

(No Model.)

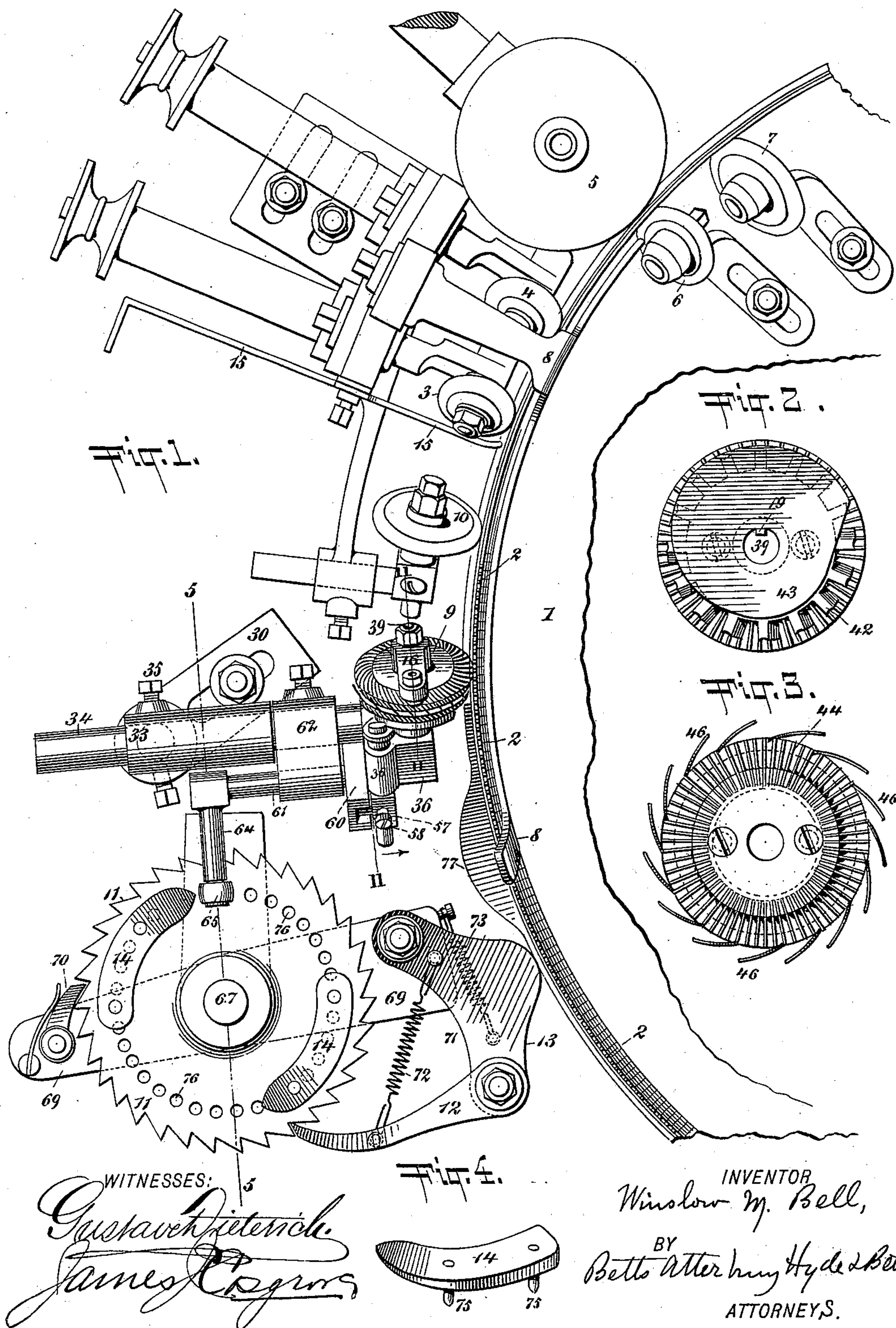
3 Sheets—Sheet 1.

W. M. BELL.

PLUSH BUR FOR CIRCULAR KNITTING MACHINES.

No. 564,360.

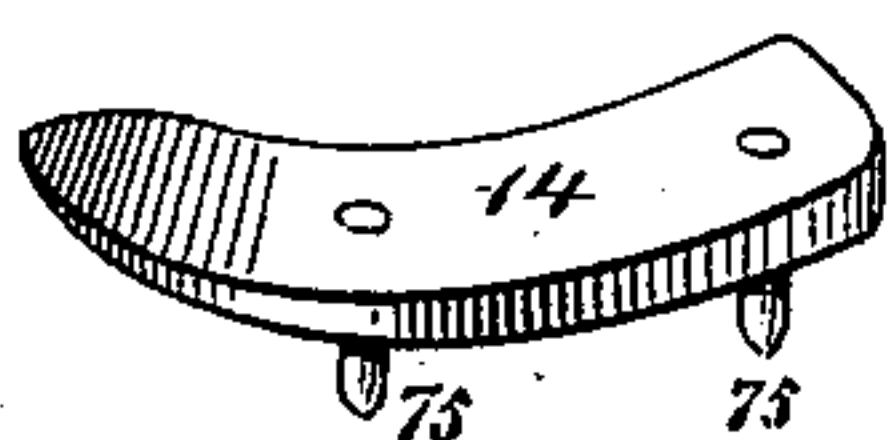
Patented July 21, 1896.



WITNESSES:

Gustav Dietrich
James C. Rogers

Fig. 4.



INVENTOR

Winslow M. Bell,

BY

Beth Atterbury Hyde & Bell,
ATTORNEYS.

(No Model.)

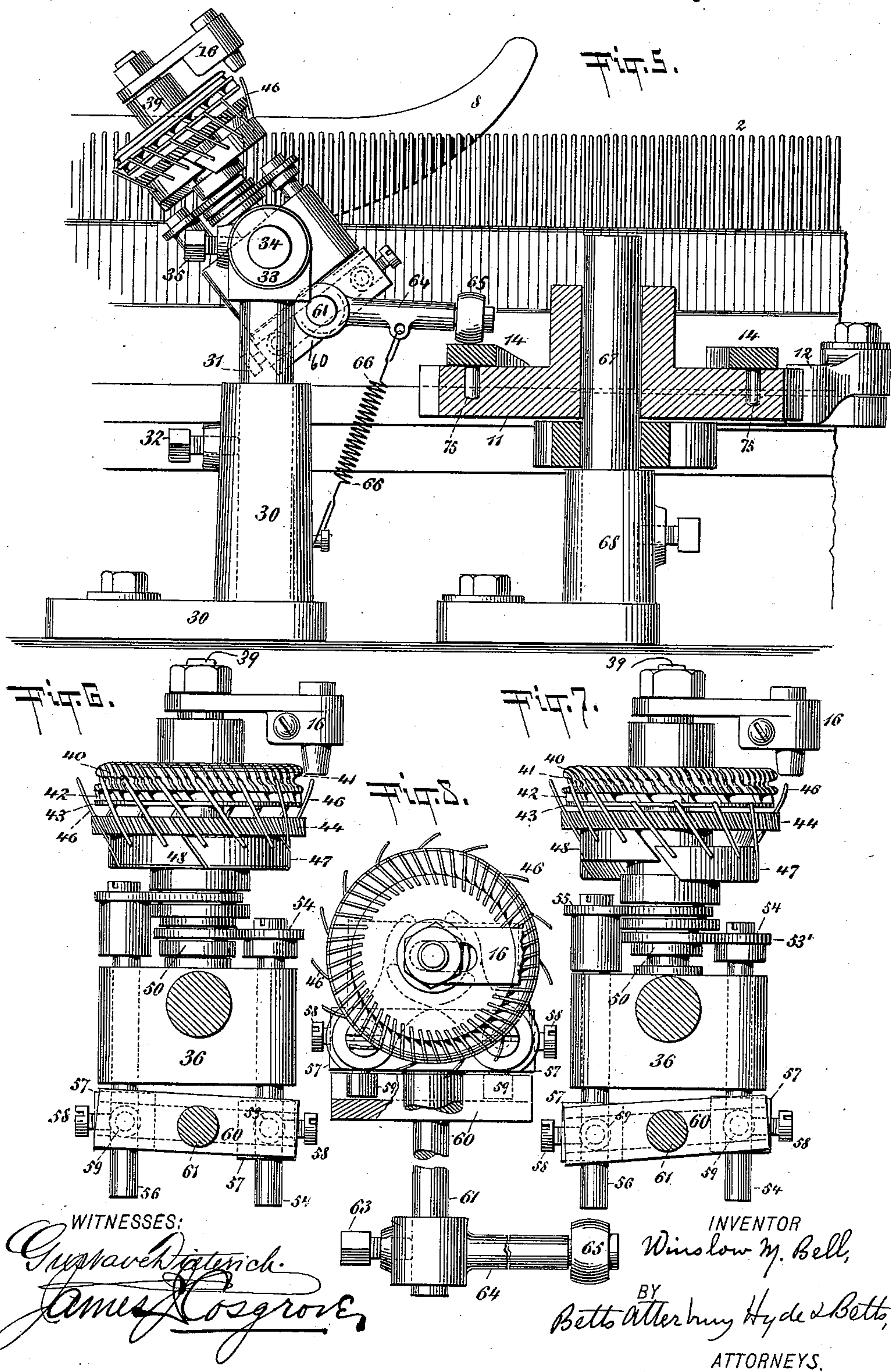
3 Sheets—Sheet 2.

W. M. BELL.

PLUSH BUR FOR CIRCULAR KNITTING MACHINES.

No. 564,360.

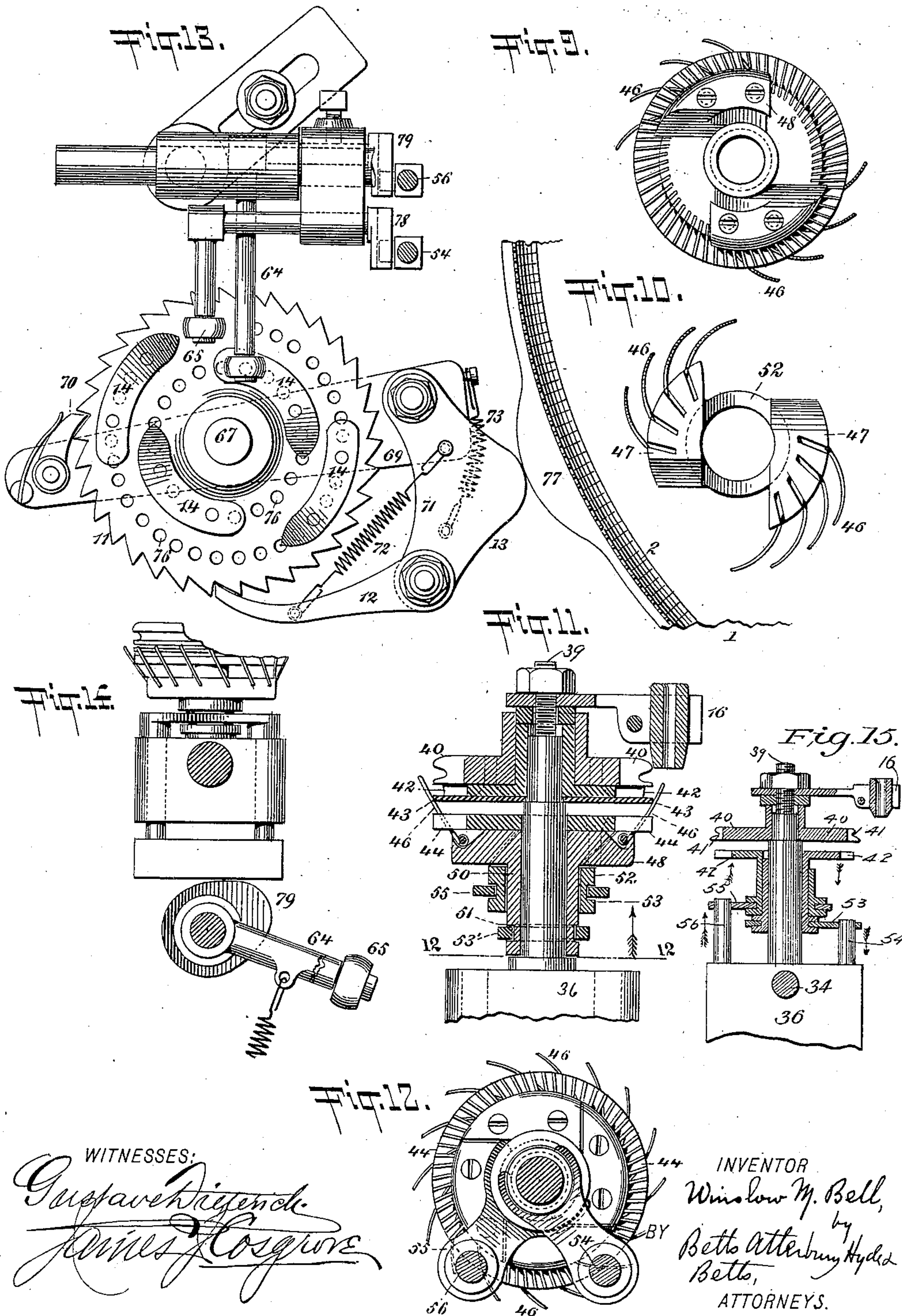
Patented July 21, 1896.



3 Sheets—Sheet 3.

PLUSH BUR FOR CIRCULAR KNITTING MACHINES.

Patented July 21, 1896.



UNITED STATES PATENT OFFICE.

WINSLOW M. BELL, OF MILTON, NEW YORK, ASSIGNOR TO THE HENRY H. BELL'S SONS' COMPANY, OF SAME PLACE.

PLUSH-BUR FOR CIRCULAR-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 564,360, dated July 21, 1896.

Application filed July 21, 1893. Serial No. 481,147. (No model.)

To all whom it may concern:

Be it known that I, WINSLOW M. BELL, a citizen of the United States, residing at Milton, county of Ulster, in the State of New York, have invented a new and useful Improvement in Plush-Burs for Circular-Knitting Machines, of which the following is a specification.

My invention relates to plush burs or wheels for circular-knitting machines, and the object of my invention is to enable the operator to knit the plush-thread into the fabric in a larger variety of patterns than has been heretofore possible with any of the plush-burs known to me.

Heretofore in making knitted-plush fabric it has only been possible to knit the plush-thread into the fabric in alternate loops of a predetermined uniform length, depending upon the number and arrangement of the teeth, blades, or sinkers of the plush-wheel, but with my improved plush-wheel I can make a great variety of patterns, such as different forms of squares or vertical and diagonal stripes, disposed at will over the fabric, and presenting contrasts of different colors.

In the accompanying drawings, in which similar numerals represent similar parts throughout the several views, I have shown three different methods of operating my improved plush-wheel, but the invention itself is based upon one underlying principle. This broad idea consists in so constructing the plush-wheel as to cause it to introduce the plush-thread into the fabric in short and long or floating loops, automatically, at such intervals, respectively, as desired. This produces contrasts in the arrangement of loops.

Again, having one plush-wheel introducing a thread of one color in the manner above, the following plush-wheel may be caused to introduce a second plush-thread of another color at such different intervals that the long loops of each color will overlie the short loops of the other color, and thus give the contrasts in color. The place where any particular color appears upon the finished fabric of two or more colors therefore will depend upon the time at which the plush-thread of

each color is introduced in long or floating loops.

My invention is applicable to different forms of plush-wheels, and I therefore do not limit myself to its use with any one particular form, but in the drawings I have shown it as applied to a form of plush-wheel combining a modified form of the sinker-plate described in the United States patent to George W. Cummings, dated December 3, 1889, No. 416,256, and such a plush-wheel as is described in the United States patent to John Bradley, dated March 22, 1892, No. 471,415.

Figure 1 of the drawings is a plan view of a section of the cylinder of a circular-knitting machine and its wheels with my improved plush-wheel in position. Fig. 2 is an inverted detail plan view of the upper part of the plush-wheel. Fig. 3 is a detail plan view of the lower part of the plush-wheel. Fig. 4 is a perspective view of one of the movable cams of the pattern-wheel. Fig. 5 is a sectional view on the plane of the line 5 5 of Fig. 1. Fig. 6 is a detail view of the plush-wheel and its mechanism, showing one of the sections of the sinker-plate in position to make long loops and another of the sections in position to make short loops. Fig. 7 resembles Fig. 6, but shows the position of the sections of the sinker-plate reversed. Fig. 8 is a detail plan view of the plush-wheel and part of its operating mechanism. Fig. 9 is a detail inverted plan view of part of the lower portion of the plush-wheel, showing two segments. Fig. 10 is a detail plan view of part of the lower portion of the plush-wheel, showing two other segments. Fig. 11 is a central vertical section of the plush-wheel and part of its operating mechanism on the plane of the line 11 11, Fig. 1. Fig. 12 is a horizontal sectional inverted plan view of the plush-wheel, taken on the line 12 12, Fig. 11, looking in the direction in which the arrow points. Fig. 13 is a plan view of the pattern-wheel and another form of operating mechanism for the movable sections of the sinker-plate of the plush-wheel. Fig. 14 is a vertical view, partly in perspective and partly in section, of an-

other form of the plush-wheel-operating mechanism. Fig. 15 is a vertical sectional view of a form of plush-bur in which the sinker-plate is dispensed with and the presser-plate is divided into movable sections.

Referring now to Fig. 1, the numeral 1 is a segment of the cylinder of the machine, carrying the ordinary bearded needles 2. The ordinary knitting-thread loop-wheel 3, the dividing-wheel 4, the presser 5, the landing-wheel 6, the cast-off wheel 7, the push-down 8, the clearing-wheel 10, the plush-wheel 9, the pattern-wheel 11, the guide for the knitting-thread 15, and the guide for the plush-thread 16 are all shown in their ordinary positions in circular-knitting machines, and it will be understood that only one set of these appliances is shown in the drawings, there being duplicate sets disposed about the cylinder after the usual manner. It is unnecessary to explain the operation of any of these parts of the machine, other than my improved plush-wheel and the pattern-wheel, as they are all well known and understood by those skilled in this art.

The construction and mode of operation of my improved plush-wheel will be understood by a reference to Figs. 1 to 12, inclusive.

The standard and base-plate 30 support the vertical shaft 31, the height of the latter being regulated by the set-screw 32. This shaft 31 carries at its upper end a sleeve 33, this sleeve forming the bearing for a horizontal shaft 34, fixed in position by the binding-screw 35. The shaft 34 carries on its inner end the block 36, which supports the plush-wheel 9, mounted on the stud or spindle 39.

This plush-wheel is composed of the following parts: The upper wheel 40 has the combination of the usual inclined blades 41 for introducing the plush-thread over the needles with the presser-plate 42 for pressing back every fourth needle which thus misses a loop. Next below this is a cam-shaped disk 43, made immovable by a lug 19 thereon, held in a groove in the spindle 39. This disk 43 serves to keep the sinkers spread out except where it is cut away just in front of the needles. Just below this disk 43 is another wheel 44, provided with inclined blades between which the sinkers play back and forth. Below this wheel 44 is mounted the sinker-plate, in the periphery of which is a wire on which the sinkers 46 are held in the usual manner and which are arranged so that the press-teeth of the presser-plate 42 are intermediate between the movable sinkers; but instead of making this sinker-plate in one piece, as has been done heretofore, I make it in two or more sections (only two are shown in the drawings, Figs. 6, 7, 9, 10, and 12) 47 and 48, each of which carries a portion of the sinkers and has a reciprocating vertical movement, the sinkers on one section being slightly longer than those on the other section. This is shown as effected in the following manner; but the particular

method of imparting these motions is not an essential feature of my invention, for other methods might be adopted without departing from the use of my invention: One section, 48 of the sinker-plate carrying the shorter sinkers, and which is composed of two opposite segments made in one piece, Figs. 6, 7, 9, and 11, is mounted upon a sleeve 50, embracing spindle 39 and sliding thereon. Near the lower end of this sleeve 50 is an annular recess 51. The other section 47 of the sinker-plate, carrying the longer sinkers likewise comprising two opposite sections made in one piece, Fig. 10, is mounted upon a larger sleeve 52, embracing and sliding upon the sleeve 50, and likewise having an annular recess 53 near its lower end. Into the recess 51 is fitted a yoke 53', mounted upon a rod 54, sliding in the block 36, Figs. 6, 7, 8, and 12, and into the recess 53 is fitted a yoke 55, mounted upon a rod 56, also sliding in the block 36, Figs. 6, 7, 8, and 12. Each of the rods 54-56 carries below the block 36, Figs. 1, 5, 6, 7, and 8, a collar 57, secured by a set-screw 58 and having a lug 59. These lugs 59 engage in a recessed cross-bar 60, secured to the end of a shaft 61, having its bearing in a collar 62, Fig. 1, carried on the shaft 34. To the outer end of the shaft 61 is secured by the set-screw 63 an arm 64, Figs. 5 and 8, the other end of this arm bearing a roller 65, resting on the pattern-wheel 11, yielding engagement with which is secured by the spring 66, Fig. 5.

The pattern-wheel 11 is shown as constructed as follows; but the particular form of the pattern-wheel and the method of operating it are not of the essence of my invention, and may be varied, if desired:

The pattern-wheel shown consists of a ratchet-wheel 11, turning on the axle 67, supported by the standard 68, Fig. 5. The cross-bar 69, Fig. 1, underneath the ratchet-wheel 11, carries on the upper surface of its projecting ends, respectively, the spring stop-pawl 70 and the elbow-jointed operating-pawl 71, having an elastic bearing on the ratchet-wheel 11, by the action of the spring 72, and a spring-contact with the periphery of the cylinder of the machine 1, through the action of the spring 73. The upper surface of the ratchet-wheel 11 carries the cams 14, removably connected to said ratchet-wheel by means of the pins 75, Figs. 4 and 5, and the holes 76, Fig. 1. The cam 77 (of which there may be several, if desired) on the periphery of the cylinder 1 of the machine, Fig. 1, actuates the pawl 71 and ratchet-wheel 11 by the revolution of the needle-cylinder 1, as will be readily understood. The spring-pawl 70 acts as a governor for the ratchet-wheel 11. It will thus be seen that the position of the cams 14 on the ratchet-wheel 11 regulates the reciprocating movements of the sections of the plush-wheel through the arm 64, shaft 61, and rods 54-56, as the rise and descent of the roller 65 will give a rocking motion to the

cross-bar 60 and cause the sections of the plush-wheel to rise and fall alternately.

In Fig. 13 I have shown a mode of construction in which the rods 54 56, which raise and lower the sections of the plush-wheel, instead of being actuated by a single cross-bar or rock-shaft are operated independently of each other by separate levers 78 and 79, each of which is moved by its own set of cams 14 on the ratchet-wheel 11, as will be apparent from the drawings.

Again, in Fig. 14 I have shown a method of raising the movable sections of the plush-wheel by means of a cam 79, attached to the shaft 6, the fall of this cam and consequently of the sections of the plush-wheel being preferably insured by the use of a spring (partly shown) suitably placed, as will be easily understood from the drawings; but, as previously stated, any other suitable method of imparting a vertical reciprocating motion to the segments of the sinker-plate of the plush-wheel which will accomplish the same practical result may be used, so that I do not limit myself to one particular form of mechanism for this purpose.

From the above description it will be seen that the operation of my plush-wheel as illustrated is as follows: When one section of the sinker-plate is raised and the other lowered, the sinkers of the raised section will act in conjunction with the corresponding portion of the toothed wheel 40 to form short plush-thread loops, the teeth of said wheel or plate pressing back every fourth needle, so as to place the plush-thread in front of such needles instead of behind the same, and the raised sinkers, which are intermediate of the press-teeth of the wheel 40, will also place the plush-thread in front of every fourth needle, which will be the needles which are intermediate of those pressed back by the teeth of wheel 40, so that when a section of a sinker-plate is raised the plush-thread will be caught by every alternate needle. When, however, a section carrying sinkers is lowered, its sinkers will not affect the plush-thread, which will be placed in front of every fourth needle only and by the teeth of the wheel 40 solely. The sections of the sinker-plate will be raised or lowered by means of the pattern mechanism, and a single revolution of the plush-wheel will thus lay both short and long loops, the plush-thread design being produced on the face of the fabric by the grouping of series of long loops and short loops alternated as desired. A reversal of the position of the segments of the sinker-plate will cause a corresponding difference in the time in which the wheel makes its long and short loops, respectively; but I do not limit myself to the use of my invention with the form of plush-wheel shown, for it can be employed with any form of plush-wheel which has the equivalent of sinkers. Thus, instead of using a sinker-plate at all, I can divide the presser-plate 42 into movable sections, as shown in Fig. 15, so

that only such portions of it as may be desired at any one time are utilized as a presser-plate, acting on the needles to push them back to escape loops. By this construction I am enabled to dispense with the sinker-plate, but I also am enabled to dispense with the necessity of employing the cam-disk. The construction of parts is such that substantially the same mechanism as is shown in Figs. 6 and 7, used to effect the movement of the sections of the plush-wheel, may be usefully employed with Fig. 15. This modification, as well as many others, will readily suggest themselves to persons skilled in the art, without departing from my invention; nor do I limit myself in the number of sections or segments into which the sinker-plate or its equivalent may be divided, nor to a plush-wheel of which all the sections of the sinker-plate (or its equivalent) are movable, for one or more may be fixed and always in operation and the remainder movable; nor, again, do I limit myself in the matter of the relative motion of the movable sections, for two or more of these may have the same simultaneous motion, or each one may have a separate independent motion, these variations of details affording different embodiments of my invention, from which a corresponding variety of patterns can be produced in the knitted fabric.

The new knitted fabric which can be produced by my improved plush-wheel above described forms the subject-matter of another application for Letters Patent of the United States filed by me on the 13th day of February, 1893, Serial No. 462,178.

Having thus described my invention, what I claim is—

1. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more movable segments which can be withdrawn from and put into operation as desired.

2. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more movable segments which can be withdrawn from and put into operation as desired in combination with means for operating said segment or segments.

3. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more movable segments which can be withdrawn from and put into operation as desired, in combination with a pattern-wheel and intermediate mechanism for operating said segment or segments.

4. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more movable segments which can be withdrawn from and put into operation as desired, in combi-

nation with a pattern-wheel and intermediate mechanism for actuating such segment or segments, said pattern-wheel being caused to rotate by the rotation of the needle-cylinder.

5 5. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more pairs of oppositely-connected movable segments
10 which can be withdrawn from and put into operation as desired.

6. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means
15 comprising a plate having one or more pairs of oppositely-connected movable segments in combination with a pattern-wheel and intermediate mechanism for actuating said pair or pairs of segments.

20 7. A plush-wheel for knitting-machines containing means by which some of the needles may be caused to escape looping, such means comprising a plate having one or more pairs of oppositely-connected movable segments in
25 combination with a pattern-wheel and intermediate mechanism for actuating such pair or pairs of segments, said pattern-wheel being caused to rotate by the rotation of the needle-cylinder.

30 8. A plush-wheel containing movable segmental sinker-plates and revolving upon a common center, said segments having one or more movable sinkers thereon, in combination with a presser-plate permanently attached to the wheel, whose press-teeth are in-
35 termediate between the movable sinkers.

9. A plush-wheel containing a presser-plate,

and segmental movable sinker-plates and their attendant sinkers, all revolving upon a common center, in combination with mech- 40
anism for actuating the movable segments, said mechanism being actuated by a design-cam, a ratchet-wheel for actuating said cam, a stay-pawl, a lever and pawl to actuate the
45 ratchet, power being applied to said lever by the revolving cylinder of the knitting-machine, substantially as described.

10. In a knitting-machine, a rotary cylinder carrying a cam, a ratcheted pattern-wheel means, operated by said cam, for moving said
50 ratcheted pattern-wheel, and a segmental plush-wheel, the movements of which are controlled by the ratcheted pattern-wheel, substantially as described.

11. In a knitting-machine, a rotary cylinder carrying a cam, a ratcheted pattern-wheel means, operated by said cam, for moving said
55 ratcheted pattern-wheel bearing one or more cams, and a segmental plush-wheel the movements of which are controlled by the cam or
60 cams of the ratcheted pattern-wheel, substantially as described.

12. In a knitting-machine, a rotary cylinder carrying a cam, a ratcheted pattern-wheel means, operated by said cam, for moving said
65 ratcheted pattern-wheel bearing one or more removable cams, and a segmental plush-wheel, the movements of which are controlled by the removable cam or cams of the ratcheted pattern-wheel, substantially as described.

WINSLOW M. BELL.

Witnesses:

JAMES J. COSGROVE,
WM. TALLMAN.