(No Model.)

3 Sheets—Sheet 1.

J. A. BRAUTIGAM.

SWEAT BAND SEWING MACHINE.

No. 336,204. Patented Feb. 16, 1886.

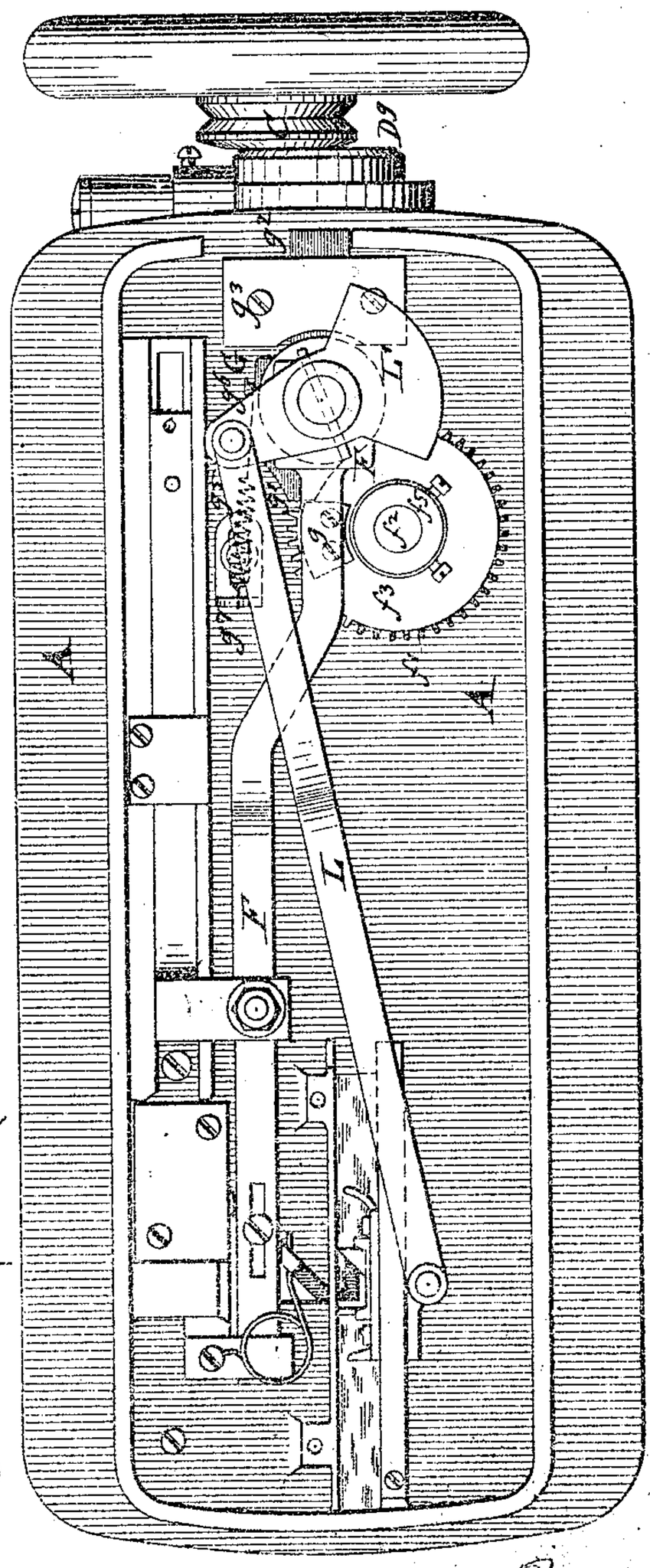

Fig. 1.

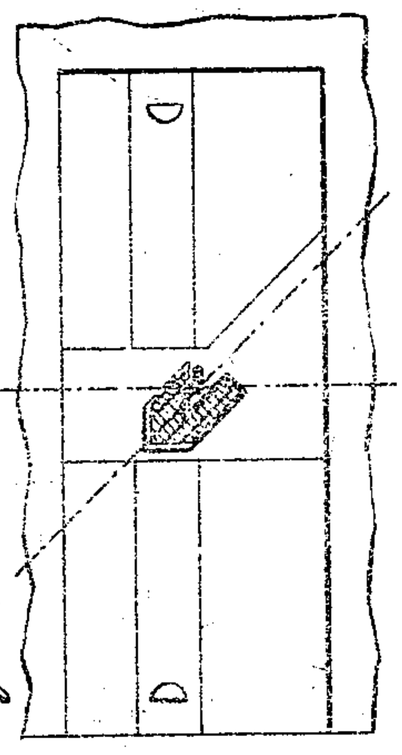

Fig. 1 a.

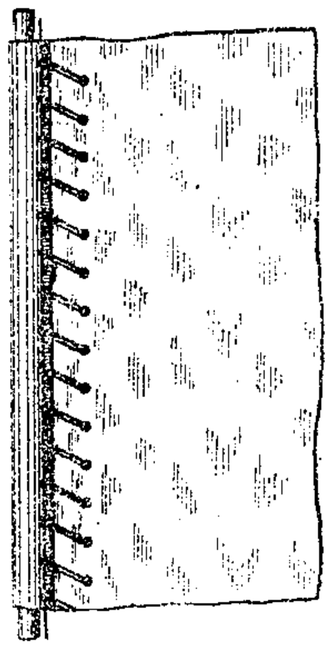

Fig. 1 b.

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SWEAT BAND SEWING MACHINE.

No. 336,204. Patented Feb. 16, 1886.

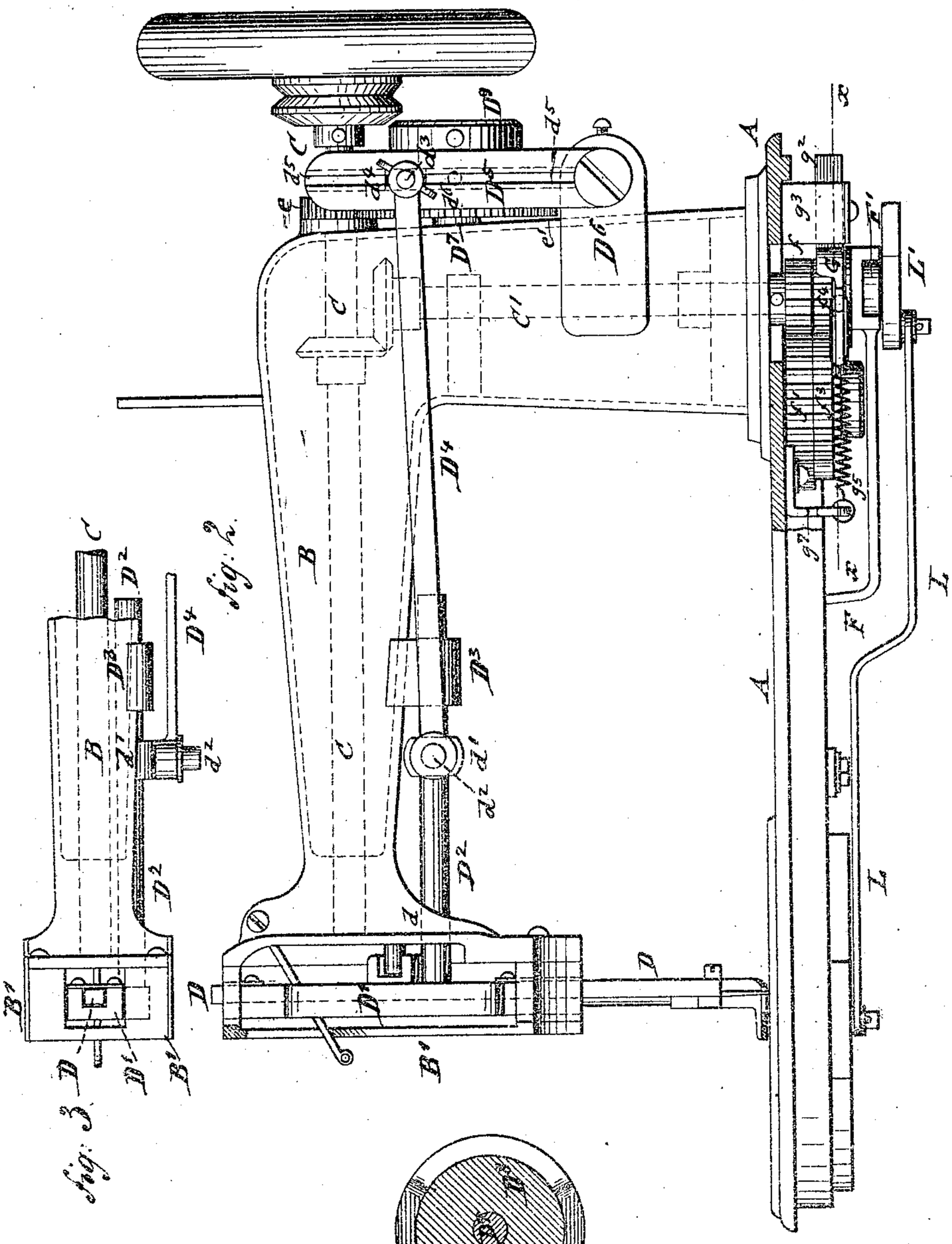

Fig. 2.

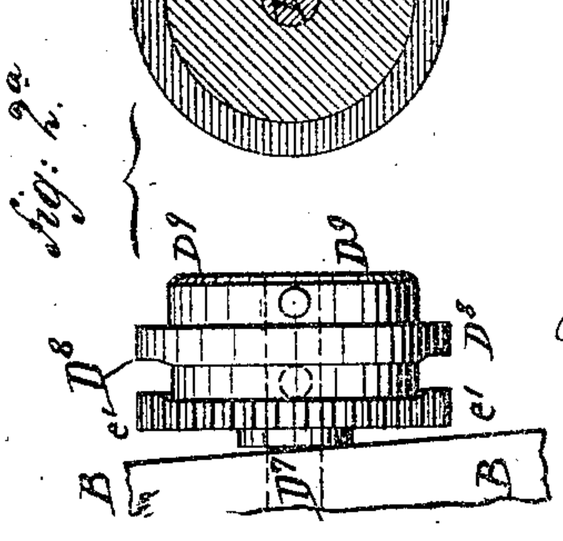

Fig. 2a.

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Fig. 4.

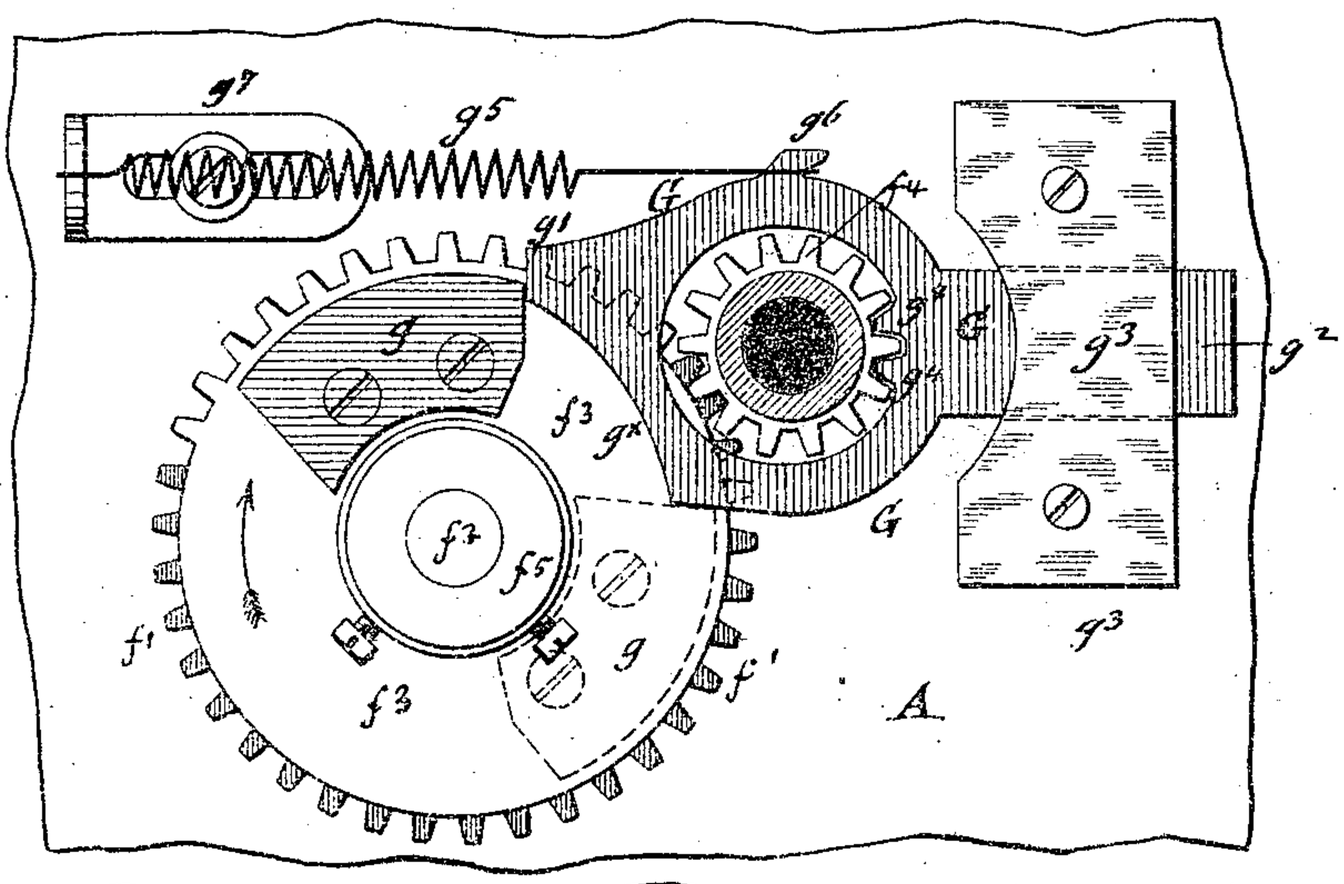


Fig. 5.

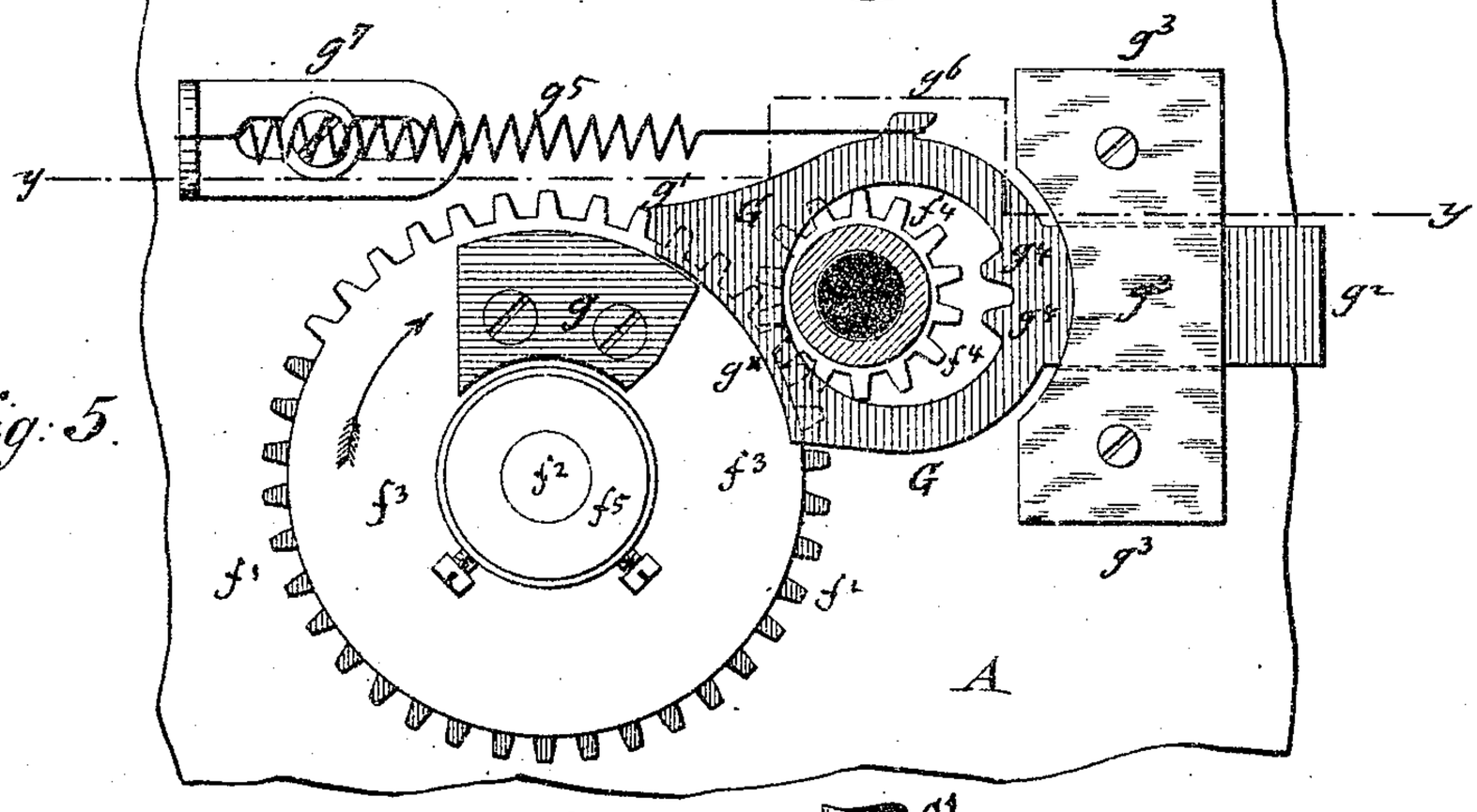
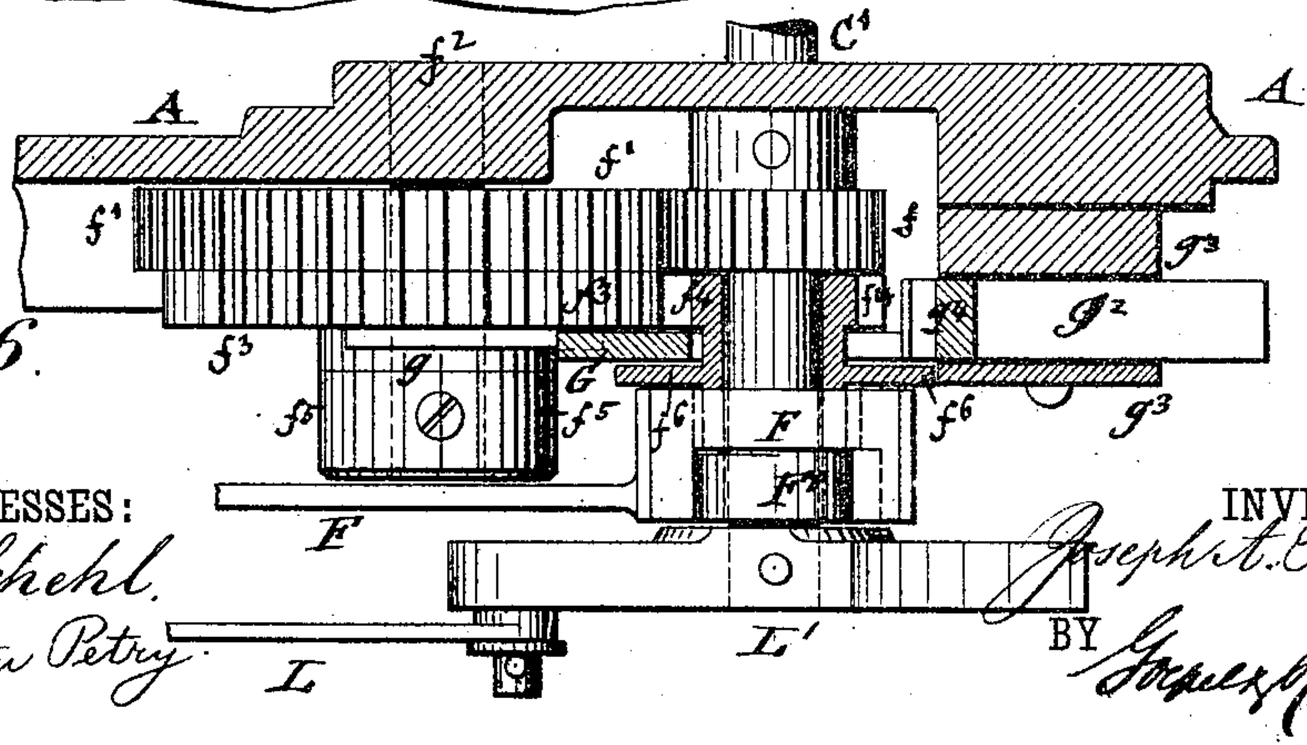


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH A. BRAUTIGAM, OF NEW YORK, N. Y.

SWEAT-BAND SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 336,204, dated February 16, 1886.

Application filed March 11, 1885. Serial No. 158,402. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. BRAUTIGAM, of the city, county, and State of New York, have invented certain new and useful Improvements in Sweat-Band Sewing-Machines, of which the following is a specification.

This invention has reference to an improved sewing-machine for making sweats for hats and caps, in which the reed-cover is attached thereto by stitching in imitation of hand-whipping; and the invention consists of a sweat-band sewing-machine having a vertically-reciprocating needle-bar that is guided in a needle-bar box to which a horizontally-reciprocating motion is imparted by suitable intermediate mechanism operated by the main shaft of the sewing-machine. To the needle-bar box is attached a horizontal guide-rod having a fixed collar. A connecting-rod is pivoted to the collar and to a slide-piece guided in a grooved and oscillating arm having an anti-friction roller that is engaged by a grooved cam that is rotated by suitable gearing once for every three rotations of the main shaft of the machine. The grooved cam imparts horizontally-reciprocating motion to the needle-bar, the cam-groove being so shaped that for one-third of its circumference the needle-bar remains at one end of its horizontal stroke, while for the remaining two-thirds of the circumference of the cam-groove the needle-bar remains at the other end of its horizontal stroke, so as to make two stitches of the needle. The feed mechanism is operated intermittently and feeds the sweat-band before every third stitch of the needle.

The feed mechanism is operated by the main and intermediate vertical shaft of the machine, which actuates by a transmitting-gearing a mutilated gear-wheel, which is provided with teeth at about one-third of its circumference. The mutilated gear-wheel meshes with a loose pinion on the vertical shaft, which is thrown in or out of mesh with a laterally-movable and spring-actuated ring-guide having teeth that interlock with the loose pinion. A projecting nose of the ring-guide is acted upon by a cam-segment on the mutilated gear-wheel, whereby the ring-guide is moved back so as to clear the loose pinion. An eccentric keyed to the loose pinion actuates thereby the feed-lever and feed devices, whereby the sweat-band is fed forward for every third stitch of the needle.

In the accompanying drawings, Figure 1 represents a bottom view of my improved hat-band sewing-machine. Fig. 1ª is a face view of a sweat-band for hats and caps made by the machine. Fig. 1ᵇ is a detail top view of the feed devices. Fig. 2 is a side elevation of my improved machine, partly in section, showing the mechanism for operating the feed. Fig. 2ª shows details of the cam for imparting horizontally-reciprocating motion to the needle-bar and its box. Fig. 3 is a top view of the upper arm of the machine, showing the needle-bar and its needle-bar box. Figs. 4 and 5 are horizontal sections on line *x x*, Fig. 2, drawn on a larger scale, showing the mechanism for imparting intermittent motion to the feed devices; and Fig. 6 is a vertical longitudinal section on line *y y*, Fig. 5.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the cloth-plate, B the upper arm, and C the main shaft, of my improved sweat-band sewing-machine. The needle-bar D is vertically reciprocated by a crank-pin of the main shaft C, said crank-pin engaging a grooved socket of the needle-bar, as customary in sewing-machines. The needle-bar is surrounded at three sides by a needle-bar box, D′, which is guided in top and bottom openings of the head B′ of the upper arm, B. To the needle-bar box D′ is rigidly attached a horizontal rod, D^2, which is guided in an opening, *d*, of the head B′ and by a bracket, D^3, of the arm B′. A collar, *d′*, is attached to the horizontal rod D^2, and provided with a pivot-pin, d^2, from which a connecting-rod, D^4, extends to a pivot-pin, d^3, of a slide-piece, d^4, which latter is guided by a groove, d^5, of an oscillating arm, D^5, that is pivoted at its lower end to the bracket D^6 of the vertical part of the arm B. An anti-friction roller, d^6, is attached to the rear side of the oscillating arm D^5, and engaged by a grooved cam, D^8, that turns loosely on a short shaft, D^7, attached to the vertical part of the arm B. The grooved cam D^8 is retained on the short shaft D^7 by a collar, D^9, that is keyed to the shaft D^7. The cam D^8 is rotated by a gear-wheel, *e*, on the main shaft C, which gear-wheel meshes with a gear-wheel, *e′*, on the cam D^8. The rel-

ative proportion of the gear-wheel *e* and gear-wheel *e'* is such that the grooved cam D^8 makes one rotation to every three rotations of the main shaft C. The cam-groove of the cam D^8 engages the anti-friction roller d^6 of the oscillating arm D^5, so as to impart to the latter an oscillating motion, which is transmitted by the connecting-rod D^4 and guide-rod D^2 to the needle-bar box, so as to impart a horizontally-reciprocating motion to the needle-bar. The shape of the cam-groove is so arranged that for one-third of its circumference the needle-bar is held at one end of its horizontal stroke, while for the remaining two-thirds of its circumference the needle-bar is retained at the opposite end of its horizontal stroke. The horizontally-reciprocating motion or stroke of the needle-bar may be made greater or smaller, according as the slide-piece d^4 is adjusted higher or lower in the groove d^5 of the oscillating arm D^5.

The cam D^8 and the shape of its groove is clearly shown in Fig. 2^a, and has the effect that the needle makes one stitch while the needle-bar is at one end of its horizontal motion and two stitches while the same is at the other end of its horizontal motion, in which position the needle-bar is retained by the cam for twice the length of time than at the other end of its horizontal stroke. The shuttle-motion is shown in Fig. 1, and is operated from the main shaft C by an intermediate vertical shaft, C', located in the upright part of the arm B and transmitting bevel-gears. (Shown in dotted lines in Fig. 2.) The shuttle-motion is of the usual construction in sewing-machines, and forms no part of my invention.

The sweat-band to be stitched is fed on the bias toward the needle, the devices for guiding the sweat being also well known and not shown in the drawings.

The feed mechanism is so constructed that the sweat-band is moved forward for every third stitch made by the needle. For this purpose a novel feed mechanism is used, which is shown in Figs. 1 and 2, and in detail in Figs. 4, 5, and 6. The feed mechanism receives motion from the vertical shaft C' by a fixed pinion, *f*, which meshes with a gear-wheel, *f'*, that turns loosely on a short vertical shaft, f^2, that is attached at its upper end to the cloth-plate A. A mutilated gear-wheel, f^3, is attached to the under side of the gear-wheel *f'*, made of the same diameter therewith, and provided with teeth at one-third of its circumference. The mutilated gear-wheel f^3 may be made in one piece with the gear-wheel *f'*, if desired. The gear-wheels *f'* and f^3 are retained on the short vertical shaft f^2 by a fixed collar, f^5, keyed to the lower end of the shaft f^2. The mutilated gear-wheel f^3 meshes with a loose pinion, f^4, on the vertical shaft C', which pinion is retained on the shaft C' by the crank-arm L' of the shuttle-lever L, as shown in Fig. 6. To an extension-sleeve of the loose pinion f^4 is keyed an eccentric, F', which actuates the fulcrumed feed-lever F. The opposite end of the feed-lever is connected to and operates a feed device of the usual construction, which forms no part of my invention. To the under side of the mutilated gear-wheel f^3 is attached a cam-segment, *g*, which engages at each rotation of the gear-wheel f^3 a projecting nose, *g'*, of a laterally-movable ring-guide, G. The ring-shaped guide G is located immediately below the loose pinion f^4, and is guided along a flange, f^6, of the extension of the same. The ring-guide G has a shank, g^2, that is guided by a grooved bracket-plate, g^3, attached to the under side of the cloth-plate A, as shown in Figs. 4, 5, and 6. The ring-guide G is provided with one or more upwardly-projecting teeth, g^4, which mesh with the loose pinion f^4, and hold the same rigidly in position on the shaft C'. When the nose of the ring-guide G is engaged by the cam-segment *g*, the ring-guide is moved back so as to clear the teeth of the pinion f^4, which is thereby at liberty to be engaged by the teeth of the mutilated pinion f^3. A spiral spring, g^5, is attached at one end of a projecting lug, g^6, of the ring-guide G, and at the opposite end to a slotted adjustable plate, g^7, by which the tension of the spring g^5 is regulated. When the cam-segment *g* has moved back the ring-guide G, the segment moves along an arc-shaped portion, $g^\times$, of the guide G sidewise of the nose *g'* and holds the ring-guide G in position so that its teeth g^4 will clear the teeth of the pinion f^4, as shown in Fig. 5. Simultaneously the pinion f^4 is engaged by the teeth of the mutilated pinion f^3, and rotated around the shaft C'. The feed-eccentric F' is turned thereby with the pinion f^4, so as to operate the feed-lever and the feed. As soon as the cam-segment has passed the arc-shaped portion $g^\times$ of the guide G—that is to say, when it arrives in the position shown in dotted lines in Fig. 4—the cam-segment releases the guide G, which is thereby returned by the spring g^6 to its normal position, so that the teeth g^4 mesh with the loose feed-pinion f^4 and lock it against axial motion. At the same time the teeth of the mutilated pinion f^3 clear the teeth of the feed-pinion f^4.

The effect of the feed mechanism described is that the sweat-band to be stitched is moved forward for every third stitch of the needle. The relative position of the mutilated pinion f^3 and feed-pinion f^4 is such that the feed takes place before the needle makes its second stitch, while the needle-bar is held by the cam D^8 at that end of its horizontal stroke in which it makes two stitches. The needle passes then through the sweat-band at the edge of the sweat-band, and forms a stitch alongside of the edge. The cam D^8 moves then the needle-bar in lateral direction, so that the needle passes through the band and reed-cover and forms a stitch across the edge of the band. The needle-bar is then again moved horizontally by the cam D^8, so that the needle is returned to the needle-hole at the edge of the sweat-band and forms a second stitch acro s the edge of the sweat-band. The sweat-band is then moved forward again by the feed mechanism, after

which the needle makes a stitch along the edge of the sweat-band through the reed-cover, as shown by reference to the sweat-band shown in Fig. 1ª. This formation of the stitches is repeated for each full rotation of the cam D⁸, so that the sweat-band is stitched in imitation of hand-whipping by a series of double stitches extending at a suitable angle of inclination across the edge of the sweat-band and by a longitudinal row of stitches running along the edge of the sweat-band.

I have filed a separate application for Letters Patent for the sweat shown in Fig. 1ª at the same time herewith, Serial No. 158,401, to which reference is made.

The advantages of my improved sweat-band sewing-machine are, first, that a series of regular double stitches in imitation of hand-whipping are produced by one needle and one shuttle at a considerable saving of time and labor; and, secondly, that the sweats can be made at a considerable saving in silk-thread, so as to be less expensive than the sweat-bands heretofore in use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a sewing-machine, the combination, with a vertically-reciprocating needle-bar, of a needle-bar box in which the needle is guided vertically, a main or needle-bar-operating shaft, a primary gear-wheel thereon, a second gear-wheel meshing with said primary gear-wheel, but having three times as many teeth as the latter, a cam rotating coincidently with said second gear-wheel, and connections between said cam and needle-bar box, whereby the former may move the latter horizontally to cause the needle-bar to reciprocate twice in one vertical plane and once in another, substantially as set forth.

2. In a sewing-machine, the combination, with a needle-bar, of a main shaft, and connections for reciprocating said bar vertically, a primary gear-wheel on said main shaft, a second gear-wheel meshing with said primary gear-wheel, but having three times as many teeth as the latter, a grooved cam rotating coincidently with said second gear-wheel, a movable box in which the said needle-bar is guided vertically, a horizontal guide rod or arm rigidly attached to said needle-bar box, a grooved oscillating arm or lever having an adjusting slide-piece and an anti-friction roller, the latter engaging said grooved cam, and a connecting-rod pivotally attached to said guide-rod and oscillatory arm, whereby the said needle-bar will be reciprocated vertically and horizontally and will be retained at one end of its horizontal movement the proper time to make two stitches and will make one stitch at the opposite end of said movement, substantially as set forth.

3. The combination, with a vertically-reciprocating needle-bar, of mechanism—as a grooved cam geared to rotate once to three rotations of the main or needle-bar-operating shaft, and connections between said cam and needle-bar—for imparting horizontal reciprocating movements to the latter so that the needle may take two stitches at one end of the horizontal movement and one at the other end thereof alternately, and a feeding mechanism comprising a cam or eccentric and gearing to rotate the latter once while the needle makes three stitches for moving the work only between the two stitches which occur at the one end of the said horizontal movement of the needle-bar, substantially as set forth.

4. A feed mechanism for sewing-machines, consisting of a transmitting-gearing operated from the main shaft, a mutilated gear-wheel, a cam-segment on said mutilated gear-wheel, a loose feed-pinion adapted to mesh with the mutilated pinion, a laterally-reciprocating ring-guide having teeth interlocking with the teeth of the feed-pinion, an eccentric keyed to said feed-pinion, and a feed-lever and feed device operated by said eccentric, substantially as set forth.

5. The combination, with a transmitting-gearing operated from the main shaft, a mutilated gear-wheel having teeth along one-third of its circumference, a loose feed-pinion, a cam-segment attached to the mutilated gear, a laterally-reciprocating and spring-actuated ring-guide actuated by said cam-segment and having teeth interlocking with the loose feed-pinion, an eccentric keyed to the loose pinion, and a feed-lever actuated by said eccentric and operated once for every third rotation of the main shaft, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOSEPH A. BRAUTIGAM.

Witnesses:
PAUL GOEPEL,
SIDNEY MANN.