(No Model.)

4 Sheets—Sheet 1.

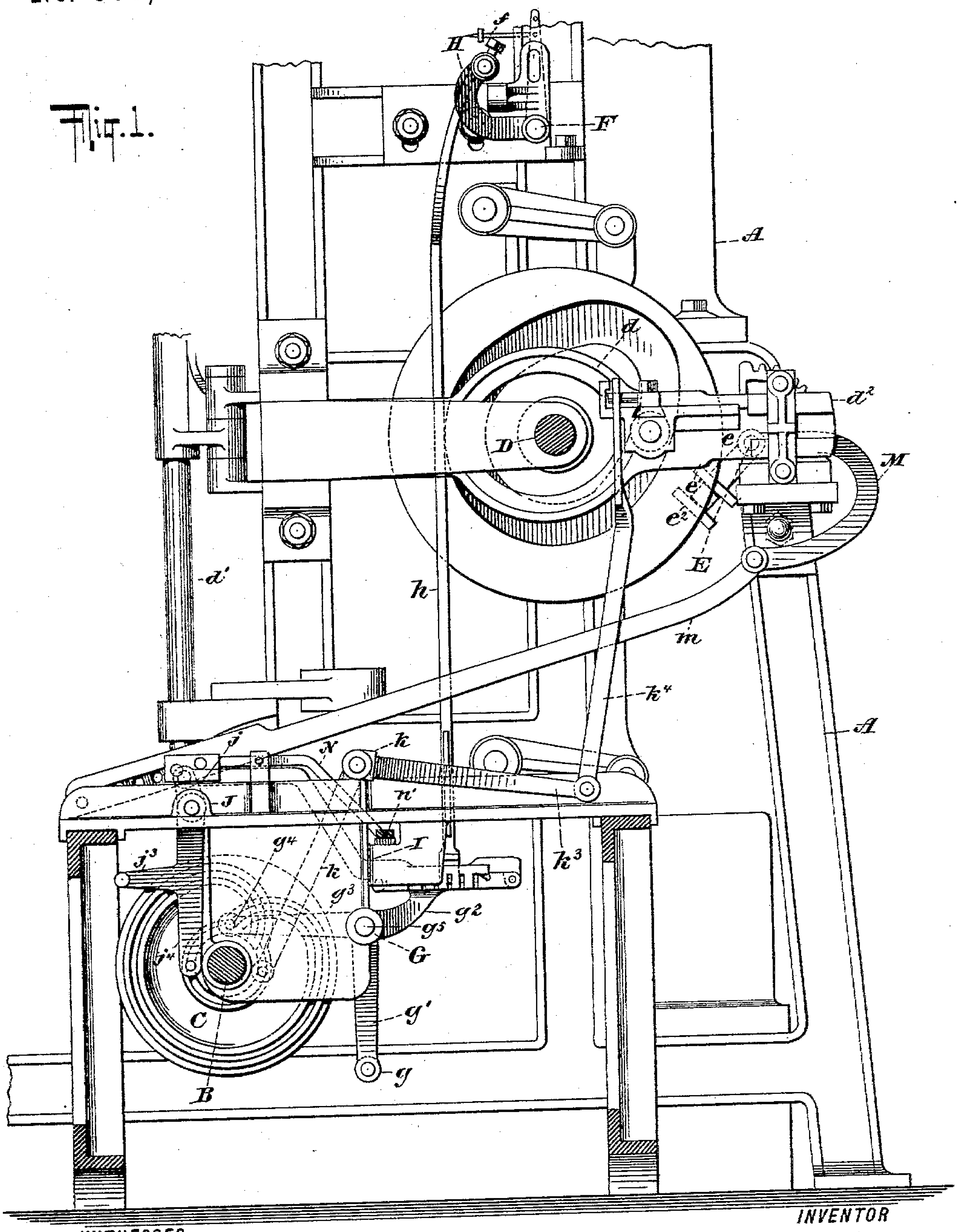
J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 593,207.

Patented Nov. 9, 1897.

Fig. 1.



WITNESSES

Gustave Dieterich

Fed. C. Morse

INVENTOR

Joseph A. Groebli,

BY

Briesen & Knauth

ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 593,207. Patented Nov. 9, 1897.

Fig. 4.

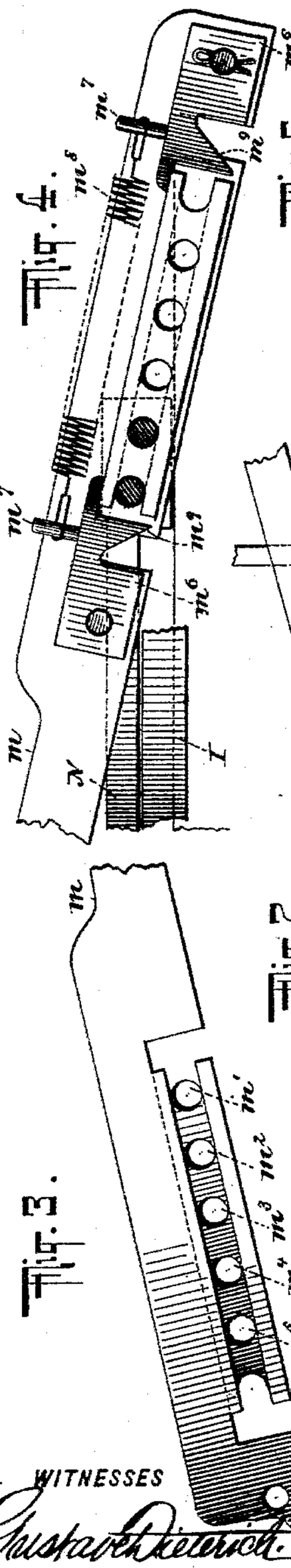


Fig. 6.

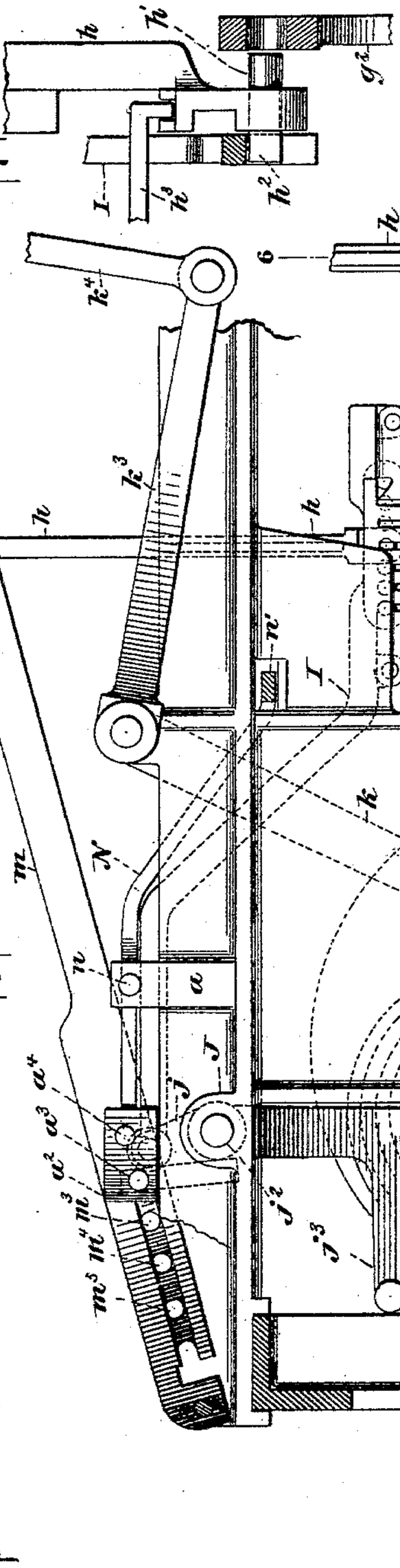


Fig. 5.

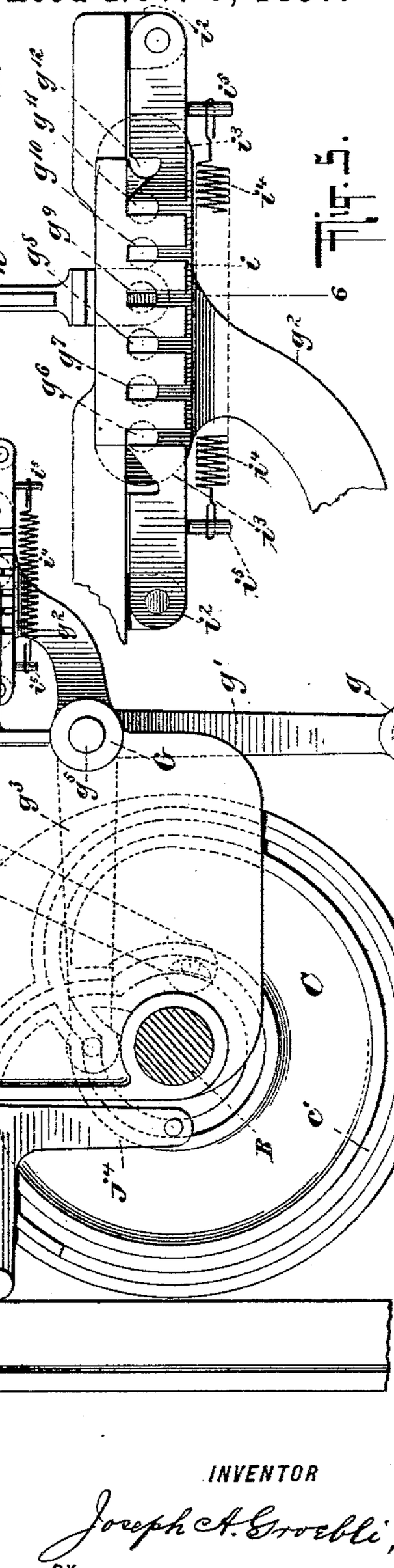


Fig. 2.

Fig. 3.

WITNESSES

Gustave Dieterich.

Fred. C. Hoge.

INVENTOR

Joseph A. Groebli,

BY

Briesen & Knauth

ATTORNEYS.

(No Model.) 4 Sheets—Sheet 3.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 593,207. Patented Nov. 9, 1897.

Fig. 7.

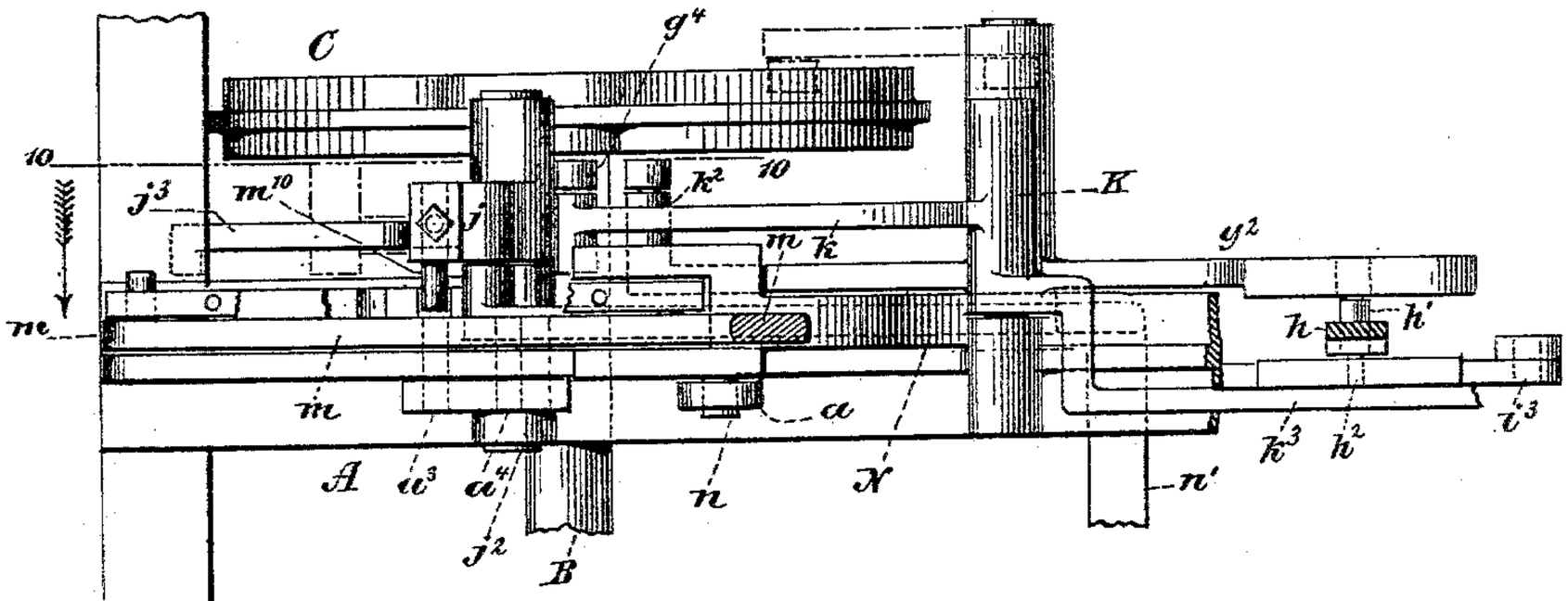


Fig. 8.

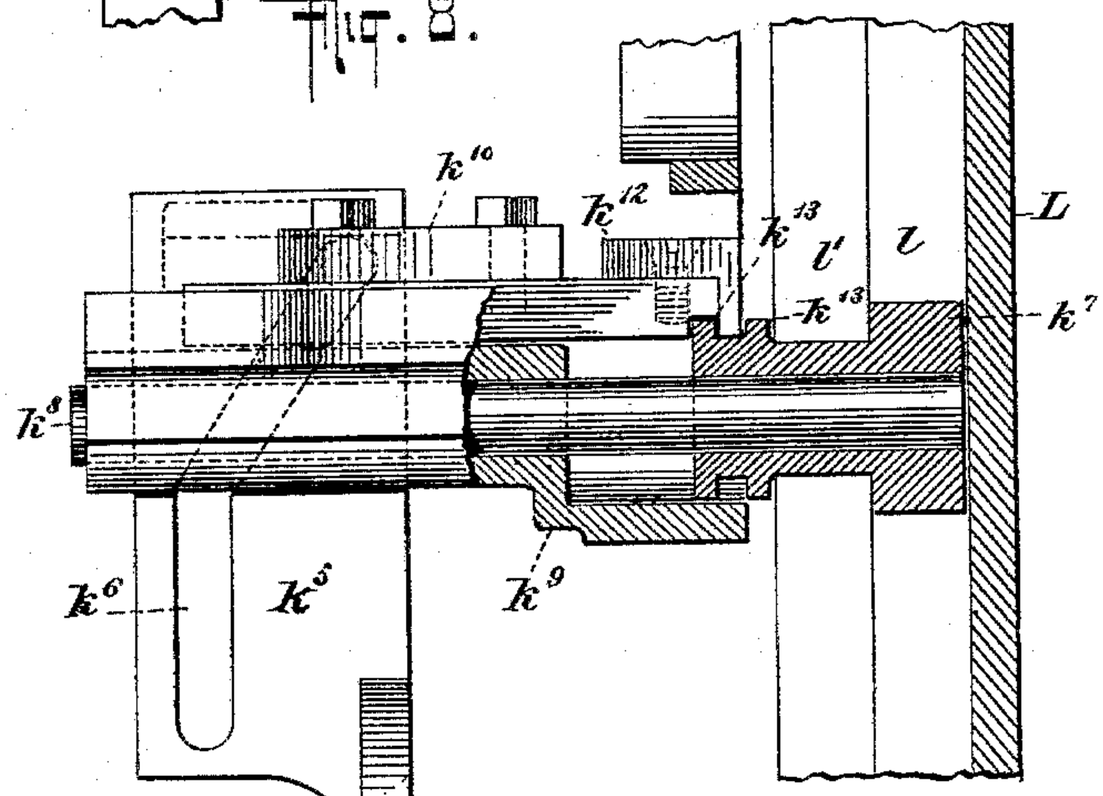


Fig. 9.

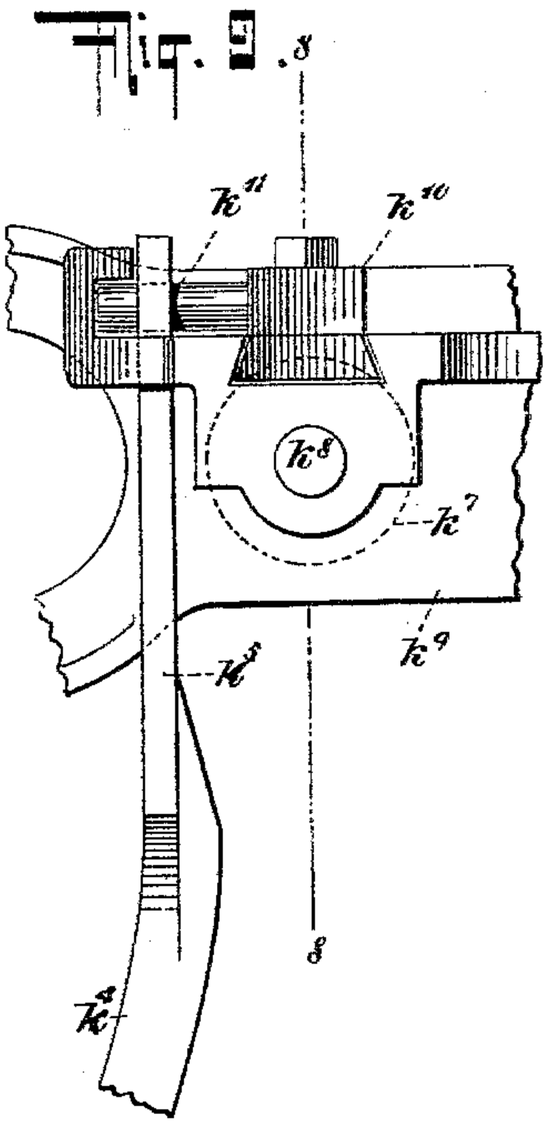
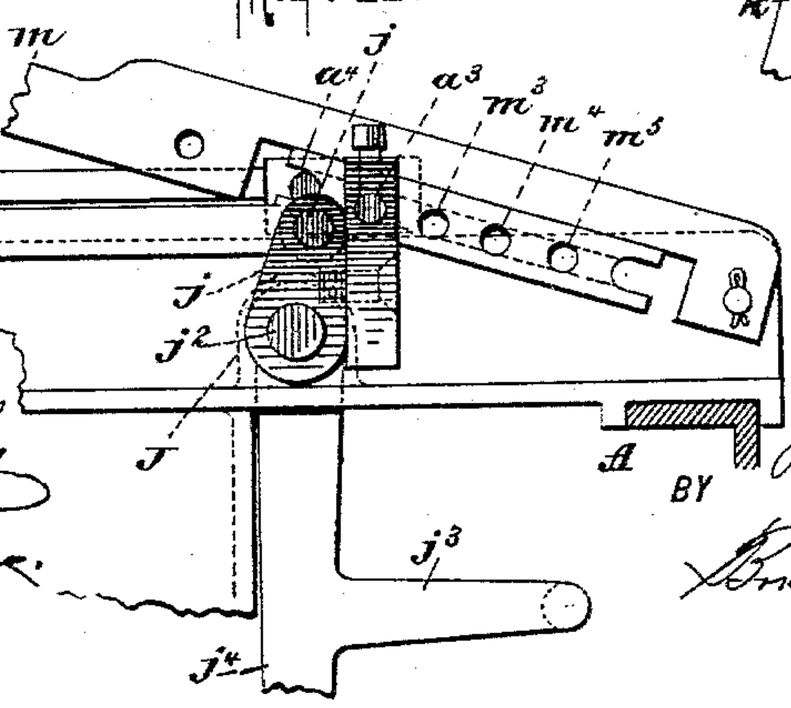


Fig. 10.



WITNESSES

Gustave Dieterich.

Fred. C. Dieterich.

INVENTOR

Joseph A. Groebli,

BY

Briesen & Knauth

ATTORNEYS.

(No Model.)

4 Sheets—Sheet 4.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 593,207. Patented Nov. 9, 1897.

Fig. 12.

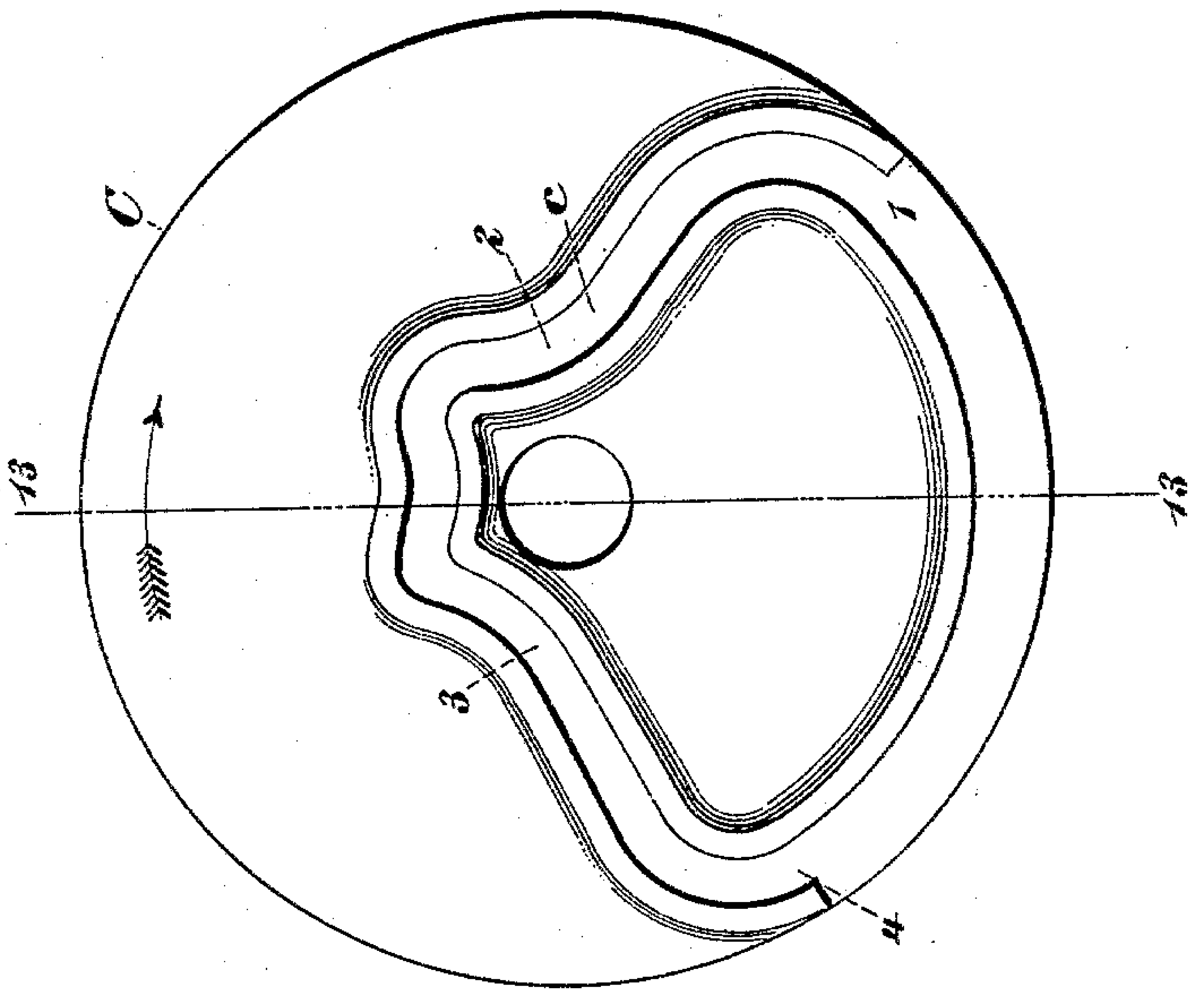


Fig. 13.

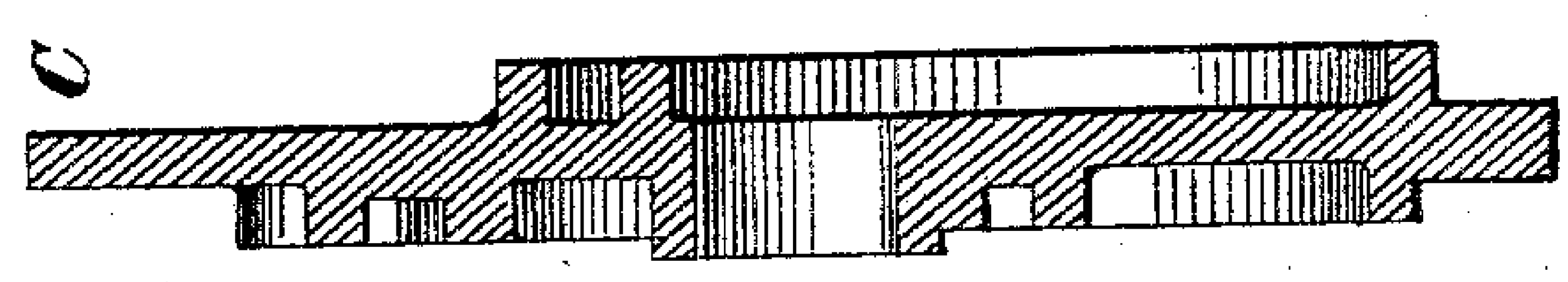
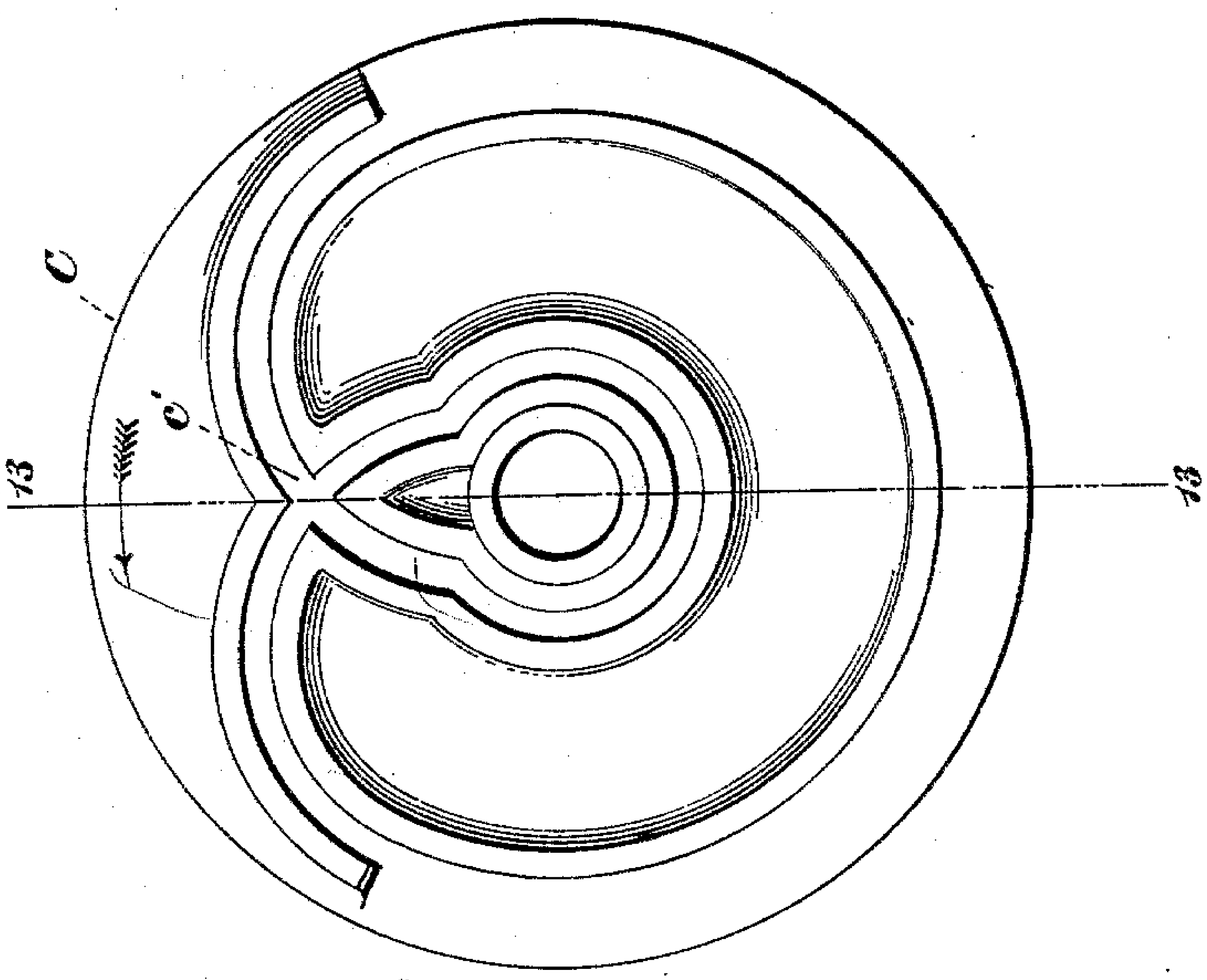


Fig. 11.



WITNESSES

Gustav Dieterich.

Ed. E. Morse.

INVENTOR

Joseph A. Groebli,

BY

Briesen & Knauth

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH A. GROEBLI, OF NEW YORK, N. Y., ASSIGNOR TO THE KURSHEEDT MANUFACTURING COMPANY, OF SAME PLACE.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 593,207, dated November 9, 1897.

Application filed March 13, 1897. Serial No. 627,295. (No model.)

To all whom it may concern:

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

My invention relates to embroidering-machines, and has for its object to produce a structure wherein various functions in the operation of the embroidering-machine may be performed by mechanism under control of the jacquard. For instance, as I have shown in the present drawings and will hereinafter fully describe, I have produced a mechanism embodying my invention wherein the movement and also the penetration of the bore-points, the regulation of the tension, and the regulation or changing of the shuttles are effected from a common source of motion.

My invention will be understood by referring to the accompanying drawings, forming part hereof, in which—

Figure 1 is a side elevation of an embroidering-machine embodying my invention. Fig. 2 is an enlarged side elevation of the driving-cam and associated mechanism. Fig. 3 is a side view of the lower end of the regulating-bar for the tension mechanism, which will be hereinafter described, the same being shown as detached. Fig. 4 is a side elevation from the opposite side of the same end of the tension-regulating bar which is shown in Fig. 3, with its adjunctive devices in place. Fig. 5 is a broken-away side elevation, on an enlarged scale, of the mechanism for shifting the bar for moving and regulating the motion of the bore-points. Fig. 6 is a section on the line 6 6 of Fig. 5. Fig. 7 is a plan view of the mechanism shown in Fig. 2. Fig. 8 is a broken-away sectional side elevation of the shifter for the bowl of the shuttle-changing mechanism. Fig. 9 is an end view thereof, showing also a dotted section-line on which the section Fig. 8 is taken. Fig. 10 is a side elevation of the end of the tension-regulating bar which is shown in Figs. 2, 3, and 4, the same representing the said tension-regulating bar stripped of the yielding teeth for the purpose of clearer illustration. Fig. 11 is a side view of the main driving-cam. Fig. 12 is a side view of the opposite side of the main driving-cam. Fig. 13 is a section on line 13 13 of Fig. 11 or Fig. 12.

In the drawings, A indicates the main frame of the embroidering-machine; B, the main driving-shaft, upon which the main driving-cam C is mounted. D is the shuttle-operating shaft, E the tension-regulating shaft, and F the bore-point-moving shaft. My invention has for its object to produce mechanism for effecting the operation of these several parts from the jacquard. The jacquard mechanism, which may be of the construction shown in my United States Letters Patent No. 528,632, granted November 17, 1894, is not here shown, but it will be understood that bars or connections may be run from the connectors k^9 of the said mechanism shown in the said patent, so that the various operations hereinafter set forth may follow from actuating the said bars by means of the jacquard.

I will first proceed to describe the connections from the main cam-wheel C which move and regulate the bore-points. It will be understood that as heretofore devised bore-points were designed to enter a fabric stretched upon a tambour-frame and to be withdrawn therefrom.

My present invention contemplates causing the bore-points to approach the fabric to the working position with a long forward stroke, then to receive one or more short oscillations while in the fabric in order to clear out the hole and to withdraw the bore-point from the fabric to the working position, which last-named operations may be repeated *ad libitum*, and then to be withdrawn from the working position by a long retractive stroke. In order to do this, I have provided one side or face of the main driving-cam C with a cam-path *c*, which receives the bowl *g*, carried on an arm *g'* of the three-armed lever G. When the bore-joints are intended to be inactive, the bowl *g* is in the position shown in Figs. 1 and 2, and is only entered into the cam *c* when the bore-boints are to be actuated. This bowl enters the cam at about the point 1, and between the points 1 and 2 the movement of the cam causes the bore-point to enter the fabric. Between the points 2 and 3 the bore-points make two short oscillations and

between the points 3 and 4 the bore-points are withdrawn from the fabric. The bore-points *f* are moved from the shaft or bore-point mover F, which is oscillated by the arm H, which in turn is swung by the link or rod *h*, which is engaged with the arm g^2 by the three-armed lever G. This three-armed lever G is also provided with an arm g^3, which is provided with a sliding crescent g^4, which is slid into or out of the cam *c'* by means of the jacquard, as will be readily understood. When it is desired to actuate the bore-point, the crescent g^4 is slid into the cam *c'*, which thereupon swings the three-armed lever G on its pivot g^5 far enough to bring the bowl *g* into the cam *c* on the opposite face of the main driving-cam, so that the oscillations which have been described will be imparted by the said cam to the shaft F through the medium of the arm g^2, rod *h*, and rocking arm H. It is frequently desirable to change the amplitude of the vibrations of the bore-points, which in the present instance I have done by shifting the lower end of the rod *h* so as to engage it nearer to or farther from the center of the arm g^2.

Referring particularly to Figs. 1, 2, 5, and 6, it will be noted that the end of the arm g^2 of the three-armed lever G is perforated, forming a series of apertures g^6 g^7 g^8 g^9 g^{10} g^{11} g^{12}, with which a pin *h'*, carried on the lower end of the rod *h*, may be engaged. When the pin *h'* on the rod *h* is entered into the hole g^6, the oscillations of the said rod will be shorter than when the said pin is engaged with the outermost hole g^{12}, motions of intermediate extent being imparted to the said rod by engaging the pin with the intervening holes g^7 to g^{11}. This rod, in addition to its up-and-down movement, may likewise be shifted laterally by the jacquard to engage its pin h^2 with the teeth *i* of an oscillating bar I. This lateral shifting may be effected by the connection h^3, running to the jacquard and engaging with the arm *h*, as clearly shown in Fig. 6. This oscillating bar I is likewise provided with ears i^2, to which are pivoted inclined teeth i^3, which are held yieldingly inward by means of the spring i^4, engaging studs i^5 on the said yielding teeth. This bar I extends upward and across the machine and is oscillated backward and forward by a swinging arm *j* of a three-armed lever J, carried on the shaft j^2 and having depending arms j^3 j^4 for engaging in the cam *c'* of the main driving-cam C.

The operation of so much of my device as I have now described is as follows: When the bowl *g* is entered into the cam, the rock-shaft F, governing the bore-points, will receive oscillations of varying amplitudes, which oscillations will be constant as long as the pin *h'* is entered into a hole of the arm g^2 of the three-armed lever G. When, however, it is desired to increase or decrease the amplitude of the vibrations, this may be done by adjusting the lower end of the rod *h* along the arm g^2 as follows: If it is desired to shorten the vibrations, the jacquard is made to act at the proper instant to move the lower end of the rod laterally to remove the pin *h'* from a hole in the arm g^2 and enter the pin h^2 into one of the slots between the teeth *i* of the reciprocating rod or connection I when the said rod or connection is moving to the left, as shown in Figs. 1, 2, and 5. This movement of the oscillating rod or connection I is just sufficient to carry the lower end of the rod *h* from one hole g^9 to an adjacent hole g^8. When this shifting has been accomplished the jacquard again acts to insert the pin *h'* into the hole g^8, which it is now opposite, so that further movements of the bore will be of less amplitude. By suitably arranging the jacquard the lower end of the rod may be stepped in either direction step by step within the limits of the arm g^2, and when the rod *h* reaches either extremity of its adjusted positions the pin h^2 is entered into the inclined slot of the yielding pivoted teeth i^3, so that should further adjustment be attempted no damage will ensue.

I will now proceed to describe the parts which constitute the shuttle-changing mechanism, and will have special reference to Figs. 1, 2, 7, 8, and 9. In these figures, K is a two-armed lever, whose lower arm *k* is provided with a crescent k^2 (see Fig. 7) and whose upper arm k^3 is connected to an upright rod or connection k^4, which is shown as provided at its upper end with a cam-plate k^5, (seen clearly in Fig. 8,) which cam-plate k^5 is provided with a slot k^6. On the shaft D of the machine a shuttle-working cam L is mounted, which has two working surfaces *l* and *l'*, each giving a different character of throw to a bowl k^7, which may be engaged with one or the other of the cam-surfaces *l l'*, as will be explained. This bowl is connected to the yoke *d*, which works the shuttle-shaft *d'*, and is shown as carried upon an arbor k^8, secured in a bracket k^9 on the slide d^2 of the yoke *d*. This bracket k^9 is provided with a slide k^{10}, from which projects a pin k^{11}, which enters a slot k^6 in the cam-plate k^5. This slide is shown as provided with an angle-piece k^{12}, which is entered between collars k^{13} on the bowl k^7, so as to slide the said bowl along its arbor k^8. This bowl is suitably connected to shuttle-working mechanism whose action depends upon the throw given by the cam L, whose action on the bowl depends upon which of the cams *l* or *l'* is engaged by the bowl.

Shifting the bowl will engage it with one or the other of the cams, this shifting, as will readily be understood, being effected as follows: The crescent k^2 is entered into the cam *c'* by the jacquard, and thereupon the arm *k* is swung by the cam *c'*, thereby swinging the arm k^3, oscillating the upright rod k^4, and shifting the bowl k^7 from one of the cams *l* or *l'* to the other. The tension-regulating shaft carries an arm *e*, with a block *e'*, sliding in the arc e^2 of the ordinary secondary take-up-

bar mechanism, and is controlled by the lever M, to which is connected a rod *m*. (Clearly shown in Figs. 1 and 2 and in considerable detail in Figs. 3, 4, and 10.) The free arm of this link is provided with a series of apertures m' m^2 m^3 m^4 m^5 and with a pair of yielding pivoted teeth m^6, which are provided with studs m^7 and are held in place by the spring m^8. These pivoted teeth are provided with inclined faces m^9. This free end of the arm extends into proximity to a pin m^{10} on the arm *j* and is embraced by a forked arm N, which is provided with a guiding-pin *n*, passing through a bracket *a* on the frame A of the machine. The arm N is shown as extending downward and provided with an extension *n'*, which leads to the jacquard, so that the jacquard will operate to shift the arm N laterally, carrying with it the lower end of the rod or bar *m* to move the said lower end of the rod to enter the pin m^{10} into one of the apertures m' m^2, &c., of the said bar. In this manner, when it is desired to give the lever M an oscillating motion to adjust it, the jacquard operates to shift the said rod or link *m* laterally to engage it with the pin m^{10} of the constantly-vibrating lever J. Opposite to the pin m^{10} is a standard a^2, carrying pins a^3 a^4, which are spaced far enough apart to enter adjacent holes m^3 m^4, &c., of the lower end of the link *m*, and when the jacquard operates to shift the lower end of the said link *m* off the pins a^3 a^4 it moves the same on to the pin m^{10} for the purpose of engaging the link *m* with the pin m^{10} on the swinging lever J. This may be done while the lever J is at either extremity of its swing, so that if it be desired to adjust the link *m* to the right the jacquard is so operated as to shift the link *m* off the pins a^3 a^4 when the lever J is at the left extremity of its swing and on to the pin m^{10}, which, swinging to the right, will carry the link *m* to the right, thus adjusting it. This adjustment of the link is to an extent equal to the distance between the centers of adjacent holes m' m^2 m^3, &c., so that when the adjustment has been effected the link *m* may be again shifted by the jacquard to enter the pins a^3 a^4 into a pair of holes a^4 a^5. Adjustments to the left may be similarly effected by timing the shifting of the link *m* to an instant when the lever J is at the right extremity of its stroke. This adjustage of the lever may be effected as often as desirable by first moving the lever *m* into engagement with the pin m^{10} and then back into engagement with the pins a^3 a^4, the teeth m^6 providing against any breakage which might occur in case of false adjustment.

It will be understood that the various parts of the mechanism constituting my invention may be and are used in an embroidering-machine irrespective of its character and that the jacquard mechanism may be of any desired construction.

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

1. In an embroidering-machine, the combination with sewing mechanism of a bore-point for piercing the fabric, a bore-point mover and moving mechanism therefor and means for actuating the moving mechanism to cause the bore-point to make a long forward movement into the fabric and a short oscillating movement back and forth while in the fabric, followed by another long retractive movement, substantially as and for the purposes set forth.

2. In an embroidering-machine, the combination with sewing mechanism of a bore-point, a moving mechanism therefor and means for causing the said mechanism to drive the bore-point into the fabric, oscillate the same in the fabric a distance less than the ordinary stroke of the bore-point to enter the same into the fabric and to thereupon withdraw the said bore-point from the fabric.

3. In an embroidering-machine, the combination of bore-points, a connection *h* for oscillating the said bore-points, an oscillating arm for moving the said connection, an independent means for adjusting the said connection along the said arm and means for engaging the said connection with the oscillating arm or with the adjusting device.

4. In an embroidering-machine, the combination of bore-point-operating mechanism comprising in its structure a means for oscillating the bore-points, a means for altering the adjustment of the said bore-point-operating mechanism and a jacquard connection for controlling the means for altering the adjustment.

5. In an embroidering-machine, an organism of mechanism for controlling the movement of the bore-points, the same comprising in its structure an oscillating-rod *h*, a swinging actuator g^2 therefor, an adjuster I for adjusting the rod *h* and means for engaging the rod alternately with either of the elements I or g^2, substantially as set forth.

6. In an embroidering-machine an organism of mechanism for controlling bore-points, the same comprising in its structure an oscillating rod *h* and actuator g^2 therefor, a reciprocating adjuster I for the oscillating rod *h* and jacquard mechanism for engaging the rod *h* with its actuator or its adjuster *ad libitum*.

7. In an embroidering-machine, the combination of the following instrumentalities in operative combination, to wit: a driving mechanism and bore-point mechanism of suitable construction, combined with adjusting means comprising an adjuster I, a laterally-movable oscillating rod *h* combined with an actuator therefor and jacquard mechanism controlling the oscillations of the oscillating rod and its engagement with the adjuster.

8. In an embroidering-machine, the combination with needle-operating mechanism of two-throw cam mechanism adjunctive thereto and arranged to impart varying throws, a bowl-controlling mechanism for effecting

functions in the operation of the embroidering-machine other than the needle-operating functions and adapted to be engaged with different portions of the two-throw cam at different times so as to receive throws of different characters according to its position on the cam, a shifting mechanism for the said bowl for engaging the said bowl with different portions of the said cam and jacquard mechanism for controlling the shifting mechanism for the bowls.

9. In an embroidering-machine, the combination of a shuttle-driver operable by cams of different throws, a two-throw cam mechanism, a jacquard device and mechanism intervening between the jacquard device and the two-throw cam for bringing a movable part into engagement with either part of the two-throw cam.

10. In an embroidering-machine, the combination of a shuttle-driving mechanism and a changer therefor, comprising double-throw cam mechanism and an oscillatory cam-engaging device k^7 combined with means for moving the cam-engaging device and jacquard mechanism engaging the cam-engaging device with the two-throw cam.

11. In an embroidering-machine, the combination of an actuating device adapted to govern the secondary take-up bar of the embroidering-machine, combined with means for varying the amplitudes of the movement of the said actuating device and jacquard connection for controlling the amplitude-varying means.

12. In an embroidering-machine, the combination of bore-point-regulating mechanism, tension-adjusting mechanism, shuttle-driving mechanism and cam mechanism for operating the same from a common source and jacquard connections for regulating the engagement of the said mechanisms with the cam mechanism.

JOSEPH A. GROEBLI.

Witnesses:
MAURICE BLOCK,
GEO. E. MORSE.