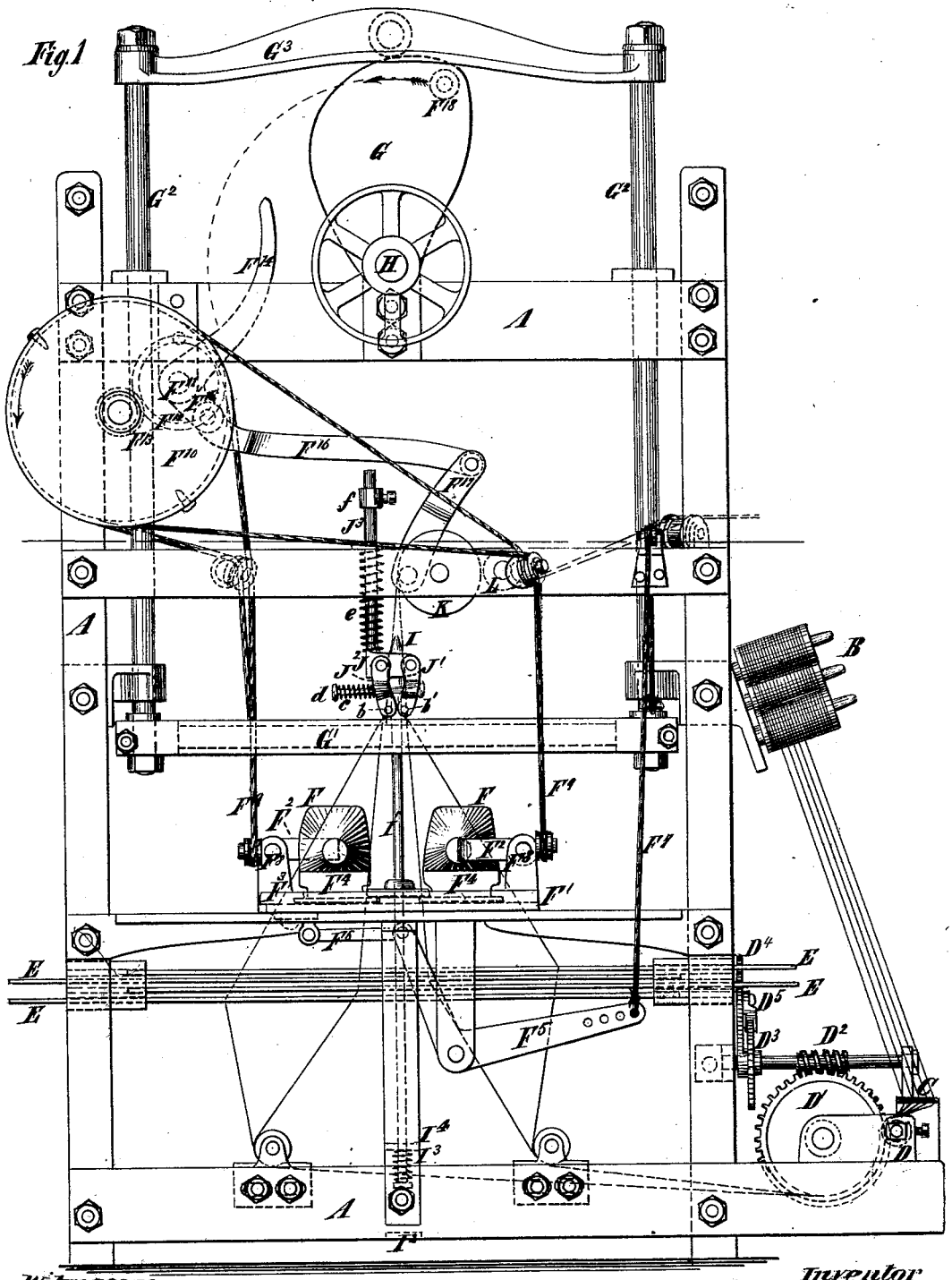
3 Sheets—Sheet 1.

# J. E. GILLESPIE.

## Loom.

No. 218,012 Patented July 29, 1879.

Fig. 1




Witnesses
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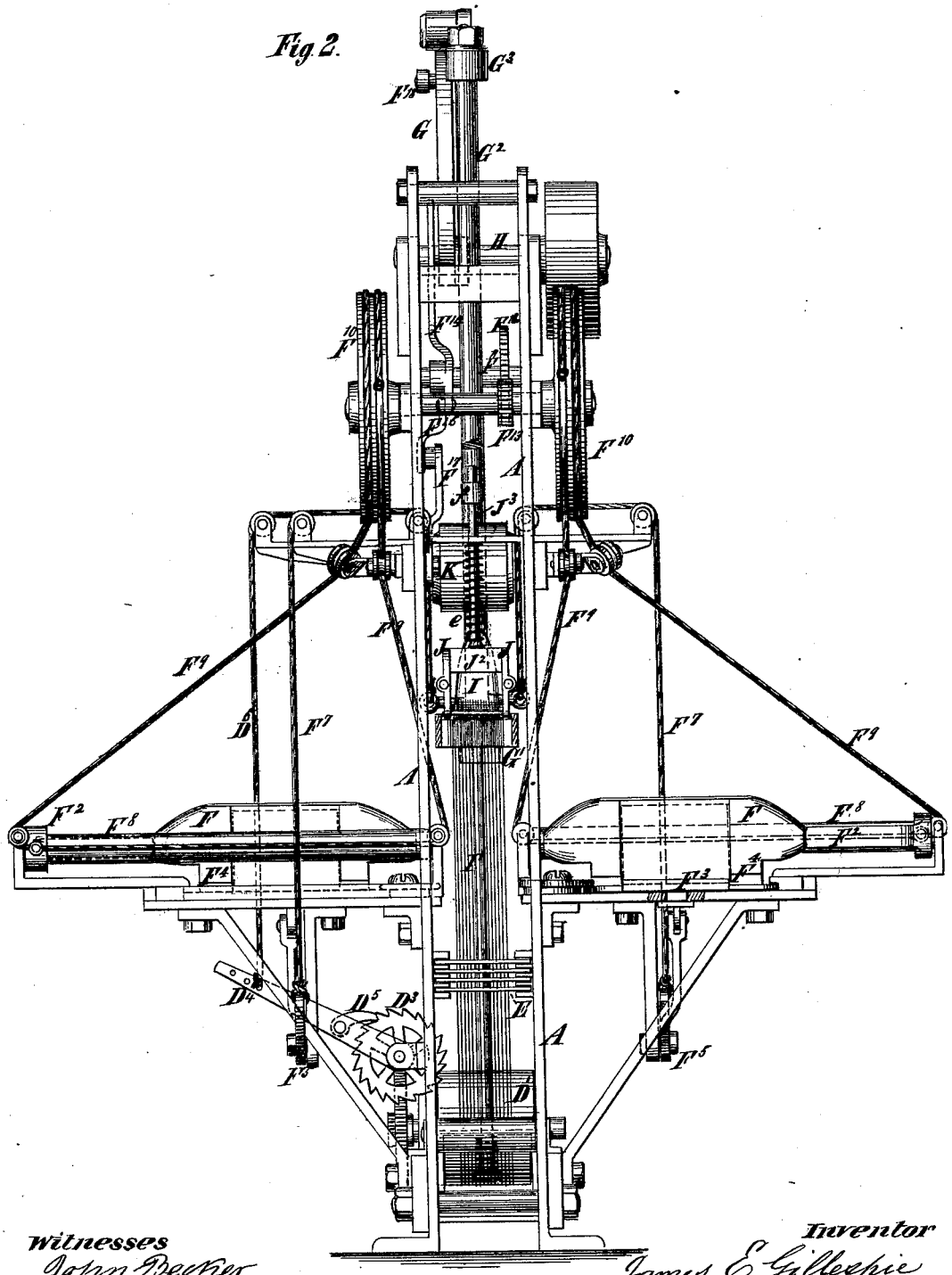
3 Sheets—Sheet 2

# J. E. GILLESPIE.

## Loom.

No. 218,012. Patented July 29, 1879.

*Fig 2.*



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3 Sheets—Sheet 3.

# J. E. GILLESPIE.

## Loom.

No. 218,012. Patented July 29, 1879.

Fig. 5.

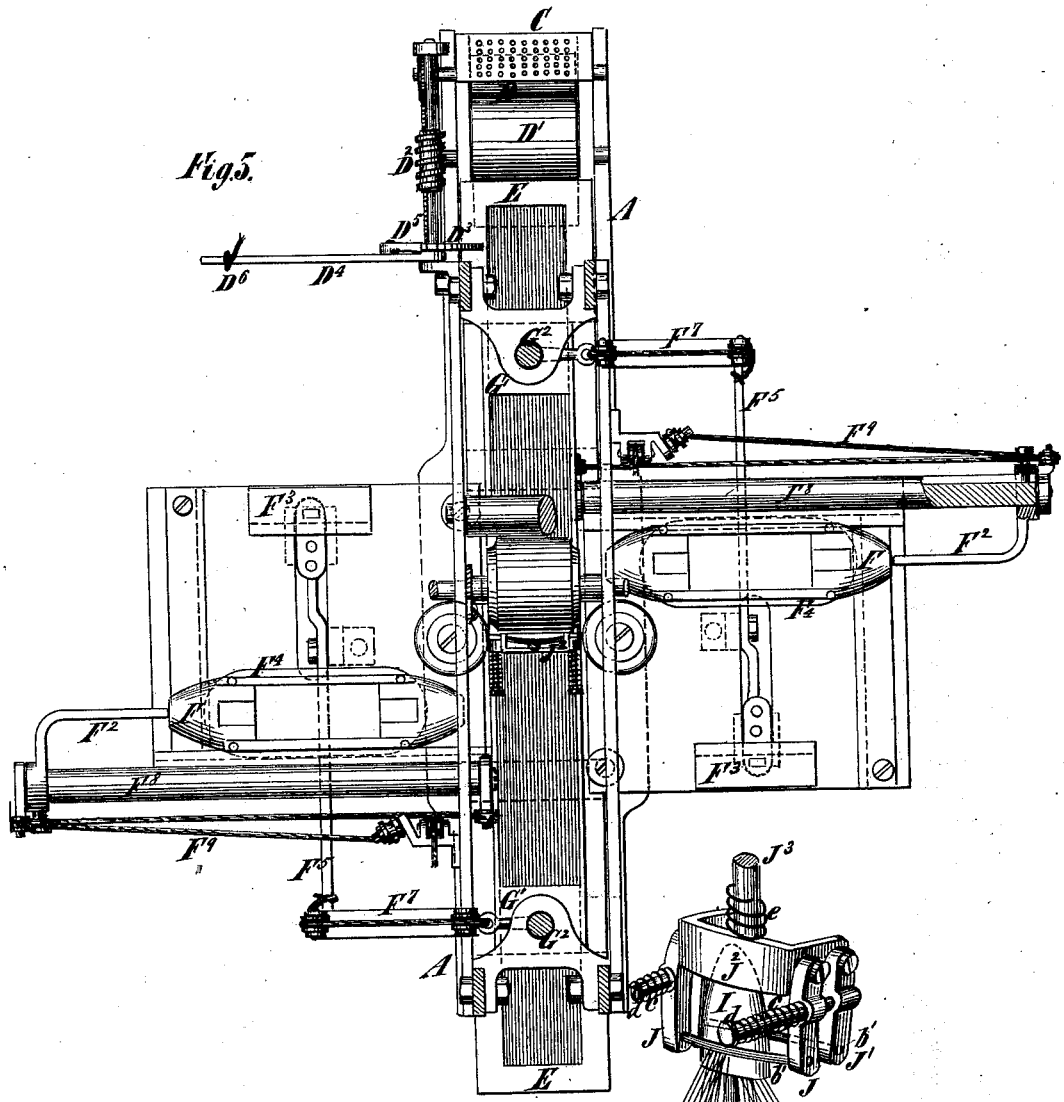


Fig. 4.

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# UNITED STATES PATENT OFFICE.

JAMES E. GILLESPIE, OF WARWICK, NEW YORK, ASSIGNOR TO JAMES H. HOLLY AND ELIHU B. TAYLOR, OF SAME PLACE.

## IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **218,012**, dated July 29, 1879; application filed February 24, 1879.

*To all whom it may concern:*

Be it known that I, JAMES E. GILLESPIE, of Warwick, in the county of Orange and State of New York, have invented certain new and useful Improvements in Looms, of which the following is a specification.

These improvements relate particularly to looms for weaving tubular fabrics, though some may be found applicable to other looms—the combination, in a loom for weaving tubular fabrics, of shuttle-tables, shuttle-pickers for impelling the shuttles through different portions of a double shed, cords or tackle for operating said shuttle-pickers, shuttle-shifters moving the shuttles across the tables in reverse directions, levers for operating said shuttle-shifters, cords or tackle for operating said shuttle-shifters, and deriving motion from the reed, and means for operating said parts, whereby a very desirable mechanism for operating the shuttles is produced.

One improvement consists in the combination, in a loom for weaving tubular fabrics, of a reed, a movable wedge-shaped male temple unconnected with the reed, but impelled by the reed into the fabric woven as the reed beats up, and means (preferably a spring) for drawing the said male temple outward from the fabric as the reed recedes therefrom.

Another improvement consists in the combination, in a loom for weaving tubular fabrics, of a reed, a female temple consisting of yielding jaws, a rod supporting said female temple, and a spring applied to said rod, said female temple being actuated by the reed in one direction and by the spring in the opposite direction.

Another improvement consists in the combination, in a loom for weaving tubular fabrics, of a reed, a wedge-like male temple, an expansible female temple consisting of yielding jaws, and means for operating the same.

Other improvements consist in details of construction to be hereinafter explained.

In the accompanying drawings, Figure 1 is a side elevation of a loom embodying my improvements. Fig. 2 is a side elevation thereof taken at right angles to the former. Fig. 3 is a horizontal section of the same, and Fig. 4 is a perspective view of the reed and the male and female temples comprised in the same.

Similar letters of reference designate corresponding parts in all the figures.

A designates the frame of the loom, which, though represented as consisting of two rectangular side frames connected by stretchers or cross-rails, may be of any suitable form. B designates (see Fig. 1) a spool-creel mounted on the frame A, and supplying the warp-threads. The latter passes through a comb or plate, C, provided with small perforations, and are thereby kept separate from each other. Thence they pass between let-off rollers D $D^1$, connected by gear-wheels and driven by a worm, $D^2$, engaging with the gear-wheel of the larger roller. Upon the worm-shaft a ratchet-wheel, $D^3$, is rigidly affixed. A lever, $D^4$, carrying a pawl, $D^5$, engaging with such ratchet-wheel, is loosely mounted on said shaft, and has connected to it a cord or tackle, $D^6$, which runs over suitable pulleys, and is fastened to the reed, presently to be described. On each reciprocation of the reed the lever is actuated so as to rotate the worm, and through it the rollers, thereby letting off the proper quantity of warp-threads.

E designates leaves of heddles (shown as four in number) receiving the warp-threads after they pass from the let-off mechanism, and separating them to form a double shed. They are supported horizontally in suitable ways, and may be actuated in any convenient manner.

F designates shuttles for carrying the weft or filling threads through the double shed. They are shown as supported on shuttle tables or platforms $F^1$, extending horizontally beyond the frame A, (see particularly Figs. 1 and 3,) and are actuated by pickers $F^2$ and shuttle-shifters $F^3$, so as to move longitudinally in opposite directions through the two portions of the double shed, then laterally across the shuttle-tables and each through that portion of the double shed which the other traversed before, following one another around the warp-threads, and laying in the weft or filling threads the while.

In this example of my invention the shuttle

shifters $F^3$ consist of plates furnished on the inner sides with guides along which the shuttles, carriages, or base-plates $F^4$ may travel, and fitted to the shuttle-tables, so that they may be impelled transversely across the same, to shift the shuttles after they finish each pick, over to other guides adjacent to the pickers $F^2$, and whence they may be driven through the opposite portions of the double shed. These shuttle-shifters (see particularly Figs. 1 and 2) may be advantageously actuated by bell-crank levers $F^5$, pivoted to hangers under the shuttle-tables, connected. At one end these levers are connected to said shuttle-shifters by links $F^6$, the shuttle-shifters extending through slots in the tables to admit of this; and at the other end they are connected to cords or tackles $F^7$, passing around pulleys and fastened to the reed, so that the latter on its descent will effect the adjustment of the shuttle-shifters into position to receive the shuttles. The weight of the levers or weight hung thereon actuates the shuttle-shifters to shift the shuttles.

The pickers $F^2$ are supported upon rods $F^8$, so that they may be moved longitudinally thereon to drive the shuttles through the shed. They are actuated by cords or tackles $F^9$ connected to them and wound around and fastened to pulleys $F^{10}$, having an oscillating motion alternately in different directions for moving the pickers back and forth. These pulleys derive motion from shafts $F^{11}$, through gear-wheels $F^{12}$ on the latter meshing into pinions $F^{13}$. On the shafts $F^{11}$ are mounted arms $F^{14}$, upwardly curved, so as to resemble horns; also short arms $F^{15}$, extending nearly at right angles to the former, and connected by rods $F^{16}$ to levers $F^{17}$, pivoted to one of the cross-rails of the frame A.

A stud or tappet, $F^{18}$, (shown as arranged on a support consisting of cam G, located on the driving-shaft H of the loom,) coming in contact with the inner portion of the horn-like arms $F^{14}$, turns them downward, imparting a quick motion to the pulleys $F^{10}$, but, moving outward along their upwardly-curved outer end portions, it gradually operates them with a slower motion, and as it leaves them they are almost without motion. Thus the pick of the shuttles is effected and the pickers slowly and gradually stopped. After leaving these horn-like arms $F^{14}$, the stud $F^{18}$ comes in contact with the levers $F^{17}$, and, pushing the same abruptly aside, imparts a sudden reverse motion to the pulleys $F^{10}$, whereby the pickers are returned to their normal positions, and the horn-like arms $F^{14}$ raised for the engagement of the stud on its next revolution. The pickers are of course operated while the shuttle-shifters are at rest, and vice versa.

$G^1$ designates the reed. It is represented as adapted for vertical motion, and as supported by two rods or swords, $G^2$, connected to a yoke, $G^3$. It is raised toward the fabric being woven by the action of the cam G upon the under side of the yoke $G^3$, and it descends by its own weight.

I designates a male temple, which, in this instance, is wedge-like in form on the edges, as well as on the sides. It is so constituted that its apex or pointed end shall not during the weaving be withdrawn from the fabric, and so that it may be forced into the fabric by the reed when the latter makes its beat. It is shown as supported by a rod, $I^1$, which passes loosely through an opening, *a*, provided for it in the reed, (see particularly Fig. 4,) and rests on a support, $I^2$.

A spring, $I^3$, (see Fig. 1,) may be applied to the rod $I^1$, between a collar thereon and a cross-piece, $I^4$, to return the temple to its normal position.

I desire here to remark that it is not essential that the rod $I^1$, supporting the temple, should pass through the heddles, as it is represented as doing.

In making its beat the reed comes in contact with the rear portion of the temple, whereupon it raises it and forces it farther into the fabric. Returning after its beat, the reed permits the temple to move outward relatively to the fabric by its own weight, or that and the force of the spring $I^3$, and to retreat with the reed until its rod $I^1$ reaches its support $I^2$, after which the reed moves beyond it.

This temple acts as a former, whereby the fabric may be woven of a uniform size throughout its extent, and compact and solid in quality.

J $J^1$ designate a female temple, shown as consisting of a pair of jaws, J and $J^1$, severally consisting of arms pivoted to a hanger, $J^2$, and preferably connected by cross bars *b b'*, for extending across the fabric. Preferably these jaws J $J^1$ are drawn toward each other by means of spiral springs *c* applied to bars or pins *d*, extending through and connected to the jaws. The function of this female temple is to pinch the warp-threads and fabric together at the fell, to facilitate the forming of a good selvage. The cross-bars *b b'* aid in accomplishing this by obviating the tendency of the opposite portions of the fabric from pulling apart through the two shed-openings or two portions of the double shed. I have shown this female temple as supported by a rod, $J^3$, suspended from one of the cross-rails of the frame A in such manner as to be free to move vertically. Preferably a spring—such, for instance, as a spiral spring, *e*—is employed to return the temple to its normal position after being shifted. An adjustable collar, *f*, on the rod $J^3$ serves as the support for the said rod, and may be adjusted thereon to regulate the normal position of the female temple. It is intended that the normal position of this temple should be slightly above the fell. As the reed makes its beat and forces the male temple into the fabric it also raises this female temple. The jaws of the latter are spread apart by the male temple, and when raised they hug and pinch the fabric tightly.

K L designate take-up rollers, which may be operated in any suitable manner to take up the fabric as it is woven.

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

1. In a loom for weaving tubular fabrics, the combination of shuttle-tables, shuttle-pickers for impelling the shuttles through different portions of a double shed, cords or tackle for operating said shuttle-pickers, shuttle-shifters moving the shuttles across the tables in reverse directions, levers for operating said shuttle-shifters, cord or tackle for operating said shuttle-shifters, and deriving motion from the reed, and means for operating said parts, substantially as specified.

2. The combination, with a shuttle-picker, $F^2$, pulley $F^{10}$, connected thereto by cord or tackle $F^9$, the horn-like arm $F^{14}$, arm $F^{15}$, link or rod $F^{16}$, and lever $F^{17}$, of a stud or tappet, $F^{18}$, a support therefor, a shaft, H, upon which said support is arranged so as to revolve with it, and means for operating such shaft, substantially as and for the purpose specified.

3. In a loom for weaving tubular fabrics, the combination of a reed, a movable wedge-shaped male temple unconnected with the reed, but impelled into the fabric by the reed as the reed beats up, means for drawing the said temple outward from the fabric as the reed recedes therefrom, and mechanism for operating said parts, substantially as specified.

4. In a loom for weaving tubular fabrics, the combination of a reed, a movable wedge-shaped male temple, a rod supporting the said temple and passing through an opening in the reed, and a spring surrounding the said rod, and means for operating said parts, the whole being organized as described, so that the reed impels the said temple into the fabric as the reed beats up and the spring draws the said temple outward from the fabric as the reed recedes therefrom, substantially as specified.

5. In a loom for weaving tubular fabrics, the combination of a reed, $G^1$, male temple I, rod $I^1$, table or support $I^2$, and springs $I^3$, substantially as specified.

6. In a loom for weaving tubular fabrics, the combination of a reed, a female temple consisting of yielding jaws, a rod supporting said female temple, and a spring applied to said rod, said female temple being actuated by the reed in one direction and by the spring in the opposite direction, substantially as specified.

7. In a loom for weaving tubular fabrics, the combination of the reed $G^1$, female temple J $J^1$ $J^2$ $J^3$ *e f*, substantially as specified.

8. In a loom for weaving tubular fabrics, the combination of a reed, a wedge-like male temple, an expansible female temple, consisting of yielding jaws and means for operating the same, substantially as specified.

JAMES E. GILLESPIE.

Witnesses:

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E. P. JESSUP.