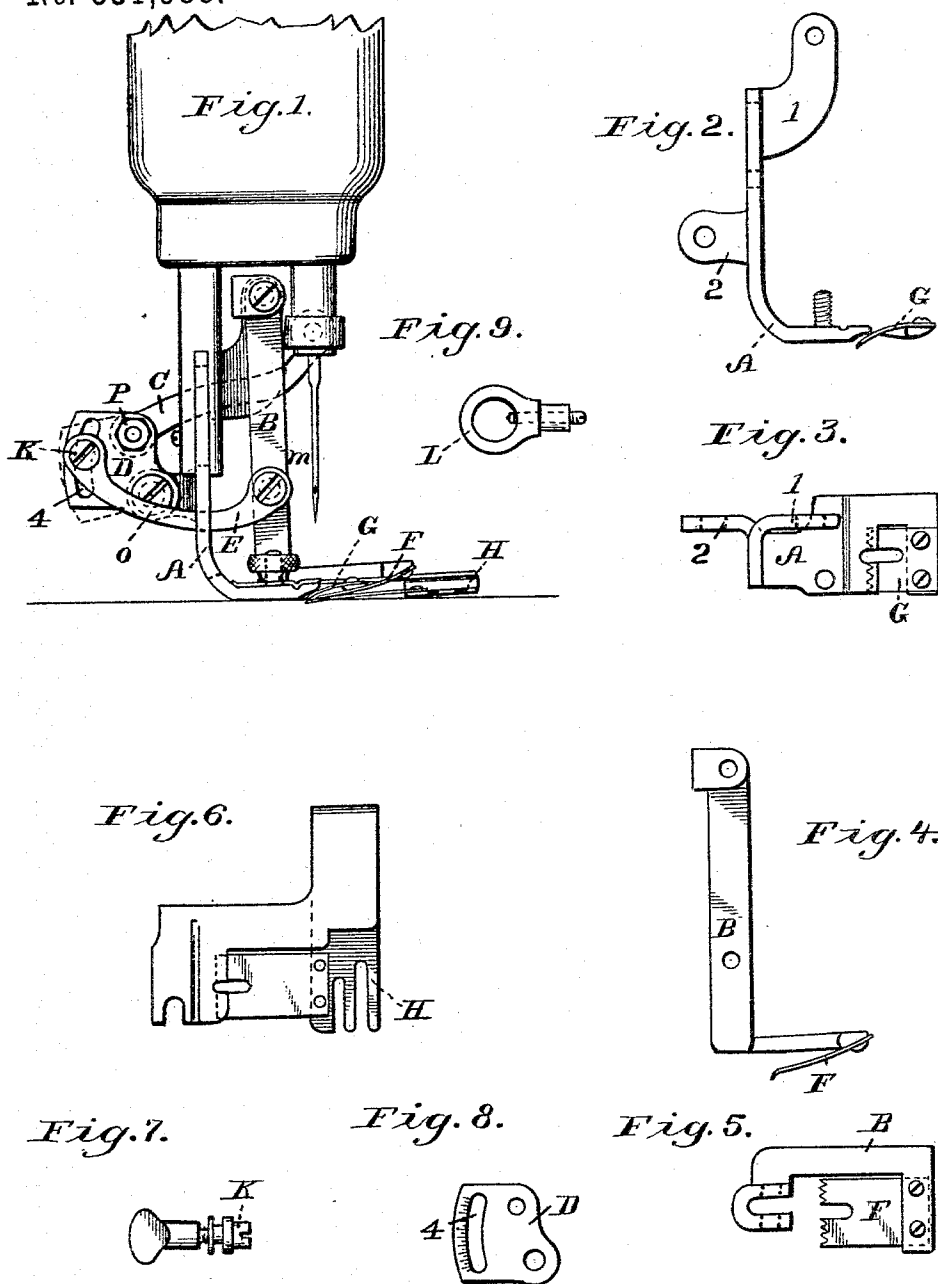


(No Model.)

W. R. ABERCROMBIE.
RUFFLER FOR SEWING MACHINES.

No. 531,988.

Patented Jan. 1, 1895.



WITNESSES:

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WILLIAM ROBERT ABERCROMBIE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR
TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME
PLACE.

RUFFLER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 531,988, dated January 1, 1895.

Application filed May 25, 1894. Serial No. 512,396. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROBERT ABERCROMBIE, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Rufflers for Sewing-Machines, of which the following is a specification.

The object of my invention is to produce a ruffler which will produce "full" and "scant" ruffling with equal regularity; which has the least possible amount of friction in its operating parts, that it may be easily propelled; its parts made interchangeable, that the necessarily frail parts may be readily replaced when dulled or broken, and that is capable of running at the highest speed attainable by power-driven machines without injury to itself or the sewing machine to which it is attached. I obtain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows my ruffler secured to a sewing machine, ready for use. Fig. 2 is a side elevation of the presser foot, detached, and Fig. 3 is a plan of the same. Fig. 4 is a side elevation of the pendulum foot, and Fig. 5 is a plan of the same. Fig. 6 is a plan of the separator plate. Fig. 7 is a detail view of the adjusting stud and nut. Fig. 8 is a detail view of the segment lever, and Fig. 9 is a detail view of the operating stud.

The presser-foot A is substituted for, secured in the same manner and serves the same purpose (as far as affects the sewing), as the presser-foot (proper) of the sewing machine, but is formed with two projecting lugs, 1 and 2, to support the operating parts of the ruffler, and a right angled projection from its front end, as shown in Fig. 2, to which, by means of screws, is attached a thin, flexible, toothed spring, G, which I term a retaining blade, the purpose of which will be hereinafter described. To the forwardly projecting lug 1 is pivotally attached the pendulum foot, B, and to the right angled projection at the lower end of the latter, by means of screws, is attached a toothed crimping blade F.

To obtain the desirable stability of the pivotal connection between the pendulum foot

B and the lug 1 of the presser foot, a right angled projection of the upper end of the pendulum foot is turned back to overlie, but stand apart from, the shank or body of the same, and the pivot hole made through both the body and the overlying end, as may be seen in Figs. 4 and 5. Through this hole a pivot screw is inserted and solidly secured, by a suitable check nut, to the lug 1 of the presser foot A. As thus secured it will be seen that the crimping blade F attached to the lower end of the pendulum foot is allowed a free forward and backward movement in the direction of the line of sewing, while it is yet held securely against any side movement without the employment of the usual guideways and the excessive friction resulting therefrom.

To the backwardly projecting lug 2 of the presser foot B is pivotally attached the segment lever D, (see Fig. 1) by means of the screw *o* and a check nut, (not shown,) and by means of a screw P (and check nut), the operating link C is secured to the upper end of the segment lever, as shown in the same drawing. The segment lever is provided with a slot 4 into which is loosely fitted a shouldered and threaded stud, shown in Fig. 7, upon the threaded end of which is placed a thumb nut, by which the stud may be held in any desired position in the slot.

By means of the connection E, I connect the pendulum foot B with the segment lever D, one end being pivotally attached to the pendulum foot, by the large headed screw *m*, which prevents lateral movement, and the hole in the other end embracing the protruding stud K secured in the segment lever D.

The separator plate, so called, is a steel plate shaped as shown in Fig. 6, to one end of which is attached a plate of thinner steel, having the desirable flexibility, which serves as the separator, proper. This separator plate is detachably secured to the presser foot A, a rib depressed in the plate entering a corresponding groove in the top of the foot, a notch in the plate embracing a threaded stud affixed to the foot, and all held in position by a thumb nut upon said stud, all as shown in Fig. 1.

To actuate the ruffler I attach, by means of a set screw, to the lower end of the needle bar, the collar L, Fig. 9, having a projecting stud which enters the hole in the end of the operating link C, as seen in Fig. 1. When thus connected it will be seen that the vertical movement of the needle bar will impart an oscillatory movement to the segment lever, which, in turn, through the connection E, will impart a swinging movement to the pendulum foot and a vibrating movement to the crimping blade F attached to its lower end.

As is well understood it is the office of the crimping blade to seize a portion of the fabric which is to be ruffled and carry it forward to, a little faster than the feed, proper, of the sewing machine carries the stitched fabric away from, the needle, thus forcing the fabric into slight crimps or larger plaits, as may be desired, before being stitched. To perform this function properly the crimping blade must perform both its forward and backward movement while the needle is out of, and remain practically stationary while the needle is in, the fabric. This is accomplished perfectly by the compound action of the operating link C and the segment lever D as follows:—When in its action the needle bar has brought the operating link into a horizontal position it will be seen that all the operating parts of the ruffler, except the connected end of the operating link C, will remain practically at rest during a considerable portion of the movement of the bar. This period of rest occurs when the needle bar is near the lower extremity of its movement and while the needle is entering and receding from the fabric; but as the needle bar rises and approaches the upward limit of its movement the segment lever is drawn into the position shown in full lines, and the crimping blade thereby forced back, while the descent of the bar reverses the movement and forces the segment lever into the position indicated by dotted lines, carrying the crimping blade forward; the movement in both directions taking place while the bar is near the upward extremity of its movement and consequently while the needle is free from the fabric. The movement being imparted to the operating parts in this manner by the operating link it will be seen that the impetus given to said parts to bring them into action is so exceedingly gradual that any shock is impossible, though driven at the highest rate of speed, and the durability correspondingly great. As shown in Fig. 1, the adjusting stud K, which serves to join the segment lever D and the connection C, is secured about midway in the length of the slot 4, but by changing the height of the stud in the slot (its thumb nut being provided for that purpose), the throw of the crimping blade may be varied and hence the fullness of the ruffle regulated as desired.

The parts are so constructed that when the adjusting stud K is set near the lower end of

the slot 4, where required for ruffling with the least possible fullness, the crimping blade will advance only far enough to carry the slight wave or crimp of the ruffle past the needle, that the needle may just step over the crimp so formed at each stitch, by which means only can accurate scant ruffling be produced. When greater fullness is desired, however, especially where so great that the crimp or gather will be formed into an overlapping fold or plait, the crimping blade must not only recede farther to seize a greater length of ruffle, but must also advance farther that the needle may puncture and stitch the three ply of ruffle so formed and thus retain it in position. It is found that the best proportionate increase in each direction is for the blade to recede two-thirds and advance one-third of the increased amount of its throw. This result is obtained by the shape, or more properly the pitch or inclination of the slot 4 in the segment lever D its pitch being such that as the stud K is moved upward it is carried also to the right; thereby not only increasing, but also automatically locating the position of the throw so as to produce the best results through all the varying range from the most scant to the very fullest ruffling. An index stamped upon the side of the segment lever D, as shown in Fig. 8, is provided for accuracy and convenience in adjustment.

In the operation of the ruffler, if it is desired to gather a ruffle and stitch it to a plain piece, called a band, as is well understood the piece to be gathered is inserted below the crimping blade F and above the separator H, while the band is placed beneath the separator, that it may be protected from the action of the crimping blade; while if desirable to gather and sew the ruffle only, the band is omitted, and the separator serves to protect the crimping blade from injury by contact with the feed points of the machine.

Now in the production of perfect ruffling it is evident that the crimping blade must always move the same distance to produce uniform gathers, and must also press downward sufficiently that it may not slip upon the ruffle but always carry it forward the full length of its stroke. If, however, the downward pressure is very great, as rufflers have been heretofore constructed, there is too much tendency to draw back the ruffle as the crimping blade recedes and thus destroy the accuracy of the ruffling. It is usually sought to prevent this by having the front end of the presser foot cut away underneath to form a slight cavity into which the crimp may be forced by the point of the crimping blade, but this only serves properly for a certain size of crimp. If a smaller crimp is made it is but loosely held and the cavity does not serve its purpose; while if larger crimps are made, as for full ruffling, the cavity is too small and the crimping blade must overcome the entire pressure of the presser bar spring of the sewing machine in forcing the crimp beneath the

foot, thus often injuring the crimping blade which, on account of the desirable flexibility, is necessarily frail. This difficulty is overcome in my ruffler by the use of the retaining blade G. As seen most clearly in Fig. 2, the front end of the presser foot is cut away beneath to form a cavity larger than required for the largest crimp or fold, and into this cavity the end of the retaining blade extends. Its exact position is such that when set for the scantiest ruffling the crimping blade will carry the fine crimp just beyond its forward end, where by the retaining blade the crimp is held, to prevent its withdrawal by the return movement of the crimping blade. The retaining blade is of such flexibility as to readily yield and permit the entrance of all sizes of crimps without injury to the crimping blade.

By the use of the retaining blade I am enabled to set the crimping blade so that it will impinge with greater force upon the fabric and carry the crimp forward with much more certainty, and yet prevent the possibility of any displacement of the crimp by the return movement of the blade.

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

1. The presser foot A, with its forwardly

and rearwardly projecting lugs 1 and 2, its forwardly projecting extension for supporting the retaining blade G, in combination with the pendulum foot B, connection E, adjusting stud and nut K, segment lever D, and operating link C, all connected and operating substantially as described.

2. The presser foot A, with its forwardly and rearwardly projecting lugs 1 and 2, and its forwardly projecting extension for supporting the retaining blade G, in combination with the pendulum foot B, the crimping blade F and the retaining blade G, all constructed and operating substantially as described.

3. The presser foot A, with its forwardly and rearwardly projecting lugs 1 and 2 and its forwardly projecting extension for supporting the retaining blade G in combination with the pendulum foot B, the crimping blade F, the retaining blade G and the separator plate H, all constructed and operating substantially as described.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 23d day of May, A. D. 1894.

WILLIAM ROBERT ABERCROMBIE.

Witnesses:

F. HURD,

A. STEWARD.