No. 610,486. Patented Sept. 6, 1898.

H. E. HAWES.

SEWING MACHINE.

(Application filed Feb. 9, 1897.)

(No Model.)

Fig. 1.

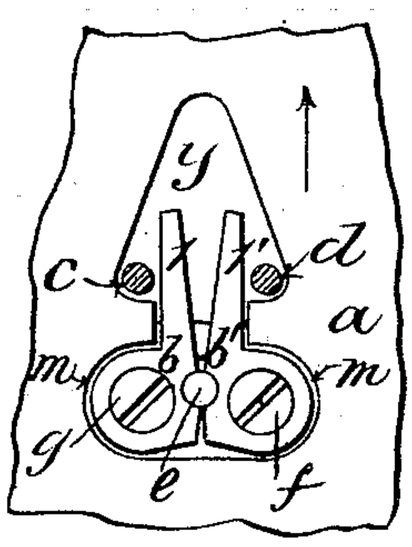


Fig. 2.

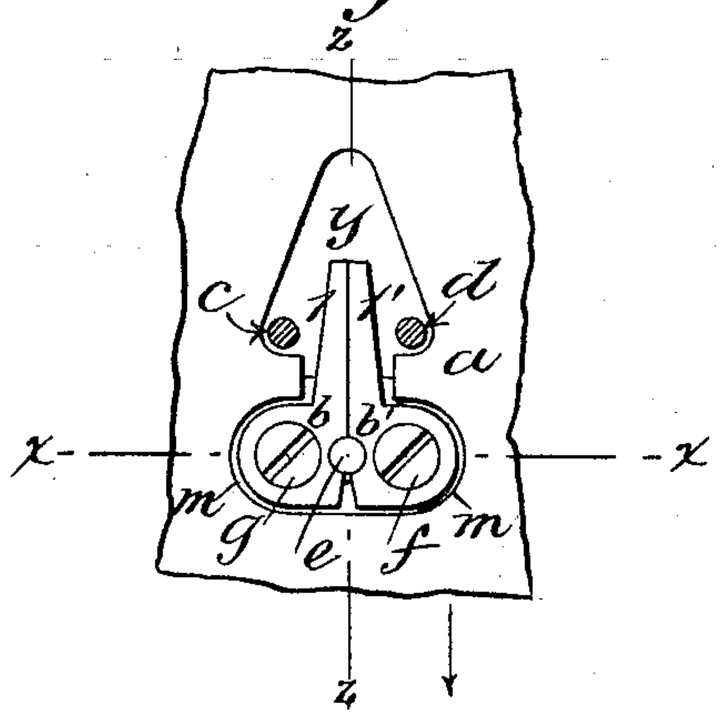


Fig. 3.

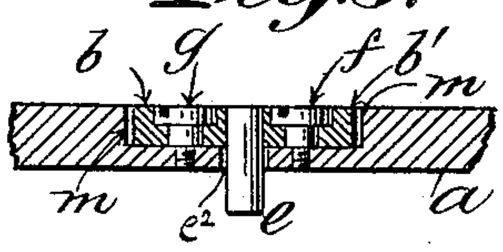


Fig. 4.

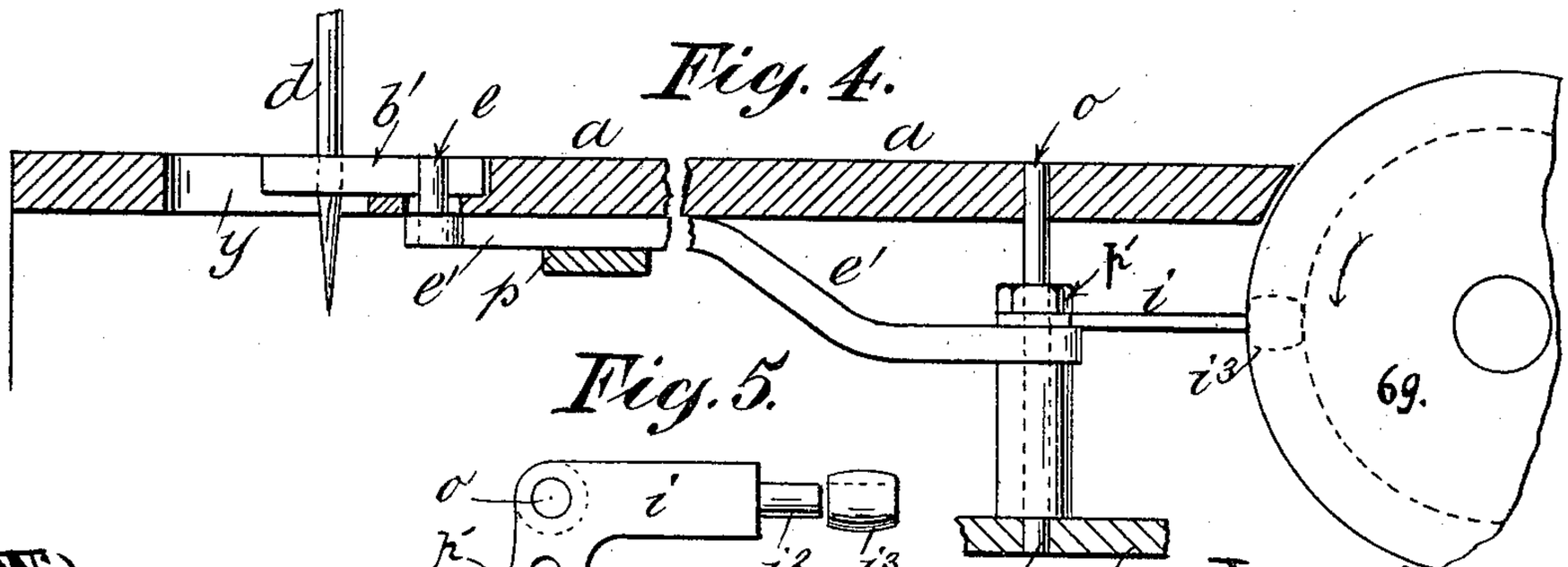
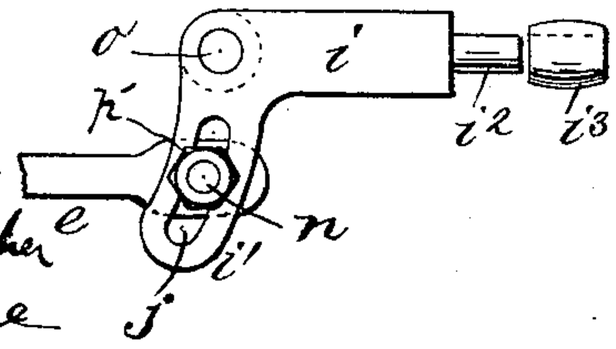


Fig. 5.



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UNITED STATES PATENT OFFICE.

HERBERT E. HAWES, OF NEW YORK, N. Y., ASSIGNOR OF ONE-FOURTH TO THOMAS COOPER BYRNES, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,486, dated September 6, 1898.

Application filed February 9, 1897. Serial No. 622,597. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. HAWES, a citizen of the United States, and a resident of the city of New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of my improved collapsing stitch-regulator or "last" in normal position; Fig. 2, a similar view of same collapsed. Fig. 3 is a section at the line *x x* of Fig. 2. Fig. 4 is a view, partly in section and partly in elevation, showing the connection between the said regulator or last and one of the moving parts of the machine whereby power is transmitted thereto. Fig. 5 is a detail, being a top view of the rocker and its connections hereinafter described, showing the devices for securing adjustability.

The object of my invention is to provide means in a sewing-machine whereby the length of the thread comprising each stitch may be regulated and controlled, thereby producing at will a tighter or looser seam and avoiding the puckering and drawing of the material sewed. I attain this object by introducing into the stitch at the place of its formation an adjustable stitch-regulator or last, across and around which the thread is laid and tightened during the formation of the stitch, said regulator or last being so constructed and actuated as to insure its greatest desired expansion at the time of the tightening or completion of the stitch and its collapse during the interval when the goods are being fed forward in the progress of the sewing, thus accomplishing the uniform regulation of the length of thread comprised in each stitch, the subsequent withdrawal of the stitch from said regulator with the least possible resistance as the goods are fed forward, and the consequent avoidance of puckering or distortion of the seam or goods.

Briefly stated, my invention consists, among other things, in regulating the length of thread in each stitch and supporting the seam against undue tightening by forming it around a normally open or expanded regulator or last, which is subsequently collapsed when its support ceases to be necessary, and the extent of the expansion of which can be varied and regulated according to the will of the operator.

My invention is especially adapted to be useful in sewing together the abutting edges of goods; but it may also be used in any other case in which it is desired to avoid undue tightening of the stitch and consequent puckering or unevenness of seam, and also particularly in cases in which the regulation and securing of a predetermined and uniform length of thread in each stitch is desirable—as, for instance, in embroidery and the like.

My invention may be applied to any style of sewing-machine with merely such adaptation in location and in connection with and relation to the moving parts as will readily occur to any person skilled in the art.

The drawings show the invention applied to one of that class of machines which employ two needles for seaming together the abutting edges of two pieces of goods lying in the same plane, the goods being fed so as to keep the line of junction centrally between the two needles and the thread underneath the goods manipulated by the use of suitable loopers, so as to assist in the formation of the stitch, &c., as will be readily understood, in which case the tension on the threads, combined with the feed, operates often to unduly and unevenly tighten the stitches, so as to produce puckering in the goods along the line of the seam.

In the drawings, *a* represents the cloth-plate of the sewing-machine.

b b are two members which coöperate to make up the last or stitch-supporter proper. These are by the pivot-screws *f g* secured to the cloth-plate within a suitably-shaped recess or depression in the latter, the edge of which is indicated by *m m m*. The members *b b'* are free to turn upon said pivot-screws, and their upper surfaces are preferably flush with that of the cloth-plate, a portion of which is entirely removed back of the needles *c d*, (shown in cross-section, Fig. 4,) so as to present an open space *y*. The members *b b'* are, as shown in the drawings, capable of being turned on their pivot-screws a certain distance, so that the extremities of their backwardly-projecting arms or extensions *l l'* are

separated from each other, as shown in Fig. 1, and the outside edges brought into proximity to the needles. While in this position that part of the stitch formed under the goods by carrying the thread or threads crosswise of the line of juncture of the goods or otherwise will be pulled by the combined effect of the thread-controlling mechanisms and other related parts against the temporarily unyielding support and regulation afforded by the open arms *l l'*. On the other hand, when the members *b b'* are rotated upon their pivot-screws, so as to bring them into the position shown in Fig. 2, in which they are closed against each other, their support is withdrawn from the stitch and they present no resistance or impediment to the forward feed of the goods in the direction indicated by the arrow, Fig. 1.

The alternate automatic expansion and collapse of the arms *l l'* may be conveniently accomplished by means of a vertical rod *e*, passing through a slot e^2 in the cloth-plate, so as to project thereunder, as shown in Fig. 3, and fitted to corresponding recesses in the members *b b'*, which thus partly embrace said rod. The slot in the cloth-plate is sufficiently wide to freely admit the passage of the rod and sufficiently long in the direction of the line of feed to permit a reciprocation or stroke backward and forward on the part of the rod sufficiently extended to cause the members *b b'*, with their arms *l l'*, to take at the extremes of the stroke the respective positions shown at Figs. 1 and 2—*i. e.*, expanded or collapsed.

The backward-and-forward movement of the pin *e* and the alternate expansion and collapse of the arms *l l'* may be effected in any convenient way, it being only necessary to so connect the said pin with such moving part of the sewing-machine as to insure its alternate backward-and-forward movement at the proper time. I have illustrated in the drawings one method of such connection. (See Fig. 4, in which the cloth-plate *a* of the machine is shown in section, taken on the line *z z* of Fig. 2.) The member *b'* is shown in elevation, likewise the pin *e*, the member *b* being removed for the purpose of clearness of illustration.

The pin *e* is connected with the rod *e'*, (shown broken away in the center,) of any convenient length, according to requirement. The said rod *e'* is in turn pivotally connected at its opposite extremity with the two-armed rocker *i*, which is sleeved and oscillates upon a vertical shaft *o*, which rests in bearings or steps at both upper and lower ends. The rocker *i* is provided in one of its arms with a curved slot *j*, which is perferably concentric with pin *e* when its members are in their collapsed position and are drawn from *e* through center of slot *j*, cutting center of shaft *o*. Through this slot passes a threaded pin *n*, carried by and pivoted in the connecting-rod *e'* and secured in position at the proper time by screw-nut *p'*. The other arm of the rocker *i* is provided with a roller-stud i^2 and a barrel-shaped roller i^3, operating within a peripheral groove in the cam 69, the said groove being so shaped, as will be readily understood, as to secure the desired movement in the pin *e*, the cam 69, connected with the source of power, operating the machine in any convenient manner, so as to be rotated thereby.

I accomplish the regulation of the length of thread tightened about my last or regulator in the formation of the stitch by loosening the nut *p'*, adjusting the pin *n* to the required position in the slot *j*, and securing it in that position by screwing down the nut *p'* into place. By this means the length of the stroke or movement of the pin *e* may be regulated as desired and the extent of the separation of the arms *l l'* at the length of the stroke be regulated accordingly, whereby, as will be readily understood, the length of the thread drawn around the arms *l l'* during the formation of each stitch will be gaged and thus preserved uniform during the sewing until a new adjustment is made.

The operation of my device is therefore as follows: On the needles approaching the goods the members of my last or regulator are rotated on their screw-pivots, so as to expand their arms *l l'* relatively to each other and are held in this position at the proper time while the needles are in the goods and until the stitch has been tightened. After the withdrawal of the needles from the goods and upon the feed forward of the latter for another stitch the arms *l l'* are collapsed relatively to each other by the continued action of the cam transferred, as aforesaid, to the rod *e*, whereby the latter is moved, causing the members *b b'* to rock upon their pivot-screws in a contrary direction, and so on indefinitely, the last performing its function of support and regulation and in turn at the proper moment ceasing to do this and assuming a shape which will present the least (in fact, practically no) interference with and resistance to the forward movement of the goods by the feed mechanism of the machine.

It will be understood that I do not confine myself to the precise form of alternate collapsing and expanding devices illustrated and described. It is manifest that the beneficial results of my invention might be obtained by holding one member stationary and causing the other to move toward and from it, also that the form and direction of motion of the arms and members might be varied without departing from my invention.

In the drawings I have for the purpose of greater clearness shown the members *b b'* considerably thicker in proportion to the cloth-plate *a* and other parts than will probably be found advantageous in ordinary use, the thickness of these members being of course regulated according to the thickness of the cloth or material and the degree of tightness required in the seam.

What I claim as new, and desire to secure by Letters Patent, is the following, viz:

1. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of a stitch-regulator or "last" consisting of members coacting to expand such regulator or "last" while there is tension or pull upon the thread during the making of the stitch and to collapse it thereafter and during the interval while the goods sewed are being fed and means to actuate said members, substantially as and for the purposes described.

2. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of a stitch-regulator or "last" consisting of two independently-rocking members having arms across and about which when expanded the thread or threads are tightened in forming the stitches, and means for rocking into said expanded position and alternately rocking in the opposite direction so as to draw together or collapse said arms during feed intervals, and back again in the opposite direction to reëxpand for another stitch, substantially as and for the purposes described.

3. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of a stitch-regulator or "last" consisting of two rocking members turning in one direction to expand and in the opposite direction to collapse, an actuating-pin engaging with said members to so rock them, and means for reciprocating said actuating-pin, substantially as and for the purposes described.

4. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of a stitch-regulator or "last" consisting of two members, each rocking in opposite directions, an actuating-rod engaging therewith, a two-armed rocker and means for connecting said rocker with said reciprocating rod and with a properly-moving part of the mechanism of said sewing-machine, substantially as and for the purposes described.

5. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of a stitch-regulator or "last" consisting of members coacting to alternately expand and collapse said "last," a reciprocating pin directly actuating said members, a two-armed rocker connected to said pin by a connecting-rod, an adjustable connection between said connecting-rod and one of the arms of said rocker and means for actuating aforesaid parts, substantially as and for the purposes described.

6. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of stitch-supporter composed of pivoted members b b', pin e, connecting-rod e', rocker i', having slot j, pin n, nut p', stud i^2 stud-roller i^3 and grooved cam 69, substantially as and for the purposes described.

7. In a sewing-machine the combination with stitch-forming and cloth-feeding mechanisms of an adjustable alternately expanding and collapsing "last," adapted to receive at the time of stitch formation, the thread comprising each stitch, and to limit the size and tightness to which each stitch is drawn at completion and to collapse during feed intervals, and means for actuating said "last," substantially as and for the purposes described.

Dated New York, N. Y., February 8, 1897.

HERBERT E. HAWES.

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