G. B. & A. ARNOLD.

Sewing Machine Attachment.

No. 30,112. Patented Sept. 25, 1860.

Fig. 1.

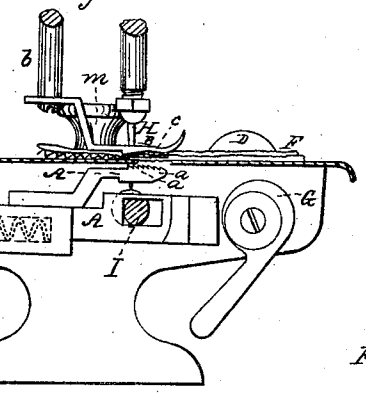


Fig. 4.

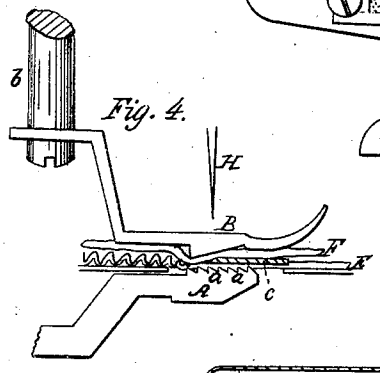


Fig. 5.

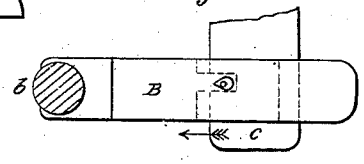


Fig. 2.

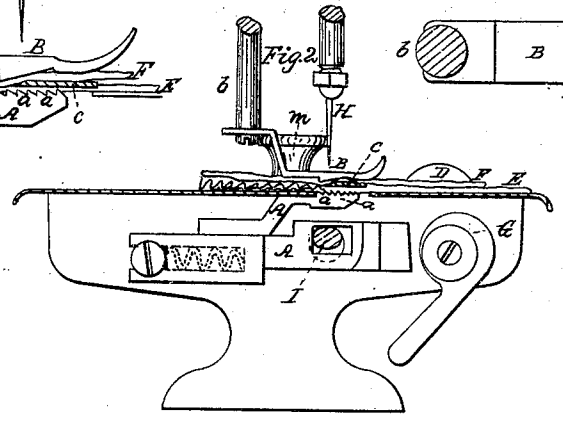
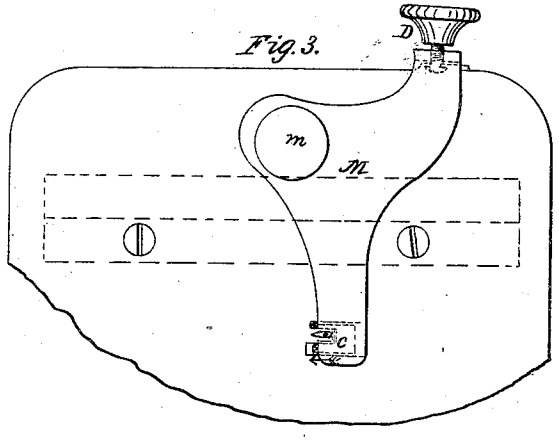


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEO. B. ARNOLD AND ALFRED ARNOLD, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **30,112**, dated September 25, 1860.

To all whom it may concern:

Be it known that we, GEORGE B. ARNOLD and ALFRED ARNOLD, both of the city, county, and State of New York, have invented certain new and useful Improvements in Gathering Mechanism for Sewing-Machines; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of our invention consists, first, in separating the cloth to be gathered from that which is to remain plain, and thereby protecting the latter from the action of the gathering device or surface, as will be hereinafter set forth; second, in a mode of forming and confining gathers on a sewing-machine when only a single feeding, or gathering and feeding surface is used, as will appear below; third, in certain means of regulating the length of the stitches in the production of a gathered fabric, which will be explained below.

To enable others skilled in the art to make and use our invention, we will proceed to describe it by the aid of the drawings, in which—

Figure 1 is a vertical section with the feeder depressed. Fig. 2 is a corresponding section with the feeder elevated. Fig. 3 is a plan of the cloth-plate and gathering-presser. Fig. 4 is an elevation of the feed-presser on a larger scale. Fig. 5 is a plan of the same.

Similar letters of reference indicate like parts in all the drawings.

A represents the feeder, a roughened surface by the motion of which the cloth lying thereon is moved forward at intervals.

B represents the feed-presser, a piece of a peculiar form mounted over the feeder and capable of being elevated and depressed like an ordinary presser-foot.

C represents the gathering presser or separator, a plate of suitable thickness standing between the feed-presser and a portion of the feeder.

E represents the cloth which is to be gathered. F represents a piece of cloth to which E may be sewed.

G is the graduating-cam which regulates the throw of the feeder, the motion of the latter being capable of increase to a range considerably more than that which is usually required for the length of the stitches.

H represents the path of the needle.

The correct form and position of the several parts is sufficiently well indicated in the drawings, or will appear in the following description of the operation.

When it is desired to gather one piece of cloth upon another, we place the edge of the cloth to be gathered under the feed-presser B, and also under the gathering presser or separator C exposed to the whole action of the feeder. We then place the edge of the other piece of cloth to which the gathered portion is to be sewed also under the feed-presser B, but over the gathering-presser C. The cloth F is placed over C, and thus separated from E in order that it may be protected from the action of the feeder A while a gather is being formed in E. The feed-presser B is then lowered to its position, and the machine is put in motion. The feeder A takes hold of the cloth E under C, and through E raises the dividing-plate C and the cloth F, pressing the latter against the feed-presser B and clamping it there with more or less force, according to the rigidity of the spring which holds down the presser-foot B. A now commences to move forward, actuated by the cam I. The serrated surface of A, seizing the cloth E between itself and the dividing-plate C, moves E forward, but F is held between C and B, so that it does not move forward, and as F is, equally with E, connected to that portion of the work already finished, it follows that the finished work does not yet move forward. In this condition the machine feeds forward that portion of E which is grasped between A and C; but that portion of E which is secured to F by the last stitch cannot move forward. The consequence is that that portion of the cloth E which is forward of A is compressed edgewise. As the movement of A progresses, E is forced to bend or corrugate itself into a more or less regular plait. This condition continues until the forward portion of A emerges from under the separator C. On doing so it commences to press the thickened or corrugated cloth E and through it the plain cloth F against the presser-foot B, forward of the separator C, and therefore commences to overcome the elasticity of the spring which holds down B, and to lift B independently of C. This action tends to diminish the force with which F is clamped or confined between C and B, and to allow F to move forward with E, which it ultimately does to a

proper extent, to make a stitch by the time the feeder A has finished its entire forward movement. This release of F, so as to allow F and E to thus move forward together durring the last portion of the movement of A, is facilitated by the form of the lower face of B, which projects downward to a slight extent at the proper point, as represented, so as the better to receive the force applied by the forward part of A after it has emerged from under C. It is also further facilitated, when the gathering is carried to a considerable extent, by the increased tension on F due to the compression or crowding of the gather.

It is obvious that as A has seized a quantity of cloth and drawn it forward, if F were not to feed forward at all, that portion of E which is moved forward must be not simply corrugated, but must be compressed into an indefinitely small space laterally, while the space for it to extend vertically is very limited. This compression necessarily results in an increased pull on F, which tends to overcome the force with which it is clamped between C and B, and compel it to move forward during the last fraction of the motion of A. It follows from one or the other of these facts—*i. e.*, the lifting of B or the increased pull on F, or from both operating together—that the cloth E is gathered or plaited during the first portion of the forward movement of A, and is not gathered, but is moved bodily forward (together with F and the entire finished or united portion) during the latter portion of the said forward movement of A, the motion of the single feeding-surface A being sufficient to accomplish, in connection with a suitable form and disposition of the other parts, both these important functions. Each gather or plait, after being formed in this manner, is carried past the needle by the latter portion of the forward motion of A, and is by the action of the needle immediately inclosed in the next stitch, which, when drawn up with a sufficient tension, holds it fast.

The cloth F may be held back while a gather is being formed in E by other means than by gripping it between B and C. Thus, for example, the cloth F may be gripped between any other surfaces than these; or it may be held upon a reel, and the motion of the reel may be restrained by friction or otherwise; but we prefer the specific means above described.

The point reached by the forward part of A when A has completed its forward movement is maintained under all conditions of the adjustable parts; but the quantity of the cloth E seized by A may be varied to any required degree by turning the cam G so as to increase the extent of its backward movement. Thus if G is turned to one extreme of its motion, A will at each revolution of the machine move back to a great extent, and bring forward on its return a large quantity of the cloth E, while if it is turned to its opposite extreme it will move backward to an almost inappreciable extent and bring forward very little of the cloth E; but under each of these conditions the forward movement of A will terminate at the same point.

To regulate the length of the stitches it is only necessary to change the position of C relatively to that of the feed-presser and feeder by turning the screw D backward or forward. The gathering-presser C is attached to or rather is a part of the lever M, which turns on a fulcrum at *m*, as represented, and is controlled in position by the screw D, which is tapped therein and takes hold of the cloth-plate of the machine. To shorten the stitches the screw D may be turned in such direction that C is moved in the direction shown by the blue arrow, so as to lessen the extent to which A moves under the direct pressure of B. To lengthen the stitches, C is moved in the opposite direction. This action of C in regulating the length of the stitches arises from the fact that so long as F is protected from the action of A by the separator C it will not be moved, and the length of the stitch depends entirely upon the distance to which F is moved at each stroke of A. By moving C in the direction indicated by the blue arrow the action of A upon F takes place at a later period in the movement of A, and consequently F is moved less and the stitch is shorter. By moving C in the opposite direction the action of A upon F takes place at an earlier period, and the stitches are lengthened without any change in the movement of A. The fullness of the gathers will be affected by these changes in the position of C, all the other parts remaining the same; but when the desired length of stitch is obtained, then the fullness of the gathers may be regulated by simply changing the amount of throw of the feeder A in the ordinary manner—that is to say, by turning backward or forward the graduating-cam G.

The machine with our improvements attached may be used to sew a plain seam by either bringing back C, so that the stitch may be made equal to the throw of the feeder, or by placing both pieces of cloth together under both B and C. In the latter case the length of stitch will be regulated by the adjustable cam G in the usual manner. The length of the stitches may also be adjusted in gathering by changing the parts so as to affect the path of A relatively to both C and B, which may be accomplished by rendering that part of A upon which the cam I operates adjustable, so as to give A a greater or lesser extent of motion in the direction of the blue arrow, or by other well-known means; or by adjusting B on its standard *b*, so as to change its position relatively to C, or by adjusting both B and C relatively to the feeder A. We, however, prefer the means above described—viz., a changing of the position of C alone by turning the screw D.

We do not confine ourselves to the precise form of the parts herein shown, as any modification thereof may be made which will produce the same result. For example, we have

represented C as forming one extremity of a lever mounted on the cloth-plate of the machine; but in case our improvement is attached to a machine to be used on a great variety of work, some of which may extend quite across the whole surface of the cloth-plate, the gathering-presser C may be connected to the feed-presser B, and may be raised and lowered with it. This will allow cloth of any width to be passed under it that could be otherwise passed through the machine. It can in that case be made adjustable, as at present, by any ordinary device for producing such effect.

Having now fully described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the employment of the separator C or its equivalent for the purpose of separating the two pieces of cloth E and F, and thereby protecting F from the action of the gathering mechanism, substantially as herein set forth.

2. Gathering cloth and stitching or fastening the gathers on a sewing-machine by the combined action of the single feeding device A, presser-foot B, and separator C, or their equivalents, substantially in the manner herein described.

3. Regulating the length of the stitches in the production of a gathered fabric by changing the position of the separator C, or of C and the presser-foot B, relatively to the forward extremity of the path traversed by the feeder A, substantially as herein set forth.

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