

1,286,913.

Inventor:
William T. Barratt.
by his attorney
Charles S. Hooding.

W. T. BARRATT.
CIRCULAR KNITTING MACHINE.
APPLICATION FILED FEB. 11, 1916.

Patented Dec. 10, 1918.
6 SHEETS—SHEET 2.

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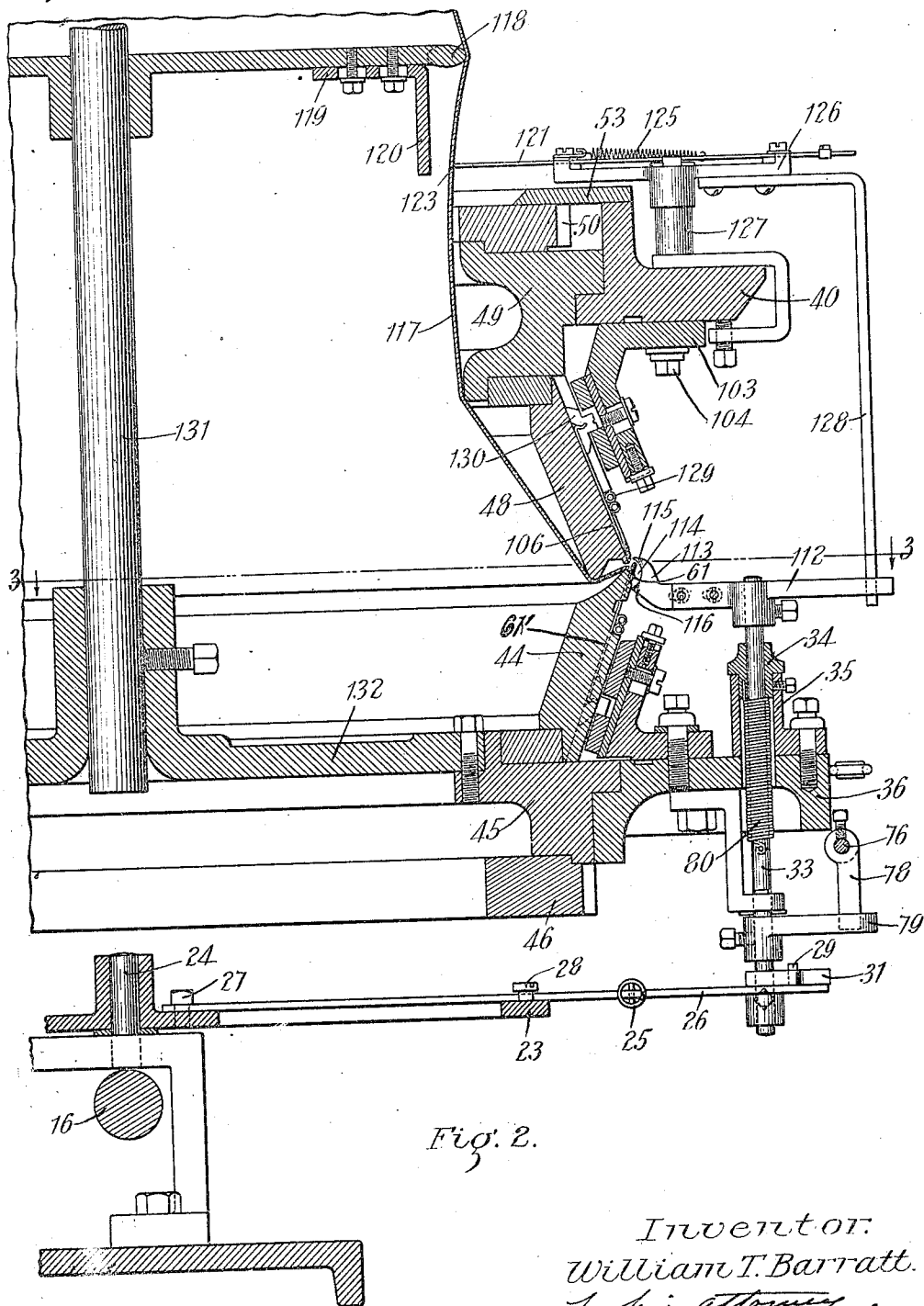


Fig. 2.

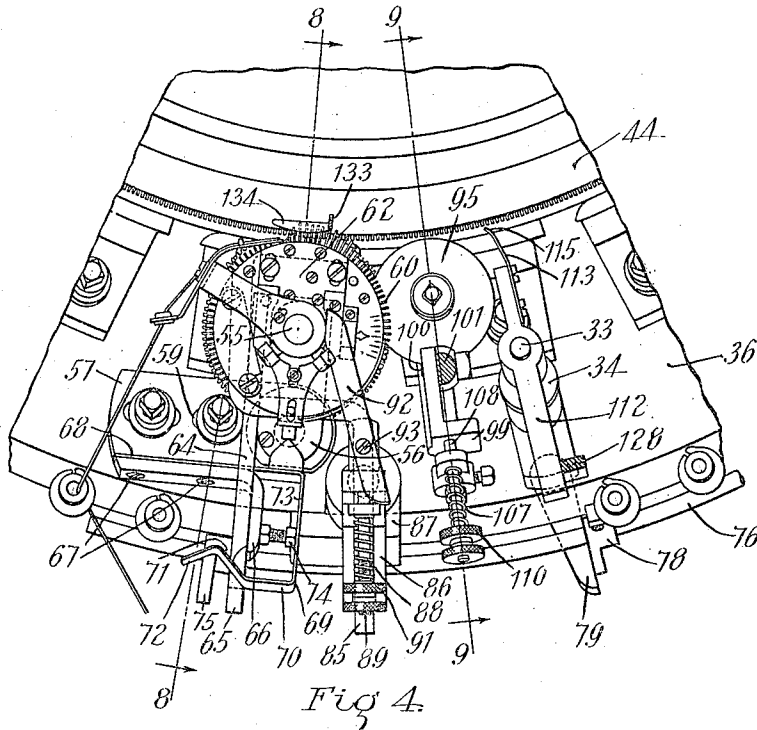
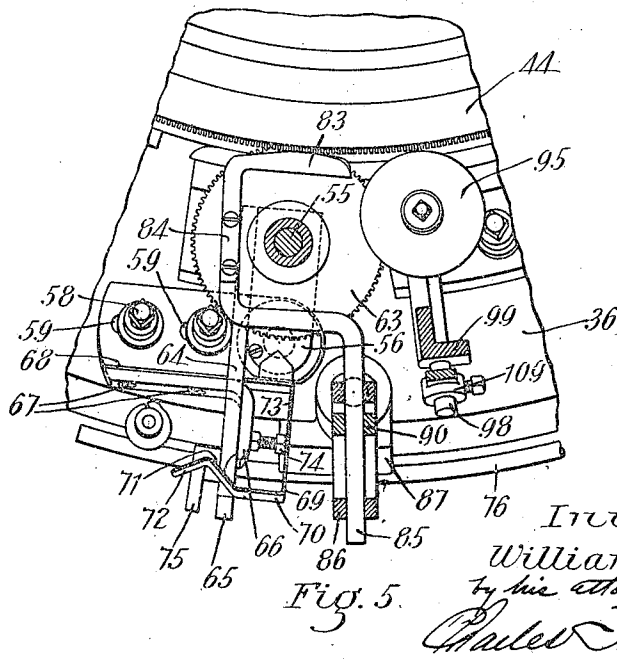
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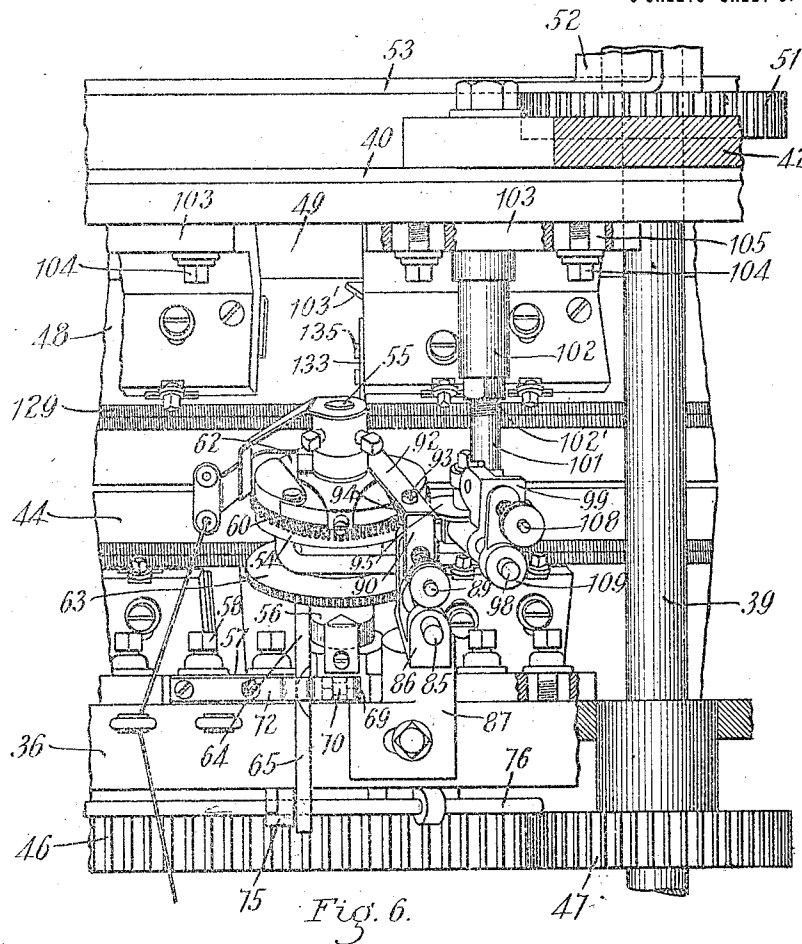
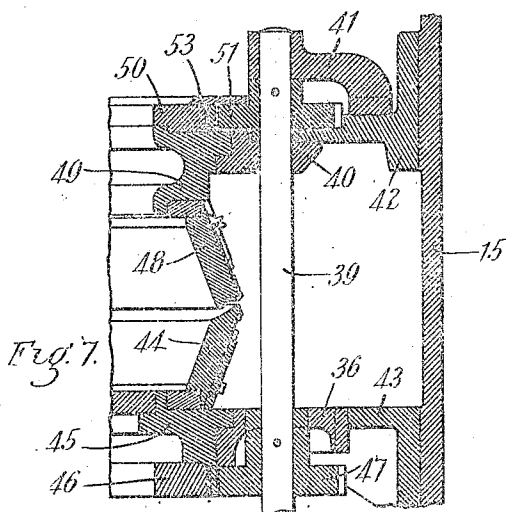
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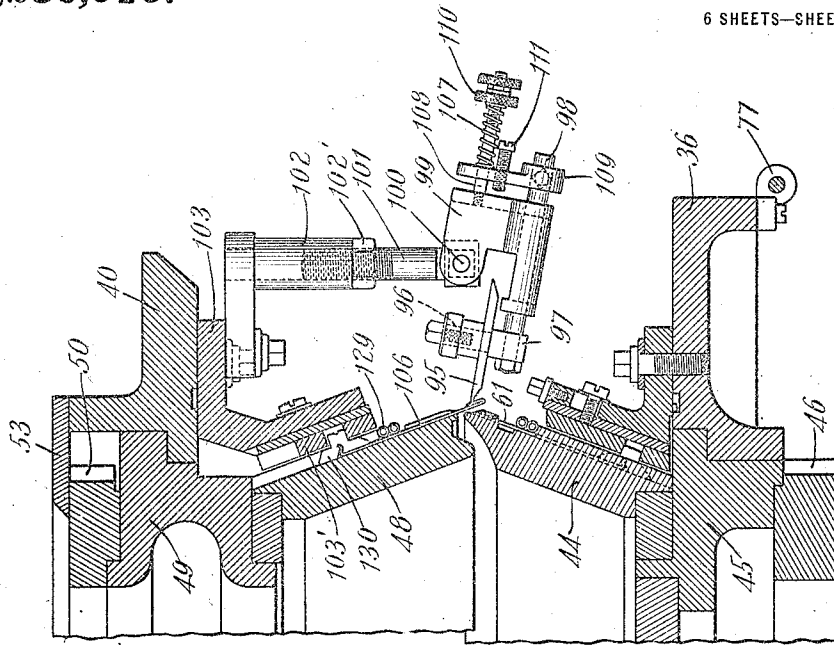


Fig. 9.

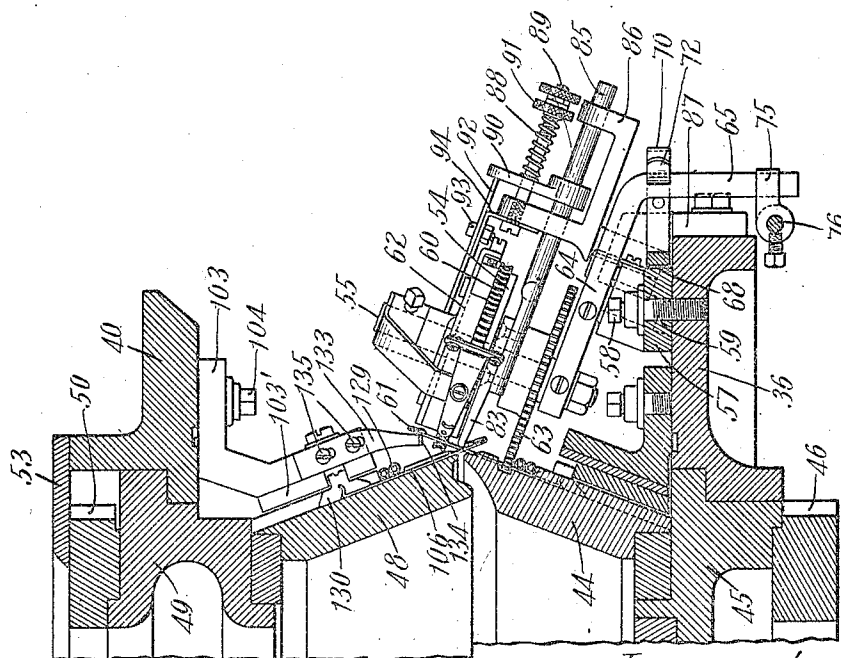


Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM T. BARRATT, OF BENNINGTON, VERMONT, ASSIGNOR TO CHARLES S. KEHOE, ANNIE COOPER, AND ALEXANDER J. COOPER, EXECUTORS OF THE WILL OF CHARLES COOPER, DECEASED, LATE OF BENNINGTON, VERMONT.

CIRCULAR-KNITTING MACHINE.

1,286,913.

Specification of Letters Patent.

Patented Dec. 10, 1918.

Application filed February 11, 1916. Serial No. 77,782.

To all whom it may concern:

Be it known that I, WILLIAM T. BARRATT, a citizen of the United States, residing at Bennington, in the county of Bennington and State of Vermont, have invented new and useful Improvements in Circular-Knitting Machines, of which the following is a specification.

This invention relates to improvements in circular knitting machines.

The object of the invention is to increase the production without increasing the size of the machine or the expense of manufacture of the same.

Another object of the invention is to improve the quality of the fabric knit on the machine and to render the machine less liable to accidents, while at the same time simplifying the machine and rendering it easier to operate and requiring a less skilled operator to successfully operate the machine.

One machine embodying my invention hereinafter described in the specification and set forth in the claims is of that class of machines known as "circular rib knitting spring needle machines." Said machine comprises a primary and a secondary needle cylinder with spring needles and a plurality of feeds grouped in series around these cylinders. Heretofore in machines of this class the number of feeds which it was possible to use in an eighteen inch cylinder machine was six. By means of the improvements hereinafter set forth I am now enabled to use nine feeds on the same size machine, thereby increasing the production for the same size machine fifty per cent. Certain subject matters set forth in the following specification relates to a sinker wheel of general application and the supporting structure therefor which has been made the subject matter of a divisional application filed July 24, 1916, Serial No. 110,829, and which has issued into Patent No. 1,230,837, patented June 26, 1917, and other subject matter relating to general machine construction and arrangement was divided out of this application and filed July 21, 1916, Serial No. 110,608, patented March 5, 1918, No. 1,257,968.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings:

Figure 1 is a plan view of my improved knitting machine partly broken away and shown in section, the fabric being indicated also in section.

Fig. 2 is a sectional elevation taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional plan taken on line 3—3 of Fig. 2, nine different feeds being shown diagrammatically therein.

Fig. 4 is a detail plan illustrating one of the feeds.

Fig. 5 is a plan similar to Fig. 4 with the sinker wheel removed in order to more clearly show the primary and secondary pressers, and partly shown in section.

Fig. 6 is a front elevation of one of the feeds without the needles, and partly shown in section.

Fig. 7 is a sectional elevation on a reduced scale on line 7—7, Fig. 1 illustrating the mechanism for rotating the cylinders.

Fig. 8 is a sectional elevation taken on line 8—8 of Fig. 4.

Fig. 9 is a sectional elevation taken on line 9—9 of Fig. 4.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 15 is the frame of the machine. 16 is the main driving shaft which is driven by a clutch pulley 17, said clutch pulley being locked to the shaft 16 by a clutch member 18 which is operated by a stop motion mechanism consisting of a rocker arm 19 fast to a rock-shaft 20, said rock-shaft being actuated by a rocker arm 21 and rod 22 which connects the rocker-arm 21 to a segmental wheel 23 (Fig. 3). The segmental wheel 23 is rotatably mounted upon a stationary stud 24. The segmental wheel 23 is rotated in the direction of the arrow *a* by springs 25 which are connected to arms 26 pivoted at 27 to the segmental wheel 23. These arms are held against screws 28 on the segmental wheel 23 by the springs 25 and are provided with pins 29 constituting projections on said arms which engage notches 30 in dogs 31, the dogs 31 being V-shaped on one side 32 thereof so as to enable the pins 29 to be engaged with the notches 30 in the dogs 31 quickly and conveniently, as hereinafter more fully described.

The dogs 31 are fastened to the lower ends of vertical shafts 33 (Figs. 2 and 3) and

these shafts are rotatably mounted in bearings 34 which are fastened to brackets 35 fast to the lower bed plate 36 of the machine. When the shafts 33 are rocked by means and
5 instrumentalities hereinafter described the pins 29 will be released and the springs 25 will act, through the arms 26 to rotate the segmental wheel 23 in the direction of the arrow *a* and through the rod 22 tip the
10 rocker arm 21, rocker shaft 20 and rocker arm 19 in the proper direction to disengage the clutch member 18 from the clutch pulley 17, whereupon the machine will be stopped.

It will be understood that there are two
15 sets of instrumentalities for actuating the stop mechanism and that the rocking of either one of the vertical shafts 33 will free the stop mechanism so that it will operate to stop the machine, as hereinbefore described.

The shaft 16 has fastened thereto a bevel gear 37 which meshes into a bevel gear 38 fast to a vertical shaft 39. The vertical shaft 39 has bearings in the lower bed plate
25 36 and in an upper bed plate 40 and also in a bracket 41. The bracket 41 and upper bed plate 40 are supported upon a bracket 42 which is fastened to the frame 15 of the machine. The lower bed plate 36 is supported
30 upon brackets 43 fast to the frame of the machine.

A lower needle cylinder 44, which constitutes the primary needle cylinder, is fastened to a running ring 45 which is rotatably mounted upon the lower bed plate 36. Said running ring and lower needle cylinder are rotated by an annular gear 46 which is fast to the running ring 45 and is driven
35 by a gear 47 which is fast to the vertical shaft 39. The cylinder 44, running ring 45 and gear 46, while made in separate parts for convenience in manufacture, are fastened rigidly together and constitute, in effect, a single piece.

An upper or secondary cylinder 48 is fastened to a running ring 49 which is rotatably mounted in the upper bed plate 40 and has fastened to its upper edge an annular gear 50 which is driven by a gear 51 fastened to the shaft 39. It will be noted that the gear 51 is located above the bed plate 40 and that the gear 47 is located below the bed plate 36, thus leaving the space between the upper and lower bed plates practically free of obstruction except for the vertical shaft 39, so that the instrumentalities forming the feeds on opposite sides, respectively, of the vertical shaft 39 may be brought close thereto if desired.

Plates 52 (Fig. 1) are fastened to the bracket 41 and a ring 53 is fastened to the upper bed plate and projects over the gears 50 and 51. Thus it will be seen that the gears are thoroughly covered to prevent
65 dust, lint, etc. from getting into them and

furthermore to prevent the operator from being injured.

In each of the feeds which are nine in number in this particular embodiment of my invention, there is a rotary sinker wheel 54 which is substantially the same in construction as the sinker wheel illustrated in my United States Letters Patent No. 917,989. This sinker wheel is rotatably mounted upon a stud 55 which is fastened
70 to a rocker frame 56. The rocker frame 56 is rotatably mounted upon a standard 57 fast to the lower bed plate 36 by means of screws 58 which have screw-threaded engagement with the lower bed plate 36 and project through slots 59 in the standard 57, whereby said standard is rendered adjustable upon the lower bed plate 36. It will be noted that the sinker wheel 54 is eccentric to the axis of the rocker frame 56.

The sinker wheel 54 is provided with sinkers 60 which are slidable radially upon said sinker wheel and between the primary needles 61, said needles being slidable in tricks 61' in the primary needle cylinder 44 and movement being imparted to said sinkers by a cam 62. A rotary motion is imparted to the sinker wheel 54 by a gear 63 fast thereto and meshing into the primary needles 61, whereby said gear is rotated.

The rocker frame 56 has an arm 64 fast thereto which extends radially outward from said rocker frame and terminates in a vertically disposed portion 65. Said vertically disposed portion, when the parts are in operative position as illustrated in Fig. 4, bears against a stop 66. Said stop also acts as a clamp and by means of screws 67 it clamps one leg 68 of a U-shaped spring 69 to the standard 57. The other leg 70 of said U-shaped spring 69 is bent at its free end to form a V, one side 71 of said V bearing against the arm 64 and holding it against the stop 66 when the parts are in operative position, the other side 72 of said V bearing against the opposite side of said arm and holding the sinker wheel 54 out of operative position with relation to the needles. The base 73 of said U-shaped flat spring bears against a stop screw 74 which has screw-threaded engagement with the stop 66.

When the parts are in the position illustrated in Fig. 4 the sinkers are in operative relation to the needles of the primary cylinder and the sinker wheel is held yieldingly in this position by the spring 70 which bears against the arm 64 and holds said arm 64 against the stop 66, with the sinker wheel and its sinkers in operative position relatively to the needles of the primary needle cylinder. When, however, anything happens to prevent the free rotation of the sinker wheel, such as the yarn bunching on the needles or the needles becoming bent, then the sinker wheel is moved in the same

general direction as the portion of the needle cylinder adjacent thereto and the sinkers are moved out of operative position with relation to the needles, this operation being substantially the same as described in my Patent No. 1,003,085, and as the sinker wheel moves out of operative position relatively to the needles the leg 70 of the spring 69 is sprung outwardly by the arm 64 until the portion 72 of said flat spring contacts with the right hand side of the arm 64 (Fig. 4), when it will be evident that said arm 64 will be held by said flat spring in such a position that the sinker wheel will be held out of operative position relatively to the needles.

The stop-screw 74 supports the flat spring 69 while the arm 64 is moving past the V-shaped portion of the flat spring. Otherwise, said flat spring would bend from the point where it is clamped between the stop 66 and the standard 57, the whole end of said spring swinging with the arm 64, but as the base 73 is supported against the stop-screw 74 the action of said flat spring when the arm 64 is moved to the left (Fig. 4) is to spring outwardly away from the standard 57 and allow the arm 64 to pass from one side of the V-shaped portion of said flat spring to the other. By this construction a light and flexible flat spring can be employed which will firmly hold the sinker wheel in position but yet will allow it to yield readily when there is a needle bent or when a bunch of yarn collects on the needles.

The sinker wheel is thrown back into operative position by the operator who springs the leg 70 outwardly to allow the arm 64 to be pushed against the stop 66, when the leg 70 of the flat spring is released and assumes the position illustrated in Fig. 4 with the parts locked in position ready for operation. When the sinker wheel is moved in the general direction of movement of that portion of the needle cylinder adjacent thereto the vertical portion 65 of the arm 64 will engage an arm 75 which is fastened to a circular slide 76. Said circular slide 76 is arranged to slide in suitable guide brackets 77 fast to the lower bed plate 36 and has an arm 78 fast thereto (Fig. 2) which engages an arm 79 fast to the vertical rock-shaft 33 forming a portion of the instrumentalities for releasing the stop mechanism.

A spiral spring 80 encircles the shaft 34, one end of said spring being fastened to the bearing 34 and the other end to the shaft 33 and said spring operates to rock the shaft 33 counter-clockwise. It will be seen that when the arm 78 is actuated by the circular slide 76 to rock the shaft 33 clockwise, the dog 31 will release the pin 29, thus allowing the stop motion mechanism to operate, as hereinbefore described to disconnect the clutch member 18 from the clutch pulley 17, and the machine will then stop.

In the particular embodiment of my invention illustrated in the drawings, the sinker wheels of four of the feeds operate the circular slide 76 to release the stop mechanism, as hereinbefore described, and the sinker wheels of the other five feeds operate a similar circular slide 81 which has an arm 82 thereon which operates to rock one of the shafts 33 in the manner hereinbefore described to release the stop mechanism and stop the machine whenever the slide 81 is moved by any one of the five sinker wheels on the left hand side of the machine (Fig. 3), while any one of the sinker wheels at the right hand side of the machine will operate the stop mechanism to stop the machine through the slide 76, as hereinbefore described.

The two slides 76 and 81 are used to operate the rock-shafts 33 on the right and left hand sides of the machine (Fig. 3) in order to operate the stop mechanism, merely for the sake of convenience in the construction and operation of the machine. It is evident that if desired the circular slide might extend entirely around the machine and form a single circular slide which would be operated by any one of the sinker wheels in the nine different feeds without departing from the spirit of my invention.

The primary needles are pressed at the proper time by a presser 83 which is preferably made in one piece with a supporting member 84 (Fig. 5), said supporting member extending outwardly from the needle cylinder at the left hand side of the sinker wheel 54 and terminating in a radially extending rod 85 which is slidably mounted upon a bracket 86 fast to a presser stand 87 which, in turn, is fastened to the lower bed plate 36. Said presser 83 is held in yielding engagement with the needles of the primary cylinder by a spring 88 which encircles a rod 89 fast to the bracket 86 and bears at one end against an arm 90 fast to the rod 85 and at the other end against a nut 91.

When the sinker wheel is thrown from operative to inoperative position, it throws the primary presser 83 out of engagement with the needles by rocking a lever 92 which is pivoted at 93 to a bracket 94 fast to the bracket 86. The outer end of said lever 92 bears against the arm 90, so that when said lever is rocked by the sinker wheel being thrown out of operative position it rocks the lever 92 and by means of the arm 90 pushes the rod 85 outwardly, thus removing the pressure of the primary presser 83 from the primary needles.

The secondary presser 95 is disk-shaped and is rotatably mounted upon a stud 96 which has a hub 97 (Fig. 9) and said hub is clamped to a rod 98 which thus forms a supporting member for the secondary presser. The rod 98 is slidably mounted in

a bracket 99 which is pivoted at 100 to a vertically disposed rod 101 which has screw-threaded engagement with a bracket 102, said bracket 102 being fastened to a secondary needle cam bracket 103 which has a secondary needle cam 103' fast thereto and which is adjustably fastened to the upper bed plate 40 by means of screws 104 which project through slots 105 in said needle cam bracket.

A support 133 is provided for the primary needles. Said support has a foot 134 thereon which bears against the backs of the primary needles to take any lateral thrust that may be brought to bear upon said needles when they are in their advanced positions, such, for example, as the lateral thrust brought to bear upon said needles when the thread is fed between the needles by the sinkers. Said support is attached by screws 135 to the secondary needle cam bracket 103, the object of this construction being to provide a means whereby when the secondary needle cams are adjusted in a circumferential direction relatively to the secondary needle cylinder 48 by means of the screws 104 the needle support for the primary needles will at the same time be adjusted therewith. Thus by one adjustment the needle support and the secondary needle cams are adjusted together.

Said secondary presser 95 is held against the secondary needles 106 by a spring 107 which encircles a rod 108 fast to the bracket 99 and bears at one end against an arm 109 and at the other end against a nut 110 having screw-threaded engagement with the rod 108. The arm 109 is provided with a stop-screw 111 adapted to abut against the bracket 99 to limit the distance to which the presser 95 can be moved inwardly by the spring 107.

It will be noted that said secondary presser 95 is mounted upon and adjustable with the secondary needle cam bracket 103 the supporting member 98 for said secondary presser extending radially outward from the needle cylinders and that the stud 55 of the sinker wheel of its respective feed is located between said member 98 and the supporting member 84 for the primary presser. It will be noted that a portion of both the primary presser and of the secondary presser is located beneath the sinker wheel 54, thus enabling the two pressers and the sinker wheel to occupy a comparatively small space upon the lower bed plate. When it is desired to adjust said rotary presser 95 in a direction tangential to the needles of the secondary cylinder, it may be done by loosening the set nut 102' and rotating the rod 101 until said presser 95 has been moved to the desired position. The rod 101 and said presser are then locked in position by means of the lock nut 102.

The stop mechanism hereinbefore referred to is operated by another device, namely, a tripper arm 112 (Fig. 2). This tripper arm 112 is operated when the yarn bunches on the needles. Two of these tripper arms only are used on the machine, located, preferably on diagonally opposite sides thereof, as illustrated in Fig. 3. Said tripper arm 112 is fastened to the upper end of the rock-shaft 33 and terminates at its free end in close proximity to the needles of the primary cylinder in a contact member 113 consisting, preferably, of a piece of flat steel, which, in plan view, as illustrated in Fig. 3, is normally inclined at an angle to the periphery of the needle cylinder and in the opposite direction to that in which said cylinder rotates, the outer free edge of said piece 113 being located at the rear side of a vertical plane containing the axial lines of the needle cylinder and of the arm 112. In other words, said flat spring 113 is curved backwardly at its outer free end.

By reference to Fig. 2 it will be seen also that said flat steel piece is provided with a notch 114 in its outer edge whereby said outer edge terminates in an upper prong 115 and in a lower prong 116. The notch 114 allows the beards of the needles and the loops of the fabric to pass therethrough without engaging the contact member 113 and without, therefore, operating the tripper arm 112 to stop the machine, but if the yarn becomes bunched on the needles then said yarn will engage the contact member 113 and will push the same in the direction to rotate the shaft 33 clockwise. At the same time the curved outer portion of the contact member 113 will tend to straighten out and will enter one of the tricks 61' in the primary cylinder. Then the primary cylinder will, together with the bunched yarn on the needles, move the tripper arm 112 so as to rotate the shaft 33 clockwise and thus will turn the dog 31, releasing the pin 29 and the stop motion will then be operated to stop the machine, as hereinbefore described.

The fabric 117 which is knitted on the machine is preferably carried upwardly through the secondary needle cylinder by a suitable take-up mechanism, such, for example, as is disclosed in my U. S. Letters Patent No. 1,013,471, patented January 2, 1912, to which reference may be had. Said take-up mechanism holds the fabric 117 under tension longitudinally thereof and the same is held under tension laterally thereof by means of a guide-ring 118 which is fastened to the running ring 45 of the lower needle cylinder by a shaft 131 and wheel 132. Said guide ring 118 has a plurality of projections 119, preferably in the form of brackets, fast thereto, each of said brackets having a depending arm 120.

In order to stop the machine when there is

a hole in the cloth caused by a broken needle or the dropping of a stitch, or when a press off occurs, I have provided in my machine two tripper fingers 121 and 122 (see Figs. 1 and 2), each of which is adapted to bear against the outer face of the fabric 117 and is normally held out of the path of the projections 120 by said fabric. Each of said fingers has means which are adapted to move the same into the path of said projections, however, when allowed so to do by said fabric, and in that case instrumentalities are operated by said fingers to actuate the stop mechanism to stop the machine.

The tripper finger 121 has a narrow somewhat pointed end 123, while the tripper finger 122 has an end 124 of substantial width. The tripper finger 121 acts to stop the machine when a hole appears in the cloth. Said tripper finger 121 is held with a spring pressure against the outer face of the fabric 117 by means of a spring 125 which acts to move the tripper finger 121 toward the fabric 117. Said tripper finger 121 consists of a slide arranged to slide in ways on a rocker frame 126 which is mounted to rotate upon a standard 127 fast to the upper bed plate 40. The rocker frame 126 has an arm 128 fast thereto and extending downwardly (see Fig. 2) with the lower end of said arm engaging the tripper arm 112.

When a hole, due to a broken needle or to any other cause, appears in the fabric 117, the spring 125 will cause the tripper finger 121 to enter said hole and as the fabric continues in its rotation it will rock the rocker frame 126 clockwise and the arm 128 will rotate the tripper arm 112 clockwise, together with the vertical rock-shaft 33, thus operating the dog 31 to release the pin 29 and thus allow the stop mechanism to be operated to stop the machine.

If a press off should occur the fabric 117 would slacken up and the tripper finger 121 would be moved forward by the spring 125 so that it would be engaged by one of the arms 120 which would rotate the tripper finger in the manner hereinbefore described to cause the machine to be stopped. When, as hereinbefore described, a hole occurs in the fabric from any cause and the machine has been stopped, it is evident that if the machine is again started up after the cylinders have made one rotation the tripper finger will again stop the machine by entering the hole a second time.

In order to prevent this, under such circumstances, the tripper finger 122 is provided with an end 124 which is of sufficient width to extend across the hole in the fabric when said hole comes into alignment therewith and thus while taking care of the stopping of the machine, in case a press off should occur the machine will not be stopped by the finger 122 entering said hole a second

time, the operator being careful to draw the tripper finger 121 out of the hole before starting the machine again and moving said finger 121 around counterclockwise to a position where it will not contact with the fabric. This can be readily done without interfering with the other portions of the actuating mechanism for operating the stop mechanism, as the arm 128 can be moved counterclockwise without engaging the tripper arm 112.

The tripper finger 122 is in all respects like the tripper finger 121 except for the formation of its end 124 and either the tripper finger 121 or the tripper finger 122 or both of said tripper fingers will be operated by the arms 120 should a press off occur, for the fabric would then slacken up and these fingers would be moved by their respective springs toward the center of the cylinders, and as said cylinders rotate the guide ring 118 would cause the arms 120 to encounter said fingers and rotate them clockwise to operate the stop mechanism to stop the machine.

The needles 106 of the secondary cylinder are held in the tricks in the usual manner by springs 129 which encircle the secondary cylinder, and these springs are placed in such a position relatively to the needle jacks 130 and to the lower edge of the secondary cylinder and to the gear 63 that when the needles 106 are in their most advanced position the jacks 130 will abut against the upper spring 129 and at that time the lower end of the needles will be located above or will clear the gear 63.

If it should happen, due to carelessness of the operator, that some of the secondary needles were left too far down so that their lower ends would engage the gear 63, it would cause trouble if a guard cam were not provided to prevent it.

If for example an operator after manipulating a needle to straighten the same by pliering should carelessly leave a secondary needle too low down and no guard cam were used to push it up into place, it would collide with the gear 63. In other cases, when a press off occurs and the tension of the yarn on the needles is removed, the needles of their own volition will slide down in the tricks far enough to engage the gear 63. In order to overcome these difficulties a guard cam has been employed for each feed which pushed the secondary needles up in their tricks to a sufficient extent to clear the gear 63 before they could engage it. To eliminate these difficulties and particularly to do away with the guard cams in my improved machine I have so proportioned the parts and arranged them relatively to each other that the needles 106 cannot be moved downwardly to a sufficient extent so that they can collide with the gear 63. Before this could happen

the jack 130 engages the spring 129 and prevents the needle from descending to such an extent as to engage said gear 63.

The general operation of the mechanism 5 and of the devices hereinbefore specifically described is as follows: The needle cylinders 44 and 48 are rotated counterclockwise by the gears 47 and 51 as hereinbefore described. If the yarn bunches on the needles the tripper arm 112 will be operated as hereinbefore 10 fully set forth to rock the shaft 33 and disengage the pin 29 from the notch 30 in the dog 31, thus allowing the stop mechanism hereinbefore described to operate to throw 15 the clutch member 18 out of engagement with the clutch pulley 17 and stop the machine.

If a hole appears in the fabric 117, due to a broken needle or to any other cause, the 20 tripper finger 121 will enter the hole in the fabric when it arrives in alinement therewith and the movement of the fabric will cause the tripper finger 121 to be moved clockwise, thus rocking the rocker frame 126, 25 and the lower end of the arm 128 being in engagement with the tripper arm 112 will rock said tripper arm and the shaft 33 to which it is fastened to operate the dog 31 to release the pin 29 and allow the stop mechanism to operate to stop the machine. After 30 the machine has been stopped and the broken needle or whatever may have caused the hole in the fabric has been remedied, the operator pulls the tripper finger 121 outwardly and 35 rocks the rocker-frame 126 counterclockwise to a sufficient extent to remove the tripper finger 121 from contact with the fabric, the arm 128 moving away from the tripper arm 112 during this operation. The tripper finger 121 is then left in this position until the 40 fabric is fed up sufficiently so that the hole therein has passed above the tripper finger 121, whereupon said tripper finger can again be thrown into operative position by the 45 operator.

While the tripper finger 121, however, is out of operative position, the tripper finger 122 remains in operative position and having a broad end 124 it is obvious that when the 50 fabric arrives at this tripper finger the same will pass by said tripper finger without causing the same to operate the stop mechanism.

If, however, there should be a press off 55 either one or both of the fingers 121 and 122 will be operated by the arms 120 to rock said tripper fingers clockwise and thus operate the shafts 33 and their dogs 31 to release the pins 29 and allow the stop mechanism to operate to stop the machine. 60

It will be understood that the pin 29 remains at all times in contact with the dog 31, being located either in the notch 30 or farther away from the center of the shaft 33 65 and in engagement with the inclined edge

32 and thus at all times perfectly controls the tripper arm, whether said tripper arm is in or out of operative position, so that when the machine is again set in position to be operated and the dog 31 is moved counterclockwise the pin 29 will be moved along the inclined edge 32 and into the notch 30 as illustrated in Fig. 3.

If the needles jam in the sinker wheel or if the yarn becomes bunched or jammed in the 75 sinker wheel, or if for any reason the free rotation of any one of the nine sinker wheels is interfered with, the sinker wheel will be moved in the general direction of that part of the needle cylinder adjacent thereto, so as 80 to move the rocker frame 56 which, as hereinbefore described, will cause the arm 65, the lower end of which engages the arm 75, to move the circular slide 76 or the circular slide 81, as the case may be, to move the 85 arm 78 which is in engagement with the arm 79 to rock the vertical shaft 33 and cause the dog 31 to disengage the pin 29 from the notch 30 and allow the stop mechanism to operate. In the latter case the sinker wheel 90 is moved back into position by the operator who, preferably, moves the free end of the spring 69 outwardly so that the arm 64 can be brought back into contact with the stop 95 66. The flat spring is then released by the operator to lock said arm and the sinker wheel in operative position, as illustrated in Fig. 4.

It will be noted that by the relative arrangement of the gears 51 and 50 and 46 and 100 47 a clear space is left between the upper and lower bed plates adjacent to the vertical shaft 39, so that the needle cams of the upper and lower cylinders and the different instrumentalities connected with the feeds, 105 as, for example, the pressers and sinker wheels, can be placed near said shaft and thus enable a greater number of feeds to be introduced in the machine than would be the case if the gear 51, for example, were placed 110 beneath the upper bed plate. Moreover, the arrangement of the gears 50 and 51 with the ring 53 and bracket 51 and bracket plates 52 covering the same secures absolute freedom from danger of injury to the operatives 115 and also prevents lint, dust and dirt from getting into the gears 51 and 50. Moreover the space is rendered free from obstructions so that it is easy to get at the feeds and needles adjacent to the vertical shaft 39 on 120 opposite sides thereof.

The advantages of the construction will be apparent in this regard by reference to Fig. 7. It is very important in a machine of this class to be able to get at the different feeds 125 and needles and to see the different parts so as to detect any imperfections and poor adjustment so that everything that makes for simplicity and for compact arrangement of the different parts is a great improve- 130

ment to the machine from a practical point of view.

In view of the other safeguards hereinbefore referred to, namely, the tripper fingers 121 and 122 and the tripper instrumentalities operated by the sinker wheels, it is only necessary at most that two of the tripper arms 112 should be employed in the machine and this leads to a great saving of space and expense, as heretofore a tripper finger and all the instrumentalities connecting said tripper finger to the stop mechanism were used for each feed, thus taking up a great deal of space and causing considerable expense.

It will be understood that in each case when the stop motion mechanism is operated to throw out the clutch member 18 a brake is applied to stop the machine substantially like the brake mechanism illustrated and described in my patent for "Stop motion mechanism," No. 1,173,244, patented February 29, 1916.

It will be understood that by carrying the support for the presser for the primary needles outwardly from the needle cylinder at the left of the sinker wheel Fig. 5, the sinker wheel will be left free to be moved out of operative position without colliding with said support. Also by setting the secondary presser at substantially the same angle as the sinker wheel, the sinker wheel can be thrown out of operative position without colliding with the secondary presser.

It will also be seen that by putting the spring 69 on the stand 57 room is provided to allow the primary presser stand to be fastened to the periphery of the lower bed plate and thus leave the upper face of the lower bed plate free of obstructions to the free access to the primary needle cams by the operator.

It will be seen by reference to Fig. 3 that the cam bracket 103 indicated in broken lines in said figure comes very close to the shaft 39. As a matter of fact the placing of the gear 51 above the bed plate 40 enables an extra feed to be put into the machine. It will also be noted that between the feeds A and B in said Fig. 3 there is considerable space. This space is for the purpose of enabling the operator to put the work on the needles when the machine is first started or when there has been a press off. The larger this space is made the more convenient it is for the operator.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A rib knitting machine for knitting a tube of fabric having, in combination, a rotary needle cylinder, a take-up mechanism constructed and arranged to hold said tube of fabric under tension, a rotary member adapted to be located within said tube of

fabric, and rotatable with said cylinder, a tripper finger constructed and arranged to bear against the outer face of said fabric and normally held out of the path of said rotary member by said fabric, a stationary support upon which said tripper finger is movably mounted, means adapted to move said finger into the path of said rotary member when allowed so to do by said fabric and instrumentalities adapted to be operated by said finger to actuate said stop mechanism when said finger is engaged by said rotary member.

2. A rib knitting machine for knitting a tube of fabric having, in combination, a rotary needle cylinder, means to hold said fabric under tension, a rotary guide ring arranged to engage the inner face of said fabric and hold it under tension, a projection on said guide ring, a tripper finger constructed and arranged to bear against the outer face of said fabric and normally held out of the path of said projection by said fabric, a stationary support upon which said tripper finger is movably mounted, means adapted to move said finger into the path of said projection when allowed so to do by said fabric and instrumentalities adapted to be operated by said finger to actuate said stop mechanism when said finger is engaged by said projection.

3. A knitting machine for knitting a tube of fabric having, in combination, a needle cylinder, means to hold said fabric under tension, a rotary member arranged to be located within said tube of fabric, a tripper finger having an end of substantial width constructed and arranged to bear against the outer face of said fabric and normally held out of the path of said rotary member by said fabric, means adapted to move said finger into the path of said rotary member when allowed so to do by said fabric and instrumentalities adapted to be operated by said finger to actuate said stop mechanism when said finger is engaged by said rotary member.

4. A knitting machine for knitting a tube of fabric having, in combination, a needle cylinder, means to hold said fabric under tension, a rotary member adapted to be inclosed within said tube of fabric, a tripper finger having a narrow end and a tripper finger having an end of substantial width, said ends constructed and arranged to bear against the outer face of said fabric and normally held out of the path of said rotary member by said fabric, means adapted to move said fingers into the path of said rotary member when allowed so to do by said fabric and instrumentalities adapted to be operated by said fingers to actuate said stop mechanism when said fingers are engaged by said rotary member.

5. A rib knitting machine for knitting a

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tube of fabric having, in combination, a rotary needle cylinder, means to apply tension to said fabric longitudinally thereof, a rotary guide ring arranged to engage the inner face of said fabric and hold it under tension laterally thereof, a bracket on said guide ring with an arm extending therefrom longitudinally of said fabric tube, a tripper finger constructed and arranged to bear against the outer face of said fabric and normally held out of the path of said arm by said fabric, a stationary support upon which said tripper finger is movably mounted, means adapted to move said finger into the path of said arm when allowed so to do by said fabric and instrumentalities adapted to be operated by said finger while said finger is being moved in one direction to actuate said stop mechanism when said finger is engaged by said arm.

6. A knitting machine having, in combination, a rotary needle cylinder, with needles, a stop mechanism, a pivotally mounted tripper arm, instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to needles of said needle cylinder in a contact member of yielding material normally inclined at an angle to the periphery of said cylinder and in the opposite direction to that in which said cylinder rotates.

7. A knitting machine having, in combination, a rotary needle cylinder with needles, a stop mechanism, a pivotally mounted tripper arm, instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to needles of said needle cylinder in a contact member of yielding material normally inclined at an angle to the periphery of said cylinder and in the opposite direction to that in which said cylinder rotates, with its outer free edge located outside of and to the rear side of a vertical plane containing the axial lines of said cylinder and arm.

8. A knitting machine having, in combination, a rotary needle cylinder with needles, a stop mechanism, a pivotally mounted tripper arm and instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to needles of said needle cylinder in a flat spring curved backwardly at its outer free end.

9. A knitting machine having, in combination, a rotary needle cylinder with needles, a stop mechanism, a pivotally mounted tripper arm and instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to needles of said needle cylinder

in a flat spring curved backwardly at its outer free end and having a notch in its outer edge whereby said outer edge terminates in an upper and a lower prong.

10. A knitting machine having, in combination, a rotary needle cylinder with needles, a stop mechanism including an arm with a projection thereon, a vertical rock-shaft, a tripper arm fast to said shaft and a dog fast to said shaft, said dog comprising an arm with a notch in one side thereof at a substantial distance from its free end and adapted to receive said projection and means adapted to hold said projection at all times in contact with said dog arm.

11. A knitting machine having, in combination, a rotary needle cylinder with needles, a stop mechanism including an arm with a projection thereon, a vertical rock-shaft, a tripper arm fast to said shaft and a dog fast to said shaft, said dog comprising an arm with a V-shaped recess in one side thereof, said side having a notch therein adapted to receive said projection and means adapted to hold said projection at all times in contact with said dog arm.

12. A knitting machine having, in combination, a needle carrier, a set of needles therefor, a sinker wheel with sinker blades adapted to be engaged by said needles, a yieldingly mounted support upon which said sinker wheel is rotatably mounted, a portion of said support being movable in the general direction of movement of the portion of said carrier adjacent thereto, a stop mechanism and instrumentalities, including a slide, adapted to actuate said stop mechanism, said slide being operated directly by the movement of said sinker wheel and by the movement of a portion of said support in the direction of movement of said slide.

13. A knitting machine having, in combination, a needle carrier, a set of needles therefor, a plurality of sinker wheels with sinker blades adapted to be engaged by said needles, a yieldingly mounted support for each of said sinker wheels upon which said sinker wheels are rotatably mounted, said yieldingly mounted supports being movable in the general direction of movement of the portion of said carrier adjacent thereto, a stop mechanism, and instrumentalities, including a slide, adapted to actuate said stop mechanism, said slide being adapted to be operated directly by the movement of any one of said sinker wheels and by the movement of a portion of any one of said supports in the direction of movement of said slide.

14. A circular knitting machine having, in combination, a circular needle carrier, a set of needles therefor, a plurality of sinker wheels with sinker blades adapted to be engaged by said needles, said sinker wheels

arranged in series around said needle carrier, yieldingly mounted supports upon which said sinker wheels are rotatably mounted, a portion of each of said supports being movable in the general direction of movement of the portion of said carrier adjacent thereto, whereby under conditions of abnormal stress said sinker wheels and a portion of their support will be moved in the direction aforesaid, a stop mechanism and instrumentalities, including a circular slide, adapted to actuate said stop mechanism, said slide being operated directly by the movement of any one of said sinker wheels in the direction aforesaid and by the movement of a portion of any one of said supports in the direction of movement of said circular slide.

15. A knitting machine having, in combination, a circular needle carrier, a set of needles therefor, a sinker wheel with sinker blades adapted to be engaged by said needles, a yieldingly mounted support upon which said sinker wheel is rotatably mounted, said sinker wheel and its support being movable in the general direction of movement of the portion of said carrier adjacent thereto whereby under conditions of abnormal stress said sinker wheel and a portion of its support will be moved in the direction aforesaid, an arm on said support, a stop mechanism and instrumentalities including a circular slide adapted to actuate said stop mechanism, said slide being operated directly by the movement of a portion of said arm in the direction of movement of said slide.

16. A machine for knitting a tube of fabric having, in combination, a circular needle carrier with needles thereon, a tripper arm having its free end in close proximity to the needles of said needle carrier, a sinker wheel with sinker blades adapted to be engaged by said needles, a yieldingly mounted support upon which said sinker wheel is rotatably mounted, said support being movable relatively to said needle carrier whereby under conditions of abnormal stress said sinker wheel and its support will be moved relatively to said needle carrier, a slide adapted to be moved by the movement of said sinker wheel support, a stop mechanism, and instrumentalities operated directly by the movement of either said tripper arm or said slide adapted to actuate said stop mechanism.

17. A machine for knitting a tube of fabric having, in combination, a circular needle carrier with needles thereon, means for holding said tube of fabric under ten-

sion, a tripper finger adapted to bear against the outer face of said tube of fabric, means adjacent to said tripper finger located on the opposite side of said tube of fabric therefrom and adapted to support said fabric against lateral pressure of said tripper finger thereagainst, a tripper arm having its free end in close proximity to the needles of said needle carrier, a sinker wheel with sinker blades adapted to be engaged by said needles, a yieldingly mounted support upon which said sinker wheel is rotatably mounted, said support being movable relatively to said needle carrier whereby under conditions of abnormal stress said sinker wheel and its support will be moved relatively to said carrier, a slide adapted to be operated directly by the movement of said sinker wheel support, a stop mechanism and instrumentalities operated by the movement of said tripper finger, said tripper arm or said slide adapted to actuate said stop mechanism.

18. A knitting machine having, in combination, a rotary needle cylinder with needles located in tricks provided in the periphery of said needle cylinder, a stop mechanism, a pivotally mounted tripper arm and instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to the periphery of said needle cylinder, normally located out of engagement therewith and adapted to enter one of said tricks when a rotary motion is imparted thereto.

19. A knitting machine having, in combination, a rotary needle cylinder with needles located in tricks provided in the periphery of said needle cylinder, a stop mechanism, a pivotally mounted tripper arm and instrumentalities adapted to be operated by said tripper arm to actuate said stop mechanism, said tripper arm terminating at its free end in close proximity to the periphery of said needle cylinder and adapted to be advanced into one of said tricks when rotated by bunched yarn located on said needles, whereby said tripper arm will be rotated by engagement with said needle cylinder and said stop mechanism actuated to stop said machine.

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

WILLIAM T. BARRATT.

Witnesses:

CHARLES S. GOODING,
CHARLES S. KEHOE.