

No. 690,427.

Patented Jan. 7, 1902.

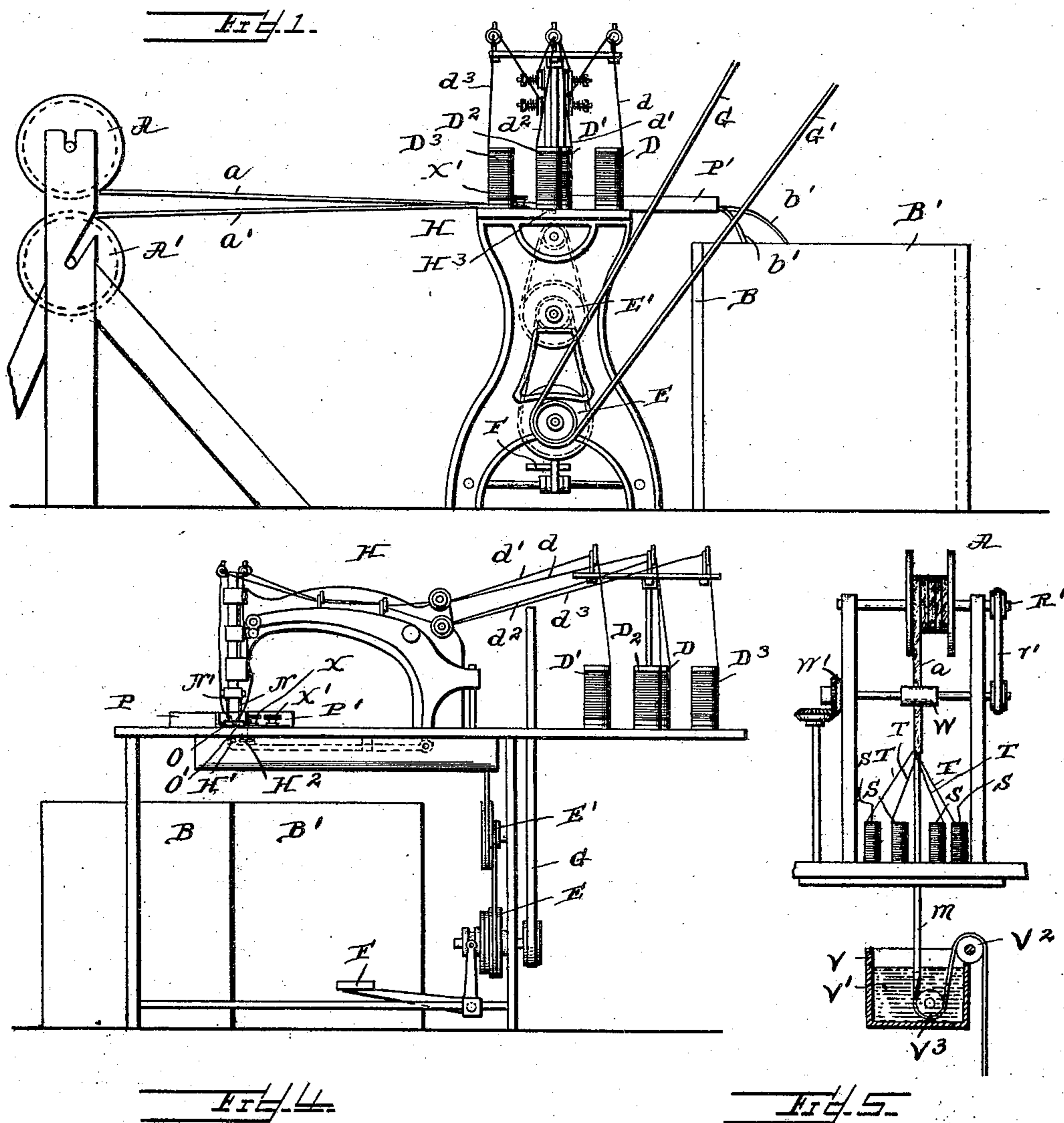
I. W. HEYSINGER.

COVERED STRIP OF SOFT METAL AND THE MANUFACTURE THEREOF.

(Application filed Aug. 29, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
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*John R. Neller*

Inventor:  
*Isaac W. Heysinger*

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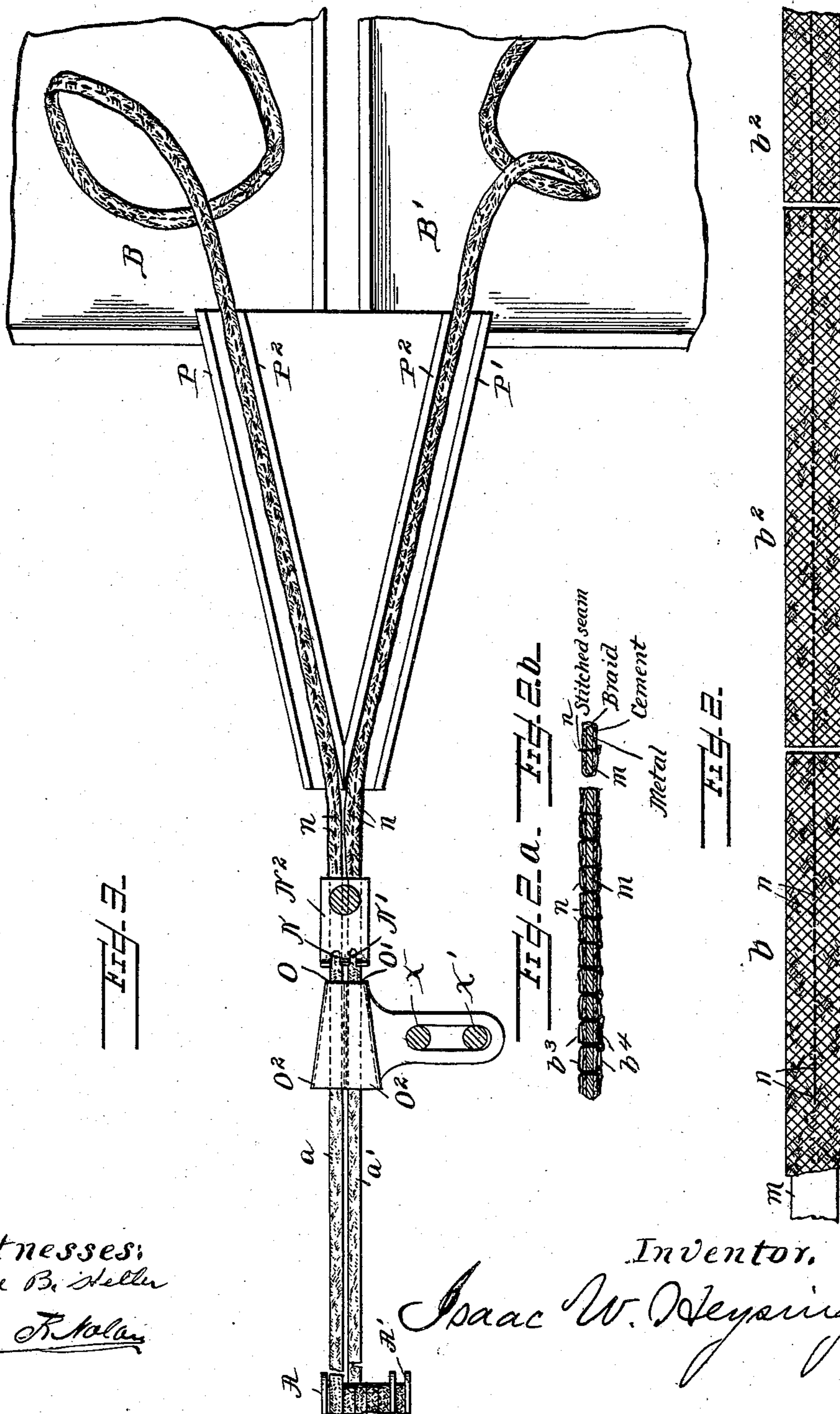
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# UNITED STATES PATENT OFFICE.

ISAAC W. HEYSINGER, OF PHILADELPHIA, PENNSYLVANIA.

COVERED STRIP OF SOFT METAL AND THE MANUFACTURE THEREOF.

SPECIFICATION forming part of Letters Patent No. 690,427, dated January 7, 1902.

Application filed August 29, 1901. Serial No. 73,652. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC W. HEYSINGER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have made a certain new and useful Improvement in Covered Strips of Soft Metal and the Manufacture Thereof, of which the following is a full, clear, and exact description, reference being had to the drawings which accompany and form a part of this specification, in which—

Figure 1 is a side elevation of a sewing-machine of special construction provided with two independent needles, two independent loop-formers beneath, and four large spools, two of which supply said needles and two said loop-forming devices, said needles and said loop-forming devices being operated by the same mechanism simultaneously and provided with an independent duplex guide for the two strands of fabric, together with two reels of material, two receptacles for the stitched product, and driving pulleys and belts for operating said machine. Fig. 2 is a view of the flat side of a covered soft-metal strip, the bare metal projecting at the left-hand side, then the braided covering cemented thereto, then the same stitched through braided covering on one side, cement, metal strip and cement and braided covering on the opposite side, and at the right hand showing two short strips divided from said strips and adapted for use. Fig. 2<sup>a</sup> is a longitudinal middle section through the strip shown in Fig. 2 and along the line of stitches. Fig. 2<sup>b</sup> is a cross-section thereof, showing the different parts in place and secured together. Fig. 3 is a top view, somewhat diagrammatic, representing the two reels of unstitched but cemented fabric, the duplex guides through the sewing-machine, and the divergent delivery-passages, together with the two receptacles into which the product is loosely coiled as delivered. Fig. 4 is a front view of the machine and appliances shown in side view in Fig. 1; and Fig. 5 is a view of a braiding and cementing apparatus used for cementing the braided covering to the soft-metal strip, for braiding the said covering over said strip as it passes upward through the machine, and for reeling the same, the said reel appearing above, and be-

low it the feed-rolls which draw the braided fabric up through the machine.

The lettering in all the figures is uniform.

The object of my invention is to produce a long flat strip of soft metal—such as copper, lead, or some soft-metal alloy—which is first covered with a covering of textile fabric braided on it, said fabric continuously cemented fast to said metal strip, and afterward, during the same manufacture, pass said fabric-covered and cemented strip through a sewing-machine adapted to make a lock-stitch seam midway between the sides of said flat strip continuously. This strip is then cut up into suitable lengths for use, and to increase the rapidity of product and diminish cost of manipulation I prefer to use a sewing-machine, as shown, described, and claimed, having a double or twin or multiple series of needles, side by side, and a lock-stitch loop-making device for each needle, and a multiple guide-passage, one for each strand, and for each needle and loop-forming and stitch-making device, the fabric being taken from separate reels, fed automatically through said guides by feed mechanism beneath and in contact with the same, and delivered separately for use to be cut up into suitable lengths, as desired. I stitch in this way the cemented braided covering directly through the metal strip, the needles making their own holes, so that no metal is removed, the mass for electrical conductivity remaining as it was before, and for other purposes the body of metal not being diminished. I drive my sewing-machine by power at a high speed—from fifteen hundred to three thousand stitches per minute—so that the metal offers but slight resistance to the passage of the needles, and heating is thereby prevented, the needles striking rather than gradually piercing holes through the said metal.

For electrical purposes I use strips of soft annealed copper, and the finished product being flat is readily cut apart by a small pair of scissors to any suitable length required, and when used for electrical conduction is simply tacked fast to a wall or other surface by small staples embracing the fabric as a whole, or by its flatness and covering of fabric it is glued fast to said wall, so that it is ex-

tremely inconspicuous when put up, and if braided of a color to correspond with the color of the wall or other surface to which it is to be applied is practically invisible. If desired, I cover and cement these soft-metal strips with two or more braided coverings applied successively, so that a very high insulation is cheaply secured, while the cement prevents charring or burning of the coverings by short-circuiting or the like accident. I prefer to use a thick cement of dextrine with a small proportion of glycerin, a few drops to the quart of solution, although I may, if desired, use fish-glue, marine glue, india-rubber or gutta-percha cement, or any of those adapted to the purpose. The outer covering of braid, which I prefer to make of cotton yarn, I make of different colors corresponding to the color of the object to which it is to be applied. By means of this cemented and stitched covering when a connection is desired to be made a knife-blade inserted endwise will cut a few of the stitches, when the braided covering can be forced back and again drawn up over the junction when formed and the covering held by a staple in the attachment or wall to which it is applied. It being flat is readily coiled on an exceedingly small spool or no spool, if desired, so that its bulk is very small for transport. I vary the width and thickness of the copper strip to suit the current to which it is to be applied or other circumstances, as desired.

When not required as an electrical conductor, my invention is equally applicable for other purposes, as the metal is soft and ductile, and when bent over in the braided product it retains its bend without springing back. It is especially adapted for wrapping around the ends of plaits or long braids of hair, making a very secure and an invisible attachment if colored to suit the color of the hair, for which purpose I make them up in different colors of braid, and for these purposes instead of using a flat strip of copper I use a flat strip of lead or some soft ductile alloy. These cut to suitable lengths—three or four inches, for example—are very useful for wrapping around strands of hair or for folding strands of hair around and around them in repeated wrappings and then bending inward the free ends, which thus hold the strand secure. When unwrapped, the hair is waved or frizzed and will remain so for a long time. Such short pieces also make a convenient fastening for small packages of goods, as the ends bent over or around each other hold the goods securely and, as the metal is covered, are not objectionable to use with the hands.

Referring to the drawings, at *m*, Fig. 2, is seen the end of a small flat strip of soft metal, the same being shown in longitudinal section in Fig. 2<sup>a</sup> and in cross-section in Fig. 2<sup>b</sup>. In Fig. 5 this strip is shown passing up over roller *V*<sup>2</sup>, thence down into the cement-cup

*V*, the cement solution being shown at *V*'. The strip *m* passes beneath the roller *V*<sup>3</sup> at the bottom of the cup and thence up through the braiding-machine *S S S S*, the different bobbins being represented by these letters. As these rotate in complicated circles around the metal strip, now covered with liquid cement, the threads *T T T T* make the braided covering, strongly drawn down by their tension upon the cemented surface. I only show four such bobbins *S S S S*; but I use eight or twelve or sixteen or more, as preferred. At *W*, Fig. 5, are shown a pair of roughened feed-rolls, only the front one of which is visible, which grasp the covered strip and drag it up through the machine, at the same time compressing the covering down hard and embedding it in the surface of the metal, while the surplus cement is at the same time forced out. These feed-rolls are driven by the bevel-gear *W'*, connected with the machine beneath, though other means may be employed. Above the feed-rolls is the take-up reel *A*. This I prefer to give an alternating movement, too, from side to side to lay the strands regularly. It is rotated by the pulley *R'* and the round belt *r'*, which has friction enough to always take up what the feed-rolls deliver, but not enough to force the feed itself. When full, the reel *A* is lifted off its supports and placed in the rack *A*, Figs. 1 and 2, another reel *A'* being beneath it. From these reels *A A'* the braided strands are led to the double-tubed guide *O O'*, Figs. 3 and 4, of the sewing-machine, detachably secured thereto, as shown at *X X'*, Fig. 3. Above the middle of each strip is one needle *N N'* and a separate shuttle or loop-forming device *H' H*<sup>2</sup> beneath.

In Figs. 1 and 4 are shown the separate spools *D D' D*<sup>2</sup> *D*<sup>3</sup>, from *D* and *D*<sup>2</sup> of which the thread supplies the needles and from *D'* and *D*<sup>3</sup> the mechanism beneath. *N*<sup>2</sup>, Fig. 3, is the presser-foot above the feed. Fig. 3 shows how these separate strands *a* and *a'* enter the mouths of the guides *O*<sup>3</sup> *O*<sup>2</sup> and thence pass beneath the needles at *O* and *O'*.

*H*<sup>3</sup>, Fig. 1, represents a feed which applied beneath to the strips carries them forward in the ordinary manner.

After leaving the guides *O O'* the strips of stitched product encounter the diverging passages between *P* and *P'* and the interposed piece *P*<sup>2</sup> and are carried into the receptacles *B B'*, Figs. 1, 3, and 4, where after drying they are readily taken up by a backward motion without entanglement and cut into the short pieces shown at *b*<sup>2</sup> *b*<sup>3</sup>, Fig. 2, or in the elongated piece at *b* in the same figure. In these figures *m* represents the metal strip; *n*, the row of stitches; *b*<sup>3</sup>, the needle-thread; *b*<sup>4</sup>, the thread from beneath to make the lock-stitch, and the braid and cement coverings are written in in the drawings.

The sewing-machine *H* derives its power through the belt *G G'* from the pulleys *E E'*. *N N'* are the needles.

$d$   $d'$   $d^2$   $d^3$  are the threads from the spools to the machine, and F, Figs. 1 and 4, is the foot-treadle to stop or start the sewing-machine.

While I describe the above, I do not rigidly  
5 confine myself to the precise construction or means of manufacture described, but vary the same to suit special requirements, as would be done by one skilled in the art without the further exercise of invention and without departing from the principles of my invention as herein shown, described, and claimed.

I do not in this application claim the mechanism or specific means which I employ in  
15 producing the article set forth and claimed in this application, and which mechanism and means I describe and claim in a separate application for Letters Patent divisional from this application as originally filed. The date  
20 of filing of said divisional application is December 4, 1901, and the serial number thereof is 84,623.

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

25 1. An improvement in the manufacture of covered strips of soft metal consisting of braiding over a soft flat metal strip a covering of fabric and cementing the said braided covering to the said metal strip substantially as  
30 described, and subsequently passing said braided and cemented strip through a sewing-machine and forming a continuous lock-stitch seam along the flat sides thereof, and through said braided and cemented coverings,  
35 and said soft-metal strip, substantially as and for the purposes set forth.

2. The method of manufacturing covered electrical flat copper strips, consisting in covering a soft flat copper strip with a covering  
40 of braided fabric, cemented thereto continuously, said braid and said cement applied to said strip successively while said cement is liquid, and afterward passing said braided and cemented flat copper strip through a sewing-machine and sewing the whole together  
45 by a seam passing through said fabric-covered and cemented copper strip continuously, along the flat sides thereof, substantially as described.

50 3. The method of manufacturing covered soft-metal strips, consisting of covering a continuous strip of flat soft metal with a coating of liquid cement and a braided covering of

fabric successively and continuously applied, and subsequently passing the same through  
55 a sewing-machine, and sewing said braided and cemented covering, and soft-metal strip together from end to end, and afterward dividing the same transversely into suitable lengths, substantially as and for the purposes  
60 described.

4. In the manufacture of covered strips of flat, soft metal, a braided cover cemented to said metal strip continuously, said cemented cover and strip additionally secured to each  
65 other by a continuous sewed seam, the needle forming the said seam passing at one operation through said cemented covering and metal strip, substantially as described.

5. A covered soft-metal strip consisting of  
70 a flat elongated strip of soft metal, such as copper, adapted to form a conductor for an electric current, a braided covering of fabric cemented thereto continuously from end to end, and a continuous lock-stitch seam extended  
75 along the flat sides thereof, and passing through both sides of braided covering, both layers of cement, and said soft-metal strip, substantially as described.

6. As an article of manufacture the short,  
80 covered soft-metal strip  $b^2$ , divided from a longer length,  $b$ , of the same material, and consisting of a flat, elongated soft-metal strip, a braided covering applied and cemented thereto, a stitched seam extended continu-  
85 ously along the flat sides thereof, and passing through said metal strip and cement and braided covering, substantially as described.

7. A flat, soft-metal braided, cemented and stitched, strip of copper or the like, substan-  
90 tially as described, having the outer braided and cemented covering, and stitched seam through the same and through said metal strip, of a color corresponding with the object to which it is to be applied, substantially as  
95 described.

8. A flat, soft-metal strip provided with a covering of textile fabric, cemented to said strip continuously, and a stitched seam sewed through said strip, cement, and covering,  
100 along the flat sides thereof, substantially as and for the purposes described.

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Witnesses:

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