No. 686,752. Patented Nov. 19, 1901.

C. B. NEUBAUER.

AUTOMATIC STOP MECHANISM FOR EMBROIDERING MACHINES.

(Application filed Jan. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

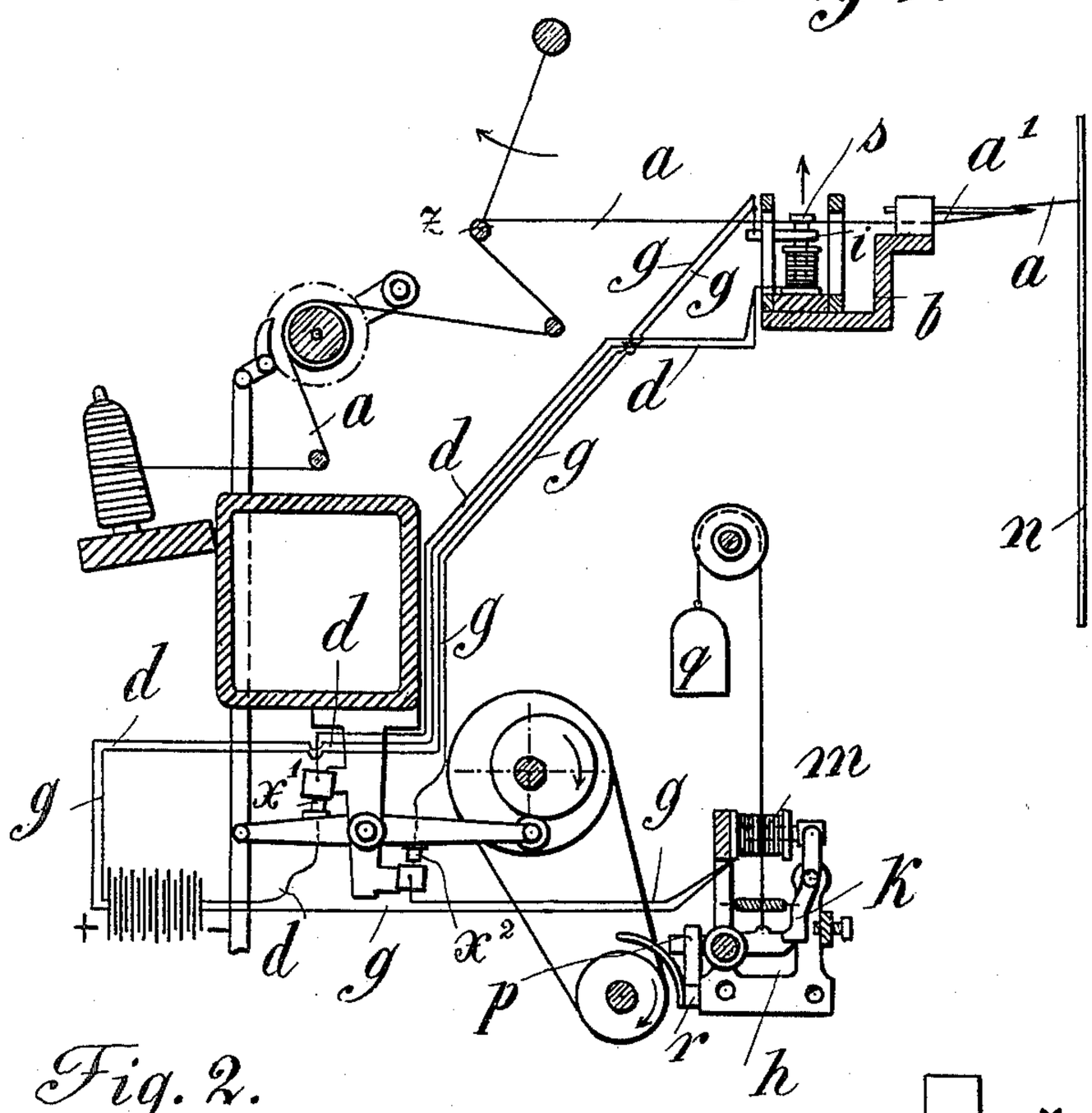


Fig. 2.

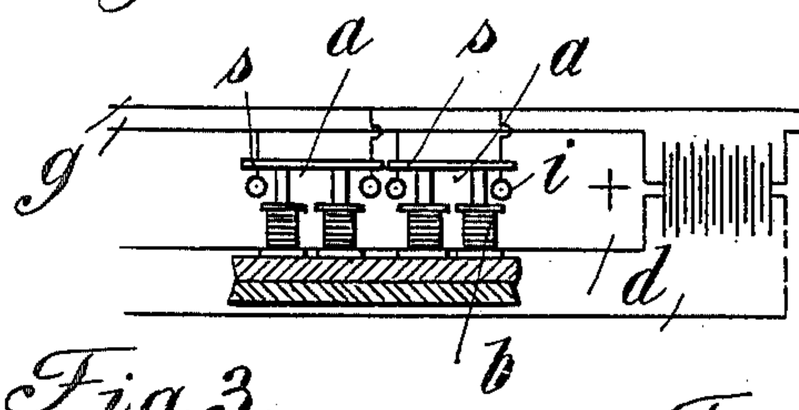


Fig. 3.

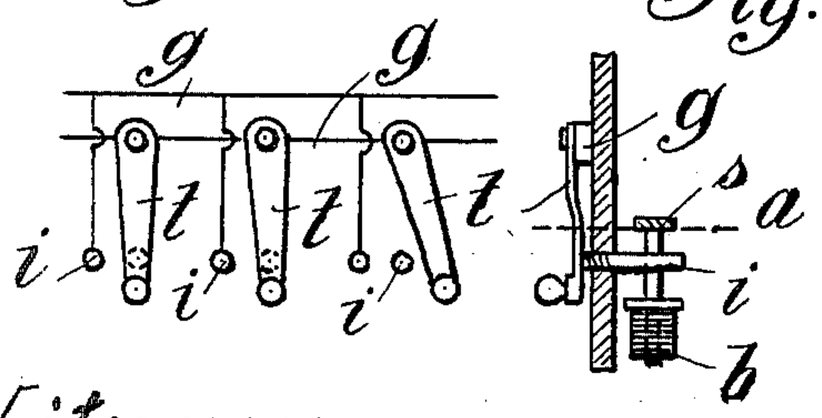
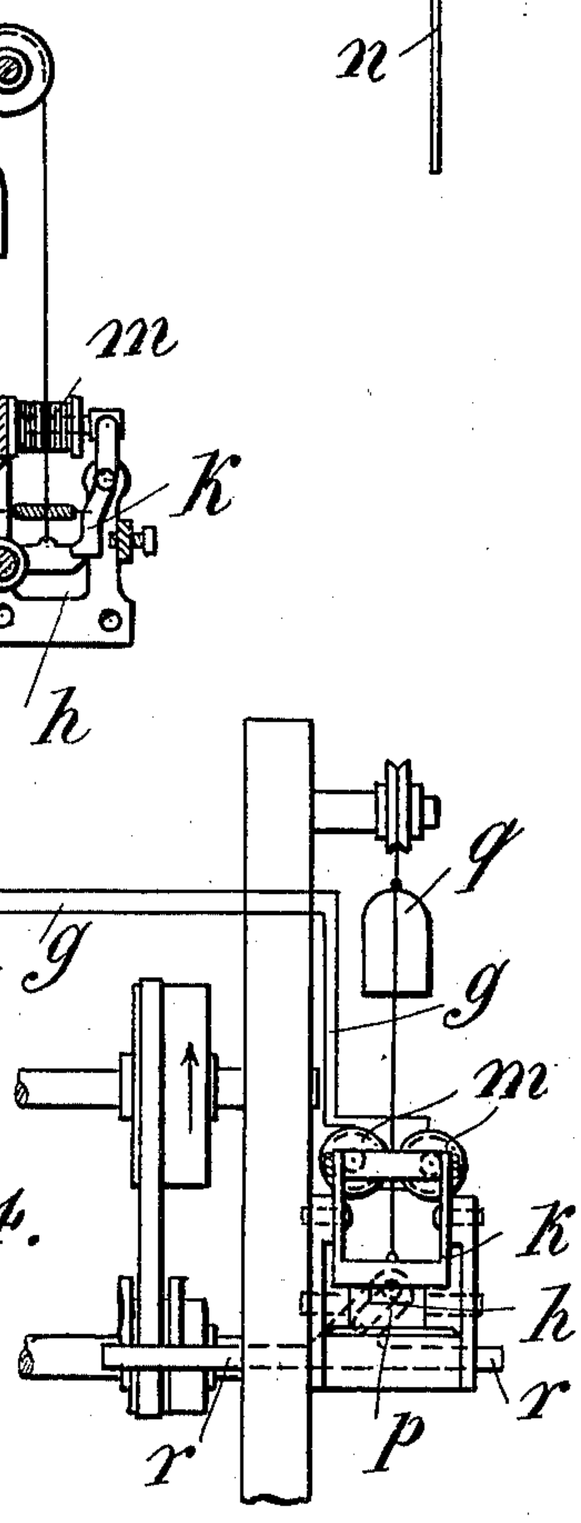


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

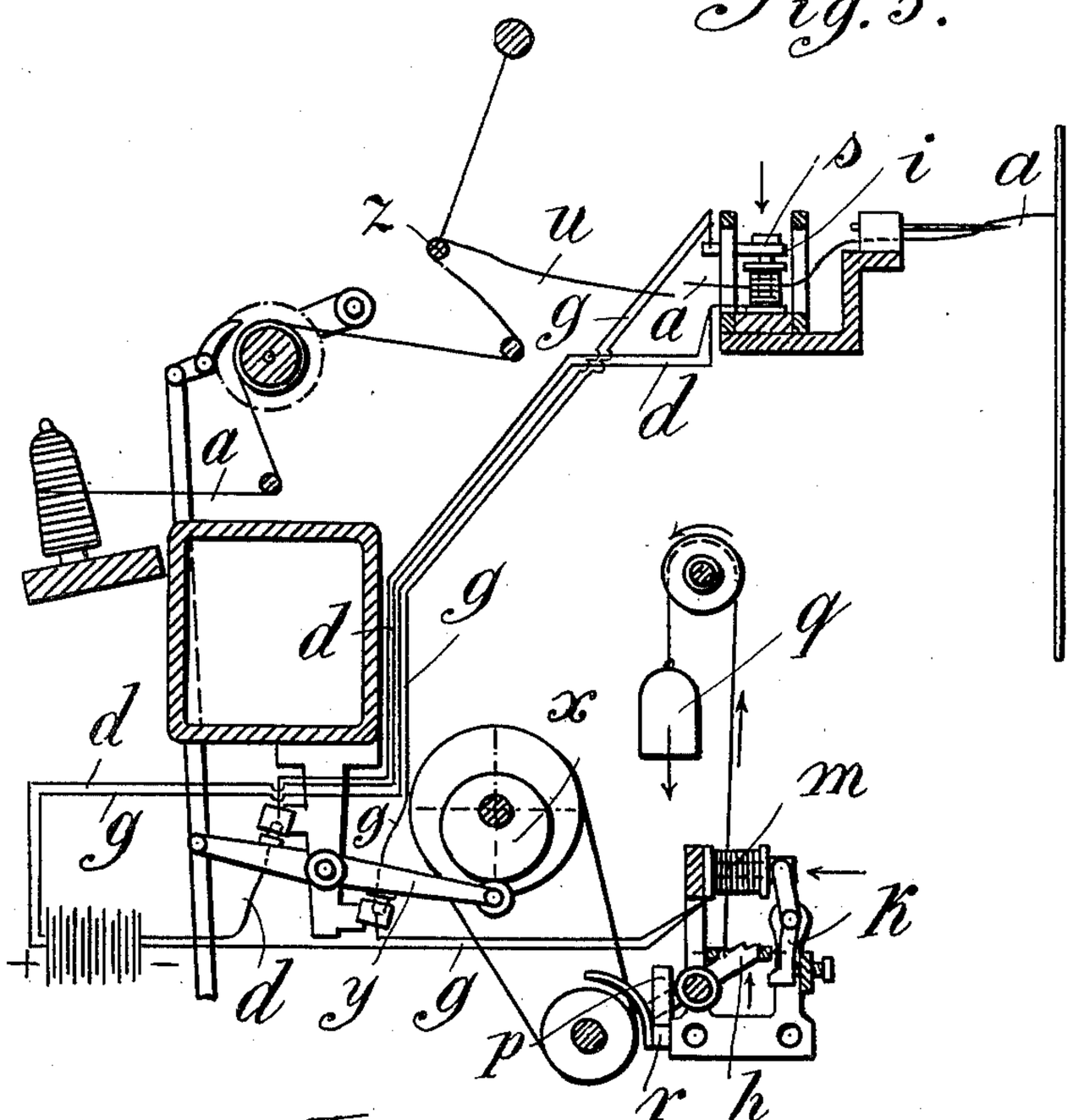
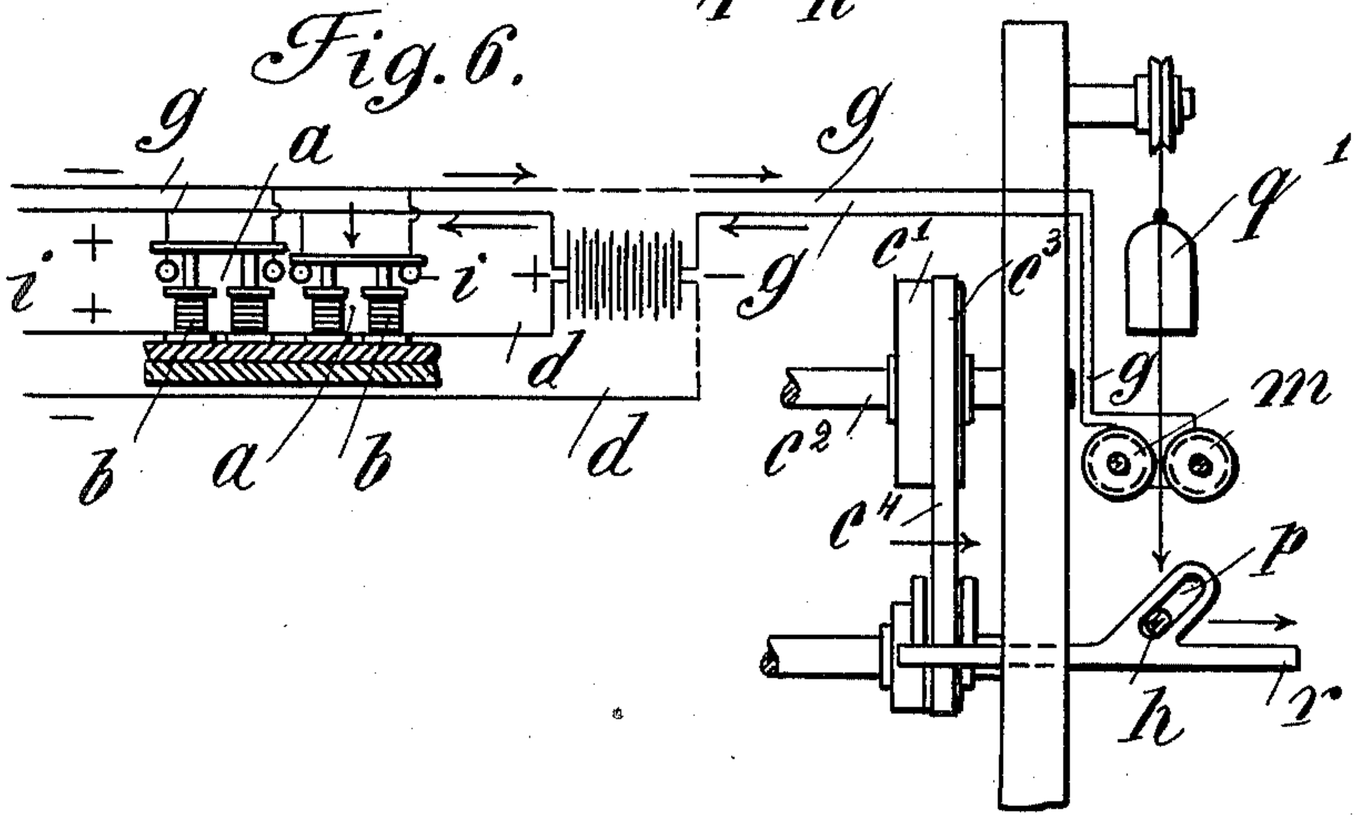


Fig. 6.



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CARL BRUNO NEUBAUER, OF PAUSA, GERMANY.

AUTOMATIC STOP MECHANISM FOR EMBROIDERING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 686,752, dated November 19, 1901.

Application filed January 28, 1901. Serial No. 45,179. (No model.)

To all whom it may concern:

Be it known that I, CARL BRUNO NEUBAUER, a subject of the King of Saxony, residing at Pausa, Saxony, Germany, have invented certain new and useful Improvements in Automatic Stop Mechanism for Embroidering-Machines, of which the following is a description.

My invention relates to embroidering-machines, especially to such machine in which a shuttle-thread is employed; and it consists of devices for automatically stopping the machine if one of the needle-threads or the shuttle-thread is torn and by which the needle-threads are controlled, so that each of same is torn and the machine stopped in case of insufficient quality of the said threads.

Referring to the accompanying drawings, Figure 1 is a diagrammatic side elevation of the part of the embroidering-machine to which the improved devices are connected, whereby the needle-threads are shown as being in a stretched condition, while the electric circuit is broken. Fig. 2 is a front elevation of the releasing mechanism, the thread-controlling device, and the circuit-closer. Figs. 3 and 4 represent details of the switches for the releasing device; and Figs. 5 and 6 are similar views to those shown in Figs. 1 and 2, but representing the mechanism in a position after the thread has been torn.

a represents the threads, fed to their respective needles a' in an ordinary manner and being in contact with the under side of horizontal bars s, which connect up in pairs the armatures of solenoids b, arranged in series. The said solenoids are fixed to the embroidering-machine so that the armatures may be supported by the said threads stretched beneath them.

d is an electric conductor connected with a suitable source of energy and leading to the said solenoids, so that the latter are excited simultaneously as soon as the circuit is completed. By closing the circuit the armatures will be drawn into the said solenoids, whereby the stretched threads will be forced downward, so that a tension is imparted to the threads which will tear the same if said threads by any reason cannot resist the said tension.

Within the cross-bars s extend pins i to a circuit g, being in connection with the releasing device, so that alternately one pin is secured to the positive pole, while the next one communicates with the negative pole. By means of those pins the circuit leading to the releasing device is closed on contact with the cross-bars s when by the tension effected by the armatures of solenoids b any one of the threads has been torn.

c' is a pulley fixed to the driving-shaft c^2, and the pulley c^3 is loosely supported by the said shaft. c^4 represents a belt by means of which the said shaft c^2 is rotated. Although I may employ any convenient mechanism for shifting the belt c^4 from the fixed pulley c' upon the loosely-mounted pulley c^3, I prefer the belt-shifter r, which is provided with a projection having a longitudinally-extending inclined slot p. h is a lever pivoted to a support and engaging with one end the said slot p, while the other end is connected with a weighted rope q. This lever is normally forced upward by means of the weight q' and is held in its lower position if the belt engages the fixed pulley c' by means of a pivotally-arranged pawl k, Fig. 1. m represents a solenoid the armature of which is pivoted to one arm of said lever k. g is an electric conductor being in connection with the said solenoid m and pins i, so that an electric current may pass to said solenoid m if the cross-bar s reaches the pins i after the thread a is torn. Thus when exciting the said solenoid m its armature is drawn inward, whereby the pawl k disengages the lever h, so that the latter may be forced upward into the position shown in Fig. 5. This movement of lever h effects the shifting of belt q upon the loosely-mounted pulley c^3, so that the machine is stopped.

x is a cam-disk mounted on the shaft c^2 and being in engagement with a roller at the end of a pivotally-supported lever y, provided with plugs x' x^2, which may be brought into contact with contact-pieces of the circuits d g after the machine has been started. As will be readily seen in Figs. 1 and 5, the cam will depress the lever y, thus closing the circuit d, so that the said solenoids b are excited. While the plug x^2 comes into contact with its contact-piece on depressing the lever y, the circuit g is closed only if the tension applied to the threads a by means of the armatures

of the solenoids *b* results in tearing one of the threads, since then two pins *i* will be connected by means of one of the said cross-bars *s*. It will be obvious that the solenoid *m*, and therefore the stopping of the machine, will be effected if one of the threads tears. Again, the stopping of the machine will take place if the shuttle-thread behind the fabric *n* is torn. In this case the respective thread *a* will not be in stretched condition at the backward movement of the needle *a'*, so that the respective armature of the solenoid *b* may drop into the latter. Therefore it is evident that the circuit *g* is completed and the machine stopped.

Figs. 3 and 4 represent a device by means of which the pins *i* may be made inoperative, if desired. This device consists of a lever *t* for each set of pins *i*, pivotally arranged at the needle-support and adapted to be brought into contact with one of the respective pins *i*.

By means of the present invention faulty embroidery is effectually prevented, since the machine is automatically stopped on the breakage or looseness of any one of the threads.

I claim as my invention—

1. In an embroidering-machine having stitch-forming mechanism comprising a thread-carrying needle, shuttle mechanism and means for stretching the needle and shuttle threads, the combination of a series of solenoid-magnets having armatures and cross-bars to connect up the said armatures in pairs, said cross-bars resting upon a needle-thread and carried by the same when properly stretched, and means for stopping the machine when one of the threads becomes loosened or breaks substantially as described.

2. In an embroidering-machine of the class specified having stitch-forming mechanism comprising a thread-carrying needle, the combination of a series of solenoid-magnets having armatures and cross-bars to connect up said armatures in pairs, said cross-bar resting on a needle-thread and carried by the same when properly stretched, a source of electric energy, means operated thereby to throw the machine out of action when its circuit is closed and means for closing the said circuit when the tension of any one of the threads allows its cross-bar to fall, substantially as described.

3. In an embroidering-machine of the class specified having stitch-forming mechanism comprising a thread-carrying needle, the combination of a series of solenoid-magnets and armatures, cross-bars to connect said armatures up in pairs, said cross-bar resting on a needle-thread and carried by the same when properly stretched, an electric circuit and means in connection with the said armature pairs, for closing the same when the tension of the thread is not sufficient to hold up the said armature pair, a belt-shifting lever and a solenoid having an armature to control said lever and means for energizing the said latter solenoid-magnet when the tension of any one of the threads relaxes in the manner and for the purpose substantially as described.

4. In an embroidering-machine of the class specified having a stitch-forming mechanism comprising a thread-carrying needle, the combination of a series of solenoid-magnets having their armatures connected up in pairs by cross-bars, said cross-bar resting on a needle-thread and carried by the same when properly stretched, contacts on the said armature pairs, an electric circuit adapted to be closed when said armature pairs are operated, a weighted lever to operate the belt-shifting forks, a detent mechanism for the same, a solenoid having an armature to control said detent mechanism and conductors to energize said latter solenoid when one of the former solenoid pairs moves by the loosening or breakage of a thread, in the manner and for the purpose substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CARL BRUNO NEUBAUER.

Witnesses:

EDWIN NUFALE,

WILHELM BERKING.