S. P. CHAPIN.

Cloth Folder for Sewing Machines.

No. 14,283. Patented Feb. 19, 1856.

Fig. 7.

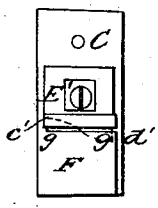


Fig. 3.

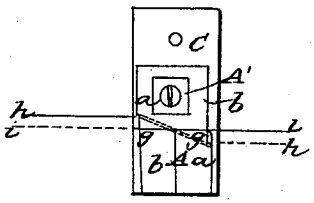


Fig. 11.

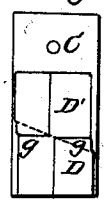


Fig. 8.

Fig. 9.

Fig. 4.

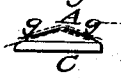


Fig. 5.

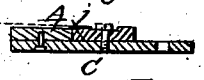


Fig. 12.

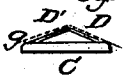


Fig. 10.

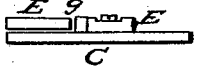


Fig. 2.

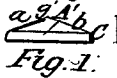


Fig. 6.

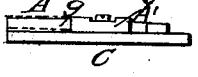


Fig. 1.

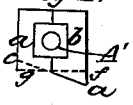


Fig. 13.

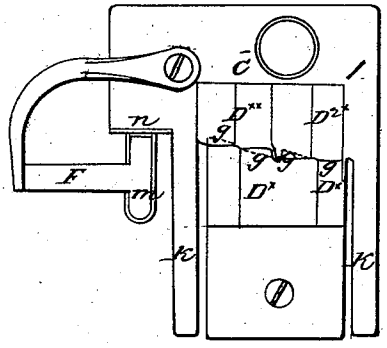


Fig. 14.

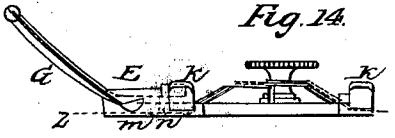
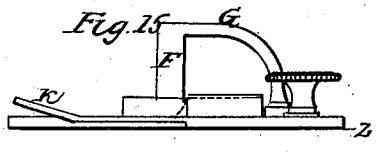


Fig. 15.



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UNITED STATES PATENT OFFICE.

SETH P. CHAPIN, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-GUIDES.

Specification forming part of Letters Patent No. **14,283**, dated February 19, 1856.

To all whom it may concern:

Be it known that I, S. P. CHAPIN, of the city, county, and State of New York, have invented certain new and useful Improvements in means of turning the edges of or otherwise folding cloth and such other materials as may be sewed with needle and thread, for hemming, cording, tucking, and such like purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention consists, first, in the employment of a guide or guides, curved or straight, for laying such folds as are required for hemming and otherwise sewing materials adapted to such operation; second, in the employment of a spring to hold the material, in place of the hand of the operator.

The invention is intended, chiefly, though not exclusively, to be attached to a sewing-machine.

Figure 1 in the drawings is a top view of one of a pair of angular heads by which a single turn or fold is made. Fig. 2 is a face view of the same. Fig. 3 is a top view of the pair of heads. Fig. 4 is a front end view of the same. Fig. 5 is a longitudinal section of the same through the center. Fig. 6 is a side view of the same. Fig. 7 is a top view of a pair of curved heads for the same purpose. Fig. 8 is a front end view of the same. Fig. 9 is a longitudinal section of the same through the center. Fig. 10 is a side view of the same. Fig. 11 is a top view of a pair of angular plates for the same purpose. Fig. 12 is a front end view of the same. Fig. 13 is a top view, showing the arrangement of two pairs of angular plates like those shown in Figs. 12 and 13, for making two turns for hemming the raw edge of a piece of cloth. Fig. 14 is a front view of the same. Fig. 15 is a side view of the same.

Similar letters of reference indicate corresponding parts where they occur in the different figures.

A A′ are the two angular heads, both of the same form, which will be best understood by reference to Figs. 1 and 2, where A′ is represented. The transverse section is an isosceles triangle, the base of which rests upon a plate, C. The front part is a plane occupying a position perpendicular to the base, but oblique to the sides *a b*, the degree of obliquity being such that the length from *c* to *d* in a right line is equal to the distance from *e* to *f* over the angle. From the side *a* there extends a thin piece, *g*, whose front edge stands at right angles to the lines by which the said side is bounded. The head A is precisely like A′; but its position is reversed to bring the oblique ends opposite each other. The two heads are placed a little out of line, in order that the thin projecting piece *g* of the one may lap over the other, as shown in Figs. 3 and 4, and that the cloth or material to be folded may pass under the lap, and they are set so far apart that the cloth will pass freely between their two oblique faces, the head A′ being movable for the purpose of adjustment. By conducting the cloth over either head and under the lap of the other one, with the edge at right angles to the sides of the heads and even with the back part of the lap or the extremity of the oblique face, and drawing it lengthwise, the edge is caused to pass down the space *j* (see Fig. 5) between the oblique faces of the two heads, until it reaches the central part, where the laps terminate and nearly meet each other, when the edge turns under the other lap. The width of cloth turned in is equal to the extreme depth of the lap, or to the distance between the points *c d* and the extremities of a line, *e f*, which is at right angles to the sides of the head, and intersects the former line at the middle of its length. I have endeavored to illustrate the operation of the instrument in Figs. 3, 4, and 5, where a piece of cloth is represented in red color, the edge to be turned in being denoted by *h* in Fig. 3, and the line where the turn is made by *i*. The cloth is laid upon the head A and its edge conducted under the lap of A′, and is moved from left to right, and in passing to the central part or termination of the first lap the part between the edge *h* and the line *i* is turned down at right angles to the piece, as shown in Fig. 5, and as the piece moves over the lap of A the part turned down is caused to pass under the said lap and complete the fold, as shown in Fig. 6.

I have described first the angular heads A A′, as being that method of applying my invention to producing a turn or fold which can be most readily understood. The angular plates D D′ are substantially similar to the an-

gular heads, the only difference being that thin plates of metal are arranged to produce the same external form as that of the solid heads. The only difference in the operation of the plates is that, instead of forming a continuous guide for the whole width of the turn in the cloth, they only guide it at the edge and where the turn is made, which is perhaps preferable, especially as the plates can be more cheaply constructed.

The curved or circular heads E E′ (shown in Figs. 7, 8, 9, and 10) consist each of a segment of a cylinder, and the ends which face each other are formed of a double curve, as indicated by the dotted line *c′ d′* in Fig. 7, said curve being formed of two arcs which are tangent to each other, and are described with the same radius as the cylinders, of which the heads form parts. The segments are set out of line with each other, like the angular heads, and in order to enable the lap *g*, under which the cloth is first introduced, to stand out prominently, for the purpose of allowing the cloth to enter easily under it, the head E is slightly enlarged at the front end. For the purpose of varying the spaces under the laps *g g* for the cloth to pass to suit cloth of different thicknesses, that side of the segment where the lap is may be raised by placing under it a piece of paper card or other material. The segmental heads E E′ operate in precisely the same manner as the angular heads A A′, and for stiff goods are perhaps better suited.

The instrument represented in Figs. 13, 14, and 15 consists, merely, of the arrangement of angular plates shown in Figs. 11 and 12 twice repeated. The plates D* D** are precisely like the plates D D′, and give the first turn or fold to the edge of the cloth, like the heads A A′, as hereinbefore described; but the plate D* is continued to form a repetition, D′*, of the part which produces the first turn or fold, and another plate, D²*, is arranged to form a repetition of D* D*, the latter plates, D′* and D²*, being so arranged that as the cloth moves in a right line the edge of the fold is presented to the second pair of plates in the same way as the edge of the cloth was presented to the first, and the fold is thereby repeated. The base-plate C′, to which the folding-plates are secured, is supposed to be bolted to the feed-table of a sewing-machine, and the cloth is drawn tight over the folding-plates, as shown in Fig. 14, by passing under two tongues, *k k*, on the front part of the base-plate.

F (see Figs. 13, 14, and 15) is the spring which holds the cloth in rear of the fold. It is attached to an arm, G, which is bolted to the plate C′, and it has a broad bearing-piece, *m*, which rests upon the cloth and holds it against the face of the feed-table, which is represented by a line, *l l*, in Figs. 14 and 15. It is better that this bearing-piece should press rather harder at its front than at its back end, in order to give the cloth a slight tendency to move laterally, or back toward the plates D* D²*; but this lateral or backward tendency is counteracted by a fixed guide-piece, *n*, attached to the plate C′, opposite the spring, and the spring is caused only to keep the cloth from moving forward as it comes in contact with the folding-plates. This spring is also applicable in sewing-machines where the folding apparatus is not employed, in order to keep a proper tension on the cloth and insure a straight feed.

In all modifications of the invention it must be particularly observed that the distance over the heads or plates where the cloth passes must be equal to the length of the oblique or curved guide *c d* or *c′ d′*, in contact with which the edge passes in being folded. It is in order to make the cloth travel the same distance directly as the edge travels obliquely that the upper side of the folding heads or plates are made of angular or arched form. There are, however, some compensating conditions, rendering this form in a less degree necessary—such as, first, an arrangement of guides operating, chiefly, on the portion of the material going to form the folds, leaving the other portions free to corrugate and drag; second, feeding in the material in a turned or rolled shape given by the hand; third, the elasticity of the material and the feed acting in conjunction with the others. In adjusting a hemming-folder to a sewing-machine it should be observed to make that line of the material operated on by the feed move a distance fully equal or greater than other parts.

In order to cord the edge of the cloth, the cord merely requires to be placed in a groove, which should be provided, running directly over the front folding plate or head, close behind the line where the fold takes place. The cord is covered by the cloth and drawn along with it and the edge is turned under it.

I have described above two of the simplest forms required for the guides to lay the material into folds of any desired number or direction, and at the same time preserve the parallel relations of all its fibers. Other forms there are, more or less analogous to these, equally correct in principle, or so nearly so as to be useful for obtaining several successive folds. One of the best is that obtained by carrying the line of the material on which the fold is being turned in a flattened arch, like the side of an ellipse. The folds may then be carried in a regular wind, singly or several at once, one turning upon the other. Another form, differing a little from this, is that obtained by carrying the edge obliquely over or around a cylinder or cone in a spiral direction. The line of the turn then sympathizes with the edge, and becomes a spiral also, and the fold becomes arched transversely. In the first part of the movement the material may be guided on either surface or neither; but the latter part requires it on the outer side to force the edge under and compress the hem. This underlap should partake of the spiral also; but the corresponding overlap need scarcely exist at all if two turns be brought in together, for the transverse arch-

ing and the resistance of the material to an abrupt bend perform the same use. The various forms which may be given to a flexible material resulting in folds may be reduced to three classes. In the first the movement is by right lines; second, by regular curves; third, by spirals. I have employed several varieties of each class, and in order the inverse of that adopted in this description. My preference is most decidedly for the regular forms, or those nearly so, and I only mention the others to show the successive steps of the invention.

The form to be given to a material in its transitional state being determined, the arrangement of guides and supports follows. These admit of much variation and operate in several ways. There is the glancing effect, as when a flexible material is pushed against an oblique surface; the supporting effect, as when drawn on a convex surface; the deflecting effect, as when drawn obliquely across an edge or corner. An example of the latter occurs in the operation of the underlap of the outside plates above, which causes the material to hug closely around the edge of the opposing upper lap and counteract any tendency of the material to fall out. For the more flexible materials supporting is generally better than guiding. These combinations should be made with particular reference to convenience in operating. In use of the above combinations it will be observed that a backward movement restores the material to its original form when the machine has broken thread and failed to sew for some distance.

The construction and adjustment of instruments for hemming and plaiting on the principles of this invention is a matter of exact calculation and measurement, and not at all of experiment.

I do not claim a device invented by S. C. Blodget for cording umbrella-covers, in use of which the edge of the cloth, in a partially-turned state, is guided into a slot, and a turn over the cord completed by passing under the presser, the parts forming the sides of the slot being neither curved nor crossing, and the one conveying the cord terminating at some distance from the presser; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of forming hems on the edge of flexible materials by means of folding-guides made to turn the edge one hundred and eighty degrees or more, substantially as described.

2. In combination with guides, substantially as described, the employment of a spring, F, Fig. 13, or analogous device, first, to hold and guide a piece of cloth by an edge or plait; second, to cause the cloth to follow the guides, placed between it and the needle, with certainty; third, to keep the cloth on a stretch while the stitch is being drawn.

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WM. TUSCH.