Aug. 11, 1925. 1,549,484

P. GARDNER

SEAM OPENING DEVICE

Filed May 14, 1924 3 Sheets-Sheet 1

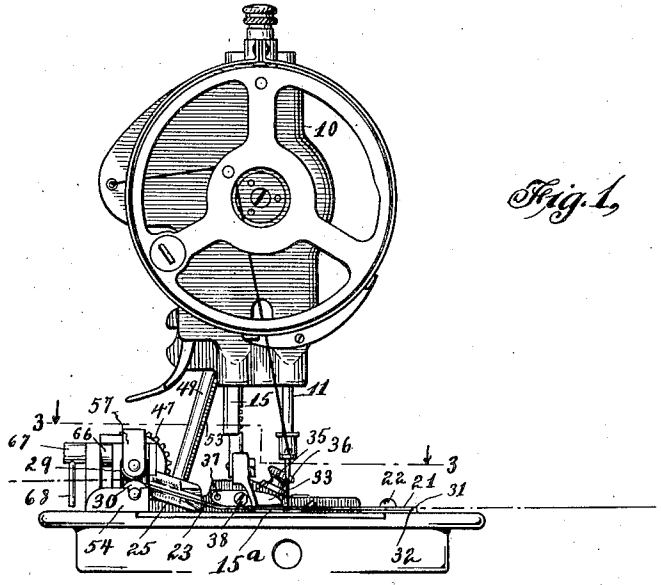
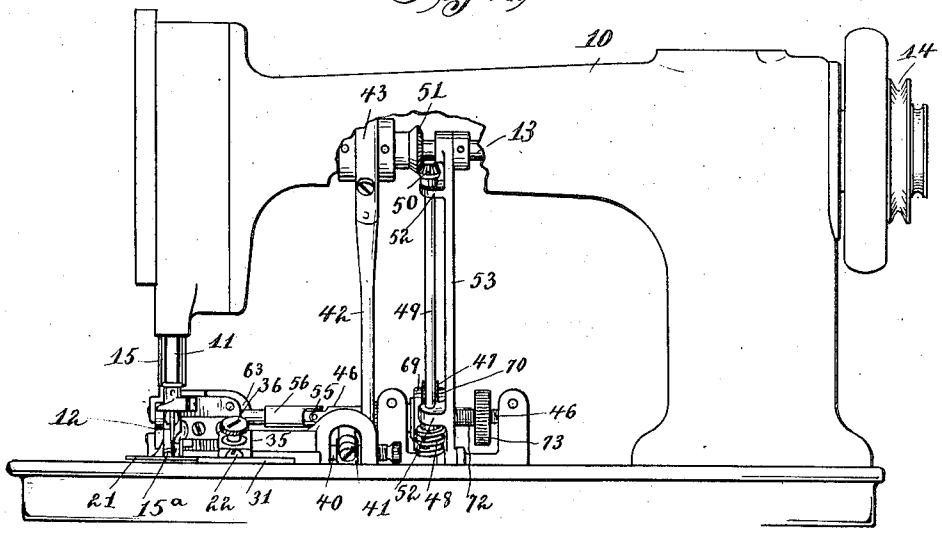


Fig. 1.

Fig. 2.



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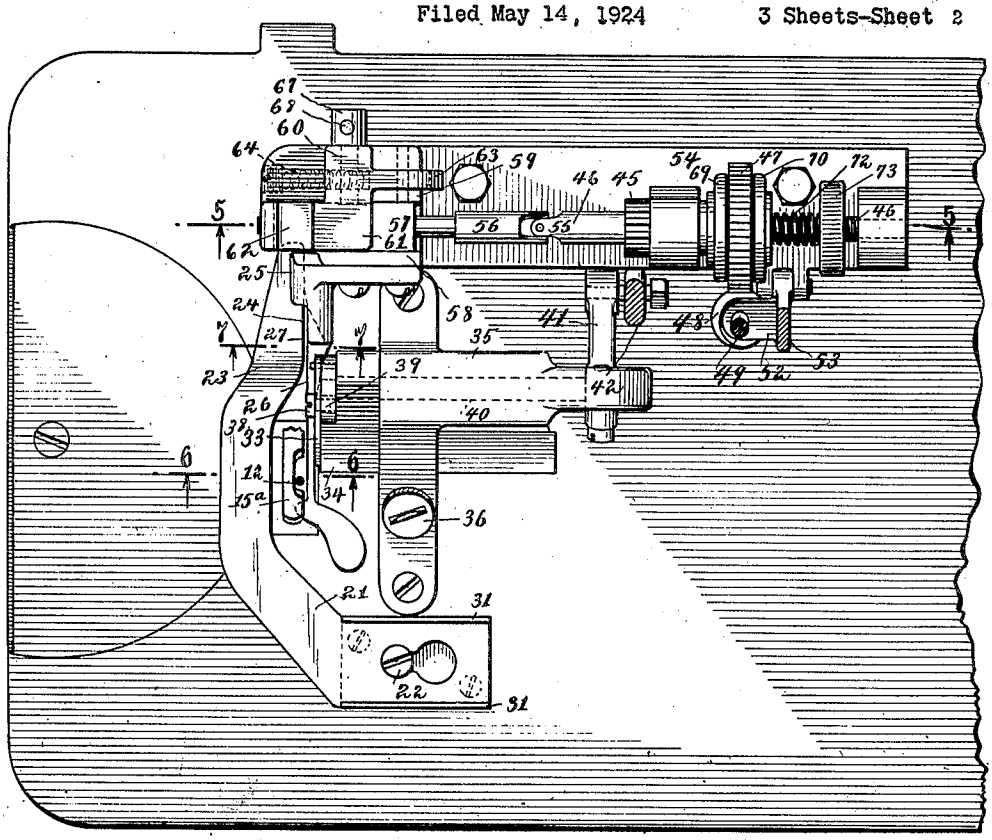


Fig. 3.

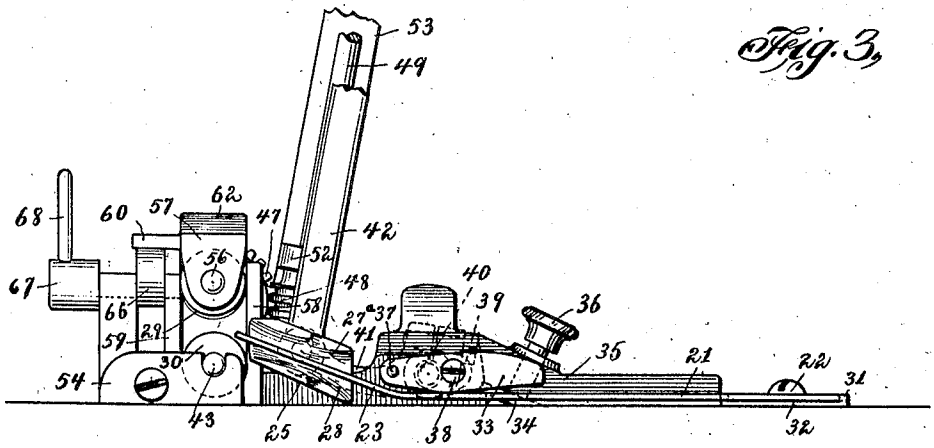


Fig. 4.

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SEAM OPENING DEVICE

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Fig. 5,

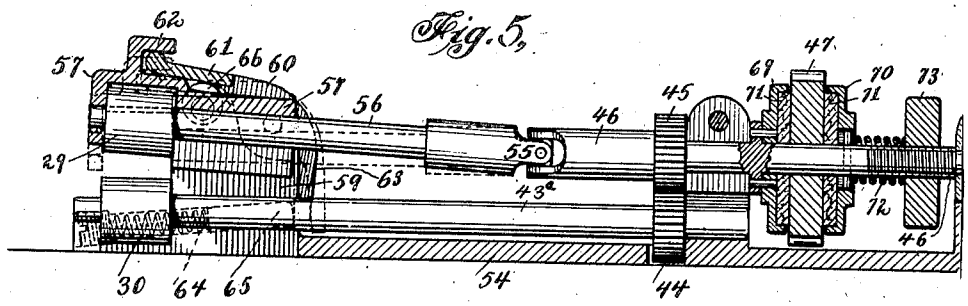


Fig. 6,

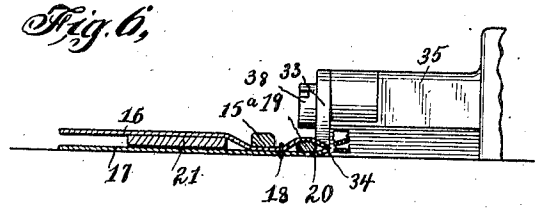


Fig. 7,

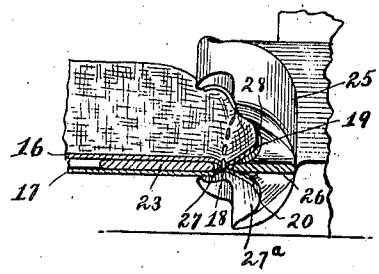
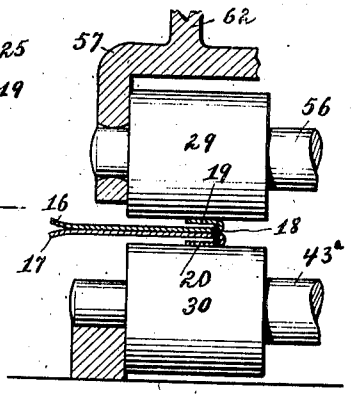


Fig. 8,



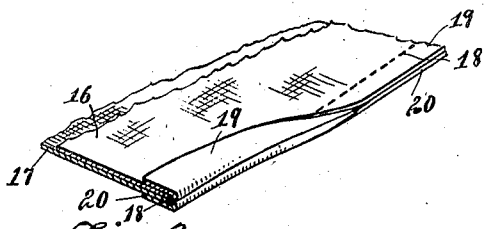


Fig. 9,

Inventor
Percy Gardner.

By his Attorney Charles R. Searle.

Patented Aug. 11, 1925. 1,549,484

UNITED STATES PATENT OFFICE.

PERCY GARDNER, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO H. M. BUNKER & CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SEAM-OPENING DEVICE.

Application filed May 14, 1924. Serial No. 713,131.

To all whom it may concern:

Be it known that I, PERCY GARDNER, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Seam-Opening Devices, of which the following is a specification.

The invention relates to mechanism used in conjunction with a sewing machine for separating the margins of the fabric along a stitched seam and folding such margins back upon the upper and lower layers of the fabric adjacent to the line of stitches, and the object of the invention is to provide simple, easily operated and reliable means by which such separation and turning of the margins may be successfully accomplished. A further object is to provide means whereby the line of stitches is utilized in guiding and presenting the seam uniformly in operative relation to the opening and turning member, and to a trimming mechanism for such margins in advance of the presentation to such member.

The invention consists in certain novel features and details of construction and arrangement by which the above and other objects are attained, to be hereinafter described and claimed.

The accompanying drawings form a part of this specification and show the invention as it has been carried out in practice.

Figure 1 is a front elevation of the seam-opening and other devices with so much of a sewing machine used in connection therewith as is necessary to show their relation thereto.

Figure 2 is a corresponding side elevation.

Figure 3 is a plan view, on a larger scale, and partly in horizontal section, the plane of section being indicated by the line 3—3 in Figure 1.

Figure 4 is a front elevation of a portion of the opening device.

Figure 5 is a longitudinal vertical section on the line 5—5 in Figure 3 and partly in elevation.

Figure 6 is a vertical section taken on the line 6—6 in Figure 3, and partly in elevation.

Figure 7 is a vertical section on the line 7—7 in Figure 3, partly in elevation, showing the action of the folding member.

Figure 8 is an elevation of the pressing rolls for flattening the turned and folded margins of the seam.

Figure 9 is a perspective view of the layers of stitched fabric showing the opened and folded margins.

Similar reference numerals indicate the same parts in all the figures.

Referring to Figures 1 and 2, 10 is the frame of the sewing machine having a needlebar 11 and needle 12 operated in the usual or any approved manner by the main or driving shaft 13 rotated by the pulley 14 from any suitable source of power, and 15 is the presser-foot bar carrying a presserfoot 15^a acting with a feed mechanism, not shown, in the usual manner.

The goods to be sewn may be of any character but the mechanism is designed more particularly for joining the two superposed layers 16 and 17 of folded fabric by a line of stitches 18 along their edges to form a continuous tube, and for opening such seam by separating the lapped margins 19 and 20 and folding them upon their respective layers 16 and 17, as clearly shown in Figure 9.

On the bedplate of the machine is a guide tongue 21 of thin metal secured to the plate well in advance of the presserfoot 15^a, extending angularly outward and thence along-side and parallel with the presserfoot, in the plane of the bedplate and above the latter, and thence inclined upwardly at 23 with its inner edge 24 lying parallel with and close to the line of stitches. The fabric folded to form the layers is introduced with the edge 16 above and upon the tongue, and the edge 17 beneath the tongue and is thus fed to the needle. The portion 23 of the tongue lies within and close to the line of stitches in the seam thus formed and guides the sewn edges to and through a fixed turning block 25, having a thin finger 26 inclined downwardly therefrom close to and parallel with the edge 24 of the tongue 23 to provide with the latter a narrow open slit or way 27 along which the line of stitches move, with the finger 26 inclosed between the lapped margins 19 and 20 on one side of the line of stitches and the tongue 21 in-

closed between the layers 16 and 17 on the opposite side of such line. Thus reliably guided the seam is led to the turning block 25.

The face of the block 25 is grooved and concavely curved as at 27ª and 28 to act cam-wise on the margins 19 and 20, separated by the finger 26 extending from the centre line of the block, and turn them gradually back in directions opposite to each other, upon their respective layers 16 and 17. With the margins thus folded and still guided by the tongue 21, the seam is passed between a pair of rolls 29 and 30 which pinch the opened seam and produce the required sharp creases at the folds necessary to set them permanently in their opened condition. This operation is continuous throughout the entire length of the piece of goods treated.

The fixed end of the tongue 21 is received between the upturned flanges 31 of a plate 32 and held adjustably therein by a set screw 22 so that its edge 24 may be adjusted relatively to the line of stitches and the slit 27 varied in width as required. The free end of the tongue extends to the rolls 29 and 30.

It is important that the widths of the sewn margins 19 and 20 be equal and uniform; this is accomplished by trimming such margins at a point between the needle 12 and turning block 25. The trimmer comprises a vertically oscillating blade 33 having a shearing edge adapted to coact with a corresponding fixed blade 34 mounted in a frame 35 and held by a thumbscrew 36 to the bedplate. The blade 33 is pivotally mounted on the frame 35 at 37 and is loosely connected by a screw 38 to a lug 39 on a shaft 40, which latter has an arm 41 connected to an eccentric rod 42 extending upwardly with its ring 43 inclosing an eccentric on the main or driving shaft 13. The rotations of the latter through the eccentric rod 42 oscillates the shaft 40 and operates the shearing blade 33 and thus removes any surplus width from the margins.

The lower roll 30 is fixed relatively to the upper roll 29 and is mounted to revolve with a shaft 43ª on which it is secured and which also carries a gearwheel 44 in mesh with a similar gearwheel 45 on a shaft 46 immediately above the shaft 43ª. This shaft 46 carries loosely a wormwheel 47 forming part of a friction clutch mechanism to be described, and is driven by a worm 48 on an angularly upwardly extending worm shaft 49 carrying at its upper end a beveled pinion 50 in mesh with a beveled gearwheel 51 on the driving shaft 13. The worm shaft 49 is supported in bearings 52 in a strut 53 extending from a frame in which the shafts 43ª and 46 are mounted, to the main shaft 13.

At the forward end the shaft 46 is connected by a universal joint at 55 with a shaft 56 on which the upper roll 29 is fixed, and the upper roll is received in a housing 57 arranged to slide vertically between cheeks 58 and 59 formed on the frame 54 and permit the upper roll 29 to be raised or lowered relatively to the lower roll 30, the movement being allowed by the universal joint 55.

Upon the cheek 59 is pivoted a lever 60 having an L-shaped laterally extended arm 61 engaged beneath a flanged lug 62 on the housing 57, and a downwardly projecting leg 63 lying adjacent the rear face of such cheek. This leg 63 is acted upon by a spring 64 and thrust block 65 mounted in the cheek 59, shown in dotted lines in Figures 3 and 5, tending to tilt the lever 60 downwardly in the direction to force the upper roll 29 toward the lower roll 30. The lever 60 is raised as shown in Figure 5 by an eccentric 66 on a shaft 67 mounted in the cheek 59 and operated by a handle 68. The eccentric 66 acts upon the under face of the lever 60 and by turning the handle 68 the upper roll 29 may be raised relatively to the lower roll 30 to permit the insertion of the stitched seam and lowered thereon adjustably to vary the space between the rolls as required; the spring 64 provides the desired yielding tension of the bite of the rolls upon the seam passing between them.

The rotation of the shaft 46, through the wormwheel 47 and worm 48, is effected yieldingly by a friction device comprising two disks 69 and 70 located on opposite sides of the wormwheel, each equipped with a friction ring 71 of felt or the like in contact with the adjacent face of the wheel; the disk 69 is fixed upon the shaft 46 and the disk 70 is mounted to rotate with the shaft but is free to slide axially thereon, and is forced yieldingly against the face of the wormwheel 47 by a helical spring 72 encircling the shaft 46 and adjustable as to tension by the nut 73 on a threaded portion of the shaft.

Thus arranged the worm 48 and wormwheel 47 are positively driven by the main shaft 13 but the frictional engagement of the wormwheel with the shaft 46 permits the latter to slip relatively to the wormwheel and revolve slower than the latter under certain conditions. The beveled gearwheel 51 and beveled pinion 50, with the wormwheel 47 and worm 48 are so proportioned as to rotate the rolls 29 and 30 at a rate to maintain a constant pull on the sewn seam as the fabric is delivered from the turning block 25, or, at a rate faster than the goods are fed by the sewing feed, the friction grip of the disks 69 and 70 permitting the slip necessary to avoid exces-

sive strain on the goods while insuring the required take-up of the latter and preventing slack between the turning block and rolls.

The operation briefly described is as follows:—The layers 16 and 17 of the superposed edges of the folded piece of fabric are presented beneath the presserfoot 15ª of the machine, with the guide tongue 21 between them, and are stitched together with the lapped margins of the seam lying one upon the other with the finger 26 between them, and the line of stitches confined in the narrow slit 27 leading to the turning block 25. While thus held the margins 19 and 20 pass to the shears and are trimmed to a uniform width relatively to the line of stitches. The closed margins still guided by the engagement of the line of stitches in the slit 27 and supported by the tongue 21 and finger 26 pass to the turning block 25 by the action of the curved surfaces of which the lower margin 20 is turned and folded upon the under face of the layer 17 while the upper margin 19 is similarly folded upon the upper face of the layer 16. In this turned condition the seam passes from the tongue 21 to and between the rolls 29 and 30 which by their pressure effectively complete the turning and insure sharp folds in the opened seam. As before stated the rate of travel of the seam, due to the yielding pull of the rolls is normally slightly faster than that due to the sewing feed, thus tending to hold the seam taut and insuring the maintenance of the turned condition of the margins in their presentation to the rolls. This tension may be varied by adjusting the nut 73 and correspondingly changing the frictional grip of the disks 69 and 70 upon the wormwheel 47.

I claim:—

1. In a seam-opening device, a tongue adapted to lie between the layers of the goods on one side of the line of stitches of an open seam, a finger adapted to lie between the free margins of such layers on the other side of said line in opposed relation to said tongue, the slit between said tongue and finger receiving the needle forming such line, and turning means to which said margins are led and guided by the engagement of such line of stitches with such slit, said turning means adapted to separate said margins and fold them back oppositely upon the outer faces of said layers.

2. In a seam-opening device, a tongue adapted to lie between the layers of the goods on one side of the line of stitches of an open seam, a finger adapted to lie between the free margins of such layers on the other side of said line in opposed relation to said tongue, the slit between said tongue and finger receiving the needle forming such line, turning means to which said margins are led and guided by the engagement of such line of stitches with such slit, said turning means adapted to separate said margins and fold them back oppositely upon the outer faces of said layers, and means for pressing said folded margins while thus guided.

3. In a seam-opening device, a tongue adapted to lie between the layers of the goods adjacent the line of stitches of an open seam, a turning block adapted to separate the free margins of such seam and fold them back oppositely upon the outer faces of said layers, means coacting with said tongue and with such line of stitches on the side of said line opposite to said tongue for guiding the stitched margins of said layers to said turning block, and means for pressing such folded margins while thus guided.

4. In a seam-opening device, a tongue adapted to lie betwen the layers of the goods adjacent the line of stitches, a turning block, and means between such layers on the opposite side of such line of stitches and operating in opposition to said tongue, to lead the stitched margins of said layers to said turning block.

5. In a seam-opening device, a tongue adapted to lie betwen the layers of the goods adjacent the line of stitches, a turning block, means coacting with said tongue and with such line of stitches for leading the stitched margins of said layers to said turning block, and shearing means for trimming said margins.

6. In a seam-opening device, a tongue adapted to lie betwen the layers of the goods adjacent the line of stitches, a turning block, means between such layers on the opposite side of said line of stitches and operating in opposition to said tongue, to lead the stitched margins of said layers to said turning block, and means for pressing the folded free margins back, over, and covering the stitches.

7. In a seam-opening device, a tongue adapted to lie between the layers of the goods adjacent the line of stitches, a turning block having a finger adapted to lie between the margins of such layers adjacent such line and opposite said tongue, the slit between said tongue and finger receiving the needle forming such line, and serving to lead said margins to said block to be turned backward over the stitches and upon the material adjacent thereto, and means for pressing said margins folded by said block.

8. In combination with a sewing mechanism, a turning block having concavely curved members to operate on the separated margins of the seam, means coacting with the line of stitches for leading said margins to said block to open the seam, rolls for pressing such seam, opened by said block,

and actuated by said sewing mechanism at a rate faster than the rate of delivery of such seam to said rolls by said sewing mechanism.

9. In combination with a sewing mechanism, a tongue adapted to lie between the layers of the goods adjacent the line of stitches, a margin-turning block, having concavely curved members to operate on the separated margins of the seam, means coacting with said tongue and with such line of stitches for leading the stitched margins of said layers to said block, rolls for pressing such margins folded by said block, leaving their edges free and folded back over the stitches, means actuated by said sewing mechanism for driving said rolls at a rate faster than the rate of delivery of such line of stitches to said rolls by said sewing mechanism, and yielding means for permitting the retardation of said rolls.

10. In combination with a sewing mechanism, a tongue adapted to lie between the layers of the goods adjacent the line of stitches, a margin-turning block, having concavely curved members to operate on the separated magins of the seam, means coacting with said tongue and with such line of stitches for leading the stitched margins of said layers to said block, said block constructed to fold the free margins of the goods back over the stitches, spring actuated rolls for pressing such margins folded by said block, and means for adjustably separating said rolls.

11. In combination with a sewing mechanism having a driving shaft, a seam opening device and means for guiding the margins of a stitched seam thereto, a beveled gearwheel on said driving shaft, a worm shaft, a beveled pinion thereon in mesh with said beveled gearwheel, a worm on said worm shaft, a pair of rolls adapted to press said margins folded by said seam-opening device, shafts for said rolls, a wormwheel loosely mounted on one of such roll shafts and in mesh with said worm, and means on such roll shaft for frictionally engaging said wormwheel.

12. In combination with a sewing mechanism having a driving shaft, a seam-opening device and means for guiding the margins of a stitched seam thereto, a beveled gearwheel on said driving shaft, a worm shaft, a beveled pinion thereon in mesh with said beveled gearwheel, a worm on said worm shaft, a pair of rolls adapted to press said margins folded by said seam-opening device, shafts for said rolls, a wormwheel loosely mounted on one of such roll shafts and in mesh with said worm, spring actuated means on such roll shaft for frictionally engaging said wormwheel, and means for adjusting the tension of such spring.

13. In combination with a sewing mechanism having a driving shaft, a seam-opening device and means for guiding the margins of a stitched seam thereto, an eccentric on said driving shaft, an eccentric ring and rod actuated by said eccentric, a fixed shearing blade and a movable shearing blade in the path of said margins, and means actuated by said eccentric rod for moving said movable blade relatively to said fixed blade and trimming said margins before presentation to said opening device.

In testimony that I claim the invention above set forth I affix my signature hereto.

PERCY GARDNER.