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AUTOMATIC STOP MECHANISM FOR JACQUARD EMBROIDERING MACHINES.

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1,049,556. Patented Jan. 7, 1913.

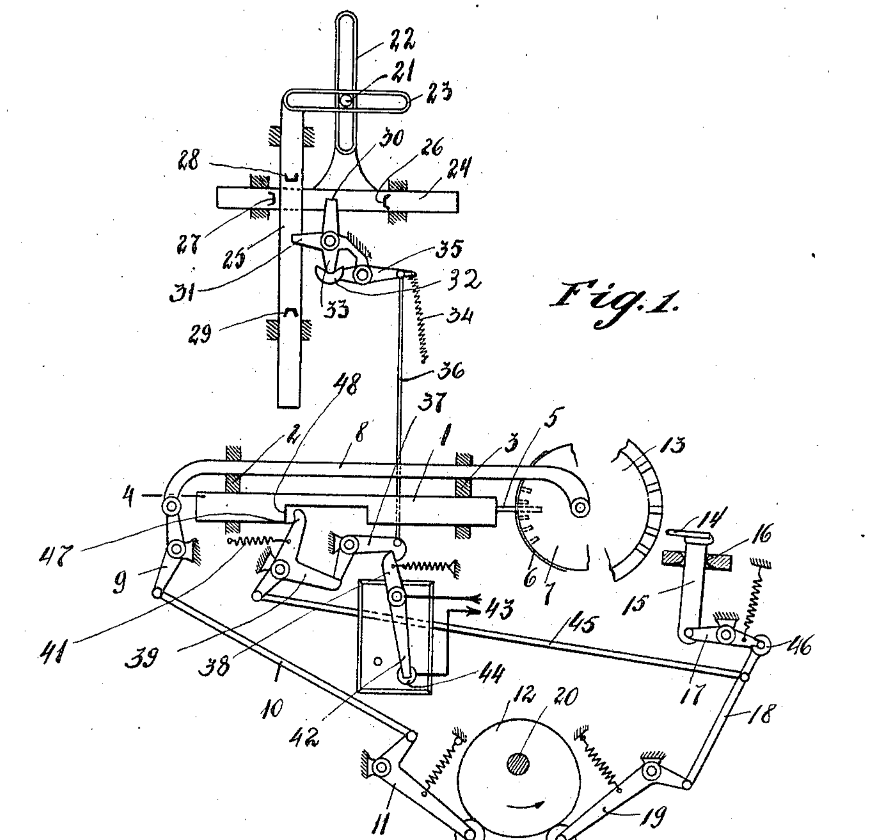

Fig. 1.

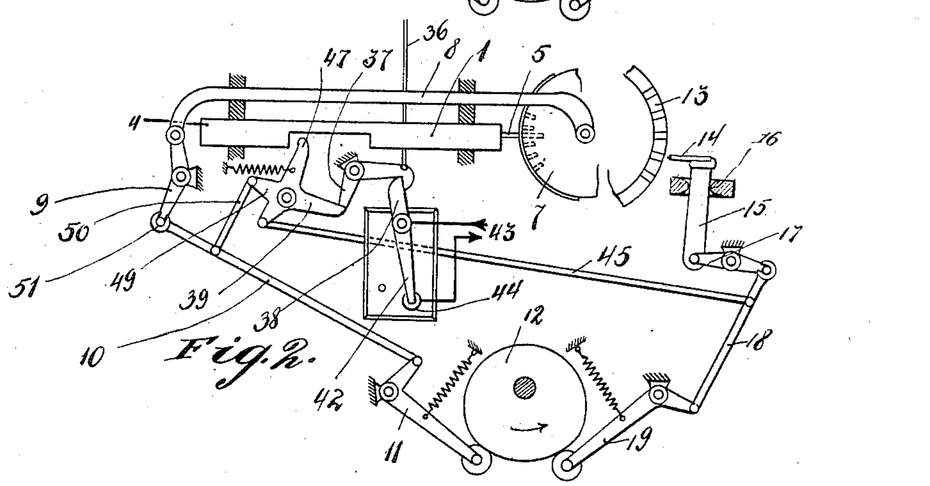

Fig. 2.

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AUTOMATIC STOP MECHANISM FOR JACQUARD EMBROIDERING-MACHINES.

1,049,556. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed November 7, 1911. Serial No. 659,049.

To all whom it may concern:

Be it known that I, ROBERT ZAHN, a subject of the German Emperor, residing at Plauen, Vogtland, in the Kingdom of Saxony, Germany, have invented certain new and useful Improvements in Automatic Stop Mechanism for Jacquard Embroidering-Machines, of which the following is a specification.

The present invention relates to an automatic stop mechanism for jacquard embroidering machines.

With ordinary embroidering machines, that it to say, such that are operated by hand by means of a pantograph, it is the duty of the operator among other things to also carefully watch that the limits of the embroidery surface be not exceeded. Would the fabric frame move outside of the predetermined limits, then either the fabric rollers or the inner edges of the fabric frame would come into the range of the embroidering implements, which would, of course, have fatal results. For the same reason, this precaution is required with automatic embroidering machines. Since, however, the operation of the machine is controlled automatically by the jacquard mechanism, a special mechanism is required, whereby the machine and the jacquard card are automatically stopped and the jacquard needles are made inoperative just as soon as the fabric frame in course of its operation arrives at the limit of its movement in any direction, or at any disturbance in the jacquard mechanism.

In the accompanying drawing, in which similar reference letters denote corresponding parts, Figure 1 is a diagrammatic view of one embodiment of my apparatus and Fig. 2 is a similar view of a modification thereof.

The jacquard mechanism being of substantially well known construction, I have shown only so much of it as is necessary for a clear understanding of the operation of my new mechanism.

The needle bars 1, which in bearings 2 and 3 are capable of sliding in longitudinal direction, carry at one end the so called jacquard needles 5, which are adapted to cooperate with the jacquard card 6. The latter is conveyed over a roller or drum 7, which is rotatively borne in longitudinally movable bars 8. These bars are operated from a cam disk 12 arranged on a driving spindle 20 by means of a spring actuated bell crank lever 11, one arm of which carries a roller bearing on the surface of the said cam disk and the other arm of which by means of a rod 10 and lever 9 is connected to bars 8. Rigidly connected and coaxially arranged with the card drum or roller 7 is a ratchet wheel 13 with which coöperates a tooth 14 carried by one end of a rod 15, which at 16 is so supported as to be capable of swinging and simultaneously reciprocating toward and away from the said ratchet wheel. The other end of the said rod 15 is connected to a spring actuated lever 17, which is adapted normally to be engaged by the forked or hook-shaped end 46 of a rod 18. The latter is connected to one arm of a spring actuated bell crank lever 19, which by means of a roll bears on the periphery of the cam disk 12 or a cam disk arranged coaxially therewith. By the constant rotation of the spindle 20, the card roller or drum 7 receives an intermittent rotary motion through the medium of the ratchet wheel 13 and tooth 14 and simultaneously a reciprocatory longitudinal motion, whereby the needle bars 1, those of the needles 5 which register with a solid part of the card 6, are displaced to the left, while those of the needle bars the needles of which register the perforations in the card remain stationary.

21 denotes a pin projecting from the fabric frame with which are engaged the cross loops 22, 23 for transmitting the various movements to the fabric frame. The loops 22, 23 are respectively connected to sliding members 24, 25, to which in well known manner, as for instance, in the manner shown and described in my German Patent #228,231, of November 7, 1910, or in my copending application for U. S. patent Ser. #542,305, filed February 5, 1910 and allowed December 5, 1911, reciprocatory motion is transmitted from the needle bars 1 at the points 4 thereof, the above named sliding members 24, 25 corresponding to the racks x, y in the said German patent and the said former application.

Thus far, the construction and operation of the machine are well known.

My new mechanism, whereby the embroidering machine may automatically be stopped and the jacquard mechanism rendered inoperative at the moment the fabric frame reaches the predetermined limit of its move-

ment in any direction consists in the following: The sliding bars 24 and 25 connected to the loops 22, 23 are provided at certain points each with a pair of noses or projections 26, 27 and 28, 29, respectively. Fulcrumed at a certain point is a three armed lever 30, 31, 33, so that one of its arms as 30, projects into the path of the sliding member 24 between the noses 26, 27 thereof and the arm 31 projects into the path of the member 25 between the noses 28, 29 thereof. The third arm 33 normally rests in a pan-shaped head 32 of a lever 35 actuated by a spring 34. The lever 35 by a rod 36 is connected to a double armed latch lever 37. One arm of this latch controls a spring actuated switch arm 38, 42 of an electric switch 43, 44 while the second arm of the latch 37 controls a three armed lever 39, 47. The lever 39, 47, which is actuated by a spring 41, is connected by means of a rod 45 to the rod 18 that normally engages the double armed lever 17. The arm 47 of the lever 39, 47 is adapted to project into the path of a shoulder 48 provided on each needle bar 1, while the arm 39 normally is engaged by the latch 37, so that the lever 39, 47 is held in the position shown, in which the electric circuit driving the main motor of the machine is closed, the needle bars 1 are free to be operated by the jacquard card 7 and the tooth 14 is continuously operated to feed the card.

As long as the fabric frame in course of operation does not exceed the limits of its movements, the cam 12 through the medium of lever 11, rod 10, and lever 9 imparts a reciprocatory motion to the card drum 7 and on the other hand, an intermittent feeding motion to the card through the medium of ratchet wheel 13, tooth 14 and the members 17, 18 and 19. Just as soon, however, as the fabric frame exceeds the limit of its movement in any direction, one of the noses 26, 27, 28, 29, on the corresponding members 24, 25 will engage one of the corresponding arms 30 31 and rock the same, whereby its arm 33 will impart motion to the lever 35 raising the arm 35 against the tension of its spring 34. Through the medium of the rod 36, the latch 37 will hereby be swung into a position in which simultaneously the switch arm 38, 42 will be released, opening the electric circuit of the main driving motor of the machine and thus stopping the latter and on the other hand the lever 39, 47 will be released and by its spring 41 be swung to the left. By this swinging motion of the lever 39, 47, the rod 18 will be thrown out of engagement with the lever 17 and consequently rod 15 and tooth 14 will be disconnected from the motion transmitting members 19, 18 and the operating cam 12 interrupting the feeding of the jacquard card and on the other hand the arm 47 will in striking against the shoulder 48 of the needle bars 1 shift the latter to the left out of range of the jacquard card. In this manner, the movement of the fabric frame will be so automatically controlled, that as soon as in the course of its movement in any direction, it tends to exceed a predetermined limit, not only will the embroidering machine be stopped, but the needle bars and jacquard needles will be moved out of range of the jacquard card, and simultaneously the feeding of the jacquard card will be interrupted.

To enable the complete arrest of the entire jacquard mechanism, I have, according to the modification shown in Fig. 2, provided a separate device, whereby simultaneously with the release of the arm 39, the reciprocatory longitudinal motion of the drum carrying the jacquard card will be automatically stopped. To this end, the lever 39, 47 is provided with an additional arm 49 to which the rod 10 is connected by a link 50. The rod 10 in this case, instead of being permanently connected to the lever 9, is provided with a hook-shaped or forked end 51, which normally engages the arm 9, but upon the release of the lever 39, 47, 49 by the latch 37 will become disengaged from the said arm 9, so that the connection between members 8 carrying the card roll 7 and the cam 12 will be broken and the members 8 thus instantaneously stopped.

What I claim and desire to secure by Letters Patent is:

1. In an automatic embroidery machine, the combination with the jacquard card feeding mechanism, the jacquard operated needle bars and the power controller, of means interposed between said feeding mechanism and said needle bars, and means interposed between said first named means and said power controller, and adapted to normally lock said first named means and said power controller in a certain position and when affected owing to some irregularity in the working of the machine to release the same, whereby simultaneously the machine and the feeding mechanism will be stopped and the needle bars moved away from the jacquard card.

2. In an automatic embroidery machine, the combination with the fabric frame, jacquard card feeding mechanism and the jacquard operated needle bars, of means dependent upon the movements of the said fabric frame and interposed between said needle bars and the said card feeding mechanism, said means being adapted at the moment the said frame exceeds the limits of its movement in any direction to simultaneously stop the feeding mechanism and move the needle bars away from the jacquard card.

3. In an automatic embroidery machine, the combination with the fabric frame, the jacquard card feeding mechanism, driven

means for transmitting motion to said feeding mechanism, the jacquard operated needle bars and the power controller, of means interposed between said feeding mechanism and said needle bars and means dependent upon the movements of the said fabric frame and interposed between the said power controller and the said second named means and adapted at the moment the said fabric exceeds the limit of its movement in any direction to simultaneously stop the machine, throw out of operation the feeding mechanism and to draw the needle bars away from the jacquard card.

4. In an automatic embroidery machine, the combination with the fabric frame, jacquard card feeding mechanism and the jacquard operated needle bars, of means dependent upon the movements of the said fabric frame and means interposed between said needle bars and the said card feeding mechanism and normally locked by said first named means in a certain position, said first named means being adapted at the moment the said fabric frame exceeds the limit of its movement in any direction to release the said second means, whereby simultaneously the feeding mechanism will be stopped and the needle bars drawn away from the jacquard card.

5. In an automatic embroidery machine, the combination with the fabric frame, the jacquard card feeding mechanism, the jacquard operated needle bars and the power controller, of means dependent upon the movement of the said fabric frame and means interposed between said needle bars and the said feeding mechanism, the said first named means being interposed between said power controller and the said second means and adapted to normally lock the same in a certain position and at the moment the fabric frame exceeds the limit of its movement in any direction to release the power controller and the said second means, whereby simultaneously the machine and the feeding mechanism will be stopped and the needle bars drawn away from the jacquard card.

6. In an automatic embroidery machine, the combination with the power controller, the jacquard mechanism embodying jacquard operated needle bars, a jacquard card feeding mechanism, driven means for transmitting motion to said feeding mechanism and a jacquard card reciprocating mechanism, of means interposed between said needle bars and the first named means, means interposed between said second named means and the said reciprocating mechanism, and means interposed between said power controller and said second named means and adapted to normally lock the same in a certain position and when affected owing to some irregularity in the working of the machine to release the same, whereby simultaneously the machine will be stopped, the feeding and the reciprocating mechanisms will be thrown out of operation and the said bars drawn away from the jacquard card.

7. In an automatic embroidery machine, the combination with a jacquard mechanism embodying jacquard card feeding means, and jacquard operated needle bars, and a power controller, of a mechanism between said needle bars and said feeding means and a common latch for said last named mechanism and said power controller, whereby when moved owing to some irregularity in the working of the machine, simultaneously the machine and the feeding mechanism will be stopped and the needle bars drawn away from the jacquard card.

8. In an automatic embroidery machine, the combination with the parts positively connected to the fabric frame, a jacquard mechanism and a power controller, of a common latch mechanism for the said jacquard mechanism and the power controller and means between said parts and said latch mechanism, whereby at the moment the fabric frame exceeds the limit of its movement in any direction the jacquard mechanism and the machine are simultaneously stopped.

9. In an automatic embroidering machine, the combination with parts positively connected to the fabric frame, a jacquard mechanism and power controller for the machine, of projections on said parts, a yielding member adapted to be operated by the said projections and a common latch mechanism for the said jacquard mechanism and power controller operatively connected to the said yielding member and adapted at the moment the fabric frame exceeds the limit of its movement in any direction to permit the said power controller and jacquard mechanism of being automatically set into inoperative position.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT ZAHN.

Witnesses:

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ROBERT HEINRICH NIER.