J. A. GROEBLI.

EMBROIDERING MACHINE.

APPLICATION FILED FEB. 9, 1915.

1,166,676.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

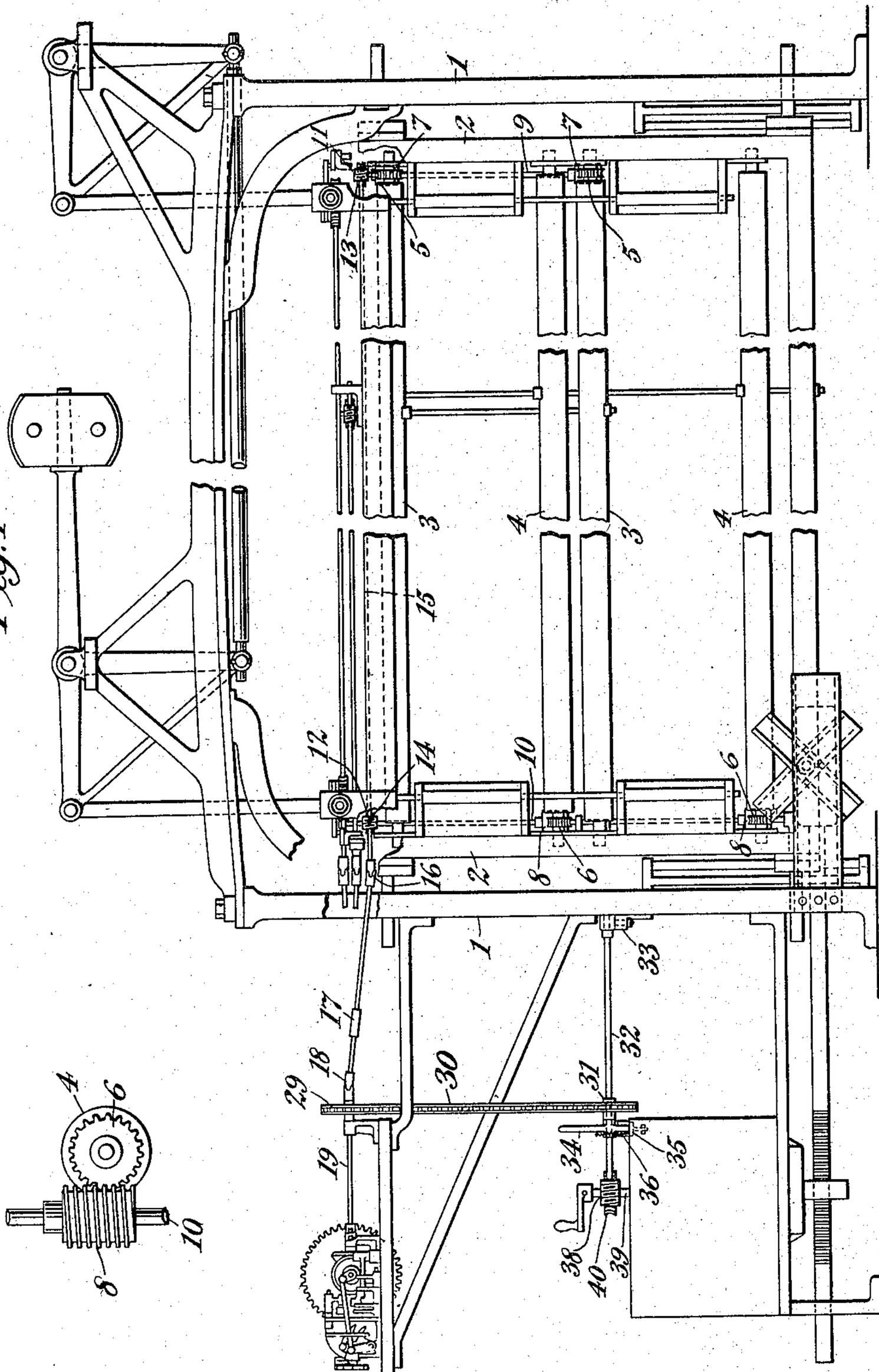

Fig. 1

Fig. 4

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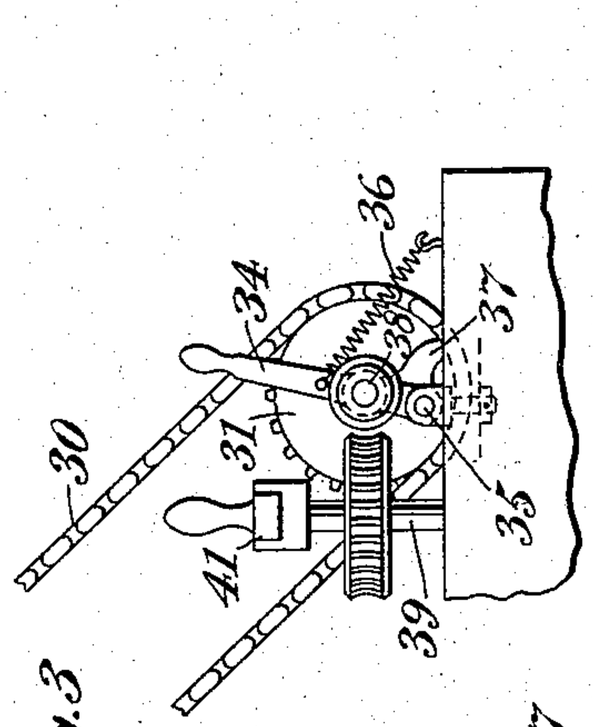

Fig. 3

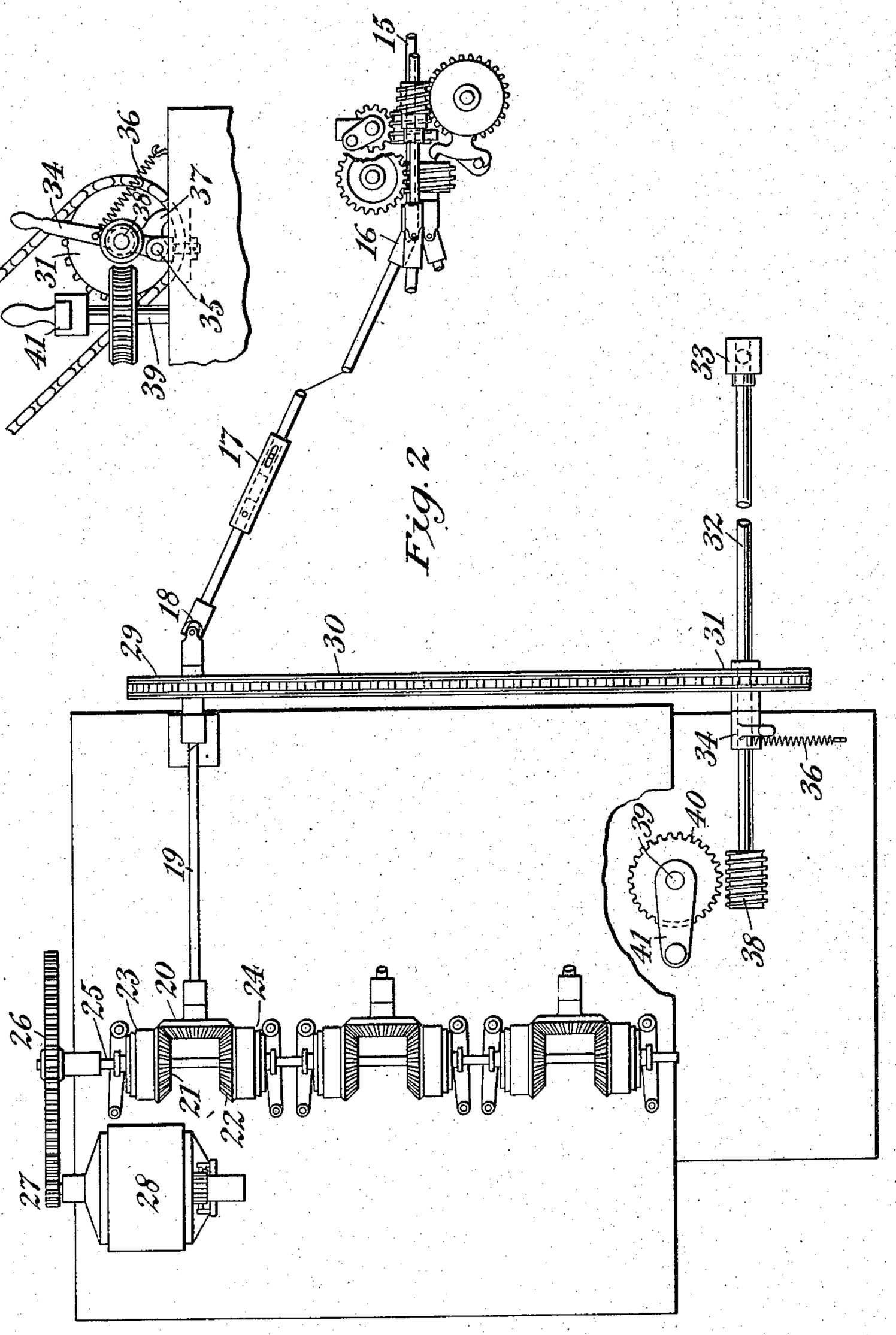

Fig. 2

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UNITED STATES PATENT OFFICE.

JOSEPH A. GROEBLI, OF NEW YORK, N. Y.

EMBROIDERING-MACHINE.

1,166,676. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed February 9, 1915. Serial No. 7,103.

To all whom it may concern:

Be it known that I, JOSEPH A. GROEBLI, a citizen of the United States, and 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 that class of embroidering machines wherein the fabric to be embroidered is carried by fabric holders, as rollers, mounted in a tambour frame, which frame is moved, preferably automatically under the control of jacquard mechanism, step by step into different positions in a vertical plane to successively present the fabric in the selected stitch positions before the needles, while the fabric is periodically shifted in its position in the frame, as by rolling it from one roller to another, so as to bring forward new portions to be embroidered.

In embroidering a pattern in an automatic machine of the character mentioned, it is customary for the workman, after the fabric has been properly shifted by rolling it from one fabric roller to another, to begin at the top of the figure to be embroidered and work down, gradually raising the tambour frame, so that the embroidering is finished at the bottom of the figure, and hence at a point nearest to the top of the next figure to be embroidered. This results in bringing the tambour frame into an elevated position, from which it must be brought down before beginning work on the next figure of the embroidery. If now the tambour frame is lowered, the embroidering threads which are still attached to the fabric will be drawn out from the needles and shuttles to an extent equal to the distance the tambour frame is lowered, while if the fabric is first wound up from a lower to an upper roller, before the tambour frame is lowered, the threads will also be drawn out as much as the fabric is rolled up. And, in either case, when the following movement of rolling the fabric or lowering the tambour frame is completed and the fabric is brought back to approximately its last position relative to the needles, the threads which have been drawn out as mentioned above will remain slack and loose, the slack not only being wasted but also interfering with the neat and accurate commencement of the next figure.

My present invention is directed to means whereby the fabric shall be rolled up simultaneously with the lowering of the tambour frame and at substantially the same rate of speed; so that the fabric shall retain substantially the same position relative to the needles (allowance being made, of course, for the proper distance between the completed figure and the next), and unnecessary slack and waste of the threads will be avoided, while time will be saved by performing the two operations of reeling the fabric and adjusting the tambour frame simultaneously.

In the drawings, Figure 1 is a front elevation of an embroidering machine, in which, for simplicity, the various stitching devices are omitted, but which shows my new method of connecting the reeling apparatus with the tambour frame actuating mechanism, portions of the mechanism being broken away for clearness; Fig. 2 is a plan view, showing particularly the mechanism connecting the reeling devices and the tambour frame actuating mechanism, parts being broken away to make the construction clearer; Fig. 3 is an elevation taken at right angles to Fig. 1 and looking from left to right at the lower part of the aforesaid connecting mechanism; and Fig. 4 is a detail of the worm and worm gear mechanism actuating the fabric rollers. Figs. 3 and 4 are on an enlarged scale.

Similar reference numerals designate corresponding parts in all the figures.

The automatic mechanism employed to shift the tambour frame may be of a character well known in the art, as, for instance, that shown in Letters Patent of the United States, issued to me November 6, 1894, and numbered 528,632, and for that reason I have not illustrated such mechanism in detail, and I will explain the application of my present invention by considering it as connected with the mechanism illustrated in that patent, the shaft 39 of the present drawings corresponding with the shaft shown in said patent as carrying the pinion D^{18}. It is through this shaft that the movements of the tambour frame are controlled by hand, as explained in said patent.

1 is the frame of the machine; 2 is the tambour frame mounted therein and counterbalanced so as to move freely in a vertical plane, in the way well known in the art, under the influence of the jacquard mechanism. Fabric rollers, shown as two pairs,

3, 4; 3, 4; are journaled in the tambour frame, and carry worm gears 5, 5 and 6, 6, driven by worms 7, 7 and 8, 8 upon the vertical shafts 9 and 10, respectively, which, in turn, are respectively provided with worm gears 11 and 12, meshing with worms 13 and 14 on shaft 15, driven through knuckle joint 16, sleeve joint 17 and knuckle joint 18, shaft 19, bevel gears 20, 21 or 22, clutch 23 or 24 on shaft 25 and gears 26, 27, by the motor 28. By this means the upper and lower fabric rollers of each pair are rotated simultaneously and uniformly, the direction of movement depending upon which of the clutches 23 or 24 is made to engage with a beveled gear 21 or 22 which gears are idle upon the shaft 25 except when engaged by their respective clutches, splined to shaft 25.

Upon the shaft 19 is mounted a sprocket wheel 29, carrying a chain 30 traveling around a similar sprocket wheel 31 mounted upon a shaft 32, journaled at one end in a swiveled bearing 33 upon the frame of the machine, and, toward its other end, in an arm 34 pivoted at 35 in a pivoted bearing and held back by a spring 36 into a position determined as by a suitable stop as 37. Upon the end of the shaft 32 is a worm 38.

I have shown the shaft 39, which as already mentioned, corresponds with the shaft shown in my Patent No. 528,632 as carrying the gear D^{18}, as extended upward somewhat and as carrying a worm gear 40 adapted to mesh with the worm 38. The shaft 39 is also provided with a handle 41 which is identical with the handle D^{20} of said patent. It will be seen, therefore, that, by means of the sprocket wheels 29, 31 and chain 30, the shaft 32 may be made to revolve at the same speed as the shaft 19, and if the worm 38 is brought into mesh with the worm gear 40, the shaft 39 may be made to revolve simultaneously with the rollers 3, 4, and at the same speed if that is desired, or at such relative speed as may be established by the pitch and size of the respective worms and worm gears.

In practice, when it is desired to lower the tambour frame and reel the fabric, the shaft 39 is first swung into position and lowered to bring its gear D^{18} into mesh with the gears D^{9} and D^{16} of said patent, so that the rotation of said gear D^{18} will cause the tambour frame to move vertically. The arm 34 is then drawn over, against the resistance of the spring 36, so as to bring the worm 38 into mesh with the worm gear 40, and, the motor being put in operation, the fabric rollers will be turned to reel the fabric to the desired extent, while simultaneously the tambour frame will be moved in the reverse direction, the gearing intermediate shafts 19 and 39 being so arranged that the relative movement of the fabric rollers and tambour frame shall be as described.

Obviously, the movement of the fabric rollers may be initiated before the worm 38 is thrown into mesh with the worm gear 40, and it may be continued after the worm and gear have been disconnected, and special adjustments of the tambour frame may be made manually by the use of the crank 41, the arrangement whereby the roller operating and the tambour frame operating mechanisms are, optionally, connected or disconnected allowing them to be worked together or independently as may be desired.

I have illustrated the connection between the two mechanisms last mentioned as being made by means of sprocket wheels, a chain and a swinging shaft. But, of course, it will be understood that other well known mechanical equivalents for transmitting motion may be used instead of these elements, the important thing being that the movement of the roller driving mechanism shall be communicated to the tambour frame adjusting mechanism at a suitable rate of speed and so as to be readily applied to or detached therefrom.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:—

1. The combination, in an embroidering machine of a tambour frame provided with fabric carriers, means for actuating the fabric carriers to shift the fabric, means for actuating the tambour frame in a direction reverse to the shift of the fabric, and intermediate means for causing the carrier actuating means to govern the movement of the tambour frame actuating means.

2. The combination, in an embroidering machine of a tambour frame provided with fabric carriers, means for actuating the fabric carriers to transfer fabric from one to another, means for moving the tambour frame vertically and intermediate means for detachably connecting the fabric carrier actuating means with the tambour frame moving means.

3. The combination, in an embroidering machine, of a tambour frame, fabric transferring means mounted therein, and interconnected means for moving the tambour frame and fabric transferring means relatively and simultaneously in opposite directions in the same line.

4. The combination, in an embroidering machine, of a tambour frame, fabric transferring means mounted therein and optionally interconnectible means for moving the tambour frame and fabric transferring means relatively and simultaneously, so as to return the tambour frame each time to the same initial position coincidently with the shifting of the fabric.

5. The combination, in an embroidering machine, of a tambour frame, fabric transferring means mounted therein, intercon-

nectable means for causing the fabric transferring means to shift the fabric in one direction while the tambour frame is returned in the opposite direction to an initial position.

6. The combination, in an embroidering machine, of a tambour frame, means for supporting a fabric thereon, and common means for shifting the fabric in one direction in the frame and simultaneously returning the frame in an opposite direction to an initial position.

7. The combination, in an embroidering machine, of a tambour frame, means embodying carrying rollers for shifting a fabric vertically thereon, means for moving the tambour frame vertically and disconnectible, common means for simultaneously causing the rollers to shift the fabric in one direction while the tambour frame is shifted in the opposite direction.

8. The combination, is an embroidering machine, of a tambour frame, means embodying carrying rollers for shifting a fabric vertically thereon, means for moving the tambour frame vertically and disconnectible, common means for simultaneously causing the rollers to shift the fabric in one direction while the tambour frame is shifted in the opposite direction at substantially the same rate of speed.

9. The combination, in an embroidering machine, of a tambour frame, fabric rollers mounted thereon, a driving shaft for actuating said rollers, means for moving the tambour frame vertically, a shaft governing said latter means, and gearing intermediate the said shafts for transmitting motion from the former to the latter.

10. The combination, in an embroidering machine, of a tambour frame, fabric rollers mounted thereon, a driving shaft for actuating said rollers, means for moving the tambour frame vertically, a shaft governing said latter means, and gearing intermediate the said shafts and embracing sprockets, a chain, a swingable shaft, a worm and worm gear for transmitting the motion from one shaft to the other.

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