

No. 627,329.

Patented June 20, 1899.

C. DRATZ.

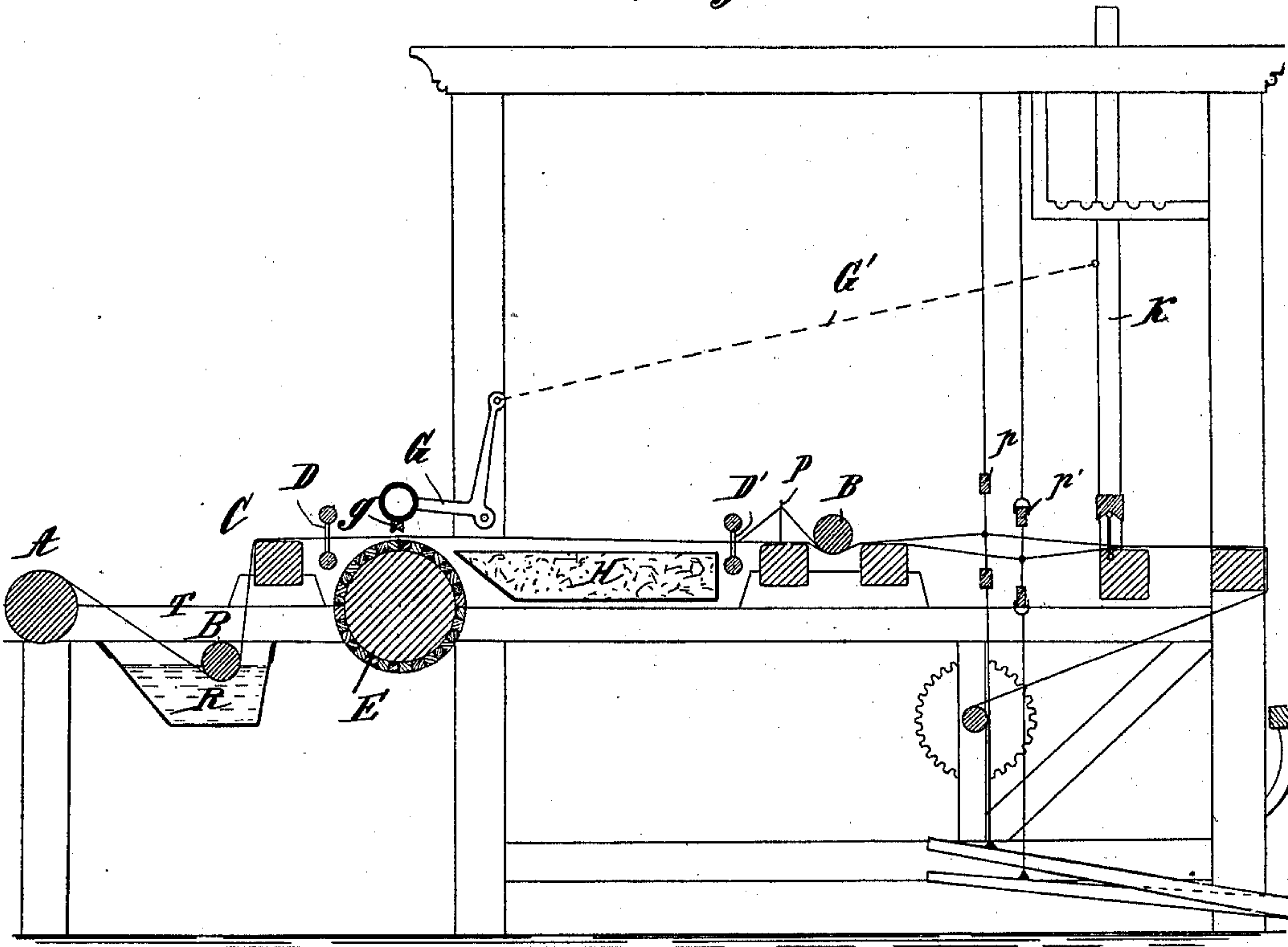
PROCESS OF AND APPARATUS FOR PRINTING MULTICOLORED DESIGNS.

(Application filed Dec. 29, 1897.)

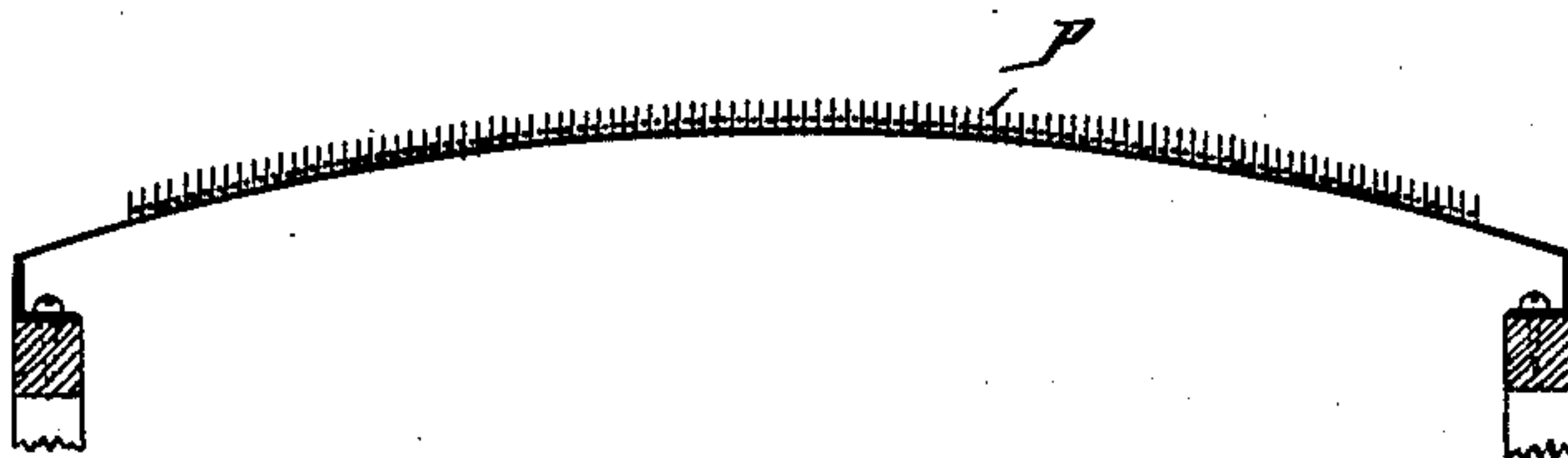
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4 Sheets—Sheet 1.

*Fig. 1.*



*Fig. 3.*



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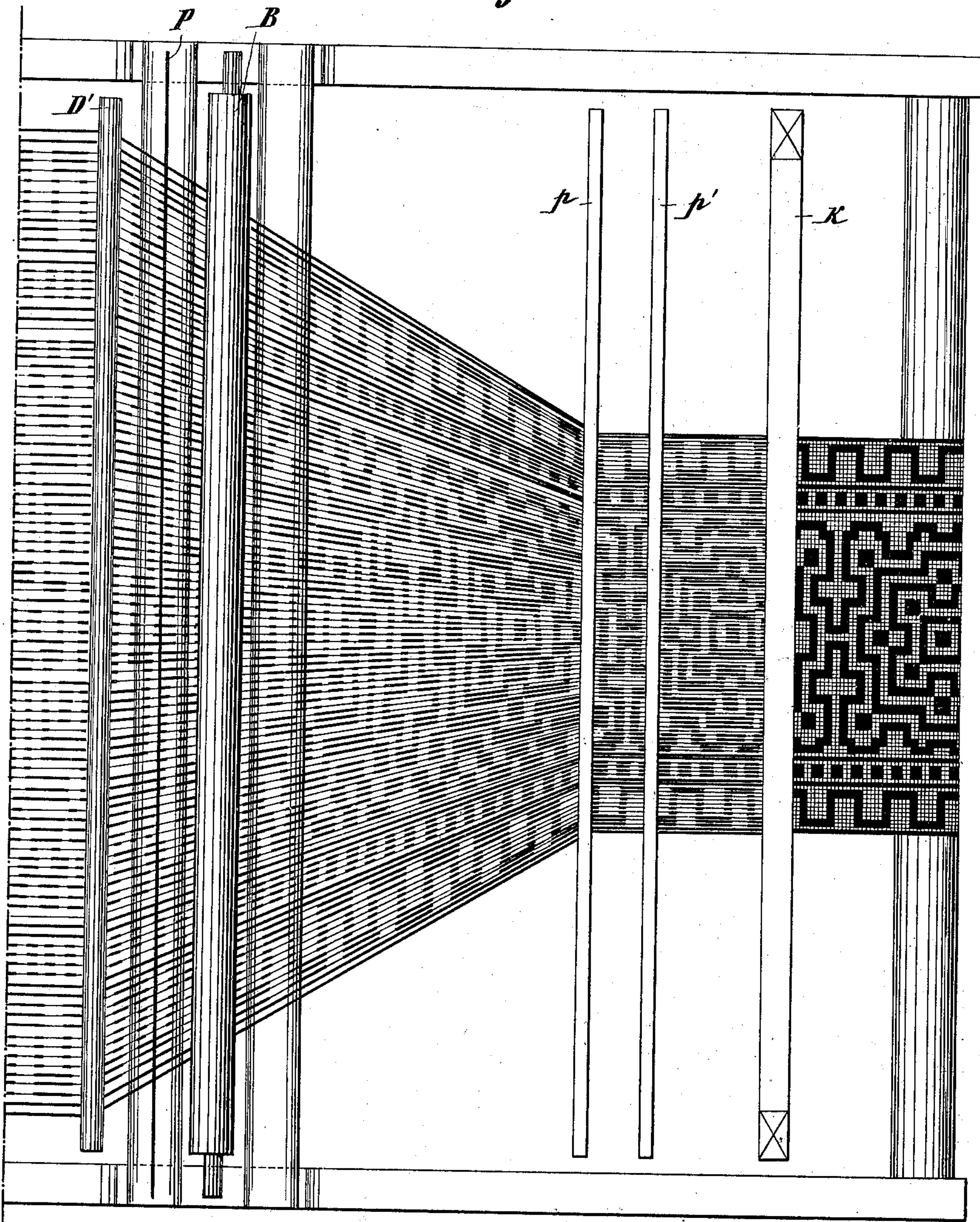
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*Fig. 2.*



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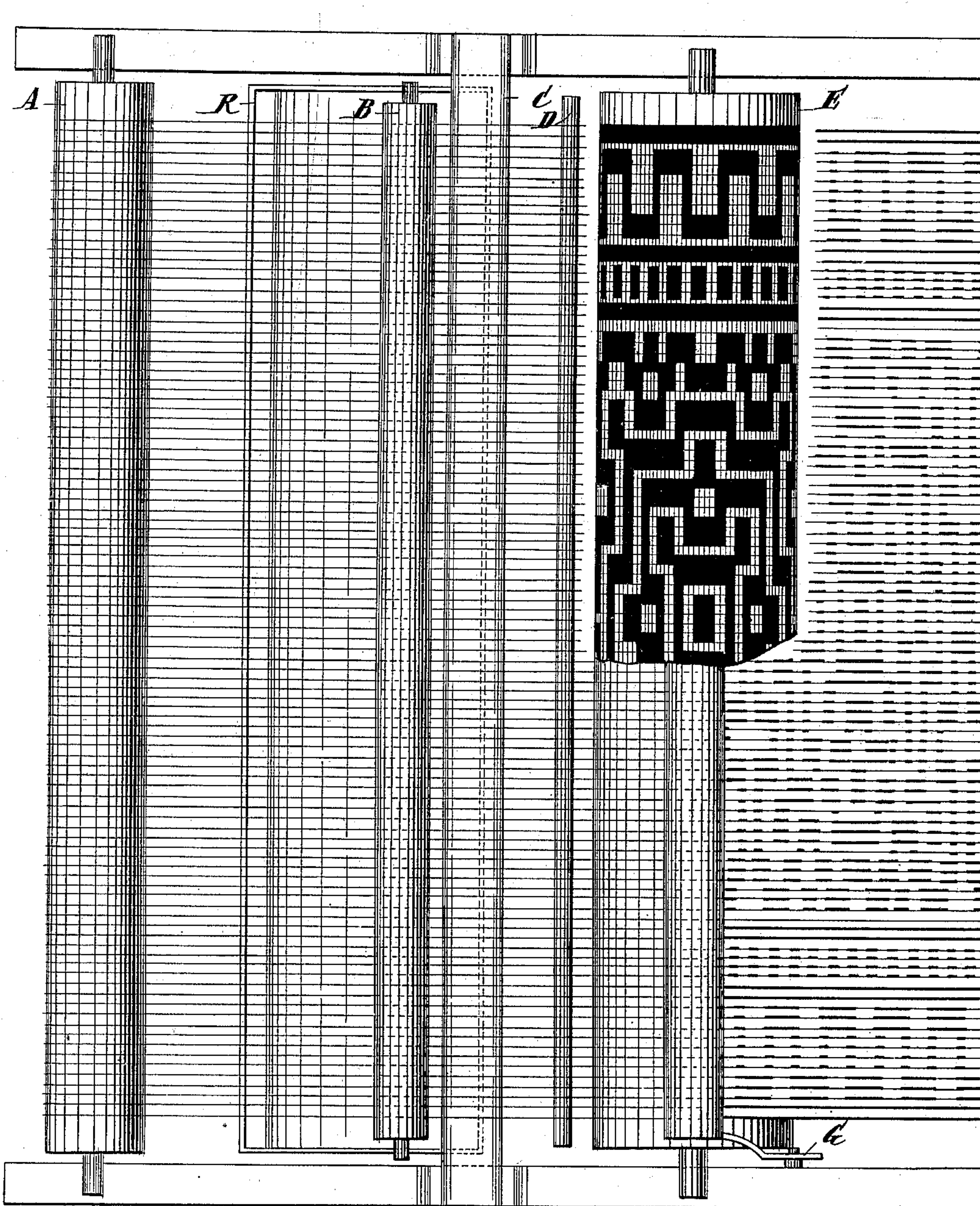
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*Fig. 2.<sup>a</sup>*



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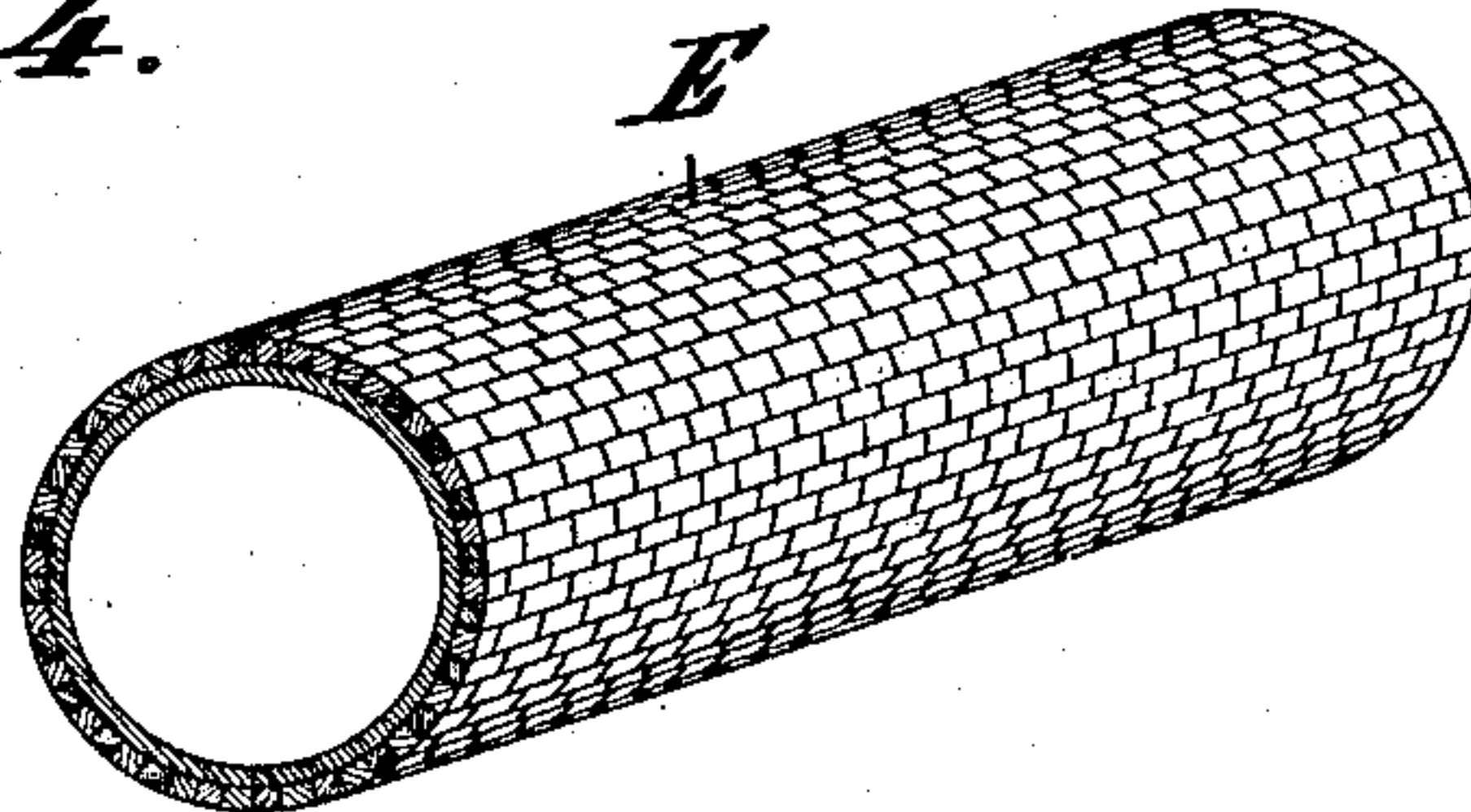
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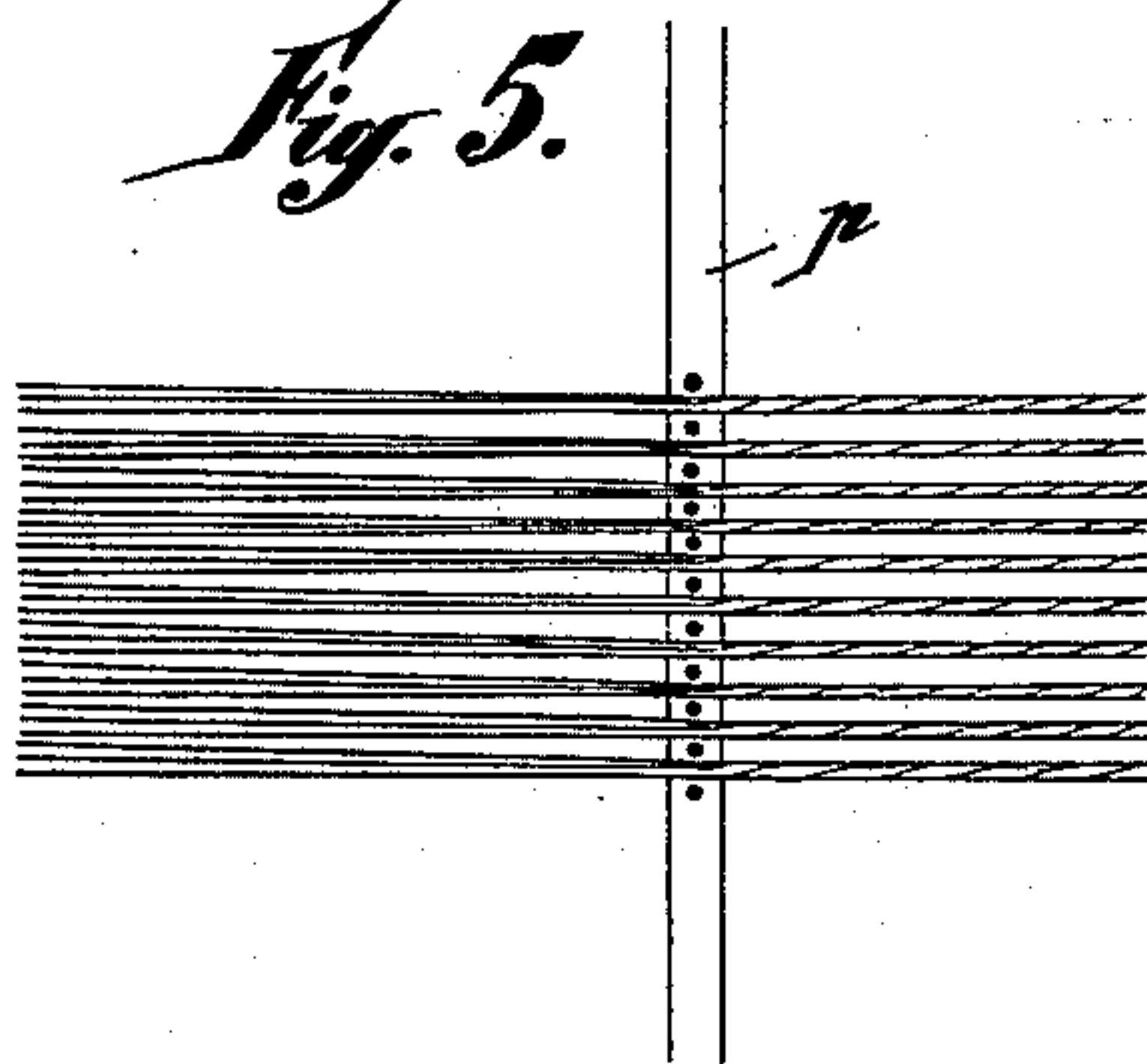
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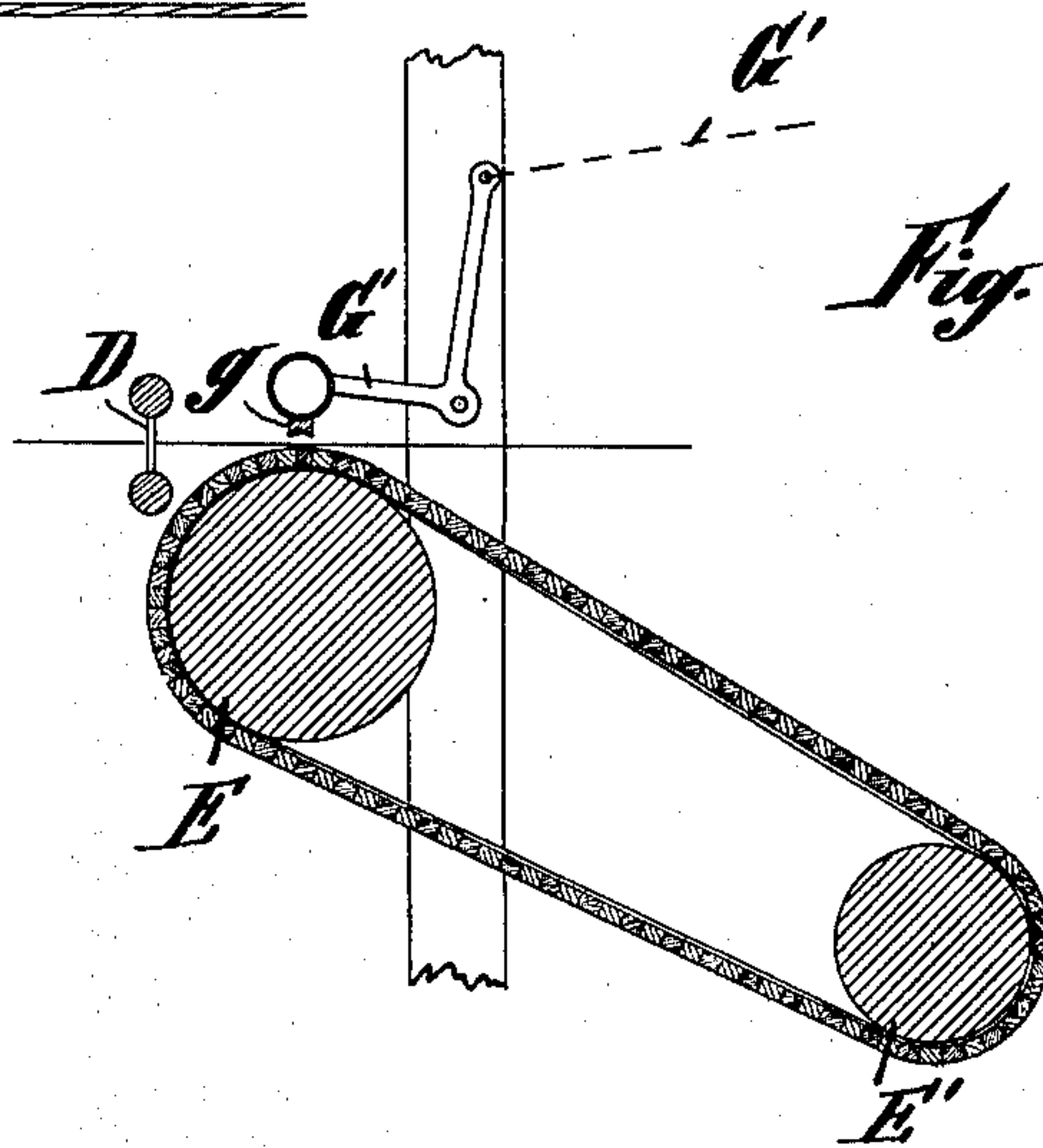
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

CHARLES DRATZ, OF BRUSSELS, BELGIUM.

PROCESS OF AND APPARATUS FOR PRINTING MULTICOLORED DESIGNS.

SPECIFICATION forming part of Letters Patent No. 627,329, dated June 20, 1899.

Application filed December 29, 1897. Serial No. 664,322. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES DRATZ, a subject of the King of Belgium, residing at Brussels, in the Kingdom of Belgium, have invented a certain new and useful Process of and Apparatus for Printing Multicolored Designs, of which the following is a specification.

The present invention relates to improvements in printing multicolor designs on textiles by means of solid coloring-matters imprinted on wetted warp-threads of a tissue in course of weaving. In this process of printing the design to be printed is represented by a series of blocks of juxtaposed colors, and this design in the known process is applied to the warp-threads in their passage from the warp-beam to the fabric being woven. This necessarily brings about the mutual contact of neighboring warp-threads, so that it is impossible to prevent the diffusion of the coloring-matters from one thread to the next and to obtain clearly-defined color outlines. The present improvements do away with these drawbacks. These improvements consist principally in holding apart or spacing on the warp-beam all warp-threads which are destined to form part in the composition of a tissue, so that they occupy a greater width than they should occupy in the weaving. In this manner the contact between two wetted neighboring threads is absolutely prevented. Then I impregnate simultaneously these threads so separated with the coloring-matter, and I do not let the warp-threads fall back to the width intended for the tissue before this coloring-matter has entirely dried in the fibers. Then there is no more danger of diffusion of color from one thread to the others.

My improvements further consist in assembling the warp-threads so printed in groups so as to make of them warp-thread groups to be afterward combined by the weft-yarn or filling in the weaving in such a manner as to produce thick tissues printed throughout their thickness and showing the printed design on both sides.

Finally my improvements concern the means for printing on the warp-threads so kept apart on the warp-beam so as to obtain the regular imprint of an outline design on

these threads, to effect the drying of the printed threads, and to prevent any malformation of the design when the width of the warp-thread tissue is reduced in the weaving.

The accompanying drawings show as a matter of illustration the application of my improvements in printing tissues in course of weaving and the mechanical means for the practical working of same.

In the drawings the figures represent the following details.

Figure 1 is a view in vertical section of a loom for the execution of my invention. Figs. 2 and 2<sup>a</sup> are diagrams of this loom, showing the design to be printed and the manner in which the design is made in the weaving. Fig. 3 is a view in detail. Fig. 4 is a view in detail showing separately the construction of the printing-roller. Fig. 5 is a separate view showing the manner of assembling in groups the warp-threads for making very thick warp-strands. Fig. 6 is a view in detail showing the means employed for allowing the printing of extensive designs.

In order to impregnate the straight threads with their color and to prevent the diffusion of the different colors toward places which they are not intended to touch, I spread the warp-threads upon the warp-beam A by making them occupy a width greater than that which they will occupy at the place and at the moment of weaving. A receiver R, fixed on the framing of the loom, contains the liquid intended to wet the stuff to be dyed. The latter is obliged to traverse this liquid by passing under a roller-guide B, plunging into the receiver R. A fixed bar C serves as a guide for the wetted threads leaving the receiver R. This bar C assists a comb D to maintain and to direct the threads before their passage in proximity to the printing-cylinder E. This cylinder E constitutes the only roller necessary for the printing of any design upon the warp-threads of the fabric. This printing-roller E, which is driven by any convenient means, is constituted, preferably, by a cylinder of wood or metal, upon which slides a sleeve carrying the design to be printed up of a great number of small blocks of solid coloring-matter conveniently arranged in order to realize a composition in a manner analogous to type-setting. A printing-lever G,



carrying a ruler *g* in hollow planed metal in order to present two sharp edges, is arranged above the roller *E* in order to operate, at the time of the to-and-fro movement which is communicated to it by a lever *G*, actuated by the lathe *K* of the loom, a series of percussions upon the wetted threads and to bring them thus in contact with the printing-roller *E* in order to effect thus the incorporation of the coloring-matter with the wetted threads. Immediately next to the roller *E* and the lever *G* is arranged a table *H*, heated by any means and intended to dry the threads as soon as they are impregnated with coloring stuff by their passage upon the printing-roller *E* and under the action of the lever *G*. The threads so printed and dried must then be tightened together, so as not to occupy more space at the lathe *K* than the width of the finished tissue shall have. To this end they pass between the teeth of a comb *D'*, on which they occupy the same width as on the warp-beam *A*, and between the teeth of the combs *p p'*, on which they occupy only the width of the tissue; but as the gradual concentration or narrowing of the threads between the teeth *D'* and *p p'* would of necessity produce in threads of the same length an uneven run, and consequently a malformation of the design, I arrange between the comb *D'* and a tension-roller *B* an arched comb *P*, (shown separately in Fig. 3,) between the teeth of which pass the straight threads of the warp in such a manner that the threads from the middle of the warp-beam—for instance, by means of their passing over the highest part of the curved comb—make a course equal to that of the exterior threads passing upon the lowest parts of the comb, Fig. 3. It is understood that this arrangement, serving to maintain an identical tension of the threads upon the whole length of the warp-beam *A*, will prevent the inequalities hereinbefore specified.

The comb *D'*, completed by the tension-roller *B'*, assures the regular advancing of the threads and the maintaining of their relative distances up to their arrival at the healds *p p'* of the loom. My invention also comprises the constitution of each warp-thread by the connection or combination of a certain number of the threads from the warp-beam. The healds *p p'* unite, as illustrated in Fig. 4, these threads in more or less numerous groups in order to constitute by means of each group a warp formed by the juxtaposition of a certain number of threads and which operates like a single warp, which allows of obtaining a thick fabric upon which the printing and the different contours of each colored motive will be equally clean and visible on the two sides of the fabric, each of the threads constituting the warp having been impregnated separately before the real operation of the weaving, which is then effected, as usually, by means of the usual organs of looms of this kind.

The printing-roller *E* can carry the complete design to be printed if the latter is not of a repeat requiring a very great length of fabric. In the contrary case, in order to avoid the use of rollers of excessive diameter, it is convenient to use a second roller *E'* and an endless cloth, (see Fig. 6, for instance,) upon which are glued or fixed by any means the blocks of coloring-matter circulating in this case upon the two rollers *E E'*.

The small blocks of coloring-matter can be formed in any appropriate manner. For instance, they can be obtained by melting the color and the materials necessary for its fixing upon the textile fiber and by adding any thickening and a certain quantity of dextrin, gluten, or of any other kind. In the paste so formed is introduced felt cut in tablets, and it is left there until it is completely impregnated with the coloring stuff. Then each tablet of felt is hardened and sawed in small cubes of equal dimensions. These small cubes are then distributed, according to their color and shade, in drawers, whence they are taken according to necessity for composing the printing design. The latter can then serve for the impression of a relatively large quantity of textile stuff. As may be seen from the example hereinbefore described, my new process is especially appropriate for printing visible designs upon the two sides of very thick fabric, this result being obtained by means of the possibility of impregnating threads of the warp arranged side by side and then connected in real warp-chain formed by the juxtaposition of a large number of threads. It can be applied more easily in case of printing upon finished fabrics.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. The herein-described process of printing designs in multiple colors upon textiles with solid coloring-matter on the juxtaposed and dampened warp-threads of a tissue during the course of weaving consisting in spreading the warp-threads upon a warp-beam, making them occupy at first a width greater than that which they will occupy at the place and at the moment of weaving in dampening and printing said threads in said spread state and then narrowing the width of the warp-thread to the width of the tissue to be formed, all substantially as set forth and for the purpose specified.

2. The herein-described process of printing designs in multiple colors upon textiles with solid coloring-matter on the juxtaposed and dampened warp-threads of a tissue in course of weaving, consisting in spreading the warp-threads upon a warp-beam, making them occupy a width greater than that which they will occupy at the place and at the moment of weaving, then narrowing the width of the warp-threads to the width of the tissue, connecting the threads into groups or strands



constituting each a thread or warp-strand and finally effecting the crossing of said groups of threads with the weft.

3. The combination with a loom of a printing device consisting of one or more cylinders E E' carrying the composition to be printed from consisting of small blocks of solid coloring-matter conveniently arranged and a printing-lever G in combination with a dampening-receptacle R a drying-table H and the necessary rollers, tension-combs and regulators.

4. In combination with a loom, having means for holding the warp-threads apart and for reassembling them, a printing device consisting of one or more cylinders E E, carrying the composition to be printed from consisting of small blocks of solid coloring-matter conveniently arranged, a printing-lever G, a

dampening-receptacle R, a drying-table H an arched comb serving to avoid any malformation of the design and the necessary rollers, tension-combs and regulators.

5. In combination in a loom, means for holding the threads in spread condition, means for dampening the threads while spread out, means for printing said threads while spread out, and tension and guide means for bringing the threads together to the width of the fabric to be woven, substantially as described.

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

CHARLES DRATZ.

Witnesses:

GEORGE BEDE,  
GREGORY PHELAN.