2 Sheets--Sheet 1.

F. MICHALET & P. BOURGET.

Embroidering Machine.

No. 164,751. Patented June 22, 1875.

Fig: 4

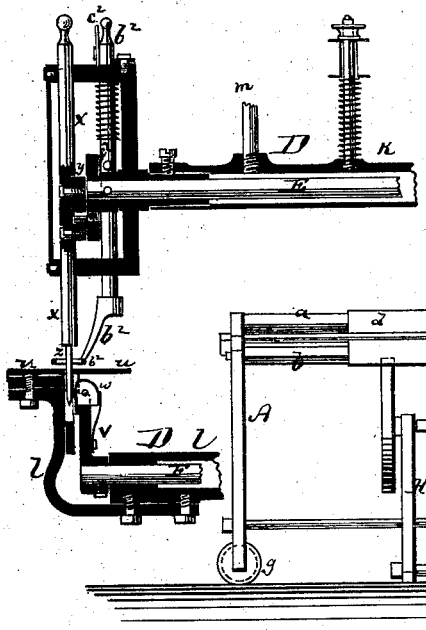


Fig: 1

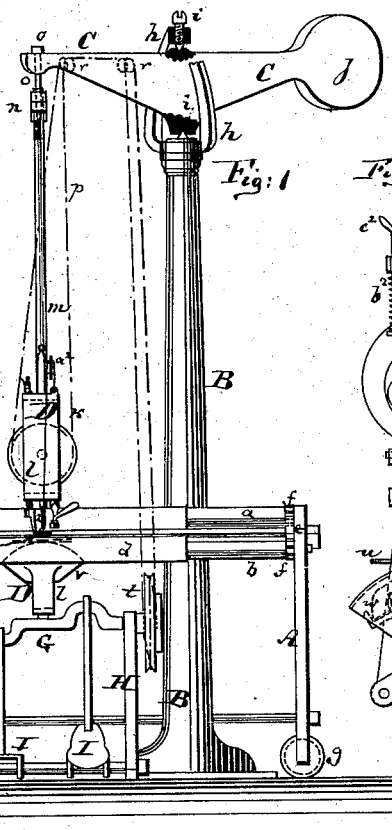


Fig: 3

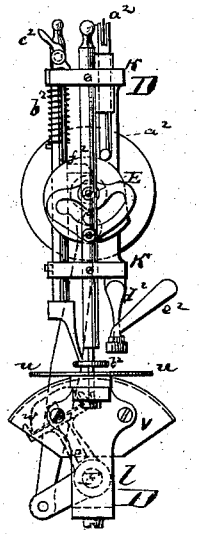
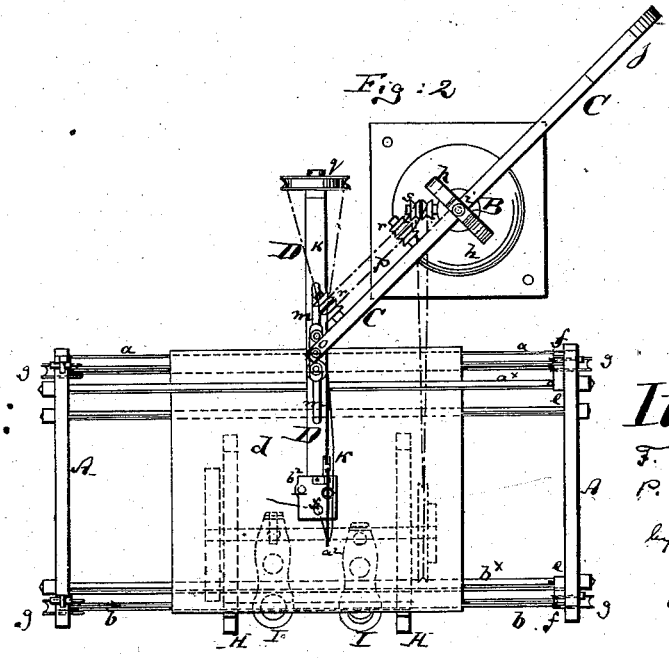


Fig: 2



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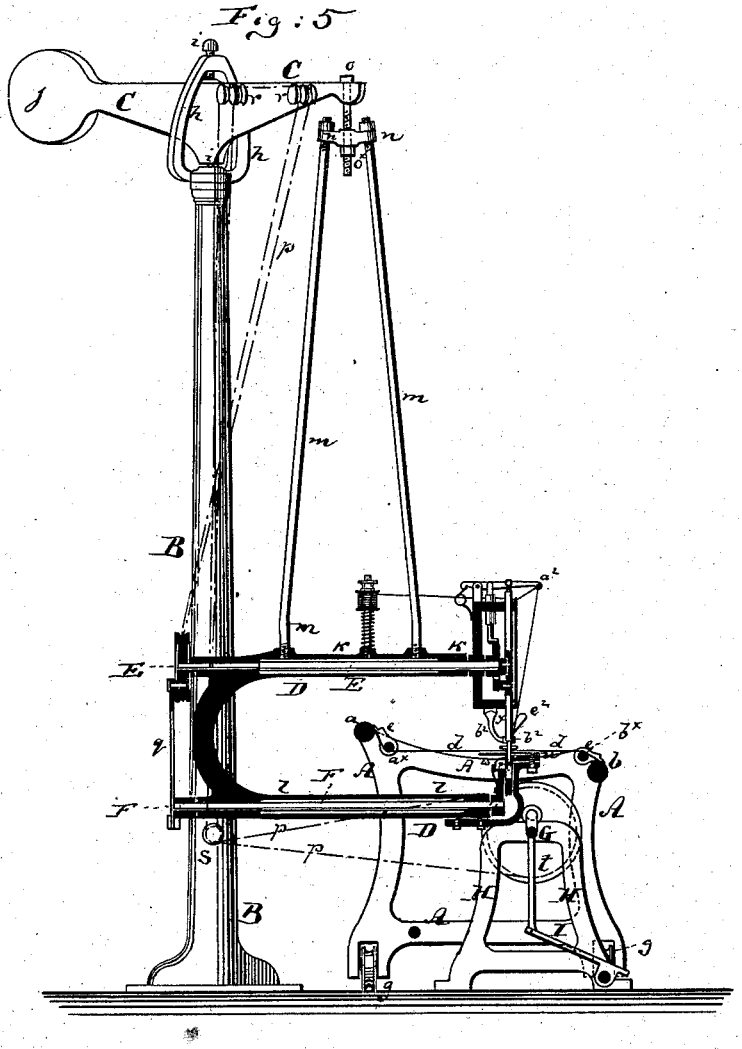
2 Sheets--Sheet 2.

F. MICHALET & P. BOURGET.

Embroidering Machine.

No. 164,751. Patented June 22, 1875.

Fig: 5



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UNITED STATES PATENT OFFICE.

FRANÇOIS MICHALET AND PASCAL BOURGET, OF LYONS, FRANCE.

IMPROVEMENT IN EMBROIDERING-MACHINES.

Specification forming part of Letters Patent No. **164,751**, dated June 22, 1875; application filed February 26, 1875.

To all whom it may concern:

Be it known that we, FRANÇOIS MICHALET and PASCAL BOURGET, both of Lyons, France, have invented a new and Improved Embroidering-Machine, of which the following is a specification:

The object of this invention is to devise a simple and efficient apparatus for embroidering all kinds of fabrics, more particularly those of light texture, such as tulle, netting, tarlatan, and muslin, so that any given pattern marked out on the fabric may be correctly followed, and groundwork designs of a complicated character properly produced.

Our invention consists in a peculiar mode of hanging a jointed U-shaped embroidering-frame from the end of a balanced lever, as will be hereinafter more fully described.

In the drawing, Figure 1 is a side elevation, partly in section, of our improved embroidering-machine. Fig. 2 is a top view of the same; Fig. 3, a detail face view, on an enlarged scale, of the embroidering mechanism proper; Fig. 4, a detail vertical cross-section of Fig. 3, the observer looking to the right; Fig. 5, a vertical cross-section of the entire machine, the observer looking toward the left.

Similar letters of reference indicate corresponding parts in all the figures.

A in the drawing is a frame, carrying two parallel rollers, *a b*, over which the fabric *d*, to be embroidered, is stretched. These rollers are (or at least one of them is) free to revolve, so the fabric may be wound upon and unwound as may be required. By pawls *e* engaging into ratchet-wheels *f*, that are mounted on the rollers *a b*, the rollers are locked to hold the fabric stretched, said fabric passing over and under fixed tie-rods $a^{\times}$ $b^{\times}$, near the rollers *a b*, respectively, as shown in Figs. 2 and 4. The fabric is wound on the rollers *a b* in the direction of its length, and is unwound from one and wound upon the other roller, as part of its length has been embroidered. The frame A stands on rollers *g g*, so it may be moved in the direction of its length, which causes a lateral shifting of the fabric under the embroidering mechanism, allowing any part of the fabric to be brought within convenient reach of the embroidering mechanism. B is a fixed standard or post, firmly secured in position, and terminating on top in an eye, *h*, through which the balance-lever C, which carries the embroidering-frame D, extends, and wherein said lever has its support. *i i* are the vertical pivots of the lever C, extending in line with each other from the said lever through the upper and lower parts of the eye *h*, or vice versa, as indicated in Figs. 1 and 5. The lever C is weighted, as at *j*, at one end, and carries at the other end the suspended embroidering-frame D, the weight *j* balancing that of the arm D′, so as to relieve the pivots *i* from unequal strain. The embroidering-frame D is U-shaped, its two arms, *k* and *l*, extending horizontally one above the other below one of the rollers *a b* of the frame A. Rods *m m* extend upward from the embroidering-frame D, and are joined at their upper ends by a rigid bar, *n*, through which a vertical pin, *o*, which is secured in the non-weighted end of the balance-lever C, passes, as shown in Fig. 5. This pin O constitutes the direct pivot of the embroidering-frame D, on which said frame can freely vibrate in a horizontal direction; yet the frame D can also vibrate, together with the lever C, on the pivots *i i* of the latter. The frame D is supported by a nut, $o^{\times}$, which is fitted upon the pin *o* beneath the bar *n*, as shown. By means of this nut the height of the frame D can be carefully adjusted with particular reference to the height of the fabric *d*.

E and F are two horizontal shafts, which are respectively hung in the arms *k* and *l* of the embroidering-frame D. The shaft E of the upper arm *k* receives rotary motion by a belt or band, *p*, passing around a pulley that is mounted upon said shaft. The belt or band *p* passes from said pulley around friction-rollers *r r*, that are hung at the side of the lever C, and thence down around a friction-roller, *s*, which is hung on the stationary post or frame B, and thence around the pulley *t* of the driving-shaft G. This driving-shaft is hung in stationary frame-work H, and receives rotary motion by means of treadles I I, or by other suitable mechanism. When the shaft G is revolved, rotary motion is also imparted to the upper shaft E of the embroidering-frame D. By a connecting-rod, *q*, the shaft E, when rotated, imparts oscillating motion to the shaft

F, said rod q connecting with a crank of the shaft F, and with an eccentric pin on the shaft E, as indicated in Fig. 5. At its free end the lower arm l of the embroidering-frame D is turned up, and carries a horizontal work-plate, u, of circular or other suitable shape. This work-plate is held directly beneath the fabric, which is stretched on the frame A. The end of the shaft F carries, directly beneath the work-plate u, an oscillating shuttle-carrier, v, on which the thread-carrying shuttle w is supported.

The inner end of the upper arm k of the embroidering-frame D is vertically enlarged to constitute a guide for the needle-bar x, to which, by a heart-shaped cam, y, on the end of the shaft E, vertical reciprocating motion is imparted. A needle, z, is secured to the lower end of the needle-bar. A spring tension-rod, a^2, is pivoted to the upper part of the needle-guide, and receives vibrating motion by a cam on the shaft E.

b^2 is an annular presser-foot, whose straight shank is fitted vertically through the needle-guide, having its upper end connected to a lever, c^2, by means of which it can be raised or let down. If let down by a spring that connects with its shank, the presser-foot holds the fabric to the work-plate u below, and as the said presser-foot encircles the needle, its effect on the fabric will be equal on all sides of the needle.

A pin, f^2, projects from the shank of the presser-foot over a cam on the shaft E, so that by said cam and pin the presser-foot will be raised off the fabric to allow the motion of the frame D whenever the needle is raised; otherwise, the presser-foot is held down upon the fabric.

To an arm, d^2, which projects from the needle-guide, is pivoted a handle, e^2, by which the operator can hold the inner end of the embroidery-frame, and direct the same to bring the needle over the required place of the fabric.

The embroidering mechanism of the machine is, as will be observed, similar to that of a sewing-machine, only that, in place of the automatic feed of a sewing-machine, the handle e^2 is applied to the needle-guide, to allow the jointed frame D C to be moved so that the needle will follow the pattern that is marked on the fabric. Another difference is the annular presser-foot encircling the needle, which is required to affect the fabric equally around the needle, as the machine has no feed for moving the fabric, and as it is necessary that the fabric should be properly held to the work-plate before the needle enters it. The work-plate u has a hole in the center for the needle to pass through, and the operator, whenever the needle is raised, must swing the frame D until he perceives the hole of the work-plate to be in the right place beneath the transparent fabric, and the ring of the presser-foot around the spot of the pattern where the needle is to enter. The continued operation first brings down the presser-foot and locks the frame D to the fabric, and next brings down the needle for making the stitch.

We claim as our invention—

In an embroidering-machine, the combination, with the balanced lever C, adapted to be turned upon the vertical pivots $i\,i$, and the U-shaped embroidering-frame D, of the rods $m\,m$, vertical pivot O, and nut $O^{\times}$, substantially as herein shown and described.

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