

(No Model.)

2 Sheets—Sheet 1.

L. N. D. WILLIAMS.

DIAL CAM OPERATING DEVICE FOR KNITTING MACHINES.

No. 491,911.

Patented Feb. 14, 1893.

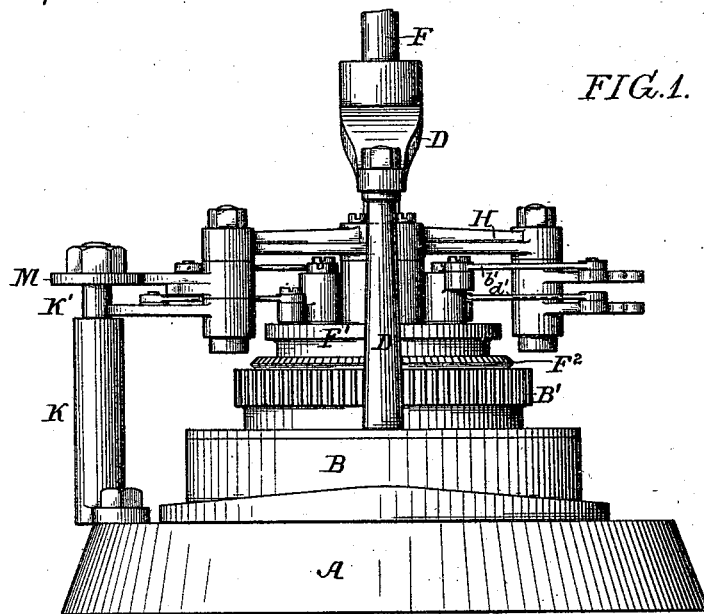


FIG. 1.

FIG. 4.

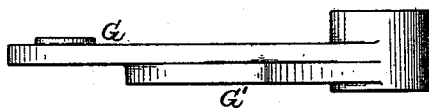


FIG. 5.

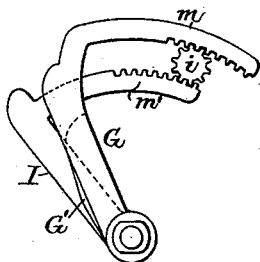
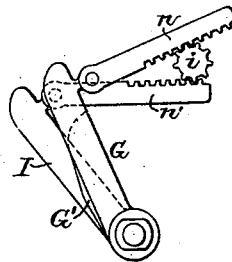


FIG. 6.



Witnesses:

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Inventor:

Louis N. D. Williams  
by his Attorneys

Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

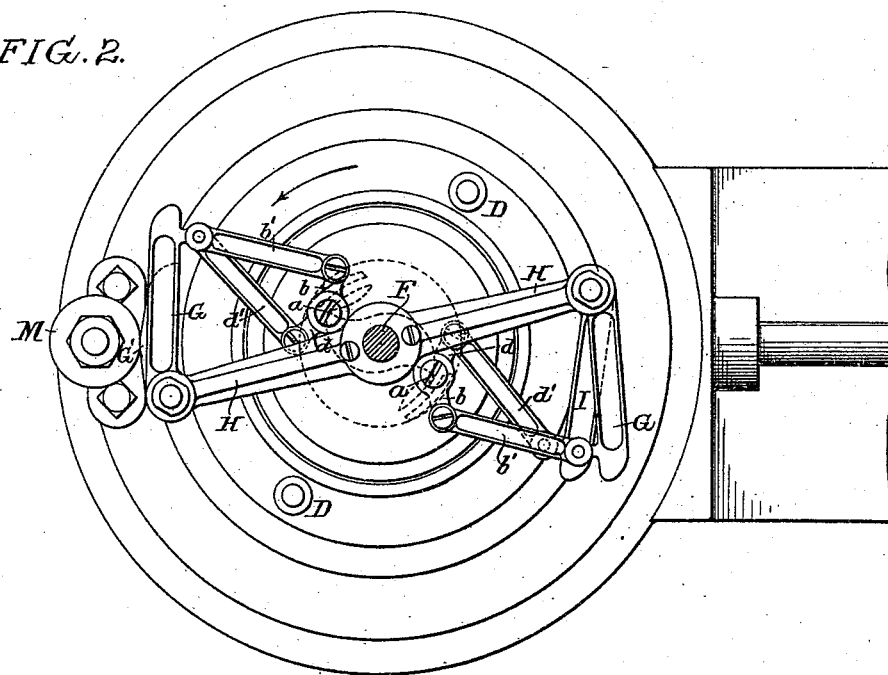
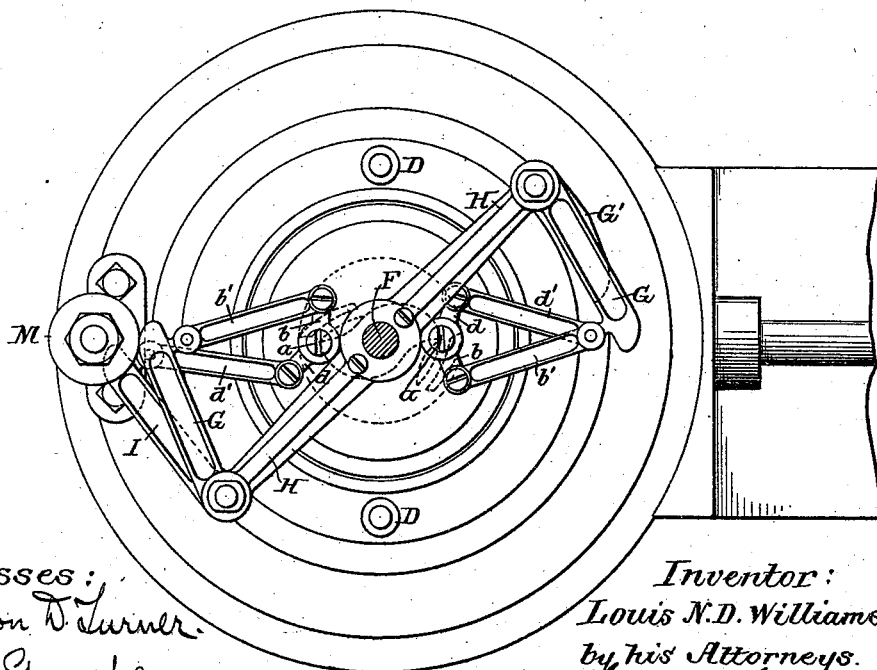


FIG. 3.



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# UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF  
ONE-HALF TO ROBERT W. SCOTT, OF SAME PLACE.

## DIAL-CAM-OPERATING DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 491,911, dated February 14, 1893.

Application filed November 2, 1892. Serial No. 450,771. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Dial-Cam-Operating Devices for Knitting-Machines, of which the following is a specification.

My invention relates to mechanism for operating the dial cam or cams of a rib knitting machine, the mechanism being adapted to change the position of one or more of said dial cams so as to effect different operations of the needles in successive rotations of the dial, for instance, it may be intended for moving the dial needles from the tuck point either inward to the welt point or outward to the clearing point, or permitting said needles to remain at the tuck point.

My present invention comprises simple mechanism for effecting the required movements of the dial cam or cams, such mechanism being so constructed and so mounted that the required movements can be effected without risk of breakage of any of the parts even when the machine is being run at very high speed.

In the accompanying drawings I have illustrated my invention as employed in connection with a swinging dial cam such as is shown in Robert W. Scott's patent No. 368,429, dated August 16, 1887, but it should be understood that the mechanism can be employed for operating sliding cams, as well as swinging cams, the machine shown in the drawings being simply selected for convenience.

In the drawings:—Figure 1, is a side view of sufficient of the machine to illustrate my invention; Figs. 2 and 3, are plan views of the same illustrating two dial cams and operating mechanism therefor, the mechanism in Fig. 3 being in a different position from that shown in Fig. 2; Fig. 4, is a side view of one of the cam operating arms or levers of the machine; and Figs. 5 and 6, are diagrams illustrating modifications of the invention.

A represents part of the fixed frame or bed of the machine and B the usual rotating cam box co-operating with the needle cylinder B' of the machine, this cam box having the usual posts D and connecting cross bar or arch D' carrying the central spindle F upon which is

mounted the dial cam box or disk F' which co-operates with the needles of the dial F<sup>2</sup> in the usual manner. This dial cam box is provided in the present instance with two needle operating cams of the character shown in the patent of Robert W. Scott before referred to, the fixed portions of the dial cams being constructed to move the needles to the tuck point and the movable portions of said cams being slotted and having their pivots at or adjacent to the outer terminations of the fixed portions of the cams so as to direct the bits of the needles from these latter points either outward to the clearing point or inward to the welt point, or to permit them to remain at the tuck point.

Although I have shown my invention as in duplex form, that is to say, as applied to a dial cam plate having two cams, it should be understood that the cam operating mechanism can be used in connection with a cam plate having more than two cams, or in connection with a single cam only, hence I will describe the operating mechanism for but one cam, that for the other cam being the same with the slight exception hereinafter noted.

The cam has a central pivot pin or stud *a* to which is secured a lever having two arms *b* and *d*, the arm *b* being connected by a link *b'* to the outer end of an arm *G* hung to a suitable pin or stud at the outer end of an arm *H*, the latter being secured to the hub of the dial cam plate F' or to the spindle F or other rotating part of the machine. The arm *d* is connected by a link *d'* to the outer portion of an arm *I* which is likewise hung to the depending stud or pin on the arm *H*. The arms *b* and *d* of the lever project in opposite directions from the pivot pin or stud of the dial cam, hence inward movement of either arm will cause outward movement of the other arm, and vice versa.

The arm *G* comprises two portions, the lower portion *G'* being somewhat shorter than the upper portion *G*, and also projecting slightly beyond the face of said upper portion as shown in Figs. 2, 3 and 4.

In a suitable bearing *K* at one side of the frame *A* is guided a pin *K'* which carries, near the upper end, a disk *M*, this pin being intended to be controlled by suitable pattern

mechanism similar, for instance, to that shown in the Scott patent before referred to, so that the position of said disk M can be shifted vertically so as to bring the disk into line  
5 either with the upper portion of the arm G, with the lower portion G' of the same, or with the lower arm I.

When the machine is running normally, that is to say, with the dial cam at the outermost or clearing point, as shown at the right hand side of Fig. 2 the disk M occupies its lower position, that is to say, the position in line with the lower arm I which just clears the disk as the head is rotated, the upper arms  
15 G G' projecting outward over the disk M.

When it is desired to move the cam to the intermediate or tuck point the disk M is raised to the second or intermediate position so as to be in line with the lower portion G' of the upper projecting arm. As the head is rotated said portion G' of the upper arm comes in contact with the disk M and is thereby moved inward to the extent shown at the left hand side of Fig. 2 in order to adjust the cam to the intermediate or tuck position as shown by dotted lines, any further movement of the cam being prevented owing to the short length of the arm G' which permits it to clear the disk M after this partial inward movement has been imparted to it.

When it becomes necessary to move the cam inward to the welt point, the disk M is raised to its highest position, as shown in Fig. 1, so as to strike the upper portion G of the upper arm, as shown in Fig. 3, further inward movement being thereby imparted to said upper arm so as to swing the dial cam farther inward as shown by dotted lines at the left hand side of said Fig. 3.

In order to restore the dial cam to the outward or clearing position the disk M is dropped to its lowermost position so as to strike the lower arm I and move the same inward to the position shown at the right hand side of Fig. 2.

By means of the devices described I am enabled to effect the desired operation of the dial cam or cams by easy and gradual movements which exert no injurious strain upon any part of the mechanism so that there is  
50 no liability of breakage even when the machine is run at very high speed.

When the mechanism is desired for simply moving the dial cam from the welt position to the clearing position, or vice versa, the peculiar construction of the upper arm G which I have shown and described need not be resorted to, said upper arm in such case being similar to the lower arm I, for instance, one of the sets of operating mechanism shown is  
60 constructed in this manner. It will be evident also that mechanism constituting the mechanical equivalent of the lever with oppositely projecting arms on the pivot pin of the dial cam and the links for connecting said  
65 arms to the operating arms may be employed without departing from the main feature of

my invention, for instance, said lever might be in the form of a pinion *i* secured to the pivot pin of the cam and adapted to be engaged by the internal teeth of a segmental rack *m* formed on the upper arm G, and by the external teeth of a segmental rack *m'* to be formed upon the lower arm I as shown in Fig. 5 or pivoted and guided racks *n, n'* engaged with a like pinion as shown in Fig. 6  
75 might also be employed in place of the connecting links, the latter, however, being preferred as the simpler construction, and the lever may, as before stated, be used to impart movement to a sliding cam or cams instead  
80 of to a swinging cam.

Having thus described my invention I claim and desire to secure by Letters Patent:—

1. The combination in dial cam operating mechanism for rib knitting machines, of the  
85 rotating structure having as one of its elements a dial cam disk, a cam operating lever rotating with the dial cam disk, a pair of arms pivoted to the rotating structure, and means for imparting the movement of one of said  
90 arms to the lever at a point on one side of the axis of the same, and for imparting the movement of the other arm to said lever on the opposite side of its axis, substantially as specified.

2. The combination of the rotating structure having as one of its elements a dial cam disk, the pivoted dial cam, a lever hung to the pivot pin of the same, a pair of arms pivoted to the rotating structure, and means for  
100 imparting the movement of one of said arms to the lever at a point on one side of the axis of the same, and for imparting the movement of the other arm to said lever on the opposite side of its axis, substantially as specified.

3. The combination in dial cam operating mechanism for rib knitting machines, of the rotating structure having as one of its elements a dial cam disk, the cam operating lever rotating with the dial cam disk, a pair of  
110 arms pivoted to the rotating structure and links connecting said arms respectively to the oppositely projecting arms of the lever, substantially as specified.

4. The combination in dial cam operating  
115 mechanism for rib knitting machines, of the rotating structure having as one of its elements a dial cam disk, the cam operating lever rotating with the dial cam disk, upper and lower arms hung to the rotating structure, one of said arms comprising upper and lower portions, one shorter than the other, and means for transmitting the movements of said arms to the cam lever, substantially  
120 as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS N. D. WILLIAMS.

Witnesses:

FRANK BECHTOLD,  
JOSEPH H. KLEIN.