

(No Model.)

2 Sheets—Sheet 1.

A. McMICHAEL.

DIAL CAM OPERATING MECHANISM FOR KNITTING MACHINES.

No. 567,547.

Patented Sept. 8, 1896.

FIG. 1.

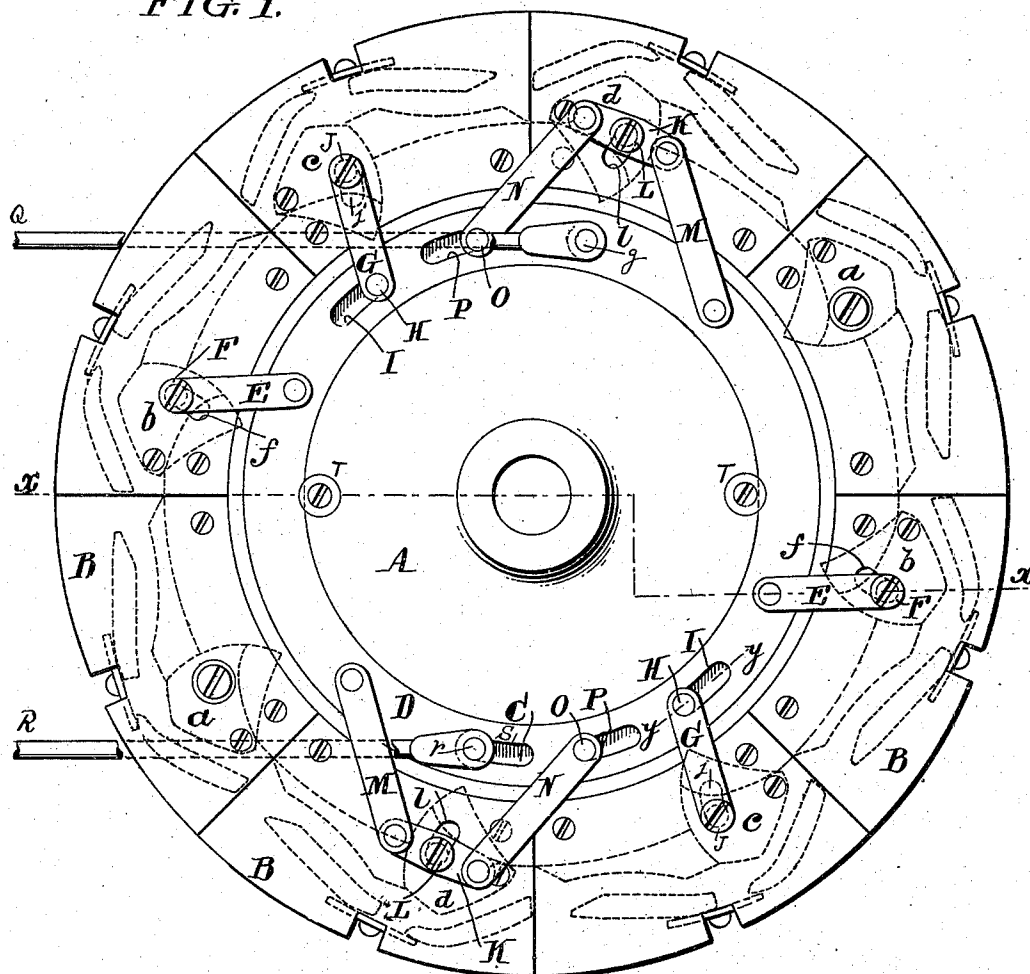
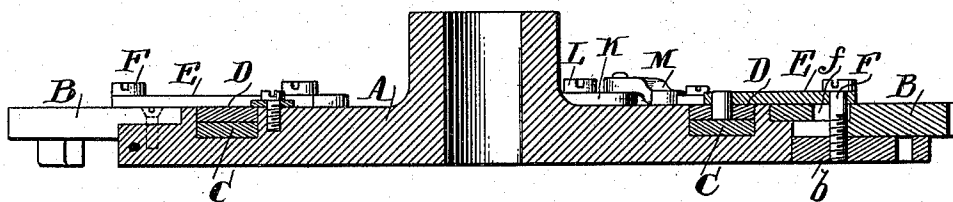
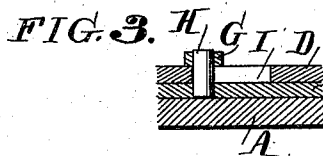


FIG. 2.



Witnesses.

Henry Denny
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Inventor.

Abner McMichael
By [Signature]
Attorney.

(No Model.)

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FIG. 4.

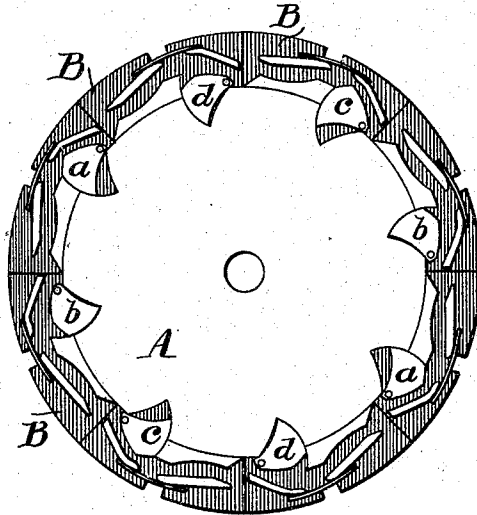
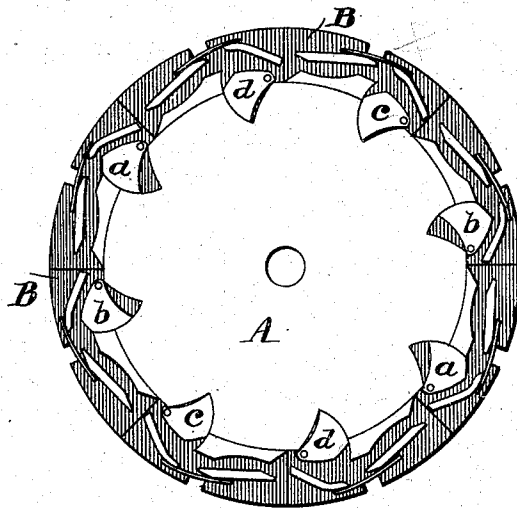


FIG. 5.



Witnesses.

Henry D. King
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UNITED STATES PATENT OFFICE.

ABNER McMICHAEL, OF NORRISTOWN, PENNSYLVANIA.

DIAL-CAM-OPERATING MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 567,547, dated September 8, 1896.

Application filed April 6, 1896. Serial No. 586,355. (No model.)

To all whom it may concern:

Be it known that I, ABNER McMICHAEL, of Norristown, Montgomery county, and State of Pennsylvania, have invented an Improvement in Dial-Cam-Operating Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates to cam-dials for knitting-machines; and it consists of improvements which are hereinafter fully set forth and are shown in the accompanying drawings.

More particularly my invention relates to cam-dials in which movable cams, actuated through the medium of a pattern-chain, are employed, and my improvements are designed for imparting these movements so that the cams may be thrown into certain desired positions relatively to one another.

In carrying out my invention I arrange the cams so that all cams or alternate cams or alternate pairs of cams may be projected for the purpose of projecting the needles to produce plain knitting, tuckwork, or racking. For operating the movable cams I employ two independently-movable plates guided in the main dial-plate, to each of which part of the cams is operatively connected, while a third part is operatively connected with both plates, so as to be actuated by either one. By the operation of these plates I am able to project or retract certain cams which are so disposed with relation to fixed projected cams that the three desired conditions of projecting all cams or alternate cams or alternate pairs of cams may be attained.

It is also an object of my invention to embody my improvements in a simple, compact mechanism easy to operate or to take apart.

In the drawings, Figure 1 is a plan view of the cam-dial of a knitting-machine embodying my invention. Fig. 2 is a transverse vertical sectional view of the same on the line *x x* of Fig. 1. Fig. 3 is a similar view of a portion of the same on the line *y y* of Fig. 1; and Figs. 4 and 5 are inverted plan views of the dial-cap on a reduced scale, showing the cams moved into the different positions for producing "tucking" and "racking," respectively.

A is the main plate of the cam-dial.

a a b b c c d d are the usual cams, which control the outward movements of the needles, and are carried by the cam-dial as by the

detachable sections B thereof. While I have shown eight of these cams, it is to be understood that my invention is not limited to that precise number. The two cams *a a*, which in the arrangement shown are diametrically opposite, are stationary, while the cams *b b*, *c c*, and *d d* are movable.

C is an annular plate or ring supported in an annular guide in plate A and adapted to turn therein on its center.

D is a second annular plate or ring also supported in the plate A, preferably in the annular guide therein and above the ring C. The rings C and D are independent, so that either may move without the movement of the other. The cams *b b*, which are pivoted, are connected with the ring D by links E, which are pivotally connected at one end with the ring D and at the other end with the cams by a pin F, extending through a slot *f* in the dial-plate or section B. The cams *c c*, which are also pivoted, are connected with the ring C by links G, which are pivotally connected at one end with the ring C by pins H, extending through slots J in the ring D, and at the other end with the cams by a pin I, projecting through a slot *j* in the dial-plate or section B. The cams *d d*, which are also pivoted, are connected with both the rings C and D. As shown, this double connection is made in the following manner:

K is a cross-piece connected with the cam *d* by a pin L, extending through a slot *l* in the plate or section B, and having one end connected with the ring D by a link M, and the other end with the ring C by a link N, through a pin O, extending through a slot P in the ring D. It is apparent that, while the cams *a a* remain stationary, the cams *b b* may be swung on their pivots and may be moved in or out by the operation of the ring D, that the cams *c c* may be similarly moved by the operation of the ring C, and that the cams *d d* may be moved by the operation of either of the rings C or D. When the two rings C and D are in their extreme positions, as shown in Fig. 1, *i. e.*, the ring D having been turned to the left and the ring C to the right, the cams *b b*, *c c*, and *d d* will all be thrown out, and all the cams will occupy the outward position shown. When the cams occupy this position, as shown in Fig. 1, they oper-

ate the needles to produce plain knitting. If the ring D be moved back, or to the right in Fig. 1, the cams *b b* and *d d* will be drawn in through the action of the connecting-links E E and M M, and the cams will then assume the position shown in Fig. 4, with the cams alternately projected and retracted. In this position the cams operate the needles to produce tucking. The projected cams throw the needles out to take the thread and form a loop, shedding the previously-formed loop when they are retracted, while the retracted cams project the needles sufficiently to take the thread, but not to get the previously-formed loop behind the latch or shed the same when the needles move back. If, however, the ring C be moved back, *i. e.*, to the left in Fig. 1, the cams *c c* and *d d* will be drawn in through the action of the connecting-links G G and N N, and the cams will assume the position shown in Fig. 5, with alternate pairs of cams projected and retracted. In this position they operate the needles to produce racking or double tucking. It is apparent that the cams may be changed from any one position to any other by the proper movement of the rings C D.

It is not material to my invention by what means the movements are imparted to the rings C D, but for this purpose I have shown slide-rods or links Q R, the former connected with the upper ring D, as at *g*, and the latter with the lower ring C by a pin *r*, extending through a slot S in the ring D. These slide-rods or links may be reciprocated in any suitable manner from a pattern-chain, *e. g.*, as in Letters Patent No. 508,965, dated November 21, 1893, granted to me jointly with F. B. Wildman.

T are retaining-screws carried by the plate A and projecting over the upper ring D to retain the rings in place while permitting them to be operated.

The details of construction may be varied without departing from the invention.

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

1. In a cam-dial for knitting-machines, the combination with the main dial-plate, of a

pair of independently-movable operating-plates guided in the main dial-plate, a movable cam or cams operatively connected with one of said plates, a movable cam or cams operatively connected with the other of said plates, and a cam or cams operatively connected with both of said plates.

2. In a cam-dial for knitting-machines, the combination with the main dial-plate and a stationary cam or cams carried thereby, of a pair of independently-movable operating-plates guided in the main dial-plate, a movable cam or cams operatively connected with one of said plates, a movable cam or cams operatively connected with the other of said plates, and a cam or cams operatively connected with both of said plates, said cams being so arranged that by the operation of said cam-operating plates, all of said cams or alternate cams or alternate pairs of cams may be projected.

3. In a cam-dial for a knitting-machine, the combination with the main plate, a stationary cam or cams and a series of movable cams carried thereby, of the superimposed independently-movable actuating-plates guided in the main plate, and connections by which part of said movable cams are connected with one plate, part with the other plate and part with both plates.

4. A cam-dial for knitting-machines embracing, in combination with the main dial-plate, two independently-movable superimposed plates C, D, guided in the main dial-plate, a movable cam or cams *b* carried by the dial-plate and operatively connected with the plate D, a movable cam or cams *c* operatively connected with the plate C by link G through a pin-and-slot connection H, I, a movable cam or cams *d* connected with the pivoted cross-piece K, a link M between the cross-piece K and the plate D, and a link N between the cross-piece K and the plate C.

In testimony of which invention I have hereunto set my hand.

ABNER McMICHAEL.

Witnesses:

MAGGIE POTTER,
AVONIA FRICK.