

(No Model.)

2 Sheets—Sheet 1.

A. TOWNSEND.
KNITTING MACHINE.

No. 431,417.

Patented July 1, 1890.

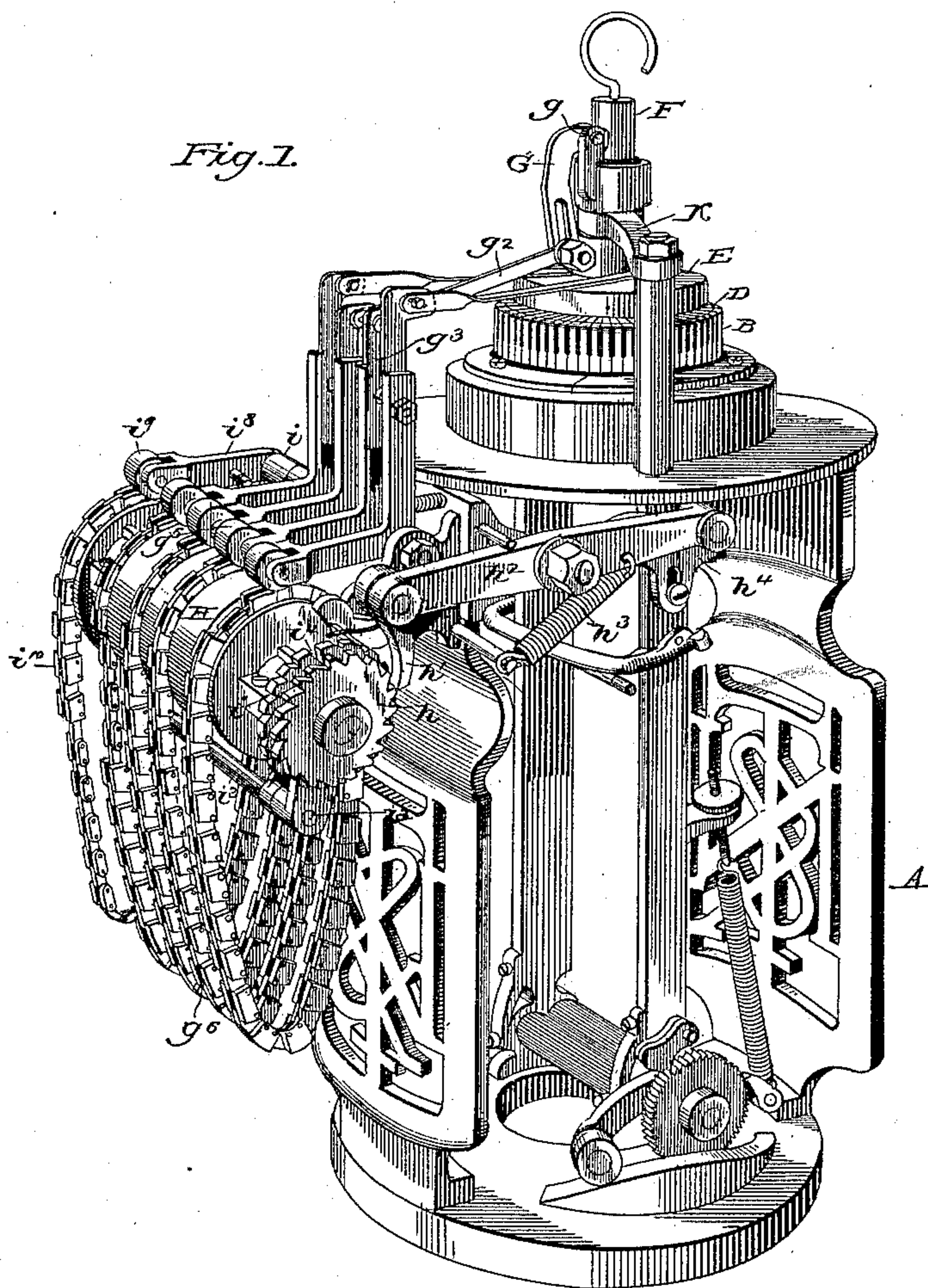
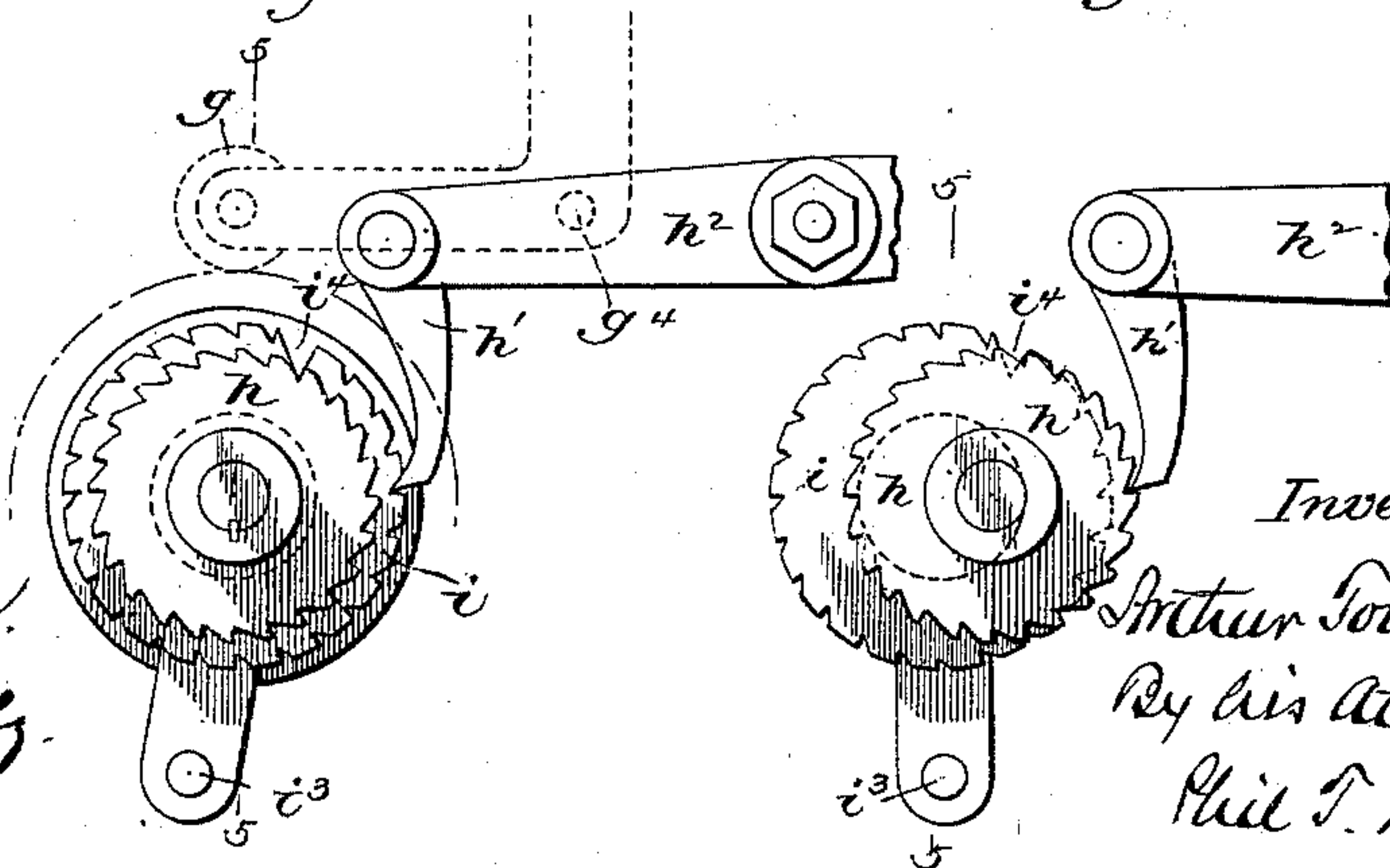


Fig. 2.

Fig. 3.



Witnesses:
H. H. Norton.
H. A. Kennedy.

Inventor:
Arthur Townsend
By his Atty
Phil T. Dodge.

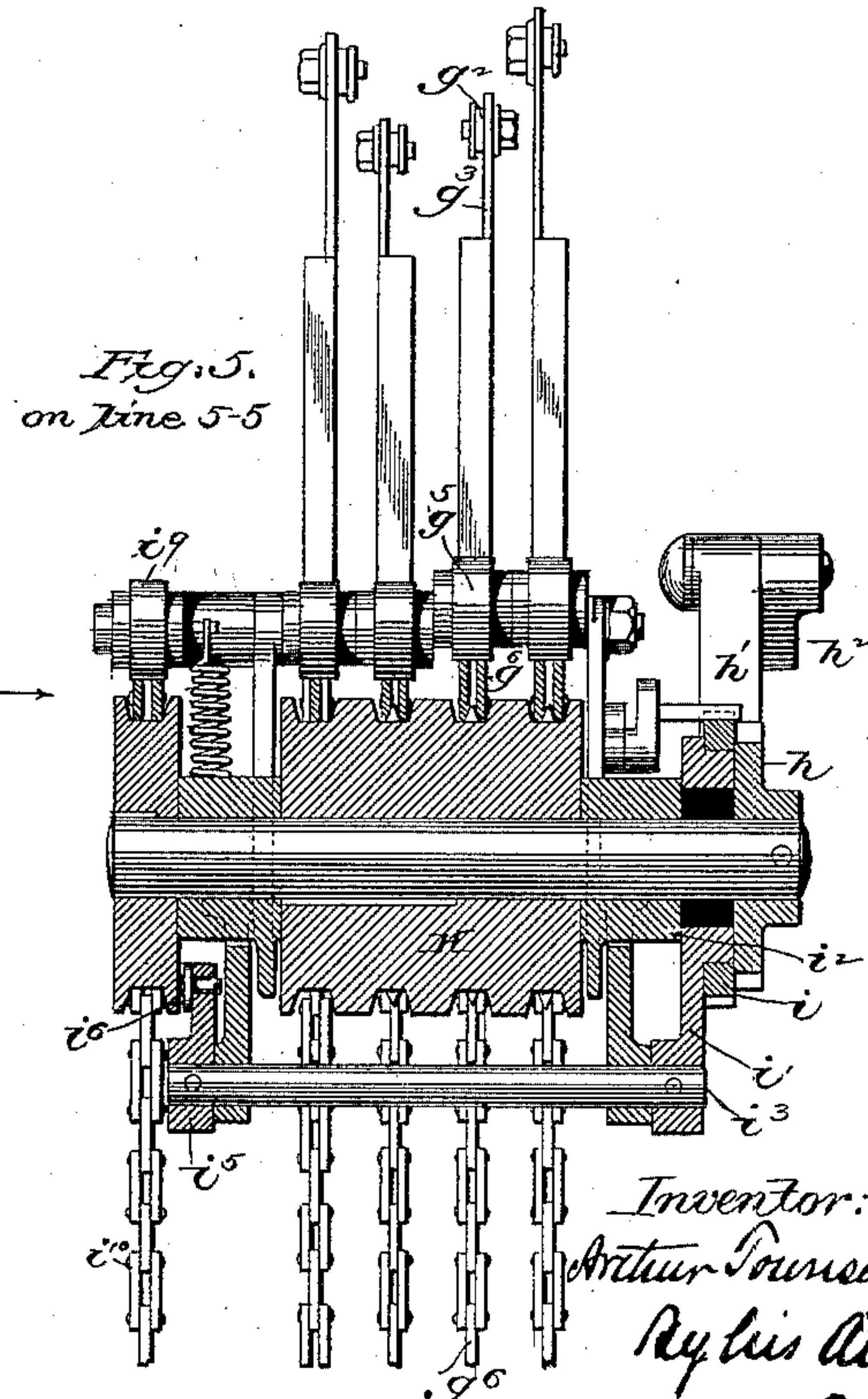
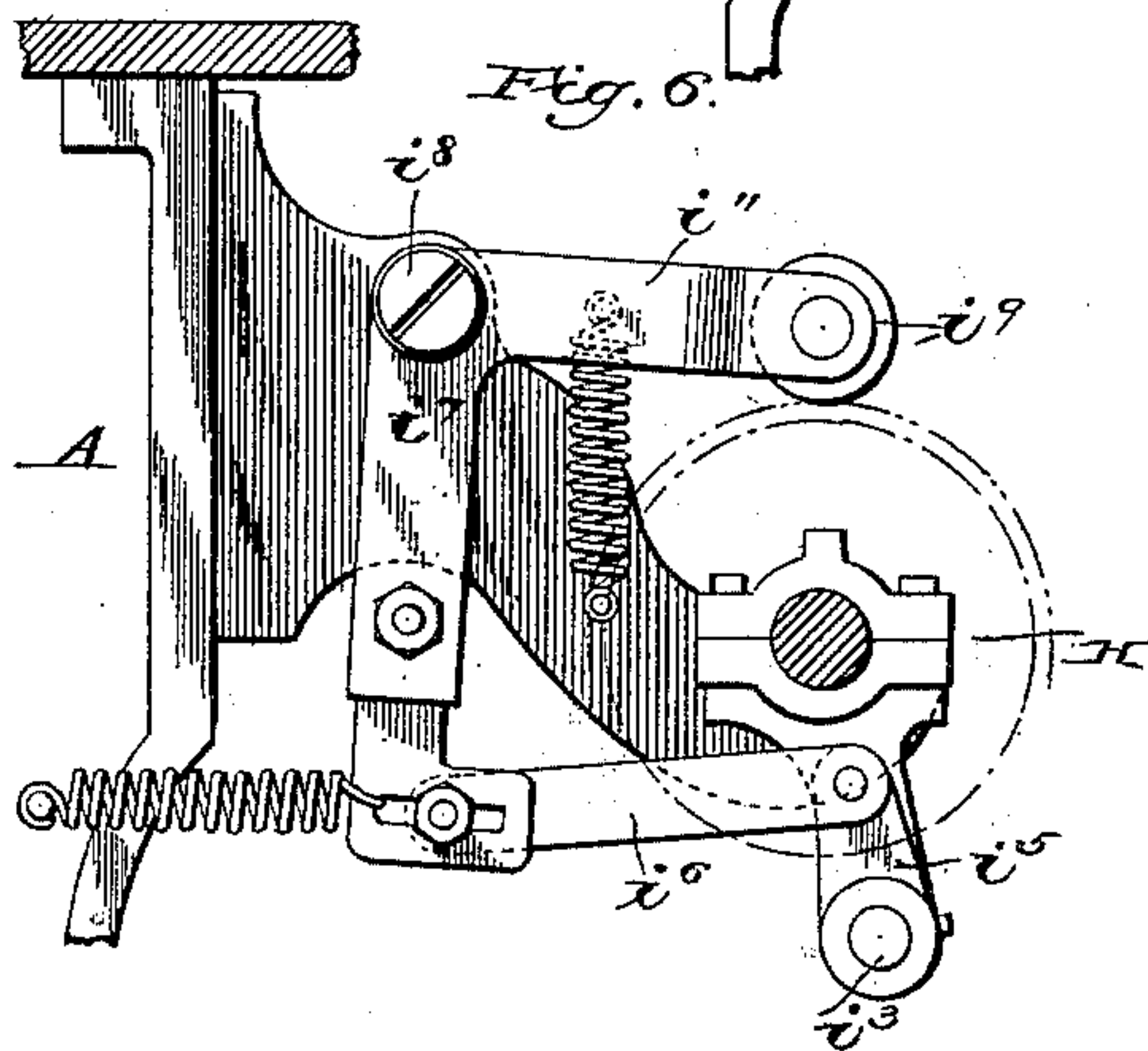
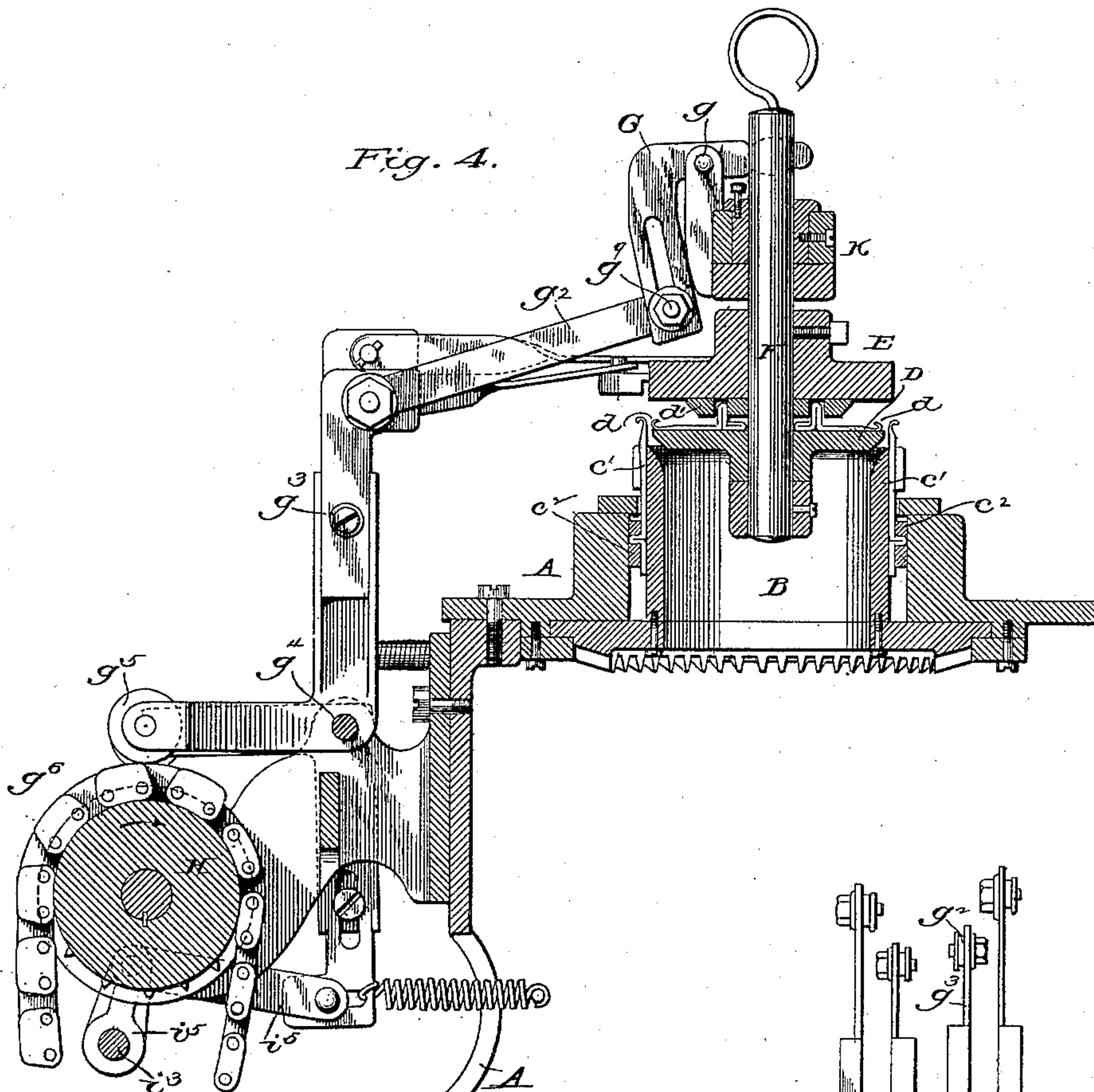
(No Model.)

2 Sheets—Sheet 2.

A. TOWNSEND.
KNITTING MACHINE.

No. 431,417.

Patented July 1, 1890.



Witnesses:
W. H. Mortimer
H. R. Kennedy.

Inventor:
Arthur Townsend
By his Atty
Phil. T. Dodge

UNITED STATES PATENT OFFICE.

ARTHUR TOWNSEND, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
NYE & TREDICK.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 431,417, dated July 1, 1890.

Application filed November 29, 1889. Serial No. 331,872. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR TOWNSEND, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Knitting-Machines, of which the following is a specification.

This invention relates to "cylinder-machines," so called, in which vertical reciprocating needles mounted in the walls of an upright cylinder co-operate with reciprocating needles radially arranged in an overlying dial-plate.

It has reference more particularly to machines employed for the knitting of shirt-bodies, sleeves, and stockings. In the production of these articles it is the practice to knit them in continuous lengths, which are afterward cut into shorter lengths, the action of the needles being changed at suitable intervals to produce a closely-knitted fabric for the ends of the sleeves, the waists of shirt-bodies, &c., and to produce a loosely-knitted fabric for the body portions of the sleeves, the busts, and skirts of shirts, &c.

It is the aim of my invention to provide for this change from tight to loose knitting, and vice versa; and to this end the first part of the invention consists in mounting the dial-plate so that it may be raised and lowered at will in relation to the cylinder, and in combining therewith automatic mechanism to effect such movement at predetermined intervals.

The second part of the invention relates to improved means for operating the pattern-chain through which the dial-plate is raised and lowered, whereby I am enabled to use chains of less length than would otherwise be required. This chain-operating mechanism is applicable not only to the chain for adjusting the dial, but also in connection with pattern-chains used for changing the position of the needle-operating cams, and generally for operating the pattern-chains of knitting-machines regardless of the purpose for which such chains are employed.

In the accompanying drawings, Figure 1 is a perspective view of a machine having my improvement incorporated therein. Figs. 2 and 3 are side views showing portions of the mechanism for operating the pattern-chains. Fig. 4 is a vertical central section through

the principal operative parts of the machine, parts being in section. Fig. 5 is a section on the line 5 5 of Fig. 2, parts being in section. Fig. 6 is a view looking in the direction indicated by the arrow in Fig. 5.

Referring to the drawings, A represents the stationary frame-work of the machine; B, the revolving cylinder therein; c' , the cylinder-needles, and c^2 the cams for operating said needles.

D represents the dial-plate, d its needles, and d' the cams for operating the dial-needles, located on the under side of a stationary plate E, fixed to a central sustaining-shaft F, which also sustains the freely-rotating dial.

The foregoing parts are all constructed and operated in the usual manner, with the single exception that the dial-sustaining shaft F, mounted in the stationary cross-bar K, instead of being fixed in position, as usual, is arranged to slide vertically through said bar and provided at its upper end with a recess to receive the end of an elbow-lever G, pivoted to the bar at g , whereby the lever is enabled to raise and lower the dial, its needles, and cam-connections, in order to change the distance between the cylinder and dial and between the cylinder and dial-needles without effecting the action of the needles in other respects. When the dial is in its lowest position, the needles produce a closely-knitted fabric; but when the dial is elevated so as to increase the distance between the needles the stitches are stretched or elongated in such manner as to somewhat loosen the texture of the fabric. This loosening is of advantage in many places—for instance, in shirt-bodies, or where sleeves are to be inserted in order to avoid the necessity for the insertion of a gusset.

I propose to effect the elevation and depression of the dial by mechanism of any appropriate character; but I prefer to employ the elbow-lever and to connect the latter by a link g^2 with the upper end of an elbow-lever g^3 , which is pivoted to the main frame at g^4 and provided at its outer end with a roller g^5 , acted upon by links of varying height in a pattern-chain g^6 , carried by a horizontal roll H, which may be operated by either of the various mechanisms now known in the art.

It will be perceived that by providing in

the pattern-chain high and low links in proper numbers and relations the elevation and depression of the dial-plate may be regulated at will, so as to knit the tight and the loose courses at such periods of time as may be demanded.

It is to be understood that the pattern-chain and intervening levers herein shown constitute but one form of pattern mechanism and that they may be replaced by either of the various pattern mechanisms now known in the art.

In order that the dial may be raised or lowered to a greater or less extent, as demanded; I propose to make the connections adjustable. The simplest construction to this end is that shown in Fig. 4, in which the lever G is provided with a slot to receive the adjustable pivot-bolt g^9 , by which the link is attached thereto. By shifting this pivot to and from the fulcrum of the lever the latter will be caused to vibrate through a shorter or longer arm, and thus the dial caused to rise to a greater or less extent.

For the purpose of operating the roll which carries the pattern-chain I provide the roll at one end with a ratchet-wheel h , operated by a pawl h' on the end of lever h^2 , pivoted to the main frame and vibrated by a depressing-spring h^3 and a lifting-cam h^4 , the latter connected to and revolving with the cylinder. These parts are of ordinary construction, being the same as those represented in Letters Patent to George E. Nye, dated April 28, 1885, No. 316,907.

As machines have been heretofore constructed the ratchet mechanism advances the chain one length at each revolution of the cylinder, and it was therefore necessary to employ very long pattern-chains whenever a large number of courses was to be knit without change. In order to avoid the use of these long and objectionable chains, I provide a mechanism by which the chains are slowly advanced, the cylinders being allowed to make a number of revolutions each time that the chain is advanced one link.

This mechanism, as shown in the various figures, consists, primarily, of a second and larger ratchet-wheel i , loosely mounted at the side of wheel h and formed with a series of ordinary teeth and with a single deep tooth i^4 . When the two wheels are concentric, as shown in Figs. 1 and 2, the pawl engages and turns the wheel i , which, by reason of its size, holds the pawl out of engagement with the wheel h until the deep tooth i^4 arrives at the pawl, when the latter is permitted to engage the wheel h and advance the same one tooth, thereby advancing the pattern-chain one link, after which the continued rotation of the wheel i again holds the dog out of engagement with wheel h , allowing the pattern-chain to remain at rest until the wheel i has completed another revolution, when the wheel h and the pattern-chain are advanced another step. It will be observed that the wheel i

acts simply as a throw-out device for the driving-pawl, so that the latter is permitted to move the chain only at long intervals. As the pawl is operated once at each revolution of the cylinder—that is to say, while the controlling-wheel i has, as shown in the drawings, twenty-four teeth—it follows that under the arrangement shown a single-feed machine would lay into the fabric twenty-four courses for each link in the pattern-chain, while a double-feed machine would in like manner introduce forty-eight courses.

For many kinds of work—that is to say, in the production of many garments or fabrics—it is unnecessary to provide for any control of the pattern-chain beyond that above described. In some cases, however, it is necessary to change the pattern of the fabric momentarily only, so that it becomes necessary to change the pattern-chain g^6 , hereinafter designated as the “main pattern-chain,” more speedily than it could be effected if the wheel i remained always in operative position. To this end I provide means for throwing the wheel i automatically out of its operative position, so that the pawl may at suitable intervals operate, in its usual manner, rapidly to advance the main pattern-chain. As shown in the drawings, the wheel i is mounted on a tubular journal or arm i^2 , which loosely surrounds the pattern-roll shaft, being fixed at its lower end on a horizontal rock-shaft i^3 , provided at the opposite end with an arm i^5 , connected by link i^6 to an elbow-lever i^7 , which is in turn pivoted at i^8 to the main frame and provided with a roller i^9 , acted upon by a pattern-chain i^{10} , mounted on the roll H. A spring i^{11} returns the lever i^7 after the action of the secondary pattern-chain. The secondary chain, being composed of high and low links suitably arranged with reference to the required fabric, acts at the proper time to move the lever i^7 , and through the intermediate parts to throw the wheel i from its normal operative position backward, as shown in Fig. 3, in eccentric relation to wheel h , leaving the edge of the latter exposed to the constant action of the driving-pawl. While the parts are in this position the chains are all advanced at each rotation of the cylinder.

As before mentioned, the wheel i and the devices for operating the same are applicable in general for controlling the pattern-chains of a knitting-machine—that is to say, for controlling-chains which control in turn the needle-cams as well as the chains for moving the dial. In the drawings I have shown upon the pattern-roll a number of pattern-chains operating through elbow-levers to adjust the cams which control the cylinder and dial needles. These chains, levers, and other connections are all of known form and arrangement and in themselves constitute no part of my invention, and a detailed description thereof is rendered unnecessary.

Having thus described my invention, what I claim is—

1. In a cylinder knitting-machine, the dial
movable vertically in relation to the cylinder,
in combination with an automatic pattern
mechanism and driving-gear therefor, sub-
stantially as described and shown, to effect
the rising and falling action of the dial, where-
by the machine is adapted to produce auto-
matically a continuous fabric with coarsely-
knitted courses therein at predetermined in-
tervals.

2. In a cylinder knitting-machine, the cyl-
inder and the dial mounted to move verti-
cally in relation to the cylinder, in combina-
tion with the pattern-chain, automatic driv-
ing mechanism therefor, and connecting de-
vices through which the chain raises and low-
ers the dial.

3. In a cylinder knitting-machine, the ver-
tically-movable dial, its sustaining-shaft, the
elbow-lever to raise and lower the shaft, the
second lever g^3 , the connecting-link, and the
pattern-chain to actuate the second lever.

4. In a cylinder knitting-machine, the dial,
its vertically-movable shaft, the lever G to
operate the shaft, the pattern-chain, and ad-
justable connections, substantially such as
shown, to vary the length of movement of le-
ver G.

5. In a knitting-machine, the pattern-chain
roll, in combination with its ratchet-wheel,
the actuating-pawl, the second and larger
ratchet-wheel, its movable support, and con-
nections, substantially as shown, actuated by
the pattern-chain to move said support, where-
by the actuating-pawl is caused to move the

pattern-roll at each stroke for a predeter-
mined time, and thus remain out of action for
a long period of time.

6. In a cylinder knitting-machine, the ver-
tically-movable dial and the roll, pattern-
chain, and intermediate devices for moving
the dial, in combination with the roll-oper-
ating ratchet-wheel, its actuating-pawl driven
from the cylinder, a throw-out device for the
pawl, and a pattern-chain mounted on the
roll and connected with the throw-out device,
whereby one chain is caused to control the
movement of the second chain through which
the dial is adjusted.

7. In a pattern-chain mechanism, a main pat-
tern-chain, a secondary pattern-chain, and a
single roll or shaft by which the two chains
are carried, in combination with a roll-driving
mechanism, an automatic throw-out device
whereby the driving mechanism is controlled
to act only at regular intervals, and connec-
tions from the secondary chain to the throw-
out device to let the roll-driving mechanism
into action momentarily at times when it
would not otherwise operate, whereby the au-
tomatic periodic action of the feed mechan-
ism is modified by the secondary chain.

In testimony whereof I hereunto set my
hand, this 11th day of November, 1889, in the
presence of two attesting witnesses.

ARTHUR TOWNSEND.

Witnesses:

HENRY M. BOYD,
J. M. CATLETT, Jr.