

C. C. COPELAND & F. M. BENNET.
 BED SHEET AND SHEETING.
 APPLICATION FILED NOV. 13, 1909.

977,936.

Patented Dec. 6, 1910.

2 SHEETS—SHEET 1.

Fig. 1

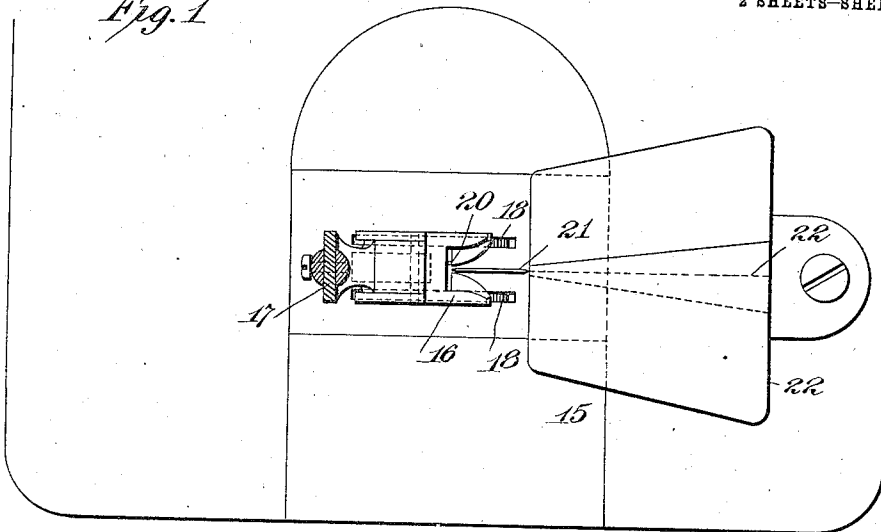


Fig. 2

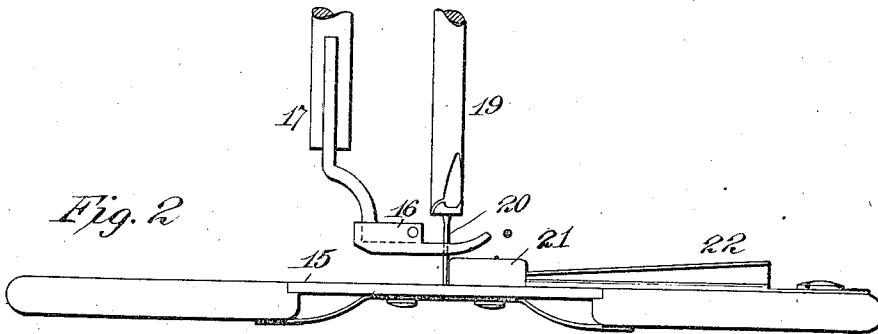


Fig. 3

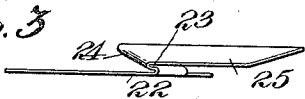


Fig. 4

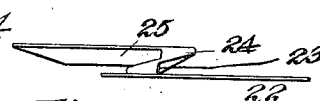


Fig. 5

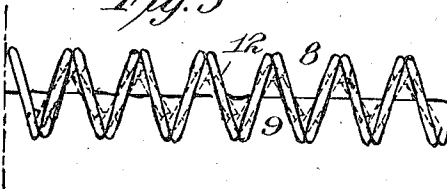


Fig. 6

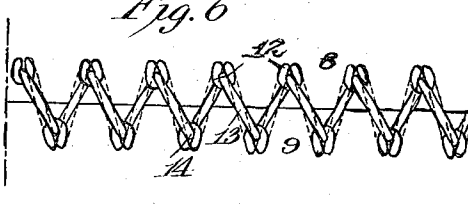
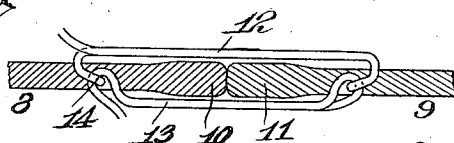


Fig. 7



Witnesses:

Geo. F. Coleman
 John H. Foster

Inventors

Charles C. Copeland
 Frank M. Bennet
 By Ayer & Ayer
 Attorneys.

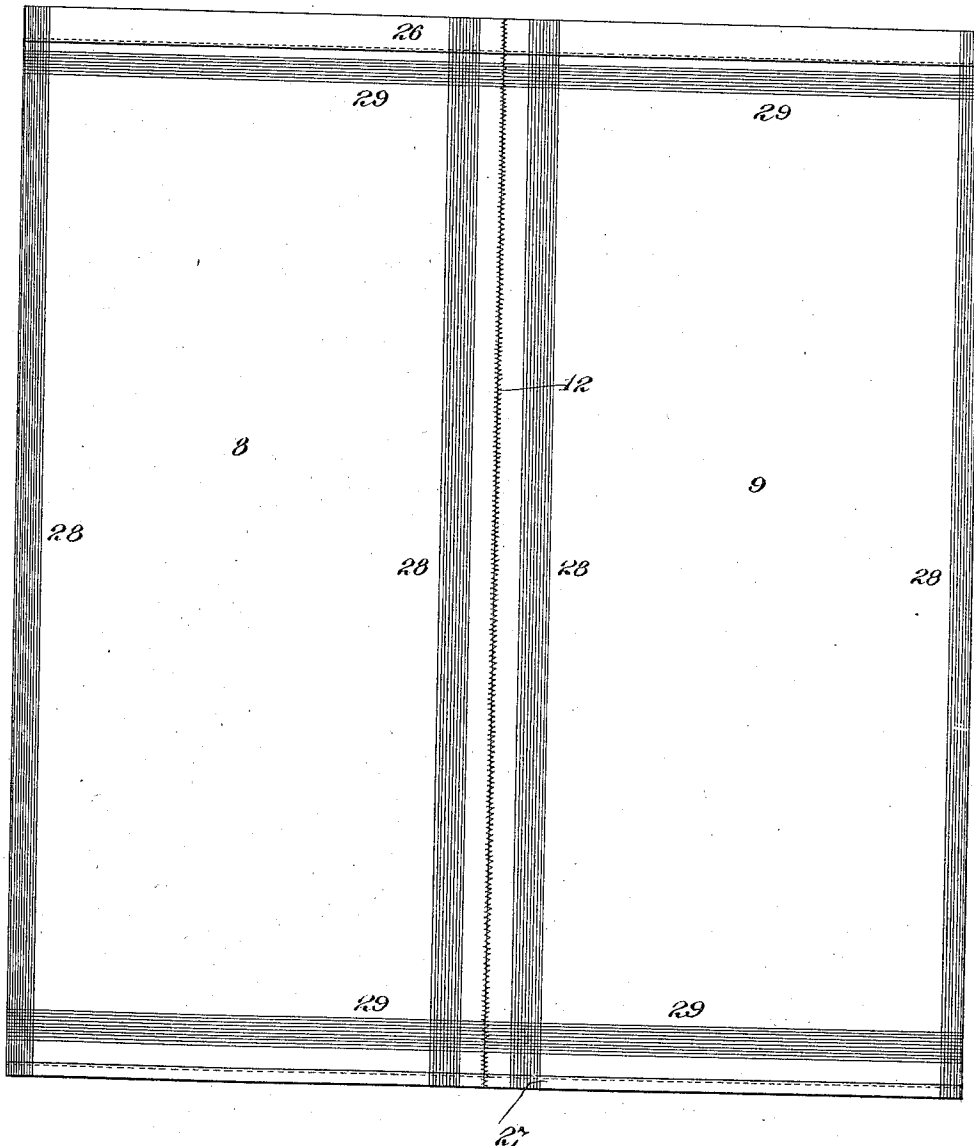
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2 SHEETS—SHEET 2.

Fig. 3



Witnesses:

Jas. F. Coleman
John K. Kotsch

Charles C. Copeland **Inventors**
Frank M. Bennett
By S. J. & Dyer **Attorneys.**

UNITED STATES PATENT OFFICE.

CHARLES C. COPELAND, OF NEW YORK, N. Y., AND FRANK M. BENNET, OF EAST ORANGE, NEW JERSEY.

BED SHEET AND SHEETING.

977,936.

Specification of Letters Patent.

Patented Dec. 6, 1910.

Application filed November 13, 1909. Serial No. 527,872.

To all whom it may concern:

Be it known that we, CHARLES C. COPELAND, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, and FRANK M. BENNET, a citizen of the United States, residing in East Orange, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Bed Sheets and Sheeting, of which the following is a specification.

Owing to the increased cost of sheeting woven the full width required for a bed sheet, it has been for some time recognized as desirable to make a bed sheet of two widths secured together at the longitudinal center of the sheet. It has also been known that to do this with commercial economy the widths of sheeting must be sewed or otherwise secured together in a rapid manner by machinery. Heretofore the best known way of doing this was to overlap the selvage edges of the widths of sheeting for a quarter of an inch or more and secure them by two parallel longitudinal lines of stitching passing through both thicknesses and produced by a double-needle sewing machine. This method had numerous disadvantages: The seam produced being of double thickness was uncomfortable to the user; and the selvage edges being outside the lines of stitching and unconfined were liable to turn up and be caught by the laundry machinery, resulting in the ripping of the stitching, or be ironed over on to the stitching producing additional thickness at the seam and added discomfort to the user. A further disadvantage arose from the fact that with the lapped seam the feed of the sewing machine acted only on the under thickness and the two pieces of cloth did not feed evenly. As a result of the uneven feed of the two widths of cloth, one width projected beyond the other at the end of the seam and the projecting corner was cut off obliquely to correspond with the other width, which was shorter at the center than at the outside of the sheet, due to puckering. This not only resulted in a waste of the cloth, but an uneven end was left which produced more or less puckering when the sheet was hemmed. This uneven and puckered end of the sheet was unsightly in appearance and prevented the sheet from being folded evenly when ironed. The uneven feed also produced a fullness of one width

with relation to the other at the seam, and when ironed the cloth became wrinkled along the seam and would not lie flat, but would present an uneven ridge-like center with consequent unsightliness and discomfort. Further than this, the two thicknesses of cloth being under unequal tension the strength of the seam was affected, resulting in an additional tendency to break the stitching under the strains produced by laundrying and use. Aside from the defects already indicated, the bed sheet resulting from this method of manufacture was characterized by lack of parallelism, and a difference in length, of the warp threads as well as of the woof threads of the cloth. In the width of cloth which was puckered at the seam the obliquity of this width at the end of the sheet was produced by the puckering along its inner edge, resulting in a departure from parallelism of the woof threads of the cloth and to some extent also of the warp threads; while in the other width of cloth the cutting off of the projecting inner corner obliquely across the warp and woof threads resulted in making the warp as well as the woof threads of uneven length.

We have discovered that bed sheets and sheeting can be made of two or more widths of sheeting and secured together at their selvage edges in a rapid and economical manner, without producing a ridge of increased thickness, without leaving the selvage edges unconfined, without material waste of the cloth without departure from a straight edge at the end of the sheet or a lack of parallelism or a difference in length of the warp or woof threads of the cloth and with a practically even tension on the adjacent widths of material at the join; and that without sacrificing any of these advantages bed sheets and sheeting can be made of two or more widths which will have the necessary strength at the join or joins to withstand without breaking or ripping the peculiar and severe strains to which bed sheets are subjected in handling, in laundrying and in use.

In carrying out our invention, we employ a sewing machine producing a zig-zag stitch in which the single needle reciprocates vertically as well as laterally while the cloth is fed forward in a straight line. The stitch produced is one composed of two threads which zig-zag on the two sides of the cloth

the upper and lower threads looping through each other at the acute angles of the stitches so as to form a lock stitch. The machine is provided with a multiple feed for the cloth, side feed bars being located outside the range of the lateral play of the needle, and a central feed bar being located in line with the needle at the rear. This machine is of a well known character, being used particularly for sewing edging on ladies' and children's underwear and for embroidering ornamental edges on doilies and the like. To adapt this machine for our purpose, we provide it with a dividing plate rising from the cloth plate of the machine and embraced by the presser foot, which dividing plate approaches the needle as closely as possible and extends a short distance in front of it; and in front of the dividing plate we provide a double covered guide which has a central guiding partition in line with the dividing plate and also has covers extending laterally on both sides from the guiding partition to hold the edges of the cloth down and prevent them from riding over the dividing plate. These devices enable the heavy widths of sheeting of considerable length to be properly presented to the needle and to the feed bars when the machine is running at high speed. The thread tension of the machine being properly adjusted, the selvage edges of two widths of sheeting cut to the same length are brought together so as to abut under the presser foot and the machine is started, the widths of sheeting being held by the operator with their selvage edges in contact with the central partition of the covered guide and thereby, and by means of the guiding plate, delivered slightly separated to the needle, so that the tension of the threads as the cloth leaves the needle will draw the selvage edges firmly together and produce a butt joint at these edges. We have found that a two or more piece bed sheet or sheeting made in this manner presents no material ridge or seam which can produce discomfort to the user or be liable to be caught and torn or ripped by the laundry machinery; the selvage edges being confined by the stitching cannot turn up; and the two widths of sheeting being evenly fed during the sewing operation there is no material waste of the cloth or unevenness at the end of the sheet or fullness at the join and no departure from parallelism or difference in length of the warp or woof threads of the cloth. Further, the locked stitching prevents ripping if either thread is broken. We have also found that sheeting secured together in this manner, has great strength at the join; in fact the join wears apparently as well and has as great strength as the body of the sheeting, and this notwithstanding the fact that the

widths of cloth are secured together by a single line of stitching passing through one thickness of material. This we believe is due to unexpected attributes in the method of sewing which have not before been observed, required or utilized in the uses to which the peculiar stitching has heretofore been applied. The stitching crossing the abutting selvage edges obliquely, if the join is subjected to a strain consisting of a straight pull perpendicular to the join, the strain will be distributed at an angle to the pull; this will tend to draw the stitches into parallelism, compressing the cloth and cushioning the strain. If the strain is parallel to the join but applied immediately to opposite sides thereof, one width of the cloth will tend to slide on the other at the join, thus shortening the distance between the angles of the stitches, where the threads enter the cloth on the opposite sides of the join, and compressing the selvage edges together, forming a cushion. If the strain is a diagonal one both effects will be combined. In addition, the locking of the two threads together in the cloth furnishes a large bearing surface for the thread on the cloth; the thread itself, which is made of a very hard twisted yarn, has, therefore, less tendency to cut the softer yarn of which the cloth is made. Furthermore, the two widths of sheeting being uniformly fed when sewed together, they are under substantially equal tension at the join so that the strains are properly distributed and equalized between the selvage edges and the connecting stitching. Due to these several causes the join has the unexpected strength required for bed sheets. If the tension of the threads of the sewing machine in sewing together the widths of sheeting is sufficient the selvage edges may slightly overlap, but while this is not desirable the result is still vastly superior to the lap seam and double stitching heretofore employed since the selvage edges are confined by and lie within the stitches and the necessary strength of join is secured. Indeed a slight overlapping of the selvage edges less than the width of the stitches may be intentionally produced without departing from the spirit of our invention in its broadest aspect.

In the accompanying drawing, Figure 1 is a top view looking down on the cloth plate of a sewing machine of the character employed by us in practicing our invention, the foot bar being in section; Fig. 2 is a side elevation of the parts shown in Fig. 1; Fig. 3 is a view from the rear end of the double covered guide; Fig. 4 is a view from the front end of the double covered guide; Figs. 5 and 6 are views from opposite sides of a section of a bed sheet or sheeting made in accordance with our invention the stitches being greatly enlarged; Fig. 7 is a sectional

view, on an enlarged scale, through the join showing the character of the stitch; and Fig. 8 is a plan view of a completed bed sheet embodying our invention with some of the warp and woof threads illustrated.

The widths of the bed sheet or sheeting are shown at 8 and 9, abutting selvage edges at 10 and 11 and the two threads of the zig-zag stitching at 12, 13. The threads are looped together at 14. In Figs. 5 and 6 the loops are shown for clearness of illustration as drawn to one side of the cloth but with a proper relative tension of the upper and lower threads of the sewing machine, the loops may be central as shown in Fig. 7.

15 is the cloth plate of the sewing machine, 16 the presser foot, 17 the foot bar, 18 the side feed bars, 19 the needle bar and 20 the needle. The position of the central rear feed bar is shown in dotted lines in Fig. 1 beneath the presser foot.

21 is the dividing plate on the cloth plate and 22 is the double covered guide having the central guiding partition 23 and the laterally projecting covers 24, 25.

In the completed bed sheet shown in Fig. 8, the widths of cloth 8 and 9 are cut to the same length and have their selvage edges, preferably abutted in the same plane, machine sewed by locked zig-zag stitching 12 crossing the join obliquely and inclosing the selvage edges. The top and bottom ends of the sheet are finished by turning over hems 26, 27 of uniform width. The zig-zag stitching, as already explained, is done while the widths of cloth are fed at a practically uniform speed or tension, so that the selvage edges are secured together without puckering and under equal tension. Some of the warp threads 28 are illustrated, showing that they are parallel and of the same length in both widths and also at the inner and outer edges of each width. The woof threads 29, some of which are shown, are also parallel and of the same length throughout both widths. The fact that the widths are sewed together under equal tension and without

puckering is illustrated by this equality in length and parallelism of the threads of the cloth. The resulting sheet is of rectangular shape and has straight top and bottom edges.

What we claim is:

1. As a new article of manufacture, a machine-sewed bed sheet or sheeting made of a plurality of widths of cloth having their selvage edges abutted and secured together in the same plane without puckering and under equal tension, said article being of rectangular shape and having the warp threads of the cloth as well as the woof threads parallel and of the same length, substantially as set forth.

2. As a new article of manufacture, a machine-sewed bed sheet or sheeting made of a plurality of widths of cloth having their selvage edges secured together without puckering and under equal tension by locked zig-zag stitching inclosing the selvage edges and translating pulling strains upon the sheet into compression of the cloth, said article being of rectangular shape and having the warp threads of the cloth as well as the woof threads parallel and of the same length, substantially as set forth.

3. As a new article of manufacture, a machine-sewed bed sheet or sheeting made of a plurality of widths of cloth having their selvage edges abutted and secured together in the same plane without puckering and under equal tension by locked stitching crossing the join or joins obliquely and translating pulling strains upon the sheet into compression of the cloth, said article being of rectangular shape and having the warp threads of the cloth as well as the woof threads parallel and of the same length, substantially as set forth.

This specification signed and witnessed this 12th day of Nov. 1909.

CHARLES C. COPELAND.
FRANK M. BENNET.

Witnesses:

H. JUNGLEING,
JOHN L. LOTSCH.