

L. J. KNOWLES.
Loom.

No. 233,937.

Patented Nov. 2, 1880.

FIG. 1.

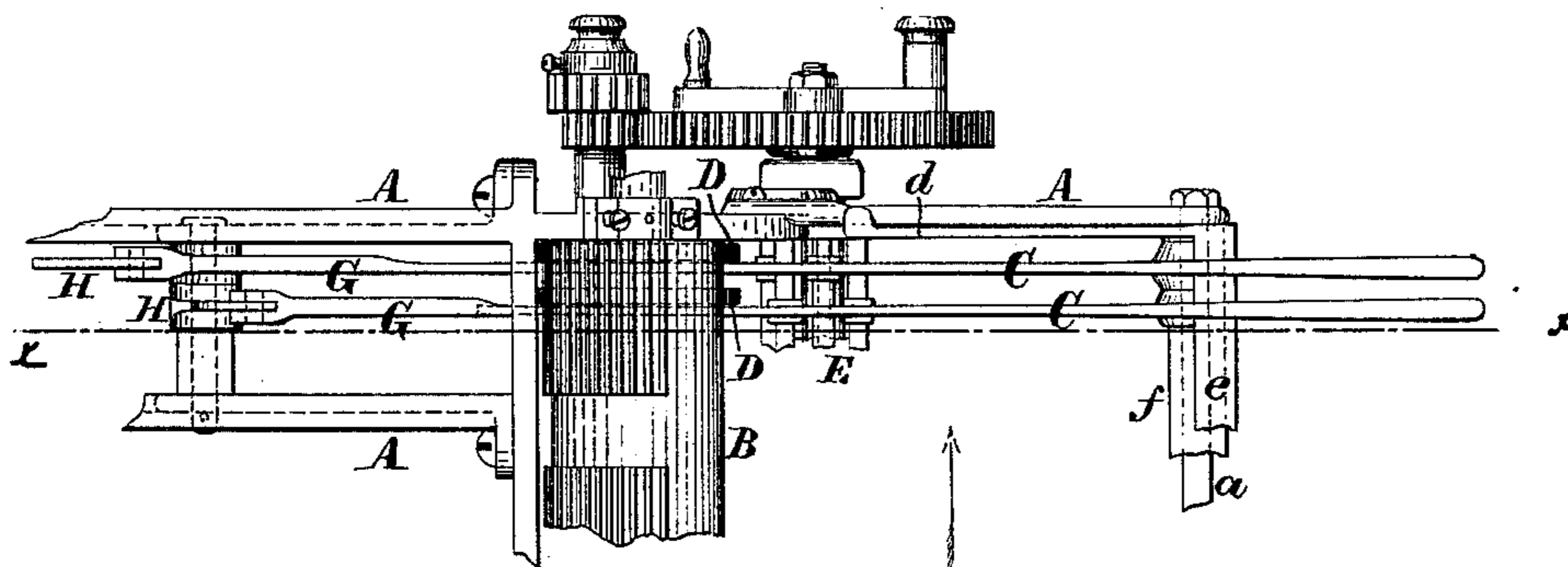


FIG. 2.

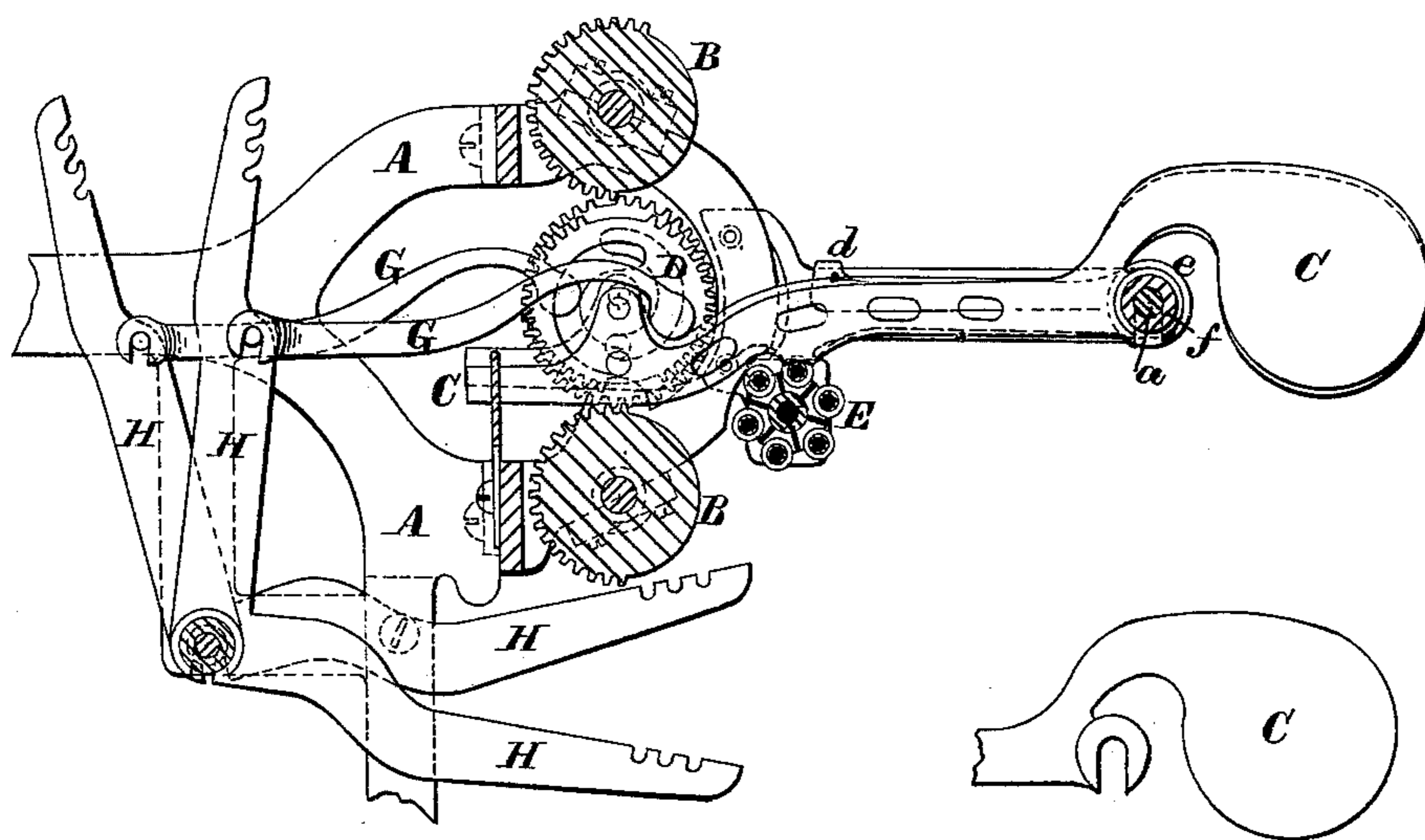


FIG. 3.

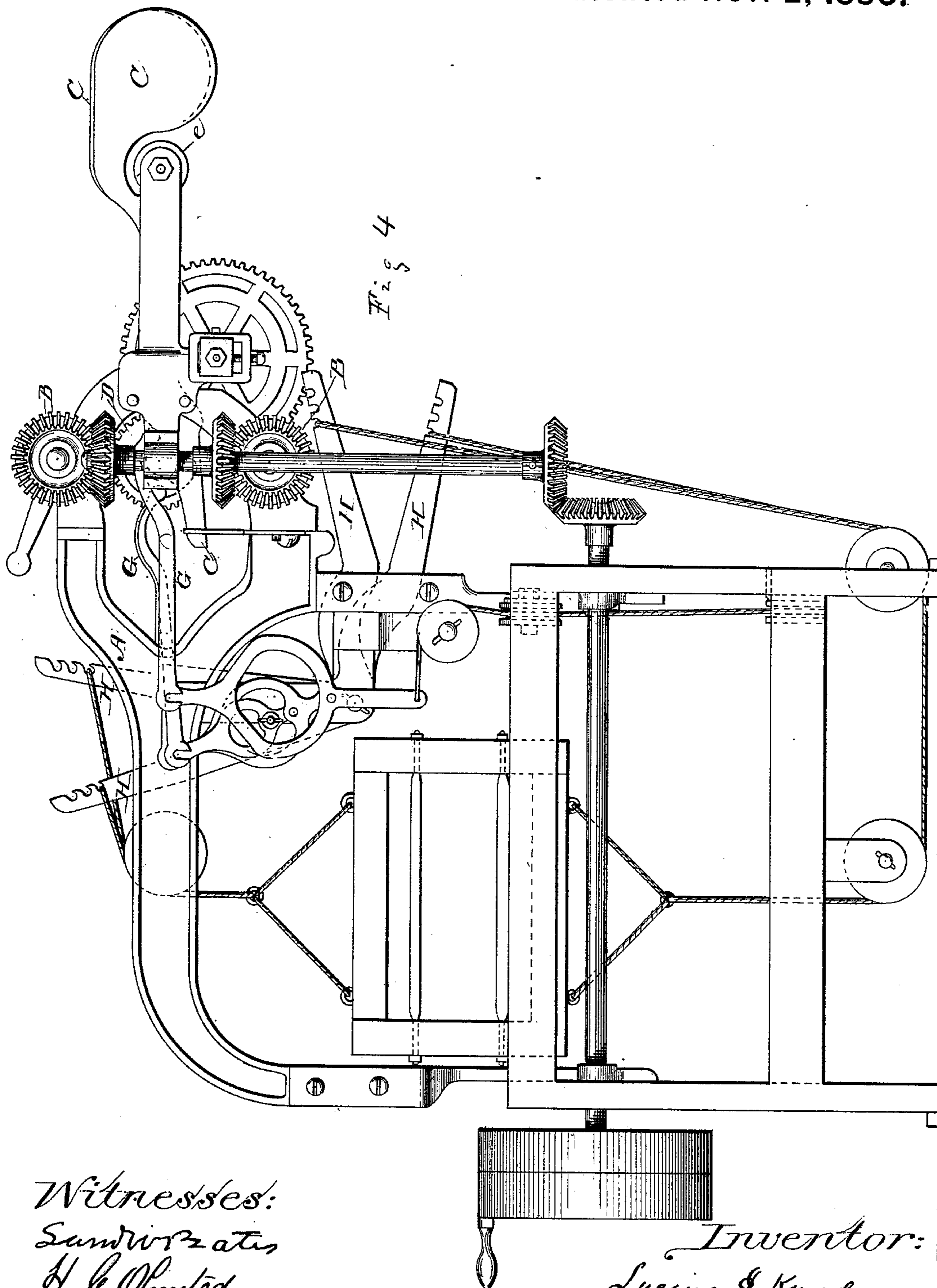
Witnesses;
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Inventor;
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UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS.

LOOM.

SPECIFICATION forming part of Letters Patent No. 233,937, dated November 2, 1880.

Application filed May 19, 1879.

To all whom it may concern:

Be it known that I, LUCIUS J. KNOWLES, of Worcester, in the State of Massachusetts, have invented a new and useful Improvement in Looms, of which the following is a specification.

This invention relates to the well-known class of looms bearing my name, and patented to me in several Letters Patent of the United States, among others No. 37,760, February 24, 1863, and No. 134,992, January 21, 1873, and has particular reference to the mechanism for operating the heddles of such looms, when constructed substantially as described and shown in the last-named patent—that is, so that much of the mechanism for operating the heddles lies horizontally, instead of being vertical, as in the loom described in the earlier patent.

In my looms as more recently constructed, and as shown in Patent No. 134,992, each heddle is connected by a pitman with a toothed crank-wheel, commonly called a "vibrating gear," having two sets of teeth upon opposite sides of its periphery, and having as its axis a pin located near the free end of a vibrating arm, one set of teeth taking into a cylinder-gear revolving in one direction and the other set taking into another cylinder-gear revolving in the opposite direction, according to the position of the vibrating arm, which position is determined by a pattern-cylinder revolving underneath the vibrating arm. When by the action of the pattern-wheel the vibrating arm is elevated the vibrating gear is thrown backward by the engagement of one set of its teeth with the teeth of the upper constantly-rotating cylinder, and the pitman or connector is pulled back, thus pulling outward the heddle-lever and raising the heddle, with which the heddle-lever is connected by a cord, and when the pattern-wheel permits the vibrating arm to fall the vibrating gear is thrown forward by the engagement of its other set of teeth with the teeth of the lower cylinder constantly rotating in the opposite direction, and the connector is pushed forward, thus pushing forward the heddle-lever and pulling the heddle-lever down by a second cord. Thus the pattern-cylinder has lifted all the mechanism lying between the pivot of the vibrating arm and the heddle-lever—namely, the vibrating

arm, the vibrating gear, and the connector—in order to cause the vibrating gear to engage with the upper cylinder, and has permitted this entire mechanism to fall by its own weight, to cause the vibrating gear to engage with the lower cylinder. This construction is somewhat faulty, since, instead of falling freely, the connector sometimes sticks, as does also sometimes the vibrating gear on the side to which the crank-pin is attached, and when this happens the weight of the vibrating arm acting upon the pivot of the vibrating gear at its center tends to turn, and often does turn, the vibrating gear upon the crank-pin as an axis, and thus prevents its teeth from engaging properly with the teeth of the cylinder-gear when they come together.

The object of this invention is to remedy this difficulty, and this is accomplished by extending the vibrating arms back from their pivots, so that the part in rear of the pivot will balance substantially the part carrying the vibrating gear.

Since the general construction and mode of operation of my looms are so well known to those skilled in the art, and may clearly be seen in my Patent No. 134,992, I have shown in the drawings and shall confine my description to so much of a loom only as is necessary to illustrate my present invention. Accordingly—

Figure 1 is a plan of a portion of a loom. Fig. 2 is a sectional elevation on line *xx* of Fig. 1, and Fig. 3 is a detailed view of a portion of a vibrating arm. Fig. 4 is a front elevation of so much of a loom as is necessary to show the connection of the devices represented in the other figures with the heddles, and also the means for actuating the cylinder-gears and pattern-cylinder.

A is a part of a loom-frame. B B are cylinder-gears or toothed cylinders, constantly rotated, one in one direction and the other in the other direction, in the usual manner and by the usual means.

C C are the vibrating arms carrying the toothed crank-wheels or vibrating gears D D, which engage with one or the other of the cylinder-gears, as and for the purpose before mentioned. The vibrating arms are pivoted to the frame upon a common rod or shaft, *a*,

and in order to accomplish the result herein-
before mentioned as the object of this inven-
tion it is only necessary that the parts on either
side of the pivot shall balance each other; but
5 to take advantage of an arrangement shown
in Letters Patent to me, No. 134,992, whereby
each of the vibrating arms can readily be re-
moved from the common pivot independently
of the others, and that I may make use of the
10 cap shown in that patent for keeping the arms
in place upon the pivot-shaft when the loom
is in operation, I cast the arms with a projec-
tion, *c*, which is slotted out underneath to fit
upon the pivot-shaft and bend the rear part
15 of the arm over the pivot-shaft, as shown, so
as to allow the cap to turn, as described in said
former patent, within the hollow of the bend.

The cap is marked *e*. The arm or lever by
which it is operated is marked *d*. A sleeve
20 on shaft *a*, to separate the vibrating arms be-
longing to the heddle-levers from the vibrat-
ing arms belonging to the drop shuttle-boxes,
is marked *f*.

E is the pattern-cylinder, constructed and
25 operated in the usual manner.

G G are the connectors, and H H the hed-
dle-levers, to which are connected the heddle-
cords, passing over sheaves in the usual man-
ner.

It will be readily observed that by this con- 30
trivance the pattern-cylinder will be subjected
to considerably less friction than when made
to sustain the full weight of the vibrating arms,
and that consequently less power will be re-
quired to turn it, and that the fall of the gear- 35
wheel will be effected by its own weight and
the weight of the connector or any extraneous
force which may be applied to it, and will be
entirely independent of the weight of the vi-
brating arms. 40

I claim—

The horizontal arms C C, extended beyond
their pivots and weighted to counterpoise the
other ends carrying gearing for operating the
heddles, substantially as described, for the pur- 45
pose specified.

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Witnesses:

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