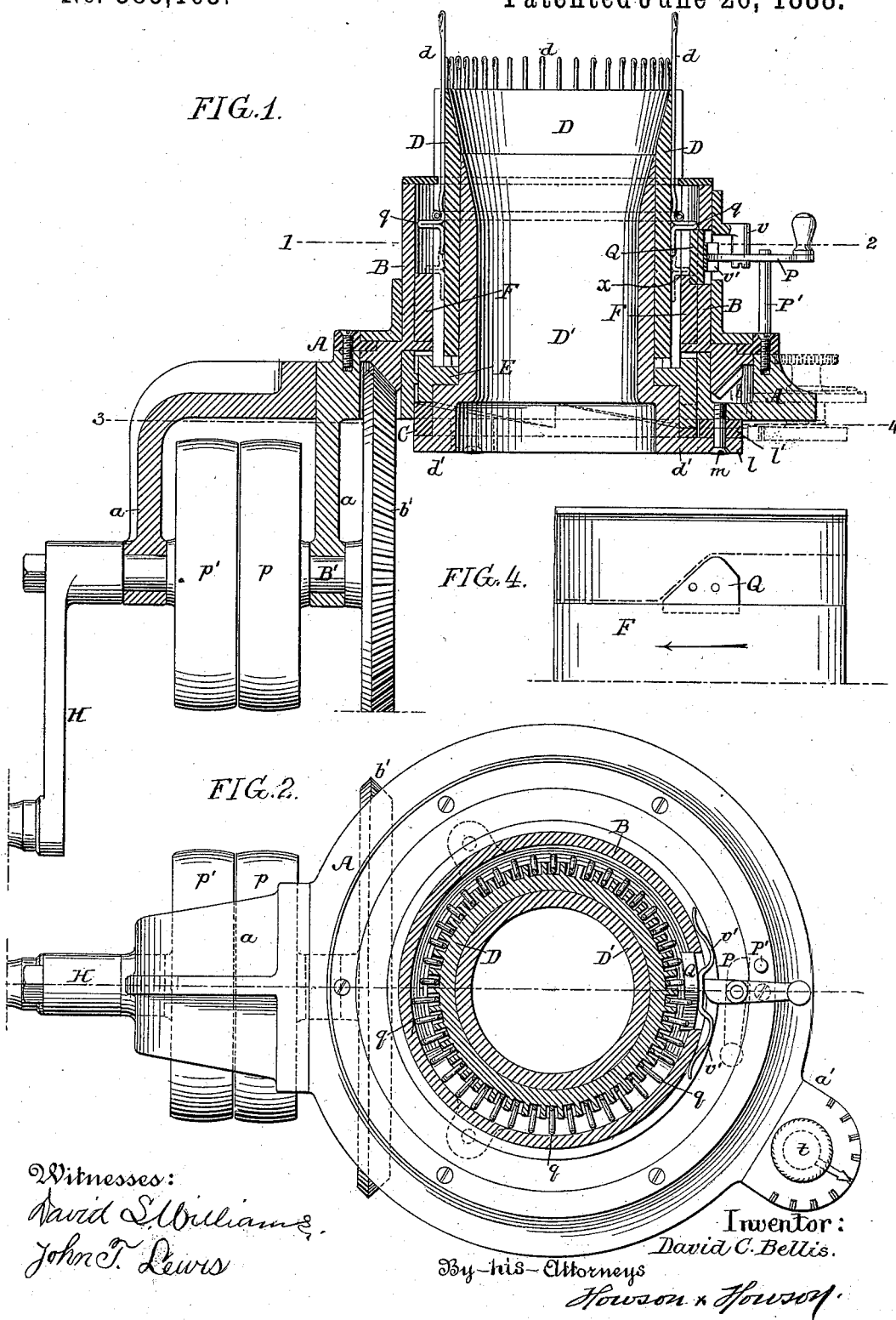


2 Sheets—Sheet 1.

Patented June 26, 1888.

No. 385,163.



D. C. BELLIS.  
KNITTING MACHINE.

No. 385,163.

Patented June 26, 1888.

FIG. 3.

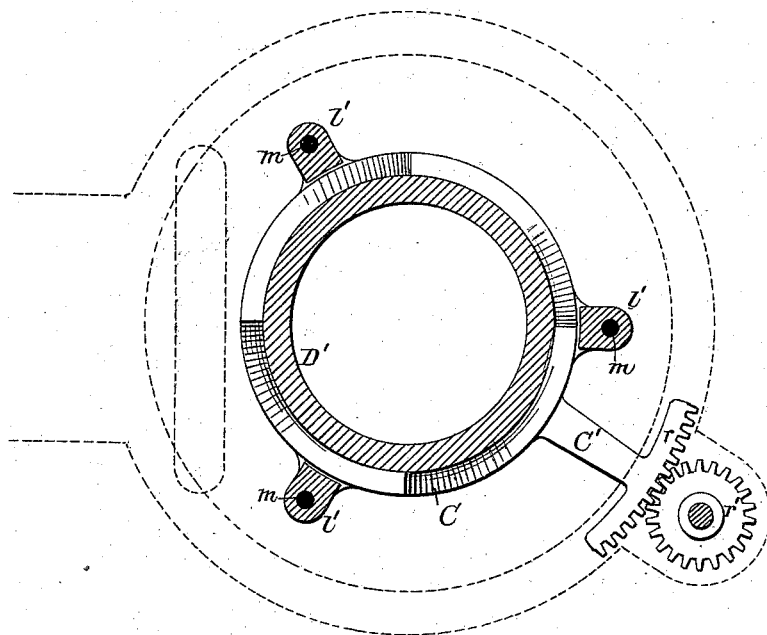


FIG. 5.

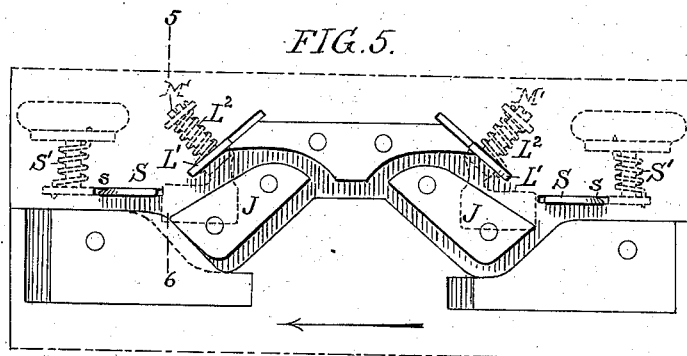
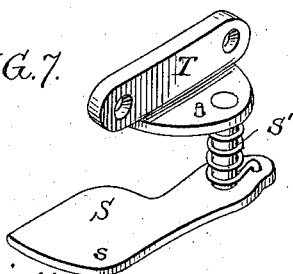
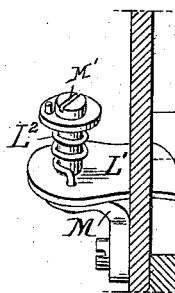


FIG. 7.



Witnesses:  
David S. Williams,  
John T. Lewis.

FIG. 6.



Inventor:  
David C. Bellis.

By his Attorneys *Houson & Houson*

# UNITED STATES PATENT OFFICE.

DAVID C. BELLIS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO SIGMUND H. WEIHENMAYER, OF SAME PLACE.

## KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 385,163, dated June 26, 1888.

Application filed October 26, 1887. Serial No. 253,447. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID C. BELLIS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Knitting-Machines, of which the following is a specification.

My invention consists of certain improvements in knitting-machines, more particularly of the construction illustrated in my Patent No. 372,195, dated October 25, 1887, the main objects of my present invention being to strengthen the construction of the needle-cylinder and its support, to improve the construction of the guard-cams and the lifting-cam in the needle-rest, to simplify the devices for throwing the latter cam into and out of action, and to prevent the jumping of the needles as they rise after the action of the drawing-down cam.

In the accompanying drawings, Figure 1 is a vertical section of a knitting-machine provided with my improvements. Fig. 2 is a sectional plan view on the line 1 2, Fig. 1. Fig. 3 is a sectional plan view on the line 3 4, Fig. 1. Fig. 4 is a view of part of the needle-rest and its lifting-cam. Fig. 5 is a side view of the needle operating cams with the modified form of cam nose or guard and the stops to prevent jumping of the needles. Fig. 6 is a vertical section on the line 5 6 of Fig. 5, showing the cam-nose and its hanger in elevation; and Fig. 7 is a perspective view of the needle stop-plate and its hanger.

A is the bed-plate of the knitting-machine, which can be fixed to a table or other suitable support in any convenient way. On this bed-plate rotates the cam-cylinder B, which is provided on its lower periphery with bevel-gearing *b*, engaging with a bevel-wheel, *b'*, on the driving-shaft B'. The latter is adapted to suitable bearings in brackets *a* on the bed-plate. This driving-shaft may be provided with fast and loose pulleys *p* and *p'*, and also with a crank-handle, H, as usual.

D is the needle-cylinder, with the usual exterior grooves for the reception and guidance of the latch-needles *d*. This needle-cylinder is supported on an inner central supporting-cylinder, D', which is flanged at its lower end, *d'*. This flange *d'* is provided with lugs

*l*, three in the present instance, Figs. 2 and 3, through which pass screws, bolts, or pins *m* to secure this supporting-cylinder to the under side of the bed-plate A. A space, however, is left between the upper side of this flange *d'* and the under side of the bed-plate by means of distance-pieces *l'*, and on the flange rests a cam-ring, C, provided with an arm, C', and segmental rack *r*, into which gears an operating-pinion, *r'*. (See Fig. 3.) This pinion is carried by a thumb-nut, *t*, adapted to bearings in a bracket, *a'*, on the bed-plate, so that by turning this thumb-nut the cam-ring C may be partially rotated to raise or lower the needle-cylinder. The corresponding cams on the latter, instead of being formed directly on the cylinder itself, may be formed on a flanged ring, E, which, however, is secured or connected to the needle-cylinder in any suitable way. By securing the supporting-cylinder D' to the bed-plate and employing the bottom flange of this cylinder to support the cam-ring C, I obtain a firm, steady, and secure construction of these parts.

In my former machine the movable cam Q in the needle-rest F, to operate in conjunction with the needles having long bits *g*, was arranged to be thrown into and out of action by raising and lowering it, but its retention in the raised position was not always certain. In my present invention this cam Q is adapted to a horizontal slot in the wall of the cylinder, and is thrown into and out of action by a horizontal inward and outward movement. The cam is acted on by a cam-lever, P, pivoted to a bracket, *v*, on the outside of the cylinder. By turning this lever to the position shown in Figs. 1 and 2 the cam is pressed inward, so as to project within the cylinder sufficiently to be within the path of the long bits of the needles, but not within the path of the short bits, the cam-lever P being such as to fail to project the cam Q inward beyond the proper point, and the needle-rest F having a shoulder, *x*, as shown in Fig. 1, to prevent accidental inward movement of the cam beyond the prescribed line. On releasing the cam from the action of this lever P, by turning the latter to the position shown by dotted lines in Fig. 2, springs *v'* on the cam Q, by pressing on the outer wall of

the cylinder, draw the said cam outward until its inner face is flush with the inner wall of the cylinder above the needle-rest.

The automatic operation of the lever P is effected in the present instance by a pin, P', on the bed-plate, the lever coming into contact with this pin as the cylinder is rotated, and thus effecting the movement of the lever from the position shown by full lines to that shown by dotted lines in Fig. 2.

In place of the sliding cam noses or guards L, (shown in my application above alluded to,) I use in the present machine cams L', which overlie the ends of the fixed cams, as in the former machine, and are pivoted to suitable pins, M', projecting at an angle to the vertical from brackets M on the outside of the cam-ring, the said pivoted cams being acted upon by springs L<sup>2</sup>, which tend to press them forward and downward, but permit them to yield backward and upward in the same manner as the cams L of the former machine, the present construction being preferable to the former on account of its greater certainty of action, and because the cams occupy less space on the inside of the cam-ring. As the bits of the needles rise in the camway after the action of the drawing-down cam J, they have a tendency to jump above the needle-rest, and this displacement of the needles is objectionable, because the bits have a tendency to come in contact with the ends of the next acting cam and cause breakages, slipping or dropping of stitches being also caused by this undue movement of the needles. In order to overcome these objections, therefore, I place above the rising camway, at the end of the drawing-down cam J, a retainer-plate, S, which by contact with the bits of the rising needles prevents the jumping of the same and keeps the bits down upon the needle-support in their proper position.

The plate S is beveled at its inner corner, s, and is pivoted to a bracket, T, on the outside of the machine, and is acted upon by a spring, S', so that should the inclined end of the plate be struck by a needle-bit on the backward

movement of the cam-ring in reciprocating said plate will yield without risk of breaking the bit.

I claim as my invention—

1. The combination of the bed-plate of a knitting-machine, the cam-cylinder, and a needle-cylinder, with a supporting-cylinder for the latter, flanged at its lower end and secured to the bed-plate, and a cam-ring on the flange of the supporting-cylinder to raise and lower the needle-cylinder, all substantially as specified.

2. The combination of the needle-cylinder of a knitting-machine, having needles, some with long projecting bits and others with short projecting bits, with a cam-cylinder having a needle-rest, a cam adapted to slide laterally into and from said needle-rest, devices for pushing the said cam inward and drawing it outward, and means for restricting the inward movement before the cam reaches a position to act upon the short bits of the needles, all substantially as specified.

3. The combination of the needles and needle-cylinder of a knitting-machine, with a cam-cylinder having a needle-rest, a cam adapted to slide laterally in said cylinder, a cam-lever to push the said cam inward and springs to draw it outward, and a tripping-pin acting on said cam-lever as the latter rotates with the cam-cylinder, all substantially as specified.

4. The combination of the cam-cylinder of the machine and its fixed cam with the cam-nose, a spring acting thereupon to hold it in operative position, and a pivot-pin for said cam-nose, inclined in respect to the vertical, whereby said cam-nose has an upward and backward yielding movement, all substantially as specified.

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

DAVID C. BELLIS.

Witnesses:

WILLIAM D. CONNER,  
HARRY SMITH.