

No. 690,385.

Patented Jan. 7, 1902.

W. ARBETTER.
SEWING MACHINE FOR FELLING.

(Application filed Aug. 13, 1901.)

(No Model.)

3 Sheets—Sheet 1

Fig. 1.

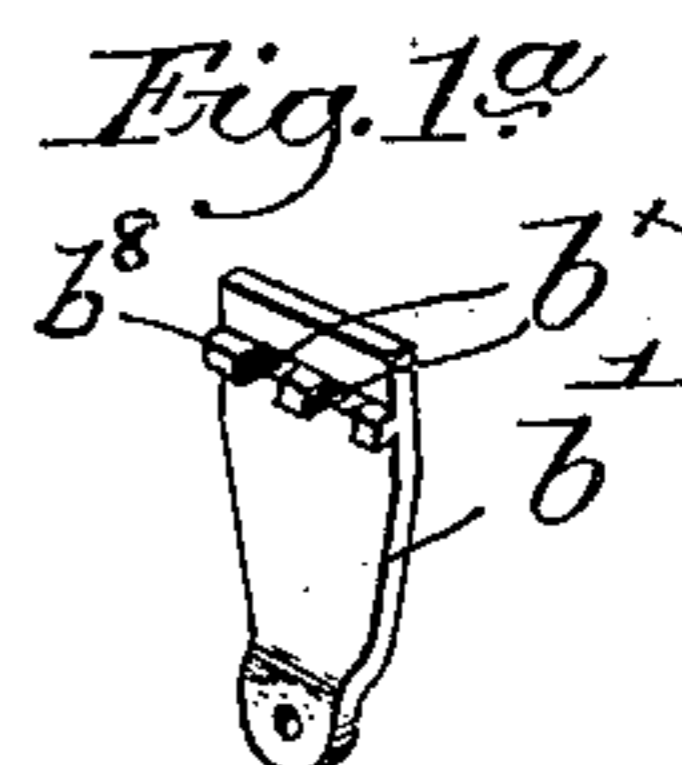
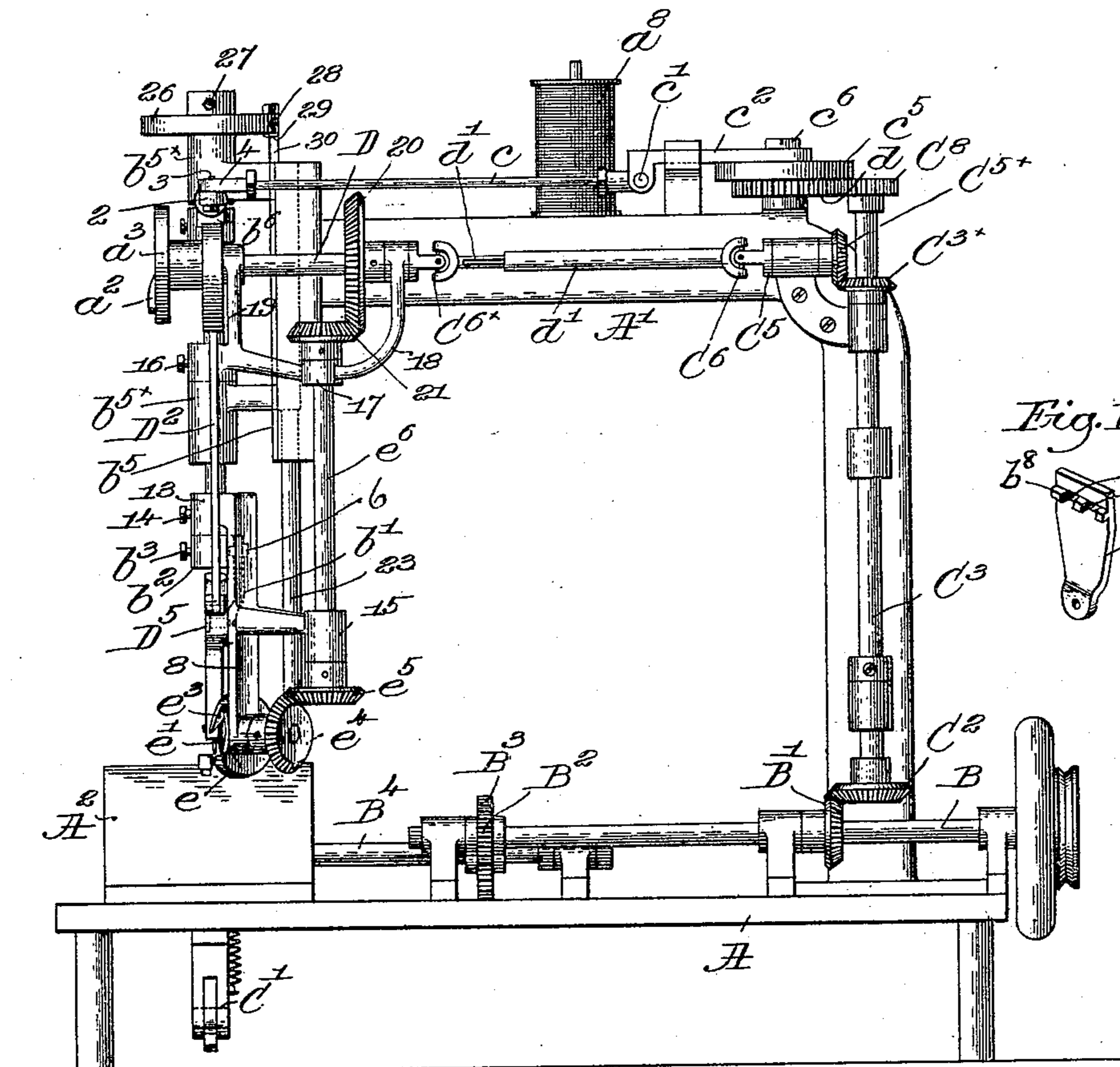
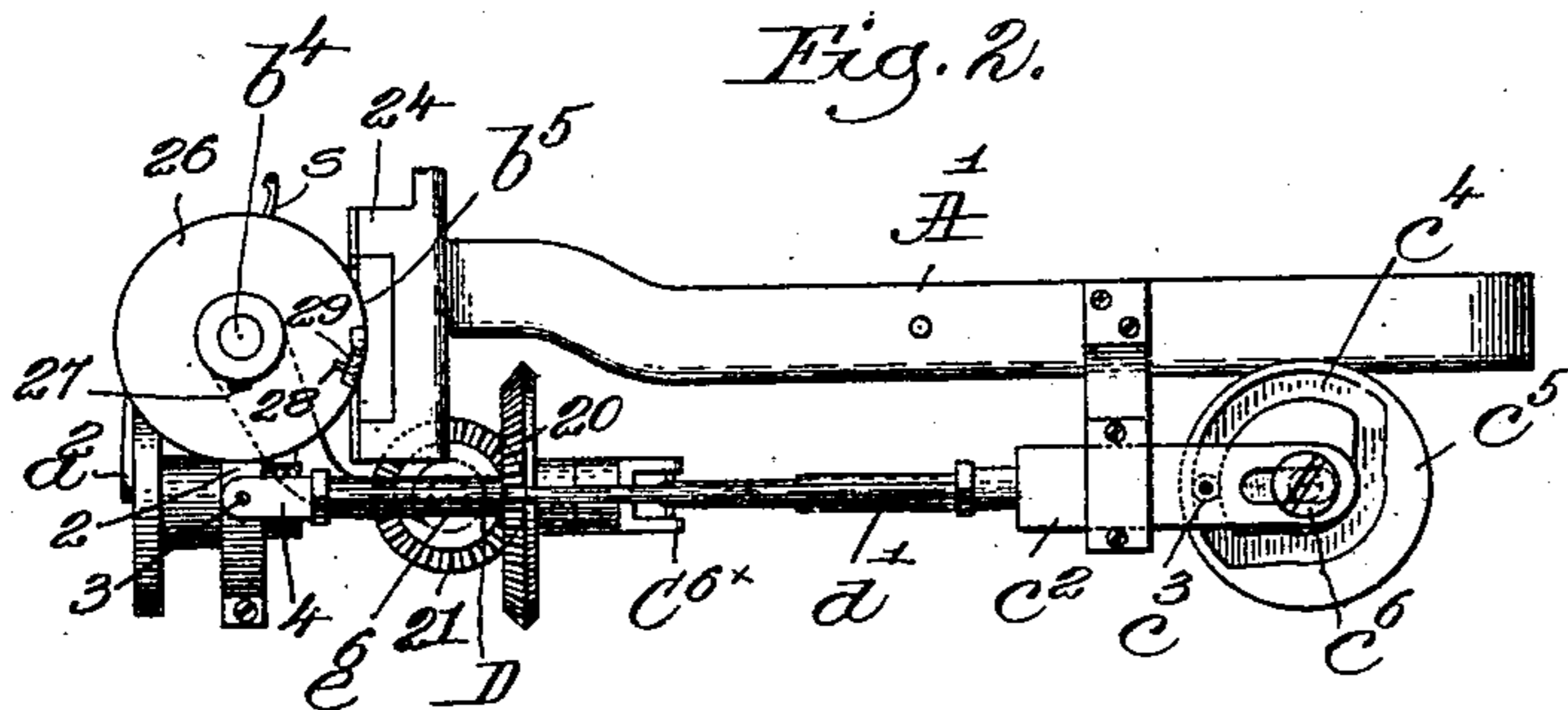


Fig. 2.



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Fig. 3.

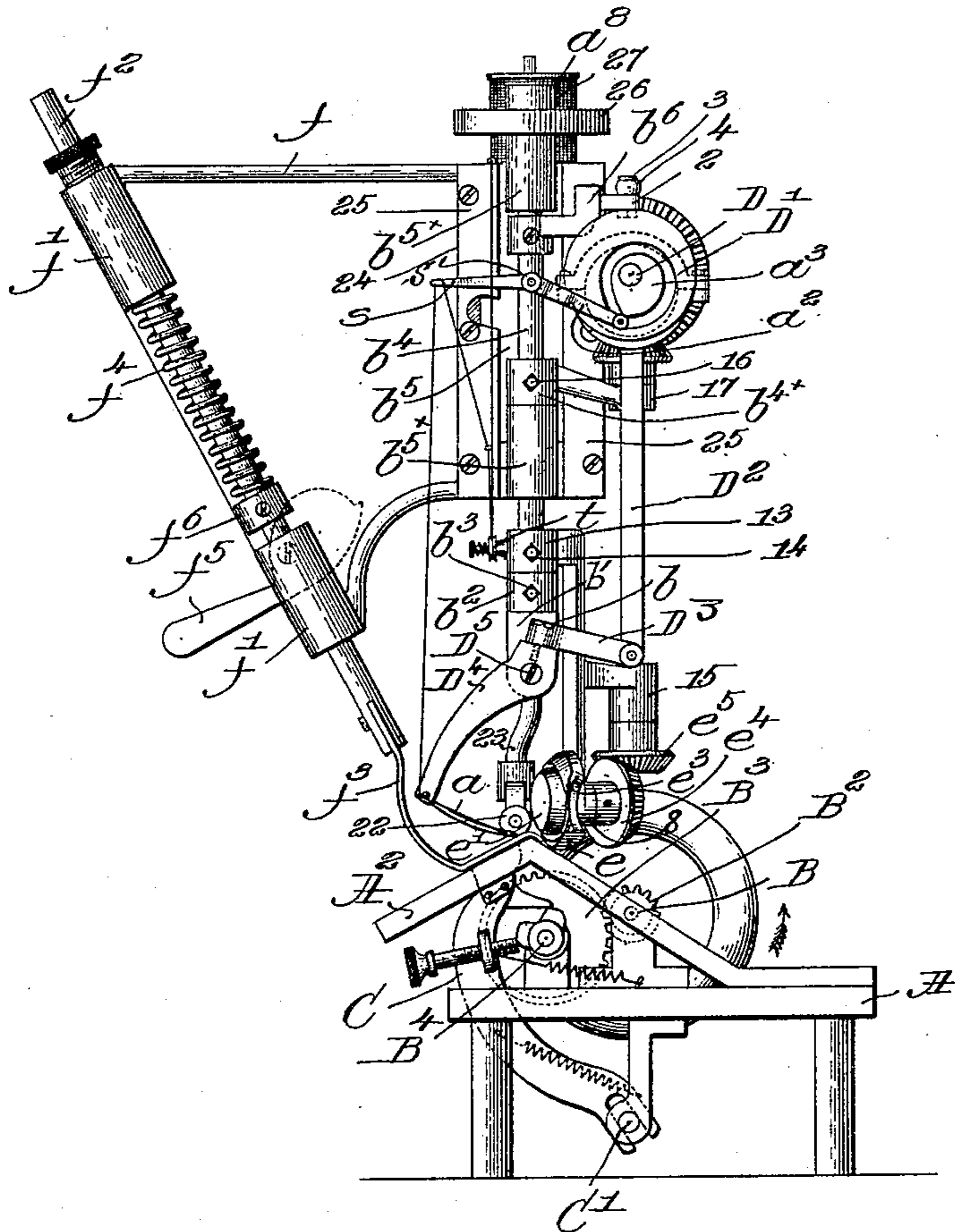


Fig. 4.

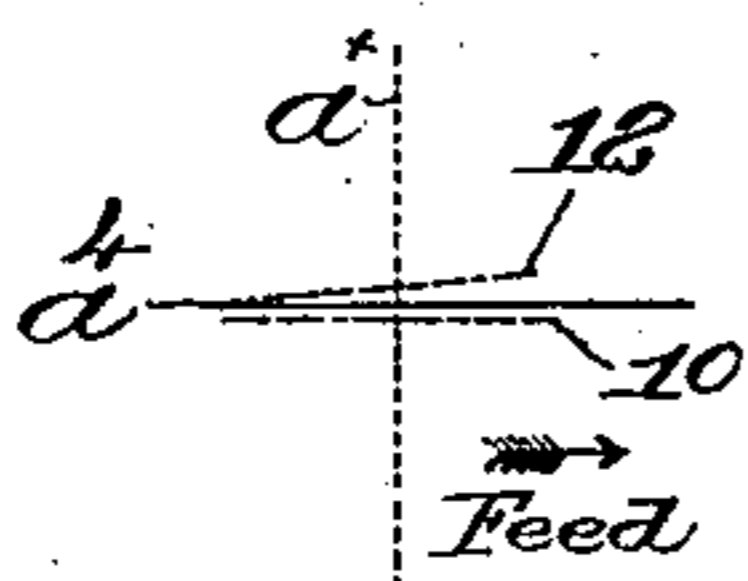
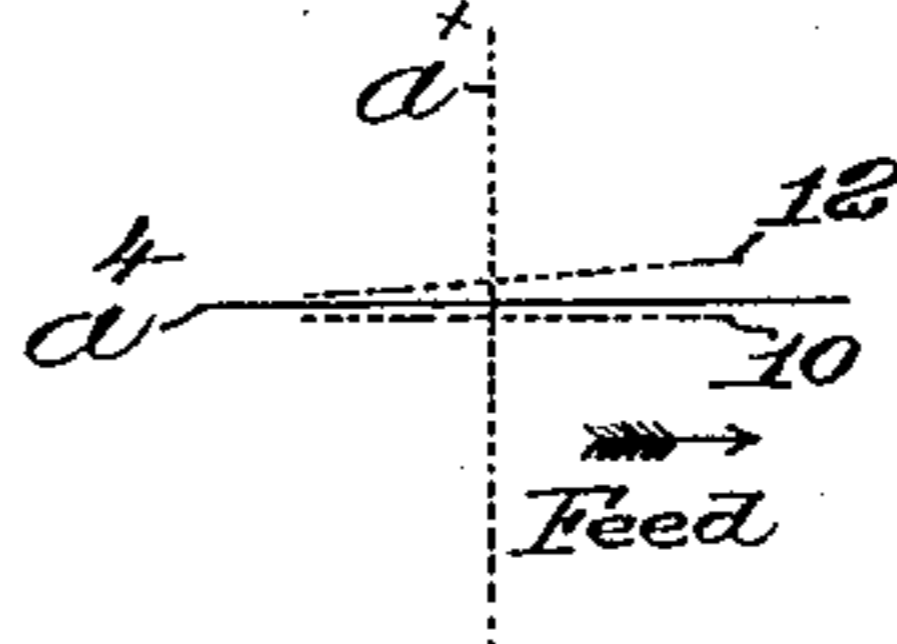


Fig. 5.



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Fig. 6.

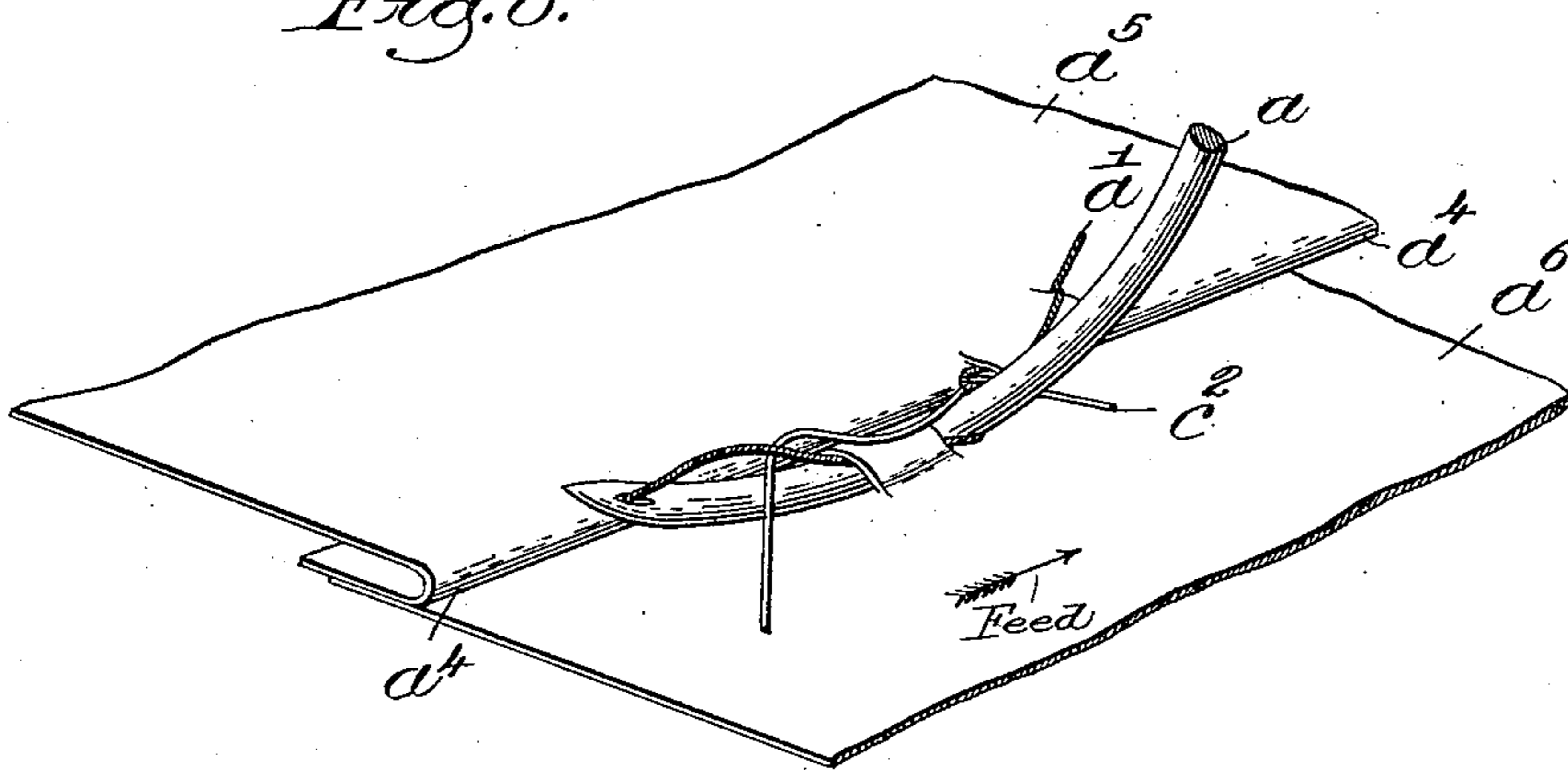


Fig. 7.

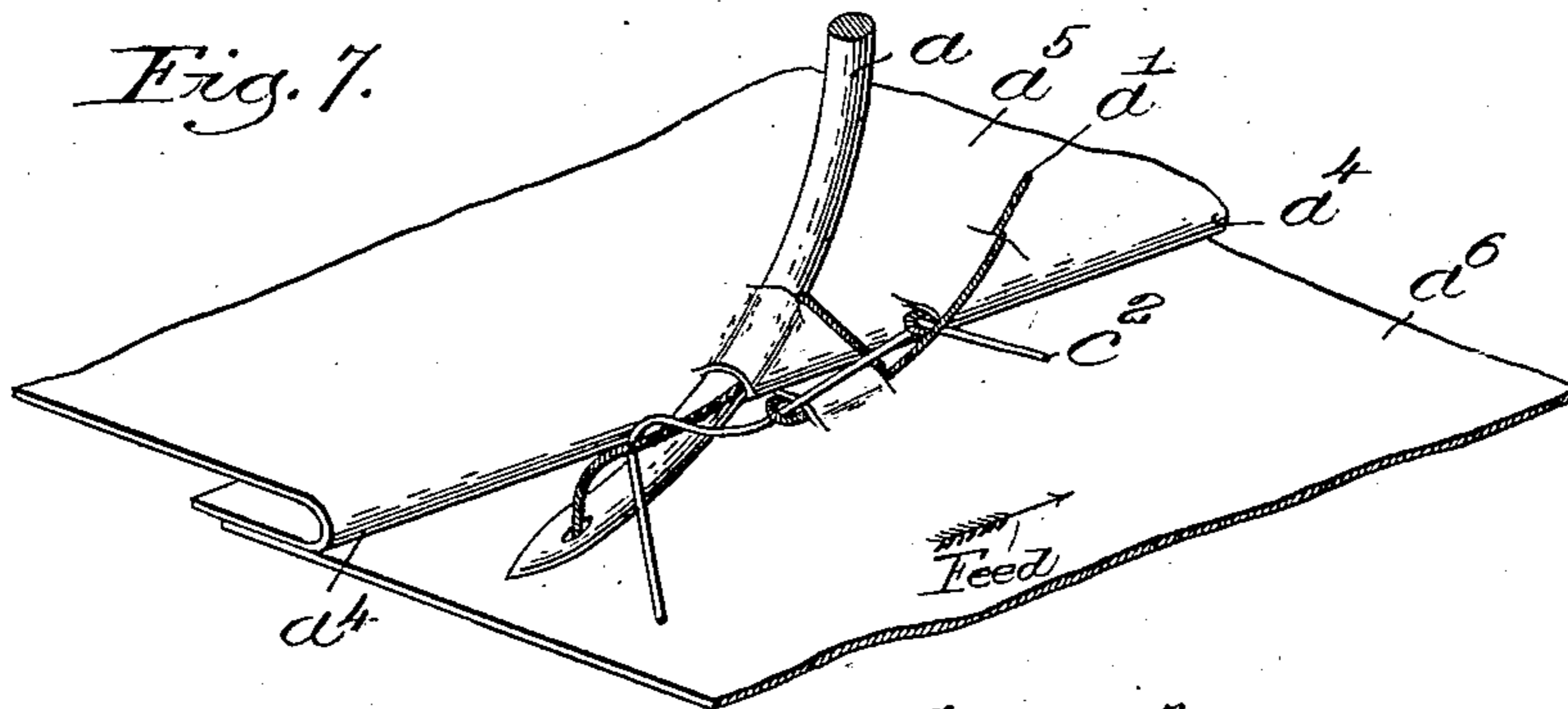
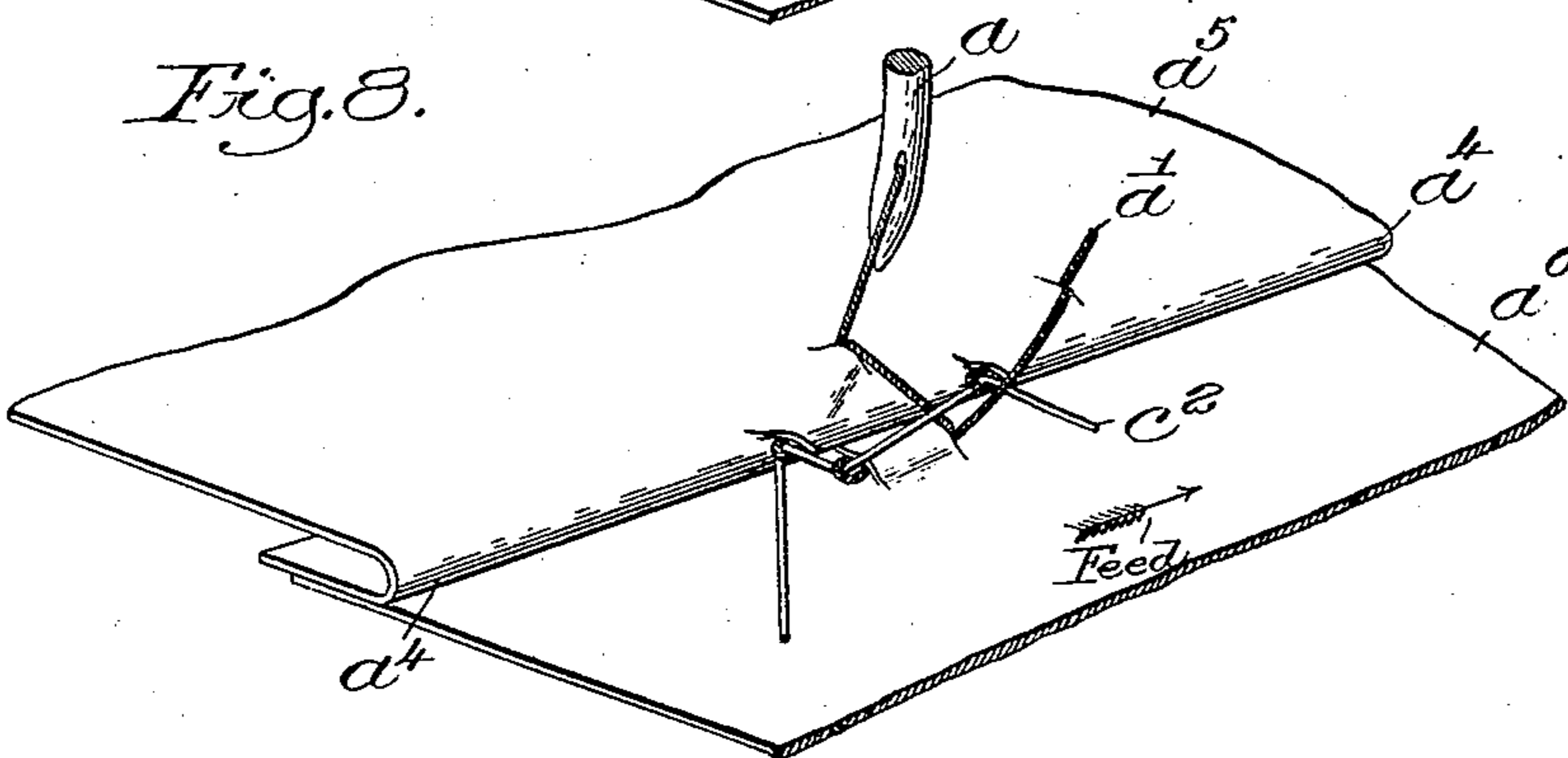


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE FOR FELLING.

SPECIFICATION forming part of Letters Patent No. 690,385, dated January 7, 1902

Application filed August 13, 1901. Serial No. 71,892. (No model.)

To all whom it may concern:

Be it known that I, WOLF ARBETTER, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the production of a sewing-machine for felling or for stitching a fold of material to a flat piece of material—as, for instance, a sleeve-lining to the lining of the garment in the manufacture of clothing.

In my machine the needle at one thrust enters and emerges from the same face of the folded edge, say, of the sleeve-lining, the needle approaching the folded edge at an angle, said needle entering the sleeve-lining in an angular position with relation to the direction of feed of the material. At the next thrust the needle will enter the garment-lining parallel with the edge of the fold in the sleeve-lining, and said needle will emerge from said lining at the same side or face. At each thrust of the needle alternately into the sleeve-lining and into the garment-lining the loop of thread carried by the needle will be entered and locked by a suitable second thread controlled by a complementary second-thread carrier, so that the stitch made unites the folded edge, say, of the sleeve to the garment-lining.

In the machine herein shown, it embodying in one of the best forms now known to me my invention, the stitching mechanism is located wholly at one side of the work-support which sustains the material to be stitched, and by a relative movement between the stitch-forming mechanism and the work-support the needle of the stitch-forming mechanism is moved to provide for the needle entering the material to be stitched at one thrust in a direction diagonal to the direction of feeding of the material and at the next thrust substantially parallel with the direction of feeding. The complementary second-thread carrier coacting with the needle changes its position about the vertical axis referred to with the needle, so that it may coact with the needle in either of its two operative positions.

In the machine herein shown the position

of the stitch-forming mechanism is changed automatically at one and at the next stitch with relation to the work-support by moving the stitch-forming mechanism about an axis vertical to the work-support to thereby adapt the needle to enter either the folded edge, say, of the sleeve-lining or the unfolded part, say, of the lining to which the folded part is to be stitched, and the stitch-forming mechanism is also free to have its position changed vertically with relation to the work-support according to variations in thickness of the material—as, for instance, on the occurrence of a seam in the material at right angles to the folded edge. The cloth or material is fed between each two thrusts of the needle, one through the folded and the other through the unfolded portion of the material.

Figure 1, in side elevation, shows in one of the best forms now known to me a sewing-machine for felling; Fig. 1^a, a detail showing the arm *b'*; Fig. 2, a top or plan view of the machine shown in Fig. 1; Fig. 3, a front end elevation. Figs. 4 and 5 are diagrams showing by a dotted vertical line the top of the cloth-support, the horizontal line showing the folded edge of the cloth and the two shorter dotted lines indicating different positions occupied by the needle in making a felling-stitch. Figs. 6, 7, and 8 represent two pieces of cloth and a needle to illustrate the stitch.

The framework consists, essentially, of a bed A, an overhanging arm A', and a cloth-support A², presenting a rather sharp corner. (See Fig. 3.)

The main shaft B, driven in any usual manner, has a bevel-pinion B' and a toothed gear B², the latter engaging a larger toothed gear B³ on a shaft B⁴, parallel to the shaft B. The shaft B⁴ has suitable cams which coact with and impart proper motions to a feeding device C, serrated at the upper end to engage the cloth on the cloth-support and feed it over said support after each two operations of the stitch-forming mechanism. The lower end of the feeding device embraces loosely a stud C', and suitable springs (see Fig. 3) connected with said feeding device and with the framework cause the feeding device to retire from and release the cloth preparatory to reengaging the same. The bevel-gear B' engages a bevel-gear C², fast on a shaft C³,

provided with a bevel-gear C^{3x} , which engages another bevel-gear C^{5x} , fast on a short shaft C^5 , said shaft C^5 rotating a two-part telescopic shaft $d\ d'$, one having a spline entered by a pin of the other. The telescopic shaft is connected by a suitable universal or gimbal joint C^6 with the shaft C^5 and by a like joint C^{6x} with a shaft D , provided, as shown, at its front end with an eccentric D' , embraced by an eccentric-strap at the end of a link D^2 , said link having jointed to its end an arm D^3 , attached loosely by a screw b with the needle-carrier D^4 , having its center of motion at D^5 and carrying, as shown, an eye-pointed needle a , shown as curved. The needle-thread a' will be supplied to the needle from any suitable spool a^8 , and it will be acted upon by any suitable tension device t and take-up s , one form of take-up being shown as a lever a^2 , pivoted at s' on the rod b^4 and actuated by a cam a^3 on a shaft D .

The fulcrum D^5 of the needle-carrier is mounted in an arm b' , depending from a block b^2 , secured by a screw b^3 to a rock-shaft b^4 , extended loosely through ears b^{5x} of a carriage b^5 . The shaft b^4 is sustained in its working position by means of a collar b^{4x} , secured to said shaft and contacting at its lower end with the upper side of the lowermost ear b^{5x} .

The rock-shaft b^4 has extended from it an arm b^6 , provided at its free end with an ear 2, which receives a bolt 3, used to attach to said ear a rod c , jointed at c' to a slide c^2 , suitably guided, and having a roller or other stud c^3 , which enters a groove c^4 in a cam c^5 , free to be turned about a suitable stud-screw c^6 . The cam has at its under side a gear d , which is engaged and rotated by a pinion C^8 on the shaft C^3 .

The rotation of the cam c^5 actuating the slide c^2 causes the shaft b^4 to be rocked, so that at one thrust of the needle a through the cloth the needle will approach diagonally the folded edge a^4 and the corner of the work-support sustaining the cloth at the point where it is to be stitched, and at the next thrust it will approach the lining a^6 parallel to the edge a^4 and at right angles to said corner. The two lines of thrust of the needle are illustrated diagrammatically in Figs. 4 and 5, wherein one thrust of the needle is shown by the dotted lines 10 substantially parallel to the line a^4 , which is supposed to represent the folded edge of the cloth. (See Figs. 6, 7, and 8.) The other thrust of the needle is shown by dotted lines 12, it being in a line diagonal to the edge a^4 and diagonal to the line a^x , which represents the corner of the work-support at the stitch-forming point.

In Fig. 5 it will be seen that the dotted line 12 is farther from the line a^4 than in Fig. 4. This is to illustrate that the inclination of the line 12, indicating one thrust of the needle, varies with cloth of varying thickness, said inclination being increased with the thickness of the goods. This adjustment

of position is effected by loosening suitable screws 6, one of which is shown in Fig. 1, and sliding the projections b^8 of the arm b' laterally with relation to the block b^2 , it being provided with a suitable groove to receive said projection, said arm having elongated holes b^x (see Fig. 1^a) to receive the said screws 6.

The member complementary to the needle and forming part of the stitch-forming mechanism is shown as a circularly-moving hook e , containing a bobbin e' , carrying a second thread e^2 . The hook and bobbin shown are of the class common to lock-stitch sewing-machines, the point e^3 of the hook entering the loop of needle-thread, expanding the same, and casting it about the bobbin carrying the second thread. The hook shown has imparted to it two rotations to one complete movement of the needle in making a stitch, said hook at one rotation not taking the loop of needle-thread. Giving the hook two rotations to one complete operation of the needle enables the hook to be run at a constant speed, as practiced in the Wheeler & Wilson sewing-machine. The hook-shaft is sustained in a bearing 8, depending from a block 13, connected to the shaft b^4 by a set-screw 14, and the bearing 8 has an extended bearing 15, which sustains shaft e^6 , to be described. The shaft b^4 has connected with it by a set-screw 16 a bearing 17, provided, as shown, with arms 18 and 19, which embrace loosely the shaft D . The hook-shaft is provided with a bevel-gear e^4 in engagement with a bevel-gear e^5 on a shaft e^6 , free to be rotated in the bearings 15 and 17 by a large gear 20 on shaft D in engagement with a pinion 21 on shaft e^6 .

The universal or gimbal joints C^6 and C^{6x} between the shafts C^5 and D enable the shaft b^4 to rise and move with it the shaft D and the parts actuated by it as the thickness of the material increases, as when a seam in the part of the cloth a^5 , which is folded at a^4 and which is laid on the flat piece of cloth a^6 , passes between the cloth-support and a suitable roller 22, carried at the lower end of a rod 23, connected with the vertically-movable carriage b^5 , which is free to be slid vertically in a suitable guideway 24 in the head of the overhanging arm behind suitable gibs 25.

The needle is thrust into the cloth twice between each feeding operation, and at each thrust of the needle a loop of its thread is entered by the hook to pass a second thread through the loop of needle-thread. At the first descent, supposedly through the material a^5 , the needle works in the arc of a circle; but when the needle at its second thrust is to enter the lining a^6 the needle must move in a parallel but lower arc. This is accomplished through a lifting device 26, which acts to lift the shaft b^4 just prior to the needle being moved to enter the material a^5 . The lifting device shown is represented as a plate secured to the shaft b^4 by a suitable screw 27, said plate having adjustably secured to it by

screws 28 a toe 29, which prior to making each diagonal thrust of the needle in the folded edge strikes a block 30, mounted on the upper end of the carriage b^5 .

5 Figs. 6 and 7 show the needle a in the cloth, the first thrust of each complete stitch being in the cloth a^5 at its folded edge a^4 , (see Fig. 6,) the second thrust being in the cloth or lining a^6 , on which the edge a^4 is laid. Fig. 8 shows the needle as it is being withdrawn to tighten the stitch.

The overhanging arm of the machine has extended from it at the left (see Fig. 3) an arm f , having suitable ears f' bored to receive the shank f^2 of a suitable presser-foot f^3 , preferably shaped to fit the work-support A^2 and bear upon the cloth above the serrated end of the feeding device, said foot being suitably slotted where it overlaps the upper corner of the work-support to enable the needle as it is moved toward the cloth to enter the slot in the presser-foot. This presser-foot is normally kept down by a suitable screw, as f^4 , and it may be lifted from contact with the cloth or material by means of a cam-lever f^5 , of suitable construction, adapted to act on a collar f^6 , secured to the presser-bar.

I believe that I am the first to produce a sewing-machine for felling, the first to provide for changing at alternate stitches the line of approach of the needle to the direction of the feed of the material, and also the first to provide means for changing at alternate thrusts of the needle the arc in which the needle moves, and consequently my invention is not limited to the construction of the parts shown and described, and I consider within the scope of my invention any devices for imparting to the various parts the novel movements herein specified.

When in the claims I refer to changing the relative positions of the stitch-forming mechanism and work-support "laterally," I mean such a change as will place the stitch-forming mechanism in different positions across the surface or plane of the work-support in contradistinction to a position nearer to or farther from each other—as, for instance, if the work-support were horizontal the lateral movement referred to would be a movement over the work-support in a substantially horizontal plane.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a sewing-machine, a bed-plate carrying a work-support, stitch-forming mechanism including a needle and complementary devices located at one side of the bed-plate and work-support, and means for laterally changing the relative positions of the work-support and stitch-forming mechanism, whereby the needle at succeeding thrusts through the material for stitching approaches and enters the material in different lines.

2. A sewing-machine comprising a bed-

plate, a work-support, stitch-forming mechanism including a needle and complementary devices located at one side of the bed-plate, and means for laterally changing the relative positions of the work-support and stitch-forming mechanism whereby the needle at succeeding thrusts through the material for stitching approaches and enters the material in different and convergent lines.

3. In a sewing-machine, a work-support, stitch-forming mechanism including a needle and a complementary device located above the work-support, and means to change the relative positions of the work-support and stitch-forming mechanism laterally about an axis substantially perpendicular to the work-support to enable the needle at succeeding thrusts through the material for stitching to approach and enter the material in different lines.

4. In a sewing-machine, a work-support to sustain the material to be stitched, a needle, and complementary stitch-forming devices located above the work-support, means to feed the material, means to actuate the stitch-forming means, and means to turn the stitch-forming means about an axis vertical to the work-support that the needle may enter the material parallel with and then at an angle to the line in which the material is fed.

5. In a sewing-machine, a work-support to sustain the material to be stitched, means to feed the material over said work-support, stitch-forming mechanism comprising a needle and a complementary thread-carrier coacting therewith, said stitch-forming mechanism being located above the work-support, and means for changing the relative positions of the needle of the stitch-forming mechanism and the work-support laterally and vertically, whereby the needle is caused to enter at one thrust the material of least thickness and at the next thrust the material of greater thickness.

6. In a sewing-machine, a work-support to sustain the material to be stitched, means to feed the material over said work-support, stitch-forming mechanism comprising a needle and a complementary thread-carrier coacting therewith, said stitch-forming mechanism being located above the work-support, and means for changing the relative positions of the needle of the stitch-forming mechanism and the work-support laterally, whereby the needle is caused to enter at one thrust the material of least thickness sustained on the work-support, and at the next thrust the material of greater thickness, and means to move the stitch-forming devices relatively vertically with relation to the work-support, to enable the needle when entering the material of least thickness to move in the arc of a circle closer to the work-support than when entering the material of greater thickness.

7. In a sewing-machine, a work-support to sustain the material to be stitched, a needle, and complementary stitch-forming devices lo-

cated above the work-support, means to feed the material, means to actuate the stitch-forming means to form a stitch, and means to turn the stitch-forming means about an axis vertical to the work-support that the needle may enter the material parallel with and then at an angle to the line in which the material is fed, and means to control the extent of movement of the stitch-forming means about said vertical axis.

8. In a sewing-machine, a work-support presenting a corner to sustain and bend the work at the point where the stitch is to be made, a needle and a complementary means located to one side of said work-support to form stitches, means to control said needle that it may approach the material at alternate stitches in different lines, and means for changing the needle to different positions in the plane of its travel in alternate thrusts.

9. In a sewing-machine, a work-support, stitch-forming mechanism including a needle and a complementary device, and means to change the relative positions of the work-support and stitch-forming mechanism to enable the needle at succeeding thrusts through the material for stitching to approach and enter the material in different vertical planes, and means to further move said stitch-forming mechanism that one thrust of the needle will be made in an arc of a circle closer to the work-support than at a preceding thrust.

10. In a sewing-machine, a work-support to sustain the material to be stitched, means to feed the material over said work-support, stitch-forming mechanism comprising a needle and a complementary thread-carrier coacting therewith, said stitch-forming mechanism being located above the work-support, and means for changing the relative position of the needle of the stitch-forming mechanism and the work-support laterally and toward and away from each other, whereby the needle is caused to enter at one thrust the material of least thickness sustained on the work-support, and at the next thrust the material of greater thickness, two thrusts of the needle being made between each operation of the feeding device.

11. In a sewing-machine, a work-support

presenting a corner to sustain and bend the work where the stitch is to be made, a needle, and complementary means located to one side of the material to coact with said needle and form stitches, means for controlling said needle that it may approach the material in different vertical planes at alternate stitches, and means for changing the needle to different positions in its planes of travel at alternate stitches, and feeding means to feed the material after each two thrusts of the needle through the material.

12. In a sewing-machine, a work-support, a carriage, a rock-shaft therein, stitch-forming mechanism sustained by said rock-shaft above the work-support, a shaft D in said carriage, means actuated by said shaft to operate the stitch-forming mechanism, means to rock said rock-shaft in said carriage and turn the stitch-forming mechanism with it.

13. In a sewing-machine, a work-support, a carriage, a rock-shaft therein, stitch-forming mechanism sustained by said rock-shaft above the work-support, a shaft D in said carriage, means actuated by said shaft to operate the stitch-forming mechanism, means to rock said rock-shaft in said carriage and turn the stitch-forming mechanism with it, and means to move said carriage and the rock-shaft vertically between making one and the next stitch.

14. In a sewing-machine, a work-support, a carriage, a rock-shaft sustained in said carriage, stitch-forming mechanism sustained by said rock-shaft, a shaft mounted in said carriage, devices intermediate said shaft and said stitch-forming mechanism to actuate the latter when the shaft is rotated, means to rock the shaft sustaining the stitch-forming mechanism, and means including a shaft and a universal-jointed telescopic connection to operate the shaft which actuates the stitch-forming mechanism.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

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Witnesses:

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