

M. SCHOENFELD.
EMBROIDERING MACHINE.
APPLICATION FILED FEB. 16, 1910.

1,024,867.

Patented Apr. 30, 1912.

2 SHEETS-SHEET 1.

Fig. 1.

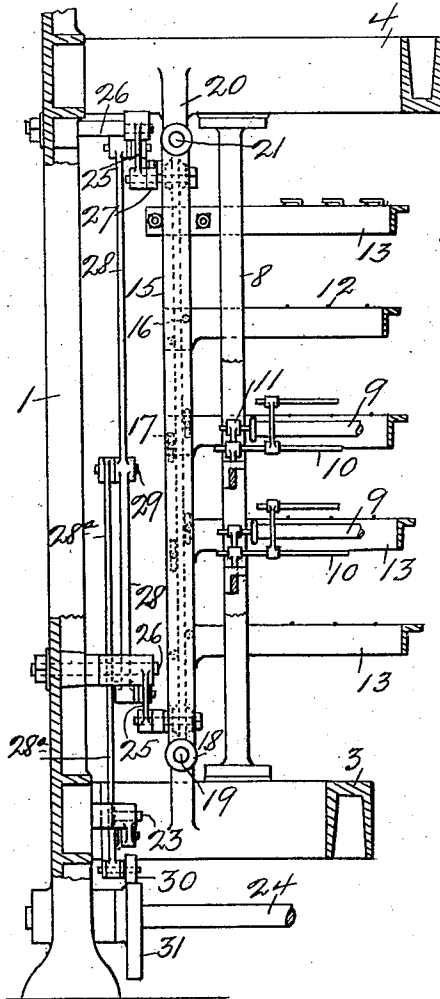
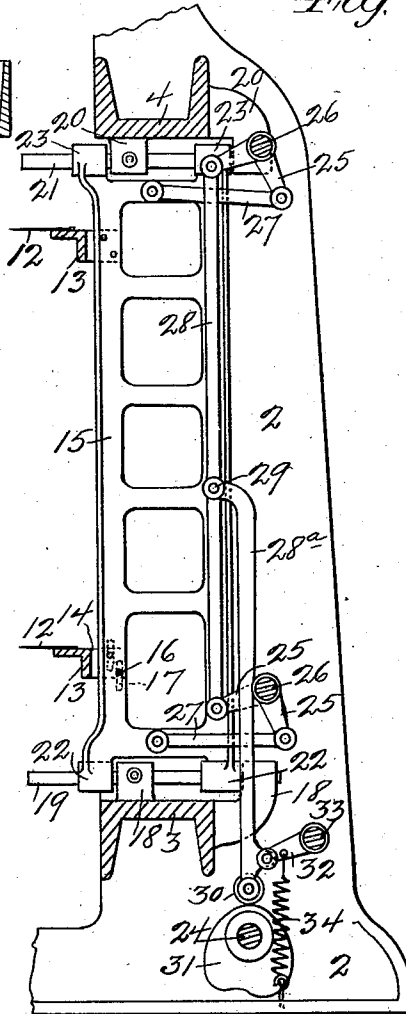


Fig. 3.



Witnesses:
Wm. J. Quinn
William H. Dale

Inventor
Merris Schoenfeld
By his Attorney
Charles E. Hensley

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2 SHEETS-SHEET 2.

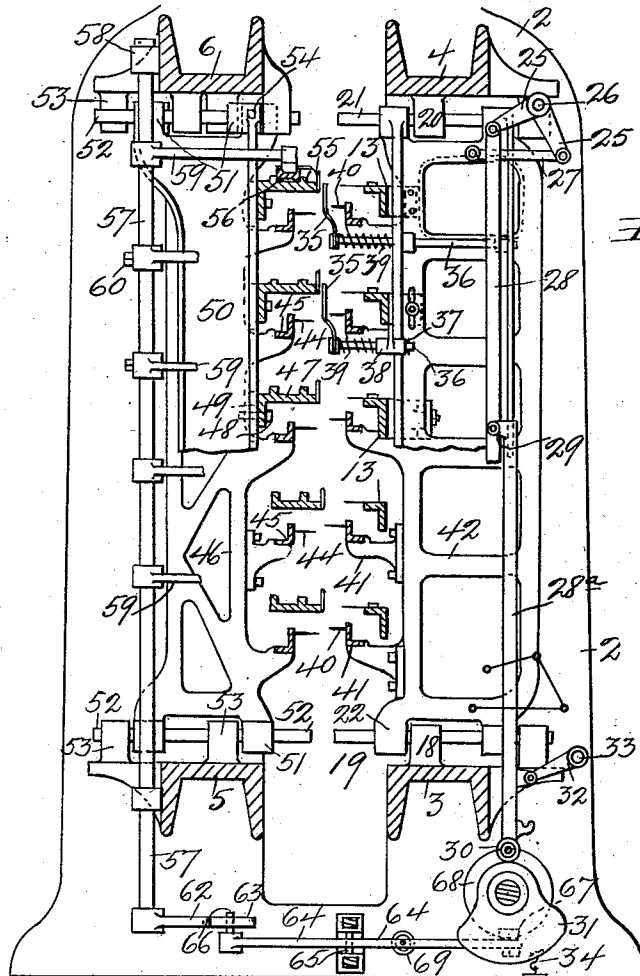


Fig. 2.

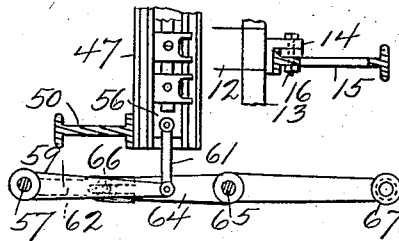


Fig. 4

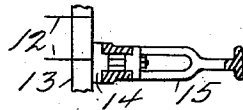


Fig. 5.

Witnesses:
Wm. Benjamin
William R. Drake

Inventor
Morris Schoenfeld
By his Attorney
Charles A. Hensley

UNITED STATES PATENT OFFICE.

MORRIS SCHOENFELD, OF RORSCHACH, SWITZERLAND.

EMBROIDERING-MACHINE.

1,024,867.

Specification of Letters Patent.

Patented Apr. 30, 1912.

Application filed February 16, 1910. Serial No. 544,197.

To all whom it may concern:

Be it known that I, MORRIS SCHOENFELD, a citizen of the United States, and a resident of Rorschach, in the Canton of St. Gall, Switzerland, have invented certain new and useful Improvements in Embroidering-Machines, of which the following is a specification.

My present invention relates to improvements in embroidering machines of the large type wherein several hundred needles are adapted to operate simultaneously in the production of embroidery upon a fabric stretched upon a tambour frame. Heretofore it has been customary to construct the embroidering machine frame of end standards connected by longitudinal beams, generally four in number, two in front of the machine and two at the rear, upon which the various tools, such as needle bars, tension, take up, etc., and their operating parts were directly supported, the beams being disposed near the said tools. In such constructions the long beams, carrying the great weight of such mechanisms were necessarily of considerable size and they therefore offered considerable obstruction to the embroidery surface, making it difficult for the attendants to see the fabric and attend to the various devices. In such machines it has been impracticable to have more than two rows of embroidering devices, one above the other, because an increase in the rows meant an increase in the number of such heavy beams, which, owing to the great weight, prevented such, and the increased obstruction of the embroidery surface increased the already objectionable features of such machines. I have overcome these objections by revolutionizing the entire construction of embroidering machines making it possible to increase the number of rows of embroidering devices to say six rows, and at the same time have a much clearer view of the embroidery surface and also a lighter running and more rigid machine which can be made even longer than former machines.

In carrying out my general objects I have produced certain new types of frames which I have shown and described in certain applications for patent filed by me on the 16th day of February, 1910, and serially numbered 544195, 544193, 544198 and 544199. Furthermore, in carrying out my plan of general improvement I have provided cer-

tain novel improvements in the embroidering mechanisms such as the needle mechanism and shuttle mechanism which are set forth in my co-pending application Serial Number 544198 and filed on the 16th day of February, 1910. In this latter case I have shown radical improvements in the needle bar mechanism, whereby a movable frame is formed of two or more of the superimposed needle bars, and a novel operating mechanism provided therefor. I have also shown in said case a shuttle mechanism.

The object of my present invention is to provide simple mechanism whereby the same broad objects of the said case will be carried out and additional advantages secured.

In the present case I have utilized a movable frame structure formed by rigidly uniting two or more of the several rows of needle bars which frame is mounted upon the machine frame so that it may be reciprocated laterally of the machine to cause the needles to stitch the fabric. This frame structure is so supported that there is no material obstruction to the embroidery surface. In the present case I have employed a driving mechanism for this movable frame embodying upright reciprocating elements, operated from a common source of operation and connecting devices for changing the operating force of the upright reciprocating elements into a lateral movement of the said movable frame. This is done in such a way that perfect parallelism in the operation of the movable frame is secured. Furthermore I have provided the same general features in the operation of certain other devices, such as detents, borers, etc. I have also embodied certain improvements in the shuttle mechanism whereby I not only preserve the advantages of the construction in my said case Serial Number 544198 but I so mount the shuttle mechanism that the same may be bodily moved laterally of the machine to facilitate in the placing of the fabric in position to be embroidered and in positioning the shuttle mechanism with relation to the fabric.

Other advantages will be apparent from the detailed description of one embodiment of my invention hereinafter.

In the drawings forming a part of this application, Figure 1 is a front elevation of one end of an embroidering machine em-

bodying my improvements, the left hand end, Fig. 2 is a cross section of the machine, showing the various mechanisms, Fig. 3 is a cross section of the front half of the machine showing the needle mechanism, Fig. 4 is a horizontal sectional view showing certain details of the mechanism, and Fig. 5 is a similar view showing a modification in the connection of the needle bars with their connecting elements.

I have shown my improved mechanism applied to a machine of preferred construction but the same may be used in various constructions.

In the machine herein shown the frame consists of end standards 1 and 2, at the ends of the machine which are connected in the front by longitudinal beams 3 and 4, at the bottom and top and in the rear by longitudinal beams 5 and 6, the two sets of beams being spaced sufficiently to permit the fabric 7 to be operated between them upon a tambour frame, and to permit certain mechanisms to be mounted between the pairs of beams. I have shown these longitudinal beams as commercial forms of metal which, together with the end standards form a rigid frame structure with the longitudinal beams so disposed that they offer no obstruction to the embroidery surface. Upon this frame structure is mounted the various mechanisms for the production of embroidery, some of the devices being mounted stationarily, such as the tension, take up, etc., while other devices such as the needle bars, shuttles, etc., are mounted to have a reciprocating movement laterally or longitudinally of the machine as the case may be.

It may be here stated that the fabric 7 is stretched upon any known tambour frame and may be operated by any well known mechanism to position the fabric in front of the needles for each stitch, the mechanism for which is here omitted to simplify the present case.

In the present case I have shown an improved mechanism for operating the needle bars, and I have also shown other embroidering tools operated by similar mechanism and it will be apparent to one skilled in the art that still other tools may be operated in a similar manner and it is deemed unnecessary to show every possible set of embroidering tools which may be operated by similar mechanism.

In the present case I have shown certain devices, which though embodying movable parts have a fixed position (except for adjustability) upon the machine, mounted on stationary elements forming a part of the frame work of the machine, such as the intermediate posts or standards 8, connected between the longitudinal beams 3 and 4, of the frame. Such devices as the tension roll-

ers 9, and take up 10 are mounted, by means of brackets 11, between the posts 8 at the ends of the machine or such other intermediate positions as may be desired. These devices may be actuated by mechanism similar to that used to actuate the needle and other devices as will appear hereinafter or they may be actuated by mechanism similar to that shown in my co-pending application referred to.

The needle mechanism, comprising an important feature of the present case is a decided improvement over the long continued practice of mounting the needle bars upon long heavy beams, near the needle bars. In the present construction I employ a number of needle bars arranged one above the other, which may be increased in number over former practice (as many as six being here shown) and two, and preferably all, of these needle bars are connected with each other to form a rigid whole, a frame preferably in the nature of a series of parallelograms, and this frame is so mounted and guided upon the machine frame as to be movable laterally of the machine to cause the fabric to be stitched by the many needles. The frame thus formed is reciprocated by a novel mechanism which operates the same in proper parallelism, so that the entire needle mechanism will operate uniformly.

The many needles 12 are suitably secured in any well known manner to the needle bars 13 which latter are preferably arranged longitudinally of the machine and running substantially the length thereof and are arranged one above the other. The needle bars 13 are shown with blocks 14 which are bolted by bolts 16 to members which connect two or more of the several needle bars in a single unit. These connections are preferably in the nature of upright metal sections 15 and the bolts 16 which secure the needle bars thereto engage in slots 17 whereby the needle bars may be adjusted in their connection with the uprights, to cause the needle bars to operate more or less remote from each other. In Fig. 3 I have shown only two of the needle bars, it being understood that they are multiplied to conform to the other views in making the machine, or the number may be altered as desired. These uprights 15 are mounted to move laterally of the machine and preferably in such a way that the movement will be a straight reciprocating movement so that the needles will go in and out of the fabric in a direct line, and I prefer to connect the operating mechanism to these uprights.

Upon the lower longitudinal beam 3 I have constructed journals 18, which carry a lateral shaft 19, while on the upper beam I have constructed similar sockets or jour-

nals 20, which likewise carry a lateral shaft 21 and the shafts 19 and 21 are preferably in vertical alinement. The upright connecting member 15 has sockets 22 on its lower end and similar sockets 23 on the upper end which slide freely upon the shafts 19 and 21, and guide the whole movable needle frame in a direction lateral of the machine and fabric.

It is to be understood that the upright 15 is duplicated at the opposite end of the machine and in long machines I prefer to duplicate the same at regular intervals throughout the machine whereby the weight of the various needle bars will be carried at various points intermediate of, as well as at, the ends. Otherwise they would have to be made very strong, or they would sag or the old style heavy beam construction would have to be resorted to.

The power for driving the various mechanisms is distributed throughout the machine by a longitudinal shaft 24 which I have shown near the base of the machine and from which the various mechanisms are preferably driven by means of a number of cams disposed along the shaft and the peripheries of which cams are shaped and proportioned according to the requirements of the various mechanisms which they are required to operate.

In Figs. 1 and 3, I have shown very clearly the mechanism by which the needle bar frame is operated. I have mounted a bellcrank lever 25 upon a suitable axle 26 to rock laterally of the machine; and one arm of this lever is connected by a link 27 to the upper part of the upright 15, the link being fulcrumed to the bellcrank lever and upright. This same arrangement is duplicated at the lower part of the machine as will be seen, to cause the needle bar frame to move in parallelism. The other ends of the two bellcrank levers 25 are connected by a pitman 28, which is shown vertically disposed. To the pitman 28 at 29 is fulcrumed an operating rod 28^a which extends downwardly and is provided with a roller 30 which engages with a cam 31 on the operating shaft 24. The rod 28^a is fulcrumed to a short arm 32 which rocks on a support 33 and retains the lower end of the rod in place. A spring 34 pulling down on the arm 32 retains the roller 30 in continual contact with cam 31. This arrangement is duplicated at the opposite end of the machine and it may be duplicated at intermediate points to furnish enough power to drive the needle mechanism and without distorting the needle bar frame. In other words, preserve parallelism in the operation of the needle mechanism.

I have shown detents for pressing upon the fabric and I prefer to mount such upon the uprights 15 which carry the needle bars,

making duplication of parts unnecessary. This combining, in the case of needles and detents is possible because their time of movement and direction are more or less similar.

I have shown the detent fingers 35 mounted to press the fabric against the shuttle tracks and they are shown carried upon shafts 36, which are journaled in sockets 38 movably bolted to the uprights 15 below the needle bars. The springs 39 press the detents toward the fabric and the shafts are retained in their sockets by pins 37 on their outer ends. The detents are adapted to be moved with the uprights 15 to cause the detent fingers 35 to engage the fabric before the needles enter the fabric. The movement of the needle device causes the detent fingers to press the fabric and the compression of the springs 39 permits the detent fingers to remain pressed against the fabric while the uprights continue until the needles receive their full stroke. Upon the retracting of the needle device the detents remain in contact with the fabric until the needles are withdrawn, when the extreme thrust of the needle device will withdraw the detent fingers sufficient to permit the fabric to be repositioned for the next stitch.

I have shown other embroidering tools operating in the same way as the needle bars. In the front of the machine I have shown such devices as the borers 40 mounted in longitudinal rows on bars 41, similar to and below the needles, the function of which is well known in the art. These bars 41 are mounted adjustably upon upright connecting members 42, preferably in the same way that the needle bars are mounted on their uprights 15. These members 42 are mounted on the machine frame similar to the needle bar frames and are operated by similar mechanism. I have not shown the complete mechanism for operating the members 42 as it is the same as the needle mechanism and it would only be a duplication thereof. On the rear side of the machine I have shown stupfels 44, mounted on bars 45, which in turn are mounted on uprights 46, and which stupfels are adapted to operate on the fabric from the rear. The stupfel bars and their uprights are like the needle bars and their uprights, are similarly mounted on the frame and operated by similar mechanism.

I have shown a novel shuttle mechanism disposed at the rear side of the machine, which is shown in Figs. 2, 4, and 5. The shuttle tracks 47 are preferably of the same form as those shown in my application Serial Number 544198 and are adjustably mounted by bolts 48 which engage in slots 49 on the uprights 50, which connect the several shuttle tracks in a similar manner to the upright which connect the several

needle bars. This forms a rigid frame of the several shuttle tracks which are disposed one above the other corresponding to the disposition of the needle bars. The frame constituted by the shuttle tracks and their uprights 50 are adapted to be moved, laterally, to withdraw the shuttle mechanism sufficient to permit the fabric to be placed. The uprights 50 are provided at bottom and top with sockets 51, which are guided upon the shafts 52 mounted laterally in sockets 53, similar to the mounting of the uprights 15. As it is only necessary to move the shuttle tracks when changing the fabric it is preferably done manually and the shuttle track frame is retained in fixed position by set screws 54 which engage the shafts 52, to prevent the frame from moving when the shuttle mechanism is in operation. The shuttles 55 are guided in one groove of the shuttle track while the fingers of the drive bar 56 reciprocate the shuttles similar to my case number 544198. The upright shafts 57 are journaled in sockets 58, on the machine frame and are adapted to be oscillated as will appear. The shafts 57 are provided with collars carrying arms 59, the collars being vertically adjustable by means of set screws 60 upon the shafts. The arms 59 are connected with the several shuttle drive bars 56 by means of links 61 which are fulcrumed to the arms 59 and to the shuttle drive bars. The lower end of the shaft 57 is provided with an arm 62 (see Fig. 4) which has a slotted end 63. There is a lever 64, fulcrumed at 65 on a suitable support, which carries a pin 66 engaging in the slot of the arm 62; which latter it is adapted to rock. The lever 64 is provided with a roller 67 which is retained in contact with the cam 68 on shaft 24 by means of a spring 69.

The revolution of the cam 68 with the main operating shaft will, through the lever 64 and arm 62, oscillate the shaft 57, which in turn will reciprocate the shuttle drive bars by means of the arm and link connections therewith. The shifting of the shuttle tracks when placing the fabric will not require any disconnection of the remainder of the shuttle mechanism. The screws 54 are loosened and the shuttle track frame moved back from the fabric. The present mechanism is susceptible of use for other embroidering tools and changes may be made without departing from the scope and spirit of my invention.

Having described my invention what I claim is;

1. An embroidering machine comprising a longitudinal stationary frame, embroidering elements carried by longitudinally disposed superimposed carrying members, and a plurality of upright members uniting said

carrying members in a rigid movable frame, said upright members being disposed at intervals along the embroidering machine, stationary longitudinal members disposed free of the embroidering surface, for supporting said upright members and upright reciprocating driving means adapted to operate the said movable frame.

2. An embroidering machine comprising a longitudinal stationary frame, embroidering elements carried by longitudinally disposed superimposed carrying members and a plurality of upright members uniting said carrying members in a rigid, movable frame, said upright members being disposed at intervals along the embroidering machine, stationary longitudinal members disposed free of the embroidering surface, for supporting said upright members, and levers mounted on the stationary frame adapted to reciprocate said movable frame and upright reciprocating elements adapted to operate the movable frame through said levers.

3. An embroidering machine comprising a longitudinal stationary frame, embroidering elements carried by longitudinal superimposed carrying members and a plurality of upright members uniting said carrying members in a rigid, movable frame, said upright members being disposed at intervals along the embroidering machine and supported by said stationary frame, levers mounted on the stationary frame and adapted to operate on the upper and lower portions of the movable frame, to move the same laterally of the machine, and upright reciprocating means for operating said levers.

4. An embroidering machine comprising a stationary frame, embroidering elements and a movable frame mounted to be movable laterally of the stationary frame and embodying a plurality of longitudinal carrying members for the embroidering elements, laterally swinging bellcrank levers on the stationary frame connected with the upper and lower portions of the movable frame, pitmen connecting the bell-crank levers, a power shaft and operating rods for the pitmen, operated from said power shaft.

5. An embroidering machine comprising a longitudinal stationary frame, embroidering elements carried by longitudinal superimposed bars, and a plurality of upright supporting members uniting said bars in a rigid, movable frame, said upright members being disposed at intervals along the embroidering machine, shafts by which the upright members are supported and laterally guided on the stationary frame, levers on the stationary frame adapted to operate on the upper and lower portions of the movable frame to reciprocate the same laterally of the machine and upright reciprocating means for operating the levers.

6. An embroidering machine comprising a longitudinal stationary frame, embroidering elements, such as needles, carried by longitudinal superimposed bars and a plurality of upright supporting members uniting said bars in a rigid, movable frame, other embroidering elements, such as detents, carried by said upright members, said upright members being disposed at intervals along the embroidering machine, stationary longitudinal members disposed free of the embroidering surface, for supporting said upright members and means for reciprocating said movable frame.

7. An embroidering machine comprising a longitudinal stationary frame, longitudinal superimposed shuttle tracks, upright supporting members uniting a plurality of said tracks in a rigid, movable frame and disposed at intervals along the machine, stationary longitudinal members disposed free of the embroidering surface, for supporting said upright members, said upright members being supported movably upon the said longitudinal supporting members whereby the shuttle tracks may be moved toward and from the fabric.

8. An embroidering machine comprising a stationary frame embodying end standards and upper and lower longitudinal beams, movable upright supporting members supported on said upper and lower longitudinal beams by guiding shafts and disposed at intervals between the end standards and a plurality of superimposed lon-

gitudinal shuttle tracks rigidly secured to said movable upright supporting members.

9. An embroidering machine comprising a stationary frame embodying end standards and upper and lower longitudinal beams, movable upright supporting members supported on said upper and lower longitudinal beams by guiding shafts and disposed at intervals between the end standards and a plurality of superimposed longitudinal shuttle tracks rigidly secured to said movable upright supporting members, shuttles traveling in said tracks, shuttle drives and upright oscillating shafts having means for operating the several shuttle drives.

10. An embroidering machine comprising a stationary frame, upright supporting members, shafts by which the upright members are laterally guided on the stationary frame, shuttles, shuttle drives, longitudinal shuttle tracks adjustably mounted on said upright members, an upright oscillating shaft having means for operating the several shuttle drives, said operating means being adjustable, whereby adjustment may be made in the shuttle drives to permit adjustment of the several shuttle tracks and means for oscillating said shaft.

Signed at St. Gall in the Canton of St. Gall, Switzerland, this 3rd day of February 1910.

MORRIS SCHOENFELD.

Witnesses:

ALBERT PHILLIPS,
RANDALL ATKINSON.