





# UNITED STATES PATENT OFFICE.

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## ELECTRIC-CIRCUIT CLOSER FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 692,930, dated February 11, 1902.

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*To all whom it may concern:*

Be it known that I, HARRY W. SMITH, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Electric-Circuit Closers for Looms, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, in which—

Figure 1 represents a side elevation of one end of a loom-lathe having a shuttle-box mounted thereon with a shuttle contained in the shuttle-box. Fig. 2 is a top view of the same. Fig. 3 is a top view of a shuttle with a weft-bobbin held therein, said shuttle and bobbin being provided with electric-circuit-closing devices embodying my invention. Fig. 4 is a central vertical longitudinal view of one end of the shuttle. Fig. 5 is a transverse sectional view on line 5 5, Fig. 3. Fig. 6 is a top view of one end of a shuttle shown in central horizontal sectional view. Fig. 7 is an enlarged view of one of the yielding blades or feelers carried by the shuttle; and Fig. 8 is a sectional view of the same on line 8 8, Fig. 7.

Similar reference-letters refer to similar parts in the different views.

My present invention relates to an electric-circuit-closing device in a loom by which an electric circuit is closed at a predetermined period in the operation of weaving, as controlled by the withdrawal of the weft from the shuttle to set in action some auxiliary mechanism, such as a weft-replenishing or stop mechanism; and it consists in the construction and arrangement of parts, as hereinafter described, and set forth in the annexed claims.

Referring to the drawings, A denotes one end of a loom-lathe, and B a shuttle-box mounted thereon and containing a shuttle C.

D is a weft carrier or bobbin provided with a head D', which is held between a pair of elastic jaws E E', carried by the shuttle-body in a well-known manner in shuttles of this class.

Upon the upper surface of the shuttle-body are placed two electric contact-strips F F', arranged to be brought into contact with electrical brushes G G', which are supported on

the loom-lathe and are connected with the opposite poles of a battery or other source of an electric current. The contact-strips F F' extend forward upon each side of the bobbin-chamber H, with the forwardly-extended ends G<sup>2</sup> G<sup>3</sup> of the contact-strips preferably inclosed in recesses I I' in the side walls of the bobbin-chamber. To the forward ends G<sup>2</sup> G<sup>3</sup> of the contact-strips F F' are pivoted yielding blades or feelers J J'. The free ends of the feelers J J' are carried toward the center of the bobbin-chamber by the tension of torsional springs J<sup>2</sup>, which are coiled about the pintles of the feelers, with one end bearing against the forward ends of the contact-strips and with the other end bearing against the back side of the feelers. The bobbin D is provided with a conical base D<sup>2</sup>, upon which is placed a metallic band or contact part K in the plane of the feelers J J' when the bobbin is in position in the shuttle. The bobbin is supported between the elastic jaws E E' by means of metallic rings L L', which project radially from the head D' of the bobbin and engage a series of notches N on the inside of the elastic jaws E E'. In shuttles of the type shown in the accompanying drawings the bobbin is inserted by being pressed vertically downward into the bobbin-chamber, and in order to provide for any longitudinal variation in the position of the bobbin as held by the elastic jaws E E', I make the blades or feelers considerably wider than the surface of the metallic band K in order to insure the contact of the feelers with the band whatever the position of the bobbin and of less diameter than the band K. I form a neck O by cutting away the bobbin in the path of the blades or feelers, thereby reducing the diameter of the bobbin between the band K and the head of the bobbin in order to allow the feelers to contact with the band. When the bobbin is forced into the bobbin-chamber by being pushed between the elastic jaws, the feelers J J' are held by the torsional springs J<sup>2</sup> in the path of the bobbin, and as the bobbin is forced into the bobbin-chamber from above the feelers are pressed apart and rest upon the weft carried by the bobbin. As the weft is gradually withdrawn in the process of weaving the two feelers J J' approach each other until a sufficient amount of weft has



been removed to uncover the metallic band K, when the feelers J J' are brought into contact therewith and are electrically connected. As the shuttle passes into the shuttle-box, bringing the two contact-strips F F' beneath the electrical brushes G G', the two feelers J J' become the terminals of an electric circuit, and if feelers are then in contact with the metallic band K the electric circuit is completed and an electromagnet forming part of the circuit will be energized.

In Figs. 2 and 3 I have shown the inner sides of the feelers J J' as plane surfaces arranged to be brought into contact with the periphery of the metallic band K upon the withdrawal of the weft, with the inner surface of each feeler tangential to the periphery of the metallic band K and inclosing a small acute angle between the feeler and band, so that the unwinding of a coarse weft-thread will cause it to wedge itself between the feeler and the band and move the feeler out of contact with the band before it reaches the point of contact between the feeler and the band, thereby increasing the period during which the feeler is held out of contact with the band by the unwinding of the weft-thread. In Figs. 7 and 8 I have shown a modification of the feeler by which this period of non-contact is reduced to a minimum, which consists in forming a rib P transversely across the face of the feeler and in the plane of contact between the feeler and the band, thereby increasing the space between the periphery of the band and the face of the feeler, so that the movement of the weft-thread between the feeler and the band will not act to move the feeler out of contact with the band, except during the short period required for the weft-thread to pass the rib P.

The contacting surface of the metallic band K is raised above the adjacent weft-supporting surface of the bobbin, so that the periphery of the band will become uncovered by the removal of the weft before the weft is entirely exhausted from the bobbin, the weft remaining upon the bobbin being sufficient to continue the operation of weaving in case the shuttle should be thrown across the lathe after the band K is uncovered. As a portion of the surface of weft-bobbins are usually stepped or provided with circumferential corrugations, it is inconvenient to remove the weft remaining on the bobbin after the circuit has been closed, and I provide a longitudinal groove Q, preferably extending a short distance on both sides of the metallic band K, in order to either allow a hook to be inserted beneath the weft or the weft to be cut in the plane of the groove Q for the purpose of removing the residue of weft on the bobbin.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric-circuit closer for looms, the combination with a shuttle-body and a bobbin held therein, of a circumferential con-

tact-band on said bobbin, yielding blades, or feelers, forming the terminals of an electric circuit, placed transversely to said bobbin and in the plane of said band, said bobbin being reduced in diameter between said band and the head of the bobbin, substantially as described.

2. In an electric-circuit closer for looms, the combination with a shuttle-body having a bobbin-chamber and a bobbin for delivering weft from the end thereof and held therein, having a circumferential metallic contact-band, of a pair of contact-strips on the shuttle-body, a pair of yielding blades, or feelers, hinged to said contact-strips, means by which the free ends of said feelers are pressed toward said bobbin in the plane of said metallic band, and means for bringing said blades, or feelers, into an electric circuit, the weft as it slides beneath the feelers in passing off the end of said bobbin, raising the feelers as the weft approaches exhaustion, substantially as described.

3. In an electric-circuit closer for looms, the combination with a shuttle-body, of a pair of yielding blades, or feelers, a bobbin having a circumferential metallic contact-band in the plane of said blades and provided with a reduced portion, or neck, between said band and the head of the bobbin, whereby the diameter of said neck is less than the outer diameter of said band to allow the feelers to contact with said band, substantially as described.

4. In an electric-circuit closer for looms, comprising a shuttle-body, a yielding blade, or feeler, carried by the shuttle-body, a bobbin held in said shuttle and a circumferential metallic band on said bobbin, of a rib in said blade arranged to contact with said metallic band and transversely thereto, substantially as described.

5. In an electric-circuit closer for looms, the bobbin having a circumferential metallic band on the weft-supporting surface and said weft-supporting surface having a reduced portion, or neck, between said band and the head of the bobbin on which the filling or weft is adapted to be wound prior to covering said band, substantially as described.

6. In an electric-circuit closer for looms, the bobbin having a circumferential contact-band on the weft-supporting surface and said weft-supporting surface having a reduced portion on each side of said band on which the filling may be wound prior to covering the said band.

In testimony whereof I have signed my name to this specification, in presence of two subscribing witnesses, this the 24th day of January, 1900.

HARRY W. SMITH.

Witnesses:

RUFUS B. FOWLER,  
AVA T. MURPHY.