F. D. PALMER.

Straw-Braid Sewing-Machine.

No. 204,599. Patented June 4, 1878.

Fig: 1.

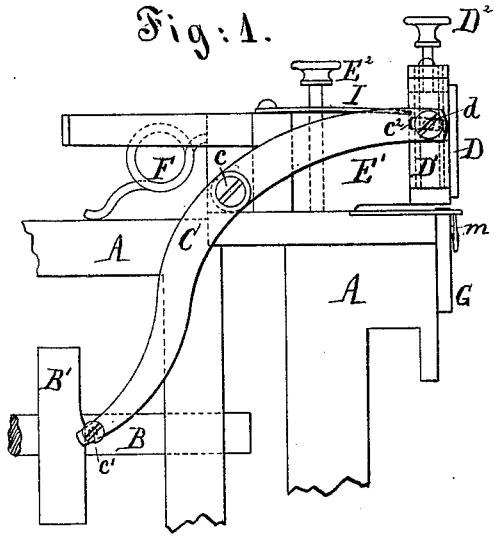



Fig: 2.

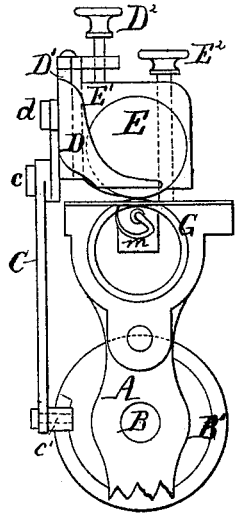
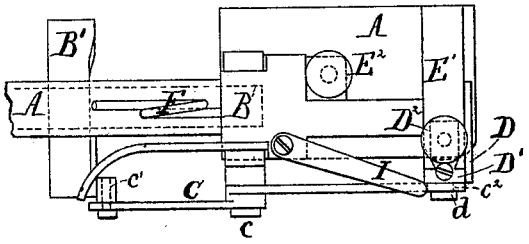



Fig: 3.

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# UNITED STATES PATENT OFFICE.

FRANK D. PALMER, OF NEW YORK, N. Y.

## IMPROVEMENT IN STRAW-BRAID-SEWING MACHINES.

Specification forming part of Letters Patent No. **204,599**, dated June 4, 1878; application filed August 16, 1877.

*To all whom it may concern:*

Be it known that I, FRANK D. PALMER, of New York city, in the county and State of New York, have invented certain new and useful Improvements relating to Presser-Feet of Sewing-Machines, of which the following is a specification:

There is a class of sewing-machines much used for sewing straw-braid to form ladies' hats and analogous uses, in which the thread comes up from below in one place and goes back again in another, taking hold of only a portion of the thickness of the fabric. In one example two needles cross each other in the thickness of the fabric. In another example a curved needle is operated with a vibrating or rocking motion from a center near the goods, and a curved stitch is made. My invention may be applied to either of these classes of machines. I will describe it as applied to the last-named variety.

It is a defect in the product if the sewing-thread is exposed on the face side or "right side" of the work. It is important that the material be so held that the needle in making the stitch shall never strike quite through the fabric. There are difficulties in the way of attaining this by any ordinary means.

Straw-braid varies considerably in thickness. If the needle be adjusted to seize only the due proportion of the thickness at the thin parts it will seize only the same absolute quantity, and therefore a smaller quantity than would be allowable in the thick parts, and the sewing is therefore much weaker than it might be on the thick parts of the braid.

It is customary to sew straw-braid in a damp condition, in which state it is practicable to compress the thickest parts by a suitably-applied force, so as to make it all of an exactly-predetermined thickness at the moment when the needle is introduced. This condition may also be very nearly approximated when the braid is dry, or in treating other material than straw-braid, provided it is sufficiently elastic. But if the compression is effected by ordinary means, so as to be applied constantly, it will so hold the goods as to interfere with the facility of manipulating.

In order to form tastefully-shaped hats by sewing successive rows of braid in a sewing-machine, it is essential that the hat be sometimes pressed forward faster than the feed, and at other times held back, so as to move slower than the feed. By this means we insure the disposition to flare or widen at one point, and to draw in at another, at will. We thus obtain a disposition in the hat to remain permanently in shape, in addition to what may be impressed by the after treatment on the block. We want a pressure which shall be applied only during the period of taking the stitch, and shall be relieved for a considerable interval between each stitch. My presser-foot accomplishes this. It rises after each stitch is taken, and for a period allows the goods to be either urged forward or held back, and then sinks and presses forcibly upon the goods again. At each descent it presses the upper surface of the goods down to a mathematically-determined plane corresponding with the thickness of the thinnest parts. There it stands firmly while the curved needle makes its partial revolution to traverse forward and back in the goods and put in the thread. The thread is thus always inserted an equal distance below the carefully-predetermined plane of the presser-foot, and consequently a sufficient distance beneath the upper surface of the straw-braid after it has finally expanded.

I have in my experiments used a sewing-machine which is, in other respects than the presser-foot and the means for operating the presser-foot, in accordance with the machine described in the patent to me dated August 29, 1876, No. 181,590. In that machine the presser-foot was held at a certain level all the time after the goods were properly introduced.

My present invention automatically raises the presser-foot by means independent of the feeding devices, and leaves the hat practically free at the moment while the measured feeding forward of the braid is being accomplished. It then forces down the presser-foot to an exactly-predetermined extent, which may be considerably lower than was allowable with the old machine, and thus compresses the braid forcibly and reliably to a uniform thickness. The needle, being mounted to work to a uniform distance below the surface of the fabric, always conceals the stitch on the front face, while allowing the needle to grasp a nearly uniform proportion of the material under all circumstances.

Suppose, for example, my needle is set to sweep over and seize two-thirds of the thick

ness of the braid. It will do that while working on the thin part of the braid, treating it in its ordinary uncompressed condition. It will also do it while working on a thick part of the braid, because the needle will rise to exactly the same height, and will traverse in a precisely similar manner through material which has been so strongly compressed by my presser-foot as to bring its whole mass into the prescribed thickness. After the braid has been liberated from the pressure it will expand again to its original thickness, and as it swells it will carry the contained thread up with it. The thread will stand much higher in the thick portions of the goods than in thin, and will hold much stronger. The needle will get hold of two-thirds of the material in the thin part and of two-thirds of the material in the thick part.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation of a part of the machine. Fig. 2 is a front elevation, and Fig. 3 is a plan view, of the same.

The figures show the novel parts, with so much of the ordinary parts as is necessary to indicate their relation thereto.

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

A is a part of the fixed frame-work of the sewing-machine. B is the main driving-shaft, and B′ is a face-cam carried thereon, which gives motion to the lever C by acting against a roller which turns on the pin $c^1$. The lever C turns on a fixed center, *c*, and embraces, in a slot, $c^2$, at its front end, a pin, *d*, which is mounted in the side of a slide, $D^1$, which is capable of vertical motion in the ordinary head-block $E^1$. The presser-foot D is firmly bolted on the slide $D^1$, and rises and sinks with it as it is actuated by the cam B′ through the lever C, while the top roller E and its block $E^1$ may be rigidly held stationary by any ordinary or suitable means.

It will be understood that the needle *m* is oscillated, and that the feed-wheel G is moved forward intermittingly by the ordinary means. (Not represented.)

It will also be understood that the head-block $E^1$ is strongly depressed by a stout spring, F, to an extent gaged by the ordinary gage-screw $E^2$, and may be lifted, as usual, to allow the introduction and removal of the work.

The face-cam B′ is plain for about half of its circumference. While that portion passes the pin $c^1$ the presser-foot D remains stationary in its depressed condition, firmly and rigidly holding down the goods to allow the needle to act with a certainty that it shall neither force a straw up or down, but shall split the straws which lie in its way, and make the stitch always at the desired distance below the upper surface, which is to form the exposed surface of the finished hat. The remaining part of the face-cam B′ is swelled. While this is passing the pin $c^1$ the presser-foot D is elevated, and leaves the hat free to be urged forward or backward, as the conditions at that point shall require, in order to produce the desired shape.

During the period while the plain part of the cam B′ is acting, the presser-foot D may be held down with the required force by various means.

I have tried a face-cam having a form the counterpart of the face-cam B′, and mounted on the same shaft. This has the effect, while the machine is in perfect adjustment, to depress the lever C, and consequently the presser-foot D, by a positive motion; but as it will be liable to become loose by wear, I prefer, for ordinary purposes, to depress the presser-foot D and take up the lost motion by a spring, I, having sufficient force to compress the most obstinate braid which is likely to be treated.

The depth to which the presser-foot D may descend in obedience to the force of this spring may depend, as so far described, entirely upon the contour of the cam B′; but I prefer an additional gaging means which shall be nearer to the point of action, and consequently less liable to be affected by any elasticity or yielding of any part.

I employ a gage-screw, $D^2$, tapped through a lug on the upper end of the slide $D^1$, and pressing on a plane surface on the top of the head-block $E^1$.

This arrangement, as shown, requires that the spring F, which operates the head-block $E^1$, shall have considerably more force than the spring I, which operates the presser-foot. I prefer to make the spring F of about four times the force of the other.

There is a large class of machines to which my invention is obviously applicable in which the head-block or the part corresponding to the head-block $E^1$ does not lift; but liberty to introduce and remove the work is obtained by depressing the table-plate and its connections instead. My invention is obviously applicable to such without requiring any modification.

I claim as my invention—

The presser-foot D and operating mechanism C B′, in combination with the separate head-block $E^1$, having separate pressing mechanism E, and with a gage-screw, $D^2$, adapted to not only gage the level to which the work may be compressed, but also to permit the presser-foot to rise when the head-block is raised, as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 15th day of August, 1877, in the presence of two subscribing witnesses.

FRANK D. PALMER.

Witnesses:

THOMAS D. STETSON,

CHAS. C. STETSON.