

(No Model.)

2 Sheets—Sheet 1.

W. D. HUSE.

CAST-OFF FINGER OPERATING CAM FOR CIRCULAR KNITTING MACHINES.

No. 370,543.

Patented Sept. 27, 1887.

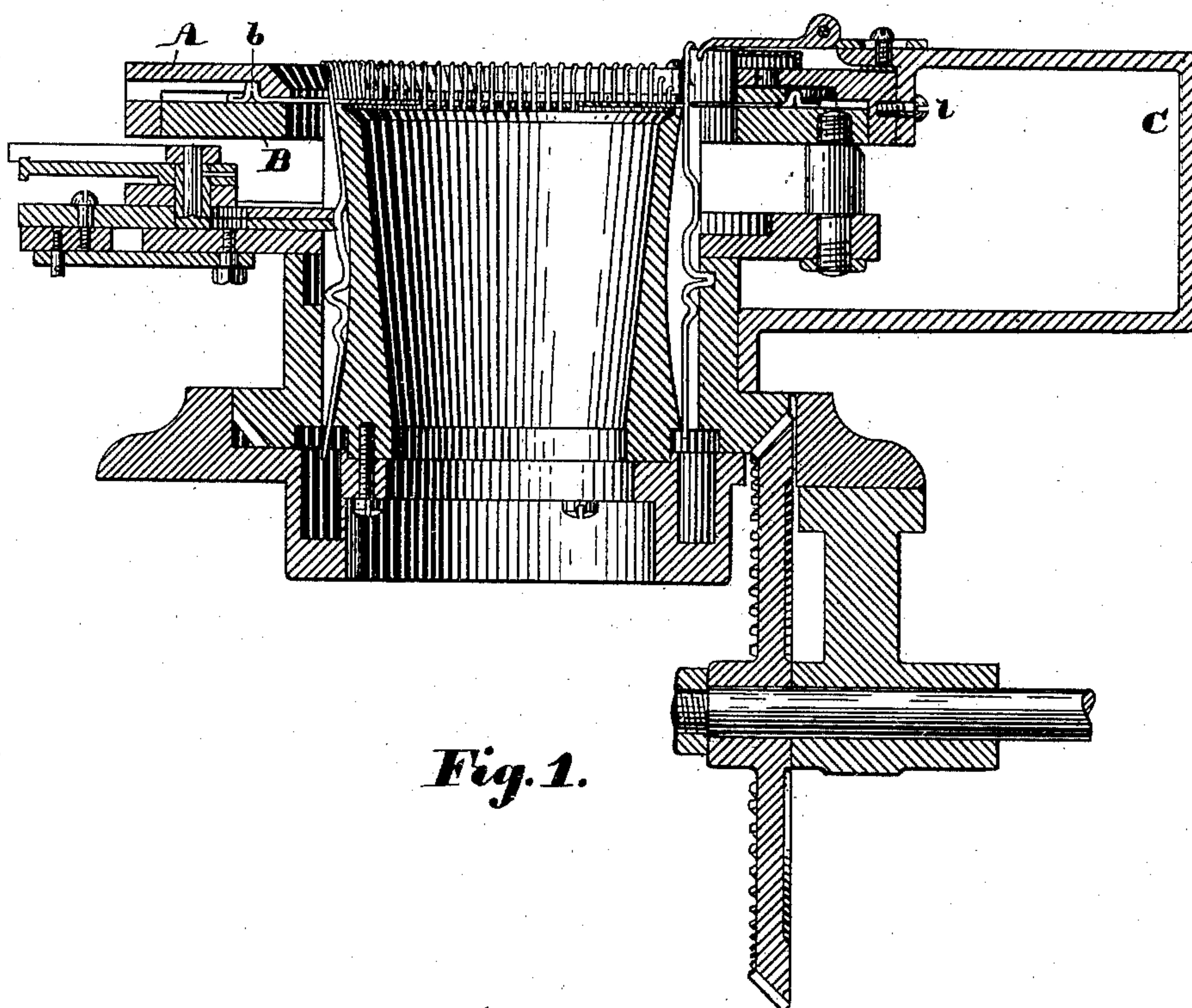


Fig. 1.

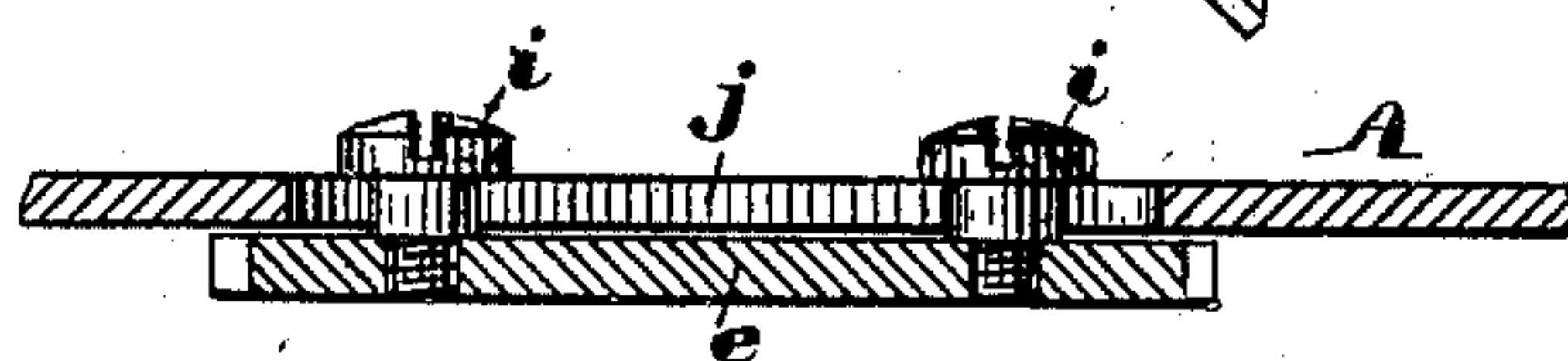


Fig. 5.

Witnesses:

Chas. H. Stearns.
Walter E. Lombard.

Inventor:

Warren D. Huse,

by

N. C. Lombard
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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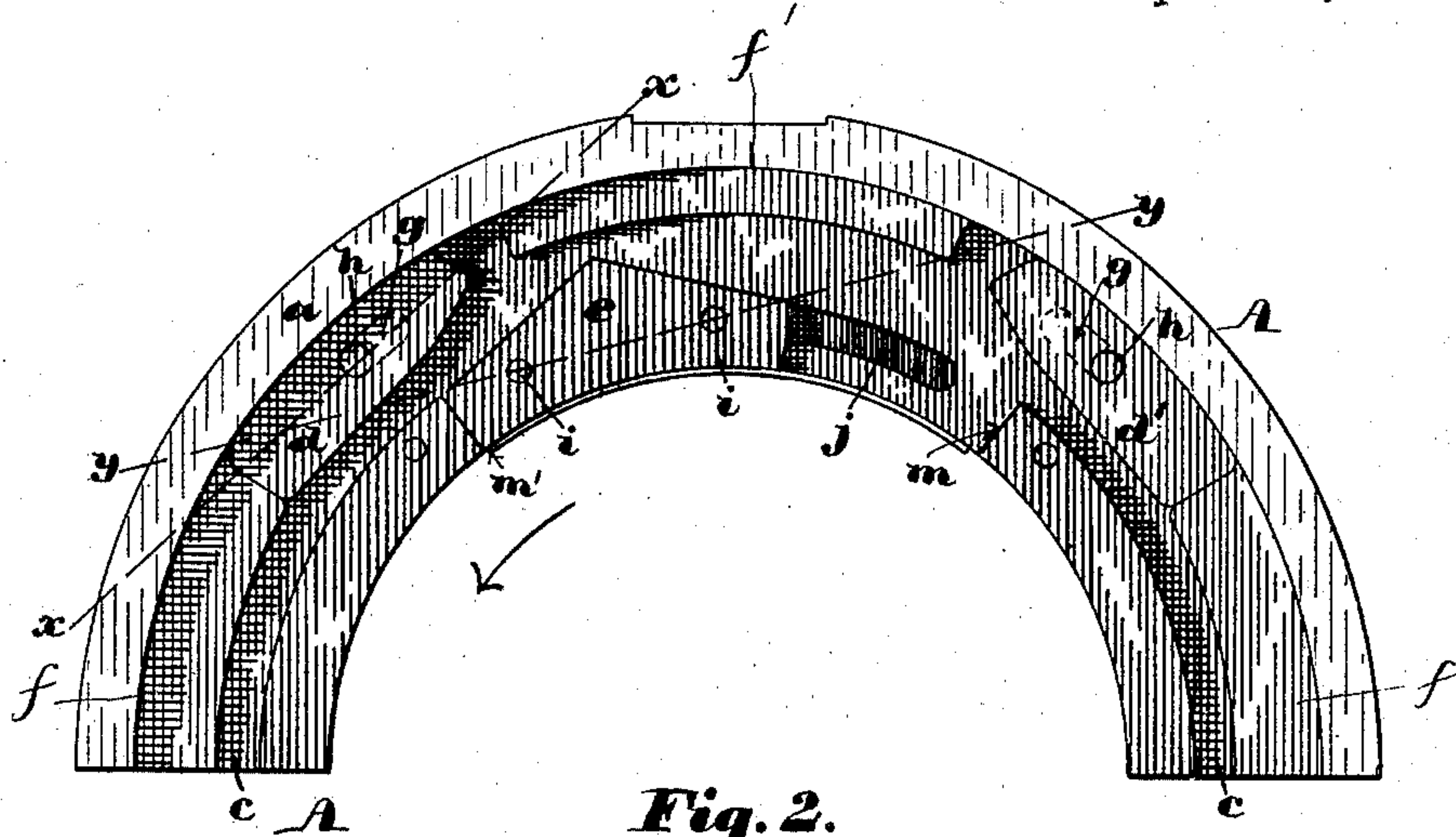


Fig. 2.

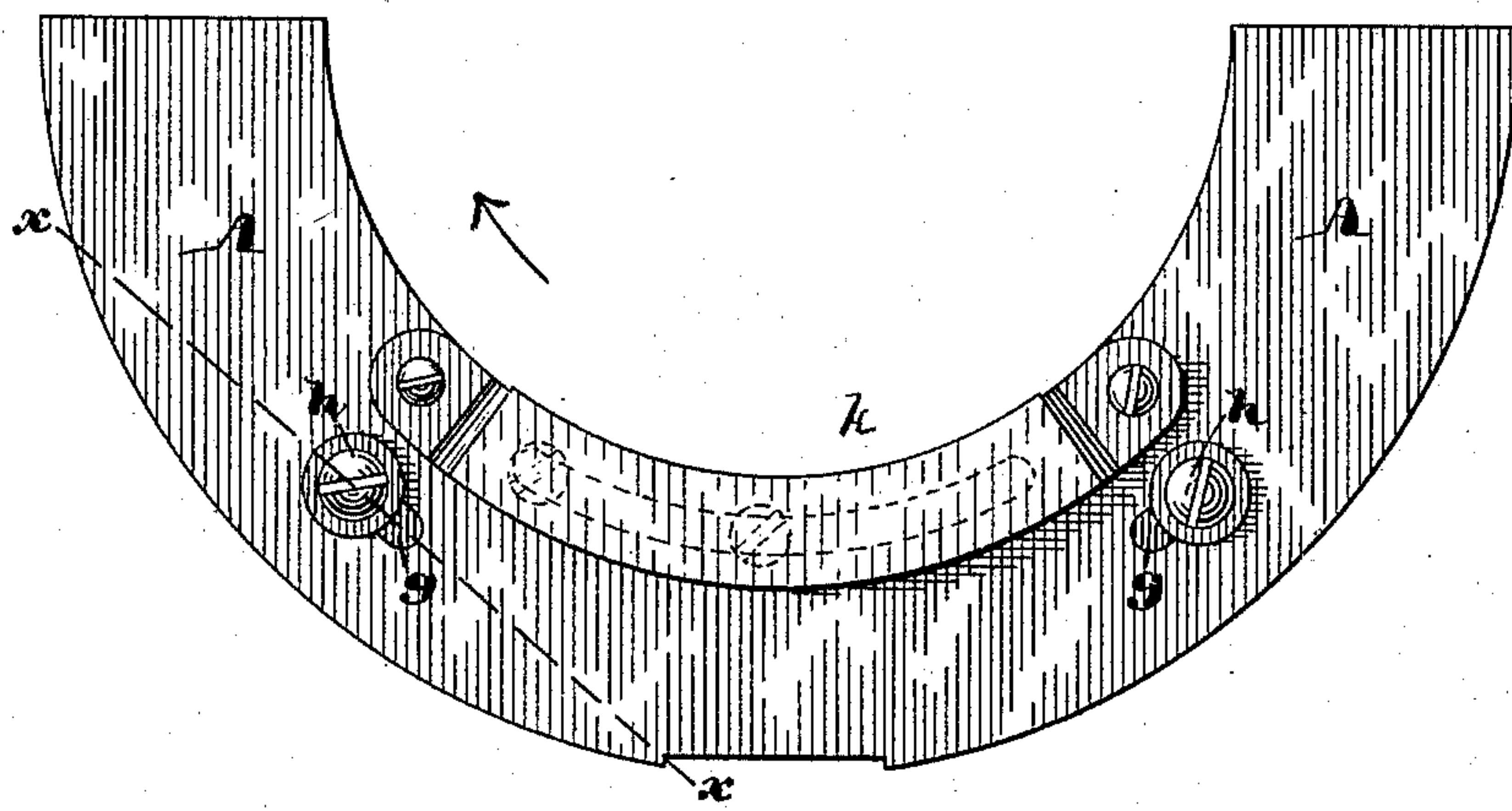


Fig. 3.

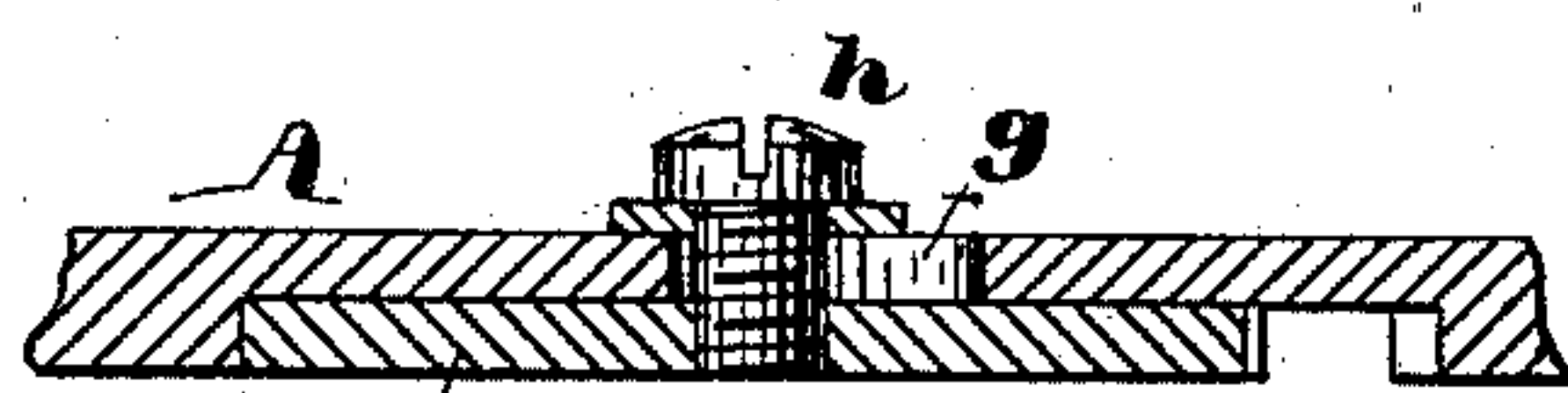


Fig. 4.

Witnesses:

Chas. H. Stearns.
Walter E. Lombard

Inventor:

Warren D. Huse,
by N. C. Lombard
Attorney.

UNITED STATES PATENT OFFICE.

WARREN D. HUSE, OF LACONIA, NEW HAMPSHIRE.

CAST-OFF-FINGER-OPERATING CAM FOR CIRCULAR-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 370,543, dated September 27, 1887.

Application filed October 21, 1886. Serial No. 216,823. (No model.)

To all whom it may concern:

Be it known that I, WARREN D. HUSE, of Laconia, in the county of Belknap and State of New Hampshire, have invented a new and useful Improvement in Cast-Off-Finger-Operating Cams for Circular-Knitting Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of circular-knitting machines in which a series of vertically-reciprocating latch-needles are used in combination with a series of radially-reciprocating cast-off fingers, and particularly to the cam for operating said cast-off fingers, and is an improvement upon the invention described in Letters Patent No. 331,400, granted to me December 1, 1885; and it consists in a novel construction of the cast-off-operating cam, which will be readily understood by reference to the description of the drawings, and to the claim to be hereinafter given.

Figure 1 of the drawings is a central vertical section of a machine embodying my invention. Fig. 2 is an inverted plan of one-half of the cast-off-operating cam, showing that portion of the cam in which the throws are formed. Fig. 3 is a plan of the same portion of said cam. Fig. 4 is a section on line *x x* on Figs. 2 and 3, and Fig. 5 is a section on line *y y* on Fig. 2.

In circular-knitting machines of the class herein described it is necessary that the reciprocation of the cast-off fingers should take place after the needles have been moved to their highest position and from said highest position nearly to their lowest position, and this is true whether the machine is revolved in one direction or the other, and as it is necessary, in order to knit the heel and toe portions of a stocking on such a machine, to move the needle-operating-cam cylinder through a portion of a revolution in one direction and then in the opposite direction, it becomes necessary to provide for changing the position of the cast-off-operating cam relative to the needle-operating cam, or in some way causing the movements of the cast-offs to succeed the movements of the needles regardless of the direction in which the needle-cam is moved. This I have heretofore accomplished in two different ways, as follows: first, by connecting the nee-

dle-cam and the cast-off cam rigidly together, so that they should revolve or move in unison, and providing the cast-off cam with two throws adapted to impart two complete reciprocations to the cast-off fingers, as described in Letters Patent No. 331,400, granted to me December 1, 1885; second, by providing the cast-off cam with only one outward and inward throw, and so connecting said cam with the needle-cam that the latter, whenever its motion is reversed, shall move some distance before the cast off cam is moved in the same direction, as described in Letters Patent No. 335,587, granted to me February 9, 1886.

The object of my present invention is to dispense with the lost motion between the needle-cam and the cast-off cam of the last-mentioned patent and the duplicate throw of the first above-mentioned patent. To accomplish this I make the cast-off-operating cam as shown in Figs. 2, 3, 4, and 5, in which A is the cam-ring, having the downwardly-projecting annular rim *a*, arranged to encompass the radially-grooved ring B, in the grooves of which are fitted the cast-off fingers *b*, as shown in Fig. 1.

The cam-ring A is provided upon its under side with a cam-groove for operating the cast-off fingers, composed of a concentric portion, *c*, formed in the metal of said ring and extending around nearly three-fourths of the circumference of a circle, and the remaining portion formed by the inner edges of the plates *d*, *d'*, and *e* and the section of the fixed outer wall, *f*, as shown in Fig. 2. The plates *d* and *d'* are each secured in position by a single screw, *h*, which passes through a slot, *g*, formed in the ring A, and screws into said plate *d* or *d'*, as shown in Figs. 3 and 4, so that each of said plates may be readily adjusted to any desired position between the ends of the two sections *f* and *f'* of the fixed outer wall of the cam-groove, and may be firmly secured in said desired position by tightening the screws *h*.

The plate *e* is connected loosely to the ring A by means of the two screws *i i*, which pass through the slot *j* formed in said ring, and screw into the plate *e* in such a manner as not to clamp said plate *e* to the ring A, but leave it free to be moved endwise thereon, as shown in Figs. 2 and 5.

The heads of the screws *i i*, which project

above the ring A, are inclosed in the segmental casing *k*, to prevent said heads while moving from catching the yarn and breaking the same, as shown in Figs. 1 and 3.

5 The ring A has firmly secured thereto at *l* the upper branch of the U-shaped arm C, the lower branch of which is firmly secured to the needle-cam cylinder in such a manner that the point *l* of the cast-off cam is directly above the
10 apex of the needle-operating-cam path. (Not shown.)

The operation of my invention is as follows: The several parts of the machine being in a state of rest and the cam-plate *e* being in the
15 position shown in Fig. 2, if the needle and cast-off cams be revolved in the direction indicated by the arrows on Figs. 2 and 3 the friction of the lugs of the cast-off upon the cam-plate *e* will retard said plate or prevent
20 it moving with the ring A until the end *m* of the inner wall of the cam-groove comes in contact therewith, when the plate *e* will move in unison with the ring A so long as the motion is continued in the same direction, and as the apex
25 of the double incline formed upon the working-edge of the plate *e* is behind the apex of the throw of the needle-cam it follows that the reciprocations of the cast-off fingers succeed in proper order the reciprocations of the needles.
30 If, now, the motion of the needle-cam cylinder and the cast-off cam-ring is reversed, the plate *e* will be retarded or held in a state of rest until

the end *m'* of the inner wall of the cam-groove comes in contact with said plate, when said plate and the ring will again revolve in unison 35 and the cast-off fingers will be reciprocated by the double-inclined edge of said plate and the curved or inclined inner edge of the plate *d*, said reciprocation of the cast-off fingers succeeding the reciprocations of the needles, as 40 before.

The plates *d* and *d'* may be adjusted to regulate the time when the cast-off fingers shall be moved inward to discharge the loops from the
45 sinkers.

What I claim as new, and desire to secure by Letters Patent of the United States, is— 45

A cast-off-finger-operating cam provided with the adjustable plates *d* and *d'*, means whereby the plates *d* and *d'* may be held in 50 place when adjusted to the desired position, the automatically-movable cam-plate *e*, and a fixed concentric segmental groove arranged to co-operate with said plates, substantially as and for the purposes described. 55

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 20th day of October, A. D. 1886.

WARREN D. HUSE.

Witnesses:

WALTER E. LOMBARD,
CHARLES K. STEARNS.