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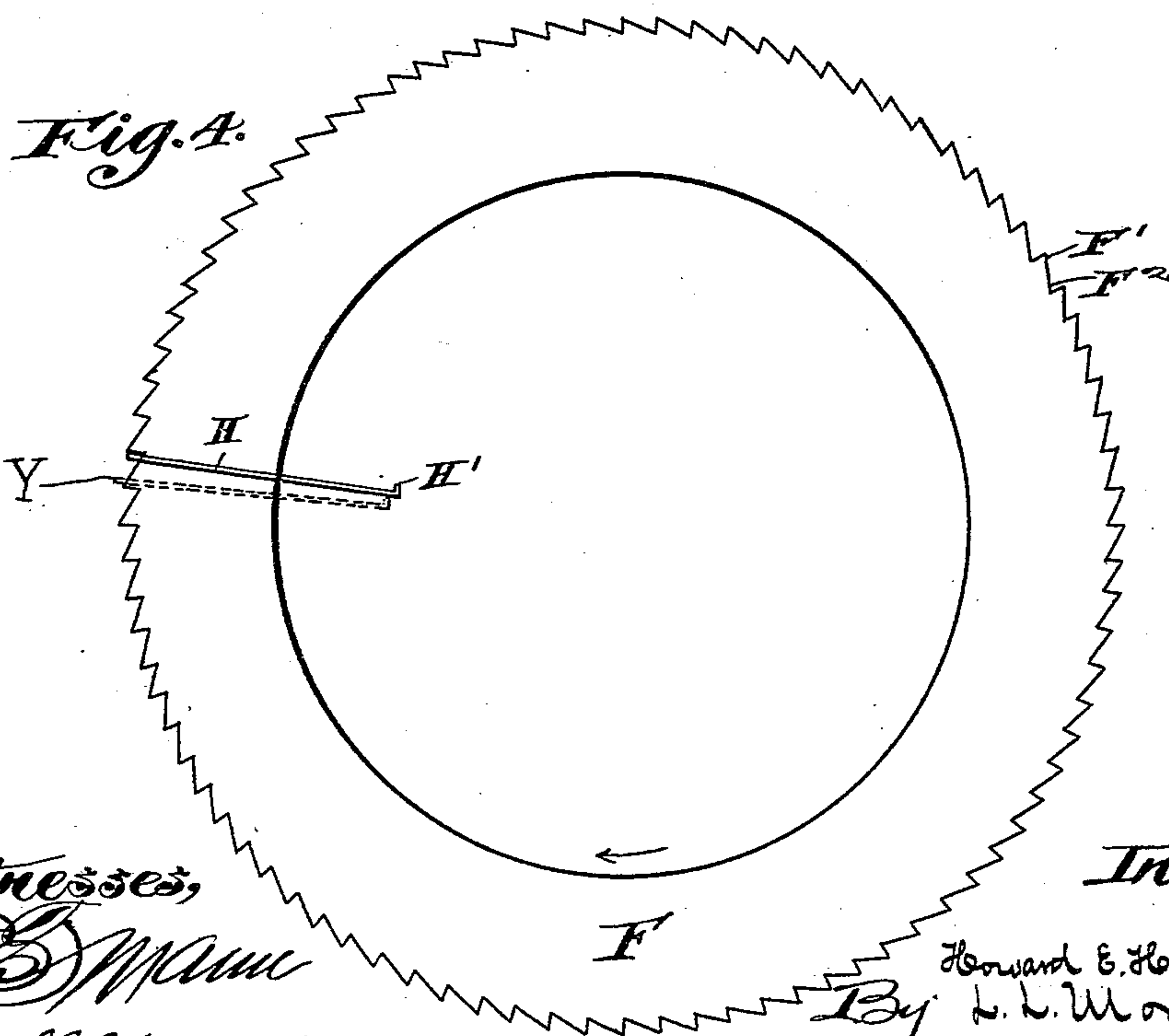
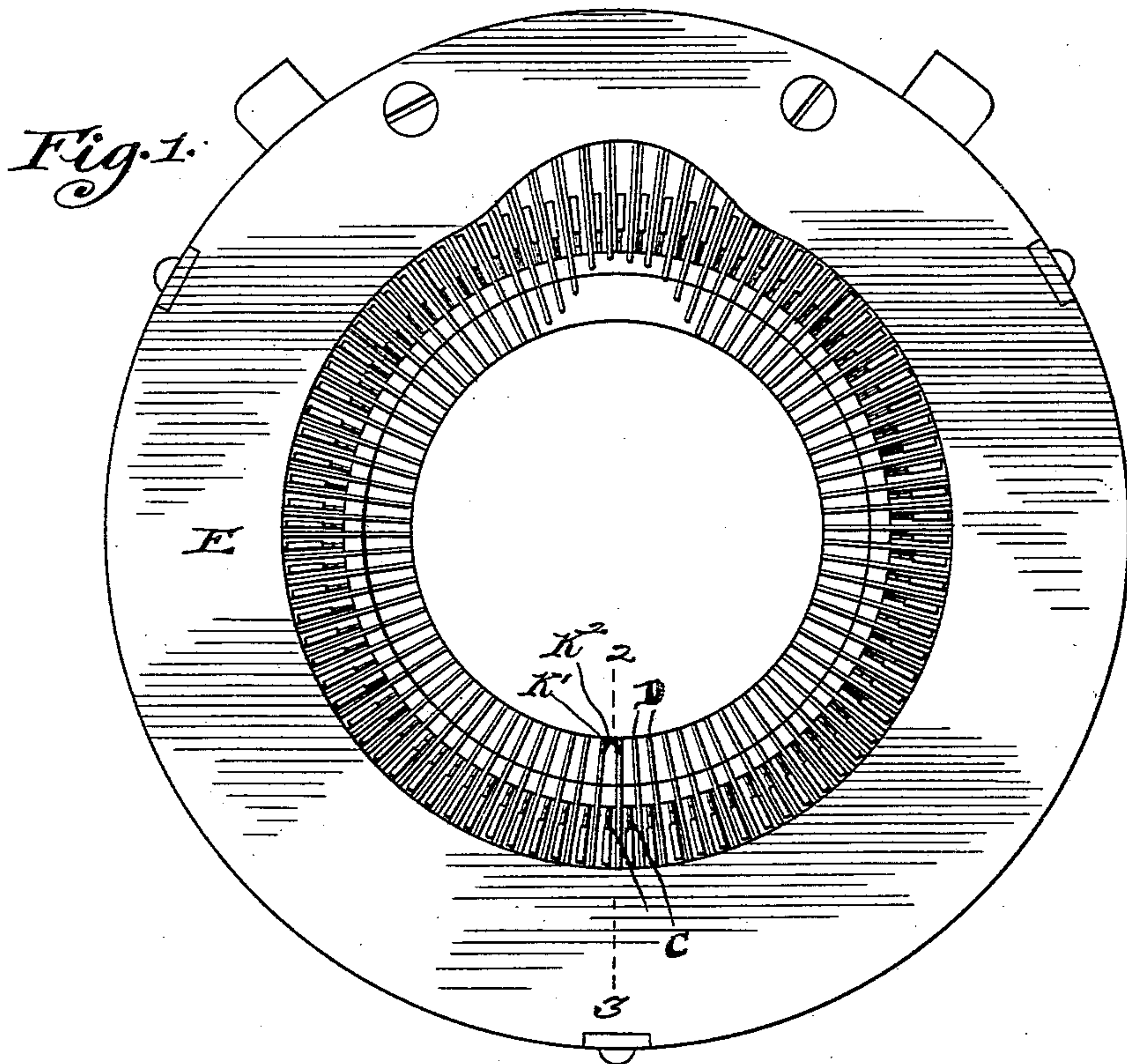
2 Sheets—Sheet 1.

H. E. HARBAUGH.

TRANSFERRING DEVICE FOR KNITTING MACHINES.

No. 555,161.

Patented Feb. 25, 1896.



Witnesses,

V. E. Mann
Jas. V. Mellington

Inventor,

By Howard E. Harbaugh,
L. L. Morrison,
Attys.

(No Model.)

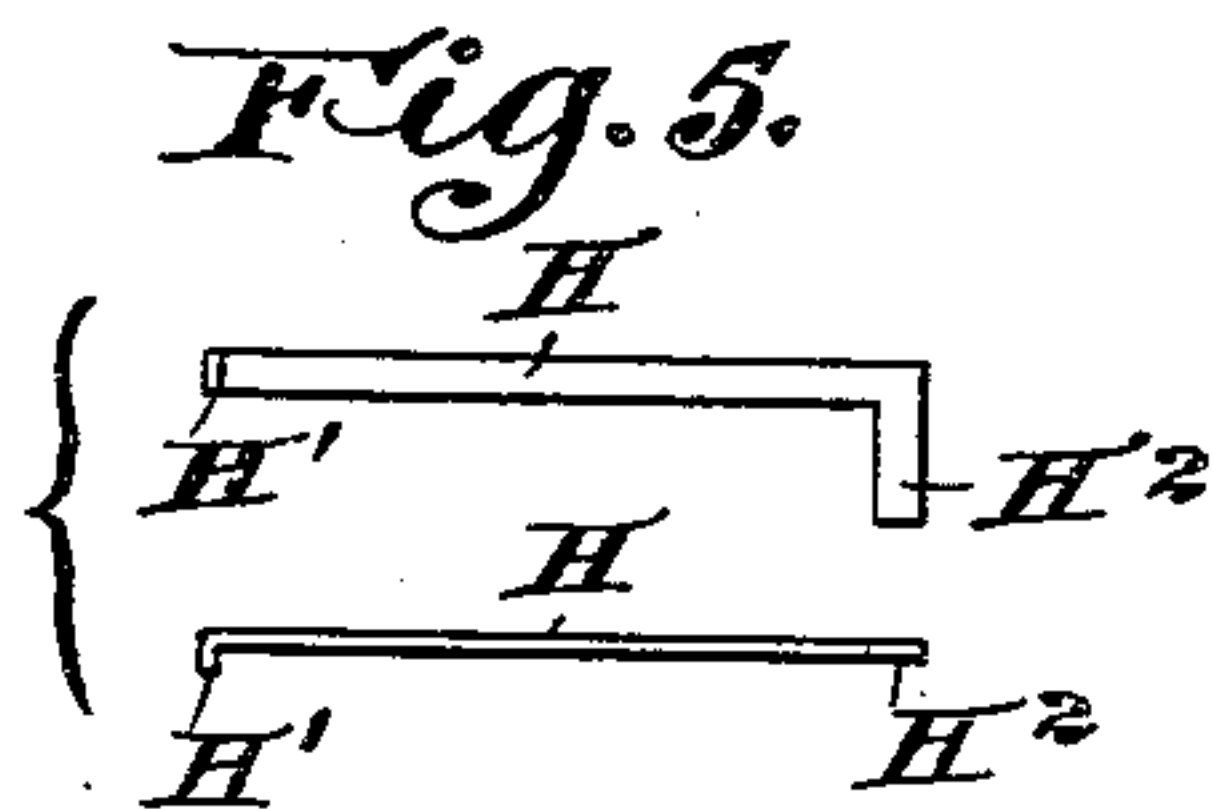
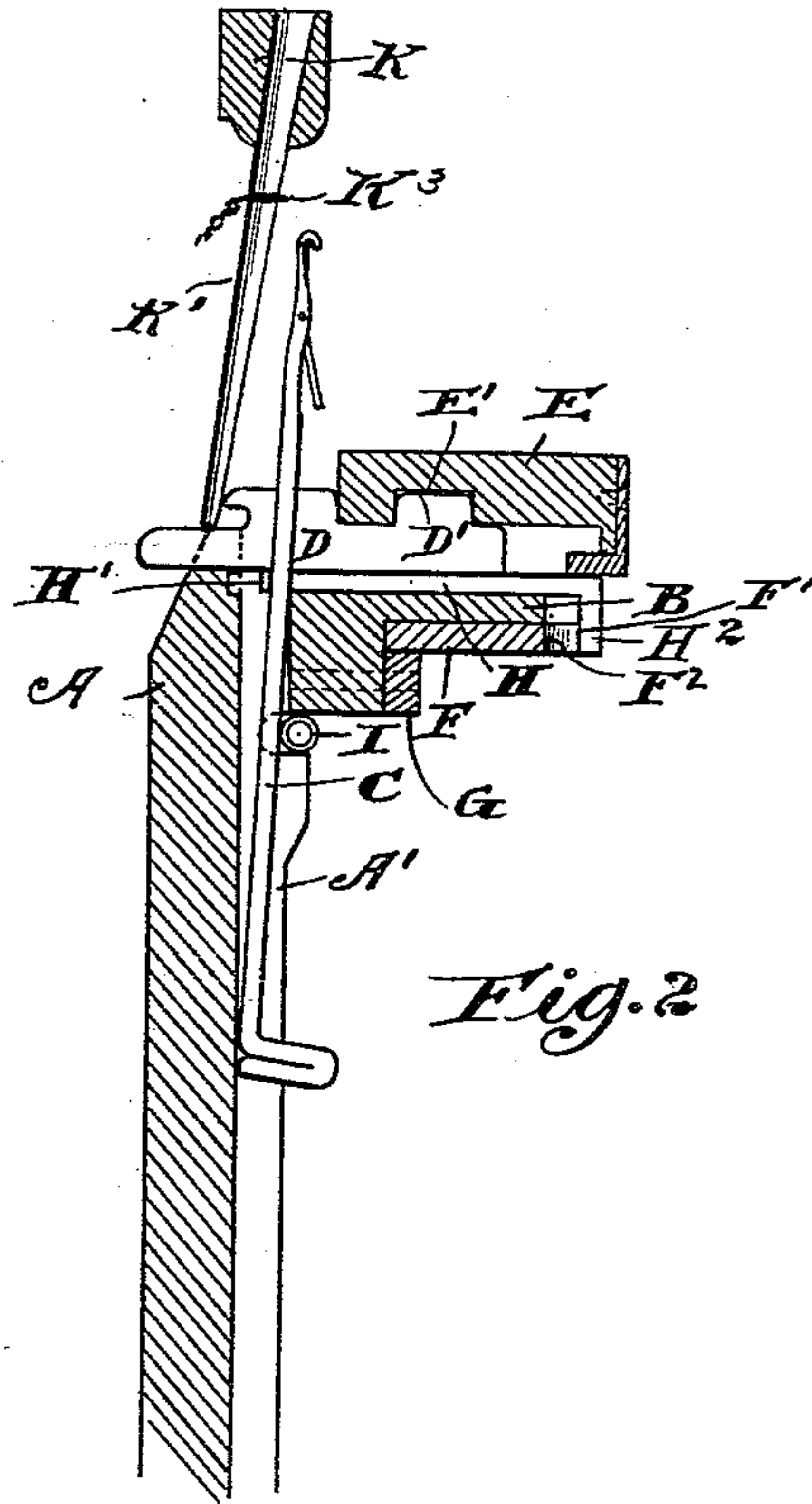
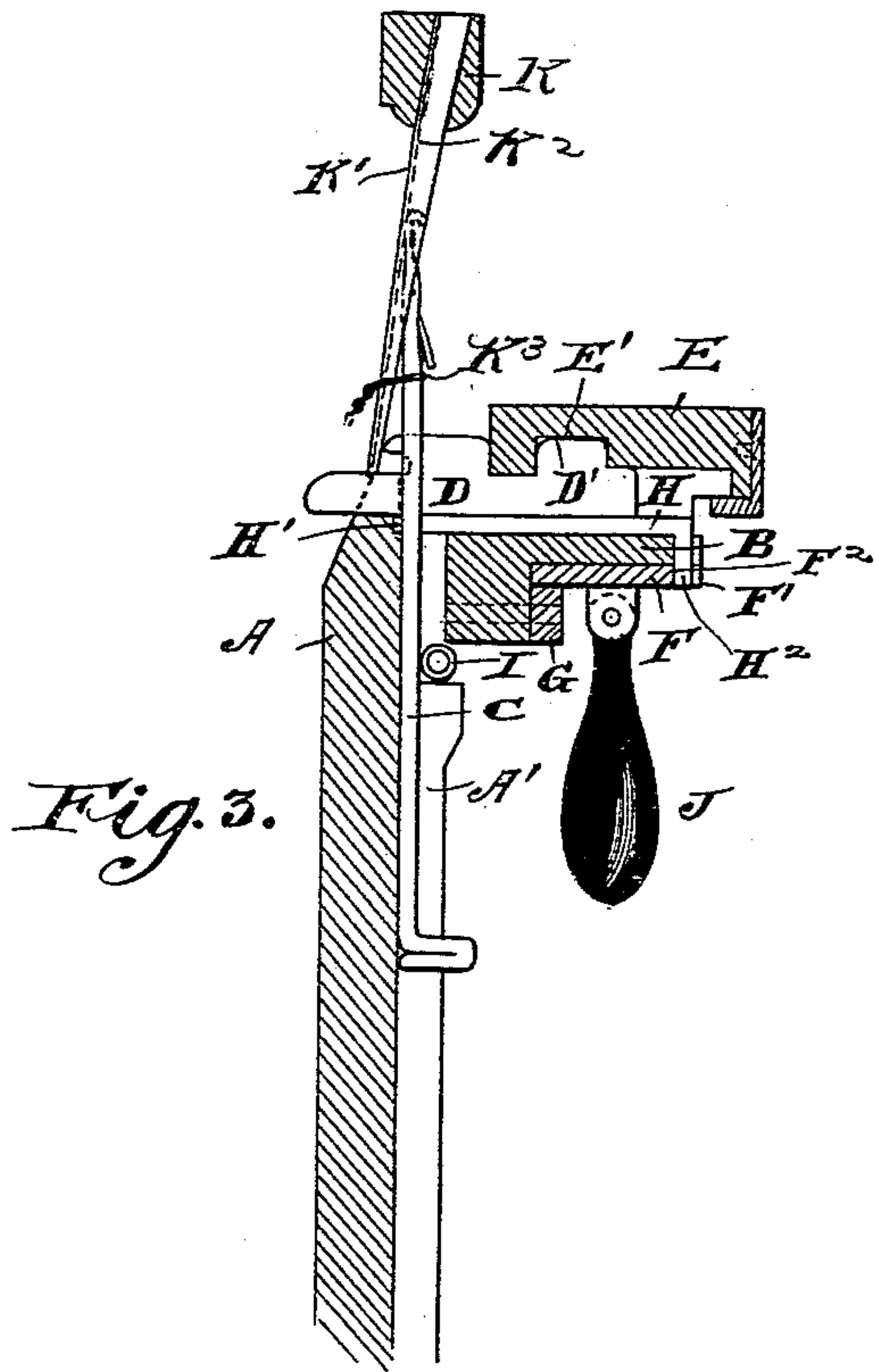
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J. D. Mann,
Wm. V. Millington

Inventor,
Howard E. Harbaugh,
By L. L. Morrison,
Atty

UNITED STATES PATENT OFFICE.

HOWARD E. HARBAUGH, OF KENOSHA, WISCONSIN, ASSIGNOR TO THE
CHICAGO-ROCKFORD HOSIERY COMPANY, OF SAME PLACE.

TRANSFERRING DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 555,161, dated February 25, 1896.

Application filed August 5, 1895. Serial No. 558,214. (No model.)

To all whom it may concern:

Be it known that I, HOWARD E. HARBAUGH, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented certain new and useful Improvements in Transferring Devices for Knitting-Machines, of which the following is a specification.

The object of my invention is to provide circular-knitting machines with mechanism for throwing the upper ends of their needles outward away from the needle-cylinder preparatory to having a quilled transfer-ring placed within the circular series of needles of the same, so that the quills thereof may admit the needles as they return to their normal positions when released from the force that threw them outward and transfer to them a course of stitches received from the needles of a machine from which the transfer is being made; and it consists essentially of a needle-cylinder having a series of vertical radial grooves therein furnished with needles, a spring normally sustaining the needles in a substantially vertical position in the needle-cylinder, a slide-bed connected with the upper portion of the needle-cylinder, the needle-actuating slides for drawing the needles outward preparatory to entering the quills of a quilled transfer-ring, and means for operating said slides against the action of the spring.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a top plan view of a knitting-machine provided with my improvements. Figs. 2 and 3 are vertical sections of the same at the dotted line 2 3 in Fig. 1, the former showing one of the needles of the machine thrown out ready to enter its corresponding quill in the quilled transfer-ring, which is shown in operative position on the machine, the latter showing the needle released from the action of the cam-toothed wheel and in its quill ready to have transferred thereto a stitch received on the quill from the machine that knit the same. Fig. 4 is a plan view of a cam-toothed wheel for throwing the needles of the machine from the position shown in Fig. 3 to that shown in Fig. 2. Fig. 5 is a side elevation and a bottom plan view of one of the slides that con-

nect the needles of the machine with the cam-toothed wheel.

Like letters of reference indicate corresponding parts throughout the several views.

A is a needle-cylinder having a series of vertical radial grooves A' therein corresponding in number with the number of needles in the machine.

B is a combined needle-actuating-slide bed and sinker-slide bed and is rigidly connected with the upper portion of the needle-cylinder A.

C are needles.

D are sinker-slides operative on the slide-bed B.

E is a sinker-cam ring having a sinker-slide groove E' therein engaging with lugs D' on the sinker-slides D.

F is a wheel provided with peripheral cam-teeth F' and interdental spaces F², each corresponding in number with the needles C of the machine, and is rotatably mounted on the annular bearing G, which is rigidly connected with the slide-bed B concentric with the needle-cylinder A.

H are needle-actuating slides having their inner ends projecting between and connecting with the backs of the needles C of the machine by means of lugs H' thereon and having their outer ends connecting, by means of lugs H², with the periphery of the cam-toothed wheel F. The needle-actuating slides H correspond in number with the number of needles C in the machine and the number of cam-teeth F' on and the number of interdental spaces F² in the periphery of the cam-toothed wheel F.

I is a spring (shown as being formed of spirally-coiled wire) encircling the entire series of needles C of the machine and normally sustaining them in a substantially vertical position, Fig. 3.

J is a handle pivoted to the under side of the wheel F for operating the same.

K is a transfer-ring provided with quills K', corresponding in number with the needles C of the machine to which transfer is to be made, cut away longitudinally so as to form in each of them a recess K² of suitable dimensions to admit one of the needles C of the machine.

Supposing the number of needles C of the machine, the number of quills K' in the transfer-ring K, and number of stitches K³, Figs. 2 and 3, in one course of the fabric to be transferred to be the same—say one hundred in each case—each quill K' of the transfer-ring K is inserted through one of the hundred stitches K³ preparatory to transferring the same. The wheel F, Figs. 3 and 4, is turned by means of the handle J sufficiently to cause the toothed cams F' to engage with the lugs H² of the slides H and force them from the positions shown in Figs. 3 and 4 to that shown in Fig. 2 and indicated by dotted lines Y in Fig. 4. All the parts of the machine will then be in the positions shown in Fig. 2, and the entire series of needles C will have been thrown outward, as there indicated by one of them, preparatory to having the transfer-ring K placed thereon, which may be properly done by placing the free end of one of the series of quills K' thereof between and upon two of the adjacent sinker-slides D of the machine, as clearly shown in Fig. 1, where the transversely-broken lower end of one of the quills K' is shown in such connection. The wheel F is next turned sufficiently to cause the toothed cams F' to move out of contact with lugs H² on the slides H, when the spring I will return the needles C and slides H, Figs. 3 and 4, to their normal positions, and the lugs H² will have passed into the interdental spaces F² in the wheel F. The stitches K³, Fig. 2, are next slid downward over the ends of the needles, Fig. 3, when the transfer-ring K is lifted and the quills K' thereof are thereby withdrawn from the stitches K³ and they are left upon the needles C ready to be further added to by knitting.

I claim—

1. In a knitting-machine, in combination,

a needle-cylinder having a series of vertical, radial grooves therein furnished with needles, a slide-bed rigidly connected with the upper portion of the needle-cylinder, a cam-toothed wheel and needle-actuating slides, operating on the slide-bed and having their inner ends projecting between and connecting with the backs of the needles and their outer ends connecting with the cam-toothed wheel, substantially as and for the purpose specified.

2. In a knitting-machine, in combination, a needle-cylinder having a series of vertical, radial grooves therein furnished with needles, a spring normally sustaining the needles in a substantially vertical position in the needle-cylinder, a slide-bed connected with the upper portion of the needle-cylinder, the needle-actuating slides for drawing the needles outward preparatory to entering the quills of a quilled transfer-ring, and means for operating said slides against the action of the spring, substantially as and for the purpose specified.

3. In a knitting-machine, in combination, a needle-cylinder having a series of vertical, radial grooves therein furnished with needles, means for normally sustaining the needles in substantially vertical positions in the grooves in the needle-cylinder, a wheel provided with peripheral cam-teeth and interdental spaces—each corresponding in number with the number of needles in the machine—for throwing the upper ends of the needles outward preparatory to entering the quills of a transfer-ring, and means for connecting the cam-toothed wheel with the needles, substantially as and for the purpose specified.

HOWARD E. HARBAUGH.

Witnesses:

J. H. GOODENOW,
WILLIS W. COOPER.