(No Model.) 4 Sheets—Sheet 1.

J. A. PARR.

STRIPING ATTACHMENT FOR CIRCULAR KNITTING MACHINES.

No. 509,243. Patented Nov. 21, 1893.

Fig. 1.

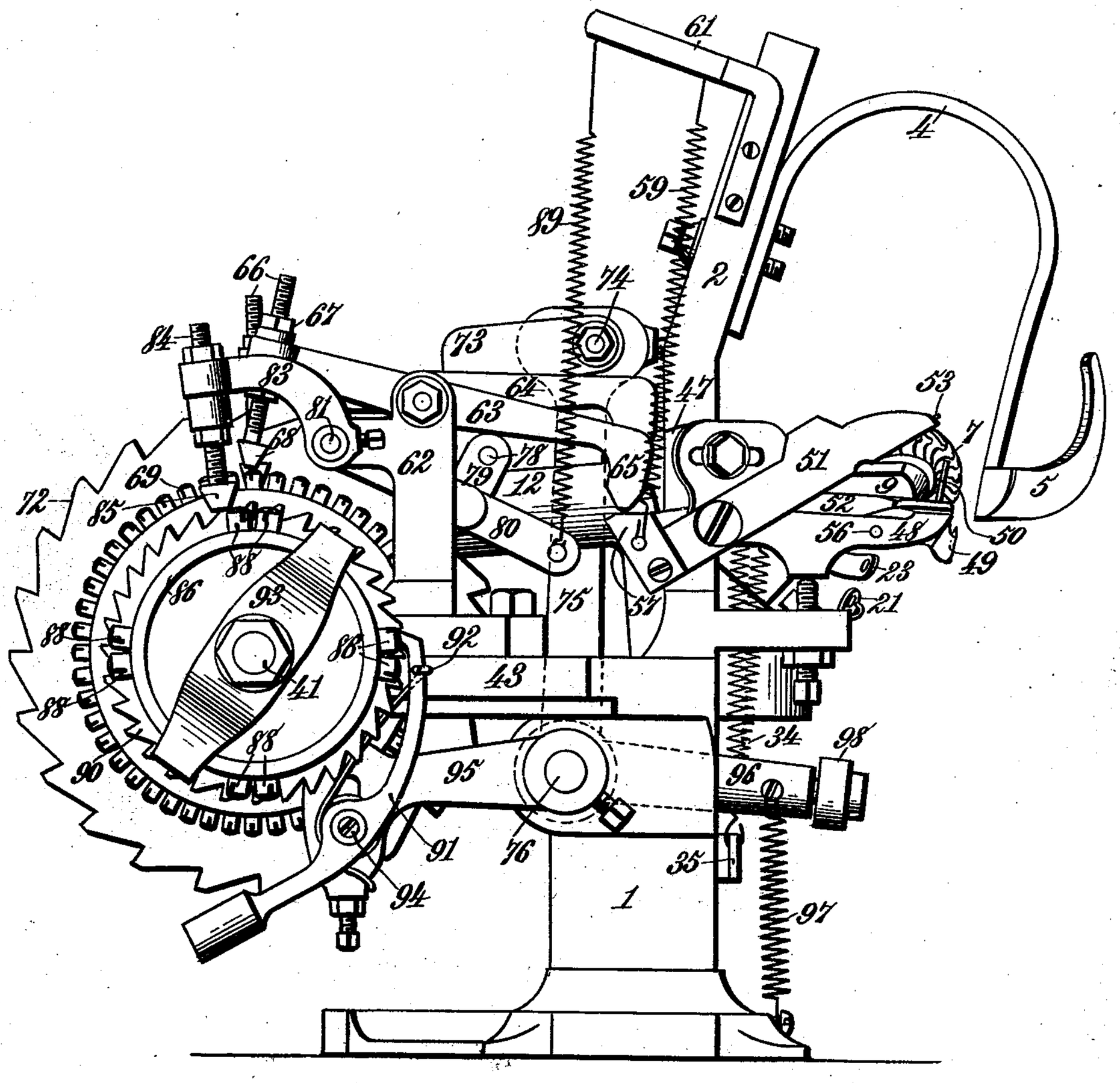

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Fig 2.

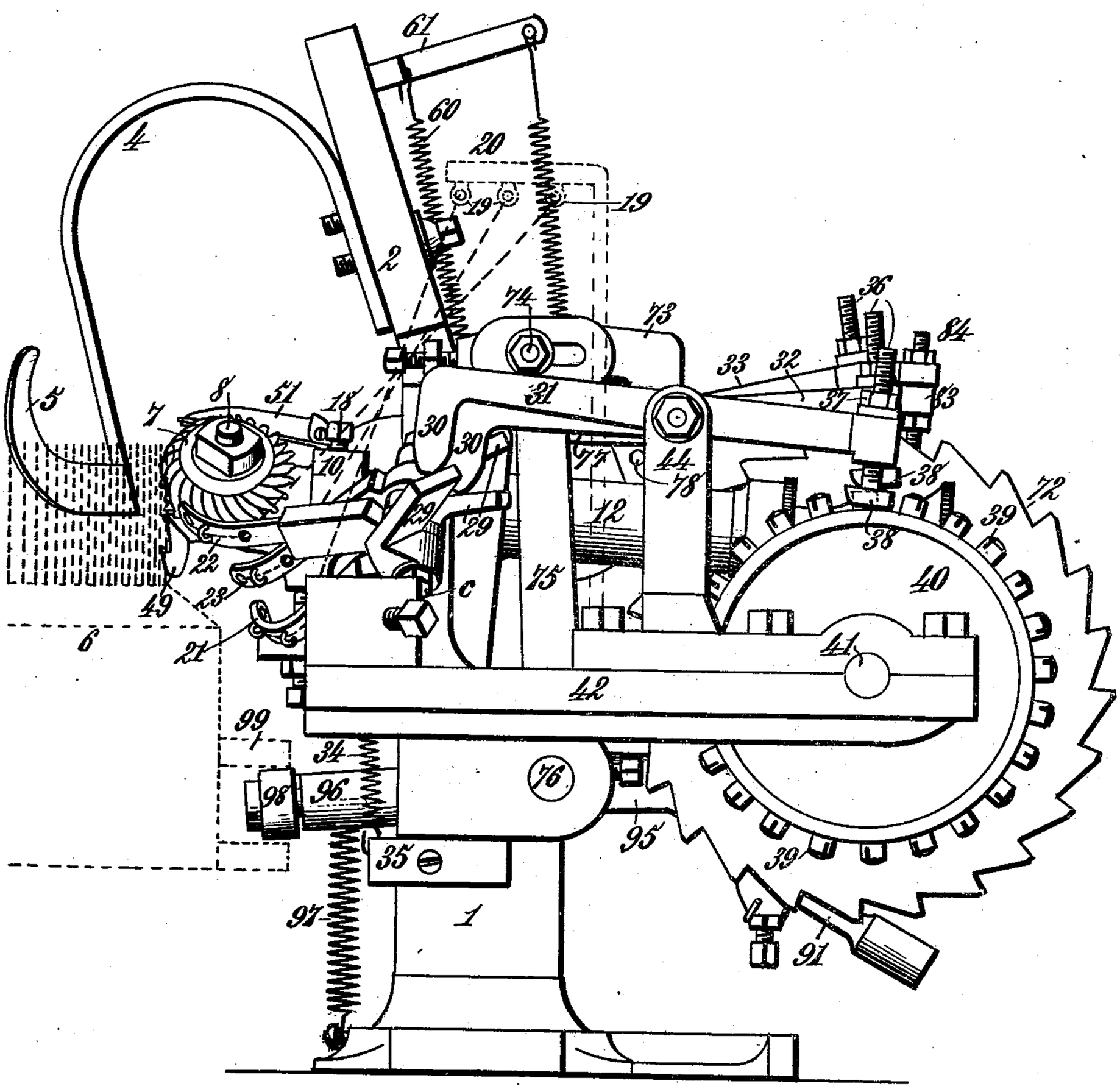

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Fig. 3.

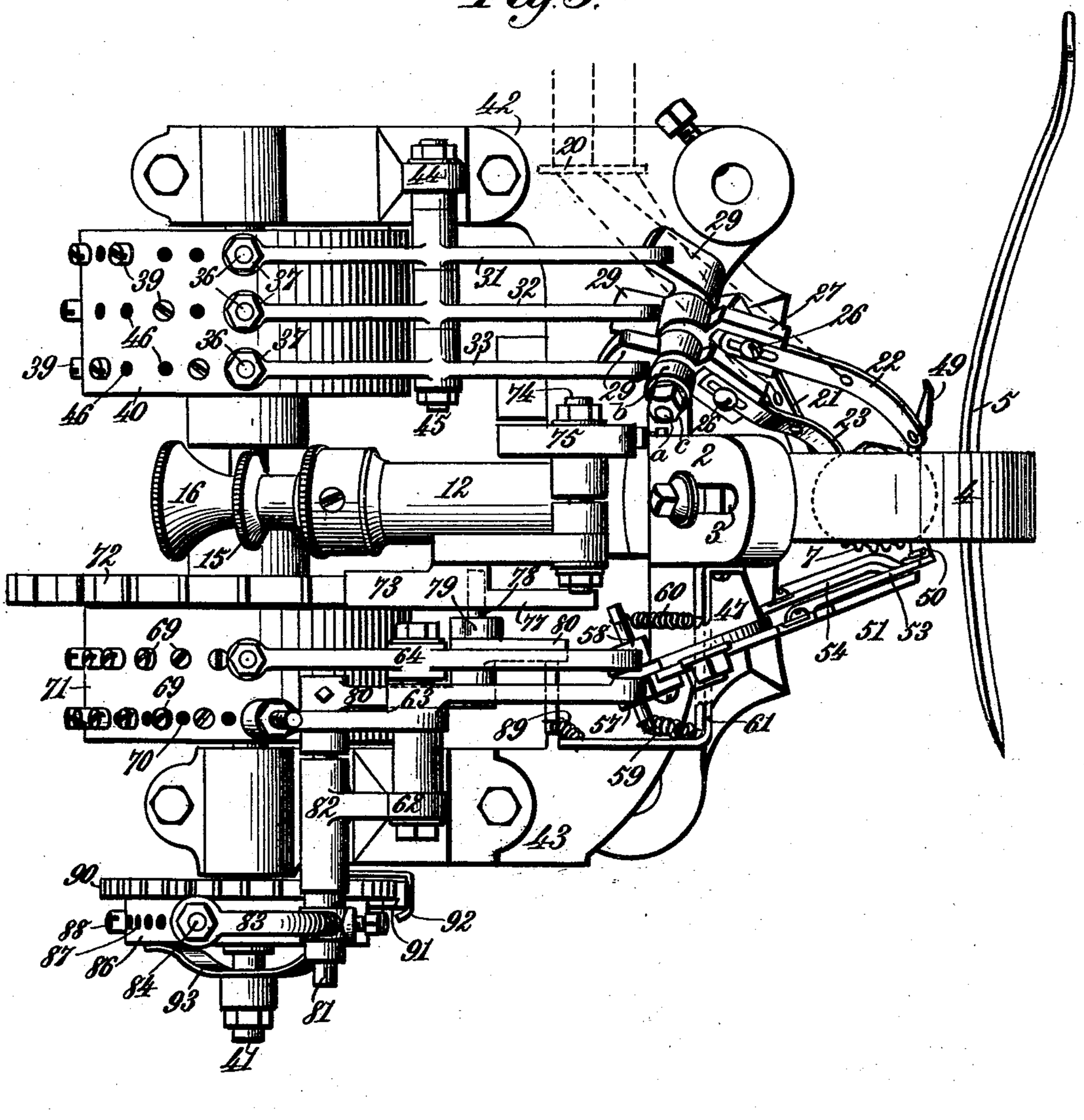

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Fig. 4.

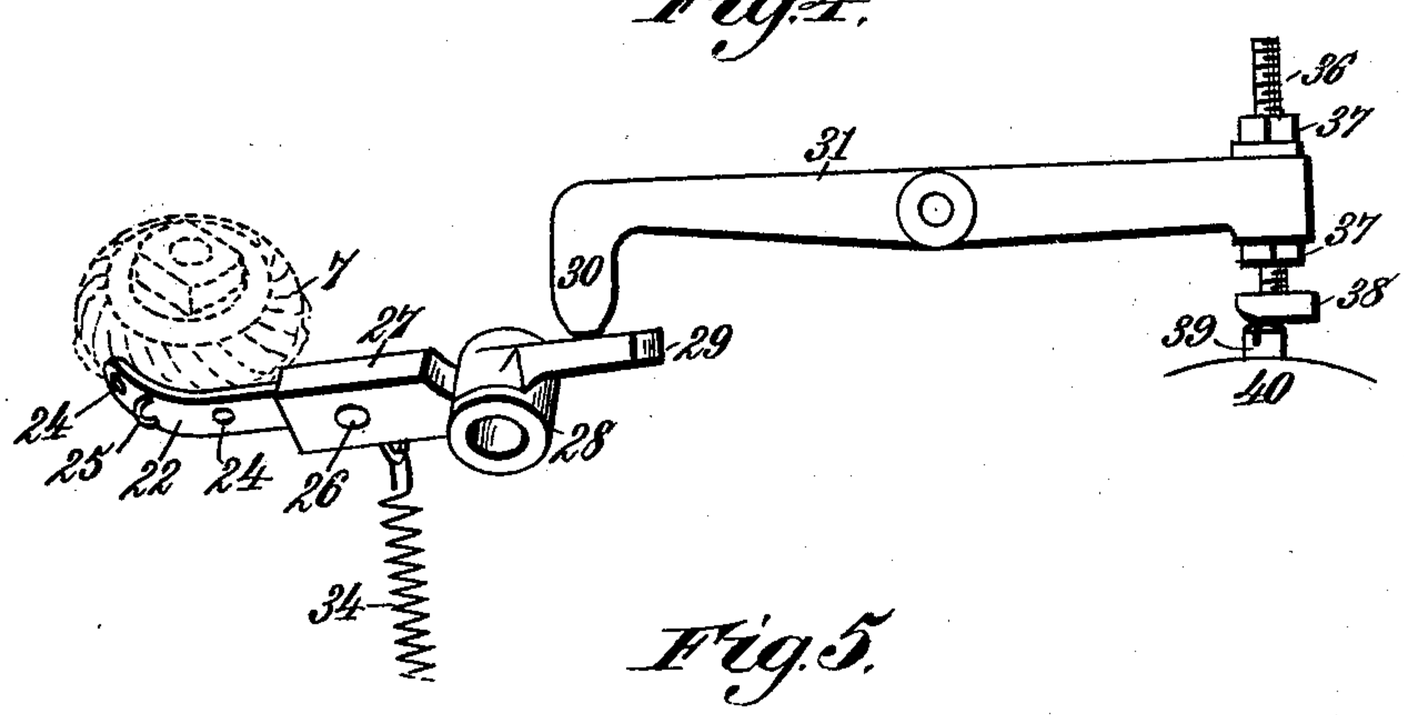


Fig. 5.

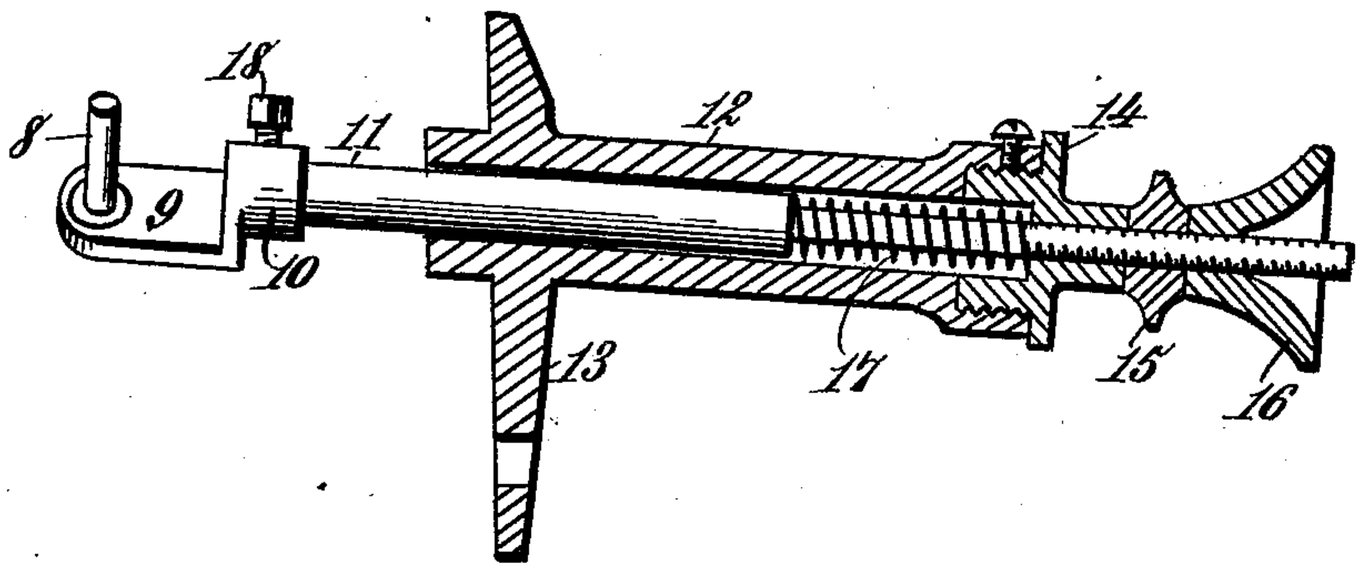
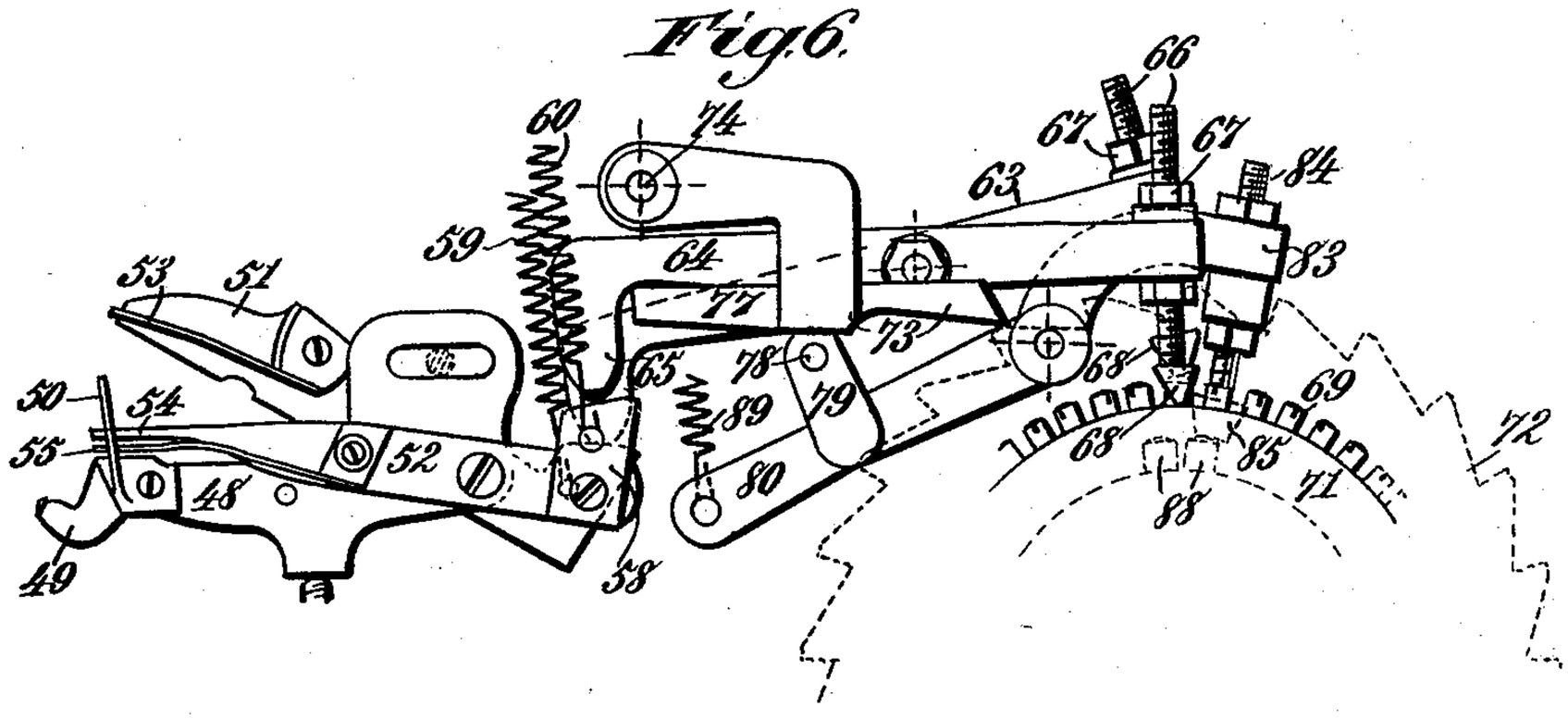


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES A. PARR, OF AMSTERDAM, NEW YORK.

STRIPING ATTACHMENT FOR CIRCULAR-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 509,243, dated November 21, 1893.

Application filed May 11, 1893. Serial No. 473,755. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. PARR, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented new and useful Improvements in Striping Attachments for Circular-Knitting Machines, of which the following is a specification.

My invention relates to striping attachments for circular knitting machines, and has for its objects to improve and simplify the operating mechanism of the thread guides and thread cutting devices; to provide a simple and quickly adjustable pattern mechanism for controlling the change of threads at desired intervals; and generally to provide such an arrangement of devices for effecting a change of the threads that are to be taken up by the knitting needles, as will greatly facilitate the operation of the several mechanisms and permit a large saving of time and labor in adjusting them to the requirements of different kinds of work.

The invention consists in the features of construction and novel combinations of devices relating to striping attachments for knitting machines, as hereinafter described and claimed.

In the annexed drawings illustrating the invention, Figure 1 is a side elevation of my improved striping attachment for circular knitting machines. Fig. 2 is an elevation of the opposite side of the attachment, showing in dotted lines the needle cylinder and the thread support. Fig. 3 is a plan of the striping attachment. Fig. 4 is a view of one of the movable thread guides and its operating lever with a portion of the thread guide operating wheel, and showing the crimper or loop wheel in dotted lines. Fig. 5 is a partly sectional elevation of the adjusting mechanism for the crimper or loop wheel support. Fig. 6 is a detail view of the operating mechanism for the thread cutter.

Referring to Figs. 1 and 2, the numeral 1 designates a pedestal supporting a framework on which the various operative devices are arranged. At its central front portion, the pedestal 1 supports a standard 2, the upper end of which is inclined forward and longitudinally slotted at 3, Fig. 3, for adjustable attachment of a forward and downwardly curved arm 4 to the lower end of which is secured a hold-back or cloth-presser 5, which presses the knitted fabric down into the needle-cylinder 6, shown by dotted lines in Fig. 2. On the outside of the needle-cylinder is a toothed crimper or loop wheel 7 which is rotated by intermeshing with the needles on the rotating cylinder. This crimper or loop wheel 7 is mounted in a diagonal position on an inclined pivot 8, carried by an arm 9, Fig. 5, projecting from a collar 10 adjustably mounted on the forward end of a longitudinally movable shaft or rod 11 that projects through an opening in the lower portion of the standard 2 and is supported in a tubular guide or sleeve 12 secured to the rear of the standard. As shown in Fig. 5 this guide sleeve 12 may be provided with a perforated plate or flange 13 through which the standard and sleeve may be detachably bolted together. The rear end of the sleeve 12 is provided with a detachable screw cap or bushing 14 having a central perforation for passage of a reduced and screw threaded rear portion of the shaft or rod 11, on which an adjusting nut 15 and jam nut 16 are mounted. A spiral spring 17 surrounds the reduced portion of the rod or shaft 11 within the rear portion of its tubular guide support or sleeve. The required diagonal position of the spirally toothed crimper or loop wheel 7 may be obtained by loosening a set screw 18 in the collar 10 and turning said collar a sufficient distance on the end of the shaft 11; and by adjusting said shaft longitudinally, through its nut 15, the crimper can be made to approach or recede from the knitting needles, to mesh more or less closely therewith, as desired.

The differently colored threads for the body and stripes of the fabric to be knitted are brought down through eyes 19, Fig. 2, on an arm 20, shown by dotted lines in Figs. 2 and 3, which is supported by a suitable standard on one side of the machine. From the eyes 19 the threads are passed to the crimper or loop wheel and knitting needles through movable thread guides 21, 22 and 23 a series of which, for giving the required changes of color, are pivoted in an inclined position adjacent to one side of the standard 2 at the front of the machine frame, the arrangement of the said thread guides being such that they will project diagonally downward, forward

and inward in proximity to the front under portion of the crimper or loop wheel, as shown in Figs. 2, 3, and 4. The several thread guides 21, 22 and 23 are pivoted on a downward and outwardly inclined pin *a* that is supported in a bracket *b* and provided with nuts *c*, Figs. 2 and 3, to hold said guides on their said supporting pin or pivot. Each of these thread guides may be of the form shown in Fig. 4 and comprises a curved blade having apertures 24 for passage of a thread. On the under side of each blade portion of the guide and between the apertures 24 is a loop or staple 25 through which the thread is also passed. At its rear end the blade portion of each thread guide may be longitudinally slotted for passage of a set screw 26, Fig. 3, by which the said blade portion is adjustably attached to a supporting lug 27 on the pivotal body portion 28 of the guide. The pivotal portion 28 of each thread guide is also provided with a bearing lug 29 to receive the pressure of a nose 30 on the forward end of each of a series of centrally fulcrumed levers 31, 32 and 33 through which the respective thread guides are thrown into operative position at proper intervals, in order to change the stripe or color in the fabric as required. When either thread guide is relieved from the pressure of its actuating lever it will be at once drawn out of position by the tension of a spring 34 attached to the lug 27 in front of the pivotal portion of the guide. The lower or fixed ends of the several springs 34 may be secured to a lug or arm 35 on the pedestal.

In the rear end of each thread guide operating lever 31, 32 and 33 is a vertically adjustable screw 36 that is held in place by nuts 37 above and below the lever. The lower end of each screw 36 has attached thereto a beveled lug 38 adapted to be acted upon at any desired intervals by pins 39 that are removably set at corresponding intervals in the periphery of a thread-guide-operating wheel 40 secured to an intermittently rotary shaft 41 journaled in suitable bearings that are provided in or upon parallel arms 42 and 43 which project from the pedestal 1 in a rearward direction. On the arm 42, adjacent to the wheel 40, is supported a standard 44 to the upper end of which is attached an inward projecting shaft or pivot 45 on which the thread guide operating levers 31, 32 and 33 are fulcrumed.

The periphery of the thread guide operating wheel 40 is provided with several annular series of circular apertures or recesses 46 for insertion of the removable pins 39 in the required relative positions to effect a change of thread by operating the levers 31, 32 and 33 in any desired order and either singly or two levers simultaneously according to the character of work to be done. It will be understood that the pins 39 must be so arranged with relation to the lugs 38 that at all times at least one of the levers 31, 32 and 33 will be caused to actuate the corresponding thread guide 21, 22 or 23 and maintain it in an operative position. When the wheel 40, which is normally at rest, is rotated a sufficient distance to move one of the pins 39, from beneath the lug 38 of one of the thread guide operating levers and permit one of the springs 34 to draw the corresponding thread guide out of position, another pin 39 will have acted on the lug 38 of another lever and caused it to throw its thread guide into operative position. The pins 39 are capable of being quickly inserted into and removed from the apertures 46 in the periphery of the intermittently actuated wheel 40 so that their relative positions can be readily changed without the expense of much time or labor in adjusting the machine to different kinds of work.

While I have shown three movable thread guides and accompanying operating devices it is obvious that the number of guides may be increased or diminished as required, or without removing any guide or its actuating lever, they may be rendered inoperative by detaching the screw 36 or adjusting it to such a height that its lug 38 will not come in contact with the pins on the wheel 40, or the same result may be accomplished by removing all the pins 39 beneath the lever of the guide that is to remain inoperative. The threads will then be changed only by those guides whose levers can be actuated from the pins on the thread guide operating wheel.

To a lug 47 on one side of the lower portion of the standard 2 is adjustably secured a fixed cutter blade 48 that is inclined inward toward the crimper or loop wheel 7 as shown in Fig. 3. A curved and somewhat crooked guard 49 projects inward and slightly downward and forward from the front end of the fixed blade 48, and below the front portion of the loop wheel 7, to support and guide the successive striping threads into the cutting mechanism. At the inner end of said guard is a nearly vertical guard-wire 50 that prevents the threads from being carried too far between the cutters. To the fixed cutter blade 48 are pivotally attached a movable cutter blade 51 for severing the threads at the proper time and a movable clamping lever 52 to aid in holding the severed thread or threads. The inner side of the movable cutter blade 51 has attached thereto a spring strip 53, Fig. 6, to assist in holding the end of the thread. At its forward end the clamping lever 52 is formed into a tongue or prong 54 that projects beneath the spring strip 53 on the movable cutting blade. Between this prong or tongue 54 and the fixed cutter blade 48 is a spring strip 55 that is attached to the movable clamping lever. The fixed cutter blade 48 may be provided with a stop pin 56 to prevent the movable cutter blade 51 from swinging down too far. This cutting and thread-holding mechanism is substantially the same as that described in Letters-Patent No. 402,854, granted to me May 7, 1889, but is operated through a somewhat different actuating mechanism

which will now be explained. The rear ends of the movable cutter blade 51 and movable thread clamping lever 52 are provided with bearing lugs 57 and 58, respectively, to which are connected the lower ends of spiral spring 59 and 60 that are supported above by an arm 61 projecting from the standard 2. On the arm 43 of the pedestal or machine frame is supported a standard 62, Figs. 1 and 3, in the upper end of which is secured an inward projecting shaft or pivot on which are fulcrumed two levers 63 and 64 each of which is provided at its forward end with a downward projecting nose 65 adapted to bear on one of the lugs 57 and 58 of the movable cutter blade 51 and movable clamping lever 52, respectively. In the rear end of each lever 63 and 64 is attached a screw 66 that is vertically adjustable by means of nuts 67 and provided at its lower end with a beveled lug 68 adapted to be acted on at proper intervals by pins 69 that are removably set in two annular series of circular apertures or recesses 70 formed in the periphery of a cutter operating wheel 71 which is secured to the shaft 41 by which the thread guide operating wheel 40 is carried. By the pins 69 bearing upward beneath the lugs 68 the rear ends of the levers 63 and 64 are elevated and their forward ends pressed downward against the lugs 57 and 58 on the movable cutter blade 51 and clamping lever 52 thus holding them in an elevated position until it is required to sever and hold a thread when changing the stripe.

The thread guide operating wheel 40 and cutter operating wheel 71 rotate together and the pins 69 on said wheel 71 are so arranged with relation to the pins 39 on the wheel 40, that when a thread guide is lowered out of its operative position, in the manner hereinbefore described, the downward movement of said guide will carry its thread between the cutters 48 and 51 and the lever 63 will be released and permit the spring 59 to act so as to cause the cutter blade 51 to descend and sever the thread. When the thread is thus severed the end thereof leading from the thread guide will be held, say, between the spring 53 and prong 54, the thread formerly held by said parts being thrown by movement of its thread guide against the crimper or loop wheel and thereby presented to the needles. Meanwhile a second inoperative thread may be held by the prong 54 and spring 55 against the fixed cutter, the lever 64 having been released by rotation of the wheel 71 so as to permit the spring 60 to lower the clamping lever 52 to which said prong and spring are attached. At certain points on the cutter operating wheel 71 some of the pins 69 in the two rows may be arranged in alignment so that the movable cutter 51 and clamping lever 52 will be raised simultaneously to release the thread held between the spring 55 and the fixed cutter 48, the then active thread being passed, by movement of its thread guide, between said spring 55 and fixed cutter where it is severed and held by immediate descent of the movable cutter and clamping lever.

For the purpose of rotating the thread guide operating wheel 40 and cutter operating wheel 71 at the same time and intermittingly a ratchet wheel 72 is secured to the wheel 71 or to the shaft 41 on which said wheels 40 and 71 are carried. This ratchet wheel 72 is moved the distance of one tooth at certain intervals through the action of a pawl 73 fulcrumed on a pin or pivot 74 that is adjustably secured in the upper slotted end of a vertical arm 75 mounted on a rock-shaft 76 journaled in suitable bearings on the rear of the pedestal. The pawl 73 is provided with an elongated flange or tail portion 77, Figs. 3 and 6, through which it is normally supported in an elevated position, out of engagement with the ratchet wheel 72, by a pin 78 projecting laterally from a lug 79 on an arm of a crooked lever 80 carried by one end of a rock-shaft 81, that is mounted in a bearing 82 on the standard 62, Figs. 1 and 3. To the other end of the rock-shaft 81 is secured a rearwardly curved arm or lever 83 in the rear end of which is supported a vertically adjustable screw 84 having attached to its lower end a beveled lug 85, Fig. 1, which normally rests on the periphery of a pattern wheel 86 that is loosely mounted on one end of the shaft 41 which carries the thread guide operating wheel and the cutter operating wheel. In the periphery of the pattern wheel 86, is an annular series of circular apertures or recesses 87, Fig. 3, to receive a number of removable pins 88 that may be arranged in groups of two or more at suitable points to correspond with the intervals at which the striping of the fabric is to be changed. While the lug 85 remains on the periphery of the pattern wheel 86, the arm 83 will be depressed, the lever 80 will be held firmly in an elevated position by a spring 89 at one end, which spring is suspended from the bracket arm 61 and serves by its tension to hold the rock-shaft 81 and arms 80 and 83 from vibration, and the pin 78 carried by the arm 80 will support the pawl 73 at such a height that though it is free to oscillate or reciprocate with the movements of the rock-shaft 76 it will not engage the ratchet wheel 72 through which the thread guide operating wheel 40 and cutter operating wheel 71, are to be actuated. When, however, the pattern wheel 86 has been rotated a sufficient distance to bring a pin or group of pins 88 beneath the beveled lug 85 so as to raise the arm 83 and thereby oscillate the rock-shaft 81 in such manner as to depress the arm 80 and pin 78, the pawl 73 will drop into engagement with the ratchet wheel 72 and thereby actuate the thread guide operating wheel 40 and cutter operating wheel 71, so as to effect a change of stripe in the fabric being knitted.

The pattern wheel 86 has secured thereto a ratchet wheel 90 which is actuated step by step, through a weighted pawl 91, that may be

provided with a spring 92, Figs. 1 and 3, for holding it to close engagement with said ratchet wheel. On the end of the shaft 41 may be placed a spring brake or detent 93, Figs. 1 and 3, to bear on the side of the pattern wheel and steady its movements. The pawl 91, through which the pattern wheel is actuated, is fulcrumed on a pivot 94, Fig. 1, that is adjustably supported in the slotted end of an arm 95 mounted on one end of the rock-shaft 76 from which the pawl 73 is also actuated. On this rock-shaft 76 is also mounted a forward projecting arm 96 having a spring 97 attached thereto and carrying a roller 98 which is adapted to engage a cam race 99 on the rotary needle cylinder 6, as indicated by dotted or broken lines in Fig. 2, so that when said cylinder is operated it will furnish the power to actuate the several working parts of the striping attachments.

The pins 39, 69 and 88, carried, respectively, by the wheels 40, 71 and 86, are preferably formed as screws, or screw bolts that can be readily and quickly inserted in or removed from said wheels by means of a screw driver so that in order to re-set the pins or arrange them in various positions to adapt the attachment for use in different kinds of work but little time or labor will be required.

What I claim as my invention is—

1. The combination with a rotary needle cylinder, a series of movable thread-guides, and a thread-guide-operating wheel intermittingly actuated from the needle-cylinder, of several annular series of removable pins inserted radially in the periphery of said thread-guide-operating wheel, and a series of levers actuated at intervals from the pins on the thread-guide-operating wheel and each adapted to act directly on a thread-guide to throw it into operative position, substantially as described.

2. The combination with a rotary needle cylinder, a series of movable thread-guides, a fixed cutter, a movable cutter and thread-holding lever, of a thread-guide-operating wheel and a cutter-operating wheel each having its periphery provided with a series of radially inserted and removable pins, levers actuated from said pins and adapted to bear directly on and operate the thread-guides, movable cutter and thread-holding lever, and mechanism through which the thread-guide-operating wheel and cutter-operating wheel are intermittingly actuated from the rotary needle cylinder, substantially as described.

3. The combination of a rotary needle cylinder, having a cam race, a loop wheel, a series of movable thread-guides pivotally supported at one side of the loop wheel and each provided at its rear end with a bearing lug, springs connected with said thread-guides to draw them away from the loop wheel and needle cylinder, a thread-guide-operating wheel, a series of levers actuated by said wheel and each adapted to bear at its forward end directly on the bearing lug of one of the movable thread-guides to throw it into operative position adjacent to the loop wheel, a cutter mechanism mounted at one side of the loop wheel, a cutter-operating wheel, a pattern wheel, a rock-shaft having an arm provided with a roller engaged in the cam race of the needle cylinder devices for actuating the pattern wheel, cutter-operating wheel and thread-guide-operating wheel from said rock shaft, and mechanism actuated by the pattern wheel to control the devices actuating the cutter operating wheel and thread-guide-operating wheel, substantially as described.

4. The combination with a rotary needle cylinder, a loop wheel, and a series of movable thread-guides pivotally supported at one side of the loop wheel and each provided at its rear end with a bearing lug, of springs connected with said thread-guides to draw them away from the loop wheel and needle cylinder, a thread-guide-operating wheel intermittingly actuated from the needle cylinder, several annular series of removable pins inserted in the periphery of said thread-guide-operating wheel, and a series of levers each of which is adapted to bear at its forward end directly on the bearing lug of one of the movable thread-guides and provided at its rear end with an adjustable lug through which it is actuated by the pins on the thread-guide-operating wheel to throw the thread-guide into operative position adjacent to the loop wheel and needle cylinder, substantially as described.

5. The combination of a rotary needle cylinder, a loop wheel, a series of movable thread-guides each of which is provided at its rear end with a bearing lug, a thread-guide-operating wheel having its periphery provided with several annular series of removable pins, a series of levers each of which is adapted to bear at its forward end directly on the bearing lug of one of the thread-guides, screws carried by the rear ends of said levers and provided with lugs to be acted on by the pins of the thread-guide-operating wheel to actuate the levers and cause them to throw either thread guide into operative position, springs connected with the thread guides to draw them away from the loop wheel when released by their respective levers, thread cutting devices, and mechanism intermediate the thread guide operating wheel, cutting devices and needle cylinder and through which the thread guides and cutter are actuated, substantially as described.

6. The combination with a rotary needle cylinder, a loop wheel, a series of movable thread-guides mounted at one side of the loop wheel, a thread-guide-operating wheel and a series of levers through which the thread-guides are operated from said wheel, of a fixed cutter mounted on the other side of the loop wheel, a movable cutter and thread holding lever pivoted to the fixed cutter and each provided at its rear end with a bearing lug, springs connected with said bearing lugs, a

cutter-operating-wheel having its periphery provided with series of removable pins, levers having their forward ends adapted to bear directly on the bearing lugs of the movable cutter and thread-holding lever and each carrying at its rear end an adjustable lug adapted to be acted on by the pins on the cutter-operating-wheel, and mechanism intermediate the needle cylinder and the cutter-operating wheel through which the thread-guide-operating wheel and cutter-operating wheel are intermittingly actuated, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES A. PARR.

Witnesses:

ALBERT H. NORRIS,

GEO. W. REA.