

UNITED STATES PATENT OFFICE.

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HALCYON SKINNER, DECEASED.

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 681,004, dated August 20, 1901.

Application filed November 28, 1900. Serial No. 37,961. (No model.)

To all whom it may concern:

Be it known that we, HALCYON SKINNER and FRANK H. CONNOLLY, citizens of the United States, and residents of Yonkers, in the county of Westchester and State of New York, have jointly invented a new and useful Improvement in Needle-Looms, of which the following is a specification.

Our invention relates to an improvement in needle-looms, and has more particularly for its object to provide a loom with flexible weft-inserting needles, so that the needles may be wrapped around drums when withdrawn from the fabric being woven, whereby a great deal of lateral space is saved, and also whereby the needles may be employed on looms for weaving wide fabrics without taking up the lateral space, which has hitherto been necessary with the straight needles.

A further object is to provide a weft-inserting needle which will be flexible in one direction from a straight line and inflexible in other directions from a straight line, thereby doing away with any tendency on the part of the needle to buckle when it has been extended into the shed.

A practical embodiment of our invention is represented in the accompanying drawings, in which—

Figure 1 represents in front elevation a portion of a loom-frame with two flexible weft-inserting needles carried thereby and the mechanism for operating the same. Fig. 2 is a top plan view of the parts shown in Fig. 1. Fig. 3 is a vertical section taken from front to rear through a portion of the loom. Fig. 4 is an enlarged detail side view of a portion of one of the flexible needles and its oscillating sprocket-wheel, a portion of the side plate of one of the links of the flexible needle being broken away to show more clearly the engagement of one of the teeth of the sprocket-wheel with the flexible needle. Fig. 5 is a partial top plan view of one of the flexible needles. Fig. 6 is a detail side view of portions of the hooked needle and the forked needle, showing the hooked needle in position about to withdraw the weft from the forked needle. Fig. 7 is a top plan view of the same, the end of the forked needle being shown in section;

and Fig. 8 is a detail view showing the ends of the two needles in the positions which they assume when the weft has been withdrawn from its engagement with the forked needle.

In the accompanying drawings, we have only shown so much of a loom as will enable a clear understanding of the construction and mode of operation of the flexible needles to which our present invention is directed.

The side frames of the loom are denoted by A A', which frames are spaced apart in the usual manner. Brackets *a a'* project laterally from the side frames A A' at points a short distance above the lay-beam B, in which brackets are secured forwardly-extended stub-axes C C'. Wheels D D', which are represented in the present instance as sprocket-wheels, are mounted to oscillate upon the stub-axes C C'.

A pair of flexible weft-inserting needles E E' have their inner ends secured at *e e'* to the peripheries of the wheels D D'. These flexible needles are arranged to be partially wrapped around the peripheries of the said sprockets when their free ends are drawn outwardly away from the shed of warp and to be unwound therefrom when their free ends are caused to engage each other at the middle of the loom. In the present instance we have shown the needle E' as the forked needle and the needle E as the hooked needle. A single needle may also be used, arranged to pass entirely through the shed and provided with a hooked or forked end.

As the bodies of the needles E E' are quite similar, we will proceed to describe the construction of one only of the said needles. The portion of the needle which is intended to be partially wrapped around the periphery of the oscillating wheel comprises a plurality of inner and outer links *e² e³*, so arranged that the teeth of the wheel will enter the outer links *e³* between the ends of the inner links *e²* for positively moving the needle in either direction. The needle is made flexible in one direction from a straight line and inflexible in other directions by providing the one set of side plates of the outer links with noses *e⁴*, which are arranged to engage stops or pins *e⁵*, carried by the inner links *e²*. The guides F

F' are supported by brackets $f f'$, projecting from the side frames A A', which guides serve to support the needles as they leave the wheels D D' and guide them into the space between the two sets of warp which form the shed. The wheels D D' are rotated in one direction, tending to force the needles E E' inwardly into engagement with each other at the middle of the loom by means of tension-springs G G', having their lower ends secured to the side frames A A' and their upper ends secured to flexible connections $g g'$, which flexible connections engage peripheries of drums or pulleys $g^2 g^3$, mounted on the stub-axes C C' and fixed to the wheels D D'. The wheels D D' are rotated in the opposite direction, tending to withdraw the flexible needles from the shed by means of flexible connections H H' leading from a central pulley or drum I to drums or pulleys $h h'$, mounted on the stub-axes C C' and fixed to rotate with the wheels D D'. These flexible connections H H' also pass around idler-pulleys $h^2 h^3$, carried by the side frames A A'.

The central pulley I, from which the flexible connections H H' lead, is fixed to rotate with a shaft i , mounted in suitable bearings $i' i^2$, carried by cross-bars $a^2 a^3$ of the loom-frame, the oscillating movement of which shaft i is under the control of a cam J, fixed to the rotary cam-shaft j of the loom. This cam J engages a stud or roller k on a rocking lever K, hinged to the cross-bar a^3 , above referred to, the free end of the said lever having secured thereto a flexible connection k' , which leads to a drum or pulley i^3 , fixed on the shaft i .

By the use of flexible weft-inserting needles instead of the straight needles heretofore commonly used the loom is permitted to occupy much less lateral space than has been common. It furthermore permits of the use of the needles in connection with much wider looms than it has been possible to do before, as the gearing may be so arranged that a slight movement of the controlling-cam will impart a great movement of the needles. Furthermore, by making the needles flexible

in one direction from a straight line and inflexible in all other directions we are enabled to force the needles positively toward each other within the shed without any danger of the needles buckling.

It is to be understood that by the use of the term "flexible" in connection with the weft-inserting needles hereinbefore set forth we mean a needle which may be easily bent, so as to be capable of being wrapped around a drum at the side of the loom instead of causing it to project in a straight line away from the side of the loom, as has hitherto been usual. The term "flexible" is used to distinguish our improved needle from the stiff needles already in use, which needles may be possibly bent from their normal straight position, but which are not easily bent or pliant.

It is evident that changes might be resorted to in the form, construction, and arrangement of the several parts without departing from the spirit and scope of our invention. Hence we do not wish to limit ourselves strictly to the structure herein set forth; but

What we claim is—

1. A weft-inserting needle for needle-looms, flexible in one direction from a straight line and inflexible in the opposite direction, substantially as set forth.

2. A weft-inserting needle for needle-looms being flexible in one direction only from a straight line and inflexible in all other directions, substantially as set forth.

3. A weft-inserting needle for needle-looms comprising a plurality of links so connected that the needle will be flexible in one direction from a straight line and inflexible in the opposite direction, substantially as set forth.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 24th day of November, 1900.

HALCYON SKINNER.
FRANK H. CONNOLLY.

Witnesses:

CHAS. E. SKINNER,
W. H. DUNSTONE.