

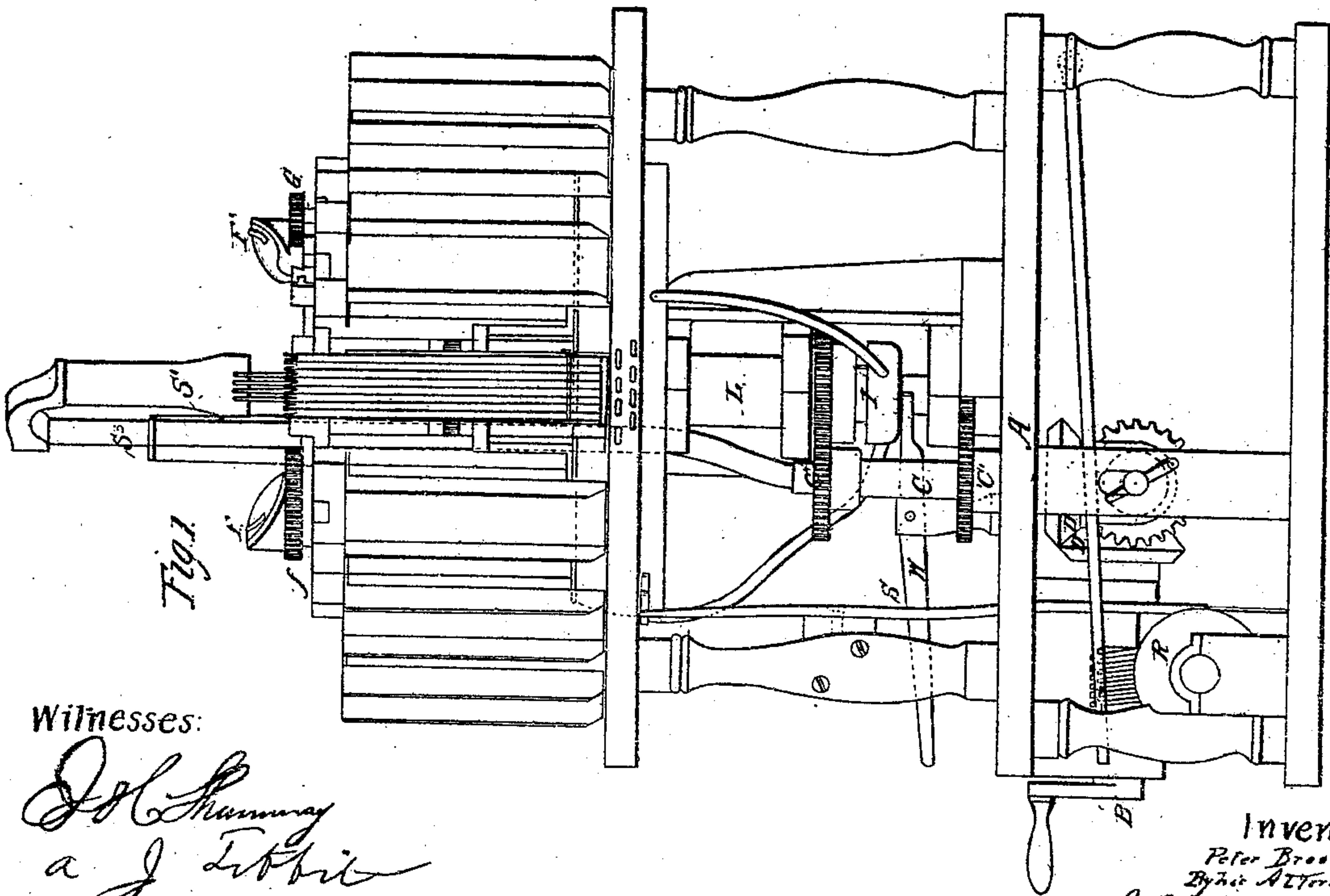
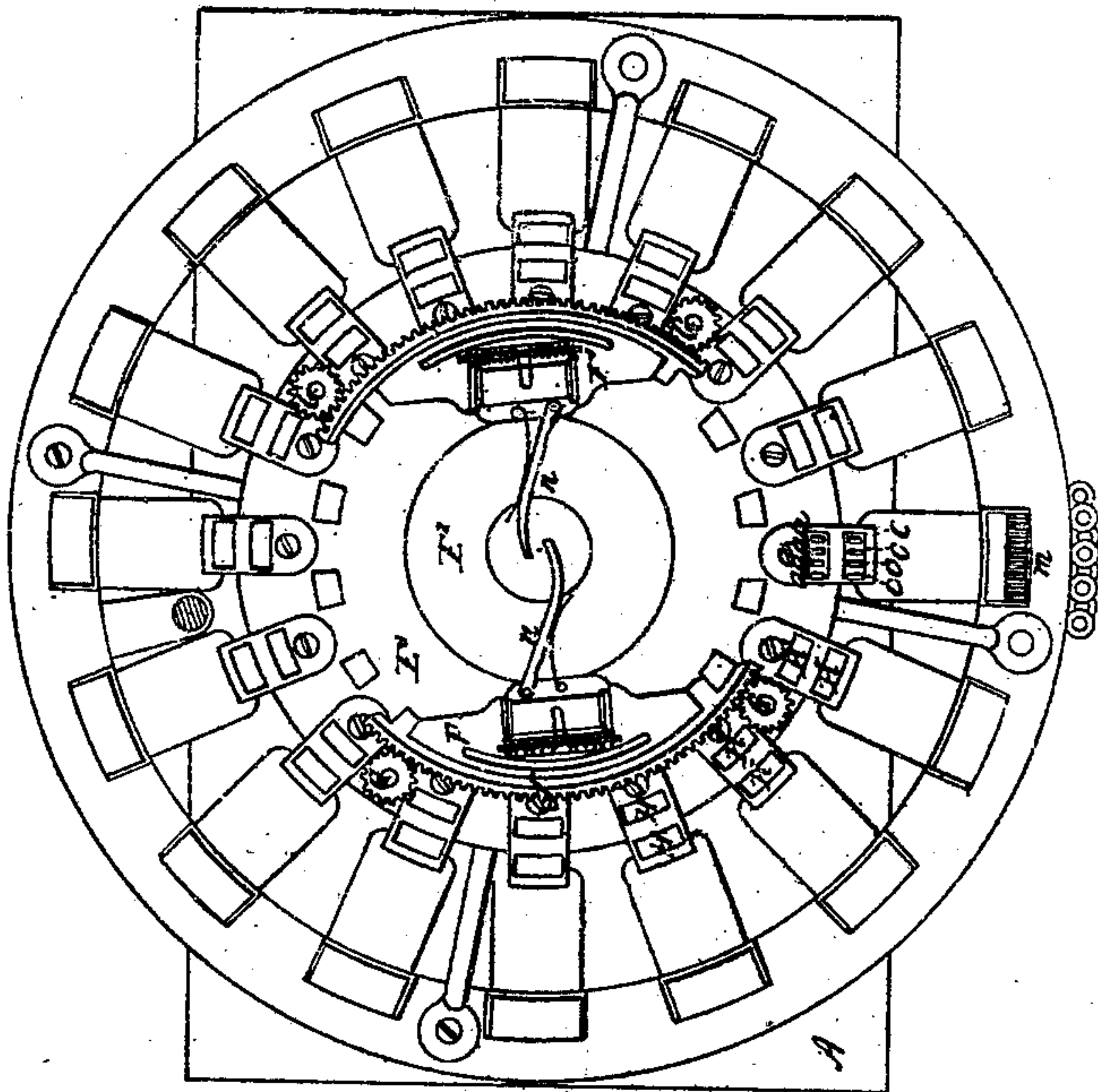
*P. Brooks.*  
*Circular Weaving.*

*Sheet 1-2 Sheets.*

*Nº 9,305.*

*Patented Jun. 15, 1869.*

*Fig. 2.*



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Inventor:

*Peter Brooks*  
*By his Attorney*

*John E. Earle*

P. Brooks.  
Circular Weaving.

Sheet 2-2 Sheets.

N<sup>o</sup> 91,305.

Patented Jun. 15, 1869.

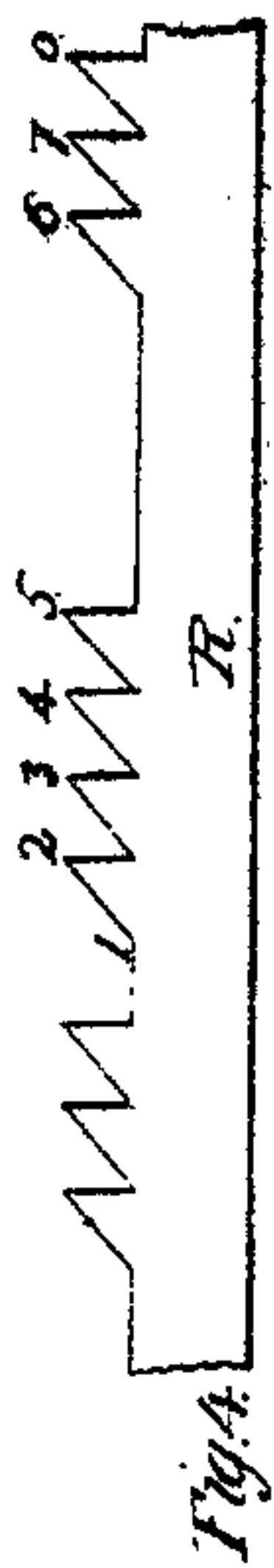
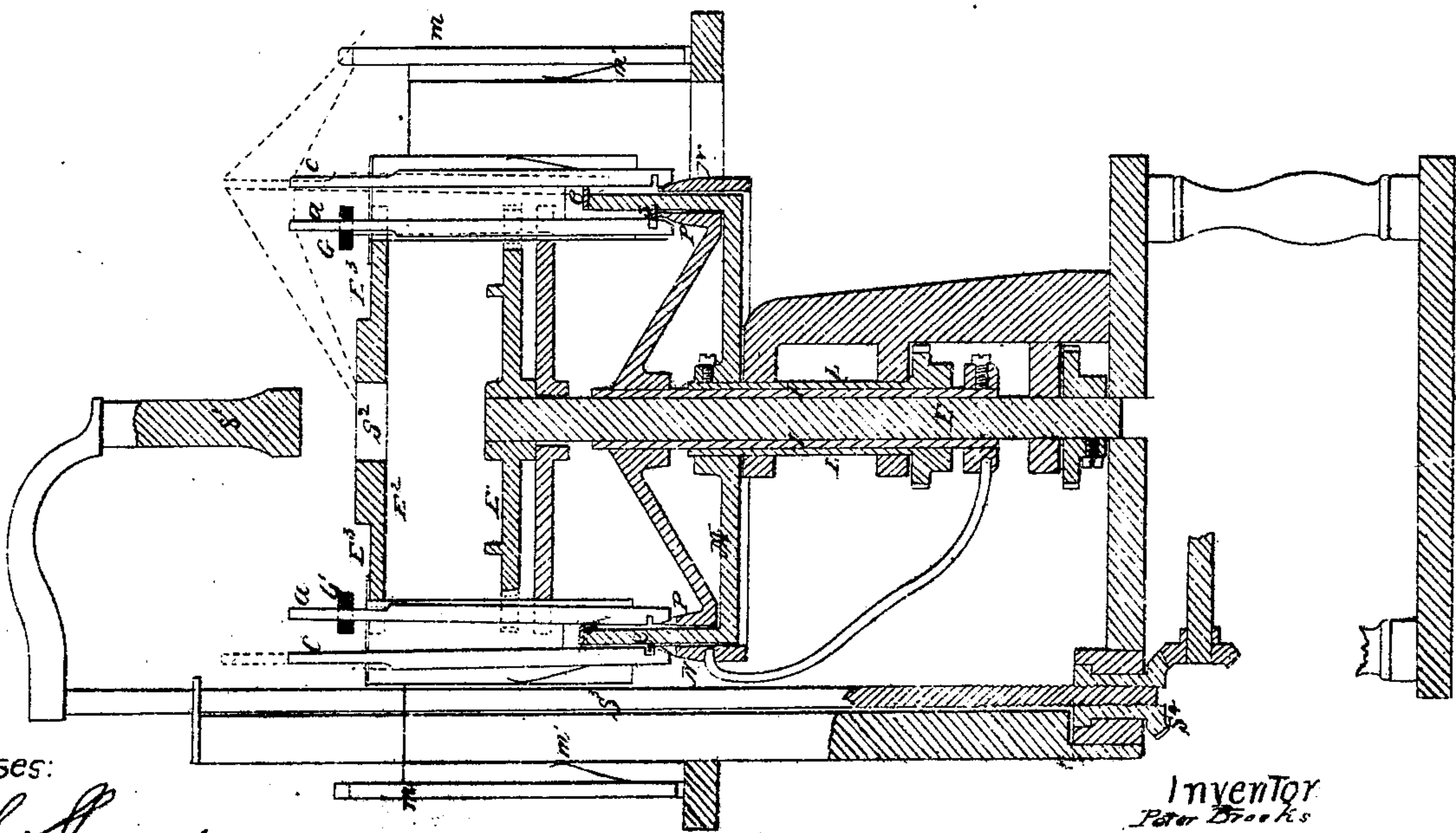


Fig. 3



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Fig. 7

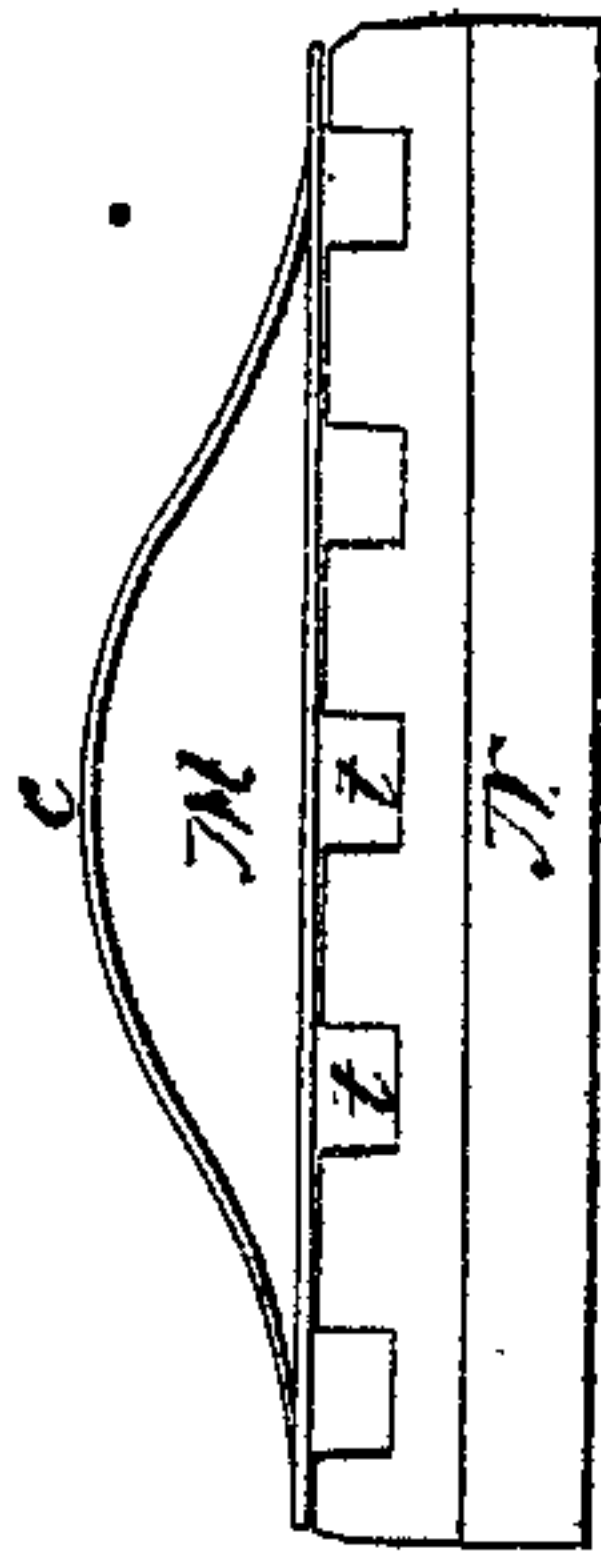


Fig. 5

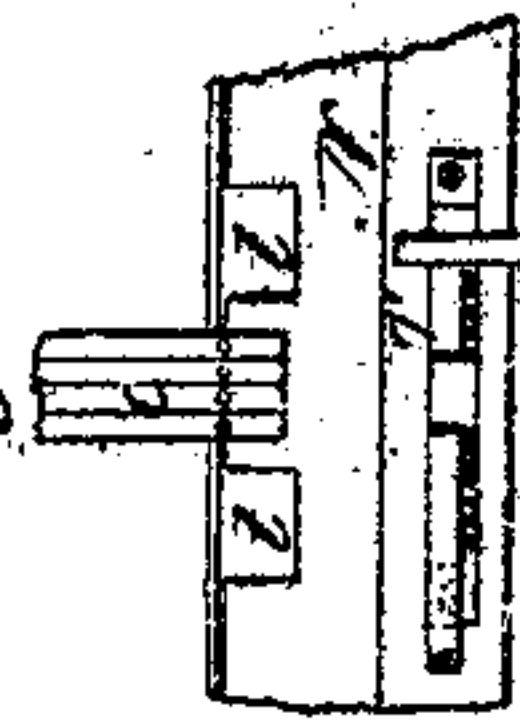


Fig. 6

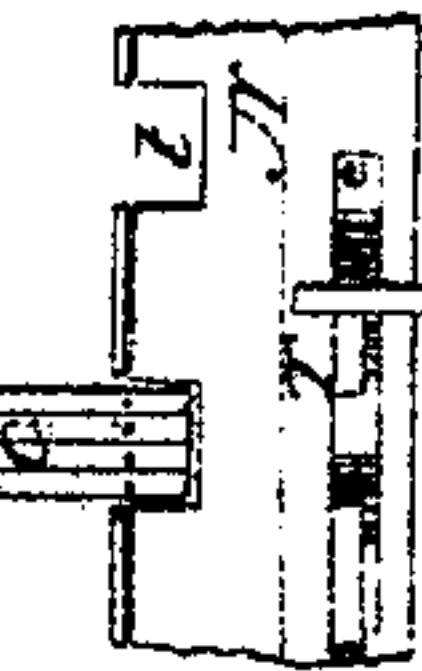
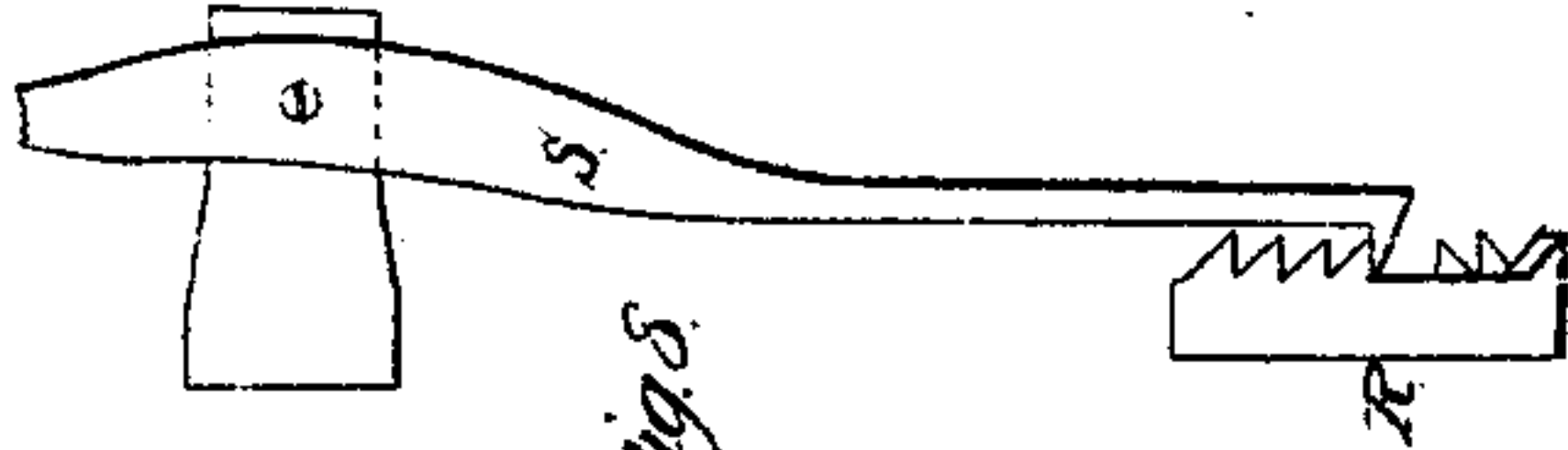


Fig. 8





# UNITED STATES PATENT OFFICE.

PETER BROOKS, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO HIMSELF  
AND C. O. CROSBY, OF SAME PLACE.

## IMPROVEMENT IN LOOM FOR WEAVING HATS.

Specification forming part of Letters Patent No. 91,305, dated June 15, 1869.

*To all whom it may concern:*

Be it known that I, PETER BROOKS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Loom for Weaving Hats; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a side view; Fig. 2, a top view; Fig. 3, a vertical central section; Figs. 4, 5, 6, 7, and 8, detached views, to illustrate the construction and operation of the machine.

The object of this invention is the construction of a loom for the purpose of weaving a hat-body—that is to say, commencing at the center of the top of the crown and weaving to the edge of the brim, the machine itself introducing the new warps for the expansion of the top or brim, and automatically giving shape to the hat.

To enable others to construct and use my invention, I will fully describe the same as illustrated in the accompanying drawings.

A is the bed-plate of the machine; B, the driving-shaft, from which power is communicated to a vertical shaft, C, by means of bevel-gears D D; and from the said shaft C, through a spur-gear, C', power is communicated to a central vertical shaft, E, which said shaft carries a large spur-gear, E', in the center of the machine.

E<sup>2</sup> is a central plate, upon which the shuttle-race E<sup>3</sup> is arranged. F and F' are the two shuttles, each shuttle fixed upon a segmental gear, f, and arranged within the race, so as to travel around a common center. Around the plate E<sup>2</sup> at convenient points are arranged pinions G G, which are caused to revolve by connection with the large spur-gear E', as seen in Fig. 3, the said pinions arranged relatively to the segments f in the shuttle, so that, working in the said segments, the shuttle is driven around the race, a second pinion taking into the segmental gear on the shuttle before the first has left, thus maintaining a constant and uniform velocity of the shuttles, each of the said shuttles carrying a bobbin of the filling material.

I would here remark that, while I represent two shuttles, I do not wish to be understood as confining myself to that number, as a single shuttle may be used, or more, if desirable. The greater the number of shuttles the faster the loom will weave.

H and H' are the holders for the warp-thread guides, extending around the shuttle-race, and is here represented, each of the holders carrying four thread-guides or healds, a and c, as seen in Fig. 2, the said guides or healds being arranged vertically, as seen in Fig. 3, and each guide carrying its own particular thread. When the guides are down, as denoted in Fig. 3, then the shuttle will pass over the threads carried by the said guides; but when any of the guides are raised, as denoted in blue, Fig. 3, the thread being denoted in broken lines, the thread is raised, so that the shuttle passes beneath such raised thread; and it is essential that the threads be so raised at the proper time to introduce new threads during the process of weaving the top or brim. To perform this, I arrange over the central shaft, E, a hollow shaft, I, and over that a third shaft, L, as seen in Fig. 3. The said shaft L has power communicated to it to cause it to revolve through the gear C' on the shaft C, (see Fig. 1,) the said outer shaft carrying a cam-wheel, M, which has a projecting flange, e, upon the outer edge, and upon the inner edge a corresponding projecting flange, s; and upon the shaft I are fixed what may be called the "jacquard-wheels" N and P, the one, N, outside the cam, and the one, P, inside the cam, as denoted in Fig. 3, both fixed to the same shaft. The said jacquard-wheels M and P have notches t cut through their upper edge, as denoted in Figs. 5, 6, and 7. The thread-guides or healds a and c extend down, the one set, c, so as to rest upon the surface of the wheel N, the other set, a, so as to rest against the beveled portion of the wheel P, as denoted in Fig. 3, and also seen in Fig. 5. In this position (Fig. 5) the cam-wheel M will revolve without in any way affecting the thread-guides; but when the wheels N and P are turned so that one of the thread-guides falls into the notch t, as denoted at the left in Fig. 3, then the projecting ledge on the edge of the cam M will catch into the notch formed in the said



thread-guide, and raise the guide, as denoted in blue in said Fig. 3, the cam being formed as seen in Fig. 7, and each revolution of the cam will raise the same guides which have been let off the wheels N and P; and, as more threads are wanted, the further turning of the wheel N will cause the other thread-guides to pass into the notches until all are taken, as seen in Fig. 6. Therefore, commencing at the center, all the warp-threads are fixed together, and as the shuttles revolve, only so many of the warp-threads are raised as are required at that point, new warp-threads being introduced as the process of weaving goes on and the fabric woven expands.

From each of the shuttles an arm, *n*, extends to the center, bearing against the filling-thread, which serves the purpose of a beater in a common loom.

Each of the warp-threads passes through a tension-bar, *m*, as seen in Fig. 3, the said bar being provided with a spring, *m'*, which forces the bar outward, to take up the slack, as denoted in Fig. 3.

In order at the proper time to introduce the requisite warp-thread, I arrange a feed-wheel, R, which is caused to revolve by any convenient connection of the driving-shaft to give it the proper velocity, the said feed-wheel being formed as seen in Figs. 4 and 8, Fig. 4 being the diagram of the circumference of the wheel, and may be explained as follows: 1 being the point of starting at the center of the crown, four teeth, 2 3 4 5, being sufficient for the formation of the top of the crown, the space between 5 and 6 for the side of the crown, and 6, 7, and 8 for the brim.

The wheel R operates upon a lever, S, (more clearly seen in Fig. 8,) and extending up to the wheel N, as shown in Fig. 6, so that as each tooth on the wheel R operates upon the lever S it will turn the two wheels N and P by means of a pawl and ratchet, T, (seen in Figs. 5 and 6,) each movement being sufficient to let off one of the thread-guides, either upon the outside or inside, or both, as the two wheels N and P may be arranged so that the first movement will take in an outside thread and the second an inside, and so on.

The wheel R being caused to revolve, the tooth 2 will throw in the first-needed thread-guides in the expansion of the crown, and so on each successive tooth, 3 4 5, more or less, until the top of the crown is formed. Then, as no more extra threads are required to be introduced until the side or body of the hat is formed, the space in the wheel R between 5 and 6 has no effect upon the wheels N and P; but when the crown is formed and the widening for the brim necessary, then the teeth 6 7 8 in their turn introduce the extra threads required.

The cutting of the wheel R, it will be readily seen, is to be formed and adjusted according

to the form and style of the hat, the diagram, Fig. 4, being sufficient to show the construction and adjustment.

When a hat has been thus formed, to begin again for a second hat the several thread-guides or healds must be returned to their first position. To do this, the wheels N and P are dropped below the ends of the thread-guides by means of a lever, W, (see Fig. 1,) upon which the shaft I rests, and turned until, in the position in Fig. 5, the wheels are again raised, bringing all the guides once more against the surface of the wheel between the spaces *t*, as seen in Fig. 5.

After the top of the crown has been formed and the body is being formed, it is necessary to carry the top of the crown down or raise it from the path of the shuttle-threads so fast as the body is formed. To do this I arrange a follower, S<sup>1</sup>, centrally over the plate E<sup>2</sup>, which said plate has an opening, S<sup>2</sup>, through its center, the follower S<sup>1</sup> being of the diameter of the crown of the hat.

After the top has been formed the follower is brought down onto the fabricated top, and is forced down through the opening S<sup>2</sup>, carrying with it the top of the hat, so that the body will be formed around the said follower; and when the crown has been fully formed the further movement of the follower is stopped, holding the crown in that position until the brim is formed; and it is thus operated by being connected to a vertical shaft, S<sup>3</sup>, which said shaft is drawn down by a revolving nut, S<sup>4</sup>, by its connection with the operative mechanism of the machine, thrown into or out of gear at the proper time.

Having fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. The wheel N, constructed with the recesses *t*, and combined with the cam-wheel M and thread-guides *c*, so as to operate as specified.

2. The combination of the two wheels N and P, each constructed with recesses *t* and cam-wheel M, with the thread-guides *a* and *c*, so as to operate substantially as specified.

3. In combination with the cam-wheels N and P, the pattern-wheel R, so as at the proper time to turn either or both the said wheels for the purpose of introducing new warp-threads.

4. In combination with the thread-guides *a* and *c*, the tension-bars *m*, operating as described.

5. In combination with the shuttles and warp-thread carriers, operated as described, the follower S<sup>1</sup>, all arranged so as to operate together, substantially as and for the purpose set forth.

PETER BROOKS.

Witnesses:

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