

(Model.)

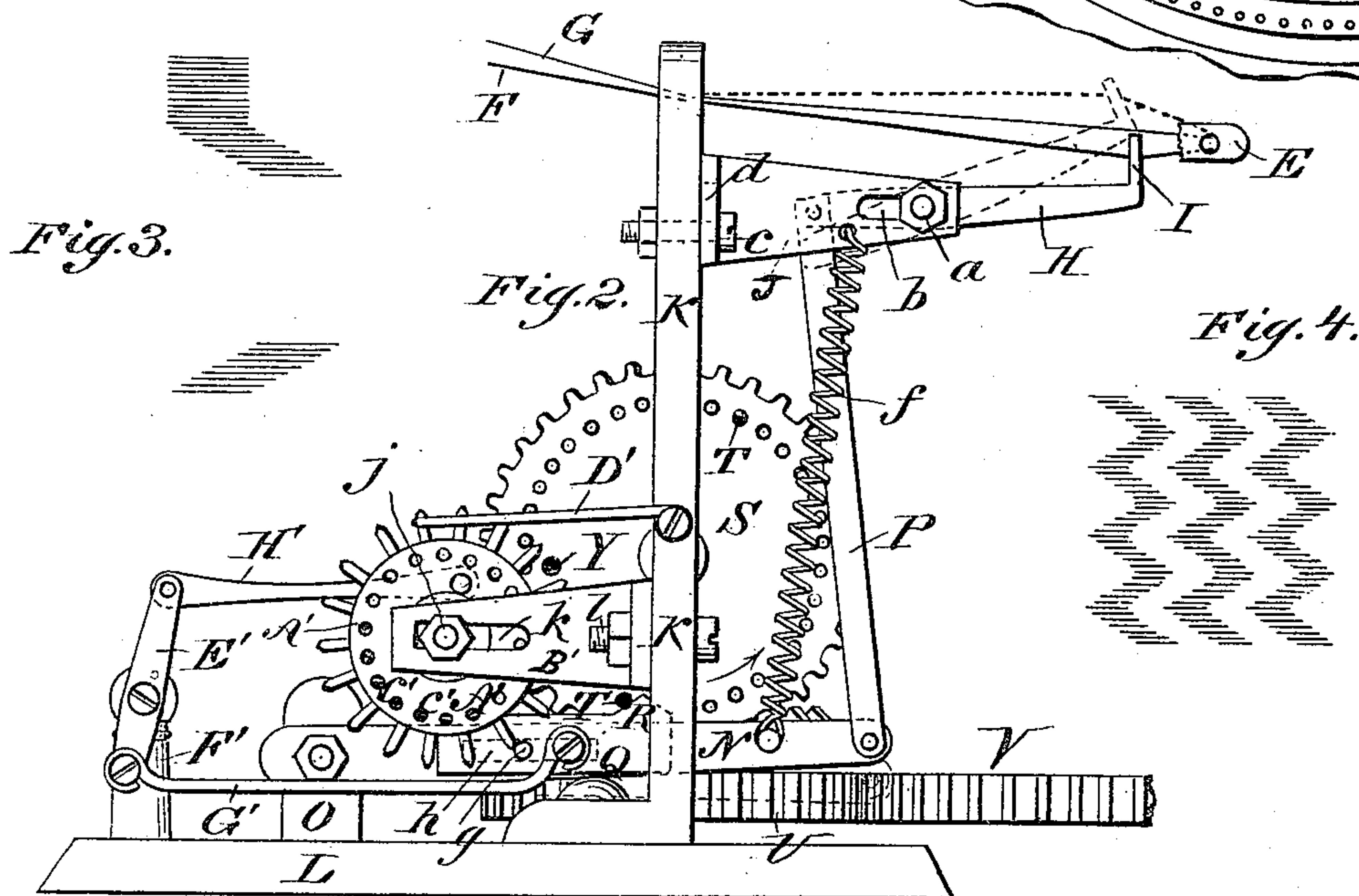
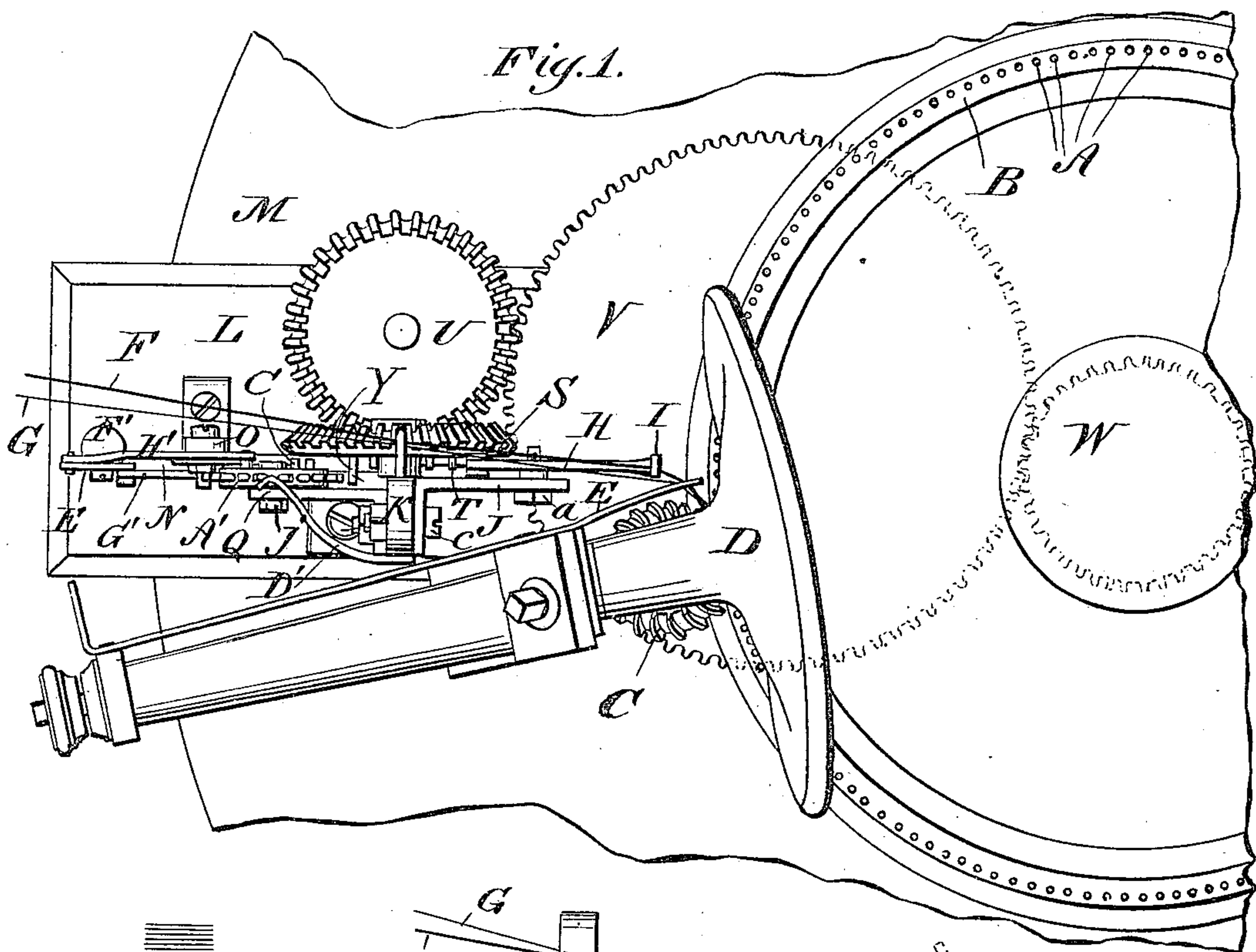
2 Sheets—Sheet 1.

J. DENTON.

ATTACHMENT FOR KNITTING MACHINES.

No. 248,719.

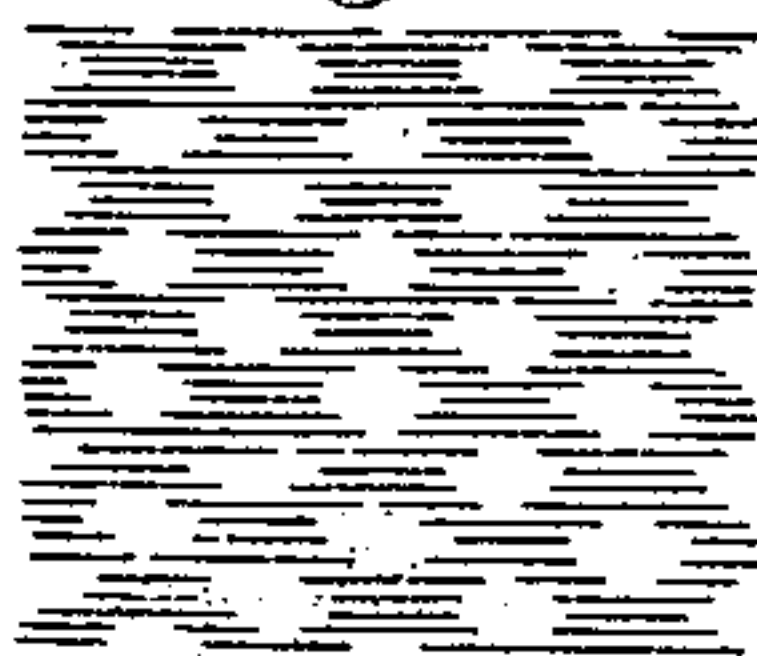
Patented Oct. 25, 1881.



WITNESSES:

*Donn P. Twitchell.*  
*C. Sedgwick*

*Fig. 6.*



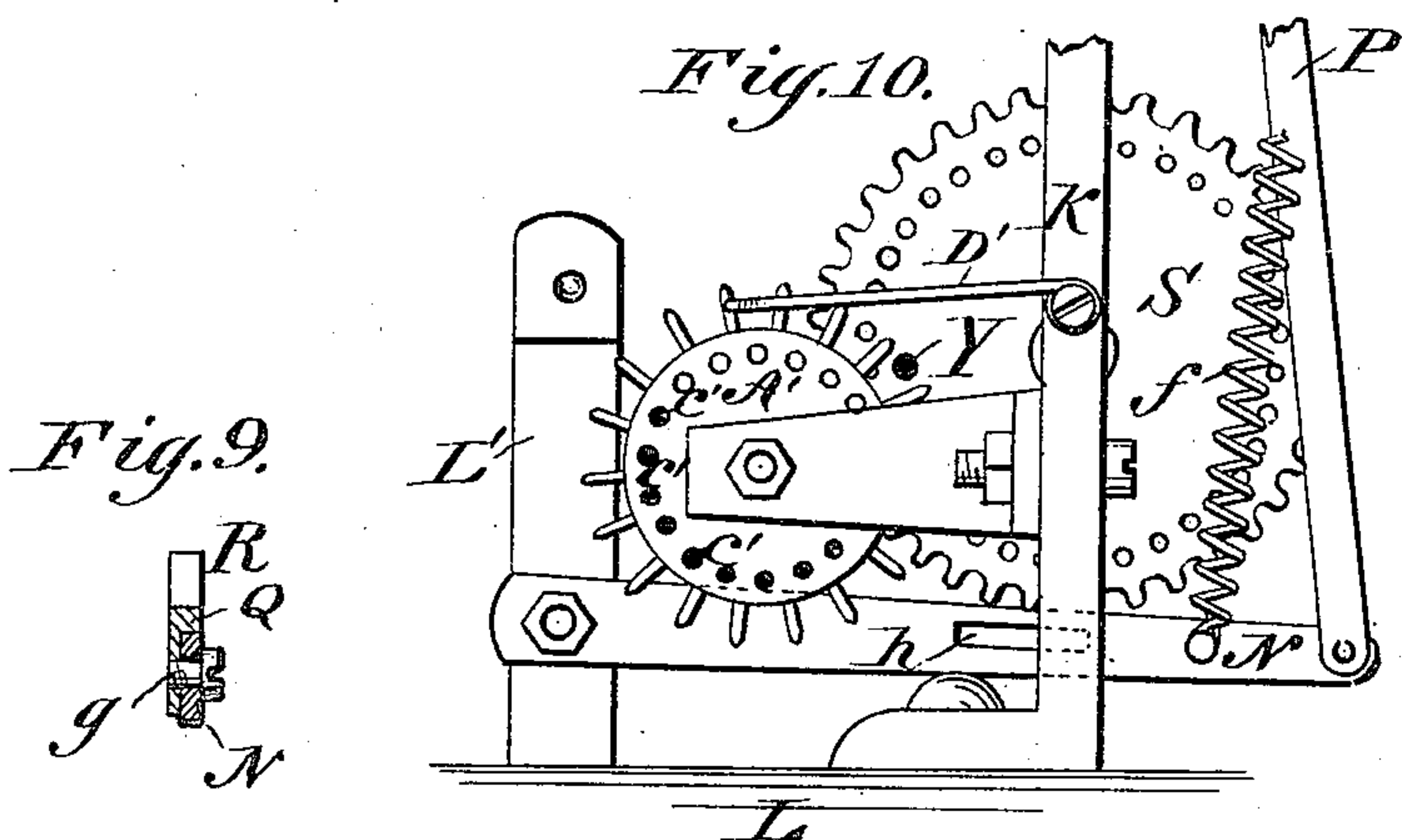
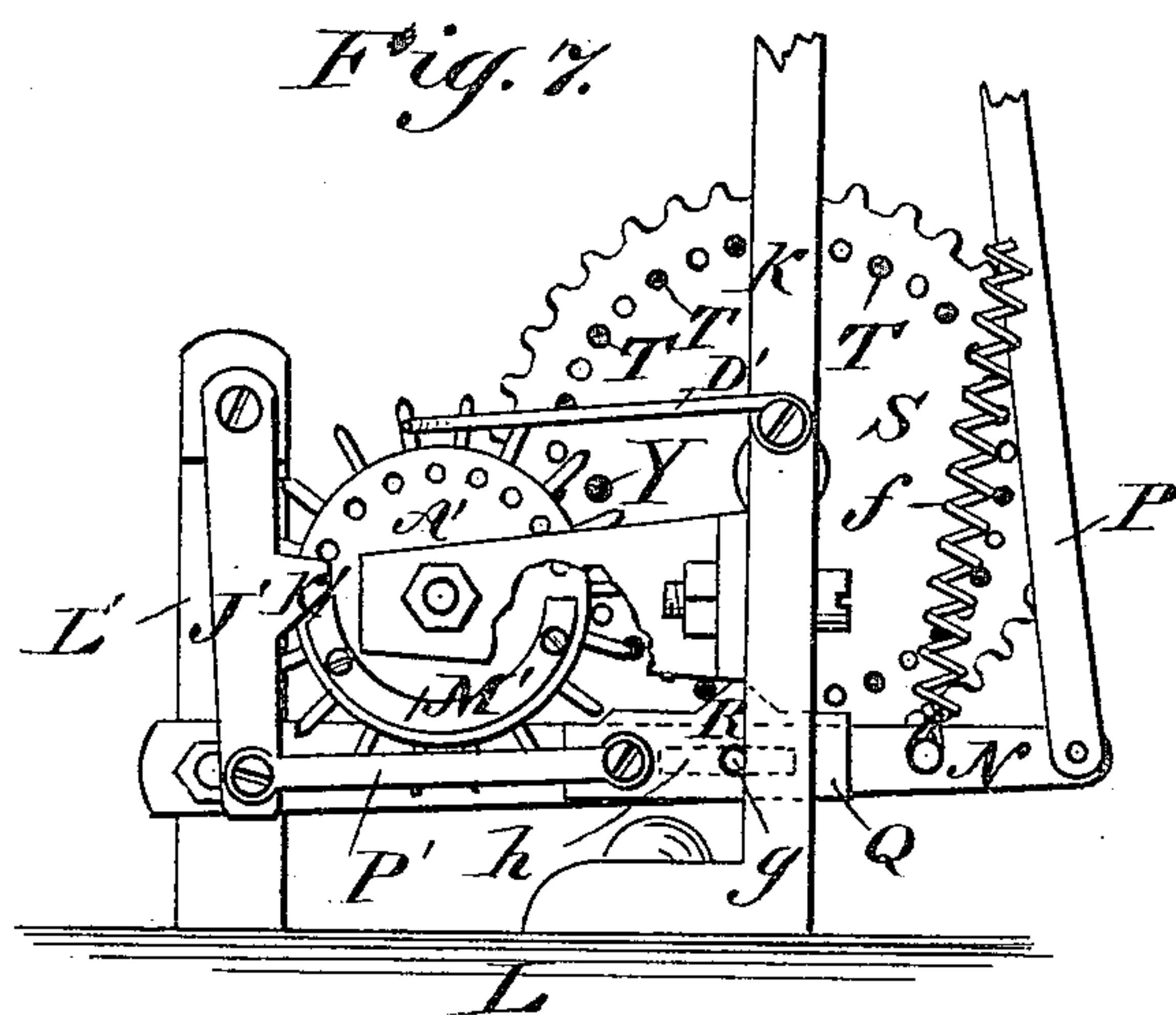
INVENTOR:

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ATTORNEYS.

(Model.)

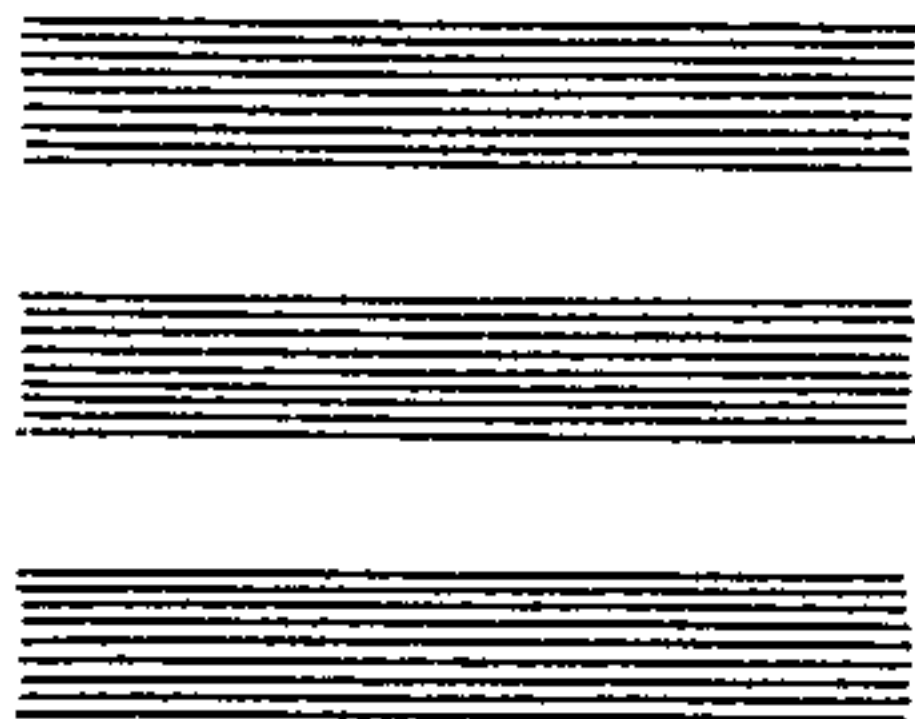
2 Sheets—Sheet 2.

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*Fig. 11.*

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*Donn P. Twitchell.*  
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INVENTOR:  
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# UNITED STATES PATENT OFFICE.

JAMES DENTON, OF AMSTERDAM, NEW YORK, ASSIGNOR TO HIMSELF AND  
HENRY E. GREENE, OF SAME PLACE.

## ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 248,719, dated October 25, 1881.

Application filed March 5, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, JAMES DENTON, of Amsterdam, in the county of Montgomery and State of New York, have invented a new and  
5 useful Improvement in Attachments for Knitting-Machines, of which the following is a specification.

The object of my invention is to provide certain new and useful improvements in knitting-  
10 machines for making knit fabrics with horizontal, vertical, or diagonal stripes or other patterns of one or more colors, without breaking the thread whenever the color is to be changed.

15 In the accompanying drawings, Figure 1 is a plan view of my striping attachment for knitting-machines and of a part of the machine to which it is attached. Fig. 2 is a side elevation of my improved striping attachment for knitting-  
20 machines, showing it arranged for making vertical stripes. Fig. 3 is a representation of the vertical and inclined stripes made with my improved striping attachment. Fig. 4 represents the zigzag stripes; Fig. 5, the diagonal stripes inclined in opposite directions. Fig. 6  
25 is a diamond pattern, all of which are made with my improved striping attachment for knitting-machines. Fig. 7 is a side elevation of my improved striping attachment for knitting-  
30 machines, showing it arranged for making a checker-pattern, shown in Fig. 8. Fig. 9 is a cross-sectional elevation of the cam upon which the pins act. Fig. 10 is a side elevation of my improved attachment for knitting-machines,  
35 showing it arranged for making horizontal stripes, shown in Fig. 11.

Similar letters of reference indicate corresponding parts.

40 The barbed knitting-needles A A are fastened in the upper edge of a rotating cylinder, B, and a sinker-wheel, C, and a presser-wheel, D, operate in combination with needles as in an ordinary knitting-machine. A thread-guide, E, through which two threads, F and G, pass,  
45 is attached to the bearing of the presser-wheel D. A vibrating lever, H, with an eye or loop, I, at the forward end, is adjustably pivoted by a pin, a, and longitudinal slot b to an arm, J,

which is vertically adjustably fastened by a screw, c, and a slot, d, to an upright, K, which  
50 is rigidly fastened to a bed-plate, L, which in turn rests and is secured upon the plate M, supporting the bearings for the several wheels, guides, &c.

A lever, N, is pivoted to a small upright or  
55 post, O, behind the upright K on the plate L, and the front end of this lever N is connected with the inner end of the lever H by a connecting-rod, P. The front end of the lever N is pressed or drawn upward by some suitable  
60 spring, which may be of any desired construction, a spiral spring, f, attached to the lever N and the arm J, being shown in this case. A slide, Q, with a beveled cam, R, projecting  
65 above the upper edge of the lever N, is fastened to this lever by a screw, g, passing through a longitudinal slot, h, in the lever and taking in the slide Q.

A beveled-cog wheel, S, provided with detachable laterally-projecting studs or pins T,  
70 arranged along the side thereof, is mounted on a pintle projecting from the side of the upright K in such a manner that the pins or studs T will strike the cam R when the wheel S revolves, and will thus depress the lever N,  
75 and consequently raise the outer end of the vibrating lever H every time a pin or stud, T, strikes this cam R. A bevel-gear wheel, U, of the same diameter as the wheel S, engages with the same, and this wheel is rotated by an  
80 intermediate cog-wheel, V, which, in turn, is rotated by a wheel, W, of exactly the same diameter as the wheels U and S and mounted on the shaft of the cylinder B, so that the wheel S will revolve once for every revolution of the  
85 cylinder B. The bevel-gear wheels may be replaced by known equivalents, but the wheel S must not revolve any more rapidly than the cylinder B. A longer stud, Y, projects from the side of the wheel S and passes into the  
90 radial teeth of a similar wheel, A', and thus rotates it, which wheel is adjustably pivoted by a screw, j, and a longitudinal slot, k, to an arm, B', which is fastened to the upright K by a screw, l, on the side opposite the one to which  
95 the arm J is fastened. This wheel A' is also



provided with detachable laterally-projecting pins or studs C', which also are adapted to depress the lever N by coming in contact with its upper surface when the slide Q is removed, but  
 5 are only used in place of pins T when horizontal stripes are to be made. A spring-pawl, D', presses against the teeth of the wheel A' and prevents it from rotating freely.

A lever, E', is pivoted to a small post, F',  
 10 behind the post O, and the lower end of this lever is connected with the slide Q by a connecting-rod, G', whereas the upper end is connected with the wheel A' by a connecting-rod, H', thus causing the slide Q and cam R to  
 15 move to and fro when the wheel A' rotates. The inner end of the connecting-rod may be acted upon by an eccentric on the shaft of the wheel A' or by some other suitable device that will rock the lever E' when the wheel A' rotates;  
 20 or the rod p' may connect the slide Q with a lever, J', pivoted to a post, L', and provided with a cam, K', that is acted upon by a semicircular projection, M', of the wheel A', this device being used to make checker patterns.  
 25

The operation is as follows: As has been stated, the wheel S rotates as rapidly as the cylinder. If a single vertical stripe is to be made in the knit fabric, all the pins or studs T  
 30 but one of the wheel S are removed, and consequently this remaining pin will strike the cam R, and thus depress the lever N and raise the loop end of the vibrating lever H once for every revolution of the cylinder. If a colored thread, F, passes through the loop I of the vibrating lever H and a plain thread, G, passes through the thread-guide E with the thread F,  
 35 the plain thread G will be raised, as shown in Fig. 2, and the color of this thread will show on the outside of the knit fabric; but as soon as the lever H is raised by the action of the remaining stud T of the wheel S, the colored thread F will be raised and will show on the outside in place of the plain thread which has  
 40 been raised during the other part of the revolution of the cylinder B. As this colored thread is raised regularly once for every revolution of the cylinder a vertical colored stripe will be formed. If the next stud or pin T is  
 45 placed into the wheel S, a second colored vertical stripe will be formed a short distance from the first, and all the rest of the goods will be plain. If two vertical stripes directly opposite those above named—that is, stripes  
 50 that will be formed on the opposite side of the cylinder—are desired, two pins T T must be placed into the wheel S directly opposite the two pins T T that have formed the first vertical stripes, for the stripes on the fabrics or  
 55 goods have the same relative position as the pins T on the wheel S. If all the pins T are in the wheel S, there will be just as many colored vertical stripes in the knit fabric as these pins T in the wheel S, and just as many plain  
 60 stripes as there are spaces between the pins—that is, an equal number of both. The least slid-

ing motion of the cam R either backward or forward will cause the stripes to deviate from the vertical line, for if the cam is moved toward the rear of lever N one thirty-second of an inch the  
 70 pins T of the wheel S will strike it sooner, the loop end of the lever H will accordingly be raised sooner, and the result is the colored thread will be raised a moment before the needle which formed the colored loops at the other  
 75 revolutions arrives, and the stripe which is formed will be inclined, as is shown in Fig. 3. It is evident that if the cam is moved in the opposite direction the stripe also will be inclined in the opposite direction, as is also indicated in Fig. 3. As has been stated, the pin  
 80 Y of the wheel S passes into the teeth of the wheel A', which is thus rotated slowly, and this rotation causes the cam R to move forward and backward very slowly as the slide Q  
 85 is acted upon by the wheel A' by means of the lever E' and the connecting-rods G' and H'. By this reciprocating movement of the cam R the stripes will be inclined first in one direction and then in the opposite direction, or, in  
 90 other words, zigzag stripes, as shown in Fig. 4, are made. The width of these stripes is regulated by means of the pins T T in the wheel S in the manner described hereinbefore.

If the connecting-rod H' is acted upon by a  
 95 suitable cam attached to the small wheel A', (not shown,) a great variety of patterns can be produced, according to the eccentricity of the cam or the formations of the edge of the same, which may be waved regularly and irregularly, &c. If two or more of my attachments are combined with one machine, the variety in design can also be increased.  
 100

To make a diamond pattern I use two of my attachments, placed opposite to each other on  
 105 the knitting-machine. The cam on the wheel A' or crank-connection, which is shown in the drawings, is to be so adjusted that the cam R will be moved very slowly, and the colored thread will be raised one needle ahead of time  
 110 at each revolution, whereby a continuous diagonal stripe is formed. The attachment on the other side of the knitting-machine is so adjusted that the colored thread will be raised one needle behind time, whereby a diagonal  
 115 stripe inclined in the opposite direction of the one above will be made, as shown in Fig. 5, and if these two diagonal stripes cross each other a diamond pattern, Fig. 6, will be formed, if all the pins T are on the wheel S. To make  
 120 horizontal stripes the slide Q, with the cam R, is removed from the lever N, the pins T T are taken from the wheel S, and the lever N is allowed to be acted upon by the pins C' of the wheel A', which then come in contact with the  
 125 upper surface of the said lever.

To facilitate the explanation we will assume that there are eighteen pins, C', on the wheel A', which has eighteen teeth. If one colored horizontal stripe is to be made in the knit  
 130 fabric for every eighteen revolutions of the cylinder B, all the pins C' but one are removed.



If two stripes are desired adjoining each other, all the pins but two are removed, &c. Each pin C' in the wheel A' makes a stripe. The stripe is made by the action of the pins C' on the lever N in the manner that has fully been set forth above. As the wheel A' has eighteen teeth, and as the wheel S rotates with the speed of the cylinder B, one rotation of the wheel A' will correspond to eighteen rotations of the cylinder, and thus the number of stripes made in one rotation of the wheel A will correspond to the number made in eighteen rotations of the cylinder B.

To make a checker pattern the slide Q is pivoted to the rod P', which is pivoted to the lower end of a lever, J', provided with a cam, K'. The pins T in the wheel S are adjusted to make a vertical stripe of the same width as the fields of the checker pattern. The semicircular projection M' on the wheel A' presses on the cam K', thereby drawing the cam R toward the rear of the lever N, and causing the loop end of the lever H to be raised sooner. The assumption being that there are eighteen teeth on the wheel A', the cam R will remain in this position for nine revolutions of the cylinder B, as the projection M' is only semicircular, but then the cam R is moved forward by the teeth T, and the lever H will be raised as ordinarily. After nine revolutions of the cylinder B the cam R is drawn back again, and after nine revolutions is moved forward, and in this manner is moved to and fro and produces the checker pattern shown in Fig. 8.

I have described the colored thread F as passing through the loop I of the lever H, but just as well the plain thread G may have been passed through this loop.

One or more attachments may be used at the same time with one knitting-machine.

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

1. An attachment for knitting-machines made substantially as herein shown and described, and consisting of a vibrating lever for

guiding one of the threads, a frame for supporting said lever, a supplemental lever and means for connecting it to the thread-guiding lever, and a reciprocating adjustable cam which is removably secured to the supplemental lever, in combination with a pair of wheels which are provided with means for giving a reciprocating movement to the cam and vibratory movements to the levers, and devices connecting said wheels, for the purpose of making stripes and other patterns, as set forth.

2. In an attachment for knitting-machines, the combination, with the levers N and H, cam R, connecting-rod P, spring f, upright K, and arm J, of the wheel S, having pins T and Y, and the wheel A', having peripheral pins in engagement with pins Y, and laterally-projecting pins C', the pins T and C' being removable and adjustable, substantially as shown and described, and for the purpose set forth.

3. In an attachment for knitting-machines, the combination, with a wheel provided with laterally-projecting pins, of a vibrating lever and a sliding cam on this lever, substantially as herein shown and described, and for the purpose set forth, suitable mechanism being provided for operating the lever and cam, as set forth.

4. In an attachment for knitting-machines, the combination, with the levers N and H, of the wheel S, having pins T and Y, the sliding cam R, connecting-rods G' and H', the lever E', and the wheel A', having pins C', substantially as herein shown and described, and for the purpose set forth.

5. In an attachment for knitting-machines, the combination of the wheel S, provided with laterally-projecting pins T, the lever N, sliding cam R, and means for operating the same, the connecting-rod P, the thread-guiding lever H, the upright K, arm J, and spring f, substantially as shown and described.

JAMES DENTON.

Witnesses:

MARTIN L. STOVER,  
SAMUEL MOAK.