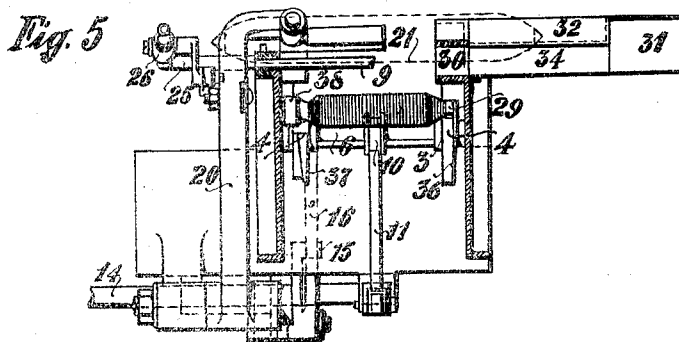
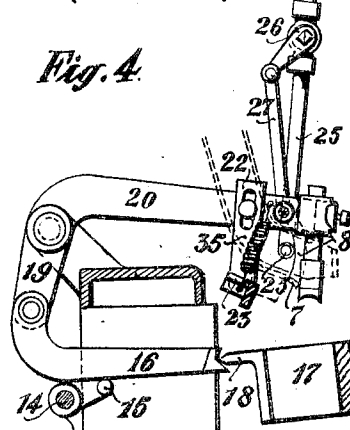
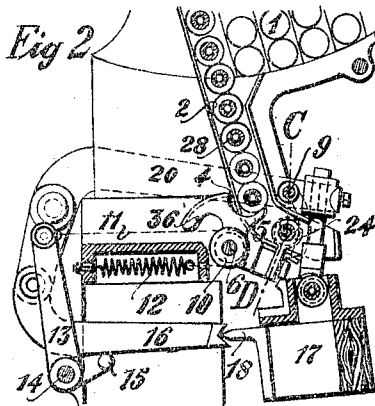
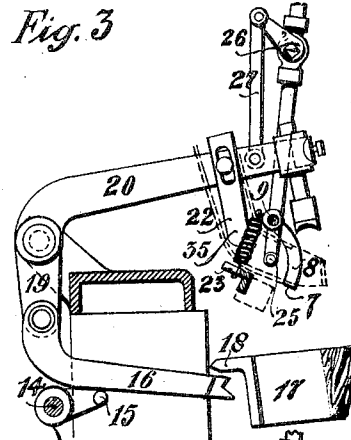
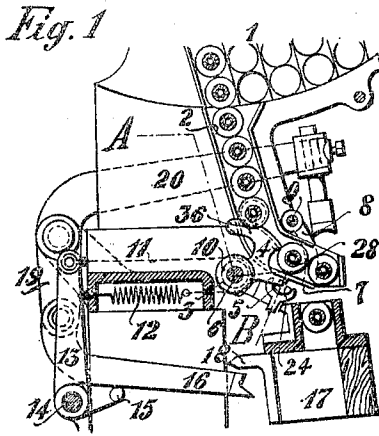


A. G. KOECHLIN.
SPOOL CHANGING APPARATUS FOR LOOMS.
APPLICATION FILED MAY 21, 1908.

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Patented Oct. 4, 1910.

2 SHEETS—SHEET 1.



Witnesses.

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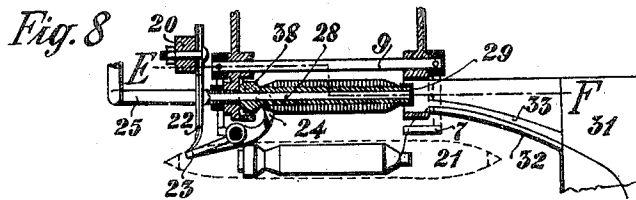
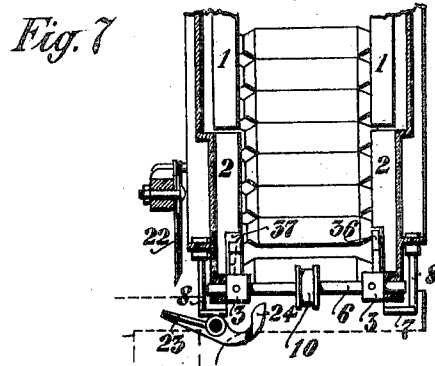
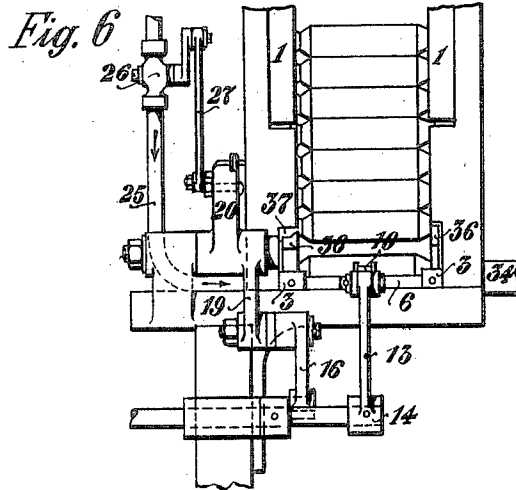
Attorneys.

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UNITED STATES PATENT OFFICE.

ALBERT GEORG KOECHLIN, OF STEINEN, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENOSSENSCHAFT FÜR TEXTILPATENTE, OF BASEL, SWITZERLAND.

SPOOL-CHANGING APPARATUS FOR LOOMS.

971,541.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed May 21, 1908. Serial No. 434,209.

To all whom it may concern:

Be it known that I, ALBERT GEORG KOECHLIN, a citizen of the Swiss Republic, and residing at Steinen, in the Grand Duchy of Baden, Germany, have invented certain new and useful Improvements in Spool-Changing Apparatus for Looms, of which the following is a specification.

This invention relates to looms with automatic spool changing apparatus, and it consists in improved means for advancing the spools one by one from a magazine and drawing off the loose end of the thread from the fresh or reserve spool. These means consist in providing on the pointed end of the spool tube a cap composed of paper or other light material over or around which the loose end of the weft is spun or coiled. This cap is removed by a blast of air before the changing of the spools.

In the accompanying drawings: Figure 1 is a vertical section of the improved apparatus in which the situation of the spools and the positions of the operative parts are shown in a state of rest. Fig. 2 is a similar view showing the positions of the parts immediately after a spool has been changed. Fig. 3 is a side elevation of the spool ejecting mechanism in a state of rest. Fig. 4 is a similar view of the spool ejecting mechanism immediately after a spool has been changed. Fig. 5 is a horizontal section on the line E—F of Fig. 8. Fig. 6 is a rear elevation of the improved apparatus. Fig. 7 is a section on the line A—B of Fig. 1, and Fig. 8 is a section on the line C—D of Fig. 2.

The spools are stored in a movable receptacle, 1, which is actuated automatically by known means in such a manner that the spools move successively into fixed guide channels, 2, arranged at its two ends, in which they advance according to requirement. One of these channels is adapted to receive the wide end, and the other the narrow end of the spool tube. The channel adapted to receive the wide end is shown in the drawings, the other channel for receiving the narrow end being omitted for the sake of clearness. In the state of rest, the duration of which depends on the uninterrupted working of the loom, all the spools with the exception of the two lowest, are held back by two devices, 3, fixed by the side of the guide channels on a rock shaft, 6. These devices effect also the regular advance of each spool in its turn and they regulate the

advance of the overlying spools. The two lowest spools are prevented from falling out by two flaps, 7, mounted at each end in the extension of the lower fillets of the channels, and connected together by arms, 8, with the rotary shaft, 9.

On the rock shaft, 6, is fixed a roller, 10, around which passes a strap, 11, connected at one end to a tension spring, 12, and at its other end to a lever, 13. The lever, 13, is mounted on a rock shaft, 14, which is under the influence of the weft fork or weft feeler and is rotated through a small angle when the former is brought into operation by a breakage of the weft or break-down of the feeler, and when the latter is brought into operation in the usual manner when the weft has been used up. This rotary movement first by means of the finger, 15, causes the arm, 16, to rise in the path of the bunter, 18, provided on the lay, 17, whereby the said bunter, 18, enters the notched end of the arm, 16, and pushes the latter in front of it for a short distance. This produces a rocking movement of the two-armed ejecting lever, 19—20, whereby the bottom spool forcing the flaps, 7, aside is pushed into the shuttle, 21, which at this moment is situated directly under the outlet of the guide channels, 2. At the same time the spool that has been used up or has become otherwise useless, is ejected from the shuttle.

To the arm, 20, of the ejector is fixed a leaf spring, 22, which in the ejecting operation, causes a two armed lever, 23, to rock so that its arm having the form of a forked gripper, 24, grips the next lowest spool which has been released by the devices, 3, and presses it with its wide end close up against the mouth of a compressed air supply duct, 25. At the same time the stop cock, 26, is opened by the striker, 20, by means of the rod, 27, whereupon a blast of compressed air enters the spool tube, 28, and blows off the paper cap, 29, closing the pointed end, together with the loose thread end coiled or spun around it, out through an aperture, 30, provided in the wall of the channel, into a vessel, 31, situated near it. (Figs. 5 and 8).

The leaf spring, 22, acts as an elastic connecting member for transmitting motion to the gripping lever 23—24 for the purpose of pressing the spools as tightly as possible against the air supply duct without endangering the actuating parts.

34 is a channel leading to the vessel, 31; it is provided with a forwardly projecting bottom plate, 32, and is formed with a slot, 33, for the exit of the thread. In the blowing off of the cap, 29, so much thread is unwound from the spool and laid upon the plate, 32, as is necessary for threading it into the shuttle. The remainder of the thread is severed by the sharp edge of the slot 33 and remains with the cap in the vessel, 31.

The arm, 23, of the gripping lever, is connected by a tension spring, 35, (Figs. 3 and 4) with the shaft, 9, to which the flaps, 7, are attached. In the descent of the ejector this tension spring is tensioned, so that after the ejection, the flaps, 7, which have been pushed aside can now be returned into their original positions by the said spring. During these operations, the shaft, 6, is rocked by reason of its connection with the lever, 13, through the medium of the strap, 11. This rocking movement brings the shaft, 6, together with the devices, 3, from the position shown in Fig. 1, into the position shown in Fig. 2, whereby the edges, 4, are moved out of the path of the spools, and the cams, 5, are moved into the said path. Consequently the overlying spools are advanced through the distance of one spool, and are then prevented by the cams, 5, from advancing any farther. After the commencement of the aforesaid movements the influence of the weft fork or of the weft feeler upon the shaft, 14, ceases, and therefore after the completion of the changing of a spool, the shaft, 6, is rocked back by the tension spring, 12, from the position shown in Fig. 2, into the position shown in Fig. 1, whereby the spool resting on the cams, 5, is released and is pushed forward by the edges, 4.

The edge, 4, of each of the two devices, 3, is continued in the form of an arc, 36, having its center in the axis of the shaft, 6. This arc is provided, in the case of the device arranged at the thicker end of the spool tube, with a prominence, 37, which bears against the collar, 38, of the spool tube and is set obliquely to the axis of the shaft, 6. The rotary movement from the position shown in Fig. 1, into the position shown in Fig. 2, therefore produces first a longitudinal movement of the spool lying directly on the arcs, toward the wall of the channel to which the air supply duct is connected. After this longitudinal movement, the forward movement upon the cams, 5, takes place when the edges, 4, leave the path of the spools. This has the result of causing the spool that is to advance later on into the position of the next lowest spool, to take up on the cam, 5, the position which it must assume in order after it has been fed forward by the edges, 4, that it shall be securely gripped by the gripper, 24, and thus be brought with certainty in front of the mouth of the air sup-

ply duct. The return rotation of the ejector arm, 20, which follows the ejection, and which is effected by tension springs not shown in the drawings, releases the gripping arm, 23, so that it, together with the gripper, 24, aided by the spring, 35, can likewise return into its original position. Consequently the spool which has up till then been held by it and is now freed from the cap, 29, moves into the place of the previously ejected bottom spool, and is prevented from falling out of the guide channels, 2, by the flaps, 7, that have moved in the meantime into their initial position. As the influence of the weft fork and of the weft feeler ceases after the commencement of the ejector movements, the finger, 15, will return into its initial position and allows the arm, 16, to fall out of the path of the bunter, 18, so that the subsequent movements of the lay, 17, have for the present no further effect upon the ejector. The return rotation of the arm, 20, has finally also the effect of closing the stop cock, 26, so that finally all the parts are situated again in the position shown in Fig. 1 and Fig. 3, until a new change of spool shall be rendered necessary by reason of the emptying of the spool, breakage of the thread &c. The to-and-fro rotation of the arm 20 is effected so quickly that the cock 26 is closed almost immediately after being opened. By this means the compressed air is caused to issue in a short sharp puff which effectively removes the cap 29 as desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In spool changing apparatus for looms, a spool having a spool tube open at each end, and a closed cap (composed of light material around which the loose end of the spool thread is wound a few turns) frictionally held on one end of the spool tube and adapted to be blown off said end by a blast of air admitted through the other end of said tube, as set forth.

2. In spool changing apparatus for looms, the combination of a spool magazine containing weft spools each having a closed cap connected to the loose end of the spool thread fitted on one end of the spool tube, a compressed air supply duct, means for moving and holding the spool tube against said duct and means for admitting a blast of compressed air from said duct into said spool tube, whereby the cap on said spool tube is blown off and caused to draw off a length of weft thread for threading into the weft shuttle of the loom, as set forth.

3. In spool changing apparatus for looms, the combination of a spool magazine containing weft spools each having a closed cap connected to the loose end of the spool thread, fitted on one end of the spool tube,

a compressed air supply duct, an ejector for ejecting the empty spool from the loom shuttle a gripper operated by said ejector so as to grip the next lowest spool in said spool magazine, and bring it with its open end against the mouth of said air duct, and means for controlling the issue of compressed air from said air duct, whereby a blast of compressed air is admitted into the spool tube to blow off the cap with the loose thread end attached thereto, as set forth.

4. In spool changing apparatus for looms, the combination of a spool magazine containing weft spools each having a closed cap connected to the loose end of the spool thread fitted on its spool tube, a compressed air supply duct, a rock shaft operated by weft fork and feeler mechanism, means operated by said shaft for advancing the spools one by one from the magazine, means operated by said shaft for ejecting the lowermost spool from the magazine, moving it into the shuttle and removing the used up spool from the shuttle, a gripper for moving and holding the lowest spool but one against said com-

pressed air supply duct, and an elastic member connected to the last mentioned means for operating said gripper, as set forth.

5. In spool changing apparatus for looms, the combination of a spool magazine containing weft spools, each having a closed cap connected to the loose end of the spool thread, fitted on the spool tube, a compressed air supply duct, a gripper for moving and holding a spool against said compressed air duct and an oscillatory device for advancing the spools one by one from the magazine, formed with a prominence arranged obliquely to the axis of rotation of said device whereby the lowest spool but one in the magazine is moved axially into a position which shall insure its being gripped by said gripper, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT GEORG KOECHLIN.

Witnesses:

WOLFGANG REES,
GERTRUDE E. LIEFELD.