V. KOBLER.

NEEDLE THREAD GUIDING DEVICE FOR SHUTTLE EMBROIDERY MACHINES.

APPLICATION FILED SEPT. 20, 1909.

1,008,650. **Patented Nov. 14, 1911.**

2 SHEETS—SHEET 1.

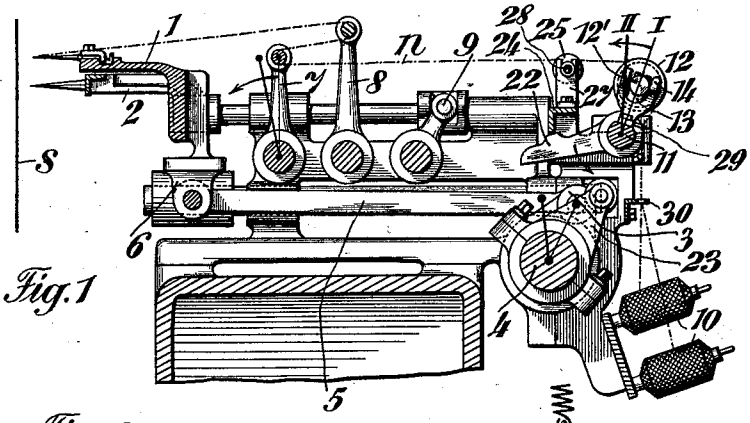

Fig. 1

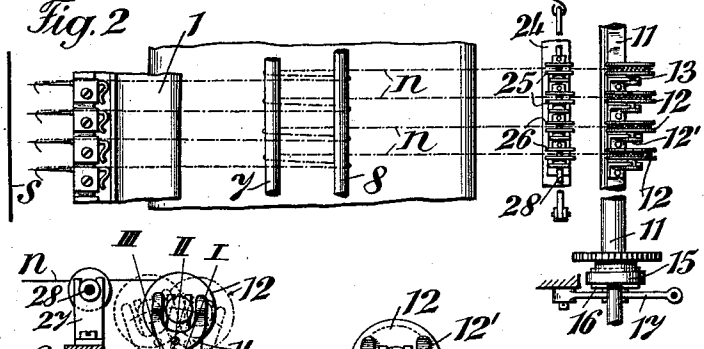

Fig. 2

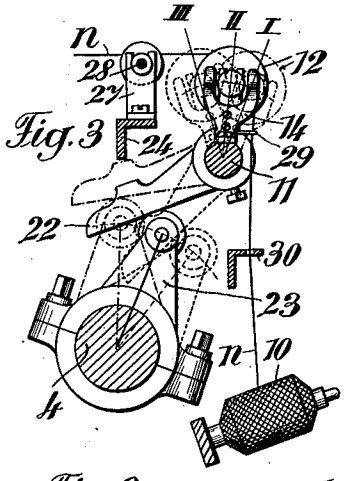

Fig. 3

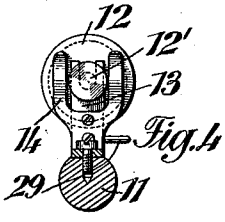

Fig. 4

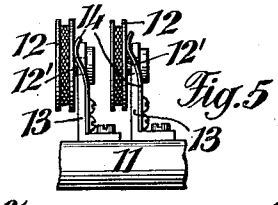

Fig. 5

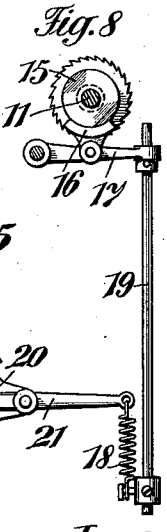

Fig. 8

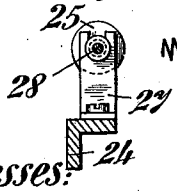

Fig. 6

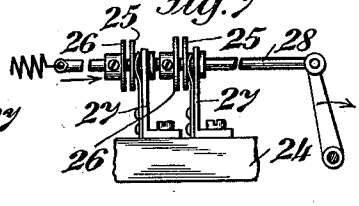

Fig. 7

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2 SHEETS—SHEET 2.

Fig. 9

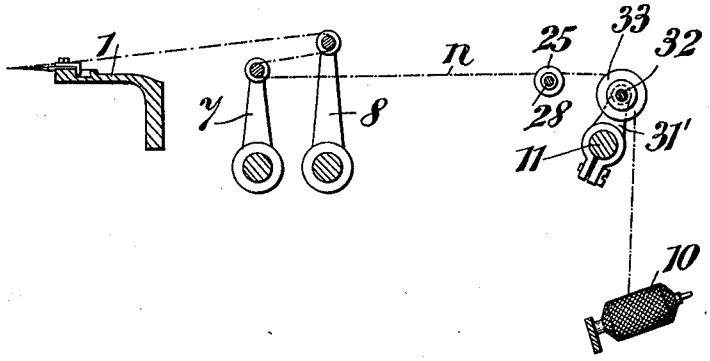
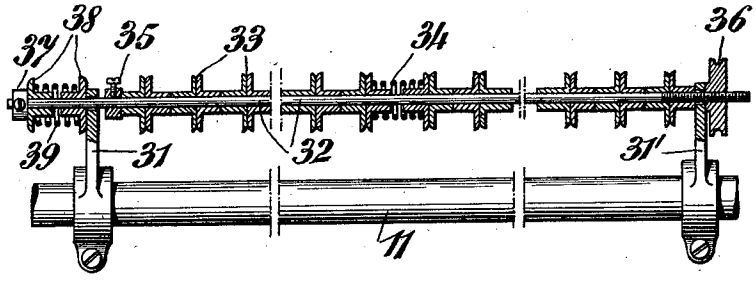


Fig. 10



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NEEDLE-THREAD-GUIDING DEVICE FOR SHUTTLE EMBROIDERY-MACHINES.

1,008,650. Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed September 20, 1909. Serial No. 518,680.

To all whom it may concern:

Be it known that I, VICTOR KOBLER, a citizen of the Republic of Switzerland, residing at Rorschach, Promenadenstrasse 92, Switzerland, have invented certain new and useful Improvements in Needle-Thread-Guiding Devices for Shuttle Embroidery-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Needle thread guiding devices for shuttle embroidering machines are already known in which there are provided, as a substitute for the emery tension roller hitherto used for each needle thread, two clamping devices and between these and the thread spools a thread guide which serves to draw the threads off the spools and which, when the thread is drawn off to form the stitch, and while the longitudinal part of the thread which passes over the thread guide to the spools is clamped fast, is brought out of its normal position by one of the clamping devices, and for the purpose of drawing off the thread, and while the longitudinal part of the thread which passes to the needles is clamped fast, is positively moved back into the normal position by the other clamping device. These known needle thread guiding devices have the disadvantage that the threads passing over the thread guide suffer too great a friction against it and that an equalization of the tension of the individual threads cannot be obtained as the threads are alternately held fast by the two clamping devices.

The present invention relates to a needle thread guiding device for shuttle embroidering machines, with a clamping device for each thread and a rocking thread conductor arranged between the clamping devices and the thread spools. In this device the thread conductor is constructed to regulate the tension of the thread, being provided with a brake arrangement for each separate needle thread, which brake arrangement puts a brake upon the thread to such an extent that the thread conductor is brought out of its normal position by the pull of all threads together and overcoming, as it does so, a brake resistance exerted upon its shaft, and at the same time permits an equalization of the differences of tension in the several threads.

The accompanying drawings show an example of a needle thread guiding device constructed according to this invention.

Figure 1 of such drawings shows the device in vertical section with adjacent portions of the embroidering machine. Fig. 2 is a partial plan of Fig. 1. Fig. 3 shows the device on a larger scale likewise in vertical section. Figs. 4 to 8 are detail views of parts of the same. Figs. 9 and 10 illustrate a modification of the device in transverse and longitudinal section respectively.

Of the portion of the embroidering machine shown in Figs. 1 and 2, 1 indicates the needle bar carrying the needles, and 2 the piercer bar provided with piercers; 3 is the operating lever for the needle bar, which is mounted upon a shaft 4 and is connected to the needle slide 6 carrying the needle bar by means of a link 5.

7 is the small and 8 the large thread conductor; 9 is the operating lever for the piercer bar and 10 are thread spools; *s* is the groundwork of the embroidery and *n* the needle threads.

In place of the emery tension roller hitherto used there is provided in the embroidering machine shown a rocking regulating thread conductor located between the large thread conductor 8 and the thread spools 10 and which carries a thread braking device for each separate thread, these thread braking devices being carried upon a common shaft 11 which extends the whole length of the embroidering machine. Each of these thread braking devices is constituted by a friction disk 12 formed on its periphery with a roughened furrow and loosely mounted by means of a headed pin 12^1 in the fork-shaped end of an arm 13 fixed upon the shaft 11 and is subjected to the braking action of a fork-shaped flat spring 14 which is fixed to the arm 13 (see Figs. 4 and 5), and bears with both of its arms on both sides of the arm 13 against the disk 12.

Upon the end of the shaft 11 which is nearest the place where the embroiderer stands is mounted a brake disk 15 against which a brake block 16 carried by a lever 17 bears under the action of a tension spring 18. The spring 18 is attached at one end to a rod 19 bearing against the lever 17 and at

its other end the spring is secured to a lever 21 which is adjustable along a fixed segment 20 (see Fig. 8). By shifting the lever 21 on the segment 20 the tension of the spring 18 and thereby the braking action of the block 16 upon the disk 15, that is to say upon the shaft 11, can be varied according to requirements. Upon the shaft 11 of the regulating thread conductor 11—14 are also mounted lever arms 22 which, for the purpose of rotating the shaft 11, can be acted upon by other lever arms 23 mounted on the shaft 4 and provided at their free ends with rollers. Figs. 1 and 3 of the drawings only show one of the lever arms 22 and one of the lever arms 23.

24 is a fixed stop bar that serves to limit the stroke of the lever arm 22 and which is arranged in front of the shaft 11 and extends in the same direction as such shaft; this bar carries a clamping device for each needle thread formed in the well known way by a rigidly mounted disk 25 and another disk 26 movable axially with relation thereto, the corresponding needle thread being passed between the two disks. The disks 25 are mounted on arms 27 fixed to the bar 24 and lie against springs, while the disks 26 are carried by a common bar 26 passing through the disks 25 and movable against the action of a spring, so that by movement of the bar the disks 26 can be pushed against the disks 25 for the purpose of clamping the needle threads fast. On the arms 13 of the regulating thread conductor 11—14 are also arranged thread guide eyes 29 and between these arms and the thread spools 10 a thread guide bar 30 is arranged.

The needle threads *n* are drawn from the spools 10, through the guide bar 30 and eyes 29, laid once around the friction disks 12 and then passed between the disks 25 and 26 and over the bars of the thread conductors 7 and 8 to the needles.

When embroidering the action of the hereinbefore described device is as follows: At the beginning of the operation the needle bar 1 is situated with the needles in their rear or drawn-back position and the regulating thread conductor 11—14 is likewise in its rearward position of rest, corresponding to Figs. 1 and 2 and the needle threads are released by the clamping disks 25, 26.

When the needle bar is moved toward the groundwork *s* of the embroidery, by means of the shaft 4 through the parts 3, 5 and 6, for the purpose of forming a stitch, and the small thread conductor 7 simultaneously executes its forward stroke, the threads will be drawn forward an amount corresponding to the amount consumed during the formation of the previous stitch, simultaneously the regulating thread conductor 11—14 will rock in the direction indicated by the arrows, without the friction disks being in general rotated during this operation by the threads lying in the roughened furrows thereof. This rocking of the thread conductor 11—14 is a movement which takes place for threads with normal tension; it is a result of the fact that, as already mentioned, the braking action exerted on the shaft 11 is different in intensity from that exerted on the friction disks 12 as a whole. As there are more threads under the normal tension than there are under an abnormal tension and the braking action exerted upon the shaft 11 by brake block 16 (Fig. 8) is only about five kilograms and consequently less than the total braking exerted upon the friction disks 12, which is only about thirty kilograms when there are 300 needles, the brake action on the shaft 11 is overcome and the regulating thread conductor is rocked out of its position of rest I (Fig. 3) into the position II. At the same time however the threads, the tension of which is greater than normal, rotate the corresponding friction disks 12 and overcome the braking action exerted thereupon which is less than that exerted on the shaft 11 because, as mentioned there are fewer threads under abnormal tension, so much thread being thereby drawn from and off the spools until the normal thread tension is attained. When the necessary thread has been drawn off the spools and the equalization of the tension has taken place all the needle threads are held fast between the clamping disks 25, 26.

When the needles are moved into the groundwork *s* of the embroidery for the purpose of forming a loop, the two thread guides 7 and 8 permitting a drawing off of the threads through the needles in the usual way and the shaft 4 executing its greatest forward rotation, the levers 23 strike against the arms 22 located in their path (see Fig. 3) and swing them upwardly and in doing so bring back the regulating thread conductors out of the position II into the position of rest I again (see Fig. 3), which movement is limited by the striking of the arms 22 against the bar 24. As in this operation the threads *n* are on the one hand still held fast by the clamping disks 25 and 26, and on the other hand cannot slide on the roughened periphery of the disks 12, then, while the disks 12 rotate and the total braking action exerted thereon is overcome, threads will be drawn off the spools for a length which is equal in amount to the length of thread consumed immediately previous. After the formation of the loops of the needle threads the stitches are drawn up in the usual way by the larger thread conductors 8. The operation described is repeated at each advance of the needle bar 1 and each thrust of the needles into the groundwork *s* of the embroidery to form a loop.

When piercing, during which operation the needle bar 1 remains in its rear or withdrawn position as shown and only the piercer bar 2 is moved toward the groundwork of the embroidery by the levers 9, the length of thread drawn off the spools is, as a rule, greater than when embroidering, since the groundwork of the embroidery is displaced relatively to the piercers and the needles respectively. The needle threads released by the disks 25 and 26 will therefore rock the regulating thread conductor a greater amount forwardly after overcoming the braking action on the shaft 11 and without rotating the friction disks, in other words it will bring it out of the position of rest I into the position III of Fig. 3.

If embroidering is being done instead of piercing, the regulating thread conductor 11—14, when the needle bar is moved toward the groundwork of the embroidery, will be brought back from the position III into the position I again by the levers 23 of the shaft 4 acting on the arms 22 and thereby the length of thread situated between the clamping disks 25, 26 and the groundwork of the embroidery will be shortened by an amount corresponding to the surplus thread drawn off and the thread lengths will be again brought back to the normal.

The device hereinbefore described has, in comparison with the known devices mentioned, an advantage in that the differences of tension in the various individual threads are equalized when the thread is drawn off.

It is obvious that instead of the disks 12 any other suitable thread braking devices may be employed. The main thing is that these braking devices be carried by the common shaft 11 which in its turn is again movable and subjected to braking action.

In the modification of the improved needle thread guiding device shown in Figs. 9 and 10, the brake resistances of all the brake devices of the regulating thread conductor are capable of being regulated simultaneously so as to allow for take-up of the parts forming the brake devices when worn and to enable the braking action for all the brake devices being increased at once. For this purpose arms 31, 31^1 are fixed upon the rotary brake-controlled shaft 11 of the regulating thread guide and in these arms is carried an axially movable shaft 32 upon which the pairs of brake disks are loosely mounted. One such pair is provided for each needle thread and the needle threads n are drawn through between the disks. Between two pairs of brake disks is arranged a spiral spring 34 by the action of which the pairs on the right of it are thrust toward the arm 31^1 and the pairs on the left of it toward a locking ring or collar 35 on the shaft 32, so that the disks of all the pairs of brake disks are pressed against each other and with greater or less force according to the tension of the spring 34. The right hand end of the shaft 32 is screw threaded and is fitted with a regulating wheel by means of which the distance of the locking ring or collar 35 from the arm 31^1 and the tension of the spring 34 and consequently the brake resistance of all the pairs of brake disks can be regulated. In a regulating device of this kind the shaft 32 moves axially in relation to the arms 31 and 31^1. It is not the spring 34 which effects this movement of the shaft. In order to insure this endwise movement when the brake resistance is decreased or when the regulating wheel is slackened, there is fixed on the left hand end of the shaft 32 a locking ring or collar 37 and between it and the arm 31 there are loosely mounted on the shaft two stops 38 which are held apart from each other by a spiral spring 39 arranged between them so as to press the stops on the one hand against the ring or collar 37 and on the other hand against the arm 31. So arranged it will be seen that the spring 39 insures the movement of the shaft 32. Compared with the regulating thread conductor described with reference to Figs. 1 to 8 the thread conductor shown in Figs. 9 and 10 possesses the advantage of greater simplicity and easier and quicker regulation of the brake resistance for all the threads simultaneously, this regulation being capable of being undertaken even while the machine is in motion.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In shuttle embroidering machines, a shaft pivotally carried on the frame of the machine and adapted to be turned by the tension of the threads, arms connected to said shaft, thread guiding elements rotatably carried on said arms, and means for exerting a braking action on said thread guiding elements.

2. In shuttle embroidering machines, a shaft pivotally carried on the frame of the machine and adapted to be turned by the tension of the threads, arms secured to said shaft, thread guiding elements rotatably carried on said arms, means for exerting a braking action on said thread guiding elements, and means for returning the shaft to its initial position.

3. In shuttle embroidering machines, a shaft pivotally carried on the frame of the machine and adapted to be turned by the tension of the threads, arms secured to said shaft, thread guiding elements rotatably carried on said arms, means for exerting a braking action on said thread guiding elements, and means for automatically returning the shaft to its initial position.

4. In shuttle embroidering machines, a

shaft pivotally carried on the frame of the machine and adapted to be turned by the tension of the threads, said shaft having arms, thread guiding elements rotatably carried on said arms, and means for exerting a braking action on said thread guiding elements, a lever mounted on the shaft, and means positively driven by the machine adapted to engage the lever and turn the shaft.

5. In shuttle embroidering machines, a thread regulating conductor comprising a rotatable shaft, laterally projecting arms on the latter, an axially movable support mounted in the arms, a plurality of thread guides mounted on the support, a spring interposed between two of said guides, a sleeve fixed on the support, a spring interposed between the sleeve and one of the laterally projecting arms, and means for regulating the tension of the last named spring to exert pressure on the spring interposed between the guides.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

VICTOR KOBLER.

Witnesses:
C. MEYER,
CARL ELDER.