *g'* lies outside of a vertical plane passing through the adjacent edge of the guide-tube, the band-edge is prevented from being indented, while the single spiral, lying inside of the corresponding plane of the opposite side of the guide-tube, causes the loose edge of the frilling to be indented or crimped, as above explained.

Having thus fully described the construction, organization, and operation of my improved frilling and ruching machine, what I claim therein as new, and as of my own invention, is—

1. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, spirals of different pitch on opposite sides of the guide, and a winding-thread carrier or guide rotating around the frilling-guide and spirals to lay a winding thread around the frilling between the guide and pressing-rollers, as described.

2. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, spirals rotating at different speeds on opposite sides of the guide, and a winding-thread carrier or guide rotating around the spirals to wind a thread around them and the frilling between the guide and rollers, as described.

3. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, spirals of different pitches rotating at different speeds on opposite sides of the guide, and a winding-thread carrier or guide rotating around the spirals to wind the thread around the frilling, as described.

4. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, a single spiral on one side of the guide, a double spiral of greater pitch but revolving at less speed than the single spiral on the opposite side of the frilling-guide, and a winding-thread carrier or guide rotating around the frilling to wind a thread thereon, as described.

5. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, a single spiral overlapping the frilling-edge of the guide and crossing the space between

said guide and the pressing-rollers, and a winding-thread carrier rotating around the spiral and the line of traverse of the frilling, as described.

6. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, a double spiral opposite the band-edge of the guide crossing the space between said guide and the pressing-rollers, and a winding-thread carrier rotating around the spiral and the line of traverse of the frilling to wind the thread around them in the space between the guide and rollers, as described.

7. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, rotating spirals on opposite sides of the guide and presser-rolls, a rotating thread-carrier laying a winding thread around the spirals and frilling, a steam-moistening vessel, a drying-plate, and guides thereover through which the band is drawn after passing between the pressing-rollers.

8. The combination, substantially as hereinafore set forth, of a frilling-guide, pressing-rollers which draw the frilling therefrom, rotating spirals on opposite sides of the guide and presser-rolls, a rotating thread-carrier laying a winding thread around the spirals and frilling, a steam-moistening vessel, and guides thereover through which the band is drawn after passing between the pressing-rollers to moisten the fabric.

9. The combination, substantially as hereinafore set forth, of pressing-rolls, a double spiral rotating adjacent thereto, a stud supporting its delivery end, and a winding-thread carrier rotating around the spiral in advance of the rollers to wind the thread thereon, as described.

10. The combination, substantially as hereinafore set forth, of a rotating ring or tube, a winding-thread carrier revolving therewith, a frilling-guide extending longitudinally through the tube, pressing-rollers in the plane of the guide in advance of its delivery end, rotating spirals on opposite sides of said guide and of the pressing-rollers, moistening and drying devices on the delivery side of the rolls, a guide overlying them, and means for actuating the moving parts, all co-operating as and for the purpose described.

London, September 6, 1886.

CHARLES GREY HILL.

Witnesses:

JNO. WIGHTMAN,
17 Villa Road, Nottingham.

ERNEST LIDDELL,
17 Gracechurch Street, London, E. C.