

No. 751,811.

PATENTED FEB. 9, 1904.

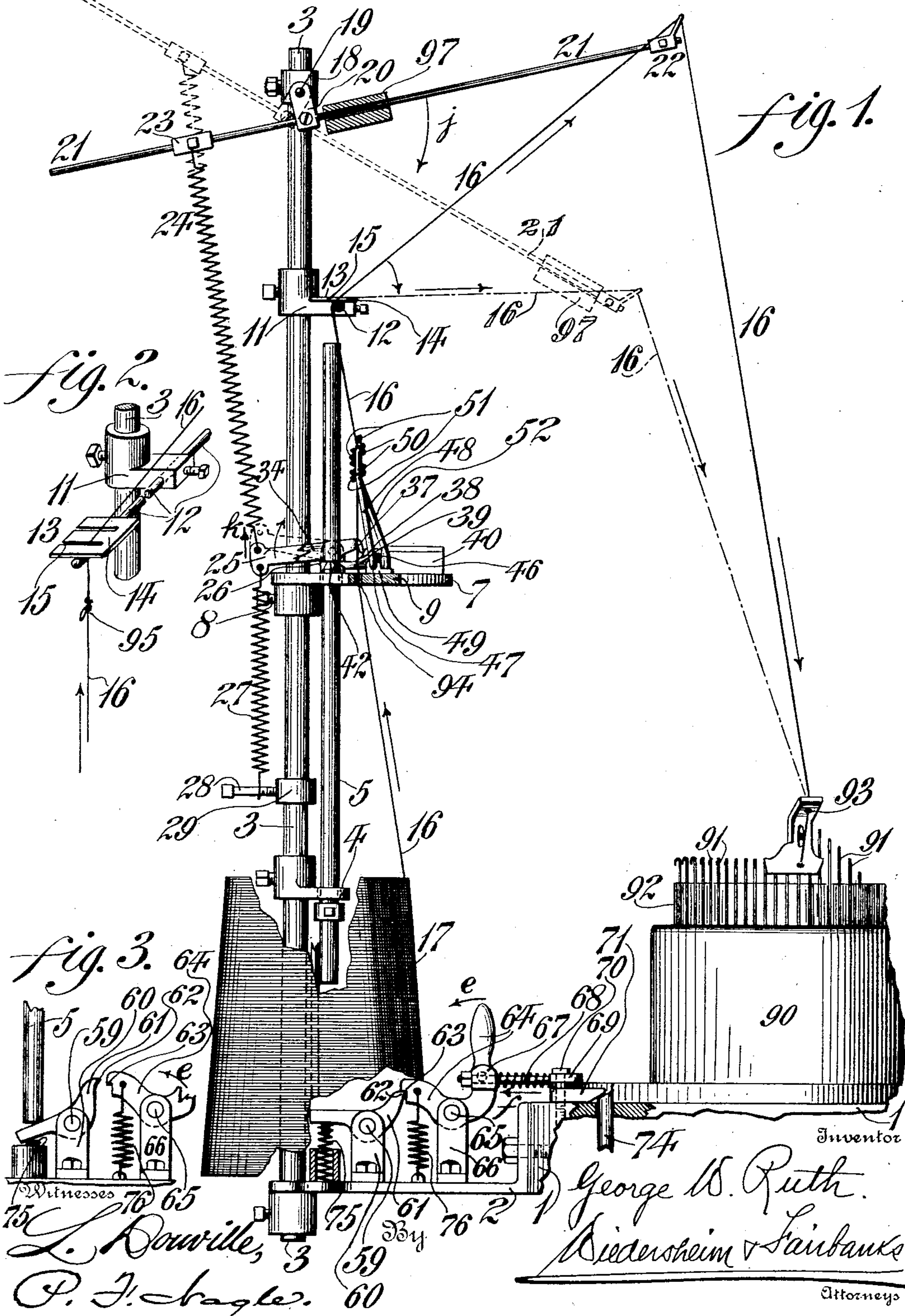
G. W. RUTH.

STOP MOTION FOR KNITTING MACHINES.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



No. 751,811.

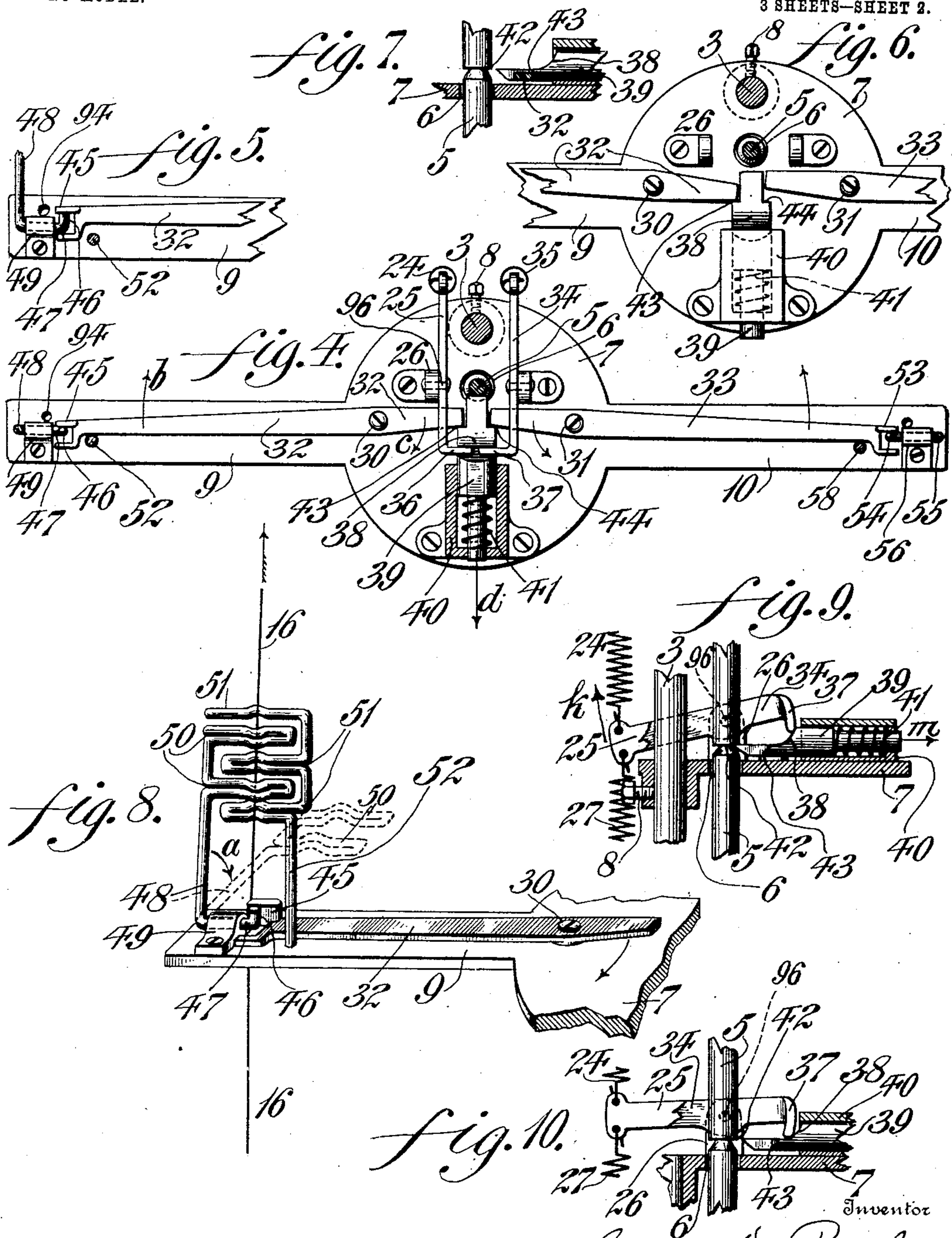
PATENTED FEB. 9, 1904.

G. W. RUTH.
STOP MOTION FOR KNITTING MACHINES.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses

L. Bouville,
P. J. Bagley.

By

George W. Ruth.
Wiedersheim & Fairbanks,
Attorneys

G. W. RUTH.
STOP MOTION FOR KNITTING MACHINES.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

fig. 12.

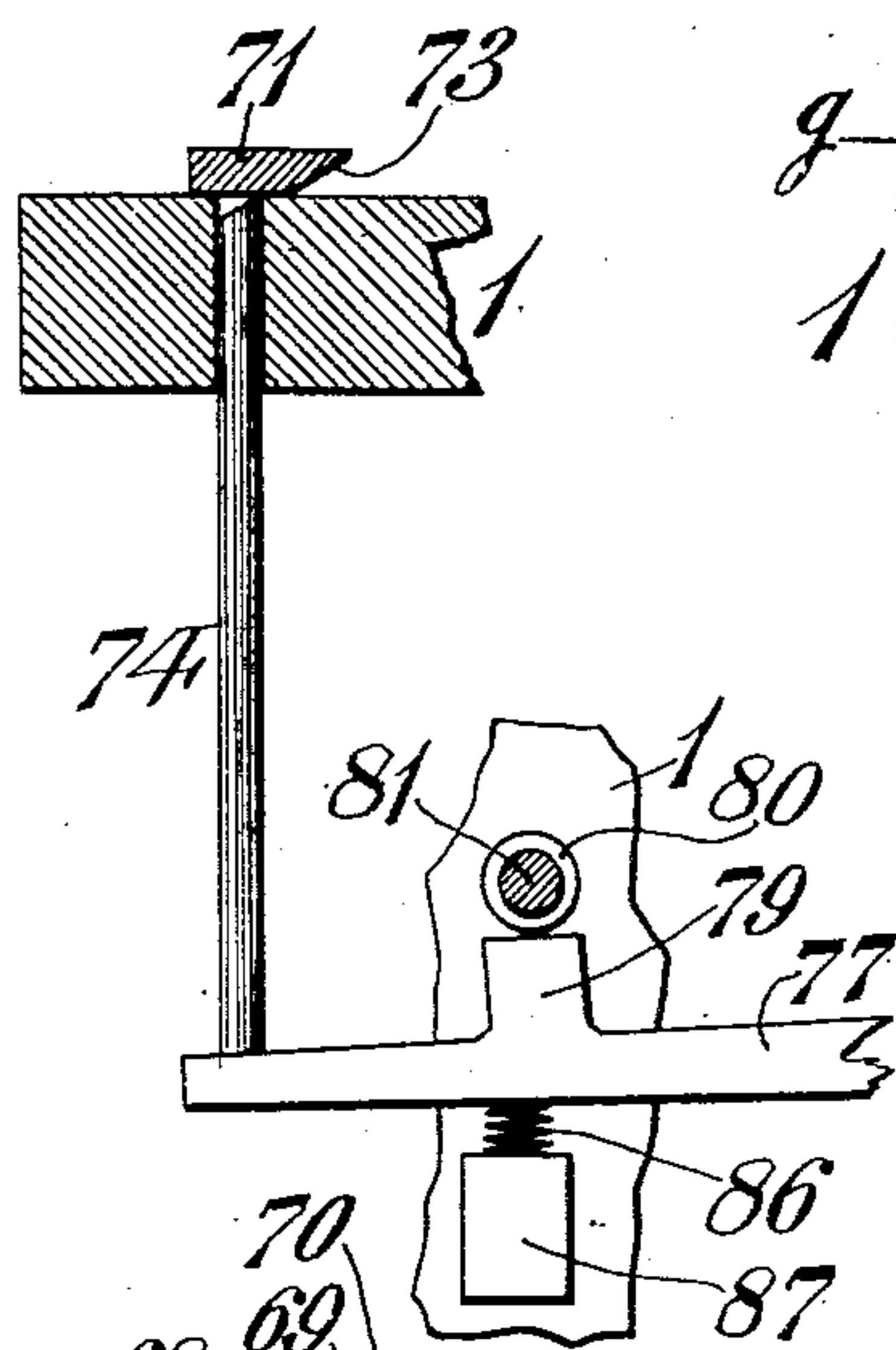


fig. 11.

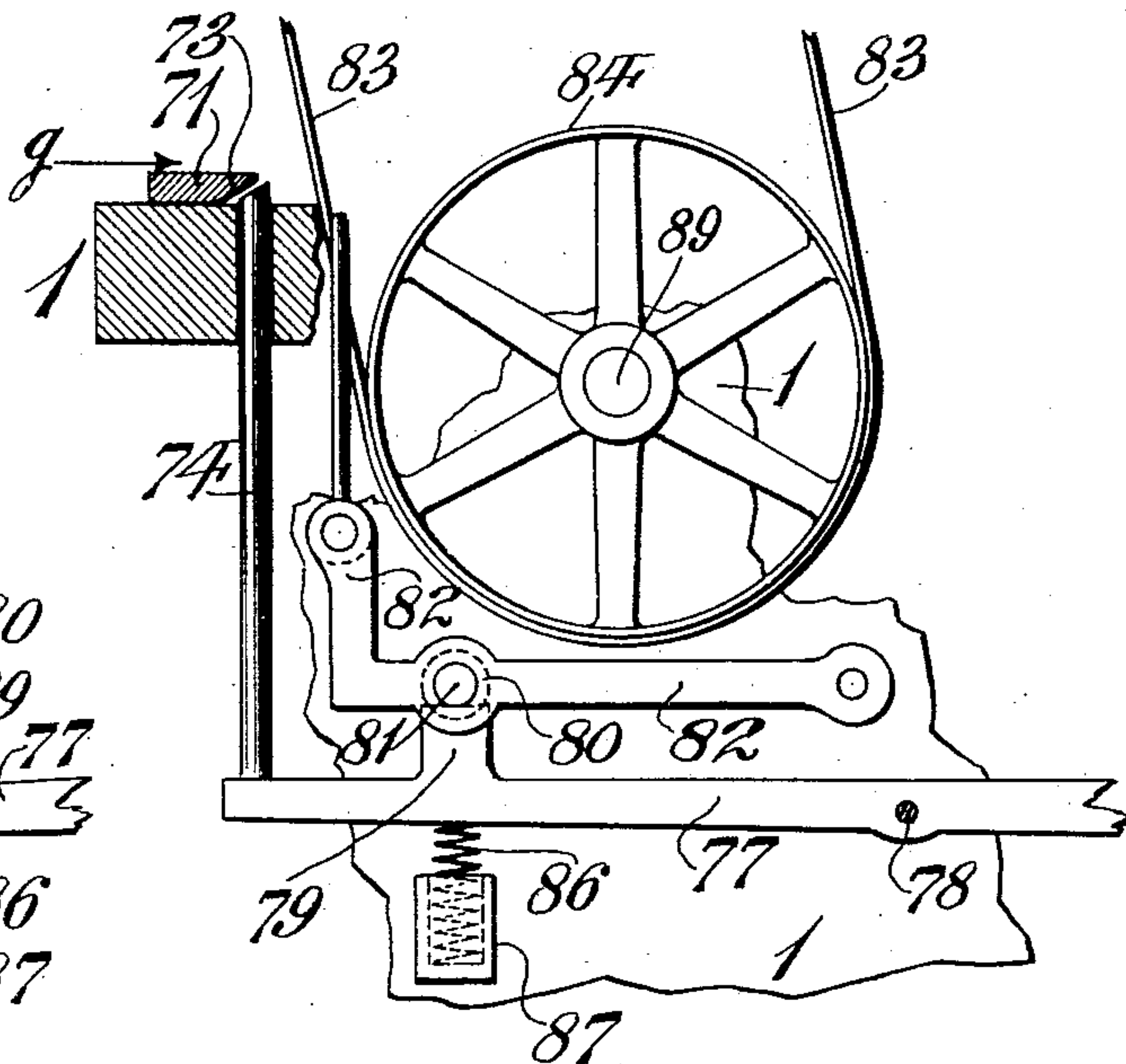


fig. 13.

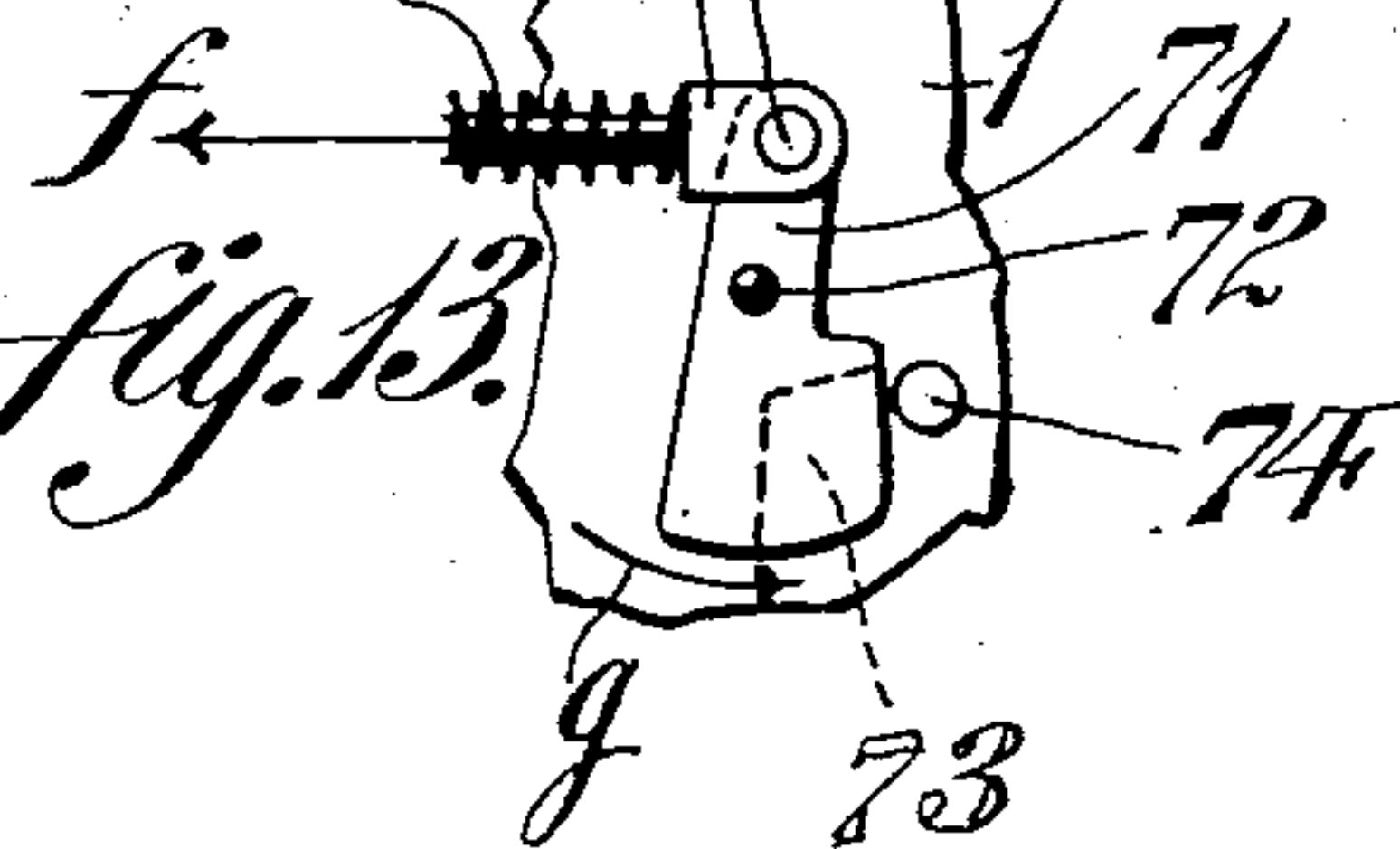


fig. 14.

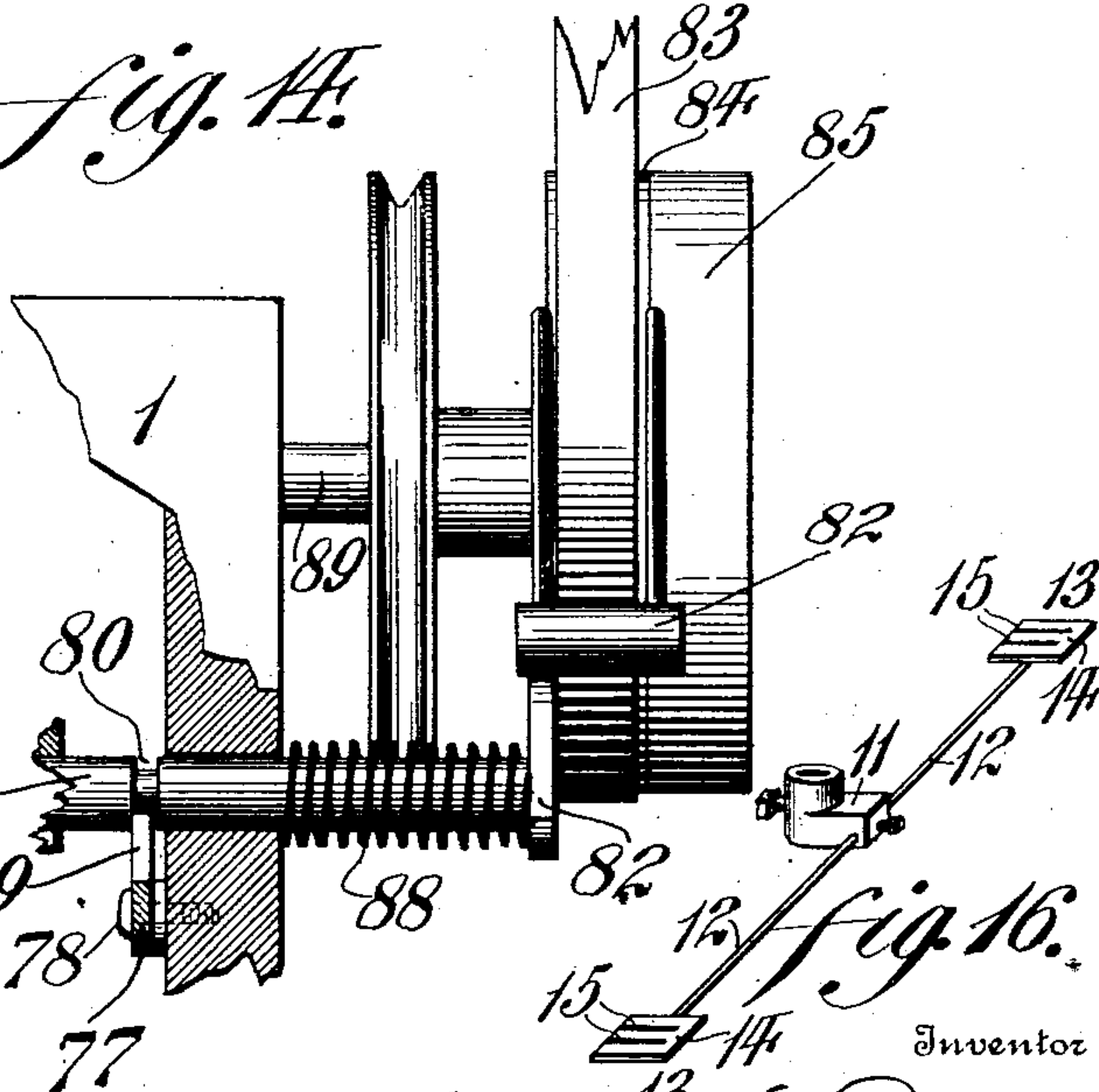


fig. 15.

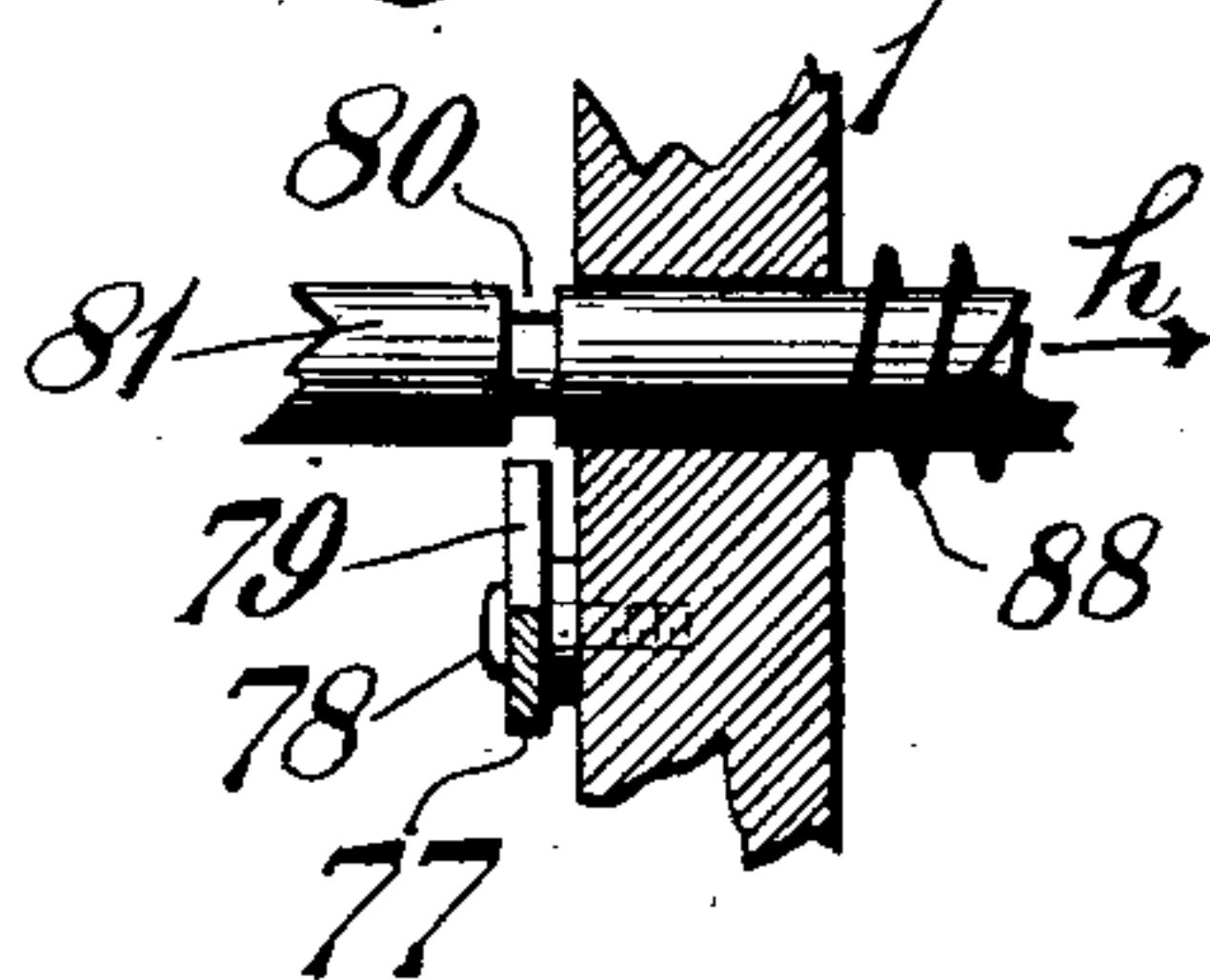
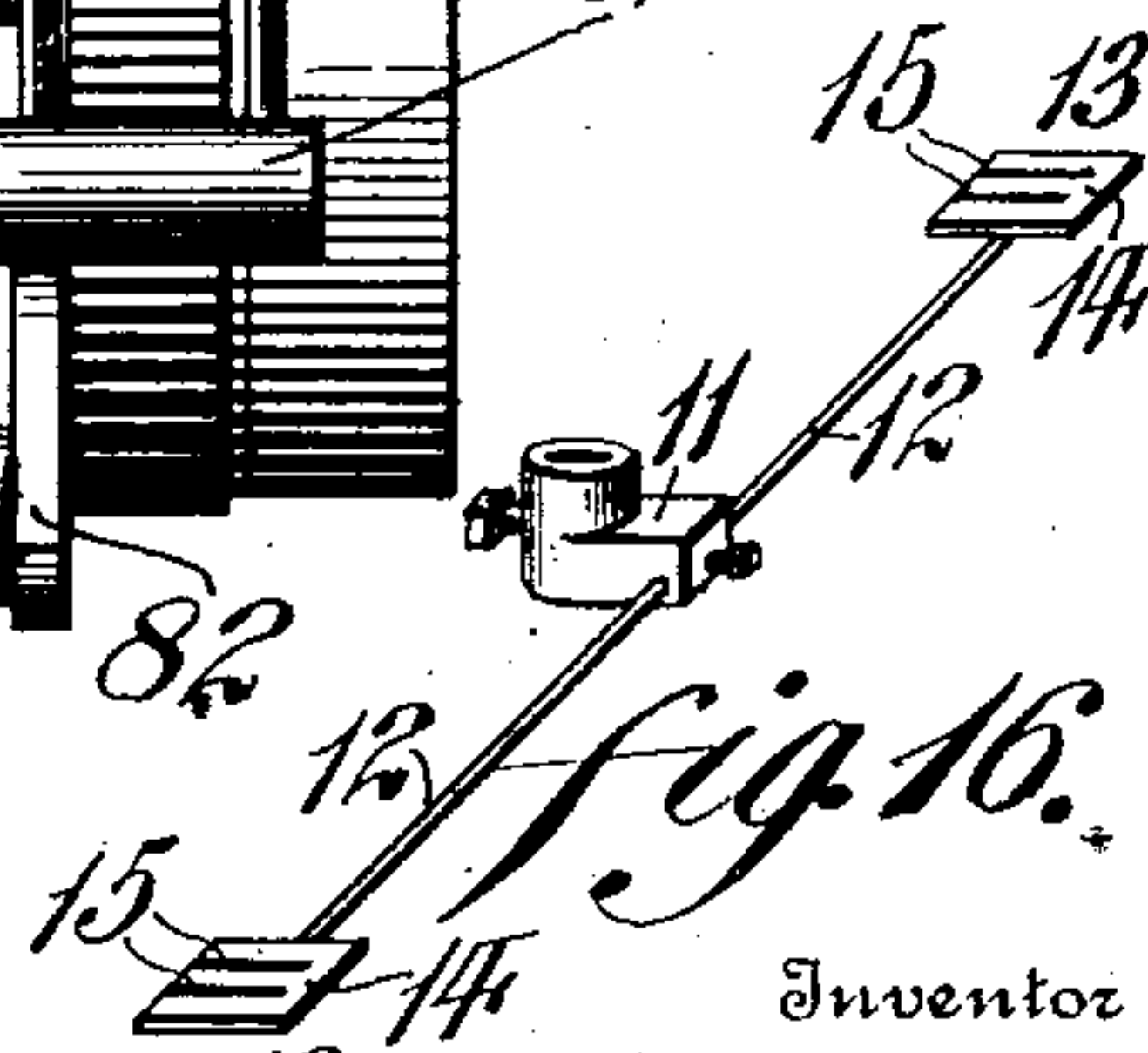


fig. 16.



Witnesses

L. Douville,
P. J. Bagley.

By

Inventor
George W. Ruth.
Niedersheim & Fairbanks,

UNITED STATES PATENT OFFICE.

GEORGE W. RUTH, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO
RUTH AUTOMATIC KNITTING MACHINE COMPANY, A CORPORATION OF DELAWARE.

STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 751,811, dated February 9, 1904.

Application filed March 10, 1903. Serial No. 147,044. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. RUTH, a citizen of the United States, residing at Norristown, in the county of Montgomery, State of Pennsylvania, have invented certain new and useful Improvements in Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to stop-motions for knitting-machines; and it consists of means whereby when the yarn as drawn from a bobbin or cop either breaks or sticks to the bobbin or in case the yarn has knots or other defects therein the machine is automatically stopped.

Figure 1 represents a side elevation of certain portions of the device. Fig. 2 represents a perspective view of certain of the parts seen in Fig. 1. Fig. 3 represents a side elevation of certain of the parts seen in Fig. 1 and some of which are in different positions from those seen in Fig. 1. Fig. 4 represents a partial plan view and partial horizontal section of certain detached portions of the device. Fig. 5 represents a plan view of certain of the parts seen in Fig. 4, but in different position from those seen in said Fig. 4. Fig. 6 represents a partial plan view and partial horizontal section of certain of the parts seen in Fig. 4 and some of which are in different positions from those seen in said Fig. 4. Fig. 7 represents a partial side elevation and partial vertical section of certain detached portions of the device. Fig. 8 represents a perspective view of certain of the parts seen in Fig. 4. Fig. 9 represents a partial side elevation and partial vertical section of certain detached portions of the device. Fig. 10 represents a partial side elevation and partial vertical section of certain of the parts seen in Fig. 9 and some of which are in different positions from those seen in said Fig. 9. Fig. 11 represents a partial side elevation and partial vertical section of certain detached portions of the device. Fig. 12 represents a partial side elevation and partial vertical section of certain of the parts seen in Fig. 11 and some of which are in different positions from those

seen in said Fig. 11. Fig. 13 represents a plan view of certain detached portions of the device. Fig. 14 represents a partial side elevation and partial vertical section of certain detached portions of the device. Fig. 15 represents a partial side elevation and partial vertical section of certain of the parts seen in Fig. 14 and some of which are in different positions from those seen in said Fig. 14. Fig. 16 represents a perspective view of certain detached portions of the device on a reduced scale.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, secured to the frame 1 of the knitting-machine is a bracket 2, in which is secured the rod 3, as best seen in Fig. 1, it being noted that said rod 3 has secured thereto the guide 4, through which freely passes the lower portion of the movable rod 5, whose upper portion is guided by passing freely through an opening 6 in the plate 7, which latter is secured to the rod 3, in the present instance by the screw 8, and it will be noted on referring to Fig. 4 that arms 9 and 10 project from said plate 7 for a purpose hereinafter described.

The rod 3 has secured thereto the bracket 11, (see Figs. 1, 2, and 16,) in which is supported a rod 12, provided with yarn-guides 13, which in the present instance consist of plates 14, provided with slots 15, through which the yarn 16 from a cop or bobbin 17 is passed for a purpose hereinafter described.

The rod 3 has secured thereto a collar 18, to which is pivoted, as at 19, the clamp 20, in which is secured the rod 21, it being noted that said rod 21 has secured to one end thereof the yarn-guide 22 and that said rod 21 is also provided with a collar 23, in which is secured one end of a spring 24, the opposite end of which is secured to the extremity of a lever 25, fulcrumed in an ear 26, as best seen in Figs. 1, 4, 9, and 10. It is to be understood that although but one collar 18, clamp 20, and rod 21 are illustrated in the accompanying drawings there are in practice two sets of collars 18, clamps 20, and rods 21. The lever

25 has secured thereto one end of a spring 27, whose opposite end is secured in the present instance to a screw 28, which is fitted into a collar 29 on the rod 3, as best seen in Fig. 1.

5 Referring now to Figs. 4 and 8, it will be noted that the plate 7 has fulcrumed therein, as at 30 and 31, the levers 32 and 33, respectively, and, furthermore, that there is a lever 34, which has secured thereto one end of a spring 35,
10 whose opposite end is secured to a rod similar to the rod 21, but not illustrated, as hereinbefore stated. The inner ends 36 and 37 of the levers 25 and 34, respectively, are adapted to engage with the recessed portion 38 of the
15 bolt 39, which is guided in the casing 40 and is retained in its normal position by a spring 41, it being noted that the forward end of said bolt 39 is adapted to engage the shoulder 42 in the rod 5, as best seen in Fig. 9 and for
20 a purpose hereinafter described. The bolt 39 is provided with shoulders 43 and 44, against which abut the inner ends of the levers 32 and 33, respectively.

The outer end of the lever 32 is provided
25 with a wall 45, against which abuts the member 46, which projects from the journal 47 of the finger 48, it being noted that said journal 47 is fitted in a box 49, so as to turn therein, and, furthermore, that said finger 48 is pro-
30 vided with the members 50, as best seen in Fig. 8, said members 50 occupying the spaces between the members 51, which project from the stem 52, which is rigidly secured in the arm 9, and the object of all of which is here-
35 inafter described.

The outer end of the lever 33 is provided with a wall 53, against which abuts the mem-
40 bers 54 of the finger 55, which is journaled in the box 56, as seen in Fig. 4, it being understood that the finger 55 is provided with mem-
45 bers 50 and operate in conjunction with members similar to the members 57 and which project from the stem 58, which is rigidly secured to the arm 10, and the object of which is hereinafter described.

Pivoted at 59 (see lower portion of Figs. 1 and 3) in an ear 60 is a trigger 61, whose ex-
50 tremity 62 engages a recess 63 in one end of the lever 64, which is fulcrumed at 65 in an ear 66 and which has pivoted thereto a box 67, through which is passed the stem 68 of the link 69, which latter is pivoted, as at 70, to the lever 71, which is fulcrumed, as at 72, (see Fig. 13,) to the frame 1 and is provided with an in-
55 clined face 73, which is adapted to be brought in contact with the upper extremity of the rod 74, which is loosely fitted in the frame 1, so as to move up and down therein for a purpose hereinafter described. The trigger 61 is pro-
60 vided with a spring 75 for a purpose hereinafter described. The lever 64 is provided with a spring 76, the object of which is hereinafter described.

It will be noted on referring to Figs. 12 and
65 13 that the rod 74 rests upon a lever 77, which

is fulcrumed at 78 in the frame 1, and that in the present instance said lever 77 has an up-
wardly-projecting member 79, which is adapted to enter the recessed portion 80 of the rod 81, which is suitably guided in the frame 1, so
70 as to slide therein, and has connected therewith the shipping-lever 82, so that the movements of said rod 81 are transmitted to said lever 82, and consequently to the driving-belt 83, so as to shift the latter from the fixed pul-
75 ley 84 to the loose pulley 85, and vice versa. Bearing on the under side of the lever 77 is a spring 86, which retains said lever 77 normally in the position seen in Figs. 11 and 14. The
80 spring 86 is retained in position by placing the same in a pocket 87, which may be either secured to or formed with the frame 1. The rod 81 is provided with a spring 88 for a purpose hereinafter described.

Journalled in the frame 1 is the driving-shaft
85 89, which imparts motion in any well-known manner to the cam-cylinder 90, which operates the needles 91 in the needle-cylinder 92, which is provided with one or more yarn-guides 93. (See Figs. 1, 11, and 14.)
90

The operation is as follows: The yarn 16
from the bobbin 17 is passed through the open-
ing 94 in the arm 9 and from the latter be-
tween the members 50 and 51 of the fingers
48 and 52, respectively, (see Figs. 1 and 8,) it
95 being noted that the finger 48 is retained in its elevated position by that portion of the yarn 16 against which the members 50 abut and that said yarn 16 is brought from the
members 50 and 51 to and through the slot 15
100 in the guide 14, (see also Fig. 2,) and from said slot 15 to the guide 22 on the rod 21, and from said guide 22 to the yarn-guide 93 on the cam-cylinder 92, and from said guide 93 to the
needles 91 in the usual manner. Assuming
105 the several parts of the device to be in the positions seen in Figs. 1, 4, 8, 9, 11, 13, and 14, it is apparent that the driving-belt 83 im-
parts motion to the fixed pulley 84, which in its turn transmits motion to the shaft 89, which
110 latter operates, by any well-known mechanism, the cam-cylinder 90, which actuates the needles 91, so as to produce a tubular knitted fabric. When the yarn 16 remains unbroken and is
free from knots or other objectionable de-
115 fects, the machine remains in operation as long as motion is imparted thereto. If, however, the yarn 16 should break, it is apparent that the members 50 of the finger 48 are no
longer supported by the yarn 16, and as said
120 finger is normally out of plumb, as seen in Fig. 1, it is evident that said finger will turn on its journal 47, (see Fig. 8,) whereupon it will move in the direction indicated by the ar-
row *a* and drop into the position seen in dot-
125 ted lines in said Fig. 8, it being noted that the member 46 follows the movement of the finger 48 and moves from its normal or up-
right position, as seen in Figs. 1, 4, and 8, and is brought into a horizontal position, as
130

seen in Fig. 5, whereupon the lever 32 is caused to turn upon its fulcrum 30 and in the direction indicated by the arrows *b* and *c* in Fig. 4, and thus bring said lever 32 into the positions seen in Figs. 5 and 6, whereupon the bolt 39 is moved in the direction indicated by the arrow *d* in Fig. 4, thereby causing the bolt 39 to move into the position seen in Figs. 6 and 7, it being noted that the forward extremity of said bolt is withdrawn from the shoulder 42, whereupon the rod 5 drops upon the outer end of the trigger 61 and moves the same from the position seen in Fig. 1 to that seen in Fig. 3, it being noted that the extremity 62 of said trigger 61 is removed from the recess 63 in the lever 64, whereupon the spring 76 contracts and turns said lever 64 on its fulcrum 65, causing said lever 64 to move in the direction indicated by the arrows *e* in Figs. 1 and 3, it being apparent that this movement of the lever 64 exerts a pull upon the rod 69 and causes the latter to move in the direction indicated by the arrows *f* in Figs. 1 and 13, and thus cause the lever 71 to turn on its fulcrum 72 and in the direction indicated by the arrows *g* in Figs. 11 and 13, thereby causing said lever 71 to ride over the rod 74 and lower the latter and bring it into the position seen in Fig. 12, whereupon the lever 77 is turned upon its fulcrum 78 and against the resistance of the spring 86 and is brought from the position seen in Fig. 11 to that seen in Fig. 12, it being noted that the member 79 is now withdrawn from the recess 80, (see also Figs. 14 and 15,) whereupon the spring 88 expands and causes the rod 81, and with it the shipping-lever 82, to move in the direction indicated by the arrow *h* in Fig. 15, thereby shifting the driving-belt 83 from the fixed pulley 84 to the loose pulley 85, and thus stop the machine. After the break in the yarn 16 is repaired the parts are returned to the position seen in Fig. 1, after which the belt 83 is shifted from the loose pulley 85 to the fixed pulley 84, and the machine is thus again put in operation. When knots or other defects exist in the yarn 16—for instance, as indicated at 95 in Fig. 2—said knots or other defects are stopped in their movements in the direction indicated by the arrow *i* in Fig. 1 by reason of the slot 15, thus bringing that portion of the yarn 16 between the bobbin 17 and guide 13 to a standstill, whereupon that portion of the yarn 16 which is between the guide 13 and the guide 93 becomes shortened as the knitting progresses and gradually assumes the position indicated by the line consisting of dots and dashes in Fig. 1, whereupon the rod 21 is caused to turn on its pivot 19 and move in the direction indicated by the arrow *j* in Fig. 1, thereby bringing said rod 21 into the position seen in dotted lines in said Fig. 1, thus exerting a pull upon the lever 25 by reason of the spring 24, whereupon said lever 25 is turned on its fulcrum 96 and moved in

the direction indicated by the arrows *k* in Figs. 1 and 9, and thereby brings said lever 25 into the position seen in Fig. 10, whereupon the bolt 39 is moved in the direction indicated by the arrow *m* in Fig. 9, thus causing the inner extremity of said bolt 39 to be withdrawn from the shoulder 42, as seen in Fig. 10, whereupon the rod 5 drops upon the trigger 61 and moves the latter from the position seen in Fig. 1 to that seen in Fig. 3, whereupon the belt 83 is shifted from the fixed pulley 84 to the loose pulley 85, as hereinbefore described, and the machine is brought to a stop.

It is apparent that in the event of a bobbin being wound too tightly to permit the yarn 16 to be withdrawn therefrom during the process of knitting the yarn is not necessarily broken, and the machine is automatically stopped by the shortening of the yarn between the bobbin 17 and the guide 93 in substantially the same manner as that described in connection with a knot or other defect in the yarn 16.

If desired, the rod 21 may be provided with a weight 97, adapted to slide on said rod, so as to compensate for the increase in the tension of the spring 24 when the rod 21 is moving from the position seen in full lines to that seen in dotted lines in Fig. 1, it being noted that when the rod 21 is in the position seen in full lines the weight 97 is close to the pivot 19 and produces practically no change in the normal tension of the spring 24. When, however, the rod 21 is in the position seen in dotted lines in Fig. 1, it is apparent that the tension of the spring 24 is increased, and this increase is in proportion to the degree of depression of the guide 22, and in order to overcome this difference in the tension of said spring the weight 97 is employed, it being apparent that when the rod 21 is in the position seen in dotted lines the weight 97 slides down said rod 21 and toward the guide 22, so as to provide a force acting in a direction to compensate for the additional tension of the spring 24, and thus secure an approximately uniform tension of said spring 24 during the entire movement of the rod 21.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, a rod adapted to actuate the mechanism for stopping the machine, means for holding said rod in elevated position, a lever supported adjacent said means, one end of which is adapted to contact with said means, a spring secured to said lever and adapted to hold the same normally out of contact with said means, a rod pivotally supported and adapted to support the thread and a spring connected with said pivoted rod and with said lever.

2. In a device of the character described, a rod adapted to actuate the mechanism for stopping the machine, means for holding said rod in elevated position, a lever supported adjacent

cent said means, one end of which is adapted to contact with said means, a spring secured to said lever and adapted to hold the same normally out of contact with said means, a
 5 rod pivotally supported and adapted to support the thread, a spring connected with said pivoted rod and with said lever, and means for adjusting the tension of said springs.

3. In a device of the character described, a
 10 rod adapted to actuate the mechanism for stopping the machine, means for holding said rod in elevated position, a lever supported adjacent said means, one end of which is adapted to contact with said means, a spring secured
 15 to said lever and adapted to hold the same normally out of contact with said means, a rod pivotally supported and adapted to support the yarn and a spring connected with said pivoted rod and with said lever, in combination with a finger separately supported
 20 adjacent said means and adapted to be supported in upright position by the yarn, said finger being adapted to operate said means to release said rod when not supported by said
 25 yarn.

4. In a device of the character described, a rod adapted to actuate the mechanism for stopping the machine, means for holding said rod in elevated position, a lever supported adjacent
 30 cent said means, one end of which is adapted to contact with said means, a spring secured to said lever and adapted to hold the same normally out of contact with said means, a rod pivotally supported and adapted to support
 35 the yarn and a spring connected with said pivoted rod and with said lever, in combination with a finger movably supported adjacent said means and adapted to be supported in upright position, by the yarn, a
 40 lever situated between said finger and said supporting means and adapted to be actuated by said finger in order to actuate said means to release said rod.

5. In a stop-motion, a stopping device, a
 45 drop-rod adapted to trip said device, a detent adapted to normally maintain said rod in elevated position, a lever adapted to operate said

detent, a yarn-supporting rod, a spring operatively connecting said rod and said lever, and a second spring connected with said lever
 50 and opposing said first-named spring.

6. In a stop-motion, a stopping device, a drop-rod adapted to trip said device, a detent adapted to normally maintain said rod in elevated position, a lever adapted to operate said
 55 detent, a yarn-supporting rod, a spring operatively connecting said rod and said lever, a second spring connected with said lever and opposing said first-named spring, and means for adjusting the tension of one of said springs. 60

7. In a stop-motion, a stopping device, a drop-rod adapted to trip said device, a detent adapted to normally maintain said rod in elevated position, a lever adapted to operate said
 65 detent, a yarn-supporting rod, a spring operatively connecting said rod and said lever, a second spring connected with said lever and opposing said first-named spring, and means for adjusting the tension of said opposing
 70 spring.

8. In a stop-motion, a stopping device, a drop-rod adapted to trip said device, a detent normally engaging with said rod to maintain it in its elevated position, a lever adapted to
 75 operate said detent, a yarn-supporting rod, a spring operatively connecting said rod to said lever and means on said rod for equalizing the tension of said spring.

9. In a stop-motion, a stopping device, a drop-rod adapted to trip said device, a detent
 80 normally engaging with said rod to maintain it in its elevated position, a lever adapted to operate said detent, a yarn-supporting rod, a spring operatively connecting said rod to said lever, and a weight movable on said rod and
 85 operative to adjustably resist the pull of said spring.

GEORGE W. RUTH.

Witnesses:

WM. CANER WIEDERSEIM,
 C. D. McVAY.