G. F. SIMON.

Loom-Temple for Weaving Tubular Fabrics.

No. 210,715. Patented Dec. 10, 1878.

Fig. 1.

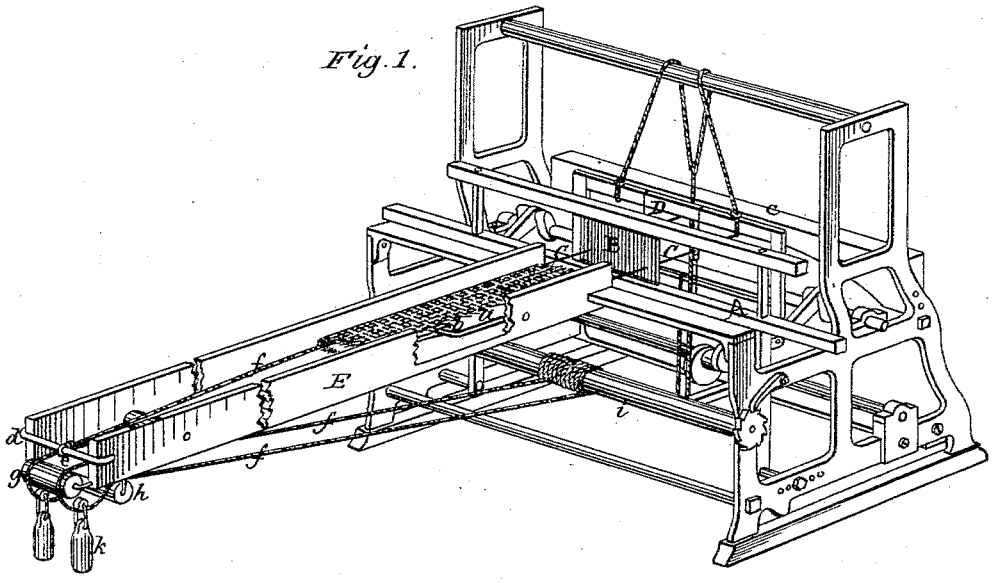


Fig. 2.

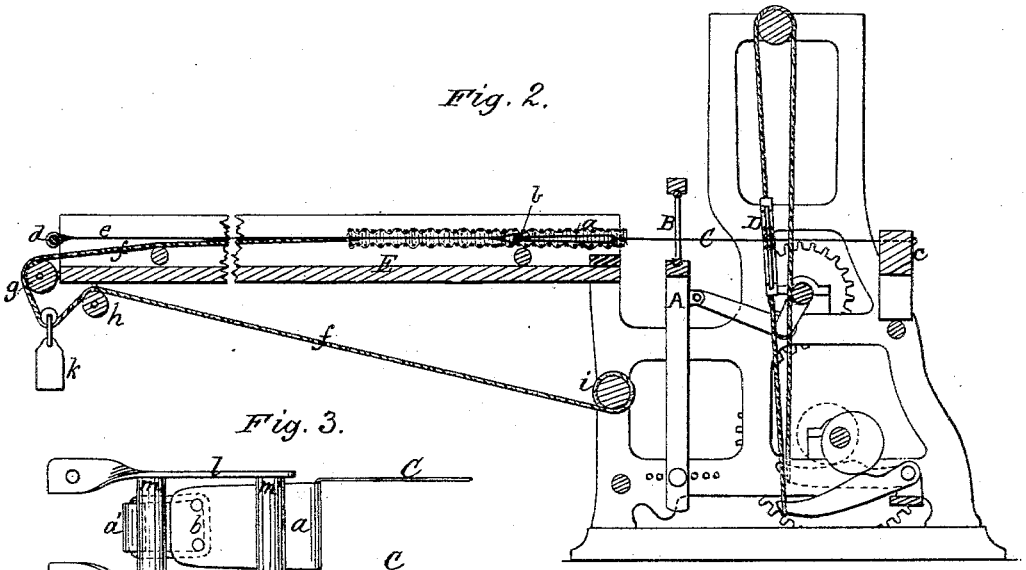
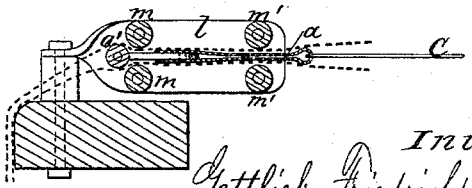


Fig. 3.

Fig. 4.



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IMPROVEMENT IN LOOM-TEMPLES FOR WEAVING TUBULAR FABRICS.

Specification forming part of Letters Patent No. **210,715**, dated December 10, 1878; application filed May 2, 1878.

To all whom it may concern:

Be it known that I, GOTTLIEB FRIEDRICH SIMON, a subject of the King of Saxony, residing in Bristol, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Loom-Temples for Weaving Tubular Fabrics; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements relate, solely, to such looms as operate after the manner of flat weaving, in contradistinction to circular weaving, as in circular looms.

The object of my improvements is to produce, by flat weaving, tubular fabrics of a uniform diameter, and more particularly hydraulic hose, which, when flattened, will have straight and even edges.

Loom-temples of various kinds have heretofore been devised for use in this class of weaving, which, to a certain degree, serve as interior lateral supports for the fabric; but, so far as my knowledge extends, they are not to be relied upon for attaining uniform results, because of their dependence upon springs or weights and their inability to afford a proper support at the moment the reed makes its beat on the filling, on account of a greater or lesser space existing between the front of the reed and the ends of the temple, which is driven rearward by the lay and forced forward again by springs.

The mechanism employed by me in accordance with my invention operates as a temple; but the reed of the loom is an important factor in securing a uniform lateral support for the fabric, not only when making its beat, but also when in its most rearward position during the passage of the shuttle.

My invention consists in the combination, with the reed and a harness, of parallel wires or cords, which serve as supports for the fabric, and which are secured at each end against longitudinal movement, occupy spaces between the dents of the reed, are controlled by the harness, and are arranged to occupy the interior of the tubular fabric. These parallel wires or cords are separated by a space which is equal to the interior width of the fabric as it lies folded in the loom, and, being secured at each end, they afford proper resistance to the draft on the filling during the terminal movements of the shuttle, are accurately spaced by the reed during its beat, and afford a perfect interior lateral support close to the face of the reed. These wires are of suitable length and of a size easily accommodated between the dents of the reed; but heavy strong cord of any material may be used with good results, save as to durability when compared with wire. These wires, which, for the purposes of this specification, will be hereinafter termed "temple-wires," are provided with a special harness, which is relied upon for placing them out of the path of the shuttle, and in so doing the harness co-operates with these wires in attaining a well-rounded edge to the flattened fabric.

In flat-weaving single-ply hose, for instance, four harnesses are employed, there being two distinct sheds, which are merged together at the edges, and therefore one harness is up or down while the other three are down or up, according to whether it is the upper or lower shed which is opened to receive the filling.

As the temple-wires are always inside the fabric and are never interwoven with the filling, their harness moves with the three harnesses, and as each warp-harness in its regular turn is separately lifted or depressed, no one of them can be relied upon to control the temple-wires.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figure 1 represents, in perspective, so much of a loom for weaving hydraulic hose as is deemed necessary to illustrate my invention. Fig. 2 represents the same in longitudinal central vertical section. Fig. 3 is a top view of a device by which the ends of the temple-wires are secured within the hose, of a construction differing from that shown in Figs. 1 and 2. Fig. 4 is a longitudinal vertical central section of the same.

A denotes the main portion of the lay of a loom, and B the reed, which is provided with heavy dents capable of service with the dou-

ble heavy beat desirable in this class of weaving.

The warp-harnesses and shuttle are not shown.

The temple-wires C are preferably composed of iron or steel, and are of a size which will permit them to freely occupy spaces between the dents of the reed. At their front ends they are secured to a plate, *a*, which, in its simplest form, is composed of sheet metal folded upon itself longitudinally, and provided at its rear end with holes *b*. The temple-wires in one continuous length are passed through the folded plate *a* laterally and bent short at each side thereof.

The plate *a* should be but little narrower than the flat hose to be woven, so that the wires will be in close contact with the interior surfaces on each side of the hose.

The temple-wires are passed through the reed parallel with each other and properly spaced, thence through the metal eyes in harness D, and are secured at their rear ends to a cross-bar, *c*.

The temple-wires should be slightly strained, and this may be done in any suitable manner.

The loom, as shown in Figs. 1 and 2, is arranged to maintain a full length of hose—say, fifty feet—in an extended position longitudinally. Although such an arrangement involves the occupation of considerable space for each loom, the hose made thereon is much more easily lined with rubber than when a drum or roller take-up is employed, because the hose leaves the loom in perfect form, just as it is woven, instead of being flattened and strained by coiling.

A take-up frame, E, of, say, fifty or more feet in length, is attached at one end to the breast-beam of the loom. At its outer end a cross-bar or roller, *d*, is provided, around which is secured a heavy rope or wire, *e*, connected with the temple plate and wires, and affording to the latter a proper degree of tension.

The ends of the warp, properly distributed above and below the plate *a*, are knotted, and the loom worked until a sufficient length of hose has been woven to afford a hold for a hook at each edge, whereby a connection is effected with two take-up cords, *f*, which extend from the outer end of the hose to the end of the take-up frame, downward over a grooved roller, *g*, thence backward toward the loom over another grooved roller, *h*, and thence to the cloth-roll *i* of the loom, which may be provided with the usual ratchet and pawl, and wound up intermittingly by hand or by any common automatic take-up mechanism.

I prefer that the fabric be taken up by weights, and I therefore hang weights *k*, provided with pulley-hooks or snatch-blocks, on the take-up cords between the rollers *g* and *h*, as shown.

The weights afford a uniform strain on the warp and fabric, and require only occasional attention for winding the cord on the cloth-roll.

In practice, I have economized shop-space by extending the long take-up frame through the side of a building into the open air, and providing a roof or cover therefor to shelter its contents.

The length of hose may be removed from either end of the frame, requiring for that purpose either the removal of the cross-bar *d* at the outer end, or the disconnection of the cords or wires *e* from the plate *a*, or the disconnection of the temple-wires from the cross-bar *c*, and their withdrawal from the harness and reed.

The temple-wires do not necessarily require the long take-up frame, as will be seen in Figs. 3 and 4.

The plate *a* is constructed as before described, with the exception of being provided at its rear end with a roller, *a'*. The tension on the temple-wires in this form of mounting the plate is attained by straining them at the rear side of the loom. A rectangular frame, *l*, is provided with two pairs of transverse rollers, *m m'*, between each pair of which the plate *a* is located horizontally within the hose, which is drawn off by take-up mechanism as fast as woven. The roller *a'* being larger than the space between the rollers *m*, and being within the hose, the temple-wires may be strained to any desirable degree. With this device the hose is carried over the rounded edge of the breast-beam, and thence to the usual cloth-roll or sand-roll, controlled by an automatic take-up.

The number of warp-threads outside the temple-wires may be varied from five to fifteen, and even upward, according to the character of the warp, and the more there be outside the wires the more fully will the edge of the hose be rounded.

The outer end of the plate *a* is preferably located so as to be within an inch or so of the reed when making its beat, which will leave such a short length of temple-wire between it and the reed as will render it sufficiently rigid to properly resist considerable draft on the filling; but even if the wires be moved inward slightly, it will be seen that when the reed moves forward the wires will be properly spaced and the filling beaten when actually strained by the temple-wires.

I do not limit myself to the precise construction and arrangement of mechanism shown and described so long as the temple-wires, or cords operating as equivalents therefor, are firmly secured at each end, are controlled by the reed, are arranged to allow the passage of the shuttle, and are not interwoven with the filling.

I am well aware that looms for weaving thin flat piece goods have been heretofore provided with selvage-wires, which were interwoven with the filling into the fabric, and the latter stripped from the free ends of the wires as it was moved forward by the take-up, and that such wires so used were relied upon for performing the service of temples. The interweaving of wires with the filling in making

hose is impracticable, both because it is so solidly woven and because the withdrawal of the wires would leave a streak of open weaving.

I am also aware that a temple-plate for tubular fabrics has heretofore been mounted between rollers, as shown herein, and so arranged that when the lay is moved forward to make the beat the plate is thrown backward by the lay, and then thrown forward again by means of springs when the lay is next moved backward.

I am also well aware that temple twines or cords have heretofore been employed in the weaving of tubular fabrics in flat looms without being interwoven with the fabric; but, so far as my knowledge extends, such cords or twines have been drawn through the loom with the warp and taken up within and with the fabric by the cloth-beam. My temple-wires have no longitudinal movement, but are rigidly secured at each end, and therefore I am enabled to use a heavy wire, of any size proportioned to the heaviest hose, and such wires could not possibly be taken up with the fabric on the cloth-beam.

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

The combination, with the reed of a loom and a harness, of temple wires or cords, which are secured at each end against longitudinal movement, occupy spaces between the dents of the reed, and are controlled by the harness, substantially as described.

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