

A. BONNAZ.
SEWING MACHINE FOR EMBROIDERING.

No. 83,910.

Patented Nov. 10, 1868.

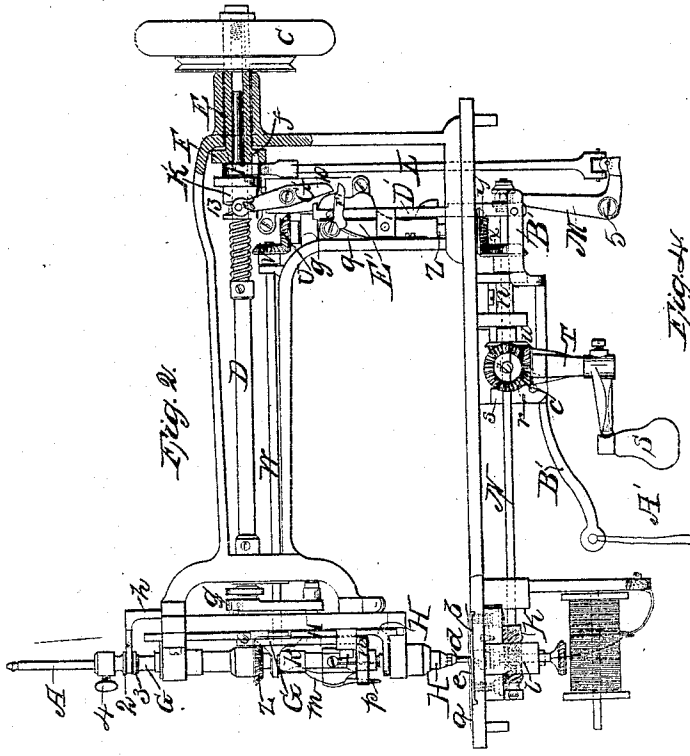


Fig. 2.

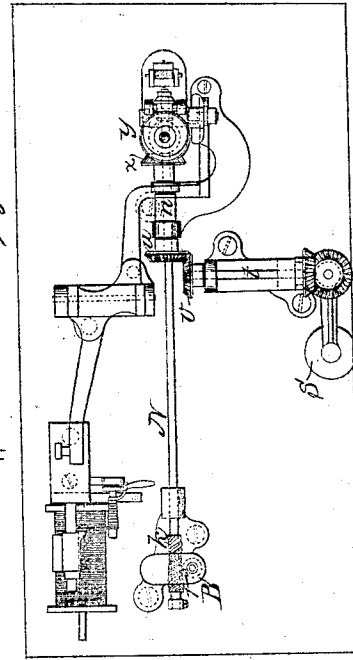


Fig. 4.

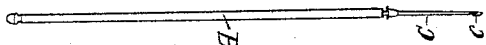


Fig. 3.

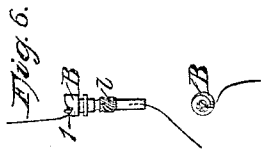


Fig. 6.

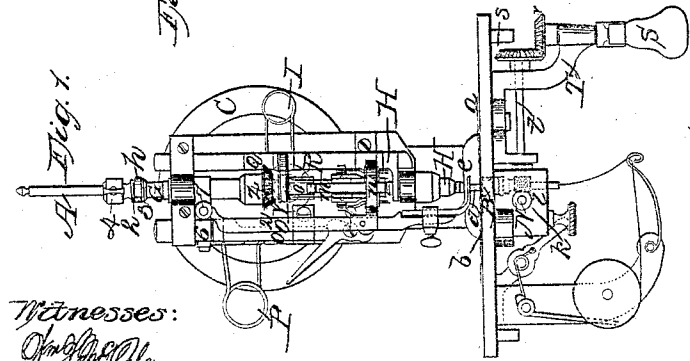


Fig. 1.

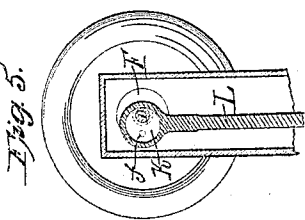


Fig. 5.

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 Attorney

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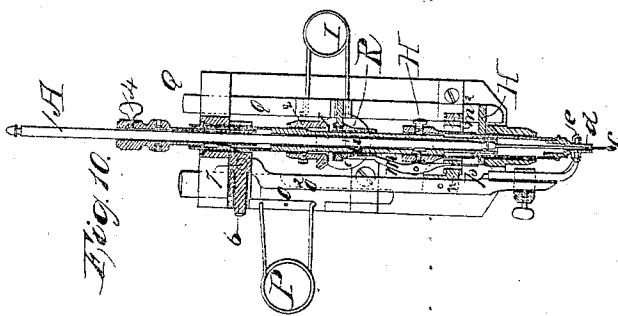
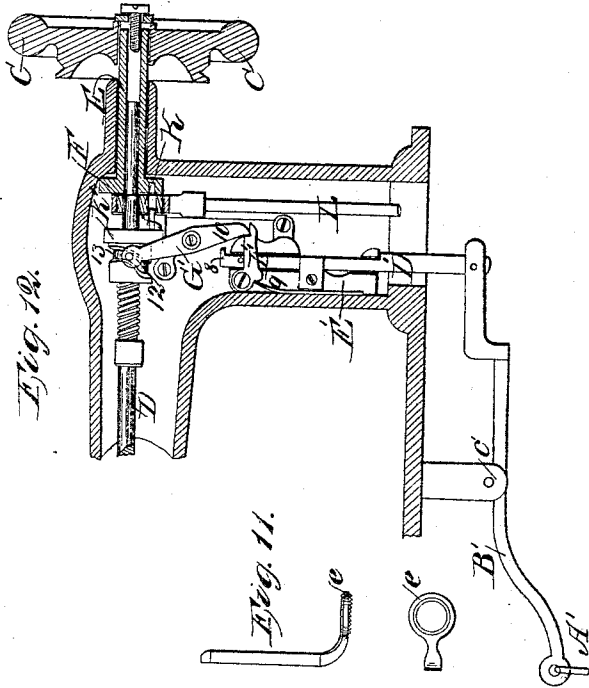
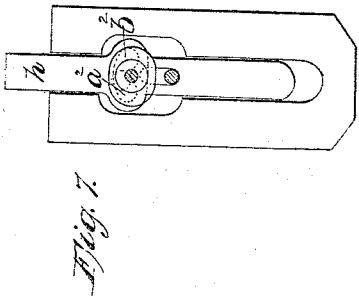
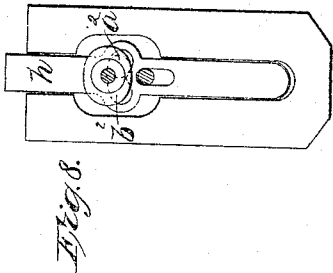
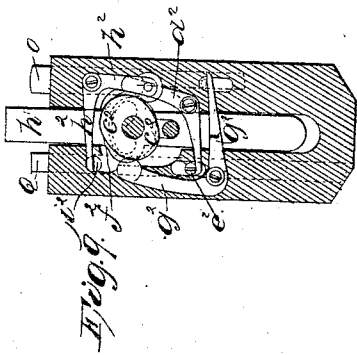


Fig. 12.

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UNITED STATES PATENT OFFICE.

ANTOINE BONNAZ, OF PARIS, FRANCE, ASSIGNOR TO EMILE CORNELY, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES FOR EMBROIDERING.

Specification forming part of Letters Patent No. 83,910, dated November 10, 1868.

To all whom it may concern:

Be it known that I, ANTOINE BONNAZ, of Paris, in the Empire of France, have invented certain new and useful Improvements in Embroidery-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents an end view of the machine. Fig. 2 represents a side view thereof. Fig. 4 represents a plan of those parts of the machine which are below its platform. Figs. 3, 5, 6, 7, 8, 9, 10, 11, 12 represent detached views, hereinafter to be referred to.

The like parts of the machine are denoted on the several figures by similar letters.

In making embroidery-work on a sewing or embroidery machine the great difficulty occurs that on making rounds or other intricate designs the entire cloth has to be turned constantly in conformity with the design to be made, and for this reason that description of embroidery-work is not only difficult to be executed, but can be made with a very moderate degree of speed only. To avoid this difficulty, I have combined the several working-parts of an embroidery-machine in such a manner that a universal-feed motion causes the cloth to move in any direction desired, and that the hooks or needles which make the stitch move in combination with said feed-motion, so as not to change their relative positions to each other, and thus embroidery-work of the most intricate design can be made at any desired speed, and without turning the cloth.

To the better understanding of the machine I will first explain the manner in which the stitch is made. I employ a hooked needle, *c*, (represented at Fig. 3,) such as is employed in making crochet-work, and said hook is secured to the needle-bar *A*, and has a vertical reciprocating motion imparted to it, and in piercing the cloth *a*, which is supported by the cloth-plate *b*, the needle-hook *c* takes the thread beneath the cloth-plate, draws it up through the cloth, holds the thread while the feed-motion takes place, and then returns downward to make the succeeding stitch. To accomplish this operation it is

necessary that the thread below the cloth-plate should, at each descending motion of the needle-hook *c*, be presented to the latter in such a manner that it can pull up said thread, or else the machine will make drop-stitches. This operation of presenting the thread to the hook *c* is effected by means of an oscillating looper, *B*, which, by means of a projection, *1*, takes hold of the thread, and when the needle *c* has arrived at its lowest position, the looper *B* makes a turn of about two hundred and seventy degrees of a circle, and lays the thread around the needle, which, on rising, takes infallibly hold of the thread. It is further necessary that, when the needle-hook *c* rises, the cloth should be firmly held down upon the cloth-plate, so as to prevent the hook *c* from pulling it up. This is effected by means of a small tube or nipple, *d*, which surrounds the needle. While the needle *c* rises the nipple *d* remains stationary until the needle *c* has cleared the cloth, after which the nipple *d* rises, so that the feed of the cloth can take place.

The feed is effected by means of the feed-surface *e*, which has a circular-ring shape, and which surrounds the needle and its nipple *d*. The feed-surface has a vibratory horizontal as well as a vertical motion, as that of an ordinary sewing-machine, besides its universal-feed motion, hereinafter to be described.

To enable an easier and better understanding of my machine, I will describe the *modus operandi* of the above elements when the machine works on straight lines only, and add to it afterward the operation of said parts when the machine runs on curved lines, and for producing sharp angular work.

C represents the driving-wheel of the machine. It is secured to a hollow shaft, *E*, provided with a coupling-disk, *F*, and which, by means of the coupling-pin *f*, drives the shaft *D*. The latter turns an eccentric, *g*, whose pin *a*² enters into the cam-groove *b*² of the needle-bar driver *h*, which, holding the needle-bar carrier *G* between two collars, 2 3, imparts to it the desired vertical reciprocating motion. The needle-bar *A* itself is secured to the needle-bar carrier *G* by means of the pressure-screw 4.

The movement of the tubular nipple *d* is effected by means of a cam, *c*², which acts

upon the lever d^2 , whose pin e^2 operates the needle-piece carrier H to raise the nipple d , while the spring I presses it downward upon the cloth-plate, when the cam c^2 releases the lever d^2 .

The eccentric-disk K imparts a vibrating motion to the rod L and to the lever M, which is pivoted to a bracket at 5. The long arm of the lever M reciprocates the rod N, to whose end is secured a horizontal endless screw, k , which acts upon a vertical endless screw, l , secured to the shaft of the looper B. Thus, at each motion of the needle-hook c the screws k and l act like a rack and pinion, to turn the looper B the amount necessary to throw the thread into the path of the rising needle-hook c .

The vertical motion of the feed-surface e is effected by means of a cam, f^2 , on shaft D, which, acting upon the lever g^2 , the latter raises the bar O, to which the feed-bar O^2 is secured, by means of a universal joint, 6 and 7. When the action of cam f^2 ceases, the spring P causes the bars O and O^2 , and consequently the feed-surfaces e , to descend down upon the cloth-plate.

The horizontal action of the feed-surface is effected in the following manner: The cam f^2 of the shaft B acts upon the lever h^2 , and the latter upon the pin i^2 of the rod Q. A nut or sleeve, R, is secured to the shaft G, and has a cam-groove, o , in which the end of the small lever m slides. When the sleeve R descends, its cam-groove acts upon the upper end of the lever m , and the lower end p of said lever imparts a horizontal movement to the nut m^2 , which is adjusted within the circular collar n , and which latter is secured to the feed-bar O^2 . It thus imparts to the latter and to the feed-surface e the horizontal-feed motion.

As the nut m^2 is adjusted upon the square part of the sleeve R, it will forcibly turn therewith, and within its collar n as the sleeve R is turned, and thus the direction of the feed is changed, according to the position which is given to the sleeve R.

Having thus described the operation of the several parts of the machine for sewing straight lines, it is to be shown in what manner any design of curved lines can be executed without turning the cloth, which is the essential feature of this machine.

The feed-bar O^2 is pivoted to a vertically-sliding bar, O, by means of a double hinge, 6 and 7, constituting a universal joint.

S represents a crank, beneath the platform of the machine, whose shaft is supported by a bracket, T.

A bevel-pinion, r , transmits motion to a pinion, s , and to the transversal shaft t , whose other end is geared to the pinion u by means of the pinion v .

The pinions u and x are secured to a sleeve, w , which latter is connected with the rod N by means of a tongue and groove, so that the rod N can slide longitudinally within the

sleeve w , but will turn by the action of pinion u .

Pinion x is geared to pinion y on the vertical shaft z , which latter carries, at its upper end, pinion U, gearing into pinion V on the horizontal shaft W, which, at its end, carries the pinion Y, gearing into pinion Z of the needle-bar carrier G.

By turning the crank S, a combined turning movement will be given to the looper B, to the needle-bar carrier G, and to the cam-grooved sleeve R, which controls the feed-motion, and thus the three elements of the machine can be turned in combination without changing their relative positions toward each other.

I have thus established the means of producing a universal-feed motion, and by it any design, no matter how complicated, can be embroidered without turning the cloth, but by simply directing its motion by turning the crank S.

In making complicated embroidery-work, and chiefly in embroidering letters, it frequently occurs that sharp angles have to be produced. This can only be made by arresting the motion of the machine instantaneously, by suddenly turning the crank S the desired angle, and then by again starting the machine.

To effect this in an easy and effective manner, I have organized the following coupling-device: On working the machine, two treadles are applied to its stand, one for each foot. By means of the right-hand treadle the fly-wheel is turned, whose strap passes in and around the groove of the wheel C, and said wheel therefore rotates constantly. The left-hand treadle is connected, by means of a rod, A' , to the end of the lever B' , which is pivoted to a horizontal shaft, C' . The end of the lever B' is pivoted to the vertical rod D' , which slides within the block E' .

When the lever B' is raised up, by acting upon the treadle of the rod A' , the rod D' is drawn downward, and the pin 8 on said rod presses downward the pawl F' , which is actuated by the spring 9, and in that position the machine operates as above described, the clutch-pin f , Fig. 2, being within the recess of the disk F, secured to the wheel C; but as soon as the treadle connected to rod A' is released, its balanced weight, in conjunction with the action of the spring 9, causes the lever B' to descend, throws upward the pawl F' , and the latter engages and holds the end of the lever G' .

The end 12 of the lever G' , which carries a friction-pulley, gliding in the cam-groove 13 of piece K' , causes the latter to slide longitudinally on shaft D, and draws the pin f out of its recess in the disk F, and thus instantaneously uncouples the machine, throwing the parts into the position represented at Fig. 12, while, during the same time, the wheel C has been turning and continues to turn. When the machine is thus uncoupled, the crank S is

suddenly turned, to change or to reverse the feed-motion, and a sharp angle is produced without arresting the motive power of the machine.

Having thus fully described the nature of my invention, what I claim herein as new, and desire to secure by Letters Patent, is—

1. The needle-bar carrier G, the universal-jointed feed-bar O², as herein shown and described, and the horizontal looper-shaft B, connected by means of the gearings Z Y, shaft W, gearing V U, shaft z, gearings y x,

shaft N, and endless screws l k, substantially in the manner and for the purposes described.

2. The mechanism herein described for connecting the shafts E D, consisting substantially of disk F, cam-grooved disk K', lever G', spring-pawl F', rod D, and lever B', substantially as and for the purposes described.

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