

No. 864,354.

PATENTED AUG. 27, 1907.

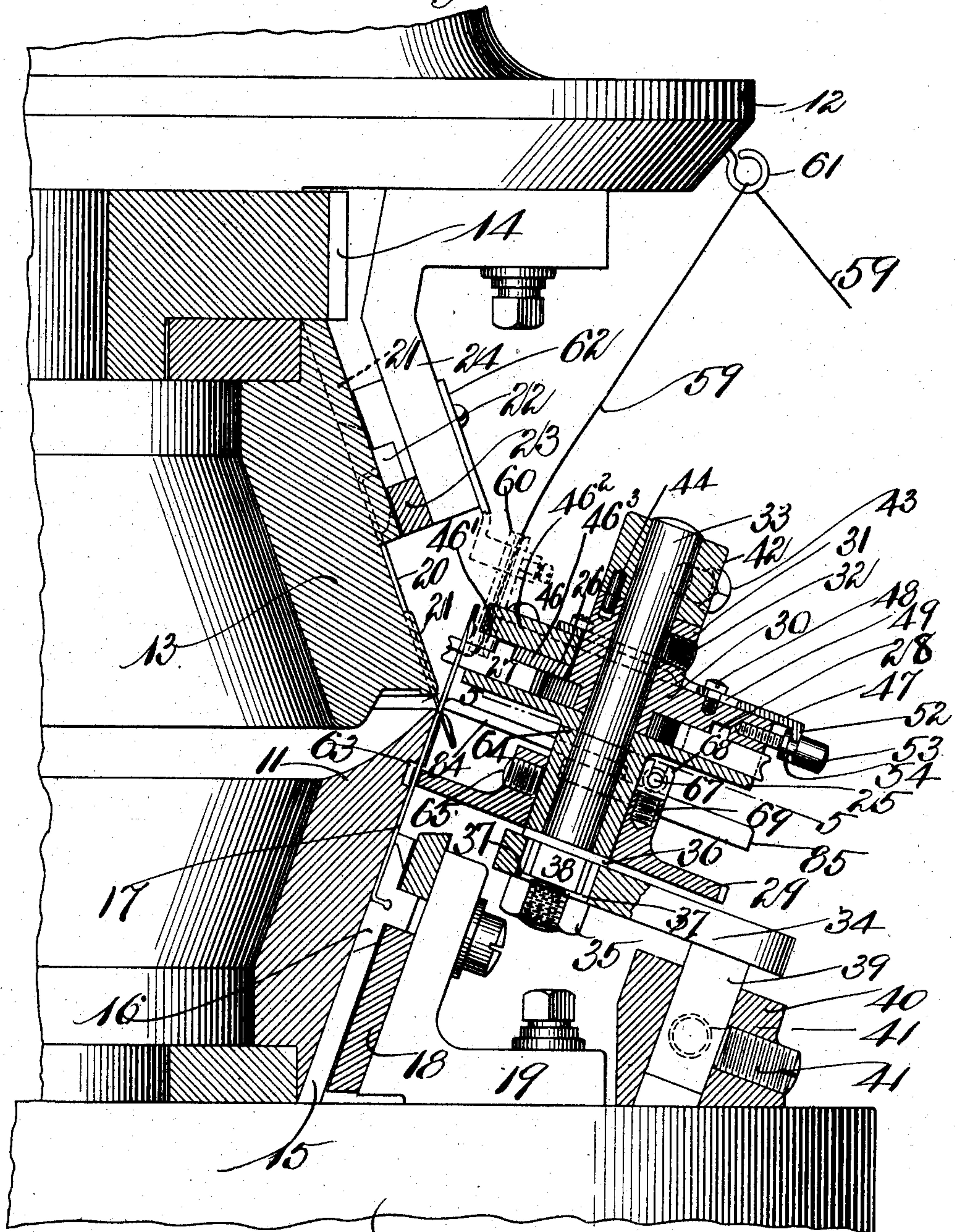
W. T. BARRATT.

SINKER WHEEL FOR CIRCULAR KNITTING MACHINES.

APPLICATION FILED NOV. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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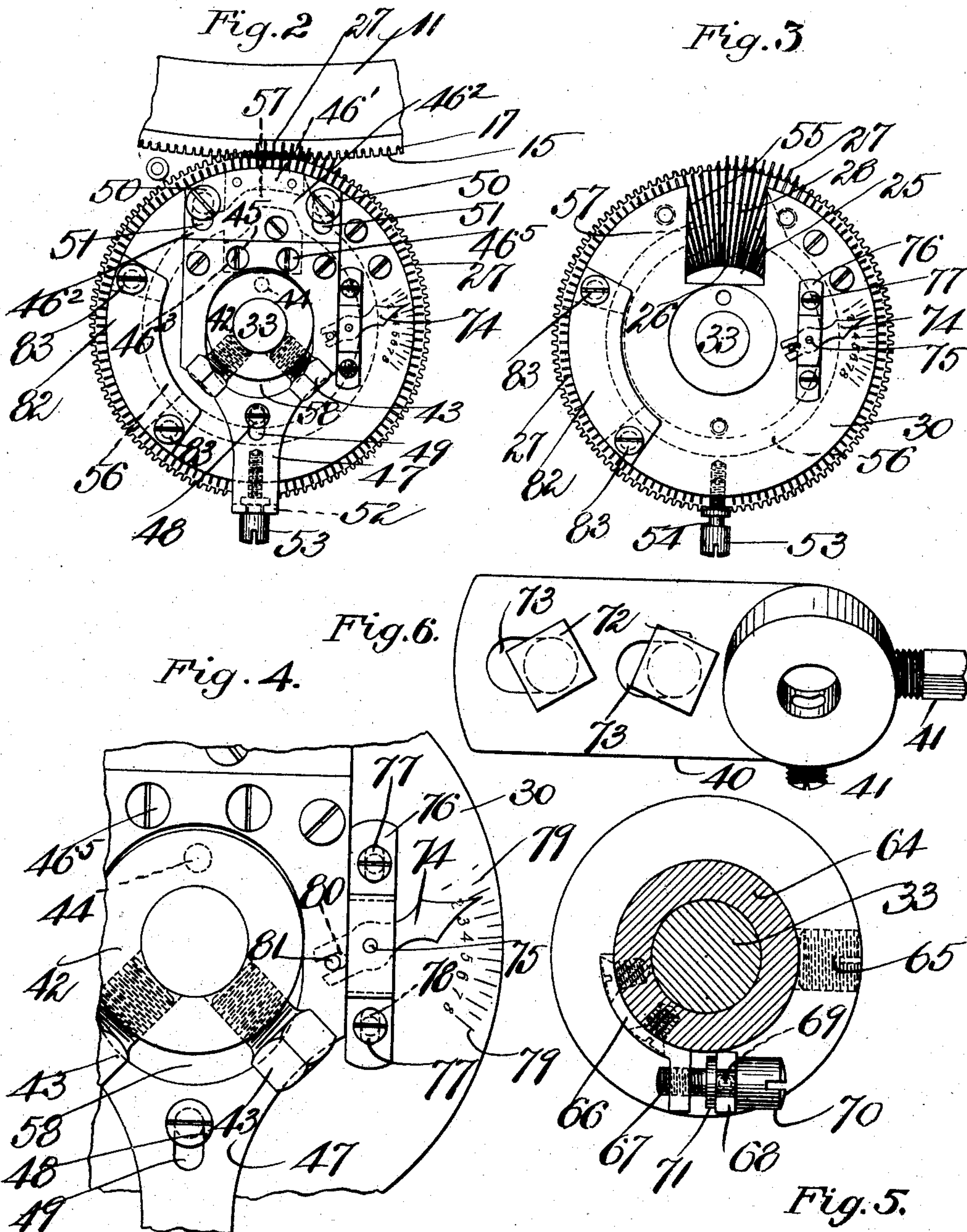
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UNITED STATES PATENT OFFICE.

WILLIAM T. BARRATT, OF BENNINGTON, VERMONT, ASSIGNOR TO CHARLES COOPER, OF BENNINGTON, VERMONT.

SINKER-WHEEL FOR CIRCULAR-KNITTING MACHINES.

No. 864,354.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed November 26, 1906. Serial No. 345,009.

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 Sinker-Wheels for Circular-Knitting Machines, of which the following is a specification.

This invention relates to improvements in a circular rib knitting machine and particularly to that portion of said knitting machine known as the "sinker wheel."

One object of the invention is to combine two sets of inclined needles in a circular rib knitting machine with a sinker device having sinkers movable relatively thereto in and out between the needles of one of said sets of needles, substantially at right angles to the primary set of needles.

The object of the invention is further to provide a sinker wheel which is adapted to be used in connection with the needle cylinders of a circular rib knitting machine and is particularly constructed and adapted to be used in combination with two conical needle cylinders using spring needles for the purpose of knitting a tubular ribbed fabric.

The object of the invention is further to provide certain improved mechanism for rotating the sinker wheel and means to adjust said sinker wheel relatively to said rotating mechanism.

The object of the invention is again to provide a device of the character hereinbefore set forth which may be adjusted in any desired direction relatively to the primary needle cylinder and the needles located thereon in order that said sinkers may accurately feed the yarn between said needles at the required height and to the requisite depth prior to the stitch forming operation.

The object of the invention is still further to provide a convenient means for readily adjusting the sinker wheels of different feeds upon the same machine, so that each sinker wheel will feed to the needles the same length of yarn for a certain number of stitches independent of any inaccuracies arising from the construction or assembling of the machine.

The invention consists, fundamentally, in a knitting machine provided with two sets of inclined spring needles combined with means for feeding the yarn to the needles, consisting of a sinker wheel equipped with sinkers adapted to be moved relatively to the sinker wheel and in and out between the primary needles and which consists particularly in the mechanism shown and described, whereby the combined instrumentalities are practically adapted to cooperate for the purposes set forth herein.

The invention further 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 sectional elevation of a portion of a circular rib knitting machine showing my improved sinker wheel and its adjusting devices in connection therewith. Fig. 2 is a plan view of said sinker wheel and the adjusting devices connected therewith, the same being shown in connection with a portion of the lower cylinder and its needles. Fig. 3 is a plan view of the same with the slur cock removed. Fig. 4 is a plan view on an enlarged scale of a portion of the slur cock and the indicator device connected thereto. Fig. 5 is an enlarged sectional plan taken on line 5—5 of Fig. 1. Fig. 6 is a detail plan view of the base 40 forming a portion of the sinker wheel stand.

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

In the drawings, 10 is the bed-plate upon which is rotatably supported the lower needle cylinder 11.

12 is the cap-plate upon which is rotatably supported the upper cylinder 13.

The upper cylinder 13 is rotated by means of a gear 14 fast to said cylinder 13, the lower cylinder 11 being rotated in a similar manner by a gear not shown in the drawings.

The lower cylinder is provided with grooves or tricks 15 in its periphery in which the jacks 16 and their needles 17 are adapted to slide, said jacks and needles being moved longitudinally of the tricks 15 by the rotation of the cylinders coacting with the needle cams 18 which are supported upon brackets 19 fast to the bed-plate 10. The upper needles 20 are adapted to slide in tricks or grooves 21 formed in the periphery of the upper cylinder 13. The upper needles 20 are connected to jacks 22 and are moved longitudinally of the tricks 21 by cams 23 fast to brackets 24, said brackets being fastened to the cap-plate 12.

The rotation of the cylinders and the operation of the spring needles 17 and 20 is substantially the same as in the machine set forth in the patent to Daniel Hurley dated December 8, 1896, No. 572,679.

The sinker wheel 25 has a series of grooves 26 in the upper face thereof, said grooves radiating from a common center and in these grooves or tricks are located sinkers 27, each of said sinkers being provided with a lug 27' which projects into a groove 26 formed in the under face of the cam 30. The cam 30 has a hub 31 projecting upwardly therefrom which has a flush set-screw 32 in screw-threaded engagement therewith adapted to bear against the shaft or stud 33 which is rigidly clamped at its lower end to a bracket 34 by means of a nut 35. The stud 33 is provided with a flange 36 which bears against the upper face of the

bracket arm 34 and that portion of the stud between the flange 36 and the nut 35 projects through a slot 37 in the bracket 34 and is flatted off at 38 to prevent the rotation of said stud relatively to said bracket. The bracket 34 has a cylindrical stem 39 fast thereto or integral therewith which projects into a base 40 to which it is secured by set-screws 41, 41. It will be understood that the cam 30 is fastened to the stud 33 by the set-screw 32 and said cam is further securely fastened to said stud, in order to prevent rotation thereon, by a collar 42, which is fastened to the stud 33 by set-screws 43, 43 and is locked to the cam 30 by a pin 44 which is fast to the collar 42 and projects downwardly therefrom into the hub 31 of said cam 30.

The slur-cock 45 consists of a cam block 46 and a slide-plate 47 fast to said cam block and extending across the upper face of the sinker cam 30. Said cam block 46 is preferably made in three parts, viz., 46', 46² and 46³. The part 46' is fastened to the lower face of the part 46² by rivets 46⁴, 46⁴ and the part 46³ is fastened to the under face of the part 46² by screws 46⁵, 46⁵, the parts 46³ and 46' having a cam groove or space 57 therebetween which forms a continuation of the cam groove 56 formed in the under face of the cam plate 30. This construction enables the part 46³ to be removed from the part 46², when the same becomes worn, and to be replaced by a new part 46³.

The slide-plate 47 is suitably guided upon the cam-plate 30 by a screw 48 which projects through a slot 49 provided in the slide-plate 47 and has screw-threaded engagement with the cam-plate 30. Said slide plate is further guided by two screws 50, 50 which project through slots 51, 51 provided in the cam block 46, said screws having screw-threaded engagement with the cam plate 30. The front end of the slide plate 47 is bent downwardly at 52 and is forked to straddle an adjusting screw 53, said forked end projecting into an annular groove 54 provided in the periphery of said screw. The screw 53 has screw-threaded engagement with the cam-plate 30. The cam block 46 and slide-plate 47 which form, as a whole, a slur-cock, are still further guided, on being adjusted as hereinafter described, by the slot or opening 55 which is formed in the cam plate and extends therethrough (see Fig. 3), the cam block 46 projecting downwardly into said opening and fitting therein. The slide plate 47 has an opening or slot 58 therein which surrounds the hub 31 of the cam plate 30 and thus enables said slide plate, with the cam blocks attached thereto, to be moved across the upper face of the cam plate 30 by rotating the adjusting screw 53.

The yarn 59 is guided to the sinkers 27 by yarn-guides 60 and 61. The yarn-guide 61 is fastened to the cap-plate 12 and the yarn-guide 60 is fastened to a bracket 62 which, in turn, is fastened to the cam bracket 24. The gear 29 meshes into the needles 17 of the lower cylinder and projects into an annular groove 63 provided in the periphery of the lower cylinder 11. Said gear is fastened to a hub 64 projecting downwardly from the sinker wheel 25, by a set-screw 65. The hub 64 of the sinker wheel 25 has a bracket or arm 66 fast thereto and forming, in effect, a portion thereof, into which is screwed an adjusting screw 67 which rotatably engages a swivel bearing 68. The swivel bearing 68 consists of a screw 69 which engages the hub of the gear 14, the upper end of said screw being forked to

receive the shank of the screw 67 between the head 70 thereof and a flange 71 formed thereon.

The base 40 is adjustably fastened to the bed-plate 10 by screws 72, 72 which project through slots 73, 73 provided in said base and have screw-threaded engagement with said bed-plate 10.

An index finger 74 is pivoted upon a pin 75 fast to a bracket plate 76. The bracket plate 76 is adjustably fastened by means of screws 77, 77 to the upper face of the cam plate 30. The screws 77 project through slots 78, 78 provided in said bracket plate and the outer end of the index finger 74 moves over the upper face of the cam plate 30 adjacent to graduations 79, 79 provided in the upper face of said cam plate. The rear end of said index finger 74 is slotted at 80 to straddle a pin 81 fast to the slide plate 47 which constitutes a portion of the slur-cock 45.

In order to render the device capable of having the sinkers readily removed from the sinker wheel, a segment 82 of the cam plate 30 is made removable from the main portion of said cam and is secured thereto by screws 83, 83, so that if desired said segment may be taken out by removing the screws 83, 83 and the sinkers removed from the sinker wheel to be repaired or replaced.

I will now proceed to describe the operation and manner of adjusting my improved sinker wheel and the parts coacting therewith with relation to the needle cylinders and their respective sets of spring needles. If it is desired to adjust the sinker wheel and the gear by which it is rotated toward or away from the needles 17, the nut 35 is loosened and the stud or stationary shaft 33 is moved in the slot 37 toward or away from the cylinder 11 and its needles 17 to the desired position, and said stud is then fastened or clamped to the bracket arm 34 by tightening the nut 35 which clamps the flange 36 to the upper face of said bracket arm 34. If it is desired to swing the sinker wheel laterally with relation to the cylinder 11 and its needles 17, it may be done by loosening the set-screws 41, 41 and swinging the bracket arm 34, thus rotating the stem 39 in the base 40. Said stem is then clamped to said base by tightening the screws 41, 41. If it is desired to raise or lower the sinkers relatively to the barb of the needle in order to change the height at which the yarn is fed to the needle by said sinkers, it may be done by loosening the set-screw 65 and the set-screws 41, 41 and raising the sinker wheel and cam bodily by moving the stem 39 of the bracket 34 upwardly or downwardly, as desired, in the base 40, then tightening the set-screws 41, 41 and the set-screw 65. If it is desired to move the sinker wheel and its adjusting devices bodily upon the bed-plate 10, it may be done by loosening the screws 72, 72 and moving the said base 40 in the desired direction, said base finally being clamped to the bed-plate 10 by tightening the screws 72, 72.

To adjust the gear 29 about its axis relatively to the sinker wheel 25 and the sinkers 27 slidably supported thereon, so that said sinkers will aline with the spaces between the needles 17, 17 and so that the teeth of the gear 14 will mesh with said needles 17, 17, the set-screw 65 will be loosened and the adjusting screw 67 rotated until said sinkers aline with the spaces between the needles 17 and the teeth of the gear 14 correctly mesh with the needles 17, 17. The set-screw

65 is then tightened, thus clamping the gear 29 to the hub of the sinker wheel 25 in correct operative relation thereto and to said needles 17, 17. If it is desired to move the slur-cock toward or away from the needles 17, 17 the screws 48, 50 and 50 are loosened and the adjusting screw 53 is rotated toward the right or the left to move said slur-cock toward or away from the needles 17, 17, respectively. Said screws 48 and 50, 50 are then tightened and the slur-cock is thus clamped rigidly to the cam-plate 30. This adjustment of the slur-cock toward and away from the needles 17, 17 increases or diminishes the depth to which the sinkers are moved between said needles and, therefore, increases or diminishes, respectively, the length of the loop of yarn fed to said needles. The index finger, 74, together with the graduations 79, 79, indicates the length, therefore, of loop fed to the needles.

In setting up a circular rib knitting machine, as is well known to those skilled in the art, there are several feeds employed around the periphery of the needle cylinders, and it is desirable that each sinker wheel should feed the same length of loop for a certain gage and character of yarn, but owing to the inevitable inaccuracies of mechanical construction it would be practically impossible to set up a plurality of sinker wheels around the periphery of a pair of needle cylinders and have each sinker wheel feed the same length of yarn to a certain number of needles without some adjusting device for overcoming such inaccuracies of mechanical construction, and for this purpose the index finger 74 and its adjustment relatively to the cam plate 30 is provided. The manner in which this index finger is used is as follows: Assuming the different parts of the machine to have been assembled and one sinker wheel and its stand and adjustments set up relatively to said needle cylinders, with the axis of the stud 33 substantially parallel to the needles 17 of the lower cylinder adjacent thereto and with the sinkers adjacent to said needles substantially at right angles thereto, the operator feeds the yarn to the machine and finds that in one hundred loops, for instance, twenty-four inches of yarn of a certain gage is used in the one sinker wheel which has been set up and that the index finger 74 points to "5" under these conditions. The operator then sets up another sinker wheel for another feed and adjusts the sinkers by means of the screw 53 to use twenty-four inches of yarn for one hundred loops. He then notes the reading of the index finger 74, and if said index finger 74 points to "5" upon the graduated scale the device is correctly located in all respects with relation to the needle cylinders and the needles thereon, but if said index finger does not point to the graduation "5", the operator loosens the screws 77, 77 and moves the bracket plate 76 forwardly or backwardly until said index finger does point to the graduation "5" whereupon the screws 77, 77 are tightened and said index finger is then correctly located and the sinker wheel is also correctly located with relation to the needles, so that the same amount of yarn and the same number of loops will be fed to the needles for this second sinker wheel feed as for the first. Each sinker wheel provided for each feed is thus adjusted and set up so that the index finger points to the graduation "5" for one hundred loops and for twenty-four inches of a certain gage yarn used. The operator then knows that for each feed the sinker wheel and the sinkers

thereon are correctly located and adjusted with relation to the needles of the lower cylinder to supply the same number and length of loops for the same length of yarn fed thereto.

Having thus located the sinker wheels correctly and bearing the same relative location to the needles of the lower cylinder for all of the different feeds, a table can be made by the operator for different lengths of loop and different gage yarns which can be utilized at any time desired in the following manner: Assuming that in the table a certain gage of yarn and length of loop is indicated when the index finger points to "8" and the operator desires to use such a yarn and such a length loop, he sets all of the different index fingers until they point at "8" on their respective graduated scales by rotating the screw 53 toward the right until the slur-cock has been moved toward the needles to a sufficient distance so that the pin 81 has moved the index finger 74 upon its pivot 75 until said index finger points to the graduation "8." The operator then knows that all of the different sinker wheels will feed the required length of yarn and the required length of loops corresponding to the length of yarn and loops set forth in said table, and thus by the aid of said table and the index finger 74 and graduations 79, the operator is enabled to positively set the sinker wheel to feed any length of yarn and loops he may desire without experimenting or trying the machine by rotating the same and measuring the result by the yarn fed to the different feeds. A large amount of time and expense is thus saved.

The particular advantage derived from the use of the collar 42 and the square headed set-screws 43, 43 and the lock pin 44 resides in the fact that by the use of said square headed set-screws the cam plate 30 can be firmly locked to the stud 33 to overcome any rotation of said cam relatively to said stud, and yet the slur-cock with its slide-plate 47 and cam block 46 can be removed from the stud 33 without disturbing the adjustment of the cam plate 30 relatively to the sinker wheel 25. For instance, if it is desired to remove said slur-cock, the set-screws 43, 43 will be loosened and the collar 42 removed from the stud 33, while the flush set-screw 32 will still hold the cam plate 30 fast to the stud 33, maintaining the same relation to the sinker wheel 25. The slur-cock 45 can then be removed by removing the screws 48 and 50, 50 and slipping said slur-cock, consisting of the slide plate 47 and cam blocks 46', 46² and 46³, upwardly away from the cam plate 30 and the stud 33. After said slur-cock has been repaired or the cam blocks 46', 46³ thereon have been renewed or replaced, said slur-cock is returned to its original position and the collar 42 fastened to the stud 33 by the set-screws 43, 43, and the device will then be in readiness for use.

The primary needles are pressed to cast off their loops, preferably, by means of a fixed presser 84 supported upon a bracket 85 which, in turn, is suitably supported upon the bed-plate 10 or any other suitable stationary support.

The advantages derived from my improved sinker wheel and its combination with the needles of the lower cylinder of a circular rib knitting machine employing two conical cylinders are as follows: The sinker wheel enables the sinkers to be set so that they will be at right angles to the needles adjacent thereto and will feed the yarn between the needles at right angles to said needles.

The sinker wheel as compared with a sinker ring does not in any way interfere with the handling of the machine, that is, with the ready access by the operator to the needles on the lower cylinder when he desires to put the cloth on said needles, or when he desires to have access to the needles for any purpose. The space between the feeds is left entirely clear for the operator to plier or otherwise manipulate the needles in order to get the best results in the operation of the machine.

The sinker wheel is also very cheap in construction, requires less power to operate it, and the gear by which the sinker wheel is rotated is driven by the needles at a point where said needles are firmly supported upon each side of said gear. Each feed has a separate radial adjustment independent of the other feeds and their relation to the needles. The location of the sinkers at right angles to the needles of the lower cylinder or in relation to the primary set of needles in a machine employing two conical needle cylinders locates said sinkers at an angle to the secondary set of needles, or in this case, the needles of the upper cylinder. Therefore, the space between the back of the needles of the first set and the front of the needles of the second set, or the tricks in which said second set are adapted to slide, is ample to allow of any desired length of loop being fed between the needles of the first set by said sinkers without danger of said sinkers colliding with the needles of the second set.

The sinker wheel and cam can be placed very close to the needles and to the upper edge of the lower cylinder, so that a very short and light sinker can be used and it will not be necessary to mill off the edge of the sinker in order that the same may not take up too much space between the needles, for the reason that the sinker is supported so close to the needles that a light sinker of the same thickness throughout its entire length may be used. By the relative arrangement of the sinkers to the needles and to the presser, rendered possible by the arrangement of my improved sinker wheel in relation to the two conical needle cylinders, the primary needle has a very short distance to travel before the old loop on said primary needle is landed on the outside of the beard of said primary needle preparatory to being cast off of said primary needle, and the new loop fed to the primary needle by the sinker is held by the sinker on the primary needle under the beard thereof until the presser 84 has fully closed said beard, so that better plaited work can be made, and, moreover, the needles driving the sinker wheel gear by the bodies thereof between two supporting points, said driving of the gear does not in any way interfere with the straight movement of the upper ends of the needles after they pass above the upper edge of the lower cylinder, so that the needles are not sprung laterally in driving the sinker wheel.

The general operation of the device hereinbefore described is as follows: The cylinders 11 and 13 are rotated by suitable gearing, carrying their respective sets of needles 17 and 20 with them. The yarn 59 is fed through the yarn-guides 61 and 60 to the sinkers and is pushed between the needles by the sinkers, as illustrated in Figs. 1 and 2, at the time when the sinkers are passing the slur-cock or through the portion 57 of the cam located between the outer and inner cam blocks 46' and 46³. Said sinkers are moved outwardly from

the sinker wheel and between the needles to feed the thread thereto by reason of the rotation of the sinker wheel 25 which is rotated by means of the gear 29, said gear 29 being rotated by the needles 17 into which the teeth of said gear mesh. After the yarn has been fed to the needles 17, said needles are carried downwardly by their jacks 16 and the cam 18, and are subsequently pressed by the presser 84 to cast off the old loops, the yarn being fed to the second set of needles 20 and pressed in a manner well known to those skilled in this art, by a suitable presser such for instance as that shown in the patent to D. Hurley, No. 607,798, July 19, 1898, Fig. 22.

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

1. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a rotary sinker wheel, and a plurality of sinkers supported upon said sinker wheel, movable relatively thereto, and adapted to be moved in and out between the needles of one of said sets of needles.
2. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a rotary sinker wheel, and a plurality of sinkers adapted to slide between the needles of one of said sets of needles and to slide in grooves provided in said sinker wheel.
3. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of the said cylinders, respectively, and a plurality of sinkers adapted to slide between the primary needles and at right angles thereto when the sliding sinkers are projected between the needles.
4. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a rotary sinker wheel, and a plurality of sinkers adapted to slide between and at right angles to the adjacent needles of one of said sets of needles and to slide in grooves provided in said sinker wheel.
5. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a rotary sinker wheel, and a plurality of sinkers adapted to slide between and at right angles to the adjacent needles of one of said sets of needles and at an angle to the adjacent needles of the other of said sets of needles, said sinkers adapted to slide in grooves provided in said sinker wheel.
6. In a circular rib knitting machine, two conical needle cylinders, two sets of spring needles, jacks to which said needles are connected adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a rotary sinker wheel, and a plurality of sinkers adapted to be moved relatively to said sinker wheel in and out between the needles of one of said sets of needles.
7. In a circular rib knitting machine, two conical needle cylinders, a set of spring needles adapted to slide in grooves provided in the peripheries of each of said cylinders, respectively, a presser for each of said sets of needles, a rotary sinker wheel, and a plurality of sinkers supported upon said sinker wheel movable relatively thereto, and adapted to be moved in and out between the needles of one of said sets of needles.
8. In a circular knitting machine, a needle cylinder, a set of needles adapted to slide in grooves provided in the periphery of said cylinder, a sinker wheel, a gear fast thereto and meshing into said needles, and means to adjust said sinker wheel relatively to said gear about a common axis, said means consisting of a screw having a screw-threaded engagement with one of said parts and being rotatably mounted upon and connected to the other of said parts.
9. In a circular knitting machine, a needle cylinder, a

set of needles adapted to slide in grooves provided in the periphery of said cylinder, a sinker wheel, a gear fast thereto and meshing into said needles, an adjusting screw having screw-threaded engagement with said sinker wheel, and a swivel bearing which said screw rotatably engages, said swivel bearing being connected to said gear.

10. In a circular knitting machine, a rotary sinker wheel, a plurality of sinkers adapted to slide in grooves provided in said wheel, a cam plate, a slur-cock adjustable relatively to said cam plate, a pivot adjustable relatively to said slur-cock, and an index mounted upon said pivot and engaging said slur-cock.

11. In a circular knitting machine, a rotary sinker wheel, a plurality of sinkers adapted to slide in grooves provided in said wheel, a cam plate, a slur-cock adjustable relatively to said cam plate, a bracket fast to said cam plate and adjustable thereon, and an index pivoted to said bracket and engaging said slur-cock.

12. In a circular knitting machine, a sinker wheel, a stud whereon said sinker wheel is journaled, a sinker cam

plate fast to said stud, a collar fast to said stud above said cam plate, and means for locking said collar to said cam-plate.

13. In a circular knitting machine, a rotary sinker wheel, a plurality of sinkers adapted to slide in grooves provided in said wheel, a cam plate, a slur-cock adjustable relatively to said cam plate, said slur-cock consisting of a cam block and a slide plate fast thereto, extending across said cam plate and suitably guided to slide thereon, the front end of said slide plate extending downwardly over the edge of said cam plate, and an adjusting screw having screw-threaded engagement with said cam plate and rotatably engaging said front end of said slide plate.

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

WILLIAM T. BARRATT.

Witnesses:

CHARLES S. KEHOE,
EARL A. SMITH.