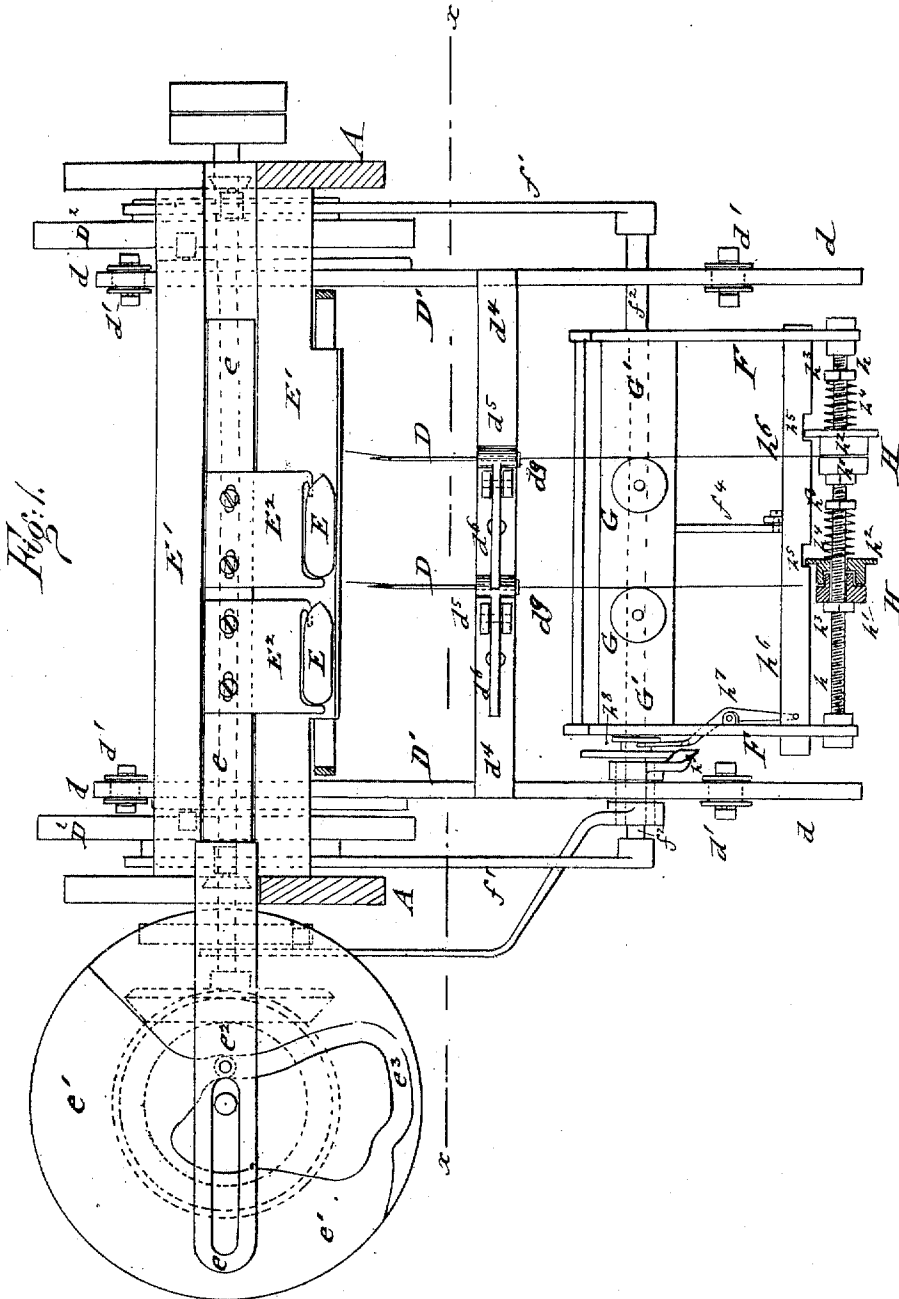


C. NIDA.
EMBROIDERING MACHINE.

No. 247,944.

Patented Oct. 4, 1881.



WITNESSES:

Carl Karp
Otto Pusch

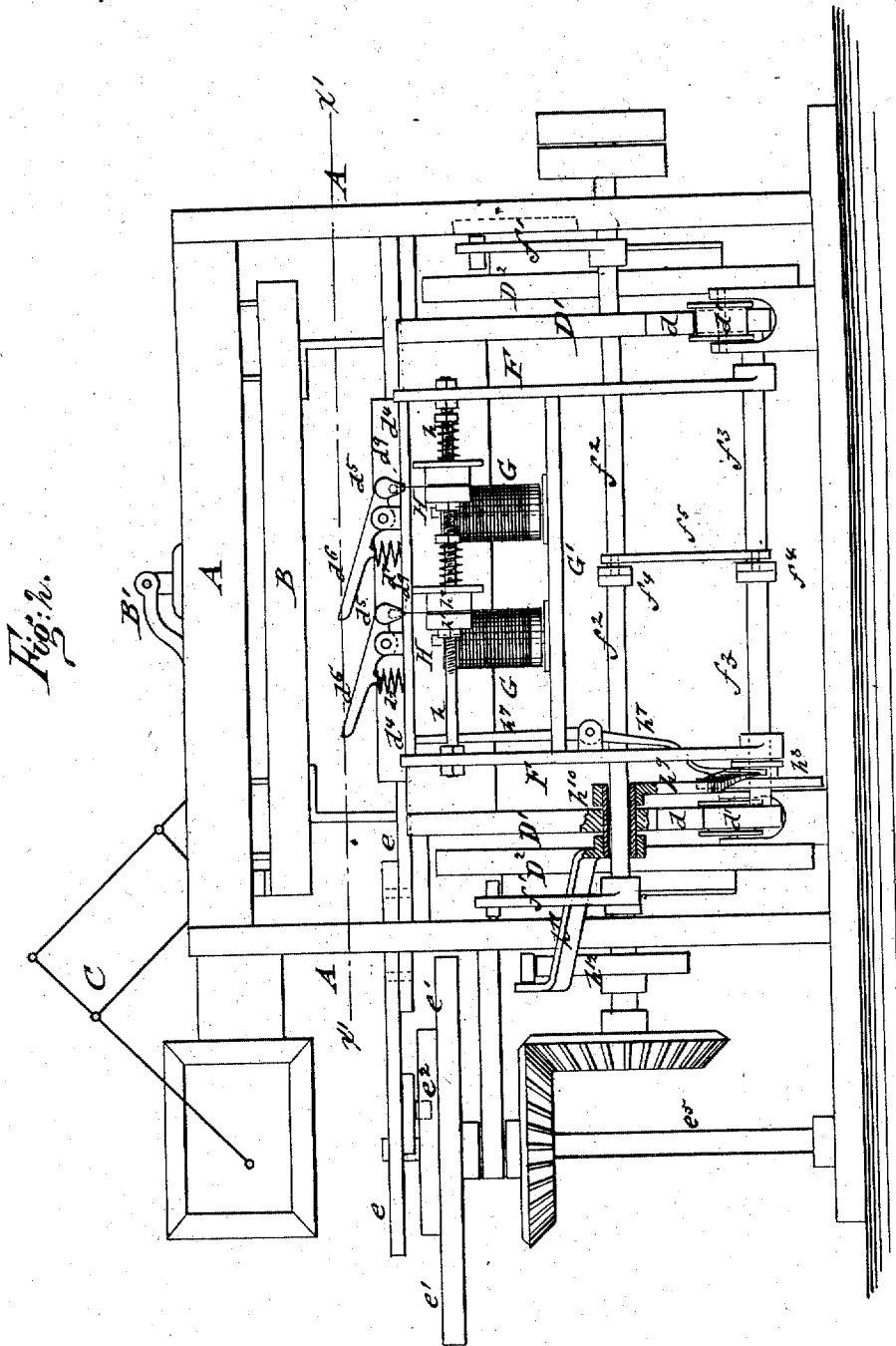
INVENTOR:

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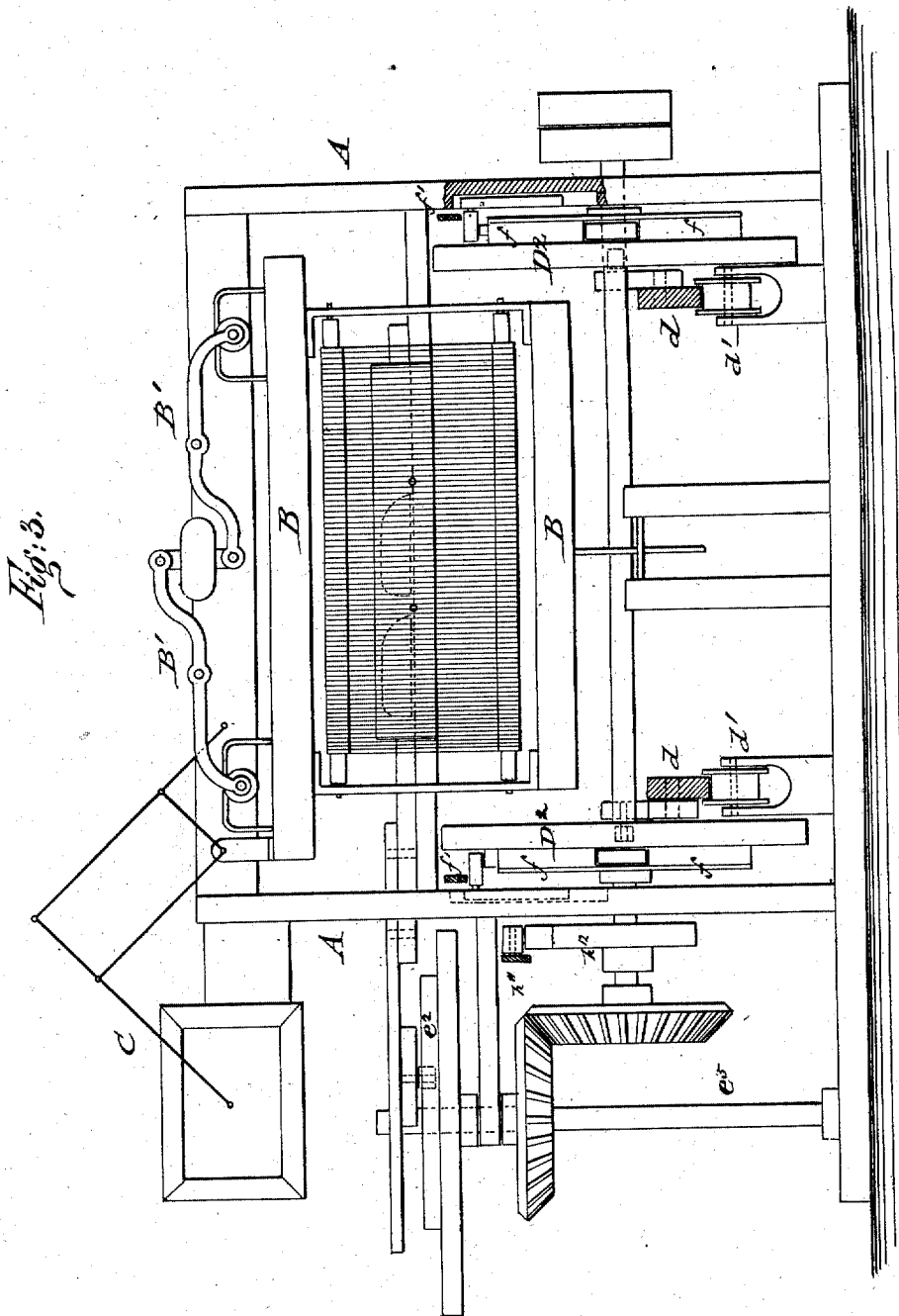
WITNESSES:
Carl Kapp
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WITNESSES:

Carl Hays
Otto Pischke

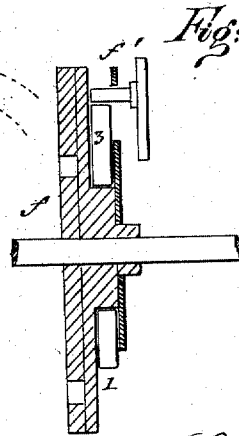
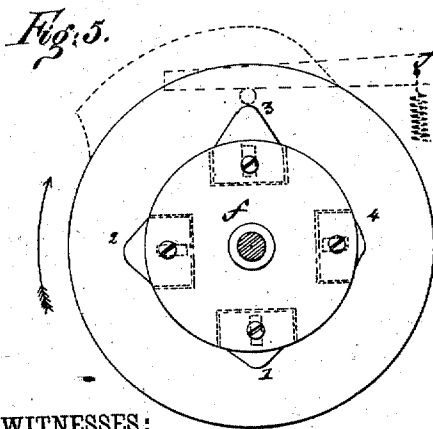
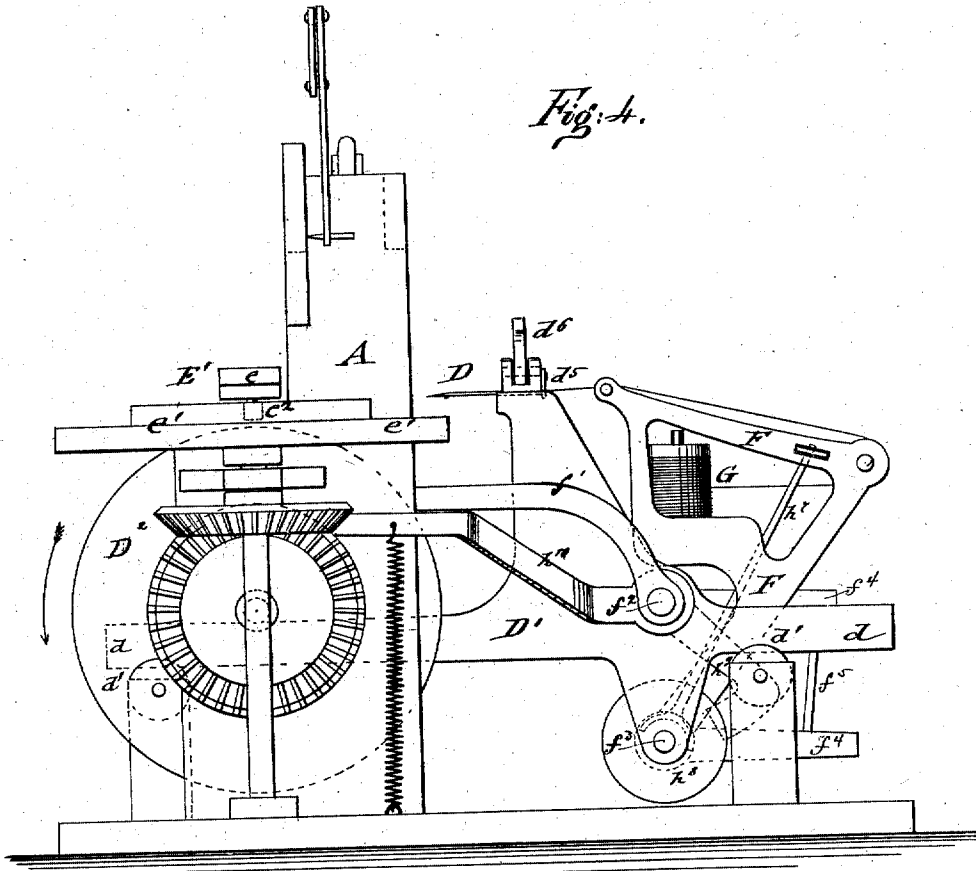
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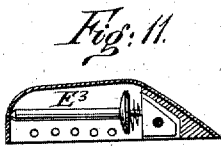
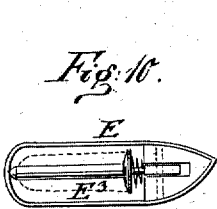
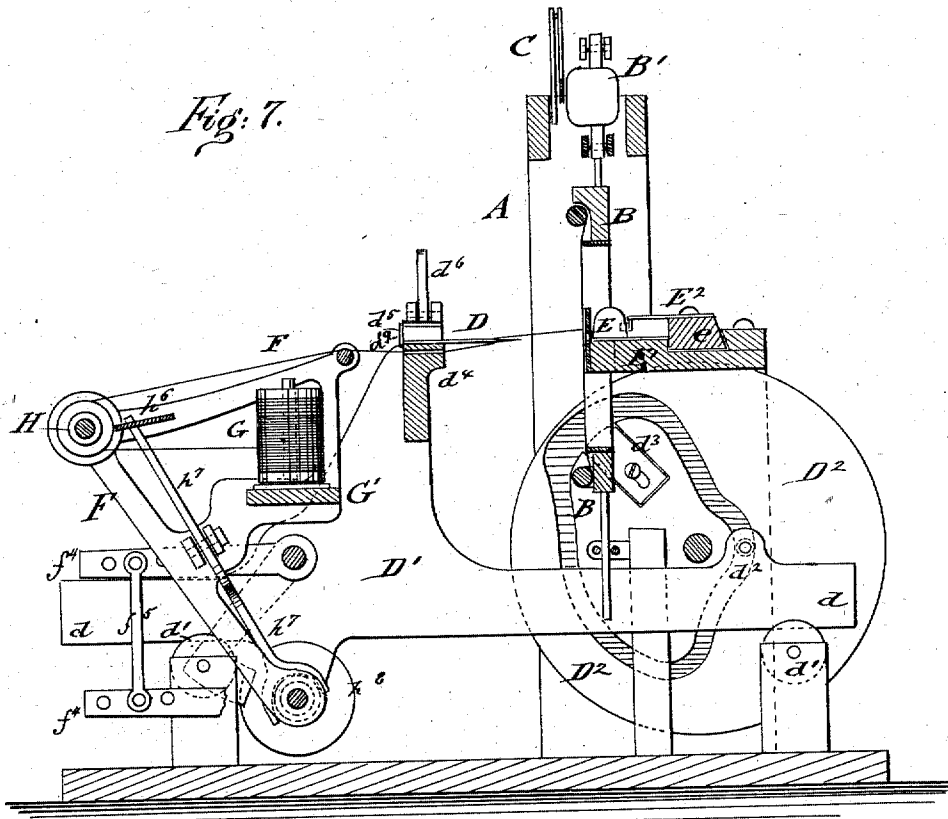
INVENTOR:

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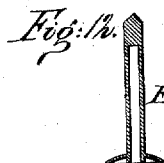
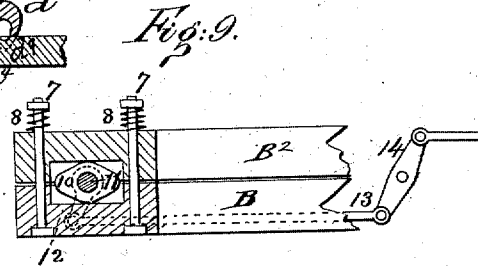
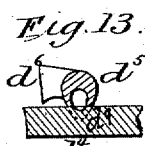
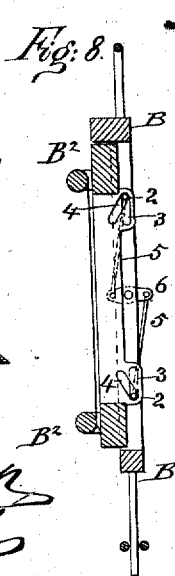
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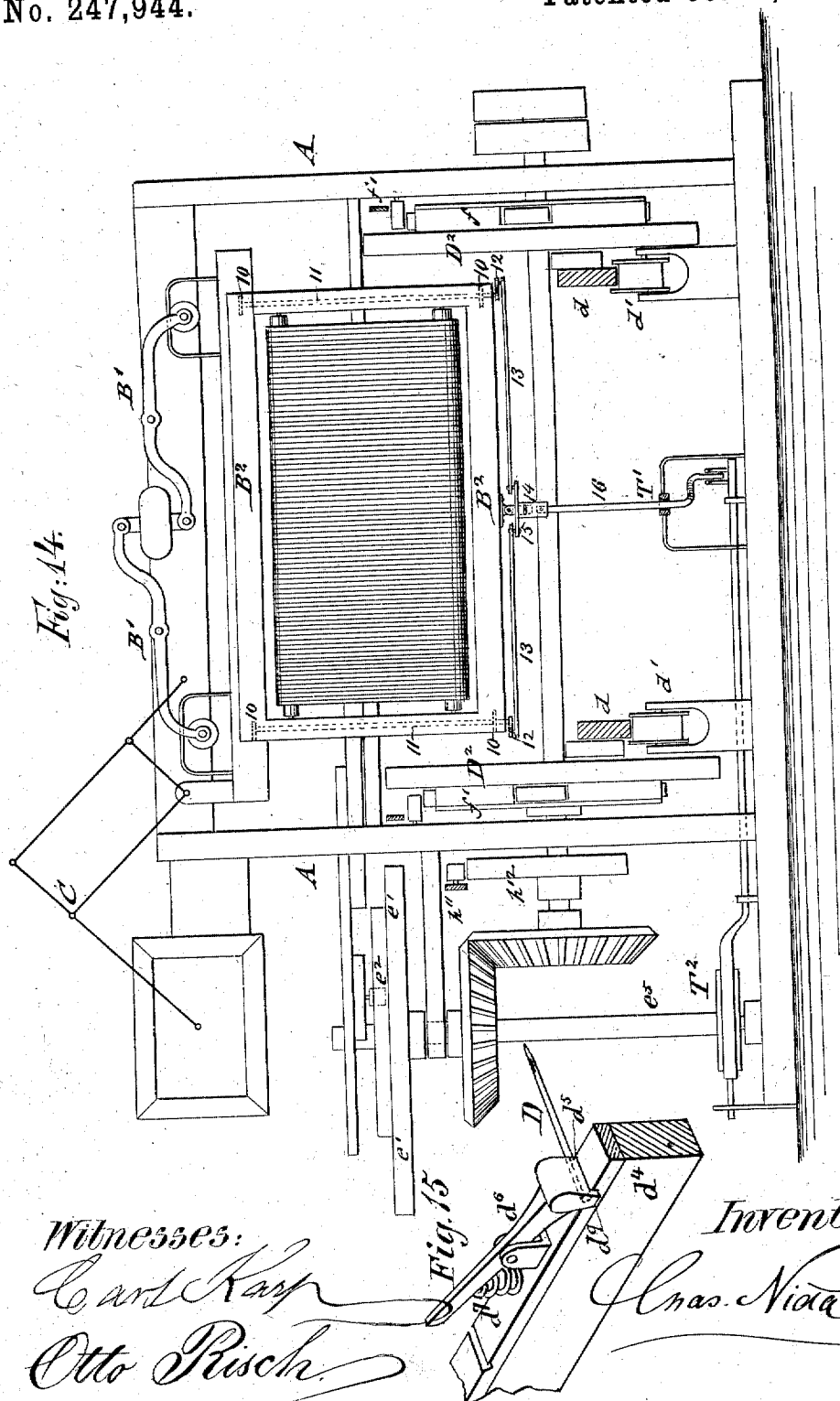
INVENTOR:

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Patented Oct. 4, 1881.

No. 247,944.



Witnesses:

Michigan:
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Otto Pusch.

Inventor:

Chas. Viola.

UNITED STATES PATENT OFFICE.

CHARLES NIDA, OF NEW YORK, N. Y., ASSIGNOR TO DAVID STURYENEGGER,
OF SAME PLACE.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 247,944, dated October 4, 1881.

Application filed September 16, 1879.

To all whom it may concern:

Be it known that I, CHARLES NIDA, 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.

This invention has reference to improvements in that class of embroidering-machines in which a series of needles and a series of shuttles are used in connection with a vertically-suspended cloth-supporting frame that is wound up on rollers, counterbalanced by weighted levers, and having connected with it a pantograph.

The improvements relate, essentially, to means for effecting a more reliable working of the needle-carriage and of the take-up mechanism for the needle-threads, and to improved tension devices for the needle and shuttle threads, and to an auxiliary cloth-supporting frame for embroidering thin fabrics without injuring the same.

In the accompanying drawings, which fully illustrate my invention, Figure 1 represents a plan view of my improved embroidering-machine, partly in horizontal section on the line $x'x'$, Fig. 2. Fig. 2 is a front elevation, showing the take-up mechanism. Fig. 3 is a side elevation of the same, partly in vertical longitudinal section on line xx , Fig. 1, to show the counterbalanced cloth-supporting frame. Fig. 4 is an end elevation of the machine. Figs. 5 and 6 are, respectively, a detail side view and vertical transverse section of the adjustable cam for regulating the extent of motion of the take-up. Fig. 7 is a vertical transverse section of the machine; Fig. 8, a vertical transverse section of the auxiliary cloth-supporting frame; Fig. 9, a detail view of a modified form of adjusting mechanism for the same. Figs. 10 and 11 are, respectively, a top view and a vertical longitudinal section of the shuttle with bobbin-tension; and Fig. 12 is a detail vertical central section of the tubular bobbin-spindle. Fig. 13 is a sectional detail, showing the manner of confining the needles to their reciprocating bar. Fig. 14 is a side elevation, showing a mode of operating the frame B, carrying the cloth on which the embroidery is made. Fig. 15 is a perspective view, showing the rear flange on the needle-clamp, the needle, and a portion of the needle-bar.

Similar letters of reference indicate corresponding parts.

A in the drawings represents the supporting-frame of my improved embroidering-machine, from the upper part of which is suspended the vertically-guided cloth-supporting frame B, which is counterbalanced by weighted levers B' in the well-known manner. The cloth-supporting frame B is connected with a pantograph, C, the pointer of which is moved along a pattern-card, so as to produce thereby the corresponding motion of the cloth-supporting frame for the proper length and position of the embroidering-stitches, which are formed by a series of needles, D, and shuttles E, that work in conjunction with each other.

The shuttle carriage or race E' is stationary and secured to the supporting-frame A immediately back of the cloth-supporting frame B. The shuttles E are moved by a number of shuttle-drivers, E², which are adjustably secured by slots and set-screws to a slide-rod, e , to which reciprocating motion is imparted by the cam-track of a horizontal cam, e' . (Shown in top view in Fig. 1.) The cam track or groove of cam e' engages a roller, e^2 , on the extension of the slide-rod e , the extension being guided by a slot in said extension on the shaft of the cam. One portion of the cam-track at e^3 , the point of greatest eccentricity, is of arc-shape and concentric to the shaft, for the purpose of obtaining a full stop for the shuttles at the point when it is desired to stretch the needle-threads for properly laying on the stitches. The vertical shaft of the shuttle-actuating cam receives its motion from the driving-shaft of the machine by means of bevel-gears.

The needle-carriage D' slides by guard-rails d on rollers d' , being retained thereon by its weight. The eccentricity of the cam-track of the cams D² imparts the proper motion to the needle-carriage, so as to cause the needles to advance, pass through the cloth, and recede at the proper time. The interior portion of each driving-cam D² is provided at its point of greatest eccentricity with an adjustable section, d^3 , which is guided in suitable manner and secured by slot and set-screw, so as to be projected forward into the cam-track and force the needles to a greater or less extent through the fabric. The needle-threads are thereby

enabled to form larger loops, and consequently admit of the easier passage of the shuttles.

The guide-rails d of the needle-carriage D are extended upward in the form of standards, 5 which are transversely connected by a horizontal rail, d^4 , to which are applied the clamp-sockets d^5 for the needles. The shank of each needle is placed into a groove of the rail and a groove of the clamp, the butt of the needle 10 bearing against a rear flange or shoulder, d^6 , of the clamp. The clamps d^5 are secured to the ends of levers d^6 , the longer arms of which are acted upon by spiral springs d^7 , so that the clamps are tightly pressed on the rail, thus 15 securely retaining the needles. By pressing on the outer ends of the clamp-levers the clamps are raised, and the needles may be inserted or removed with great facility. By this arrangement the needles may be quickly and 20 conveniently inserted or removed for being exchanged—a point of considerable advantage, when it is considered that in machines of this class the needles are arranged in gangs of one hundred and more. The needles pass through 25 perforations of the front flange of the shuttle-race, after having pierced the fabric, the threads forming on the back of the same the loops for the shuttles in the customary manner.

The take-up mechanism consists of a frame, 30 F, the side standards or arms of which are keyed to a pivot-shaft, turning in bearings of the rails d . The bobbins G are placed on fixed pins on a horizontal board or shelf, G', which is supported on bracket-arms of frame F, the 35 threads passing from the bobbins over intermittently-operated tension devices H back of the bobbins, then over a round guide-rod in front of and above the bobbins, through holes of the needle-clamp supporting-rail to the needles. 40

The proper motion is imparted to the take-up by cams f on the driving-shaft and by levers f' of sufficient length, the levers being held in contact with the cams f by weights or 45 springs. The opposite ends of the levers f' are keyed to an auxiliary shaft, f^2 , that is supported in bearings of needle-carriage D' vertically above the lower pivot-shaft, f^3 , of the same.

50 The upper and lower shafts are provided with parallel crank-arms f^4 , which are keyed to the same and connected by a pivoted link, f^5 , which can be set by pins and holes of the crank-arms to greater or less distance from the shaft, so as to produce a greater or less 55 oscillating motion of the take-up frame, as required.

The actuating-cams f impart the oscillating motion to the take-up frame, and are provided 60 with adjustable cam-sections 1, 2, 3, and 4, as shown in Fig. 5, said cam-sections being of different length, so as to project to greater or less distance from the cams.

By setting the cam-sections so as to project 65 more or less the motion of the take-up mechanism may be controlled to a nicety.

The action of the cam-sections is as follows: Cam-section 1 unwinds the threads sufficiently from the bobbins to admit the forming of the loops for the shuttles, while cam-section 2, 70 being somewhat longer than cam-section 1, draws the loops tightly over the shuttles. Cam-section 3 is of greater length, and serves, in connection with the receding motion of the needle-carriage, to draw the loops through the fabric 75 after the shuttles have been withdrawn therefrom. Cam-section 4 is the smallest in size, and imparts, when the return motion of the needle-carriage is completed, a slight stretching action on the threads, to take up any slack 80 therein.

The take-up mechanism is reciprocated with the needle-carriage, and is oscillated as described, to properly form the stitches. As the 85 top guide-rod of the take-up oscillates in the same plane, or nearly so, with the threads, a more reliable action of the take-up is produced than when the stitches are formed by lifting the thread above the plane in which they pass through the needles and cloth. Another advantage of the take-up mechanism consists in 90 arranging all the bobbins and tension devices on the take-up frame and oscillating them therewith, which is an entirely new feature.

The tension of the threads is obtained by 95 the intermittently-actuated tension-devices H, which are arranged on a transverse screw-rod, h , at the rear part of the take-up frame F, back of and in line with the bobbins and needles. Each tension H is formed of two disks, h^1 h^2 , 100 one of which abuts against a screw-nut, h^3 , while the other is guided on a sleeve-shaped extension of the first disk and pressed against the same by a spiral spring, h^4 , interposed between the second disk and a second screw-nut, 105 h^5 , at a suitable distance therefrom.

The degree of pressure of the spring on the tension-disk h^2 is regulated by setting the screw-nut nearer to or farther from the second disk.

The spring-acted disks are provided with 110 circumferential flanges h^6 , which are engaged by a notched rail, h^6 , that is guided in slots of the take-up frame F and intermittently reciprocated by a fulcrumed lever, h^7 , the lower forked part of which is acted upon by a flanged 115 sleeve, h^8 , of the lower pivot-shaft, f^3 , of the frame F. The flanged sleeve h^8 is shifted laterally to and fro on the pivot-shaft f^3 by a crank-arm, h^9 , which is keyed to a sleeve, h^{10} , of the shaft f^2 , said sleeve being connected by 120 a lever, h^{11} , to a cam, h^{12} , on the driving-shaft, which cam, by its eccentric portion, lifts the lever at the proper moment. The lever h^{11} acts by the crank-arm on the shifting sleeve, which again transfers motion to the notched rail h^6 . 125 The notched rail h^6 engages the flanges of all the spring-acted tension-disks h^2 and pushes them away from the fixed disks and from the threads, so that the latter, being released from the pressure of the spring-acted disks, may 130 freely follow the motion of the needles and supply the required length of thread for the

loops. As soon as this is accomplished the threads are clamped again by the tension-disks, so as to follow the motion of the take-up mechanism in forming the stitches.

5 The adjustable tension-devices at the rear part of the take-up frame are within convenient reach for adjustment devices operating on the bobbins, owing to the gradual unwinding and decreasing size of the bobbins.

10 Hitherto there was some difficulty in machines of this kind in embroidering thin and yielding fabrics—such as gauze, &c.—as by the tightening of the stitches the fabrics were liable to give and tear. This objection I have

15 obviated by the employment, in combination with the main frame B, of an auxiliary frame, B², which is movable toward and from the main frame, and on which the cloth-rollers are applied. I have represented in the annexed

20 drawings two ways of operating the auxiliary frame B². In Fig. 8 frame B² is arranged to work freely inside of frame B', and is connected to the latter by means of pins 2, which pass freely through the vertical slots 3, made through the

25 side rails of frame B, and through inclined slots 4, made through ear-projections on the side rails of auxiliary frame B². The pins 2 are connected to short rods 5, which are connected to levers 6. By oscillating levers 6 the

30 frame B², with its cloth-bearing rollers, can be moved toward or from the frame B. The roller carrying frame B² of Figs. 9 and 14 is placed on the back of the frame B, and connected to it by means of guide-rods 7, on which it can

35 slide freely, acted on by springs 8, which hold it in contact with the frame B. At the four corners of the frames, and in recesses formed in them, cams 10 are arranged on vertical rods 11, bearing on their lower ends crank-arms 12,

40 which are connected by rods 13 to a lever, 14, located at the middle of the length of the lower rails of the frames and pivoted to a plate fixed to frame B. The lever 14 is connected by a gimbal-joint, 15, to a rod, 16, which is free to play vertically and to oscillate in a bearing,

45 T', and which has a crank formed on its lower end that is acted on by an eccentric, T², keyed on the shaft e' of cam e'.

50 The connection of the frame B to the eccentric T² will not interfere with the movements which it is desired to give to the frames by means of the pantograph to produce the figures.

55 The eccentric T² is adjusted on its shaft with reference to the movements given to the needles, shuttles, and take-up mechanism on the reciprocating carriage, and so that the auxiliary frame B² will be moved forward at the time when the needles pierce the fabric, and

60 at the moment it is necessary to draw the stitches tight in the fabric the said auxiliary frame will receive a slight backward movement or a movement from the carriage when the latter arrives at the end of its back-stroke.

65 It will be seen from the above description that the final act of tightening the stitches is

produced by the slow backward movement given to the auxiliary frame; hence the carriage may receive a very rapid motion without liability of tearing the fabric during the act of 70 drawing tight the stitches.

The frame B², it will be observed, receives movements from the eccentric for the purpose described independently of the frame B. This frame B² is, however, free to take part in all 75 the movements given to the frame B' by the pantograph to form the figures.

The shuttles are provided with bobbins, having hollow tubular spindles E², as shown in Figs. 10, 11, and 12, said spindles being placed 80 on center pins that are pivoted at one end to the slotted point of the shuttle. The tubular spindle fits by a conically-tapering point into a tapering socket-hole in the heel portion of the shuttle, and receives the proper tension by a 85 spiral spring interposed between a concaved disk or flange at the opposite end of the spindle and the point of the shuttle, as shown in Figs. 10 and 11. The bobbin is removed from the shuttle first by releasing the conical end, 90 then swinging the spindle on its pivot to the outside of the shuttle, the spindle being then wound with thread and replaced. The advantage of the tubular spindle consists in the facility and speed by which a series of them 95 can be rewound on a bobbin-winding machine and then replaced into the shuttles. I reserve the right to make a separate application for a patent on this shuttle construction.

As in embroidering-machines of this class, 100 a large number of needles and shuttles are employed, which form the embroidering-stitches on the stretched fabric, as the fabric is placed into the proper position for the same by the pantograph, a high degree of accuracy in the 105 motions of the needle-carriage, shuttles, take-up mechanism, &c., is required. This I have aimed to secure by the variable and adjustable cams, which govern the motion of the needle-carriage, shuttles, and take-up, while I 110 have furthermore aimed to simplify the needle-holding devices and the tensions for the needle and shuttle threads, and finally adapted the machine for embroidering even the thinnest fabric without injury to the same. 115

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

1. In embroidering-machines of the class described, a series of shuttles and shuttle-drivers with a shuttle-actuating rod, having a slotted 120 extension, a horizontal cam the cam-track of which has at its point of greatest eccentricity an arc-shaped portion or point of repose concentric with the shaft of said cam, all combined substantially in the manner and for the purpose described. 125

2. In an embroidering-machine of the class described, the combination of the reciprocating needle-carriage with actuating-cams, of the driving-shaft, having adjustable cam-sections 130 at the point of greatest eccentricity of the cam-tracks to force the needles to a greater or less

extent through the fabric to be embroidered, substantially as described.

3. In an embroidering-machine of the class described, the combination of the needle-carriage, having a transverse supporting-rail, with lever, spring-acted needle-clamps, and their rear flanges, *d*⁹, substantially as described.

4. In an embroidering-machine of the class described, the combination of the reciprocating needle-carriage with an oscillating take-up mechanism, the frame of which supports the bobbins, and the intermittently-actuating tension devices for the needle-threads, substantially as described.

5. In an embroidering-machine of the class described, the combination of the oscillating take-up with intermittently-actuating tension devices formed of fixed and spring-acted disks, with a laterally-reciprocating notched rail that embraces the spring-acted tension-disks when the threads have to be released to form the loops for the shuttles, substantially as described.

6. In an embroidering-machine of the class described, the combination of the take-up

frame, the crank-levers, the actuating-cams of the driving-shaft, and the adjustable cam-sections of different sizes to oscillate the take-up at the proper time to form the stitches, substantially as described.

7. In an embroidering-machine wherein a reciprocating carriage is employed, bearing the needles, and take-up mechanism, and a frame, B, which latter receives its movements from a pantograph, the combination, with the frame B, of an auxiliary cloth-frame, movable independently of frame B by means of an eccentric, cams, and connecting-rods or their equivalents adapted to effect the tightening of the stitches, substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of August, 1879.

CHARLES NIDA.

Witnesses:

PAUL GOEPEL,
CARL KARP.

It is hereby certified that in Letters Patent No. 247,944, granted October 4, 1881, upon the application of Charles Nida, for an improvement in "Embroidering Machines," the name of the assignee and grantee was erroneously written and printed therein "David Sturyenegger," instead of "David Sturzenegger;" that the correct name is "David Sturzenegger;" that the proper corrections have been made in the files and records pertaining to the case in the Patent Office, and are hereby made in said Letters Patent.

Signed, countersigned, and sealed this 18th day of October, A. D. 1881.

[SEAL.]

A. BELL,
Acting Secretary of the Interior.

Countersigned:

E. M. MARBLE,
Commissioner of Patents.