No. 626,314. Patented June 6, 1899.

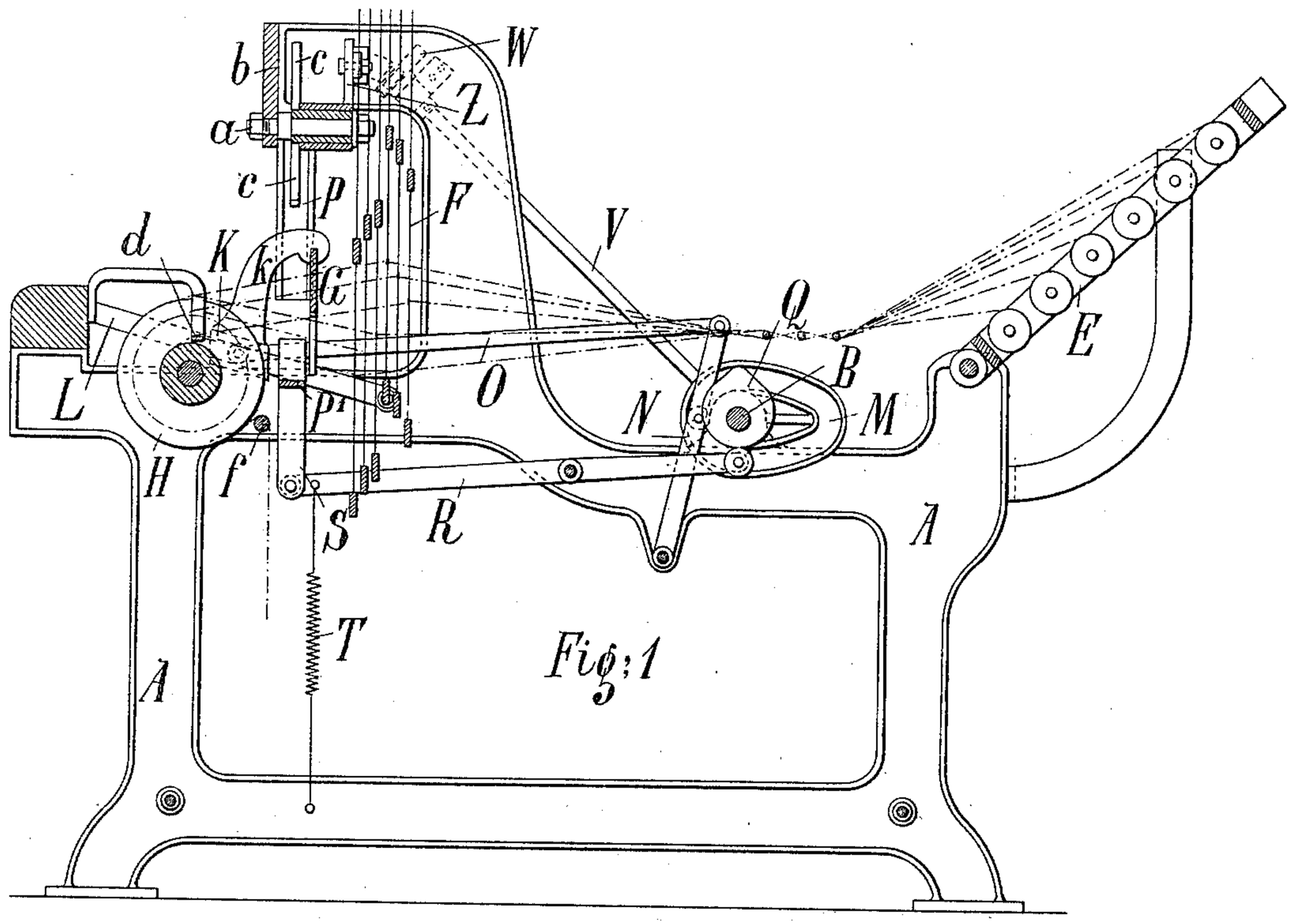
F. WEVER & C. SEEL.

LOOM.

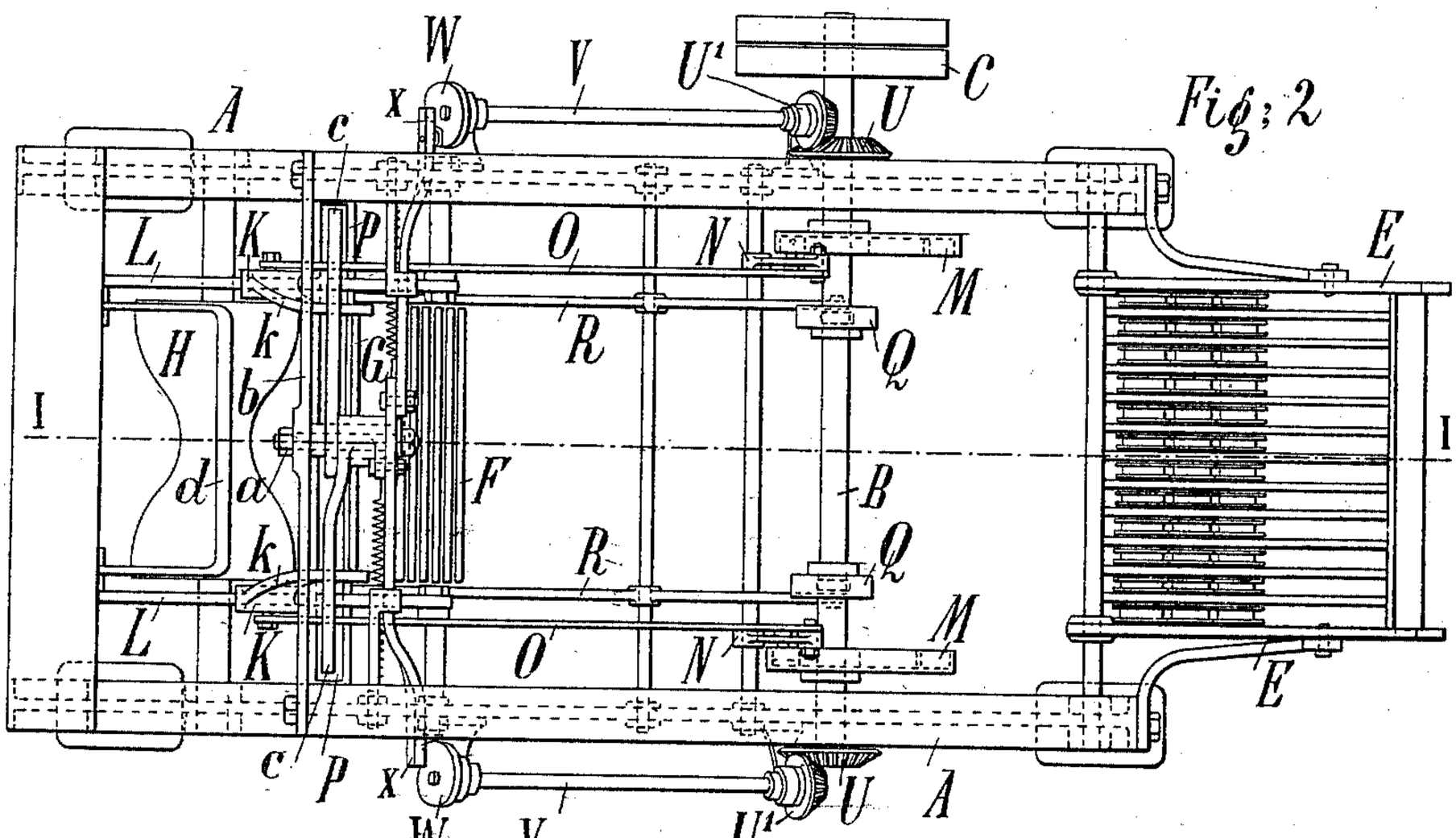
(Application filed June 6, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Fig; 1



Fig; 2

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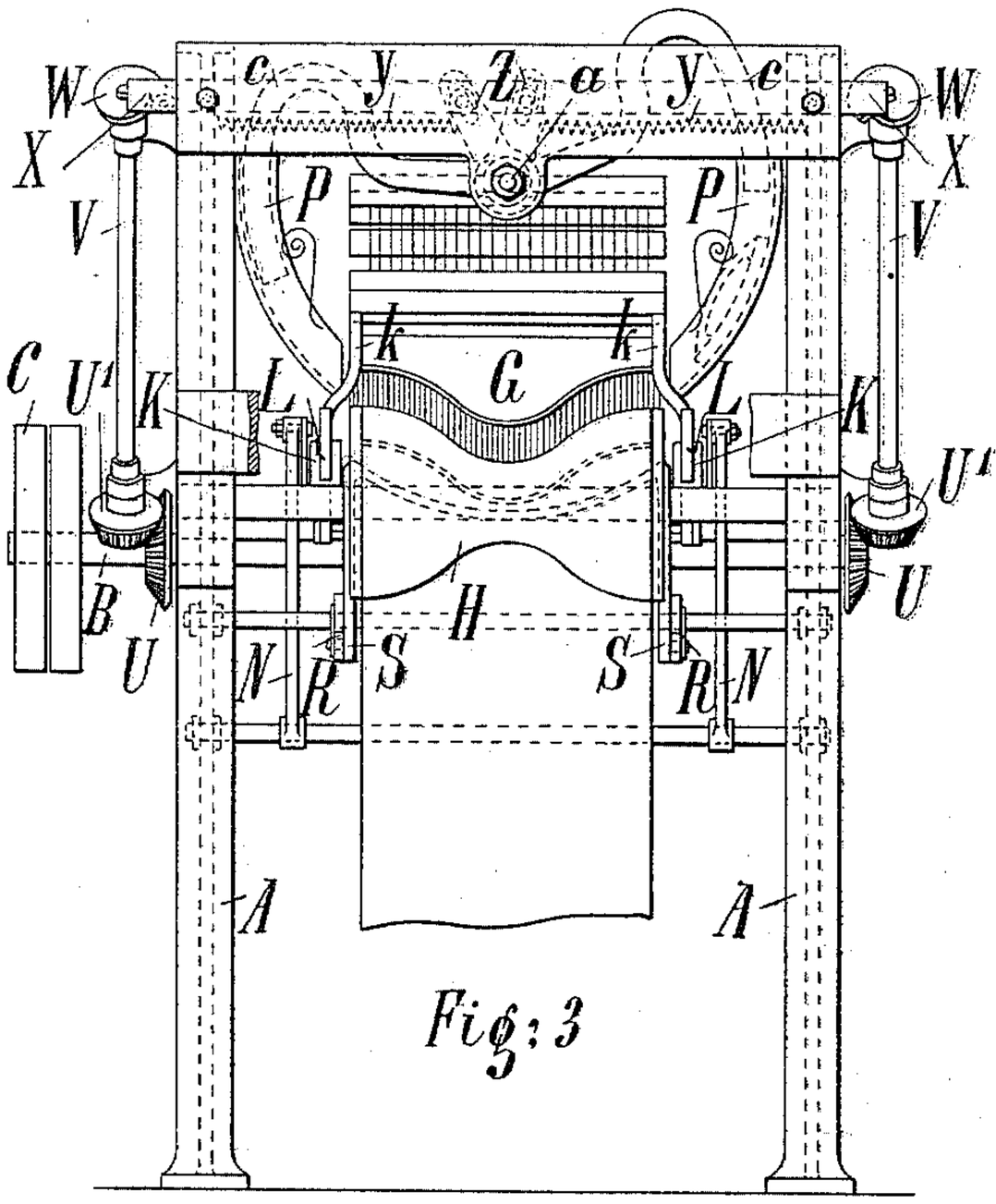
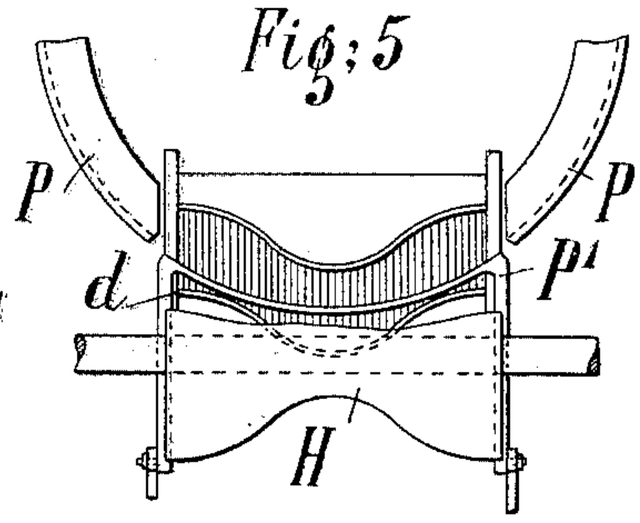
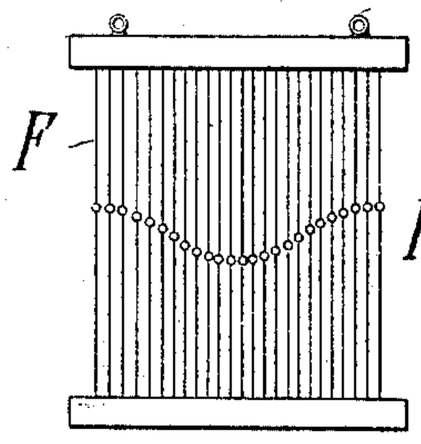


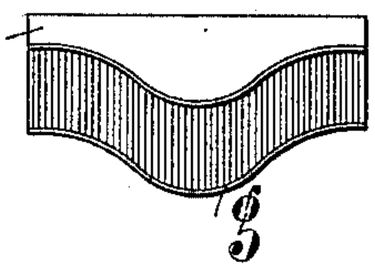
Fig; 3



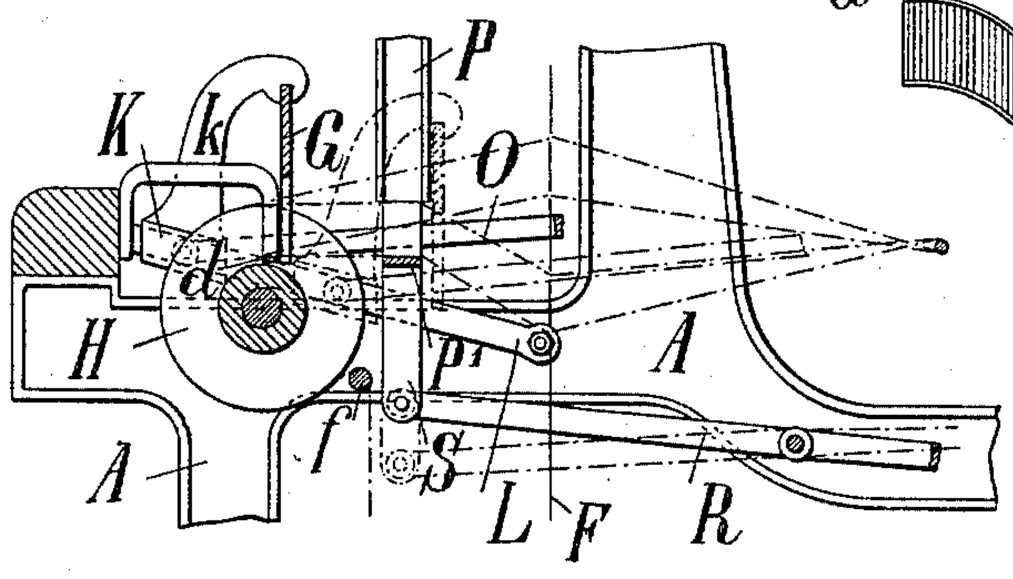
Fig; 5



Fig; 6



Fig; 7



Fig; 4

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UNITED STATES PATENT OFFICE.

FRIEDRICH WEVER AND CARL SEEL, OF BARMEN, GERMANY.

LOOM.

SPECIFICATION forming part of Letters Patent No. 626,314, dated June 6, 1899.

Application filed June 6, 1898. Serial No. 682,634. (No model.)

To all whom it may concern:

Be it known that we, FRIEDRICH WEVER and CARL SEEL, subjects of the Emperor of Germany, residing at Barmen, in the Province of Rhenish Prussia, Germany, have invented certain new and useful Improvements in Looms; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention consists in a new loom for weaving fabrics especially shaped to conform to and cover the human bust or other bodies not conical, cylindrical, or of any simple and regular figure. It is an improvement on the subject-matter of our application filed October 13, 1897, Serial No. 655,099.

The present loom is distinguished from looms of ordinary make, first, by the peculiar shape of the breast-beam, which, however, is exchangeable and varies in form according to the shape of the fabric to be produced; second, by the peculiar design of the reed, which also in each case varies according to the shape of the breast-beam; third, by the special manner of arranging the mails in the heddles, which instead of lying in a straight line, as usual, are arranged in a line corresponding approximately to the general outline of the breast-beam and of the lower edge of the reed; fourth, by the race-board of the shuttle and the means for producing a clean shed; fifth, by the peculiar means for working the reed, so that it can be driven close up upon the breast-beam and beat up a longer weft-thread than the apparent width of the woven stuff.

On the accompanying drawings the new loom is shown as a whole and in various details and the manner of its working shall be explained hereinafter.

Figure 1 shows a vertical section along line I I of Fig. 2. Fig. 2 is a plan of Fig. 1. Fig. 3 is a front view seen from the left of Fig. 1. Fig. 4 shows a part of the loom in vertical section, serving to explain the working of the reed and of the shuttle-race. Fig. 5 shows in front view part of the loom with the reed behind the shuttle-race and the central part of this in normal position. Fig. 6 shows one example of arranging the mails in the heddles. Fig. 7 shows a detail view of the reed G, illustrated also in Figs. 3 and 5.

In a frame A is mounted the main shaft B, which is driven by fast and loose pulleys C, and from which the other movable parts of the loom are set in motion, as will be explained farther on. At the right or rear side of the frame is placed a light wooden frame E, containing the warp-bobbins, in place of a single warp-beam, as usual, the nature of the fabrics intended to be produced by our new loom requiring different lengths of warp at different places of the weaving, and therefore special means for giving off various lengths of yarn at different places. From these bobbins the yarn is drawn in to the heddles F and the reed G, and thence around the breast-beam H. The heddling and reeding are done as usual, with the difference only that the mails in the heddles are not arranged in a horizontal or straight line, (only for making small articles, ribbons, and the like the mails in the heddles may be arranged in a horizontal line,) but in a line corresponding in shape to the shape of the breast-beam, as clearly shown in Fig. 6. The reed also differs from an ordinary reed in this respect: its bottom stay *g* instead of being straight, as usual, has also the curved shape of the outline of the breast-beam. The reed further differs from an ordinary reed by the manner of its working and arrangement in the loom.

The reed instead of being arranged in a batten is here held between two guide-blocks K, which slide on two guide-bars L, mounted obliquely in the main frame. These guide-blocks have brackets *k* surmounting them, on which the reed is so held that when it is fully pushed backward it will stand behind the shuttle-race board, and when it is fully drawn forward—that is, toward the breast-beam—its bottom stay will stand exactly, or nearly so, in the middle over the breast-beam. The moving forward and backward of the reed may be done, as in the example shown, by means of cams M and levers N and O, as is clearly shown in Figs. 1 and 2.

The breast-beam H is exchangeable and varies in form. It receives always the shape which is prescribed by the shape of the fabric to be produced. In the example shown on the drawings it has a wavy form, resembling

somewhat the bust of a human body, because the stuff produced thereby is used for making corsets.

Between the heddles and the breast-beam is arranged the shuttle race-board. This is composed of three separate parts, forming together a channel of half-circular form. The two side parts P P are fixtures. The central part P′ can be raised and lowered. The lowering has for its object to allow the reed to pass through on its way backward before a new weft is laid in. The raising of the middle part P′ of the race-board has for its object to raise all those warp-threads which do not form a clean shed, so that when the part P′ is raised it not only forms a continuous semicircular race, together with the two other parts, but that it also brings up the warp-threads into place, so that they do form a clean surface for the shuttle to pass over in the race-board.

The raising and lowering of the movable part P′ of the race-board is done by means of cams Q, levers R, and bars S, properly arranged in the loom between the two main frames, a spring T serving to pull the levers downward and keep their rear ends in contact with the cams.

The driving-gear for the shuttle—the picker-driver in ordinary looms—is arranged as follows: At both sides of the main shaft bevel-wheels U are placed, gearing together with similar wheels U′ on obliquely-arranged shafts V, held in suitable brackets at the sides of the frames and at the upper ends of which are keyed volute cams W. These volute cams work against slides X, which are pulled against them by springs Y, which are fixed with one end on the main frame and with the other upon arms Z, which are made to oscillate on a bolt *a*, upon which they are keyed and which is suitably carried and held in the cross-beam *b* of the frame. On the bolt *a* are also fixed the (picker) drivers *c*, which, with their circularly-shaped ends, reach into the race-board of the fixed parts P P. It will be observed that the bolt *a* lies in the center of the circle of the race-board.

Finally, we have to call attention to a small bar *d*, which is placed exactly over the breast-beam, closely fitting its outline and fixed at both sides on the frame in such a manner that it will not hinder the turning of the breast-beam. Over this bar are laid the warp-threads before they touch the breast-beam. It has for its object to raise the warp-threads a little above the outline of the breast-beam, so that the reed when beating fast a weft-thread and being driven quite forward upon the center line of the beam does not require to raise the threads; otherwise by its movement it might easily happen that thin threads are torn, which is prevented by passing the warp over the thin bar *d*.

Variations in minor details may be made; but in the main the loom described and shown is new, and so is its working, of which we let follow a short description. This is as follows: The drawing and heddling of the warp into the reed and the heddles having been done as usual and the yarn having been drawn over the bar *d* and around the breast-beam, which is roughened by any of the known means, the shed is opened and the reed is pushed backward into the position shown in Fig. 1 in full lines and dotted lines in Fig. 4. The loose part P′ of the shuttle race-board is then raised and brought in position that the race in the three parts P P′ P forms a continuous circular channel. The shuttle, with the weft-thread, is then driven through the shed by means of the drivers *c c* and their connections, and then the part P′ is dropped again and the reed is pushed or pulled forward to beat the weft into the warp tight and close to the bar *d*, so that the weft-threads follow as closely as possible the outline of the breast-beam, and the now already woven fabric—that is, the intermeshed warp and weft threads—forms the exact wrapper of the breast-beam, so that when this is being turned by the ordinary means—that is, a regulator of any known and suitable design—the woven stuff is pulled forward while the weaving is going on. It will, however, be observed that the pulling off of the woven stuff in our mode of working and with our peculiar fabric cannot be done, as usual, by the use of a cloth-beam, upon which the stuff is wound, the peculiarity in the shape of the goods produced not allowing this mode of working. The stuff, or, as we might say, the "partial wrapper of the breast-beam," is taken along with it by its rotation so much as to give sufficient hold to it upon the breast-beam that it will be able to pull forward the warp. It then is taken off simply by carrying it over a bar *f* and is then taken up by a suitable receptacle placed underneath the loom, or it may be allowed to fall on the ground.

The gist of the invention consists in this, that the loom is so constructed and so worked that, first, the reed is pulled forward and beats the weft-thread fast only right up in the line of tangence between the warp-threads and the breast-beam, or at any rate in a line as close to that line of tangence that, practically speaking, the line given to the weft-thread has the form of the outline of the breast-beam and that it cannot any more alter this form or take another shape, as is the case in ordinary weaving, where the weft is beaten tight at a certain distance from the beam, and that, secondly, the reed is enabled to distribute a greater length of weft-thread than corresponds to the real length of the breast-beam. In order to be able to bring up the reed into the said position and beat the weft tight upon the breast-beam itself, it is necessary that the bottom stay of the reed corresponds in its general form to the general outline of the breast-beam. A further condition is that means are provided to raise the warp-threads of the lower shed so as to form a clean shed for the shuttle to pass through.

The mechanisms used for carrying out these ideas are of minor importance, and they may vary in construction according to the general arrangement of the loom.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim, and desire to secure by Letters Patent, is—

1. In a loom for weaving shaped fabrics, the combination of a breast-beam conforming to the shape desired, with heddles having their mails arranged in a line corresponding to the contour of the said beam, a reed having a bottom stay of shape also corresponding thereto, and the necessary actuating and connecting mechanism, substantially as set forth.

2. In a loom for weaving shaped fabrics, the combination of a breast-beam conforming to the shape desired, with a bar *d* fixed closely over the breast-beam near the line of tangency of the warp-threads therewith, heddles having their mails arranged in a line corresponding to the contour of the said beam, a reed having a bottom stay also of corresponding shape, and the necessary actuating and connecting mechanism, substantially as set forth.

3. In a loom for weaving shaped fabrics, the combination with a breast-beam conforming to the desired shape, of heddles having their mails arranged in a line corresponding to the contour of the said beam, a reed having a bottom stay of shape also corresponding thereto and the necessary actuating and connecting mechanism, the length of the reed at the top being equal to the total length of the working part of the breast-beam, its bottom being of equal length with the breast-beam and the reed-bars converging from the said top toward the said bottom substantially as set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

FRIEDRICH WEVER.
CARL SEEL.

Witnesses:
R. E. JAHN,
OTTO KÖNIG.