

(No Model.)

4 Sheets—Sheet 1.

G. BÜRKLE.
JACQUARD MECHANISM FOR LOOMS.

No. 504,323.

Patented Sept. 5, 1893.

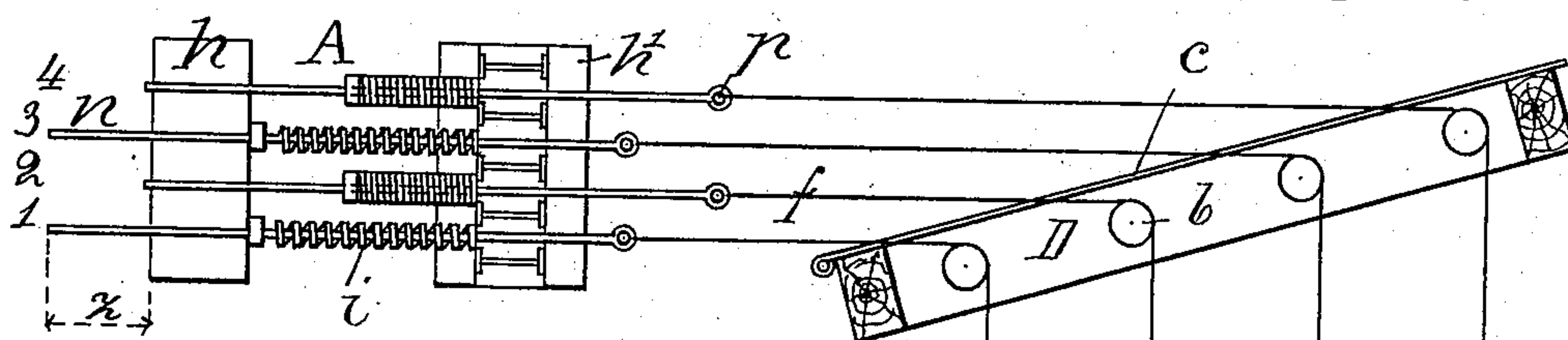
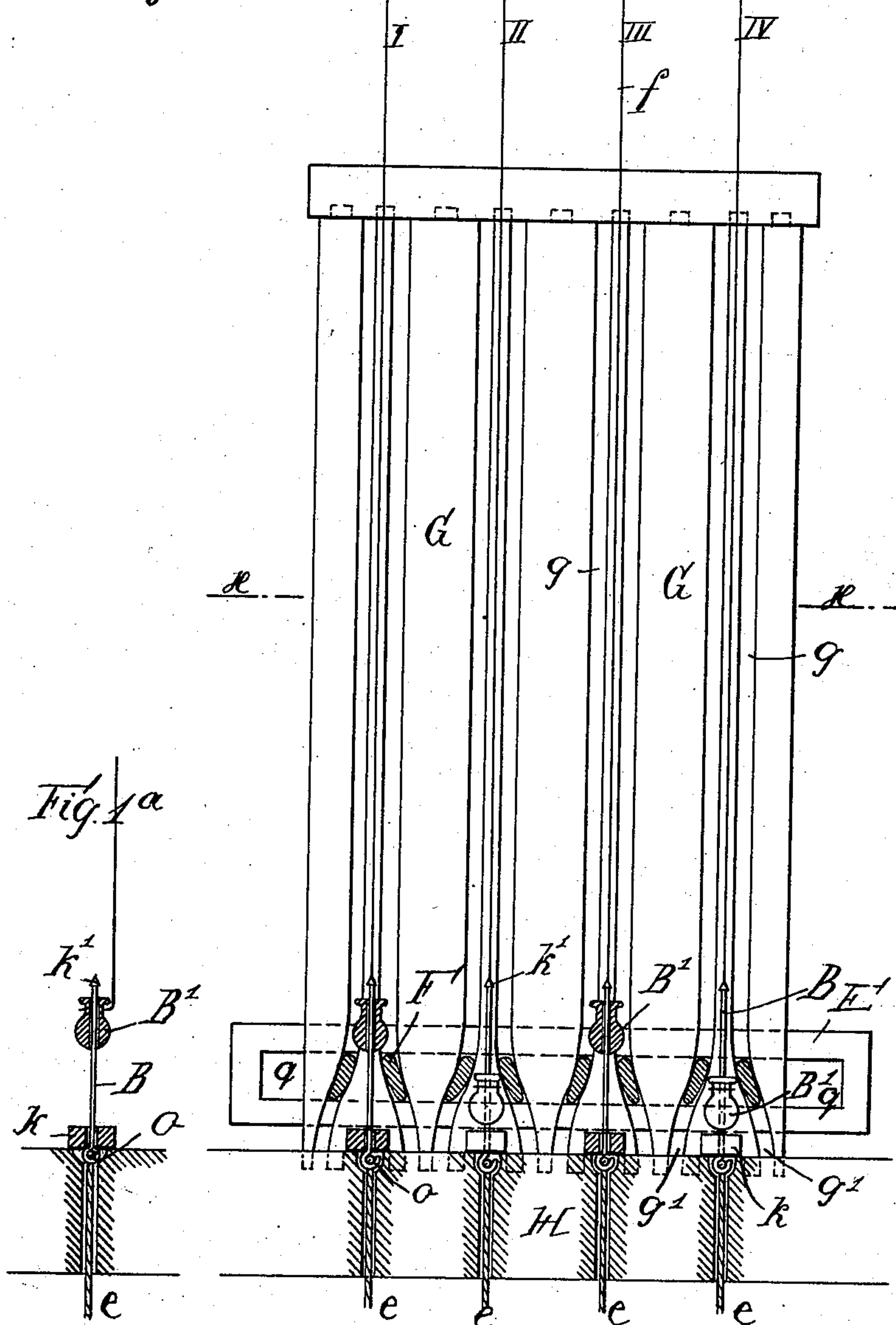


Fig. 1.



Witnesses
E. Kaiser.
Carl Hoffmann.

Inventor
Georg Bürkle
by
Robert W. Fisher
Attorney

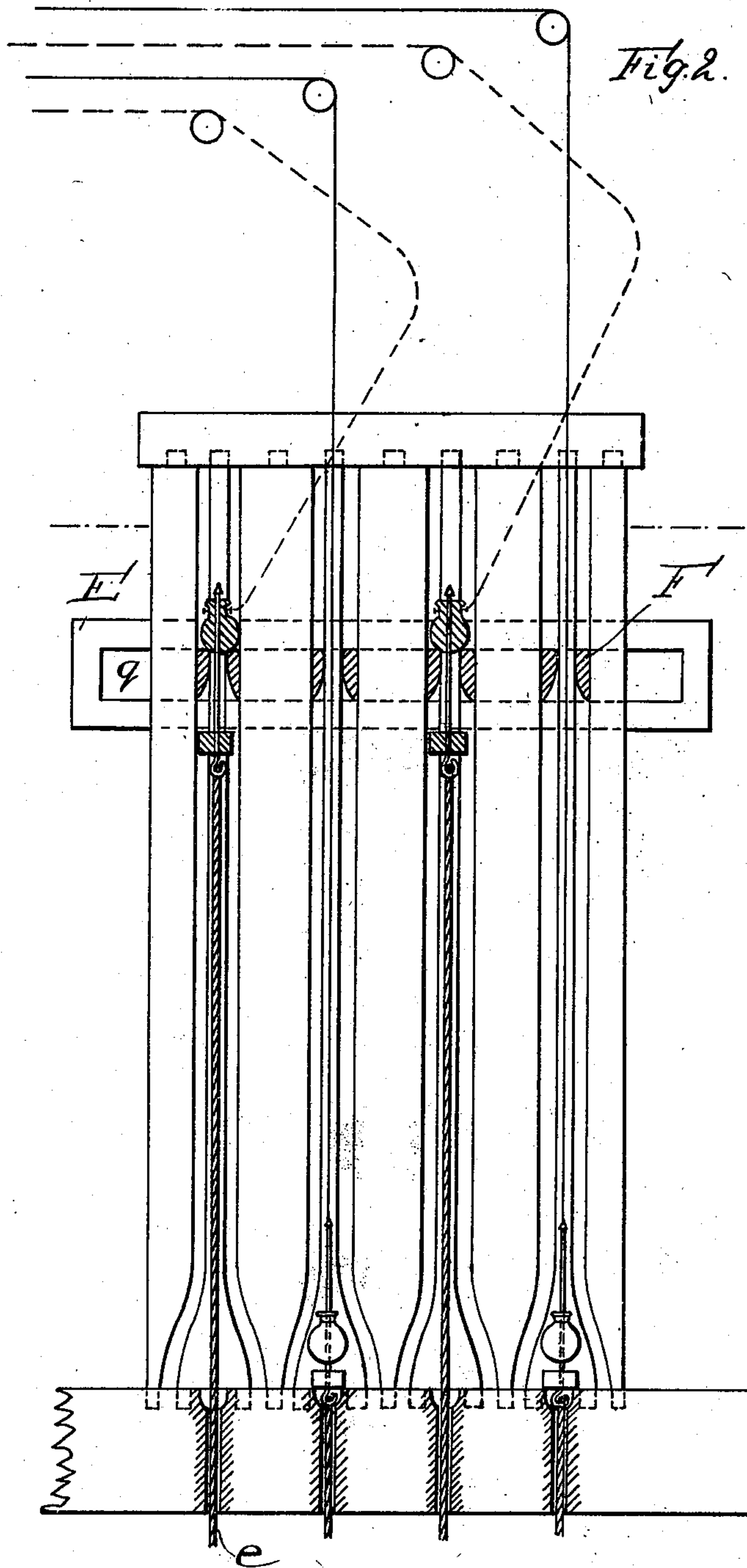
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G. BÜRKLE.
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Patented Sept. 5, 1893.



Witnesses:
E. Kaiser
Carl Rofsbach.

Inventor
Georg Bürkle
by Robert Winder
Attorney.

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G. BÜRKLE.
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Fig. 5.

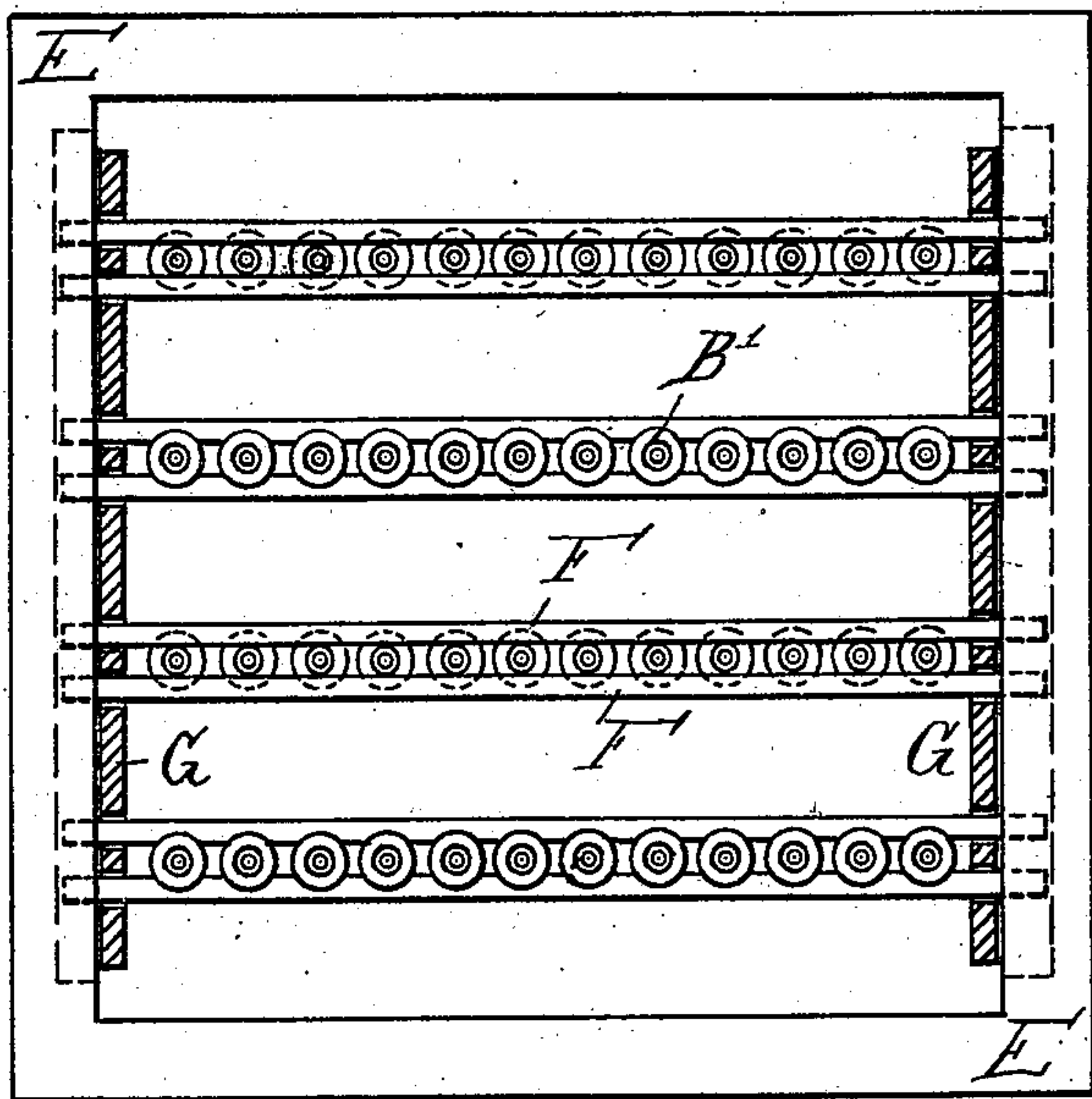
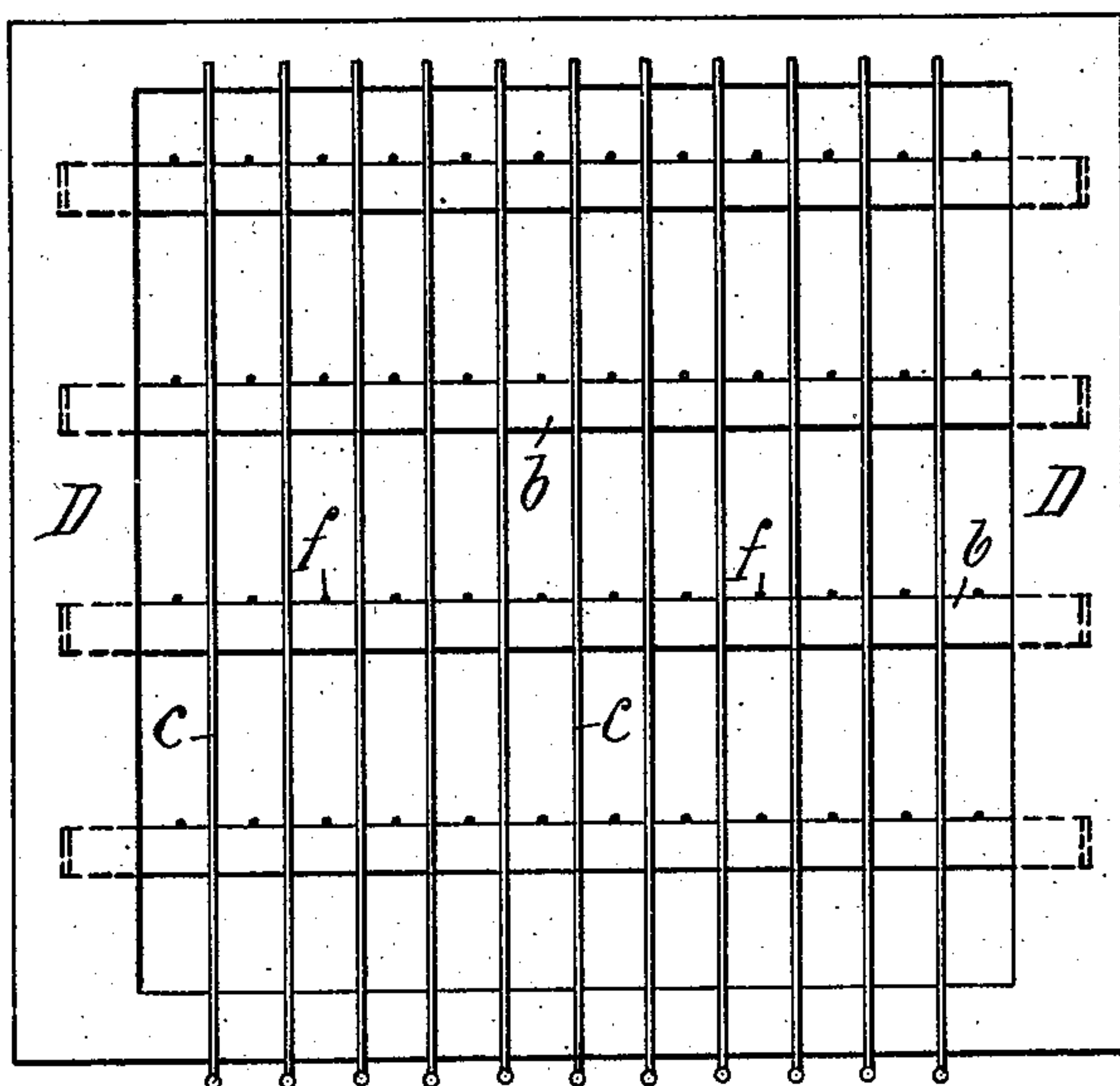


Fig. 3.



Witnesses
E. Kaiser.
Carl Ropsbach.

Inventor
Georg Bürkle.
by Robert Weber
Attorney

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Fig. 6

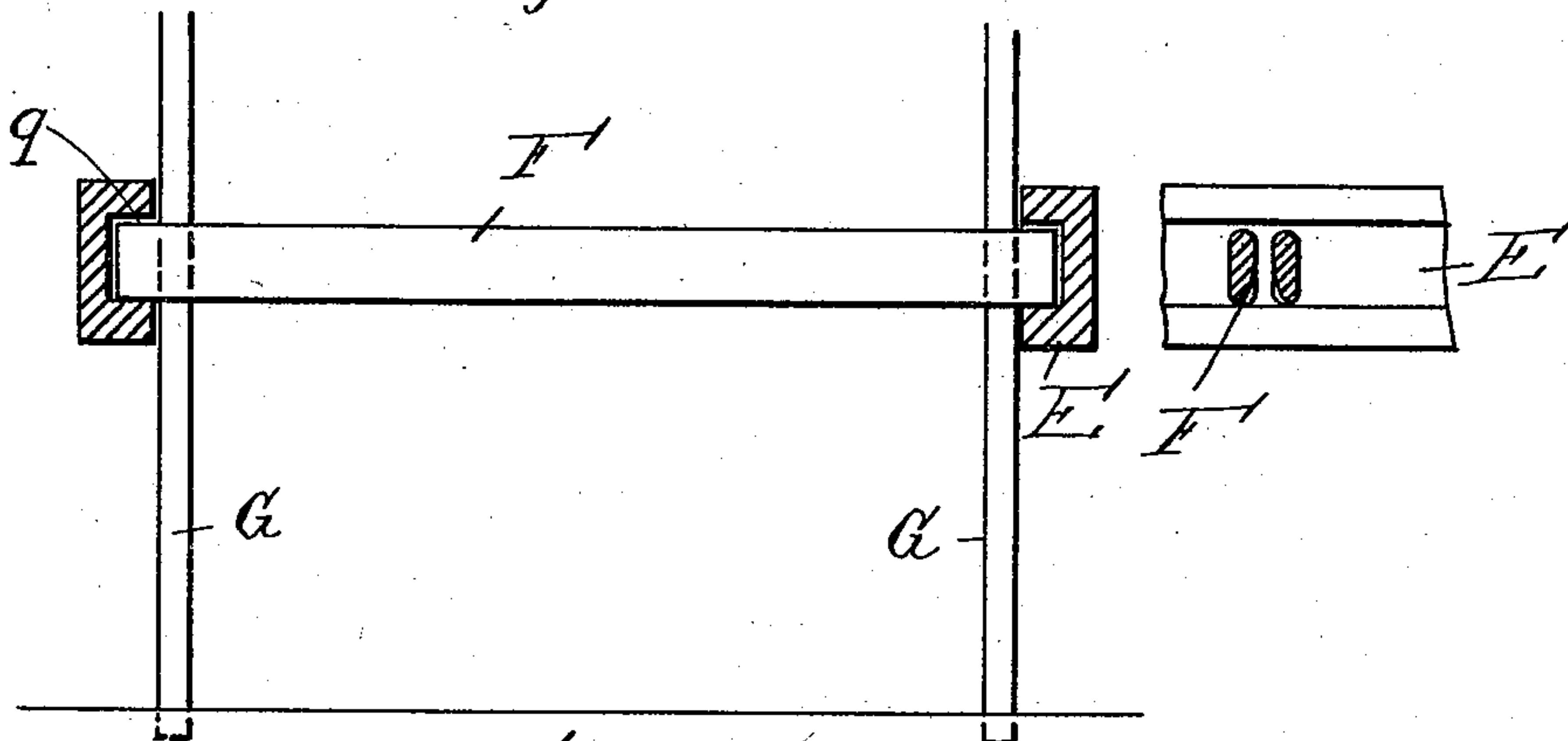
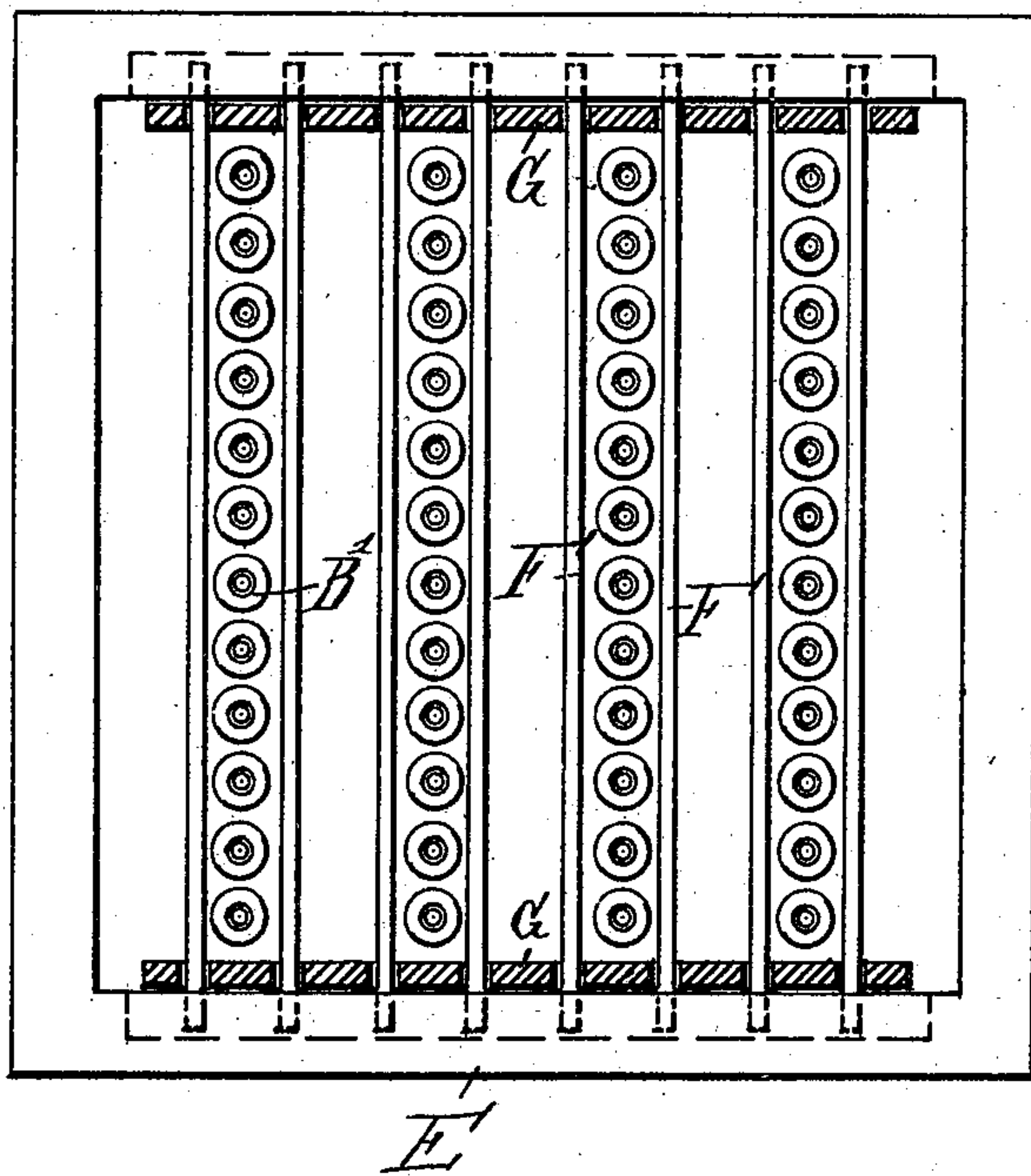


Fig. 4



Witnesses.
E. Kaiser.
Carl Ropsbach.

Inventor
Georg Bürkle
by
Robert Winkler
Attorney.

UNITED STATES PATENT OFFICE.

GEORG BÜRKLE, OF BLAUBEUREN, GERMANY.

JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 504,323, dated September 5, 1893.

Application filed May 31, 1892. Serial No. 434,983. (No model.)

To all whom it may concern:

Be it known that I, GEORG BÜRKLE, a subject of the King of Würtemberg, and a resident of Blaubeuren, in the Kingdom of Würtemberg, in the German Empire, have invented certain new and useful Improvements in Jacquard Mechanism for Looms, of which the following is a full and exact specification.

My invention relates to a new arrangement and construction of needles and lifting wires for Jacquard looms, and the object of my invention is to secure an easy mobility and exact working of the said parts and at the same time to construct the same so that they occupy a reduced space, as compared with the constructions in use heretofore. I effect these improvements by connecting the needles with the lifting-wires by means of separate threads and by making the lifting-wires of two parts movable the one in relation to the other. I construct the said lifting-wires of short vertical rods resting on the bottom board of the lifting mechanism, and of light spherical balls adapted to glide along the said rods.

The construction and operation of my invention will be more readily understood by reference to the accompanying drawings, of which—

Figure 1 is a side elevation of the part of a Jacquard-loom, to which my improvements relate, the lifting-frame being in its lower position. Fig. 1^a is a detail view of one separate lifting-wire. Fig. 2 is a side elevation similar to Fig. 1, the lifting-frame being in its upper position. Fig. 3 is a plan view of the frame D. Fig. 4 is a sectional plan on the line $x-x$ of Fig. 1, the lifting-blades being open. Fig. 5 is a similar view, the lifting-blades being closed. Fig. 6 is a side elevation of a lifting-blade, and at the right I have also shown two lifting-blades in cross-section.

The loom has a cylinder, on which are mounted the usual cards which influence the needles n each of which is, by means of a thread f , connected to a ball B' sliding on the lifting-wire B. The threads f pass over cylindrical glass rods b , which are secured to the frame D and form a grating in combination with wires c crossing the glass rods b at right angles [Figs. 1 and 3]. This construction prevents the threads f from becoming

entangled. E is the lifting-frame provided with grooves $g g$ into which the extremities of the lifting-blades F are adapted to engage; G G are two opposite vertical side boards connected to the bottom board H, said side boards being placed between the guiding laths of the lifting-frame E. These laths are not shown on the drawings, but their construction will be obvious and need not differ from the usual construction. In the side boards G G I provide divergent guiding grooves $g g'$ in order to move each pair of lifting-blades F F from each other or toward each other, when the lifting-frame E is displaced vertically.

As will be seen in Figs. 1 and 1^a, the lifting-wires B are not, as usual, constructed in the form of simple hooks, but of two parts, the one, B, being secured to one of the cords e , the other, B', which slides along the first, being fixed to the thread f as already mentioned. The part B rests on the bottom board H by means of the plate k , and is at its top provided with a head k' , and at its under end with a hook o adapted to receive the harness cord e . The thread f is wound around the neck of the sliding ball B' and its other end fixed to an eye or hook p at the end of the needle n . The pairs of lifting-blades F during their vertical course closely approach the lifting-wires B B' and are so guided in the grooves $g g'$ that at the lower end of the same they separate so as to allow the ball B' to pass freely between the same.

The object of this construction is a double one: first, by lifting the ball B' up to the head k' , to be enabled to raise the lifting-wire B belonging to the same [as is the case for the rows 1 and 3 in Fig. 1], together with the lifting-frame E into the position Fig. 2, so that a shed is formed for the shuttle; or, when the ball B' rests upon the plate k , the needles n may be set out of gear with the card by pushing them back through the distance indicated by z on Fig. 1; the lifting-wires B connected to these needles are then not operated, as is the case for the rows 2 and 4 in Fig. 1. The needles n , which are arranged in rows 1, 2, 3, 4, and each of which influences a ball B', are guided in cross-bars $h h'$ fixed to the frame of the machine. When the cards mounted on a cylinder, the opera-

tion of which I need not describe, as it differs in nothing from the usual one, come in contact with the ends of the needles n protruding from the cross-bar h , they operate only upon the needles for which there are no corresponding holes on the cards [such is the case for the rows 2 and 4 on Fig. 1]; whereas the needles for which corresponding holes are provided on the card, [such is the case for the rows 1 and 3] are not operated, but remain in their respective positions. In consequence thereof the balls B' connected to the needles n of the rows 1 and 3 remain in the position above the lifting-blades F as shown in Fig. 1; thus when hereinafter the lifting-frame E is raised, the blades F , approaching each other, seize the balls B' of the rows 1 and 3 and lift the same together with the lifting-wires B , whereby the corresponding number of warp-threads is lifted by the cords e [Fig. 2]. During this lifting the threads f attached to the raised balls B' are loosely hanging down from the glass rods b , as will be seen in Fig. 2, and the said threads are stretched again during the descending movement of the lifting-frame E . The needles n , when no more influenced by the card, are brought back into their former position by the spiral springs i [Fig. 1] and thus the balls B' are lifted again into the position as shown for the rows 1 and 3 on Fig. 1. To the cords e there are fixed small weights as is usual in Jacquard looms and these weights contribute to stretch the threads f , and also to give a vertical position to the lifting-wires B . The order in which the balls B' are lifted or brought down on the plate k , depends of course on the arrangement of the holes in the card, that is to say, on the pattern to be produced. Each time a needle n is pushed back, the corresponding ball B' slides down to the collar k , and thus is not lifted together with the lifting frame E , when the latter begins its ascending movement; but when a needle n comes in line with one of the perforations of the card, the end of said needle is driven into the perforation by the action of the spring i , and the corresponding ball B' remains in such position, that the blades F , when moving upward, will seize the same and take it with them. The balls B' are preferably small beads but I may also employ balls consisting

of a light metal, such as for instance aluminum. A very important advantage of my improved construction is that the threads f may be very fine and yet last very long without sensible wear. I construct the bottom plate H in the same manner for all looms, that is to say, with the same space between the cords e ; and when the perforations on the card are not placed at the corresponding distance, the arrangement of the needles n is of course such as to register with the said perforations, and the threads f are stretched out obliquely from the eyes or hooks p to the glass rods b .

I will now sum up the advantages offered by my invention. First. The needles n and the lifting-wires B B' are of the same size for all machines two and one-half and one and one-fourth inches respectively. Second. The whole machine is lower than the Jacquard-loom of usual construction. Third. The threads f may be very fine, as already mentioned.

Having thus fully described the nature of my said invention, what I desire to secure by Letters Patent of the United States is—

1. In a Jacquard loom: the combination, with the lifting-frame E , lifting-wire B , having head k' , plate k , hook o and the cord e secured to the same, of the carrier-ball B' adapted to slide along the lifting-wire B and to collide with the head k' , needle n adapted to be operated by the perforated cards of the loom, and the thread f connecting the ball B' to the needle n , substantially as and for the purpose set forth.

2. In a Jacquard loom: the combination, with the lifting-blades F F and the lifting-frame E adapted to operate the same, of the side-boards G G provided with grooves g g for the guidance of the lifting-blades F F , the lower ends g' of these grooves being made divergent, substantially as and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORG BÜRKLE.

Witnesses:

PAUL HÜZEL,
HANS GIENGER.