No. 898,110. PATENTED SEPT. 8, 1908.

H. A. HOUSEMAN.

CIRCULAR KNITTING MACHINE.

APPLICATION FILED MAY 22, 1907.

2 SHEETS—SHEET 1.

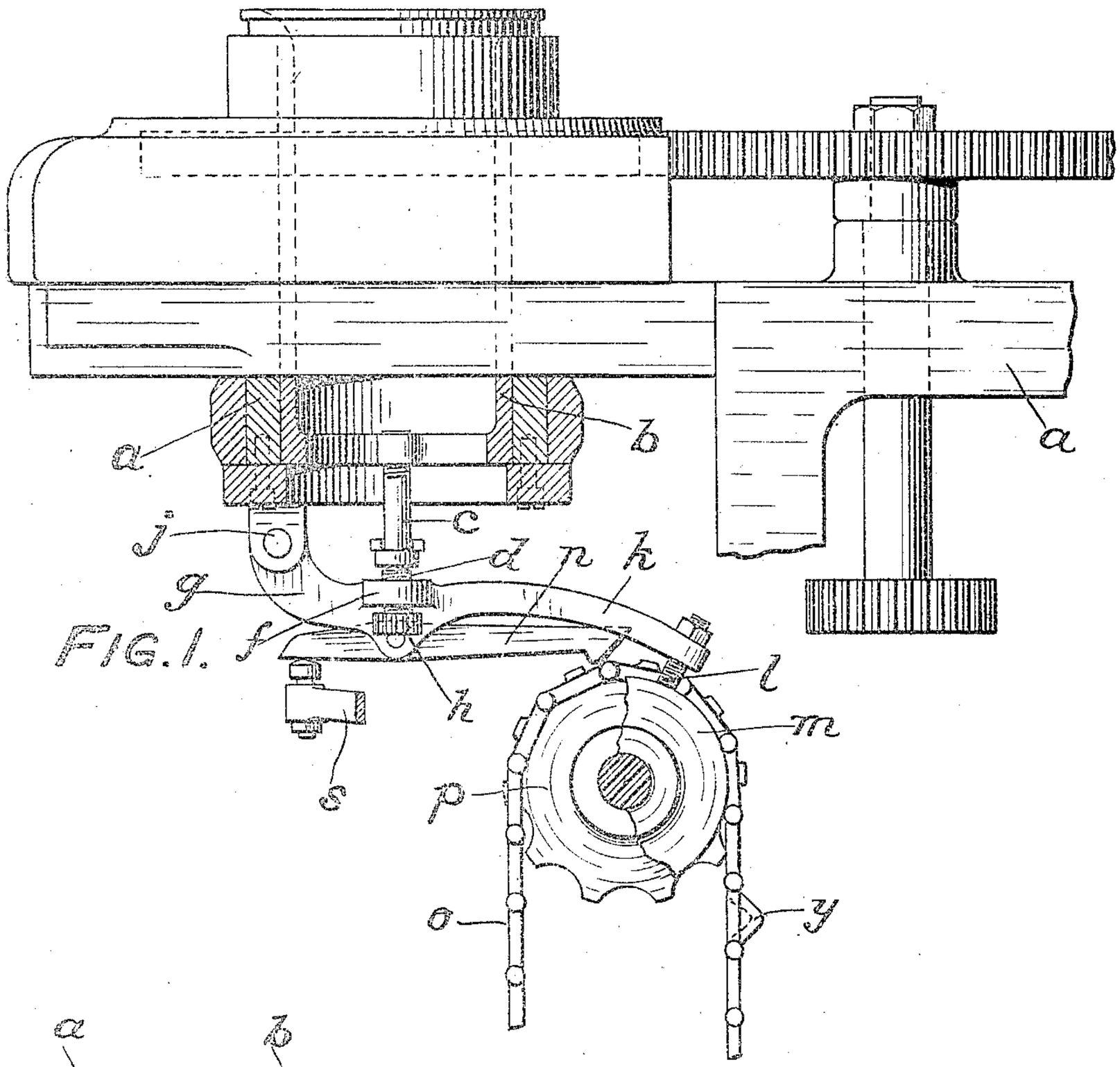

FIG. 1.

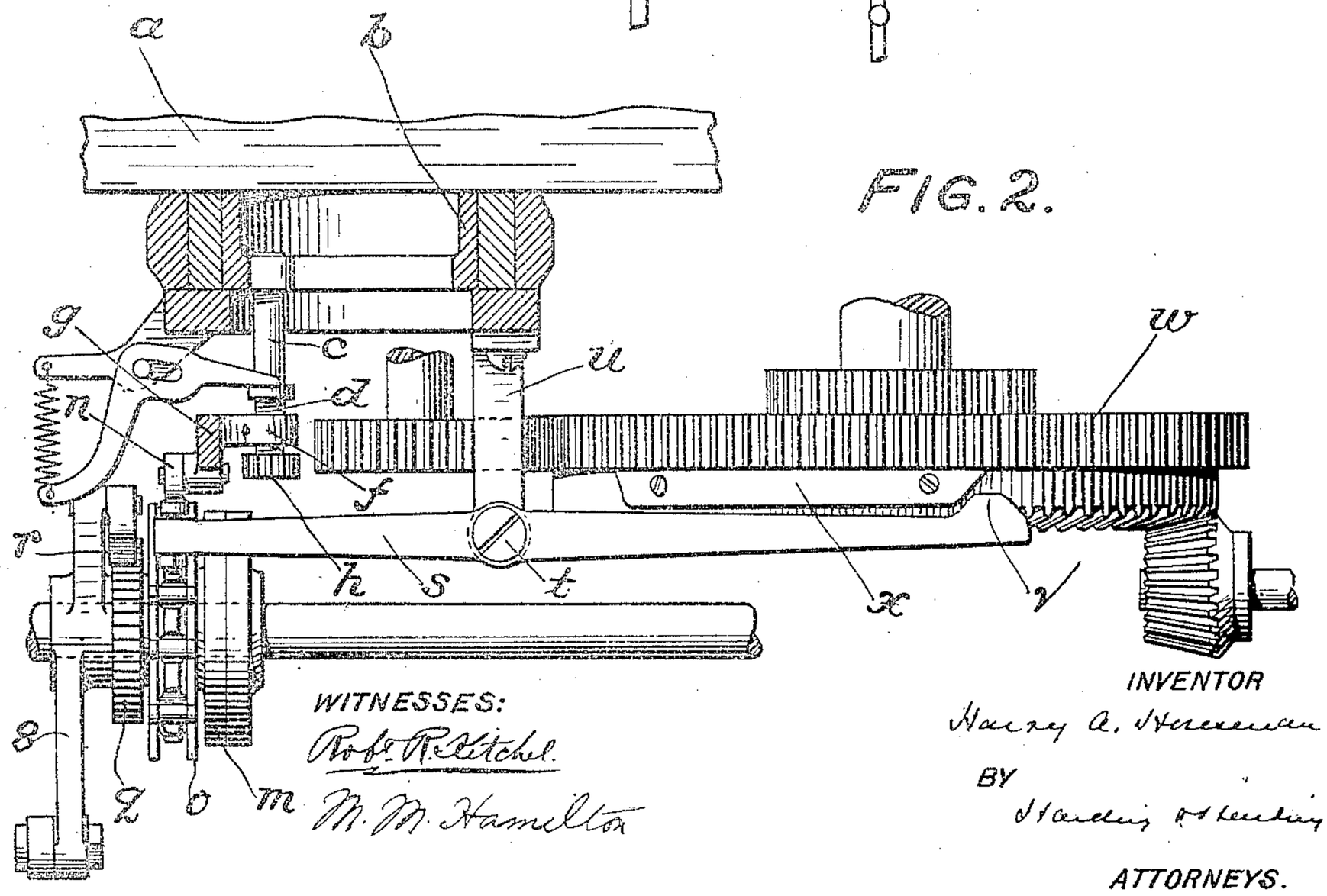

FIG. 2.

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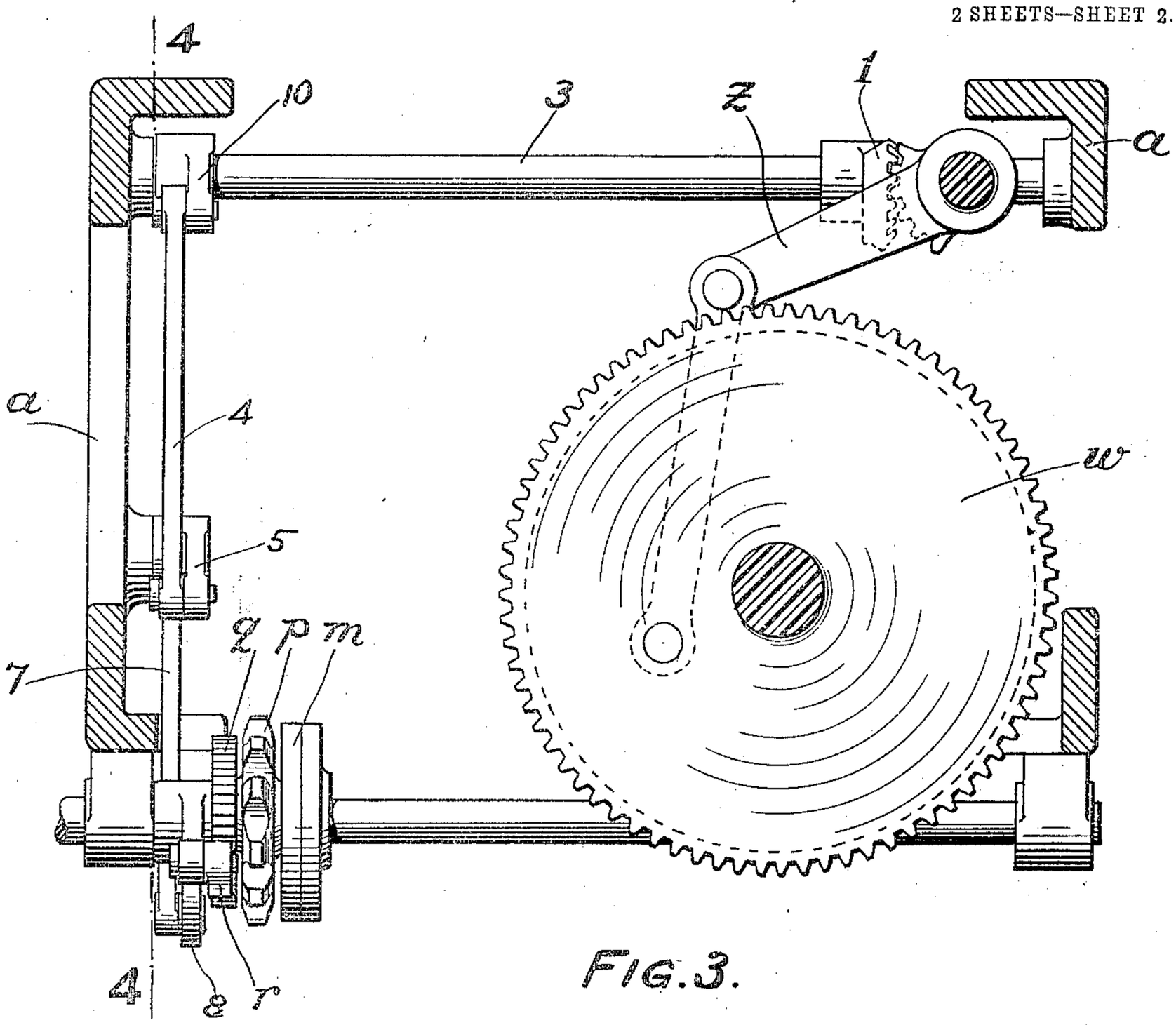

FIG. 3.

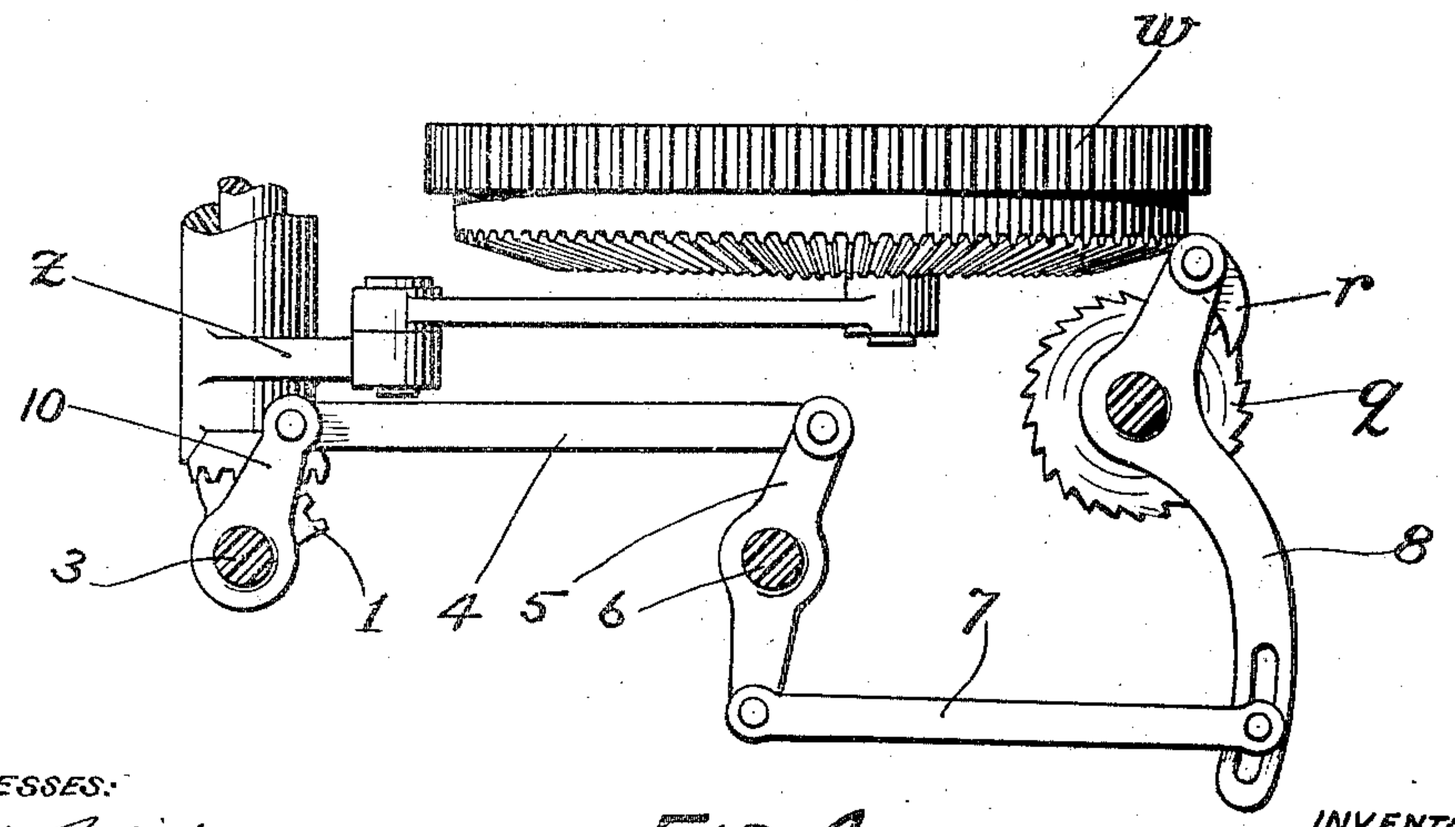

FIG. 4.

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UNITED STATES PATENT OFFICE.

HARRY A. HOUSEMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO STANDARD MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CIRCULAR-KNITTING MACHINE.

No. 898,110. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed May 22, 1907. Serial No. 375,022.

To all whom it may concern:

Be it known that I, HARRY A. HOUSEMAN, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Circular-Knitting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

In the manufacture of stockings or half hose upon circular knitting machines after the completion of the stocking or half hose, the stitches at the end of the toe are transferred to a looper in order to close up the opening. It is required, to produce proper work, that the fabric shall be put upon the looper in a straight line. With the course at the end of the toe of the same mesh or tightness as the contiguous courses, it is quite difficult for the operator to put the stitches upon the looper in a straight line.

It is the primary object of my invention to provide mechanism which causes the production of a course at the end of the toe looser than the contiguous courses so as to form a ready means of placing such stitches upon the looper, and thus place the fabric upon the looper in a straight line of stitches. The invention is however applicable to form a course looser than the contiguous courses at any point in the fabric.

I will first describe the embodiment of my invention illustrated in the accompanying drawings and then point out the invention in the claims.

In the drawings: Figure 1 is a side view partly in section of a portion of a circular knitting machine embodying my invention. Fig. 2 is a front view of same, partly broken away. Fig. 3 is a horizontal section showing how the pawl *r* is driven from the main driving gear. Fig. 4 is a side view of same, taken on line 4—4 Fig. 3.

a is the frame of a circular knitting machine, *b* the needle cylinder. The needle cylinder is supported upon the rod *c*. The rod *c* is supported by the rod *d* which is threaded and passes through a threaded orifice *f* in the lever *g*. Upon the rod *d*, below the lever *g* is the head of screw *h*. The lever *g* is pivoted at *j* and the projecting portion *k* has the follower *l* resting upon the periphery of the cam roller *m*. This cam roller has high and low points and operates to automatically lift and depress the needle cylinder and vary the tightness of the courses to fashion the stocking. All of the before described apparatus is described, illustrated and claimed in Letters Patent of the United States, numbered 774,473, issued to me November 8th, 1904, to which reference may be had for further details of the construction just described.

Pivoted to the lever *g* is a floating lever *n*, one end of which rests upon the pattern chain *o* on the pattern chain wheel *p*. This wheel *p* is operated by the ratchet wheel *q*, which is driven by the pawl *r*. The other end of floating lever *n* rests upon the lever *s*, pivoted at *t* to a hanger *u* from the frame of the machine. The other end of the lever *s* has the operating face *v*.

w is the main driving gear of the machine and is connected by intermediate mechanism with the cam cylinder. The connecting mechanism is as shown and described in United States Letters Patent No. 774,473, issued to me November 8th, 1904. The arrangement is such that the gear revolves once for four revolutions of the cam cylinder and thus revolves once for four courses of the fabric. Upon this gear is the cam *x*, which extends one quarter around the cam cylinder or the distance corresponding to one course of the fabric. Upon the pattern chain, at predetermined points, where it is desired to knit the loose course, is placed the lug *y*. When, in the movement of the pattern chain, this lug strikes the lever *n* it forms a fulcrum for said lever and the cam *x* on the gear *w* elevates the lever *s*, elevating the lever *n* and lifting the needle cylinder and loosening the mesh. As the extent of this cam *x* is equal only to one course, the needle cylinder is held up only for one course. The pawl *r* is reciprocated by means of a crank *z* connected to the gear *w*. This crank operates the segmental gear 1. On the shaft 3 of the segmental gear 1 is a lever 10. A connecting rod 4 is connected at one end to lever 10 and at the other end to lever 5, swiveled on shaft 6. To the other end of the lever 5 is connected the connecting rod 7 which is adjustably connected at the other end to lever 8. To the other end of lever 8 is pivoted the pawl *r*. Thus the pawl *r* drives for two courses and retreats for two courses. This makes certain that the lug *y* will act upon lever *n* as a fulcrum for a time sufficient to enable the cam *x* to act with certainty, to

lift the needle cylinder. The lug *y* is placed so as to operate the lever *n* when the machine is knitting the last course of the toe of the stocking.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a supporting lever for said cylinder, a second lever normally floating with respect to the first lever, a pattern device for operatively connecting said levers and means to operate upon said normally floating lever when in the last mentioned condition to lift said last mentioned lever.

2. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a supporting lever for said cylinder, a second lever normally floating with respect to the first lever, a pattern device for operatively connecting said levers and means, operative during the knitting of one course, to operate upon said normally floating lever when in the last mentioned condition to lift said last mentioned lever.

3. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a lifting device and means to render said device active at a predetermined point and a cam, operative during knitting of one course, adapted, when the lifting device is rendered active, to lift said device.

4. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a lifting lever normally loosely connected with said needle cylinder, a pattern device adapted to make a fixed connection between said lifting lever and needle cylinder, and means to lift said lever when said lever is so connected.

5. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a lifting lever normally inoperative, a pattern device adapted to make an operative connection between said lifting lever and needle cylinder, and means to lift said lever when said lever is operatively connected with the needle cylinder.

6. In a circular knitting machine, the combination with a vertically movable needle cylinder, of a lifting lever normally inactive, a pattern device for rendering said lever active and a cam adapted to lift said lever and the needle cylinder when said lever is rendered active, the extent of said cam being such as to operate during one course, whereby said lever is released from the cam and the cylinder lowered at the end of said knitting of one course.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 20th day of May, 1907.

HARRY A. HOUSEMAN.

Witnesses:
M. M. HAMILTON,
A. M. URIAN.