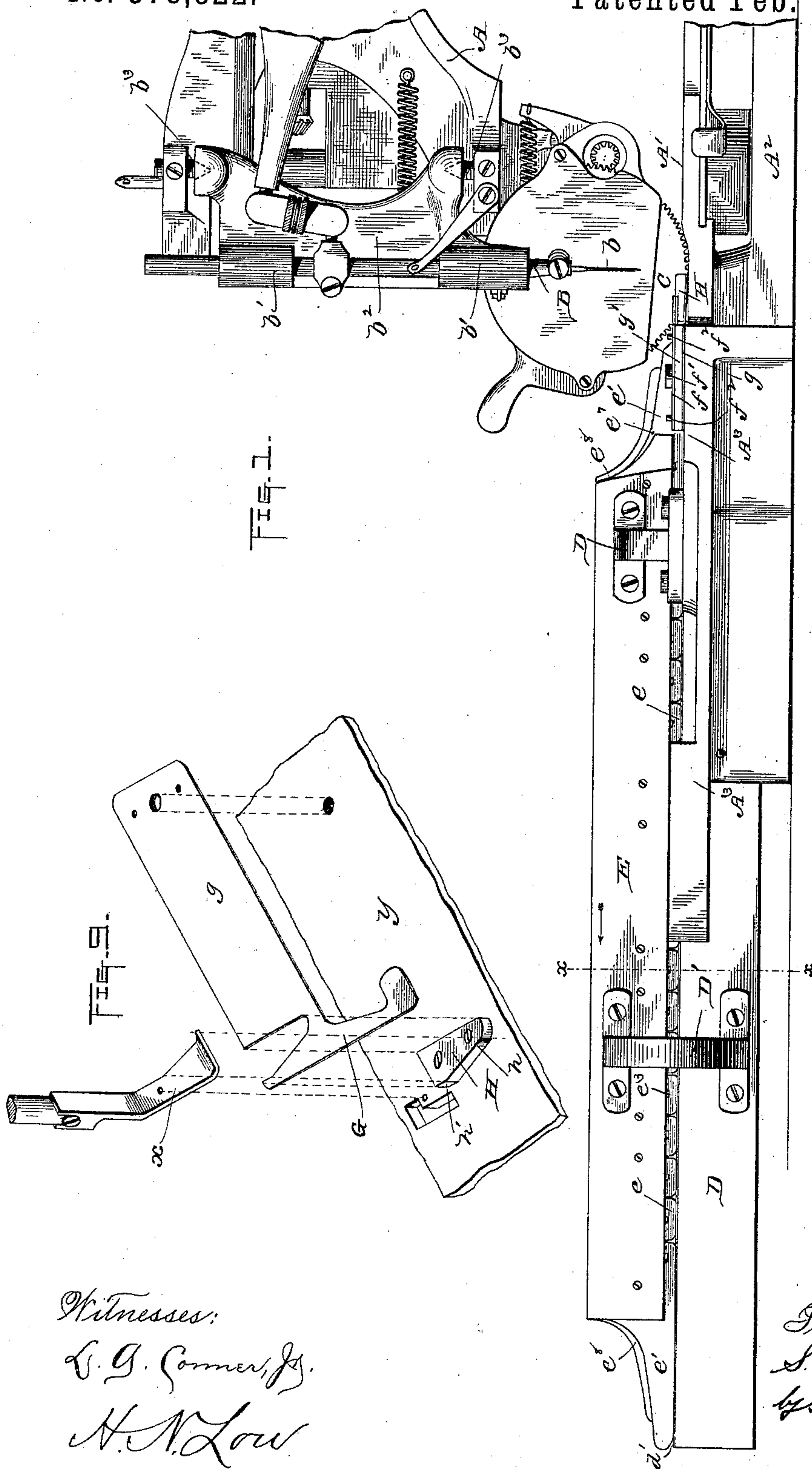


3 Sheets—Sheet 1.

APPARATUS FOR GUIDING, STRAIGHTENING, AND EVENING FABRICS.
No. 378,822. Patented Feb. 28, 1888.

Patented Feb. 28, 1888.



Witnesses:

L. G. Sommer, Jr.

H. N. Low

Inventor:
S. Arnold,
by Henry Calver,
att'y.

(No Model.)

3 Sheets—Sheet 2.

S. ARNOLD.

APPARATUS FOR GUIDING, STRAIGHTENING, AND EVENING FABRICS.

No. 378,822.

Patented Feb. 28, 1888.

FIG. 2.

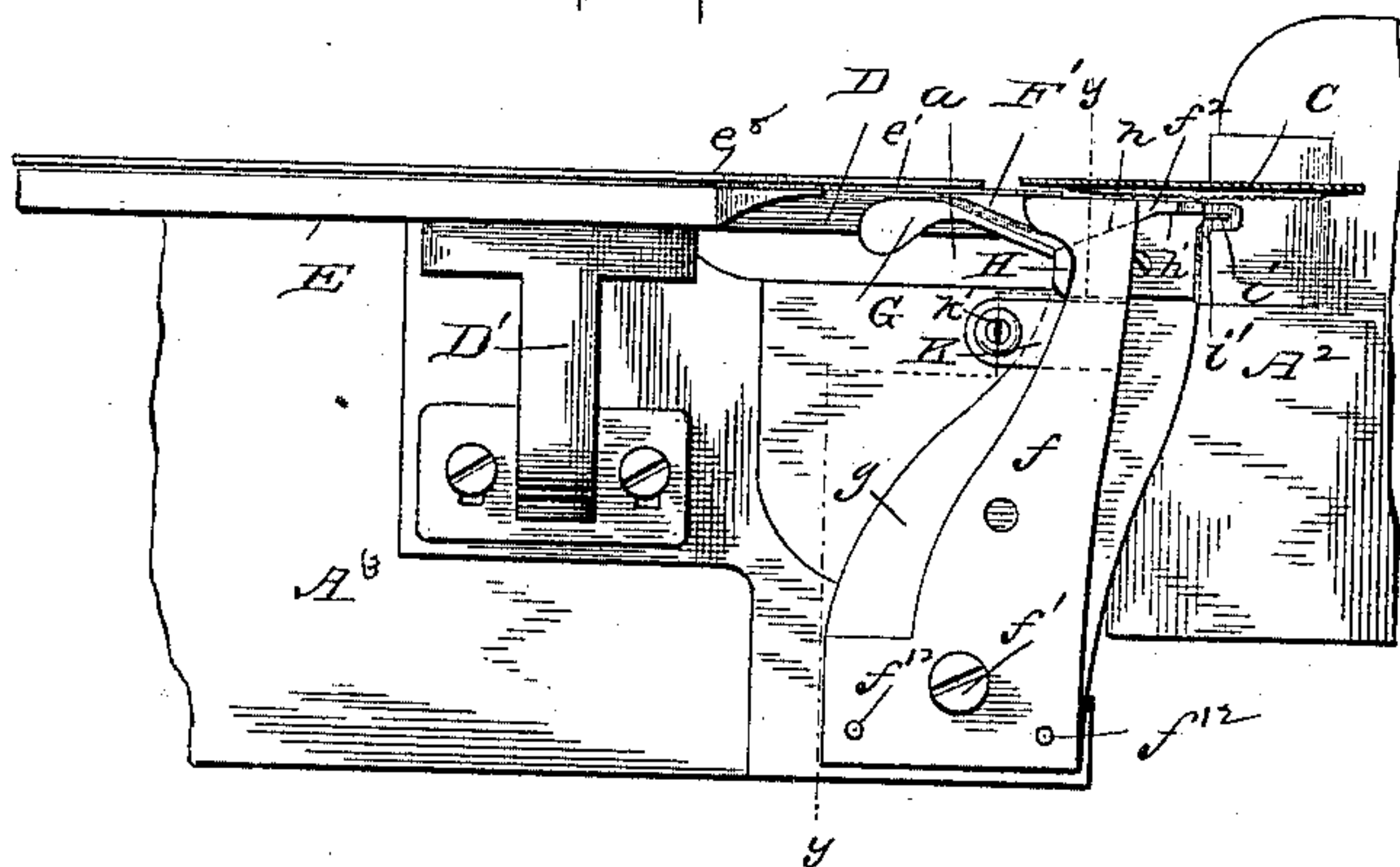


FIG. 5.

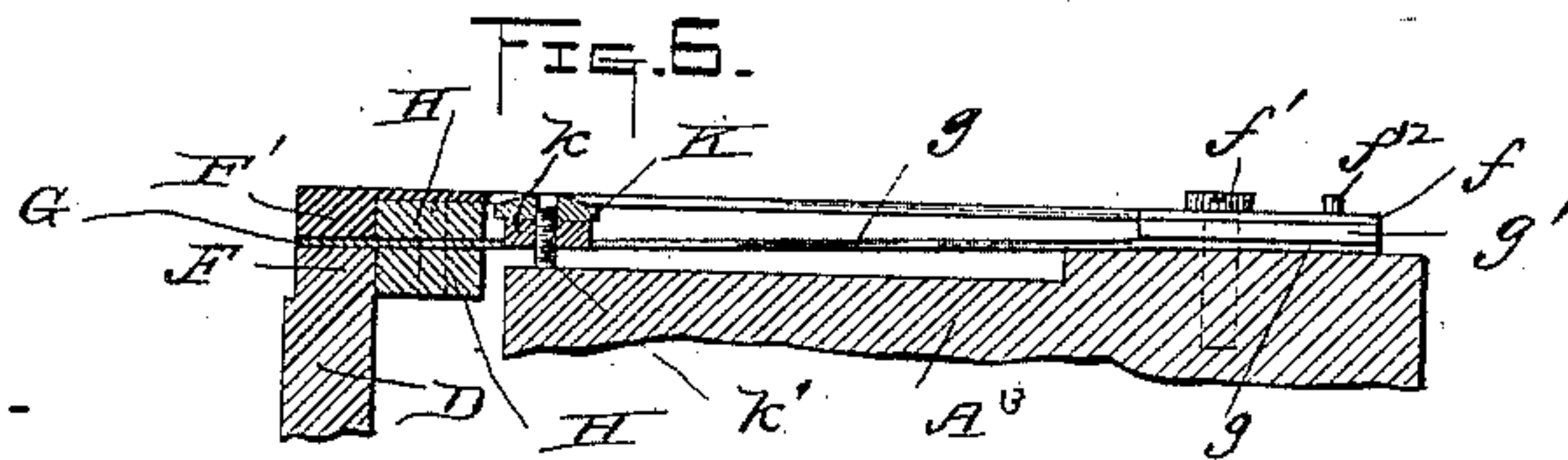


FIG. 5.

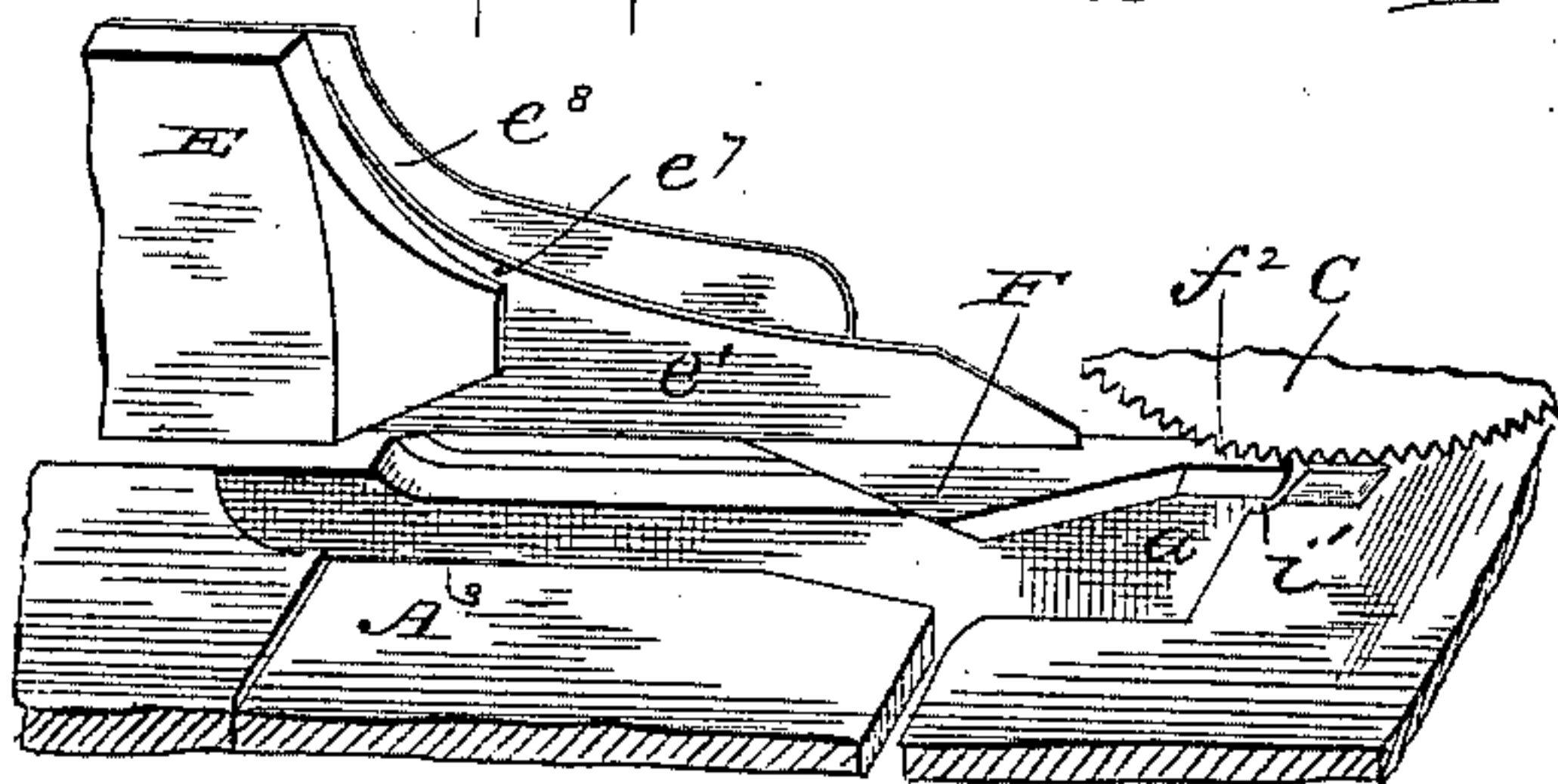


FIG. 6.

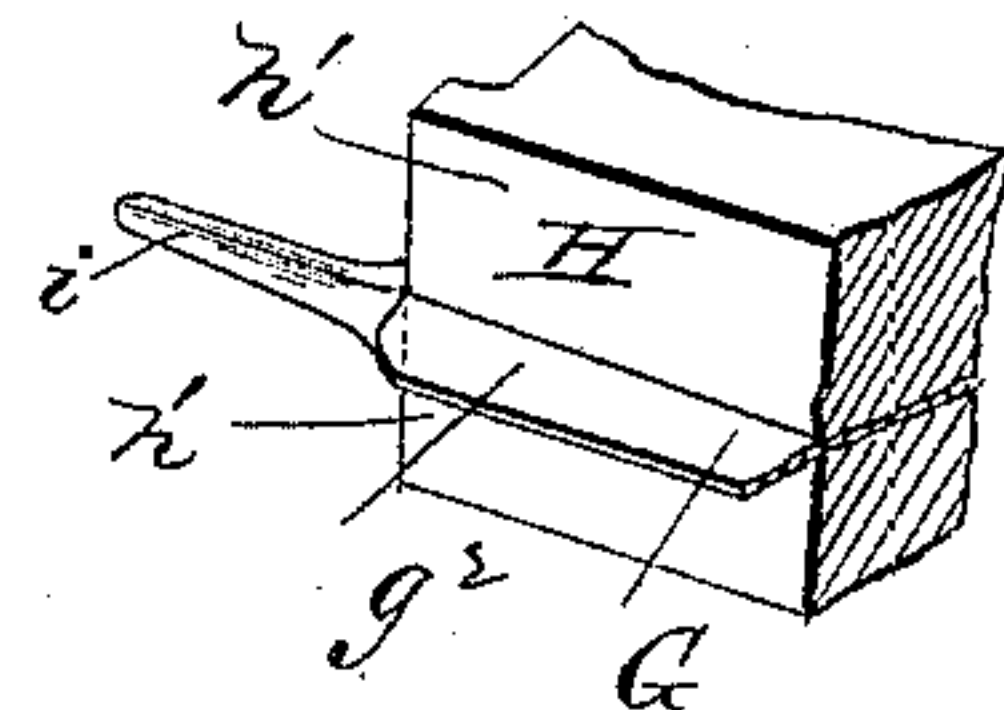
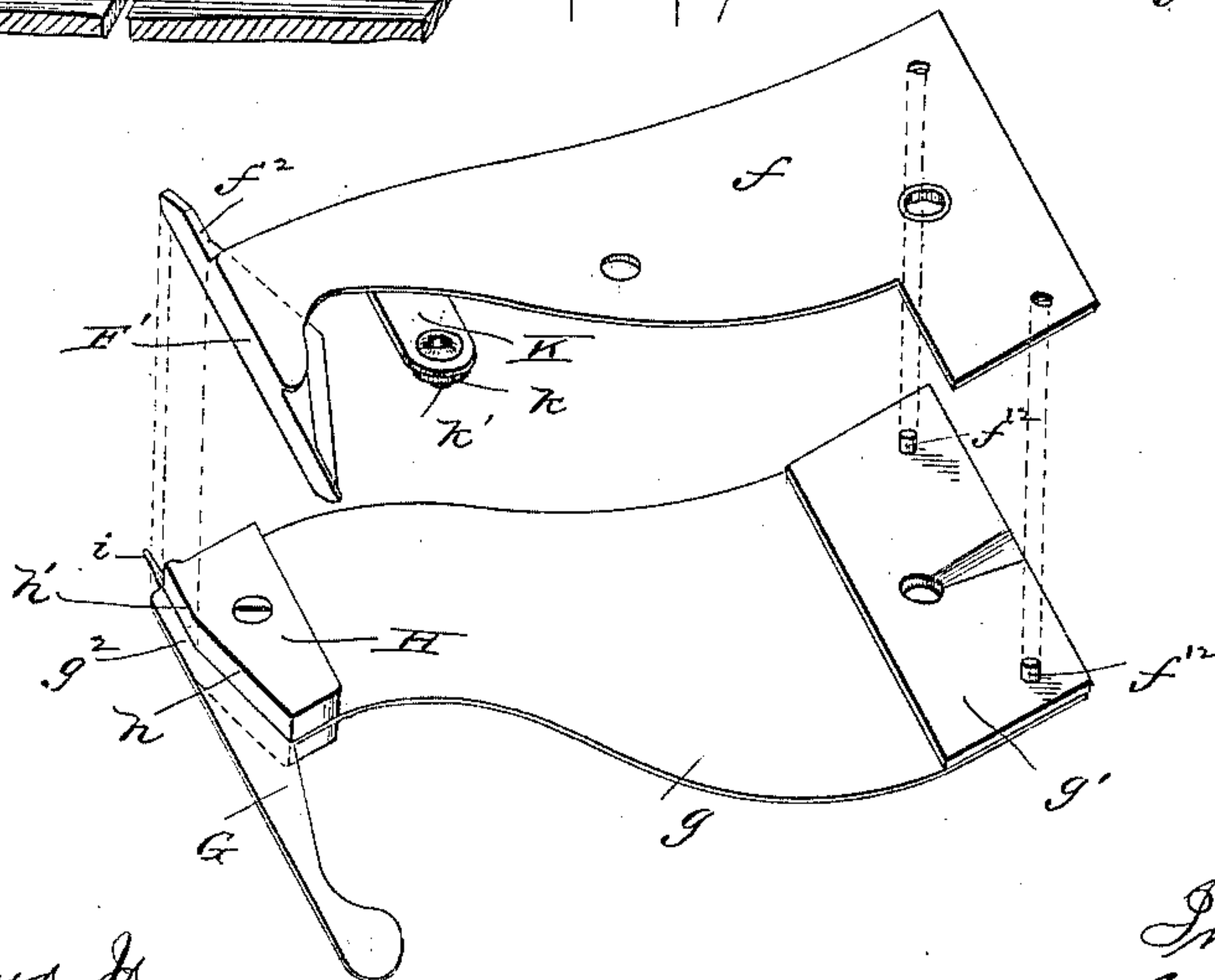


FIG. 7.



Witnesses:

J. G. Thomas, Jr.
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3 Sheets—Sheet 3.

APPARATUS FOR GUIDING, STRAIGHTENING, AND EVENING FABRICS.

Patented Feb. 28, 1888.



UNITED STATES PATENT OFFICE.

SATTERLEE ARNOLD, OF NEW YORK, N. Y.

APPARATUS FOR GUIDING, STRAIGHTENING, AND EVENING FABRICS.

SPECIFICATION forming part of Letters Patent No. 378,822, dated February 28, 1888.

Application filed March 4, 1887. Serial No. 229,691. (No model.)

To all whom it may concern:

Be it known that I, SATTERLEE ARNOLD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Guiding, Straightening, and Evening Fabrics, and for Presenting the Same to Stitch-Forming Mechanisms, of which the following is a specification, reference being had therein to the accompanying drawings.

The present invention relates to an apparatus for presenting fabrics to the stitch-forming mechanisms of sewing-machines, and embraces certain improvements on the guiding, straightening, and evening apparatus covered by my patent, No. 313,909, dated March 17, 1885, these improvements rendering my apparatus more automatic in its operation, besides extending its capacity to a large range of work in connection with fabrics of different thicknesses without rendering positive adjustment necessary.

In this my improved apparatus the lower guide-plate, having on its upper edge a small guiding-rib, is rigidly secured to the work-plate, as before, with its forward end adjacent to the needle. The upper guide-plate is rigidly supported relative to the lower plate; but the guiding-edge thereof is formed in sections consisting of a series of thin spring-pressed plates, the edges of which, taken collectively, form a guiding-rib on the lower guide-plate. The front corners of these presser-plates are rounded up slightly, somewhat like the toe of an ordinary presser-foot, to permit the goods to pass easily without catching. The springs by which these sectional presser-plates are forced against the goods are very light, so that the collective friction of a large number of these plates will not make too heavy a drag on the work, and as the said presser-plates yield readily to varying thicknesses of goods, the guide-plates are adapted to a large range of work without being positively adjusted toward or from each other. Moreover, as the spring-acted presser-plates are capable of a considerable movement within certain limits, much shorter guide-plates may be conveniently used than heretofore, for the reason that a considerable quantity of material which is to be sewed may be puckered or gathered into

the guide-plates, and the latter can therefore act as storage-plates to hold a quantity of work, which is gradually drawn in to the needle by the feed-wheel of the sewing-machine. Thus, when several machines are being attended by one operator, the latter may carelessly force a quantity of work into the comparatively short guide-plates, after which the sewing goes on automatically, the feed-wheel drawing the goods forward through the evener, and the latter, smoothing out the edges of the goods and bringing them into exact register with each other, causes them to be presented to the needle with such nicety that the seams may be formed almost within a thread's width from the edges, if desired. Thus in sewing seams in stockings and other classes of knit goods (which, owing to the softness and the tendency to curl at the edges, have heretofore been most difficult to sew mechanically) the seams may be run with such exactness that no appreciable welt will be formed where the sections of materials are joined, and the work goes on automatically when it has once been commenced and the storage guide-plates have been supplied with a quantity of material, so that one operator may tend several machines. The spring presser-plates at the opposite ends of the guide-plates are made longer than those between, so that the one at the end of the guide-plates toward the operator may be easily lifted to introduce the work, while the one at the end of the guide-plates near the needle extends forward, so as to hold the edges of the work passing into the evener, which latter I prefer to place closely adjacent to the needle.

In my improved evener, as herein shown, the lower beveled-edge straightening or uncurling plate is formed on the lower guide-plate and the upper straightening-plate is carried by a spring plate or arm, which yields readily to permit different thicknesses of goods or uneven places in the work to pass. Between these straightening-plates is the separating-plate or divider, which separates the two pieces of fabric passing through the evener, so that the edge of one piece of fabric may be out of frictional contact with the other, to permit one piece of fabric to move relatively to the other, if necessary, to bring the edges into exact register. This divider is also carried by or formed at the end of a spring arm or

plate, which readily yields to permit of the passage of goods of varying thicknesses. On each side of the dividing-plate or divider extends a guide or deflector having inclined and straight portions, the acting or outer edges of the deflector on the opposite sides of the divider being in the same vertical plane, so as to guide the edges of the work into exact register with each other. This deflector has a width or thickness on each side of the divider somewhat greater than the thickest goods in connection with which it is to operate, and the lower portion of the deflector enters into a recess formed for its reception in the work-plate of the sewing-machine adjacent to the lower straightening-plate, while the upper portion of said deflector extends adjacent to the upper straightening-plate, and the latter, owing to the spring arm or plate by which it is carried, serves as a presser-foot to hold the work.

For use in connection with some classes of work, the deflector is provided with a stitch-retaining finger extending rearward past the needle hole or slot in the work-plate of the machine, this finger being in line with the straight portion of the deflector, so as to assist in guiding the work, and to this end its outer side may be somewhat flat. The laterally-moving needle, in connection with which the thread-holding finger is to be used, first descends on one side of the said finger and then on the other, so as to make the stitches somewhat loose, and thereby increase the elasticity of the overseam by which the goods are joined. Moreover, as the said finger is rigid, it serves as a resistance to the action of the take-up, so that the edges of the soft knit fabrics will not be distended or distorted by the pull of the take-up on the thread in tightening the stitches. The said finger is long enough to hold two or three stitches, and is slightly tapered, so that as the feed-wheel draws the work forward the stitches readily slip off therefrom.

In order that my invention may be readily understood by those skilled in the art to which it pertains, I will now describe the same in connection with the accompanying drawings, in which—

Figure 1 is a side view showing a portion of my sewing-machine with my fabric-presenting apparatus applied thereto. Fig. 2 is a plan view showing my said apparatus and a part of the work-plate of the machine. Fig. 3 is a side view, partly broken away, from the side opposite to that shown in Fig. 1. Fig. 4 is a cross-section of the guide-plates on line *x x*, Fig. 1, looking in the direction of the arrow adjacent to said line. Fig. 5 is a detail perspective view to show the lower straightening-plate and adjacent parts. Fig. 6 is a front sectional view of the detachable evenner on line *y y*, Fig. 2. Fig. 7 is a detail perspective view thereof with the parts separated. Fig. 8 is an enlarged detail view to show the stitch retaining and guiding finger more clearly; and Fig. 9 is a detail perspective view with the parts detached to illustrate a modification.

A denotes a portion of the bracket-arm of a sewing-machine; A', the work-plate thereof; A², the base of the machine, and A³ an extension or horn of the said base-plate, forming a supplemental work-plate.

B is the laterally-moving needle-bar, carrying the needle *b*, the said needle-bar being guided vertically in bearings *b'* of a swinging frame, *b²*, hung on pivot-screws *b³*. The said swinging frame may be vibrated to move the needle laterally or horizontally by mechanism substantially such as is described in my Patent, No. 331,106, dated November 24, 1885, or in my application, No. 203,028, filed May 22, 1886, the particular operating mechanism for the needle-bar forming no part of the present invention.

C is the feed-wheel, which is or may be operated by mechanism such as is described in my said patent and application.

D denotes the lower guide-plate, rigidly secured by screws *d* to the extension A³ of the base of the machine, the said guide-plate preferably having on its upper edge or face the small guiding-rib *d'*.

E is the upper guide-plate, rigidly supported on the extension A³ and the lower guide-plate by arched brackets D'. The lower or working face of the upper guide-plate, E, consists of a series of small vertically-movable spring-acted presser-plates, *e*, and larger end presser-plates, *e'*, the said plates collectively forming a guiding-rib for the said upper guide-plate. The presser-plates *e* are guided vertically on the guide-plate E by pins *e²* engaging in slots *e³* in the presser-plates, and the latter are forced downward by light wire springs *e⁴*, housed in a longitudinal recess, *e⁵*, in the plate E, and arranged to engage the said presser plates, the said recess and springs being covered by removable plates *e⁶*. The end presser-plates, *e'*, are guided vertically and pressed downward in a manner similar to the plates *e*; but the two slots *e⁶* of the said end plates are made somewhat wider than the guiding-pins, engaging therein so as to permit said plates to be rocked or tipped slightly. The point of connections of the springs *e⁴*, by which the said plates are pressed downward, is outside of the outer guiding-pins, *e²*, or nearer to the ends of the said plates than said pins, so that the outer ends of said plates are normally held down by said springs.

From this construction it results that the outer end of the forward end presser-plate (or the one nearest the operator) may be raised to permit of the easy introduction of the goods between the guide-plates, and when released it will instantly resume its normal position, while the rear end plate (or the one nearest the needle) will exert a proper pressure on the goods at its extreme outer end, so that the work will be properly held until it is securely between the straightening-plates.

The straightening or uncurling and evening device or evenner consists, as in my former patent hereinbefore referred to, of two pointed

smoothing-plates or "scrapers," preferably having beveled outer faces. In the present instance the lower one, F, of these straightening-plates is formed on the lower guide-plate, D, while the upper straightening-plate, F', is carried by a spring plate or arm, *f*, attached by a screw, *f'*, and dowel-pins *f*¹² to the base-extension or extended work-plate A³. Between the straightening-plates F and F' is interposed the separating-plate or divider G, and on the opposite sides of the latter extends the inclined guide or deflector H. The latter is arranged at the inner edge of the divider, so as to guide the edges of the fabrics to be evened, and may consist of a single block of metal extending on both sides of the divider, or of two thinner blocks or plates secured to opposite sides of the divider. The divider is formed integral with or attached to a spring plate or arm, *g*, connected with the plate *f* and secured to the work-plate by the dowel-pins and screw by which the said plate *f* is attached, the plates *f* and *g* being preferably separated by a plate, *g'*.

The deflector H has inclined guiding-faces *h* on each side of the divider, to bring the edges of the goods to be evened into register with each other, and straight guiding-faces *h'*, to direct the evened goods to the needle of the machine, the deflector on each side of the divider being preferably somewhat thicker than the thickest goods to be evened. The inclined and straight faces of the guide or deflector fit closely against similar faces formed on the rear portions of the straightening-plates F and F', one of the points or rearward extensions, *f*², of the said plates being above and the other below that portion *g*² of the divider which projects beyond the straight portions *h'* of the deflector. The lower portion of the deflector is received in a slot or opening, *a*, in the work-plate A, and, owing to the fact that the deflector and divider are carried by the spring-arm *g* and the upper straightening-plate by the spring-arm *f*, these parts are adapted to have a limited vertical movement relative to the lower stationary straightening-plate, F, so as to be adapted for operation with different thicknesses of material, the upper straightening-plate, F', with its rearward extension or heel-presser *f*², being gently forced downward by the spring-arm *f*, so that it acts as a presser-foot to hold the work passing beneath it securely until the work is close to the needle.

To limit the downward movement of the pressing straightening-plate F', the spring-arm *f* is provided with a plate or bracket, K, having a thickened portion or stud, *k*, in which is tapped a screw, *k'*, which abuts against the upper surface of the work-plate extension A³.

As an auxiliary guide, and to prevent the soft edges of the work from being distended or displaced by the pull of the take-up on the thread in tightening the stitches, and also to insure a proper elasticity of the seam, I have provided a stitch-retaining finger, *i*, which extends across the needle throat or slot *i'*. This

finger is shown in the present instance as being formed on the deflector H, which serves as a holder therefor; but it is obvious that it may be secured in place by any suitable holder, and that it may be used in connection with a laterally-moving needle, either with or without the guiding, straightening, and evening apparatus herein shown. The said thread-holding finger *i* is tapered slightly and is raised a little above the bearing-surface of the work-plate beneath the same, so that the stitches are formed over the said finger. In the present instance the said work-plate is recessed slightly above the adjacent bearing portion of the said plate. The outer side of the finger *i* is on a line with the straight guiding-edge *h'* of the deflector, and is flattened slightly to assist in the guiding operation.

The feed-wheel C is formed from a thin plate of metal, and is preferably so arranged that its lower or feeding portion will be in a line with the guiding-rib on the lower guide and with the presser-plates forming the guiding-rib for the upper guide-plate, the said wheel being thus brought as closely as possible to the needle, so that while it engages the goods very close to their edges it will have a proper feeding-grip on the same, and will prevent them from being forced into the opening in the throat-plate by the downward thrust of the needle. The feed-wheel is also placed alongside of the thread-holding finger *i*, so that it rotates in a plane parallel to the said finger, or approximately so.

In the use of my automatic apparatus the goods are first introduced between the guide-plates and drawn forward through the evener to the needle, and the pressing feeding-wheel (which is lifted to facilitate the introduction of the work) is lowered and the machine started. The guiding, straightening, evening, and sewing operations will then go on automatically without requiring further attention on the part of the operator until a piece of work has been finished, or nearly so, and another is to be introduced. The yielding sections (or presser-plates) of the guide-plates will admit of the puckering or gathering of the work, as hereinbefore stated, so that long pieces of goods may be stored between the comparatively short guide-plates, to be drawn forward by the feed as the sewing progresses. Should any uneven places occur in the work, as where the seam being formed crosses other seams, or should fabrics of varying thickness be presented to the operation of the apparatus, the spring presser-plates *e* will readily yield to accommodate all inequalities, and the spring-pressed straightening-plate F' and the divider and deflector carried by the spring-arm *g* will also automatically adjust themselves according to the thickness of the work, (so that the divider will always be in the center,) or to permit of the easy passage of the seams or other inequalities.

The stitch-retaining finger *i* is primarily designed for operation in connection with a lat-

erally-moving needle forming an overseam, the needle-thread of which is locked with the under or shuttle thread, the needle descending alternately on opposite sides of the said finger and laying its thread over the same.

As my apparatus is more particularly designed for use in sewing soft elastic knit fabrics, the seams of which are to be formed very close to the edges, and as in thus sewing such goods the pull of the take-up on the needle-thread in tightening the stitches has a tendency to distend the edges of the goods so that the seams will present a puckered appearance, the stitch-retaining finger *i* is of great advantage in securing perfect work and proper elasticity in the seams. The said finger is long enough to hold several stitches, and thus the sewing-threads hold the work close to the finger and against lateral displacement as the sewing proceeds. The said finger also permits the stitches to be properly tightened in the work without distending the edges of the latter, as the finger, being rigid, acts as a resistance against the pull of the take-up. The strong pull of the feed-wheel in drawing the work forward easily draws the tightened stitches off from the tapering finger, and the stitches, although properly tightened in the fabric, are sufficiently loose to render the seam very elastic, owing to the fact that they have been tightened around the stitch-holding finger, the lateral movements of the needle being equal to or greater than the diameter of the said finger, so that the needle will clear the same as it descends alternately on opposite sides thereof.

It will of course be understood that the details of my invention may be varied somewhat without departing from the leading features thereof, and I do not therefore wish to be understood as limiting my invention to the exact constructions herein shown and described. For example, the deflector *H* might be attached directly to the work-plate *y* of an ordinary sewing-machine, as in Fig. 9, the divider *G* being at the end of a spring-arm, *g*, so as to be vertically movable to accommodate different thicknesses of goods. With this construction the work may be held down by an ordinary presser-foot, *x*, shaped to fit against the deflector; or the presser-foot *x* could be used in connection with the deflector and divider constructed as shown in Fig. 8 instead of the upper straightening-plate, which serves as a presser.

I claim—

1. In a fabric-guiding apparatus, the combination, with two guide-plates arranged adjacent to each other, with an interval between them, and extending lengthwise in the direction in which the fabrics are to be guided, of a series of spring-actuated presser-plates attached to one of the said guide-plates and adapted to adjust themselves automatically to varying thicknesses of fabrics, the said presser-plates being placed edgewise vertically and end to

end in the direction in which the fabrics are to be guided.

2. The combination, with two guide-plates arranged adjacent to each other, with an interval between them, one of the said plates having on its guiding-edge a small guiding-rib, of a series of spring-held presser-plates attached to the other of the said guide-plates and adapted, collectively, to form a rib registering with the aforesaid rib.

3. The combination, with the guide-plates *D* and *E*, arranged lengthwise in the direction in which the fabrics are to be guided, and the spring actuated presser-plates *e*, placed edgewise vertically and end to end in the direction in which the fabrics are to be guided, of the end spring-held presser-plates *e'*, having slots *e''*, the guiding-pins in the said slots and of lesser diameter than the width of the latter, and the springs *e'''*, connected to the said plates *e'* outside of the outer guiding-pins.

4. In a fabric-guiding apparatus, two guide-plates arranged adjacent to each other, with an interval between them, and extending lengthwise in the direction in which the fabrics are to be guided, and a series of spring-actuated presser-plates attached to one of the said guide-plates and adapted to adjust themselves automatically to varying thicknesses of fabric, the said presser-plates being placed edgewise vertically and end to end in the direction in which the fabrics are to be guided, combined with a feeding-wheel arranged in line with the said guide-plates, and thus adapted to draw the fabrics directly therefrom.

5. In the fabric-guiding apparatus, the combination, with a lower or work-supporting plate, of a series of spring-actuated presser-plates placed edgewise vertically above the said work-supporting plate and arranged end to end in the direction in which the fabrics are to move, and an upper plate or support to sustain the said presser-plates and to permit them to automatically adjust themselves to varying thicknesses of fabrics.

6. The combination, with the straightening-plates, the interposed loosely-held divider, and the deflector movable with the latter, of a spring or spring-arm for yieldingly pressing one of the said plates toward the other, and thus permitting the passage of different thicknesses of material between the said straightening-plates and on opposite sides of the said divider.

7. A straightening and evening apparatus consisting of the combination of two straightening-plates, one of which is yieldingly supported relative to the other, a movable or yielding separating plate or divider between the said straightening-plates, and an inclined deflector extending on both sides of the said divider and arranged at the inner edge of the latter.

8. The combination, with the lower stationary straightening-plate, *F*, of the divider *G*, the spring-carrying arm or plate *g*, the de-

flector H, movable with the said divider, the upper straightening-plate, F', and its spring-carrying arm f.

5 9. The combination, with the straightening-plates, the divider, the carrying-arm for the latter, and the deflector, of the carrying-arm f, provided with an adjustable stop.

10 10. The combination, with the straightening-plates, the divider, and the vertically-movable deflector, of the machine work-plate having a recess or opening for the reception of the lower part of the said deflector.

15 11. In a sewing-machine, the combination, with a laterally-moving needle-bar and needle, of a device for evening the edges of the fabrics, a stationary stitch-retaining finger arranged to extend between the two vertical paths of descent of the said needle, and a holder by which the said finger may be secured in place.

20 12. In a sewing-machine, the combination, with a laterally-moving needle-bar and needle, a device for evening the edges of the fabrics, a stitch-retaining finger, and a holder for the latter, of a feed-wheel rotating in a plane par-

allel, or approximately so, with the said finger. 25

13. The combination, with the guide-plates, of the straightening-plates, the divider, the deflector, and the stitch-retaining finger.

14. The combination, with the lower or work-supporting plate, a divider, and an in- 30 clined deflector at the inner edge of the latter, of an upper yieldingly-held plate or member adapted to serve as a presser-foot.

15. An automatic evening device comprising a vertically-movable pressing member, a 35 divider for separating two pieces of fabric to be evened, and a work-supporting plate or surface beneath the said divider, combined with an inclined guide or deflector at the inner edge of the divider, and adapted to deflect and 40 even the edges of the fabric, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SATTERLEE ARNOLD.

Witnesses:

PERCIVAL J. PARRIS,
EDWARD L. PARRIS.